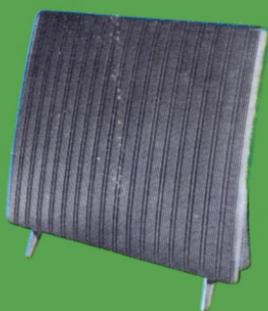
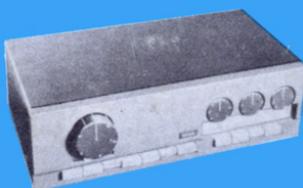
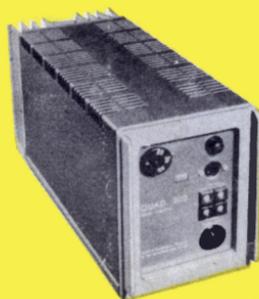


# Hi Fi YEAR BOOK

1967/8



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# HI-FI YEAR BOOK 1967-1968

EDITOR .... MILES HENSLOW



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# INTRODUCTION

Once again *Hi-Fi Year Book* has increased in size—partly on account of an additional directory section, but mainly because of the greater range of products which are now available. Readers of the book who have followed its contents through twelve years of publication can recall how the industry has grown and developed. In 1956, when the first edition of 180 pages was published at the time of the first “*Audio Fair*”, the buyer’s chief difficulty was to make a selection of suitable equipment from a good though fairly limited range. Today, with the “Year Book” at more than 400 pages, the difficulty lies in the almost overwhelming selection of units that are available.

From an editorial point of view this expansion provided plenty of headaches in the earlier years, because the “Hi-Fi Band Waggon” attracted many new ventures which were “Hi-Fi” in name only, and which could not fit into the scheme of things as planned by knowledgeable enthusiasts. Later, however, as techniques were improved, the gap narrowed between the “acceptable minimum requirements for high fidelity reproduction” and what had previously been regarded as “not in the hi-fi class”. And today it may fairly be said that there exists an almost unbroken range of equipment, from the “near perfect”, to “good-quality audio reproduction”, which enables buyers to select their own “quality bracket” according to their bank balances and personal whims. And, most important, this has not been a result of levelling down, to make it easier for all, but a definite up-grading of standards all round.

The point of greatest controversy was reached in 1958–9, when the section of the book dealing with tape recorders was expanded to take in the General Purpose machine. These were the years which saw the beginning of wild “specifications”, in which recorders priced at £40 to £60 appeared, in print, to have capabilities equal to the big professional instruments costing £400 to £600. By subdividing the entries it was possible to group them all, and so provide the maximum amount of information for trade and public alike.

From a publishing point of view all this expansion has provided its own special problems, and it was ultimately necessary to increase the price of the book to its present price of 15 shillings so as to catch up with a long series of rising costs all round, the most significant of all being the price of paper. Now, in order to hold the present price for as long as possible, and to accommodate still greater demands for space, we are taking the logical step of altering the book, to transfer from it those sections which are more at home under another cover.

This twelfth edition of *Hi-Fi Year Book* (1967–8) contains all the sections that have so far been incorporated into it, plus one addition. But in order to

provide both the trade and the public buyers with further information about audio, radio and home entertainment products, a companion book, **Radio Year Book**, is being produced. This Year Book, price 15 shillings, will include *Record Players, Radiograms, Radios* (car radios, portables, etc.), *Televisions* and *Tape Recorders*.

Thus, for example, the "General Purpose" tape recorder section of *Hi-Fi Year Book* will be duplicated in *Radio Year Book* in their current editions, so as not to inconvenience regular readers, but will be transferred to *Radio Year Book* in future editions. Further details of *Radio Year Book* will be found in the advertising section of this volume.

It is hoped that this expansion will result in two books of equal value and interest in their own separate but overlapping fields. Certainly *Hi-Fi Year Book* should benefit immediately from the additional space gained for it. *Radio Year Book* will offer a similar service to those who wish to keep in touch with the other, very large side of the audio and video industry.

As usual, every care has been taken to avoid mistakes in the compilation of this book, which runs into many thousands of items of data, but the publishers cannot accept responsibility for any errors or omissions.



# SPEAKER SHRINKAGE!

THE NEW 'MINIS' ARE MOST ACCEPTABLE

In 1956, when *Hi-Fi Year Book* first appeared serious listeners would not regard a bass speaker enclosure as really adequate in size unless it occupied several cubic feet. This was before the period when stereo recordings became generally available, and many enthusiasts used a single corner fitting enclosure, often weighing a hundredweight or two and only accepted in living rooms under some protest! Commercial examples of typical contemporary wide range speakers were the *Wharfedale* Corner System, the *Vitavox* "Klipschorn" and the *Tannoy* "Autograph", all quite bulky and capable of high level, high quality results (see photos. Incidentally, the two latter models are still in current production).

The "do it yourself" home constructor would generally use a drive unit of 12, 15 or even 18 inches in nominal diameter, housed in a large enclosure based on absorption, reflex or folded horn principles, with various arrangements of ports or internal damping material. Because of their very size, such enclosures required walls of massive construction—brick, concrete or very thick wood being popular materials. All this ensured that the system was virtually immovable, but fortunately mono reproduction requirements were usually well met by a corner siting. In favourable surroundings, the bass response, power output and electro-acoustic efficiency were very satisfactory with a substantial reserve handling capability.

Coming forward to recent times, it is surprising to discover those same enthusiastic listeners now find it possible to listen to, and enjoy, sound reproduction from relatively tiny enclosures of a fraction of a cubic foot in overall volume. Although a large system of optimum design will still give superior results at the high levels demanded by absolute realism, at the more moderate levels used by many listeners the audible differences between the former large and the new small systems may be subtle or even negligible. What technical advances over the last decade have made it possible to effect such a revolutionary reduction in size without appreciable detriment to musical performance? How much further can enclosure size reduction be pursued?

Returning to the late fifties, the "infinite baffle" (or, more precisely, completely sealed)

enclosure was usually of 3 or more cubic feet in internal air volume. Using a high quality 8-inch drive unit having a free air fundamental resonance of about 60 HZ, this was not raised above about 75–80 HZ in such an enclosure and quite good results were obtainable. Any attempt, however, to reduce the enclosure air volume to appreciably less than 1 cubic foot resulted in a system resonance well above 100 HZ and inferior bass response.

Replacing the 8-inch unit by a 12- or 15-inch unit of 30–40 HZ free air resonance and suitable design, the final system resonance frequency could be satisfactory, but the forces impressed on the large diaphragm by the enclosed air stiffness were liable to provoke flexure and consequent distortion. Generally speaking, drive unit designers expected them to be used in conjunction with a generous volume of air loading; given this, they worked well with good efficiency ("good" meaning about 3–5% in the speaker realm!). But the penalty paid for this efficient performance, as mentioned earlier, appeared in the high bulk and weight of the enclosure.

1955–56 was a significant period in the history of speaker design, since it was during this time that the full range electrostatic system was shown to be a commercial practicability by the *Acoustical Manufacturing Co. Ltd.*, now more familiar as "Quad". Demonstrations highlighted, in particular, the clean mid-range performance possible, resulting from accurate diaphragm behaviour and absence of enclosure colouration as compared with most conventional speakers of the period. Gloomy forecasts that cone speakers would disappear from the hi-fi scene have proved inaccurate, but for reasons bound up with cost, efficiency, size and other factors this extinction has yet to materialise; indeed, at present they abound in even greater variety. However, the standards set by the electrostatic speaker stimulated research into improvements in the moving coil/cone systems, and indirectly this has contributed to the startling reduction in acceptable enclosure volume that has been witnessed.

Perhaps the first really significant reduction in system volume, consistent with maintaining a wide response and high bass output, came from *Acoustic Research Inc.* of the U.S.A. with their

AR1 speaker in the late fifties. Developments culminated in the AR3 of the early sixties, using three drive units to cover the full frequency spectrum. Of principal interest was the 12-inch bass radiator, having a suspension specially designed to allow exceptional diaphragm movement, and permitting the free air resonance to be in the region of 10 Hz. When mounted in an enclosure of total volume 2.3 cubic feet, the system resonance was kept down to 40 Hz, an extraordinarily low value for the space occupied. Combined with the low resonance, the tough and rigid diaphragm gave a very uniform overall response. Because the diaphragm suspension was much more compliant (compliance being the reciprocal of stiffness) than the effective compliance of the enclosed air, the latter became the major restoring factor, hence giving rise to the term "air suspension".

In a case of this nature the properties of the air acting as a spring are much more uniform than those of the diaphragm suspension, and allow a movement almost up to the suspension limits before appreciable distortion arises. Despite having a large magnet to maintain the driving force over the range of movement, the system's overall efficiency was around 1-2%, and an amplifier of at least 25 watts rating was necessary to obtain high level output. Of very rigid construction, the enclosure was fairly heavy, but because of its compact size it was easily transported. The combination of high price (nearly £100) and the high input power required, limited the ownership of these speakers to those with sufficient money to spare for both speaker and amplifier. But insensitivity and cost aside, the performance was exceptional and set new standards for the volume of enclosure involved.

Of rather similar size and proportions, occupying 2.7 cubic feet, the *Leak* "Sandwich" uses only two drive units and represents another original approach in the quest for wide range performance in a small volume. In this case, high bass diaphragm stiffness is obtained by using a plastic foam cone, bounded by two thin aluminium skins, the overall mass being relatively low for the degree of stiffness obtained. For bending forces the stiffness is hundreds of times greater than conventional cone material. Because of this the diaphragm behaviour is better maintained to a higher frequency than normally possible, thus allowing a two drive unit system to cover the required frequency range. Using a fairly soft suspension, the final system resonance is kept down to the region of 60 Hz, giving a useful output down to about 30 Hz. Although weighing 50 lbs, the system is moderately priced at just under £40, has moderate sensitivity, and so allows the associated

amplifier to be about 10 watts rating for most purposes.

Although both the above compact speakers gave unexpectedly excellent results for the space occupied—only a fraction of the volume of earlier wide range ancestors—they were still large enough to arouse domestic opposition, being well over 1 cubic foot. A cubic foot appears to be about the acceptance borderline! Domestic stereo was well established in the early sixties, because of the success of the stereo disc in 1958-59, and so speaker enclosure volume became doubly offensive. For the majority of listeners a small speaker system of high performance was sorely needed, giving well balanced results down to around 50 Hz, taking up well under 1 cubic foot and having reasonable sensitivity and maximum output under domestic conditions.

Fortunately, the majority of serious listeners already possessed feedback power amplifiers giving 10 watts or more. Given these terms of reference, the backroom designers started thinking afresh around fundamental principles, coming up finally with some ingenious answers. To appreciate fully the revised approach behind these recent developments, it is necessary to look closely at some basic facts of low frequency speaker operation. One cannot alter the laws of Nature, but intelligent co-operation can be helpful!

If a vibrating diaphragm is used un baffled, then, unless of large area, the low frequency radiations from its two surfaces will tend to cancel, being initially out of phase. At 50 Hz the wavelength of sound in air is around 22 feet, and a diaphragm would need to be several feet in effective diameter to obviate some degree of cancellation at a region some distance away on axis. In practice, despite some cancellation, a diaphragm 2 to 3 feet across is capable of radiating adequate acoustic power without excessive overall movement; hence the size of the most successful full-range electrostatic speaker.

For diaphragms whose dimensions are a small fraction of a wavelength (which is true below a few hundred Hz for those a few inches in diameter or less) the operative mechanism when mounted in an infinite baffle may be regarded as merely that of pumping fluid (in this case air) into and out of the immediate vicinity. This mode of operation is classed as "small source", its only property being that of displacing so much volume per unit time. Since the diaphragm is of constant area, this requires the effective *velocity* during a cycle (given by the *rms* or root mean square value) to remain constant with frequency. It is immediately apparent that, as the frequency is lowered, the peak to

peak movement required to maintain this condition will increase in inverse proportion to the frequency; in other words, double for each octave decrease. This, in fact, is true for all radiators, irrespective of size or shape. There is nothing particularly remarkable about this requirement from Mother Nature's point of view, but it is most distressing to the drive unit designer, who finds large amplitude requirements rather embarrassing!

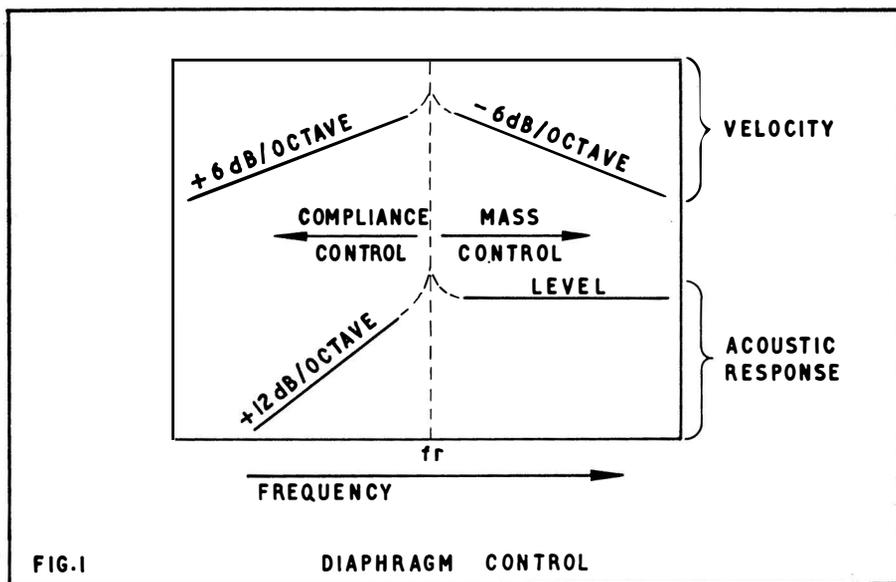
Practical design difficulties do not finish here however. When a diaphragm is small compared with the wavelength of sound at the frequency of interest, the impedance, or total load, presented by the medium consists largely of a reactive component together with a very small resistive component. In everyday language, this means that most of the energy supplied to the drive system is stored locally in moving a mass of air to and fro, the remainder of the energy being dissipated in the resistive component in the form of sound pressure waves, or radiated energy. To put it colloquially, the small diaphragm cannot get an effective "grip on the air", tending rather to "stir it up" in its neighbourhood. To achieve constant energy radiation in the resistive component, which falls by a factor of four for each octave decrease in frequency, the diaphragm *velocity* must be doubled in sympathy, so demanding a doubling of amplitude *over and above* that already shown to be necessary to maintain the velocity constant with frequency. Further headaches for the drive unit designer!

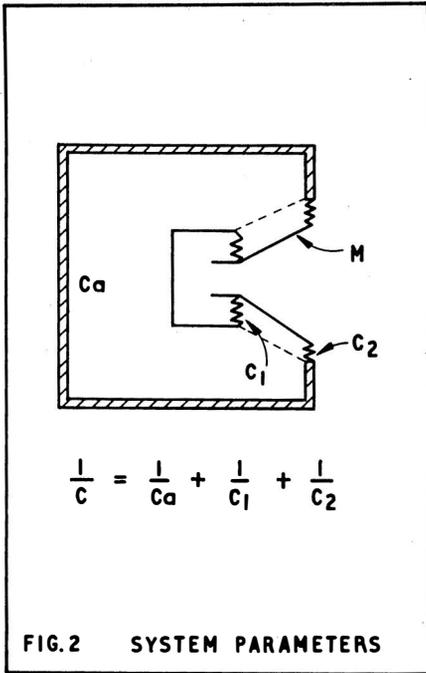
It is fortunate that if the suspension of the

drive unit is sufficiently soft, the fundamental resonance may be kept down in the low bass region without recourse to using a heavy diaphragm. The fundamental resonance is the frequency ( $f_R$ ) at which the reactance of the suspension is just cancelled by the equal and opposite reactance of the diaphragm mass, the resulting velocity when driven being controlled by frictional effects and the slight loading due to the air itself. Below this resonant frequency, the reactance due to the compliance predominates and conditions are such that if the driving force is maintained constant, the diaphragm velocity is *reduced* by a factor of two for each octave decrease in frequency, since the *amplitude* remains constant. Because of the "small source" conditions, the pressure response falls off at four times or 12 dB/octave, since the velocity characteristic is the inverse of that shown to be required.

Above the resonant frequency, the diaphragm mass reactance constitutes the principal component, and controls the diaphragm velocity in just the manner required to give a constant pressure response. Because the mass reactance *diminishes* by a factor of two for each octave decrease in frequency, the velocity developed by a constant driving force naturally *increases* by a factor of two, so just compensating for the falling resistive air load component. Fig 1 illustrates the principal features of this mode of operation.

The foregoing automatic frequency response compensation above  $f_R$  may be regarded as a re-matching effect resulting from the enhanced

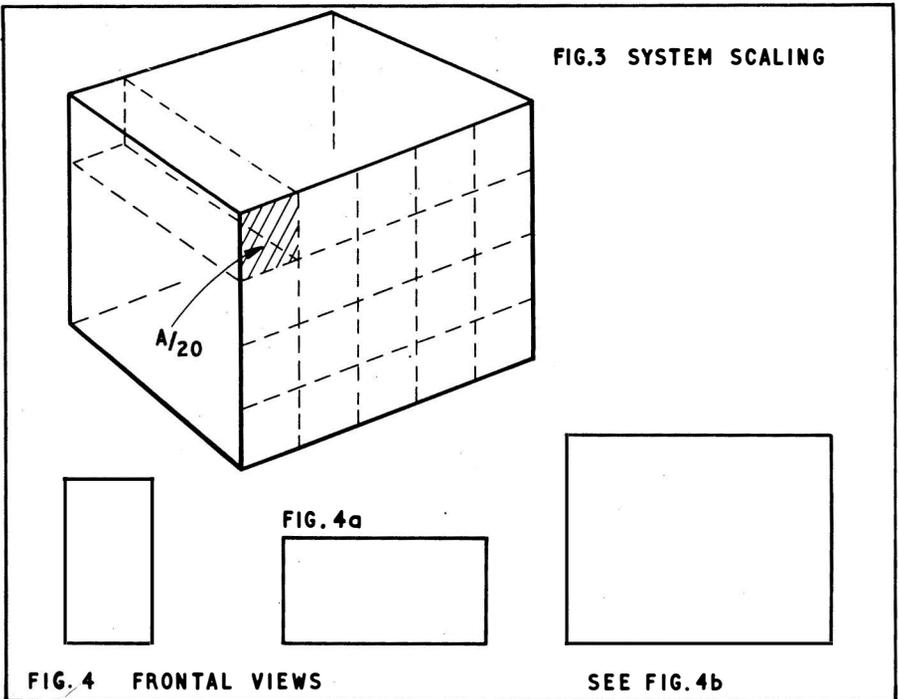




**FIG. 2 SYSTEM PARAMETERS**

amplitudes developed. Combined with the "natural" requirement of amplitude rising inversely with frequency, a small diaphragm will therefore have to develop relatively large amplitudes at low frequencies to give adequate radiation. In a nutshell, constant pressure radiation from a small source requires a quadrupling of its amplitude for every octave reduction in frequency.

At frequencies as low as 50 Hz, practically all speaker systems may be regarded as small sources, and it is commonplace with such systems to observe quite noticeable diaphragm movements at high radiation levels. This tends to give the impression that low frequency sound pressure waves are of large amplitude. But where conditions are favourable for efficient radiation—such as where the diaphragm is  $\frac{1}{2}$  wavelength or more in effective diameter, or drives the whole of the area of one end of an endless parallel duct very small diaphragm excursions will create quite high sound wave pressures. For instance, at 50 Hz the very loud intensity level of 100 dB above the standard threshold of 0.0002 dynes/sq. cm. is given by a total air particle movement of only about 1 thousandth of an inch. Unfortunately, advantage can only be taken of this sort of efficiency by listening *inside* the duct—not very practicable unless the diaphragm is very large indeed!



**FIG. 3 SYSTEM SCALING**

**FIG. 4 FRONTAL VIEWS**

**SEE FIG. 4b**

So far the small radiator has been considered as if mounted in a plane baffle of infinite extent. Whether or not this is a case of zero or infinite enclosure volume is academic—such a mounting is impracticable. The nearest approach used is that obtained by mounting a drive unit in the dividing wall between two rooms. If the rooms are sufficiently large and not too “lively” acoustically, then the diaphragm loading will be very similar to the case of the infinite baffle. The only disadvantage in practice is that any occupants of the room fed by the “unwanted” back radiation of the diaphragm may object to the “left over” sound!

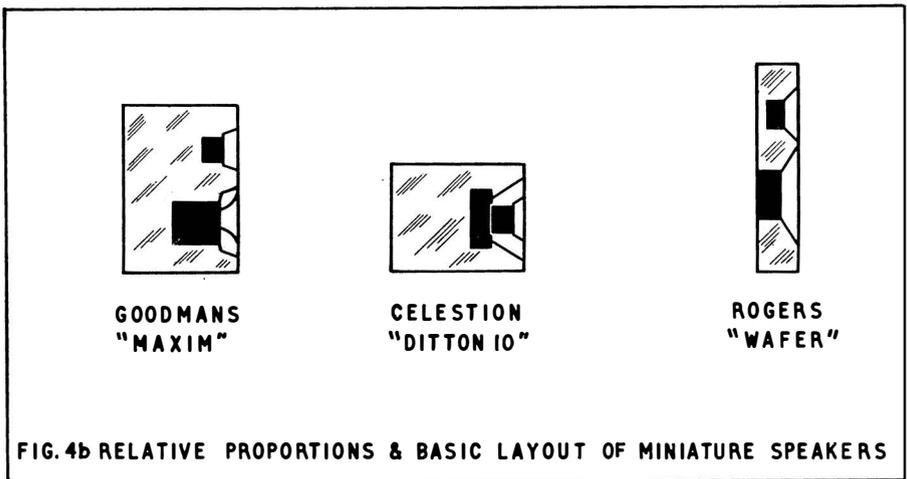
Commercially speaking, a system is wanted that is “infinite” in effect but very finite in volume occupied. Suppose the radiation from the back of the diaphragm is confined by an airtight and rigid box. Obviously, if the diaphragm profile and movement are maintained equal to the case of the infinite baffle, then the air volume displaced by the front of the diaphragm will be identical. But what of the properties of the enclosed volume of air behind it?

Such a system has acquired the description “infinite baffle” (IB for short), but it would be better termed “totally enclosed”, since its infinite properties are restricted to complete isolation of the two sides of the diaphragm. Even this is only true if the enclosure is of sufficient rigidity and any residual vibrations are very much less than those of the diaphragm itself. Whatever its volume, the enclosed air adds some stiffness to the drive unit suspension at low frequencies, its effect being as shown in the expression in fig 2,  $C_1$  and  $C_2$  being respectively the compliances of the diaphragm centring device and the front surround. Whilst  $C_1$  and  $C_2$  are constants of the drive unit, the value of

$C_a$  as “seen” by the diaphragm depends on the ratio of its area to the enclosure volume. If the diaphragm area is kept constant whilst the enclosure volume is reduced, the value of  $C_a$  progressively diminishes, until its effect swamps that of the other compliances. This is the condition of “air suspension” mentioned earlier. For a large diaphragm and small enclosure  $C_a$  will be quite small and the fundamental resonance of the system relatively high. How can this be avoided?

Consider fig 3. This represents a diaphragm of area  $A$  (rectangular for the convenience of the argument; for “small sources” the shape is of no consequence) set in one face of an enclosure of volume  $V$ . Let the diaphragm have a mass  $M$  and be suspended by a compliance  $C$ . Then the fundamental resonance of the system will depend on the mass of the diaphragm and the series combination of the air and suspension compliances, being proportional to  $1/\sqrt{MC}$ . Given a few cubic feet of air volume and a normal soft suspension 15-inch unit, this might be around 45 Hz. Now suppose the diaphragm area to be divided equally into 20 regions of mass  $M/20$ , each suspended by a compliance of  $20C$  and coupled to  $1/20$ th of the original enclosure volume, or  $V/20$ . If, for sake of argument, each diaphragm is now driven separately, then, provided all move equally in phase, the power radiated and resonance characteristics will be indistinguishable from those of the single large diaphragm and enclosure.

If now 19 of the small systems are removed, then, ignoring the minor effects due to mutual air mass loading, the one remaining will retain the low resonance characteristics of the original system, but with lowered power radiation capabilities. To regain this, the diaphragm would



require to move 20 times as far, but basically the small system is the equivalent of the large one, but with the emphasis on greater amplitude to obtain the necessary *volume* of air displacement per second. A small diameter, large amplitude system is not "inferior", but rather works into a lower resistance load.

Taking A at 100 square inches and V at 5 cubic feet, the equivalent "shrunk" system would have a 5 square inch diaphragm housed in an enclosure of internal volume  $\frac{1}{4}$  cubic foot. In practice it would be very difficult to suspend the small diaphragm sufficiently softly or allow it enough movement so as to be truly equivalent, but it is apparent that a system of low resonance and creditable power output is possible within a very small enclosure. The main requirement is the use of a diaphragm of *low* area, softly suspended and capable of considerable movement. Immediately this yields the benefit of wider range performance, since a small diaphragm is more predictable in behaviour and less directional at high frequencies than one of bigger diameter. This permits the crossover frequency for the associated high frequency radiator to be raised.

The advantages of small enclosure size and wide frequency coverage are not obtained entirely free of handicap, since the relatively large amplitudes required to give sufficient low frequency output level now demand a deep and uniform magnetic field in which to suspend the driving coil. Also, for practical production and reliability reasons, the clearance between coil and magnet must be rather greater than customary. This, in turn, requires the magnet to be of relatively high weight and volume to give a total flux sufficient to preserve reasonable electro-acoustic efficiency. Any attempt, however, to increase the magnet volume beyond a moderate proportion of the total enclosed air volume will reduce the air compliance and tend to nullify the increased driving force. Similarly, the enclosure walls, whilst desirably rigid, must not be too thick, or the internal air volume will again suffer. Any other space absorbing items, such as crossover network components, must also be kept to the absolute minimum volume necessary for adequate results. Certainly, the designer cannot take the sort of liberties allowable with larger enclosures.

In general, the proposed miniature system will give a satisfactory low and middle frequency response provided it is driven from a power amplifier of low output impedance. All high fidelity equipment has this property and it assists in damping the fundamental resonance of the speaker system. At this frequency, energy stored by the diaphragm and suspension would, if left to itself, give an unpleasant "boominess"

to the reproduction. But when the drive unit coil is fed from a low impedance source, these unwanted oscillations are quickly damped by internal dissipation of the energy. At frequencies where the wavelength of the sound is a few times greater than the enclosure dimensions, the air behaviour cannot be regarded entirely like a simple compliance, and for higher frequencies internal resonances arise. It is therefore desirable to fill or partially fill the enclosure with acoustically absorbent material to minimise reflections and allow the LF drive unit to operate up to as high a frequency as possible. In practice this should be limited to about 2 KHZ to avoid directional effects and other difficulties described later.

The outcome of the revised approach to high quality speakers outlined above was seen in 1964, when *Goodmans Industries* launched their tiny "Maxim" system, weighing but 7 lbs. This was so small that reviewers initially thought it must be just another "gimmick" and not intended for serious listening. But this impression was swept away after a few minutes demonstration, when expressions such as "revolutionary", "unbelievable", "it's impossible" or just "I don't believe it" were banded about. People looked behind curtains for hidden "woofers", but the little boxes really were working on their own.

Occupying an overall volume of just under  $\frac{1}{4}$  cubic foot (the equivalent of  $2\frac{1}{2}$  house bricks) the "Maxim" set the standard for miniature enclosures of wide range performance. Its woofer, only  $2\frac{3}{8}$  inches in effective diameter, is vastly different from the conventional unit one associates with transistorised portables and the like. Instead of the usual pillow sized magnet there is a high efficiency type normally used for a high flux 8-inch drive unit! In contrast, the peak to peak diaphragm movement possible is about  $\frac{1}{2}$ -inch! To make such movements feasible, the diaphragm surround had to be of the "roll" type, which allows an easy soft action without itself undergoing reversed effects. With some earlier types of surround under air cushion pressure conditions, there was a tendency for the surround to move backwards as the diaphragm moved forwards, and vice-versa, so giving partial cancellation of air displacement and possibly non-linear distortion.

The roll surround is very effective under these circumstances—incidentally, it is not a recent invention, since it was used by *Bramah* for hydraulic seals early in the 19th century! Being small and rigid, the LF diaphragm (no bigger than many a conventional tweeter) gives a smooth mid-range performance, a damping compound being applied to the suspension to suppress resonances. The back centring device

is unusually large to avoid adding undue stiffness and is in the form of an annular corrugated disc. Resonating at 35–40 HZ in free air, the system resonance is still commendably low at 60–70 HZ when mounted, so allowing the bass response to be maintained down to 50 HZ or lower. Mid-range and high frequency colouration due to the enclosure is minimised by judiciously arranged damping material. A 2-inch back sealed tweeter and crossover network completes the system, the combination having an electro-acoustic efficiency which, whilst not as high as conventional large high fidelity units, is still adequate to allow pleasant results using amplifiers of about 10 watts rating.

Since the introduction of the "Maxim", other manufacturers have brought out systems using similar principles, but of somewhat greater overall volume with different proportions. Noteworthy examples are the *Celestion* "Ditton 10" taking up about 0.4 cubic feet, and the *Rogers* "Wafer" of around 0.3 cubic feet. Both these use a woofer of about 5-inch diameter and back sealed tweeter. The *Rogers* version is interesting because it is no thicker than its 5-inch unit, which helps to brace together the back and front panels, so allowing the thickness of the speaker to be only 2½ inches (see photos and fig 4). All these speakers give well balanced results and continue to surprise listeners unacquainted with this type of development.

Having reduced speaker enclosure volume so far, what is there to prevent further paring down? What practical and theoretical difficulties arise?

If a displacement of 2½ cubic inches or so of air is regarded as the minimum acceptable, then, retaining the principle that reduction of enclosure volume should be accompanied by a proportional reduction in diaphragm area, it is apparent that smaller diaphragms will demand even greater amplitudes. This brings with it three difficulties. The first is simply that suspension design and magnetic field clearances

become increasingly difficult to handle with large amplitudes and if too much is asked the overall efficiency will be absurdly low.

Secondly, and more subtle, is the frequency modulation distortion arising from the Doppler Effect experienced with moving sound sources. This is very familiar to everyone as the changing of pitch of train whistles or aircraft engines as they pass the observer. With a diaphragm handling a range of frequencies simultaneously, the higher frequency movements may be regarded as being carried on top of the slower low frequency movements, so periodically acquiring and losing the extra low frequency velocity. Thus the pitch of the high frequency components is cyclically modulated by those of low frequency. This gives rise to a type of distortion akin to intermodulation, which gives a roughness to reproduction, which, although not readily audible, can be demonstrated as undesirable in large quantities. This distortion may amount to several hundred percent for a diaphragm handling a wide range of frequencies and moving up to ¼-inch, but fortunately this is mitigated in most current miniature speakers by dividing the frequency spectrum between two drive units.

A theoretical effect which could have practical consequences if enclosure volume reduction were taken too far is illustrated in fig 5. Here a piston resting at position *A* is subjected to the ambient air pressure of 14 lb/sq. inch on both faces, and hence it remains in equilibrium. If a force is now applied over its outer surface and it is moved *slowly* into the cylinder until half way towards the end at *B*, the internal air volume will be halved and the pressure doubled to 28 lb/sq. inch, so subjecting the piston to a differential pressure of 14 lb/sq. inch outwards. If now the driving force is reversed and the piston moved, again slowly, to an equal distance the other side of its rest position at *C*, the internal pressure will fall to ⅔ of its original value, since the internal volume has risen by 50%. But the net restoring force on the piston tending to move it inwards will be only 14/3 lb/sq. inch, or ⅓ of that at *B*. If the piston is in reality a drive unit diaphragm driven electro-magnetically, then with equal currents on positive and negative cycles of the signal the actual movement would be very asymmetric. When a gas is compressed its temperature rises and vice-versa. If the heat energy is removed from the gas, then the process is known as "isothermal", as in the case above, where changes in air volume were considered to happen so slowly that the heat energy would be conducted via the enclosure walls, so maintaining the internal temperature constant. But for rapid changes in volume, as encountered at all audio frequencies, the heat energy

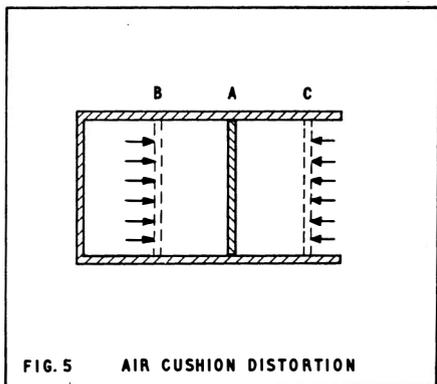


FIG. 5 AIR CUSHION DISTORTION

developed within the air is not given time to conduct away and its temperature cycles accordingly. This state of affairs is known as "adiabatic". In this case the pressures vary according to the reciprocal of the (volume)<sup>1-4</sup>, and the distortion encountered with a constant driving current is even greater than the isothermal case. But because damping material is generally used inside sealed enclosures, the air characteristics become, in fact, close to the isothermal case. The distortion in these cases could be reduced by a separate feedback system driven from the diaphragm, but this would tend to give rise to an expensive amplifier/speaker combination.

In current designs of miniature hi-fi speakers, the ratio of enclosed air volume to maximum total displacement is kept up to about 100 and the air cushion characteristics are satisfactory; even so, the internal ac pressures developed are well beyond the threshold of pain! Really efficient sealing of enclosure joints is vital, for any leakage will reduce bass output and is liable to give rise to unpleasant noises.

Any attempt to reduce enclosure size and diaphragm area by a further factor of, say, 5, whilst retaining 2½ cubic inches displacement capability, would reduce the enclosure volume/displacement ratio to 20 with the distortion consequences outlined. It would be rash to be too dogmatic about future developments, but it seems unlikely that speaker systems occupying much less than ¼ cubic feet will be developed for serious listening using present day materials and techniques.

Given a fair power input and possibly some bass lift, these little speakers can give results undreamed of a couple of decades ago. But whilst the enthusiast can sit back and derive great enjoyment at moderate levels, for full scale sound reproduction he will turn to the larger system, particularly for long periods of listening. What does this offer that is not already provided by the new type of miniature speaker?

First the question of acoustic power radiated. A 15-inch drive unit with a 100 sq. inch diaphragm moving a total of ¼ inch and mounted in an "infinite baffle" displaces 25 cubic inches of air. In some type of near resonant enclosure the net displacement might be 50 cubic inches over a limited bandwidth, whilst coupled to a large bass horn this might be increased to 100 cubic inches at the mouth in its efficient band. Under these conditions the low frequency sound pressure developed will be between 20 and 30 dB higher than the miniature speakers, sound pressure being proportional to volume displacement.

Depending upon the degree to which "standing waves" or resonant effects within the listening room assist in bolstering up the bass response,

so the small system may or may not radiate the acoustic power necessary to achieve satisfactory levels. It is perhaps fortunate that bass response in domestic rooms is enhanced relative to that in an anechoic chamber where response measurements are usually made, but room response can vary by anything up to 20 or 30 dB depending on size, shape and construction. In favourable surroundings a miniature system might, for instance, yield a maximum level of 85-90 dB at 50 Hz without protest and be found quite adequate, whereas in another it might not manage 70 dB. In similar situations such difficulties might go unnoticed using a large system because of the reserve capability present.

It is well known that as a system is improved the listening level may be increased before fatigue sets in; levels measured at live musical performances do involve peak pressures of certainly 100 dB and even occasionally as much as 120 dB. If a high degree of realism is aimed at then even a large speaker system may only be barely adequate in acoustic output, especially at very low frequencies. Despite its higher sensitivity, the "old fashioned" big speaker may demand occasional peak inputs of 10 or 20 watts on musical climaxes, giving sound levels quite beyond the capabilities of the "new generation". Even though it uses two drive units, the modern miniature speaker may give audible Doppler distortion (this is still the subject of heated arguments) and there is some doubt as to whether bass originating from a large amplitude small area is of a quality equal to that from a large area low amplitude system, the latter being closer in mode of operation to most large musical instruments.

These more subtle considerations are of little interest to most miniature speaker users, who really require "high quality" rather than "high fidelity"; in other words, they are more concerned with clean sound reproduction at an average listening level lower than at the original performance.

Small, light speakers have advantages. Diminutive panels can be light yet very rigid and the sheer reduction in volume reduces the overall cost of materials by a large factor. Again, only a small area of decorative grille material is necessary, whilst only a fraction of a cubic foot of internal damping wadding need be found. More important, they are so easily moved around, weighing but a few pounds, that all sorts of stereo placing arrangements can be tried for best effect without difficulty.

At last the high fidelity speaker can be small enough to be unobtrusive. Given a good signal it has brought pleasure to many homes that could not previously benefit from modern advances in sound reproduction.

# THE SEMI-CONDUCTOR AT HOME

## THERMIONIC VALVES ARE ON THE WAY OUT

If someone in the early-twenties had used two cat's whiskers instead of the usual one in a crystal detector of those early radio days it is likely that the thermionic valve as we know it would hardly have bloomed, and that electronic development all the way along would have been focused on the semiconductor.

The first transistor used two cat's whiskers bearing on a small piece of crystal material. This was called a *point-contact* transistor for obvious reasons. The early crystal detector could by similar analogy be termed a point-contact rectifier or diode. Actually, there is a modern version of the old-style crystal detector, properly named *point-contact diode*. This is extensively used in contemporary electronics, and it consists of a small piece of treated germanium with a cat's whisker arranged permanently to bear upon it—the whole lot sealed in a small glass tube or similar housing. The cat's whisker is set for optimum performance, and it is not necessary to wriggle it about on the crystal—as in the crystal set days—to get it to work properly.

It is an easy matter to connect such a diode in circuit with a coil, tuning capacitor and headphones to make a modern version of the crystal set. This works very well indeed and goes on working *ad infinitum*—for it is the power in the radio wave that works the headphones.

Here lies the difference between the crystal detector—new or old—and the transistor. The former relies on the power of the signal applied to it, while the latter increases the power of the signal.

Although it was only a stone's throw from crystal detection to crystal amplification, the thermionic valve was developed as an amplifier with the crystal at the front for detection—giving the early crystal-valve set—and even for detection the crystal was eventually ousted in favour of the valve in its various power detector modes, many of which permitted the application of positive feedback and hence "reaction" for improved sensitivity and selectivity.

The semiconductor lost the day and soon, even when a diode was needed, a diode valve got the job. During the Second World War, however, the second-generation crystal detector was found to be more efficient than a diode valve for

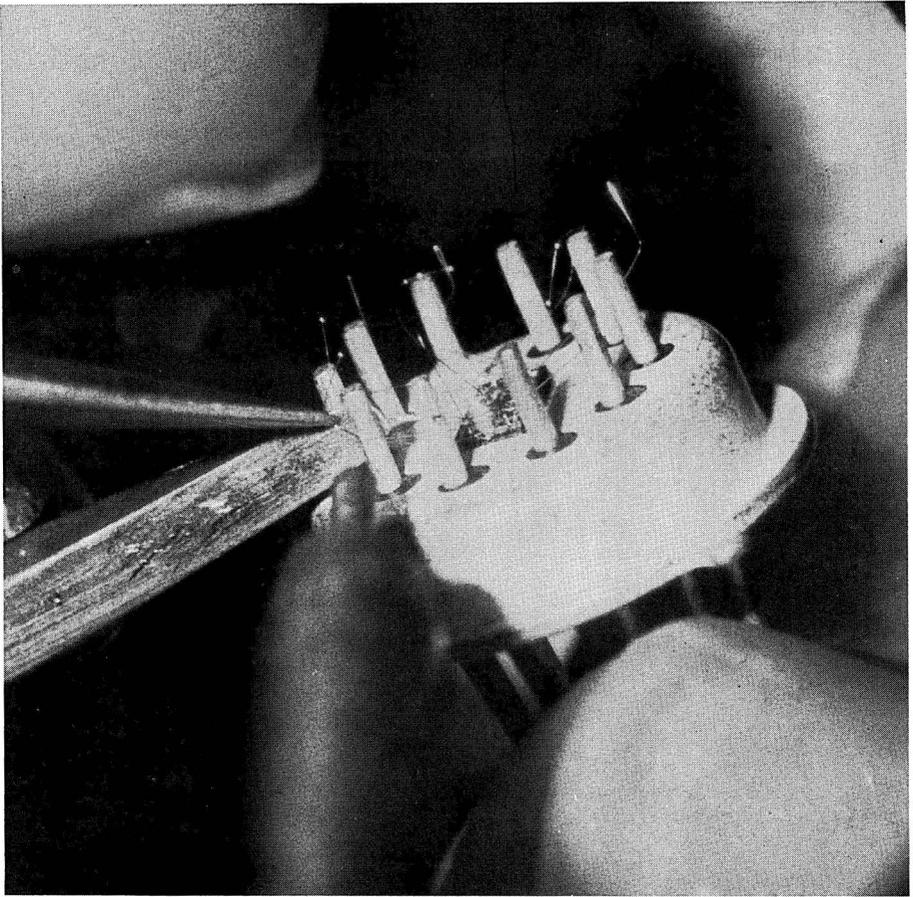
signal mixing in very-high and ultra-high frequency circuits. It produced less noise than the valve in this application, and its small size resulted in smaller capacitances and hence less loading on the signal circuits.

The crystal detector was redeveloped and once again it started to find its way into radio sets and early televisions. It was not until 1948, though, that the transistor effect was discovered by Dr W. H. Brattain and Dr W. B. Shockley of the Bell Telephone Laboratories—jointly awarded the Nobel Prize in 1956 for their invention.

The transistor started life more as a scientific curiosity than anything of great practical value; but it was not long after its discovery that tests and calculations revealed with dramatic clarity and excitement that here was a device ranking in electronic importance to the thermionic valve itself. Like so many inventions before it, it appeared on the scene at an appropriate time, when the valve had almost reached a stage of full development and saturation, and when demands were for equipment of smaller size and power than allowed by the valve—it was the age of the guided missile and the portable radio set. The incentive for its rapid development was thus twofold—commercial and quasi-political. Without the transistor as we know it today it is difficult to see how communications (sound and vision) over long distances relayed by space satellites could possibly have developed, let alone the remarkable television pictures that we get back on earth from the moon and planets. Transistors are used extensively up there in space.

A fantastic aspect of the transistor—allowing their powering from relatively low capacity solar batteries—is the small amount of power required to make them work. In early transistor development work at the Bell Telephone Laboratories it was written in a special commemorative issue of the *Bell Laboratories Record* by R. L. Wallace, Jr, thus: "*Some rough calculations showed that if a suitable treadmill and generator could be devised, a flea could easily supply the power required to operate one transistor by doing the amount of work equivalent to making one good-sized jump per minute.*"

The low power requirements must certainly



**Fig 5.** Fixing an integrated circuit to its mounting. *Mullard Ltd.*

have represented one of the most exciting aspects of the transistor directly following its discovery. A thermionic valve needs two supplies, one for the filament or heater and the other for the anode and screen grid electrodes. The heater or filament supply produces heat which effectively “boils off” electrons into the valve’s vacuum, which are picked up by the anode. The bombardment of the anode by the electrons also produces heat, so much of the energy of the two supplies is dissipated in heat—not very efficient.

Nothing like this happens in a transistor, and although they can get warm or even hot when handling extra large powers, the majority of their activity is focused into handling the signal—not setting the stage for signal handling, as with the valve. The electrons produced by the hot heater or filament can be termed current carriers and, because electrons are negatively-charged particles, the term negative current car-

riers is generally adopted. Moving electrons represent “active electricity”, so by the same token atom electrons not under controlled movement can be considered as “passive electricity”.

Electrons are components of atoms—the remaining ones being protons and neutrons, forming the nucleus of the atom. Each electron has a specific negative charge, balanced by a charge of opposite polarity and similar magnitude on each proton. Neutrons are devoid of charge. They add atomic weight and contribute to the release of atomic energy. Electrons are about 2,000 times smaller than protons and they revolve in orbit round the nucleus as the planets of the universe revolve likewise round the sun, and a whole relative universe of “space” exists between the orbiting electrons and the atom nucleus. Generally, the number in the atomic table of an element is given by the number of

electrons it has in orbit. Thus, hydrogen is the first with one electron, helium the second with two electrons and so on.

Heat causes outer orbiting electrons to depart temporarily from their atoms, which is what happens when a valve heater or filament is energised. The anode in the valve is connected to a positive charge and the small electrons rush towards it (according to the law of unlike charges attracting), causing a flow of electron current from heater (cathode) to anode. The electrons get back to the cathode through an external circuit. Current flow in the opposite direction is impossible as will be appreciated, so the basic valve acts as a rectifier.

A control grid between cathode and anode in the electron stream will adjust the amount of electron current when it is negatively-biased by tempting some of the cathode electrons to return to source. Thus, the valve amplifies by virtue of a small power of charge on the control grid controlling a relatively greater power in terms of anode current. Additional grids and anodes are fitted for some applications, but the fundamental operation remains unchanged.

On this foundation we can explore the transistor via the semiconductor diode. It is as well for us to get some idea of how the transistor works, for the door is almost fully closed on the valve for domestic applications, whether we like it or not and, in spite of some of the unflattering things that have been uttered about the use of transistors in hi-fi amplifiers, valved amplifiers will be "vintage" in a few years from now. Indeed, already there are more transistorised hi-fi amplifiers available from all sources than valved ones.

The transistor gave a poor account of itself a few years after it came out of the "Brattain and Shockley nursery". It was quickly exploited commercially in the first transistor radios. Manufacturers rightly wanted to get on the bandwagon and render extinct those nasty, power-hungry, all-dry battery sets that caused so much trouble to dealers and users alike. But the early transistor was so noisy and distortion-prone that the valve protagonists giggled with glee—"it will never come to anything!"

It was some years before the small transistor portable improved much, but by then the transistor had acquired a bad name. At that time it certainly did not appear that it would contribute much to hi-fi, and amplifier designers ordered up their *KT66*'s with settled minds.

The story is mighty different right now, however, for transistor hi-fi amplifiers are producing sounds equally as good as those given by the best of the old valved ones—often better. There are commercial-hi-fi-quality transistor radios working on FM in the VHF bands, and television set

designers are busily discarding their valves in favour of the latest crop of silicon transistors, even in colour sets.

We still hear vaguely of the so-called "transistor sound" when solid-state (just another name for equipment carrying semiconductors and transistors instead of valves) amplifiers are compared with the "good old valved ones". The author has been fortunately placed, over the last three or four years, to test many of the best transistorised designs—both subjectively and objectively—and to compare them with the well known valved makes.

Objective tests have often revealed technical aspects well in advance of some of the valved counterparts, and to be perfectly fair the so-called transistor sound in derogatory context has never—but never—been experienced. Extended power bandwidth of many of the best designs appears to produce loudspeaker drive waveforms that are closer to the pre-transduced nature of the sound wave than some of the valved types. Could it be, therefore, that transistorised amplifiers are tending to show up some shortcoming in loudspeakers—previously not even considered—that in the past has been masked by the relatively early power cut-off of valved amplifiers? It makes one wonder, for there is still much we yet have to discover about sound and its reproduction, having in mind that sound is absolutely subjective and that it fails to exist—only as vibrations and variations in air pressure—outside of ourselves.

This must not be taken to imply that present loudspeakers are in some way inadequate; but as one section of the hi-fi chain is perhaps improved, the overall result can be negative rather than positive. Think of the results that are sometimes obtained when a high-quality loudspeaker system is connected to a particularly poor amplifier. Nor should it be taken to imply that all transistorised amplifiers are without fault. Like valved designs, there are the good and the bad—the very good and the very bad.

After this digression let us return to the main theme. We have seen that thermionic valves use electrons or negative current carriers working in a vacuum. Semiconductors are not like this at all; their current carriers work in the lattice of pure crystal.

Crystals used are germanium and silicon. Let us investigate germanium, the basic oxide of which is obtained from the flue ash which results after burning Northumberland coal. This needs to be highly purified before it is suitable for semiconductors, and purification is achieved by "sweeping" a germanium ingot from top to bottom with an RF heating coil. This causes local melting of the crystal in the field of the coil, and the sweeping action concentrates the im-

purities to one end of the ingot which is then sliced off, leaving the purified or refined germanium.

This is analogous to the vacuum of a valve, but in pure germanium there are no free electrons for current conduction, so they have to be introduced. There are no free electrons because the atoms of germanium form a crystal lattice and all the electrons are used to bond the atoms into this form. The pure crystal is thus a remarkably good insulator at normal temperatures.

Semiconducting characteristics are provided by the addition of impurity atoms. For instance, the addition of a very small amount of antimony or arsenic releases atoms into the crystal which line-up with the general crystalline nature, but these atoms have more than the required number of electrons for bonding. This gives free electrons for conduction. Crystal treated in this manner is called n-type—*n* standing for *n*egative current carriers or electrons.

If atoms of aluminium or indium are introduced they line-up with the crystal atoms but they are short of one bonding electron. This means that there is a deficiency of one electron per atom, and this electron deficiency is called a *hole*. Now, if an electron or negative current carrier is introduced into this type of semiconductor, the holes exert an attractive force

upon it and it soon falls into one of them. When this happens another hole forms which can be filled by a further free electron. If there is a continuous supply of free electrons, holes effectively move within the crystal in the opposite direction to the electrons filling them.

An analogy is one person missing from a row of people. This is the hole. If the person next to the hole moves to fill it the hole moves in the opposite direction.

Because holes attract negative current carriers, they are called positive current carriers, and semiconductor material of this kind is called p-type—*p* standing for *p*ositive current carriers or holes.

In other words, n-type material uses negative carriers for current conduction, while p-type uses holes.

The equivalent of the diode valve is produced when a p-type semiconductor is merged with an

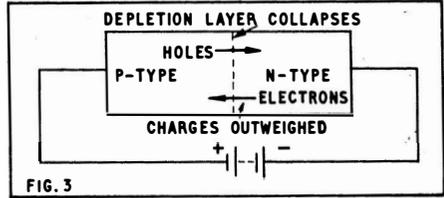
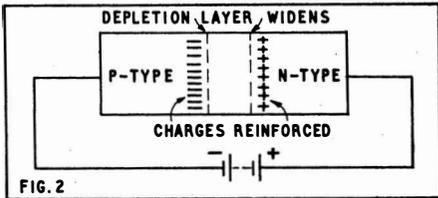
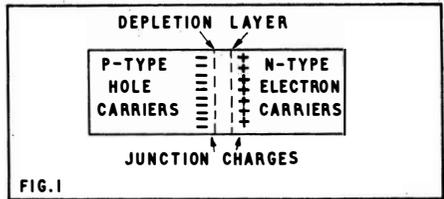
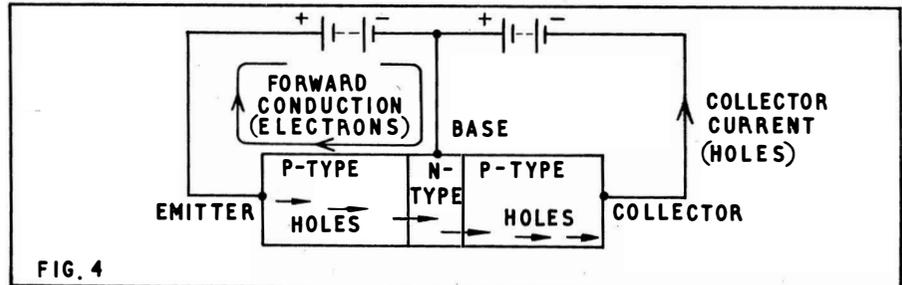


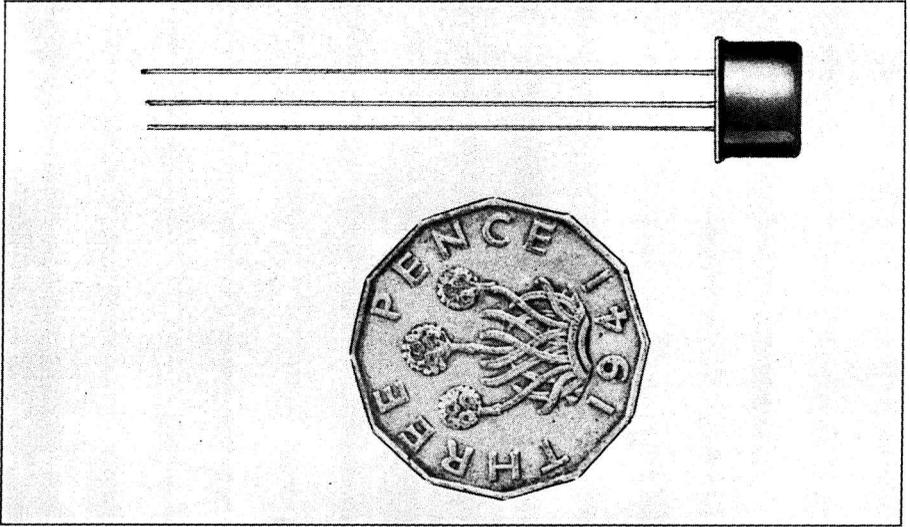
Fig 1. Formation of charged depletion layer at p-n junction.

Fig 2. Diode in reverse conduction. Junction charges reinforced—no current.

Fig 3. Diode in forward conduction. Junction charges collapsed—high current.

Fig 4. Elementary illustration showing the working on p-n-p transistor. Holes from the emitter region diffuse through the base region due to forward emitter junction conduction. The holes are attracted by the negative collector region, enter the collector region and form collector current.





**Fig 6.** General purpose junction transistor by Mullard Ltd.

n-type. This gives rise to what is called the p-n junction. When the merger takes place electrons flow from the n-type to the p-type and neutralise the holes and holes flow from the p-type to the n-type and neutralise the electrons. But this happens for a very small instant of time because immediately the electron/hole diffusion occurs, the n-type takes on a positive charge (because it has lost electrons) and the p-type takes on a negative charge (because it has lost holes). These charges occur across the p-n junction and they prevent further interchange of current carriers. The idea is shown in **fig 1**.

We can now see how the p-n junction acts as a diode or rectifier. Suppose we connect a battery to the diode, as shown in **fig 2**, so that its potential reinforces the charges at the junction. No current will flow because there can be no movement of carriers across the junction. However, when the battery is reversed, **fig 3**, the junction charges are neutralised and outweighed and carriers then easily interchange across the junction, giving current flow.

The diode is reverse-biased in **fig 2** and forward-biased in **fig 3**, giving reverse (extremely small) and forward (large) current respectively.

Crystals of early detectors had characteristics similar to those of a piece of treated semiconductor—indeed, some of them were obtained from coal. This kind of “detector” and the point-contact diode work because the carriers in a semiconductor tend to concentrate on the surfaces. N-type germanium, for instance, has a surface layer of negative carriers and an adjacent layer of positive ions (positively-charged atoms caused by electron deficiency). The surface of

the semiconductor thus develops charges like those in a p-n junction when a cat’s whisker bears upon it, and the device passes current freely in one direction only.

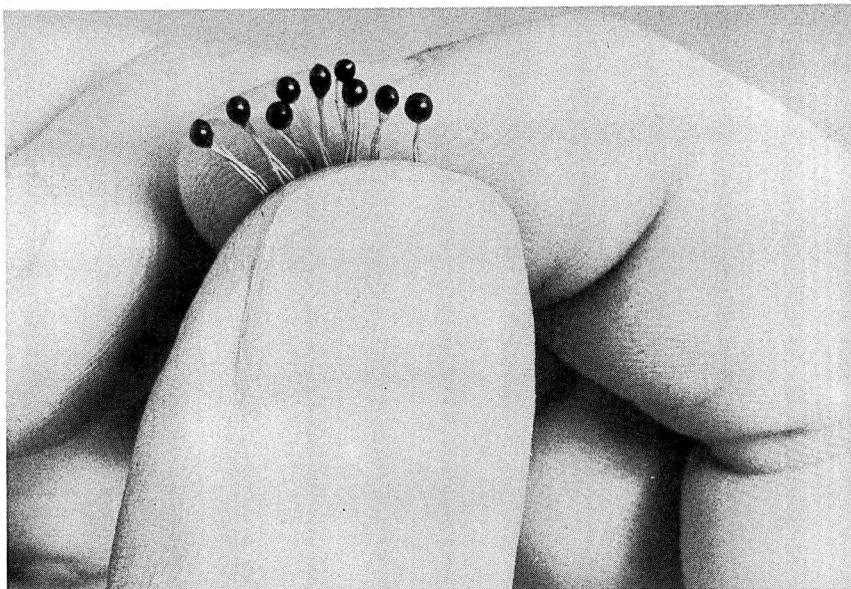
The p-n charge, incidentally, is called the depletion layer, and this layer widens as the reverse bias is increased and collapses, as we have seen, when the junction is in forward conduction.

Point-contact transistors are now virtually extinct. They were rather like a point-contact diode, but with two cat’s whiskers bearing on the semiconductor very close to each other. The latest junction transistors have superseded them, and these themselves have passed through a number of stages of development. It is impossible to explore all of them in the short compass of this article, but basically a transistor can be considered as two junctions formed by three “doped” regions in a crystal of germanium or silicon, giving either n-type sandwiched between two p-type (p-n-p) or p-type sandwiched between two n-type (n-p-n). **Fig 4** shows the elementary arrangement of a p-n-p transistor.

The p, n and p regions are connected to lead-out wires; the middle region is called the *base* and the two outside regions *collector* and *emitter*. These electrodes respectively are analogous to the grid, anode and cathode of a triode thermionic valve.

In circuit, the emitter-base junction is generally biased for forward conduction and the collector-base junction for reverse conduction, as **fig 4** shows. The action of the transistor is then as follows:

Holes flow into the n-type base from the



**Fig 7.** Collection of microminiature silicon planar epitaxial transistors by *Mullard Ltd.*

emitter, due to the forward conduction here, and quite a large proportion of them diffuse through the base region because in practice this is very thin. The holes then find themselves within the attractive field of the negative collector, and they flow into this region, thereby producing collector current.

As more holes are produced by an increase in forward emitter-base current, so the collector current increases—in the same way as the anode current of a valve increases as the grid is made less negative.

The n-p-n transistor works in a similar manner, but this time the emitter acts as a source of electrons or negative carriers, and these diffuse through the base region and are attracted to the collector, which this time is positive.

The transistor amplifies because the input signal is applied to the emitter-base junction, where the resistance or impedance is low, and extracted from the collector where the resistance or impedance is high. The input is low because the emitter junction is in forward conduction and the output high because the collector is in reverse conduction. Ohm's law tells that the power yielded by a given current is greater in a high resistance circuit than in a low resistance one. Thus, a small power change in the emitter junction controls a far greater power in the collector circuit. Power gains in the order of thousands of times are not uncommon!

Hundreds of volts are required by the anodes and screens of thermionic valves, while only tens

of volts are required by transistors. Of course, the collector current of large power transistors can rise to several amperes, while the anode current limit for large power valves of the KT66 class, for instance, is a tenth of an ampere or so.

Over the last two decades transistors of various types have been designed to meet almost every domestic application. There are large transistors for producing 20 or 30 watts of audio power, very small ones for voltage amplification to drive the power amplifiers, special ones for radio-frequency amplification—found in our AM and FM tuners—medium-sized ones for transistor radios and tape recorders, and low-noise ones for use in the early stages to amplify the weak signals delivered by magnetic pickups and tape heads.

There is no doubt now that transistors can handle all the jobs in domestic electronics that previously employed valves. Moreover, transistors can do some of the jobs better than valves—and far more efficiently. Once transistors have settled down in circuit, they have an indefinite period of life—the same, for instance, as a good-quality resistor. They are not like valves, which progressively reduce in emission as their cathodes deteriorate—and, of course, there are no heaters or filaments to fuse.

Transistors run relatively cool—cutting the ventilation problems from even relatively high power equipment; they are much smaller than valves, so equipment incorporating them can be

made much smaller than the same class of equipment based on valves.

While valves are operated from signal *voltage*, transistors work more from signal *current* in low impedance circuits. To some extent this makes transistors less linear in their transfer characteristics than valves, and non-linearity in this signal aspect implies that transistors are likely to introduce more distortion on a signal than valves. This is fair enough, looking at the matter purely from first principles, but an amplifier is not just a transistor or series of them—it represents a complete circuit designed specifically for transistors. In such a design the inherent non-linearity of transistors can readily be neutralised, and a well-designed “black box” containing transistors can be just as linear (overall) as a similar box containing valves. This is where many people view transistors, hi-fi-wise, incorrectly. They see valves as more linear devices

than transistors and utter things about how much negative feedback is necessary to linearise them. Surely this does not matter provided the end result is satisfying. What goes on in the black box is not really important from the subjective point of view.

Transistor amplifiers are now being made with full power distortion specifications well down in the “point-something per cent” region over a wide frequency spectrum. This in itself implies excellent overall linearity. Moreover, the higher levels of feedback can far better be applied to transistor amplifiers than valved ones whose phase characteristics are governed so much by the nature of the output transformer. Indeed, similar amounts of negative feedback as used in transistor circuits would turn some valved circuits into oscillators!

There is no doubt that a well-designed transistor amplifier—devoid of transformers—can

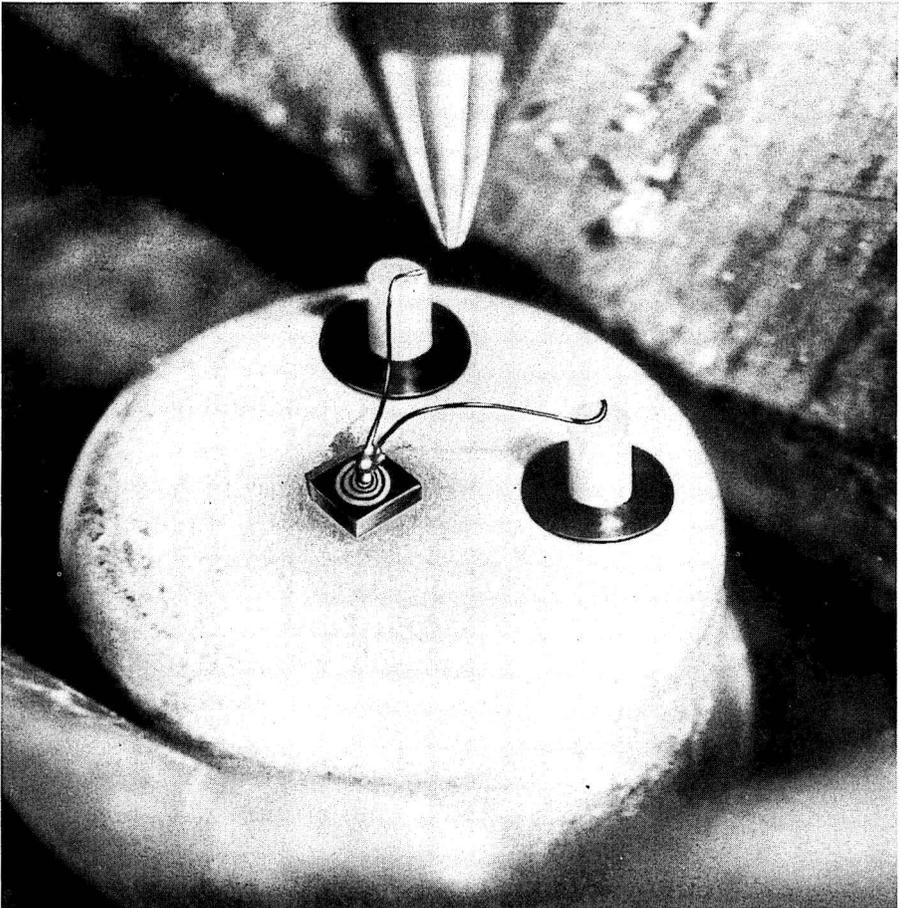


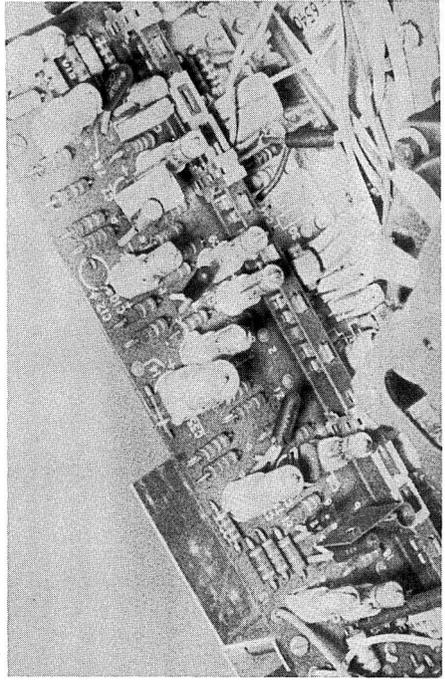
Fig 8. Fixing the base wire to a Mullard transistor.

have a rise-time characteristic several magnitudes better than that of a valved amplifier—and hence improved transient performance.

We are certainly now well into the transistor era, and each month new devices are appearing. Of interest to designers of audio equipment is the latest metal-oxide silicon transistor (called a *MOST*). This has an input resistance of millions of megohms—far higher than that of a conventional transistor or even a field-effect transistor (called a *FET*). It can be used for front-end coupling, the same as to the grid of a valve, and it is ideal as a high-to-low impedance converter. Like the valve, the device operates essentially by signal voltage rather than current.

The *FET*, too, has a very high input resistance; it is rather similar to the *MOST*, but the latter is a development of the former.

What of the future of semiconductors? Next to move into the domestic sphere will be the integrated circuit. This is a complete circuit section, containing transistors, diodes, resistors and sometimes capacitors, tailored on a very small slice of silicon or germanium. Indeed, it is already possible to form most of a hi-fi pre-amplifier as an integrated circuit, encapsulated into a housing not much larger than that of a single transistor! Some integrated circuits are designed for plugging into sockets of a holder, rather like a valvholder (see **fig 5**). These devices are used extensively in computers and space equipment.



**Fig II.** Transistors mounted on a printed circuit board in an all-transistor tape recorder. *Truvox R44.*

# MICROPHONE AND STUDIO DEVELOPMENT

CHANGES AND PROGRESS OF 43 YEARS

Although the word “microphone” tends to be associated with radio and television, the instrument was, of course, in use long before these services became available, and is today employed in many branches of human activity well outside the radio and television field—indeed often well outside the entertainment world. The first large users of microphones in this country were the telephone companies, and later the GPO. The Post Office took over the trunk telephone service in 1892, and the National and other smaller companies in 1912. Shortly after 1898 the central battery system was adopted and the GPO built two new exchanges, City and Central, with a total capacity of 32,000 lines to cater for the growth of the service in London. Compared with this, at least one subscriber in the London area today has over 11,000 telephones connected to the GPO network through ten Private Automatic Branch Exchanges.

The modern telephone still uses the carbon granule microphone, similar but considerably superior in performance to the carbon microphone used in earlier installations; and it was with this type of microphone that the earliest broadcasts were made. Fig 1 shows Dame Nellie Melba broadcasting from Chelmsford on 15th June, 1920, using a telephone type microphone—albeit “improved” by the fitting of a paper cone to help to direct the sound waves on to the diaphragm.

These, then, were the microphones available to, and used by, the early broadcasters, but the frequency response and sensitivity of such instruments, although satisfactory for telephone communications, was not really suitable for any kind of programme which purported to have any entertainment value. Everything possible was done to provide the highest possible fidelity in the reproduction of the sounds produced in the studio, and much research and ingenuity were concentrated on the effort to produce microphones for improved quality and sensitivity. By the time the British Broadcasting Company was formed in November 1922 there were alternatives available, and one of the early types used at Savoy Hill was the magnetophone—affectionately called the “meatsafe” from the appearance of the substantial cradle-like mounting in which it was housed (Fig 2). It was a form of moving



**Fig 1.** The first broadcast of entertainment in Britain. Dame Nellie Melba uses a carbon microphone at Chelmsford on 15th June 1920. BBC Picture.

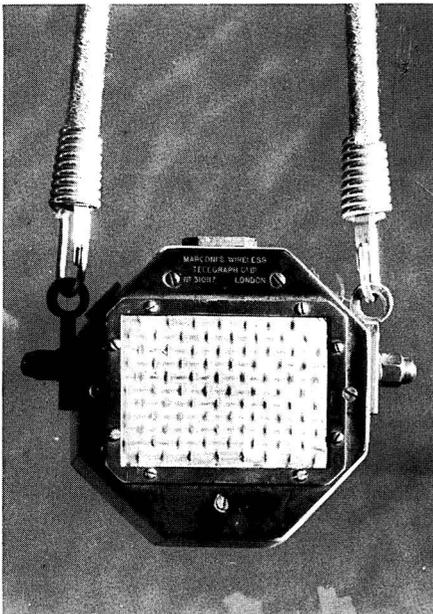
coil microphone but, at the time, considerable difficulties were found both in manufacture and maintenance. Those old enough to remember the once-familiar, “2-LO calling, 2-LO calling” will have heard programmes emanating from magnetophone microphones.

These in turn were supplanted by—strangely enough—a carbon microphone. Towards the end of the 'twenties the *Marconi-Reisz* transverse current carbon microphone appeared on the scene. Its reliability—never a notable feature of earlier microphones—and its good sound quality led to its widespread use; and indeed it became a familiar symbol of British Broadcasting in the late 'twenties and early 'thirties. Fig 3 shows its external appearance, which will be well remembered by those listening in the days before the war. It was of the transverse current type and consisted of a heavy marble block containing a



Fig 2. A Savoy Hill studio arrangement with the “meat safe” magnetophone predominant.

Fig 3. The Marconi-Reisz transverse current carbon microphone.



cavity, in which were located the two carbon electrodes and the finely divided carbon granules, retained by a thin, non-metallic diaphragm. The diaphragm was of mica in the early models but impregnated paper was later substituted to overcome the pronounced resonance of the mica at about 4,500 Hz. The axial frequency response of the modified microphone was sensibly flat up to about 500 Hz, above which it rose fairly sharply and at 8,000 Hz was about 10 dB up.

About 1934 a number of new microphones began to make their appearance, among them the “bomb” condenser microphone, so called from the shape of its streamlined housing, which can be seen with others in fig 4. All these instruments had their advantages over their predecessors but none could be regarded as being the perfect answer in the constant search for improved quality and sensitivity.

The middle 'thirties saw the introduction of the *BBC-Marconi type “A”* ribbon microphone developed by the BBC Research Department and made by the Marconi Company; this was a great step forward. This new pressure-gradient microphone did away with the background hiss of the carbon types. It was reliable to a degree

never envisaged in the early days, and it had a reproduction quality far better than its contemporaries. Above all it offered a very wide frequency range and its sensitivity was high compared with then existing types. The type "A" microphone has of course been modified from time to time, and all examples in use today belong to one of the two modified types known as the *A.X.B.* or the *A.X.B.T.* By substituting modern permanent magnet materials for the cobalt steel used in the type *AXB*, the sensitivity of the *AXB* microphones was appreciably improved and they give a sound quality of a very high order even when judged by modern standards. Its general construction can be seen in fig 5.

Over the years, however, a demand arose for microphones which should be lighter in weight and smaller in size and, in the absence of any commercial microphone which would meet all the requirements, the Research Department of the BBC Engineering Division undertook the necessary development work.

The desirable features of a high-quality microphone include high-sensitivity, smooth response, wide frequency range, directional properties which are independent of frequency, freedom

from electrical interference, and small size. The fact that some of these features are incompatible with others inevitably leads to a compromise, and the final choice depends largely upon operational considerations. In the event two alternative types of pressure-gradient microphones were produced for trial and were designated *P.G.S.* and *P.G.D.*, the final letter of the code referring to single and double-ended magnetic systems employed.

The two microphones, although similar in their essential features, differed in size and sensitivity. The *PGD* was designed as a high-efficiency general purpose instrument having a sensitivity equal to the existing *ABXT*. However it was considerably smaller and weighed only half as much. The *PGS*, on the other hand, was intended for use when a slightly lower efficiency could be tolerated, provided that the microphone was small physically. The sensitivity of the *PGS* is similar to that of the *AXB*, but its weight is less than one-third.

The magnetic circuit of the *PGD* has a permanent magnet at each end which support the pole pieces surrounding the ribbon. The latter is 5.6 mm wide—the same width as that in the earlier *ABXT* microphone—but only 28.6 mm

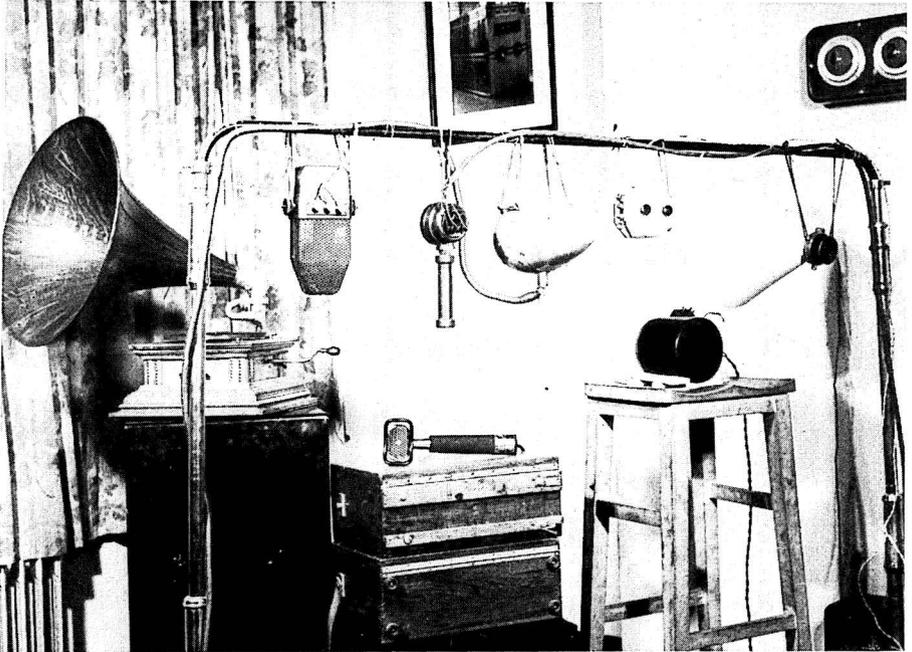


Fig 4. A series of microphones showing the work of BBC research engineers in the 25 years up to 1949. L to R, *BBC-Marconi* ribbon; moving coil on hand grip; condenser in "bomb" mounting; *Reisz* carbon; *Round-Sykes* "Magnetophone" (on stool); *Peel-Connor* Carbon with trumpet; *BBC-Marconi* lip microphone (on box). The gramophone was used to replay the voice of Dame Nellie Melba in a broadcast recalling the past.

long instead of 66 mm. The result was an improvement in the polar characteristics in the vertical plane. The shorter ribbon called for special measures to achieve adequate damping of the higher vibrational modes in order to ensure a smooth response below 1 kHz. For this purpose wire-gauze screens are fitted close to the ribbon on either side. The screen material is slightly magnetic and so forms a trap for any iron particles which might otherwise penetrate the screen and foul the ribbon. Since damping alone causes some loss of bass response, compensation is provided by baffles of bolting cloth which increase the effective length of the acoustic path between the front and back of the ribbon at low frequencies. The case was made as small as possible by ensuring a close fit round the working parts of the microphone, and special attention was paid to the shaping in the vicinity of the ribbon so as to improve the high-frequency response.

The ribbon output is fed through four heavy connecting straps, symmetrically arranged so as to balance the system against induction pick-up without recourse to any special adjustment. The ribbon, ribbon-clamps and the connecting straps are designed as a complete unit which can be withdrawn from the magnetic system for maintenance purposes. The axial frequency response of the *PGD* microphone extends by about half an octave above that of the *AXB*T and it is also more sensitive to high-frequencies arriving at oblique angles in the vertical plane.

The *PGS* microphone has a single-ended magnetic system but uses a magnet identical with that used for the *PGD*. The ribbon width is the same (5.6 mm) but is shorter, being only 25.4 mm long. Although somewhat less sensitive than the *PGD* the microphone has, nevertheless, adequate sensitivity for its intended purposes and well above the majority of the cheaper microphones intended for public-address work. In order to permit the maximum possible reduction in the size of the case, the ribbon-to-line transformer is mounted in the base of the stirrup which forms an integral part of the case. The low-impedance leads are carried through the hollow interior of the stirrup arms.

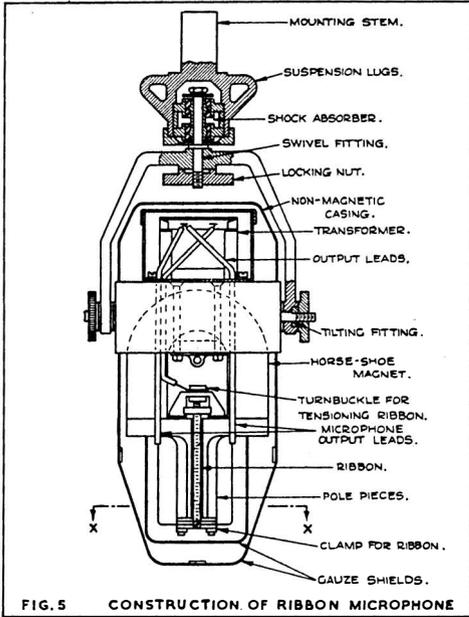
For reasons connected with its lower sensitivity, the baffle size necessary to maintain the bass response is less in the *PGS* than in the *PGD*; this in turn permitted a further reduction to be made in its size. The polar characteristics in the vertical plane tend to be asymmetrical in single-ended microphones, and a top reflector, forming part of the case, has been incorporated in the *PGS* which partially compensates this effect. The frequency range covered by the microphone is in general similar to that covered by the *PGD* but is slightly higher at the extremes of the band.

Both microphones were subjected to extended service trials in various BBC studios and at outside broadcasts involving all types of programme material from the news to symphony concerts. In direct comparison with types *AXB* and *AXB*T, the *PGD* microphone always shows up to advantage. It provides a cleaner speech quality than the *AXB*T; in particular consonants are clearer. In choral broadcasts the words are clearer when the *PGD* microphone is used, and it is easier to distinguish choir and organ. A preference for the *PGD* was also expressed in the case of orchestral programmes, the bass being stronger and better defined and the string tone smooth, yet having more top. The characteristic tone of the piano is very faithfully reproduced and a more even tone perspective maintained over the entire range from bass to high treble. A microphone of this kind can be used as an orchestral microphone some 30 yards from the orchestra and it is found to deal adequately with large choirs and piano concertos, the rendering in many cases being superior to that obtained with microphones individually arranged for choir and piano.

The *PGS* was likewise judged to provide improved quality and clarity compared with the earlier microphones, and at the Royal Albert Hall in particular one of these instruments gave the best results so far attained, using a single distant microphone for a large chorus and orchestra. When direct comparisons were made between the *PGS* and the *PGD*, particularly on orchestral programmes, there was a slight preference for the *PGS* (fig 6) although the difference was very small. In view of the fact that the smaller size also renders it more suitable as a cast microphone in variety productions, and for both "in-shot" use in television and outside broadcasts this microphone has achieved considerable popularity. It is now made under licence by *Standard Telephones and Cables Limited* and is known as the 4038.

There have, of course, been many other microphones developed during the period from the early 'twenties to the present day; examples include the cardioid, various types of electrostatic, moving-coil and crystal instruments. Fig 7 shows a moving coil microphone used with a parabolic reflector which concentrates sound received from a distance on to the microphone diaphragm. This technique has been used not only for recording bird songs and other sounds for natural history programmes where the subject would be frightened by a close approach, but also for such events as the University boat race, to pick up the sound of the oars.

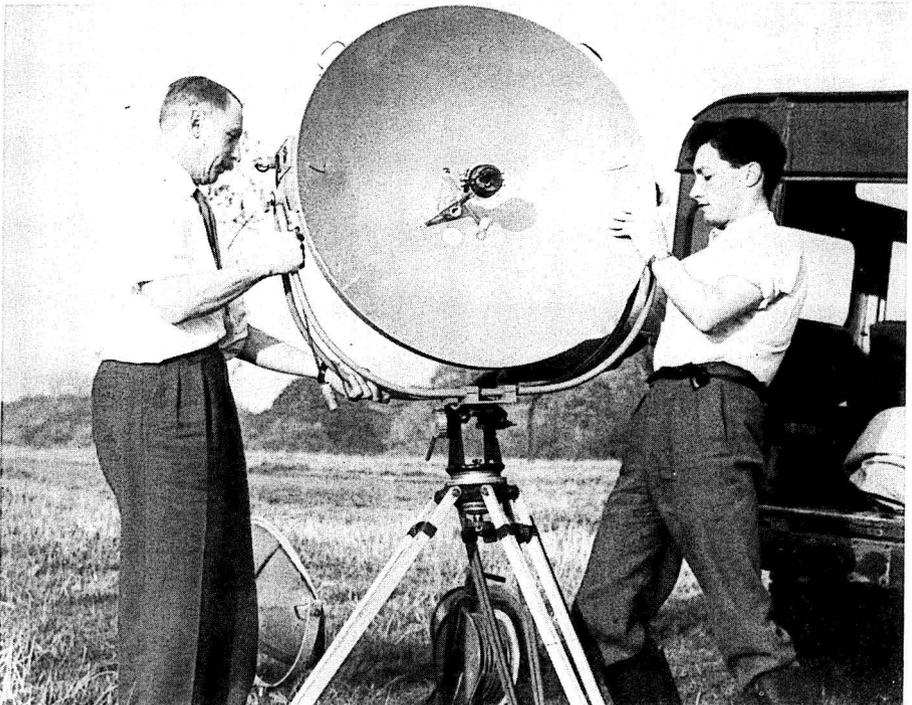
Another type of microphone used for picking up individual sounds at considerable distances is the so-called "rifle" microphone (fig 8). It has



**Fig 5.** BBC-Marconi ribbon microphone.

**Fig 6.** The PGS with its in-built top reflector.

**Fig 7.** A moving coil microphone mounted in a 36-inch parabolic reflector for use by the BBC's Natural History Unit.



been used for collecting such sounds as a foot striking the ball in a football match, where the use of a microphone close-in to the required source of sound would be impracticable.

On outside broadcasts, whether for radio or television, it is often necessary for a commentary to be made in conditions of high ambient noise, e.g. a motor-cycle race or a Royal procession. The use of an ordinary microphone under such conditions would render the commentary virtually useless, as it would be lost in the general hubbub of the crowd. For such occasions the BBC Research Department evolved, as long ago as 1937, the L.1 "noise cancelling" microphone, known generally as a "lip-microphone" from the way in which it is used. An improved version of this instrument, the L.2, was produced in 1951.

In designing such an instrument several considerations had to be taken into account. For instance, as it would be held in the hand for lengthy periods its weight must be kept low; it must be small, so as not to interfere with a commentator's view; sensitivity must be adequate to deal with whispered commentaries when necessary, and so on. Other design features had to take into account the fact that speech heard very close to the speaker's mouth has characteristics which must as far as possible be modified if the output is to simulate a natural voice. Another difficulty arises when using a pressure-gradient microphone close to the mouth; namely, the variation in effective frequency response with changes in the working distance. As such a microphone will inevitably be used, out of doors for considerable periods, steps must be taken to ensure that any wind-

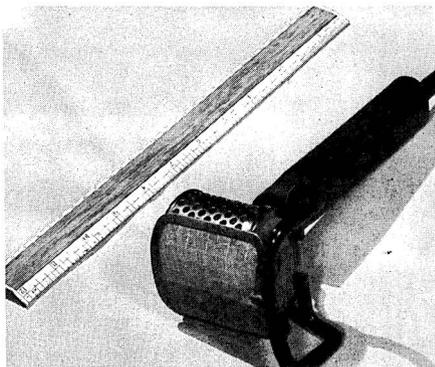


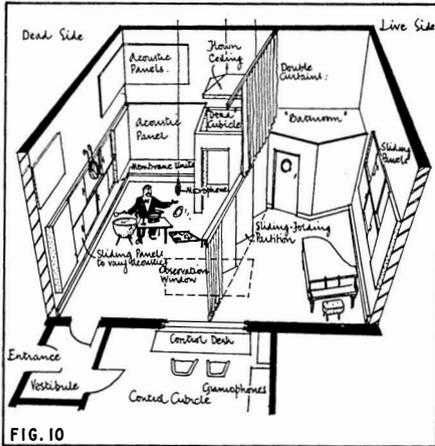
Fig 9 The L.2 lip microphone developed by the BBC in 1951.

noise be drastically reduced and also that wind pressure will not damage the ribbon.

The L.2 microphone is shown in fig 9. To meet the constant distance requirement, a curved mouth-guard is provided to fit comfortably against the upper jaw of the speaker whilst leaving the lower jaw unobstructed. The case is made from perforated metal, lined with a fine metal gauze. Two stainless steel gauze screens are provided on the top and front surfaces of the instrument and, as a certain amount of the moisture contained in the speaker's breath condenses on the front screen, this and the mouth-guard are made readily detachable for cleaning. To avoid discomfort for users in cold weather, the mouth-guard itself is covered with plastic. The magnet assembly is so mounted that the ribbon itself is horizontal and the ribbon-to-line



Fig 8. The "rifle" microphone being aimed at an aircraft to provide close-up sound for a TV broadcast.



**Fig 10.** A sketch of a general purpose studio designed in the early fifties.

transformer is located in the handle, together with its screening case.

Each type of microphone has its polar diagram, which may be roughly circular at low frequencies, but becoming more one-sided as the frequency rises with pressure-operated instruments, figure-of-eight for pressure gradient microphones, heart-shaped for cardioids, and so on. Each type of polar diagram commends itself for specific tasks—e.g. the cardioid for use on a boom in television, where noise towards the rear of the instrument has less effect, and where speech in front has more effect than would be the case with an omni-directional microphone. The cardioid polar diagram may be considered as a combination of the characteristics of a pressure-gradient and an omni-directional element—thus

on one side of the microphone the two outputs will be additive, whereas on the other they will cancel out due to phase differences between them. Although a microphone constructed in this way would have a response which varied with frequency, it is possible to achieve the desired result in other ways. Both electrostatic and ribbon microphones having cardioid characteristics are available.

However, as so often happens when different equipment can be obtained to do similar work, the very fact that different polar diagrams existed led to a demand for single microphones which could be switched to provide different polar characteristics. Instruments having this facility are in general compounded from two cardioid capsules mounted back to back. The variation in polar characteristic are effected by circuits which combine the two outputs in varying proportions, in or out of phase with each other. Such microphones have characteristics which are variable from figure-of-eight, through cardioid to omni-directional.

For stereophonic work it is possible to use two microphones placed close together, although their physical size makes it difficult to locate them in such a way as to achieve a balanced frequency response over the full range. Special instruments have, however, been developed especially for stereophonic work and generally consist of two electrostatic elements mounted closely together in a single casing. The electrostatic type seems to be favoured for this type of microphone on account of its small size and the fact that it is possible to match the frequency response of the pairs with somewhat greater accuracy.

The studios and the techniques used for



**Fig 11.** Modular acoustic treatment in Broadcasting House Extension.

acoustic treatment, insulation, and programme balance have not had quite such a long history as microphones, but nevertheless many changes have taken place in the forty odd years of broadcasting, electric gramophone recording and similar work. In the very earliest days, as illustrated in **fig 1**, people gathered in some mutually convenient place and made their contributions. Gradually, however, the idea developed that programmes should emanate from quiet surroundings. This led to the heavily carpeted and draped studios which were characterised by the illustration of Savoy Hill (**fig 2**).

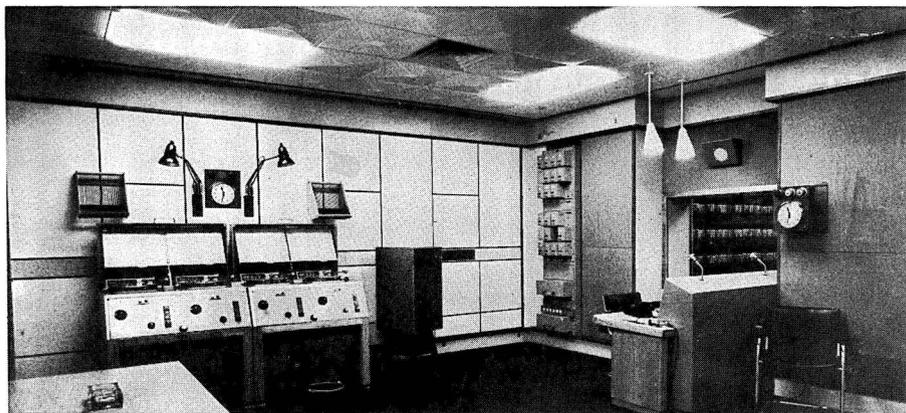
By the time Broadcasting House, London, was opened in May 1932, experience had shown that different types of studio were desirable for different types of programme, and the twenty-two studios in the new building were treated in various ways according to the programme material which was to be broadcast from them. Over the years improved equipment, new ideas and techniques, new materials and similar factors have led to many changes; and in fact only the Concert Hall now appears much the same as when the building was opened.

In the book, *A technical description of Broadcasting House*, published by the BBC in 1932, there appears the statement “. . . the so-called ‘general-purpose’ studio is of comparatively limited use, and it becomes necessary to design studios specifically for the purpose for which they are intended”. At the time this statement was quite true, but it is interesting to note how changing circumstances have led to a much greater use of the general-purpose studio in modern times. In the 'thirties, for example, dramatic productions generally came from the sixth- or seventh-floor drama suites, each of which comprised groups of five studios, three having different reverberation times, ranging

from 0.85 sec to “Dead”, whilst the two remaining studios were used for effects, one being confined to the production of effects from gramophone records. The outputs of these studios were combined through a dramatic control panel, the producer being isolated from his cast except for talkback. Gradually it became apparent that not only was it wasteful of space to employ separate studios having different acoustic properties, but that closer integration of cast and producer was a valuable asset—especially as the advent of new equipment and facilities rendered this possible.

The idea of the studio suites had evolved from the necessity of providing differing acoustic climates for parts of the action—e.g. the use of “dead” studios for outdoor speech. The early general-purpose studios offered a “live” end and a “dead” end which could be separated by curtains if required. The live end could be used for small musical combinations if the programme called for them. Experience dictated the addition of extra facilities—particularly for programmes in the dramatic field—so that virtually any acoustic climate could be produced in a single studio, together with certain local effects—e.g. a concrete path or a bathroom. **Fig 10** shows an architect's sketch of a general-purpose studio, designed in the early 'fifties, which provides some of these features. It will be noted that the producer at the control desk in the cubicle had visual as well as oral contact with his cast, and in a few steps he could be in the studio itself, if necessary, to explain some point.

When the extension to Broadcasting House was brought into use, several new studio areas became available. These were developed for various purposes, but it is interesting to consider the construction as an example of the techniques used in building broadcasting studios to modern standards.



**Fig 12.** The control cubicle of the studio shown in **fig 11**.

Four of the new studios are intended for discussion and feature programmes; the dimensions of the two larger studios (known as B13 and B14) are 17 by 27 by 9 ft high and the two smaller studios (B15 and B16) measure 16 by 21 by 9 ft high. All the studios have a reverberation time of 0.3 seconds. Each studio has its own control cubicle, and each control cubicle is fitted with studio control equipment arranged to handle up to eight sound sources. These sources can be connected by plugs and jacks as required, and include four microphone points in the studio, the output from two gramophone record reproducers and two magnetic tape reproducers located in the control cubicle, and four external sources. The recording channel associated with these studios is equipped with three magnetic tape recording and reproducing machines and has intercommunication circuits between the channel and the four studios.

The studios, control cubicles and recording channel are located in a group flanking opposite sides of a corridor. They are fully air-conditioned and equipped with fluorescent lighting and slave clock dials. Loudspeakers and headphones are provided for talk-back purposes and the control cubicles have BBC *Type L55/1* monitoring loudspeakers.

The Broadcasting House Extension is a conventional steel-framed building, the steelwork being encased in concrete and provided with reinforced concrete floor slabs. Buildings of this type are prone to transmit sound via the structure, and consequently special precautions had to be taken to reduce the possibility of noise penetrating to the studios in this way. This is particularly important in the case of the basement and sub-basement of Broadcasting House and the Extension, as the Bakerloo tube between Oxford Circus and Regent's Park runs within some 50 ft of the studios, and the passage of trains produces a high level of noise in the areas in which the studios are formed. The floors of the new studios were therefore constructed from reinforced concrete slabs mounted on rubber pads, which in turn are supported on 1-inch plinths formed on the structural floor of the area. The studio walls, of 4½-inch brickwork, were erected on this 2½-inch-thick floating floor, and they support the ceilings constructed from steel girders and wood-wool slabs. Finally, a further 2½-inch layer of concrete was poured over the floating floor slabs. This reduced to a minimum the possibility of setting up bending stresses in the finished studio floors which might have occurred had this final floor screed been poured before erecting the walls and ceilings.

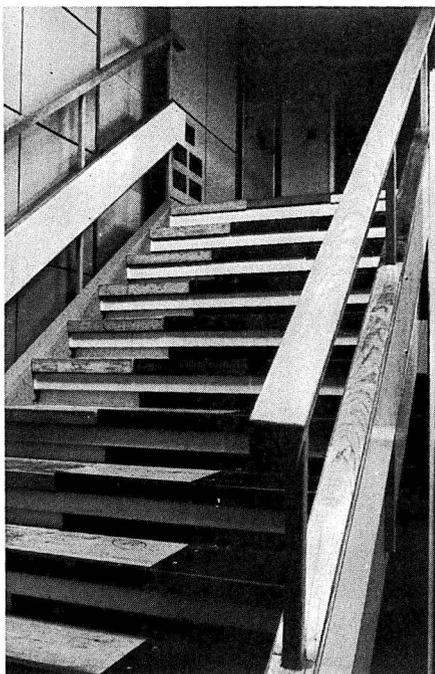
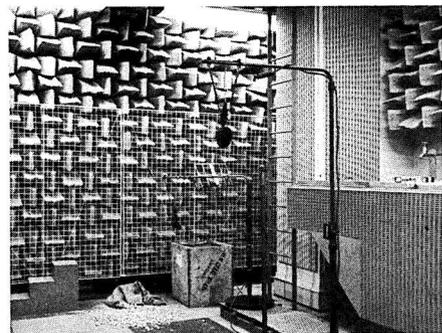
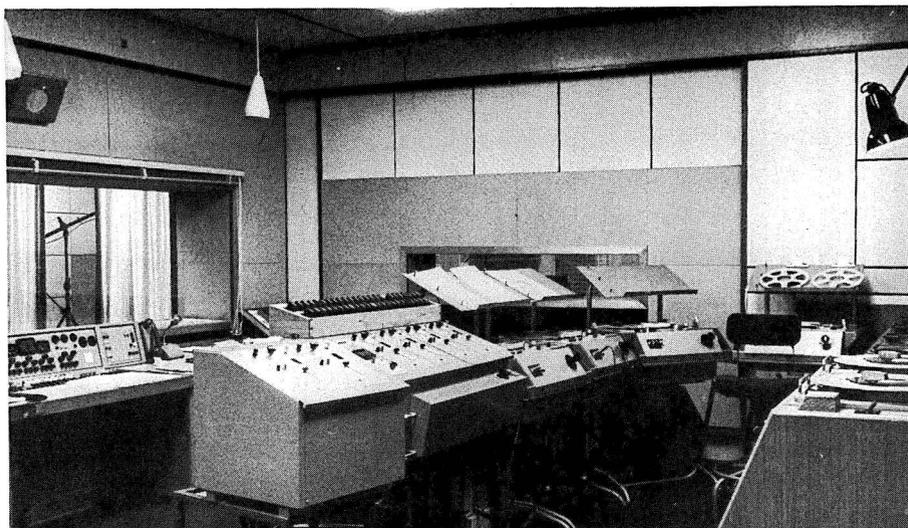
The corridor between the studios is not floating, but between it and the studios are floating lobbies which form a sound-lock. Each lobby is

fitted with doors having special rubber and magnetic seals to prevent the ingress of air-borne noise. The internal acoustic treatment of the studios comprises a series of modular sound reflecting and absorbing panels. These are formed from a series of 2-ft-square panels of perforated, decoratively-faced hardboard, mounted in front of sound-absorbing material. By using plain and perforated boards, backed or covered with various materials, audio frequencies in the lower-middle and upper registers can be absorbed or reflected. Thus, by measurement and selection of the most suitable panels it is possible to remove unwanted resonances or coloration, and to produce an acoustic atmosphere to suit the type of programme for which the studio is intended.

A further advantage of this method of modular acoustic treatment is that any future alterations or modifications can be carried out without the necessity of stripping and re-treating a complete wall surface. Some small variation in the acoustics is made possible by the provision of full-length curtains over one wall. These curtains can be pulled back to reveal a section of the frequency-selective panelling or, if fully drawn, to provide a higher degree of absorption over the upper portion of the frequency spectrum. Figs 11 and 12 show one of these studios and its control cubicle respectively.

Another very interesting studio in this area is one which was designed as an "experimental drama" studio. This is probably one of the most modern and best-equipped studios for this type of work in existence. Although basically designed as a single studio, if required it can be separated into two parts by the usual double curtains—velour, for the "dead" end and sail cloth for the "live" end. The acoustic treatment of the studio also provides a third area, fitted with anechoic wedges which are effective down to about 150 Hz, and can thus simulate an outdoor acoustic. In this area a large water tank is installed, fitted with rowlocks, for producing various aquatic sound effects, also a steel ladder. This area is separated from the main studio by a soundproof overhead door, suitably treated on its two sides to maintain the acoustic environment of the respective areas.

The floor treatment in various areas of the studio includes carpet, concrete slabs, wood blocks, asphalt, lino and chequer plating—the latter suitably supported to provide the characteristic "ring". There is also a trough, running almost the full width of the studio, filled with gravel; these varied finishes provide for realistic footfalls or other sounds associated with particular floor surfaces. Other facilities which are provided in the studio include a wide flight of steps, with wood, concrete, and iron treads; a



**Fig 16.** A general view of studio B.10's control cubicle.

**Fig 14.** Part of the "dead end" area of studio B.10, with anechoic wedges and other wall treatment, water tank and floor finishes.

**Fig 13.** General view of BBC studio B.10, showing the observation window and part of the acoustic treatment.

**Fig 15.** The effects staircase of studio B.10, with concrete, wood and iron treads and effects doors above.

“telephone kiosk”; a flight of stone spiral steps, such as might be found in a mediaeval castle; a variety of doors—some fitted with letterboxes and a good selection of knockers, chains, locks, bolts, etc.; sash, casement and french windows.

**Figs 13, 14 and 15** show part of this studio in which some of the features mentioned above can be seen. **Fig 16** shows a general view of the control cubicle. The main control desk is entirely transistor-operated and all amplifiers, relays, jackfields, etc., are mounted in it. An apparatus bay provides accommodation for the mains supply units for the transistor amplifiers and condenser microphone amplifiers. The desk itself provides for a total of fifteen channels using quadrant faders. These are allocated as: nine studio microphones arranged in two switchable groups; four disk and tape reproducers, and two independent channels. Any channel can be switched to either of two echo devices. Source, cue and reproduction selection are all initiated from the desk, and provision is made for inserting response-selection amplifiers in any channel. A recording room containing two trolley-mounted tape machines and a linking console is associated with the studio.

In the picture (**fig 16**) can be seen the latest programme effects generator which enables recorded sound effects and other short programme inserts to be reproduced accurately on cue and to be repeated in rapid succession. It consists of a number of tape reproducer modules of novel design, using lengths of quarter-inch magnetic tape, each sufficient for a duration of thirty seconds, in cassettes of about the same size as a matchbox. The capacity of the generator is virtually unlimited, being restricted only by the number of cassettes available. An indefinite number of reproducing channels may be combined but four or six are enough for most purposes. Facilities are incorporated to enable new effects recordings to be made rapidly, either from new programme material or by recording into a new cassette, combinations of effects derived from the replay of existing cassettes. The main unit of the generator is a four-channel combination built into a cabinet containing common amplifier and power supply sections. Auxiliary units containing two or more channels can be connected to the main unit to increase the number of channels available. All reproducing modules are identical and can be used in any of the channel receptacles in the main and auxiliary units.

A channel module is prepared for operation by inserting a cassette. When the cassette is pressed down it locks in place, and the tape is drawn out and automatically laced into the stand-by or ready-to-run position. This opera-

tion takes about one-and-a-half seconds and when it is completed the lamp in the green *Run* button illuminates. On pressing the button, reproduction starts instantly from the beginning of the recording in the cassette. The *Replay Fader* enables the reproduced level to be preset to the required value, or to be varied smoothly during reproduction. If the *Run* button is released before the end of the tape is reached, the output of the channel is muted, and in a few seconds the tape runs back rapidly and silently to its stand-by position. Short effects recordings of discrete sounds such as shots and footfalls can therefore be readily repeated at intervals to synchronize with action. If the *Run* button is held down, replay of the tape continues for thirty seconds, after which the mechanism automatically trips, the channel is muted and the tape runs back in about four seconds. If the button is still held depressed, reproduction then starts again. Instead of this method of operation, the *Auto* key can be used for the reproduction of effects of more than a few seconds in duration. Operation of this key ensures that running continues after only a momentary operation of the *Run* button. When it is required to remove a cassette, the *Reject* button is pressed. This causes the tape to be drawn completely back into the cassette, which then springs up so that it projects from the loading slot. Each channel module has a *Response Control Switch*, which places Bass and Treble controls into circuit for varying the frequency response of the output. Means are also provided for listening on headphones to the output even when the *Replay Fader* is in the faded out position, thus enabling the programme from the channel to be checked without connecting it to the output.

Recording facilities in the cabinet of the main unit are connected to the adjacent *Channel 1* receptacle, and any channel module in this position is capable of recording when the *Record* button on the cabinet is pressed. However, recording can take place only if the *No. 1* channel module has been loaded with the right kind of cassette. This kind has a detachable “pip” to indicate that it is loaded with blank tape. When this cassette is inserted into *Channel 1*, the pip operates a switch which permits the channel to be converted for recording by operation of the *Record* button. Cassettes containing recorded tape normally have the pip removed. They can then be replayed in any channel, but do not allow the recording facility to operate and it is therefore impossible to damage a library tape by accidental re-recording. Similarly, only tapes in cassettes having a pip can be erased in the separate *Eraser Unit*.

# AMBIOPHONY — THE NEXT STEP AFTER STEREO

A good stereo reproduction system using good programme material can give a most life-like reconstruction of the original sound. The sound in one's drawing room is not, however, exactly the same as in the concert room or church, etc., as in the original, sound reaches the ears directly from the sound source and also by

reflection from the walls and ceiling. In the home, most drawing rooms are rather heavily damped by curtains, carpets and furniture, and almost all the sound that is heard comes directly from the Speakers. The listener's impression is thus that the wall behind the speakers is a window into the concert hall, not that the listener is in the concert hall.

Ambiophony attempts to remedy this defect by supplying, in the drawing room, the reflected sound which would be present in the concert hall, coming from the correct directions. In the concert hall, the reflected sound consists of a rather confused jumble of sounds, as much of the non-direct sound has suffered multiple reflections. It therefore arrives at the ear later than the direct sound, and in fact several sounds, separated by various time delays, arrive at the ear, the different delays being caused by different path lengths. It is one of the facets of auditorium design to obtain a correct balance between the original sound source, the number and intensity of the reflections, and their time delays. Different sound sources require different treatments. The human voice is most intelligible with very little indirect sound, but a complete absence of reflections makes the voice sound dry and lifeless. A piano or chamber group such as a string

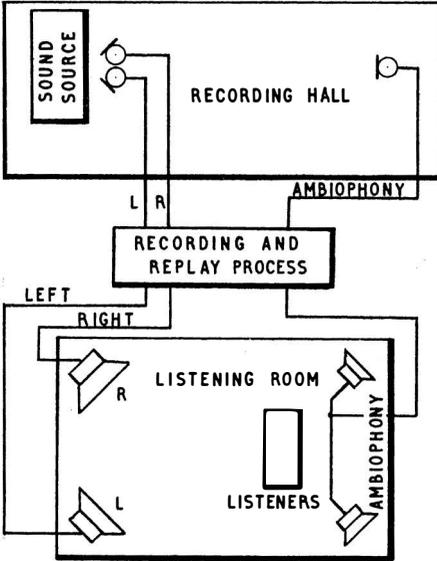


FIG. 1 FULL AMBIOPHONIC SYSTEM

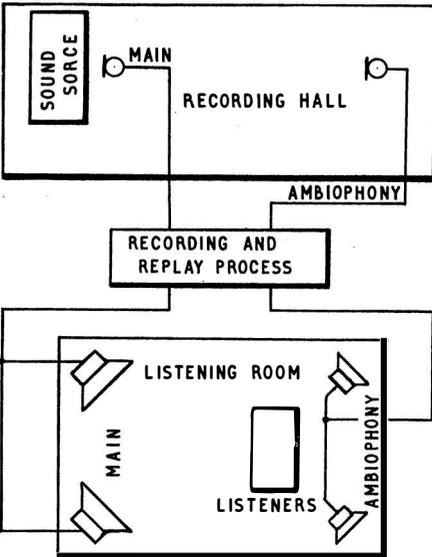


FIG. 2 TWO CHANNEL AMBIOPHONIC SYSTEM

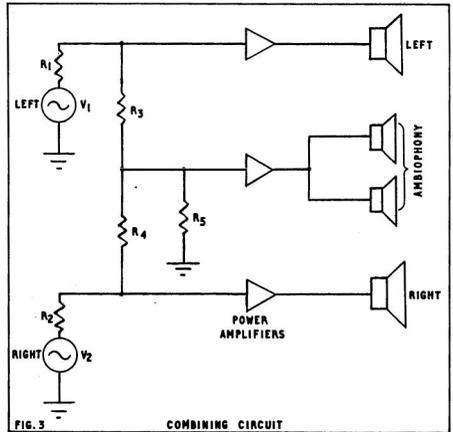


FIG. 3 COMBINING CIRCUIT

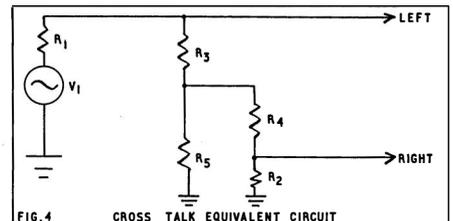


FIG. 4 CROSS TALK EQUIVALENT CIRCUIT

quartet requires rather more reflected sound, culminating in ecclesiastical music (large choir and organ) which require much reflected sound and a long reverberation time. To some extent a Cathedral organ sounds good in a Cathedral with a long reverberation time because this is what we are used to, but one of the reasons we are used to it is because, over the ages, it has been found to be a pleasing sound, and new Churches have also been designed with a long reverberation time.

In the acoustic design of an auditorium it is most important to keep the reflected sound diffuse. This means that there must be a great number of reflecting surfaces, giving each listening point a great number of different reflected path lengths, and hence different time delays. Care must also be taken to control the amplitude of the reflected sound and to obtain a satisfactory (not necessarily very wide) frequency response. Failure to produce a diffuse pattern of reflected sound produces an effect which is detectable as an echo.

In making a recording it is well known that the microphones cannot be placed in the position of a normal listener or the recorded sound lacks clarity, being confused by the echoes. This is not due to defects in the microphones. In fact microphones—if you pay enough—probably introduce less distortion than any other link in the recording/replay chain. The reason is that the ears of a listener have a very powerful computer attached to them (called the brain) which can sort out and pay attention to the direct sound and disregard the reflected sounds. The failure of the recording/replay chain is in the stereo replay, which even under the best conditions cannot really simulate a full symphony orchestra using only two spaced speakers. The microphones thus have to be placed quite close to the sound source, where they pick up an undue amount of direct sound in relation to reflected sound.

The problem of reproducing a concert hall in the drawing room is thus that of producing some “reflected” sound and making this appear to come from around and behind the listener. The ambiophonic sound must not appear to the listener to come from any particular place. It is therefore best to employ more than one speaker and make use only of reflected sound. Suitable speakers are therefore the “minis” which have a totally enclosed back and have no rearward radiation. They can be arranged to project their sound on to the back wall of the drawing room and then on to the ceiling (or vice versa). The side walls can also be made use of. The arrangement should be checked by playing an “ambio-phony” signal through the “ambio-phony” speakers and noting that from the listening

position (or positions) and facing forwards it is difficult or impossible to locate the source of the sound.

Since the ambiophonic signal is diffuse, there is no stereo information in it, and only a single channel ambiophonic signal need be produced. The ambiophonic signal can be produced by an auxiliary microphone placed in the body of the concert hall.

This system not only needs special recordings but also a 3-channel recording and replay system. Special recordings are less of a problem than might be supposed. Most amateur orchestras, etc., are keen to co-operate, particularly if they are substantially allowed to hear the recordings. However the requirements for three channels puts this system beyond the reach of all but those with very deep pockets. A useful compromise is to sacrifice one of the stereo channels, and employ one “main” and one “ambience” microphone as shown in **fig 2**. To enable recordings thus made to be passed around among experimenters, some standardisation is necessary, so it is suggested that the main microphone should record on the No. 1 (upper) track and the ambience microphone on the No. 2 (lower) track.

If both normal speakers are energised in phase from the Main source, a central non-stereo sound image should be produced by them which, while not stereo, is at least as good, and is probably better than a monophonic signal. Experiments with this arrangement show that very pleasing results can be obtained, and because of the ambience sound, the listener tends not to realise that the Main signal is not stereophonic. However, commercially, only normal 2-channel stereo signals from tape or disc are available. Thus, on the face of it, a genuine ambiophonic sound cannot be produced as the required signal information is not present.

By the use of some trickery, it is possible to produce quite an acceptable ambiophony signal for replay through the ambience speakers. The first step is to produce a combined “Left+Right” signal which can be most easily done with a resistive adder as shown in **fig 3**. Here the two sound sources are shown as V1 and V2 with source resistances of respectively R1 and R2. The combining resistors are R3 and R4. These are normally equal, as are the source resistances. One of the effects of connecting R3 and R4 between the Left and Right channels is to allow some inter-channel cross-talk.

**Fig 4** shows the circuit re-drawn to show that the cross-talk comes via two attenuators in cascade, R5:R3 and R2:R4. With a fixed value of source resistance, less cross-talk will be produced the lower the value of R5, but this also reduces the amplitude of the combined (ambio-

phony) signal, so a compromise must be reached. In practice, a cross-talk of  $-30$  dB to  $-40$  dB is completely satisfactory. If the source resistances of the signal sources (R1 and R2) are each 1 k ohm, R3 and R4 are 50 k ohm and R5 5 k ohm, then the cross-talk will be about  $-36$  dB, and the combined signal will be about 20 dB below the Left and Right signals. Unfortunately this signal cannot be applied directly to the ambiophony speakers. There is a phenomenon in acoustics called the "Haas effect" or "precedence", whereby the brain tends to latch onto a signal which arrives first even though later similar signals are much louder.

In a typical drawing room, the listener may be about twelve feet from the main speakers but only about 8 feet from the ambiophony speakers. The velocity of sound in air is about 1 ft per millisecond, so that if the two sets of speakers were supplied with the same signal, the sound from the ambiophony speakers would arrive at the listener about 4 mS before the main sound. Unless the ambiophony signals were so soft as to be almost useless, the brain would therefore hear only the ambiophony sound. The ambiophonic sound thus has to be delayed so that it arrives at the listener considerably after the main sound so that he "listens" to the main sound but is conscious of the ambiophony. Provided that the delay at the listener's ear is more than about 10 mS, it can have any value up to about 50 mS. Delays longer than this tend to be recognised as a separate echo. A good compromise value is about 30 mS which will permit a difference in sound path of up to 20 ft, which is adequate for all domestic conditions.

This time delay can be produced by an endless magnetic tape loop either running at an adjustable speed or with adjustable spacing between the record and replay heads. Another method is a "spring" delay. In this, a piece of spring steel wire is excited torsionally by, in effect, an oscillating electric motor. The disturbance travels down the wire at the velocity of sound in steel, and is picked up at the far end by a pickup. For convenience, the long length of wire is coiled into the form of a helical spring. This does not affect its delay characteristics.

A signal delayed in this manner produces a useful ambiophonic sound, but the sound so produced is merely a delayed combined main signal. The real ambiophonic sound, as produced via the ambiophony channel of **fig 2**, has also a considerable amount of echo on it. As an exaggerated example, imagine what a voice or a piano sound like at the far end of an indoor swimming bath. This effect can be obtained on a tape delay machine by using several replay heads spaced appropriately down the tape and with their outputs suitably combined. Quite long echo times can be produced if a proportion of

one of the replay head outputs is re-recorded along with the incoming signal. In this arrangement there are many variables: several delays: amplitude contributed by each delay: amount re-recorded: and amount of re-recording delay. Unskilful adjustment can produce a howl or a flutter, but the number of inter-dependant adjustments should provide ample scope for even the most determined knob-twiddler.

A "spring" delay unit is available commercially (Grampian Model 666). In essentials it consists of two springs with propagation delays of 29 mS and 37 mS. They are individually driven from the same signal and their outputs are combined electrically. Neither spring is terminated at either end, so the signal suffers multiple reflections, and a very diffuse echo is produced, further complicated (intentionally) by the non-integral relationship of 29 mS to 37 mS. The unit is not designed to be adjustable.

Referring to **fig 3**, either type of delay is inserted in the combined Left + Right signal to the ambiophony speakers. With suitable programme material, coming from an ordinary stereo type or disc, this arrangement can produce most satisfying results. Sounds such as Church Choirs and Organs which originate in reverberant buildings can be made to sound most lifelike.

Ambiophony is less successful with small groups of instruments which are normally heard under rather "dry" conditions, and a spring delay can produce a most unpleasant effect on the human voice, making it sound as though the talker is inside a large galvanised iron tank.

In general, ambiophony improves sounds which are normally heard in reverberant surroundings, does little for Chamber music etc, and is downright unpleasant for the human voice. These remarks refer to the use of pseudo-ambiophony, using an artificial delay which has to add its own colourations and modifications. Genuine ambiophony, of the form shown in **fig 2**, reproduces the original sound pretty well, but even this is not always suitable. A human voice heard at a distance in a reverberant building is difficult to understand: the true ambiophonic reproduction is also nearly unintelligible.

To sum up: (1) *Genuine ambiophony* requires special recordings and (ideally) a 3-channel record/replay system. With suitable programme material, most realistic results can be produced. (2) *Pseudo-ambiophony* using artificial delay and echo can produce very satisfying results from suitable normal stereo programme material. (3) Sounds which are normally heard with little or no reverberation can be made to sound most unpleasant, the effects varying between the sound in a swimming bath and the colouration of a large galvanised iron tank.

# HOME VIDEO-TAPING

WILL IRON OXIDE OUST SILVER BROMIDE?

Right now we are on the brink of a major and highly exciting development in the field of domestic entertainment—the home recording and replay of television programmes via the medium of magnetic tape. Little more than a decade has elapsed since the first practical video tape recorder was launched by the *American Ampex Company*—a professional machine designed for television broadcasting stations and costing tens of thousands of pounds.

Realising the fantastic potential in the storing of pictures and sound on relatively inexpensive magnetic tape—erasure is possible as with sound-only tape recording—coupled with the *Ampex* success and the greatly reduced recording, replay and processing costs relative to the telecine system, most television stations active at the time soon had a video tape recorder on order. Other television programme equipment manufacturers also had video machines under development, and the stage was set for a whole new science of television recording on magnetic tape. The BBC was not slow to respond to the message and *VERA* (standing for *Vision Electronic Recording Apparatus*) was soon in action. This originally ran at a tape velocity equivalent to 200 inches/sec and, with a head gap of around 0.0002 inch, yielded a video output over 2.5 MHz between the half-power ( $-3$  dB) points.

That was ten years ago; today's professional video tape machine performance renders it virtually impossible even for those skilled in the arts to tell whether the picture is "live" or via tape. Schemes have also been evolved to obtain stationary pictures on the screen by the head continuously reading a single field of recorded picture signal when the appropriate "freeze" switch is operated and to provide slow-motion facilities on par with film—a feature which is somewhat complicated by the need to maintain good picture synchronism without increasing flicker or decreasing the standard number of picture fields per second.

Fully professional machines have trailed the way for slightly less sophisticated models for commercial and educational applications. But even these—by *Ampex*, *Philips*, *Peto-Scott* and others—are still up in the £1,000 (or a little below) price bracket and are thus still several

stages removed from the economics of the domestic market.

In turn this latter type of machine has helped to pioneer the third-generation domestic model, selling in terms of hundreds of pounds. Already several machines of this kind are available, a notable example being the Sony TCV2000 whose machine cost alone is less than £300. For £500 a complete system can be purchased. This includes the tape machine proper, spool of tape, television monitor—which seconds as an ordinary television set from which any television programme can be instantaneously recorded—and a television camera outfit with tripod, giving home television recording and facilities for closed-circuit television on the screen of the monitor set. Loewa Opta also make the semi-professional *Optacord*.

Other firms actively in the domestic market include the *Japanese Akai Company* with the VX1100 and the *Japanese Shiba Electric Company* whose machines, it is understood, are to be marketed by the solidly *British Truvox Company*. Interest is developing rapidly and already the *Sony* machine is a best-seller in the commercial and educational fields the world over. Domestic interest in Great Britain will almost certainly flare up as soon as the pending competition knocks the prices down just a bit more.

In America they are all set for an overwhelming domestic activity which many authorities consider is likely to dwarf all other home applications of magnetic tape, thereby bringing the video tape recording business in all its home applications in line with that of television itself.

Home video taping will certainly not halt at monochrome, but will trigger-on to the great colour television build-up which is just starting in Great Britain and many other countries and which in America is now showing signs of extremely rapid development. Dr. Walter Bruch of the *German Telefunken Company*, inventor of the *PAL* additions to the American *NTSC* colour television system, has already developed a relatively simple *PAL* colour addition-for video tape machines.

For many domestic applications the home television set—monochrome or colour—will serve as the replay device for video taping; it will give the set extra application, and since most

people already possess a set of some kind the cost of home video taping will be reduced. The set will serve as the "projector", required as an extra for home movies.

Of course, for video tape seriously to compete with home movies, a portable video tape recorder and camera system will be necessary—on par with the cine camera for film making. The portable would simply be plugged into a socket at the back of the domestic television set to reproduce both vision and sound of the day's filming. As radio sets are often equipped with pick-up sockets, so television sets will have "video" sockets for in and out signals.

The portable recorder and camera is not a thing of the distant future. Transistor and integrated circuit modules have made this possible now. Indeed, already *Sony* is exploiting the "smallest video tape recorder in the world"—a shoulder-strap model, battery-operated and using  $\frac{1}{2}$ -inch tape for vision and sound together. We shall certainly be hearing more about this remarkable machine as time goes on.

While capital costs of a complete video tape outfit might be greater—especially with colour—than a home cine outfit, running costs will be less. Tape can be used over and over again and is just as easily erased as ordinary sound-only tape. Present tapes give up to 200 runs-through before the oxide starts getting into trouble, and a spool for the *Sony* machine just mentioned costs about £12.

Two major advantages over film are ability to monitor what is being recorded and instantaneous replay without processing. Tape also allows for remarkable flexibility. The television camera system is akin to the microphone of sound recorders, and just as sounds can be mixed by using several microphones, so, too, can vision by using several camera systems. Vision mixers, while being more technically sophisticated, work on exactly the same principles as sound mixers.

Home cine systems with perfectly synchronised sound are much more costly than picture-only systems, and sound with video tape is given as a bonus. Some arrangements will have to be made, of course, about recording from a television programme. As the law stands at the moment this, as with sound, anyway, can land one in legal trouble; but as it becomes so easy to tape programmes—via a time-switch, perhaps, during the time that direct viewing is not possible—for later replay some licencing scheme will surely have to be evolved—it is high time that this was cleared up for sound, but vision added may accelerate matters in this respect!

Trick television by synchronised superimposition of a second programme on top of the first recorded is also possible, as with sound, and then there crops up the question of editing. Home

cine enthusiasts have certainly developed this to a very fine art, and those of the clan advocating film as a better home creative medium than magnetic tape, based on alleged tape editing problems, appear not to have given the tape system full study.

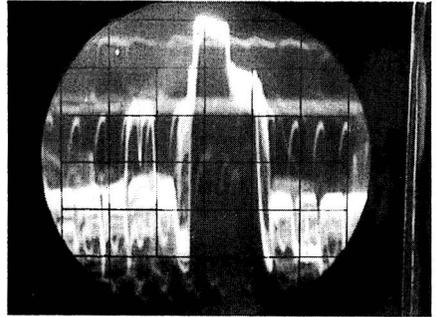
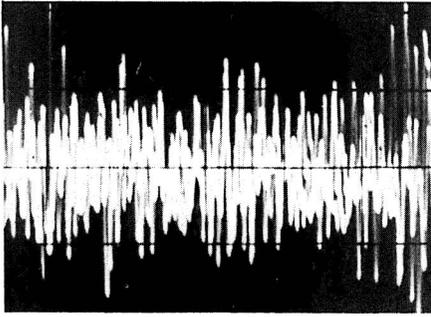
While different techniques are involved, video tape can, nevertheless, be edited in a similar manner to sound-only tape. Current machines have facilities to halt the normal tape transport while keeping the video heads rotating and scanning a picture frame. This makes it possible to display almost any frame along the tape as a "still", as with cine film using an editor-viewer. Unwanted sections of tape can thus be removed by the usual 90-degree cuts used for sound-tape splicing.

Sound synchronously recorded with the picture—this happens along one edge of the tape as we shall see—can present a bit of a problem, as with sound-track film, but the problem is less severe with tape because it is possible to erase the existing sound and record new without the film processing complications. Moreover, it is not unduly difficult to record vision and add sound afterwards during the time that the vision is being replayed on the television monitor. There is no doubt that tape has a far greater "creative" flexibility than film in all aspects of application.

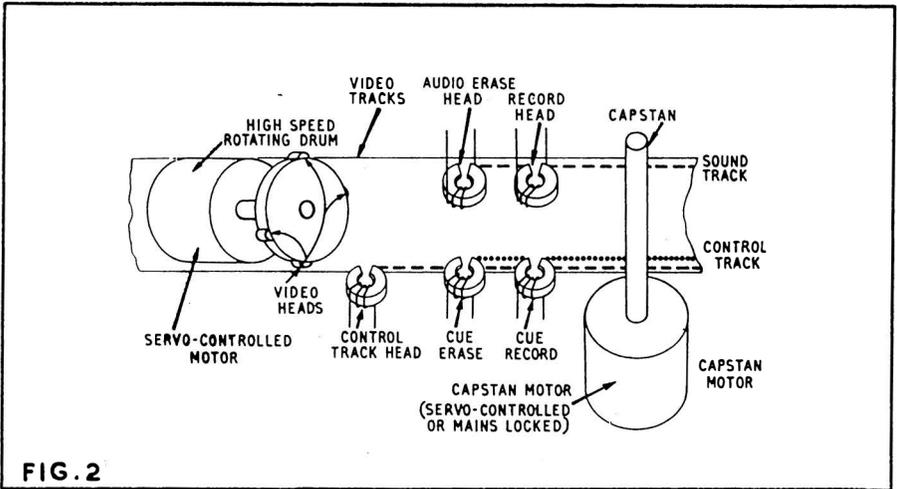
While cine film is "locked" to the camera and projector shutter system, so to speak, by means of the film perforations, magnetic tape is "locked" to the television field frequency by synchronising impulses recorded along the opposite edge of the tape to the sound recording. These impulses are recorded while the picture (and sound if required) is being recorded, and on replay they are translated to electrical signals which synchronise a servo-controlled head drive motor. Thus, splicing tape for editing fails to destroy the synchronism, and the worst that may happen is a slip of one single field—lasting only 20 milliseconds, anyway—as the spliced tape passes the video heads.

Not so well known is the fact that recorded video tape can be "developed" to make the video fields and synchronising pulses visible. This is achieved simply by applying a solution containing carbonyl-iron to the oxide side of the tape. The iron particles adhere to the surface of the tape according to the recorded magnetic pattern. Professional machines record along a third linear track "cueing" or so-called "editing" pulses. These are also developed by the carbonyl-iron solution, thereby making it a relatively simple matter to cut and splice the recorded tape as required.

To sum up, then, video tape recorders use ordinary oxide-coated magnetic tape, usually



**Fig 1.** Waveform of sound (a) compared with waveform of television line (b). The period of the latter is only about 64 microseconds, and component frequencies within this rise to some 5MHz.



**FIG. 2**

**Fig 2.** The transverse scanning system used in professional video tape machines.

wider than that developed for sound-only (*Sony* uses  $\frac{1}{2}$ -inch tape) work and with a more sophisticated oxide coating to minimise drop-outs and wear. The tape is recorded, erased and replayed on the same principles as sound-only tape. Professional machines generally use 2-inch tape moving linearly at a velocity of 15 inch/sec—although, as we shall see, the tape/head velocity is far greater than this linear velocity.

Taped television is inexpensive compared with conventional film tele-recordings. It costs only one-quarter as much as 16 mm film and less than one-tenth as much as 35 mm film. The same tape can, if necessary, be erased and used over and over again. It has the attributes of immediate replay, immediate availability for re-use and good fidelity of reproduction. Not the least of its advantages lies in its freedom from chemical processing.

The very best sound tape recorders operate over a frequency spectrum of about 25 to

20,000 Hz—not always over such a wide spectrum—and for this replay heads with very fine gaps are required to “define” magnetically the very short magnetic patterns corresponding to the top frequencies. To avoid self-demagnetisation of the short magnets so recorded the tape has to run through the machine at a velocity of at least  $7\frac{1}{2}$  inch/sec and velocities of 15 and 30 inch/sec are not uncommon in the professional field. These put smaller demands on the head gaps and make wear less of a problem. They also help with the editing as they “stretch out” the sound patterns recorded on the tape.

Sounds occupy a spectrum from about 16 Hz to a little more than 20,000 Hz, and good quality is possible with a 16,000 Hz top limit. The higher frequencies represent the harmonics or overtones, endowing the sound with its particular characteristic or “timbre”. Pure tone, as produced by a tuning fork for instance, is simple harmonic motion represented by the sine wave.

Complex tones and transients are composed of a whole range of sine waves from the fundamental frequency upwards. The compounded wave is then steeply-rising, square and triangular. If some of the higher-order harmonics are missing, the timbre of the sound is altered, and this can be shown by a change in nature of the compounded waveform—rise-time is reduced and sharp corners are rounded. Thus, even though sound as simple harmonic motion may extend only to, say, 16,000 Hz, higher frequencies must be retained to ensure that the original timbre and “attack” of the sound is not altered.

Vision is like this, too (see **fig 1**), but to give moving pictures without flicker half the information of a scene must be recorded fifty times per second. The system is such that two half-information *fields*, as they are called, interlace to one complete picture or *frame*, thereby giving 25 frames per second. Each field is composed of slightly less than half the number of lines making up a complete picture or frame. A 625-line picture thus has a total of 312½ lines per field, but some of these are blacked out for picture synchronising purposes. Interlacing simply means that the lines of one field are interlaced between the lines of the next field.

The television camera sends information of the scene line-by-line to the recorder, and it has to do this mighty quickly as we have seen to secure continuous motion and to avoid flicker. It has to send information on little under 312½ lines of a 625-line picture in 20 milliseconds! Indeed, just one line of a 625-line picture is scanned in about 64 microseconds (*milli* meaning a thousandth and *micro* a millionth in this parlance). Bearing in mind that even one line may contain quite a lot of picture detail, the component frequencies involved, in terms of signal change, rise to about 5.5 MHz on the 625-line standard. To retain this definition, therefore, the tape has to record this frequency.

It should be understood that far lower frequencies would be involved if the picture information could be presented over a greater period of time. For instance, if all the information on a given scene could be recorded during a period of, say, one minute quite reasonable frequencies would be involved. This is the technique behind the video tape facsimile system. At 7½ inch/sec a standard spool of ¼ inch tape can record an equivalent of seven 7- by 9-inch news photos scanned at 100 lines per inch, plus print instructions at audio. Similar, low-speed arrangements are used for recording space-photos. The recorded pictures, of course, take several minutes to resolve fully—compared with the 40 millisecond *complete* picture speed of television. Reducing the number of lines per complete picture is another way of cutting frequency

spectrum—a scheme used in the original *Baird* scanning-disc television system.

Since we are interested in high definition, moving pictures there is no substitute for frequency spectrum. Information compression techniques are being currently explored, but even if these prove feasible it will be many years before they appear in practice. The problem, then, is that of recording up to several MHz on magnetic tape. This can be resolved either by increasing the velocity of the tape relative to the video head, or by reducing the dimension of the head gap dramatically. The latter taken to the *n*th degree is not physically feasible at the existing state of the art; micro gaps have been developed but have been pestered by wear progressively increasing the gap dimension. However, the wear problem is being reduced by the use of ferrite and quartz head core materials.

The trend has been towards higher tape velocities relative to the head, schemed in some cases to keep the linear velocity of the tape itself at 7½ or 15 inch/sec. Maximum frequency that can be recorded on tape is about 2,000 Hz at a tape/head velocity of 1 inch/sec using simple, standard audio heads. This would call for a tape/head velocity approaching 1,000 inch/sec for record and replay up to 2 MHz. Even so, development was at one time directed towards relatively high-velocity linear tape transport, and using special arrangements and micro-gap heads a video response approaching 2 MHz at 120 inch/sec was claimed by the *Wesgrove Electric*s people.

The *Japanese Akai Company* has been experimenting with the crossfield head—they use this on some of their audio recorders which makes possible the recording and replay up to 7,000 Hz per second inch of tape velocity. On this basis alone the velocity is reduced by a factor of 3.5 times for a given top frequency. Other refinements cut the speed further and the *Akai VX1100* video tape recorder records up to 1 MHz at 30 inch/sec using the crossfield head system.

The idea is basically that instead of the HF bias signal being fed to the recording head it is fed to a second head, whose field appears at the reverse side of the tape a little out of line with that of the recording head proper. In this manner the HF bias has less tendency to demagnetise the high-frequency magnetic components recorded on the tape.

Early in the British field of linear video taping were Messrs *Norman Rutherford* and *Michael Turner* with their *Telcan* machine—highly publicised a few years back in the national and technical press and on television. These engineers, formerly engaged in inexpensive closed-circuit television systems, took out several patents on linear video recording and replay, aimed towards information compression and speed reduction.

Sadly, neither the *Telcan* nor the *Wesgrove* development of it appeared to bloom into a commercial proposition—not in this country, anyway.

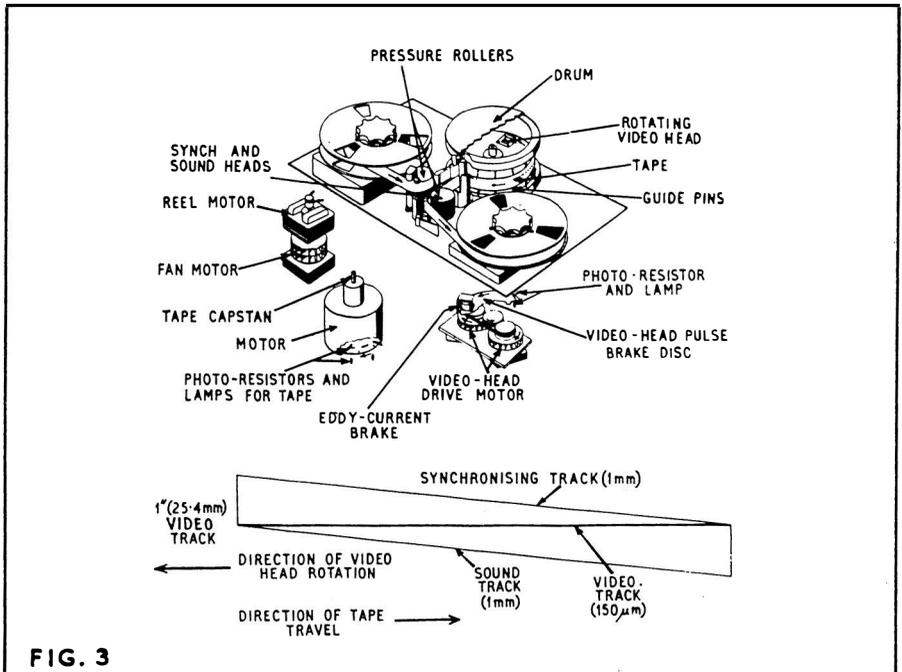
Home video machines as they are developing today, with their rotating heads and helical-scan system, evolved from the true professional technique shown in **fig 2**. Here the required head-to-tape velocity is attained by the use of four heads equally spaced round the periphery of a rotating drum. The heads “scan” the tape width-wise and record side-by-side tracks slightly slanting across it as it moves at 15 inch/sec past the drum assembly. This is called *transverse scanning* of the tape and this, which is 2 inches wide, is driven linearly by a capstan system under servo control for constant speed.

Tracks for cueing (and editing), sound and synchronism are recorded along the edges of the tape as shown. Drive for the rotating heads runs at about 15,000 rpm, giving the heads a relative tape velocity in the order of 1,500 inch/sec. Head gaps down to a feasible  $50\ \mu$  inch make possible the recording and replay of signals approaching 10 MHz at this velocity.

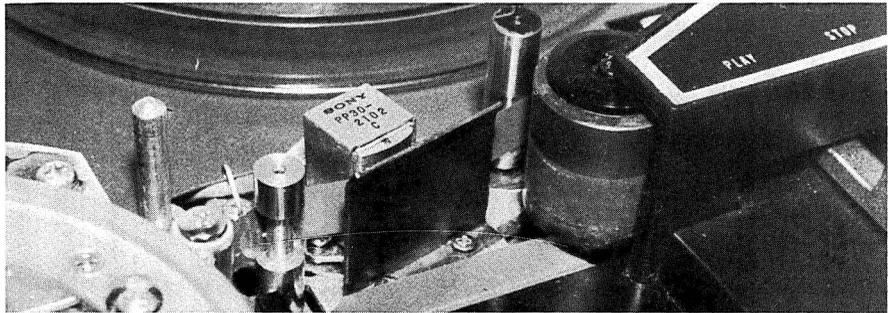
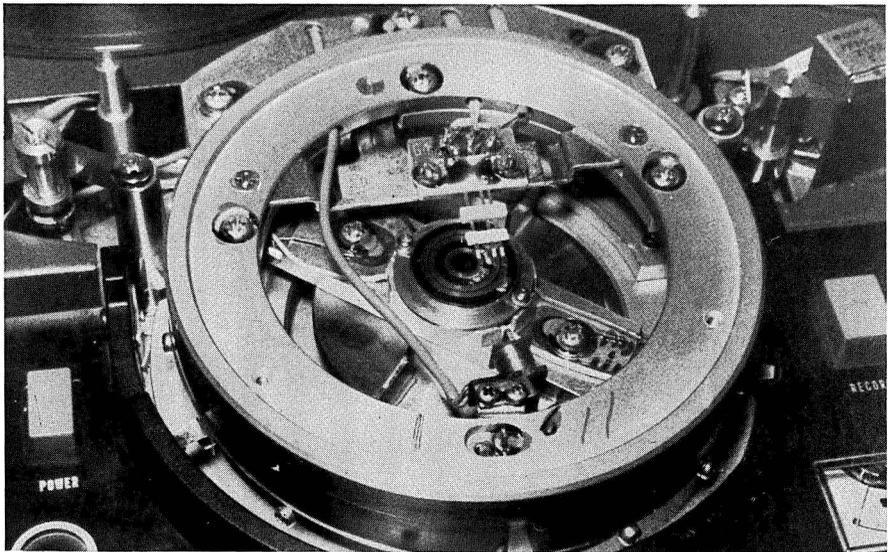
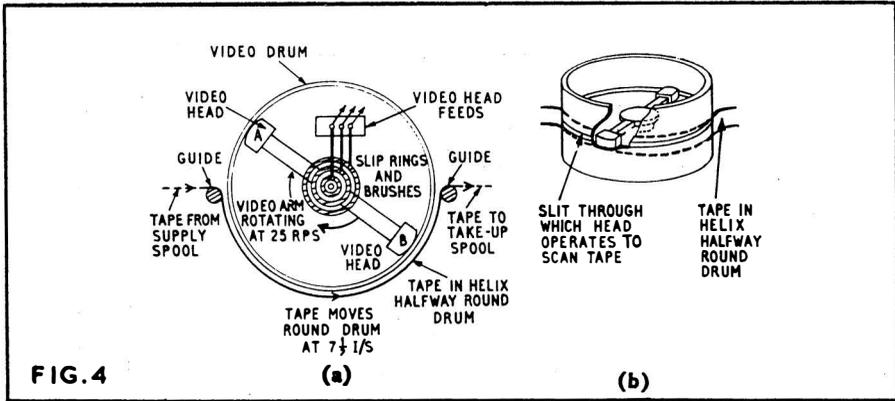
The less costly semi-professional machines by *Philips/Peto-Scott* and *Ampex* (i.e., the *Ampex* domestic model) use a compromise between this

highly developed transverse scanning technique and linear recording. This is called the *helical-scan* system, and the mechanism involved is shown in **fig 3**. Tape used with these machines is generally 1 inch wide and it is handled by a capstan, pressure rollers on the deck in the fairly conventional manner. It passes heads which record and “read-off” sound on one edge and synchronising pulses on the other—the latter for “locking” the rotational speed of the heads as we have seen—but instead of traversing a video head in the usual sound-machine manner, the tape passes in a helix round a drum unit. Along the middle of the side of this drum is a slit in which operates the poles of the video head. The head is mechanically-coupled to a servo-controlled drive motor, picking up its signals from the synchronising track, and for each revolution of the head one video track is recorded obliquely, as shown at the bottom of **fig 3**.

The head rotates at about 3,000 rpm (50 rps) so that each video track takes about 20 milliseconds; the time of one complete television field. Linear tape movement during each revolution of the head means that tracks are recorded close to each other, covering the entire oxide with narrow, oblique tracks. A 9-inch spool holds 3,000 ft of tape, plays for about 1 hour



**Fig 3.** The semi-professional helical-scanning system.



**Fig 4.** The helical-scanning system used in the Sony home video tape machine. This is fully explained in the text.

**Fig 5.** Picture of the video head assembly of the Sony TCV2000.

**Fig 6.** Sound and control head and capstan system of the TCV2000.

and costs—for this type of machine 1-inch—about £30.

The *Sony* video home video machine, Model TCV2000, also uses helical scanning but with two heads instead of one—one at each end of an arm, attached at its centre to the drive motor spindle. The two heads revolve in the drum as shown in **fig 4(a)**, while their active poles contact the tape oxide through a slit in the middle of the drum periphery—as with the other helical system just described—shown in **fig 4(b)**. Here, though, the  $\frac{1}{2}$ -inch tape passes only half way round the drum, but on a slant so that it is “scanned” diagonally as with the other helical system. The two heads are electrically connected through slip rings and brushes (see **fig 5**) on three circuits because one is made common to both heads.

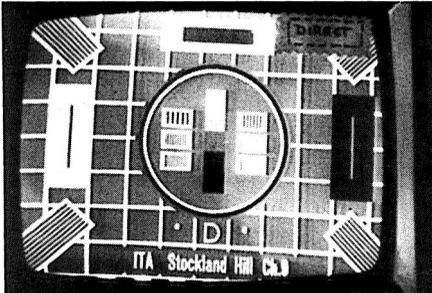
The video head arm rotates at 25 rps and the tape passes round the drum at a linear speed of  $7\frac{1}{2}$  inch/sec. Referring to **fig 4**, if head B is that used for recording, it produces a diagonal track on the tape during a period of 20 milliseconds—equal to the time of one television *field* as we have seen. For the next 20 milliseconds it is not scanning the tape. Head A is then passing over the tape but is not recording. The next video track is recorded when head A comes round again.

While just one head is used for recording, both of them are used for replay, and each recorded track is effectively “read” twice—first with head A then with head B—thus filling in the missing field and giving what appears to be a properly interlaced picture.

It may be wondered why the same track can be “read” twice since the tape is moving linearly while the heads are rotating. The reason is that the recorded tracks are virtually touching each other and very little track displacement occurs during half a revolution of the head motor. In practice it seems that both heads—or one in particular—“reads” simultaneously parts of adjacent tracks, using displaced heads.

The head system on the *Sony* is pictured in **fig 5**, while **fig 6** shows the sound and control head and capstan drive. An idea of the picture quality on the monitor set from an off-the-air Test Card D transmission and from the camera is shown respectively at (a) and (b) in **fig 7**, while (c) and (d) show the same signals recorded on and replayed from the tape. Good quality is retained in spite of the limited bandwidth, which is about 1.5 MHz. This is brought about by the bandwidth saving artifice of the “double-reading” two-head helical-scan system.

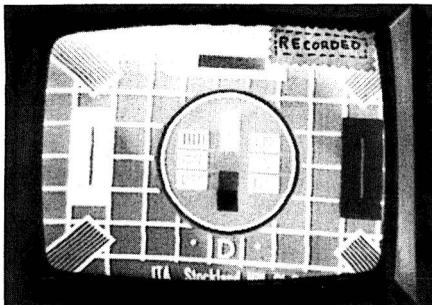
Like the *Telcan*, the *Sony* machine has re-



A



B



C



D

**Fig 7.** (a) and (b) show respectively off-the-air display of Test Card D and camera display (on closed-circuit television) on the *Sony* monitor receiver, while (c) and (d) respectively give the recorded/replayed representations of these video signals.

ceived a great deal of television and press publicity and **fig 8** shows an off-screen television picture of the machine being demonstrated on the BBC *Blue Peter* programme some months ago.

Simple television cameras for home video-taping are not particularly expensive, depending on the quality of the lens system utilised and on whether zoom facilities are featured. An alternative are turret lenses, but these are less versatile than a zoom lens. Remote camera control is also available to the enthusiast if he is sufficiently rich and, of course, a good, solid tripod is essential for television activities. The *Sony* television camera and top of associated tripod are seen in **fig 9**.

To conclude, one or two comments regarding the nature of the video recording signal and the techniques adopted for synchronising the video head drive motor would not be amiss. A high-frequency bias signal is rarely fed to the video head along with the video signal. Instead, the video signal is caused to frequency-modulate a carrier-wave and this is then fed to the video head which records the FM signal as a whole on the tape oxide. Amplitude compression or limiting techniques can then be introduced to counter amplitude changes, which to some extent are inevitable at such high head-to-tape velocities; amplitude limiting also minimises the effects of tape drop-outs which, at direct video, could cause disconcerting interference effects on the picture.

On replay the FM signal is amplified and eventually passed into a discriminator, akin to an ordinary FM detector circuit, from whence the original video signal is derived. This is further amplified and equalised and then fed at sufficient

level to the video amplifier of the monitor receiver. Alternatively, the video signal is caused to amplitude-modulate a VHF carrier generator tuned to an unused television channel. This signal can then be applied to the aerial socket of any matching-standard television set—ordinary domestic set will serve.

Sound is recorded along the edge track in the usual manner, and this is fed out of the recorder at fairly high level for application to the audio stages of the monitor set.

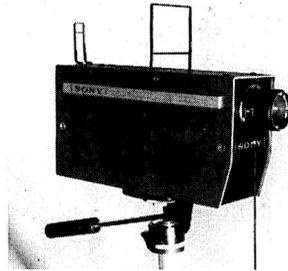
The television field synchronising pulses are processed and then recorded on the control track. On replay these are fed to a discriminator, which also receives signals from the head drive motor telling of its speed. The sync and motor signals are compared in a discriminator, and if the motor tends to wander from its proper speed the discriminator gives a DC output. This is the control signal which, after amplification, slows down or speeds up the head drive motor, keeping it at its correct speed.

“There is little doubt that the tape enthusiast of the future will have available a vision tape player which can be plugged into the video channel of a television receiver for the showing of pre-recorded tapes. Vision tape records, also carrying sound accompaniment, will be available, and the enthusiast will eventually be able to make his own vision records with the aid of a small television camera and tape recorder; immediate replay facilities will be available by way of the domestic television screen.”

Those words were written after a crystal-ball gazing exercise by the author way back in 1958 (see *The Practical Hi-Fi Handbook*, Odhams Press). The future is today . . .



**Fig 8.** The *Sony TC-V2000* home video tape recorder being demonstrated on the BBC's *Blue Peter* programme.



**Fig 9.** *Sony* television camera for closed-circuit and video tape applications.

## RADIO TUNERS

The purpose of a tuner is to select a chosen broadcast from those available at its aerial connection, and to extract the audio signal at a level suitable for passing to the audio amplifier(s). Superficially, an ordinary radio receiver having an extension speaker socket could carry out this function, but this arrangement would not be classed as “hi-fi” for reasons which must be well-known. A specially designed tuner is necessary, but before the prospective purchaser can settle on a particular product a number of choices must be made. The first of these concerns the type of transmission to be utilised—shall it be AM, or FM (or both); and if FM, is stereo reception desired? Second, what additional facilities, such as afc, tuning indication, stereo monitor, etc., are wanted? Should tuning be by continuous control or push-button?

Next, is a tuner or a tuner/amplifier required? As the names imply, the tuner provides only low-level audio signals requiring power amplification before they can drive loudspeakers, while the tuner/amplifier has this extra power amplification built in. Generally, tuner/amplifiers also provide facilities for tone and level control, and for dealing with alternative inputs from microphones, gramophones or tape recorders. Then comes the constantly-asked question—transistors or valves? Last but by no means least come the factors of size, style and price. Let us look more closely at these varied considerations, starting with the two types of transmission.

AM TRANSMISSIONS are available on a world-wide basis, and cover most of the radio-frequency spectrum. The usual sources are in the short, medium and long wave bands (approximately 10–150 m, 190–550 m and 800–2,000 m) and the Bands I and III television sound channels.

The principles and disadvantages of AM are now so well known that they need not be discussed here in detail. Summarising very briefly for any newcomer, the AM transmission consists of a fixed-frequency RF carrier whose amplitude is made to vary, the variations following

the audio-signal to be transmitted. In the receiver, after suitable amplification, a rectifying circuit recovers the audio waveform; the smoothing circuit following the rectifier serves to bypass the carrier frequency while acting as a high impedance at audio frequencies.

The proliferation of AM stations and their long ranges make it difficult to separate them at the receiver, even if they all observe the Copenhagen frequency allocation. The existence of some who do not observe it, and the effects of anomalous propagation and local terrain, combine to produce intolerable interference in all parts of the frequency spectrum, and this can be countered only by reducing the receiver bandwidth. Even with the nominal 9KHz between stations, the avoidance of overlap between adjacent sidebands requires a bandwidth of only  $\pm 4$ KHz in practice, and this hardly represents hi-fi! AM is also particularly prone to man-made interference, which appears as AM on the RF carrier, so that the demodulator cannot distinguish between noise and signal.

Regarding AM transmission quality, the chief limitation on most BBC broadcasts is the frequency response of lines rented from the GPO to carry the audio signals from their point of origin to the transmitters. The main trunk routes are limited in bandwidth to about 50Hz to 10KHz, though some purely local lines near transmitters do extend to 15KHz. Taking this factor and the general reception conditions into account, there would be no advantage in extending the transmitter response appreciably beyond 10KHz, and this figure must therefore be taken as the upper limit for AM transmissions.

If the AM tuner begins to sound rather unattractive, we must bear in mind that there are at least two important applications for it. One is to enable a variety of stations to be heard from all over the world, and this can be valuable for study purposes as well as for entertainment. Many folk are prepared to tolerate inferior quality, if they must, in order to have this facility. Another possible user is the man who lives near an AM transmitter, and hence obtains interference-free reception using the proverbial bit of

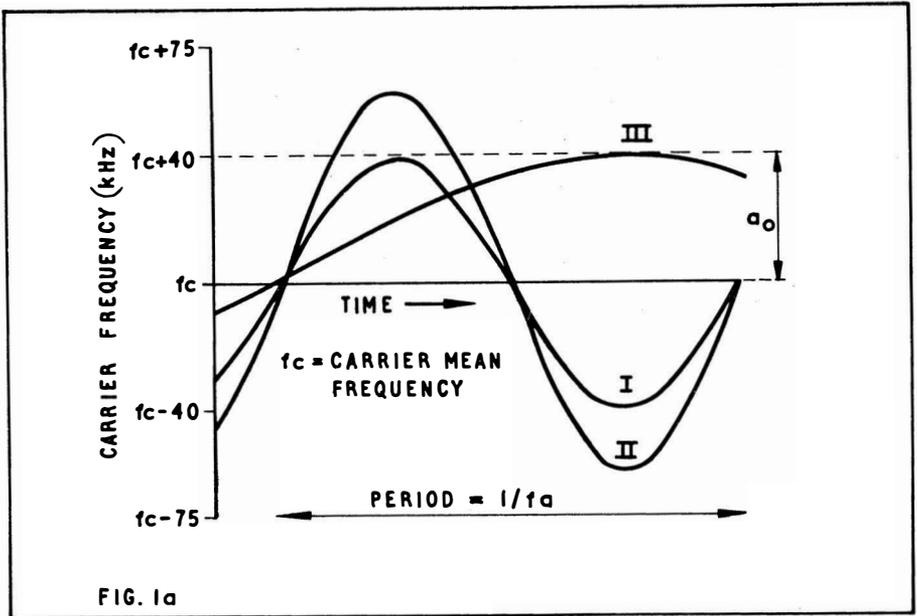


FIG. 1a

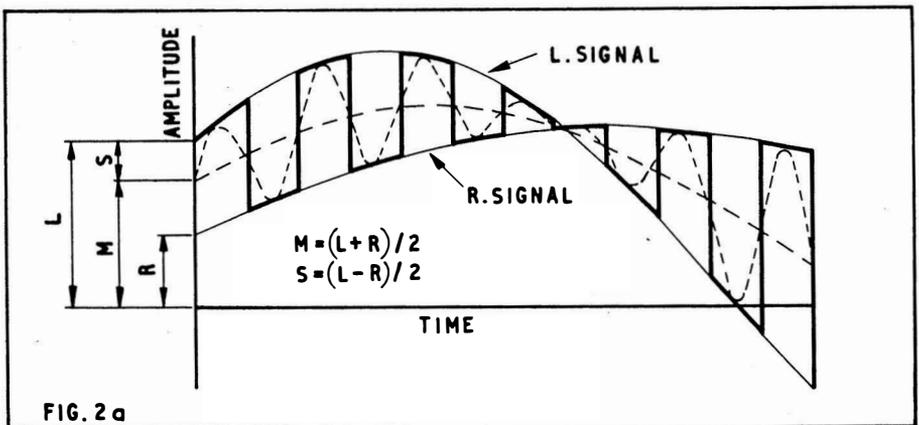


FIG. 2a

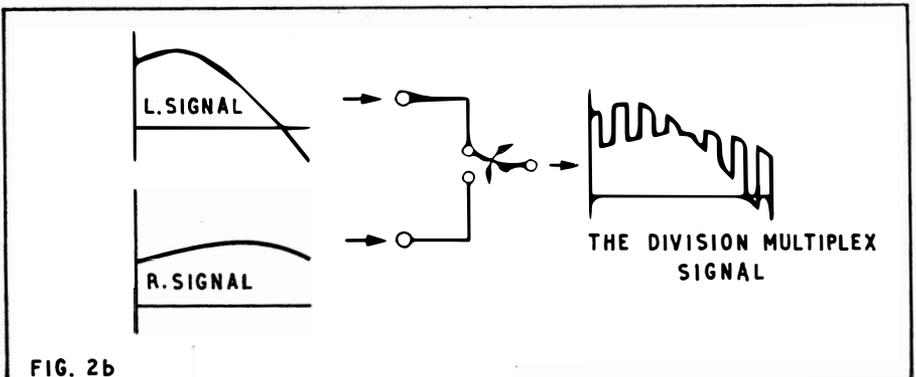
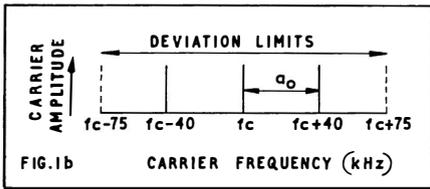


FIG. 2b



wet string as an aerial, but who is unfavourably sited for any FM transmission.

FM TRANSMISSIONS are found in the VHF band 88–108MHz and, some VHF programmes both British and foreign, are available in stereo —indeed, the most important development in FM during the past year has been the introduction of regular stereo broadcasts in the south-east region by the BBC. These complicate both transmission and reception, so before dealing with these processes, let us see how a monophonic programme is transmitted and received using this type of modulation.

Fig 1a shows how modulation is carried out at the transmitter. A simple audio sound, in this case a sine wave of frequency  $f_a$  and peak amplitude  $a_0$ , represented by the full curve 1, is frequency modulating a carrier of mean frequency  $f_c$ , and the diagram shows how the instantaneous carrier frequency (vertical axis) varies with time. It can be seen that the extent to which the carrier deviates from its mean frequency is determined by the amplitude  $a_0$  of the audio signal, while the frequency at which the carrier deviates is the audio frequency. To emphasise these points, curve 2 has been added to show the effect of increasing the amplitude of the audio signal, while curve 3 shows an audio signal of the same amplitude as that of curve 1, but at a lower frequency. In all cases, the amplitude of the carrier is constant. This cannot be deduced from fig 1a, but is shown in fig 1b, where carrier amplitude is plotted against carrier frequency.

Design considerations in transmitters and receivers demand a controlled upper limit to the permissible deviation, and this has been fixed at 75KHz, as indicated in fig1b. This deviation represents the maximum audio amplitude transmitted, and is normally reached only on extreme peaks in the signal.

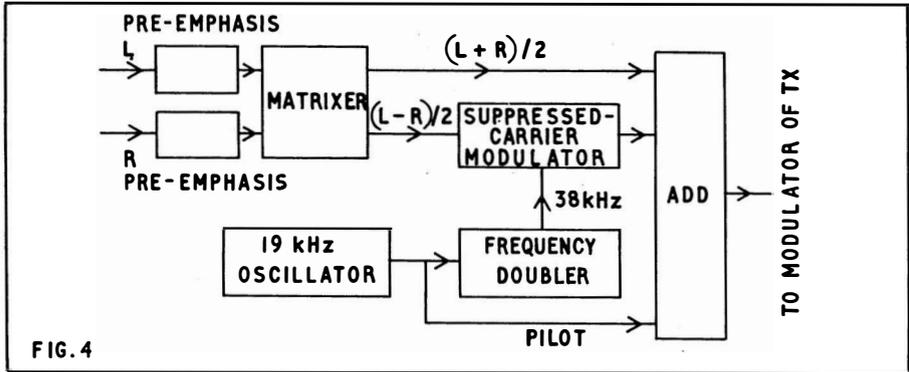
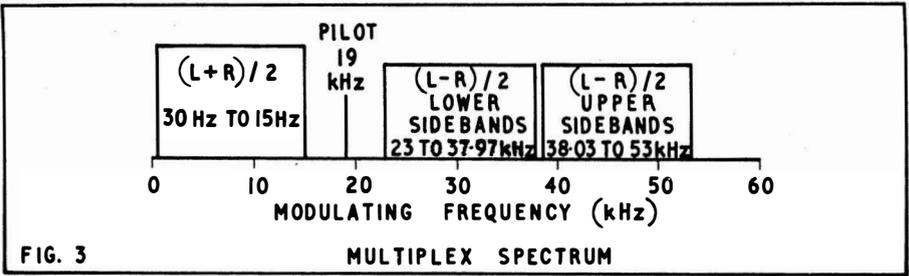
Turning now to the receiver, normal super-heterodyne practice is followed up to and including the I.F stages. Two or three of these are usually provided, the standard I.F being 10.7-MHz. In the receiver any spurious AM on the carrier, especially that due to man-made interference, must be disposed of, and this is best arranged by limiting the output from the last

I.F stage to a fixed level, so that the AM is literally sliced off the waveform. A self-limiting stage is generally used.

The last stage is the demodulator or frequency-discriminator, which gives an output proportional to the deviation from its mean frequency of the I.F, and hence proportional to the carrier deviation. There are three types of discriminator in general use. The most popular (about four out of every five manufacturers) is the ratio detector circuit, because it has inherent limiting capability, and this may allow the omission of the limiting I.F stage. The remaining manufacturers nearly all use the Foster-Seely circuit, which gives the benefit of lower distortion when properly designed and adjusted, but must be preceded by a good limiter. Many people find it difficult to distinguish between these types of discriminator in manufacturers' published circuits—of several differences, the easiest to spot is probably that a Foster-Seely discriminator transformer has two windings (one of which may be tapped), while the ratio-detector has three.

The third discriminator circuit uses the pulse counting arrangement favoured by many amateur constructors but not by any manufacturer, as far as can be discovered. In this type a diode pump circuit charges a small capacitor to the peak value of each limited peak from the last I.F stage, and discharges it into a larger capacitor forming part of a low-pass filter. The voltage across the filter is proportional to the charge conveyed per unit time interval, and hence to the frequency of the charging waveform. The circuit is attractive because it is extremely linear and needs no alignment, but it has a low sensitivity and must follow an efficient limiter. It also demands a low value of I.F, the A.F output being a function of the ratio of maximum to minimum frequency at the discriminator input. On the other hand, too low an I.F prevents proper filtering of the output from the residual I.F component, so that the lower limit must be set at about 100KHz for mono, and twice this figure for stereo working—i.e. the sensitivity for stereo reception is reduced. Further, I.F drift must be very small, so that crystal control or highly efficient afc must be applied to the oscillator.

**STEREO TRANSMISSION:** Let us consider next how stereophonic signals are transmitted. The main requirements to be met are: (1) Transmission must be compatible; i.e. listeners with monophonic receivers must automatically obtain mono signals without modification to their equipment, and without impairment of quality. (2) The stereophonic signals



must be of similar quality to monophonic ones. This implies full A.F bandwidth with low distortion and low cross-talk between channels.

The first requirement is met by adding together the signals from the two input channels and frequency modulating the carrier with their sum. The two inputs used, of course, constitute left- and right-hand information respectively, and may be derived from two (or more) microphones, or from the two outputs of a stereo pick-up or tape-recorder. At the receiver the sum signal is extracted in the usual way, and passed to a monophonic loudspeaker arrangement. The results should be virtually indistinguishable from those obtained when a single source is employed. Lapses from this ideal can occur—e.g. vanishing notes resulting from phase cancellation where widely spaced microphones are used, but these are studio problems, and do not affect the basic validity of the system.

The second requirement is met by transmitting separately the differences between left- and right-hand channels. In the stereo receiver the two transmitted signals (left plus right and left minus right) can be combined to recover the stereo information.

Of the possible systems by which these sum and difference signals can be transmitted, that now used in Britain is the Zenith-G.E. method, adopted also as the FCC standard in the USA. To follow its operation, we may start from fig 2a,

where the amplitudes of two waves, representing left-hand (L) and right-hand (R) channels, respectively, are plotted against time. The square-wave shown between these signals would be that obtained by using a switch to monitor the amplitudes of the two waves alternately. This is time-division-multiplex, and the principle is illustrated in fig 2b.

On looking again at fig 2a, it may be seen that the amplitude of this switching wave is  $(L-R)/2$ , and this signal will be referred to as the S signal (S for stereo). The mean level of the switching wave is the mean of the L and R signals, i.e.  $(L+R)/2$ , which is quite suitable for use as the compatible monophonic signal, and will therefore be called the M signal. Thus we now have available the two essential transmission components. However, a steep-sided switching wave has very high frequency components associated with it, and bandwidth could be saved by not transmitting these. In fig 2a, the dashed curve shows a sine approximation to the original switching wave, and it can be shown that this curve represents a suppressed-carrier A.M version of the S signal. Making use of this, the complete signal to be passed to the modulator of the transmitter can be made up by adding together the M signal and a sub-carrier obtained by amplitude-modulating the switching frequency (38KHz in this case) with the S signal in a suppressed-carrier modulator. To these is

added a third signal, a 19KHz single frequency pilot tone, which will be needed in the receiver to enable the 38KHz sub-carrier to be inserted.

Fig 3 shows the complete spectrum, which is transmitted as a frequency modulation of the main carrier just as any other complex waveform would be. Of a number of possible ways of generating this spectrum, that used by the BBC is shown in fig 4. It will be noted that the 38KHz sub-carrier is generated by frequency doubling the 19KHz pilot tone, and this ensures the maintenance of an accurate phase relationship between the two, as required in the receiver.

To improve the signal/noise ratio at the higher audio frequencies, these are pre-emphasised before transmission, and a corresponding de-emphasis in the receiver restores the original relative levels over the audio spectrum. Pre- and de-emphasis are normally specified in terms of the time-constant of a simple C-R network used for the purpose, the European standard being  $50\mu\text{s}$  (+3 dB pre-emphasis at about 3KHz, rising by 6 dB/octave at higher frequencies). In the case of stereo signals, pre-emphasis is applied separately to L and R channels before matrixing.

It is often convenient to have a mathematical description of the modulation, and this can be given in terms of the instantaneous carrier deviation  $f_D$  as a function of the audio signal instantaneous amplitudes L and R as follows:

$$f_D = 0.9 [0.5(L+R) + 0.5(L-R) \sin \omega t + 0.1 \sin \omega t/2]$$

where  $f_D$  is the deviation as a fraction of 75KHz. For 100% modulation L and R vary in the range  $\pm 1.0$ , and  $\omega/2\pi$  is the sub-carrier frequency (38KHz). The values assigned to L and R should include pre-emphasis.

**STEREO RECEPTION:** We next consider how the receiver deals with the multiplex signal. The first step is to recover the modulating waveform from the main carrier, and this function can be carried out by a normal FM receiver, the wanted waveform appearing, as usual, at the discriminator. It is true that stereophonic reception places more stringent requirements on this part of the chain, but we will return to these later.

Following the discriminator, if monophonic working only is desired, the complete signal is merely passed to the audio amplifier through the normal de-emphasis network, which will get rid of most of the unwanted S signal—if too much were left, it could lead to trouble in the amplifiers in some situations. For stereo working, however, de-emphasis must not be applied until the multi-

plex waveform has been decoded into L and R outputs.

To decode the information, the first essential is to recover the 38KHz sub-carrier which was suppressed in transmission. The 19KHz pilot tone is therefore extracted from the composite signal by means of a tuned circuit, and the 38KHz is then produced either by frequency-doubling the pilot tone, or by using the pilot to lock a local 38KHz generator. Correct and stable phase of the regenerated carrier is essential, and the repeatability and stability of this parameter must be ensured in the design. Some designers provide a control for phase adjustment. It is often labelled "Channel (or Stereo) separation".

The 38KHz carrier is now used in demodulating the S signal and combining it with the M signal. If the terms M+S and M-S are formed, these will be equivalent to  $(L+R)/2 + (L-R)/2 = L/2$  and  $(L+R)/2 - (L-R)/2 = R/2$  respectively or, in other words, the original L and R signals will be correctly sorted out. The process can be carried out by multiplying the multiplex waveform of Eq (1) in a pair of demodulators, by each of the following sine-functions:

$$\begin{aligned} f_a(t) &= \left(\frac{1}{2} + \sin \omega t\right) \\ f_b(t) &= \left(\frac{1}{2} - \sin \omega t\right) \end{aligned}$$

On doing the arithmetic, and discarding terms not comprising audio frequencies, this leads to two outputs of  $L/2$  and  $R/2$  respectively. Unfortunately, this process, although perfectly practicable, would demand rather elegant (and therefore expensive) circuitry, and there is a much easier and cheaper alternative. If we multiply by a square wave at 38KHz, the multipliers become:

$$f_a(t) = \frac{1}{2} + \frac{2}{\pi} \sin \omega t + \frac{2}{3\pi} \sin 3\omega t + \dots \text{higher terms}$$

$$f_b(t) = \frac{1}{2} - \frac{2}{\pi} \sin \omega t - \frac{2}{3\pi} \sin 3\omega t - \dots \text{higher terms}$$

Again doing the sums, taking only terms representing audio products, we finish up with the outputs:

$$\frac{\pi+2}{4\pi} L + \frac{\pi-2}{4\pi} R \quad \text{and} \quad \frac{\pi+2}{4\pi} R + \frac{\pi-2}{4\pi} L$$

in the left- and right-hand channels respectively. We now have cross-talk, because some R signal appears in the L channel, and vice versa, but this can be dealt with fairly simply, as we shall see shortly. Meanwhile, how are we to put this theoretical operation into practice?

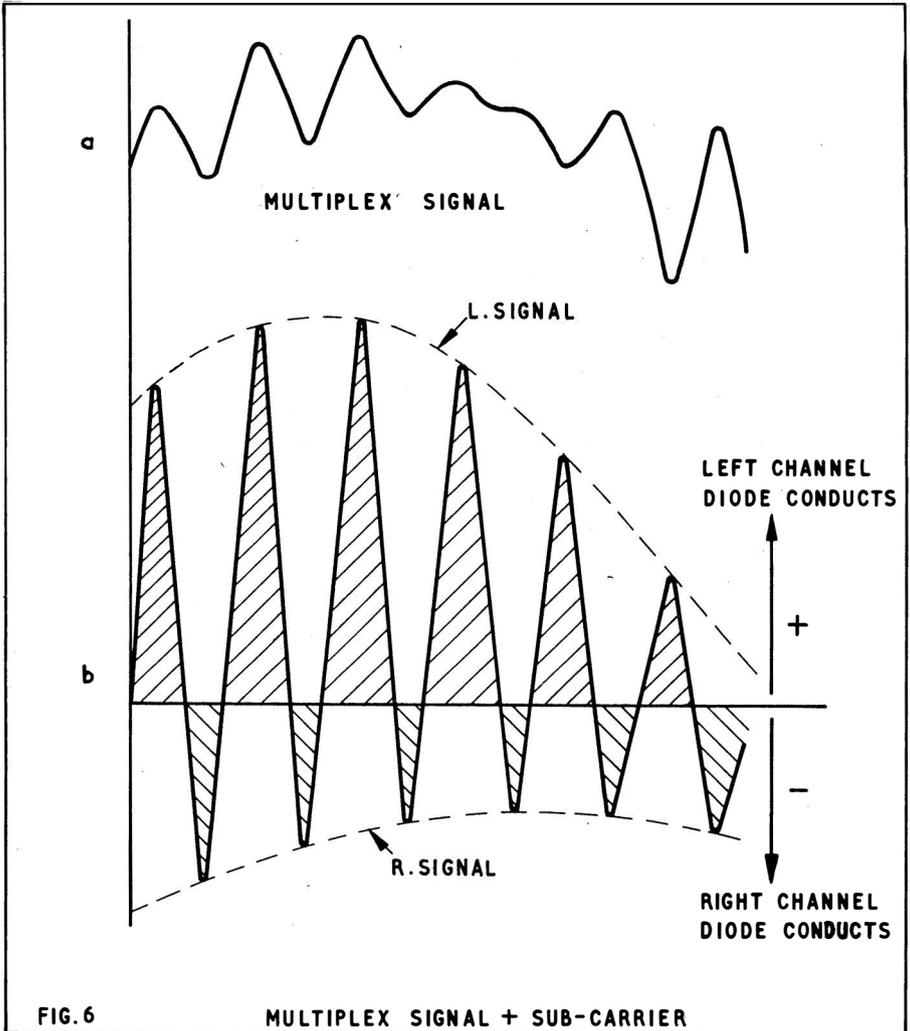
All that is involved is to apply the multiplex signal to the common inputs of a pair of switches

which are turned on and off alternately by the 38KHz sub-carrier, each switch conducting on alternate half-cycles of the 38KHz wave. Fig 5a is a block schematic of the complete decoder, while fig 5b shows simple diode demodulators used in this way. With such a circuit, a large output at carrier frequency and its harmonics will accompany the audio signals, and will have to be filtered out—moreover, if the regenerated carrier is noisy, any such noise lying within the audio band will be reproduced. These disadvantages are largely overcome by using a balanced demodulator such as that shown in fig 5c.

Another way of looking at the demodulation process is indicated in fig 6. The multiplex wave-

form from fig 2a is shown again in fig 6a. If we now add to it a 38KHz sine wave of constant amplitude we obtain the waveform of fig 6b. When this is applied to two diodes so arranged that one conducts on positive and one on negative half-cycles, then their respective outputs will be as indicated by the hatching. The smoothed versions of these (shown dashed) are the required L and R signals. In balanced working, the diodes are switched without the sub-carrier waveform appearing at the output.

The crosstalk inherent in the switching method can be dealt with in at least two ways. The first method is to reduce the amplitude of the M signal with respect to that of the S signal by a factor of  $2/\pi$ . Going through the multiplication



again, but including this modification, will show that this gets rid of the cross-talk terms. A similar result is obtained by subtracting a suitable fraction of the M signal from each output, and this is the method adopted by the *Acoustical Manufacturing Co.* in the Quad decoder shown in **fig 7**. This circuit embodies a balanced demodulator, and the cross-talk correcting signal is taken from the top of the variable resistor in the collector circuit of the input stage Tr1. The emitter of this stage drives the ring demodulator through a low-pass filter. Tr3 is a local 38KHz oscillator, locked by rectified pulses from the pilot amplifier Tr2.

A second method of dealing with cross-talk is the use of a common-mode amplifier, in which a fraction of the signal from each channel is subtracted from the opposite channel to cancel out the cross-talk. A basic circuit is shown in **fig 8**, in which the variable resistor controls the extent of the cross-subtraction. **Fig 9** shows a cunning and effective alternative by *Leak*, who use a single transistor to take a fraction of each output, phase reverse it, and add the result back into both channels again.

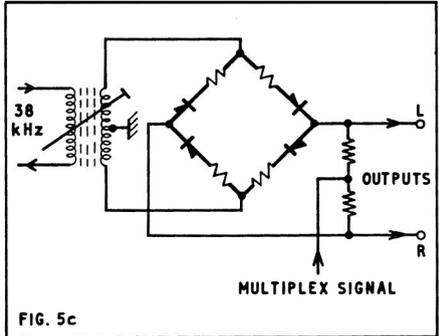
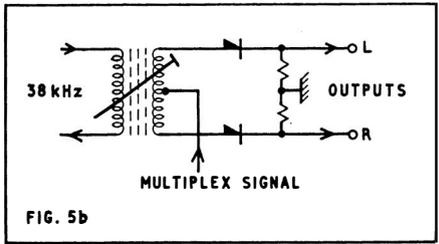
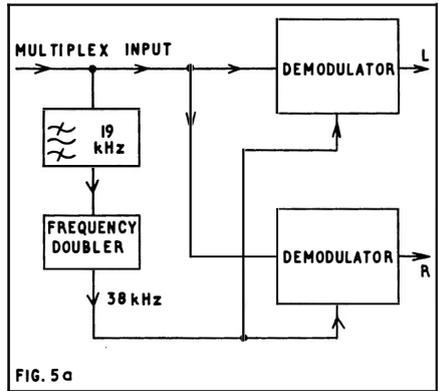
The basic demodulation process discussed here is not the only source of cross-talk, which can arise in many parts of the chain. In particular, the phase of the switching waveform must be correct. Reference to **fig 6** will show that if the 38KHz wave were phase-shifted, there would be a corresponding alteration in the diode conduction periods, and the output to each channel would contain some of the signal intended for the other. It can be shown that the S signal is proportional to the cosine of the sub-carrier phase error, while the M signal is not affected, i.e. cross-talk is introduced. An adjustable correction does enable cross-talk from all sources to be reduced, but it is clearly desirable that the residual cross-talk contribution from each source should be kept as small and as constant as practicable.

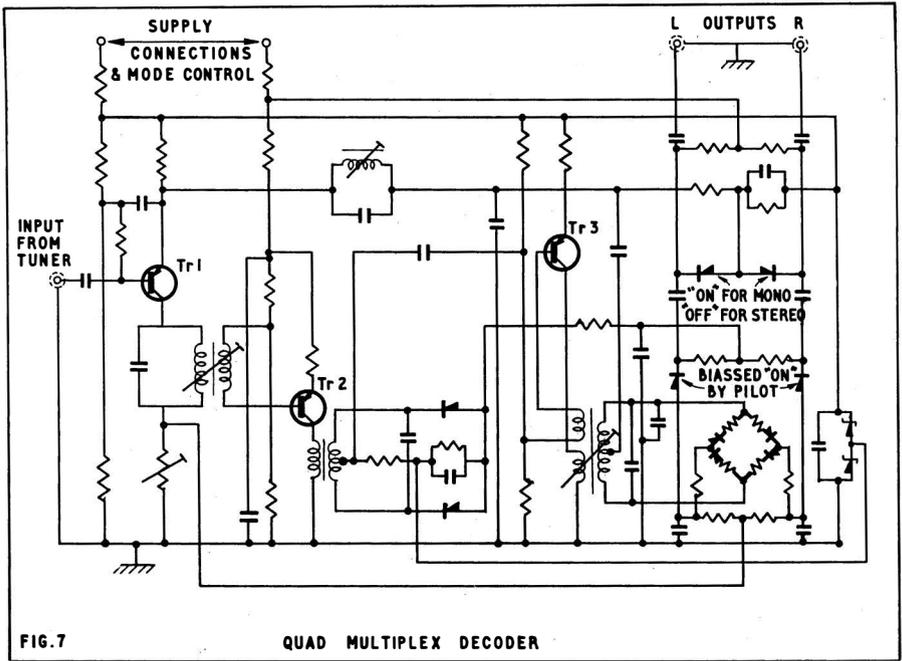
**REVERSE COMPATIBILITY:** Where a stereo decoder is installed, it is convenient if it provides a "double mono" signal (i.e. the same mono signal from each output channel) when a mono programme is received. This function, when carried out automatically in the decoder, is referred to as "reverse compatibility". In the simple arrangement of **fig 5b**, for example, reverse compatibility is not available, and to obtain double mono, the two outputs would have to be connected together, or preferably both diodes would be biased suitably to ensure continuous conduction. If the diodes are replaced by transistors, as in the circuit of the *Heathkit* decoder, part of which is shown in **fig 10**, normal switching and decoding occur

when the 38KHz signal is present, but when it is not, the transistors are both conducting and reverse compatibility is thus obtained.

In some transistor-switch circuits, the transistors are arranged to operate as Class A amplifiers in the absence of the pilot. If the 38KHz is obtained from a locked oscillator, arrangements must be made to switch it off manually or automatically, in the absence of the pilot tone, otherwise the operation becomes noisy, and in the circuit of **fig 10** a switch is provided for this purpose in series with the oscillator supply.

In the *Quad* circuit given in **fig 7**, a clever system of biased diodes is used to link the decoder to the Quad control unit, so that the mono/stereo function is selected by the appropriate push-buttons. Diodes biased by the recti-





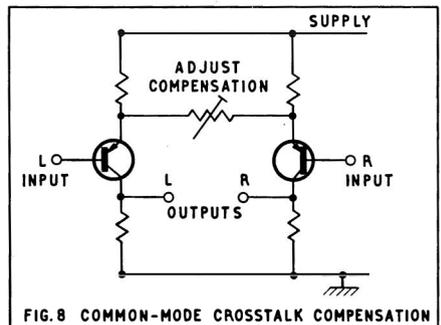
fied pilot tone ensure silence in the "stereo" position unless the pilot tone is present. This allows any programme which is being transmitted in stereo to be quickly found on tuning through the range.

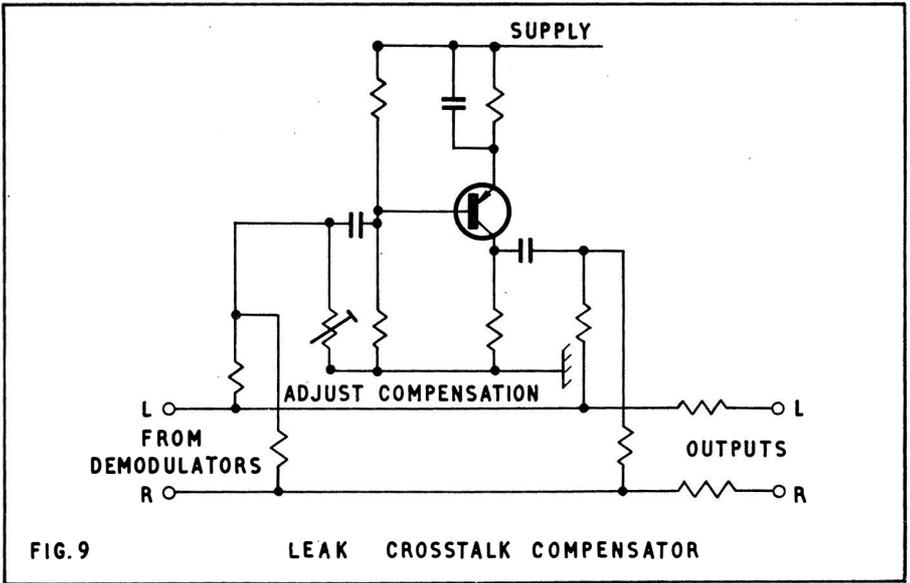
When manual stereo/mono switching is required in any decoder, whether or not there is some degree of reverse compatibility, it is useful to have a warning that a stereo transmission is being received. This is easily provided by a circuit which recognises the presence of the 19KHz pilot and operates a signal lamp accordingly. A typical circuit is shown in **fig 11**. Some Continental makers prefer to derive this indication from the 38KHz doubler stage, and **fig 12** shows the arrangement in the *Bang & Olufsen* Stereo Decoder Type 0001, in which an extra tuned circuit is employed solely for the purpose. The variable resistor controls the sensitivity, and is adjusted so that the circuit is not operated by inter-station noise.

Another alternative in the quest for reverse compatibility is to make the decoder do its own mono/stereo switching, and, again, the 19KHz pilot can be used as a command signal. This method is used in the *Radford* decoder, as fitted to their FMT2 MPX tuner, part of the circuit of which is reproduced in **fig 13**. On opening the auto/stereo switch, TS10 (the doubling stage) will remain cut-off in the absence of pilot tone. If the pilot is present, and exceeds a predeter-

mined acceptable threshold level as set by the user, TS9 conducts, and rectification of the pilot by D6 and D7 turns TS10 on. TS11 is also turned on, and the "stereo on" lamp in series with its collector lights. If the auto/stereo switch is closed, TS10 is held off, and no sub-carrier regeneration can occur, the switching diodes being biased so that reverse compatibility is obtained.

**TUNER REQUIREMENTS:** Having considered the decoder and its facilities, we must see what special requirements it places on the FM tuner it follows. Quite the most important and stringent requirement is that of low signal/noise ratio. It is far from sufficiently realised that the signal/noise ratio for stereo reception is degraded by almost 24 dB when referred to a monophonic





transmission using the same FM receiver without decoder—and this is the *best* that can be achieved. The basic reason for this degradation is that, in the stereo case, the spectrum handled by the receiver is extended to 53KHz, so that noise components associated with the additional bandwidth are demodulated to appear as audio output. The susceptibility of the receiver to all forms of interference is also increased.

For monophonic reception, the degradation in signal/noise ratio is limited to about 4 dB, and most receivers used within service areas are likely to have a noise performance good enough to render this insignificant. However, for stereo reception, especially towards fringe areas, the noise penalty is serious, and the greatest attention is necessary to avoid aggravating the situation by the use of unsuitable equipment.

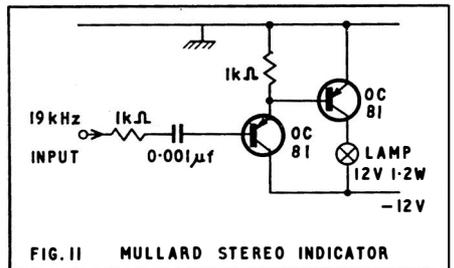
The first consideration should be the aerial and its feeder. The aerial should be efficient, properly orientated and as high as possible, and the feeder should be of the correct type for both aerial and tuner input. Poor aerial systems are all too common, and it cannot be over-emphasised that these often lead to very disappointing results when stereo reception is attempted.

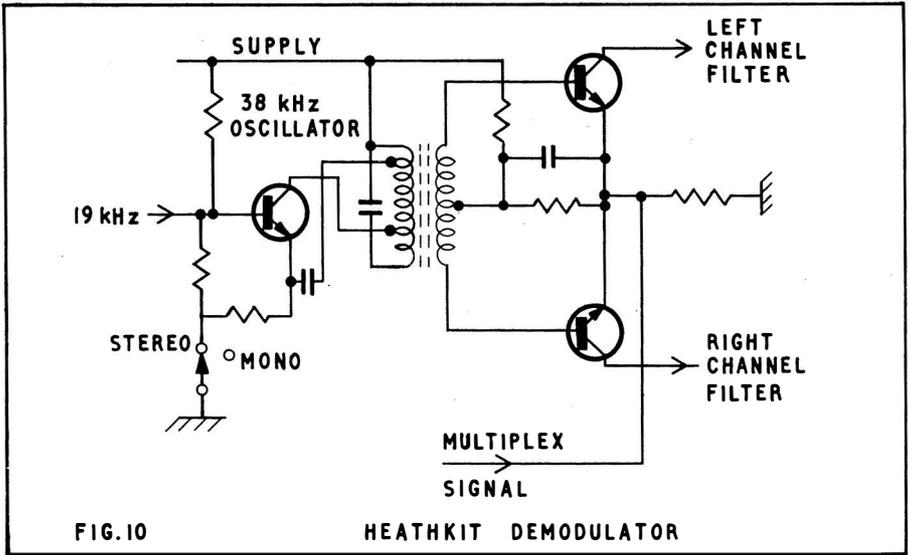
Next comes the receiver, which should have low-noise input, oscillator and mixer stages, and adequate I.F gain before the limiter. The actual gain required will vary with the situation, but one cannot have too much of a good thing, and those in low-signal areas are almost certain to need tuners designed with really adequate noise and gain margins. It is regrettable that some tuners seem noisier than they need be, and may

give rise to difficulty in realising a satisfactory stereo performance in low signal areas.

Finally, the decoder design should minimise any additional noise in this part of the chain. In particular, interference components above 53-KHz may be present in the multiplex signal, and a low-pass filter of cut-off frequency 55KHz should be included to remove these. It should have a constant insertion loss and linear phase characteristic over the whole of the pass-band—in practice a simple passive network with a cut-off frequency of about 55KHz is a good enough approximation to the ideal. If a separate 38KHz oscillator, locked by the pilot, is used, this must be switched off for mono reception, or other arrangements made to prevent switching occurring on the combined channels. If this is not done, the monophonic signal/noise ratio will be considerably degraded.

Another increased requirement placed on the tuner when receiving stereo signals concerns the bandwidth. As we have seen, the modulation





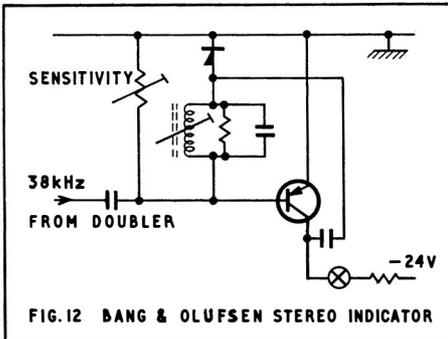
**FIG. 10**

frequencies extend to 53KHz, and the overall response characteristic of the tuner including the demodulator should be constant in amplitude and linear in phase up to this frequency. If this requirement is not achieved, additional cross-talk will be introduced. Hence some widening of the I.F bandwidth over that required for the mono case is theoretically desirable, but, if carried too far, may give rise to adjacent channel interference which is more objectionable than the cross-talk, especially as the latter can be compensated to a large extent by the methods already described. The tendency, therefore, is to use similar I.F stages in both monophonic and stereo practice.

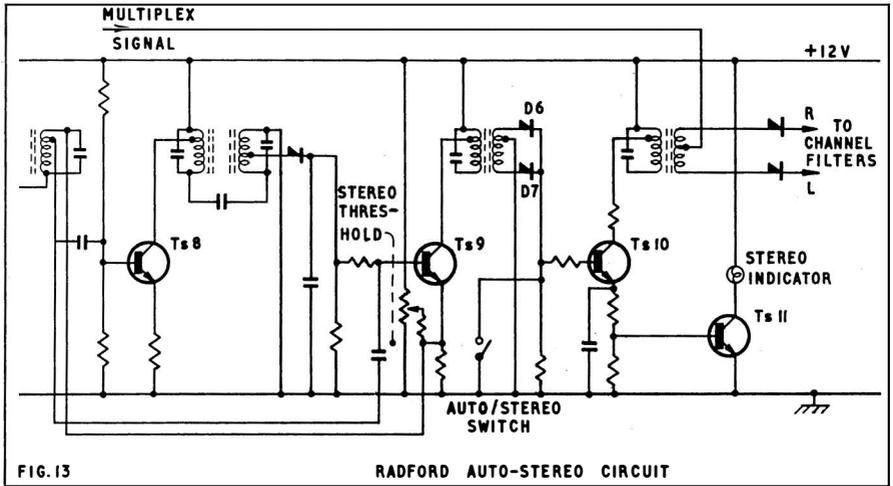
Those who wish to delve more deeply into the details and background of stereo reception should consult the excellent paper: "Stereo-*phonic broadcasting and reception*" by J. G. Spencer and G. J. Phillips, "Radio and Electronic Engineer," June 1964, pp. 399-416.

**TUNER FACILITIES:** In addition to the decoder facilities already discussed, one or two refinements can also be provided in the basic tuner, and these are concerned with the tuning arrangements. Aural tuning of an FM receiver is not at all satisfactory, because the discriminator has a flat response, and it is very difficult to judge the mid-setting. Some form of tuning indication is therefore essential, and most indicators make use of the fact that the dc output at the discriminator passes through zero at the correct tuning point. Some makers use a meter directly operated by this dc component while others use "magic eye" devices or pairs of discharge tubes operated indirectly through amplifiers. It is essential that any such arrangement should be very stable, because it will be implicitly trusted by the user—who (generally) has no means of checking it anyway. The tuning itself must also be stable for, apart from the annoyance of having to fiddle with it at frequent intervals, a slow drift may give rise to unnecessarily poor reception before the need to correct it is noticed. Oscillators of adequate stability can be, and are, made, and the intending purchaser should satisfy himself on this point.

A further help is automatic frequency control, now available on a number of tuners. The afc control is obtained from the dc output at the discriminator, and this is used to vary the local oscillator frequency. One way of doing this is to use a junction diode, whose capacitance is a function of the bias applied to it, as part of the tuning capacitance, the dc bias being obtained from the discriminator. **Fig 14** shows the relevant parts of the *Truvox* FM100 tuner in which this



**FIG. 12 BANG & OLUFSEN STEREO INDICATOR**



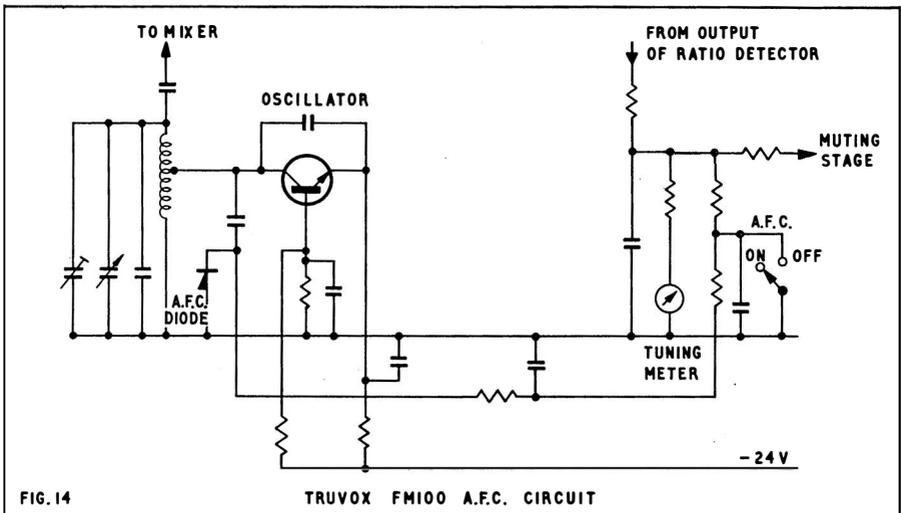
method is adopted. Many makers continue to use the old reliable favourite, a reactance valve, which is now well enough known to need no explanation here.

It should be noted that afc is no substitute for a stable oscillator, and it is desirable to put the afc out of action while tuning, which should be carried out as accurately as possible. These precautions are needed to avoid unwittingly extending the afc too close to the end of its pull-in range, leading to unstable working.

Most manufacturers seem to avoid switched-station tuning as one would the plague. It is difficult to see why this is so, and one would have thought this system attractive to many users who are quite content with their local pro-

grammes, and who have no wish to climb their chimney stacks every hour or so to alter the orientation of their aerials for a different group of programmes. (Yes, there *are* other ways of doing it, but not for the average listener!) The *Rogers Mk III* tuner provides this switching facility, and so do some *Jason* tuners, which can also receive television sound programmes. It should be noted that switched tuning also demands high oscillator stability, and some form of tuning indication is still necessary when the pre-setting of the tuning is being carried out.

No attempt has been made to discuss the extra controls and facilities associated with tuner/amplifiers, which would need another article to themselves. However, the various



requirements and facilities dealt with here can all be applied, more or less directly, to the tuner sections of tuner/amplifiers.

**GENERAL CONSIDERATIONS:** Finally we come to one or two very general queries frequently raised by prospective owners. One of the most frequent is—"should I buy a valve or transistor model?" A few specific comments may help here. First, as far as a decoder is concerned, whether a separate unit or built into a tuner, there is little choice—nearly all manufacturers have transistorised this bit! This is no bad thing either, since transistors can do switching jobs very efficiently; and they consume little power which can be derived, in general, from valve or transistor power supplies. In practice, most decoders are designed to work with particular tuners so, if in doubt about a proposed combination, the makers or a good dealer should be consulted before purchasing.

In the case of the tuner, a spot check on twenty products from well-known makers shows an eleven-to-six majority in favour of transistors, with three makers using both. There is no doubt

at all that equally good designs are possible with valves or transistors, and many features of solid-state circuits, such as low power consumption, cool running and good reliability, are a great advantage. It is probably true to say, however, that if there is any skimping in the design, or if devices of marginal performance are incorporated, the transistor version is likely to fare worse. The moral, of course, is to know your manufacturer; or, if not, to deal with one who has a reputation to lose! It is also worth bearing in mind that, although the best is not necessarily the most expensive, no manufacturer can afford to offer superb equipment at give-away prices. Quality must, in general, be paid for.

The man who does not yet own a stereophonic outfit may wonder whether a stereo tuner is worth consideration. He would be very well advised to make sure that any tuner he buys has a performance adequate for stereo working, and that it is at least possible to fit it subsequently with a decoder. It will cost him little or nothing extra now, and may save quite a few pounds (per square inch) of blood pressure when, converted to stereo records, he then has to replace a tuner before he can enjoy stereo radio!

# DIRECTORY OF PICKUPS AND ARMS

★ In the abridged specifications of this directory, the following abbreviations are used for economy of space: **Pw**=recommended playing weight; **mg**=milligram; **gm**=gram; **Rec load**=recommended resistive load; **mV**=millivolt. In all cases where decibel limits for frequency response and frequency for stated separation are given by manufacturer, these are included. Output is usually referred to a recorded velocity of 1 cm/sec; this figure should be multiplied by five for the practical music output. ● denotes stereo equipment.

**AUDIO AND DESIGN LTD.**, 40 Queen Street, Maidenhead, Berks. Tel: Maidenhead 25204.

**Laboratory 9.** 9 in. pickup arm designed for low-mass ultra-high compliant cartridges tracking at very low stylus pressures. Damped uni-pivot arm with no lead-out wires. Bias correction and lifting device incorporated. Lathe base all fully adjustable by finger locking levers. Price: £25 (U.K. purchase tax £4 7s. 1d.).

**Laboratory 12.** 12 in. version for professional use available to special order. Price on request.



**AUDIO DYNAMICS CORPORATION**, New York, U.S.A. Sole U.K. agents: KEF Electronics Ltd., Tovil, Maidstone, Kent. Tel: Maidstone 58361. Cables: KEF, Maidstone.

● **ADCpoint four.** Stereo cartridge. Induced magnet.  $\frac{1}{2}$  in. fixing centres. Stylus 0.4 thou diamond. Pw  $\frac{3}{4}$ -1 $\frac{1}{2}$  gm. Compliance  $30 \times 10^{-6}$  cm/dyne. Range 10 c/s-20 Kc/s  $\pm 2$  dB. Separation 30 dB from 50 c/s-8 Kc/s. Output 1 mV. Rec load 47K. 15° vertical tracking angle. For use only with the ADC 40 arm. Price: £20 10s. (U.K. purchase tax £3 12s. 4d.).

● **ADC point four/E.** Similar specification to ADC point four but with elliptical stylus  $0.2 \times 0.8$  thou. Price: £25 (U.K. purchase tax £4 8s. 2d.).

● **ADC 660.** Stereo cartridge. Induced magnet. For use with all high grade arms. Stylus 0.5 thou diamond. Sensitivity 7 mV at 5.5 cm/sec. FR 10 c/s-20 Kc/s  $\pm 3$  dB. 15° tracking angle. Pw  $1\frac{1}{2}$ -4 gm. Compliance  $20 \times 10^{-6}$  cm/dyne. Weight 7 gm. Separation 30 dB 50 c/s to 8 Kc/s. Price: £12 (U.K. purchase tax £2 2s. 4d.).

● **ADC 660/E.** Similar specification to ADC 660 but with elliptical stylus  $0.2 \times 0.8$  thou and playing weight  $1\frac{1}{2}$ -3 gm. Price: £17 4s. (U.K. purchase tax £3 0s. 8d.).

● **ADC 770.** Stereo cartridge. Induced magnet. For use with good quality automatic turntables

and record changers. Sensitivity 8 mV at 5.5 cm/sec. Separation 30 dB 50 c/s to 8 Kc/s. FR 10 c/s-20 Kc/s  $\pm 3$  dB. Stylus 0.7 thou diamond. Vertical tracking angle 15°. Pw 2-6 gm. Compliance  $15 \times 10^{-6}$  cm/dyne. Weight 7 gm. Price: £9 (U.K. purchase tax £1 11s. 8d.).

**ADC 40 Mk II.** Complete low inertia arm with side thrust compensator and anti-drag lead out arrangement. Single-thrust ball bearings used at four points. Accurately machined walnut non-resonant arm. Adjustable counter-weight. Plug-in head shell accommodates nearly all cartridges. Easy installation. Built-in arm rest. Arm length  $10\frac{3}{8}$  in. overall. Pivot to stylus tip 9 in. Rear overhang  $1\frac{1}{4}$  in. Price: £15 15s. (U.K. purchase tax £2 15s. 6d.).

● **ADC 10/E.** Stereo cartridge. Induced magnet. Sensitivity 4 mV at 5.5 cm/sec. Separation 30 dB 50 c/s-10 Kc/s. FR 10 c/s-20 Kc/s  $\pm 2$  dB. Stylus  $0.7 \times 0.3$  thou diamond. Vertical tracking angle 15°. Pw  $\frac{1}{2}$ -1 gm. Compliance  $35 \times 10^{-6}$  cm/dyne. Cartridge weight 7 gm. Designed for use only with the ADC 40 arm. Price: £32 12s. (U.K. purchase tax £5 18s. 9d.).

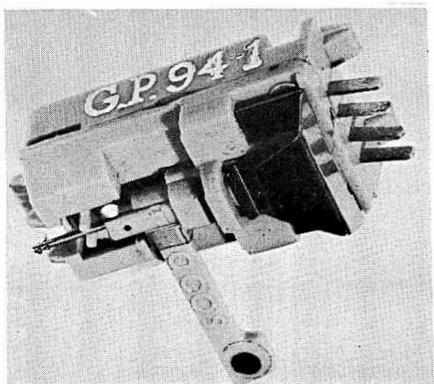


**AUDIO-TECHNICA.** Distributors: Shiro (U.K.) Ltd., 5 Queen Street, London, E.C.4.

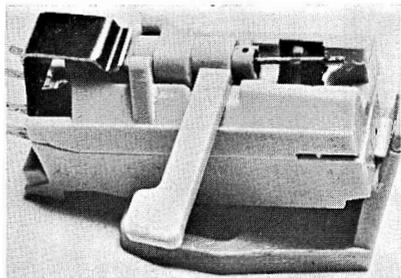
● **AT-3.** Stereo moving-magnet cartridge. Stylus 0.5 or 0.7 thou diamond. FR 20 c/s-21 Kc/s  $\pm 2$  dB. Separation 28.5 dB at 1 Kc/s, 23 dB at 10 Kc/s. Output 5 mV. Compliance  $22 \times 10^{-6}$  cm/dyne. Pw 2 gm. Price: £7 8s. 6d. (including U.K. purchase tax).

● **AT-3/E.** As AT-3 but with elliptical stylus  $0.3 \times 0.7$  thou. Price: £11 18s. 6d. (including U.K. purchase tax).

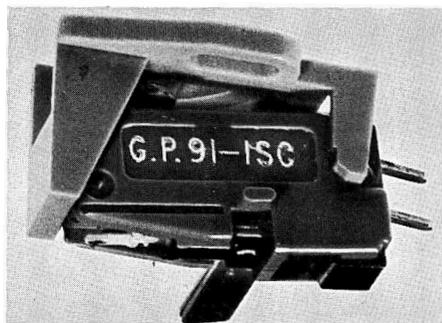
● **AT-5.** Stereo moving-magnet cartridge. Stylus 0.5 or 0.7 thou diamond. FR 10 c/s-21 Kc/s  $\pm 2$  dB. Separation 30 dB at 1 Kc/s, 25 dB at 10 Kc/s. Output 5 mV. Compliance  $28 \times 10^{-6}$  cm/dyne. Pw 1 gm. Price: £11 19s. 6d. (including U.K. purchase tax).



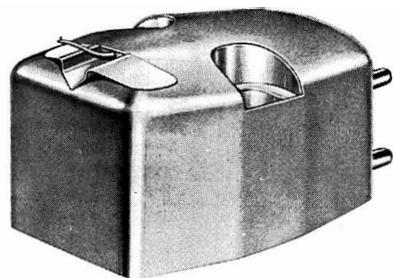
*Acos GP94-1 cartridge*



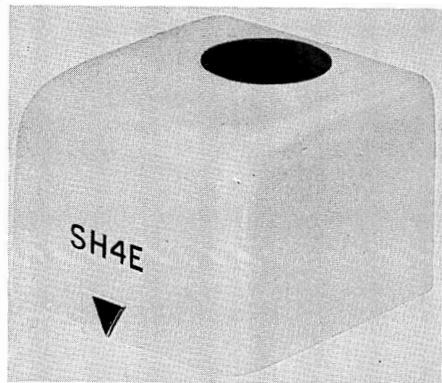
*Acos GP93 crystal stereo*



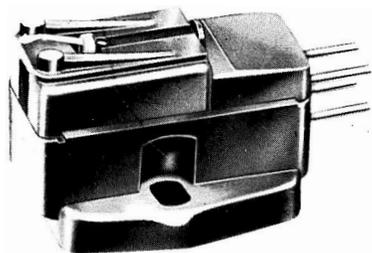
*Acos GP91-ISC*



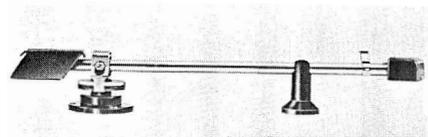
*ADC professional cartridge*



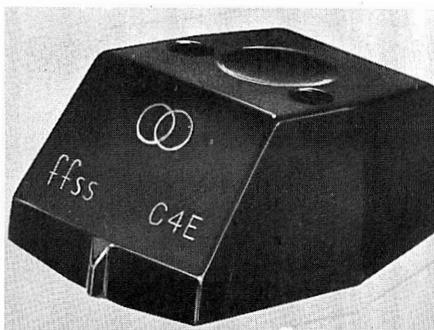
*Decca SH4E Mk 4*



*Connoisseur stereo ceramic cartridge*



*Decca Mk. I "Super" arm and head*



*Decca C4E Mk 4*

● **AT-5/E.** As AT-5 but with elliptical stylus 0.3 × 0.7 thou. Price: £16 15s. (including U.K. purchase tax).

● **AT-6.** Stereo moving-magnet cartridge. Stylus 0.5 or 0.7 thou diamond. FR 20 c/s-20 Kc/s ± 2 dB. Separation 25 dB at 1 Kc/s, 20 dB at 10 Kc/s. Output 5 mV. Compliance 20 × 10<sup>-6</sup> cm/dyne. Pw 3 gm. Price: £4 19s. 6d. (including U.K. purchase tax).

● **AT-6/E.** As AT-6 but with elliptical stylus 0.3 × 0.7 thou. Price: £8 9s. (including U.K. purchase tax).



**BANG & OLUSEN U.K. DIVISION,** Eastbrook Road, Gloucester. Tel: Gloucester 21591.

● **SP6, SP7, SP8, SP9.** Stereo cartridges. Moving iron. Pw 1-3 gm. Tip mass 1.5 mg. Compliance 12-15 × 10<sup>-6</sup> cm/dyne. FR 20 c/s-20 Kc/s ± 2.5 dB. Separation approx 28 dB at 500 c/s. Output 7 mV per channel at 5 cm/sec. Rec load 47K. Diamond stylus. Fully shielded. Stylus protected against damage if arm dropped on record. Replaceable stylus assembly. SP6 for standard ½ in. fixing centres. SP7 plug-in fitting for B & O arms. SP8 and SP9 similar to SP6 but with elliptical stylus and gold plated. Price: SP6 and SP7 £7 1s. 6d. (U.K. purchase tax £1 6s. 6d.); SP8 and SP9 £12 8s. (U.K. purchase tax £2 6s.).

● **Stereodyne SP.1 and SP.2.** Stereo cartridge. Moving iron. Plug-in. Stylus 0.7 thou diamond. Pw 2-4 gm. Rangé 30 c/s-15 Kc/s ± 2 dB. Separation 22 dB min. Output 7 mV. Rec load 47K. Price: £5 5s. (U.K. purchase tax 16s. 6d.). Replacement styli: 0.5, 0.7, 1.0, 3.0 thou diamond. Price: £2 4s. 3d. (U.K. purchase tax 8s. 3d.).

● **ST/L.** 9 in. pickup arm, less cartridge. Price: £6 6s. (U.K. purchase tax 18s. 3d.).

● **ST/P arm.** Professional 12 in. arm. Price: £8 2s. (U.K.) purchase tax £1 7s.).



**BSR LTD.,** Monarch Works, Powke Lane, Old Hill, Staffs. Tel: Cradley Heath 69272. Telex: 33282.

● **C.1.** Ceramic stereo turnover cartridge. Stylus: sapphire or diamond, .0007 LP/stereo, .0025/78. Pw 2-6 gm. Lateral and vertical compliances 5 × 10<sup>-6</sup> cm/dyne and 3 × 10<sup>-6</sup> cm/dyne. FR 20 c/s-10 Kc/s ± 2 dB, up to 15 Kc/s -6 dB. Output 0.11V ± 2 dB. Load impedance 2 meg-

ohms 100 pF. Prices: with sapphires £2 (U.K. purchase tax 7s.); with diamond LP £2 12s. 6d. (U.K. purchase tax 9s. 3d.).



**BURNE-JONES & COMPANY LTD.,** 18 Brunswick Road, Sutton, Surrey.

**B.J. Tan/11 arm.** Designed to overcome tracking error. Total tracking error less than ½ degree. Height adjustable. Price on application.

**B.J. Super 90 Mk. II pickup arm.** Two models. 12 in. and 16 in. Price (including plug-in shell to carry standard cartridges) on application.



**CONNOISSEUR.** See A. R. Sugden and Co. Ltd.



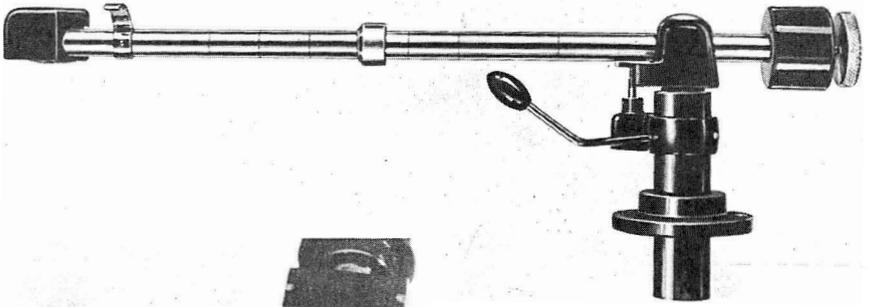
**COSMOCORD LTD.,** Eleanor Cross Road, Waltham Cross, Herts. Tel: Waltham Cross 27331. Cables: Acos, Waltham Cross.

● **ACOS GP77 Stereo.** Ceramic. For Hi-Light pickup. FR 50 c/s-15 Kc/s ± 3 dB. Output 30 mV/cm/sec. Separation -20 dB at 1 Kc/s. Rec input impedance 2 megohms or higher. Pw 2 gm. Compliance 6 micro-cm/dyne. Effective tip mass 0.9 mg. Diamond stylus, 0.5 thou. Price: (with diamond stylus) £2 6s. 6d. (U.K. purchase tax 8s. 2d.).

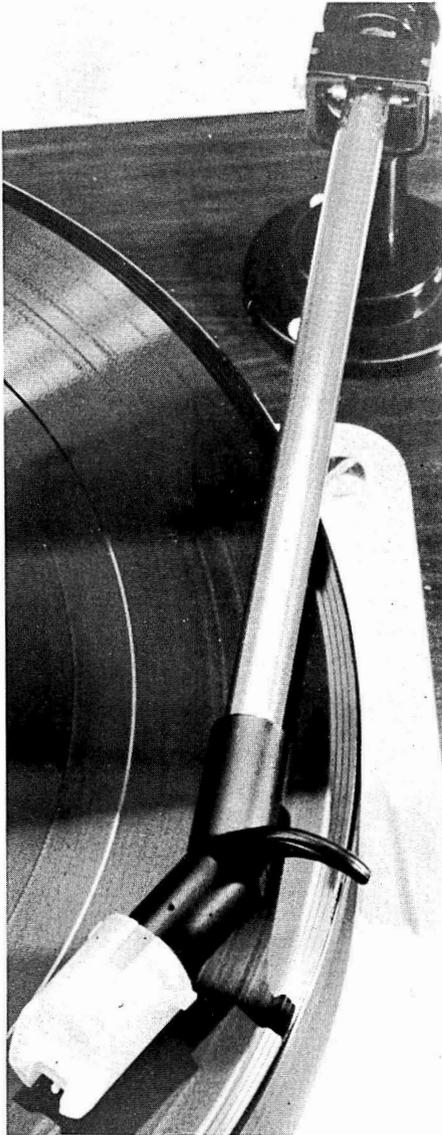
● **Acos GP77 Mono LP.** Ceramic. FR 50 c/s-18 Kc/s ± 3 dB. Rec input impedance 2 megohms. Pw 2 gm. Compliance 6 micro-cm/dyne. Effective tip mass 0.9 mg. Diamond stylus, 1.0 thou. Price: (with diamond stylus) £2 6s. 6d. (U.K. purchase tax 8s. 2d.).

**Acos GP77 Mono 78.** Specification as for LP head. Sapphire stylus, 2.5 thou. Price: (with sapphire stylus) £1 11s. (U.K. purchase tax 5s. 6d.).

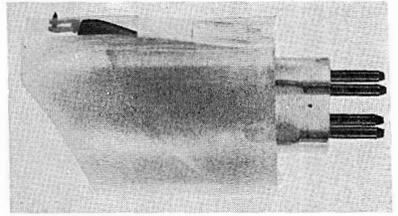
**Acos GP91-1.** Mono crystal cartridge. Turn-over dual stylus. LP 0.8 thou diamond or sapphire, 78 2.5 thou sapphire. Pw 3-6 gm. Tip mass 2.5 mg dynamic. Compliance 5 × 10<sup>-6</sup> cm/dyne. FR 30 c/s-20 Kc/s. Output 160 mV. Load impedance 1 megohm. Low temperature co-efficient. Price: (sapphire/sapphire) £1 7s. 6d. (U.K. purchase tax 4s. 10d.); (diamond/sapphire) £1 16s. 1d. (U.K. purchase tax 6s. 5d.).



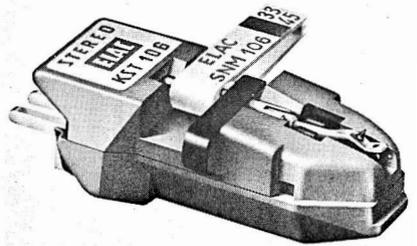
*Decca JFS professional arm and head*



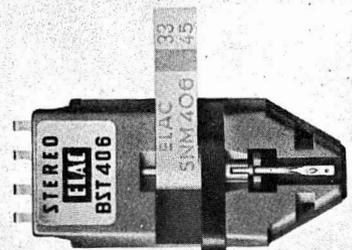
*Decca Anti-Rumble pickup*



*Decca Deram cartridge*



*Elac KST 106 cartridge*



*Elac BST.406 cartridge*

**Acos GP92.** Mono ceramic cartridge. Turnover stylus assembly. LP 0.8 thou diamond or sapphire, 78 2.5 thou sapphire. Pw 5-10 gm. Tip mass 2.5 mg dynamic. Compliance  $2.5 \times 10^{-6}$ . FR 150 c/s-16 Kc/s  $\pm 3$  dB, 12 dB down at 30 c/s relative to 1 Kc/s. Output 100 mV. Load impedance 1 megohm. Low temperature co-efficient. Price: (sapphire/sapphire) £1 10s. (U.K. purchase tax 5s. 3d.); (diamond/sapphire) £2 (U.K. purchase tax 7s.).

● **Acos GP93.** Stereo crystal cartridge. Turnover dual stylus. Stylus 0.6-0.7 thou diamond or sapphire, 2.5 thou sapphire. Pw 4-8 gm. Tip mass 2.5 mg dynamic. Compliance: vertical  $2.2 \times 10^{-6}$  cm/dyne, lateral  $2.2 \times 10^{-6}$  cm/dyne. FR flat 250 c/s-18 Kc/s, 3 dB down at 100 c/s relative to 1 Kc/s. Output 250 mV. Rec load 1 megohm. Low temperature co-efficient. Price: (sapphire/sapphire) £2 (U.K. purchase tax 6s. 10d.); (diamond/sapphire) £2 10s. (U.K. purchase tax 8s. 10d.).

● **Acos GP94.** Stereo ceramic cartridge. Turnover dual stylus. Stylus 0.6-0.7 thou diamond or sapphire, 2.5 thou sapphire. Pw 2-4 gm. Tip mass 2.5 mg dynamic. Compliance: lateral  $6 \times 10^{-6}$  cm/dyne, vertical  $6 \times 10^{-6}$  cm/dyne. FR Flat 100 c/s-12 Kc/s, 7-8 dB down at 30 c/s relative to 1 Kc/s. Separation 20 dB at 1 Kc/s, 8 dB at 10 Kc/s, minimum. Output 80 mV minimum. Load impedance: 1 megohm each channel. High capacity ceramic elements (1,000 pF). Low temperature co-efficient. Price: (sapphire/sapphire) £2 5s. (U.K. purchase tax 7s. 11d.); (diamond/sapphire) £2 15s. (U.K. purchase tax 9s. 8d.).

**Acos 91-1 SC.** Mono/stereo compatible crystal cartridge. Turnover dual stylus. Pw 3-6 gm. Tip mass 2.5 milligram (sapphire), 2.8 milligram (diamond). Compliance: vertical  $2 \times 10^{-6}$  cm/dyne, lateral  $4 \times 10^{-6}$  cm/dyne. FR 50 c/s-12 Kc/s. Output 178 mV. Rec load 1 megohm. Price: (sapphire/sapphire) £1 7s. 6d. (U.K. purchase tax 4s. 5d.); (diamond/sapphire) £1 16s. 1d. (U.K. purchase tax 5s. 10d.).

● **Acos GP95.** Specification and price as GP93. Stylus (LP) 0.7-0.8 thou; (stereo/LP) 0.6-0.7 thou.

● **Acos GP96.** Specification and price as GP94. Stylus (LP) 0.7-0.8 thou; (stereo/LP) 0.6-0.7 thou.



**DECCA SPECIAL PRODUCTS.** Decca Radio and Television Division of The Decca Record Co. Ltd., Ingate Place, Queenstown Road, London, S.W.8. Tel: Macaulay 6677.

● **Deram ceramic.** Stereo/mono cartridge. White shell transcription quality. Pw 2.5 gm. Tip mass 0.6 mg. Compliance  $9 \times 10^{-6}$  lateral,  $5 \times 10^{-6}$  vertical. FR 18 c/s-18 Kc/s  $\pm 3$  dB. Separation better than  $-20$  dB at 1 Kc/s. Output 50 mV per channel. Rec load impedance 2 megohms. Stylus 0.5-0.6 thou diamond. Price: £4 0s. 4d. (U.K. purchase tax 14s. 2d.).

NOTE: All Deram cartridges are of transcription quality, the black shell range intended primarily for cheaper auto-changers is discontinued.

**Deram ceramic.** Mono cartridge. Stylus 1 thou diamond. All other details as for stereo/mono cartridge. Price: £4 0s. 4d. (U.K. purchase tax 14s. 2d.).

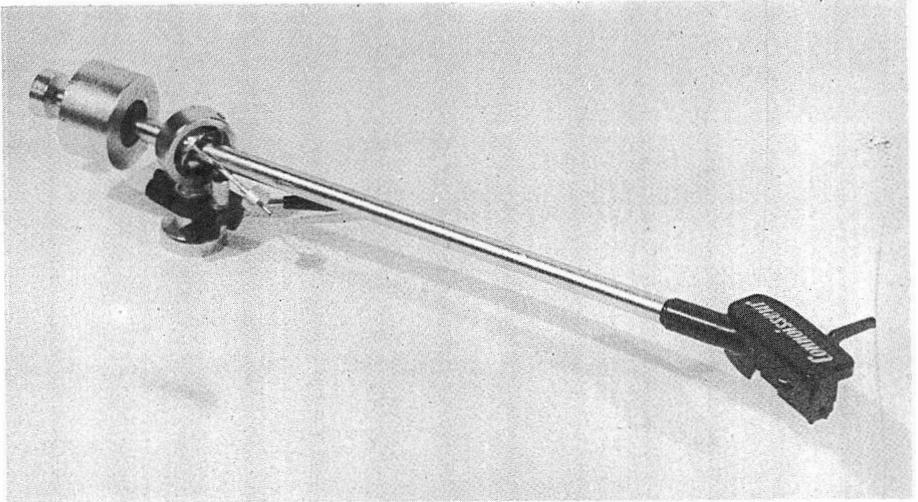
**Deram ceramic.** Mono 78 cartridge. Stylus 3 thou sapphire. All other details as for stereo/mono Deram. Price: £2 8s. 10d. (U.K. purchase tax 8s. 8d.).

● **ffss Mk II head.** Variable reluctance stereo/mono head. FR 40 c/s-16 Kc/s  $\pm 1$  dB. Separation  $-20$  dB at 1 Kc/s;  $-15$  dB at 50 c/s and 12 Kc/s. Output 1.2 mV/cm/sec per channel. Stylus 0.5 thou diamond. Pw 3.5 gm. Tip mass less than 1 mg. Compliance  $10 \times 10^{-6}$  lateral,  $2 \times 10^{-6}$  vertical. Rec load 50K. Price: £12 18s. 10d. (U.K. purchase tax £2 5s. 8d.).

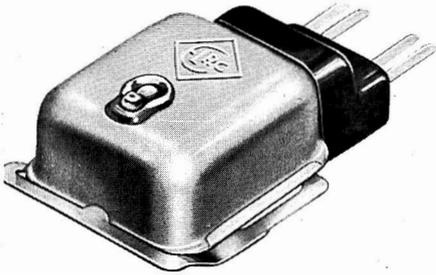
● **ffss Mk III head.** Variable reluctance stereo/mono head. Stylus 0.3  $\times$  0.7 elliptical diamond. Pw 2 gm. Compliance  $15 \times 10^{-6}$  lateral,  $4 \times 10^{-6}$  vertical. FR 20 c/s-16 Kc/s  $\pm 1$  dB. Other details as for Mk II. Price: £15 12s. 5d. (U.K. purchase tax £2 15s. 1d.).

● **ffss Mk IV head H4E.** Variable reluctance stereo/mono head. FR 20 c/s-20 Kc/s (20 c/s-16 Kc/s  $\pm 2$  dB). Separation as for Mk III. Output 5 mV at 5 cm/sec per channel. Stylus 0.3  $\times$  0.65 thou elliptical diamond. Pw 1-2½ gm. Compliance  $30 \times 10^{-6}$  lateral,  $6 \times 10^{-6}$  vertical. Rec load 50K. Output from each channel balanced within 1 dB. Price: £17 17s. (U.K. purchase tax £3 3s.).

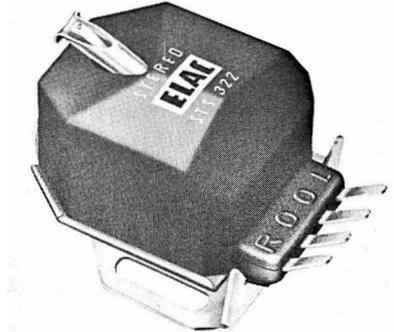
● **ffss Mk IV head SH4E.** Variable reluctance stereo/mono head. FR 20 c/s-20 Kc/s  $\pm 2$  dB. Separation as for Mk III. Output 5 mV at 5 cm/sec per channel. Stylus 0.3  $\times$  0.65 thou elliptical diamond. Pw 1-2½ gm. Compliance  $30 \times 10^{-6}$  lateral,  $6 \times 10^{-6}$  vertical. Rec load 50K. Output from each channel balanced within 1 dB. Price: £25 17s. 8d. (U.K. purchase tax £4 11s. 4d.).



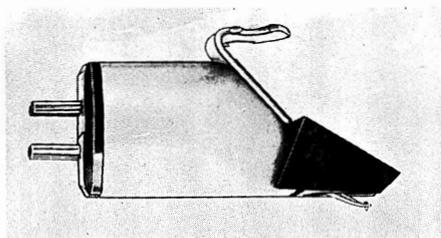
*Connoisseur SAU II pickup arm*



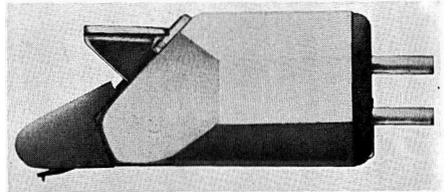
*Elac MST 1 mono*



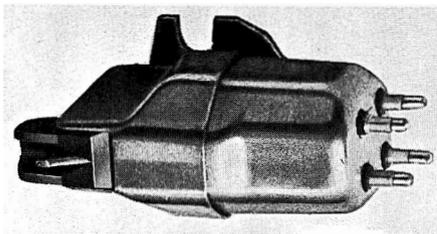
*Elac STS 322 cartridge*



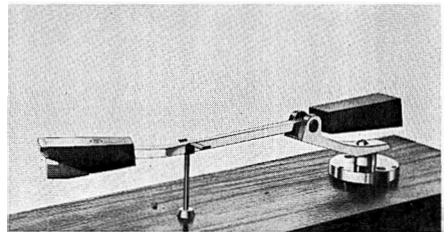
*Empire Scientific 808*



*Empire Scientific 888SE*



*Empire Scientific 880P*



*Goldring G65 pickup*

● **ffss Mk IV cartridge C4E.** Stereo/mono cartridge. FR 20 c/s-20 Kc/s (20 c/s-16 Kc/s  $\pm 2$  dB). Separation as for Mk III. Output 5 mV at 5 cm/sec per channel. Stylus 0.3  $\times$  0.65 thou elliptical diamond. Pw 1-2½ gm. Compliance 30  $\times$  10<sup>-6</sup> lateral, 6  $\times$  10<sup>-6</sup> vertical. Rec load 50K. Output from each channel balanced within 1 dB. Price: £17 17s. (U.K. purchase tax £3 3s.).

● **ffss Mk IV cartridge SC4E.** Stereo/mono cartridge. FR 20 c/s-20 Kc/s  $\pm 2$  dB. Separation as for Mk III. Output 5 mV at 5 cm/sec per channel. Stylus 0.3  $\times$  0.65 thou elliptical diamond. Pw 1-2½ gm. Compliance 30  $\times$  10<sup>-6</sup> lateral, 6  $\times$  10<sup>-6</sup> vertical. Rec load 50K. Output from each channel balanced within 1 dB. Price: £25 17s. 8d. (U.K. purchase tax £4 11s. 4d.).

**ffss Mono 78.** Variable reluctance 78 equivalent of Mk II stereo/mono head. Stylus 2.8 thou diamond. Price: £8 9s. 7d. (U.K. purchase tax £1 9s. 11d.).

**Deram ARI arm.** Anti-rumble integrated design. Used with Deram cartridge achieves mechanical rumble filter without attenuation of wanted frequencies. Price: £5 16s. (U.K. purchase tax £1 0s. 6d.).

**ffss Mk I "Super".** Transcription arm suitable for all *ffss* heads only. Price: £6 13s. 10d. (U.K. purchase tax £1 3s. 8d.).

**ffss "Professional" Arm.** Suitable for all *ffss* heads. Includes lowering device and pressure adjustment. Price: £15 12s. 5d. (U.K. purchase tax £2 15s 1d.).

NOTES: Decca maintains that head and arm should be designed as an entity for optimum results. For this reason Decca *ffss* arms and heads have an exclusive head fitting, which also ensures accurate alignment. All *ffss* heads will fit all *ffss* arms, but heads with elliptical stylus should be used only with "Professional" arms, or arms reaching the "Super" specification. Original Mk. I arms not reaching "Super" specification can be converted for £3 3s.

The anti-rumble properties of the ARI arm depend on its being used with a Deram cartridge. Deram heads are suitable for use with amplifiers having sensitivity of 150 mV.

Styli for all Deram pickup heads, including diamond 78, are £1 5s. each including tax.

Decca *ffss* pickup heads can be inspected for a charge of 12s. 6d. When the stylus is worn on a Decca *ffss* head it must be returned to the maker for replacement. The service offered is complete replacement of the head with a reconditioned head having a new stylus. Performance is

guaranteed to be as new. Prices for this service are: Mk. III elliptical styli £6 6s. (including 18s. 11d. purchase tax); spherical stereo/mono styli £5 4s. 9d. (including 3s. 9d. purchase tax); mono LP and 78 styli £4 16s. 6d. (including 3s. 9d. purchase tax).

Mk. I *ffss* heads are no longer in production but existing ones can be modified to Mk. II specification for £2 2s.



**EAGLE PRODUCTS.** Distributors: B. Adler & Sons (Radio) Ltd., 32a Coptic Street, London, W.C.1. Tel: Museum 9606/7. Cables: Reldab, London.

● **Gold M.1007G.** Cartridge. Stereo. Moving magnet. LP and stereo. 0.5 thou diamond stylus. Pw 1-2.5 gm. Compliance 5  $\times$  10<sup>-6</sup> cm/dyne. FR 20 c/s-20 Kc/s. Separation 22 dB at 1 Kc/s. Output 5 mV at 5 cm/sec at 1 Kc/s. Rec load 100K. Price: £5 12s. 9d. (U.K. purchase tax 19s 9d.).

● **Silver M.1007F.** Stereo cartridge. Moving magnet. LP and stereo. 0.7 thou diamond stylus. Pw 2-4 gm. Compliance 5  $\times$  10<sup>-6</sup> cm/dyne. FR 20 c/s-18 Kc/s. Separation 22 dB at 1 Kc/s. Output 10 mV at 5 cm/sec at 1 Kc/s. Rec load 100K. Price: £4 16s. 3d. (U.K. purchase tax 17s 3d.).

Prices quoted for Eagle products are approximate.

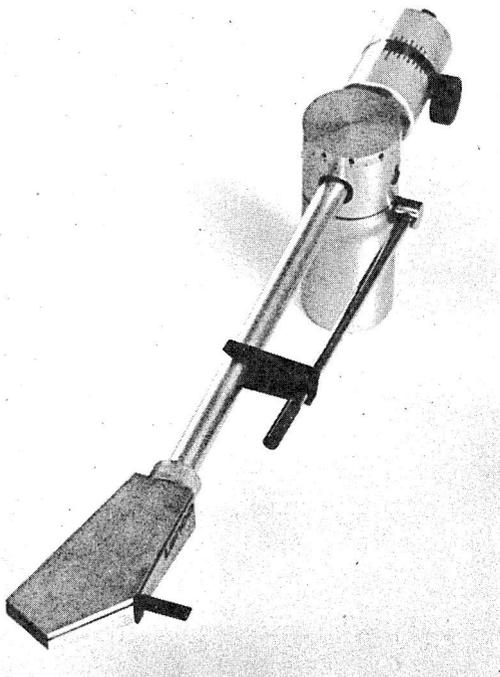


**ELAC.** Electroacoustic GmbH., Kiel, West Germany. Distributors: Mitchell Enterprises Ltd., 61 West Street, Dorking, Surrey. Tel: Dorking 4229

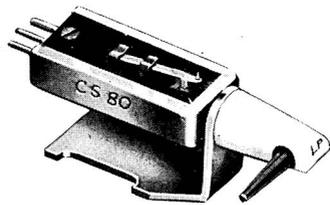
● **STS240.** Stereo cartridge. Moving magnet. ½ in. fixing centres. Stylus 0.7 thou diamond. Pw 2.5-4.5 gm. Compliance 7  $\times$  10<sup>-6</sup> cm/dyne. Range 20 c/s-20 Kc/s (up to 15 Kc/s  $\pm 2$  dB). Separation 24 dB at 1 Kc/s. Output 2.2 mV. Rec load 33-51K. Price: £13 17s. 6d. (U.K. purchase tax £2 10s. 11d.).

● **STS322.** Stereo cartridge. Moving magnet. ½ in. fixing centres. Stylus 0.5 thou diamond. Pw 2.5-3 gm. Compliance 12  $\times$  10<sup>-6</sup> cm/dyne. Range 20 c/s-20 Kc/s  $\pm 2$  dB. Separation 26 dB at 1 Kc/s, 20 dB at 10 Kc/s. Output 1 mV. Rec load 33-51K. Price: £17 14s. (U.K. purchase tax £3 4s. 11d.).

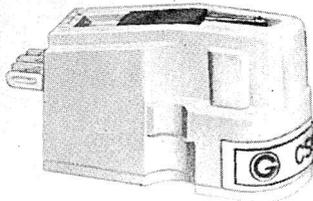
● **STS322/E.** Similar specification to STS322 but with elliptical stylus. Price: £20 5s. (U.K. purchase tax £3 14s. 3d.).



*Goldring-Lenco P77 arm*



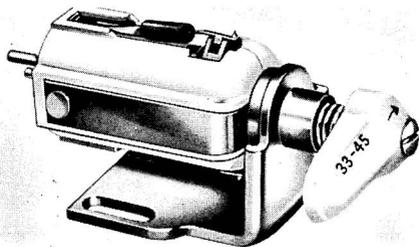
*Goldring CS 80 ceramic stereo*



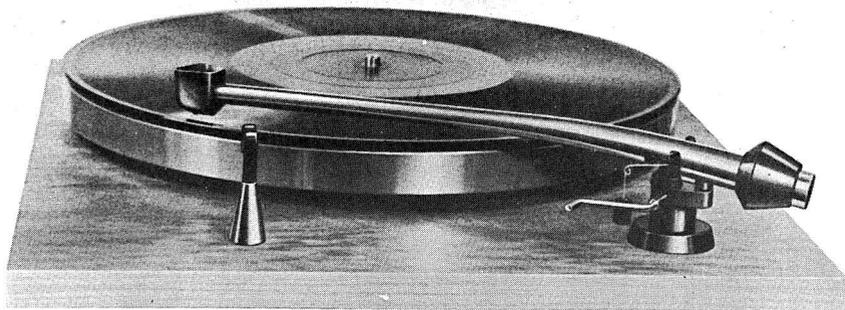
*Goldring CS90 stereo ceramic cartridge*



*Goldring 580 cartridge*



*Goldring SX 10/D stereo*



*Leak stereo pickup*

● **MST1.** Mono magnetic cartridge.  $\frac{1}{2}$  in. fixing centres. Stylus (33 $\frac{1}{3}$ , 45) 1 thou diamond, (78), 2.6 thou sapphire. Pw 5-8 gm. Tip mass 2.5 mg. Compliance  $5.1 \times 10^{-6}$  cm/dyne. Range 20 c/s-20 Kc/s  $\pm 2$  dB. Output 4.5 mV. Rec load 37K. Price: Diamond £6 14s. 3d. (U.K. purchase tax £1 8s. 5d.).

● **BST406.** Stereo ceramic cartridge. Stylus (33 $\frac{1}{3}$ , 45) 0.7 thou, (78) 2.6 thou. Pw 5-8 gm. Compliance  $4 \times 10^{-6}$  cm/dyne. Range 20 c/s-18 Kc/s  $\pm 2$  dB. Output 90 mV. Rec load 0.5-1 megohm. Cross-talk damping at 1 Kc/s 20 dB. Price: (sapphires) £3 18s. 6d. (U.K. purchase tax 14s. 5d.).

● **KST106.** Stereo crystal cartridge. Similar specification to BST406 but output 150 mV. Price: (sapphires) £2 12s. 6d. (U.K. purchase tax 9s. 8d.).

● **KST107.** Similar specification to KST106 but with LP/stereo stylus only. Price: £2 12s. 6d. (U.K. purchase tax 9s. 8d.).

Full range of replacement styli available. STS240: standard, LP/stereo or handcut and polished stereo only. STS322: standard, handcut and polished stereo only or elliptical stereo only. BST406 and KST106: sapphire or diamond. 78 and LP/stereo turn-over, LP and stereo only turn-over, LP/stereo non turn-over.



**EMPIRE SCIENTIFIC.** Distributors: Howland-West Ltd., 2 Park End, South Hill Park, London, N.W.3. Tel: Swiss Cottage 6666.

● **808.** Stereo/mono magnetic cartridge. Standard  $\frac{1}{2}$  in. fixing. 0.7 thou diamond stylus. Pw 1-6 gm. Compliance  $8 \times 10^{-6}$  cm/dyne. FR 10 c/s-20 Kc/s. Separation more than 30 dB. Output 8 mV. Rec load 47K. Price: £7 10s. (U.K. purchase tax £1 6s. 1d.).

● **880P.** Stereo/mono magnetic cartridge. Standard  $\frac{1}{2}$  in. fixing. 0.6 thou diamond stylus. Pw  $\frac{1}{2}$ -3 gm. Compliance  $30 \times 10^{-6}$  cm/dyne. FR 6 c/s-30 Kc/s. Separation more than 30 dB. Output 8 mV. Rec load 47K. Price: £7 10s. (U.K. purchase tax £1 6s. 1d.).

● **888.** Stereo/mono magnetic cartridge. Standard  $\frac{1}{2}$  in. fixing. 0.7 thou diamond stylus. Pw  $\frac{3}{4}$ -6 gm. Compliance  $10 \times 10^{-6}$  cm/dyne. FR 10 c/s-24 Kc/s. Separation better than 30 dB. Output 8 mV each channel. Rec load 47K. Price: £9 10s. (U.K. purchase tax £1 13s. 1d.).

● **888E.** Stereo/mono magnetic cartridge for high-grade autochangers. Standard  $\frac{1}{2}$  in. fixing. 0.4  $\times$  0.9 diamond stylus. Pw  $\frac{3}{4}$ -5 gm. Compliance  $12 \times 10^{-6}$  cm/dyne. FR 10 c/s-30 Kc/s. Separation more than 30 dB. Output 8 mV. Rec load 47K. Price: £12 15s. (U.K. purchase tax £2 4s. 5d.).

● **888/P.** Stereo/mono magnetic cartridge. Standard  $\frac{1}{2}$  in. fixing. 0.6 thou hand-polished diamond stylus. Pw  $\frac{1}{2}$ -4 gm. Compliance  $15 \times 10^{-6}$  cm/dyne. FR 8 c/s-28 Kc/s. Separation better than 30 dB. Output 8 mV each channel. Rec load 47K. Price: £10 10s. (U.K. purchase tax £1 16s. 7d.).

● **888/PE.** Stereo/mono magnetic cartridge. Standard  $\frac{1}{2}$  in. fixing. 0.2  $\times$  0.9 thou elliptical hand-polished diamond stylus. Pw  $\frac{1}{2}$ -3 gm. Compliance  $20 \times 10^{-6}$  cm/dyne. Frequency response 6 c/s-30 Kc/s. Separation better than 30 dB. Output 8 mV each channel. Rec load 47K. Price: £14 9s. (U.K. purchase tax £2 10s. 4d.).

● **888SE.** Stereo/mono magnetic cartridge. 0.3  $\times$  0.7 thou diamond stylus. Pw  $\frac{1}{2}$ -3 gm. Compliance  $25 \times 10^{-6}$  cm/dyne. FR 6 c/s-32 Kc/s. Separation more than 30 dB. Output 8 mV. Rec load 47K. Price: £19 2s. 6d. (U.K. purchase tax £3 6s. 8d.).



**EUPHONICS.** Distributors: Elstone Electronics Ltd., Hereford House, North Court, Vicar Lane, Leeds 2. Tel: Leeds 39834.

● **Miniconic.** Semiconductor stereo cartridge. Crystalline silicon element treated so that changing pressures produced by stylus vary the resistance. FR 20 c/s-20 Kc/s  $\pm 2$  dB. Pw 0.5 gm. Tracks up to 40 Kc/s. Stylus 0.2  $\times$  0.7 elliptical diamond. Compliance 25 micro-cm/dyne horizontal and vertical. Output dependent on setting of power supply unit and adjustable between 8 mV at 47K to 400 mV at 500K. Also supplies 100 mV at 600 ohms. Must have external power source which may be from a separate unit or derived from associated equipment. Price: (U15 LS laboratory standard) £25 5s. 11d.; (U15-LS-P1 plug-in type) £25 5s. 11d.; (U15-P professional, 0.5 thou conical stylus) £14 16s. 5d.; (U15-P-P1 plug-in type) £14 16s. 5d. All prices include U.K. tax.

**Miniconic PS-15 Power Supply.** Supplies 6 mA polarising current to each element at 14V DC. Inverts phase of one element to provide normal in-phase output signals. Matches impedances and levels to suit any type of pre-amplifier input. Price: £12 12s.

**TA-15.** Low mass professional pickup arm. Suitable for 12 in. turntables. Accepts U15 plug-in heads. Price: £21 14s. 9d. including U.K. purchase tax.



**EXPERT PICKUPS LTD.,** 74 Brownlow Road, New Southgate, London, N.11. Tel: 01-888 5350.

**Moving coil pickup heads.** LP and 78. Output 0.25 mV/cm/sec. Impedance 10 ohms. (step up required for use with most preamplifiers). Stylus 0.7 thou or 1 thou (LP), 2.5 or 3.5 thou (78). Fits most shells with  $\frac{1}{2}$  in. fixing centres. Price: £17 12s. 9d. (U.K. purchase tax £1 8s. 10d.).

**Four-pin plug-in heads.** Special for Ortofon, S.M.E. arms, styli as above. Price: £8 10s. (U.K. purchase tax £1 12s. 9d.).

**Miniature Thorn Heads.** Price: £6 10s. (U.K. purchase tax £1 5s.). Four-pin angled type £7 12s. 6d. (U.K. purchase tax £1 9s. 6d.).

**Cantilever pickup systems.** Replacement styli service. Highly polished diamond in spherical or elliptical tip using client's own used assemblies. Radius to choice. Prospectus on request.



**GOLDRING MANUFACTURING CO. (GREAT BRITAIN) LTD.,** 486/488 High Road, Leytonstone, E.11 Tel: Leytonstone 8343. Cables: Echovox, London.

**CM60.** Ceramic turnover cartridge fitted with sapphire LP and coarse groove styli. Load impedance 1 megohm. Output voltage 200 mV. Range 30 c/s-14 Kc/s  $\pm 2$  dB. Pw 5-7 gm. Price: £1 5s. (U.K. purchase tax 4s. 11d.).

**CM60/D.** As CM60 but fitted with LP diamond. Price: £2 1s. 6d. (U.K. purchase tax 6s. 9d.).

● **SX10/L.** Stereo turnover cartridge. Fitted with sapphire LP and 78 styli. Output voltage 170 mV. Range 30 c/s-14 Kc/s. Load impedance 1 megohm. Pw 4 gm. Price: £1 8s. 6d. (U.K. purchase tax 4s. 8d.).

● **SX10L/D.** As SX10/L but fitted with 0.7 thou diamond. Price: £2 5s. (U.K. purchase tax 7s. 4d.).

● **CS80.** Stereo-mono ceramic turnover cartridge. Stylus 0.7 thou sapphire or diamond for stereo/LP and 2.5 thou for 78. Pw 2-4 gm. Compliance  $4 \times 10^{-6}$  cm/dyne. Range 30 c/s-14 Kc/s.

Separation 20 dB (1 Kc/s), 10 dB (10 Kc/s). Output 200 mV. Rec load 1-2 megohms. Price: (sapphire) £1 15s. (U.K. purchase tax 5s. 8d.); (diamond) £2 11s. 6d. (U.K. purchase tax 8s. 5d.).

● **CS85.** Stereo/mono ceramic cartridge. Turnover stylus. Sapphire or diamond stylus 0.7 thou and 1.0 thou (or 2.5 thou for 78 rpm). Pw 3-5 gm. Tip mass 2 mg. Compliance  $6 \times 10^{-6}$  cm/dyne. FR 20 c/s-14 Kc/s. Separation 20 dB at 1 Kc/s, 10 dB at 10 Kc/s. Output 180 mV. Rec load 1-2 megohms. Price to be announced.

● **CS90.** Stereo ceramic cartridge. Stylus 0.5 or 0.7 thou diamond. Pw 2 gm. Compliance  $8 \times 10^{-6}$  cm/dyne. Range 30 c/s-18 Kc/s. Separation 25 dB (1 Kc/s); 10 dB (10 Kc/s). Output 50 mV. Rec load 1-2 megohms. Price: £4 4s. (U.K. purchase tax 13s. 8d.).

● **CS91E.** Stereo/LP ceramic cartridge. Stylus diamond elliptical. Pw  $1\frac{1}{2}$ -3 gm. Tip mass 1 mg. FR 20 c/s-20 Kc/s. Separation 25 dB. Output 20 mV. Rec load 2 megohms. Price: £6 6s. (U.K. purchase tax £1 0s. 6d.).

“**580**”. Variable reluctance turnover cartridge. Sapphire stylus for LP, sapphire for 78. Output voltage 3.2 mV. Range 20 c/s-18 Kc/s. Pw 6-7 gm. Load impedance 68K. Price: £4 4s. (U.K. purchase tax 13s. 8d.).

“**600**”. Variable reluctance turnover cartridge.  $\frac{1}{2}$  in. centre, mounting holes. Diamond stylus for LP, sapphire for 78. Output voltage 3.2 mV. Range 20 c/s-21 Kc/s  $\pm 2$  dB. Pw 5 gm. Load impedance 68K. Price: £8 8s. (U.K. purchase tax £1 7s. 4d.).

● “**800**”. Stereo magnetic cartridge. Stylus 0.5 thou diamond. Pw 1-3 gm. Tip mass less than 1 mg. Compliance  $20 \times 10^{-6}$  cm/dyne. FR 20 c/s-20 Kc/s  $\pm 3$  dB. Separation 20 dB at 1 Kc/s, 15 dB at 10 Kc/s. Output 1 mV. Rec load 47K. Price to be announced.

**G65.** Low-mass tubular arm. Removable head slide, moving counterweight, stylus pressure adjustment, height adjustment. Price: £6 6s. (U.K. purchase tax £1 0s. 6d.).

● **Lenco L70.** Stereo and mono transcription pickup arm. Pw adjustable. Price: £7 7s. (U.K. purchase tax £1 3s. 11d.).

**Lenco P77.** Transcription pickup arm. Pw adjustable and calibrated in grammes. Lowering device incorporated. Can be balanced in all planes. Price: £25 6s. (U.K. purchase tax £4 12s. 6d.).

**H. J. LEAK & CO. LTD.,** 57/59 Brunel Road, East Acton, London, W.3. Tel: Shepherds Bush 1173. Cables: Sinusoidal, Ealux, London.

● **Leak Mk. 4.** Stereo pickup complete. Variable reluctance. Stereo/mono head. Stylus  $0.3 \times 0.7$  thou elliptical diamond. Easily replaceable by user. Pw 2 gm. Compliance  $10 \times 10^{-6}$  lateral,  $10 \times 10^{-6}$  vertical. FR 30 c/s-20 Kc/s. No high frequency or other peaks to cause noise or "edgy" reproduction. Separation -25 dB at 1 Kc/s. Output 1.2 mV per cm/sec RMS per channel. Rec load 47K-100K. Arm: single pivot bearing with light viscous damping. Friction not greater than 10 mg. Built-in raising and lowering device. Effective tip mass less than 1 mg. Coils individually screened with mu-metal, whole cartridge enclosed in mu-metal case. Price: £23 (U.K. purchase tax £4 4s. 4d.).



**NEAT CORPORATION.** Distributors: Howland-West Ltd., 2 Park End, South Hill Park, London, N.W.3. Tel: Swiss Cottage 6666.

**Neat G30.** Transcription arm and shell. Wired for mono or stereo. Easy mounting. Accommodates all standard cartridges. Adjustable tracking weight. Supplied with aluminium head shell, pickup rest, pressure gauge and plug-in leads with phono plugs. Vertical balance by miniature ball bearings, horizontal balance by jewelled pivots. Decoupled balance weight at rear of arm provides coarse adjustment of playing weight, rider weight at side of arm provides fine adjustment. Screw collar permits height adjustment. Pivot to stylus  $9\frac{3}{4}$  in. Arm length 13 in. Leads 56 in. Height (adjustable)  $1\frac{3}{4}$ - $3\frac{1}{4}$  in. Mounting hole  $\frac{1}{2}$  in. dia. Cartridge fixing  $\frac{1}{2}$  in. centres. Price: £10 11s. 4d., (including U.K. purchase tax).

**Neat G35.** Transcription arm and shell with all features of G30 but including lowering device, bias compensator and special weight adjustment. Price: £16 10s. (U.K. purchase tax £2 17s. 6d.).



**ORTOFON.** Fonofilm Industri A/S Copenhagen. Distributed in the U.K. by Metro-Sound (Sales) Ltd., Bridge Works, Wallace Road, London, N.1. Tel: Canonbury 8641. Cables: Metrosound, London.

**Type AG.** Moving coil, interchangeable head with vertical coils. Diamond stylus. Output voltage LP 0.5 mV. Range 20-14,000 c/s  $\pm 2$  dB.

Pw 5-7 gm. Load impedance 2 ohms (transformer required). Price: £7 5s. (U.K. purchase tax £1 6s. 7d.).

**Type C (without shell).** Moving coil as above. Diamond stylus. Output voltage LP 0.3 mV. Range linear 20-20,000 c/s. Pw 3 gm. Load impedance 2 ohms (transformer required). Price: £13 5s. (U.K. purchase tax £2 6s. 8d.).

**Type CE.** As type C but with elliptical stylus. Price: £18 5s. (U.K. purchase tax £3 4s. 6d.).

**Transformer.** For use with above pickups. Price: £3 5s.

● **S15.** Moving coil cartridge with 15 degree angle and wider compliance than previously obtained. Output impedance 2 ohms. Effective tip mass 0.9 mg. Pw 1-2 gm. Output 0.04 mV/cm/sec. Stylus 0.7 thou diamond. Tracking angle 15 degrees. Compliance  $20 \times 10^{-6}$  cm/dyne. Separation 20-30 dB. FR 20 c/s-20 Kc/s  $\pm 2$  dB. Shielded against magnetic fields. Price: £20 10s. (U.K. purchase tax £3 12s. 5d.).

● **S15E.** Similar to S15 but with  $0.3 \times 0.7$  elliptical diamond stylus. Price: £25 10s. (U.K. purchase tax £4 10s.).

● **S15T.** Similar to S15 but with built-in transformers. Weight (including transformers) 18.5 gm. Pw 1-2 gm. Output impedance 15K. Rec load 47K. Output 2 mV. Price: £22 10s. (U.K. purchase tax £3 19s. 6d.).

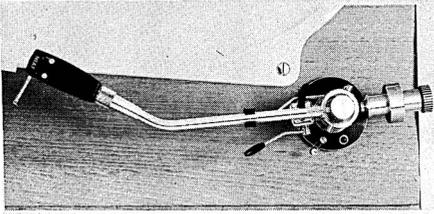
● **S15TE.** Similar to S15T but with  $0.3 \times 0.7$  elliptical diamond stylus. Price: £27 10s. (U.K. purchase tax £4 17s. 1d.).

**Shells.** Type M metal shells for 15 Series cartridges. Price: £1 5s. (U.K. purchase tax 4s. 8d.).

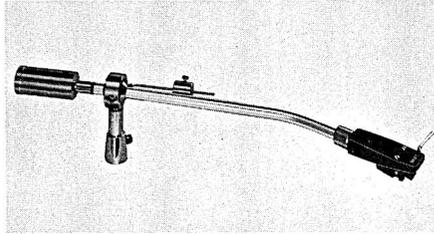
● **SL15/E.** Moving coil stereo cartridge. Pw 1-2 gm. Tip mass 0.9 mg. Compliance  $25 \times 10^{-6}$  cm/dyne. FR 10 c/s-40 Kc/s. Separation 20-30 dB. Output 0.04 mV/cm/sec (loaded). Output impedance 2 ohms. Matching transformer required for most amplifiers (see transformer below). Stylus diamond  $0.6 \times 0.3$  thou. Tracking angle 15 degrees. Price: £21 (U.K. purchase tax £3 14s. 2d.).

● **SL15.** Similar specification to SL15/E but with spherical 0.6 thou diamond stylus. Price to be announced.

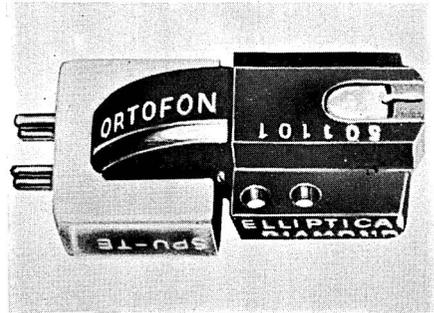
● **Transformer module.** Primary impedance 2 ohms. Secondary impedance 15K. Load 10K to FR 20 without change in frequency response. FR 20 c/s-40 Kc/s.



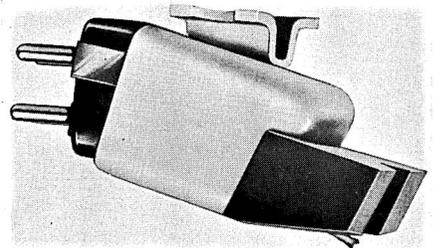
*Neat G35 pickup arm*



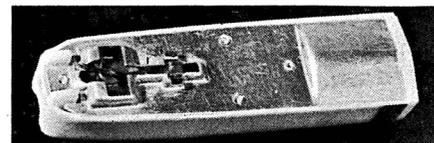
*Neat G30 pickup arm*



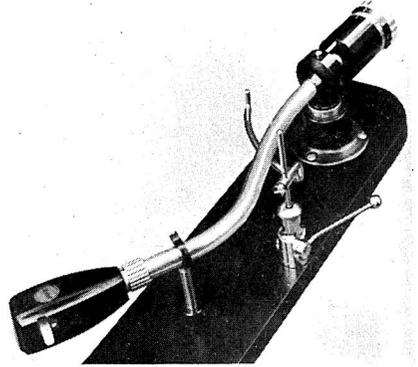
*Ortofon SPU-T|E cartridge*



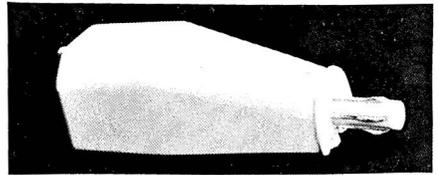
*Pickering V15 AM2 cartridge*



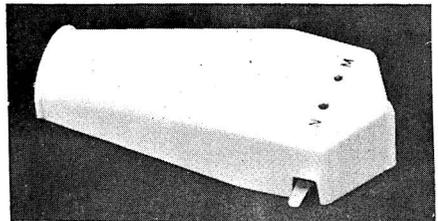
*Philips AG 3060 stereo head*



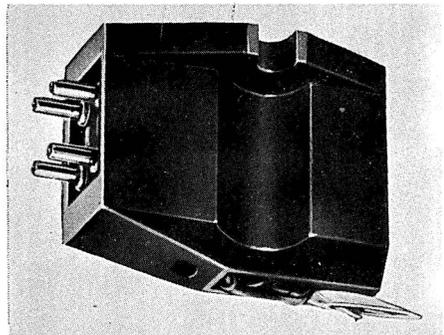
*Ortofon RMG/212 pickup arm and shell*



*Philips AG 3402 stereo head*



*Philips AG 3301 crystal stereo head*



*Ortofon SL.15|E*

● **SPU (without shell).** Moving coil stereo cartridge. Diamond stylus 0-00065-0-0007. Output voltage 0.05 mV. Range 20-20,000 c/s. Separation 20-25 dB. Pw 2 gm. Rec load 2 ohms. Price: £13 5s. (U.K. purchase tax £2 6s. 8d.).

● **SPU-T (without shell).** Moving coil cartridge with built-in transformers. Diamond stylus. Channel separation 20-25 dB. Range 20-20,000 c/s. Load imp 50K ohms. Pw 2 gm. Output voltage 2 mV. Available with pure stereo 0-0005 or 0-00065 diamond for use with mono/stereo. Price: £15 5s. (U.K. purchase tax £2 13s. 10d.).

● **SPU-E (without shell).** Stereo cartridge. Moving coil. Stylus elliptical diamond  $23 \times 8$  microns. Pw 2 gm. Tip mass 1 mg. Compliance  $10 \times 10^{-6}$  cm/dyne. Range 20 c/s-20 Kc/s. Separation 25 dB. Rec load 2 ohms. Output voltage 0.05 mV. Price: £18 5s. (U.K. purchase tax £3 4s. 5d.).

● **SPU-T/E (without shell).** Stereo cartridge with built-in transformers. Output voltage 2 mV. Rec load 50K. Other details as for SPU-E. Price: £20 5s. (U.K. purchase tax £3 11s. 6d.).

**Shells.** Type G shell for SPU and C Series cartridges. Price: £1 (U.K. purchase tax 3s. 7d.).

● **SKG/212.** 12 in. pickup arm with adjustable playing weight. Price: £7 (U.K. purchase tax £1 4s. 9d.).

● **SMG/212.** 12 in. pickup arm for stereo and monocartridges. Playing weight adjustable from 0-12 gm. Price: £11 (U.K. purchase tax £1 18s. 10d.).

● **RMG/309.** 16 in. pickup arm. Details as for SMG/212. Price: £21 (U.K. purchase tax £3 14s. 3d.).

● **RMG/212.** Pickup arm with shell. Details as for RMG/309, but with plug insert for leads. For details of lowering device see Ortofon Hi-Jack. Price: £19 6s. (U.K. purchase tax £3 8s. 1d.).

● **RS212.** Similar to RMG arm but with the addition of automatic anti-skating device. Length of arm 11.8 in. Centre of arm base to turntable centre  $8\frac{3}{8}$  in. Height adjustable  $1\frac{3}{8}$ - $2\frac{3}{8}$  in. Arm base 2 in. dia. Centre of base to stylus tip 9 in. Off-set angle 22.7 degrees. Stylus pressure adjustable 0-4.5 gm. Suitable for cartridges weighing 7-19 gm. Hi-Jack cueing device built in. Ratio between stylus pressure and anti-skating force is factory adjusted to suit Ortofon cartridge with elliptical stylus. Ratio adjust-

ment screw provided to alter for other cartridges. Price £25 (U.K. purchase tax £4 8s. 3d.).



**PHILIPS ELECTRICAL LTD.,** Century House, Shaftesbury Avenue, W.C.2. Tel: 01-437 7777. Cables: Phillamps, London.

**AG.3016.** Crystal head fitted with sapphire styli. Output voltage 100 mV. Range 30-15,000 c/s. Pw 5-7 gm. Load imp 470K ohms. Replacement type for all mono heads with three contact socket connection. Price: £1 1s. 6d. (U.K. purchase tax 3s. 10d.).

● **AG.3401.** Stereo magnetodynamic head with diamond stylus. Microgroove only with three-contact socket connection. Output voltage 2 mV per channel. Range 20-20,000 c/s. Pw 3-5 gm. Load imp 68K per channel. Price: £8 2s. 9d. (U.K. purchase tax £1 8s. 10d.).

● **AG.3301.** Crystal stereo pickup cartridge with turnover head. Sapphire styli. Three-contact socket connection. Output voltage 120 mV per channel. Pw 4-6 gm. Load imp 470K per channel. Price: £1 8s. (U.K. purchase tax 4s. 11d.).

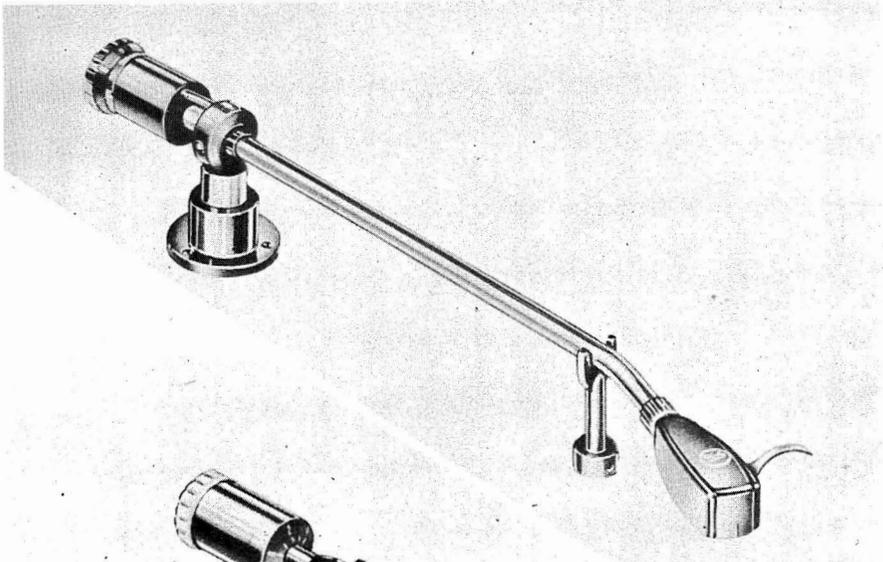
● **AG.3060.** Crystal stereo pickup. Diamond 0.7 thou stylus. Replacement type for Philips featherweight pickups. Three-contact socket connection. Range 30 c/s-12 Kc/s. Output voltage 120 mV per channel. Pw 4-6 gm. Load imp 470K ohms per channel. Price: £2 6s. 6d. (U.K. purchase tax 8s. 3d.).

● **AG.3063.** Identical to AG. 3060 but with sapphire 0.7 thou stylus. Price: £1 8s. (U.K. purchase tax 4s. 11d.).

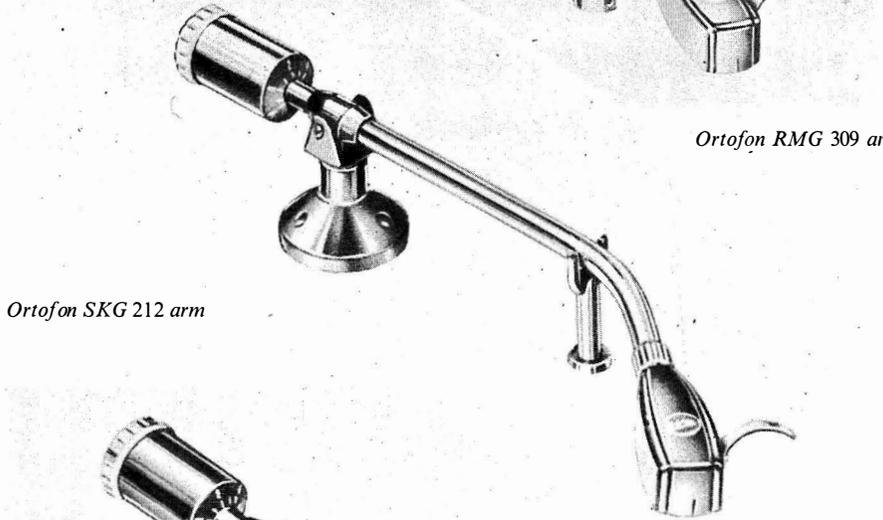
● **AG.3304.** Stereo crystal turnover head. Styli 3 thou sapphire for 78, diamond 0.7 thou for microgroove. Otherwise identical to AG.3301. Price: £2 14s. 3d. (U.K. purchase tax 9s. 7d.).

● **AG.3402.** Identical to AG.3401 but with five-contact plug connection. Price: £8 2s. 9d. (U.K. purchase tax £1 8s. 10d.).

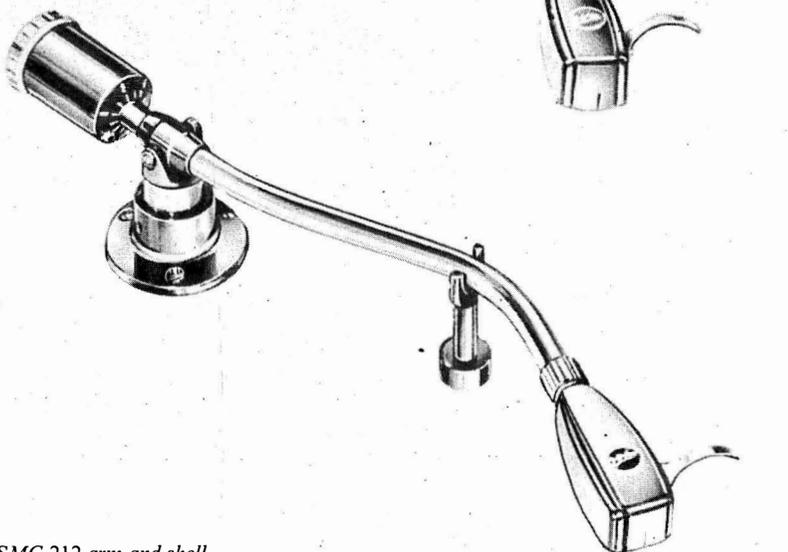
● **AG.3306.** Stereo crystal head with turnover sapphire styli: 78 3 thou, LP 0.7 thou. Five-contact plug connection. Pw 3-6 gm. Compliance (lat)  $3 \times 10^{-6}$  cm/dyne; (vert)  $1.8 \times 10^{-6}$  cm/dyne. Range 30 c/s-16 Kc/s. Separation 18 dB. Output 70 mV. Load imp 470K per channel. Price: £1 6s. 4d. (U.K. purchase tax 4s. 8d.).



*Ortofon RMG 309 arm*



*Ortofon SKG 212 arm*



*Ortofon SMG 212 arm and shell*

● **AG.3310.** Identical to AG.3306 but with diamond LP stylus. Price: £2 14s. 3d. (U.K. purchase tax 9s. 7d.).

● **AG.3407.** Stereo magneto-dynamic head for microgroove records only. 0.7 thou diamond stylus. Pw 2.4 gm. Output 1.2 mV/cm/sec. FR 20 c/s-20 Kc/s  $\pm 2.5$  dB. Separation better than 24 dB at 1 Kc/s. Compliance (lateral)  $6 \times 10^{-6}$  cm/dyne; (vertical)  $5 \times 10^{-6}$  cm/dyne. Rec load 68K each channel. Price to be announced.

● **AG.3409.** Identical to AG.3407 but with 3 thou stylus for 78 rpm records only. Price to be announced.

**GP.316.** Mono crystal plug-in head. 1.0 and 3.0 thou sapphire stylus. Pw 5-7 gm. FR 30 c/s-15 Kc/s. Rec load 470K. Output 100 mV. Price: £1 10s. 2d. (including U.K. purchase tax).

● **GP.230.** Stereo ceramic plug-in head. Stylus 0.7 and 3.0 thou sapphire. Pw 3-6 gm. FR 30 c/s-15 Kc/s. Rec load 470K. Output 45 mV. Price: £2 3s. 6d. (including U.K. purchase tax).

● **GP.306.** Stereo crystal plug-in head. Stylus 0.7 and 3.0 thou sapphire. Pw 3-6 gm. FR 30 c/s-16 Kc/s. Rec load 470K. Output 45 mV. Price: £1 10s. 8d. (including U.K. purchase tax).

● **GP.310.** Stereo crystal plug-in head. Stylus 0.7 thou diamond, 3.0 thou sapphire. Pw 3-6 gm. FR 30 c/s-16 Kc/s. Rec load 470K. Output 45 mV. Price: £3 3s. (including U.K. purchase tax).

● **GP.407.** Stereo magneto-dynamic plug-in head. Stylus 0.7 thou diamond. Pw 2.4 gm. FR 20 c/s-20 Kc/s. Rec load 68K. Output 1 mV. Price: £12 5s. (including U.K. purchase tax).

● **GP.409.** Stereo magneto-dynamic plug-in head. Stylus 0.7 thou sapphire. Pw 2.4 gm. FR 20 c/s-20 Kc/s. Rec load 68K. Output 1 mV. Price: £11 3s. 8d. (including U.K. purchase tax).



**PICKERING.** Imported by Ad. Auriema Ltd., Impetron House, 125 Gunnersbury Lane, London, W.3. Distributed by Goldring Mfg. Co. Ltd., 486/488 High Road, Leytonstone, London, E.11.

● **Pickering V15.AC-2.** Moving magnet stereo cartridge with plug-in stylus assembly. High output, rugged stylus assembly and good hum rejection. FR 20 c/s-20 Kc/s. Output 7.5 mV. Channel separation 35 dB. Pw 3-7 gm. Mu-

metal shielding. 15 degree tracking angle. Suitable for record changers including Garrard AT60, Model 50, Autoslim, RC-80, etc. Price: £9 9s. (U.K. purchase tax £1 13s. 9d.).

● **Pickering V15.AT-2.** Moving magnet stereo cartridge with plug-in stylus assembly. High output, light weight, good hum rejection. FR 20 c/s-20 Kc/s. Output 6.9 mV. Channel separation 35 dB. Pw 1-5 gm. Mu-metal shielding. 15 degree tracking angle. Suitable for record changers including Garrard LAB80, AT60, AT6, Dual 1009, 1010, Miracord, Lesa, etc. Price: £9 9s. (U.K. purchase tax £1 13s. 9d.).

● **Pickering V15.AM-2.** Moving magnet stereo cartridge with plug-in stylus assembly. For manual turntables and transcription units. Light tracking and high compliance. FR 20 c/s-20 Kc/s. Output 5.5 mV. Channel separation 35 dB. Pw  $\frac{3}{4}$ -3 gm. Mu-metal shielding. 15 degree tracking angle. Suitable for Garrard, Connoisseur, Thorens, Dual, etc. Price: £9 9s. (U.K. purchase tax £1 13s. 9d.).

● **Pickering V15.AME-2.** Moving magnet stereo cartridge with plug-in stylus assembly. For highest grade equipment. Very low tip mass, light tracking and high compliance. FR 20 c/s-20 Kc/s. Output 5.5 mV. Channel separation 35 dB. Pw  $\frac{3}{4}$ -1 $\frac{1}{2}$  gm. Mu-metal shielding. Elliptical stylus. 15 degree tracking angle. Price: £13 15s. (U.K. purchase tax £2 9s. 1d.).



**RONETTE.** U.K. Distributors: H. K. Harrison and Co. Ltd., 140 Park Lane, London, W.1. Tel: Hyde Park 9363.

**DC-395.** Crystal turnover cartridge. Sapphire stylus. Load imp 1 megohm 100 pF. Output voltage 1,000 mV. Range 30-6,000 c/s. Pw 6-10 gm. Price: £1 13s. 9d. (U.K. purchase tax 6s. 1d.).

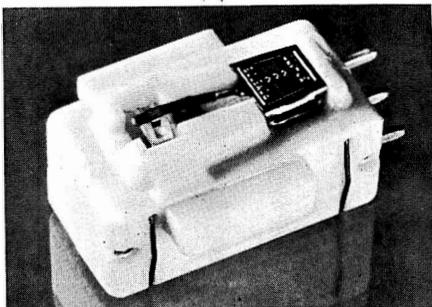
**DC-284-OV.** Crystal turnover cartridge. Sapphire stylus. Load imp 1 megohm 100 pF. Output voltage 230 mV. Range 30-10,000 c/s. Pw 6-10 gm. Price: £1 13s. 9d. (U.K. purchase tax 6s. 1d.).

**DC-284-T.** Crystal turnover cartridge. Sapphire stylus. Load imp 1 megohm 100 pF. Output voltage 600 mV. Range 30-8,000 c/s. Pw 6-10 gm. Price: £1 13s. 9d. (U.K. purchase tax 6s. 1d.).

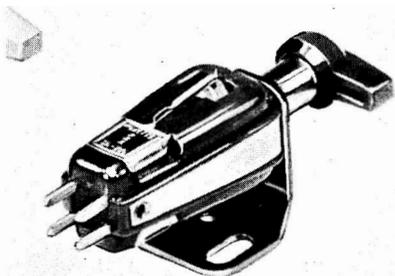
**DC-284-P.** Crystal turnover cartridge. Sapphire stylus. Load imp 1 megohm 100 pF. Output voltage 105 mV. Range 30-12,000 c/s.



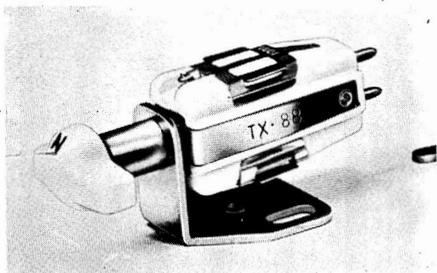
*ADC Pritchard pickup arm*



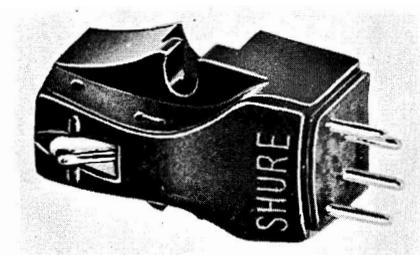
*Ronett BF-40 stereo*



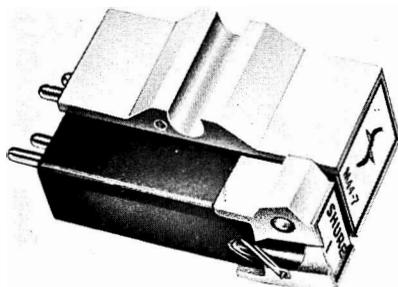
*Ronette stereo 105 cartridge*



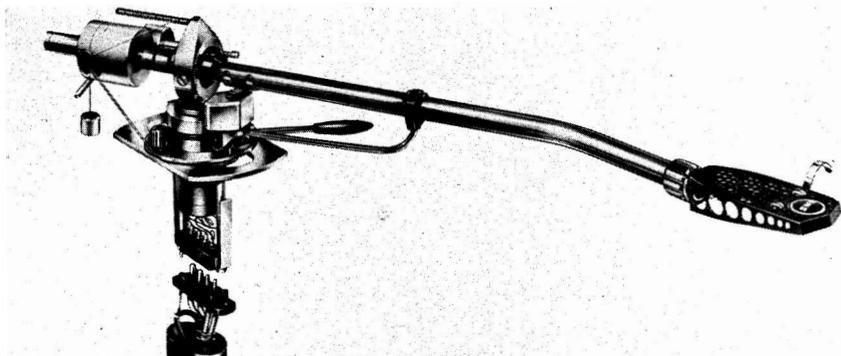
*Ronett TX88 mono cartridge*



*Shure M3D-M cartridge*



*Shure M44-7 cartridge*



*SME Series 2 precision pickup arm and shell*

Pw 4.8 gm. Price: £1 13s. 9d. (U.K. purchase tax 6s. 1d.).

**DC-395-S.** Crystal turnover cartridge. Sapphire stylus. Load imp 1 megohm 100 pF. Output voltage 1,450 mV. Range 30-6,000 c/s. Pw 10 gm. Price: £1 13s. 9d. (U.K. purchase tax 6s. 1d.).

**TX-88.** Crystal turnover cartridge. Sapphire stylus. Load imp 1 megohm 100 pF. Output voltage 150 mV. Range 30-20,000 c/s. Pw 2.8 gm. Price: £2 (U.K. purchase tax 7s. 4d.).

● **BF-40.** Stereo single sided crystal cartridge. Sapphire 0.75 thou stylus. Load imp 1 megohm 100 pF. Output voltage 180 mV. Range 30-12,000 c/s. Pw 5.7 gm. Price: £2 16s. 3d. (U.K. purchase tax 10s. 3d.).

● **Stereo 105.** Stereo crystal turnover cartridge. Sapphire stylus. Load imp 1 megohm 100 pF. Output voltage 250 mV. Range 30-12,000 c/s. Pw 3.6 gm. Price: £2 17s. 4d. (U.K. purchase tax 10s. 6d.).

● **Stereo 106.** Stereo crystal turnover cartridge. Details as for 105 but output voltage 580 mV. Price: £2 17s. 4d. (U.K. purchase tax 10s. 6d.).

● **Stereo 208.** Stereo crystal turnover cartridge. Details as for 105 but output voltage 750 mV. Range 30-6,000 c/s. Pw 6-10 gm. Price: £2 17s. 4d. (U.K. purchase tax 10s. 6d.).



**SHURE ELECTRONICS LTD.,** 84 Blackfriars Road, London, S.E.1. Tel: Waterloo 6361.

● **M3D-M.** Stereo Dynetic cartridge. Moving magnet.  $\frac{1}{2}$  in. fixing centres. Stylus 0.7 thou diamond. Pw 3-6 gm. Compliance  $4 \times 10^{-6}$  cm/dyne. FR 20 c/s-15 Kc/s. Separation 20 dB at 1 Kc/s. Output 1 mV. Load impedance 47K. Price: £6 7s. 6d. (U.K. purchase tax £1 2s. 6d.).

● **M44-C.** Stereo Dynetic cartridge. Moving magnet.  $\frac{1}{2}$  in. fixing centres. Stylus 0.7 thou diamond. (1 thou and 3 thou styli available). Pw 3.5 gm. Compliance  $7.5 \times 10^{-6}$  cm/dyne. FR 20 c/s-20 Kc/s. Separation 25 dB at 1 Kc/s. Output 1.8 mV. Load impedance 47K. Price: £9 11s. 3d. (U.K. purchase tax £1 13s. 9d.).

● **M44-E.** Stereo Dynetic cartridge. Moving magnet.  $\frac{1}{2}$  in. fixing centres. Stylus  $0.7 \times 0.4$  thou bi-radial diamond (3 thou stylus available). Pw  $1\frac{3}{4}$ -4 gm. Compliance  $15 \times 10^{-6}$  cm/dyne. FR 20 c/s-20 Kc/s. Separation >25 dB at 1 Kc/s.

Output 1.8 mV. Rec load 47K per channel. Price: £12 15s. (U.K. purchase tax £2 5s.).

● **M44-5.** Stereo Dynetic cartridge. Moving magnet.  $\frac{1}{2}$  in. fixing centres. Stylus 0.5 thou diamond. (1 thou and 3 thou styli available). Pw  $\frac{3}{4}$ -1 $\frac{1}{2}$  gm. Compliance  $25 \times 10^{-6}$  cm/dyne. FR 20 c/s-20 Kc/s. Separation 25 dB at 1 Kc/s. Output 1.2 mV. Load imp 47K. Price: £10 12s. 6d. (U.K. purchase tax £1 17s. 6d.).

● **M44-7.** Stereo Dynetic cartridge. Moving magnet.  $\frac{1}{2}$  in. fixing centres. Stylus 0.7 thou diamond. (1 thou and 3 thou styli available). Pw  $1\frac{1}{2}$ -3 gm. Compliance  $20 \times 10^{-6}$  cm/dyne. FR 20 c/s-20 Kc/s. Separation 25 dB at 1 Kc/s. Output 2.1 mV. Load imp 47K. Price: £9 11s. 3d. (U.K. purchase tax £1 13s. 9d.).

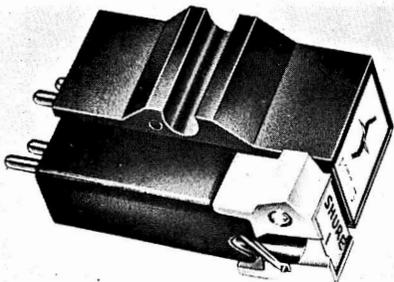
● **M55-E.** Stereo Dynetic cartridge. Moving magnet.  $\frac{1}{2}$  in. fixing centres. Stylus  $0.7 \times 0.2$  thou elliptical diamond. (3 thou stylus available). Pw  $\frac{3}{4}$ -1 $\frac{1}{2}$  gm. Compliance  $25 \times 10^{-6}$  cm/dyne. Output 1.3 mV. Load imp 47K. Price: £14 17s. 6d. (U.K. purchase tax £2 12s. 6d.).

● **M75-E.** Stereo Dynetic cartridge. Moving magnet.  $\frac{1}{2}$  in. fixing centres. Stylus  $0.7 \times 0.2$  thou bi-radial diamond (3 thou stylus available). Pw  $\frac{3}{4}$ -1 $\frac{1}{2}$  gm. Trackability (see note at end) at 1 gm in SME 3009 arm: 400 c/s 18 cm/sec, 1 Kc/s 25 cm/sec, 10 Kc/s 14 cm/sec. FR 20 c/s-20 Kc/s. Separation at 1 Kc/s >25 dB. Output 1.1 mV. Rec load 47K per channel Price: £19 2s. 6d. (U.K. purchase tax £3 7s. 6d.).

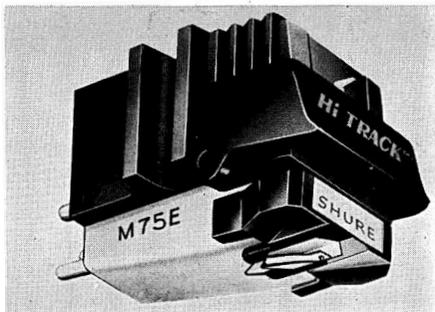
● **M75-G.** Stereo Dynetic cartridge. 15 degree angle. Moving magnet.  $\frac{1}{2}$  in. fixing centres. Stylus 0.6 thou conical diamond (3 thou stylus available). Pw  $\frac{3}{4}$ -1 $\frac{1}{2}$  gm. Trackability (see note at end) at 1 gm in SME 3009 arm: 400 c/s 18 cm/sec, 1 Kc/s 25 cm/sec, 10 Kc/s 14 cm/sec. FR 20 c/s-20 Kc/s. Separation >25 dB at 1 Kc/s. Output 1.1 mV. Rec load 47K per channel. Price: £12 15s. (U.K. purchase tax £2 5s.).

● **M75-6.** Stereo Dynetic cartridge. 15 degree angle. Moving magnet.  $\frac{1}{2}$  in. fixing centres. Stylus 0.6 thou conical diamond (3 thou stylus available). Pw  $\frac{3}{4}$ -3 gm. Trackability (see note at end) at 2 gm in SME 3009 arm: 400 c/s 18 cm/sec, 1 Kc/s 25 cm/sec, 10 Kc/s 14 cm/sec. FR 20 c/s-20 Kc/s. Separation >25 dB at 1 Kc/s. Output 1.2 mV. Rec load 47K per channel. Price: £12 15s. (U.K. purchase tax £2 5s.).

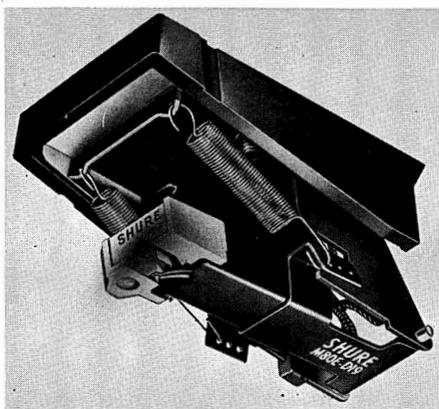
● **V15-11.** Stereo Dynetic cartridge. 15 degree angle. Moving magnet.  $\frac{1}{2}$  in. fixing centres. Stylus  $0.7 \times 0.2$  thou bi-radial diamond (3 thou stylus available). Pw  $\frac{3}{4}$ -1 $\frac{1}{2}$  gm. Trackability (see



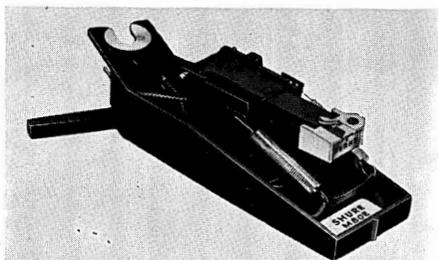
*Shure M55-E cartridge*



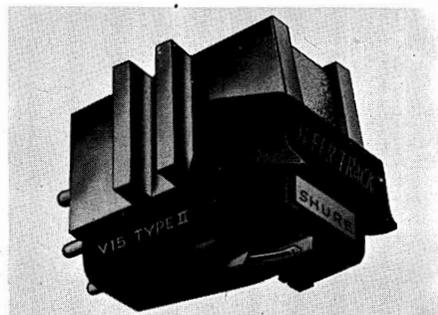
*Shure M75-E*



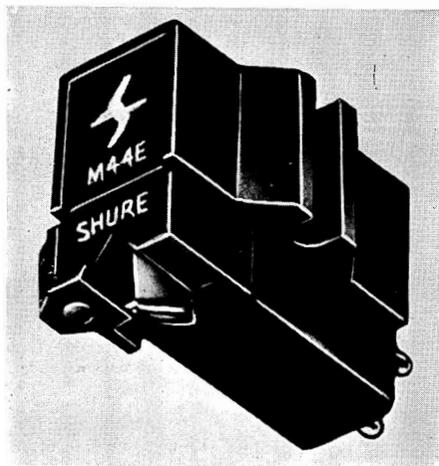
*Shure M80E-D19*



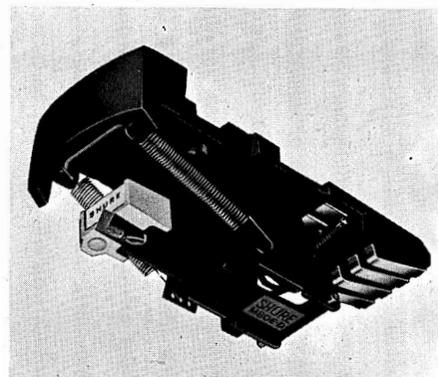
*Shure M80-E*



*Shure V15-II*



*Shure M44-E*



*Shure M80E-D*

note at end) at  $\frac{3}{4}$  gm in SME 3009 arm: 400 c/s 18 cm/sec, 1 Kc/s 26 cm/sec, 5 Kc/s 26 cm/sec, 10 Kc/s 18 cm/sec. FR 20 c/s-25 Kc/s. Separation  $>25$  dB at 1 Kc/s,  $>17$  dB at 500 c/s-10 Kc/s. Output 0.7 mV. Rec load 47K per channel. Price: £29 15s. (U.K. purchase tax £5 5s.).

● **M80-E.** Stereo Dynetic cartridge. 15 degree angle. Moving magnet.  $\frac{1}{2}$  in. fixing centres. Stylus  $0.7 \times 0.2$  thou bi-radial diamond (3 thou stylus available). Pw  $1\frac{1}{2}$  gm. Compliance  $25 \times 10^{-6}$  cm/dyne. FR 20 c/s-20 Kc/s. Separation nominally  $>25$  dB at 1 Kc/s. Output 1.3 mV. Rec load 47K per channel. Designed specifically for use with Garrard LAB80 and A70 turntables. Price: £15 8s. 9d. (U.K. purchase tax £2 16s. 3d.).

● **M80E-D.** Stereo Dynetic cartridge. 15 degree angle. Moving magnet.  $\frac{1}{2}$  in. fixing centres. Stylus  $0.7 \times 0.2$  thou bi-radial diamond (3 thou stylus available). Pw  $1\frac{1}{2}$  gm maximum. Compliance  $25 \times 10^{-6}$  cm/dyne. FR 20 c/s-20 Kc/s. Separation nominally  $>25$  dB at 1 Kc/s. Output 1.3 mV. Rec load 47K per channel. Designed specifically for Dual 1009 turntable. Price: £15 18s. 9d. (U.K. purchase tax £2 16s. 3d.).

● **M80E-D19.** Stereo Dynetic cartridge. 15 degree angle. Moving magnet.  $\frac{1}{2}$  in. fixing centres. Stylus  $0.7 \times 0.2$  thou bi-radial diamond (3 thou stylus available). Pw  $1\frac{1}{2}$  gm. Compliance  $25 \times 10^{-6}$  cm/dyne. FR 20 c/s-20 Kc/s. Separation nominally  $>25$  dB at 1 Kc/s. Output 1.3 mV. Rec load 47K per channel. Designed specifically for the Dual 1019 and 1009-SK turntables. Price: £15 18s. 9d. (U.K. purchase tax £2 16s. 3d.).

NOTE: Trackability is a term introduced by Shure to give a measure of the total performance of a cartridge. It takes into account the mechanical design parameters of tip mass, inertia, compliances throughout the system, tracking pressure, recorded velocity, etc. Explanatory leaflet available on request.



**S.M.E. LTD.**, Steyning, Sussex. Tel: Steyning 2228.

**Model 3009.** (9 in.). Series II precision pickup arm. Extremely low vertical and lateral friction. Side-thrust compensation. Hydraulically damped lowering control. Tracking force applied precisely, without the need for a gauge. Rapidly adjustable for a wide range of cartridges and heads. Price (with S.2 ultra lightweight shell): £22 17s. 6d. (U.K. purchase tax £4 3s. 11d.).

**Model 3012** (12 in.). Series II precision pickup arm. Details as above. Price (with S.2 ultra lightweight shell): £24 7s. 6d. (U.K. purchase tax £4 9s. 5d.).

**S.2 ultra lightweight shell.** Weighs only 6 gm with mounting hardware. Price: £1 16s. (U.K. purchase tax 6s. 8d.).



**SONOTONE.** Distributors: Metro-Sound Manufacturing Co. Ltd., Bridge Works, Wallace Road, London, N.1. Tel: Canonbury 8641. Cables: Metrosound, London.

**2T.** Monoaural ceramic cartridge with turnover stylus. Stylus sapphire 2.5 thou (78), 0.7 thou (LP). Pw 8-10 gm. Compliance  $1 \times 10^{-6}$  cm/dyne. Output 180 mV/cm/sec at 1 Kc/s. Capacitance 650 pF. Serviceable under all climatic conditions and compatible for 33 $\frac{1}{3}$ , 45 and 78 rpm records. Price: £1 5s. (U.K. purchase tax 4s. 5d.).

**2T35.** Similar to 2T but output 280-435 mV.

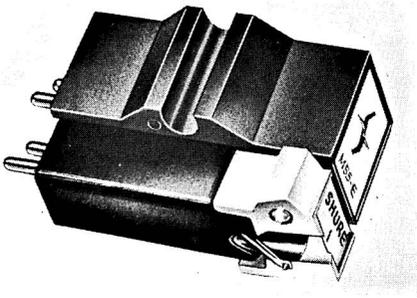
● **8TA.** Stereo ceramic cartridge with turnover stylus. Stylus sapphire 2.5 thou (78), 0.7 thou (LP). Pw 4-6 gm. Compliance  $1.4 \times 10^{-6}$  cm/dyne. Separation 25 dB at 1 Kc/s. Output 90 mV/cm/sec at 1 Kc/s. Capacitance 650 pF. Price: £1 15s. (U.K. purchase tax 6s. 3d.).

● **8TAD.** Similar specification to 8TA but with diamond stylus. Price: £2 10s. (U.K. purchase tax 8s. 10d.).

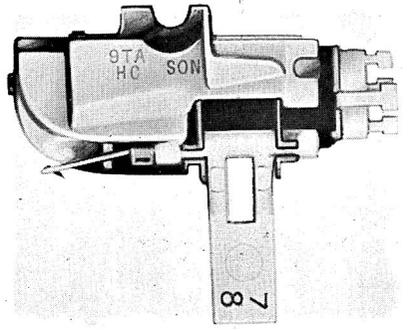
● **9TA.** Stereo turnover cartridge. Ceramic. Diamond stylus. Pw 2-4 gm. Tip mass 3.5 mg. Compliance  $5.3 \times 10^{-6}$  cm/dyne. FR 30 c/s-15 Kc/s  $\pm 3$  dB. Separation 27 dB. Output voltage 80-120 mV. Load imp 2 megohm. Price: £2 10s. (U.K. purchase tax 8s. 10d.).

● **9TAD.** Similar specification to 9TA but with diamond stylus. Price: £3 5s. (U.K. purchase tax 11s. 7d.).

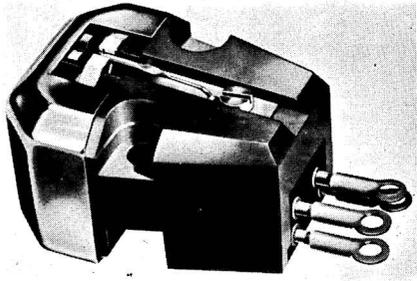
● **9TAHC.** Stereo turnover ceramic cartridge. Choice of both sapphire styli or sapphire 78/diamond stereo LP. FR 20 c/s-20 Kc/s ( $\pm 3$  dB from 1 Kc/s). Rec load 2 meg. Sensitivity 55-85 mV/cm/sec at 1 Kc/s. Lateral compliance  $8.5 \times 10^{-6}$  cm/dyne. Separation 25 dB at 1 Kc/s. Pw 1-3 gm. Tip mass 2.5 mg. capacitance 800 pF. Price: (with sapphire stylus) £2 10s. (U.K. purchase tax 8s. 10d.); (with diamond stereo/LP stylus) £3 5s. (U.K. purchase tax 11s. 7d.).



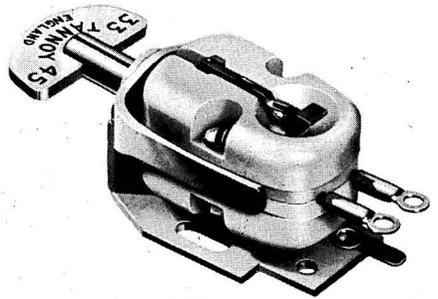
*Shure M44-5 cartridge*



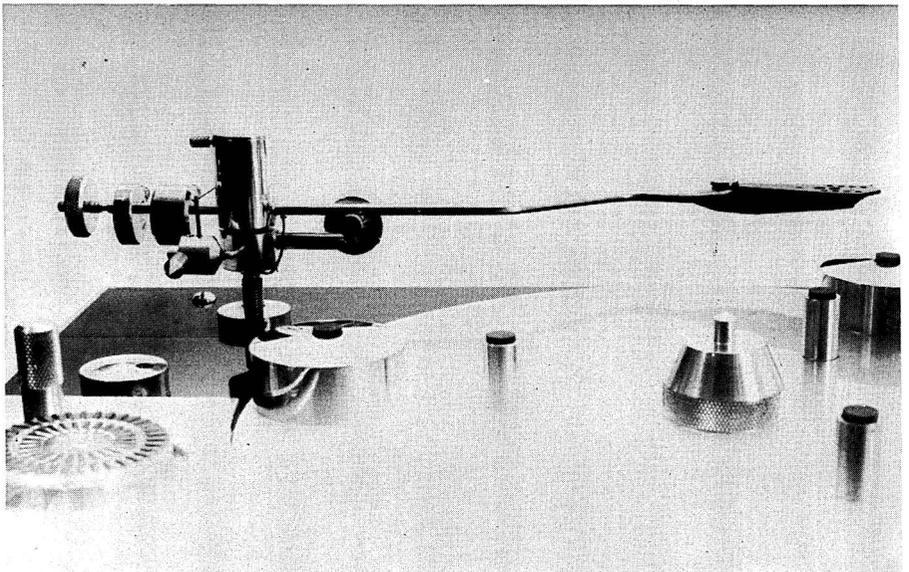
*Sonotone 9TAHC cartridge*



*Tannoy Vari-twin Mk. II cartridge*



*Tannoy variluctance cartridge*



*Transcriptors Fluid Arm*

● **19T.** Stereo turnover crystal cartridge. Stylus sapphire 2.5 thou (78), 0.7 thou (LP). Pw 7.9 gm. Compliance  $1.2 \times 10^{-6}$  cm/dyne. Separation 20 dB at 1 Kc/s. Output 270 mV/cm/sec at 1 Kc/s. Capacitance 1,200 pF. Price: (sapphire stylus) £1 12s. 6d. (U.K. purchase tax 5s. 7d.); (diamond stylus) £2 7s. 6d. (U.K. purchase tax 8s. 4d.).

● **20T.** Stereo crystal cartridge. Sapphire styli. FR 20 c/s-15 Kc/s ( $\pm 4$  dB from 1 Kc/s). Rec load 2 megohm. Sensitivity 270-535 mV/cm/sec at 1 Kc/s. Compliance  $1 \times 10^{-6}$  cm/dyne. Separation 20 dB at 1 Kc/s. Pw 8 gm. Capacitance 1,200 pF. Price: (sapphire stylus) £1 12s 6d. (U.K. purchase tax 5s. 7d.); (diamond stylus) £2 7s. 6d. (U.K. purchase tax 8s. 4d.).



**SONY U.K. DIVISION**, Eastbrook Road, Gloucester. Tel: Gloucester 21591.

● **Sony VC-8E.** Stereo moving coil cartridge. Stylus  $0.2 \times 0.8$  thou diamond. Pw 0.5-2 gm. Lateral and vertical compliance  $10 \times 10^{-6}$  cm/dyne. FR 10 c/s-25 Kc/s. Separation 30 dB at 1 Kc/s, 20 dB at 10 Kc/s. Output 4 mV  $\pm 2$  dB. Rec load approx 40 ohms at 10 c/s-25 Kc/s. Price: £23 18s. 3d. (U.K. purchase tax £4 8s. 9d.).

● **Sony PUA-237.** Transcription pickup arm. Playing weight 0.3 gm. Lowering device. Pressure adjustment. Bias compensator. Price: £34 11s. (U.K. purchase tax £6 8s.).

● **Sony PUA-286.** Transcription pickup arm. Playing weight 0.3 gm. Lowering device. Pressure adjustment. Bias compensator. Price: £38 19s. 6d. (U.K. purchase tax £7 4s. 6d.).



**A. R. SUGDEN & CO. (ENGINEERING) LTD.**, Market Street, Brighouse, Yorkshire, Tel: Brighouse 2142. Cables: Connoisseur, Brighouse.

● **Connoisseur stereo ceramic cartridge SCU1.**  $\frac{1}{2}$  in. fixing centres. Stylus diamond 0.5-0.6 thou or 1 thou for mono. Pw 2-4 gm. Tip mass 1 mg. Compliance: lateral  $12 \times 10^{-6}$  cm/dyne; vertical  $8 \times 10^{-6}$  cm/dyne. Range 20 c/s-20 Kc/s  $\pm 3$  dB. Separation (1 Kc/s) 25-30 dB; (10 Kc/s) 18 dB. Output 6 mV into 100K (constant velocity); 26 mV into 2 megohms load. Features: 4-terminal output; easily replaceable diamond armature. Price: £4 10s. (U.K. purchase tax 15s. 10d.).

**Connoisseur pickup arm SAU1**, with detachable head shell wired for stereo/mono. Optional lift/lower device. Single hole fixing. Single uni-

pivot bearing. Accommodates all standard cartridges. Adjustable stylus force-calibrated weights supplied. Single lever height adjustment. Price: (arm) £5 5s. (U.K. purchase tax 18s. 6d.); (arm with lifting device) £6 5s. (U.K. purchase tax £1 2s.); (head shell) £1 2s. 6d. (U.K. purchase tax 4s.).

**Connoisseur pickup arm SAU.II.** Gimbal mountings on ball bearings set at 45/45. Automatic bias compensator. Hydraulic lowering device. Decoupled counterbalance weight. Additional weight supplied to accommodate different cartridges. Single hole fixing. Height adjustable from 1 in. to 2 ins. Lightweight shell with  $\frac{1}{2}$  in. fixing centres. Five-pin plug connection to base of pickup. Low resistance self-cleaning contacts. Supplied with set of leads. Price: £10 (U.K. purchase tax £1 15s. 4d.).



**TANNOY PRODUCTS LTD.**, West Norwood, London, S.E.27. Tel: Gipsy Hill 1131. Cables: Tannoy, London.

**Varilutance.** Turnover cartridge. Output voltages: LP: 10-12 mV; 78 18-20 mV. Range 20-16,000 c/s  $\pm 2$  dB. Pw 5-6 gm. (less with professional arms). Load imp 50K ohms. Price (with 2 diamonds) £12 (U.K. purchase tax £2 3s. 4d.); (with 1 diamond and 1 sapphire): £9 10s. (U.K. purchase tax £1 14s. 3d.); (with 2 sapphires): £7 (U.K. purchase tax £1 5s. 3d.).

Single stylus version of Varilutance for LP also available. Price (with diamond): £6 15s. (U.K. purchase tax £1 4s. 4d.).

● **Vari-twin Mk II.** Magnetic stereo cartridge. Balance 4-pole system. Diamond stylus 0.5 or 0.7 thou. Output voltage 7 mV per channel. Range 30-15,000 c/s  $\pm 1.5$  dB. Pw 4 gm (less with professional arms). Load imp 100K ohms. Inductance 350 mH. Price: £9 19s. (U.K. purchase tax £1 15s. 11d.).



**THORENS.** Distributors: Metro-Sound (Sales) Ltd., Bridge Works, Wallace Road, Canonbury, London, N.1. Tel: Canonbury 8641. Cables: Metro-sound, London, N.1.

**TP.13 pickup arm.** Offset angle 24 degrees. Tracking error  $< 0.3$  degrees/inch. Vertical and horizontal pivots on special precision bearings. Simultaneous vertical and horizontal balance adjustment. Tracks at 0.5 gm stylus pressure. Arm resonance below 10 c/s, no resonance in audio response. Counterweight with fine ad-

justment. Stylus pressure adjustment calibrated in  $\frac{1}{4}$  gm steps. Extra light aluminium plug-in shell. Viscous damped lowering device. Price: £10 10s. (U.K. purchase tax £2 1s. 8d.).

**TP.14 pickup arm.** Precision 9 in. arm. Horizontally and vertically balanced. Patented plug-in shell with adjustable vertical tracking angle. Viscous-damped lowering and lifting control. Anti-skating horizontal bias device. Stylus pressure adjustable  $\frac{1}{2}$  to 4 gm. Price: £17 10s. (U.K. purchase tax £3 9s. 6d.).

**TP.50 shell.** For TP.13 and TP.14 pickup arms. Price: £2 (U.K. purchase tax 8s. 2d.).

**TD.224 shell.** For TD.224 transcription unit. Price: £1 6s. 3d. (U.K. purchase tax 5s. 3d.).

**BTD-12S shell.** Price: £1 2s. (U.K. purchase tax 4s. 5d.).



**TRANSCRIPTORS LTD.,** 551 Holloway Road, London, N.19. Tel: 01-272 6419.

**Transcriptor fluid arm.** Stereo or mono low-mass arm with fluid Uni-pivot mount. Modular counter-weight system with fine balance adjustment. Suitable for all cartridges with compliance of  $15 \times 10^{-6}$  cm/dyne or above, tracking at not more than 2.5 gm. Hydraulic lowering device with manual over-ride control. Incorporates precise cueing system. Single hole fixing.

Integrated leads. Plug-in head shell. Roller-action adjustable bias compensation. Price: £12 10s. (U.K. purchase tax £2 6s. 6d.).



**WALTON.** Rainer-Walton Enterprises Ltd., 19 New End, London, N.W.3. Tel: 01-435 7706.

**Walton M.1.** High quality mono cartridge which is suitable for playing stereo records without damage to disc or stylus. Pw 3-5 gm. Decoupled stylus tip. Output up to 1V. FR 40 c/s-12 Kc/s. Price: £1 15s, 4d. (including U.K. purchase tax).

Stereo version, also pickup arm, included in future range to be announced.



**WORDEN AUDIO DEVELOPMENTS LTD.,** 54 Chepstow Road, London, W.2. Tel: 01-229 4996.

**Worden articulated arm Mk. III.** Radially operative single arm with articulated head piece. Tracking correct to  $\pm \frac{1}{4}^\circ$ . Vertical and lateral friction less than .50 mg. Adjustable counterbalance weight. Height adjustment. Detachable head-shell accepts all standard  $\frac{1}{2}$  in. centre fixing cartridges. No resonances above 10 c/s. Extra head shells available. Built-in lowering and lifting device. Price: to be announced.



# PICKUP ACCESSORIES

**ARENA.** Distributors: Highgate Acoustics, 71-73 Great Portland Street, London, W.1. Tel: Museum 2901.

● **Arena F.1 preamplifier.** For magnetic pickups. Specially designed for use with Arena T. 1900F tuner/amplifier. Power supply through cable connection from stereo output socket. Plastic case. Price: £5 5s.

● **Arena FS.1 preamplifier.** Preamplifier F.1 combined with 240V AC mains power pack. Suitable for use with any stereo amplifier. Two matched silicon transistors in each channel. Matches magnetic pickup into amplifier having crystal or ceramic input only. Price: £7 7s.



**AURIOL (GUILDFORD) LTD.,** Farnham Trading Estate, Farnham, Surrey. Tel: Farnham 3366.

**Auriol pickup control.** This unit eliminates accidental damage to the record by the stylus, the control provides air cushioned lowering and positive vertical lifting and lowering of the stylus. The supporting arm is serrated and calibrated for accurate positioning of the stylus at any pre-selected position within 1-2 microgrooves. Three cursors are provided to mark starting positions and an indexing clip is supplied to suit any specified pickup arm. Price: £3 1s. 3d. (U.K. purchase tax 11s. 3d.).

**Auriol pickup control Mk. II.** This is dimensionally similar to the above but the arm will swing clear of the turntable to allow its use with the Autochanger/Manual player units. Price: £3 12s. (U.K. purchase tax 13s. 2d.).



**BANG & OLUFSEN U.K. DIVISION,** Eastbrook Road, Gloucester. Tel: Gloucester 21591.

**M/lift.** For Bang & Olufsen arms only. Hydraulic operation. Price: £3 13s. 6d. (U.K. purchase tax 10s. 8d.).

● **Type GF2.** Transistorised stereo pickup preamplifier. Sensitivity: 7 mV input for 0.5V output per channel. NL -62 dB. Price: £5 5s.

● **Type GF3.** Preamplifier. Specification and price to be announced.

**BURNE-JONES & CO. LTD.,** 18 Brunswick Road, Sutton, Surrey.

**Counterweight unit.** The addition of this unit to a B.J. pickup arm permits speed and accuracy in weight compensation. Price on application.

**Alignment protractor.** For measuring the tracking accuracy of all pickup assemblies. Made in plastic ivoryine. Price: 8s.



**CLENDISC (MAIL ORDER) LTD.,** c/o Mrs. E. Smith, 7 Trinity Court, Gray's Inn Road, London, W.C.1. Tel: Terminus 9088.

**Clendisc.** An anti-static cleaner and preserver for records. Price: 4s. 1d. Clendisc record cleaning pad. Price: 3s. 4d. including tax.



**COLTON & CO. (LAPIDARIES) LTD.,** The Crescent, Wimbledon, London, S.W.19. Tel: Wimbledon 9401.

**Antistaticloth.** A soft cloth impregnated with an anti-static material, for cleaning records. Price: 2s. 6d.

**Colton E.P. record centre adaptors** (45 rpm). Small plastic centre pieces which enable E.P. records to be used again on slim spindle changers after the large centre piece has been removed. Price: 3s. per packet of one dozen. (U.K. purchase tax 6d.).

**Varilift.** A precision instrument for lowering pickup on to record. Instantly adjustable for height using a single knurled nut. Screw valve provides variable rate of fall which, being hydraulically controlled, is smooth and independent of pickup weight. Provision is made for locking in the raised position when required. Price: £3 0s. 9d. (U.K. purchase tax 10s. 9d.).

**Precision level.** Circular bubble-type spirit level in white plastic case  $1\frac{3}{16}$  in. diameter  $\frac{1}{2}$  in. high. Three fixing holes provided or it may be fixed with adhesive. Ensures accurate levelling in all directions. Price: 6s. 9d.

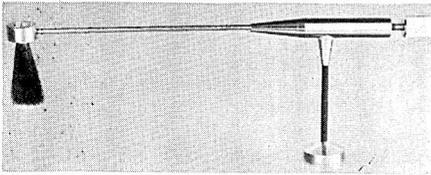
**Antistatimat.** All-rubber 12 in. turntable mat. Accurately balanced and moulded with guard edge recess. Introduction of certain materials



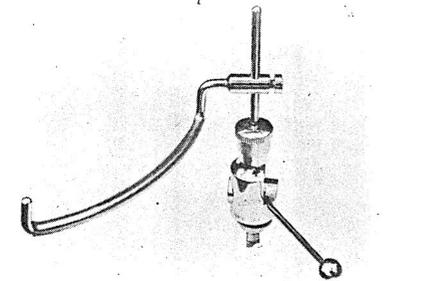
Manual parastat



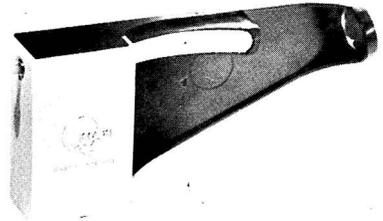
Metro-Sound stylus cleaning kit



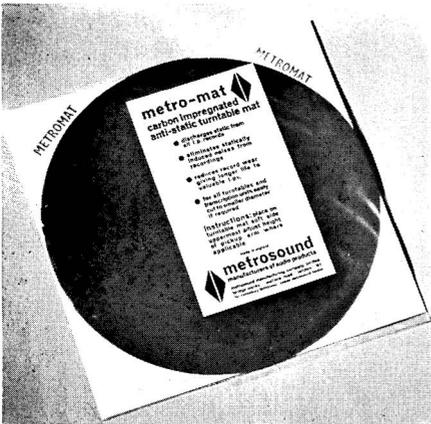
Transcriptor sweep arm record cleaner



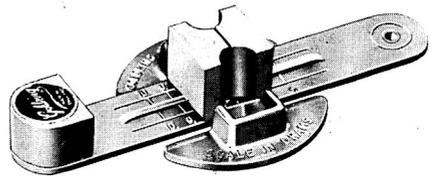
Ortofon "Hi-Jack"



Stylovue



Metro-Sound metro-mat



STB 1



The "Dust Bug"

into the rubber renders it conductive to static charges on micro-groove records. When a record is placed on the mat static charges are dispersed freeing the record from induced noises without use of sprays, etc. Price: 13s. 6d. (U.K. purchase tax 2s. 5d.).

**Plastisleeves.** Made from 200-gauge polythene and designed to protect microgroove records from dust and damp. Supplied in packets of 12. Prices: 7 in. round bottom 2s. 4d., 12 in. round bottom 5s.

**Plasticovers.** Made from 200-gauge polythene and designed to protect record sleeves against rubbing and scratching. Supplied in packets of 12. Prices: 7 in. square bottom 1s. 3d., 12 in. square bottom 3s. 1d.

**Chek.** Self-adhesive anti-slip pads for use with records played on auto-changers. Prevents records slipping one against another. Packets of 10. Price: 2s. 7d. (U.K. purchase tax 5d.).

**Times-Fifty.** Miniature pocket microscope with stylus locating slot and adjustable focus. Gives clear picture of stylus tip at X50 magnification.  $4\frac{1}{2}$  in. long and fitted with pen clip. Price: 17s. 6d.



**COSMOCORD LTD.,** Eleanor Cross Road, Waltham Cross, Herts. Tel: Waltham Cross 27331.

**Acos stylus pressure gauge.** A spring balanced gauge calibrated 0-15 gm. Accurate to within 0.5 gm. Price: 9s. 6d. (U.K. purchase tax 1s. 9d.).



**DECCA SPECIAL PRODUCTS,** Decca Radio and Television Division of the Decca Record Co. Ltd., Ingate Place, Queenstown Road, London, S.W.8. Tel: Macaulay 6677.

**Magnetic bias compensator.** Neat, simple, unobtrusive device using magnetism precisely to neutralise the forces which draw a pickup towards the centre of the turntable. Type A for Mk. I and Mk. I "Super" *ffss* arms, and for Deram ARI arm. Type B for current Decca "Professional" arm. Prices: Types A and B 17s. 10d. (U.K. purchase tax 3s. 2d.).

**Counterweight adjuster.** Placed on counterweight of Mk. I *ffss* arm produces tracking weight of 2 gm for Mk. III and mono elliptical heads. Already supplied with Mk. I "Super" arms. Price: 6s. 5d. (U.K. purchase tax 1s. 1d.).

**Centre locator.** Fits on *ffss* arm like *ffss* head. Pickup arm is correctly positioned when the locator moulding fits the turntable centre spindle. Price: 4s. 8d. (U.K. purchase tax 10d.).

**Decca Microlift.** A device for raising and lowering a manual pickup arm at any point on the record for minimising risk of damage either to record or stylus through handshake. Easy to fit to any back-pivoted pickup. It does not hinder record handling by over-lapping the turntable. Price: £1 5s. 6d. (U.K. purchase tax 4s. 6d.).

**Stylus cleaner.** Incorporates wheel covered in soft hair, which engages with the stylus when in its rest position. A height adjustment screw enables the cleaner to be accommodated to suit all non-automatic record players on the market. Price: 17s. 10d. (U.K. purchase tax 3s. 2d.).



**M. B. FITCH.** U.K. Distributors: Metro-Sound Manufacturing Co. Ltd., Bridge Works, Wallace Road, London, N.1. Tel: Canonbury 8641. Cables: Metrosound, London, N.1. Overseas Distributors: T. D. Bailey & Son Ltd., 9 St. Helen's Place, London, E.C.3.

**Cuematic Mk. II.** Precision record groove locator and pickup lowering device with sufficient accuracy to locate within one micro-groove. Price: £19 7s. 6d. (U.K. purchase tax £4 3s. 2d.).

**"Hi-Jack" Model "D".** A raising and lowering device specially designed for direct attachment to the Decca *ffss* pickup pedestal. All metal chrome plated construction, positive stops in fully raised and lowered positions. Price: £1 1s. (U.K. purchase tax 3s. 10d.).

**"Hi-Jack" Model "U".** A raising and lowering device specially suited for use with the Garrard 4HF motor unit for which no extra fixing hole is required.  $1\frac{1}{2}$  in. height adjustment by means of sliding head. All metal chrome plated construction. One  $\frac{3}{8}$  in. hole needed for fixing. Price: £1 1s. (U.K. purchase tax 3s. 10d.).

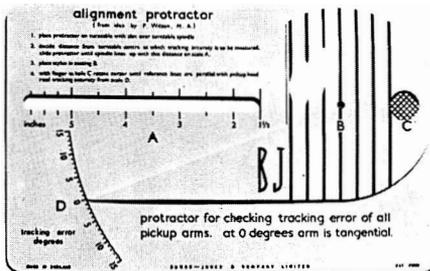


**GARRARD ENGINEERING LTD.,** Newcastle Street, Swindon, Wilts. Tel: Swindon 5381. Cables: Garrard, Swindon.

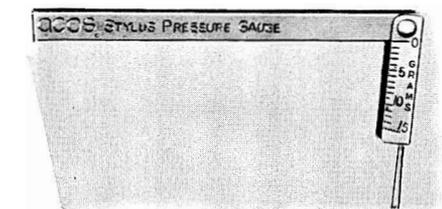
**SPG3.** Stylus pressure gauge. Suitable for all current pickup arms and heads. Elegantly styled. Range 0-12 gm with  $\frac{1}{2}$  gm indications. Supplied with 5 gm calibration checking weight. Price: 18s. 7d. (U.K. purchase tax 3s. 4d.).



*Aurion Mk. II pickup control*



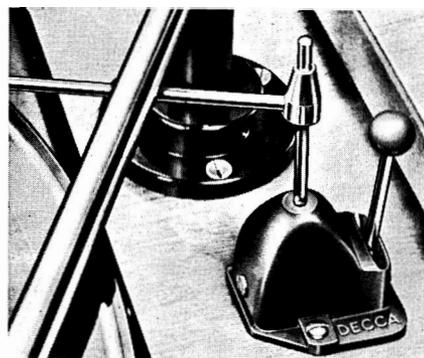
*B-J alignment protractor*



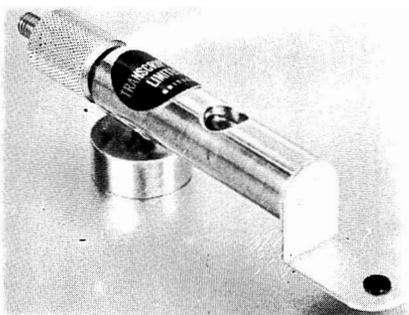
*Acos stylus pressure gauge*



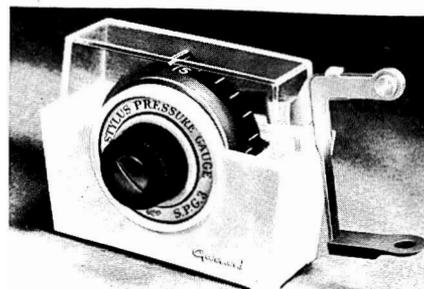
*Colton antistatic cloth*



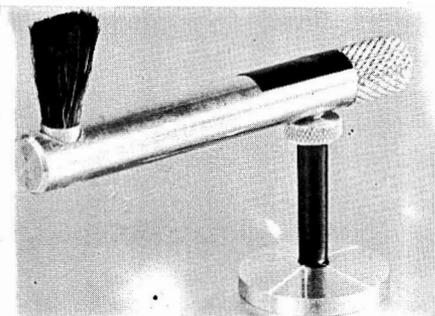
*Decca Microlift*



*Transcriptor stylus scales*



*SPG 3*



*Transcriptor stylus brush*

**GOLDRING MANUFACTURING CO. (GREAT BRITAIN) LTD.**, 486/488 High Road, Leytonstone, E.11. Tel: Leytonstone 8343. Cables: Echovox, London.

**STB.1.** Stylus balance, a simple yet accurate gauge which operates a record level. Stylus pressure is read directly in grams off the calibrated scale. Price: 3s. 6d. (U.K. purchase tax 7d.).

**Lenco STB.2.** Stylus pressure balance. A simple and accurate device, not relying on springs. Price: 12s. 6d. (U.K. purchase tax 2s. 1d.).

**Lencoclean.** Record cleaning device mounted on turntable. Tracks in front of the pickup, dispensing a narrow band of special fluid. Leaves no deposit on record, cleans the groove and cools the point contact. Keeps stylus point clean. Price: £1 17s. 6d. (U.K. purchase tax 6s. 8d.).



**LENNARD DEVELOPMENTS LTD.**, 7 Slades Hill, Enfield, Middlesex. Tel: Keats 0601.

**Play-fair Stylus Timer.** Manually operated device which indicates when stylus is due for replacement. Self-adhesive to attach to motor board if desired. Swiss mechanism. Neat plastic case with instructions. Two models: one for sapphires, one for diamonds. Price (either model): 16s. 9d. (U.K. purchase tax 3s.).



**METRO-SOUND MANUFACTURING CO. LTD.**, Bridge Works, Wallace Road, Canonbury, London, N.1. Tel: Canonbury 8641. Cables: Metrosound, London, N.1.

**Metro-Mat.** Carbon activated turntable mat. Discharges static from all LP records. Suitable for all turntables. Price: 10s. 6d. (U.K. purchase tax 1s. 11d.).

**High Fidelity Stylus Cleaning Kit.** Comprises bottle of special cleaning fluid, fine brush applicator and dirt remover. Safe for use with all pickups. Price: 6s. (U.K. purchase tax 1s. 1d.).

**Record care kit.** Price: 5s. (U.K. purchase tax 11d.).

**Metrosponge.** Record cleaner. Price: 2s. 6d. (U.K. purchase tax 5d.).

**45 rpm adaptors.** Per dozen pack. Price: 3s. (U.K. purchase tax 7d.).

**Metro-scale.** Stylus balance. 6s. (U.K. purchase tax 1s. 1d.).

**Lubricating kit.** Price: 6s. (no purchase tax).

**Disc-Key.** 45 rpm anti-slip guard. Price: 2s. (U.K. purchase tax 5d.).

**Spirit level.** Price: 6s. (no purchase tax).



**ORTOFON A/S.** Distributors: Metro-Sound Sales Ltd., Bridge Works, Wallace Road, London, N.1. Tel: Canonbury 8641. Cables: Metrosound, London, N.1.

**Ortofon "Hi-Jack".** Pickup arm lift/lowering device. All metal chromium plated. Special spring-loaded friction system for "air cushioned" lowering. Adjusting lowering speed. Positive positioning on record. Works independently of weight of cartridge or stylus force. Mk. II model for use with Ortofon arms, Mk. IV model free-standing for use with any arm. Price: £3 5s. (U.K. purchase tax 11s. 6d.).



**Q-MAX (ELECTRONICS) LTD.**, Napier House, High Holborn, London, W.C.1. Tel: Holborn 8534.

**Stylovue.** A device for projecting a magnified shadow of a stylus on to a screen facilitating inspection of a stylus *in situ*. Powered by torch batteries. Price: £1 14s.



**TRANSCRIPTORS LTD.**, 551 Holloway Road, London, N.19. Tel: 01-272 6419.

**Transcriptor Stylus scales.** Precision scales in polished aluminium with jewelled pivot. Sensitive to less than 0.01 gm. Accuracy better than 0.02 gm. Measures 0-5 gm in increments of 0.05 gm. Bubble read-out. Supplied with reference calibration check weights. British made. Price: £2 2s. (U.K. purchase tax 7s. 7d.).

**Transcriptors sweep arm.** Record cleaning device for permanent fixing. Height adjustable over 3½ in. Tracks at ¼-½ gm. Balance cursor. Integrated parking device. Precision unipivot construction. Polished aluminium. Price: £2 2s. (U.K. purchase tax 7s. 10d.).

**Transcriptors stylus brush.** For permanent installation. Comprises squirrel hair brush for cleaning stylus. Adjustable for height. Single hole fixing. Polished aluminium construction. Price: £1 5s. (U.K. purchase tax 4s. 8d.).

**Transcriptors anti-feedback legs.** As fitted to Transcriptors turntable. Effectively isolates turntable from acoustic feedback. Polished aluminium construction. Supplied in sets of three. Price (set): £2 7s. 9d. (U.K. purchase tax 7s. 7d.).

**Transcriptors record brush.** Squirrel hair brush for cleaning records by hand (too soft for any other purpose). Polished aluminium construction. Removable handle. Size:  $6 \times \frac{1}{2}$  in. Price: 15s. (no purchase tax).

**Transcriptors spirit level.** Polished aluminium construction. Accuracy 0.005 degrees maximum gradient level. Price: 15s. (no purchase tax).



**CECIL E. WATTS LTD.,** Darby House, Sunbury-on-Thames, Middx. Tel: Sunbury 3252.

**The "Dust Bug".** Claimed to be the most efficient method of removing static and dust from records as they are played. Instantly fitted, suitable for all types of records. Record quality is improved, surface noise and wear reduced. Price: 17s. 6d. (U.K. purchase tax 3s. 3d.).

**"Parostatik"** regd. Disc Preener. For record maintenance where anti-static agents are not desirable (where stylus force is less than 2 gm). Price: 6s. 9d.

**Manual parastat.** Manual Model Parastat record cleaning machine. For the cleaning and application of anti-static agents to LP records. Price: £2 5s. (U.K. purchase tax 1s. 7d. on brush only).

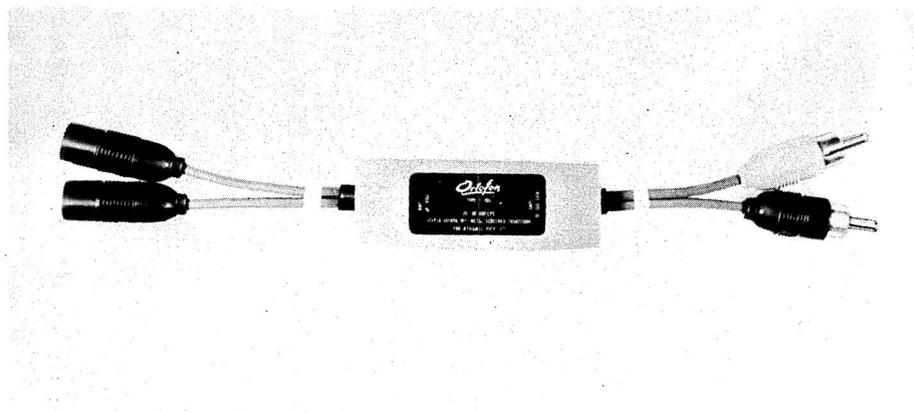
**Spares and replacements.** Dust Bug nylon bristle and plush pad. Price: 1s. 9d. New Formula dispenser. Price:  $\frac{1}{2}$  oz. 2s. 6d., 1 oz. 4s. 6d. Parastatik wicks (improved models only). Price: 2s. (packet of four). Parastat brush. Price: 8s. 6d. (U.K. purchase tax 1s. 7d.). Parastat nylon velvet pad covers. Price: 2s. Parastat white PVC sponge. Price: 1s. Humid Mop for use with manual Parastat. Price: 4s. 6d. Replacement sponges. Price: 2s. 6d. set. New Formula 1 oz. Parastatik dispenser. Price: 4s. 6d.



**WILSON STEREO LIBRARY LTD.,** 104-106 Norwood High Street, London, S.E.27. Tel: 01-670 6394.

**W.S.L. Blank Disc.** Highly polished blank vinyl disc for adjusting side thrust and alignment. Indicates the amount of side thrust to be corrected. Mirror-like surface reflects underside of cartridge and stylus and assists in accurate alignment. Supplied with instructions for correcting side thrust. Price: 13s. 6d. postage and packing included.

**W.S.L. Side Thrust Corrector.** Pulley device which may be fitted to any pickup to correct side thrust. Should be used in conjunction with W.S.L. Blank Disc for precise elimination of side thrust. Price: 6s. 9d. (U.K. purchase tax 1s. 3d.).



*Ortofon Transformer Modules*

# DIRECTORY OF MOTOR UNITS

**BANG & OLUFSEN U.K. DIVISION**, Eastbrook Road, Gloucester. Tel: Gloucester 21591.

● **Beogram 1000**. Three-speed motor unit complete with pickup arm, cartridge and dust cover. Speeds  $33\frac{1}{3}$ , 45, 78 rpm with fine speed control. Wow 0.2%. Rumble -35 dB at 1.4 cm/sec. 100 c/s NARTB. 12 in. turntable. Belt drive. Own motor. Type STL pickup arm. Built-in hydraulic arm lift. Stroboscopic mat. Anti-microphonic suspension. £35 14s.

● **GF2, GF3 Pre-amplifiers for above**. See Pickup Accessories section.



**BRAUN AG**. Distributors: Fi-Cord International, Charlwoods Road, East Grinstead, Sussex. Tel: East Grinstead 21351.

**PS400**. Turntable, pickup arm, cartridge, mounted on plinth with plexiglass lid. Speeds  $16\frac{2}{3}$ ,  $33\frac{1}{3}$ , 45, 78 rpm with  $\pm 3\%$  fine adjustment. W and F less than 0.02%. Rumble better than 56 dB. Turntable  $10\frac{1}{2}$  in. 5 lb. Stepped spindle, friction wheel, intermediate roller and drive belt. Four-pole synchronous motor. Tubular cranked metal pickup arm. Lowering and raising device. Cueing for 7 in., 10 in. and 12 in. records. Tracking error: less than  $\pm 2$  degrees. FR (Shure M44-7 cartridge) 20 c/s-20 Kc/s. Size:  $14\frac{7}{8} \times 6\frac{3}{8} \times 11\frac{1}{4}$  in. Price: £59 11s. 5d. including U.K. purchase tax.

**PCS5**. Turntable, pickup arm, cartridge, mounted on plinth with plexiglass lid. Speeds  $16\frac{2}{3}$ ,  $33\frac{1}{3}$ , 45, 78 rpm. Accuracy within -0.3% and +0.7%. Wow less than 0.1%. Flutter less than 0.05%. Rumble -52 dB. Turntable  $11\frac{7}{8}$  in. diameter, 6.6 lb. Drive by stepped pulley, friction wheel, capstan, belt and idler. Hysteresis synchronous motor. 9 in. tubular metal pickup arm. Lowering device. Cueing for 7 in., 10 in. and 12 in. records. Price (with Shure M44 cartridge fitted): £94 0s. 11d. including U.K. purchase tax: (without cartridge): £89 9s. 8d. including U.K. purchase tax.

**PS2**. Turntable unit with pickup arm and cartridge. Two-pole motor. Friction wheel drive. Speeds: 45,  $33\frac{1}{3}$ ,  $16\frac{2}{3}$  rpm. Speed fluctuations <0.3%. Turntable  $7\frac{1}{2}$  in. Rumble and noise: -50 dB. Dynamically balanced pickup arm. Tracking pressure 5-7 gm. Adjustable

counterweight. Cartridge: Elac KST107 with 0.5 thou sapphire for mono and stereo. Automatic shut-off and disengagement of drive. Size:  $12 \times 9 \times 4\frac{1}{8}$  in. Price: £15 9s. 3d. including U.K. purchase tax.

**PCS51**. Same as PCS5 but fitted with Shure M222/226 Stereo-Dynetic pickup arm and cartridge. Price: £152 12s. 1d. including U.K. purchase tax.

**PCS52E**. Same as PCS5 but fitted with SME 3009 pickup arm and Shure M55E cartridge. Price: £159 19s. 1d. including U.K. purchase tax.

**PCS52**. Same as PCS52E but without cartridge. Price: £130 5s. 11d. including U.K. purchase tax.

**PS1000**. Four-speed motor unit with pickup arm. Speeds: 78, 45,  $33\frac{1}{3}$ ,  $16\frac{2}{3}$  rpm. Speed adjustment  $\pm 3\%$ . W. and F. below 0.1%. Rumble -60 dB. Pickup arm balanced horizontally by two adjustable counterweights. Tracking adjustable down to 0.4 gm. Hydraulic lowering device, relay-operated by feather-touch button. Automatic photo-electric shut-off. Size:  $17\frac{1}{4} \times 6\frac{7}{8} \times 12\frac{3}{8}$  in. Price: £161 14s. 7d. including U.K. purchase tax.



**BSR LTD.**, Monarch Works, Powke Lane, Old Hill, Staffs. Tel: Cradley Heath 69272. Telex: 33282.

**UA65**. Automatic turntable unit with pickup arm. Speeds: 78, 45,  $33\frac{1}{3}$ ,  $16\frac{2}{3}$  rpm. Wow: below 0.2% RMS. Flutter: below 0.06% RMS. 11 in. diameter pressed steel turntable. Belt and pulley drive. Two-pole induction motor. Mains: 100-125V 60 c/s, 200-250V 50 c/s. Low-mass tubular arm with cartridge shell incorporating finger lift. Will accommodate all standard cartridges. Automatic pickup arm lock. Cue and pause lever. Anti-skate control. Price: £8 19s. 6d. (U.K. purchase tax £1 11s. 9d.).

**UA70**. Manual/automatic motor unit with pickup. Speeds: 78, 45,  $33\frac{1}{3}$ ,  $16\frac{2}{3}$  rpm. 11 in. diameter deep-rim turntable. Pulley drive. Four-pole induction motor. Tubular counterbalanced pickup arm with coarse and fine adjustments. Detented and calibrated stylus pressure control. Adjustable anti-skate control.



*Beogram 1000*



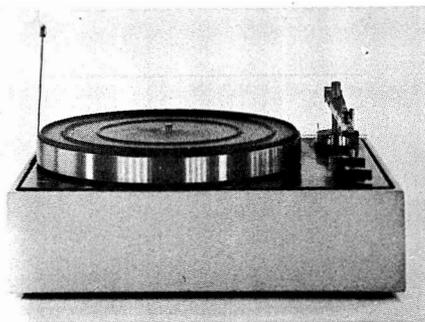
*Braun PCS-5 motor and pickup*



*Braun PCS-52E motor and pickup*



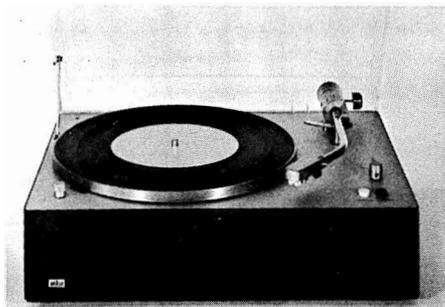
*B.S.R. UA65*



*Braun PCS-51 motor and pickup*



*BSR UA70*



*Braun PS-1000 motor and pickup*



*Connoisseur Craftsman III on plinth with arm*

Automatic pickup lock. Interchangeable spindles. Automatic shut-off. Price: (without cartridge) £10 19s. 6d. (U.K. purchase tax £1 19s. 9d.).



**COLTON & CO. (LAPIDARIES) LTD.,** The Crescent, Wimbledon, London, S.W.19. Tel: Wimbledon 9401.

**Jobo 2800S.** Turntable unit. Speeds  $33\frac{1}{3}$  and 45 rpm. Fine speed control  $\pm 4\%$ . Non-magnetic mineral loaded 4 lb plastic turntable. Six-pole outside rotor Papst motor, capacitor start. Built-in spirit level and illuminated stroboscope. Belt drive. Motor board has space for pickup arm at side. Price (with accommodation for 9 in. arm): £32 1s. 6d. (U.K. purchase tax £6 5s. 6d.); (with accommodation for 12 in. arm): £33 6s. 8d. (U.K. purchase tax £6 12s. 4d.). Complete on plinth with pickup arm and B & O Stereodyne SP-1 cartridge. Price: £36 13s. 4d. (U.K. purchase tax £7 5s. 7d.).



**CONNOISSEUR.** See A. R. Sugden and Co. Ltd.



**DECCA SPECIAL PRODUCTS,** Decca Radio and Television Division of the Decca Record Co. Ltd., Ingate Place, Queenstown Road, London, S.W.8. Tel: Macauley 6677.

● **DD1.** Deccadec motor unit with Deram pickup in teak table or shelf-mounting cabinet. Anti-rumble pickup. Autochanger version with Garrard AT6/1 available at the same price. Price: £23 4s. 2d. (U.K. purchase tax £4 1s. 10d.).

● **Deccadec de luxe.** Motor unit with Deram transcription head and arm including all fittings for cabinet mounting. Speeds:  $16\frac{2}{3}$ ,  $33\frac{1}{3}$ , 45, 78 rpm with no fine adjustment.  $10\frac{1}{2}$  in. non-magnetic turntable. Pulley drive. Garrard motor. Automatic motor switch off and return of pickup at end of record. Built-in anti-rumble filter. Lifting and lowering device and bias compensation. Price: £15 3s. 6d. (U.K. purchase tax £2 13s. 6d.).



**DUAL ELECTRONICS LTD.,** Radnor House, London Road, Norbury, S.W.16. Tel: 01-764 9465/6.

**Dual 1019.** Transcription turntable with automatic changing facility. Speeds: 78, 45,  $33\frac{1}{3}$ ,

$16\frac{2}{3}$  rpm. Variable speed adjustment  $\pm 6\%$ . Dynamically balanced low-mass arm with direct dial stylus pressure (0.5 gm) and direct dial bias compensation. Dynamically balanced non-ferrous turntable weighing over  $7\frac{1}{2}$  lb. Cueing control. Rotating single-play spindle. Continuous pole motor with low stray field. Radially elastic suspension. Friction-damped rubber-cushioned spring suspension. Rumble virtually eliminated. Accepts any standard cartridge with  $\frac{1}{2}$  in. fixing centres but specially recommended are Shure M80E-D19 and Shure V15-11. Plinths and covers in teak and rosewood. Full specification on request. Price: £40 19s. (including U.K. purchase tax).

**Dual 1009-SK.** Transcription turntable with automatic changing facility. Specification as for Dual 1019 except turntable weighs 5 lb and there is no variable speed adjustment. Available to manufacturers only. Full specification and prices on request.

**Dual 1015.** Transcription turntable with automatic changing facility. Counter-balanced pickup arm. Four speeds. Direct dial stylus pressure adjustment (0.5 gm) and direct dial bias compensation. Cueing control. Full specification on request. Price: £24 14s. 6d. (including U.K. purchase tax).

**Dual 1010-S.** Turntable providing manual operation with autochanger. Four speeds. Four-pole fully screened motor. Cueing control. Full specification on request. Price: £17 17s. (including U.K. purchase tax).



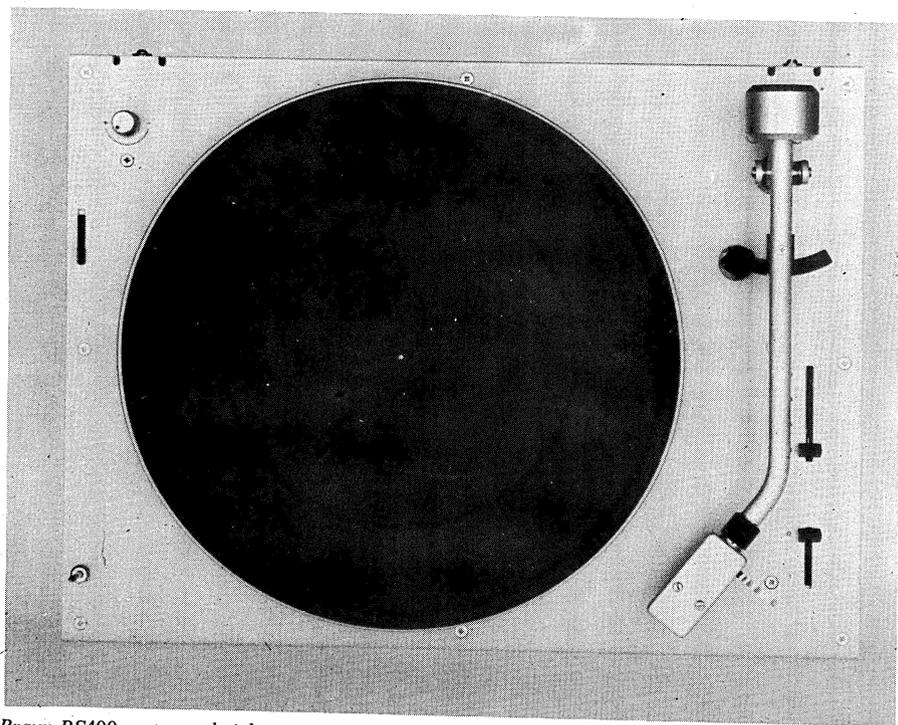
**ELAC.** Electroacoustic GmbH., Kiel, West Germany. Distributors: Mitchell Enterprises Ltd., 61 West Street, Dorking, Surrey. Tel: Dorking 4229.

**Miracord 50H.** Four speeds, with automatic shut-off. Magnetic pickup cartridge STS333. (Can also be supplied without cartridge or with other Elac cartridges.) Studio tone arm with adjustable stylus force (2-6 gm). Heavy balanced turntable, 12 in. dia (driven by special hysteresis motor), 220V AC, 50 c/s or 110V AC, 60 c/s. Push-button control for various functions. Size:  $14\frac{1}{2} \times 12\frac{1}{2}$  in. Weight:  $14\frac{3}{4}$  lb. Price on request.

**Miraphon 22H.** Design and basic technical characteristics same as for Miracord 50H. Incorporates built-in arm raising and lowering device. Weight:  $14\frac{3}{4}$  lb. Price on request.



*Connoisseur Craftsman II on plinth*



*Braun PS400 motor and pickup*

● **Miracord 40.** Transcription record changer with stereo pickup mounted on oiled walnut plinth. Speeds: 78, 45,  $33\frac{1}{3}$ ,  $16\frac{2}{3}$  rpm. 12 in. non-ferrous dynamically balanced 6 lb. turntable. Push-button control of motor and pickup arm. Studio type balanced arm. Stylus pressure adjustable 0-6 gm. Plug-in head. Normally fitted Elac STS240. Will play up to 10 records automatically. Various accessories available. Details on request. Price: £46 (U.K. purchase tax £7 13s. 4d.).

● **Miracord 20.** Similar specification to Miracord 40 but single play unit with Hydraulic lifting device. Price: £46 (U.K. purchase tax £7 13s. 4d.).



**FERGUSON.** British Radio Corporation Ltd., 284 Southbury Road, Enfield, Middlesex. Tel: Howard 2477.

● **Ferguson 202RP.** Record unit in cabinet to match Unit Audio equipment. Turntable: Garrard SP25 with bias compensation, cueing device and interchangeable head. Cartridge: Sonotone stereo ceramic 9TA with diamond stereo/LP and sapphire 78 stylus. Mains: 200-250V AC 50 c/s. Output socket: 5-pin DIN for stereo pickup. Supplied with 5 ft. lead for connecting to Unit Audio amplifiers. Size:  $16\frac{1}{4} \times 14 \times 8\frac{1}{2}$  in. Finish: Queensland walnut with transparent Perspex lid. Price: £28 14s. 10d. (including U.K. purchase tax).



**GARRARD ENGINEERING LTD.,** Swindon, Wiltshire, England. Tel: Swindon 5381. Cables: Garrard, Swindon.

**Model 401.** Transcription motor. Three speeds:  $33\frac{1}{3}$ , 45, 78 rpm. Adjustable by eddy current brake. 6 lb machined aluminium turntable with gear-cut illuminated strobe markings on rim. Statically balanced. Die-cast aluminium unit plate. Completely screened spring-mounted shaded-pole motor. Anti-static turntable mat. Styled by Eric Marshall and finished in metallic charcoal with chrome relief. W. and F. less than 0.05% RMS. Rumble almost non-existent. Mains: 110-125V and 220-250V, 50 or 60 c/s according to pulley fitted. Size:  $13\frac{3}{4}$  in. wide,  $14\frac{5}{8}$  in. front to rear,  $2\frac{1}{8}$  in. above motor board,  $3\frac{1}{8}$  in. below top of board. Price: £25 9s. 7d. (U.K. purchase tax £4 11s. 2d.).

**Lab 80 Mark II.** Transcription turntable with autochange facility and automatic single record play. Two speeds:  $33\frac{1}{3}$ , 45 rpm. 12 in. diameter heavy non-magnetic turntable. Statically balanced. Plug-in head. Wood afromosia counterbalanced arm with aluminium stabilising channel. Bias compensator. Magnetic auto-trip. Fine stylus pressure click adjustment. Wired for mono and stereo. Dynamically balanced motor. Mains: 100-130V, 200-250V, 50 c/s or 60 c/s according to pulley. Size:  $15\frac{3}{4}$  in. wide,  $14\frac{5}{2}$  in. front to rear,  $5\frac{1}{8}$  in. above and  $3\frac{1}{16}$  in. below lower edge of unit plate. Plus clearances. Price: £25 15s. 1d. (U.K. purchase tax £4 12s. 1d.).

**A70 Series.** Developed from the Laboratory series Type A the A70 provides manual operation with autochange facility. Counter-balanced pickup arm. Plug-in head. Bias compensator. Sandwich construction turntable. Four speeds:  $16\frac{2}{3}$ ,  $33\frac{1}{3}$ , 45, 78 rpm. Wired for mono and stereo. Balanced and screened motor. Pickup muting switch. Mains: 100-130V, 200-250V, 50 c/s or 60 c/s according to pulley. Size:  $16\frac{1}{4}$  in. wide,  $13\frac{1}{2}$  in. front to rear, 5 in. above and  $2\frac{3}{4}$  in. below lower edge of unit plate. Plus clearances. Price: £19 9s. 8d. (U.K. purchase tax £3 9s. 8d.).

**SP25.** High quality single record player. Die-cast non-magnetic turntable. Four speed. Magnetically screened motor. Cueing device to raise or lower pickup arm where required. Counter-balanced tubular aluminium arm. Plug-in head. Integral calibrated stylus pressure adjustment. Bias compensator. Automatic trip and return. Wired for stereo and mono. Mains: 100-130V, 200-250V, 50 c/s or 60 c/s according to pulley. Size:  $14\frac{3}{4}$  in. wide,  $12\frac{1}{2}$  in. front to rear,  $2\frac{3}{8}$  in. above,  $2\frac{3}{4}$  in. below lower edge of unit plate. Plus clearances. Price: £11 13s. 3d. (U.K. purchase tax £2 1s. 9d.).



**GOLDRING MANUFACTURING CO. (GREAT BRITAIN) LTD.,** 486/488 High Road, Leytonstone, London, E.11. Tel: Leytonstone 8343.

**Goldring-Lenco GL68.** Integrated turntable and pickup arm. Infinitely variable speeds 30-80 rpm with preset click stops for  $16\frac{2}{3}$ ,  $33\frac{1}{3}$ , 45, 78 rpm. Wow 0.2%. Speed constancy: 1% change for 13% change in voltage. Turntable 12 in. diameter pressed steel. Drive via vertical idler. Four-pole motor. Pickup arm Goldring G65. Pickup lowering device. Idler wheel disengagement. Price: £16 16s. (U.K. purchase tax £3.).



*Elac Miracord 40*



*Goldring-Lenco GL70*

**GL70 transcription unit.** Non-ferrous turntable, weight 8 lb. Speed may be continuously adjusted from above 80 rpm to below 30 rpm and from 15 to 18 rpm. Pre-set standard speeds. Four-pole constant velocity motor (15 watts). W & F max. 0.2%. Incorporates L.70 pickup arm. Pickup lowering device. Price: £25 15s. (U.K. purchase tax £4 12s.).

**Goldring-Lenco GL72.** Integrated turntable and pickup arm. Four speeds, infinitely variable. Wow <0.2%. Flutter <0.2%. Speed change less than 1% for 13% voltage change. 12 in. diameter diecast zinc turntable, 8 lb. Vertical pulley drive. Four-pole 15W induction motor. L.72 pickup arm. Counter-balance weight adjustment, knife-edge bearing, plug-in shell. Hydraulic lowering device. Price to be announced.

**Goldring G66.** Integrated turntable unit and arm. Four speeds with 10% fine adjustment. Wow 0.2%. Turntable 8½ in. diameter pressed steel. Pulley drive. Two-pole motor. Die-cast aluminium arm with plug-in shell. Pickup arm lowering device. Prices: G66/MX2 £9 18s. 8d. (U.K. purchase tax £1 15s. 6d.); G66/CS80 £10 10s. (U.K. purchase tax £1 17s. 6d.); G66/CS90 £12 12s. (U.K. purchase tax £2 6s.).

**Goldring G99.** Transcription motor only. Infinitely variable speeds 30-80 rpm. Wow 0.1%. Speed remains constant with 13% voltage change. Turntable 12 in. die-cast zinc. Vertical idler wheel with provision for disengagement. Four-pole motor. Built-in illuminated strobe. Push-button on-off. Price: £18 18s. (U.K. purchase tax £3 7s.).



**GOODMANS LOUDSPEAKERS LTD.,** Axiom Works, Lancelot, Road, Wembley, Middlesex. Tel: 01-902 1200. Cables: Goodaxiom, Wembley.

**Goodmans NT1000.** Complete record unit comprising turntable, pickup arm, plinth with hinged cover, and plug-in connection panel. Motor and arm details as Thorens TD150A unit. Cartridges: Shure M75-MB aligned and tested by Goodmans. Polished wood housing with perspex-fronted lid. Finish: teak or walnut. Designed to match Goodmans Audio Suite equipment. Size: 16½ in. wide, 13¾ in. deep, 5 in. high. Price: £49 2s. (U.K. purchase tax £8 13s. 3d.).

**PERPETUUM-EBNER.** Distributors: Howland-West Ltd., 2 Park End, South Hill Park, London, N.W.3. Tel: Swiss Cottage 6666.

**PE Studio 33.** Turntable with pickup arm. Speeds: 16⅓, 33⅓, 45, 78 rpm with fine control +1% to -2%. Wow better than ±0.15%. Flutter better than ±0.1%. Rumble -46 dB. Turntable 11 in. diameter 4.4 lb. non-magnetic alloy casting. Belt drive via intermediate pulley. Shaded pole induction motor. Pickup arm adjustable 0.6 gm stylus pressure. Slow motion lowering device. Automatic lift optional. Push-button on-off. Illuminated strobe. Size: 14 in. wide, 13 in. deep, 3⅝ in. above, 3⅝ in. below. Weight: 16 lb. Price: £40 (U.K. purchase tax £7 1s. 2d.).

**PE.34.** Turntable with pickup arm. Speeds: 16⅓, 33⅓, 45, 78 rpm with fine control +1% to -2%. Wow better than ±0.15%. Flutter ±0.1%. Rumble -42 dB. Turntable 11 in. diameter 3.9 lb. cast alloy. Belt drive via intermediate pulley. Four-pole induction motor. Pickup arm mounted on precision bearings with adjustable stylus pressure. Slow-motion arm lowering device. Price: £25 10s. (U.K. purchase tax £4 10s. 10d.).

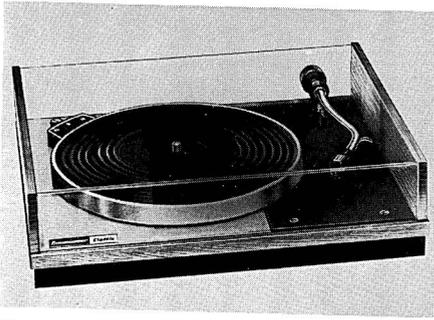


**PHILIPS ELECTRICAL LTD.,** Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437 7777. Cables: Phillamps, London.

● **GA.145.** Auto-changer record turntable on plinth. Speeds: 78, 45, 33⅓, 16⅓ rpm. W and F 0.15%. Rumble -35dB. Pickup head: GP310 stereo crystal. Motor: asymmetrical AC. Mains: 110, 127, 220, 240V AC. Consumption: 6W. Size: 14¼ × 12½ × 7 in. Weight: 12 lb. Finish: teak veneered plinth with removable clear plastic lid. Price: £24 10s. (including U.K. purchase tax).

● **GC.030.** Transcription record turntable with pickup arm and head. Speeds: 78, 45, 33⅓, 16⅓ rpm ±0.5%. Rumble > -60 dB. Pickup head: GP407 magneto-dynamic. Tone arm friction: horizontal <0.15 gm at stylus tip, vertical <0.2 gm at stylus tip. Variable side thrust compensation. Motor: Symmetrical asynchronous type. Mains: 110, 127, 220, 240V AC 50 c/s (60 c/s version available). Consumption: 10W. Size: 15½ × 13¼ in. Price: £41 10s. 10d. (including U.K. purchase tax).

● **GA.230.** Specification as for GC.030 but with teak veneered plinth and clear plastic lid. Size: 15½ × 13¼ × 6⅞ in. Weight: 21¼ lb. Price: £52 3s. 10d.



*Connoisseur Classic on plinth*



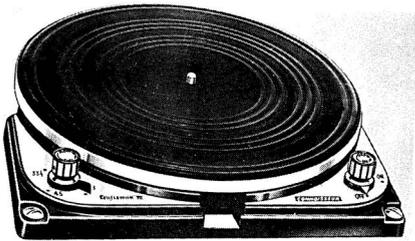
*Decca Deccadec*



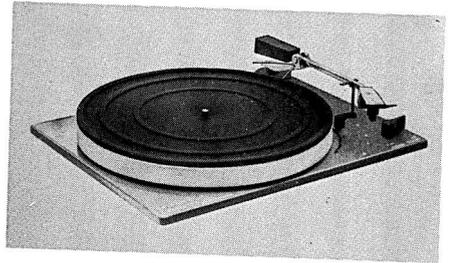
*Connoisseur Classic motor unit*



*Ferguson 202RP*



*Connoisseur Craftsman III*



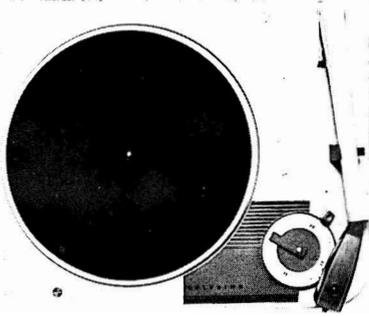
*Goldring-Lenco GL68*



*Connoisseur Craftsman II motor unit*



*Goldring G99-S*



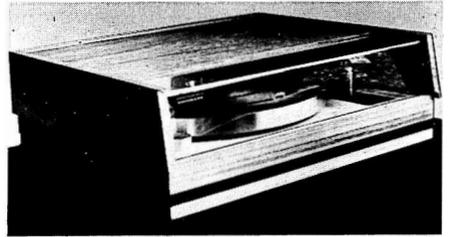
Goldring G66



Garrard LAB80 Mk II



Perpetuum Ebner PE Studio 33



Goodmans MT1000



Philips GC.030



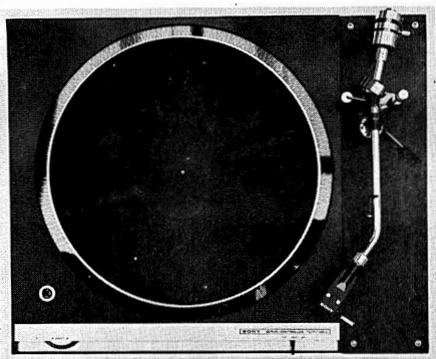
Philips GA.145



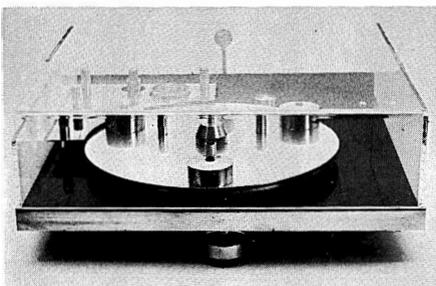
Thorens TD 124 Series 2



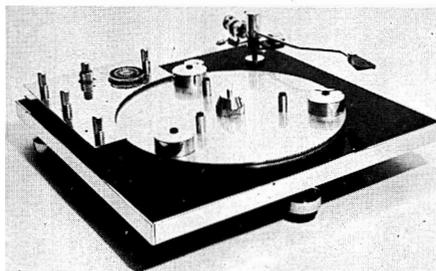
Philips GA.230



*Sony turntable*



*Transcriptor motor with cover*



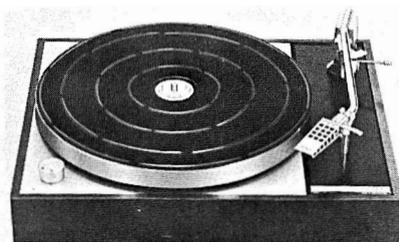
*Transcriptor motor*



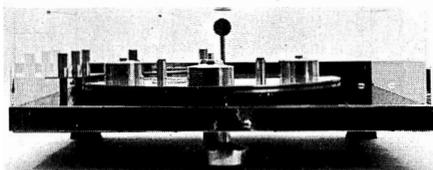
*Zenith 4-speed professional*



*Thorens TD 135*



*Thorens TD 150 AB*



*Transcriptor motor (different view)*



*Wharfedale WTT2*

**PIONEER.** Distributors: Swisstone Ltd., 48a Station Road, Cobham, Surrey. Tel: Cobham 2853 and 4214.

**PL-41.** High quality belt-drive transcription motor and turntable. Full specification and price on request.



**SONY U.K. DIVISION,** Eastbrook Road, Gloucester. Tel: Gloucester 21591.

**TTS-3000.** Turntable and motor unit only. Speeds:  $33\frac{1}{3}$  and 45 rpm. Fine speed control  $\pm 5\%$ . W and F  $< 0.05\%$  RMS. Signal/noise ratio over 60 dB. Speed constancy:  $0.05\%$ . 12 in. diameter die-cast aluminium turntable. Weight: 3 lb 5 oz. Belt drive. Servo-controlled DC motor. Illuminated strobe. Built-in spirit level indicator. Price: £57 11s. 6d. (U.K. purchase tax £10 13s. 6d.).



**A. R. SUGDEN & CO. (ENGINEERS) LTD.,** Market Street, Brighouse, Yorkshire. Tel: Brighouse 2142. Cables: Connoisseur, Brighouse.

**Connoisseur "Craftsman" two speed transcription motor.** Operates at  $33\frac{1}{3}$  and 45 rpm fixed speeds. Full 12 in. turntable of non-ferrous material. All bearings are adjustable throughout the life of the unit. Synchronous motor. Price: £14 14s. (U.K. purchase tax £2 14s. 6d.).

**Connoisseur "Craftsman" three speed transcription turntable.** Requires minimum mounting space. Heavy non-ferrous 12 in. turntable. 33, 45 and 78 rpm. 4% variation on all speeds. Neon lit stroboscope fitted. Dynamically and electrically balanced synchronous motor. All bearings are adjustable. Price: £19 10s. (U.K. purchase tax £3 11s. 8d.).

**Connoisseur Classic Turntable Unit.** Motor and turntable only mounted on metal platform. Speeds:  $33\frac{1}{3}$  and 45 rpm (fixed). Wow: better than 0.15%. Flutter: better than 0.1%. Rumble: -50 dB when measured at RIAA characteristics referred to 7 cm/sec at 1 Kc/s.  $10\frac{1}{4}$  in. lathe turned aluminium turntable weighing approximately 2 lb. Soft rubber drive rollers. Two slow-speed (375 rpm) motors, one for each record speed. Price: £12 10s. (U.K. purchase tax £2 4s. 1d.).

**Connoisseur Classic.** Combined assembly of 2-speed motor, transcription arm and cartridge

mounted on Afrosomia plinth complete with Perspex dust cover. Also available with SAU-1 or SAU-2 arms. Two slow speed synchronous motors,  $33\frac{1}{3}$  rpm 45 rpm direct drive. All spindles high quality carbon steel, phosphor-bronze bearings.  $10\frac{1}{4}$  in. lathe turned aluminium turntable. Price: £25 10s. (U.K. purchase tax £4 10s.).

**Craftsman plinth assembly.** Available with Craftsman 2-speed or 3-speed motor with SAU-1 or SAU-2 arm with lifting device and head shell fitted with SCU1 cartridge. Size:  $16 \times 14 \times 7\frac{1}{2}$  in. Finish: satin polished wood plinth, black base and with grey motor mounting board and Perspex cover. Prices from: 2-speed £33 11s. 6d. (U.K. purchase tax £6 4s. 5d.).



**THORENS.** Distributors: Metro-Sound (Sales) Ltd., Bridge Works, Wallace Road, Canonbury, London, N.1. Tel: Canonbury 8641. Cables: Metrosound, London, N.1.

**TD.124 Series II.** Transcription turntable. Four speeds, variable  $\pm 3\%$ . Neon lit stroboscope with mirror. Double turntable (non-ferrous flywheel as standard but cast-iron available to order), with clutch action, four-pole motor. Belt plus idler drive system. Inbuilt levelling device with spirit indicator. Total W and F 0.15% p-p. Rumble -35 dB. New NAB stereo standards. Price: £34 2s. 6d. (U.K. purchase tax £6 15s. 6d.).

**TD.135 Series II.** Transcription turntable and arm. Four speeds, variable  $\pm 3\%$ . Belt plus idler drive system. 12 in. non-ferrous 7 lb turntable. Four-pole motor. TP.14 pickup arm incorporated, horizontally and vertically balanced. Precision raise/lower control. Total W and F 0.2% p-p. Rumble -30 dB. New NAB standards. Built-in levelling device. Price: £34 2s. 6d. (U.K. purchase tax £6 15s. 6d.).

**TD.224.** Transcription turntable and arm with autochange facility. Four speeds, variable  $\pm 3\%$ . Built-in neon lit stroboscope. Incorporates BTD-12S arm. Total W and F 0.15% p-p. Rumble -35 dB. New NAB standards. Auto-change facility with record stacking before and after play separate from turntable. Each record placed on turntable individually and removed after playing. Price: £70 17s. 6d. (U.K. purchase tax £14 1s. 3d.).

**TD.150.** Transcription turntable. Two speeds,  $33\frac{1}{3}$  and 45 rpm. Low-speed synchronous motor (375 rpm). Belt drive. 12 in. non-ferrous  $7\frac{1}{2}$  lb turntable. Spring-mounted damped support for

turntable bearing and pickup wooden panel. Total W and F 0.2% p-p. Rumble -35 dB. New NAB stereo standards. Price: £17 10s. (U.K. purchase tax £3 9s. 6d.).

**TD.150.B.** As TD.150 plus wooden base mounting. Price: £20 15s. (U.K. purchase tax £4 2s. 4d.).

**TD.150.A.** As TD. 150 plus TP.13 precision pickup arm horizontally and vertically balanced. Viscous damped lowering control. Patented plug-in shell with adjustable vertical tracking angle. Stylus pressure adjustable  $\frac{1}{2}$  to 4 gm. Price: £26 5s. (U.K. purchase tax £5 4s. 3d.).

**TD.150.AB.** As TD.150.B. plus wooden base mounting. Price: £29 10s. (U.K. purchase tax £5 17s. 2d.).

**Teak plinths.** Suitable for TD.124 and TD.135 units. Price: £5 10s. (U.K. purchase tax £1 1s. 10d.).

**Perspex covers.** Suitable for TD.124 and TD.135 units. Price: £4 (U.K. purchase tax 15s. 10d.).

**Teak plinth (special).** Suitable for TD.124 fitted with S.M.E. 3012 arm. Price: £6 10s. (U.K. purchase tax £1 5s. 10d.).

**Perspex cover (special).** Suitable for TD.124 fitted with S.M.E. 3012 arm. Price: £5 10s. (U.K. purchase tax £1 1s. 10d.).



**TRANSCRIPTORS LTD.,** 551 Holloway Road, London, N.19. Tel: 01-272 6419.

**Transcriptors motor and turntable.** Shelf-standing unit incorporating adjustable anti-feedback legs. Speeds: 20-80 rpm infinitely adjustable. Rumble -60 dB. Speed stability: 0.005% short term, 0.9% long term. Turntable 12 in. diameter, 8 lb. Turntables up to 20 lb available for studio reference purposes. Drive:

soft rubber belt. Motor: Papst synchronous hysteresis outside rotor unit. Illuminated perspex idler stroboscope. Construction: polished aluminium and brass. Polished black polyurethane baseboard. Perspex top with hinged back and swing leg support available as optional extra. Price: Approximately £55 including U.K. purchase tax.



**WHARFEDALE.** Rank-Wharfedale Ltd., Idle, Bradford, Yorkshire. Tel: 612552. Cables: Wharfedel, Idle, Bradford. Telex: 51407.

**WTT-1.** Turntable and pickup in oiled teak plinth with lid. To match Wharfedale System 20 equipment. Thorens TD124 transcription turntable, Thorens TP-14 pickup arm, Shure M75-E cartridge. Size:  $19 \times 13\frac{1}{4} \times 7\frac{3}{4}$  in. Price: £94 (including U.K. purchase tax).

**WTT-2.** Turntable and pickup in oiled teak plinth with lid. To match Wharfedale System 20 equipment. Garrard LAB80 turntable and pickup arm, Shure M75-6 cartridge. Size:  $19 \times 13\frac{1}{4} \times 7\frac{3}{4}$  in. Price: £54 (including U.K. purchase tax).



**ZENITH RADIO CORPORATION.** Distributors: United Mercantile Co. Ltd., 13/14 Queen Street, London, W.1. Tel: Grosvenor 4901. Cables: Ramsaco, Telex, London.

● **Stereo Professional.** Four-speed automatic record changer unit. Speeds,  $16\frac{2}{3}$ ,  $33\frac{1}{3}$ , 45, 78 rpm.  $11\frac{3}{8}$  in. 4 lb turntable. Belt drive.  $8\frac{9}{16}$  in. pickup arm. Floating-action cartridge. Ceramic cartridge with 0.7 thou diamond and 3 thou sapphire. Separation 25 dB. Output 350 mV. Rec load 1-3 megohms. Price: £52 10s. (U.K. purchase tax £9 3s. 3d.).

# DIRECTORY OF RADIO TUNERS

★ In the abridged specifications of these directory entries the following abbreviations have been used: **Psn**=Power supply needed; **AFC**=Automatic frequency control; **AGC**=Automatic gain control; **Mc/s**=Megacycles; **ind**=Indicator; **disc**=Discriminator; **imp**=Impedance; **det**=Detector.

**ACOUSTICAL MANUFACTURING CO. LTD.**, St. Peter's Road, Huntingdon, Hunts. Tel: Huntingdon 2561/2. Cables: Acoustical.

**Quad F.M. tuner.** Variable tuning. Range 87.5-108 Mc/s. Special double neon display ind. Psn 330V at 27 mA; 6.3V at 1.85 amps. Size:  $10\frac{1}{2} \times 3\frac{1}{2} \times 6$  in. Price: £24 (U.K. purchase tax £4 19s.).

**Quad Multiplex decoder.** Stereo multiplex adaptor for Quad FM tuner. Transistorised. Psn 330V DC, 8 mA mono plus extra 9 mA on stereo. Price: £16.

**Quad A.M. II tuner (European).** Variable tuning. Ranges: 800-2070 m, 185-588 m, 5.8-18.5 Mc/s. Magic eye indicator. Output 100 mV nominal for 30% modulation. Output resistance 15K. Filter rejection 9 Kc/s. Psn 330V at 35 mA; 6.3V at 1.2 amps. Size:  $10\frac{1}{2} \times 3\frac{1}{2} \times 6$  in. Price: £24 (U.K. purchase tax £4 19s.).

**Quad A.M. II tuner (Overseas).** Variable tuning. Ranges: 185-588 m, 2.2-6.6 Mc/s, 5.8-18.5 Mc/s. Filter rejection 10 Kc/s. Magic eye indicator. Output 100 mV nominal for 30% modulation. Output resistance 15K. Psn 330V at 35 mA; 6.3V at 1.2 amps. Size:  $10\frac{1}{2} \times 3\frac{1}{2} \times 6$  in. Price: £24 (U.K. purchase tax £4 19s.).

★

**ARMSTRONG AUDIO LTD.**, Warlters Road, Holloway, N.7. Tel: North 3213/4.

**Model 423.** AM/FM tuner. Range: VHF 86-109 Mc/s, MW 185-590 metres, LW 1000-2000 metres. Variable tuning. FM ratio detector. Meter tuning indicator. Sensitivity: FM  $1.5 \mu\text{V}$  for 30 dB quieting, AM  $5 \mu\text{V}$  for 20 dB quieting. Aerial input: 75 ohms coaxial and 300 ohms balanced. Output: 0-1V variable. Stereo multiplex decoder optional (see M4 Decoder below). FM quiet-tuning control. Stereo indicator light. Edge connector for plug-in decoder. Mains: 100-125V and 200-250V AC. Size:  $10\frac{3}{4}$  in. wide,  $10\frac{1}{2}$  in. deep, 4 in. high. Price: £32 5s. (U.K. purchase tax £6 1s.).

**Model 424.** FM tuner. Range: 86-109 Mc/s. Variable tuning. Ratio detector. Meter tuning indicator. Sensitivity:  $1.5 \mu\text{V}$  for 30 dB quieting. Aerial input: 75 ohms coaxial and 300 ohms balanced. Output: 0-1V variable. Stereo multiplex decoder optional extra (see M4 Decoder below). Quiet-tuning control. Stereo indicator light. Edge connector for plug-in decoder. Mains: 100-125V and 200-250V AC. Size:  $10\frac{3}{4}$  in. wide,  $10\frac{1}{2}$  in. deep, 4 in. high. Price: £25 4s. (U.K. purchase tax £4 14s. 8d.).

**Model M4.** Plug-in stereo multiplex decoder for 423 and 424 tuners. Price: £9 10s.

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**BANG & OLUFSEN U.K. DIVISION**, Eastbrook Road, Gloucester. Tel: Gloucester 21591.

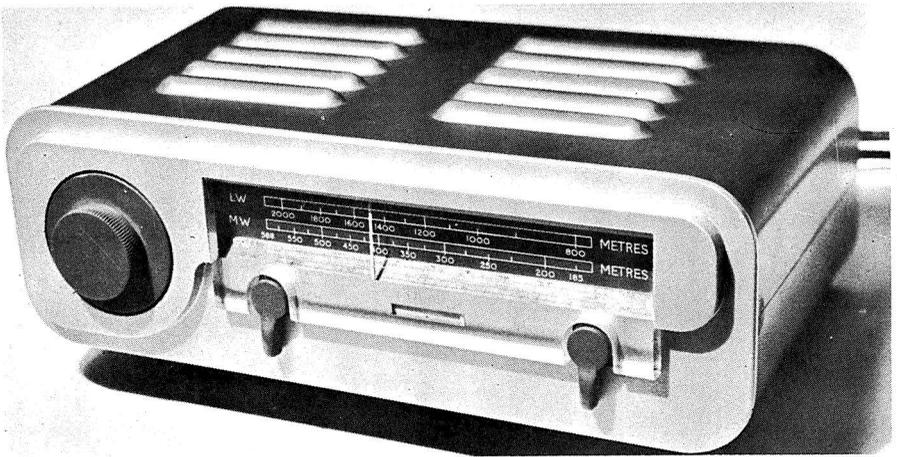
● **Beomaster 1000.** Transistorised FM tuner and stereo amplifier. Inputs: mag. PU 5 mV 47K, crystal PU 180 mV 100K. Controls: Scratch filter, rumble filter, bass, treble, volume, balance. Output 15W per channel. Distortion 1% at full output. FR 30 c/s-20 Kc/s. Output imp 3-5 ohms. Fitted with multiplex decoder. Size:  $19\frac{7}{8} \times 3\frac{7}{16} \times 10$  in. Mains: 110-240V. Price: £70 17s. 3d. (U.K. purchase tax £13 2s. 9d.).

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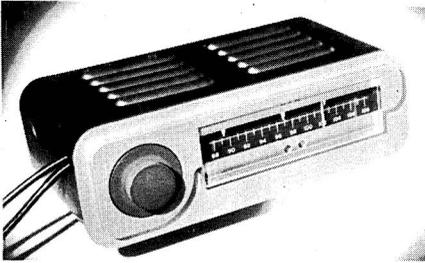
**BRAUN AG.** Distributors: Fi-Cord International, Charlwoods Road, East Grinstead, Sussex. Tel: East Grinstead 21351.

**CE16.** AM/FM tuner. VHF 88-108 Mc/s, MW 188-545 m. Variable tuning. Foster Seeley discriminator. Meter indicator. Sensitivity:  $1.5 \mu\text{V}$  for 26 dB quieting. Aerial 300 ohms balanced. Output: 200 mV. Optional multiplex. AFC switchable. Mains 240V AC. Size:  $12\frac{7}{8} \times 8 \times 4$  in. Price: £93 0s. 8d. (including U.K. purchase tax).

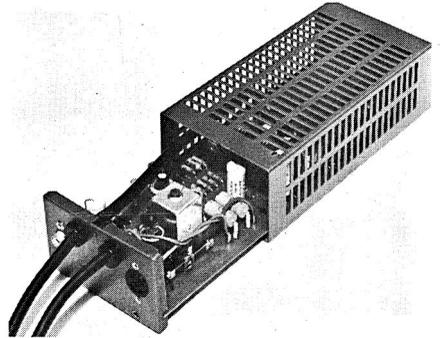
● **CE500.** AM/FM tuner. VHF, MW and LW. 18 transistors, 20 diodes. Stereo multiplex decoder and indicator. AFC. Distortion: 0.5% at 1 Kc/s and 40 Kc/s modulation. Sensitivity: VHF  $1.2 \mu\text{V}$  for 30 dB signal to noise at 40 Kc/s.



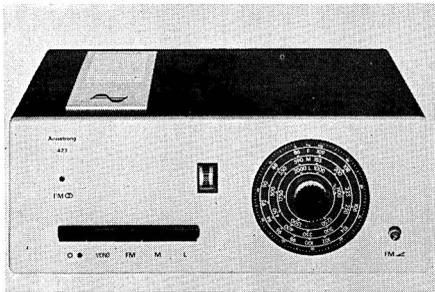
*Acoustical AM tuner covering short, medium and long wave bands*



*Acoustical FM tuner*



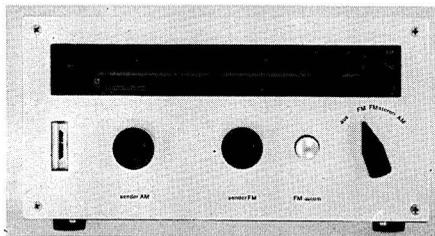
*Quad multiplex decoder*



*Armstrong 423 AM-FM tuner*



*Armstrong 424 tuner*



*Braun CE-16 tuner*



*Braun CE-1000 tuner*

Separation: 35 dB at 1 Kc/s and 40 Kc/s. Output: FM 0.5V. Characteristics exceed requirements of DIN 45 500. Size:  $10 \times 4 \times 12\frac{1}{2}$  in. Finish: grey wrinkle steel case with aluminium front panel. Price: £146 4s. 9d. (including U.K. purchase tax).

● **CE1000.** All-transistor tuner. LW, MW, SW and FM/VHF. Stereo multiplex fitted. Push-button operation. Separate dials and drives for AM and FM. Meter tuning indicator. AFC, automatically switches off when hand touches tuning knob. Variable AM selectivity. 30 transistors, 2 nuvistors, 18 germanium diodes, 9 silicon diodes, 2 photo-electric cells. Switchable FM noise suppression. Internal ferrite rod for MW and LW. FM sensitivity:  $0.8 \mu\text{V}$  for 30 dB quieting. MW/LW sensitivity:  $5 \mu\text{V}$  for 6 dB quieting. Limiting level  $1 \mu\text{V}$ . AM suppression better than 50 dB. FM bandwidth: 120 Kc/s below and 240 Kc/s above limiting level. Detector bandwidth 1 Mc/s. Distortion factor  $<0.5\%$ . Output: approx. 0.5V. Black steel cabinet with aluminium front plate. Size:  $16 \times 4\frac{3}{8} \times 13\frac{3}{8}$  in. Price: £292 5s. 7d. (including U.K. purchase tax).



**BRYAN AMPLIFIERS LTD.**, 120 Ashley Road, Hale, Altrincham, Cheshire. Tel: Altrincham 6026.

**Model 1000.** Mains-powered transistor switch-tune FM tuner. Switch selection of three B.B.C. programmes with provision for fourth station. Range 86-97 Mc/s. Sensitivity  $<3 \mu\text{V}$  for 20 dB quieting. Provision for multiplex decoder. AFC. Mains input with zener stabilising. Voltage remains constant over input range 150-250V AC. Audio output 850 mV for 30% modulation. Controls: volume and on/off, station selector. Size:  $11 \times 5\frac{1}{2} \times 4\frac{1}{4}$  in. Price: £28 7s. (including U.K. purchase tax).



**CHAPMAN.** See Derritron.



**DERRITRON RADIO LTD.**, Chapman Division, 24 Upper Brook Street, London, W.1. Tel: Hyde Park 2291.

**Chapman AM/FM tuner model S6BS/FM.** Free-tuned. Range FM 87.7-108 Mc/s; AM 6 bandspreads: 11, 13, 16, 19, 25 and 31 m; also 15-43, 43-140, 175-570 m. Wide-band ratio det. Magic eye ind. Self-powered. Size:  $13\frac{3}{4} \times 8\frac{1}{4} \times 13\frac{1}{2}$  in. Price: £64 (U.K. purchase tax £12 6s. 6d.).

**Chapman AM tuner model S6BS.** Free-tuned. Range 6 bandspread ranges: 11, 13, 16, 19, 25 and 31 m, also 13-43, 43-140, 175-570 m. Magic eye ind. Self-powered. Size:  $13\frac{3}{4} \times 11 \times 8\frac{1}{4}$  in. Price: £48 (U.K. purchase tax £9 1s. 6d.).

**Chapman FM1000A.** Transistorised FM tuner. Variable tuning. Range 87.5-108 Mc/s. AGC. Multiplex output. Aerial input 75 ohms coaxial. Output: 150 mV. Self-powered. Later models fitted with tuning meter. Size:  $14\frac{1}{2} \times 3\frac{1}{2} \times 7\frac{1}{4}$  in. Price: £25 (U.K. purchase tax £4 1s. 10d.).

**Chapman FM1005A.** Transistorised AM/FM tuner. Variable tuning. Range FM 87.5-108 Mc/s; AM 16-50 m, 50-195 m, 195-550 m, 800-2000 m. AGC. Multiplex output. Aerial imp. FM 75 ohms; AM high imp. Output: 250 mV, 100K. Self-powered 100-125V, 10W consumption. Size:  $14\frac{1}{2} \times 5\frac{1}{2} \times 7\frac{1}{4}$  in. Price: £44 (U.K. purchase tax £7 4s.).



**DUAL ELECTRONICS LTD.**, Radnor House, London Road, Norbury, S.W.16. Tel: 01-764 9465/6.

● **Dual CT.12.** Fully transistorised AM/FM tuner. Range: VHF, MW, SW, 49 metre band. Stereo multiplex decoder incorporated. Full technical specification not available on going to press. Price £60 18s. (including U.K. purchase tax).



**DYNACO.** Distributors: Howland-West Ltd., 2 Park End, South Hill Park, London, N.W.3. Tel: Swiss Cottage 6666.

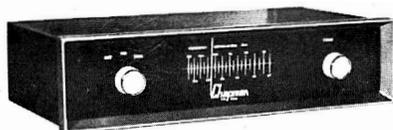
**FM-3.** Variable tuned VHF/FM tuner for shelf mounting or building in. Synchronous balanced-bridge detector. Twin indicators for tuning and stereo transmissions. Sensitivity  $4 \mu\text{V}$  for 30 dB quieting. Output 2V. Multiplex decoder fitted. Four IF stages with progressive limiting. Completely stable without AFC. Can be fully aligned without use of test instruments. Size:  $13\frac{1}{2} \times 4\frac{1}{4} \times 8$  in. Mains power unit. Price: (assembled) £63 18s. 4d. (U.K. purchase tax £12 13s. 9d.); (kit) £53 5s. 3d. (U.K. purchase tax £10 10s. 4d.).



*Bryan 1000 Mk. III switched tuner*



*Chapman FM 1005 AM/FM tuner*



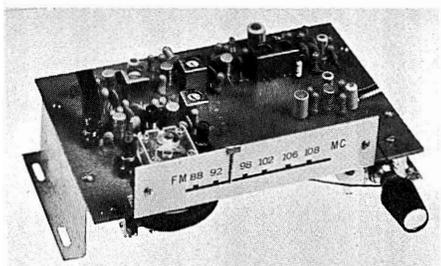
*Chapman FM 1000 FM tuner*



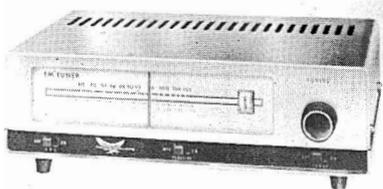
*Dynaco FM-3*



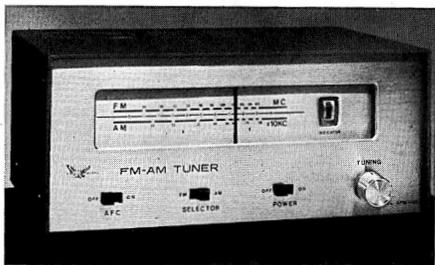
*Chapman S6BS/FM Mk. II tuner*



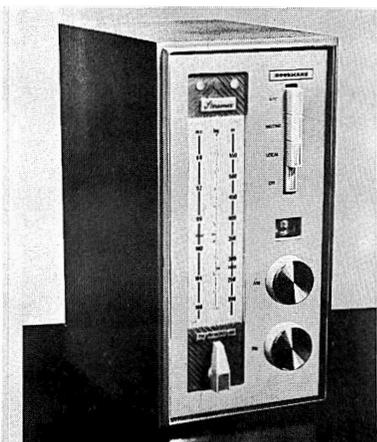
*Eagle FMT.41*



*Eagle FMT 640 FM tuner*



*Eagle AFM100*



*Goodmans Stereomax AM/FM*

**EAGLE PRODUCTS.** Distributors: B. Adler & Sons (Radio) Ltd., 32a Coptic Street, London, W.C.1. Tel: Museum 9606/7. Cables: Reldab, London.

**FMT 41 FM tuner.** Range: 88-108 Mc/s. Transistorised. Variable tuning. Aerial input: 75 ohms coaxial. Sensitivity: 10  $\mu$ V input for 10 mV output. Supply: 9V at less than 9 mA. Six transistors, three diodes. Chassis model for building in. Single tuning control and slide rule scale. Price: £7 2s. 5d. (U.K. purchase tax £1 7s. 7d.).

**FMT 640 FM tuner.** Variable tuning. Range: 88-108 Mc/s. AFC. Armstrong circuit with dual limiters and wide-band discs. FM calibrated signal meter. Input for multiplex adaptor. Aerial imp 300 ohms. Self-powered. Size: 11  $\times$  6 $\frac{1}{2}$   $\times$  3 $\frac{3}{4}$  in. Price: £21 2s. 9d. (U.K. purchase tax £3 14s. 9d.).

**AFM 100 AM/FM tuner.** Range: FM 88-108 Mc/s, MW 187-560 metres. FM circuits: wide-band discriminator and dual limiters, low-noise front end comprising tuned triode grounded grid amplifier and triode mixer. AFC. Sensitivity: 2  $\mu$ V for 20 dB quieting. Selectivity: 200 Kc/s bandwidth at 6 dB down. Distortion <1%. Hum level -56 dB. Meter tuning indicator. FM aerial input: 300 ohms unbalanced. AM circuits: superhet RF and IF, high quality detector. Sensitivity: 100  $\mu$ V. Outputs: audio and FM multiplex. Size: 9 $\frac{1}{2}$   $\times$  4 $\frac{1}{2}$   $\times$  7 in. Mains: 240V AC. Price: £24 12s. 3d. (U.K. purchase tax £4 7s. 9d.).

**AFM 200. AM/FM tuner.** VHF/FM 88-108 Mc/s, MW 187-560 m. Variable tuning. Foster Seeley. Magic eye indicator. Sensitivity 2  $\mu$ V for 20 dB quieting. Aerial input 300 ohms unbalanced. Socket for adding multiplex decoder. AFC. Mains 240V AC. 11 valves (including magic eye). Price: £24 19s. (U.K. purchase tax £4 11s.).



**FISHER RADIO CORPORATION,** Long Island City 1, New York, U.S.A. Distributors: Getz Bros. and Co. Inc., 2 Harewood Place, London, W.1. Tel: Grosvenor 6901.

● **FM-90-B.** FM stereo multiplex tuner. Synchrode front end. Three IF stages. Two limiters. Automatic stereosignal indicator. Meter tuning. Switchable noise filter. Front panel tape jack. Preset audio controls. Size: 15 $\frac{1}{8}$   $\times$  4 $\frac{3}{4}$   $\times$  11 $\frac{7}{8}$  in. Weight: 11 $\frac{1}{2}$  lb. Price: £81 18s. (walnut cabinet version available at slightly higher cost).

● **R-200-B.** Transistorised FM stereo/AM multi-band short wave tuner. FM section: synchrode front end. Sensitivity 1.8  $\mu$ V. Stereo beacon indicates multiplex transmissions. Interstation muting. Tuning meter. Wide-band IF strip and discriminator. AM section: LW 850-2000 m, MW 184-590 m, SW 7-16.5 Mc/s, bandspread 49 m (5.9-6.3 Mc/s). Tuned RF stage. Three IF stages. AGC. Variable selectivity. Whistle filter. Internal ferrite rod for MW and SW. Mains: all standard AC voltages. Size: 15 $\frac{1}{8}$   $\times$  4 $\frac{3}{4}$   $\times$  11 $\frac{7}{8}$  in. Weight: 18 $\frac{3}{4}$  lb. Price: £177 9s.



**GOODMANS LOUDSPEAKERS LTD.,** Axiom Works, Lancelot Road, Wembley, Middlesex. Tel: 01-902 1200. Cables: Goodaxiom, Wembley.

● **Stereomax.** All-silicon transistor AM/FM stereo tuner. Ranges: VHF 87.5-108 Mc/s, MW 186-550 metres. Variable tuning with separate dials and drives for AM and FM. Ratio detector on FM. Meter tuning indicator, lamp stereo indicator. Sensitivity: 2  $\mu$ V for 30 dB quieting. Aerial input: FM/VHF 70 ohms coaxial, 300 ohms balanced. Output: 250 mV for 30% modulation. Multiplex decoder fitted but version without decoder available. AFC on both wavebands. Controls: AM tuning, FM tuning, wave-change switch including mono/stereo; on/off push-button, AFC, local-distant switch, quiet tuning switch. Mains: 110V and 200-250V AC. Size: 5 $\frac{1}{2}$  in. wide, 10 $\frac{1}{2}$  in. high, 7 $\frac{1}{4}$  in. deep. Finish: teak or walnut. Price: £60 (U.K. purchase tax £11 18s. 3d.).



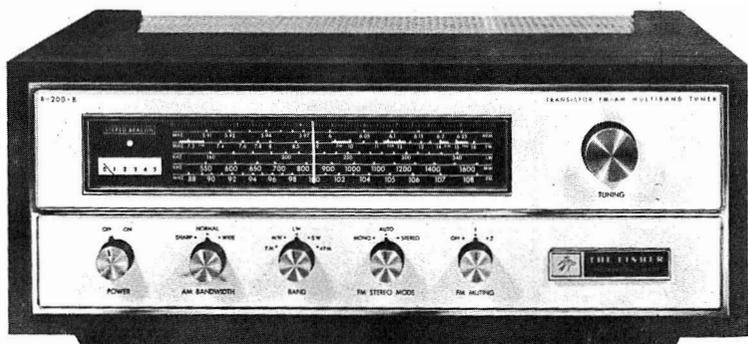
**GRAMPIAN REPRODUCERS LTD.,** 19 Harnworth Trading Estate, Feltham, Middx. Tel: 01-894 9141. Cables: Reamp, Feltham.

**FM tuner 571.** Free-tuned. Range: 85-98 Mc/s. Ratio det. Magic eye ind. Psn 300V at 35/40 mA; 6.3V at 2.5 amps. Size: 10 $\frac{1}{4}$   $\times$  5 $\frac{1}{2}$   $\times$  6 $\frac{1}{4}$  in. Price: £19 10s. (U.K. purchase tax £3 12s. 2d.).



**GRUNDIG (GREAT BRITAIN) LTD.,** Newlands Park, Sydenham, London, S.E.26. Tel: Sydenham 2211.

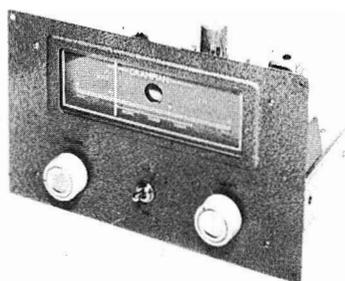
● **RT40.** Stereo AM/FM tuner. Ranges: VHF 87-108 Mc/s, MW 185-587 m, LW 858-2000 m, SW1 49 metre band, SW2 18.5-55.6 m. Variable tuning. Independent selection of AM and FM stations. Tuning meter. Stereo indicator bulb. Sensitivity: VHF 1.6  $\mu$ V, AM 10  $\mu$ V for 10 mV



*Fisher R-200-B AM/FM stereo tuner*



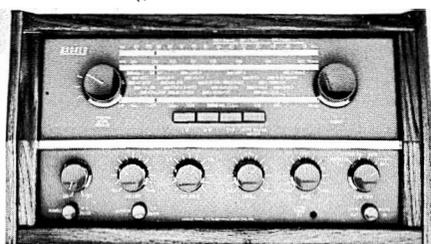
*Hacker Sovereign*



*Grampian 571 FM tuner*



*Jason JTV/2 tuner*



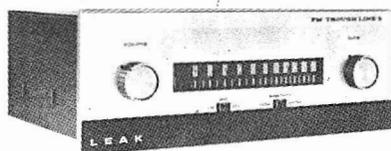
*Hacker SAR1000 shelf unit*



*Leak Troughline Stereo*



*Jason FMT/4 tuner*



*Leak Troughline 3 FM tuner*

audio. Stereo multiplex decoder incorporated. Switched AFC. 27 transistors, 19 diodes. IF's 470 Kc/s and 10.7 Mc/s. Separation better than 40 dB at 1 Kc/s. Output: FM 1V at 3K, AM 0.8V for 30% modulation. FR 30 c/s-15 Kc/s. Distortion factor  $<0.5\%/75$  Kc/s. Variable selectivity: 3, 5 and 9 Kc/s. Outlet for amplifier and recorder. Mains: 110, 130, 220, 240V 50-60 c/s. Consumption: 11W. Shelf or cabinet mounting. Size:  $15\frac{3}{8} \times 10\frac{1}{2} \times 6$  in. Finish: light walnut or teak. Price: £100 15s. 7d. (including U.K. purchase tax).

● **RT/40M.** Similar specification to RT/40 but in metal cabinet.



**HACKER RADIO LTD.,** Norreys Drive, Cox Green, Maidenhead, Berks. Tel: Maidenhead 22261/5.

**Hacker SAR1000** shelf operated stereo audio radio units, series 1000, comprising: AM/FM tuner, twin channel 20-watt amplifiers, stereo decoder, controls—volume, bass, treble, balance and function. Inter-station muting. High pass filter, low pass filter. Fully integrated units, all transistor. Provisional price: £99.

**Mayflower II model RV20.** FM/VHF radio with provision for feeding hi-fi system. Range: VHF 87-104 Mc/s. Variable tuning. Balanced ratio detector. Magic eye tuning indicator. Sensitivity: 3  $\mu$ V for 20 dB quieting. Aerial input: 75 ohms coaxial. Output voltage: 200 mV at 250K. AFC. Built-in dipole aerial. External speaker sockets. Adjustable station markers. Size:  $18\frac{1}{4}$  in. wide,  $7\frac{3}{4}$  in. deep, 12 in. high. Mains: 200-250V 40-60 c/s. Consumption: 70W. Finish: medium walnut, sapele mahogany or teak. Price: £30 15s. 3d. (U.K. purchase tax £5 8s. 7d.).

**SOVEREIGN MK. II RP25** AM/FM transistor portable receiver. Separate AM and FM tuner circuits and powerful push-pull audio amplifier, output 1.5 watts with less than 1% distortion. 16 transistors and 5 diodes. MW, 185-575 metres (520-1,620 KHz); LW, 1,070-1,940 metres (155-280 KHz); VHF/FM, 101-87.5 Mhz. Aerials: 10-in. ferrite AM, and telescopic FM. Sockets: ext. aerials: 15 mV audio output for tape recording; audio input (36 mV at 50K ohms) for pick-up, mic. or tape replay; low voltage audio output for personal earphone. Sensitivity: (AM) 2 mV at 200 m for 10 dB sig/noise at 30% mod; 6 mV at 500 m, ditto; 6 mV on LW (FM). Better than 1 mV for 10 dB sig/noise with full limiting at 5 mV. Image rejection better than 56 dB. If rejection better than 70 dB, AM rejection better than 50 dB. Audio amplifier, transformerless and DC coupled. FR 30 c/s-20 Kc/s  $\pm 2$  dB.

Controls: Bass lift +10 dB at 50 c/s. Treble lift +14 dB at 10 Kc/s. Speaker:  $8 \times 5$  in. elliptical. Finish: Padded Cordoba leather cloth in black with satin silver trim, or blue with white trim. Size:  $10 \times 12\frac{3}{4} \times 4\frac{3}{4}$  in. Price: £41 10s. (U.K. tax paid).



**JASON.** Technical Trading Co. Ltd., Devonian Court, Park Crescent Place, Brighton, Sussex. Tel: 0273-680722. Branches at London, Portsmouth, Southampton, Worthing.

**FM tuner FMT/4.** Variable tuning. Range 88-108 Mc/s. Transistor amplified. AFC. Ratio det. Multiplex adaptor output. Self-powered. Size:  $11\frac{1}{4} \times 6\frac{5}{8} \times 4\frac{3}{8}$  in. Better than 5  $\mu$ V for 40 dB quieting. Price: £17 5s. (U.K. purchase tax £2 15s. 4d.).

**JTV/2 FM and AM/TV sound tuner.** Switched turret tuning. Automatic frequency control. Range 88-96 Mc/s, plus all television channels. Disc. Self-powered. Size:  $11\frac{1}{4} \times 6\frac{5}{8} \times 4\frac{3}{8}$  in. 10  $\mu$ V for 40 dB quieting. Price: £19 4s. (U.K. purchase tax £3 1s. 7d.).

**Monitor FM and AM/TV sound tuner.** Switched tuning. AFC. Range 40-212 Mc/s. Foster Seeley disc. Psn 230V at 35 mA; 6.3V at 1.5 amps. Size:  $5 \times 5\frac{1}{2} \times 7$  in. Price: £14 5s. (U.K. purchase tax £2 5s. 8d.).



**H. J. LEAK & CO. LTD.,** 57/59 Brunel Road, East Acton, London, W.3. Tel: Shepherds Bush 1173. Cables: Sinusoidal, Ealux, London.

**Trough line 3 FM tuner.** Variable tuning. Range 88/108 Mc/s. AFC giving tuning stability from the instant of switching on. Foster-Seeley disc. Magic eye ind. Self-powered. Size:  $11\frac{1}{2} \times 4\frac{1}{4} \times 8\frac{1}{4}$  in. Price: £27 (U.K. purchase tax £5 3s. 11d.).

● **Trough line stereo tuner.** Variable tuning. Range 88/108 Mc/s. AFC gives tuning stability from instant of switching on. Foster-Seeley discriminator. GE-Zenith system decoder for stereo broadcasts. Function switch: off/mono/stereo. Output: 50 mV per channel. Separation 26 dB. Self-powered. Size:  $11\frac{1}{2} \times 4\frac{1}{4} \times 8\frac{1}{4}$  in. Price: £39 10s. (U.K. purchase tax £7 12s. 1d.).

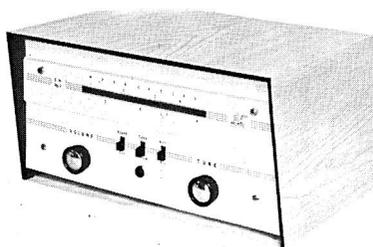


**L & H.** Distributors: Britimpex Ltd., 16-22 Great Russell Street, London, W.1. Tel: Museum 7600. Cables: Britron, London.

**Signalmaster Mk II 60851.** Self-contained battery-operated FM/VHF tuner. Plug-in V aerial. Single knob tuning control. Transistorised. Built-in audio pre-amplifier. Switchable



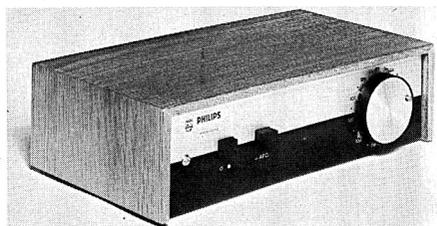
*Nikko FAM.12*



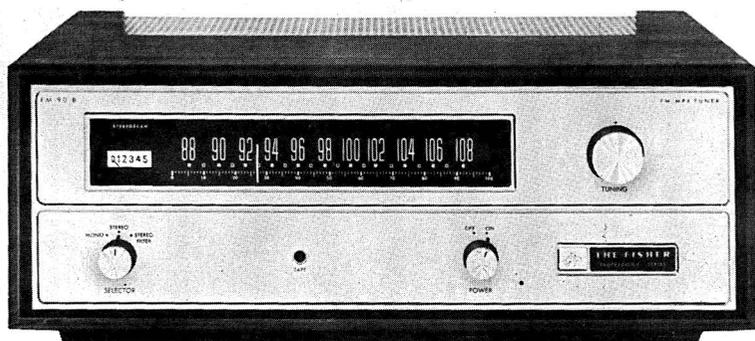
*Lowther FM tuner Mk. V*



*Philips GH.924*



*Philips GH.926*



*Fisher FM-90-B stereo multiplex tuner*



*Rogers FM tuner (switched)*



*Rogers FM tuner Mk. III*

AFC. Volume control with on/off switch. Teak case. Range 87-105 Mc/s. Batteries: Six U7 provide approximately one month's use at four hours a day. Output by screened lead. Size:  $9\frac{1}{2} \times 3 \times 3\frac{1}{4}$  in. Price: £19 5s. 11d. (U.K. purchase tax £2 4s. 1d.).



**L.L. ELECTRONICS LTD.**, 5 Shakespeare Road, Finchley, London, N.3. Tel: 01-346 3332.

**Model 700.** Fully transistorised FM/VHF tuner with AFC and provision for stereo multiplex decoder. Full details and specification on request.



**LOWTHER MANUFACTURING CO.**, Lowther House, St. Mark's Road, Bromley, Kent. Tel: Ravensbourne 5225. Cables: Lowther, Bromley.

**FM tuner Mk V self-powered.** Twin gang tuning, horizontal scale. Range 87.5-108 Mc/s. AFC. Foster-Seeley disc. Switched ind 50 c/s injection. Self-powered. Size:  $13\frac{1}{4} \times 5\frac{1}{2} \times 5$  in. Price: £24 10s. (U.K. purchase tax £4 16s. 2d.).

**FM tuner Mk V.** Variable tuning. Range 87.5-108 Mc/s. AFC. Foster-Seeley disc. Switched AFC and hum check ind. Psn 250V 30 mA; 6.3V 2 amps. Size:  $10\frac{1}{4} \times 4\frac{3}{4} \times 7$  in. Price: £22 (U.K. purchase tax £4 8s. 4d.).

● **Stereo decoder GL2.** Multiplex decoder suitable for Mk V tuners. Price: £18.

**FM tuner Mk VI.** Range 87.8-101 Mc/s. Variable tuning. Switched AFC. AGC. Aerial input: 70/80 ohms coaxial. Output: 0.75V RMS. Self-powered. Mains: 200-240V AC. All transistor. Size:  $10\frac{1}{2} \times 7 \times 4\frac{3}{4}$  in. Price: £35. (U.K. purchase tax £7 8s.).

● **Stereo decoder GL1.** Multiplex decoder suitable for Mk VI tuner. Price: £16.



**NIKKO ELECTRIC MFG. CO. LTD.** Distributors: Howland-West Ltd., 2 Park End, South Hill Park, London, N.W.3. Tel: Swiss Cottage 6666.

● **Nikko FAM-12.** AM/FM transistorised tuner. Range: VHF 88-108 Mc/s, MW 182-566 metres. Variable tuning. Meter indicator. Sensitivity: 2  $\mu$ V for 20 dB quieting. Output: 0.5V. Stereo multiplex decoder fitted. Switchable AFC. Mains: 200-240V 50/60 c/s. Local-distance control. Noise filter. Stereo indicator. 17 transistors, 16 diodes. Size:  $12 \times 10 \times 3\frac{1}{2}$  in. Weight: 7 $\frac{3}{4}$  lb. Price: £49 10s. (U.K. purchase tax and surcharge £9 1s. 1d.).

**PHILIPS ELECTRICAL LTD.**, Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437 7777. Cables: Phillamps, London.

**GH.926.** Transistorised FM tuner. Range: 87.5-104 Mc/s. Variable tuning. Sensitivity: <3  $\mu$ V for 26 dB signal-to-noise. Bandwidth: 120 Kc/s for 26 dB signal-to-noise. IF 10.85 Mc/s. Output: 1V 2K. Provision for preset tuning to three stations. Switchable AFC. Power supply: 9V (six 1.5V LPU2 or equivalent) or from GH.925 amplifier. Size:  $12\frac{1}{2} \times 8\frac{1}{4} \times 3\frac{3}{8}$  in. Weight: 4 lb. Shelf-mounting cabinet. Price: £24 10s. (including U.K. purchase tax).

● **GH.927.** Transistorised FM stereo tuner. Range: 87.5-108 Mc/s. Variable tuning. Moving coil tuning and stereo indicator. Sensitivity: (mono) 5  $\mu$ V, (stereo) 26  $\mu$ V, both for 26 dB signal-to-noise. Output: 200 mV. Switchable AFC. IF 10.7 Mc/s. Bandwidth: 200 Kc/s. 23 semiconductors. Mains: 110-127V, 200-240V AC. Consumption: 2.5W. Size:  $14 \times 6\frac{1}{2} \times 3\frac{1}{2}$  in. Weight: 3 $\frac{1}{2}$  lb. Shelf-mounting teak cabinet. Price: £37 5s. 8d. (including U.K. purchase tax).

● **GH.924.** Stereo AM/FM tuner. Range: VHF 87.5-108 Mc/s, MW 185-580 metres, LW 750-2000 metres, SW 16.5-51 metres. FR 20 c/s-15 Kc/s  $\pm 1.5$  dB. Signal-to-noise: 48 dB. AFC. Sensitivity: (FM mono) 6  $\mu$ V, (FM stereo) 60  $\mu$ V, (AM) 100  $\mu$ V, all for 26 dB signal-to-noise. Moving coil tuning indicator. Switchable quiet FM tuning. FM aerial input: 300 ohms. Mains: 100, 127, 220, 240V AC 50-60 c/s. Size:  $15 \times 8\frac{3}{4} \times 5\frac{1}{4}$  in. Weight: 10 lb. Shelf-mounting teak cabinet. Price: £62 16s. 11d. (including U.K. purchase tax).



**PIONEER.** Distributors: Swisstone Ltd., 48a Station Road, Cobham, Surrey. Tel: Cobham 2853 and 4214.

● **TX-400.** AM/FM stereo multiplex tuner. Range: VHF 88-108 Mc/s, MW 187-561 metres. Sensitivity: 2.5  $\mu$ V for 20 dB quieting. Aerial input: 300 ohms balanced. AFC. Multiplex decoder built-in. Valves. Mains: 115/230V 50 c/s AC. Size:  $13\frac{7}{8} \times 5\frac{3}{8} \times 11\frac{1}{4}$  in. *Price on request.*

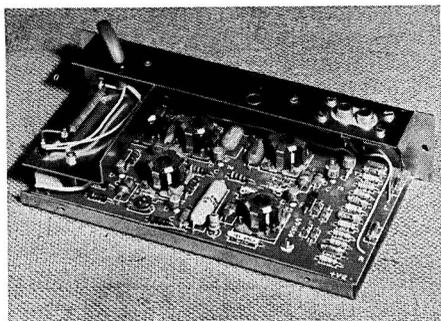


**QUAD.** See Acoustical Manufacturing Co. Ltd.



**RADFORD ELECTRONICS LTD.**, Ashton Vale Road, Bristol 3. Tel: Bristol 662301/2.

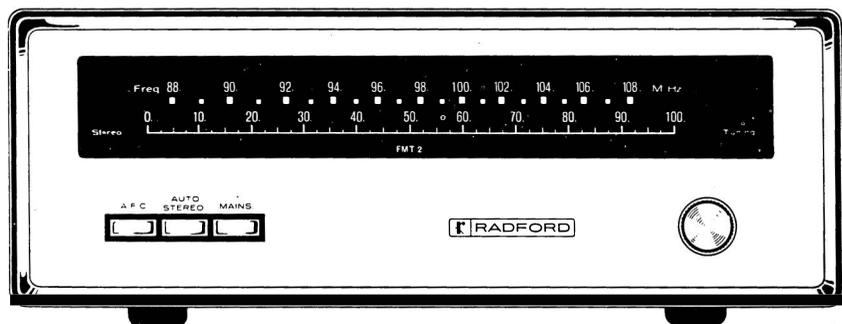
**FMT2 FM tuner.** Range: 87.5-105 Mc/s. Variable tuning. Aerial impedance 75 and 300 ohms. Sensitivity 3  $\mu$ V for 30 dB signal-to-noise. Output up to 2V at 100% modulation. All



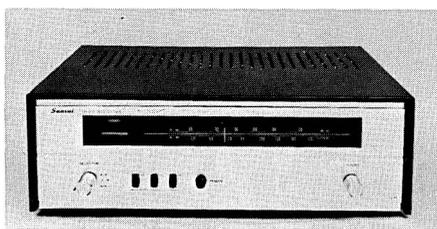
Rogers stereo decoder



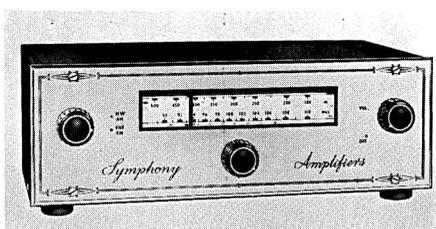
Rogers stereo decoder



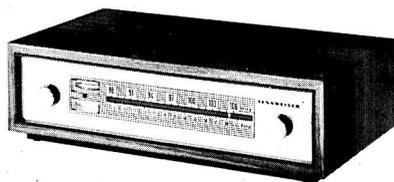
Radford FMT 2 FM tuner



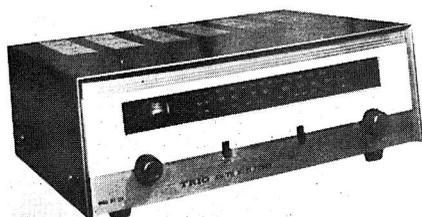
Sansui TU70



Symphony AM/FM Tuner



Sennheiser EFM 303



Trio AFE 220 AM/FM tuner

silicon transistors. Four-gang capacitor tuning. Incorporates inter-station quieting. Space for decoder. Mains powered 110-250V 50/60 c/s. Size:  $10\frac{1}{2} \times 3\frac{3}{4} \times 12\frac{5}{8}$  in., panel size:  $10\frac{3}{16} \times 3\frac{5}{16}$  in. Weight: 12 lb. Price: £35 plus U.K. purchase tax. £9 12s. 6d.

● **FMT2 MPX.** Identical specification to FMT2 tuner but with multiplex decoder incorporated. Price: £47 10s. plus U.K. purchase tax. £13 1s. 3d.

● **FMT2 MPXF.** Similar to FMT2 MPX but with field-effect transistor in RF unit. Four capacity tuned circuits in RF unit with double-tuned circuit between RF amplifier and mixer stage. Price to be announced.

● **STX1.** Stereo multiplex decoder. Price: £15 15s.



**ROGERS DEVELOPMENTS (ELECTRONICS) LTD.,** 4-14 Barmeston Road, Catford, London, S.E.6. Tel: 698-7424/4340. Cables: Rodevco, London, S.E.6.

**Mk III switched FM tuner Series III.** Range: 87-96 Mc/s. AFC. Ratio detector. Stereo beacon. Multiplex conversion facilities. Aerial imp 70-90 ohms. Output 0.25V RMS. Self-powered. Cathode follower output. Size: (chassis model)  $11 \times 6\frac{1}{2} \times 4\frac{1}{2}$  in.; (case model)  $11 \times 7\frac{1}{4} \times 5\frac{3}{8}$  in.

Suitable for un-powered multiplex decoder. Price: (chassis model) £16 16s. (U.K. purchase tax £3 3s. 1d.); (cabinet model) £19 10s. (U.K. purchase tax £3 13s. 2d.).

**Mk III Variable FM Receiver.** New design styled to match the Cadet III range. Suitable for use with Cadet III or HG88 III stereo amplifiers. Range 88-108 Mc/s. Sensitivity:  $1.5 \mu\text{V}$  for 20 dB quieting. Twin limiters. Ratio detector. Stereo beacon. Accurate tuning indicator. AFC. Provision for adding stereo multiplex decoder. AGC. Self-powered. Price: (chassis model) £25 10s. (U.K. purchase tax £4 15s. 9d.); (cabinet model) £29 (U.K. purchase tax £5 8s. 11d.).

**Multiplex stereo decoder Mk II.** Designed for use with Rogers FM tuners but also suitable for operation with other makes of tuner. Un-powered and self-powered versions. Automatic electronic switching for stereo broadcasts. Mullard Vinkor tuned circuits. Seven silicon planar transistors. Selective anti-noise filter. High degree of filtering permits tuner to be

connected to tape recorder without interference (input impedance to recorder must be over 100K). Stabilised 12V supply. Input signal level: 0.5-1V. Input imp 30K approx. Output: 700 mV RMS for input of 350 mV RMS per channel. Separation: better than 30 dB at 1 Kc/s. Total spurious output (including 19/38 Kc/s): better than -50 dB. Mains: 105-125V, 200-250V AC 3W. Size: (less power supply)  $7\frac{3}{8} \times 2 \times 4$  in.; (with power supply)  $9\frac{1}{4} \times 2 \times 4$  in. Weight: (un-powered) 1 lb 6 oz; (powered) 2 lb 1 oz. Price: (unpowered) £15; (powered) £17.



**SANSUI.** Distributors: Technical Ceramics Ltd. (Sonotone), Building 102, Cheyney Manor Estate, Swindon, Wilts.

● **Sansui TU70.** AM/FM multiplex stereo tuner. Range: VHF 88-108 Mc/s, MW 186-560 metres. Variable tuning. Ratio detector. Magic eye tuning indicator. Sensitivity:  $1.2 \mu\text{V}$  for 20 dB quieting. Aerial input: 300 ohms balanced. Output: 1.2V. Fitted with stereo decoder. Switchable AFC. Stereo indicator. Switchable quiet tuning. Noise filter. Mains: 100, 117, 240V AC 50/60 c/s. Size:  $12\frac{5}{8} \times 15\frac{3}{8} \times 5\frac{1}{4}$  in. Price to be announced.



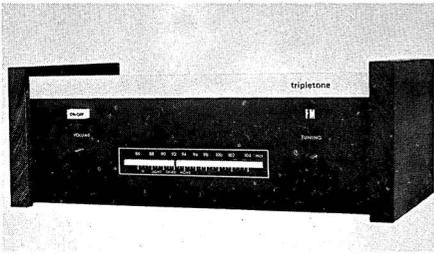
**SENNHEISER ELECTRONICS.** Distributors: Audio Engineering Ltd., 33 Endell Street, London, W.C.2. Tel: Temple Bar 0033.

● **EFM.303 Stereo Tuner.** Range: 87.5-108.5 Mc/s. Variable tuning. Two meters for tuning indication. Sensitivity  $<2 \mu\text{V}$  for 20 dB quieting. Output 0.5V. Built-in multiplex decoder. Automatic stereo transmission indicator. Inter-station noise suppression. Switched AFC. Mains: 200-240V 50 c/s. Size:  $15 \times 4 \times 9$  in. Price: See VKL.303 in Amplifier Section.

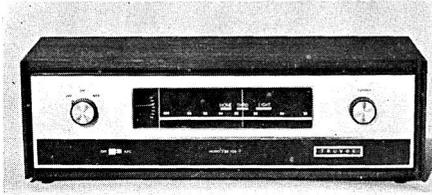


**SHIRLEY LABORATORIES LTD.,** 23 Ripley Road, Worthing, Sussex. Tel: Worthing 49098.

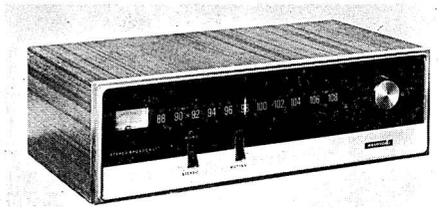
**FM tuner SB/V16.** Variable tuning. Standard range. Ratio det. Magic eye ind. Psn 200-300V 15 mA; 6.3V 2.5 amps. Price: £20 (U.K. purchase tax £3 15s.).



*Tripletone FM tuner Series 3*



*Truvox FM 100 tuner*



*Wharfedale WFM.1*



*Veritone Saturn FM tuner*



**STERN-CLYNE LTD.**, Head Office and mail order, 3-5 Eden Grove, Holloway, London, N.7. Tel: North 8161. Branches throughout London, Liverpool, Manchester, Sheffield, Bristol and Nottingham.

**FM1.** FM tuner. 88-108 Mc/s. Variable tuning. Ratio detector. Aerial input 70-80 ohms coaxial. Output voltage 200 mV. Power requirements: 200V 25 mA DC, 6.3V 1.5A AC. Size:  $8 \times 5 \times 4\frac{1}{2}$  in. Price: £9 (U.K. purchase tax £1 12s. 3d.).

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**SYMPHONY AMPLIFIERS LTD.**, 16 Kings College Road, London, N.W.3. Tel: Primrose 3314/5.

**Symphony AM/FM tuner.** VHF 88-110 Mc/s, MW 175-500m. Variable tuning. Transistorised. Sensitivity: 20  $\mu$ V. Aerial inputs: 80 ohms coaxial. Output: 0.25V audio from 80% modulated carrier (or 75 Kc/s deviation on FM). Output impedance 3K. Mains input 200-250V AC. Spare power available for indicator lamps, etc. Available in chassis or shelf mounting form. Size:  $12\frac{1}{2} \times 6\frac{1}{4} \times 4\frac{1}{4}$  in. Price (chassis): £14; (with steel case) £16.

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**TRIO.** Distributors: Winter Trading Co. Ltd., 95-99 Ladbroke Grove, London, W.11. Tel: Park 1341. Cables: Winlec, London, W.11.

**AFE220.** Mains-operated valve tuner covering VHF, MW, and LW. Variable tuning. FM/VHF 88-108 Mc/s, MW 187-560 m, LW 855-2000metres. Meter tuning indicator. Sensitivity: FM 2.1  $\mu$ V at 98 Mc/s, AM 20  $\mu$ V. Aerial 75 ohms coaxial. Output: FM 2V at 400 c/s  $\pm$  75 Kc/s deviation, AM 1.5V at 400 c/s 30% modulation. Multiplex decoder available. AFC. Mains: 115/230V 50-60 c/s. Size:  $12\frac{1}{4} \times 5 \times 5$  in. Price: £35 8s. 7d. (U.K. purchase tax £6 13s.).

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**TRIPLETONE MANUFACTURING CO. LTD.**, 241a The Broadway, Wimbledon, S.W.19. Tel: Liberty 1189.

**Tripletone FM tuner Series 3.** Variable tuning. Range: 86-104 Mc/s. AGC and interstation quieting. Ratio detector. Aerial input 70-80 ohms coaxial. Output: 0-500 mV cathode follower. Mains: 200-250V AC for self-powered version, 250V 25 mA DC and 2A at 6.3V AC

for un-powered version. Size:  $11 \times 6\frac{1}{2} \times 3\frac{3}{4}$  in. Price: (un-powered) £13 11s. 5d. (U.K. purchase tax £2 7s. 6d.); (powered) £15 2s. 10d. (U.K. purchase tax £2 13s.).

★

**TRUVOX LTD.**, Hythe, Southampton. Tel: Hythe (0421-24) 3265.

**FM100.** Variable tuning FM/VHF tuner covering 87.5-108.5 Mc/s. Ratio detector. Meter tuning indicator plus beacon for stereo transmissions. Sensitivity: 1.5  $\mu$ V for 20 dB quieting. Aerial imp 75 ohms coaxial, 300 ohms balanced. Output: 0-1V variable. Internally-fitting decoder available. Switched AFC. Overload limiting diode. Preset output control. Mains: 100-120V, 200-250V, 40-60 c/s. Price: £33 12s. including tax.

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**VERITONE.** Stern-Clyne Ltd., 3-5 Eden Grove, London, N.7. Tel: North 8161.

**Veritone Saturn.** FM tuner. Range: 87.5-108.5 Mc/s. Fully variable tuning. Ratio detector. Meter tuning indicator. Sensitivity: 5  $\mu$ V for 20 dB quieting. Aerial input 70-80 ohms coaxial. Output: 150 mV at 22K. AFC. Multiplex decoder in preparation. Self-powered. Mains: 240V 3W. Size:  $12\frac{1}{2} \times 7\frac{1}{2} \times 4\frac{1}{2}$  in. Shelf mounting teak cabinet available. Price: £22 12s. 6d. (U.K. purchase tax £3 19s. 6d.).

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**WHARFEDALE.** Rank Wharfedale Ltd., Idle, Bradford, Yorkshire. Tel: Bradford 612552. Cables: Wharfedel, Idle, Bradford. Telex: 51407.

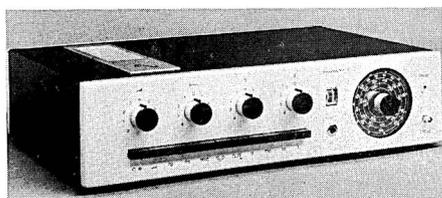
● **WFM-1.** Stereo FM/VHF tuner. Range: 87.5-108 Mc/s. Variable tuning. All transistor. Centre-zero tuning meter. Sensitivity: 1.75  $\mu$ V for 30 dB signal-to-noise ratio (75 ohms). Aerial input: 75 ohms coaxial, 300 ohms balanced. Multiplex stereo decoder fitted. AM rejection > 40 dB. Crosstalk better than -35 dB. Distortion < 0.6% at 75 Kc/s deviation. Stereo indicator lamp. Switchable inter-station muting. Size:  $15\frac{1}{2} \times 6\frac{3}{8} \times 5$  in. Finish: oiled teak veneer shelf-mounting cabinet. Price: £65 (including U.K. purchase tax).



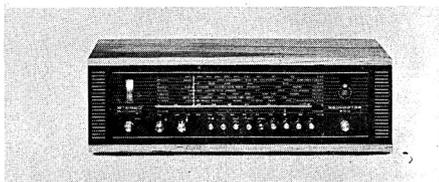
*Armstrong 227M mono tuner/amplifier*



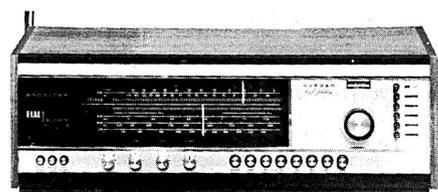
*Armstrong 227M tuner/amplifier*



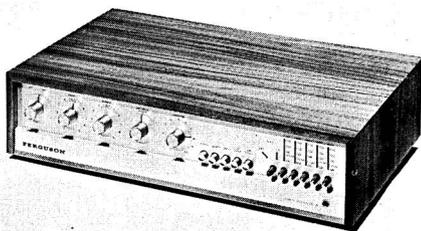
*Armstrong 426*



*Beomaster 900M*



*ELAC 3100T tuner/amplifier*



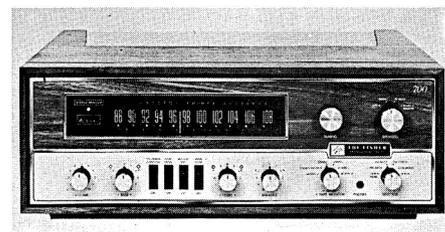
*Ferguson 206STA*



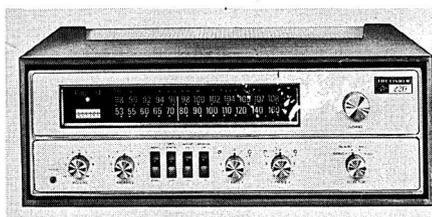
*Fisher 400 FM/stereo tuner amplifier*



*Ferguson 205STA*



*Fisher 700-T transistorised FM/stereo tuner amplifier*



*Fisher 220-T*

# DIRECTORY OF TUNER/AMPLIFIERS

★ The abbreviations used in this section are defined at the beginning of the Tuner and Amplifier Sections.

**AKAI.** Distributors: Pullin Photographic Ltd., 11 Aintree Road, Perivale, Greenford, Middlesex. Tel: Alperton 1541. Cables: Pullinfoto, Greenford, Middlesex.

● **Akai AA7000.** Transistorised stereo tuner/amplifier. Range: VHF 87-109 Mc/s, MW 187-560 metres. Variable tuning. Meter tuning indicator. Sensitivity: 1.6  $\mu$ V for 20 dB quieting. Aerial input: VHF 75 ohms coaxial. Stereo multiplex decoder fitted. All silicon transistors. Stereo indicator. Quiet tuning facility. Rotatable internal ferrite rod on AM. Inputs: PU 2.5 mV 100 ohms, aux high 1.2V 250 ohms, aux low 400 mV 150 ohms, tape 400 mV (monitor) 1 megohm, tape 350 mV (record output) 50K. Noise level: PU 60 dB, aux and tape 70 dB. Output: 40W per channel (music). HD 1% at rated power. FR 20 c/s-35 Kc/s. Output impedance: 8-16 ohms. Mains: 100-240V AC. Consumption: 160W. Size: 20 $\frac{3}{4}$   $\times$  17 $\frac{1}{2}$   $\times$  4 $\frac{1}{2}$  in. Price: approximately £156 10s.

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**ARENA.** Distributors: Highgate Acoustics Ltd., 71-73 Great Portland Street, London, W.1. Tel: Museum 2901.

● **Arena T.1900F.** Stereo tuner/amplifier. Transistorised. Range: FM 87-104 Mc/s, SW 40-51 m, 67-200 m, MW 177-582 m, LW 925-2150 m. Variable tuning. Meter tuning indicator. Sensitivity: FM 1.5  $\mu$ V for 20 dB quieting, AM 10  $\mu$ V on external aerial (400  $\mu$ V/m on ferrite rod) for 20 dB signal-to-noise ratio. Separate aerials for AM and FM. Output: 8W RMS per channel. Available with or without multiplex decoder fitted. AFC. Mains: 110 and 220V 50 c/s. 20 transistors, 13 diodes. Bass control:  $\pm$  10 dB at 100 c/s. Treble control:  $\pm$  15 dB at 10 Kc/s. Pickup input: 450 mV f or full output. For magnetic and other low-output pickups a stereo preamplifier is available as an optional extra. (See Pickup Accessories Section for details.) Finish in teak, Brazilian rosewood or light oak. Size: 16 $\frac{1}{2}$   $\times$  8 $\frac{1}{4}$   $\times$  5 $\frac{3}{4}$  in. Socket for tape recorder. Price £50 2s. 3d. (U.K. purchase tax £8 8s.); MPX multiplex decoder £6 6s. extra.

● **Arena T.2400.** All-transistor tuner/amplifier. Constructed on miniature module system.

Range: FM/VHF 87.5-105.5 Mc/s. Push-button selection of up to five FM stations. Electronic station scanning. Inputs: tape recorder, PU.1, PU.2. Output: 15W each channel. Outlets: four speakers, one head phone. Sockets for FM aerial feeder. Size: 19 $\frac{3}{4}$   $\times$  9 $\frac{3}{4}$   $\times$  3 $\frac{7}{8}$  in. Price: £62 17s. 3d. (U.K. purchase tax £10 10s. 11d.); MPX multiplex decoder £6 6s. extra.

● **Arena T.2500F.** All-transistor tuner/amplifier. Constructed on miniature module system. Five wavebands: LW, MW, SW1, SW2, VHF/FM. Push-button selection of up to five FM stations. Electronic station scanning on FM. Duplex tuning. Sockets for recorder and pickup. Output: 15W each channel. AFC. Finish: teak, light oak or Brazilian rosewood. Size: 17 $\frac{3}{4}$   $\times$  8 $\frac{1}{4}$   $\times$  5 $\frac{3}{4}$  in. Price: £71 3s. 2d. (U.K. purchase tax £12 19s. 5d.); MPX multiplex decoder £6 6s. extra.

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**ARMSTRONG AUDIO LTD.,** Warlters Road, Holloway, London, N.7. Tel: North 3213/4.

**Model 227M.** Mono tuner/amplifier. AM/FM. Variable tuning. Range: MW 180-600 m; FM 87-108 Mc/s. Foster-Seelcy disc. Tuning meter. Aerial imp 70-80 ohms. Output: 10W. Psn 200-250V AC. Inputs: gram/tape playback 80 mV, 1 megohm. Controls: vol, bass, treble, sel, tuning. Rumble filter -6 dB at 35 c/s. FR 30 c/s-20 Kc/s  $\pm$  1 dB. H and N better than -55 dB. HD less than 0.5% at 8W (overall). Feedback 15 dB. LS matching 4, 8 16 ohms. Output stages 2  $\times$  ECL86. Free-standing. Size: 13  $\times$  5 $\frac{3}{8}$   $\times$  10 $\frac{1}{2}$  in. Optional case. Price: £33 15s. (U.K. purchase tax £6 6s. 6d.); shelf-mounting case £3 10s. (U.K. purchase tax 5s. 9d.).

● **Model 425.** FM tuner/amplifier. Range: VHF 86-109 Mc/s. Variable tuning. Ratio detector. Meter tuning indicator. Sensitivity: 1.5  $\mu$ V for 30 dB quieting. Aerial impedance: 75 ohms coaxial and 300 ohms balanced. Plug-in stereo multiplex decoder optional extra (see Radio Tuner Section). Quiet-tuning control. Stereo indicator light. Inputs: PU(1) 60 mV 100K, PU(2) 3.5 mV 50K, tape play 400 mV 100K. Noise level: PU -55 dB, tape -70 dB. Controls: balance (maximum to zero each channel), bass  $\pm$  10 dB, treble  $\pm$  10 dB, loudness (two volume

levels with loudness contours at low level), rumble filter -5 dB at 30 c/s, treble filter(1) 6.5 Kc/s -3 dB, 10 Kc/s -25 dB, treble filter(2) 4.5 Kc/s -3 dB, 9 Kc/s -40 dB. Output: 15W RMS per channel. Output impedance: 4-16 ohms. HD <0.5% at rated output. FR 20 c/s-20 Kc/s -1 dB at 15W RMS. Transistors. Mains: 100-125V and 200-250V AC. Size: 16½ × 10½ × 4 in. Price: £60 13s. (U.K. purchase tax £11 7s. 9d.).

● **Model 426.** AM/FM tuner/amplifier. Range: VHF 86-109 Mc/s, MW 185-590 metres, LW 1,000-2,000 metres. Variable tuning. FM ratio detector. Meter tuning indicator. Sensitivity: 1.5 µV for 30 dB quieting on VHF, 5 µV for 20 dB quieting on AM. Aerial impedance: 75 ohms coaxial and 300 ohms balanced. Plug-in stereo multiplex decoder optional extra (see Radio Tuner Section). FM quiet-tuning control. Stereo indicator light. Inputs: PU(1) 60 mV 100K, PU(2) 3.5 mV 50K, tape play 400 mV 100K. Noise level: PU -55 dB, tape -70 dB. Controls: balance (maximum to zero each channel), bass ±10 dB, treble ±10 dB, loudness (two volume levels with loudness contours at low level), rumble filter -5 dB at 30 c/s, treble filter (1) 6.5 Kc/s -3 dB, 10 Kc/s -25 dB, treble filter (2) 4.5 Kc/s -3 dB, 9 Kc/s -40 dB. Output: 15W RMS per channel. Output impedance: 4-16 ohms. HD <0.5% at rated output. FR 20 c/s-20 Kc/s -1 dB at 15W RMS. Transistors. Mains: 100-125V and 200-250V AC. Size: 16½ × 10½ × 4 in. Price: £66 12s. 6d. (U.K. purchase tax £12 10s. 3d.).

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**BANG & OLUFSEN U.K. DIVISION**, Eastbrook Road, Gloucester. Tel: Gloucester 21591.

**900M.** AM/FM tuner/amplifier. Range: VHF 88-108 Mc/s, MW 188-578 metres, LW 940-2040 metres, TB 75-194 metres. Switchable AFC. 23 transistors, seven diodes. Tuning indicator. Duplex tuning drive (separate pointers for AM and FM). Inputs: tape 250 mV, PU 180 mV 100K. Outlet: tape 20 mV. Output: 6W RMS per channel. Mains: 220-240V AC. Consumption: 65W. Dimensions: 29½ × 11½ × 5½ in. Price: £65 2s. (including U.K. purchase tax).

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**BRAUN AG.** Distributors: Fi-Cord International, Charlwoods Road, East Grinstead, Sussex. Tel: East Grinstead 21351.

● **TS45.** Stereo tuner/amplifier. Transistorised. VHF 88-108 Mc/s, MW 188-545 m. Variable

tuning. Foster-Seeley discriminator. Meter indicator. Sensitivity: 1.5 µV for 26 dB quieting. Aerial 300 ohms balanced twin. Optional multiplex. AFC switchable. Output: 12W each channel. Distortion less than 1% at 1 Kc/s for 12W output. FR 30 c/s-20 Kc/s. Output imp 4 ohms. Mains: 240V AC. Size: 19¼ × 11¼ × 4¾ in. Price: £149 1s. 1d. including U.K. purchase tax.

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**DYNATRON RADIO LTD.**, St Peter's Road, Furze Platt, Maidenhead, Berks. Tel: Maidenhead 23331.

● **Dynatron SRX-24.** Ranges: MW 185-570 m, LW 1,100-2,000 m, VHF 87-108 Mc/s. Variable tuning. Stereo beacon indicator. Sensitivity: MW 10 µV for 20 dB quieting average over band, LW 15 µV for 20 dB quieting average over band, VHF (minimum) 2.5 µV for 10 dB quieting, 6 µV for 30 dB quieting, 10 µV for 40 dB quieting, average over band. AFC (pull-in range ±350 Kc/s or better). AGC +70 dB for 6 dB change in audio (AM). Tuner: 14 transistors, 12 diodes. Multiplex decoder included. Separate RF and IF channels for AM and FM. Inputs: radio and tape 36 mV for 10W at 1 Kc/s, mag PU 5 mV for 10W at 1 Kc/s, crystal PU 16 mV for 10W at 1 Kc/s. Controls: (push-button) wavechange, AFC and bass boost (±10 dB at 100 c/s), (rotary) tuning, selector, balance (±6 dB each channel), volume, treble (±10 dB at 10 Kc/s), bass (±10 dB at 100 c/s), toggle switch for mains on-off. Audio amplifier: 16 transistors, 4 diodes. Output: 10W RMS per channel into 3 ohms. HD <0.4% at 8W, <1% at maximum output (12.5W per channel). H and N: main amplifier -95 dB, tape input -70 dB, crystal PU -58 dB, mag PU -62 dB, all relative to 10W. FR 30 c/s-24 Kc/s -3 dB on radio, tone controls flat; 40 c/s-20 Kc/s ±1.5 dB on PU inputs, corrected to RIAA. Sockets: external AM and VHF aerials, tape recorder, external speakers (3-15 ohms), shuttered mains socket for recorder or player. Size: 16½ × 12 × 4½ in. Price: £72 17s. 9d. (including U.K. tax).

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**ELAC**, Electroacoustic GmbH., Kiel, West Germany. Distributors: Mitchell Enterprises Ltd., 61 West Street, Dorking, Surrey. Tel: Dorking 4229.

● **310 Tuner Amplifier.** In addition to normal tuning the FM circuitry includes 5 FM programme buttons for instant selection of pre-selected stations. Ranges are: VHF 87.3 to 104 Mc/s; SW 5.9 to 7.4 Mc/s; MW 510 to 1.64 Kc/s; LW 145 to 360 Kc/s. Tuned circuits: 15 FM including 10 IF, and 9 AM including 7 IF. The total complement comprises 42 transistors, 21 diodes and 3 rectifiers. IF -10.7 Mc/s for FM

and 460 Kc/s for AM. Bandsread tuning for the 49 and 41 metre shortwave bands. Selectivity 56 dB. Image rejection 50 dB. FM/IF bandwidth is 200 Kc/s. Distortion  $<1\%$  at 1 Kc/s to 40 Kc/s deviation. Stereo separation  $>35$  dB at 1 Kc/s. Signal-to-noise ratio  $>60$  dB at 1 Kc/s to 75 Kc/s deviation. Am suppression 40 dB. Pilot tone suppression 40 dB. Muting threshold  $3\mu\text{V}$ . AFC capture range  $\pm 300$  Kc/s. Amplifier section: Music power 35 W per channel, RMS 25 W per channel. Frequency response 12 to 20,000 c/s  $\pm 1.5$  dB, 12 to 40,000 c/s  $\pm 6$  dB. Power bandwidth 20 to 15,000 c/s. Distortion  $<1\%$  at 1 Kc/s and full output. Channel separation  $>55$  dB at 1 Kc/s and full output. Input sensitivity related to full output; gram 1, 3.25 mV into 47 K $\Omega$ ; gram 2/tape, 130 mV into 470 K $\Omega$ . Controls: treble, at 15 Kc/s +18 to -22 dB; bass, at 50 c/s +16 to -13 dB. Filters: rumble (50 c/s) and scratch (10 Kc/s), both -11 dB. Signal-to-noise ratio related to 50 mV; gram 1,  $>55$  dB; gram 2/tape  $>60$  dB. Size: 24.8  $\times$  9.5  $\times$  8.3 in. (63  $\times$  24  $\times$  21 cms). Weight: 21 lbs (10.5 Kg). Details of housing choice and price on request.



**FERGUSON.** British Radio Corporation Ltd., 284 Southbury Road, Enfield, Middlesex. Tel: Howard 2477.

● **Ferguson 205STA.** Transistorised stereo tuner/amplifier. Range: VHF 87.5-101 Mc/s. MW 185-566 metres, LW 1,120-2,025 metres, SW 16-51 metres. Variable tuning. Meter tuning indicator. Sensitivity: VHF 15  $\mu\text{V}$  for 20 dB limiting, MW 420-500  $\mu\text{V}$  for 20 dB S/N. Aerials: built-in 8 in. ferrite rod for MW and LW, sockets for SW and VHF. Stereo multiplex decoder built-in. Stereo indicator lamp. Switchable AFC. 25 transistors, 15 diodes. Inputs: PU 20 mV 50K, tape 50 mV 60K. Outlets: ext speakers 8 ohms, tape 120-200 mV 4-7K. Output: 7W per channel. HD  $<1\%$  a: rated output. FR 30 c/s-20 Kc/s  $\pm 3$  dB. Controls: volume (bass compensated), bass +14 dB -12 dB, treble  $\pm 10$  dB at 10 Kc/s, tuning, AFC on-off, mode, wavechange, pickup balance (on rear). Mains outlet sockets. Mains: 200-250V AC 50 c/s. Consumption 20W. Size: 16 $\frac{3}{8}$  in. wide, 9 $\frac{7}{8}$  in. deep (11 in. overall), 8 $\frac{3}{8}$  in. high. Finish: Queensland walnut veneer. Designed to match Ferguson Unit Audio system. Price: £53 4s. 6d. (including U.K. purchase tax).

● **Ferguson 206STA.** Transistorised FM/VHF stereo tuner/amplifier. Range: 87.5-105 Mc/s. Preset tuning with five press-buttons, each button tunes entire range. Sensitivity: 20  $\mu\text{V}$  for 20 dB limiting. Stereo multiplex decoder fitted.

Stereo indicator light. Switchable AFC. 27 transistors, 12 diodes. Inputs: PU 16 mV, tape 140 mV 54K, radio 16 mV 6-8K. Controls: mains on-off, bass +14 dB -12 dB, treble  $\pm 10$  dB at 10 Kc/s, balance, volume. Output: 7W per channel (RMS). HD  $<1\%$  at rated output. FR 30 c/s-20 Kc/s  $\pm 3$  dB. Outlets: ext speakers 8 ohms, tape 70 mV 68K, two mains outlets. Mains: 200-250V AC 50 c/s. Consumption: 20W. Size: 19 $\frac{1}{4}$  in. wide, 11 $\frac{1}{2}$  in. deep, 5 in. high. Designed to match Ferguson Unit Audio system. Finish: Queensland walnut veneer. Price: £48 19s. 5d. (including U.K. purchase tax).



**FISHER RADIO CORPORATION,** Long Island City 1, New York, U.S.A. Distributors: Getz Bros. and Co. Inc., 2 Harewood Place, London, W.1. Tel: Grosvenor 6901.

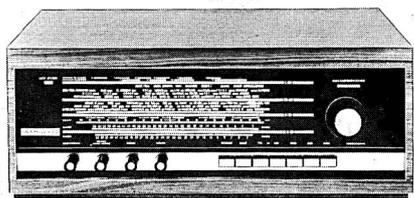
● **400.** Stereo tuner/amplifier. FM 86-108 Mc/s. Variable tuning. Ratio detector. Strip tuning indicator. Sensitivity: 1.8  $\mu\text{V}$  for 20 dB quieting. Aerial input 300 ohms balanced. Multiplex decoder fitted. AFC. Valves. Inputs: pickup (1) 4.4 mV, pickup (2) 14 mV, tape head 2.8 mV, auxiliary 280 mV. Controls: bass  $\pm 22$  dB at 50 c/s, treble  $\pm 22$  dB at 10 Kc/s, filter -3 dB at 5 Kc/s, then 12 dB/octave above 6 Kc/s. Output 25W RMS each channel. HD 0.5% at 1 Kc/s at rated output. FR 25 c/s-25 Kc/s. Noise level -80 dB. Mains input 200W. Size: 17 $\frac{1}{2}$   $\times$  13 $\frac{1}{2}$   $\times$  5 $\frac{3}{4}$  in. Weight: 31 lb. Price: £103 19s. including purchase tax.

● **440-T.** Stereo FM multiplex tuner/amplifier. Full specification on request. Price: £156 9s. including purchase tax.

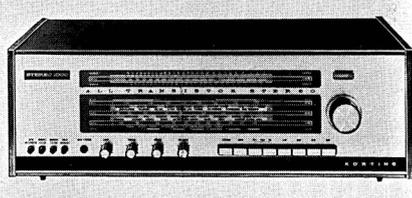
● **800-C.** Stereo AM/FM multiplex tuner/amplifier. Full specification on request. Price: £156 9s. including purchase tax.

● **700-T.** Transistorised FM stereo tuner/amplifier. Front end field-effect transistors. Two RF stages. Four IF stages. Three limiters. Automatic stereo switching. Full technical specification on request. Size: 16 $\frac{3}{8}$   $\times$  5 $\frac{1}{8}$   $\times$  12 $\frac{3}{8}$  in. Weight: 24 lb. Price: £250 19s. including purchase tax.

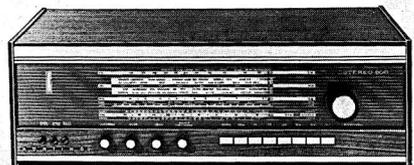
● **220-T.** Stereo tuner/amplifier incorporating field effect transistors. Ranges: FM 88-108 Mc/s, AM 187-570 metres. AFC. Variable tuning. Inputs: PU 3.6-9.5 mV, aux 410-800 mV. Output: 16W RMS per channel at 8 ohms, 20W RMS per channel at 4 ohms. Controls: volume, balance, mono/stereo switch, bass, treble, tuning, function selector, switches for speakers,



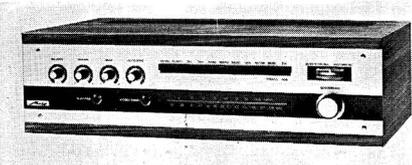
*Korting Stereo 400*



*Korting Stereo 1000*



*Korting Stereo 600*



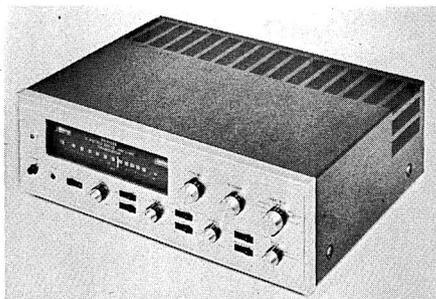
*Metz 420 tuner amplifier*



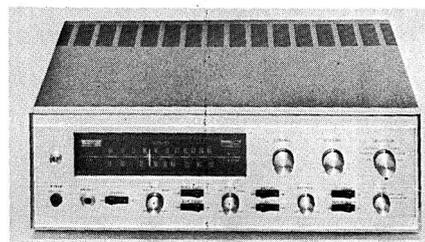
*Nikko ST-701LA*



*Pioneer SX-34B*



*Pioneer SX-1000TA*



*Pioneer SX-600T*



*Pioneer ER-420*



*Pioneer SX-800*

monitoring and muting. HD 0.8%. FR 30 c/s-20 Kc/s  $\pm 1$  dB. H and N: -80 dB (volume at minimum), PU -55 dB, aux -65 dB. Bass control: 17 dB at 50 c/s. Treble control: 16 dB at 10 Kc/s. Finish: walnut cabinet with enamelled and gold plated front panel. Size:  $15\frac{1}{2} \times 4\frac{3}{4} \times 11$  in. Weight:  $17\frac{1}{2}$  lb. Price: £181 13s. including purchase tax.



**KORTING.** Distributors: Europa Electronics Ltd., Howard Place, Shelton, Stoke-on-Trent. Tel: Stoke-on-Trent 29316.

● **Stereo 400.** Stereo tuner/amplifier in modern satin finish wood cabinet. Ranges: SW, MW, LW VHF/FM. Variable tuning. Strip tuning indicator. Sensitivity: VHF 3  $\mu$ V, SW 10  $\mu$ V, MW 5  $\mu$ V, LW 8  $\mu$ V. Internal rotatable ferrite aerial for MW and LW, folding dipole for VHF. Provision for external aerials. Transistor multiplex decoder. Stereo indicator. AFC. Nine valve circuit. Inputs: stereo PU, stereo tape recorder. Controls: bass, treble, balance, volume, push-button waveband selection. Output: 10W RMS per channel. FR 30 c/s-20 Kc/s. Output imp: 4.5 ohms. Mains: 110, 127, 220, 240V 50 c/s. Consumption: 70W. Size:  $21 \times 9 \times 8$  in. Weight: 13 lb. Price: £58 8s. 3d. (U.K. purchase tax £10 16s. 5d.).

● **Stereo 500.** Transistor stereo tuner/amplifier in modern style wood cabinet. Ranges: MW, LW, SW, VHF/FM. Variable tuning. AFC on FM. Meter tuning indicator. AGC. Internal rotatable ferrite rod for MW and LW. Folding dipole for FM. Output: 15W RMS each channel. 4.5 ohms. FR 20 c/s-100 Kc/s. Controls: bass, treble, balance, volume. Eight push-buttons for AFC, stereo, FM, LW, MW, SW, pickup, tape, on/off. Output stages: two AD148 transistors each channel. Mains 110, 127, 220, 240V AC 50 c/s. Consumption: 40W maximum. Stereo multiplex decoder incorporated. Size:  $21\frac{1}{4} \times 8\frac{5}{8} \times 9$  in. Price: £70 19s. 10d. (U.K. purchase tax £13 3s. 1d.).

● **Stereo 600.** Stereo tuner/amplifier in modern satin finish walnut cabinet. Ranges: SW, MW, LW, VHF/FM. Variable tuning. Strip tuning indicator. Internal rotatable ferrite aerial for MW and LW. Provision for external aerials. Transistor stereo multiplex decoder. Stereo indicator. Automatic stereo/mono switch. Inputs: stereo pickup, stereo tape recorder. Controls: volume, treble  $\pm 15$  dB, bass  $\pm 15$  dB, balance  $\pm 15$  dB, rumble and scratch filters, solo/treble filter, push-button waveband selection. Output: 15W RMS per channel. FR 30 c/s-20 Kc/s. Output imp: 4.5 ohms. Mains:

110, 127, 220, 240V AC. Size:  $24\frac{1}{2} \times 9\frac{1}{2} \times 8$  in. Weight:  $17\frac{1}{2}$  lb. Price: £76 7s. 8d. (U.K. purchase tax £14 3s. 1d.).

● **Stereo 1000.** Transistorised stereo tuner/amplifier in modern satin finish walnut cabinet. Ranges: SW, MW, LW, VHF/FM. Variable tuning. Aerials: ferrite rod aerial for MW and LW, provision for external aerials. Stereo multiplex decoder with automatic indicator and automatic mono/stereo switch. AFC. 39 transistors, 16 diodes. Inputs: stereo magnetic PU, stereo crystal PU, stereo tape recorder. Output: 25W RMS per channel. Output imp: 4.5 ohms. Controls: volume, treble  $\pm 15$  dB, bass  $\pm 15$  dB, balance  $\pm 15$  dB, rumble and scratch filters, solo/treble filter, push-button waveband selection. FR 15 c/s-40 Kc/s. Mains: 110, 127, 220, 240V AC. Size:  $24\frac{1}{2} \times 9\frac{1}{2} \times 8$  in. Weight:  $20\frac{1}{4}$  lb. Price: £88 19s. 3d. (U.K. purchase tax £16 9s. 8d.).



**LINEAR PRODUCTS LTD.,** Electron Works, Armley, Leeds. Tel: Leeds 63-0126.

**RA56.** Transistorised AM/FM tuner/amplifier. Range: VHF 87-108 Mc/s, MW 190-550 metres, LW 1,000-2,000 metres. Variable tuning. Inputs: mic, tape recorder, PU. Controls: wave-change, tuning, input selector, bass lift and cut, treble lift and cut, volume on/off. Output: 6W RMS. Output impedance: 3-15 ohms. Mains: 200-230-250V 50 c/s AC. Available in chassis or shelf-mounting versions. Aerials: coaxial input for FM/VHF, internal ferrite rod for AM. Size: (chassis)  $12\frac{1}{2} \times 4\frac{1}{2} \times 9$  in. Front panel:  $12\frac{3}{4} \times 5$  in. Price: £32 11s.; teak finished cabinet £4 15s. extra. Prices include U.K. purchase tax.

● **RTA66.** Transistorised stereo tuner/amplifier. Specification as for RA56 but with 6W RMS output per channel, balance control, tuning meter and provision for stereo multiplex decoder. Price: £46 4s.; teak finished cabinet £4 15s. extra. Prices include U.K. purchase tax.



**METZ.** Distributors: Mitchell Enterprises Ltd., 61 West Street, Dorking, Surrey. Tel: Dorking 4229.

● **Metz 420.** Transistorised stereo tuner/amplifier. 42 transistors and diodes. Inputs for mic, tape, crystal PU. Controls: On-off, loudness, bass, treble, HF filter, rumble filter. Output 10W each channel. FM/VHF radio with auto-tuning. Size:  $17\frac{3}{4} \times 4\frac{3}{4} \times 10$  in. Price: £83 15s. (U.K. purchase tax £13 19s. 2d.).

**NIKKO ELECTRIC MFG. CO. LTD.** Distributors: Howland-West Ltd., 2 Park End, South Hill Park, London, N.W.3. Tel: Swiss Cottage 6666.

● **Nikko ST701-LA.** Transistor AM/FM tuner/amplifier. Range: VHF 88-108 Mc/s, MW 182-565 metres. Variable tuning. Field effect transistor FM detector. Meter tuning indicator. Sensitivity: 1.8  $\mu$ V for 20 dB quieting. Multiplex decoder fitted. Switched AFC. Inputs: PU(mag) 2.8 mV 50K, tape head 1.8 mV 200K, aux 200 mV 250K, aux 500 mV 800K. Controls: mode, function, volume, balance, bass (one on each channel), treble (one on each channel), tape monitor, loudness, scratch filter, rumble filter, muting, AFC, speaker on/off, mains on/off. Output: 25W RMS per channel at 8 ohms. HD < 0.3% at 20W, < 0.8% at 25W. FR 15 c/s-50 Kc/s. Noise level: tape -55 dB, mono -60 dB, aux -65 dB. Output impedance: 4-15 ohms. Mains supply. Automatic circuit breaker. Size: 15½ × 4½ × 12¾ in. Price: £100 (U.K. purchase tax £18 5s. 9d.).



**PHILIPS ELECTRICAL LTD.,** Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437-7777. Cables: Phillips, London.

● **GH.930.** AM/FM tuner/amplifier. Range: VHF 87.5-108 Mc/s, MW 185-580 metres, LW 750-2,000 metres, SW 16.5-51 metres. AFC. Sensitivity: (FM mono) 6  $\mu$ V, (FM stereo) 60  $\mu$ V, (AM) 100  $\mu$ V, all for 26 dB signal-to-noise. Moving coil tuning meter. Switchable quiet FM tuning. FM aerial input: 300 ohms balanced. Inputs: PU(mag) 1 mV 10K, PU(crystal) 40 mV 220K, tape 110 mV at 70K. FR 35 c/s-20 Kc/s  $\pm$  1.5dB. Output: 7W RMS per channel. Separation: > -50 dB at 1 Kc/s. H and N > -70 dB at 7W. HD < 0.8% at 7W per channel at 1 Kc/s. Controls: rumble filter 12 dB/octave, scratch filter 12 dB/octave, bass  $\pm$  6 dB at 80 c/s, treble  $\pm$  14 dB at 10 Kc/s, volume, tuning, balance. Output impedance: 4-8 ohms. Damping factor: 7 at 8 ohms impedance. Transistors and diodes. Mains: 110, 127, 220, 240V 50/60 c/s. Consumption: 39W maximum. Size: 26 × 8½ × 5½ in. Weight: 17 lb. Shelf-mounting teak cabinet. Price: £99 1s. 2d. (including U.K. purchase tax).



**PIONEER.** Distributors: Swisstone Ltd., 48a Station Road, Cobham, Surrey. Tel: Cobham 2853 and 4214.

● **SX-34B.** AM/FM multiplex stereo tuner/amplifier. FM section: 88-108 Mc/s, sensitivity 3

$\mu$ V, aerial input 300 ohms balanced. AM section: MW 187-560 m, sensitivity 20  $\mu$ V, ferrite aerial. Multiplex decoder fitted. Inputs: mag pickup 2.5 mV, ceramic pickup 30 mV, aux 300 mV, tape playback 350 mV. Controls: bass  $\pm$  10 dB at 50 c/s, treble  $\pm$  10 dB at 10 Kc/s, loudness +5 dB at 50 c/s, +8 dB at 10 Kc/s, with volume control set at -30 dB. 14 valves, 10 diodes. Output: 11W RMS, 17W music, each channel. Output impedance 8 or 16 ohms. Output stages: two ECL82 push-pull each stage. Tape monitor and playback sockets. Stereo headphone jack. Mains: 115-230V AC. Size: 16¾ × 13¼ × 5¾ in. Weight: 26½ lb.

*Price on request.*

● **ER-420.** AM/FM multiplex stereo tuner/amplifier. FM section: 87-108 Mc/s, sensitivity 2  $\mu$ V, SN 55 dB, aerial input 300 ohms balanced. AM section: MW 187-560 m, sensitivity 20  $\mu$ V, selectivity  $\pm$  4 Kc/s (sharp),  $\pm$  10 Kc/s (broad), built-in ferrite rod with provision for external aerial. Inputs: mag pickup 2.7 mV, ceramic pickup 29 mV, tape head 1.8 mV, tape monitor 200 mV, aux 200 mV. Output: 15W RMS each channel. Output impedance 8 or 16 ohms. FR 20 c/s-20 Kc/s  $\pm$  1 dB. HD < 1% at rated output. H and N better than 68 dB (mag). Controls: bass  $\pm$  14 dB at 50 c/s, treble +11 dB, -13 dB at 10 Kc/s, low filter -6 dB at 50 c/s high filter -14 dB at 10 Kc/s. 18 valves, 10 diodes. Two 6BQ5/EL84 push-pull each channel. Mains: 115-230V AC. Size: 17½ × 17½ × 6 in. Weight: 35 lb. *Price on request.*

● **SX-800A.** AM/FM multiplex stereo tuner/amplifier. Automatic FM mono/stereo switching circuit. FM section: nuvistor front end, 88-108 Mc/s, sensitivity 2  $\mu$ V, SN 55 dB, aerial input 300 ohms balanced. AM section: 187-560 metres, sensitivity 10  $\mu$ V, selectivity  $\pm$  7 Kc/s (broad),  $\pm$  4 Kc/s (sharp), internal ferrite rod, provision for external aerial. Inputs: mag pickup 3 mV, ceramic pickup 30 mV, tape head 2 mV, monitor 150 mV, aux 150 mV. Controls: bass  $\pm$  15 dB at 50 c/s, treble +10 dB, -12 dB at 10 Kc/s, low filter -8 dB at 50 c/s, high filter -14 dB at 10 Kc/s. Output: 90W music (total). Nine valves, 14 transistors and diodes. Two nova-type 7868 push-pull each channel. FR 20 c/s-20 Kc/s  $\pm$  1 dB. Mains: 115-230V AC. Size: 17½ × 16¾ × 5½ in. Weight: 35 lb. *Price on request.*

● **SX-600T.** AM/FM transistor multiplex stereo tuner/amplifier. Automatic stereo/mono switching circuit. 60 transistors, 4 nuvistors. FM section: nuvistor front end, 88-108 Mc/s, sensitivity 2  $\mu$ V, SN 60 dB, aerial input 300 ohms

balanced. AM section: 187-560 m, sensitivity 16  $\mu$ V, internal ferrite rod aerial with provision for external aerial. Inputs: mag pickup 2.7 mV 60K, ceramic pickup 70 mV 100K, tape head 1.5 mV 150K, tape monitor 330 mV 180K, aux 240 mV 220K. Controls: bass +15 dB, -14 dB at 50 c/s, treble +14 dB, -13 dB at 10 Kc/s, low filter -7 dB at 50 c/s, high filter -13.5 dB at 10 Kc/s. Output: 17.5W RMS each channel 16 ohms load. Output impedance 8-16 ohms. FR 20 c/s-20 Kc/s  $\pm 2$  dB. Quiet tuning on FM. Meter tuning indicator. Mains: 115-230V AC. Size:  $17\frac{1}{2} \times 17 \times 5\frac{7}{8}$  in. Weight: 27 lb.

*Price on request.*

● **SX-1000TA.** Transistor FM multiplex stereo tuner/amplifier. 88-108 Mc/s. Sensitivity 2  $\mu$ V. SN better than 60 dB. Aerial input 300 ohms balanced. Automatic mono/stereo switching. Inputs: mag pickup 2.8 mV 45K, ceramic pickup 87 mV 100K, tape head 1.8 mV 130K, tape monitor 225 mV 200K, aux 225 mV 200K. Controls: bass +16 dB, -18 dB at 50 c/s, treble +14 dB, -11 dB at 10 Kc/s, low filter -7 dB at 50 c/s, high filter -14 dB at 10 Kc/s. Output: 40W RMS each channel. FR 20 c/s-60 Kc/s  $\pm 1$  dB. HD 0.5% at rated output. Damping factor 30. H and N better than 70 dB. Mains: 115-230V AC. Size:  $16 \times 5\frac{1}{2} \times 13\frac{3}{4}$  in. Weight: 25 lb.

*Price on request.*

● **SX-300T.** Transistor and valve A.M./FM stereo tuner/amplifier. Range: VHF 87-108 Mc/s, MW 187-572 metres. Sensitivity: (FM) 3  $\mu$ V, (AM) 28  $\mu$ V. SN better than 55 dB. Aerial input: (FM) 300 ohms balanced. Ferrite aerial for AM with provision for external wire. Output: 12.5W RMS per channel. HD <1% at rated output. FR 20 c/s-20 Kc/s  $\pm 3$  dB. Damping factor: 25. Controls: bass  $\pm 14$  dB at 50 c/s, treble +9 dB -12 dB at 10 Kc/s. 41 transistors, 12 valves. *Price on request.*



SANSUI. Technical Ceramic Ltd., (Sonotone), Building 102, Cheney Manor Estate, Swindon, Wilts.

● **Sansui 220.** AM/FM tuner and stereo amplifier. Range: VHF 88-108 Mc/s, MW 186-560 metres, SW 30-86 metres. Variable tuning. Ratio detector. Magic eye. Sensitivity: 2.5  $\mu$ V for 20 dB. Aerial input: 300 ohms balanced. No decoder available. Inputs: tape mon 660 mV 500K, tape rec 660 mV 500K, PU 3 mV 50K, aux 150 mV 2.2 megohms. Noise level: -70 dB. Controls: volume, treble cut and boost, bass cut and boost, balance, function, speakers on-off, noise

filter, loudness, tape mon, mode, AFC on-off. Output: 11W per channel. HD 1.5% at 8W per channel. FR 30 c/s-20 Kc/s  $\pm 2$  dB. Output impedance: 8 or 16 ohms. AC mains. Size:  $17\frac{3}{8} \times 12\frac{3}{8} \times 5\frac{1}{4}$  in. Price to be announced.

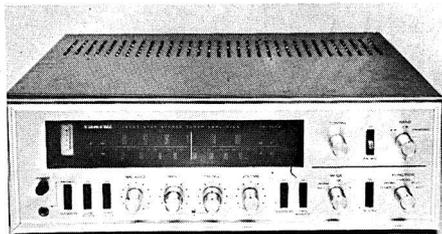
● **Sansui 250.** AM/FM stereo tuner/amplifier. Range: VHF 88-108 Mc/s, MW 186-560 metres. Variable flywheel tuning. Ratio detector. Magic eye. Sensitivity: 2.5  $\mu$ V for 20 dB. Aerial input: 300 ohms balanced. Switchable AFC. Stereo decoder fitted. Inputs: tape mon 660 mV 500K, tape rec 660 mV 500K, PU 3 mV 50K, aux 150 mV 2.2 megohms. Noise level -70 dB. Controls: volume, balance, bass boost and cut, treble boost and cut, tuning, input selector, speakers on-off, noise filter, loudness, tape mon, mode, AFC. Valves and transistors. Output: 11W per channel. HD 1.5% at 8W per channel. FR 30 c/s-20 Kc/s  $\pm 2$  dB. Output impedance: 8 or 16 ohms. Size:  $17\frac{3}{8} \times 12\frac{3}{8} \times 5\frac{1}{4}$  in. Price to be announced.

● **Sansui 500A.** AM/FM stereo tuner/amplifier. Range: VHF 88-108 Mc/s, MW 186-560 metres. Variable tuning. Ratio detector. Meter indicator. Sensitivity: 1.8  $\mu$ V for 20 dB. Aerial input: 300 ohms balanced. Stereo decoder fitted. Switchable AFC. Stereo indicator. Quiet tuning. Built-in AM ferrite aerial. Inputs: PU (mag) 2.5 mV 50K, tape head 2 mV 250K, aux 180 mV 250K, tape mon 150 mV 250K, tape rec 180 mV 250K. Noise level: -70-75 dB. Controls: bass boost and cut, treble boost and cut, balance, volume, tuning, wavechange, selector, speakers on-off, low-pass filter, high-pass filter, loudness, tape monitor, mode, muting, AFC. Output: 25W per channel. HD 1% at 20W per channel. FR 20 c/s-20 Kc/s  $\pm 1.5$  dB. Output impedance: 8 and 16 ohms. Transistors and valves. Size:  $18\frac{3}{8} \times 15 \times 5\frac{3}{8}$  in. Price to be announced.

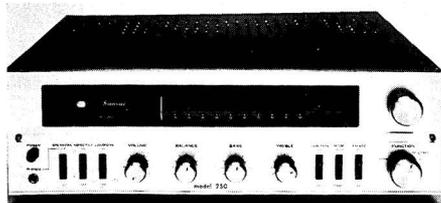
● **Sansui TR707A.** Solid-state AM/FM stereo tuner/amplifier. Range: VHF 88-108 Mc/s, MW 186-560 metres. Variable tuning. FM ratio detector. Meter tuning indicator. Sensitivity: 1.8  $\mu$ V for 20 dB. Aerial input 300 ohms balanced. Stereo decoder fitted. Switchable AFC. Stereo indicator. Quiet tuning control. Built-in ferrite AM aerial. Inputs: PU (mag) 2.4 mV 50K, PU (crystal) 50 mV 100K, tape head 2 mV 50K, mic 2.3 mV 50K, record 90 mV 100K, monitor 90 mV 100K, aux 360 mV 100K. Noise level -70 dB. Controls: balance, bass (independent or ganged left and right channels) cut and boost, treble (independent or ganged left and right channels) cut and boost, volume, tuning, wavechange, mode, selector, speakers on-off, low-pass filter, high-pass filter, loudness, tape monitor, AFC, muting. Transistors. Output: 25W RMS per



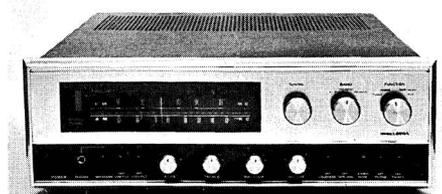
Sansui 3000



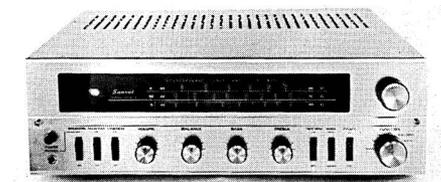
Sansui TR70A



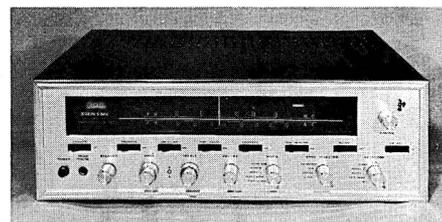
Sansui 250



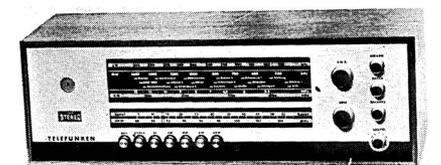
Sansui 500A



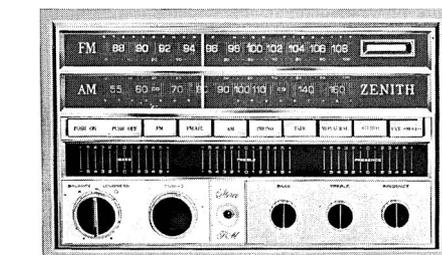
Sansui 220



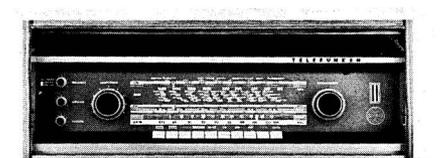
Sansui 1000A



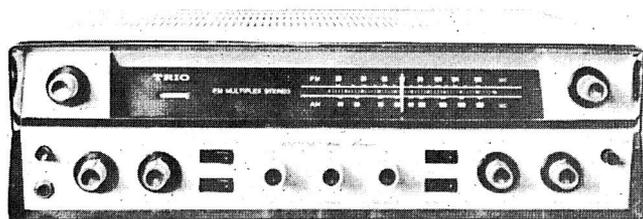
Telefunken Operette



Zenith AM/FM tuner/amplifier



Telefunken Opus



Trio WX 400U

channel. HD 1% at 18W per channel. Output impedance: 8-32 ohms. FR 20 c/s-20 Kc/s  $\pm 1$  dB. Size:  $17\frac{7}{8} \times 14\frac{1}{4} \times 5\frac{1}{2}$  in. Price to be announced.

● **Sansui 1000A.** AM/FM stereo tuner/amplifier. Range: VHF 88-108 Mc/s, MW 186-560 metres. Variable tuning. FM ratio detector. Meter tuning indicator. Sensitivity: 1-0  $\mu$ V for 20 dB. Aerial input 300 ohms balanced. Stereo decoder fitted. Switchable AFC. Stereo indicator. Quiet tuning control. Internal ferrite AM aerial. Inputs: mic 1.8 mV 50K, tape head 1.5 mV 50K, PU(1) 0.5 mV, PU(2) 1.5 mV 50K, aux(1) 65 mV 150K, aux(2) 110 mV 250K, record 65 mV 150K, monitor 65 mV 150K. Controls: balance, bass (independent or ganged left and right channels) cut or boost, treble (independent or ganged left or right channels) cut or boost, volume, mode, wavechange, selector, tuning, speaker on-off, presence, low-pass filter, high-pass filter, loudness, tape monitor, muting, AFC. Output: 50W RMS per channel. HD 1% at 40W per channel. FR 20 c/s-20 Kc/s  $\pm 1$  dB. Output impedance: 8 or 16 ohms. Damping factor 9.5. Size:  $17\frac{7}{8} \times 14\frac{1}{4} \times 5\frac{1}{2}$  in. Price to be announced.

● **Sansui 3000.** AM/FM solid-state stereo tuner/amplifier. Range: VHF 88-108 Mc/s, MW 186-560 metres. Variable tuning. FM ratio detector. Meter tuning indicator. Sensitivity: 1.4  $\mu$ V for 20 dB. Aerial input: 300 ohms balanced. Stereo multiplex decoder fitted. Switchable AFC. Inputs: PU 2.5 mV 50K, tape head 1.8 mV 500K, record 180 mV 250K, tape monitor 150 mV 250K, aux 180 mV 250K. Noise level -75 dB. Controls: tuning, wavechange, selector, balance, bass boost and cut, treble boost and cut, volume, speakers on-off, low-pass filter, high-pass filter, loudness, tape monitor, mode, muting, AFC. Stereo indicator. Quiet tuning. Switchable noise filter. Built-in FM aerial. Output: 55W RMS per channel. HD 0.8% at 40W per channel. FR 20 c/s-20 Kc/s  $\pm 1.5$  dB at 1W. Noise level -70 dB. Output impedance: 4, 8/32 ohms. Damping factor 15. Size:  $18\frac{3}{8} \times 15 \times 6\frac{3}{8}$  in. Price to be announced.



**TANDBERG.** Distributors: Elstone Electronics Ltd., Hereford House, North Court, Vicar Lane, Leeds 2. Tel: Leeds 39834/6. Grams: Elstone, Leeds.

**Huldra 8-55.** AM/FM tuner/amplifier. Range: FM 87.5-108 Mc/s, LW 857-2,000 m, MW 186-590 m, marine 50.9-187 m, SW 13.50-9 m. Variable tuning, one system for FM, one for AM.

Provision for multiplex decoder. Switched AFC. Four movable station markers for FM. 9 Kc/s filter. Variable selectivity on AM. Push-button operation of wavebands and function. Independent bass and treble controls plus six-position tone selector switch. Output: 10W RMS per channel. FR 20 c/s-20 Kc/s (30 c/s-17 Kc/s -3 dB). Input suitable for all pickups including magnetic. Output impedance 4 ohms. Mains: 115, 130, 150, 220, 240V 50/60 c/s. 5 valves, 20 transistors. Printed circuit. Size:  $19\frac{3}{4} \times 8\frac{5}{8} \times 10$  in. Price: (without multiplex decoder) £76 0s. 3d. (U.K. purchase tax £12 3s. 9d.); (with multiplex decoder) £84 3s. 2d. (U.K. purchase tax £13 9s. 10d.).



**TELEFUNKEN.** Distributors: A.E.G. (Great Britain) Ltd., Lonsdale Chambers, 27 Chancery Lane, London, W.C.2. Tel: Chancery 9944. Cables: Welmcors, London.

● **Telefunken Operette.** Transistorised stereo tuner/amplifier. Range (model 2650MX): FM, SW, MW, LW; (model 5650MX): FM up to 108 Mc/s, MW, SW1 (6.8-16 Mc/s), SW2 (2.2-6.9 Mc/s). 25 transistors, 10 diodes, 3 rectifiers. Separate flywheel-powered tuning for AM and FM. Independent bass and treble controls. Balance control. FM stereo decoder with automatic stereo indicator. 15W output. Distortion less than 1%. Sockets for pickup, recorder, external aerial and earth. Size:  $20 \times 7\frac{1}{2} \times 6\frac{3}{4}$  in. Price: £76 18s. 3d. (U.K. purchase tax £13 11s. 5d.).

● **Telefunken Opus Studio.** Stereo tuner/amplifier. Range as for Operette except SW1 6.9-22.5 Mc/s. 19 transistors, 11 diodes, 4 rectifiers, 6 valves. Switchable AFC. Slow motion SW tuning. Separate bass, treble and balance controls. FM stereo decoder with automatic stereo indicator. Sensitivity: <1.0  $\mu$ V for signal-to-noise ratio 26 dB (FM/VHF). Rumble filter. Noise filter. Stereo base adjustment. Automatic noise suppression. 50W output. FR 20 c/s-30 Kc/s  $\pm 3$  dB. Distortion 0.2% at 1 Kc/s. Cabinet: light matt walnut or teak. Size:  $25\frac{1}{2} \times 10\frac{3}{4} \times 10$  in. Price: £107 12s. 7d. (U.K. purchase tax £18 19s. 9d.).



**TRIO.** Distributors: Winter Trading Co. Ltd., 95-99 Ladbroke Grove, London, W.11. Tel: Park 1341. Cables: Winlec, London, W.11.

● **WX400U.** AM/FM. Stereo tuner/amplifier. Wavebands: FM 80-108 Mc/s, AM 187-560 m.

Variable tuning. Neon indicator. Aerial: 75 ohms coaxial. Sensitivity: FM 1.9  $\mu$ V at 98 Mc/s, AM 20  $\mu$ V at 1,000 Kc/s. Multiplex adaptor fitted. AFC. Rumble filter, noise filter, stereo headphone jack. Valves. Inputs: mag PU 3 mV, crystal PU 30 mV, aux 150 mV. Output: 20W (peak) per channel. FR. FM 20 c/s-20 Kc/s, FM Stereo 50 c/s-15 Kc/s. Both  $\pm\frac{1}{2}$  dB. Noise level -10 dB at 10 Kc/s. Imp 0-16 ohms. Mains: 115V/240V AC. Size:  $17\frac{3}{4} \times 5\frac{1}{8} \times 14$  in. Price: £88 6s. (U.K. purchase tax £17 4s. 4d.).

● **W38.** AM/FM. Stereo tuner/amplifier. Wavebands: FM 76-108 Mc/s, MW 187-560 m, SW 27-79 m. Variable tuning. ME. 75 ohms aerial input. Sensitivity: FM 2.6  $\mu$ V at 94 Mc/s, MW 40  $\mu$ V at 1 Mc/s, SW 6  $\mu$ V at 8 Mc/s. Multiplex adaptor available. Loudness control. DC filament heating. Stereo headphone jack. Output: 14W (peak) per channel. FR up to 20 Kc/s  $\pm 0.5$  dB at 500 mW output. Inputs: mag PU 30 mV, aux 4 mV. Output imp 0-16 ohms. Valves. Size:  $18 \times 10\frac{1}{2} \times 5\frac{1}{2}$  in. Price: £71 6s. 3d. (U.K. purchase tax £13 7s. 7d.).

● **KW33L.** AM/FM stereo tuner/amplifier. Wavebands: FM 88-108 Mc/s, AM 187-560 m, 858-2,000 m. Variable tuning. Meter indicator. Foster-Seeley discriminator. Sensitivity: FM 2  $\mu$ V at 98 Mc/s, AM 10  $\mu$ V at 1 Mc/s. Aerial input 75 ohms coaxial. Multiplex decoder fitted. Inputs: mag PU 1.5 mV, crystal PU 20 mV, aux 100 mV. Output: 14W (peak) per channel.

Size:  $16\frac{1}{2} \times 5\frac{7}{8} \times 14$  in. Price: £79 19s. 4d. (U.K. purchase tax £14 16s. 8d.).

● **WE8S.** AM/FM tuner/amplifier. Wavebands: FM 88-108 Mc/s, MW 187-545 m, LW 858-2,000 m. Variable tuning. Foster-Seeley discriminator. ME. Sensitivity: FM 2.5  $\mu$ V, MW 10  $\mu$ V, LW 10  $\mu$ V. Aerial input 75 ohms coaxial. Multiplex adaptor available. AFC. Valves. Controls: volume, balance, bass, treble, selector, tuning, power on-off, stereo/mono. FR 20 c/s-20 Kc/s  $\pm 1$  dB at 500 mW output. Output: 14W (peak) per channel. Output imp 0-16 ohms. Size:  $16\frac{1}{2} \times 5 \times 11$  in. Mains: 110V/220V AC. Price: £43 18s. 1d. (U.K. purchase tax £8 5s. 1d.).



**ZENITH RADIO CORPORATION.** Distributors: United Mercantile Co. Ltd., 13/14 Queen Street, London, W.1. Tel: Grosvenor 4901. Cables: Ramsaco, Telex, London.

● **AM and Stereo/FM tuner/amplifier.** FM/VHF 88-108 Mc/s, MW 187-545 m. Push-button controls. Strip indicator. Separate bass, treble and presence controls. Indicator for stereo broadcasts. Combined loudness and balance control. AFC. 16-transistor amplifier. 120W RMS total output. Price: £159 (U.K. purchase tax £28 1s. 2d.).

# DIRECTORY OF AMPLIFIERS & CONTROL UNITS

★ The following abbreviations are used in this directory section: **HD**=Harmonic Distortion; <=less than; **H** and **N**=Hum and Noise; **Pat**=Power supplies available for tuner; **RMS**=root mean square; **NL**=Noise level; **Sel**=Selector switch; **Psn**=Power supply needed; ●=Stereo equipment.

**ACOUSTICAL MANUFACTURING CO. LTD.**, St Peter's Road, Huntingdon, Hunts. Tel: Huntingdon 2561/2. Cables: Acoustical.

★  
**Quad II Q.C. II control unit.** Inputs: radio, tape 100 mV; mic 1.5 mV; gram to suit pickup. Treble, bass, vol and on/off, filter slope. Switch filter 5, 7, 10 Kc/s and "out". Tape record socket, switched playback socket. **HD** <0.1%. **H** and **N** -70 dB. Size: 10½ × 3½ × 6½ in. To operate with Quad II power amp or similar. Price: £23.

● **Quad 22 control unit.** Inputs: radio/tape 70 mV at 100K; mic 1.5 mV at 100K; pickup dependent on adaptor unit used. Vol. and on/off, bass, treble, filter slope, filter switch 5, 7 and 10 Kc/s. Push-button selection of channels, mono/stereo, and record equalisation. **HD** <0.02%. **H** and **N** -70 dB total. **Pat** 330V 35 mA each tuner; 6.3V 3 amps. Size: 10½ × 3½ × 6 in. Price: £25. To operate with Quad II amplifiers.

**Quad II amplifier.** 15W. Dist total 3rd harmonic and higher. <0.1% at 12W. Input for spec output 1.4V RMS for 15W. Response 20-20,000 c/s ±0.2 dB; 10-50,000 c/s ±0.5 dB. Feedback incorporated in original ultra-linear arrangement. **NL** -80 dB at 15W. Output imp 7 and 15 ohms. Output: KT66's. Original combined anode/screen current circuit. Size: 12½ × 4¾ × 6½ in. To operate with Q.C.II or Q.22 control units. Price: £25.

**Quad 50.** High quality transistor power amplifier primarily intended for professional and industrial use. Input: 500 mV RMS into 22K in parallel with 180 pF for 50W output. Output: 50W RMS. Two models available, one for 4, 9 or 16 ohms load, the other for 50V or 100V line. Outputs in both cases are isolated. Damping factor 10. Total harmonic distortion <0.25% at any level up to 50W output at 700 c/s. Hum -83 dB. Consumption: 24-120W depending on power output. Mains: 100-127V or 200-250V

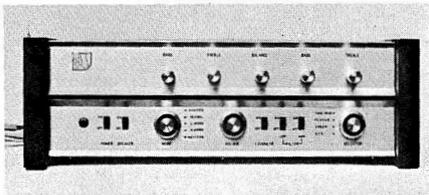
50-60 c/s to order. Size: 12¾ × 6½ × 4¾ in. Weight: 24 lb. This amplifier is not suitable for use with the Quad 22 control unit.

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**AKAI.** Distributors: Pullin Photographic Ltd., 11 Aintree Road, Perivale, Greenford, Middlesex. Tel: Alperton 1541. Cables: Pullinfoto, Greenford, Middlesex.

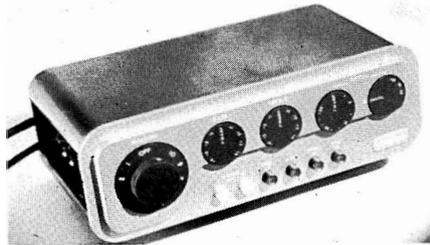
● **Akai AA-5000.** Integrated stereo transistor amplifier. Inputs: tape 1.5 mV, pickup 3 mV, radio 400 mV, aux 400 mV, tape monitor 400 mV. FR 20 c/s-35 Kc/s ±1 dB. Bass control: ±14 dB at 50 c/s. Treble control: ±11 dB at 10 Kc/s. Low filter: -8 dB at 50 c/s. High filter -8 dB at 10 Kc/s. Loudness control: +8 dB at 100 c/s and +8 dB at 10 Kc/s. Output: 35W RMS per channel into 8 ohms, 23W RMS per channel into 16 ohms. Distortion 1% at 1 Kc/s at rated load. Noise level -90 dB. 28 transistors, 6 diodes, 3 thermistors. Mains: 100/117 or 210/220/240V AC 50/60 c/s. Size: 17 × 5¾ × 10½ in. Weight: 17½ lb. Price: £78 15s.

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**ARMSTRONG AUDIO LTD.**, Warlters Road, Holloway, London, N.7. Tel: North 3213/4.

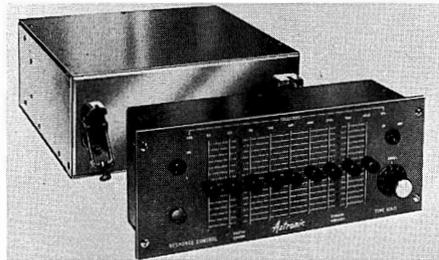
● **Model 421.** Integrated stereo transistor amplifier. Inputs: PU(1) 60 mV 100K, PU(2) 3.5 mV 50K, radio 100 mV 100K, tape play 400 mV 100K. Noise level: PU -55 dB, radio -60 dB, tape -70 dB. Controls: balance (maximum to zero each channel), bass ±10 dB, treble ±10 dB, loudness (two different volume levels with loudness contours at low level), rumble filter -5 dB at 30 c/s, treble filter(1) 6.5 Kc/s -3 dB, 10 Kc/s -25 dB, treble filter(2) 4.5 Kc/s -3 dB, 9 Kc/s -40 dB. Output: 15W RMS per channel. Output impedance: 4-16 ohms. Output transistors: AL102. FR 20 c/s-20 Kc/s -1 dB at 15W RMS. Mains: 100-125V and 200-250V AC. Size: 10¾ × 10½ × 4 in. Price: £42 15s.



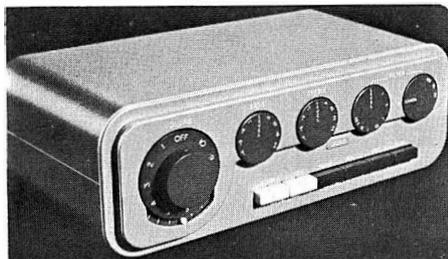
*Akai AA-5000 integrated amplifier*



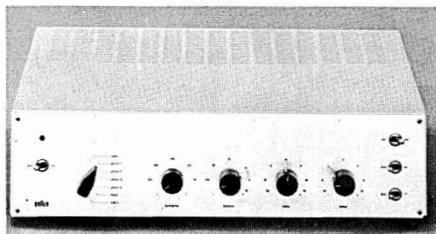
*Quad Q.C.II control unit*



*Astronic A1671 Response Unit*



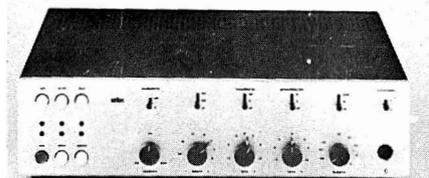
*Quad 22 stereo control unit*



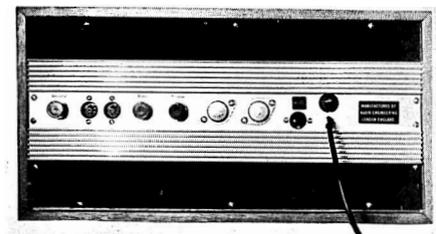
*Braun CSV13/60 integrated stereo amplifier*



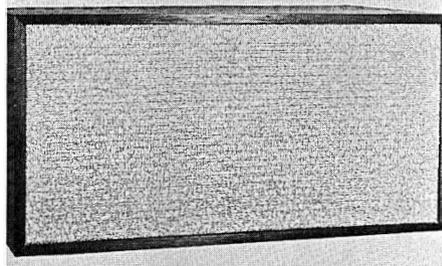
*Quad II power amplifier*



*Braun CSV1000 integrated stereo amplifier*



*Audio Engineering QL4 (rear view)*



*Audio Engineering QL4 (front view)*

**ASSOCIATED ELECTRONIC ENGINEERS LTD.**, 10 Dalston Gardens, Stanmore, Middx. Tel: Wordsworth 4474/5/6. Cables: Astronic, Stanmore.

**Astronic A1646 Response Control Unit.** Input 700 mV at 600 ohms, output 700 mV at 600 ohms. Response in flat position 20 c/s-20 Kc/s. Each octave independently variable from +13 dB to -12 dB. Size: 20×8×13 in. Price: £88.

**Astronic A1671 Response Control Unit.** Designed for professional users. Incorporates silicon planar transistors throughout. Input impedance: 600 ohms (standard model). Sensitivity: 0 dBm (0.77V). Output similar. Maximum output level for 1% distortion 7.5V (+20 dBm overload). HD (including noise) 0.3% at 0 dBm. Nine response selector slide switches (standard model) each with seven lift positions and seven cut positions (2 dB steps). With nine controls in zero position response is ±0.25 dB 20 c/s-20 Kc/s. Mains: 200-250V 40-60 c/s. Cabinet or rack mounting versions. Size (control unit only): 10×4×3½ in., (amplifier) additional 9 in. deep. Weight: 12 lb. Various specifications and accessories available for special requirements. Prices: £120-£145 approximately.



**AUDIO ENGINEERING LTD.**, 33 Endell Street, London, W.C.2. Tel: Temple Bar 0033.

**QL.4 Music Monitor.** Neat bookcase speaker with 30W transistor amplifier built-in. Developed from portable monitor unit designed for the B.B.C. Inputs: radio, pickup, tape, etc. Controls: volume, bass, treble, room acoustics compensator. Outlet for extn speaker. Mains powered. Easily replaced speaker grille material. Size: 15×7½×8½ in. Full details and specification on request. Price: £40 19s.



**BRADMATIC LTD.**, 338 Aldridge Road, Streetly, Sutton Coldfield, Warwickshire. Tel: Streetly 3171.

**MA30.** Transistor power amplifier. Output: 21.5V RMS which will provide 30W approximately into 15 ohms load. Distortion: <0.5% at 15W at 1 Kc/s, <1.0% at 30W at 1 Kc/s. FR 10 c/s-17.5 Kc/s ±3 dB. AC and DC feedback. Noise level: -72.5 dB. Inputs: 100 mV at 10K, 5 mV at 10K. Output impedance: 12 ohms or above. Power supply needed: 35V balanced at 1.5A (52W) at 30W output. Designed to operate with most control units. Size: 7×4×4

in. Weight: 3¼ lb. Price (MA30 amplifier): £14; (PP30X2 power unit, sufficient for two MA30 amplifiers): £11; (MA30PP amplifier and power unit on one chassis): £24.

**BRAUN AG.** Distributors: Fi-Cord International, Charlwoods Road, East Grinstead, Sussex. Tel: East Grinstead 21351.

● **CSV 13.** Integrated stereo valve amplifier. Output: 12W. Distortion less than 0.5% at 12W. Response 20 c/s-30 Kc/s ±3 dB (±0.5 dB 40 c/s-15 Kc/s). Inputs: mag PU-1.5 mV, crystal PU 3 mV, mic 10 mV, radio 200 mV, tape 200 mV. Output imp 4, 8, 15 ohms and electrostatic. Mains: 110-240V AC. Size: 16×12½×4 in. Price: £95 10s.

● **CSV 60.** Integrated stereo valve amplifier. Output: 30W. Distortion 0.8% for 30W at 1 Kc/s. FR 20 c/s-30 Kc/s ±3 dB (±1 dB 40 c/s-15 Kc/s). Inputs: mag PU 1.5 mV, crystal PU 3 mV, mic 10 mV, radio 200 mV, tape 200 mV. Output imp 4, 8, 16 ohms and electrostatic. Mains: 110-240V AC. Size: 16×12½×4 in. Price: £120 15s.

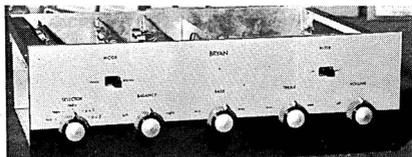
● **CSV 250.** Integrated stereo transistor amplifier. Inputs: radio, mag pickup, tape, aux. Controls: volume, treble, bass, balance, stereo/mono switch, PB tape control. Output: 15W RMS per channel. Distortion: <0.5% at 1 Kc/s. Cross talk damping: >40 dB at 1 Kc/s. Noise level: 70 dB. Output impedance: 4 ohms. Finish: grey wrinkle steel case with aluminium front panel. Size: 10×4×12½ in. Price: £89 5s. 6d.

● **CSV 1000.** Integrated stereo amplifier. All transistor. 55W RMS output per channel. FR 20 c/s-30 Kc/s. Distortion <0.3% at 1 Kc/s. 45 silicon transistors, 13 silicon diodes, 2 zener diodes, 1 silicon rectifier. Five inputs with adjustable sensitivities. CCIR equalisation. Output impedance 4-16 ohms. Black steel cabinet with aluminium front panel. Size: 16×4½×13½ in. Price: £294.



**BRYAN AMPLIFIERS LTD.**, 120 Ashley Road, Hale, Altrincham, Cheshire. Tel: Altrincham 6026.

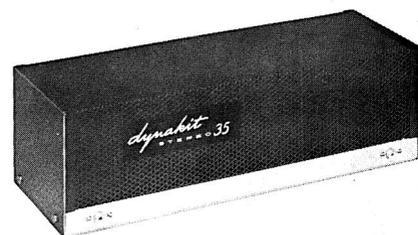
● **Model 900.** Integrated transistor stereo amplifier. Output: 10W RMS each channel. Controls: five-position input selector, mono-stereo mode switch, balance, bass, treble, 7 Kc/s filter, volume and on-off. Size: 13×10×4¼ in. Shelf-mounting teak cabinet available. Guaranteed for two years. Price: (chassis version) £36.



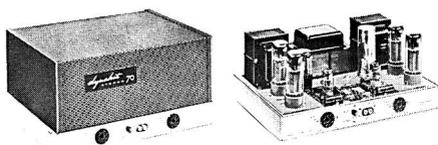
*Bryan 900*



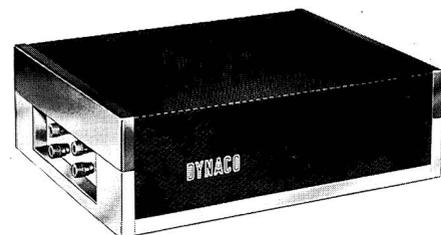
*Bryan 3000*



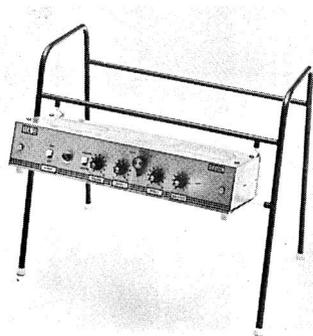
*Dynaco ST 35 stereo amplifier*



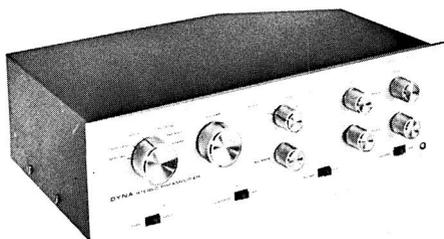
*Dynaco ST 70 mono/stereo amplifier*



*Dynaco Stereo 120*



*Decca TSA 33*



*Dynaco PAS 3 (or PAS 2) stereo pre-amplifier*



*Eagle SA100*



*Eagle SA 80 stereo amplifier*

● **Model 3000.** Integrated transistor stereo amplifier. Inputs: PU (mag) 3 mV 50K, PU (ceramic) 40 mV 100K, radio, tape, aux 75 mV 50K. Controls: input selector, mono/stereo mode switch, bass, treble, balance, high-pass filter (25 c/s and 70 c/s), low-pass filter (4, 6 and 9 Kc/s at 8 dB/octave). H and N -70 dB. Output: 13W RMS per channel. Feedback: 60 dB. FR 40 c/s-30 Kc/s  $\pm 1$  dB. HD <0.25% at 10W. Finish: shelf-mounting teak cabinet. Guaranteed five years. Price: £56 15s.

● **Model 9000.** Integrated transistor stereo amplifier. Output: 10W RMS per channel. Full range of controls and facilities. Guaranteed two years. Finish: shelf-mounting teak cabinet. Full specification on request. Price: £48 10s.



**CHAPMAN.** See Derritron Ltd.



**DECCA SPECIAL PRODUCTS,** Decca Radio and Television Division of the Decca Record Co. Ltd., Ingate Place, Queenstown Road, London, S.W.8. Tel: Macaulay 6677.

● **TSA33 Amplifier Mk II.** Transistorised integrated stereo amplifier. Inputs for PU, tape and radio. 90 mV on all inputs for 3W output each channel. Controls: selector, on/off, volume, balance, bass (+12 dB and -5 dB at 40 c/s relative to 1 Kc/s), treble (+8 dB and -13 dB at 12 Kc/s relative to 1 Kc/s). Noise level -50 dB. Output imp 15 ohms. Mains 200-250V in 10V steps. 50 c/s. Special stand available to carry DD1 or AT6/1 playing desk with Mk II amplifier below. Price: (amplifier) £26 5s.; (stand) £3 11s. 5d. (U.K. purchase tax 12s. 7d.).



**DERRITRON RADIO LTD.,** Chapman Division, 24 Upper Brook Street, London, W.1. Tel: Hyde Park 2291.

● **Chapman integrated 310 stereo amplifier.** Inputs: gram 5 mV, 100K (RIAA); radio, aux. 100 mV, 250K flat; tape 50 mV, 100K flat. Controls: bass, treble, function, balance, vol., filter, press-button sel. Filters: low-pass, 5, 10, 20 Kc/s at 12 dB octave. Response ( $\pm 0.5$  dB) 36 c/s-20 Kc/s including filters at 1W level, 25 c/s-25 Kc/s without filters. H and N (main amp) -75 dB; (radio, tape, aux) -60 dB; (gram) -50 dB. Psn 200-250V 50 c/s. Output 10W per channel. HD less than 0.1% at 1 Kc/s, intermodulation less than 1%. Feedback 15 dB. Out-

put imp 3 or 15 ohms. Output: 4  $\times$  ECL86. Size: 14 $\frac{1}{2}$   $\times$  5 $\frac{1}{2}$   $\times$  9 $\frac{1}{2}$  in. Free-standing. Fully tropicalised. Price: £48.



**CORAL.** Distributors: Denham and Morley Ltd., Denmore House, 173/5 Cleveland Street, London, W.1. Tel: Euston 3656/7.

● **Coral A-707.** All-transistor integrated stereo amplifier. Inputs: tape head 1.5 mV, PU 3 mV, tuner 400 mV, aux 400 mV, tape monitor 400 mV. Controls: bass  $\pm 14$  dB at 50 c/s, treble  $\pm 11$  dB at 10 Kc/s, low-pass filter -8 dB at 50 c/s, high-pass filter -8 dB at 10 Kc/s, loudness +8 dB at 100 c/s and 10 Kc/s, volume, balance. Output: 40W RMS per channel into 4 ohms, 35W per channel into 8 ohms, 23W per channel into 16 ohms. HD 1% at 1 Kc/s at rated output. FR 20 c/s-35 Kc/s  $\pm 1$  dB at 8 ohms. Noise level: below 30  $\mu$ V on high gain inputs, below 15  $\mu$ V on low gain inputs. Output impedance: 4-16 ohms. Mains: 100-117V AC, 220-240V AC. Consumption: 17W at no-signal, 160W at full output. Size: 15  $\times$  11 $\frac{1}{8}$   $\times$  5 $\frac{1}{4}$  in. Weight: 19 lb. Price: £78 15s.



**CROWN INTERNATIONAL.** Distributors: Carston Electronics Ltd., 71 Oakley Road, Chinnor, Oxon. Tel: Kingston Blount (OTH45) 8561.

● **Crown International SA.30-30.** Transistorised stereo power amplifier. Output: 20W RMS per channel. HD <0.2% at 20W. FR 20 c/s-20 Kc/s. 0.1 dB at full output. Feedback: about 50 dB at 100 c/s. H and N 80 dB down. Input: 0.6V for rated output. Impedance: 4, 8 or 16 ohms output. Silicon power transistors. Mains: 117 60 c/s, 230V 50 c/s. Size: 19  $\times$  8 $\frac{1}{2}$   $\times$  1 $\frac{1}{4}$  in. Weight: 7 $\frac{1}{2}$  lb. Designed to operate with any make of hi-fi control unit. Price: £74 plus import duty.



**DUAL ELECTRONICS LTD.,** Radnor House, London Road, Norbury, S.W.16. Tel: 01-764 9465/6.

● **Dual CV.4** Fully transistorised integrated amplifier and control unit. Output: 16W RMS each channel. Impedance: 15 ohms. Inputs: PU (mag), PU (crystal), tape, mic, radio aux. HD <1% at rated output. FR 20 c/s-20 Kc/s  $\pm 1.5$  dB. Controls: bass  $\pm 17$  dB at 40 c/s, treble  $\pm 17$  dB at 16 Kc/s, tone-contoured volume, balance  $\pm 12$  dB, mode switch, input

selector, on-off. Signal-to-noise: > 50 dB. Mains: 110, 125, 220, 240V AC. Consumption: 80W approx. Size:  $16\frac{1}{2} \times 11\frac{1}{2} \times 4\frac{1}{4}$  in. Weight:  $14\frac{1}{4}$  lb. Finish: shelf-mounting case in walnut veneer. Full specification on request. Price: £54 12s.

● **Dual CV.12.** Fully transistorised integrated amplifier and control unit. Output: 8W RMS each channel. Impedance: 15 ohms. Inputs: tape, radio, PU, mic. Full specification on request. Price: £35 14s.



**DYNACO.** Distributors: Howland-West Ltd., 2 Park End, South Hill Park, London, N.W.3. Tel: Swiss Cottage 6666.

● **PAS-2.** Stereo valve pre-amplifier. Inputs: PU RIAA. 1.45 mV, tape NAB 2.7 mV, special (optional for second PU, tape or mic) 1.75 mV. FM multiplex, radio, auxilliary. Output: 2V. Controls: selector, volume, balance, blend (mono-stereo), separate bass and treble for each channel, tape monitor, loudness, HF filter, on/off. Noise 70-74 dB below level of 10 mV cartridge. Mains power unit. Suitable for use with ST35, ST70 or any other power amplifier. Size:  $13\frac{1}{2} \times 4\frac{1}{4} \times 8$  in. Price: (assembled) £40 19s.; (kit) £34 13s.

● **PAS-3.** Similar to PAS-2 but with de luxe finish brass panel and knobs. Price: (assembled) £45 3s.; (kit) £38 17s.

● **SCA-35.** Integrated mono/stereo valve amplifier. Seven pairs of inputs covering high and low-level PU (50K), tape head NAB 100K, radio, tape and auxilliary. Controls: selector, volume, balance, bass, treble, stereo-mono switch, loudness switch, HF filter switch, on/off switch. Output:  $17\frac{1}{2}$ W per channel. Distortion: less than 1% over whole range  $\pm 0.25$  dB of  $17\frac{1}{2}$ W per channel. FR 20 c/s-20 Kc/s  $\pm 0.25$  dB. Noise: 70 dB below 10 mV input on low-level inputs, 80 dB below on high-level inputs. Output imp 8 and 16 ohms and centre channel. Mains supply. Size:  $13\frac{1}{2} \times 4\frac{1}{4} \times 10$  in. Price: (assembled) £59 17s.; (kit) £52 10s.

● **ST-35.** Stereo valve main amplifier. Output:  $17\frac{1}{2}$ W per channel. FR 10 c/s-40 Kc/s  $\pm 1$  dB. Distortion: less than 1% from 20 c/s-20 Kc/s within 1 dB of  $17\frac{1}{2}$ W each channel. Noise: more than 80 dB below. Input voltage for  $17\frac{1}{2}$ W output, 1V. Output imp 8 and 16 ohms. Suitable for use with pre-amplifiers PAS-2, PAS-3 or any similar units. Size:  $13 \times 5\frac{1}{2} \times 4$  in. Price: (assembled) £40 19s.; (kit) £34 13s.

● **ST-70.** Stereo valve main amplifier. 35W per channel. FR 10 c/s-40 Kc/s  $\pm 0.5$  dB. Distortion less than 1% from 20 c/s-20 Kc/s within 1 dB of 35W output per channel. Noise more than 90 dB below 35W on each channel. Input voltage for 35W output, 1.3V. Output imp 4, 8 and 16 ohms. Mains power unit. Size:  $13 \times 9\frac{1}{2} \times 6\frac{1}{2}$  in. To operate with PAS-2, PAS-3 or any other similar pre-amplifier. Price: (assembled) £59 17s.; (kit) £52 10s.

● **Stereo 120.** Transistor stereo power amplifier. Output: 35W RMS per channel. HD less than 0.25% up to 60W 20 c/s-20 Kc/s. FR 5 c/s-100 Kc/s  $\pm 0.5$  dB. Noise: 95 dB below stated output (unweighted). Input: 1.5V for stated output. Output impedance: 4-16 ohms. Output transistors: selected RCA 2N3055. Mains: 220-240V AC. Size:  $13 \times 10\frac{1}{2} \times 4$  in. Designed for use with Dynaco PAS3X or any other similar high quality stereo control unit. Price: (kit) £78 15s.; (assembled) £94 10s.



**EAGLE PRODUCTS.** Distributors: B. Adler & Sons (Radio) Ltd., 32a Coptic Street, London, W.C.1. Tel: Museum 9606/7. Cables: Reildab, London.

● **SA.80N.** Integrated stereo amplifier. Output: 4W RMS per channel. FR 60 c/s-15 Kc/s  $\pm 1$  dB. HD < 3%. HN - 52 dB. Inputs: PU 100 mV 250K, radio 100 mV. Size:  $9\frac{3}{4} \times 6\frac{1}{4} \times 3$  in. Weight: 5 lb. Price: £12 12s.

● **SA.100.** Integrated stereo amplifier. Output: 5W RMS per channel. FR 40 c/s-20 Kc/s  $\pm 1$  dB. HD < 1% at full output. HN - 58 dB. Inputs: PU 300 mV, radio 300 mV, aux 300 mV. Separation at 1 Kc/s better than 40 dB. Controls: input selector, mode, left channel volume, right channel volume, left channel tone (-14 dB at 10 Kc/s), right channel tone (-14 dB at 10 Kc/s), on-off switch. Output imp 4, 8, 16 ohms each channel. Mains: 240V AC. Size:  $9\frac{1}{4} \times 4\frac{1}{2} \times 7$  in. Price: £18.

● **SA.200.** Integrated stereo amplifier. Inputs: mag PU 5 mV, crystal PU 100 mV, radio 100 mV, tape 5 mV, mic 5 mV. Output: 7.5W per channel. Controls: selector, mode, volume, bass, treble, loudness, speaker/phones, on/off. Distortion less than 1% at 15W 1 Kc/s, less than 0.25% at 1W 1 Kc/s. FR 50 c/s-20 Kc/s  $\pm 2$  dB. Output imp 4, 8, 16 ohms. Valves. Size:  $12\frac{1}{4} \times 4\frac{3}{4} \times 8\frac{1}{4}$  in. Price: £27 15s.

● **TSA.10.** Integrated transistor stereo amplifier. Output: 5W RMS per channel. FR 50 c/s-

20 Kc/s  $\pm 2$  dB. Inputs: PU 80 mV, radio 80 mV. SN  $< 50$  dB at rated output. Controls: separate volume controls each channel, separate bass and treble controls, on-off switch. Crosstalk better than  $-45$  dB. HD  $< 1\%$  at 3W. Output imp 4-16 ohms. Mains: 240V AC. Price: £13 19s. 6d.

● **TSA.20.** Integrated transistor stereo amplifier. Output: 10W RMS per channel at 8 ohms, 20W RMS per channel at 3 ohms. FR 30 c/s-20 Kc/s  $\pm 2$  dB. HD  $< 1\%$  at 5W. Output imp 4-16 ohms. Inputs: PU (mag) 3 mV (RIAA), PU (cer/crystal) 100 mV (RIAA), radio 150 mV, aux 250 mV. SN better than 50 dB (mag PU), better than 60 dB (aux). Crosstalk better than  $-45$  dB. 12 transistors, two diodes. Silicon transistors in pre-amplifier. Size:  $10 \times 4\frac{1}{2} \times 8\frac{1}{2}$  in. Price: £24 10s.



**ELIZABETHAN ELECTRONICS LTD.**, Crow Lane, Romford, Essex. Tel: Romford 64101. Cables: Elizabethan, Romford.

● **Elizabethan Princess.** Transistor integrated amplifier. Inputs: pickup (1) 3.5 mV 47K, pickup (2) 35 mV 47K, radio 100 mV 250K, tape 2.5 mV 47K. Controls: volume, balance, treble, bass, low pass filter, rumble filter. Output: 10W RMS per channel. HD 0.25%. FR 25 c/s-20 Kc/s at 10W output. Output transistors AD149. Output impedance 15 ohms. Size:  $15 \times 7 \times 4\frac{1}{2}$  in. Price: £40 19s.



**ELSTONE ELECTRONICS LTD.**, Herford House, North Court, Vicar Lane, Leeds 2. Tel: Leeds 39834/6.

● **Stereo WAL Gain.** Transistorised stereo pre-amplifier. To match pickups, tape or mic, at 50,000 at 3,500 ohms. Battery life 1,000 hrs. Size:  $7 \times 2\frac{1}{8} \times 2\frac{1}{2}$  in. Price: £7 10s.

**WAL Gain.** Impedance matching transistor pre-amp, battery operated (3,000-hour life). Noise and distortion too low to measure, gain better than 100. Suitable for use with low output pu or for direct connection to tape head, mic, etc. Size:  $3\frac{3}{8} \times 2\frac{1}{8} \times 2\frac{1}{8}$  in. Price: £5 10s.



**FERGUSON.** British Radio Corporation Ltd., 284 Southbury Road, Enfield, Middlesex. Tel: Howard 2477.

● **Ferguson 201SA.** Transistor stereo amplifier and control unit. Designed to match Ferguson

Unit Audio system. 18 transistors, two diodes. Inputs: PU 20 mV, radio 40 mV 8K, tape 110 mV 60K. Controls: selector, mode, treble +6 dB at 10 Kc/s  $-12$  dB at 12 Kc/s, bass +30 dB  $-8$  dB at 40 c/s, volume (bass compensated), mains on-off, pickup balance (on rear panel). Output: 7W per channel. HD  $< 1\%$  at rated output. FR 30 c/s-20 Kc/s  $\pm 3$  dB. Noise level:  $-50$  dB at 5W. Output impedance: 8 ohms. Two mains outlet sockets. Mains: 200-250V AC 50 c/s. Consumption: 15W. Size:  $15\frac{1}{2}$  in. wide,  $8\frac{1}{2}$  in. deep ( $8\frac{1}{2}$  in. overall),  $5\frac{1}{4}$  in. high. Finish: Queensland walnut veneer. Price: £27 6s.



**FISHER RADIO CORPORATION**, Long Island City 1, New York, U.S.A. Distributors: Getz Bros. and Co. Inc., 2 Harewood Place, London, W.1. Tel: Grosvenor 6901.

● **X100-A.** Integrated stereo amplifier. 20W per channel. HD 0.8%. Response 20 c/s-20 Kc/s  $\pm 1$  dB. NL better than  $-90$  dB with vol control at minimum. Inputs for mono and stereo pu, tape head, tuner, aux, tape monitor. High-pass filter. Independent tone controls for each channel. Output stages EL184s. Psn 200-240V AC. Price (in chassis form): £57 15s. Also available in cabinet form.

● **X101-C.** Integrated stereo amplifier. 27W RMS per channel. HD 0.5% at 15W. Response 20 c/s-20 Kc/s  $\pm 1$  dB. Feedback 20 dB. Damping factor 10. H and N  $-60$  dB on pickup,  $-80$  dB radio. Filter  $-10$  dB at 10 Kc/s. Bass control  $\pm 22$  dB at 50 c/s. Treble control  $\pm 20$  dB at 10 Kc/s. 10 valves. Output stages: two 7591 push-pull each channel. Hinged control panel covers less frequently used controls. Centre channel for third speaker. Push-button programme selector. Size:  $15\frac{1}{8} \times 11\frac{7}{8} \times 4\frac{3}{8}$  in. Weight 26 lb. Price: £71 8s.

● **TX300.** Transistorised stereo amplifier. 31 transistors, 4 diodes and 1 selenium rectifier. 36W RMS per channel. Distortion 0.5% at rated output. Hum and noise  $-86$  dB below rated output. Response 20 c/s-25 Kc/s  $\pm 1$  dB. 200-250V AC. Size:  $15\frac{1}{8} \times 4\frac{3}{8} \times 11\frac{7}{8}$  in. Weight: 24 lb. Price: £141 15s.

● **Spacexpander K-10.** Reverberation amplifier for use with radió, records or tape. Mono or stereo. 3 valves, single control. Price: £29 8s.

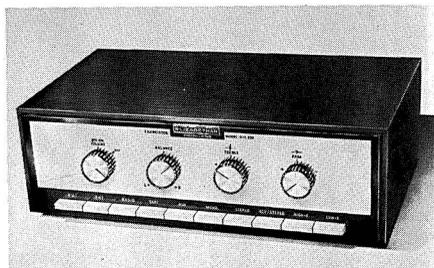


**A. R. FRANKLIN**, Audio Engineer, 41 Camden Mews, London, N.W.1. Tel: Gulliver 2340.

● **Integrated amplifier.** All-transistor integrated



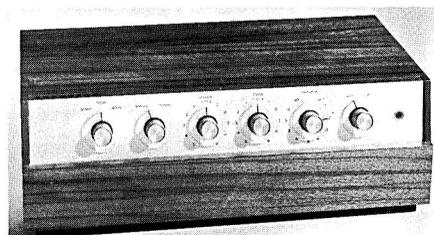
*Howland-West Dynaco SCA-35 stereo amplifier*



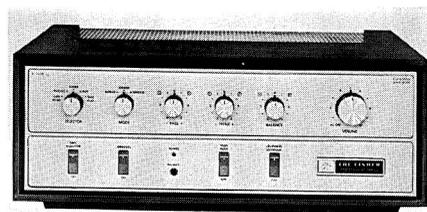
*Elizabethan DIT220 Princess*



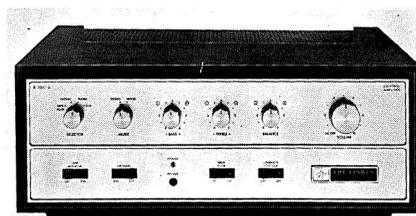
*Goodmans Maxamp*



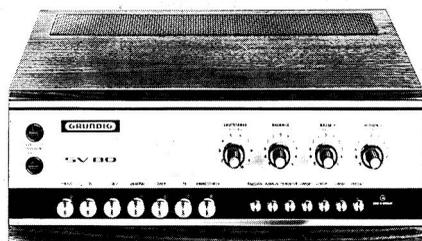
*Ferguson 201SA*



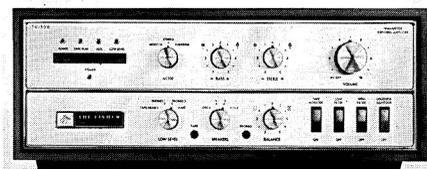
*Fisher X-100-A integrated stereo amplifier*



*Fisher X-101-C 50W stereo amplifier*



*Grundig SV80*



*Fisher TX-300 100W integrated stereo amplifier*

amplifier and control unit. Inputs for all types of sound source. Separate power pack incorporates speaker sockets to permit rear of cabinet mounting. FR 20 c/s-50 Kc/s  $\pm 1$  dB. Output: 12W RMS per channel. Custom built versions to suit individual requirements. Quotations on request.



**GOODMANS LOUDSPEAKERS LTD.**,  
Axiom Works, Wembley, Middx. Tel: 01-902  
1200. Cables: Goodaxiom, Wembley.

● **Maxamp 30.** Integrated stereo transistorised amplifier. Inputs: pickup 3.5 mV 47K or 50 mV 100K, radio 100 mV 100K, tape 150 mV 100K, aux 3 mV 50K. Controls: Input selector, volume, balance, bass, treble, P-B LF filter, P-B HF filter, P-B mono/stereo mode, P-B on/off. Indicator light when on. Output: 30W RMS (15W per channel) into 8 ohm load, 20W RMS (10W per channel) into 4 or 15 ohm load. HD less than 0.3% for 15W per channel into 8 ohm load at 1 Kc/s. FR 20 c/s-20 Kc/s  $\pm \frac{1}{2}$  dB. Output impedance: 4, 8, 15 ohms. High level outlet for tape recorder. Mains: 105, 120, 200, 220, 240V AC 40-60 c/s. Size:  $10\frac{1}{2} \times 5\frac{1}{2} \times 7\frac{1}{4}$  in. Price: £49 10s.



**GRAMPIAN REPRODUCERS LTD.**,  
19 Hanworth Trading Estate, Feltham, Middlesex. Tel: 01-894 9141.

**Grampian 666 Ambiophonic unit.** Enables one to four small speakers to be fed with amplified and delayed signal from main amplifier output. Delay device consists of two parallel springs and transducers as used in Grampian reverberation unit. Provides echoes similar to those produced by room  $32 \times 42$  ft. Volume of delayed signals controllable by listener. Twin high-impedance line-bridging input connections. Output:  $2\frac{1}{2}$ W push-pull power amplifier with 5 ohms and twin 600-ohm outputs. Fully transistorised. Mains: 100-125V or 200-250V. Consumption: 8W. Size:  $18 \times 4\frac{3}{4} \times 5\frac{1}{4}$  in. Weight: 7 lb. Price: £50.



**GRUNDIG (GREAT BRITAIN) LTD.**,  
Newlands Park, Sydenham, London, S.E.26.  
Tel: Sydenham 2211.

● **SV40.** Transistor stereo integrated amplifier and control unit. Inputs: PU 3 mV at 47K, radio/tape 200 mV 470K, aux 200 mV at 1 megohm. Controls: volume, stereo balance,

bass and treble. Output: 15W RMS per channel. Distortion  $< 0.5\%$ . FR 20 c/s-20 Kc/s  $\pm 1$  dB. SN -60 dB at 50 mW, -85 dB at 15W. Output impedance: 4-16 ohms. 25 transistors, 13 diodes. Transformerless output stages. Separation: better than 46 dB. Size:  $16 \times 11 \times 5\frac{3}{8}$  in. Weight:  $17\frac{1}{2}$  lb. Finish: natural matt walnut or teak, with satin aluminium front panel. Price: £77 14s.

● **SV40/M.** Similar specification to SV40 but in metal cabinet.

● **SV80.** Transistor stereo integrated amplifier and control unit. Inputs: mic 7.5 mV at 100K. PU (mag) 4 mV 47K, PU (crystal) 220 mV-3V 1 megohm, radio/tape 250 mV 470K. Controls: volume, stereo balance, bass  $\pm 18$  dB at 30 c/s, treble  $\pm 18$  dB at 15 Kc/s, push-button selector, scratch filter, rumble filter, tape monitoring, slope 1, slope 2, presence. Output: 30W RMS per channel. Distortion  $< 0.5\%$ . Outlets: two speakers 4-16 ohms, two 300-ohm phone sockets. 29 transistors, 15 diodes. Stabilised supply to pre-amplifier stages. Mains: 110, 130, 220, 240V 50-60 c/s. Consumption 120W maximum. FR 20 c/s-20 Kc/s. Size:  $15\frac{3}{8} \times 10\frac{1}{2} \times 6$  in. Finish: light walnut or teak. Price: £97 13s.

● **SV80/M.** Similar specification to SV80 but in metal cabinet.



**HART ELECTRONICS**, 321 Great Western Street, Manchester 14. Tel: Rusholme 2212-3. Cables: Alloys, Manchester.

● **Bailey 20W amplifier.** See Constructional Kits Section f for full details.

● **Dinsdale 10W amplifier.** See Constructional Kits Section f for full details.

**Mullard 10W Pi-mode amplifier.** See Constructional Kits Section for full details.



**HEATHKIT.** See Constructional Kit Section.

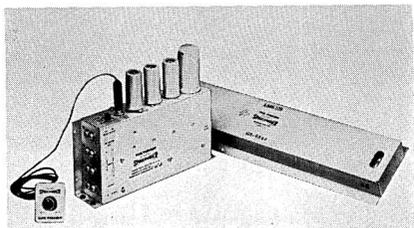


**HENRY'S RADIO LTD.** See Constructional Kits Section.

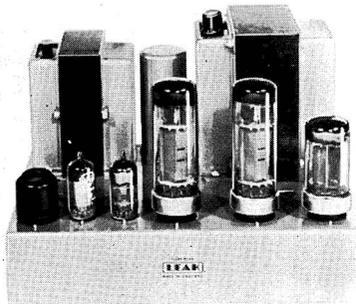


**KERR McCOSH & CO. LTD.**, 435 Sauchiehall Street, Glasgow, C.2. Tel: Douglas 0988.

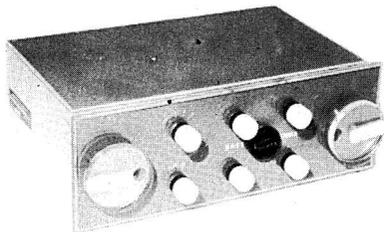
● **DSI stereo control unit.** Inputs: pickup and tape head 4 mV; crystal pickup and tape 140 mV;



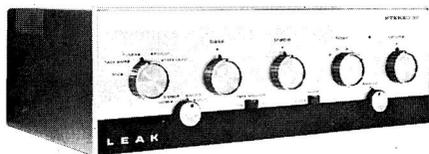
*Fisher K-10 reverberation amplifier*



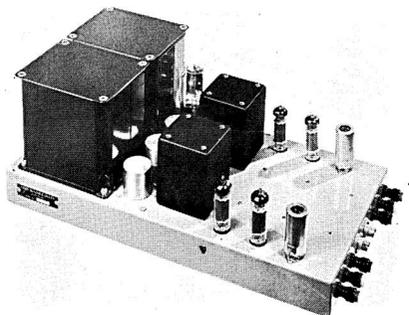
*Leak "Point One" TL/12 plus*



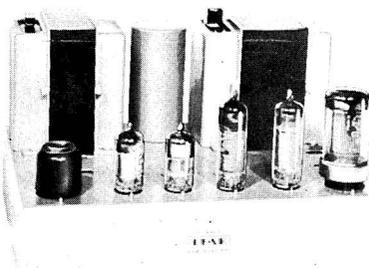
*Kerr, McCosh DSI stereo control unit*



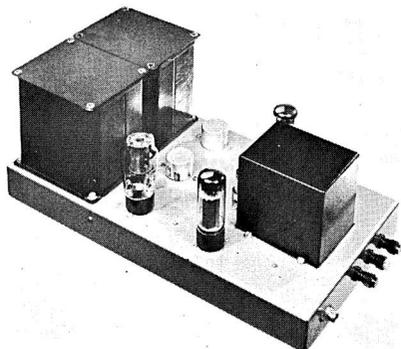
*Leak stereo 30 integrated amplifier*



*Kerr, McCosh CWA 2/12 stereo amplifier*



*Leak "Point One" TL/50 plus*



*Kerr, McCosh CWA 40 amplifier*



*LL Electronics LL.3S1 integrated stereo amplifier*

mic 1.5 mV. Sel switch, on/off, separate vol., treble, bass for each channel, flat/tone control. Tape record sockets. Size:  $12\frac{1}{2} \times 4\frac{1}{2} \times 10\frac{1}{4}$  in. Price: £34.

● **CWA 2/12.** 12W per channel. Distortion 0.1% at 12W. Noise level -95 dB. Response 25 c/s-30 Kc/s  $\pm 0.2$  dB. Output imps 7.5 and 15 ohms. Input sensitivity 1V. Designed to operate with DSI pre-amplifier. Size:  $20 \times 7 \times 8$  in. Price: £48.

**CWA 40.** Mono amplifier. 40W peak continuous sine wave. Distortion 0.1% at 38W. Noise level -98 dB. FR 25 c/s-30 Kc/s  $\pm 0.2$  dB. Output imps 7.5 and 15 ohms. Input sensitivity 1V. Designed to operate with DSI pre-amplifier. Size:  $20 \times 9 \times 8$  in. Price: £45.



**H. J. LEAK & CO. LTD.,** 57-59 Brunel Road, East Acton, London, W.3. Tel: Shepherds Bush 1173. Cables: Sinusoidal, Ealux, London.

“**Point One**” **TL/12 plus amplifier.** 12W. Dist 0.1%. Input for spec output 125 mV. Response 20-20,000 c/s  $\pm 0.25$  dB. Feedback 26 dB. NL -82 dB. Output imp 4, 8 and 16 ohms. Output EL84s. Ultra-linear. Size:  $10 \times 8 \times 6$  in. To operate with any Leak control unit. Price: £20.

“**Point One**” **TL/25 plus amplifier.** 25W. Dist 0.1%. Input for spec output 125 mV. Response 20-20,000 c/s  $\pm 0.25$  dB. Feedback 26 dB. NL -83 dB. Output imp 4, 8 and 16 ohms (other imps to order). Output EL34s. Ultra-linear. Size:  $10 \times 8 \times 6\frac{3}{4}$  in. To operate with any Leak control unit. Price: £26 10s.

“**Point One**” **TL/50 plus amplifier.** 50W. Dist 0.1%. Input for spec output 125 mV. Response 20-20,000 c/s. Feedback 26 dB. NL -84 dB. Output imp 4, 8 and 16 ohms (other imps to order). Output KT88s. Ultra-linear. Size:  $11\frac{1}{2} \times 9 \times 6\frac{3}{4}$  in. To operate with any Leak control unit. Price: £35 10s.

● “**Point One**” **stereo 20 amplifier.** 11W each channel. Dist 0.1% on each channel. Input for spec output 125 mV. Response 20-20,000 c/s. Feedback 24 dB. NL -80 dB. Output imp 4, 8 and 16 ohms. Output EL84s. Ultra-linear. To operate with any Leak control unit. Price: £32 10s.

● “**Point One**” **stereo 60 amplifier.** Details as for stereo 20 but 30W each channel. Price: £45.

**Varislope Mono control unit.** Inputs: pu (RIAA correction) 3.5 mV, 70K; tape head

(CCIR correction) 3 mV 120K; mic 3 mV, 120K; tuner 50 mV, 70K; tape amp 125 mV, 70K. Output: 125 mV. Controls: input, bass, treble, filter, slope, vol (AC-on/off), tape monitor. Low-pass filter-off, 9 Kc/s, 6 Kc/s, 4 Kc/s. Response: flat for tuner, mic, tape amp; RIAA for pu; CCIR for tape head. H and N -60 dB (tuner, tape amp); -52 dB (mic, pu, tape head). Psn. HT and LT supplied by TL/12 Plus; TL/25 Plus or TL/50 Plus. HD 0.01%. Input level controls, tape record sockets with level control, tape monitor facility. To operate with TL/12 Plus, TL/25 Plus or TL/50 Plus. Size:  $11\frac{1}{2} \times 4\frac{1}{4} \times 5$  in. Price: £15 15s.

● **Varislope 2 Stereo control unit.** Inputs: pu (RIAA correction) 3.5 mV, 70K; tape head (CCIR correction) 3 mV, 120K; mic 3 mV, 120K; tuner 50 mV, 70K; tape amp 125 mV, 120K. Output: 125 mV. Controls: input, bass, treble, filter, slope, vol (AC-on/off), tape monitor, function, balance. Low-pass filter-off, 9 Kc/s, 6 Kc/s, 4 Kc/s. Response: flat for tuner, mic, tape map; RIAA for pu; CCIR for tape head. H and N -60 dB (tuner, tape amp); -52 dB (mic pu, tape head). Psn. HT and LT supplied by stereo 20 or stereo 60. Input level controls, tape sockets for recording with level control, tape monitoring facility. HD 0.01%. To operate with stereo 20 or stereo 60. Size:  $11\frac{1}{2} \times 4\frac{1}{4} \times 6\frac{1}{2}$  in. Price: £25.

● **Stereo 30. Transistorised integrated amplifier.** Inputs: pu (RIAA correction) 3.5 mV, 47K; tape head (CCIR correction) 3 mV, 47K; mic 3 mV, 33K; tuner 100 mV, 100K; tape amp 125 mV, 50K. Output: 10W per channel at 15 ohms, 15W at 4 ohms. Controls: input, bass, treble, filter, slope, vol (AC-on/off), function, balance, tape monitor. Low-pass filter-off, 9 Kc/s, 6 Kc/s, 4 Kc/s. Response: flat on mic, tuner, tape amp; RIAA on pu; CCIR on tape head. H and N -66 dB (tuner, tape amp); -52 dB (mic, pu, tape head). HD 0.1% at 8W, 15 ohms. Feedback 60 dB. LS matching 4, 15 ohms. NL (power amp, vol at minimum) -82 dB. Psn 110-250V, 40-60 c/s. Input level controls, tape outlets for recording with level control, tape monitor facility. Free-standing. Size:  $13 \times 4\frac{1}{4} \times 9$  in. Price: £49 10s.



**LINEAR PRODUCTS LTD.,** Electron Works, Armley, Leeds. Tel: Leeds 63-0126.

**LT1A5.** Integrated transistorised amplifier. Inputs: tuner 150 mV, mic 5 mV, PU.1 30 mV, PU.2 150 mV. Controls: selector, bass +18 dB to -16 dB at 40 c/s, treble +17 dB to -14 dB

at 14 Kc/s, volume-on/off. Output: 10W RMS. Output impedance: 3 to 30 ohms. HD <0.2% at 1 Kc/s at rated output. FR 10 c/s-40 Kc/s -4 dB. Feedback: 60 dB. H and N -80 dB. Mains: 200-230-250V 50 c/s AC. Size:  $9\frac{1}{2} \times 3\frac{3}{4} \times 5\frac{1}{4}$  in. Perspex front panel  $10 \times 3\frac{3}{4}$  in. Black and silver background with matching knobs. Price: £16 16s.

**PTA15.** Similar to LTA15 but with two separately controlled inputs for mixing purposes, plus additional input for high output PU cartridges. Output impedance: 3 and 15 ohms. Size:  $9 \times 3 \times 5\frac{1}{2}$  in. Price: £15 15s.

**Audio Fidelity AF10/15B.** Integrated transistorised amplifier. Inputs: PU.1 3.5 mV, PU.2 30-50 mV, PU.3 500 mV, mic 5 mV, tape head 2 mV, aux 100 mV. Controls: selector, bass +18 dB to -16 dB at 40 c/s, treble +17 dB to -14 dB at 10 Kc/s, filter 7 Kc/s, 11 Kc/s, 15 Kc/s, volume, tape monitor, on-off. Output: 10W RMS into 15 ohms, 15W RMS into 3-75 ohms. HD 0.1% at 8W at 1 Kc/s into 15 ohms. FR 30 c/s-32 Kc/s -1 dB. Feedback: 60 dB. H and N -80 dB. Mains: 100-250V AC. Size:  $12\frac{1}{2} \times 4 \times 7\frac{3}{4}$  in. Weight:  $10\frac{1}{4}$  lb. Free-standing or for building in. Case black or imitation walnut. Satin silver and black fascia plate. Price: £24 3s.

● **Audio Fidelity Stereo-33B.** Integrated stereo transistor amplifier. Inputs: mag pickup 3.5 mV, crystal/ceramic pickup 400 mV, mic 5 mV, tape head 2 mV, aux 100 mV. Sensitivities for 10W RMS output per channel into 15 ohms, double these figures for 3-4 ohms load. FR 20 c/s-20 Kc/s  $\pm 1\frac{1}{2}$  dB. Output: 10W RMS per channel into 15 ohms load, 15W RMS per channel into 3-75 ohms load. HD 0.1% at 5W at 1 Kc/s, 0.3% at 10W RMS at 1 Kc/s. Damping factor 30. H and N -80 dB. Cross talk -42 dB to -53 dB. Bass control +18 dB to -16 dB at 40 c/s. Treble control +17 dB to -15 dB at 10 Kc/s. Equalisation: gram to RIAA, tape head to CCIR. Steep cut filter at 7 Kc/s, 11 Kc/s, 15 Kc/s. Size:  $12\frac{1}{2} \times 4 \times 8\frac{3}{4}$  in. Weight:  $12\frac{1}{4}$  lb. Price: £40 19s.



**LOWTHER MANUFACTURING CO.,** Lowther House, St Mark's Road, Bromley, Kent. Tel: Ravensbourne 5225. Cables: Lowther, Bromley.

**Lowther Mk V control unit.** Inputs: mic 3 mV; pickup 3 mV - 300 mV; radio and aux 100 mV. 5-pos sel, vol, bass, treble, filter, equalisation. Filters: 9, 7 and 4.5 Kc/s. HD <0.5%. H and N

-65 dB. Output cathode follower 1V RMS. To operate with Lowther L18 amplifier. With A-B test facility. Size:  $10\frac{1}{4} \times 4\frac{5}{8} \times 7$  in. Price: £25.

**Lowther L18 amplifier.** 18W. Distortion <0.1%. Input for specified output 0.75V. Response 20 c/s-40 Kc/s  $\pm 1$  dB. Feedback 20 dB. Noise level -85 dB. Output impedance 16 ohms with adjustment. Output: EL506 distributed load circuitry. Pat. Size:  $12 \times 6 \times 6$  in. To operate with Mk V control unit. Price: £25 10s.

**Lowther LL26 Mk I amplifier.** 26W. Dist <0.1%. Input for spec output 0.75V. Response 20-70,000 c/s  $\pm 1$  dB. Feedback 22 dB. NL -90 dB. Output imp 16 ohms with adjustment. Output: EL34s. Lowther Linear. Size:  $11 \times 12 \times 7\frac{1}{2}$  in. Weight: 33 lb. To operate with Mk IV control unit. Price: £47.

● **Lowther Mk II stereo control unit.** Input as for master control unit Mk V. Tape input sockets. HD 0.1%. Dual low-pass filters. Dual output balanced and balance controls between channels. Size as Mk V. To operate with L18S power amp. Price: £45.

● **Lowther L18S stereo amplifier.** 18W output on each channel. Distortion 0.1%. Input for specified output 0.75V. Response 20 c/s-40 Kc/s  $\pm 1$  dB. Noise level -85 dB. Output imp 8-4 or 16 ohms. Output EL506 ultra linear. Size:  $11 \times 12 \times 7\frac{1}{2}$  in. To operate with Mk II control unit. Price: £47.



**L.L. ELECTRONICS LTD.,** 5 Shakespeare Road, Finchley, London, N.3. Tel: 01-346 3332.

● **L.L. 10S2.** Transistor integrated stereo amplifier. Inputs: PU (mag) 4 mV, PU (ceramic) 100 mV, tape/radio 200 mV. FR 20 c/s-30 Kc/s  $\pm 2$  dB. Controls: push-button input selection, mode switch, monitor switch, treble  $\pm 15$  dB, bass  $\pm 15$  dB, balance, volume. H and N -52 dB. Crosstalk -64 dB. Output: 10W RMS per channel at 15 ohms. Size:  $16 \times 4\frac{1}{4} \times 6\frac{1}{2}$  in. Finish: shelf-mounting teak cabinet with gold panel. Price: £28 7s.



**MARTIN ELECTRONICS LTD.** See Constructional Kits section.



**METRO-SOUND MANUFACTURING CO. LTD.,** Bridge Works, Wallace Road, Canon-

bury, London, N.1. Tel: Canonbury 3641. Cables: Metrosound, London, N.1.

● **Pickup/microphone matching unit stereo pre-amplifier.** Transistorised. Input 0.05 mV, 2/50 ohms. Voltage gain 140. Response 20 c/s-30 Kc/s  $\pm 3$  dB. Psn 9V battery, Type VT4, or equivalent. To operate with Ortofon SPUG, SPUG/E, SPU and SPU/E, and low impedance mics. Price: £7 10s.

● **De-luxe version,** with twin concentric precision w/w potentiometer. Price: £9 10s.



**NIKKO ELECTRIC MFG. CO. LTD.,** Distributors: Howland-West Ltd., 2 Park End, South Hill Park, London, N.W.3. Tel: Swiss Cottage 6666.

● **Nikko TRM-40.** Integrated stereo transistor amplifier and control unit. Inputs: tape head 2 mV, PU (mag) 4 mV, radio 500 mV, PU (crystal) 300 mV. Controls: function, volume, bass (each channel), treble (each channel), balance, mode, tape monitor, loudness, rumble filter, scratch filter, on/off, stereo headphone jack. Output: 15W RMS at 8 ohms. HD  $< 1\%$  at stated output. FR 15 c/s-20 Kc/s  $\pm 1$  dB. Noise level better than 60 dB. Output impedance 4-15 ohms. Mains supply. Size:  $11\frac{1}{2} \times 9\frac{1}{2} \times 3\frac{3}{8}$  in. Price: £39 10s.



**PHILIPS ELECTRICAL LTD.,** Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437 7777. Cables: Phillamps, London.

● **GH.925.** Transistorised integrated stereo amplifier. Inputs: PU 20 mV 500K, tuner 20 mV 500K, tape 150 mV 500K. Controls: bass +8 dB -12 dB at 150 c/s, treble +9 dB -11 dB at 10 Kc/s, balance, volume, input selector. Output: 4W RMS per channel. HD 10% for 4W per channel. FR 40 c/s-20 Kc/s  $\pm 3$  dB. H and N  $> -50$  dB at 4W. Output impedance: 4-8 ohms. 14 transistors and diodes. Mains: 110, 127, 220, 240V 50/60 c/s. Consumption: 30W maximum. Size:  $12\frac{1}{2} \times 8\frac{1}{2} \times 3\frac{1}{2}$  in. Weight: 5 lb. Shelf-mounting teak cabinet. Price: £23 2s.

● **GH.923.** Transistorised integrated stereo amplifier. Inputs: PU (mag) 1 mV 47K, PU (crystal) 40 mV 220K, tuner 40 mV 30K, tape 110 mV 70K. Controls: rumble filter 12 dB/octave, scratch filter 12 dB/octave, bass  $\pm 6$  dB at 80 c/s, treble  $\pm 14$  dB at 10 Kc/s, balance, volume. Output: 7W RMS per channel. Output impedance: 4-8 ohms. HD  $< 0.8\%$  at 7W per channel. FR 35 c/s-20 Kc/s  $\pm 1.5$  dB. Separation:  $> -50$  dB at 1 Kc/s. H and N  $> -70$  dB at 7W. Damping factor: 7 at 8 ohms impedance. 10 transistors and diodes. Mains: 110, 127, 220, 240V 50/60 c/s. Consumption: 35W maximum. Size:  $13\frac{1}{2} \times 8\frac{1}{4} \times 5\frac{1}{2}$  in. Weight:  $8\frac{1}{4}$  lb. Shelf-mounting teak cabinet. Price: £39 18s.

tion:  $> -50$  dB at 1 Kc/s. H and N  $> -70$  dB at 7W. Damping factor: 7 at 8 ohms impedance. 10 transistors and diodes. Mains: 110, 127, 220, 240V 50/60 c/s. Consumption: 35W maximum. Size:  $13\frac{1}{2} \times 8\frac{1}{4} \times 5\frac{1}{2}$  in. Weight:  $8\frac{1}{4}$  lb. Shelf-mounting teak cabinet. Price: £39 18s.

● **GH.919.** Transistorised integrated stereo amplifier. Inputs: PU (mag) 3 mV 47K, PU (crystal) 100 mV 100K, tuner 90 mV 100K, tape recorder 90 mV 100K, auxiliary 90 mV 100K. Controls: rumble filter 12 dB/octave, scratch filter 12 dB/octave, bass +18 dB -12 dB at 30 c/s, treble +14 dB -15 dB at 15 Kc/s, balance, volume. Output: 20W RMS per channel. Output impedance: 4-8 ohms. Damping factor: 40 at 8 ohms. HD  $< 0.25\%$  at 15W per channel at 1 Kc/s. FR 25 c/s-20 Kc/s  $\pm 1$  dB. Separation:  $> 60$  dB at 1 Kc/s. H and N  $> -70$  dB. 22 transistors and diodes. Two stabilising zener diodes. Mains: 110, 127, 220, 240V AC 50/60 c/s. Consumption: 100W maximum. Size:  $13\frac{1}{2} \times 10\frac{1}{2} \times 5\frac{1}{2}$  in. Shelf-mounting teak cabinet. Price: £59 17s.



**PIONEER.** Distributors: Swisstone Ltd., 48a Station Road, Cobham, Surrey. Tel: Cobham 2853 and 4214.

● **SA-40.** Integrated stereo amplifier. Valves. Inputs: tape head 1.5 mV, PU (mag) 2.3 mV, PU (crystal/ceramic) 38 mV, aux 150 mV. Output: 30W music (total. HD  $< 1\%$  at rated output. FR 30 c/s-20 Kc/s  $\pm 1$  dB. Mains: 115/230V AC. Size:  $13\frac{3}{8} \times 5\frac{3}{8} \times 10\frac{1}{4}$  in. Weight: 15 $\frac{1}{2}$  lb. Price on request.

**SR-101.** Double-scatter reverberation amplifier. Five valves. Delay time 1/28-1/35 second. Reverb time 2-3 seconds 1 Kc/s 8 c/s modulation. Distortion  $< 5\%$ . FR (reverb sound only) 100 c/s-3 Kc/s  $\pm 10$  dB. Uses electrical circuit to create reverberation to increase "presence" and "brilliance". Visual indicator on front panel. Suitable for use with amplifiers with tape monitor sockets. Mains: 115-230V AC. Size:  $12\frac{3}{4} \times 8\frac{7}{8} \times 4\frac{1}{8}$  in. Weight: 18 lb. Price on request.

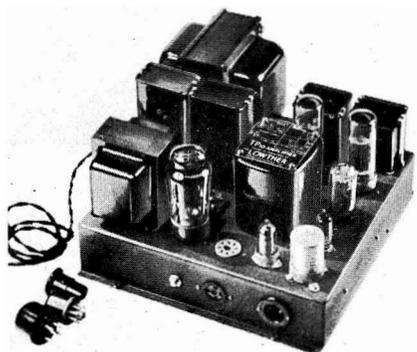


**QUAD.** See Acoustical Manufacturing Co. Ltd.



**RADFORD ELECTRONICS LTD.,** Ashton Vale Road, Bristol 3. Tel: Bristol 662301/2.

● **SC.22.** Stereo control unit with wide range of facilities. Inputs: PU 2 mV, mic 1.5 mV, aux.1



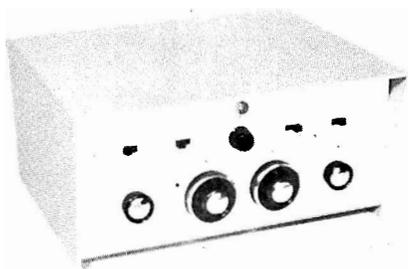
*Lowther LL26 amplifier*



*Philips GH923*



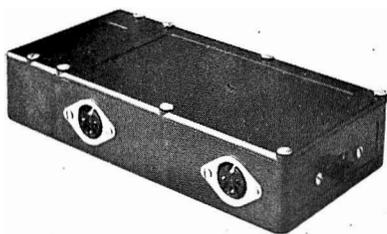
*Philips GH925*



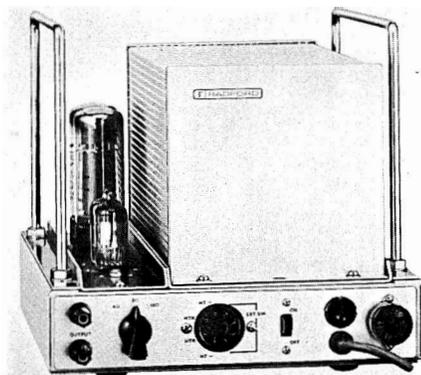
*Lowther stereo control unit*



*Nikko TRM-40*



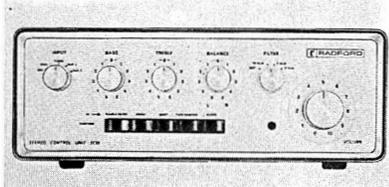
*Metro-Sound pickup/mic stereo pre-amplifier*



*Radford MA15 or MA25 (similar appearance)*



*Metro-Sound MST/15 stereo pre-amplifier*



*Radford SC22 stereo control unit*

100 mV, aux.2 200 mV, aux.3 300 mV. Outputs: Recording 100 mV nominal, 2V adjustable for power amplifier. Treble filter 5, 7 and 10 Kc/s with 12 dB/octave roll-off. Rumble filter 35 c/s 15 dB/octave. Bass and treble variable  $\pm 12$  dB at 50 c/s and 10 Kc/s. Psn 300 V 9 mA, 6.3V 1.5A. Size:  $10\frac{1}{2} \times 3\frac{3}{4} \times 12\frac{3}{8}$  in. Weight:  $9\frac{1}{2}$  lb. Price: £36 10s.

● **SC.22P.** Similar specification to SC.22 but with self-contained mains power supply unit. Weight: 11 lb. Mains: 110-250V 50/60 c/s. Price: £42 10s.

**MA15.** Power amplifier. Response 20 c/s-20 Kc/s. Distortion less than 0.1% over the major portion of the response at rated power output. Rise time less than 5  $\mu$ secs. Sensitivity 500 mV. Output imp 4, 8 and 16 ohms. Mains: 110-250V AC. Weight:  $19\frac{1}{2}$  lb. Output: 15W. Size:  $8\frac{3}{4} \times 10\frac{3}{4} \times 8\frac{1}{2}$  in. Price: £28 10s.

**MA25.** Power amplifier with similar specification to MA15 but with rated output 25W. Weight: 20 lb. Price: £33 10s.

● **STA.15.** Stereo power amplifier with similar specification to MA15 but dual channel. Size:  $14 \times 10\frac{3}{4} \times 8\frac{1}{2}$  in. Weight: 34 lb. Price: £47 10s.

● **STA.25.** Stereo power amplifier with similar specification to MA25 but dual channel. Size:  $14 \times 10\frac{3}{4} \times 8\frac{1}{2}$  in. Weight: 36 lb. Price: £57 10s.

● **STA.60.** Stereo power amplifier. Output in excess of 60W per channel at 0.1% distortion. 100W per channel at 1.0% distortion. Input: 500 mV at high impedance. Price: £97 10s.

● **STA.60B.** Identical specification to STA.60 but with additional input circuit of 600 ohms balanced 0 dBm. Price: £115.



**RADON INDUSTRIAL ELECTRONICS CO. LTD.,** Brooklands Trading Estate, Orme Road, Worthing, Sussex. Tel: Worthing 1063. Cables: Radon, Worthing.

● **R600.S Mk II.** Integrated transistorised stereo amplifier in shelf mounting cabinet. Inputs: mag PU 5 mV, crystal PU 500 mV, radio 500 mV, aux 150 mV. FR 20 c/s-25 Kc/s  $\pm 3$  dB. H and N  $-100$  dB at 10W. Noise 20 dB below level of hum. Distortion 0.06% for 10W output. 0.1% for 12W. Bass control  $+12$  dB to  $-12$  dB at 100 c/s. Treble control  $+8$  dB to  $-10$  dB at 10 Kc/s. HF filter 7 Kc/s, 9 Kc/s and flat. LF filter 20 c/s, 40 c/s, 80 c/s. Output four AD140

transistors. Power output 10W RMS each channel (12W peak). Output imp 15 ohms. Separate output for recorder. Mains: 220-250V AC. Chassis size:  $14\frac{1}{4}$  in. wide,  $10\frac{1}{4}$  in. deep,  $5\frac{1}{4}$  in. high. Perspex engraved panel in black with gold lettering. Cabinet in polished mahogany. Price: £60.



**J. RICHARDSON ELECTRONICS LTD.,** 43B Hereford Road, London, W.2. Tel.: 01-727-5096.

**IMA 135 Power Amplifier.** Output: 30 watts 0.1% distortion; 35 watts 0.25% distortion at 1KHz. Sensitivity: 250 mV for 25 watts into 4, 8 and 16 ohms. Response: 20 Hz to 20 KHz. Mains 200-250V AC. Semiconductor power supply. Size:  $8\frac{1}{2} \times 12\frac{1}{2} \times 7$  in. Price: £35.

● **SA 170.** Power amp as MA 135 but with two channels. Size:  $12\frac{1}{2} \times 12 \times 7$  in. Price: £55.

**MA 200 Power Amplifier.** Output: 70 watts 0.1% distortion; 100 watts 0.25% distortion at 1 KHz. Sensitivity 250 mV for 4, 8 and 16 ohms or 100V line, line matching input transformer available. Prices on application.

**SCP 1.** FET and transistor self-powered pre-amplifier, low noise circuit, bass  $\pm 20$  Db, treble  $\pm 16$  Db. Filters 7, 10 KHz. Rumble filter, quiet listening, tape monitor phase reverse. Inputs, two pickups. Mag. 2 mV, ceramic 50 mV, radio tape 250 mV, mic. 3 mV, tape head 2.5 mV. Output: 250 mV to 1V. Size:  $14\frac{1}{4} \times 4\frac{1}{4} \times 10\frac{1}{4}$  in. deep. Mains 110/200-250V AC. Price: £40.



**ROGERS DEVELOPMENTS (ELECTRONICS) LTD.,** 4-14 Barmeston Road, Catford, London, S.E.6. Tel: 698-7424/4340. Cables: Rodevco, London, S.E.6.

● **Master II stereo control unit.** Inputs: mic 1-10 mV, 100K; disc 1, 2-20 mV, 68K; disc 2, 60-600 mV, 2.2 megohms; tape 1-10 mV, 68K; radio 15-100 mV, 300K. (Impedance for mic and disc 1 inputs may be altered.) Output: 750 mV. Controls: input sel, vol, balance, on/off, equalisation, bass, treble, mono/stereo switches, high-pass filter, low-pass filter with variable slope and frequency, speaker/phones switch. Low-pass filters 7 Kc/s and 10 Kc/s + slope; high-pass 20 c/s and 60 c/s. To operate with Master stereo amplifier. Size:  $14 \times 6\frac{1}{2} \times 5\frac{1}{8}$  in. Price: £40.

● **Cadet III.** Stereo main amplifier and control unit. Inputs: radio 100 mV 470K, mag PU 3·8 mV 68K, crystal PU 65 mV 2 megohms, tape 600 mV. FR 20 c/s-20 Kc/s  $\pm 2$  dB. Bass control  $\pm 13\cdot5$  dB at 40 c/s. Treble control  $+13\cdot5$  dB  $-16$  dB at 10 Kc/s. High-pass filter 60 c/s 10 dB/octave. Low-pass filter 6·5 Kc/s 10 dB/octave. Cross-talk 42 dB at 1 Kc/s, 26 dB at 10 Kc/s. Signal to noise: radio 60 dB, mag PU 54 dB, ceramic PU 52 dB. Balance control 9 dB range. Valves. Size: (control unit)  $10\frac{3}{4} \times 4\frac{3}{4} \times 4\frac{1}{8}$  in., front panel  $11\frac{1}{4} \times 4\frac{1}{2}$  in. Output 10W each channel. Distortion 5W 0·25% at 1 Kc/s, 10W 0·8% at 1 Kc/s. H and N  $-80$  dB. Output imp 3·5 ohms and 12-16 ohms. Mains: 110-122-220-244V 50/60 c/s. Size: (main amplifier):  $10 \times 6\frac{1}{2} \times 4$  in. Prices: (chassis model) £31; (case model) £34 10s.

● **Master Stereo Amplifier.** Valved power amplifier. Input: 1V. Output: 35W. Self-powered. Suitable for Master II Stereo control unit. Price: £50.

● **HG88 Mk III Integrated Stereo Amplifier.** Latest version of the "Eighty-eight" features increased power, more comprehensive input and control facilities. Re-styled to match new Cadet III range. Features include high performance filters, plug-in pickup matching adaptors, tape monitoring facility, tape panel socket. Silicon mains rectifier. Available in chassis or cabinet form. Output: 15W. Price: (chassis) £42; (in cabinet) £46 10s.

● **Ravensbourne.** Integrated stereo amplifier. Transistors. 25W output per channel. Full range of inputs and controls. Specification on request. Price: (chassis) £59 10s.; (cabinet) £4 10s.

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**SANSUI.** Technical Ceramics Ltd. (Sonotone), Building 102, Cheyney Manor Estate, Swindon, Wilts.

● **Sansui AU70.** Stereo integrated amplifier. Valves and transistors. Inputs: PU (mag) 1·1 mV 50K. PU (crystal) 36 mV 100K. tape 0·9 mV

50K, mic 0·9 mV 50K, aux 50 mV 500K, radio 50 mV 500K. Controls: balance, blend (continuous mono to stereo), bass boost and cut (independent left and right) treble boost and cut (independent left and right), volume, selector, mode, speaker on-off, presence, loudness, low-pass filter, high-pass filter, tone circuits on-off, tape monitor. Output: 25W RMS per channel. HD 0·15% at 20W per channel. FR 10 c/s-80 Kc/s  $\pm 1$  dB at 1W. Feedback 26 dB. Noise level  $-60$  dB. Output impedance: 8 or 16 ohms. Damping factor: 18. Size:  $15\frac{7}{8} \times 12\frac{5}{8} \times 5\frac{5}{8}$  in. Price: to be announced.

● **Sansui AU111.** Stereo integrated amplifier. Valves and transistors. Inputs: PU.1 0·06 mV low imp, PU.2 2 mV 100K, tape head 1·8 mV 100K, radio 220 mV 500K, aux 222 mV 500K, tape monitor 250 mV 500K. Controls: volume, balance, bass boost and cut 6 dB/octave (independent left and right channels), treble boost and cut 6 dB/octave (independent left and right channels), centre channel volume, selector, loudness, speakers on-off, presence, low-pass filter, high-pass filter, tape monitor, mode. Output: 20W RMS per channel. HD 0·8% at rated output. FR 20 c/s-50 Kc/s at 1W. Noise level:  $-80$  dB (aux). Output impedance: 8 and 16 ohms. Damping factor 15. Size:  $18\frac{1}{2} \times 13\frac{5}{8} \times 16\frac{3}{4}$  in. Price: to be announced.

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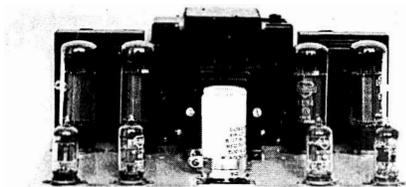
**SENNEISER ELECTRONIC.** Distributors: Audio Engineering Ltd., 33 Endell Street, London, W.C.2. Tel: Temple Bar 0033.

● **VRS.303 Philharmonic.** Armchair control unit. Transistorised stereo pre-amplifier designed to operate with VKL.303 main amplifier and VMS.303 mixer. Controls: bass, treble, balance, volume, stereo width. Power supplied from power amplifier. Size:  $4 \times 9 \times 3$  in. Price: see VKL.303.

● **VMS.303 Philharmonic.** Stereo transistorised mixer unit for use with VRS.303 armchair control unit and VKL.303 amplifier/speaker units. Inputs: mic (1) 2 mV 50K, mic (2) 2 mV 50K, pickup (crystal), pickup (magnetic) 2·5 mV 50K,



Richardson SCPI



Richardson Power Amplifier

radio (1) 2 mV 50K, radio (2) 500 mV 120K, equalised tape 220 mV 100K. Outputs: tape  $2 \times 15$  mV low Z, tape  $2 \times 300$  mV high Z, headphones  $2 \times 1V$  100 ohms. Controls: HF filter 15 dB/octave 3 dB at 6 Kc/s, LF filter 15 dB/octave 3 dB at 60 c/s, sensitivity control for each of three channels. Power drawn from main amplifier VKL.303. Size:  $9 \times 9 \times 3$  in. Price: see VKL.303.

● **VKL.303 Philharmonic.** Transistorised power amplifiers built-into speaker enclosures. Designed to operate with VMS.303 mixer and VRS.303 armchair control unit. Power output: 30W RMS per channel. HD 0.1% at 20W 30 c/s-10 Kc/s. FR (including speakers) 50 c/s-15 Kc/s  $\pm 3$  dB. Feedback  $>65$  dB for all inputs. Noise level  $>85$  dB (power amplifier only). Mains: 200-240V AC. Infinite baffle enclosures with LF and HF units. Variable equalisers to compensate for speaker position, room acoustics and stereo symmetry. Price (VRS.303, VMS.303, two VKL.303): £415 16s. complete.



**SHIRA.** Distributors: Winter Trading Co. Ltd., 95-99 Ladbroke Grove, London, W.11. Tel: Park 1341. Cables: Winlec, London, W.11.

● **TRM 40.** Integrated transistorised stereo amplifier. 14 transistors, 4 diodes. 22W IHFM per channel at 8 ohms. Inputs: mag PU 4 mV, ceramic or crystal PU 300 mV, tape head 2 mV, radio tuner 500 mV, aux 300 mV. FR 15 c/s-20 Kc/s  $\pm 1$  dB. Output impedance 4-16 ohms. Controls: on/off, volume, bass, treble (separate tone controls for each channel), balance, function, loudness, rumble filter, scratch filter, mode. Size:  $11\frac{1}{2} \times 9\frac{1}{2} \times 3\frac{3}{8}$  in. Mains: 105-240V 50/60 c/s. Price: £47 5s.



**SHIRLEY LABORATORIES LTD.,** 23 Ripley Road, Worthing, Sussex. Tel: Worthing 49098.

“**Jupiter**” **SB/1-15E.** Integrated mono amplifier. 12W (17W peak). Dist 0.2% at 10W 1 Kc/s. FR 45 c/s-25 Kc/s  $\pm 1$  dB. NL -80 dB. Inputs: radio/tape 100 mV, gram to suit pickup in use. LS matching, 15 ohms. Controls: bass, treble, vol, sel. Pat 300V, 30 mA; 6.3V, 1.5 amps. Output stages EL84s. Self-powered. Front panel  $12 \times 3$  in. Price: £23 2s.

● **SBS/15 integrated stereo amplifier.** 12W per channel (17W peak). Dist 0.1%. FR 45 c/s-25 Kc/s  $\pm 1$  dB. NL -85 dB. Inputs: radio 100 mV; gram (RIAA) 5 mV; mic 2 mV; tape

from head 3 mV; tape recorder 100 mV. Output stages EL84s. Controls: variable vol, bass, treble, balance, switched sel, tape speed equalisation, mono/stereo. Self-powered. Pat 300V, 45 mA; 6.3V, ct, 2 amps. Equalisation for two or three tape speeds. Facility for playing on both channels from monaural source. Price: £63.

See also Tape Amplifiers Section.



**SHURE ELECTRONICS LTD.,** 84 Blackfriars Road, London, S.E.1. Tel: Waterloo 6361.

● **Solophone SA-2E.** Provides personal stereo listening for one or two people. Gives sufficient amplification to accept output from any high quality cartridge (for example Shure Stereo Dynetic range), tape deck or FM tuner. There are input selector switch, separate volume controls for each channel and two headphone jacks mounted on the front panel. Size:  $10\frac{1}{4} \times 3\frac{1}{2} \times 3$  in. Weight: 2 lb. Mains: 240V 50 c/s. Price: £16 16s.

● **M61 Series.** Stereo pre-amplifiers designed to permit magnetic cartridges and tape heads to be used with amplifiers not having the necessary input sensitivity. M61 Series amplifiers provide amplification and equalisation for tape and discs. Also suitable for mic. FR 25 c/s-15 Kc/s  $\pm 2.5$  dB. Input impedance: 47K at 1 Kc/s. Output impedance: low ( $<1K$  at 10 Kc/s). Separation:  $>50$  dB at 1 Kc/s. H and N -50 dB. Size:  $5 \times 5\frac{1}{4} \times 2$  in. Price: (M61-2 mains operated) £12; (M61-3 battery operated) £9 10s.

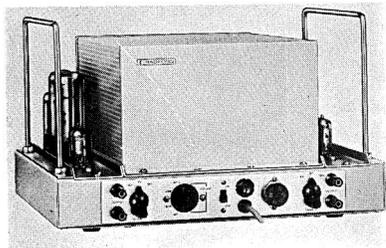


**SINCLAIR RADIONICS LTD.,** See Constructional Kit Section.

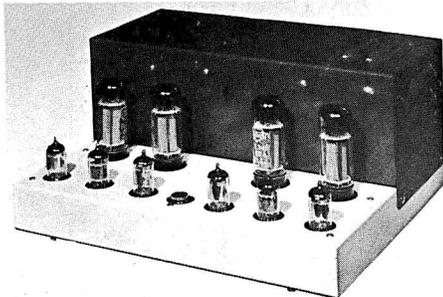


**SONY U.K. DIVISION,** Eastbrook Road, Gloucester. Tel: Gloucester 21591.

● **Sony TA-1080.** Transistor stereo integrated amplifier. Inputs: tape 0.7 mV 100K, PU (2) 2.3 mV 47K, tuner 120 mV (variable) 100K, aux 120 mV 100K. Controls: volume, balance, treble  $\pm 10$  dB at 10 Kc/s, bass  $\pm 10$  dB at 100 c/s, mode, input selector, tone control cut-out to give flat response, monitor. Output: 30W per channel. FR 30 c/s-100 Kc/s  $\pm 2$  dB. HD  $<0.15\%$  at rated output. Damping factor:  $>40$ . Noise:  $<0.05$   $\mu$ V with 8 ohms load. Signal/noise:  $>70$  dB average. 30 silicon transistors,



Radford STA15 or STA25 (similar appearance)



Rogers Master stereo amplifier



Radon R 600S Mk. II integrated amplifier



Rogers Master II stereo control unit



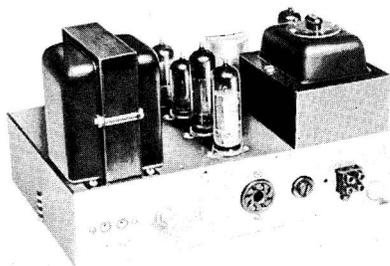
Sansui AU-70



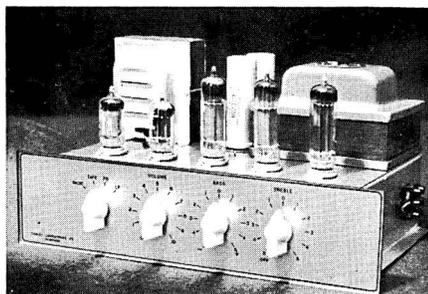
Rogers HG88 Mk. III integrated amplifier



Sansui AU11



Stern 5-10 amplifier



Shirley Jupiter SB/1-15E

21 diodes. Output impedance: 8-16 ohms. Mains: 100, 117, 220, 240V 50/60 c/s. Consumption: 25W at no signal, 200W at maximum output. Mounting bracket and oiled stained case optional extras. Size:  $15\frac{3}{4} \times 12\frac{1}{2} \times 5\frac{3}{4}$  in. Price: £103 19s.

● **Sony TA-1120.** Transistor stereo integrated amplifier. Inputs: PU(1) 5 mV 47K, PU(2) 1 mV 47K, tuner 200 mV 100K, tape head 1 mV 500K, mic 2 mV 500K. Noise level: tuner >90 dB, PU 70-80 dB, tape >70 dB, mic >65 dB. Controls: volume, balance, bass  $\pm 20$  dB at 100 c/s, treble  $\pm 20$  dB at 10 Kc/s, tone control cancel switch, mode, selector, low-pass filter, high-pass filter, monitor switch. Output: 50W per channel. Output impedance: 8-16 ohms. HD 0.1% at rated power. FR 10 c/s-100 Kc/s -1 dB at rated output. 46 silicon transistors, 23 diodes. Mains: 100, 117, 220, 240V 50/60 c/s. Consumption: 30W at no signal, 200W at maximum output. Mounting bracket and oiled stained case optional extras. Size:  $15\frac{3}{4} \times 12\frac{1}{2} \times 5\frac{3}{4}$  in. Price: £141 15s.



**STERN-CLYNE LTD.,** Head Office and mail order, 3-5 Eden Grove, Holloway, London, N.7. Tel: North 8161. Branches throughout London, Liverpool, Manchester, Sheffield, Bristol and Nottingham.

**Mullard 2-valve pre-amplifier tone control unit.** Inputs: pickup 5 mV (LP magnetic), pickup 70 mV (LP crystal), radio 300 mV, tape (1) 300 mV, tape (2) 3 mV, microphone 3 mV. 6-pos sel, bass, treble, vol. Psn 300V at 3 mA, 6.3V at 0.6 amps. Employs two EF86s. To operate with the 5-10 and similar power amplifiers. Size:  $9\frac{1}{2} \times 4\frac{1}{2} \times 2\frac{3}{8}$  in. Price: £9 10s.; (also available in kit form); £6 6s.

**Mullard 3-valve pre-amplifier.** Mono. Inputs: mag pu-7 mV, 12 mV; crystal 150 mV, 270 mV; tape head 2.5 mV; mic 7.5 mV; radio 250 mV; aux 250 mV. Output 250 mV. Controls: sel, treble, bass, vol. High-pass filters, 160 c/s, 80 c/s, 40 c/s, 20 c/s; low-pass 5 Kc/s, 7 Kc/s, 9 Kc/s, flat. H and N: mag and crystal -58 dB; tape head -47 dB; mic -44 dB; radio and aux -60 dB. Psn 6 mA at 250V, 1 amp at 6.3V. Jacks on front panel. Auxiliary input. Record output. Ferroxcube inductor in filter circuit. To operate with Stern/Mullard range power amplifiers (mono). Size:  $11 \times 4 \times 4$  in.; (front panel):  $12\frac{1}{4} \times 4\frac{1}{2}$  in. Price: £13 13s.; (kit): £10.

**Mullard 5-10 mono amplifier.** Output 10W. HD 0.1%. Response 30 c/s-15 Kc/s  $\pm 1$  dB. Feedback 26 dB. NL -65 dB. Input: 40 mV.

LS matching, 3.75 or 15 ohms. Output stages  $2 \times$  EL84. Self-powered (AC mains 200-250V). Size:  $10 \times 7 \times 7$  in. To operate with Stern/Mullard 2- or 3-valve pre-amplifiers. Price: £13 10s.; (also available in kit form): £10.



**SYMPHONY AMPLIFIERS LTD.,** 16 Kings College Road, London, N.W.3. Tel: Primrose 3314/5.

● **No. 2 stereophonic amplifier.** Output 10W per channel. HD 0.15%. Response 20 c/s-20 Kc/s  $\pm 1$  dB. Feedback 27 dB. NL 75 dB below. Input: 3 mV. LS matching, 15 ohms. New fully transistorised circuit. Psn 200-250V AC. Self-powered. Size:  $13 \times 4\frac{1}{2} \times 9\frac{1}{2}$  in. Price: £25 4s. (integrated). Magnetic cartridge model £29 8s.



**TRIO.** Distributors: Winter Trading Co. Ltd., 95-99 Ladbroke Grove, London, W.11. Tel: Park 1341. Cables: Winlec, London, W.11.

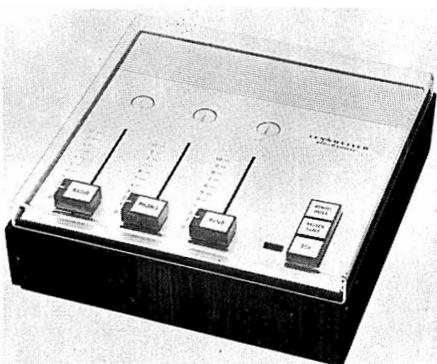
● **W41U.** Integrated mains-operated stereo amplifier. Valves. Inputs: mag PU 1.7 mV, tape head 1.7 mV, aux, radio, and tape play 110 mV. Controls: Power on/off, LS on/off, selector, mode, volume, balance, tape monitor, mono-stereo input, bass (LH), treble (LH), bass (RH), treble (RH). Loudness control. DC filament supply. Stereo headphone jack. Output: 10W (RMS) per channel. FR 20 c/s-20 Kc/s  $\pm 1$  dB. Output imp 0-16 ohms. Mains: 110-117V, 220-230V AC. Size:  $12\frac{1}{2} \times 5 \times 10\frac{1}{8}$  in. Price: £57 15s.

● **WE24.** Integrated mains-operated stereo amplifier. Valves. Inputs: PU 3 mV, radio 520 mV, crystal PU 115 mV. Controls: selector, bass (LH), treble (LH), loudness, balance, volume, mode, bass (RH), treble (RH), mains on/off. Output: 6W (RMS) per channel. FR 20 c/s-20 Kc/s  $\pm \frac{1}{2}$  dB. Mains: 110V, 220V, 50-60 c/s. Size:  $11\frac{3}{4} \times 5 \times 7\frac{1}{8}$  in. Price: £40 19s.



**TRIPLETONE MANUFACTURING CO. LTD.,** 241a The Broadway, Wimbledon, S.W.19. Tel: Liberty 1189.

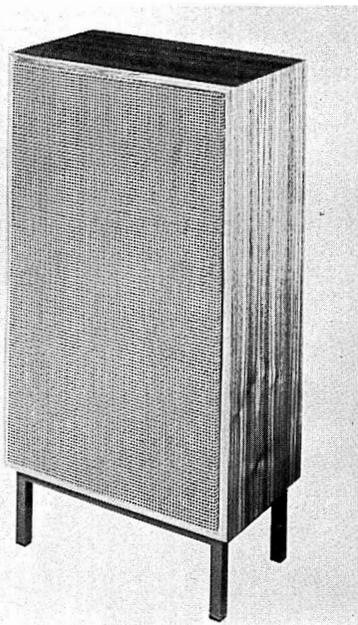
● **Gemini Series 3.** Integrated stereo amplifier. Inputs: PU 150 mV 1 megohm, radio 150 mV 1 megohm, tape 150 mV 1 megohm. Controls: bass  $\pm 15$  dB at 50 c/s, middle  $\pm 12$  dB at 400 c/s, treble  $\pm 15$  dB at 10 Kc/s, volume, function selector, push-button on/off. Output: 4W RMS per channel. Output impedance: 2-3 and 15



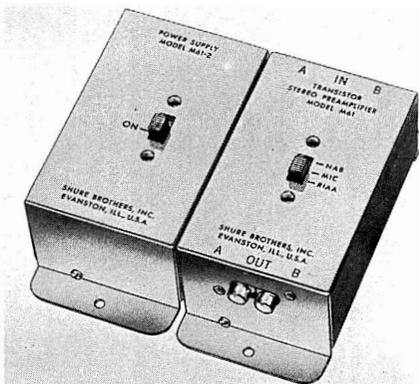
Sennheiser VMS303



Sennheiser VRS303



Sennheiser VKL303



Shure M61/2



Shure Solo-phone SA-2E



Sony 1080



Sony 1120

ohms. FR 30 c/s-20 Kc/s  $\pm 1.5$  dB. Feedback 20 dB. Tape outlet: 1V 100K. H and N - 70 dB. Two ECC83, two 6BW6, one EZ80. Size:  $11 \times 6\frac{1}{2} \times 3\frac{3}{4}$  in. Weight: 10 lb. Price: £17 10s.; (optional extra teak ends) £2 16s. 3d.

**Hi-Fi Major Series 3.** Integrated mono amplifier. 5 valves. 12W output. Output stage two EL84s. Output impedance 2-3 and 15 ohms. HD less than 0.2%. Negative feedback 41 dB. Frequency response 30 c/s-20 Kc/s  $\pm 1$  dB. Inputs: pickup 80 mV 2 megohms, radio 200 mV 200K, tape 80 mV 100K. Tape output: 500 mV 100K. H and N - 62 dB. Controls: bass  $\pm 18$  dB at 30 c/s, middle  $\pm 12$  dB at 400 c/s, treble  $\pm 18$  dB at 10 Kc/s. Filter: 7 Kc/s turnover, 6 dB per octave slope. Mains: 200-250V AC. Auxiliary power: 200-270V 20-40 mA DC, 6.3V 2A AC. Size:  $11 \times 7\frac{1}{2} \times 3\frac{3}{4}$  in. Price: £17 16s. 8d.

● **Solid State Stereo 8+8.** Transistorised integrated stereo amplifier. Inputs: PU 80 mV 2 megohms, radio 200 mV 100K, tape 80 mV 100K. Controls: bass  $\pm 18$  dB at 30 c/s, middle + 12 dB to - 15 dB at 1 Kc/s, treble  $\pm 18$  dB at 10 Kc/s, volume, function selector, filter 7 Kc/s turnover, 6 dB per octave slope. Output: 8W RMS per channel. Output impedance: 15 ohms. Distortion: < 0.2% at 8W RMS. FR 30 c/s-20 Kc/s  $\pm 1.5$  dB. H and N - 60 dB per channel at 8W. 20 transistors, four rectifiers. Tape outlet socket: 200 mV 100K  $\pm 1.5$  dB 15 c/s-30 Kc/s. Size:  $11 \times 7\frac{1}{2} \times 3\frac{3}{4}$  in. Weight: 8 lb. Price: £29 19s. 6d.; (optional extra teak ends) £2 16s. 3d.

**Transistorised pre-amplifier Series 3.** Mono or stereo version. Inputs for magnetic cartridges or tape heads. Various tape/disc combinations. S/N 70 dB. Equalisation  $\pm 2$  dB (RIAA or CCIR curve). Psn 200-300V DC. Ocial plug connector. Size:  $5 \times 2 \times 2$  in. Price (mono): £3 17s. 6d.; (stereo): £5 10s.

● **Stereo balance indicator Series 3.** Indicates volumetric and tonal balance. Can be switched in or out as required, and gives channel reversal facilities. No power required. Price: £2 16s. 3d.



**TRUVOX LTD.,** Hythe, Southampton. Tel: Hythe (0421-24) 3265.

● **TSA100.** Transistorised integrated stereo amplifier. Inputs: PU.1 50 mV 100K RIAA. PU.2 3.5 mV 50K RIAA, tape 150 mV 100K, tuner 50 mV 100K, aux 50 mV 100K. Controls: Treble, balance, volume, function switch.

monitor switch, scratch filter, rumble filter. Noise < -55 dB on PU, < -60 dB other functions. 12.5W IHFM output per channel into 15 ohms. Distortion less than 0.25% at 10W. FR 15 c/s-30 Kc/s  $\pm 1$  dB. Transformerless output will feed any speaker 8-600 ohms. Four AD140. Mains supply 100-240V 40-60 c/s. Chassis form or shelf-mounting cabinet. Size:  $16 \times 6\frac{3}{8} \times 5$  in. Price: £51 9s.



**VAN DER MOLEN.** See Speaker Enclosure Section for details of Sonic 10 amplifier/speaker unit.



**VERITONE.** Stern-Clyne Ltd., 3-5 Eden Grove, London, N.7. Tel: North 8161.

● **Veritone Vega.** Transistorised integrated stereo amplifier. Inputs: auxilliary 50 mV 100K, tape 50 mV 100K, radio 50 mV 100K, pickup (ceramic) 50 mV 100K, pickup (magnetic) 3-4 mV 50K. Controls: bass  $\pm 15$  dB at 50 c/s, treble  $\pm 15$  dB at 10 Kc/s, balance  $\pm 12$  dB between channels, filter -3 dB at 6 Kc/s then 8 dB/octave, volume, monitor (source or tape), mode. FR 40 c/s-20 Kc/s  $\pm 1$  dB at 1W. Feedback 60 dB. Noise level -55 dB. Output 15W each channel. Output impedance 15 ohms. Output stage: four OC35 or OC29. Mains 240V AC. Size:  $11 \times 6\frac{3}{8} \times 4\frac{1}{4}$  in. Price: £40 19s., shelf mounting teak cabinet £3 3s. extra.



**VORTEXION LTD.,** 257/263 The Broadway, Wimbledon, London, S.W.19. Tel: Liberty 2814, 6242/3. Cables: Vortexion, London, S.W.19.

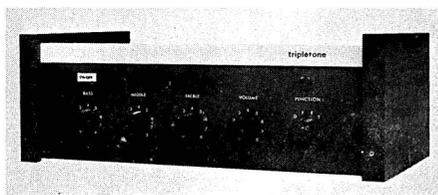
**CP50 Amplifier A.C.** Mains and 12 volt. The CP50 is an all silicon transistor amplifier for mains and 12 volt battery use, with 8 $\Omega$ -15 $\Omega$  and 100 volt line output. The amplifier itself has overload or short circuit protection and all inputs have reasonable overload protection. Very large heat sinks are used with good ventilation and it is quite cool running on speech or music peaking 50 watts and even with over 40 watts of continuous sine wave the temperature conditions are not exceeded. The reservoir capacitor has been divided into 4 parts, each fused. The frequency response is within 3 dB from 25 cycles to 20,000 and bass and treble controls are fitted, of 26 dB sweep each. This is housed in our durable steel case. Size 18 in.  $\times$  6 in.  $\times$  11 $\frac{1}{2}$  in. Battery consumption 3 amps.



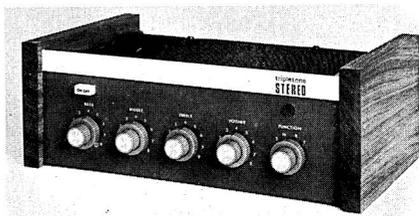
*Symphony No. 2 integrated stereo amplifier*



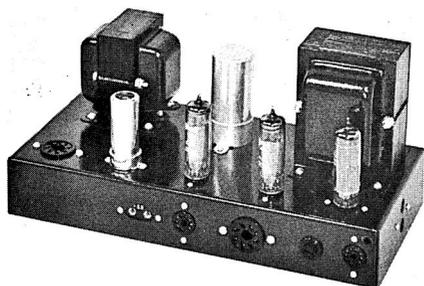
*Tripletone Series 3 control unit*



*Tripletone Hi-Fi Major Series 3*



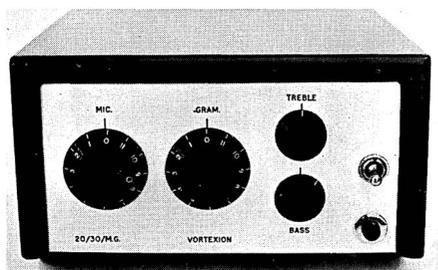
*Tripletone Gemini*



*Tripletone DP 12 amplifier Series 3*



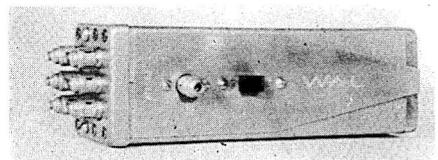
*Tripletone Solid-state 8+8*



*Vortexion 20/30W*



*Veritone Vega amplifier*



*Stereo WAL Gain*



*Wharfedale WHF20*

Weight 35 lb. Prices: 1 gram and 2 low Mic. inputs £84. 1 gram and 3 low Mic. inputs £90. 4 low Mic. inputs £92.

**All Silicon Mixer Amplifier 20/30 Watt.** This is a high fidelity "minimised" distortion transistor amplifier made possible by the latest types of Silicon transistors. Since it gives 20 watts at 0.1% harmonic and .2% intermodulation distortion and less than 3 times this as 30 watts on  $7\frac{1}{2}\Omega$  it is suitable for high quality P.A. or High Fidelity use. No output transformer is fitted in this instance, but full overload protection is provided for this cool running amplifier which is suitable for continuous night and day operation and has a quiescent consumption of less than 4 watts from the mains. In the event of overload the output is instantly switched off until it ceases without blowing any fuses, the circuit operates far faster than any fuse. The response is within 1 dB from 20-20,000 cps and feedback bass and treble controls have a total range of 24-26 dB each. It can be supplied for balanced line low impedance microphone (or high impedance at reduced prices) and the normal auxiliary or gram at 50 m.v. on 100K. Price £35.

**30/50 Watt Amplifier.** Can deliver 50 watts of speech and music or over 30 watts of continuous sine wave. Main amplifier has response of 30 c/s-20 Kc/s  $\pm 1$  dB; 0.15% distortion. Outputs 4, 7.5, 15 $\Omega$  and 100 volt line. Models are available with two, three, or four mixed inputs for low impedance balance line microphones, pick-up or guitar. Price with 4 mixed inputs £70.

**100 Watt All Silicon Amplifier.** This is a high fidelity amplifier for Audio frequencies featuring a new principle protection circuit, which is automatic on output overload, far faster than any fuse, and of course resetting when the signal is reduced. In addition a thermal cut out is fitted which automatically switches off should it be possible for any reason to take the heat sinks beyond the safe limits. The large heat sinks are funnel cooled to add efficiency, and when supplying 100 watts power at low to medium frequencies the output transistors only have to dissipate some 18 watts each and they are capable of over 100 watts each. These transistors also have a voltage rating double that required. Large output transistors are not satisfactory above 20,000 cps,

and since it is not required for audio purposes, the overload limits the power capacity to the safe power available at high frequencies. The response in level from 30 cps to 15 Kc/s and 3 dB maximum down at 20,000 cps. Outputs are for 8 $\Omega$ -15 $\Omega$  and 100 volt line. Harmonic distortion does not tell the whole story with transistor amplifiers so in this case only the intermodulation distortion is given which is less than .5%. The input required is less than 0.5 volt on 100K $\Omega$ . Price £70.

**200 Watt Amplifier.** Can deliver its full audio power at any frequency in the range of 30 c/s-20 Kc/s  $\pm 1$  dB. Less than 0.2% distortion at 1 Kc/s. Can be used to drive mechanical devices for which power is over 120 watt on continuous sine wave. Input 1 mW 600 $\Omega$ . Output 100-120v or 200-240v. Additional matching transformers for other impedances are available. Price £112.



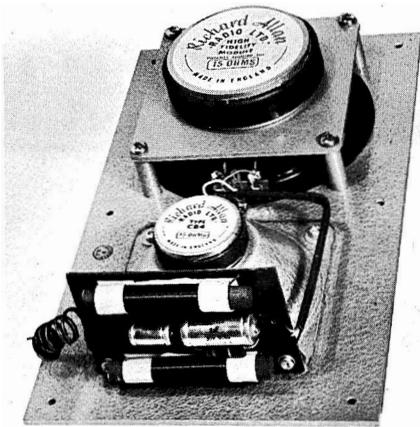
**WHARFEDALE.** Rank Wharfedale Ltd., Idle, Bradford, Yorkshire. Tel: Bradford 612552. Cables: Wharfdel, Idle, Bradford. Telex: 51407.

● **WHF-20.** Integrated all-transistor stereo amplifier. Inputs: PU (mag) 3.5 mV 47K, PU (cer) 50 mV 47K, tuner 100 mV 100K, mic 2 mV 30K, aux 100 mV 100K, tape 100 mV 100K. Controls: input selector, bass  $\pm 15$  dB at 40 c/s, treble  $\pm 14$  dB at 10 Kc/s, rumble filter -3 dB at 40 c/s, -18 dB at 20 c/s, filter slope variable 0-20 dB per octave above 7 Kc/s, balance +2 dB to zero on each channel, volume, tape switch, loudness switch, on-off switch. All-silicon transistors. Output: 20W RMS into 8 ohm load. HD <0.2% at rated output. FR 10 c/s-60 Kc/s -3 dB. Size: 15 $\frac{1}{2}$   $\times$  13 $\frac{1}{2}$   $\times$  5 in. Weight: 22 $\frac{1}{2}$  lb. Mains: 100-250V 50/60 c/s. Finish: oiled teak veneer shelf-mounting cabinet. Price: £85.

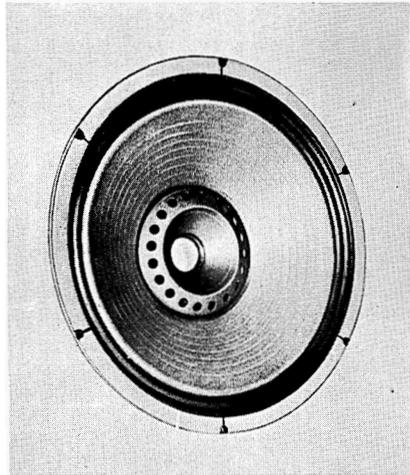


**WYE ELECTRONICS LTD.,** Queen Street North, Chesterfield, Derbyshire.

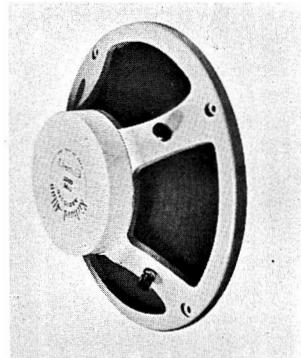
● **Stereo 500.** Transistorised integrated stereo amplifier. Inputs: tape, radio, ceramic pickup. Sensitivity: 50 mV into 1 megohm at 1 Kc/s for 10W output on all inputs. Output: 10W RMS per channel. Distortion: 1.5% at 10W into 4 ohms. Separation: 40 dB at 1 Kc/s and 10 Kc/s at 10W. Bass control +8 dB, -12 dB at 40 c/s. Treble control +3 dB, -8 dB at 12 Kc/s. FR 40 c/s-30 Kc/s  $\pm 3$  dB (tone controls level). 14 transistors. Output impedance: 4-15 ohms. Finish: rosewood or teak veneered shelf mounting cabinet. Size: 15  $\times$  9  $\times$  3 $\frac{1}{2}$  in. Price: £29 8s.



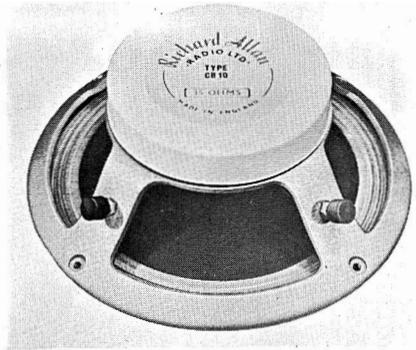
*Richard Allan mid-range and HF module*



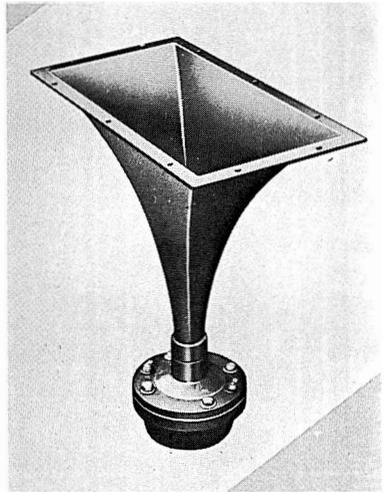
*Acustica-Electronica 12DFC*



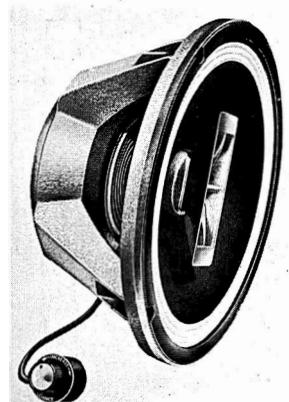
*Richard Allan CG 12T*



*Richard Allan CB10*



*Acustica-Electronica R2T*



*Celestion CX2012 co-axial speaker*

# DIRECTORY OF SPEAKERS AND ENCLOSURES

● This directory is divided into two parts. **Part 1** deals with the range of drive units which, by makers' specifications, are within the Hi-Fi classification. **Part 2** deals with complete speaker systems and enclosures. These, as a general rule, embody the drive units of Part 1. For economy of space the following abbreviations are used: **HC**=handling capacity; **FR**=frequency range; **c/o**=cut-off; **vci**=voice coil impedance; **rcf**=recommended crossover frequency (and in Part 2) **Rec**=recommended units; Height by Width by Depth are the order of printed dimensions.

## PART I—DRIVE UNITS

**ACUSTICA-ELECTRONICA.** Distributors: Britimpex Ltd., 16-22 Great Russell Street, London, W.C.1. Tel: Museum 7600.

**Roselson R1T.** Horn tweeter. Copper voice coil. 8 or 15 ohms impedance. Gap flux 14,200 gauss. Total flux 34,000 maxwells. HC 10W RMS. FR 1.5-15 Kc/s. Size:  $2\frac{3}{4} \times 5\frac{3}{4} \times 5$  in. Price: £2 19s 6d.

**Roselson R2T.** Mid-range horn. Copper voice coil. 8 or 15 ohms impedance. Gap flux 11,300 gauss. Total flux 41,300 maxwells. FR 4.5 c/s-8 Kc/s. HC 12W RMS. Size:  $5 \times 9 \times 10\frac{3}{8}$  in. Price: £3 19s 6d.

**Roselson 12 DFC.** Bass and mid-range coaxial unit. 12 in. cone.  $1\frac{1}{2}$  in. copper voice coil. 8 or 15 ohms. Gap flux 14,300 gauss. Total flux 113,300 maxwells. HC 12W RMS. FR 20 c/s-9.5 Kc/s. Price: £7 17s. 6d.

**Roselson 12 3XL.** Full-range triaxial unit. 12 in. cone. Copper voice coil. 8 or 15 ohms. Gap flux 14,300 gauss. Total flux 113,300 maxwells. HC 15W RMS. FR 20 c/s-15 Kc/s. Price: £15 4s. 6d.



**ADASTRA ELECTRONICS LTD.,** 167 Finchley Road, Swiss Cottage, London, N.W.3. Tel: Maida Vale 8164/5.

**Top 20.** 12 in. heavy duty cone speaker for guitars, electronic music or bass unit in multiple system. Impregnated fibre cone with corrugated surround. Aluminium voice coil,  $1\frac{1}{2}$  in. diameter. Impedance 15 ohms. Gap flux 12,000 gauss. Total flux 80,000 maxwells. FR 20 c/s-10 Kc/s, level over 100 c/s-6 Kc/s. Bass resonance 80 c/s. Heavy diecast chassis. Dustproof centring device. Price: £5 5s.

**RICHARD ALLAN RADIO LTD.,** Bradford Road, Gomersal, Cleckheaton, Yorkshire. Tel: Cleckheaton 2442/2. Cables: Acoustics, Bradford.

**460TC.** 4 in. tweeter. Paper cone. Cambric surround. Voice coil  $\frac{9}{16}$  in. Gap flux 6,000 gauss. Total flux 9,000 maxwells. HC 3W. vci 5, 8 or 15 ohms. FR 2 Kc/s-17 Kc/s. rcf 5 Kc/s. Price: 19s. 6d. (U.K. purchase tax 3s. 5d.).

**CB8.** 8 in. mid-range. Paper cone, doped cambric surround. Voice coil 1 in. Gap flux 12,000 gauss. Total flux 48,000 maxwells. HC 5W. vci 8 or 15 ohms. FR 50 c/s-10 Kc/s. Price: £3 12s. 6d. (U.K. purchase tax 12s. 8d.).

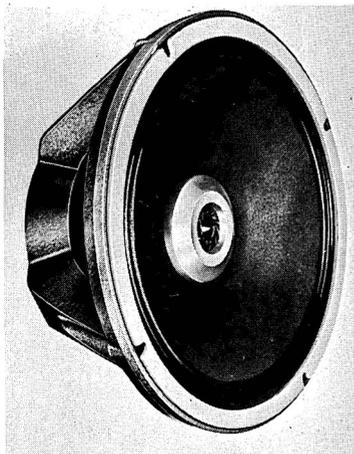
**CB8T.** 8 in. paper cone plus tweeter inner. Doped cambric surround. Voice coil 1 in. Gap flux 12,000 gauss. Total flux 48,000 maxwells. HC 5W. vci 8 or 15 ohms. FR 50 c/s-15 Kc/s. Price: £3 15s. (U.K. purchase tax 15s.).

**CB4 Tweeter.** 4 in. paper cone. Cambric surround. Voice coil  $\frac{9}{16}$  in. Gap flux 10,000 gauss. Total flux 15,000 maxwells. HC 3W. vci 5, 8 or 15 ohms. FR 2 Kc/s-17 Kc/s. rcf 5 Kc/s. Price: £1 12s. 6d. (U.K. purchase tax 5s. 8d.).

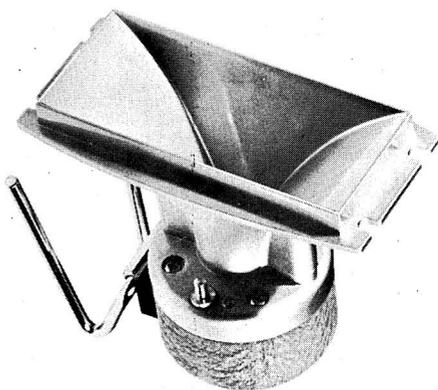
**CB10.** 10 in. paper cone, doped cambric surround. Voice coil  $1\frac{1}{2}$  in. Gap flux 12,000 gauss. Total flux 90,000 maxwells. HC 8W. vci 8 or 15 ohms. FR 2 Kc/s-17 Kc/s. rcf 5 Kc/s. Price: £6 5s. (U.K. purchase tax £1 2s.).

**CB10T.** 10 in. paper cone, doped cambric surround plus tweeter inner. Voice coil  $1\frac{1}{2}$  in. Gap flux 12,000 gauss. Total flux 90,000 maxwells. HC 8W. vci 8 or 15 ohms. FR 40 c/s-15 Kc/s. Price: £6 10s. (U.K. purchase tax £1 2s. 8d.).

**CB12.** 12 in. Single paper cone. Doped fabric surround. Voice coil  $1\frac{1}{2}$  in. (copper). vci 8 or 15 ohms. Gap flux 12,000 gauss. Total flux 90,000 maxwells. Ceramic magnet. HC 8W. FR 20 c/s-9 Kc/s. rcf 1,000 c/s. Price: £7.



*Celestion CX1512 co-axial speaker*



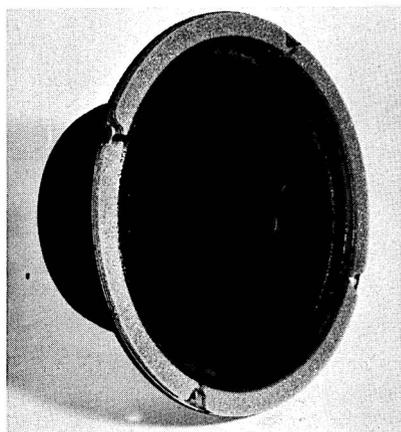
*Eagle HT20 rectangular horn tweeter*



*Eagle CT10 horn tweeter*



*Eagle CX 300*



*Eagle FR8*



*Elac type 50/12*

**CB12T.** 12 in. Paper cone+ tweeter inner. Doped fabric surround. Voice coil  $1\frac{1}{2}$  in. (copper). vci 8 or 15 ohms. Gap flux 12,000 gauss. Total flux 90,000 maxwells. Ceramic magnet. HC 8W. FR 25 c/s-15 Kc/s. Price: £7 5s.

**CB15.** 15 in. paper cone. Doped cambric surround. Voice coil 2 in. Gap flux 14,000 gauss. Total flux 182,000 maxwells. HC 15W. vci 8 or 15 ohms. FR 20 c/s-5 Kc/s. Price: £15 10s.

**CB15 HD.** 15 in. paper cone and surround. Voice coil 2 in. Gap flux 14,000 gauss. Total flux 182,000 maxwells. HC 25W. vci 8 or 15 ohms. FR 60 c/s-5 Kc/s. Price: £15 10s.

**CG8T.** 8 in. paper cone, doped cambric surround plus tweeter inner. Voice coil 1 in. Gap flux 14,000 gauss. Total flux 56,000 maxwells. HC 6W. vci 8 or 15 ohms. FR 50 c/s-17 Kc/s. Price: £5 7s. 6d. (U.K. purchase tax 18s. 9d.).

**CG8.** 8 in. paper cone, doped cambric surround. Voice coil 1 in. Gap flux 14,000 gauss. Total flux 56,000 maxwells. HC 6W. vci (copper). vci 8 or 15 ohms. Gap flux 14,000 gauss. Total flux 105,000 maxwells. Ceramic magnet. HC 10W. FR 25 c/s-15 Kc/s. Price: £5 5s. (U.K. purchase tax 18s. 3d.).

**CG10.** 10 in. paper cone, doped cambric surround. Voice coil  $1\frac{1}{2}$  in. Gap flux 14,000 gauss. Total flux 105,000 maxwells. HC 10W. vci 8 or 15 ohms. FR 40 c/s-6 Kc/s. Price: £7 (U.K. purchase tax £1 4s. 4d.).

**CG10T.** 10 in. paper cone, doped cambric surround plus tweeter inner. Voice coil  $1\frac{1}{2}$  in. Gap flux 14,000 gauss. Total flux 105,000 maxwells. HC 10W. vci 8 or 15 ohms. FR 40 c/s-15 Kc/s. Price: £7 5s. (U.K. purchase tax £1 5s. 3d.).

**CG12.** 12 in. Single paper cone. Doped fabric surround. Voice coil  $1\frac{1}{2}$  in. (copper). vci 8 or 15 ohms. Gap flux 14,000 gauss. Total flux 105,000 maxwells. Ceramic magnet. HC 10W. FR 25 c/s-9 Kc/s. rcf 1,000 c/s. Price: £8.

**CG12T.** 12 in. Paper cone+ tweeter inner. Doped fabric surround. Voice coil  $1\frac{1}{2}$  in. 8 or 15 ohms. FR 50 c/s-10 Kc/s. Price: £8 5s.

**CG12 Super.** 12 in. paper cone, doped cambric surround. Voice coil 2 in. Gap flux: 14,000 gauss. Total flux 182,000 maxwells. HC 15W. vci 8 or 15 ohms. FR 25 c/s-5 Kc/s. Price: £10 10s.

**CG12 Super HD.** 12 in. paper cone and surround. Voice coil 2 in. Gap flux 14,000 gauss.

Total flux 182,000 maxwells. HC 25W. vci 8 or 15 ohms. FR 60 c/s-5 Kc/s. Price: £10 10s.

**CG15.** 15 in. paper cone, doped cambric surround. Voice coil 2 in. Gap flux 17,000 gauss. Total flux 220,000 maxwells. HC 20W. vci 8 or 15 ohms. FR 20 c/s-5 Kc/s. Price: £17 10s.

**CG15 HD.** 15 in. paper cone and surround. Voice coil 2 in. Gap flux 17,000 gauss. Total flux 220,000 maxwells. HC 30W. vci 8 or 15 ohms. FR 60 c/s-5 Kc/s. Price: £17 10s.

**CR5.** 5 in. paper cone. Neoprene surround. Voice coil 1 in. Gap flux 14,000 gauss. Total flux 56,000 maxwells. HC 6W. vci 5, 8 or 15 ohms. FR 30 c/s-10 Kc/s. Specifically designed for low volume infinite baffle. Price: £4 12s. 6d. (U.K. purchase tax 16s. 2d.).

Richard Allan mid-range and full-range speaker modules included in speaker enclosure section.



**ALTEC LANSING.** Distributors: Carston Electronics Ltd., 71 Oakley Road, Chinnor, Oxon. Tel: Kingston Blount (OTH45) 8561.

**Altec Lansing 604E.** Dual coaxial full-range speaker unit. 15 in. main cone with 3 in. voice coil, HF radiator with  $1\frac{3}{4}$  in. voice coil. High compliance assembly with cloth surround. LF voice coil copper, HF voice coil aluminium. Impedance: 8 or 16 ohms. Gap flux: LF 13,000 gauss, HF 15,500 gauss. HC 35W (50W peak). FR 20 c/s-22 Kc/s. Crossover: built-in dual full section 1.5 Kc/s. Price: approximately £70.



**AUDIO AND DESIGN LTD.,** 40 Queen Street, Maidenhead, Berks. Tel: Maidenhead 25204.

**TCL Drive Unit.** Titanium cone speaker module. 4 in. titanium piston with cantilever suspension.  $1\frac{1}{2}$  in. dia voice coil. Total flux 160,000 maxwells. Mean hemispherical power response substantially level to 15 Kc/s. Voice coil impedance: 7.5 ohms at 400 c/s. HC 15W RMS in suitable enclosure. Price: £18 15s.

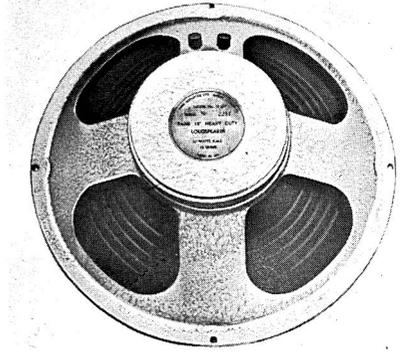


**BAKER REPRODUCERS LTD.,** Bensham Manor Road Passage, Thornton Heath, Surrey. Tel: Thornton Heath 1665.

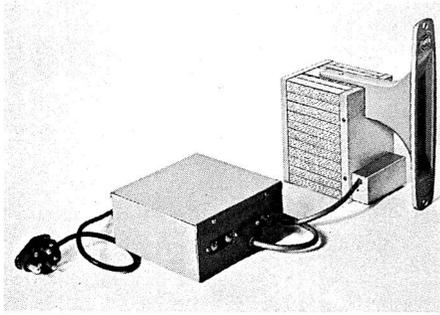
**Stalwart.** Full range 12 in. cone speaker. Paper cone with roll surround. Voice coil  $1\frac{1}{2}$  in.



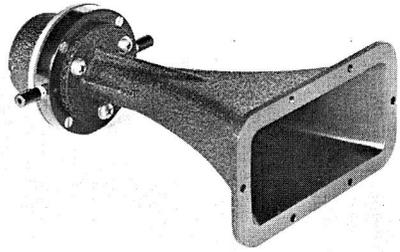
*Fane 152/17A speaker*



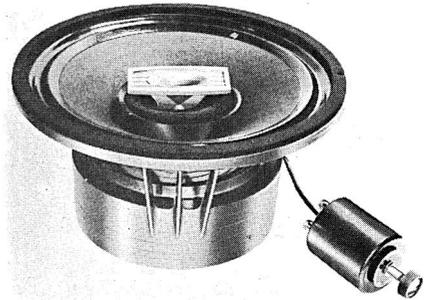
*Fane model 152/17*



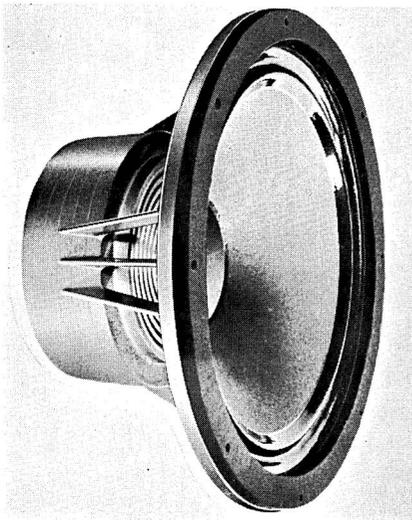
*Fane Ionofane 601 HF driver*



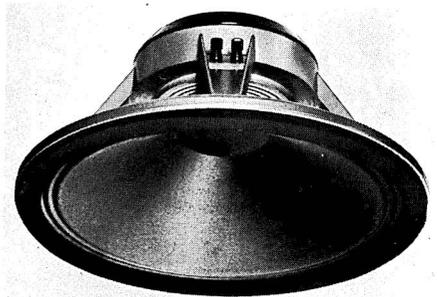
*Goodmans Midax 650*



*Goodmans Triaxiom 1220C*



*Goodmans Audiom 81*



*Goodmans Audiom 91 (18in.)*

Copper voice coil. Impedance 3 or 15 ohms. Gap flux 12,000 gauss. HC 15W. RMS. FR 45 c/s-13 Kc/s. Price: £5 5s.

**Major.** Full range 12 in. speaker with built-in tweeter cone. 14,000 gauss magnetic gap. FR 40 c/s-14.5 Kc/s. HC 20W RMS. Impedance 15 ohms. Cast aluminium chassis. Weight: 6 lb. Price: £8.

**Deluxe Mk II.** Full range 12 in. cone speaker. 15W RMS. Bass resonance 32-38 c/s. Gap flux 14,000 gauss. Copper voice coil  $1\frac{1}{2}$  in. diameter. Impedance 15 ohms. Paper cone with foam plastic surround. Built-in tweeter cone. FR 25 c/s-16 Kc/s. Cast aluminium chassis. Depth 6 in. Weight: 6 lb. Price: £9.

**Superb Twelve.** Full range 12 in. speaker with built-in tweeter cone. Plastic surround. Voice coil diameter:  $1\frac{1}{2}$  in. Impedance 15 ohms. Gap flux 16,500 gauss. HC 20W RMS. FR 20 c/s-17 Kc/s. Bass resonance 22-26 c/s. Aluminium speech coil. Diecast aluminium chassis. Weight: 10 lb. Price: £16.

**Bass Auditorium 12.** Medium range 12 in. cone speaker suitable for bass unit in multi-speaker system. HC 25W RMS. Bass resonance 36-45 c/s. Gap flux 15,000 gauss. Copper voice coil  $1\frac{1}{2}$  in. diameter. Impedance 15 ohms. FR 25 c/s-12 Kc/s. Paper cone with roll surround. Cast aluminium chassis. Depth 7 in. Weight: 10 lb. Price: £12 10s.

**Bass Auditorium 15.** High power 15 in. speaker suitable for bass unit in multi-speaker unit. HC 35W RMS. Similar specification to Auditorium 12 except 2 in. diameter voice coil and handling capacity 35W RMS. Depth: 8 in. Weight: 15 lb. Price: £18.

**Laboratory Standard 12.** Full range 12 in. speaker employing patented differential wave impedance cone. Resin-impregnated paper cone with central metallic ellipse.  $1\frac{1}{2}$  in. diameter aluminium voice coil. Foam plastic surround. Impedance 15 ohms. Gap flux 15,000 gauss. HC 15W RMS. FR 20 c/s-20 Kc/s. Bass resonance 22-27 c/s. Price: £22 10s.

**Laboratory Standard 15.** Medium range 15 in. speaker employing patented differential wave impedance cone. Resin-impregnated paper cone with central metallic ellipse. Foam plastic surround. 2 in. diameter copper voice coil. Impedance 15 ohms. Cast aluminium chassis. Gap flux 15,000 gauss. HC 20W RMS. FR 20 c/s-12 Kc/s. Bass resonance 18-25 c/s. Price: £28 10s.

**Group 25.** 12 in. cone speaker with heavy duty suspension for electronic music, guitars, etc. HC 25W RMS. Impedance 15 ohms. Bass resonance 80 c/s. FR 30 c/s-10 Kc/s. Gap flux 12,000 gauss. Voice coil  $1\frac{1}{2}$  in. Depth: 6 in. Weight: 5 lb. Price: £5 5s.

**Group 35.** 12 in. cone speaker with heavy duty suspension for electronic music, guitars, etc. HC 35W RMS. Impedance 15 ohms. Bass resonance 80 c/s. FR 30 c/s-10 Kc/s. Gap flux 14,000 gauss. Voice coil  $1\frac{1}{2}$  in. Depth:  $6\frac{1}{4}$  in. Weight: 6 lb. Price: £8 18s. 6d.

**Group 50.** 15 in. cone speaker with heavy duty suspension for electronic music, guitars, etc. HC 50W RMS. Impedance 15 ohms. Bass resonance 80 c/s. FR 30 c/s-10 Kc/s. Gap flux 17,000 gauss. Voice coil 2 in. Depth: 8 in. Weight: 15 lb. Price: £18 18s.



**BURNE-JONES & CO. LTD.,** 18 Brunswick Road, Sutton, Surrey.

**B.J. Treble 20.** Omni-directional multi-horn. One 4 in. unit. Crossover built-in. Response 1,000-18,000 c/s. Size: 6×5 in. Weight:  $1\frac{1}{2}$  lb. Price: £3 15s. including tax.

**B.J. Treble Twin.** Omni-directional horn. Two 4 in. drive units. Crossover included. Response 900-18,000 c/s. Size: 9×4 $\frac{3}{4}$ ×6 in. Weight: 2 lb. Price: £7 2s. 9d. including tax.



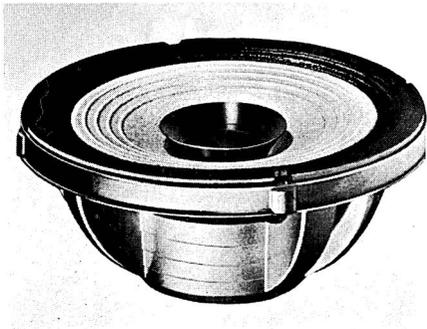
**CELESTION LTD.,** Ferry Works, Thames Ditton, Surrey. Tel: 01-398 3402. Cables: Voicecoil, Thames Ditton.

**Studio Series CX1512.** 12 in. coaxial unit comprising paper cone bass speaker and pressure driven tweeter. Plastaflex surround. Bass voice coil  $1\frac{1}{4}$  in. diameter, treble voice coil  $\frac{3}{4}$  in. diameter, both copper wound. Imp 15 ohms. Gap flux 13,000 gauss. Total flux 88,000 maxwells. HC 15W. FR 30 c/s-15 Kc/s. Price: £12 5s.

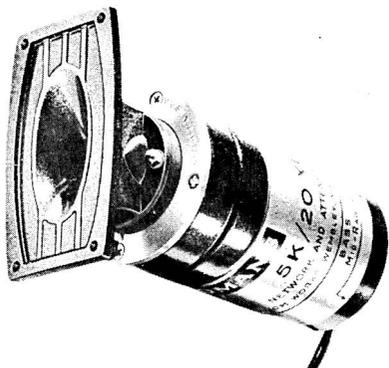
**Studio Series CX2012.** 12 in. coaxial unit comprising paper cone bass speaker and pressure driven tweeter. Hi-flex free surround. Bass voice coil  $1\frac{3}{4}$  in. diameter copper wound, treble voice coil 1 in. diameter aluminium wound. Imp 15 ohms. Gap flux 17,000 gauss. Total flux 180,000 maxwells. HC 20W. FR 30 c/s-18 Kc/s. Price: £17 10s.



*Goodmans Audiom 51*



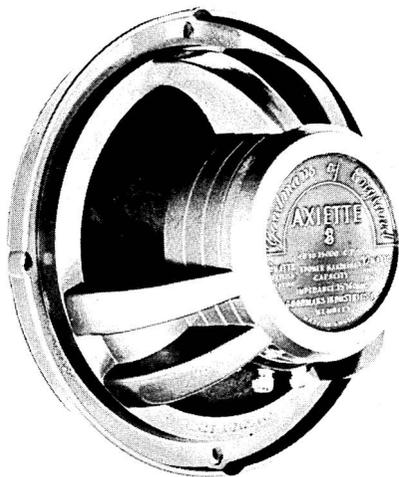
*Goodmans Twin Axiette 8*



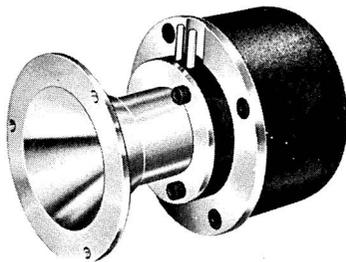
*Goodmans Trebax 5K/20 XL*



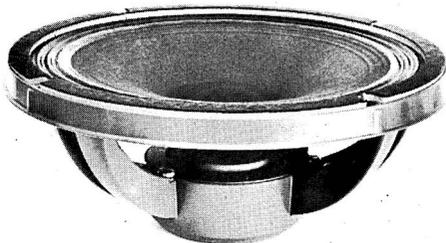
*Goodmans Axiom 301*



*Goodmans Axiette 8*



*Goodmans Trebax HF unit*



*Goodmans Axiom 10*

**Studio 12.** 12 in. bass drive designed specially for use with HF1300 Mk 2 and CO3K crossover. Paper cone with ultra compliant rubber surround. Voice coil diameter  $1\frac{1}{4}$  in. Imp 15 ohms. Total flux 88,000 maxwells. HC 15W RMS. FR 30 c/s-5 Kc/s. Rec crossover 3 Kc/s. Rigid diecast chassis. Enclosure details available on request. Price: £10 5s.

**HF1300 Mk 2.** High frequency 3 in. tweeter. Impedance 15 ohms at 10 Kc/s. HC 5W RMS (for use with systems up to 20W). FR 2-15 Kc/s. Rec crossover 3 Kc/s. Styled with flange to give easy and accurate mounting. Phase correction plate for improved polar response. Self-aligning diaphragm. Contoured pole piece. Damped acoustic cavity to reduce fundamental diaphragm resonance. High flux magnet. Price: £5 10s.



**DECCA SPECIAL PRODUCTS,** Decca Radio and Television Division of the Decca Record Company Ltd., Ingate Place, Queenstown Road, London, S.W.8. Tel: Macauley 6677.

**Kelly ribbon Mk II.** Ribbon HF unit. 2 micron aluminium ribbon element. Imp 15 ohms at 400 c/s. Handling capacity 10W. FR 2.5-25 Kc/s. Rec crossover 2.5 Kc/s. Rear face of ribbon sealed-in to permit mounting in enclosure without inter-modulation. Built-in transformer. Air coupling by catenoidal horn. Rigid diecast assembly. Price: £11 10s.

**Kelly LF driver Mk V.** 12 in. direct radiator. Curvilinear impregnated paper cone. Doped fabric concertina surround. 2 in. diameter voice coil. Imp 15 ohms at 400 c/s. Gap flux 14,000 gauss. Total flux 250,000 maxwells. HC 35W. FR 30 c/s-5 Kc/s. Rec crossover 2.5 Kc/s. Free air resonance: 25 c/s. 11 lb. ceramic ring magnet. Weight: 13 lb. Price: £14.

**Kelly LF driver Mk VII.** 15 in. direct radiator. Curvilinear impregnated paper cone. Doped fabric concertina surround. Imp 15 ohms at 400 c/s. Gap flux 17,000 gauss. Total flux 350,000 maxwells. HC 50W. FR 30 c/s-5 Kc/s. Rec crossover 2.5 Kc/s. Price: £20.



**DUODE LTD.,** Westfield Mills, Broad Lane, Bramley, Leeds, 13. Tel: Pudsey 77536

**Duode Super 12.** Linen moulded cone. Foam plastic surround. Incorporates original Barker-patented aluminium speech coil former fitted

with latex sleeve. This applies negative feedback and gives response 20 c/s-20 Kc/s  $\pm 2$  dB. Price: £17 10s.



**EAGLE PRODUCTS.** Distributors: B. Adler & Sons (Radio) Ltd., 32a Coptic Street, London, W.C.1. Tel: Museum 9066/7. Cables: Reldab, London.

**CX300.** 12 in. coaxial. Paper cone, plastic treated surround. 3 in. aluminium voice coil. vci 16 ohms. Gap flux (woofer) 12,000 gauss; (tweeter) 10,500 gauss. Total flux (woofer) 200,000 maxwells; (tweeter) 18,000 maxwells. HC 15W. FR 30 c/s-16 Kc/s. cf 2,500 c/s. Price: £15.

**8CX.50.** Twin unit comprising 8 in. woofer and horn tweeter. Roll surround. Imp 16 ohms. Woofer 10,500 gauss, tweeter 12,000 gauss. 15W. FR 30 c/s-22 Kc/s. Resonant freq 30 c/s. Crossover 3 Kc/s. Price: £9 19s. 9d. (U.K. purchase tax £1 15s. 3d.).

**CT10 Horn Tweeter.**  $3\frac{1}{4}$  in. Aluminium cone and surround. Voice coil 1 in. (aluminium). vci 16 ohms. HC 10W. FR 1,500 c/s-18 Kc/s. rcf 3,000 c/s. Price: £1 7s. 6d.

**HT20 Rectangular Horn Tweeter.**  $4 \times 2$  in. Aluminium cone. Voice coil 1 in. (aluminium). vci 16 ohms. Gap flux 13,500 gauss. HC 20W. FR 1,500 c/s-18 Kc/s. rcf 3,000 c/s. Price: £4 2s. 6d.

**FR.4.** High-compliance full-range 4 in. unit. FR 40 c/s-16 Kc/s. Bass resonance: 60-70 c/s. HC 5W RMS. Flux density: over 10,000 gauss. Impedance: 16 ohms. Baffle opening:  $3\frac{1}{2}$  in. Depth: 2 in. Price: £2 12s. 6d. (U.K. purchase tax 9s. 6d.).

**FR.65.** High-compliance full-range  $6\frac{1}{2}$  in. unit. FR 30 c/s-18 Kc/s. HC 10W RMS. Flux density: over 11,000 gauss. Impedance: 16 ohms. Baffle opening:  $5\frac{3}{8}$  in. Depth:  $2\frac{3}{4}$  in. Price: £4 4s. (U.K. purchase tax 15s. 2d.).

**FR.8.** High-compliance full-range 8 in. unit. FR 30 c/s-20 Kc/s. Bass resonance: 30-50 c/s. HC 15W RMS. Flux density: over 12,000 gauss. Impedance: 16 ohms. Baffle opening:  $6\frac{1}{2}$  in. Depth:  $3\frac{3}{8}$  in. Price: £4 18s. (U.K. purchase tax 17s.).

**ELAC. Electro Acoustic Industries Ltd.,** Stamford Works, Broad Lane, Tottenham, London, N.15. Tel: Tottenham 0505/9. Cables: Elac London, N.15.

**Elac Type 8N/148 (N/832).** 8 in. Exponential paper cone. Paper surround, integral with cone. Voice coil 1 in. copper. vci 15 ohms. Gap flux 12,000 gauss. Total flux 48,300 maxwells. HC 5 watts. FR 55 c/s-11 Kc/s (loaded conditions). rcf. High frequency crossover 8,000 c/s. Price: £2 15s. (U.K. purchase tax 8s. 10d.).

**Elac 8N/148 Mk II (8N/185).** Similar to 8N/148 but frequency response 40 c/s-12 Kc/s. Price: £3 (U.K. purchase tax 9s. 9d.).

**Elac 50/12 (Ceramic magnet).** 8 in. Exponential paper cone, plus inner cone. Paper-plasticised surround. Voice coil 1 in. copper. vci 3 ohms. Gap flux 10,000 gauss. Total flux 40,300 maxwells. HC 5W. FR 55 c/s-12 Kc/s. rcf. High frequency crossover 8,000 c/s. Price including tax: £3 3s.



**EMI SOUND PRODUCTS LTD.,** Hayes, Middlesex. Tel: Hayes 3888. Cables: Emi-sound, London.

**92390 PAL.**  $13\frac{1}{2} \times 8\frac{1}{8}$  in. elliptical. Paper main-cone/aluminium centre-cone. Paper surround. Voice coil 1 in. copper wire. vci 3 ohms. Gap flux 11,000 gauss. Total flux 43,500 maxwells. HC 10W. FR 40 c/s-7 Kc/s. rcf 6,000 c/s. Price on application.

**92390 PBL.** Details as for PAL. vci 15 ohms.

**92390 PEL.**  $13\frac{1}{2} \times 8\frac{1}{8}$  in. elliptical. Paper main cone/aluminium centre cone. PVC surround. Voice coil 1 in. copper wire. vci 3 ohms. Gap flux 13,000 gauss. Total flux 69,000 maxwells. HC 10W. (20W version also available). FR 20 c/s-5 Kc/s. rcf 4,500 c/s. Price on application.

**92390 PFL.** Details as for PEL. vci 15 ohms.

Four other versions with impedances 3-15 ohms and handling capacity 10-20 watts.

**92390 PE.** Combination loudspeaker:  $13\frac{1}{2} \times 8\frac{1}{8}$  in. elliptical with  $3\frac{1}{2}$  in. dia tweeter. Paper main-cone/aluminium centre-cone/paper tweeter. PVC surround. Voice coil 1 in. copper wire. vci 3 ohms. Gap flux 13,000 gauss. Total flux 69,000 maxwells. HC 10W. FR 20 c/s-20 Kc/s. rcf 5,000 c/s. LC filter is mounted on chassis. Price on application.

**92390 PF.** Details as for PE. vci 15 ohms.

Six other versions with impedances 3-15 ohms and handling capacity 10-20 watts. Details and prices on request.

**97492 J.**  $2\frac{1}{2}$  in. hard PVC cone. Voice coil  $\frac{1}{2}$  in. copper wire. vci 3 ohms. Gap flux 8,500 gauss. FR 5-15 Kc/s. rcf 6,000 c/s. Price on application.

**97492 E.** Details as for Model J. vci 8 ohms.

**97492 C.** Details as for Model J. vci 15 ohms.

**99110 N.**  $3\frac{3}{8}$  in. curved paper diaphragm. Paper surround. Voice coil  $\frac{1}{2}$  in. copper wire. vci 3 ohms. Gap flux 10,000 gauss. FR 3-20 Kc/s. rcf 4,500 c/s. Price on application.

**99110 J.** Details as for Model N. vci 8 ohms.

**99110 M.** Details as for Model N. vci 15 ohms.



**FANE ACOUSTICS LTD.,** Hick Lane, Batley, Yorks. Tel: Batley 2114. Cables: Fane, Batley.

**501.** 5 in. mid-range unit. Gap flux 15,000 gauss. Total flux 60,000 maxwells. HC 20W. 1 in. diameter aluminium voice coil. Impedance 15 ohms. Rigid cone with neoprene surround. FR 400 c/s-5 Kc/s. Rec crossover: 800 c/s and 3.5 Kc/s. Price: £5 5s. (U.K. purchase tax 19s.).

**505.** Similar to 501 but with 11,000 gauss magnet and HC 15W. Price: £3 3s. (U.K. purchase tax 11s. 4d.).

**502.** 5 in. full-range unit for small enclosures. Gap flux 15,000 gauss. Total flux 60,000 maxwells. HC 8W. 1 in. copper voice coil. Price: £5 5s. (U.K. purchase tax 19s.).

**506.** Similar to 502 but with 11,000 gauss magnet and HC 7W. Price: £3 3s. (U.K. purchase tax 11s. 4d.).

**801.** 8 in. full-range unit. 1 in. pole piece with 15,000 gauss magnet. Twin cone. Aluminium voice coil. Resonance 25 c/s. Response up to 15 Kc/s. HC 10W. Price: £5 (U.K. purchase tax 18s. 1d.).

**802.** 8 in. unit similar to 801 but with single cone and copper voice coil. Resonance 70 c/s. Response up to 10 Kc/s. Price: £4 10s. (U.K. purchase tax 16s. 4d.).

**805.** 8 in. unit similar to 801 but with 11,000 gauss magnet. Price: £4 (U.K. tax 14s. 6d.).

**806.** 8 in. unit similar to 802 but with 11,000 gauss magnet. Price: £3 7s. 6d. (U.K. purchase tax 12s. 2d.).

**101/10.** 10 in. ceramic magnet unit with 2 in. voice coil. HC 15W RMS. Impedance 15 ohms. Main resonance 60 c/s. Gap flux 10,000 gauss. Total flux 100,000 maxwells. Single cone. copper voice coil. FR 40 c/s-10 Kc/s. Price: £4 17s. 6d. (U.K. purchase tax 17s. 7d.).

**101/10a.** Similar to 101/10 but with twin cone, aluminium voice coil and FR 40 c/s-15 Kc/s. Price: £5 17s. 6d. (U.K. purchase tax £1 1s. 3d.).

**101/12.** Similar to 101/10 but with 12,000 gauss magnet. Price: £6 6s. (U.K. purchase tax £1 2s. 10d.).

**101/12a.** Similar to 101/12 but with twin cone, aluminium voice coil and FR 40 c/s-15 Kc/s. Price: £7 7s. (U.K. purchase tax £1 6s. 7d.).

**101/14.** Similar to 101/10 but with 14,000 gauss magnet. Price: £8 8s. (U.K. purchase tax £1 10s. 5d.).

**101/14a.** Similar to 101/14 but with twin cone, aluminium voice coil and FR 40 c/s-15 Kc/s. Price: £9 9s. (U.K. purchase tax £1 14s. 2d.).

**1001.** 10 in. full-range unit. 1 in. dia pole piece with 15,000 gauss magnet. Twin cone. Aluminium voice coil. Resonance 22 c/s. Response up to 15 Kc/s. HC 10W. Price: £5 15s. (U.K. purchase tax £1 0s. 10d.).

**1002.** 10 in. unit similar to 1001 but with single cone and copper voice coil. Resonance 60 c/s. Response up to 10 Kc/s. Price: £5 2s. 6d. (U.K. purchase tax 18s. 6d.).

**1005.** 10 in. unit similar to 1001 but with 11,000 gauss magnet. Price: £4 10s. (U.K. purchase tax 16s. 4d.).

**1006.** 10 in. unit similar to 1002 but with 11,000 gauss magnet. Price: £3 17s. 6d. (U.K. purchase tax 14s.).

**122/10.** 12 in. ceramic magnet unit with 2 in. diameter voice coil. HC 20W RMS. Impedance 15 ohms. Main resonance 40 c/s or 70 c/s as required. FR 30 c/s-5 Kc/s. Gap flux 10,000 gauss. Total flux 100,000 maxwells. Copper voice coil. Single cone. Price: £5 17s. 6d.

**122/10a.** Similar to 122/10 but with twin cone, aluminium voice coil and FR 30 c/s-15 Kc/s. Price: £6 17s. 6d.

**122/12.** Similar to 122/10 but with 12,000 gauss magnet. Price: £7 7s.

**122/12a.** Similar to 122/12 but with twin cone, aluminium voice coil and FR 30 c/s-15 Kc/s. Price: £8 8s.

**122/14.** Similar to 122/10 but with 14,000 gauss magnet and HC 22W. Price: £9 9s.

**122/14a.** Similar to 122/14 but with twin cone, aluminium voice coil and FR 30 c/s-15 Kc/s. Price: £10 10s.

**122/17.** Similar to 122/10 but with 17,000 gauss magnet, 25W handling capacity and FR 25 c/s-6 Kc/s. Price: £11 17s. 6d.

**122/17a.** Similar to 122/17 but with twin cone, aluminium voice coil and FR 30 c/s-17 Kc/s. Price: £12 17s. 6d.

**152/12.** 15 in. ceramic magnet unit with 2 in. diameter voice coil. HC 25W RMS. Impedance 15 ohms. Main resonance 32 c/s. Gap flux 12,000 gauss. Total flux 160,000 maxwells. Copper voice coil. Single cone. FR 25 c/s-2.5 Kc/s. Price: £12 12s.

**Ionofane 601.** Ionic high-frequency speaker unit. FR level 2.5 Kc/s-30 Kc/s. Will handle high note portion of 20W music signal. Impedance 15 ohms. Mains power required: 200/220/240V AC at 55W. Price: £29 8s.

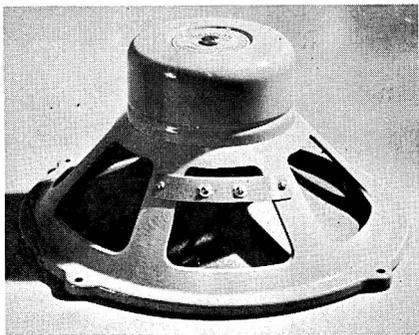
**152/12a.** Similar to 152/12 but with twin cone, aluminium voice coil and FR 30 c/s-15 Kc/s. Price: £13 13s.

**152/14.** Similar to 152/12 but with 14,000 gauss magnet, HC 27W and FR 25 c/s-3.5 Kc/s. Price: £14 14s.

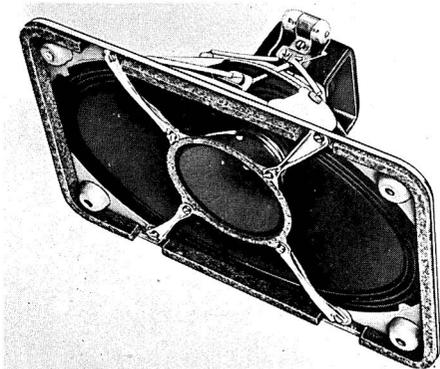
**152/17.** Similar to 152/12 but with 17,000 gauss magnet, HC 30W RMS, and FR 25 c/s-4 Kc/s. Price: £16 16s.

**152/17a.** Similar to 152/17 but with aluminium voice coil, twin cone and FR 30 c/s-17 Kc/s. Price: £17 17s.

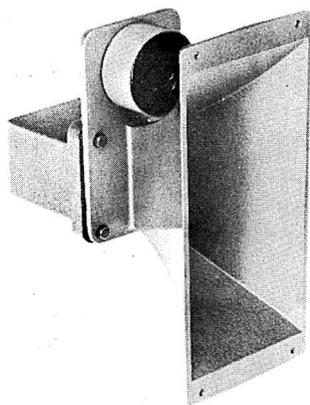
**153.** 15 in. extra heavy duty unit with ceramic magnet and 3 in. diameter voice coil. Gap flux 14,500 gauss. Total flux 375,000 maxwells. HC 40W RMS. Copper voice coil. Single cone. FR 30 c/s-3.5 Kc/s. Impedance 15 ohms. Main resonance 40 c/s. Weight: 20 lb. Price: £18 18s.



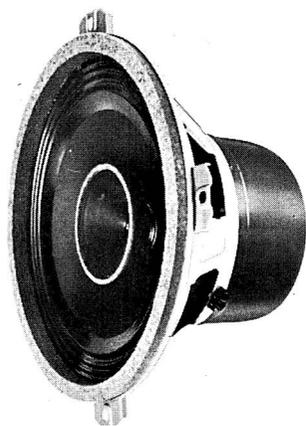
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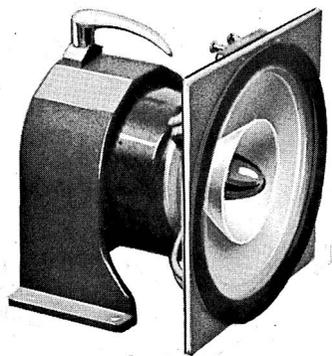
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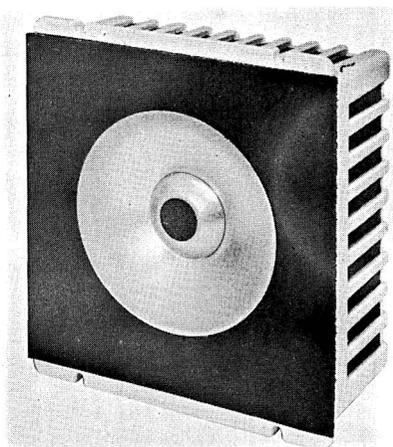
*Kelly Mk. 2 ribbon*



*Isophon Orchester 12 in. dual concentric*



*Lowther PM6*



*Jordan-Watts speaker drive module*

**183.** 18 in. extra heavy duty unit with ceramic magnet and 3 in. diameter voice coil. Gap flux 14,500 gauss. Total flux 375,000 maxwells. HC 60W. Copper voice coil. Single cone. FR 20 c/s-3 Kc/s. Impedance 15 ohms. Main resonance 30 c/s. Weight: 22 lb. Price: £25 4s.

Special low resonance versions of 10 in., 12 in., 15 in., and 18 in. speakers are available at slightly higher prices. These are intended for use as bass units in high fidelity bass systems. They have rigid moulded fibre cones with rubber surround allowing free axial movement. Must be used in suitable reflex or infinite baffle cabinets. Not recommended for use with electric guitars or with small open baffles.



**GOODMANS LOUDSPEAKERS LTD.,**  
Axiom Works, Wembley, Middx. Tel: 01-902-1200. Cables: Goodaxiom, Wembley.

**Axiette 8.** 8 in. Paper cone. Plastic treated surround. Voice coil 1 in. Gap flux 13,500 gauss. Total flux 53,000 maxwells. HC 6W. vci 15 ohms. FR 40-15,000 c/s. Price: £5 5s. (U.K. purchase tax 18s. 6d.).

**Twin Axiette 8.** 8 in. twin cone version of Axiette 8. FR 40 c/s-18 Kc/s. Mechanical crossover at 2 Kc/s. Other details as for Axiette 8. Price: £5 19s. (U.K. purchase tax £1 1s.).

**Axiom 10.** 10 in. Paper cone. Plastic treated surround. Voice coil 1 in. Gap flux 13,500 gauss. Total flux 53,000 maxwells. HC 10W. vci 15 ohms. FR 40-15,000 c/s. Price: £6 5s. (U.K. purchase tax £1 2s.).

**Axiom 80.** 9½ in. Twin Diaphragm paper cone, free edge surround. Voice coil 1 in. Gap flux 17,000 gauss. Total flux 62,000 maxwells. HC 6W. vci 15 ohms. FR 20-20,000 c/s. Price: £18 8s. 11d. (U.K. purchase tax £3 5s. 1c.).

**Trebox.** Horn-loaded pressure tweeter. Aluminium diaphragm. Voice coil 1 in. HC suitable for inclusion in systems of up to 25W. vci 15 ohms at 10 Kc/s. FR 2,500-20,000 c/s. rcf 5 Kc/s. Price: £6 16s. 11d.

**Trebox 5K/20XL.** Horn loaded pressure tweeter. Built in L/C crossover (5,000 c/s) and attenuator. Suitable for inclusion in systems of up to 20W. Dispersion angle 90°. Price: £7 13s. 9d.

**Midax 650.** Horn loaded pressure unit. Resin impregnated linen diaphragm. Diecast horn.

Voice coil 1½ in. HC suitable for systems up to 25W. vci 15 ohms. FR 650-8,000 c/s. rcf 950 and 5,000 c/s. Price: £10 6s. 3d.

**Audiom 51 bass.** 12 in. Paper cone. Voice coil 1¼ in. (4.4 cm). vci 15-16 ohms. Gap flux 13,000 gauss. Total flux 87,500 maxwells. HC 15W. Fundamental resonance 35 c/s. Price: £10 7s.

The Audiom 51 is available in two versions: Audiom 51 Bass—details as above, for use as bass unit in high fidelity systems. Audiom 51 Standard (50 c/s) for PA, guitars and all arduous conditions.

**Audiom 61 bass.** 12 in. Paper cone. Voice coil 1¼ in. (4.4 cm). vci 15-16 ohms. Gap flux 16,500 gauss. Total flux 185,000 maxwells. HC 20W. Fundamental resonance 35 c/s. Price: £15.

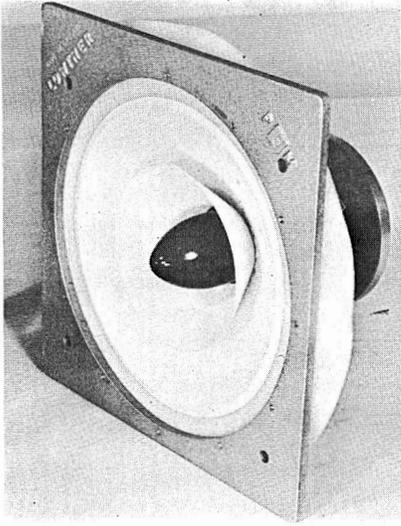
The Audiom 61 is available in two versions: Audiom 61 Bass—details as above, for use as bass unit in high fidelity systems. Audiom 61 Standard (50 c/s) for PA, guitars and all arduous conditions.

**Axiom 201.** 12 in. Twin diaphragm paper cone with pure plastic roll suspension. Voice coil 1¼ in. (4.4 cm) (aluminium). vci 15-16 ohms. Gap flux 13,000 gauss. Total flux 87,500 maxwells, HC 15W. FR 30 c/s-16 Kc/s. Built-in mechanical crossover at 5,000 c/s. Price: £11 8s. 9d.

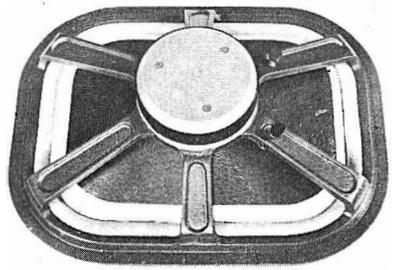
**Axiom 301.** 12 in. twin diaphragm paper cone with pure plastic roll suspension. Voice coil 1¼ in. (4.4 cm) (aluminium). vci 15-16 ohms. Gap flux 16,500 gauss. Total flux 185,000 maxwells. HC 20W. FR 30 c/s-16 Kc/s. Built-in mechanical crossover of 5,000 c/s. Price: £16 8s.

**Triaxiom 1220C.** Three-way speaker assembly comprising 12 in. bass cone, a mid-range radiator, and a pressure driven horn-loaded HF unit with independent magnet system. Bass cone paper with pure plastic edge, mid-range cone bakelised paper, HF unit aluminium horn. Bass voice coil 1¼ in. diameter copper wound, HF voice coil 1 in. diameter aluminium wound. Imp 15 ohms. Main gap flux 16,500 gauss. Total main gap flux 185,000 maxwells. HC 20W. FR 30 c/s-20 Kc/s. Built-in crossover at 2 Kc/s to mid-range and at 5 Kc/s to HF unit. Price: £19 19s.

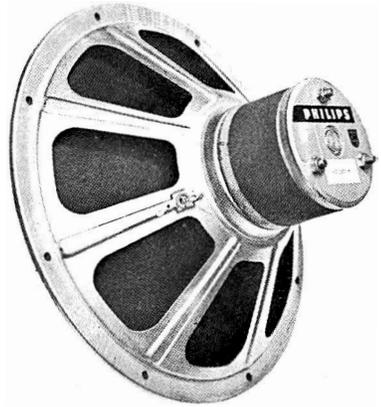
**Triaxiom 212C.** Same specification as Triaxiom 1220C but with handling capacity 15W and total main flux 87,500 maxwells. Price: £15 10s.



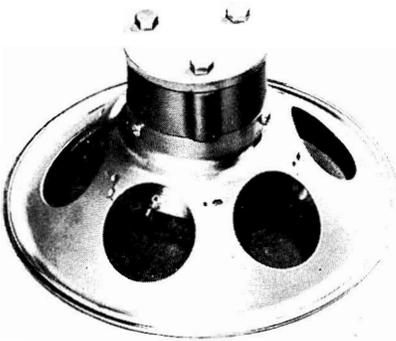
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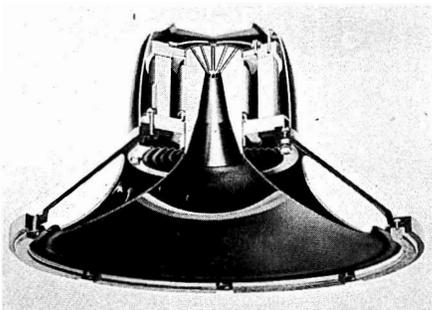
*KEF B1814*



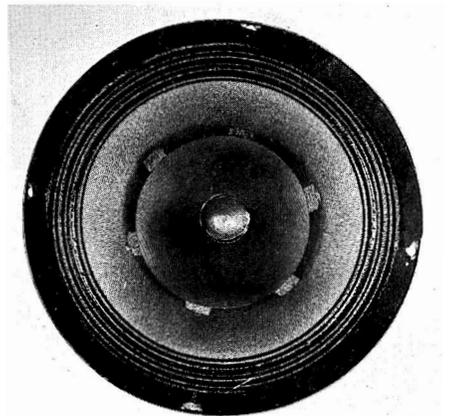
*Philips AD 5200 M*



*Philips 9710 M*



*Tamoy 12 in. Dual Concentric*



*Tripletone Twin cone 8 or 10 in*

**Audiom 81 bass.** 15 in. Paper cone. Pure plastic roll suspension. Voice coil 3 in. (7.6 cm), vci 15-16 ohms. Gap flux 14,000 gauss. Total flux 269,000 maxwells. HC 25W. Fundamental resonance 30 c/s. Price: £25 6s. 3d.

The Audiom 81 is also available in 60c/s version for special purposes.

The Audiom 81 bass (details above) with 30 c/s fundamental resonance is specially designed for use as the bass unit in a multiple system (with Midax and Trebax). In this case it must be mounted in the correct size of enclosure.

**Audiom 91 bass.** 18 in. Paper cone. Voice coil 3 in. diameter. Imp 15-16 ohms. Gap flux 14,000 gauss. Total flux 269,000 maxwells. HC 50W. Fundamental resonance 30 c/s. Price: £28 11s. 10d.

The Audiom 91 is also available with a resonance of 55 c/s (Standard version) for especially arduous conditions, PA, bass guitars, etc.



**GRAMPIAN REPRODUCERS LTD.,** Hanworth Trading Estate, Middx. Tel: 01-894-9141. Cables: Reamp, Feltham.

**Grampian 1255/15.** 12 in. Paper impregnated cone and surround. Voice coil  $1\frac{3}{4}$  in. Gap flux 14,500 gauss. Total flux 130,500 maxwells. HC 10W. vci 15 ohms. FR 35-15,000 c/s. Price: £10 10s.

**T.C.12.** 12 in. twin cone. Paper cones with plastic treated surround. Voice coil  $1\frac{3}{4}$  in. diameter. Long type voice coil. Imp 15 ohms. Gap flux 14,500 gauss. Total flux 130,500 maxwells. HC 10W. FR 35 c/s-15 Kc/s. Price: £11.



**ISOPHON-WERKE.** Distributors: Britimpex Ltd., 16/22 Great Russell Street, London, W.C.1. Tel: Museum 7600.

**Orchester.** 12 in. coaxial. Voice coil dia  $1\frac{1}{2}$  in. (main unit),  $\frac{1}{2}$  in. dia (tweeter). Copper voice coils. Impedance adjustable 4-16 ohms. Gap flux (main unit) 10,500 gauss, (tweeter) 8,500 gauss. Total flux (main unit) 63,700 maxwells, (tweeter) 10,000 maxwells. HC 12.5W RMS. FR 25 c/s-20 Kc/s. Price: £19 19s.

**PH.2132.E.** Full-range coaxial unit. 13 × 8 in. Paper cone and surround. 1 in. diameter bass voice coil,  $\frac{1}{2}$  in. diameter tweeter voice coil. Impedance 4 ohms. Gap flux (bass): 10,500 gauss, (tweeter): 8,500 gauss. Total flux (bass): 81,500 maxwells, (treble) 10,000 maxwells. HC 8W RMS. FR 35 c/s-17 Kc/s. Crossover 4 Kc/s. Price: £7 17s. 6d.

**JORDAN-WATTS.** Distributors: Boosey and Hawkes (Sales) Ltd., Sonorous Works, Deansbrook Road, Edgware, Middlesex. Tel: 01-952-7711.

**Jordan-Watts Modular.** 6 in. square frame. Aluminium diaphragm with plastic surround. Voice coil  $1\frac{1}{2}$  in. Ceramic magnet. Impedance 3-5 ohms and  $7\frac{1}{2}$ -16 ohms. HC 12W. FR 25 c/s-20 Kc/s. Price: £10 10s.



**KEF ELECTRONICS LTD.,** Tovil, Maidstone, Kent. Tel: Maidstone 58361. Cables: Kef, Maidstone.

**B139.** 13 × 9 in. Exp plastic and aluminium cone. Neoprene surround. Voice coil 2 in. (copper). vci 8-16 ohms. Gap flux 10,500 gauss. Total flux 137,000 maxwells. HC 15W. FR 30 c/s-4 Kc/s. rcf 1,000 c/s. Price: £11 10s.

**T15 tweeter.**  $1\frac{1}{2}$  in. Melinex dome. Centre pole. Alcomax magnet. Melinex surround. Voice coil  $1\frac{1}{2}$  in. (aluminium). vci 8-16 ohms. Gap flux 15,000 gauss. Total flux 53,500 maxwells. HC 15W. Treble only. FR 600-20,000 c/s. rcf 1,000 c/s. Price: £6.

**B1814.** 18 × 14 in. Exp plastic and aluminium cone. Plastic coated cloth surround. Voice coil 2 in. copper. vci 8-16 ohms. Gap flux 12,700 gauss. Total flux 165,000 maxwells. HC 25W. FR 20 c/s-2 Kc/s. rcf 500 c/s. Price: £19.

**K2 Baffle.** Two units. Baffle size  $22\frac{1}{2} \times 13\frac{1}{2}$  in. Unit 1: 13 × 9 in.; plastic and aluminium cone; neoprene surround; voice coil 2 in. copper. Gap flux 10,500 gauss; total flux 137,000 maxwells. Unit 2:  $1\frac{1}{2}$  in. Melinex dome; Melinex surround; voice coil  $1\frac{1}{2}$  in. copper; gap flux 15,000 gauss; total flux 53,500 maxwells. Both units: vci 8-16 ohms; HC 15W. FR 30 c/s-20 Kc/s. rcf 1 Kc/s. Price: £24.

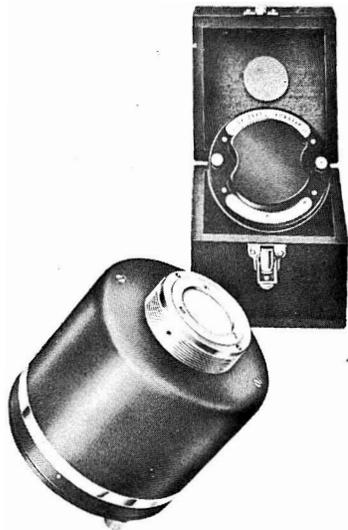


**KELLY.** See Decca Special Products.

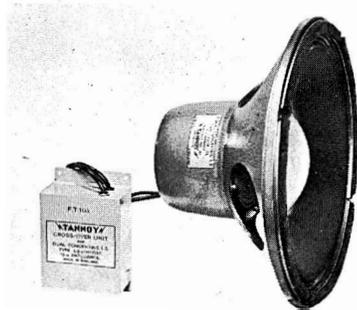


**LOWTHER MANUFACTURING CO.,** Lowther House, St Mark's Road, Bromley, Kent. Tel: Ravensbourne 5225. Cables: Lowther, Bromley.

**P.M.6.** 6 in. Selected paper cone. Plastic surround. Voice coil 39 mm. Gap flux 17,500 gauss. Total flux 196,000 maxwells. HC 6W; 20W. programme material. vci 16 ohms. FR 30-20,000 c/s. Price: £18 18s.



*Vitavox S2*

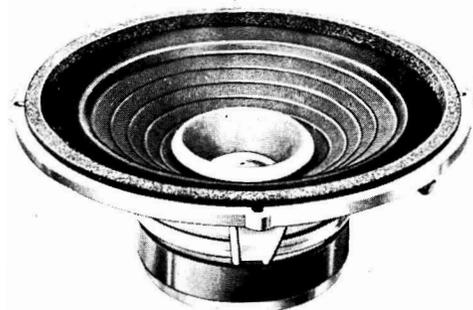


*Tannoy Monitor "Twelve"*

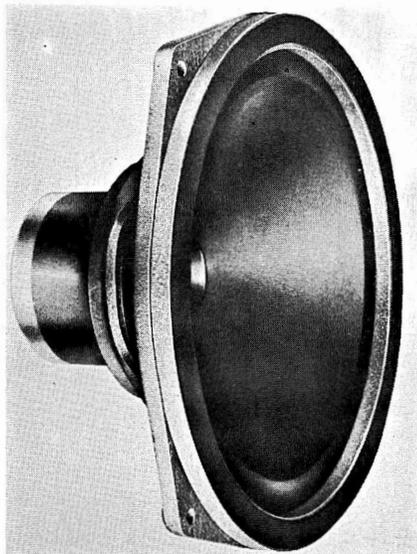
*Vitavox DU 121*



*Wharfedale Super 12/RS/DD*



*Wharfedale Super 8/RS/DD*



*Vitavox K15/40*

**P.M.6S.** As P.M.6 but with stand mounting. Price: £18 18s.

**P.M.7.** 6 in. Selected paper cone. Plastic surround. Voice coil 39 mm. Gap flux 19,650 gauss. Total flux 250,000 maxwells. HC 6W; 20W programme material. vci 16 ohms. FR 30 c/s-20 Kc/s. Price: £28.

**P.M.7S.** As P.M.7 but with stand mounting. Price: £28.

**P.M.2 Mk I.** 6 in. Selected paper cone. Plastic surround. Voice coil 39 mm. Gap flux 21,000 lines per sq cm. Total flux 281,000 maxwells. HC 6W; 20W programme material. vci 15 ohms. FR 30-20,000 c/s. Price: £30.

**P.M.2 Mk II.** 6 in. Selected paper cone. Plastic foam surround. Voice coil 39 mm. Gap flux 23,000 gauss. Total flux 350,000 maxwells. HC 6W; 20W programme material. vci 15 ohms. FR 25-22,000 c/s. Price: £40.

**P.M.4.** 6 in. Selected paper cone. Plastic surround. Voice coil 37 mm. Gap flux 24,000 gauss. Total flux 385,000 maxwells. HC 6W; 20W programme material. vci 16 ohms. FR 25-24,000 c/s. Price: £50.



**PEERLESS.** Distributors: C. E. Hammond & Co. Ltd., 90 High Street, Eton, Windsor, Berkshire.

**PABS 4-30.** Three-way speaker system comprising four speakers and crossover network. FR 30 c/s-18 Kc/s (in 1.75 cu ft cabinet). HC 30W. Bass unit, mid-range radiator and two tweeters. Crossover: 500 c/s and 3.5 Kc/s. Suggested size for cabinet:  $24\frac{3}{4} \times 13\frac{3}{8} \times 9\frac{1}{4}$  in. inside measurements. Price on request.

**PABS 2-8.** Two-way speaker system comprising two speakers and crossover. FR 50 c/s-18 Kc/s. HC 8W. Crossover: 4 Kc/s. Suggested size for cabinet:  $15\frac{1}{2} \times 9\frac{3}{8} \times 6\frac{1}{2}$  in. inside measurements. Price on request.

**PABS 2-10.** Two-way speaker system comprising two speakers and crossover. FR 50 c/s-18 Kc/s. HC 10W. Crossover: 3.5 Kc/s. Suggested size for cabinet:  $10 \times 6\frac{1}{4} \times 6\frac{1}{2}$  in. inside measurements. Price on request.

**PABS 3-15.** Three-way speaker system comprising three speakers and crossover. FR 45 c/s-18 Kc/s. HC 15W. Crossover: 750 c/s and 4 Kc/s. Suggested size for cabinet:  $20\frac{3}{8} \times 8\frac{3}{8} \times 10\frac{1}{2}$  in. inside measurements. Price on request.

**PABS 3-25.** Three-way speaker system comprising three speakers and crossover. FR 40 c/s-18 Kc/s. HC 25W. Crossover: 750 c/s and 4 Kc/s. Suggested size for cabinet:  $25 \times 15 \times 16\frac{1}{4}$  in. inside measurements. Price on request.

Above speaker systems available in kit form comprising speaker units, crossover network, cabinet construction data and mounting instructions, but without baffle. Full details on request.



**PHILIPS ELECTRICAL LTD.,** Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437 7777. Cables: Phillamps, London.

**9710M.** 8 in. Dual cone. Paper corrugated surround. Voice coil 1 in. Gap flux 8,000 gauss. Total flux 97,600 maxwells. HC 10W RMS. vci 7 ohms. FR 40-19,000 c/s. Price: £4 19s. 6d. (U.K. purchase tax 17s. 8d.).

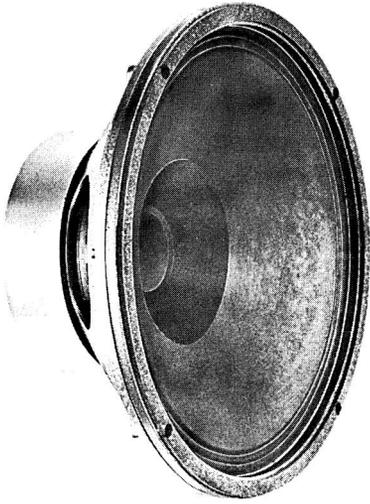
**AD5200M.** 12 in. Dual cone. Paper corrugated surround. Voice coil  $1\frac{1}{4}$  in. Gap flux 11,000 gauss. Total flux 134,000 maxwells. HC 20W. vci 7 ohms. FR 35-15,000 c/s. Price: £10 10s.



**PIONEER.** Distributors: Swisstone Ltd., 48a Station Road, Cobham, Surrey. Tel: Cobham 2853 and 4214.

**AS-303A.** Kit of speakers and crossover networks for assembling bookshelf speaker system. Cabinet materials not included. Kit comprises: 12 in. bass unit, 5 in. mid-range unit, horn tweeter, crossover network, level control, sound absorbing material, terminal strip, wire and instructions. Specification when built: FR 40 c/s-20 Kc/s, impedance 16 ohms, crossovers 800 c/s and 6 Kc/s, HC 20W RMS. Size:  $26 \times 15\frac{3}{8} \times 11\frac{1}{4}$  in. Price on request.

**AS-305A.** Kit of speakers and crossover networks for assembling hi-fi speaker assembly. Cabinet materials not included. Kit comprises: 12 in. bass unit, 5 in. mid-range unit, two cone tweeters, one horn tweeter, crossover network with level control, connecting cables, acoustic padding, mounting hardware and instructions. Specification when built: FR 30 c/s-20 Kc/s, crossovers 500 c/s and 3.5 Kc/s, impedance 8 ohms, HC 50W. Size:  $26 \times 15\frac{3}{8} \times 11\frac{1}{4}$  in. Price on request.



*Vitavox AK124*



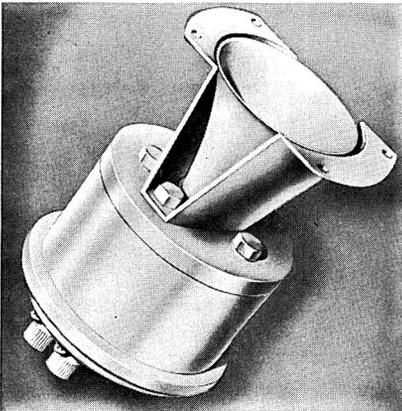
*Whiteley HF 1016*



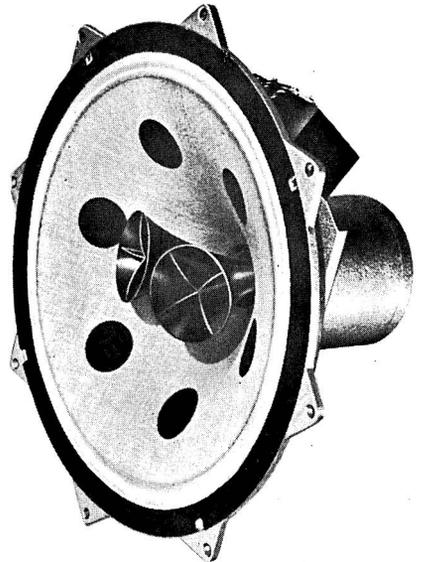
*Wharfedale Super 3 HF unit*



*Whiteley T 359 HF unit*



*Whiteley T10 HF unit*



*Whiteley 15 in. concentric duplex*

**REPRODUCERS AND AMPLIFIERS LTD.,** Frederick Street, Wolverhampton. Tel: Wolverhampton 22241 (5 lines).

**R and A 780 Mk V.** 8 in. dual cone unit. Impedance 15 ohms (3 or 8 ohms to order). Gap flux 12,000 gauss. Total flux 55,000 maxwells. Bass resonance 60 c/s. HC 6W RMS. Integral mechanical crossover. Rec enclosures: Design Furniture GD8 or Record Housing Viking. Price: £3 19s. 7d. including U.K. purchase tax, packing and postage.

**R and A 7100 Mk V.** 10 in. dual cone unit. Impedance 15 ohms (3 or 8 ohms to order). Gap flux 12,000 gauss. Total flux 55,000 maxwells. Bass resonance 55 c/s. HC 8W RMS. Integral mechanical crossover. Rec enclosures: Design Furniture GD10 or Record Housing Strauss. Price: £4 14s. 3d. including U.K. purchase tax, packing and postage.

**R and A 7120 Mk V.** 12 in. unit. Dual cone system with integral mechanical crossover. Gap flux 12,000 gauss. Total flux 55,000 maxwells. Bass resonance 50 c/s. HC 10W RMS. Rec enclosure: Design Furniture GD12. Price: £4 18s. 6d. including packing and postage.

**R and A 1251.** 12 in. dual unit with crossover. Price: £9 10s. including postage and packing.

**R and A 1262.** 12 in. dual unit with built-in crossover. Price: £6 5s. including postage and packing.

All R and A speaker units are available direct from the makers at the prices quoted. Specification sheets and enclosure construction data on request.



**STENTORIAN.** See Whiteley Electrical.



**TANNOY PRODUCTS LTD.,** West Norwood, London, S.E.27. Tel: Gipsy Hill 1131. Cables: Tannoy, London.

**Direct radiator.** 12 in. Moulded fibre cone. Plastic treated surround. Voice coil 2 in. Gap flux 14,000 gauss. HC 15W. vci 20 ohms. FR 40-16,000 c/s. Price: £14 14s.

**III LZ.** 12 in. dual concentric. Moulded fibre cone. Plastic impregnated surround. Gap flux (LF) 10,000 (HF) 15,000 gauss. HC 10W. FR 23-20,000 c/s. rcf (supplied) 1,300 c/s. vci 15 ohms. Price: £22 10s.

**Monitor "Twelve".** 12 in. Moulded fibre cone. Plastic treated surround. Voice coils (HF and LF) 2 in. Gap flux (LF) 11,500 (HF) 15,000 gauss. HC 30W. FR 25-20,000 c/s rcf. 1,700 c/s (supplied). Price: £30 15s.

**Monitor "Fifteen".** 15 in. Moulded fibre cone. Plastic treated surround. Voice coils (HF and LF) 2 in. Gap flux (LF) 13,500 (HF) 18,000 gauss. HC 50W. FR 23-20,000 c/s. rcf 1,000 c/s (supplied). Price: £37 10s.

**Director radiator** for electronic instruments. 15 in. Moulded fibre cone. Plastic treated surround. Voice coil 2 in. vci 7.5 ohms. Gap flux 14,000 gauss. HC 40W. FR 25 c/s-14 Kc/s. Price: £22.



**TRIPLETONE MANUFACTURING CO. LTD.,** 241a The Broadway, Wimbledon, S.W.19. Tel: Liberty 1189.

**Tripletone 8 in.** Full-range hi-fi unit. 8 in. Impedance: 2-3 ohms or 15 ohms. Flux density 12,000 lines/sq. cm. Bass resonance 60 c/s. HC 6W RMS. FR 30 c/s-17 Kc/s. Price: £4 7s. 6d. including purchase tax.

**Tripletone 10 in.** Full-range hi-fi unit. 10 in. Impedance: 2-3 ohms or 15 ohms. Flux density 12,000 lines/sq. cm. Bass resonance 55 c/s. HC 8W RMS. FR 30 c/s-17 Kc/s. Price: £4 17s. 6d. including purchase tax.



**VITAVOX LTD.,** Westmoreland Road, London, N.W.9. Tel: Colindale 8671. Cables: Vitavox, London, N.W.9.

**Duplex coaxial DU121.** 12 in. paper cone. Plastic treated paper surround. 3 in. polyester film cone and surround. Voice coil (LF) 1.78 in. (HF) 0.65 in. Gap flux (LF) 16,000 gauss, (HF) 12,000 gauss. Total flux (LF) 180,000 maxwells, (HF) 15,000 maxwells. HC 15W. vci 15 ohms. FR 30 c/s-15 Kc/s nominal. Price: £19 19s.

**AK123 Heavy Duty.** 12 in. paper cone. Paper surround. Voice coil 1.78 in. Gap flux 16,000 gauss. Total flux 180,000 maxwells. HC 20W. vci 15 ohms. FR 50 c/s-8 Kc/s. Price: £14 10s.

**AK124.** 12 in. paper cone. Paper surround. Voice coil 1.78 in. Gap flux 16,000 gauss. Total flux 180,000 maxwells. HC 15W. vci 15 ohms. FR 30 c/s-13 Kc/s. Price: £14 10s.

**K15/40.** 15 in. paper cone. Paper surround. Voice coil  $2\frac{1}{4}$  in. Gap flux 14,000 gauss. Total flux 260,000 maxwells. HC 40W nominal. FR 50 c/s-8 Kc/s nominal. (HC and FR determined by enclosure). vci 15 ohms. Price: £26 5s.

**AK150.** 15 in. paper cone. Treated paper surround. Bass resonance 30-35 c/s. Voice coil 2.25 in. Gap flux 14,000 gauss. Total flux 260,000 maxwells. HC 25W nominal. FR 30 c/s-5 Kc/s nominal. (HC and FR determined by enclosure). vci 15 ohms. Price: £27 5s.

**AK151.** Driver for bass horn of dual channel system. 15 in. paper cone, paper surround. Bass resonance 40-50 c/s. Voice coil  $2\frac{1}{4}$  in. Gap flux 14,000 gauss. Total flux 260,000 maxwells. DC resistance of voice coil 5.5-6.5 ohms. HC and FR determined by associated horn characteristics. Price: £27 5s.

**AK152.** Driver for bass horn of dual channel system. Treated paper surround. Bass resonance 30-35 c/s. Other details as for AK151. Price: £28 5s.

**S2 HF pressure unit.** Diaphragm pressure-formed from lightweight aluminium alloy. Voice coil 3 in. diameter. Gap flux 16,000 gauss. Total flux 150,000 maxwells. HC above 200 c/s 10W. Nominal FR 200 c/s-16 Kc/s. Rec crossover 500 c/s. Price: £35.

**HF Dispersive Horn.** Designed for use with S2 pressure unit. Cast in aluminium alloy. Non-resonant. Cut-off frequency 300 c/s. Price: £18.



**WHARFEDALE.** Rank Wharfedale Ltd., Idle, Bradford, Yorkshire. Tel: Bradford 612552. Cables: Wharfedel, Idle, Bradford. Telex: 51407.

**Super 3.** HF unit. 3 in. bakelised paper cone with fabric surround. Voice coil 1 in. (aluminium). Gap flux 14,500 gauss. Total flux 60,000 maxwells. HC 6W above 1 Kc/s. vci 2-3 and 8-15 ohms. FR 1-20 Kc/s. rcf 4 Kc/s. Price: £5 5s. (U.K. purchase tax 19s. 3d.).

**PST/4.** HF unit. 4 in. paper cone with fabric surround. Voice coil  $\frac{3}{4}$  in. vci 8-15 ohms. Gap flux 11,500 gauss. Total flux 28,800 maxwells. HC 5W, 10W peak. FR 300 c/s-15 Kc/s. rcf 300 c/s. Price: £3 2s. 6d. (U.K. purchase tax 11s. 6d.).

**Super 5.** HF unit. 5 in. bakelite cone with fabric surround. Voice coil 1 in. (aluminium).

Gap flux 14,500 gauss. Total flux 60,000 maxwells. HC 6W RMS. FR 400 c/s-17 Kc/s. vci 8-15 ohms. Price: £5 10s. (U.K. purchase tax £1 0s. 2d.).

**8 in. Bronze/RS/DD.** Full-range 8 in. unit. Paper cone with double diaphragm. Fabric roll surround. Voice coil 1 in. (aluminium). vci 8-15 ohms. Gap flux 10,500 gauss. Total flux 41,500 maxwells. HC 4W RMS. FR 50 c/s-20 Kc/s. Price: £3 10s. (U.K. purchase tax 12s. 10d.).

**Super 8/RS/DD.** Full-range 8 in. unit. Paper cone with double diaphragm. Fabric roll surround. Voice coil 1 in. (aluminium). vci 8-15 ohms. Gap flux 14,500 gauss. Total flux 60,000 maxwells. HC 6W RMS, 12W peak. FR 40 c/s-20 Kc/s. Price: £6 (U.K. purchase tax £1 2s.).

**10 in. Bronze/RS/DD.** Full-range 10 in. unit. Paper cone with double diaphragm. Fabric roll surround. Voice coil 1 in. (aluminium). vci 8-15 ohms. Gap flux 10,500 gauss. Total flux 41,500 maxwells. HC 6W RMS. FR 35 c/s-10 Kc/s. Price: £4 10s. (U.K. purchase tax 16s. 6d.).

**Golden 10/RS/DD.** Full-range 10 in. unit. Double diaphragm assembly. Fabric roll surround. Voice coil 1 in. Gap flux 14,500 gauss. Total flux 60,000 maxwells. HC 8W. vci 8 or 15 ohms. FR 30 c/s-20 Kc/s. Price: £7 10s. (U.K. purchase tax £1 7s. 6d.).

**Super 10/RS/DD.** Full-range 10 in. unit. Paper cone with double diaphragm. Fabric roll surround. Voice coil 1 in. Gap flux 16,000 gauss. Total flux 85,000 maxwells. HC 10W RMS. vci 8-15 ohms. FR 30 c/s-20 Kc/s. Price: £10 (U.K. purchase tax £1 16s. 8d.).

**W12/FRS.** 12 in. unit with Flexiprene roll surround. vci 8-15 ohms. Voice coil  $1\frac{1}{4}$  in. Gap flux 14,000 gauss. Total flux 156,000 maxwells. HC 15W RMS. FR 30 c/s-4 Kc/s. Bass resonance 23-28 Kc/s. Weight: 12 lb. Price: £11 15s.

**RS/12/DD.** Full-range 12 in. unit. Paper cone with fabric roll surround. Voice coil  $1\frac{1}{4}$  in. (aluminium). vci 8 or 15 ohms. Gap flux 14,000 gauss. Total flux 156,000 maxwells. HC 15W RMS, 30W peak. FR 25 c/s-17 Kc/s. Price: £12.

**Super 12/RS/DD.** Full-range 12 in. unit. Paper cone with double diaphragm. Fabric roll surround. Voice coil  $1\frac{1}{4}$  in. (aluminium). Gap flux 17,000 gauss. Total flux 190,000 maxwells. HC 20W RMS. vci 8-15 ohms. FR 25 c/s-20 Kc/s. Price: £17 10s.

**W15/RS.** 15 in. unit with paper cone and fabric roll surround. Voice coil 2 in. Gap flux 13,500 gauss. Total flux 180,000 maxwells. HC 20W RMS. vci 8-15 ohms. FR 25 c/s-2 Kc/s. rcf 800 c/s. Price: £18 15s.



**WHITELEY ELECTRICAL RADIO CO. LTD.,** Victoria Street, Mansfield, Notts. Tel: Mansfield 1762-5. Cables: Whitebon, Mansfield.

**Stentorian HF.812.** 8 in. Composite (paper and cambric) cone. Cambric surround. Voice coil 1 in. Gap flux 12,000 gauss. Total flux 47,400 maxwells. HC 5W. vci universal (3, 7.5 and 15 ohms). FR 50-12,000 c/s. Price: £3 19s. 4d. (U.K. purchase tax 14s. 9d.).

**H.F.816.** 8 in. Composite (paper and cambric) cone. Cambric surround. Voice coil 1 in. Gap flux 16,000 gauss. Total flux 63,000 maxwells. HC 6W. vci universal 3, 7.5 and 15 ohms. FR 50-14,000 c/s. Price: £6 10s. 6d. (U.K. purchase tax £1 4s. 2d.).

**H.F.817.** Paper cone. Cambric surround. Voice coil 1 in. Gap flux 17,000 gauss. Total flux 67,000 maxwells. HC 10W in cabinet. vci 15 ohms. FR 60-22,000 c/s. Price: £10 16s. 1d. (U.K. purchase tax £20s. 1d.).

**H.F.912.** 9 in. Composite (paper and cambric) cone. Cambric surround. Voice coil 1 in. Gap flux 12,000 gauss. Total flux 47,400 maxwells. HC 7W. vci universal (3, 7.5 and 15 ohms). FR 40-13,000 c/s. Price: £4 3s. 8d. (U.K. purchase tax 15s. 6d.).

**H.F.916.** 9 in. Composite (paper and cambric) cone. Voice coil 1 in. Gap flux 16,000 gauss. Total flux 63,000 maxwells. HC 7W. vci universal (3, 7.5 and 15 ohms). FR 40 c/s-14 Kc/s. Bass resonance 45 c/s. Price: £6 15s. (U.K. purchase tax £1 5s.).

**H.F.1012.** 10 in. Composite (paper and cambric) cone. Cambric surround. Voice coil 1 in. Gap flux 12,000 gauss. Total flux 47,400 maxwells. HC 10W. vci universal 3, 7.5 and 15 ohms. FR 30-14,000 c/s. Price: £4 15s. 5d. (U.K. purchase tax 17s. 8d.).

**H.F.1016.** 10 in. Composite (paper and cambric) cone. Cambric surround. Voice coil 1 in. Gap flux 16,000 gauss. Total flux 63,000 maxwells. HC 10W. vci 3, 7.5 and 15 ohms. FR 30-15,000 c/s. Price: £7 12s. 4d. (U.K. purchase tax £1 8s. 3d.).

**H.F.1016 Major.** 10 in. Paper cone. Cambric surround. Voice coil 1 in. (aluminium). vci 15 ohms. Gap flux 16,000 gauss. Total flux 64,000 maxwells. HC 10W. FR 60 c/s-16 Kc/s or 30 c/s-16 Kc/s (depending upon cabinet). Price: £9 15s. 4d. (U.K. purchase tax £1 16s. 3d.).

**10 in. Concentric Duplex.** Composite (paper and cambric) cone. Cambric surround. Voice coil 1 in. Gap flux (LF) 12,000 (HF) 13,000 gauss. Total flux 47,400 maxwells. HC 10W. vci 15 ohms. FR 30-14,000 c/s. rcf 3,000 c/s built-in. Price: £12 16s. 9d. (U.K. purchase tax £2 7s. 7d.).

**H.F.1214.** 12 in. Composite (paper and cambric) cone. Cambric surround. Voice coil 1.5 in. Gap flux 14,000 gauss. Total flux 106,000 maxwells. HC 15W. vci 15 ohms. FR 25-14,000 c/s. Price: £13 1s.

**H.F.1216.** Composite (paper and cambric) cone. Cambric surround. Voice coil 1½ in. Gap flux 16,000 gauss. HC 15W. FR 20-16,000 c/s. Price: £20 0s. 3d.

**12 in. Concentric Duplex.** Composite (paper and cambric) cone. Cambric surround. Series-gap Alcomax III magnet. LF gap flux 14,000 gauss. HF gap flux 17,000 gauss. Total flux 220,000 lines. vci 15 ohms. Built-in cross-over network. FR 25 c/s-17,000 c/s. Bass resonance 35 c/s. HC 15W. Pressure die-cast Mazak chassis. HF metal diaphragm protected and loaded by central pressure horn. Price: £34 18s. 9d.

**15 in. Concentric Duplex.** Composite (paper and cambric) cone. Cambric surround. Voice coil 2 in. Gap flux (LF) 14,000 (HF) 17,000 gauss. Total flux 350,000 maxwells. HC 25W. vci 15 ohms. FR 20-18,000 c/s. rcf 3,000 c/s built-in. Price: £57 3s. 6d.

**H.F.1514.** 15 in. Composite (paper and cambric) cone. Cambric surround. Voice coil 2 in. Gap flux 14,000 gauss. Total flux 178,000 maxwells. HC 25W. vci 15 ohms. FR 25-5,000 c/s. rcf 1,500-3,000 c/s. Price: £33 0s. 6d.

**T.10 Tweeter.** Aluminium cone and surround. Voice coil 1 in. Gap flux 14,000 gauss. Total flux 44,000 maxwells. HC 5W. vci 15 ohms. FR 2,000-14,000 c/s. rcf 3,000 c/s. Price: £5 12s. 3d.

**T.12 Tweeter.** Aluminium cone and surround. Voice coil 1.5 in. Gap flux 17,000 gauss. Total flux 110,000 maxwells. HC 12W. vci 15 ohms. FR 2,000-17,000 c/s. rcf 3,000 c/s. Price: £16 16s.

**T.816.** 8 in. Paper cone and surround. Voice coil 1 in. Gap flux 16,000 gauss. Total flux 63,000 maxwells. HC 15W. vci 15 ohms. FR 1,500 to 17,000 c/s. rcf 1,500 c/s. Price: £6 3s. 8d. (U.K. purchase tax £1 2s. 11d.).

**T.359.** 3½ in. Paper cone and surround. Voice coil 0.625 in. Gap flux 9,000 gauss. Total flux 14,900 maxwells. HC 15W with crossover. vci 5 or 15 ohms. FR 3,000-17,000 c/s. rcf 3,000 c/s. Price: £1 13s. 4d. (U.K. purchase tax 6s. 3d.).

**L. G. WOOLLETT & COMPANY LTD.,** 21 Anerley Station Road, London, S.E.20. Tel: Sydenham 9003.

**12 in. L.R.** Low resonance 12 in. dynamic unit. Paper cone with foam surround. HC 15W RMS. FR 20 c/s-5 Kc/s. Special unit for use with Woollett electrostatic treble speakers. Price: £12 12s.

**Type C.** Constant charge push-pull electrostatic. Uses high-voltage dust-protected membrane. Imp 15 ohms. HC 15W RMS. FR 1.5 Kc/s-20 Kc/s. Integral crossover. Attenuator, mains polariser. Rear sealed for mounting in bass cabinet behind horizontal 9×6½ in. hole. Price: £14 14s.



## DIRECTORY OF SPEAKER ACCESSORIES

**RICHARD ALLAN RADIO LTD.,** Bradford Road, Gomersal, Cleckheaton, Yorkshire. Tel: Cleckheaton 2442/3. Cables: Acoustics, Bradford.

**CN.54 Crossover Unit.** Two-way quarter section. Recommended for use with CR5 bass unit and 460TC tweeter. Crossover frequency 5 Kc/s. 8 or 15 ohms. Price: £2.

**CN.104 Crossover Unit.** A two-way half-section parallel network. Crossover frequency 5,000 c/s. All terminations 15 ohms. Price: £2 10s.

**CN.1284 Crossover Unit.** A three-way crossover with main crossover operating from half wave parallel network and subsidiary crossover capacity fed. Crossover frequencies 1,100 and 5,000 c/s. All terminations 15 ohms. Price: £3 15s.



**CELESTION LTD.,** Ferry Works, Thames Ditton, Surrey. Tel: 01-398 3402. Cables: Voicecoil, Thames Ditton.

**CO3K crossover.** Designed specially for use with Studio 12 and HF1300 Mk 2 units but equally suitable for use with any efficient bass and treble combination. Air-tight terminal assembly with flange mounting. Full half-section filter network. 12 dB per octave cut-off at 3 Kc/s. Size: 3¾ in. long, 2¾ in. diameter of body, 3¼ in. diameter of flange. Price: £2 10s.

**DECCA SPECIAL PRODUCTS,** Decca Radio and Television Division of The Decca Record Co. Ltd., Ingate Place, Queenstown Road, London, S.W.8. Tel: Macaulay 6677.

**Kelly Crossover CO/1/15.** Designed to feed power at correct levels and frequencies to the Kelly LF drive units and Mk II HF ribbon. Crossover frequency 2.5 Kc/s. Low pass slope 12 dBs per octave. High pass slope initially 12 dBs per octave and final slope 40 dBs per octave. Attenuation to frequencies below 700 c/s greater than 40 dB. Imp 15 ohms. Price: £3 3s.

**Kelly Acoustic Lens.** For use with Kelly ribbon HF speaker Mk II to disperse high frequencies so that a stable stereo image is obtained over a wider area than normal. Up to 15 Kc/s the sound pattern is constant to within 3 dBs over a 150 degree angle. From 15 Kc/s to 20 Kc/s this dispersion is maintained over an angle of 135 degrees. Price: £3 3s.



**EAGLE PRODUCTS.** Distributors: B. Adler & Sons (Radio) Ltd., 32a Coptic Street, London, W.C.1. Tel: Museum 9606/7. Cables: Reldad, London.

**CN.23 and CN.216.** Two-way speaker crossover networks. Cross-over frequency 3 Kc/s. CN.23 3 ohms, CN.216 16 ohms. Price: 14s. 6d.

Prices quoted for Eagle products are approximate.

**EMI SOUND PRODUCTS LTD.**, Hayes, Middlesex. Tel: Hayes 3888. Cables: Emi-sound, London.

**Crossover network 99970B.** Combines any 3 ohm LF driver with two 15 ohm HF tweeters in parallel. Price on application.

**Crossover network 99970F.** Combines any 15 ohm LF driver with two 8 ohm HF tweeters in series. Price on application.

Networks available for all other speaker combinations. Separate chokes and capacitors for crossover networks. Prices and details on application.

★

**FANE ACOUSTICS LTD.**, Hick Lane, Batley, Yorks. Tel: Batley 2114. Cables: Fane, Batley.

**Model 2X1.** Crossover unit for two-speaker system. Crossover frequency 2 Kc/s. 15 ohms. Cut-off 6 dB/octave. Size:  $5\frac{5}{8} \times 3\frac{1}{4} \times 1\frac{1}{2}$  in. Price: £3.

**Model 3X1.** Crossover unit for three-speaker system. Crossover frequencies 800 c/s and 5 Kc/s. Impedance 15 ohms. Cut-off 6 dB/octave. Size:  $5\frac{5}{8} \times 3\frac{1}{4} \times 2\frac{1}{2}$  in. Price: £4.

**Model 3X2.** Crossover for three-speaker system. Similar to one used in Ionophone 602

and 603. Crossover frequencies 800 c/s and 3.5 Kc/s. Matching impedance 15 ohms. Cut-off 12 dB/octave. Size:  $6 \times 5\frac{1}{4} \times 2\frac{3}{4}$  in. Price: £5 5s.

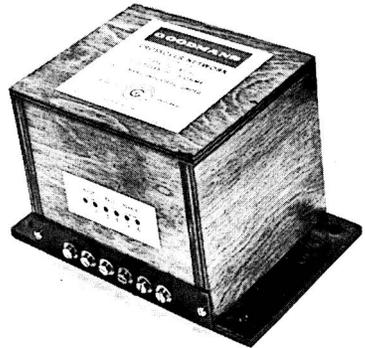
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**GOODMANS LOUDSPEAKERS LTD.**, Axiom Works, Wembley, Middx. Tel: 01-902-1200. Cables: Goodaxiom, Wembley.

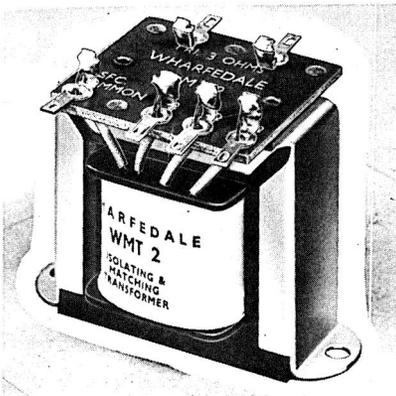
**XO/5000-Crossover Unit.** A two-way half-section crossover network, operating at 5,000 c/s. All termination 15 ohms. Price: £2 2s. 2d.

**XO/950-Crossover Unit.** A two-way half-section, crossover network, operating at 950 c/s. All terminations 15 ohms. Price: £5 17s. 2d.

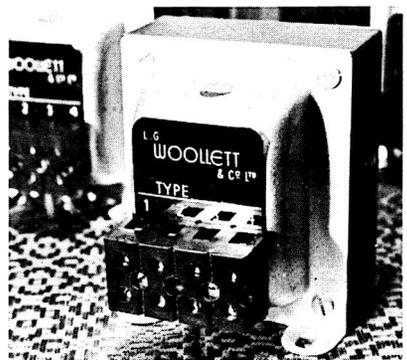
**XO/950/5000. Crossover Network.** A multiple crossover network comprising four half-section LC filters. Crossover frequencies are 950 c/s



*Goodmans XO/950*



*Wharfedale WMT2 isolating and matching transformer*



*Woollett XS1 and XS2*

and 5,000 c/s. All attenuation rates are 12 dB/octave. All terminations 15 ohms. Price: £7 14s. 8d.

★

**KELLY.** See Decca Special Products.

★

**STENTORIAN.** See Whiteley Electrical.

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**VITAVOX LTD.,** Westmoreland Road, London, N.W.9. Tel: Colindale 8671. Cables: Vitavox, London, N.W.9.

**CN232 Crossover.** Half section. Crossover 500 c/s. Attenuation 12 dB/octave. All terminations 15 ohms. Balance control giving 0-8 dB HF attenuation incorporated. Price: £15.

**CN233 Crossover.** Half section. Crossover 1 Kc/s. Attenuation 12 dB/octave. All terminations 15 ohms. Balance control giving 0-8 dB HF attenuation incorporated. Price: £15.

★

**WHARFEDALE.** Rank Wharfedale Ltd., Idle, Bradford, Yorkshire. Tel: Bradford 612552. Cables: Wharfedel, Idle, Bradford. Telex: 51407.

**QS/800.** Crossover frequency 800 c/s.  $\frac{1}{4}$ -section. Rate of attenuation 6 dB per octave. LS matching 7-16 ohms. Size:  $5 \times 4 \times 2\frac{1}{4}$  in. Weight: 15 oz. Price: £3 5s.

**HS/400/3.** Crossover frequency 400 c/s and 5,000 c/s.  $\frac{1}{2}$ -section 3-way. Rate of attenuation 12 dB per octave. LS matching 7-16 ohms. Size:  $7 \times 5 \times 3$  in. Weight: 2 lb. Price: £6 10s.

**QS.3000.** Crossover frequency 3 Kc/s.  $\frac{1}{4}$ -section. 15 ohms only. Rate of attenuation about 6 dB per octave. Price: £3 5s.

**WMT1 Matching Transformer.** Auto transformer for matching 10-16 ohms or 7-9 ohms speakers to sets with 2-5 ohms output or vice versa. Response 20-15,000 c/s  $\pm 1$  dB. Handling capacity 15W. Can also match speakers of different imps to crossover unit in 2 or 3

speaker systems. Size:  $2\frac{7}{8} \times 2\frac{3}{4} \times 2\frac{3}{4}$  in. Weight:  $12\frac{1}{2}$  oz. Price: 13s. 6d.

**WMT2 Isolating and Matching Transformer.** Similar to WMT1, but having separate windings with heavy insulation. Response 20 c/s-15 Kc/s  $\pm 1$  dB. HC 15W. Size:  $2\frac{1}{4}$  in. high,  $2\frac{7}{8}$  in. wide. Weight:  $13\frac{3}{4}$  oz. Price: 13s. 6d.

★

**WHITELEY ELECTRICAL RADIO CO. LTD.,** Victoria Street, Mansfield, Notts. Tel: Mansfield 1762-5. Cables: Whitebon, Mansfield.

**CX500 Crossover Unit.** A two-way half-section crossover network operating at 500 c/s. All terminations 15 ohms. Price: £1 15s.

**CX1500 Crossover Unit.** As CX500, but operating at 1,500 c/s. Price: £2 11s.

**CX3000 Crossover Unit.** As CX1500, but operating at 3,000 c/s. Price: £2 0s. 3d.

**Constant impedance volume control.** T-pad type attenuator having 10 steps of attenuation. Impedance presented by the load remains constant while the volume level is varied. In three versions for 3, 8 or 15 ohms. Price: £1 8s.

★

**L. G. WOOLLETT AND COMPANY, LTD.,** 21 Anerley Station Road, London, S.E.20. Tel: Sydenham 9003.

**XS1.** Speaker matching transformer. Converts 15 ohms to 7.5 ohms and 7.5 ohms to 3.75 ohms. Bifilar wound. Grain oriented laminations. Ratio 1:0.707 auto. FR 16 c/s-30 Kc/s  $\pm 0.6$  dB. Price: £3 3s.

**XS2.** Speaker isolating and matching transformer. Converts 15 ohms to 3.75 ohms. Bifilar wound. Grain oriented laminations. Ratio 1:1 double wound. FR 16 c/s-100 Kc/s  $\pm 0.6$  dB. Attenuates -6 dB and -12 dB while maintaining heavy damping on speaker and offering correct load to amplifier. Suitable for operating stereosystem comprising dual electrostatic high-frequency units with common bass driver. *Note:* Not suitable for mains isolating in live chassis equipment. Price: £3 3s.

## PART 2—SPEAKER ENCLOSURES

**ABBOTT & RICHARDSON**, 7 Agnew Road, Forest Hill, London, S.E.23. Tel: Forest Hill 1031.

**R.A. Reflex Enclosure (GRA10).** Complete system. Forward facing full range speaker with tapering depth. Two units: 10 in. bass, horn-loaded pressure unit for treble. Rec Goodmans Axiom 10, Goodmans Trebax 5K/20XL. Twin  $\frac{1}{2}$ -section crossover network. Finish: Walnut, oak, mahogany or teak. Size:  $31 \times 17\frac{1}{2} \times 10\frac{1}{2}$  max to  $7\frac{1}{2}$  in. min. Price: (with specified units) £26, enclosure only £15.

**R.A.8.** Suitable for Axiette and Wharfedale 8 in. drive units. Finish: teak and mahogany. Size:  $24 \times 16\frac{1}{4} \times 8$  in. Price (with Axiette speaker): £17 10s., enclosure only £13 10s.

**R.A.12.** Based on Goodmans specifications and fitted with ARU. Available with 12 in. twin-cone drive unit and in two-way and three-way systems. Finish: Mahogany or teak. Size:  $37\frac{1}{2} \times 21\frac{1}{2} \times 13$  in. Price (with 12 in. twin-cone driver): £32.

**Compact teak cabinet.** Finished teak on four sides with green Vynair detachable front. Other finishes to order. Suitable for Richard Allan modules, EMI 250 and 850, Eagle 6 in. full-range unit, etc. Size:  $12 \times 9 \times 6$  in. Price: £5 10s.

**Standard teak cabinet.** Finished teak on four sides with green Vynair detachable front. Other finishes to order. Suitable for good quality 3 in., 10 in., and 12 in. units. Size:  $26 \times 16 \times 11$  in. Price on request.

Enclosures built to customers own requirements. Home demonstrations in the London area. R.A. enclosures also available from Lee and Son (Development Company), 98 Lordship Lane, London, S.E.22, and Parkfield Studio, 20 Parkfield Road, New Cross, London, S.E.14.



**ACOUSTICA ASSOCIATES.** Distributors: Largs of Holborn, 76-77 High Holborn, London, W.C.1. Tel: Chancery 2626.

**Acoustica Lamp-Speaker Systems.** Each lamp-speaker system incorporates two separate speakers, crossover, power supply for electrostatic HF unit and signal step-up transformer. Bass unit is  $6\frac{1}{2}$  in. Jensen driver, HF unit comprises

electrostatic reproducer in form of cylindrical lampshade giving 360 deg radiation. Crossover 300 c/s. Impedance 8 ohms. HC 8-20W RMS. FR approximately 30 c/s-30 Kc/s depending on model. Range comprises table lamps 100, 200 and 300, and hanging lamp 400. Various finishes including walnut, antique white, leather in five colours, glazed ceramic in five colours. Shades are off-white fabric with narrow gold trim. Full details on request. Prices from £120 15s.



**ACOUSTICAL MANUFACTURING CO. LTD.,** St Peter's Road, Huntingdon, Hunts. Tel: Huntingdon 2561/2. Cables: Acoustical.

**Quad Electrostatic Loudspeaker.** Full range doublet covering 45 c/s to 18 Kc/s. Attenuation outside band asymptotic to 18 dB/8ve. Total integrated radiation at max output equivalent to 95 phons in rooms of up to 5,000 cu ft with average reverberation. Dispersion approx 70 deg horizontal; 15 deg vertical. Imp 30-15 ohms, 40 c/s to 8 Kc/s falling above 8 Kc/s. Designed for use with standard Quad II Amplifier. Suitable for AC supplies 100-120 or 200-250V. 50-60 c/s. Free standing unit requires no enclosure or cabinet. Weight: 35 lb. Price: £57 complete.



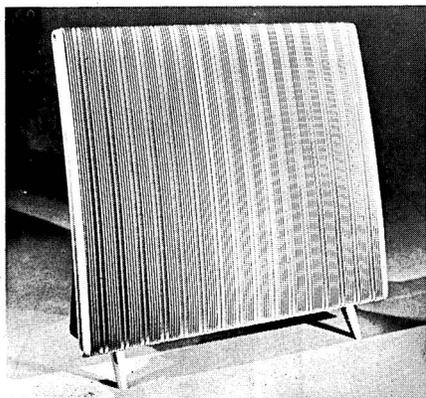
**ACUSTICA-ELECTRONICA.** Distributors: Britimpex Ltd., 16-22 Great Russell Street, London, W.C.1. Tel: Museum 7600.

**5 HRM.** Infinite baffle. FR 50 c/s-20 Kc/s. HC 7W RMS. Standard finish: walnut. Size:  $10\frac{1}{2} \times 5\frac{1}{8} \times 6\frac{7}{8}$  in. Price: £12 9s. 11d. (U.K. purchase tax £2 4s. 1d.).

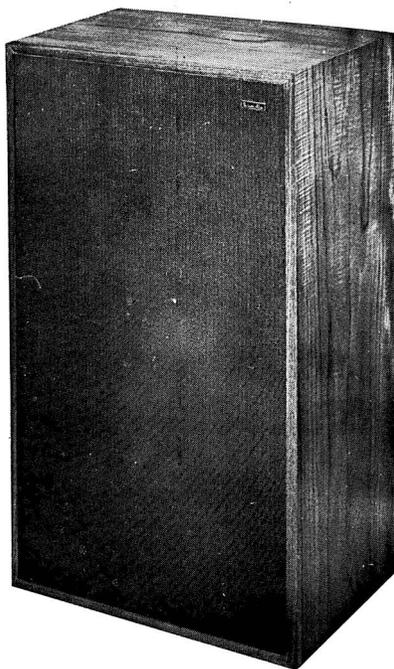
**5 HRM De Luxe.** As above with walnut front. Price: £13 7s. 9d. (U.K. purchase tax £2 7s. 3d.).

**Soprano.** Infinite baffle. 8 in. main unit plus 4 in. tweeter. FR 60 c/s-13 Kc/s. HC 7W RMS. Standard finish: walnut. Size:  $20\frac{1}{2} \times 12\frac{5}{8} \times 5\frac{3}{4}$  in. Price: £15 12s. 5d. (U.K. purchase tax £2 15s. 1d.).

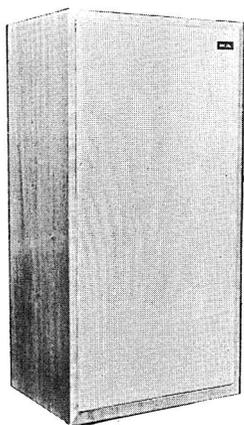
**Soprano De Luxe.** As above with walnut front. Price: £16 10s. 3d. (U.K. purchase tax £2 18s. 3d.).



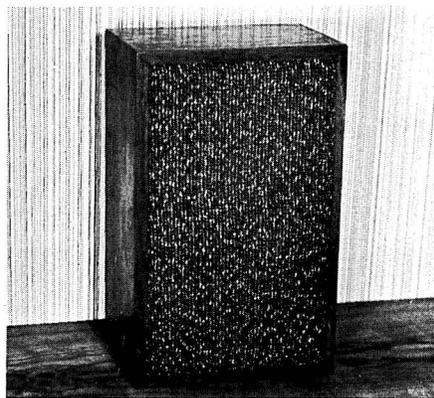
*Quad electrostatic*



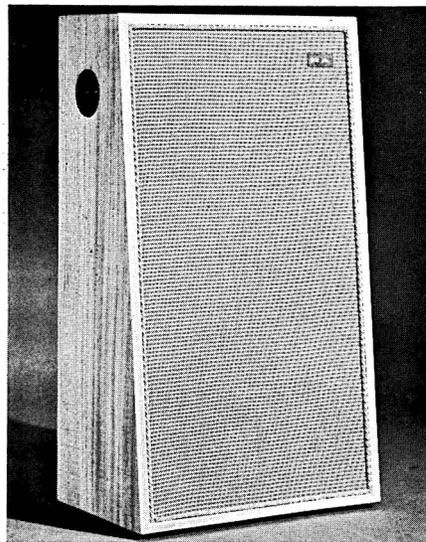
*Richard Allan Sarabande*



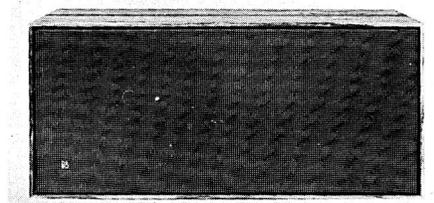
*Abbott & Richardson RA 12*



*Amphonic Minuette ES 6110*



*Abbott & Richardson GRA 10*



*Beovox 1500*

**AKAI.** Distributors: Pullin Photographic Ltd., 11 Aintree Road, Perivale, Greenford, Middlesex. Tel: Alperton 1541. Cables: Pullinfoto, Greenford, Middlesex.

**Akai SS30.** Infinite baffle with unit. Impedance 8 ohms. FR 100 c/s-12 Kc/s. HC 3W RMS. Wood cabinet covered dark grey Rexine. Size:  $13\frac{1}{2} \times 14 \times 3$  in. Weight:  $6\frac{1}{2}$  lb. Price: £11 0s. 7d. (U.K. purchase tax £1 19s. 5d.).

**Akai SW130.** Infinite baffle with two units and crossover. 12 in. bass driver, 4 in. tweeter. Impedance 8 ohms. FR 50 c/s-18 Kc/s. HC 16W RMS. Size:  $16\frac{1}{2} \times 23\frac{1}{4} \times 12\frac{1}{8}$  in. Weight: 25 lb. Price: £30.



**RICHARD ALLAN RADIO LTD.,** Bradford Road, Gomersal, Cleckheaton, Yorkshire. Tel: Cleckheaton 2442/3. Cables: Acoustics, Bradford.

**Minette.** Infinite baffle bookshelf enclosure. 5 in. bass unit, 4 in. tweeter. FR 50 c/s-17 Kc/s. HC 10W. Size:  $11\frac{1}{2} \times 7 \times 6\frac{1}{2}$  in. Weight: 9 lb. Price: £13 (U.K. purchase tax £2 7s. 7d.) including units.

**SC12 Mk II.** Infinite baffle enclosure. Bass unit CG12 Super, mid-range unit CB8, tweeter CB4. FR 40 c/s-17 Kc/s. HC 15W. Size:  $30 \times 19\frac{1}{2} \times 7\frac{1}{4}$  in. Price: £32 including units.

**Sarabande.** Full-range enclosure incorporating CB15 15 in. bass driver and mid-range/tweeter module (see details following). Enclosure: 4 cu ft. FR 30 c/s-17 Kc/s. HC 17W RMS. Size:  $34 \times 20 \times 14$  in. Price £39 17s. 6d.

**Mid-range and HF module.** Integrated speaker assembly comprising 5 in. mid-range unit, 4 in. tweeter, crossover network and attenuator control. All mounted on aluminium alloy baffle  $11 \times 6\frac{1}{2}$  in. For use with systems handling up to 20W RMS. Further details and price on request.

**High Fidelity Module.** Integrated speaker assembly comprising 5 in. bass unit, 4 in. tweeter and crossover network mounted on aluminium alloy baffle for direct mounting into small bookshelf enclosure. Price: £8 (U.K. purchase tax £1 7s. 10d.).



**ALTEC LANSING.** Distributors: Carston Electronics Ltd., 71 Oakley Road, Chinnor, Oxon. Tel: Kingston Blount (OTH45) 8561.

**Altec Lansing Bolero 890A.** Horn enclosure with speakers and crossover. 10 in. bass driver

and Altec 3000H multicellular horn and driver. Crossover: 3 Kc/s dual element with variable shelving control. FR 35 c/s-20 Kc/s. HC 20W RMS. 10 lb magnet on bass driver. Size:  $14\frac{1}{2} \times 25\frac{3}{4} \times 12$  in. Finish: hand-rubbed walnut. Price: £69.



**AMPHONIC ELECTRONICS LTD.,** 43B Hereford Road, London, W.2. Tel.: 01-727-5096.

**MINUETTE P.C.10.** A small compact pressure chamber unit suitable for inexpensive hi-fi setups. Frequency response 55 cps-18 Kc/s, handling capacity 10 watts. RMS dimensions:  $12 \times 9 \times 8$  in. Finished in teak, American walnut or Brazilian rosewood. Price, including purchase tax, £14 7s. 6d.

**Auditorium 15—R.E.15.** A three-way monitor speaker designed to professional standards. At present available as standard, capable of handling 35 watts RMS. A 75-watt version to follow, price to be announced. Frequency response 20 cps-20 Kc/s. Size:  $38 \times 24 \times 15$  in. Finish, teak or American walnut. Price £75. This speaker can be supplied in other finishes—prices on application.



**ARENA.** Distributors: Highgate Acoustics Ltd., 71-73 Great Portland Street, London, W.1. Tel: Museum 2901.

**Arena HT7.** Pressure chamber speaker system. One  $8\frac{1}{4}$  in. bass unit, one 2 in. treble unit. 4 or 16 ohms. HC 6W RMS. FR 50 c/s-20 Kc/s. Built-in crossover. Cabinet in teak or Brazilian rosewood. Size:  $20\frac{1}{2} \times 9\frac{3}{8} \times 10\frac{5}{8}$  in. Price: £13 13s. 6d. (U.K. purchase tax £2 5s. 8d.).

**Arena HT9.** Pressure chamber speaker system. One 12 in. bass unit, one 5 in. mid-range unit, one 2 in. treble unit. 4 or 16 ohms. HC 25W RMS. FR 30 c/s-20 Kc/s. Built-in crossover. Cabinet in teak or Brazilian rosewood. Size:  $26\frac{3}{4} \times 19\frac{3}{4} \times 11\frac{1}{8}$  in. Price: £28 4s. 11d. (U.K. purchase tax £4 14s. 8d.).

**Arena HT10.** Pressure chamber speaker system. One 8 in. unit, one 2 in. unit. HC 8W RMS. FR 40 c/s-20 Kc/s. Teak or Brazilian rosewood. Size  $22\frac{3}{4} \times 5\frac{1}{8} \times 16\frac{1}{8}$  in. Price: £14 11s. 6d. (U.K. purchase tax £2 8s. 11d.).

**Arena HT14.** Pressure chamber speaker system. One  $7 \times 5$  in. unit, one  $2\frac{1}{2}$  in. unit. HC 6W RMS. FR 60 c/s-20 Kc/s. Recommended for use with T1900F tuner/amplifier. Teak or

Brasilian rosewood. Size:  $6\frac{1}{4} \times 10\frac{3}{8} \times 11$  in. Price: £10 18s. 8d. (U.K. purchase tax £1 16s. 8d.).

**Arena HT15.** Pressure chamber speaker system. One  $8\frac{1}{4}$  in., one 5 in., one  $2\frac{1}{2}$  in. units. HC 6W RMS. FR 40 c/s-20 Kc/s. Teak or Brasilian rosewood. Size:  $26\frac{3}{4} \times 11\frac{3}{8} \times 11$  in. Price: £19 2s. 8d. (U.K. purchase tax £3 4s. 2d.).

**Arena HT17.** Pressure chamber speaker system. One  $5\frac{3}{4}$  in., one  $2\frac{1}{2}$  in. units. HC 8W RMS. FR 70 c/s-20 Kc/s. Teak, Brasilian rosewood or oak. Size:  $12\frac{5}{8} \times 9\frac{7}{8} \times 4\frac{3}{8}$  in. Price: £10 18s. 8d. (U.K. purchase tax £1 16s. 8d.).

**Arena HT18.** Pressure chamber speaker system. One  $5\frac{3}{4}$  in., one  $2\frac{1}{2}$  in. units. HC 25W RMS. FR 20 c/s-20 Kc/s. Teak or Brasilian rosewood. Size:  $25 \times 16 \times 10\frac{1}{4}$  in. Price: £30 1s. 6d. (U.K. purchase tax £5 0s. 8d.).



**AUDIO AND DESIGN LTD.,** 40 Queen Street, Maidenhead, Berks. Tel: Maidenhead 25204.

**Titan Mini.** Reflex cabinet with speaker unit. One titanium cone module. FR 35 c/s-20 Kc/s. HC 15W RMS. Composite timber/metal construction provides maximum internal capacity within relatively small external dimensions. Finish: teak. Size:  $12\frac{1}{2} \times 10 \times 8$  in. Weight: 16 lb. Price: £32 5s.

**D15/30.** Incorporates one TCL module. FR 30 c/s-22 Kc/s -3 dB. Mean hemispherical power response substantially flat throughout pass band. HC 15W RMS. Natural teak finish. Size:  $30 \times 15 \times 8$  in. Price: £36 15s. (professional finish version £39).

**D30/20.** Incorporates two TCL modules. FR 20 c/s-22 Kc/s -3 dB. Mean hemispherical power response substantially flat throughout pass band. HC 30W RMS. Natural teak finish. Size:  $30 \times 17 \times 13$  in. Price: £59 5s. (professional finish version £64).

**D60/20.** Professional studio monitor incorporating four TCL modules. Performance as for D30/20 but power handling 60W. Switchable polar response. Finish to order. Price: £120.



**AUDIO ENGINEERING LTD.,** See Amplifier Section for details of QL4 music monitor amplifier and speaker enclosure assembly.

**BANG & OLUFSEN U.K. DIVISION,** Eastbrook Road, Gloucester. Tel: Gloucester 21591.

**Beovox 500.** Infinite baffle shelf-mounting enclosure with speakers. Units: bass driver and tweeter. Crossover: 5 Kc/s. FR 65 c/s-18 Kc/s. HC 5W RMS. Impedance: 4 ohms. Finish: teak or rosewood. Size:  $11 \times 6 \times 9\frac{3}{4}$  in. Price: £12 8s. (U.K. purchase tax £2 6s.).

**Beovox 1000.** Infinite baffle shelf-mounting enclosure with speakers. Two units. FR 60 c/s-19 Kc/s. HC 10W RMS. Impedance 4 ohms. Finish: teak or rosewood. Size:  $18\frac{7}{8} \times 9\frac{1}{2} \times 7\frac{1}{2}$  in. Price: £15 1s. 3d. (U.K. purchase tax £2 15s. 9d.).

**Beovox 1500.** Infinite baffle floor or shelf-mounting enclosure with three units. Crossover: 800 c/s and 5 Kc/s. Mid-frequency unit fitted five-position attenuator. FR 45 c/s-20 Kc/s. HC 15W RMS. Impedance: 4 ohms. Size:  $25 \times 11 \times 12$  in. Finish: teak or rosewood. Price: £22 2s. 9d. (U.K. purchase tax £4 2s. 3d.).



**BRAUN AG.** Distributors: Fi-Cord International, Charlwoods Road, East Grinstead, Sussex. Tel: East Grinstead 21351.

**L25.** Infinite baffle. Wide range twin-cone 7 in. driver. FR 70 c/s-18 Kc/s. Floor or wall mounting. Wood case finished laminated white plastic. Anodised aluminium grille. Size:  $19\frac{1}{4} \times 11\frac{1}{4} \times 5\frac{1}{4}$  in. Price: £22 6s. 1d. including U.K. purchase tax.

**L40.** Infinite baffle.  $8\frac{3}{8}$  in. bass and mid-range unit. 4 in. tweeter. FR 50-18 Kc/s. Wood cabinet finished in white or dark grey laminated plastic. Anodised aluminium grille. Size:  $22\frac{5}{8} \times 9\frac{7}{8} \times 11\frac{1}{4}$  in. 15 ft. lead with plug supplied. Price £31 8s. 8d. including U.K. purchase tax.

**L60/4.** Infinite baffle.  $10\frac{7}{8}$  in. bass driver.  $3\frac{5}{8}$  in. tweeter. FR 40 c/s-20 Kc/s. Wood cabinet finished in white plastic laminate. Anodised aluminium grille. 15 ft. lead with plug. Chrome stand optional extra. Size:  $26 \times 14\frac{3}{8} \times 11\frac{1}{4}$  in. Price: £49 8s. 7d. including U.K. purchase tax.

**LS75.** Infinite baffle. FR 40 c/s to above upper audible limit. HC 75W RMS. Impedance 15 ohms. Four bass drivers and four tweeters. Wood cabinet finished in white laminated plastic. Anodised aluminium front grille. Size:  $16 \times 39\frac{3}{4} \times 5\frac{3}{4}$  in. Price: £105 4s. including U.K. purchase tax.

**L250.** Infinite baffle. FR 60 c/s-13 Kc/s. One  $8\frac{1}{4} \times 3\frac{3}{4}$  in. unit. HC 10W DIN. Impedance:

4 ohms. Wall or shelf-mounting. Finish: wood with white plastic or walnut veneer, anodised aluminium grille. Size:  $11 \times 14 \times 4\frac{1}{4}$  in. Price: £19 16s. 6d. including U.K. purchase tax.

**L300.** Compact infinite baffle. FR 42 c/s to above upper audible limit. HC 20W RMS. Impedance 4 ohms. One  $5\frac{1}{4}$  in. bass driver, one  $2\frac{5}{8}$  in. tweeter. Wood cabinet finished white laminated plastic or walnut veneer. Anodised aluminium grille. Provision for horizontal or vertical wall mounting. Size:  $6\frac{3}{8} \times 9\frac{3}{8} \times 5\frac{5}{8}$  in. Price: £29 13s. 2d. including purchase tax.

**L450.** Slim-line infinite baffle incorporating two units. FR 35 c/s to beyond upper audible limit. HC 20W RMS. One  $7\frac{1}{4}$  in. bass driver, one  $3\frac{3}{8} \times 2\frac{5}{8}$  in. pressure chamber tweeter. Wood cabinet finished white or graphite laminated plastic or walnut veneer. Provision on back for horizontal or vertical wall mounting. Size:  $18\frac{5}{8} \times 11\frac{1}{4} \times 4$  in. Price: £42 16s. 10d. including U.K. purchase tax.

**L700.** Infinite baffle enclosure incorporating two units. FR 30 c/s to beyond upper audible limit. HC 40W RMS. Impedance 8-16 ohms. One 10 in. bass driver, one hemispherical calotte design tweeter. Wood cabinet finished white laminated plastic or walnut veneer. Anodised aluminium front grille. Optional screw-on stand for vertical or horizontal mounting. Size:  $26 \times 14\frac{3}{8} \times 8\frac{7}{8}$  in. Price (enclosure with units): £65 18s. 2d. including U.K. purchase tax (stand extra).

**L800.** Infinite baffle. FR 25 c/s to beyond upper limit of audibility. HC 40W DIN. Impedance 8 ohms. Three speaker units comprising: 10 in. bass driver, 4 in. mid-range unit and hemispherical tweeter. Finish: wood cabinet with walnut veneer or white plastic finish with perforated anodised aluminium grille. Set of legs (LF700) optional extra. Size:  $25\frac{1}{2} \times 14 \times 11$  in. Price: £105 11s. including £15 0s. 1d. U.K. purchase tax.

**L900.** Infinite baffle. FR 25 c/s to beyond upper limit of audibility. HC 40W DIN. Impedance 8 ohms. Four speaker units comprising: two 10 in. bass drivers, one 4 in. mid-range radiator and one hemispherical tweeter. Finish: wood cabinet with walnut veneer or white plastic finish. Set of legs (LF80) optional extra. Size:  $33\frac{1}{2} \times 16\frac{1}{2} \times 13$  in. Price: £169 11s. including £26 4s. 4d. U.K. purchase tax.

**L1000.** Infinite baffle acoustically damped enclosure of over 7 cu ft. Three bass drivers, eight mid-range units (four adjustable for direc-

tion), two pressure chamber tweeters. Crossover: 500 c/s, 4 Kc/s. FR 20 c/s to beyond upper audible limit. HC 80W RMS. Impedance 8-16 ohms. Finish: wood cabinet finished white laminated plastic, perforated aluminium front grille. Size:  $30 \times 40 \times 13\frac{1}{4}$  in. Price: £453 5s. including purchase tax.



**BURNE-JONES & CO. LTD.**, 18 Brunswick Road, Sutton, Surrey.

**B.J. Treble 20.** Omni-directional multi-horn. One 4 in. unit. Crossover built-in. Response 1,000-18,000 c/s. Size:  $6 \times 5$  in. Weight:  $1\frac{1}{2}$  lb. Price: £3 15s. including tax.

**B.J. Treble Twin.** Omni-directional horn. Two 4 in. drive units. Crossover included. Response 900-18,000 c/s. Size:  $9 \times 4\frac{1}{4} \times 6$  in. Weight: 2 lb. Price: £7 2s. 9d. including tax.



**B & W ELECTRONICS**, Bowers and Wilkins Electronics Ltd., Littlehampton Road, Worthling, Sussex. Tel: 5142, 30303.

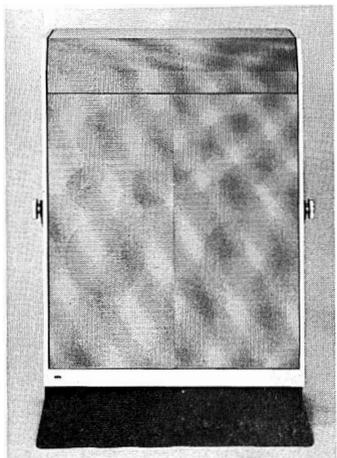
**P2 Monitor.** Floor-standing enclosure with two units and crossover. Units: E.M.I.  $13 \times 8$  in. bass and mid-range driver, Fane Ionofane HF unit. Crossover units adjusted individually to each speaker. Variable loading for bass speaker to suit conditions. Size:  $16\frac{1}{2} \times 15 \times 50$  in. Weight: 110 lb. Technical leaflet on request. Price: £79 10s.



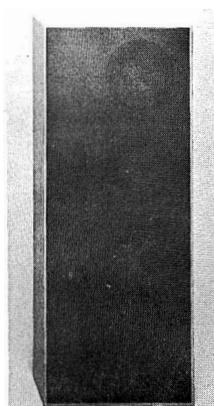
**CELESTION LTD.**, Ferry Works, Thames Ditton, Surrey. Tel: 01-398-3402. Cables: Voicecoil, Thames Ditton.

**Ditton 10.** Infinite baffle compact system. Long-throw 5 in. bass unit, HF1300 Mk 2 HF unit. Built-in half-section crossover 3,500 c/s. FR 35 c/s-15 Kc/s. HC 10W. Size:  $12\frac{3}{4} \times 6\frac{3}{4} \times 8\frac{1}{4}$  in. Weight: 13 lb. Available in teak (3-4 ohms and 15 ohms) and walnut (15 ohms only). Price: £16 10s. (U.K. purchase tax £3 1s. 7d.).

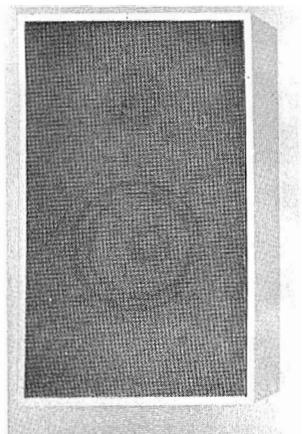
**Ditton 15.** Compact infinite baffle enclosure incorporating auxiliary bass radiator. Units: 8 in. middle/bass speaker, HF1300 Mk 2 treble radiator. FR 30 c/s-15 Kc/s. HC 15W RMS. Impedance: 4 ohms. Size:  $21 \times 9\frac{1}{2} \times 9\frac{1}{4}$  in. Weight: 20 lb. Finish: walnut or teak. Price: £24 2s. 3d. (U.K. purchase tax £4 9s. 3d.).



*Braun L1000 13-unit infinite baffle*



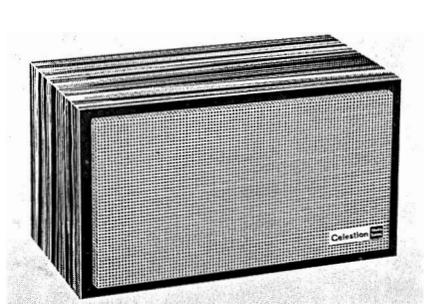
*Braun LS75 infinite baffle*



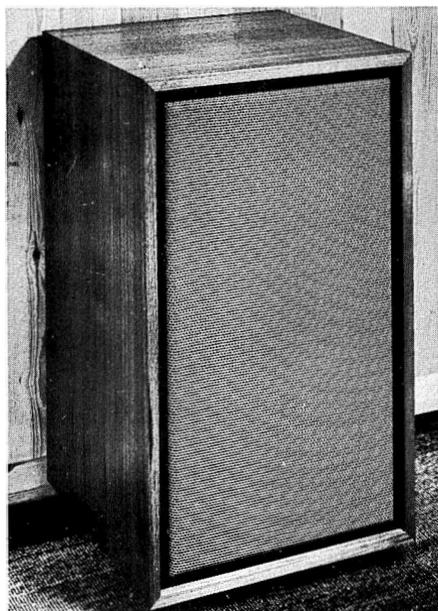
*Braun L450 slim line infinite baffle*



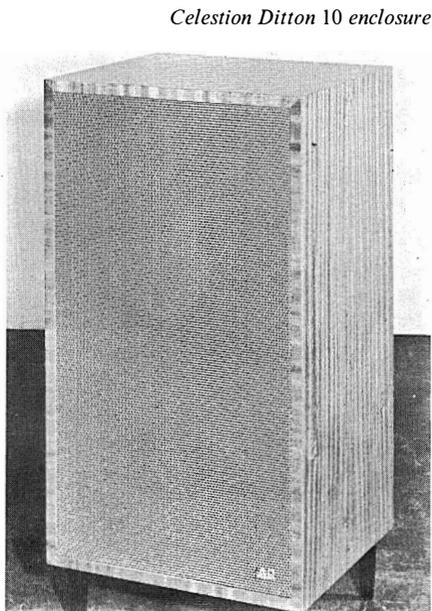
*Celestion Ditton 15*



*Celestion Ditton 10 enclosure*



*Davies AD Folded Horn*



*A. Davies bass reflex*

**CLARKE & SMITH MANUFACTURING CO. LTD.**, High Fidelity Components Division, Melbourne Works, Wallington, Surrey. Tel: Wallington 9252. Cables: Electronic, Wallington.

**CSI 619.** Infinite baffle. Complete system. Forward-facing. Three units: bass  $13\frac{1}{2} \times 8\frac{1}{2}$  in. (92390 PFL); pair of tweeters  $3\frac{3}{8}$  in. cone (99110J). Crossover (Type 99970F) 4,500 c/s. FR 50 c/s-18 Kc/s. Size:  $24 \times 13 \times 11\frac{1}{2}$  in. Finish: natural walnut veneer, matt finished. Price: £26 5s.



**CONNOISSEUR.** See A. R. Sugden and Co. Ltd.



**A. DAVIES & COMPANY**, 3/11 Parkhill Place, off Parkhill Road, Hampstead, London, N.W.3. Tel: Gulliver 5775.

**Sherwood type.** Based on Goodmans design for Axiom speakers. Approved for Goodmans Axiom 201, Axiom 301 and Goodmans three-way system. Finish: Sapele, oak, walnut, teak. Full polish or satin finish. Size:  $23\frac{1}{2} \times 27\frac{1}{2} \times 19\frac{1}{2}$  in. Price (without units or ARU172): £17. Extra for teak: £1.

**Bass reflex.** Suitable versions are made for good quality 8 in., 10 in. and 12 in. speakers. Cabinets lined with 1 in. acoustic felt. Finish: Sapele, walnut, oak, teak. Full polish or satin finish. Sizes: all cabinets are 34 in. high; 8 in. model 15 in. wide, 12 in. deep; 10 in. model  $15\frac{3}{4}$  in. wide,  $13\frac{1}{2}$  in. deep; 12 in. model  $17\frac{1}{2}$  in. wide,  $15\frac{1}{2}$  in. deep. Prices: Standard finish, 8 in. £11 10s.; 10 in. £12; 12 in. £12 10s. (teak 10s. extra).

**A.D. Sealed Folded Horn.** Designed to house Goodmans three-speaker system; 12 in. bass, Midax and Trebax. Alternative speaker arrangements are Kelly ribbon tweeter and Goodmans Audiom 51 or Woollett electrostatic treble and Wharfedale W12/RS/PST. Suitable full-range single 12 in. speakers are Goodmans Triaxiom 1220C, 212C, Axiom 301, Axiom 201, Tannoy Monitor. Rear of cabinet ready cut for attenuators. Size:  $31\frac{1}{2}$  in. high, 18 in.  $\times$  18 in. Finish: teak or veneer of colour to choice. Front: baffle sealed with black Formica (other colours to order) with neutral colour open-weave Tygan speaker grille. Full details and prices on request.

Speaker enclosures and cabinets made to customers requirements.

**DECCA SPECIAL PRODUCTS**, Decca Radio and Television Division of the Decca Record Co. Ltd., Ingate Place, Queenstown Road, London, S.W.8. Tel: Macaulay 6677.

**301 (re-styled).** Vented enclosure. Special-cone  $13 \times 8$  in. driver, exclusive Decca 3 in. HF unit. Crossover 5 Kc/s. Finished in medium polished teak. Size:  $21\frac{1}{2} \times 12\frac{1}{2} \times 9$  in. HC 6W. Price: £15 15s.

**Decca Deram Enclosure.** Two units;  $13 \times 8$  in. bass driver, 3 in. tweeter. HC 8-10W. Size:  $25 \times 13\frac{1}{4} \times 8$  in. Impedance: 15 ohms. Finish: teak or rosewood. Price: (teak) £17 17s.; (rosewood) £18 18s.

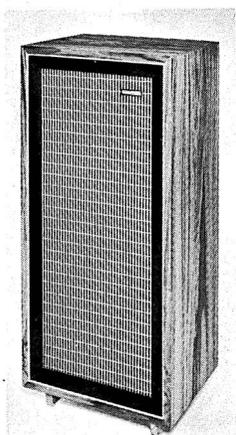
**Decca-Kelly Mini Enclosure.** Infinite baffle miniature shelf-mounting enclosure. Solid piston direct radiator bass unit. Melinex diaphragm direct radiator HF unit. Crossover 2 Kc/s. FR 40 c/s-20 Kc/s flat to within 3 dB. HC 15W RMS. Matching of driving area to enclosure volume for high-efficiency and good bass response (British Patent 36994/64). Piston diaphragm of expanded thermo-setting resin. HF unit contoured to give omni-directional sound distribution up to 16 Kc/s. Suitable for amplifiers of 8-16 ohms output impedance. Standard finish: medium teak with tygan front. Size: 10 in. high, 16 in. wide,  $7\frac{1}{2}$  in. deep. Weight: 23 lb. Price: £21.

**Decca-Kelly Kardioid Enclosure.** Reflex enclosure fitted with two units and crossover. One DK1 12 in. bass driver, one Mk II ribbon HF unit with acoustic lens. Crossover CO/2/15/2-5 Kc/s with variable slope high pass filter. HC 10W RMS. FR 40 c/s-20 Kc/s. Acoustic lens produces HF dispersion over 150 degrees with not more than 3 dB variation at 15 Kc/s, and over 135 degrees with not more than 3 dB variation at 20 Kc/s. Suitable for amplifiers of 8-16 ohms output impedance. Standard finish: medium teak with black bevelled surround to tygan front and with bright trim. Size: 36 in. high,  $16\frac{1}{2}$  in. wide, 13 in. deep. Price: £49 7s.

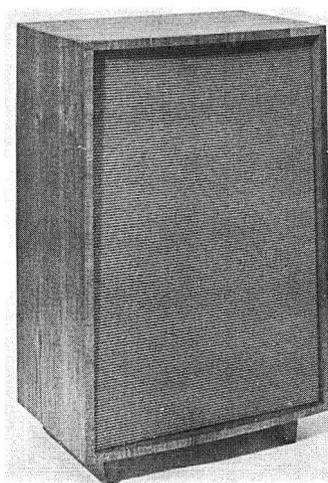


**DESIGN FURNITURE LTD.**, Calthorpe Manor, Banbury, Oxford. Tel: Banbury 4726.

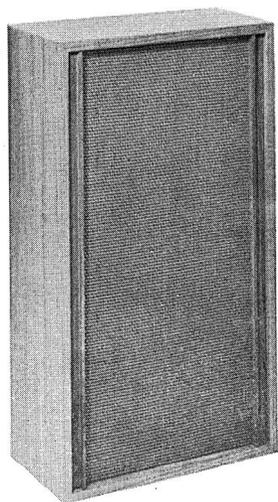
**GD.8.** Approved by Goodmans Industries for Axiom 8 speaker. Cabinet ready lagged and baffle board cut to take unit. Can be used vertically or horizontally with small suction pad feet supplied. Size:  $31\frac{1}{2} \times 17\frac{1}{2} \times 8\frac{1}{2}$  in. Finish: polished medium walnut or mahogany, oiled teak. Price: (cabinet only): £13 5s.



*Decca-Kelly Kardiod*

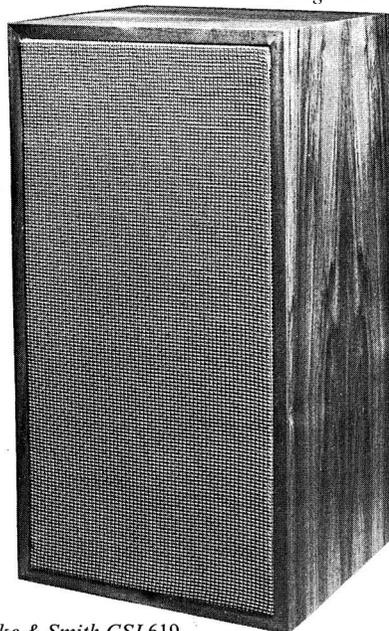


*Design GD 12*

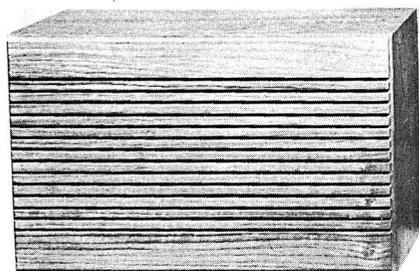


*Design GD 8*

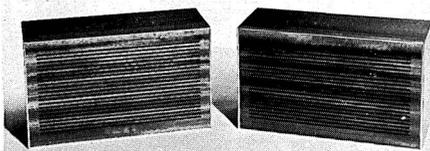
*Decca-Kelly Mini*



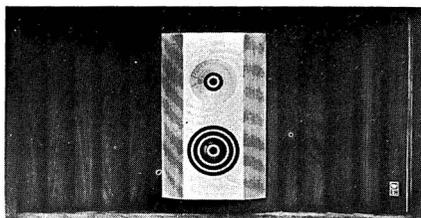
*Clarke & Smith CSI 619*



*DNH B-455/T*



*Ferguson 204SS*



*Empire Grenadier 8400*

**GD.10.** Approved by Goodmans Industries for Axiom 10 speaker. This is a full-range speaker but it can be used as bass driver when a Trebax 5K/20/XL treble unit is added. Veneered all round for use horizontally or vertically with small suction feet. Size:  $29 \times 18 \times 11\frac{1}{2}$  in. Finish: polished medium walnut or mahogany, oiled teak. Price (cabinet only): £13 17s. 6d.

**GD.12.** Approved by Goodmans Industries for 12 in. full-range and 12 in. bass speakers. Bow-fronted cabinet. ARU172 acoustic resistance can be fitted as an extra to order. Size:  $35\frac{1}{4} \times 22\frac{1}{2} \times 14\frac{1}{8}$  in. Finish: polished medium walnut or mahogany, oiled teak, polished rosewood. Price (cabinet only): £15 19s. 6d. (£3 11s. 3d. extra for ARU172).

**S33.** Smaller speaker enclosure of sufficient capacity to produce satisfactory response from most medium price hi-fi speakers. Size:  $27 \times 16 \times 12$  in. Finish: walnut or mahogany with Bay muraweave baffle, teak with peat mura-weave baffle. Price (cabinet only): £1 1.



**D.N.H.** Den Norske Hoyttalerfabrikk A/S. Distributor: Highgate Acoustics, 71-73 Great Portland Street, London, W.1. Tel: Museum 2901.

**B-455/T.** Infinite baffle. High efficiency 6 in. driver with 4 in. HF unit. FR 50 c/s-18 Kc/s. HC 10W. Imp 4 and 15 ohms. Choice of slotted teak front or fabric front. 0.31 cu ft. Standard finish teak. Size:  $10\frac{1}{2} \times 6\frac{3}{4} \times 7\frac{1}{2}$  in. Weight: 8.3 lb. Price: £11 16s. 11d. (U.K. purchase tax £1 19s. 8d.).

**B-616.** Infinite baffle. Twin-cone  $8\frac{1}{2}$  in. high-flux unit. FR 60 c/s-18 Kc/s. HC 10W. Imp 4 ohms. Standard finish: walnut with fabric front. Size:  $15\frac{1}{2} \times 11 \times 7$  in. Price: £9 2s. 3d. (U.K. purchase tax £1 10s. 6d.).

**B-420/T.** Infinite baffle. 2.2 cu ft. 8 in. bass driver, 4 in. tweeter. FR 40 c/s-18 Kc/s. HC 15W. Finish: teak with slotted wood front. Size:  $23\frac{1}{2} \times 16\frac{1}{2} \times 6\frac{1}{2}$  in. Weight: 21 lb. Price: £17 6s. 3d. (U.K. purchase tax £2 18s.).

**B-520/T.** Infinite baffle. 2.2 cu ft. 12 in. bass driver, 4 in. tweeter. FR 40 c/s-18 Kc/s. HC 20W. Finish: teak with slotted wood front. Size:  $23\frac{1}{2} \times 16\frac{1}{2} \times 6\frac{1}{2}$  in. Weight: 21 lb. Price: £21.

**DUAL ELECTRONICS LTD.,** Radnor House, London Road, Norbury, S.W.16. Tel: 01-764 9465/6.

**Dual CL.4.** Full-range enclosure with two units. Special 9 in. bass driver, 5 in. mid- and upper-frequency unit. Crossover: 1 Kc/s. Impedance: 5 ohms. HC 20W music. FR 60 c/s-18 Kc/s. Size:  $18\frac{3}{8} \times 10\frac{3}{8} \times 7\frac{1}{8}$  in. Weight:  $14\frac{1}{4}$  lb. Full specification on request. Price: £18 18s. (including U.K. purchase tax).

**Dual CL.6.** Full-range enclosure with two units. Special 10 in. bass driver, 5 in. mid- and upper-frequency unit. Crossover: 1 Kc/s. Impedance: 5 ohms. HC 25W music. FR 50 c/s-18 Kc/s. Size:  $23\frac{1}{2} \times 13 \times 10\frac{1}{4}$  in. Weight:  $23\frac{1}{4}$  lb. Full specification on request. Price: £29 8s. (including U.K. purchase tax).

**Dual CL.7.** Compact full-range enclosure with two units. Special high compliance  $3\frac{1}{2}$  in. bass driver, 5 in. mid- and upper-frequency unit. Impedance: 5 ohms. HC 15W music. FR 100 c/s-18 Kc/s. Size:  $10\frac{1}{4} \times 7\frac{3}{8} \times 6\frac{3}{8}$  in. Weight:  $7\frac{1}{4}$  lb. Full specification on request. Price: £14 14s. (including U.K. purchase tax).

**Dual CL.8.** Full-range enclosure with three units. Special 10 in. bass driver, two 5 in. mid- and upper-frequency units. Crossover: 1 Kc/s. Impedance: 5 ohms. HC 30W music. FR 40 c/s-18 Kc/s. Size:  $23\frac{1}{2} \times 13 \times 10\frac{3}{8}$  in. Weight:  $25\frac{1}{2}$  lb. Full specification on request. Price: £33 12s. (including U.K. purchase tax).



**DUODE LTD.,** Westfield Mills, Broad Lane, Bramley, Leeds, 13. Tel: Pudsey 77536.

**Duode Compact.** Full-range enclosure incorporating special Duode Super 12 in. with Barker-patented aluminium speech coil former covered with latex sleeve. Speaker design applies negative feedback and gives response 35 c/s-20 Kc/s. Price: £34.

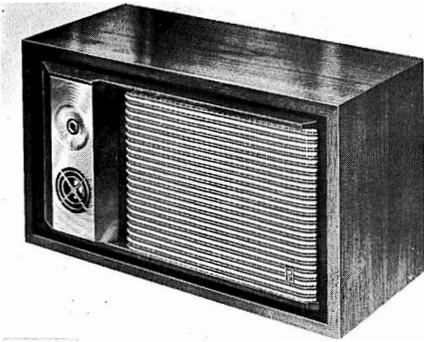


**DYNA-STATIC.** See Electrostatic Loudspeaker Mfg. Co.

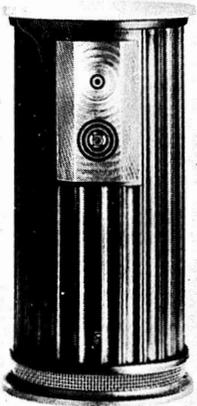


**DYNATRON RADIO LTD.,** St Peter's Road, Furze Platt, Maidenhead, Berks. Tel: Maidenhead 23331.

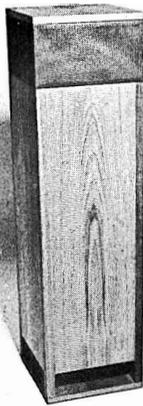
**Dynatron LS.100.** Infinite baffle wall or shelf-mounting system.  $6\frac{1}{2}$  in. special suspension bass



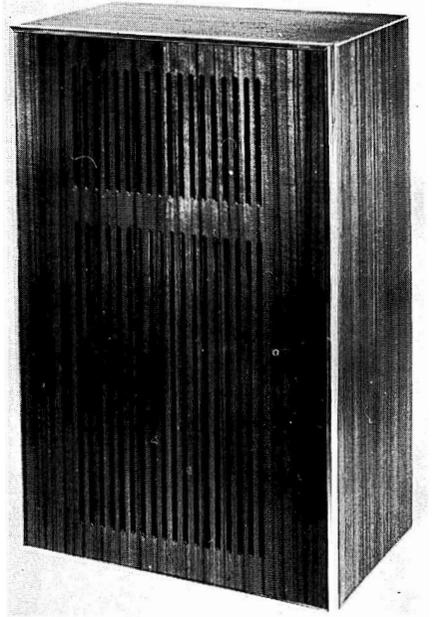
*Empire 8200*



*Empire Grenadier 8000*



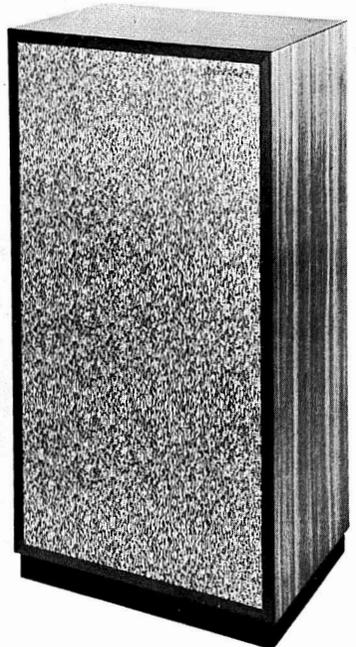
*Expert Mk. III acoustic column*



*Ferguson 203SL*



*Eagle MS40*



*Dynastatic Mk II*

unit,  $3\frac{7}{8}$  in. HF unit with high-pass filter. FR 20 c/s-40 Kc/s. Impedance: 3 ohms. Size:  $13\frac{3}{4} \times 7\frac{1}{2} \times 10\frac{1}{4}$  in. Price: £12 15s. 6d. (including U.K. purchase tax).

**Dynatron LS.200.** Floor standing bass reflex enclosure. 8 in. bass unit with high-flux ceramic magnet,  $3\frac{1}{2}$  in. HF unit with high-pass filter. FR 20 c/s-40 Kc/s. Enclosure filled with bonded cellulose acetate fibre to prevent resonance. Impedance: 3 ohms. Size:  $26\frac{3}{4} \times 10\frac{1}{4} \times 10\frac{1}{2}$  in. Price: £19 3s. 3d. (including U.K. purchase tax).



**EAGLE PRODUCTS.** Distributors: B. Adler and Sons (Radio) Ltd., 32a Coptic Street, London, W.C.1. Tel: Museum 9606. Cables: Reldab, London.

**MS.40.** Infinite baffle enclosure. FR 40 c/s-16 Kc/s. HC 5W RMS. One 4 in. high-compliance unit. Impedance: 16 ohms. Size:  $8\frac{7}{8} \times 6\frac{1}{2} \times 5$  in. Finish: Rosewood with slotted front. Price: £7 2s. 5d. (U.K. purchase tax £1 5s. 7d.).

**MS.65.** Infinite baffle enclosure. FR 35 c/s-18 Kc/s. HC 10W RMS. One  $6\frac{1}{2}$  in. high-compliance unit. Impedance: 16 ohms. Size:  $10\frac{3}{8} \times 7\frac{7}{8} \times 6\frac{3}{4}$  in. Finish: Rosewood with slotted front. Price: £10 13s. 9d. (U.K. purchase tax £1 18s. 3d.).

**MS.80.** Infinite baffle enclosure. FR 50 c/s-20 Kc/s. HC 20W RMS. One 8 in. high-compliance unit. Impedance: 16 ohms. Size:  $14\frac{1}{2} \times 10\frac{3}{8} \times 8$  in. Finish: Rosewood with slotted front. Price: £12 9s. 3d. (U.K. purchase tax £2 4s. 9d.).



**ELAC.** Electro Acoustic Industries Ltd., Stamford Works, Broad Lane, London, N.15. Tel: Tottenham 0505/9.

**Elac E6-S.** Infinite baffle compact enclosure with unit. Wide-range 6 in. speaker with long-throw suspension and moulded rubber surround of new design. FR 55 c/s-16 Kc/s. HC 10W. Impedance: 8 and 15 ohms. Size:  $11 \times 8 \times 6$  in. Weight: 7 lb. Finish: scratch resistant simulated teak or walnut. Price: £12 (U.K. purchase tax £2 2s. 4d.).



**ELAC.** Electroacoustic GmbH. Kiel, West Germany. Distributors: Mitchell Enterprises Ltd., 61 West Street, Dorking, Surrey. Tel: Dorking 4229.

**Box 30.** Reflex enclosure. Wide-range  $8\frac{1}{4}$  in. drive unit plus tweeter.  $1\frac{1}{4}$  in. diameter voice

coil. Magnetic flux 95,000 maxwells. FR 65 c/s-20 Kc/s. HC 18W. Imp 6-18 ohms. Finish: Oiled walnut. Back of cabinet also veneered permitting use in centre of room. Internally damped. Size:  $11 \times 9\frac{3}{4} \times 7\frac{1}{2}$  in. Weight:  $27\frac{1}{2}$  lb. Price: £27 15s.

**LK100.** Reflex enclosure with four drive units. Bass unit  $9\frac{1}{4}$  in. diameter with  $1\frac{1}{4}$  in. speech coil and gap flux 14,700 gauss. Mid-range 5 in. unit and two 2 in. tweeters. Crossover at 4,000 c/s and 750 c/s. FR 30 c/s-18 Kc/s. HC 22W. Imp 8 ohms. Finish: Oiled walnut. Back of cabinet also veneered permitting use in centre of room. Size:  $13\frac{3}{4} \times 25\frac{3}{8} \times 11\frac{1}{4}$  in. Weight: 36 lb. Price: £42 10s.

**LK500.** Reflex enclosure with four drive units.  $9\frac{3}{4}$  in. bass speaker,  $6\frac{1}{2}$  in. mid-range speaker, two  $2\frac{1}{2}$  in. tweeters. Crossover at 500 c/s and 5 Kc/s. FR 25 c/s-20 Kc/s. HC 36W. Imp 8 ohms. Finish: oiled walnut. Back of cabinet is also veneered permitting use in centre of room. Size:  $13\frac{3}{4} \times 25\frac{1}{2} \times 11\frac{1}{4}$  in. Weight:  $34\frac{1}{2}$  lb. Price: £51 10s.



**ELECTROSTATIC LOUDSPEAKER MFG. CO.,** 82 East Barnet Road, New Barnet, Herts. Tel: Barnet 6605. Export agents: Metro-Sound (Export) Ltd.

**Dyna-Static Doublet.** Forward-facing units in special design doublet enclosure which provides both front and rear radiation. Two closely coupled  $10 \times 6$  in. bass units, 12,000 gauss each. 2 in. dia. voice coil. Total flux 160,000 maxwells. Shackman electrostatic tweeter. Crossover approx. 1 Kc/s. HC 20W RMS. FR 40 c/s-20 Kc/s. Impedance 8-16 ohms. Finish: walnut laminate with gold/brown Vynair front. Built-in mains unit for electrostatic unit. Standard version 200-250V AC, export model 110V if required. Size:  $28 \times 22 \times 6$  in. Weight: 40 lb. approx. Price: £39 18s.

**Dyna-Static Mark II.** Infinite baffle type enclosure. 12 in. bass unit. 2 in. dia voice coil. Total flux 160,000 maxwells. Shackman electrostatic tweeter. Crossover approx 800 c/s. HC 20W. Impedance 8-16 ohms. FR 30 c/s-20 Kc/s. Finish: walnut laminate with gold/brown Vynair front. Built-in mains unit for electrostatic unit. Standard version 200-250V AC, export model 110V if required. Size:  $33 \times 18 \times 12$  in. Weight: 60 lb. approx. Price: £48.

**E.M.G. HANDMADE GRAMOPHONES LTD.**, 6 Newman Street, Oxford Street, London, W.1. Tel: Museum 9971/3.

**DL/12T.** Custom built enclosure with unit. Floor-standing. Size: 36×20×16 in. tapering to 10 in. Finish in choice of modern veneers. Full technical details and price on request.



**EMI SOUND PRODUCTS LTD.**, Hayes, Middlesex. Tel: Hayes 3888. Cables: Emi-sound, London.

**EL.100.** Infinite baffle corner enclosure available with or without legs. 13½×8½ in. bass driver, 2½ in. tweeter with capacitor crossover. FR 75 c/s-15 Kc/s. Impedance 3 or 15 ohms. HC 10W. Finish: walnut, sapele or teak. Approx volume 1½ cu ft. Size: 24 in. high, 12 in. wide, 11½ in. deep. Price on application.

**EL.200.** Infinite baffle floor standing console. 13½×8½ in. ceramic magnet elliptical bass driver, two 3⅜ in. tweeters with capacitor crossover. HC 10W (15W to special order). FR 65 c/s-20 Kc/s. Impedance 3 or 15 ohms. Finish: figured walnut or sapele. Approx volume 2½ cu ft. Size: 27 in. high, 12 in. wide, 14½ in. deep. Price on application.

**EL.301.** Slim line enclosure suitable for floor, shelf or wall-mounting. 13½×8½ in. bass driver, two 3⅜ in. tweeters with crossover network. HC 10W (20W to special order). FR 45 c/s-20 Kc/s. Impedance 3 or 15 ohms. Finish: walnut, sapele or teak. Approx volume 2½ cu ft. Size: 31 in. high, 18 in. wide, 8½ in. deep. Price on application.

**EL.400.** Infinite baffle small bookshelf enclosure. 13½×8½ in. bass driver, two 3⅜ in. tweeters with crossover network. HC 10W (20W to special order). FR 55 c/s-20 Kc/s. Impedance 3 or 15 ohms. Finish: walnut. Approx. volume 2 cu ft. Size: 13×24×12¼ in. Price on application.



**EMPIRE SCIENTIFIC.** Distributors: Howland-West Ltd., 2 Park End, South Hill Park, London, N.W.3. Tel: Swiss Cottage 6666.

**Grenadier 8000.** Divergent lens enclosure. 12 in. bass unit, mid-range direct radiator, domed HF tweeter. FR 30 c/s-20 Kc/s. Circular design gives completely omni-directional sound. Finish: Satin walnut. Size: 29 in. high, 15¼ in. diameter. Price: £115 10s.

**Grenadier 8000P.** Divergent lens enclosure. 12 in. bass unit, mid-range direct radiator, domed HF tweeter. FR 25 c/s-20 Kc/s. Circular design gives completely omni-directional sound. Finish: satin walnut, hand rubbed, with marble top. Handling capacity up to 100W music power. Size: 29 in. high, 16 in. diameter. Price: £136 10s.

**Grenadier 8400.** Features a louvered LF hyperbolic horn, 12 in. mass-loaded bass unit with floating suspension, diecast mid-frequency/high-frequency full dispersion acoustic lens, with mid-range radiator and domed HF tweeter. FR 25 c/s-20 Kc/s. Power handling capacity up to 100W music. Treble adjustment. Finish: satin walnut, hand rubbed. Size: 25×13¼×12¼ in. deep. Price: £127 1s.

**Grenadier 8200.** Similar to 8400 except frequency response 30 c/s-20 Kc/s and dimensions 24¼×14×12¼ in. deep. Price: £115 10s.

**Grenadier 9000M.** Divergent lens enclosure. 15 in. bass unit, mid-range direct radiator, domed HF tweeter. FR 20 c/s-20 Kc/s. Circular design gives completely omni-directional sound. Finish: Satin walnut. Size: 29 in. high, 22 in. diameter. Price: £173 5s.



**EXPERT GRAMOPHONES (SERVICES) LTD.**, 30 Vincent Road, Kingston-upon-Thames, Surrey. Tel: Kingston 6011.

**Expert Bookshelf Unit.** Labyrinth enclosure with unit. One Richard Allan special 8 in. unit. FR 40 c/s-15 Kc/s ±4 dB. HC 10W RMS. Smooth response, high efficiency and broad radiation pattern. Patented design enclosure. Size: 16×9½×9 in. Finish: rosewood with black Vynair grille, teak with black Vynair grille, elm with buff Vynair grille. Price: £17 10s. (U.K. purchase tax £2 10s.).

**Expert Bookshelf Major.** Labyrinth enclosure with unit. One Richard Allan special 10 in. unit. FR 30 c/s-20 Kc/s with smooth roll off above and below. HC 12W RMS. Smooth response, high efficiency and broad radiation pattern. Patented design enclosure. Size: 28×12×12 in. Finish: rosewood with black Vynair grille, teak with black or stone Vynair grille, elm with stone Vynair grille. Price: 26 15s. (U.K. purchase tax £3 5s.).

**Expert Mk III Acoustic Column.** Column type enclosure with unit. One Richard Allan special 10 in. unit. FR 30 c/s-20 Kc/s with

smooth roll-off above and below. HC 12W RMS. 360 degree radiation pattern, making for easier stereo-positioning. Available in Burma teak, French walnut, oak or mahogany with Vynair grille to suit as standard. Also available in any finish, including painted, panelled, decorated, etc., to special order at slight additional cost. Available with Lowther PM6 or PM7, providing extended frequency range, at additional cost. Size: 12 × 12 × 44 in. high. Price: £31 16s. (U.K. purchase tax £4 4s.).



**FANE ACOUSTICS LTD.**, Hick Lane, Batley, Yorks. Tel: Batley 2114. Cables: Fane, Batley.

**Ionofane 602.** HF Ionophone unit combined with new 5 in. high flux mid-range unit and 12 dB/octave crossover. Mounted in compact veneered cabinet and designed to operate with existing bass unit. FR 800 c/s-50 Kc/s. Power handling above 800 c/s: 20W peak. Impedance 15 ohms. Mains power 200/250V AC required. Size: 14 × 9 × 7½ in. Price: £47 5s. (U.K. purchase tax £7 15s. 6d.).

**Ionofane 603.** Full-range speaker comprising Ionofane 601 HF unit, 501 mid-range 5 in. unit, 152/17LR 15 in. low resonance bass unit and 12 dB/octave three-way crossover. Whole assembly mounted in veneered reflex cabinet. Finish walnut or sapele. FR 20 c/s-50 Kc/s. HC 20W RMS. Impedance 15 ohms. Mains power 200/250V AC required. Size: 35 × 22½ × 14 in. Price: £78 15s.

**Ionofane 604.** Full-range speaker system comprising Ionofane 601 high-frequency unit and 12 in. bass unit with 17,000 gauss magnet. HC 20W. FR 30 c/s-30 Kc/s. Finish: natural teak. Size: 31 × 17 × 12 in. Price: £51 9s.



**FERGUSON.** British Radio Corporation Ltd., 284 Southbury Road, Enfield, Middlesex. Tel: Howard 2477.

**Unit 203SL.** Floor-standing enclosure with two units. 13 × 8 in. bass driver, 3½ in. HF pressure unit. Crossover: LC unit 3 Kc/s. FR 30 c/s-15 Kc/s. HC 10W. Cabinet: extra thick particle board veneered in Queensland walnut. Size: 15½ in. wide, 25½ in. high, 11¼ in. deep. Designed to match Ferguson Unit Audio system. Impedance: 8 ohms. Supplied with 11 ft cable and DIN plug. Price: £19 8s. 6d.

**Unit 204SS.** Shelf-mounting enclosure with two units. 6½ in. high compliance bass driver,

3½ in. HF pressure unit. Crossover: LC unit 3 Kc/s. FR 30 c/s-15 Kc/s. HC 7W. Impedance: 8 ohms. Cabinet: extra thick particle board veneered in Queensland walnut. Size: 8½ in. wide, 16¾ in. high, 7½ in. deep. Designed to match Ferguson Unit Audio system. Supplied with 11 ft cable and DIN plug. Price: £12 15s. 6d. including U.K. purchase tax.



**FISHER RADIO CORPORATION,** Long Island City 1, New York, U.S.A. Distributors: Getz Bros. and Co. Inc., 2 Harewood Place, London, W.1. Tel: Grosvenor 6901.

**XP-5.** Speaker enclosure. Infinite baffle. One 8 in. bass unit, 12,500 gauss 2½ lb. magnet. One 2½ in. treble unit. Crossover 2 Kc/s, roll-off 12 dB/octave. FR 38 c/s-18.5 Kc/s. Handling capacity 15W. Size: 20 × 10 × 9 in. Can be used horizontally or vertically. Weight: 15 lb. Walnut finish. Price: £30 9s.

**XP-6.** Speaker enclosure. Infinite baffle. Three units: one 10 in. bass unit, 13,000 gauss 5½ lb. magnet, one 5 in. mid-range unit, one 1½ in. treble unit. Crossover 300 c/s and 2.5 Kc/s. FR 35 c/s-20 Kc/s. HC 25W. Size: 23 × 13 × 10½ in. Can be used horizontally or vertically. Weight: 35 lb. Walnut finish. Price: £46 4s.

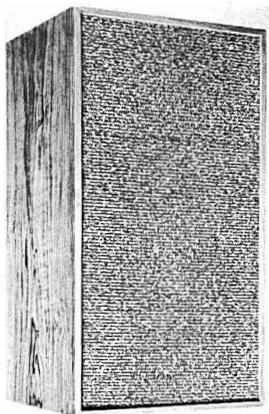


**GOODMANS LOUDSPEAKERS LTD.**, Axiom Works, Wembley, Middlesex, England. Tel: 01-902-1200. Cables: Goodaxiom, Wembley.

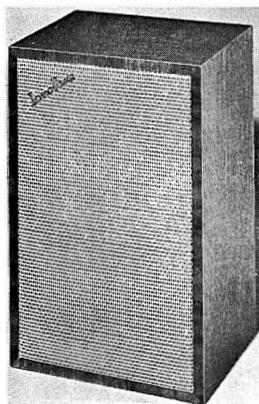
**Eleganzia II.** Acoustically sealed enclosure, exceptionally slim. Forward facing. Two units, 12 in. bass unit especially designed for this enclosure, employing Goodmans "Suprfoam" diaphragm, and one back-loaded mid-range and HF unit. Crossover unit 900 c/s. FR 35 c/s-15 Kc/s. HC 15 watts. Imp 15/16 ohms. Size: 27 × 20 × 6¼ in. Weight: 42 lb. Price: £27 10s.

**Maxim.** Infinite baffle. Forward facing. Incorporates two units specially designed for this box. Crossover included. FR 45 c/s-20 Kc/s. HC 8W. Imp 15 ohms. Size: 10½ × 5½ × 7¼ in. Weight: approx 7 lb. Price: £15 (U.K. purchase tax £2 15s. 7d.).

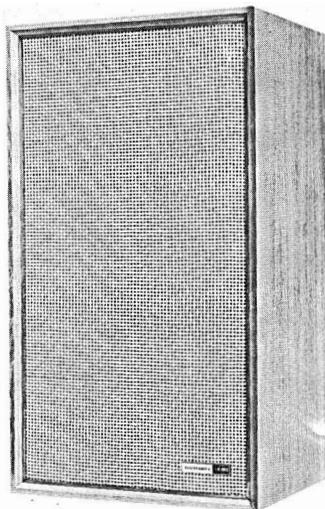
**Mezzo II.** Infinite baffle containing two units. 12 in. bass unit with inductance/capacitance crossover at 2 Kc/s. Sealed back 4 in. treble unit. FR 40 c/s-20 Kc/s. HC 15W. Impedance



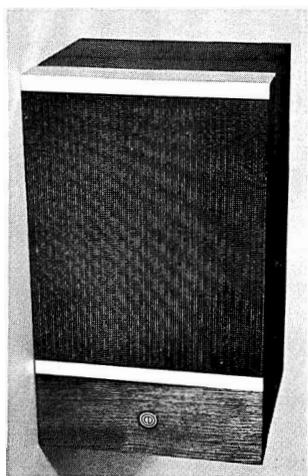
*Elac LK.100*



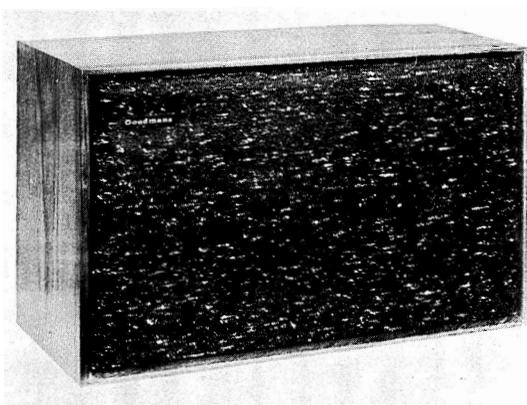
*Ionofane 602 enclosure*



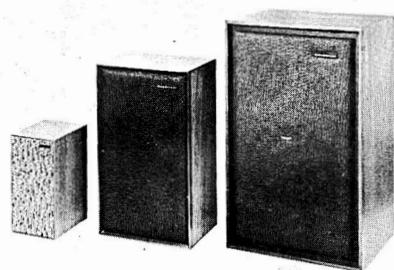
*Elac LK 500*



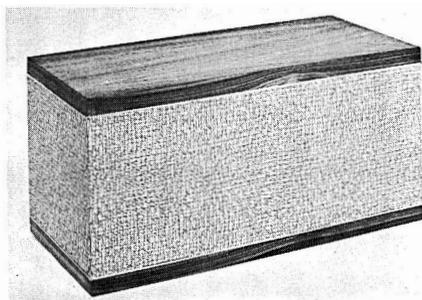
*Expert Bookshelf Unit*



*Goodmans Mezzo II*



*Goodmans Maxim, Mezzo and Magnum*



*Imhofs BS4*

8 ohms. Bookshelf speaker enclosure. Finish: teak or walnut to order. Size:  $12 \times 19\frac{1}{2} \times 9$  in. Price: £28 7s.

**Magnum-K.** Infinite baffle containing three units. 12 in. bass speaker, mid-range direct radiator, back-loaded direct HF radiator. Built-in multiple section crossover. 1.5 Kc/s and 6 Kc/s. FR 30 c/s-20 Kc/s. HC 25W. Air-cushion suspension to bass unit. Two attenuators allow sound tailoring to room acoustics. Classic styling in teak or walnut. Imp 4-8 ohms. Price: £36 15s.



**GRUNDIG (GREAT BRITAIN) LTD.,** Newlands Park, Sydenham, London, S.E. 26. Tel: Sydenham 2211.

**Box 4.** Infinite baffle incorporating three units. One 5 in. bass driver, two  $2\frac{3}{4}$  in. treble units. Crossover: 4 Kc/s. FR 50 c/s-20 Kc/s. HC 15W nominal, 20W max. Supplied with 4 yds. lead and jack-plug. Size:  $20 \times 12\frac{1}{2} \times 3$  in. Weight: 12 lb. Volume: 0.21 cu ft. Impedance: 5 ohms. Finish: selected veneers in matt walnut or oiled teak. Price: £23 8s. 3d. including U.K. purchase tax.

**Box 5A.** Similar specification to Box 4 but different size and finish. Size:  $6\frac{3}{4} \times 11 \times 8\frac{1}{4}$  in. Weight:  $9\frac{3}{4}$  lb. Finish: dark gloss, natural matt walnut or oiled teak. Price to be announced.

**Box 8.** Infinite baffle enclosure with single unit.  $6\frac{1}{2}$  in. twin-cone unit. FR 70 c/s-15 Kc/s. HC 10W. Impedance: 5 ohms. Matches ST300. Size:  $7\frac{1}{8} \times 7\frac{3}{4} \times 11$  in. Weight: 6 lb. Finish: selected veneers in matt walnut or teak. Price to be announced.

**Box 25.** Infinite baffle enclosure incorporating three units. One 8 in. bass driver,  $7 \times 5$  in. mid-range unit,  $2\frac{3}{4}$  in. tweeter. Crossover: 800 c/s and 5 Kc/s. FR 40 c/s-20 Kc/s. Size:  $23 \times 9\frac{1}{2} \times 9\frac{3}{8}$  in. Weight: 24 lb. Impedance: 5 ohms. Finish: selected veneers in matt walnut or dark oiled teak. Price to be announced.

**Box 30A.** Infinite baffle enclosure incorporating six units. One 8 in. bass driver, one  $7 \times 5$  in. mid-range unit, four  $2\frac{3}{4}$  in. tweeters. Crossover: 1.5 and 7 Kc/s. FR 40 c/s-20 Kc/s. HC 30W nominal, 40W peak. Impedance: 5 ohms. Size:  $23\frac{1}{2} \times 15 \times 5$  in. Weight: 33 lb. Volume: 0.7 cu ft. Finish: oiled teak, light walnut, or dark gloss. Price: £38 6s. 5d. including U.K. purchase tax.

**Box 40A.** Similar specification to Box 30A but different size and finish. Size:  $24 \times 14 \times 10$

in. Weight: 33 lb. Volume: 1.4 cu ft. Finish: matt walnut or oiled teak with horizontal louvred front. Price: £45 15s. 8d. including U.K. purchase tax.

**Box 80.** Six-unit enclosure incorporating push-button frequency correction network. One 12 in. bass driver, one  $6\frac{1}{2}$  in. mid-range unit, four  $2\frac{3}{4}$  in. tweeters. Crossover: 1.5 and 7 Kc/s. FR 35 c/s-20 Kc/s. HC 40W nominal, 50W max. Impedance: 5 ohms. Five-position tone correction network: treble level, treble boost, bass level, bass boost, bass cut. Size:  $21 \times 24\frac{1}{2} \times 13$  in. Weight: 73 lb. Volume: 2.48 cu ft. Finish: Dark gloss, matt walnut or oiled teak. 9 in. black legs with teak cabinet, wood legs with other finishes. Price: £73 8s. 11d. including U.K. purchase tax.



**C. E. HAMMOND & CO. LTD.,** 90 High Street, Eton, Windsor, Berks. Tel: Windsor 63388. Tel: 84316.

**Hammond L.7.** Infinite baffle enclosure. One  $6\frac{1}{2}$  in. twin-cone unit. FR 45 c/s-18 Kc/s. Impedance 8 or 16 ohms. Finish: teak. Size:  $20 \times 30 \times 4\frac{3}{4}$  in. Weight: 6 lb. Price: £11 0s. 6d.



**HEATHKIT.** See Constructional Kits Section.



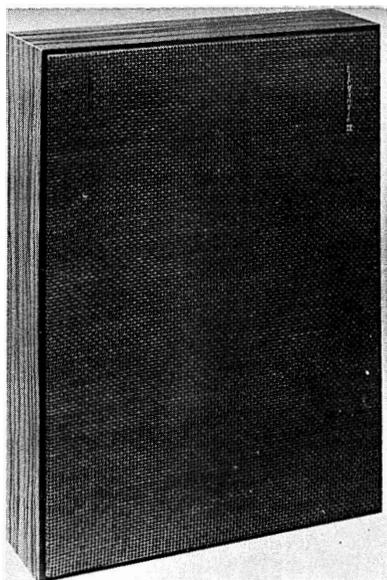
**THOMASHEINITZ,** 100 Queensway, London, W.2. Tel: Bayswater 2077.

**C.Q. Junior.** Controlled Q reflex enclosure. Units special Goodmans or Peerless  $10 \times 6$  in. FR 45 c/s-15 Kc/s depending on unit. Finishes: Teak, walnut, mahogany, all-white (others to order at no extra charge). Size:  $16\frac{1}{2} \times 9\frac{1}{2} \times 10\frac{1}{4}$  in. Weight: 7 lb. Price: £8 18s. 4d.

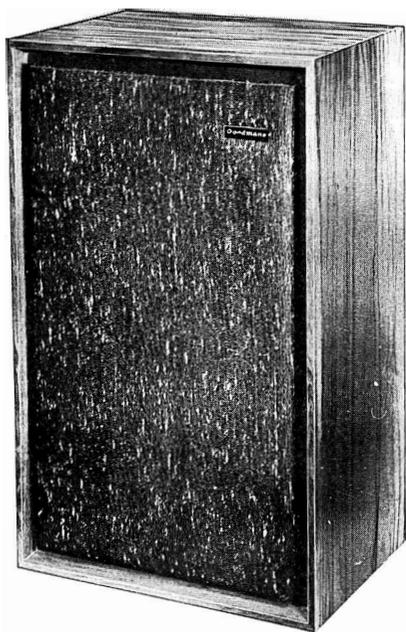


**IMHOFS.** 112-116 New Oxford Street, London, W.C.1. Tel: 01-636-7878. Cables: Imcase, London, W.C.1.

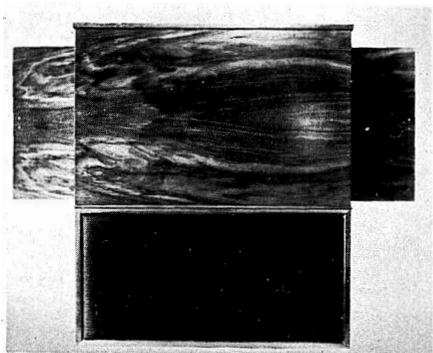
**Imhof BS/4.** Reflex cabinet with speaker and cross-over. Unit: Goodmans 8 in. Twin Axiote. Cross-over: mechanical at 2 Kc/s. FR 40 c/s-18 Kc/s. Handling capacity 6W. Finish: oiled teak. Size:  $23 \times 11 \times 11$  in. Weight: 18 lb. Price: £16 19s. 6d. (U.K. purchase tax 17s. 6d.).



*Goodmans Eleganzia II*



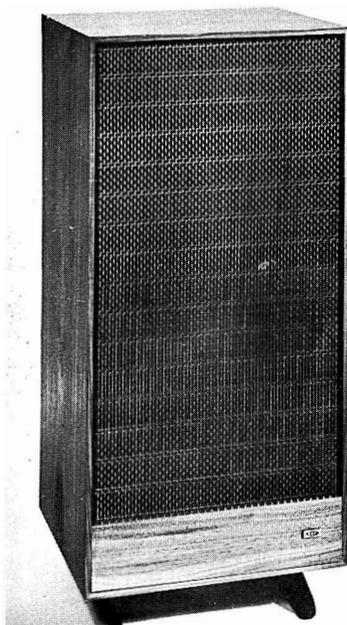
*Goodmans Magnum-K*



*Jordan-Watts Stereola*



*KEF Cresta*



*KEF Carlton*

**ISOPHON-WERKE**, Berlin-Templehof. U.K. Distributors: Britimpex Ltd., 16/22 Great Russell Street, London, W.C.1. Tel: Museum 7600.

**HSB45**. Three-speaker system. Totally closed box damped internally. Forward-facing with control at the back adjusting level +3 -7 dB to room conditions. Three units (arranged angularly for wide radiation): 10 in. bass unit and two 3×5 in. midrange/HF speakers. HC 45W. Crossover 1,500 c/s. FR 25 c/s-20 Kc/s. Finish: walnut. Size: 25 $\frac{3}{8}$  × 13 $\frac{1}{2}$  × 11 $\frac{1}{4}$  in. Weight: 39 $\frac{3}{8}$  lb. Price (with units): £43 3s. 7d. (U.K. purchase tax £7 15s. 11d.).

**G3037**. Folded horn diffuser. Four-speaker system 12 in. bass unit mounted in bitumenised soundproof case, wide angle diffuser, two 4 in. tweeters. HC 15W. FR 30 c/s-20 Kc/s. Wood finished cabinet. Size: 23 $\frac{5}{8}$  × 17 $\frac{3}{4}$  × 7 $\frac{7}{8}$  in. Weight: 29 $\frac{1}{4}$  lb. Price (with units): £33 1s. 6d. (incl tax).



**JORDAN-WATTS**. Distributors: Boosey and Hawkes (Sales) Ltd., Sonorous Works, Deansbrook Road, Edgware, Middlesex. Tel: 01-952-7711.

**Jumbo**. Infinite baffle. Power handling 12W. Forward facing. Shelf or wall mounting. Incorporates one Jordan-Watts modular unit. FR 80 c/s-20 Kc/s. Size: 16 $\frac{1}{2}$  × 8 × 3 $\frac{1}{2}$  in. Weight: 13 lb. Finish: teak. Price: £17 12s. 6d.

**Jason**. Folded column. Power handling. 12W. Omni-directional. FR 40 c/s-20 Kc/s. Size: 9 × 9 × 21 in. Weight: 23 lb. Price: £24 10s.

**Juno**. Reflex enclosure. Power handling 12W. Forward facing. Incorporates one Jordan-Watts modular unit. FR 40 c/s-20 Kc/s. Size: 24 $\frac{1}{2}$  × 12 $\frac{1}{2}$  × 6 $\frac{1}{2}$  in. Weight: 27 lb. Price: £24 10s.

**Gemini**. Reflex enclosure. Power handling 25W. Forward facing. Incorporates two Jordan-Watts modular units. FR 40 c/s-20 Kc/s. Size: 30 × 13 $\frac{1}{2}$  × 7 $\frac{1}{2}$  in. Weight: 50 lb. Price: £39 15s.

**Jupiter**. Reflex enclosure. Power handling 25W. Forward facing. Incorporates two Jordan-Watts modular units. FR 20 c/s-20 Kc/s. Size: 34 × 15 × 10 $\frac{1}{2}$  in. Weight: 70 lb. Price: £54 10s.

● **D.P.S. 100**. Delayed phase full-room stereophonic speaker. Omni-directional. Power handling: 50W each channel. Incorporates eight Jordan-Watts modular units and delay phase network. Size: 41 × 11 × 30 in. Price: £185.

● **Stereola**. Omni-directional two-channel stereo speaker system. FR 40 c/s-20 Kc/s. HC 25W RMS per channel. Impedance 15 ohms. Size: 25 $\frac{1}{2}$  in. wide, 31 in. high, 10 $\frac{1}{2}$  in. deep. Finish: teak or walnut, vynair front. Weight: 70 lb. Price: £89 10s.

**Line source columns**. 50W and 100W line source columns available to order. Full details on request.



**KEF ELECTRONICS LTD.**, Tovil, Maidstone, Kent. Tel: Maidstone 58761. Cables: Kef, Maidstone.

**Celeste Mk II**. Totally enclosed. Forward facing. Two drive units 13 × 9 in. and 1 $\frac{1}{2}$  in. dia Crossover 1,000 c/s. Size: 18 × 10 $\frac{3}{4}$  × 6 $\frac{1}{2}$  in. Weight: 24 lb. Price: £26 10s.

**Portable Celeste**. Totally enclosed. Forward-facing. Two units: B139 13 × 9 in.; T15 1 $\frac{1}{2}$  in. dia. Crossover 1,000 c/s half-section. Size: 20 × 12 $\frac{1}{2}$  × 7 $\frac{1}{2}$  in. Weight: 26 lb. Price: £28.

**Concord**. Totally enclosed. Forward-facing. Two units: B139 13 × 9 in.; T15 1 $\frac{1}{2}$  in. dia. Crossover 1,000 c/s half-section. FR 30 c/s-20 Kc/s. Size: 24 × 15 × 9 $\frac{3}{8}$  in. Weight: 45 lb. Price: £39 19s.

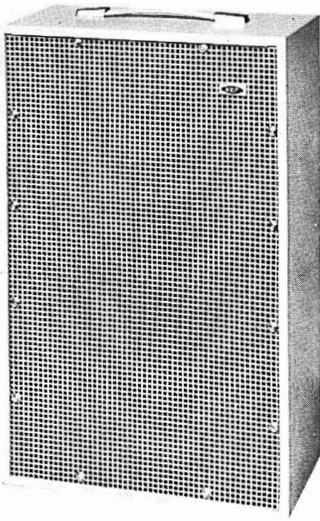
**Cresta**. Totally enclosed. Forward-facing. Two units: B110 bass driver, T27 HF unit. Crossover: 4 Kc/s. FR 50 c/s-30 Kc/s. HC 15W RMS. Impedance: 4-8 ohms. Terminal connections. System resonance: 59 c/s. Size: 13 × 9 × 7 in. Weight: 14 $\frac{1}{2}$  lb. Shelf-mounting. Finish: walnut or teak veneer and brown woven grille. Price: £16 10s. (U.K. purchase tax £3 1s.).

**Carlton**. Totally enclosed. Forward-facing. Three units: B1814 bass driver, M65 mid-range unit, T27 HF radiator. FR 20 c/s-30 Kc/s. HC 25W RMS. Impedance: 4-8 ohms. Bulgin P74 input socket. System resonance 45 c/s. Size: 36 × 17 × 14 in. Weight: 85 lb. Floor standing. Finish: teak, rosewood (palisander) or walnut with bronze grille. Price: £85.

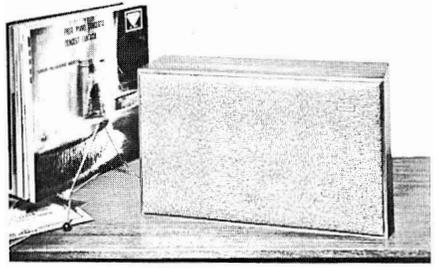


**KIRKMAN (CRAWLEY) LTD.**, 40 The Broadway, Crawley, Sussex. Tel: Crawley 26670.

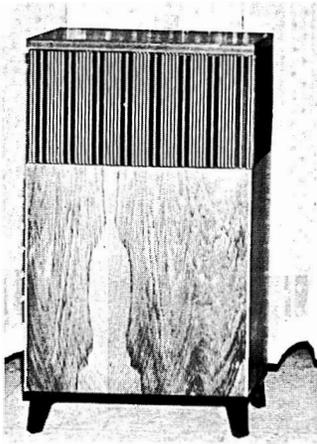
**Home Concert Hall Mk 2**. Isothermal tapered reflex enclosure with speakers and crossover. Two Richard Allan CR5 bass units and two Lorenz LPH65 tweeters.  $\frac{1}{4}$ -section crossover at



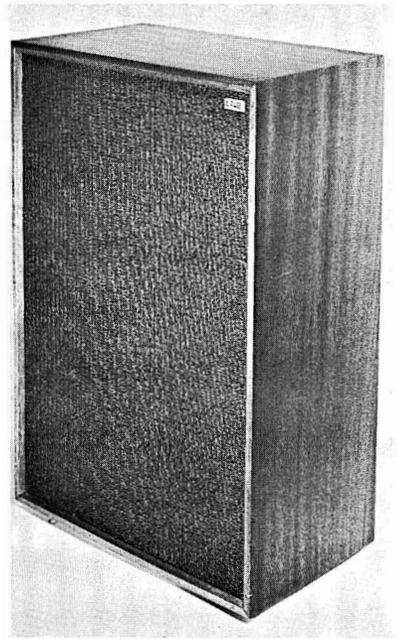
*KEF Portable Celeste*



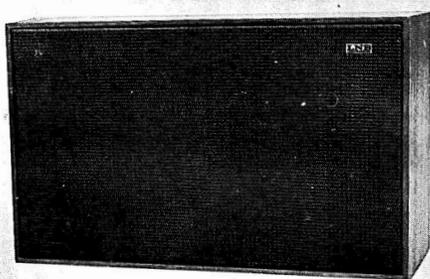
*KEF Celeste*



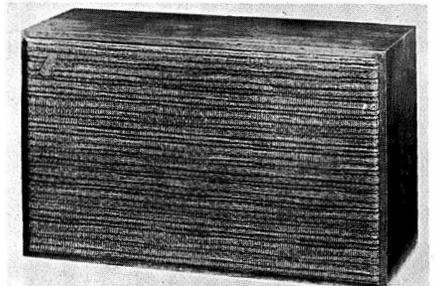
*Kirkman Home Concert Hall*



*L.N.B. 8-in. Labyrinth*



*LNB Charnwood*



*Leak Mini-Sandwich*

2 Kc/s. FR 28 c/s-16 Kc/s -6 dB. HC 20W music. Omni-directional throughout frequency range in horizontal plane. Inside and outside of enclosure employed to maintain non-resonant closely controlled acoustic load. Finish: teak with bronze grille. Size: 31 × 18 × 8½ in. Weight: 44 lb. Price: £45.



**KORTING.** Distributors: Europa Electronics Ltd., Howard Place, Shelton, Stoke-on-Trent. Tel: Stoke-on-Trent 29316.

**LSB 10 (27923).** Infinite baffle system with double cone unit. Speaker: 8 in. with treble cone. FR 40 c/s-16 Kc/s. HC 10W music power. Impedance: 4.5 ohms. Size: 24 × 11½ × 7 in. Finish: satin finished natural walnut. Supplied with 10 ft lead and plug. Price: £13 9s. 6d. (U.K. purchase tax £2 10s. 1d.).

**LSB 20 (26921).** Infinite baffle with bass and treble units. Speakers: 8 in. bass unit, 5 × 3 in. tweeter. FR 40 c/s-16 Kc/s. HC 15W music power. Impedance: 4.5 ohms. Size: 22 × 12 × 7 in. Finish: satin finish natural walnut. Supplied with 10 ft lead and plug. Price: £19 15s. 4d. (U.K. purchase tax £3 13s. 4d.).

**LSB 30 (26951).** Infinite baffle with bass and treble units. Speakers: 9½ in. bass unit, 7 × 5 in. mid- and upper-frequency unit. FR 30 c/s-20 Kc/s. HC 25W music power. Impedance: 4.5 ohms. Size: 26 × 14 × 7 in. Finish: satin finish natural walnut. Supplied with 10 ft lead and plug. Price: £26 1s. 3d. (U.K. purchase tax £4 16s. 6d.).



**H. J. LEAK & CO. LTD.,** 57-59 Brunel Road, East Acton, London, W.3. Tel: Shepherds Bush 1173. Cables: Sinusoidal, Ealux, London.

**Sandwich.** Forward facing. Two units, bass 13 in., treble 3 in. Half-section crossover filter. Cabinet can be placed in vertical or horizontal position. The unique sandwich construction diaphragm behaves as a rigid piston, thus eliminating break-up distortion and resulting in a remarkably smooth frequency response. Impedance 15 ohms. Crossover 900 c/s. Six-element filter. Finish: Walnut, sapele mahogany or teak. Other finishes to order at slightly higher cost. Size: 26 × 15 × 12 in. Weight 49.5 lb. Price: £39 18s.

**Mini-sandwich.** Forward facing. Two units, bass 12 in. elliptical, treble 3 in. Half-section crossover filter. Cabinet can be placed in ver-

tical or horizontal position. Sandwich construction diaphragm behaves as a rigid piston, thus eliminating break-up distortion and providing a smooth frequency response. Performance indistinguishable from standard Sandwich except for the lowest octave. Size: 18½ × 11 × 7 in. Weight: 22 lb. Price: £27 10s.



**LL ELECTRONICS LTD.,** 5 Shakespeare Road, Finchley, London, N.3. Tel: Finchley 3332.

**LL.SP.K1.** Infinite baffle enclosure with two units and crossover. Goodmans 6½ in. long-throw bass driver, Goodmans 4 in. tweeter. Crossover 2 Kc/s, ¼-section. FR 50 c/s-12 Kc/s. HC 10W. Finish: teak. Size: 16 × 10 × 7 in. Price: £10 17s. 2d. (U.K. purchase tax £1 18s. 4d.).



**L.N.B. AUDIO LTD.,** 25 Cambridge Street, Loughborough, Leics. Tel: Loughborough 61229.

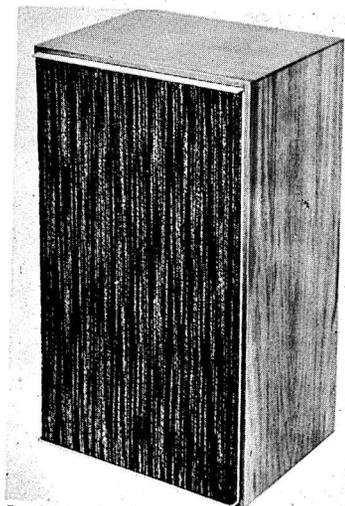
**Charnwood.** Infinite baffle bookshelf system incorporating EMI high-flux 13 × 8 in. elliptical bass driver and Celestion 1300 Mk II HF unit. Four-element crossover. Special membrane pressure compensator minimises coloration and smooths response. FR 60 c/s-18 Kc/s. Finish: sapele, afrormosa, walnut. Size: 19 × 11 × 8 in. Price: £21 16s.

**Labyrinth 8 Mk III.** Free-standing enclosure comprising 7 ft folded pipe designed to minimise resonance and extend response. Material: ½ in. chipboard in rigid tube construction. Recommended units: Wharfedale Bronze 8/RS/DD or Super 8/RS/DD, Fane 801 or 805. FR 20 c/s-20 Kc/s. Price (enclosure only): £14 14s. (U.K. purchase tax £1 2s.).

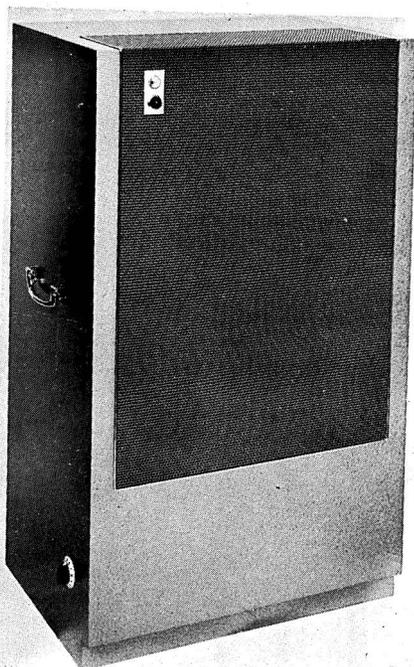
**Labyrinth 10 Mk II.** Free-standing enclosure with 9 ft folded pipe. Materials and finish as for Labyrinth 8. Suitable for 10 in. unit. Full details and price on request.

**L.N.B. Compact.** General purpose bass reflex enclosure suitable for budget stereo. Suitable for any 8 in. unit. Size: 24 × 15 × 8 in. Finish: sapele, afrormosa. Price (enclosure only): £8 18s. 6d. (U.K. purchase tax 13s. 5d.).

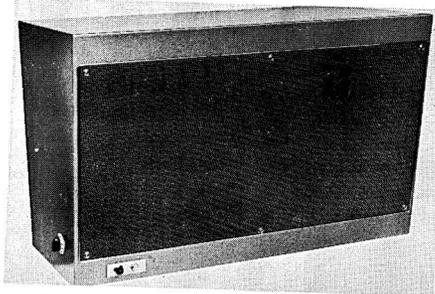
**Studio System.** Multiple unit system designed for optimum response with low distortion. FR 20 c/s-25 Kc/s. Four special units with indivi-



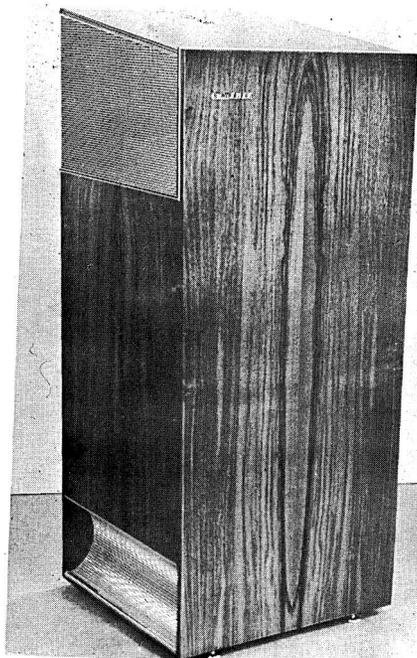
*Leak Sandwich*



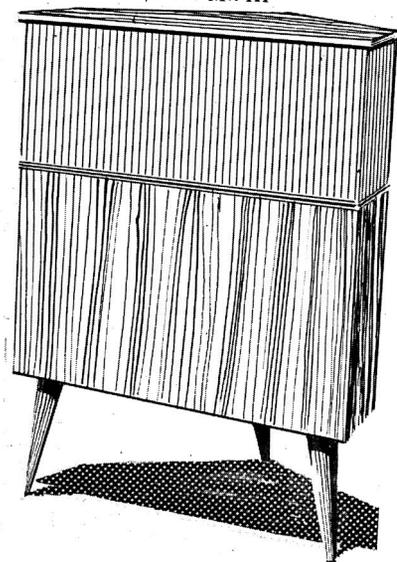
*Lockwood LE1/AS Mk III*



*Lockwood LE1/WAS Mk III*



*Lowther Acousta Twin*



*Lowther TPI*

dually calibrated controls. HC 30W RMS. Finish: teak, rosewood, French walnut, contrasting grille. Price to be announced.



**LOCKWOOD & CO. (WOODWORKERS) LTD.**, 63 Lowlands Road, Harrow, Middx. Tel: 422-3704.

**Mini-slim.** Reflex, forward facing. 12 in. units. Rec Tannoy 12 in. dual concentric, Tannoy III LZ dual concentric. Size:  $27\frac{1}{2} \times 19 \times 9\frac{3}{8}$  in. Price (with specified units): £51 15s., £43 10s.

**Minor Slim.** Reflex, forward facing. 12 or 15 in. units. Rec Tannoy 12 or 15 in. dual concentric, and units listed for Mini-slim. Size:  $33\frac{3}{8} \times 20 \times 11\frac{1}{4}$  in. Price (with specified units): £62 10s., £55 15s., £48 10s.

**Major Slim.** Reflex, forward facing. 12 or 15 in. units. Rec Tannoy 12 in. and 15 in. dual concentric. Size:  $38 \times 24 \times 11\frac{1}{4}$  in. Price: £61 15s., £68 10s.

These reproducers can also be supplied complete with units by Goodmans, K.E.F., Vitavox, Stentorian and Wharfedale. Prices on application.

**LEI/AS Mk III and LEI/WAS.** Studio quality monitoring speakers. Full details and prices on request.



**LOWTHER MANUFACTURING CO.**, Lowther House, St Mark's Road, Bromley, Kent, England. Tel: Ravensbourne 5225. Cables: Lowther, Bromley.

**Corner Reproducer TP1.** Folded bass horn/direct HF horn type. One specially designed 6 in. pressure unit PM3. Acoustical crossover. Response 40-22,000 c/s. Size:  $47 \times 32 \times 31$  in. from corner. Weight: 70 lb. Price of Standard Model A and Model D: £118 16s.; Model B £140 16s.

**Acoustica Cabinet.** Models FH/V, FH/H. Folded horn type, forward facing, with rear folded horn. Vertical on runners, or horizontal on 12 in. legs. One unit, 6 in. or 8 in. Rec Lowther PM6. Response 40-18,000 c/s. Size:  $32 \times 18\frac{1}{2} \times 14\frac{1}{2}$  in. Weight: 60 lb. Price without unit: £23 2s. (U.K. purchase tax £1 16s. 2d.).

**Mini Acoustica.** Model FH/V (vertical) and FH/H (horizontal). Folded horn type. Forward facing with rear folded horn. Veneered all

round. One 6-8 in. unit. Rec Lowther PM6 or PM7. Response 40 c/s-20 Kc/s. Size:  $27 \times 15 \times 13$  in. Price without unit: £25 6s. (U.K. purchase tax £1 19s. 8d.).

**Audiovector.** Compound horn. Upward facing mid- and high-frequency horn with rear folded horn. One 6 in. unit. Acoustic crossover. Range 40-22,000 c/s. Rec PM2, PM2 Mk II or PM4. Size:  $26\frac{1}{2} \times 19 \times 34$  in. Weight: 75 lb. Price without unit: £63 16s.

**Panoramic Twin Acousta.** Dual folded horn. Side facing and rear folded horn system for mono and stereo reproduction. Two PM6, PM7 or PM2 Mk III 6 in. drive units. Acoustic crossover. Response 40-18,000 c/s. Size:  $40 \times 16\frac{1}{2} \times 18$  in. Price without units: £47 6s. (U.K. purchase tax £3 14s. 1d.).

**Dual Position Acousta.** Folded horn. Rearward facing into corner or along wall at 45 degrees. Bass outlets coupling into corner of room or along wall. One 6 in. high flux unit. Rec Lowther PM6 or PM7. FR 40 c/s-18 Kc/s. Size:  $32 \times 9\frac{1}{2} \times 18$  in. Price without unit: £25 6s. (U.K. purchase tax £1 19s. 8d.).

Quotations on request for non-standard veneers and special finishes. Oiled finish at no extra charge.



**LUXOR.** Distributors: Britimpex Ltd., 16/22 Great Russell Street, London, W.C.1. Tel: Museum 7600.

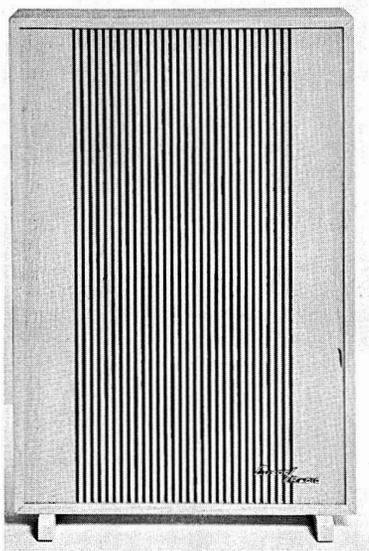
**SH105.** Floor-standing console enclosure incorporating four units. One high-flux 10 in. bass driver, one 5 in. mid-range speaker, two  $2\frac{1}{2}$  in. HF tweeters. FR 50 c/s-18 Kc/s. Impedance 8 ohms. HC 8W RMS. Finish: teak or rosewood. Size:  $25\frac{5}{8} \times 17\frac{3}{4} \times 4\frac{3}{4}$  in. Price: £17 8s. 1d. (U.K. purchase tax £3 1s. 5d.).

**SH207.** Compact floor or shelf mounting enclosure with specially designed  $10 \times 7$  in. elliptical speaker. Impedance 4 ohms. Finish: teak, oak or mahogany. Price: £8 18s. 6d. (U.K. purchase tax £1 11s. 6d.).

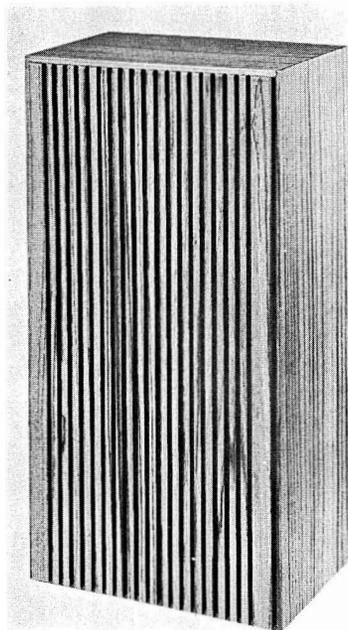


**MEDLEY MUSICAL LTD.**, 134 Plumstead Road, London, S.E.18. Tel: Woolwich 1738.

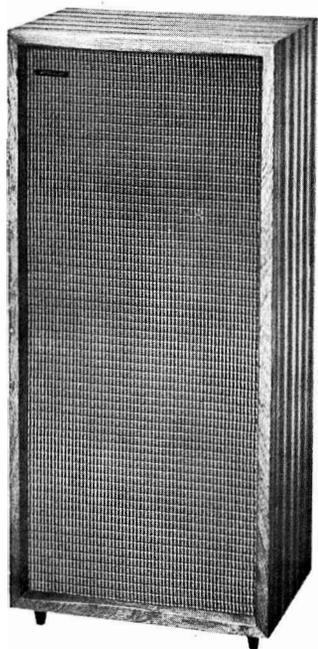
**Medley Mini Musette.** Compact single-unit enclosure. 8 in. high-flux dual-cone unit with plasticised surround. Power handling 8W RMS. Impedance: 3 and 8 or 15 ohms. FR 60 c/s-15



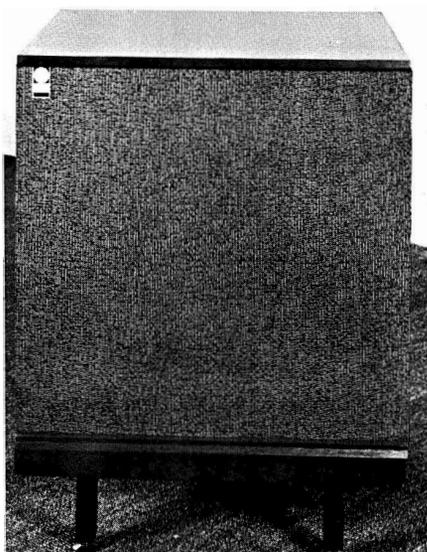
*Luxor SH105*



*Luxor SH207*



*Mordaunt Arundel, Warwick or Sterling*



*Musicraft modular enclosure*

Kc/s. Developed specifically for high quality low level listening. Finish: teak (other finishes to order). Price: £10 10s. (including U.K. purchase tax).

**Medley Musette.** Twin unit enclosure. 8 in. high-flux bass unit with plasticised surround. 3.9 in. tweeter. Power handling 10W RMS. Impedance 3 or 15 ohms. FR 50 c/s-17 Kc/s. Crossover 5,500 c/s. Finished in oiled teak. Walnut and other finishes to order. Tygan front. Corner brackets fitted for horizontal or vertical wall mounting. Size: 30 × 10 × 7½ in. Price: £18 18s.

**Medley Maestro.** Twin unit enclosure. Bass driver has rigid moulded fibre cone with rubber suspension. Specially designed HF tweeter. Power handling 15W. Impedance 8-16 ohms. FR 40 c/s-18 Kc/s. Finish in teak or walnut to order. Size: 26½ × 16 × 12¾ in. Price: £33.



**METZ.** Distributors: Mitchell Enterprises Ltd., 61 West Street, Dorking, Surrey. Tel: Dorking 4229.

**Metz 450.** Speaker enclosure complete with two units and crossover network. Special 8 in. bass unit. 10,500 gauss. 7 × 5 in. middle and upper frequency unit. 9,500 gauss. FR 55 c/s-20 Kc/s. Cross-over frequency 3 Kc/s. Impedance 5 ohms. HC 20W RMS, 30W music. Size: 21 in. high, 11½ in. wide, 8 in. deep. Weight: 22 lb. Walnut finish. Price: £28 7s.



**V. J. MONK LTD.,** 140/141 Plumstead Road, London, S.E.18. Tel: 01-854-2369.

**Variline.** Folded column enclosure similar to the Paraline in performance having an adjustable reflector board which can be "tuned" to individual requirements. Rec unit Elac 8N/185. FR nominally 40 c/s-12 Kc/s. Finish: Walnut, mahogany or teak beaume (laminated plastic). Imp 15 ohms. HC 5W. May be wall mounted or free-standing. Size (closed): 36 × 22 × 5 in. Weight: 30 lb. with unit. Price: Cabinet only £13 13s. with speaker £17 10s.

**Variline Mk II.** Specification as for standard Variline but with the addition of two Lorenz tweeters. Frequency range extended to 17 Kc/s. Variline Mk II has no reflector board. Cabinet finished back and front so the unit can be used as a reflecting system or forward facing. Price: £20.

**Paraline.** Unique design by Rex Baldock. Size: 41 × 16 × 7 in. Made in left-hand or right-hand versions. Recommended drive units: Elac 8N/185 or Lowther PM6. Price: (in white wood) £5 5s.; (finished in teak or mahogany) £10 10s.

Drive units: Elac 8N/185 £3 10s. 9d.; Lowther PM6 £18 18s.

**Paramid.** Designed by Edward Michelsen as a vertical version of the Paraline. Performance, units and prices as for the Paraline.

**Paraline Tweeter Kit.** Comprising two Lorenz LPH65 tweeters, 2 mF capacitor, sealing strip, wiring diagram and fitting template. Note: One kit is required for each Paraline. Price: £3 15s.

**A.C.E.** Acoustic coupled enclosure, a new concept in column loading. Size: 36 in. high, 16 in. wide, 9½ in. deep. FR (with Elac 8N/185) 40 c/s-12 Kc/s; (with Lowther PM6) 40 c/s-17 Kc/s. HC 6W with high electro-acoustic efficiency. Layered damping. Full specification on request. Price: (in white wood) £8 8s.; (finished in teak) £12 12s; diffuser unit for PM6 £1 6s.

Drive units: Elac 8N/185 £3 10s. 9d.; Lowther PM6 £18 18s.

**Bookshelf Horn.** Small enclosure designed to give performance near to that of the Paraline. Complete with Elac 8N/185. Price: (in white wood) £11 11s. (ready finished) £14 14s.



**MORDAUNT SOUND SALES,** Division of Soundcraft Co., 1 Stanley Road, off Napier Road, Bromley, Kent. Tel: Ravensbourne 5673.

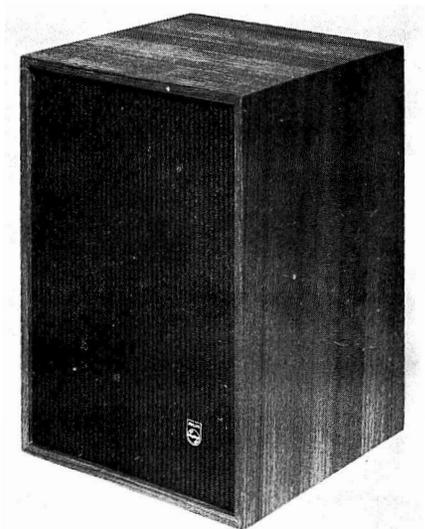
**Stirling.** Totally enclosed. Forward facing. Two units: 12 in. bass 1½ in. hemispherical treble. Crossover 1,750 c/s. FR 35 c/s-18 Kc/s. HC 15W RMS. Size: 29 × 15 × 11 in. Price: (with units): £33 12s.

**Arundel Mk II.** Totally enclosed. Forward facing. Two units, 12 in. bass, ribbon tweeter. Crossover 2,750 c/s. FR c/s-25 Kc/s. HC 12/15 watts. Size: 33 × 15 × 11 in. Weight: 44 lb. Price: £44 2s.

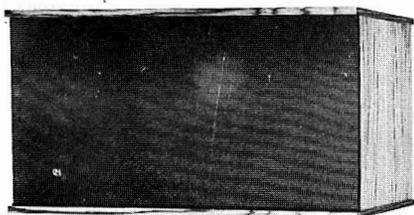
**Conway.** Totally enclosed. Forward facing. Two units, 12 in. bass, ribbon tweeter. Crossover 2,750 c/s. FR 25 c/s-25 Kc/s. HC 12-15W. Size: 33 × 18 × 12 in. Fitted with acoustic lens. Price: £51 9s.



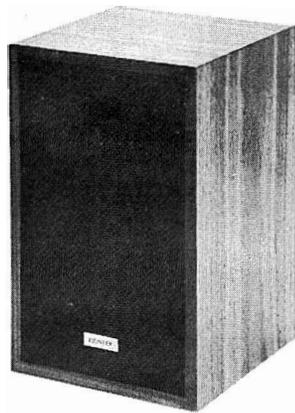
*Monk A.C.E.*



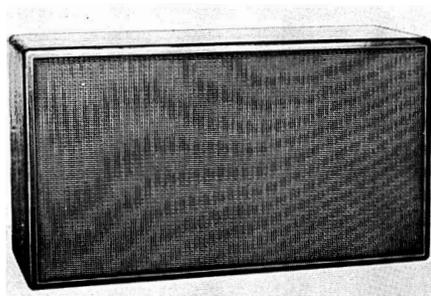
*Philips GL.559*



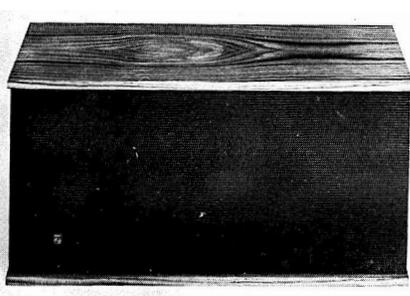
*Philips GL.564*



*Pioneer C3-20*



*Radford bookshelf*



*Philips GL.561*

**MUSICRAFT HI-FI CENTRE**, 63 High Street, Hounslow, Middlesex. Tel: 570-4640.

**Modular.** Complete forward-facing system, using reflex enclosure principle for bass loading. Designed to match Modular tape and equipment cabinets. Designed for single 12 in. unit. Celestion CX1512 recommended. Size: 20 × 20 × 20 in. Finish in sapele mahogany or teak. Price: £12 12s. (cabinet only without unit).



**NICHOLS ACOUSTICAL FITMENTS**, Church Street, Bubwith, Nr Selby, Yorks.

**Derwent Gem.** Compact enclosure designed for use with the Richard Allan Minette module. Approved by the makers. Supplied with internal lagging and wiring. Easily assembled with six screws only. Effective volume 360 cu in. Cabinet constructed from  $\frac{3}{4}$  in. thick hardwood. Finish: ash, teak, mahogany. Price: £5 16s. (£11 7s. a pair).



**PARMEKO LTD.**, Percy Road, Aylestone Park, Leicester. Tel.: 0533-32287. Cables: Parmeko Leicester.

A range of speakers, recently announced. Full details on application. *Bookshelf*: P6006 (S.10),  $11\frac{1}{2} \times 7 \times 6\frac{1}{2}$  in. Price: £13 (U.K. purchase tax £2 5s. 9d.). *Bookshelf*: P6012 (S.11),  $14 \times 9\frac{1}{2} \times 7\frac{1}{2}$  ins. Price: £10 5s. 4d. (U.K. purchase tax £1 16s. 2d.). *Mid-Size*: P6015 (S.14),  $17 \times 12 \times 8\frac{1}{2}$  in. Price: £28 7s. *Free-Standing*: P6005 (S.15),  $30 \times 19\frac{1}{2} \times 7\frac{3}{4}$  in. Price: £31 10s.



**PEERLESS.** Distributors: C. E. Hammond & Co. Ltd., 90 High Street, Eton, Windsor, Berks. Tel: Windsor 63388.

**System 65-2.** Compact two-speaker system in enclosure. One  $5\frac{1}{4}$  in. bass driver, 2 in. closed back tweeter. Crossover: 3.5 Kc/s. FR 50 c/s-18 Kc/s. HC 10W. Size:  $10\frac{1}{4} \times 6\frac{1}{4} \times 8\frac{3}{8}$  in. Price on request.

**System 24-2.** Medium size two-speaker system in enclosure. One  $10\frac{1}{4} \times 6\frac{1}{2}$  in. bass driver, 2 $\frac{1}{2}$  in. tweeter. Crossover: 3.5 Kc/s. FR 40 c/s-18 Kc/s. HC 10W. Size:  $19\frac{3}{4} \times 9\frac{7}{8} \times 10\frac{5}{8}$  in. Price on request.

**System 50-4.** Monitor three-way speaker system in enclosure. One 12 in. bass driver, 7 × 5 in. mid-range radiator, two 2 $\frac{1}{2}$  in. tweeters. Crossover: 500 c/s and 3.5 Kc/s. FR 30 c/s-18 Kc/s. HC 30W. Size:  $25\frac{1}{2} \times 14\frac{1}{4} \times 11\frac{7}{8}$  in. Price on request.



**PHILIPS ELECTRICAL LTD.**, Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437 7777. Cables: Phillamps, London.

**GL.559.** Shelf-mounting enclosure. One 5 in. unit (AD3501 RM). FR 90 c/s-20 Kc/s. HC 6W. Impedance: 8 ohms. Size:  $10\frac{1}{4} \times 7\frac{1}{2} \times 7\frac{1}{2}$  in. Weight: 4 $\frac{1}{4}$  lb. Teak cabinet with fabric front grille. Price: £10 13s. 1d. (including U.K. purchase tax).

**GL.564.** Compact floor or shelf-mounting enclosure with two units. One 7 in. bass driver with polystyrene cone, one 4 in. dual cone mid-range and treble unit. Crossover: 550 c/s. FR 60 c/s-20 Kc/s. HC 15W. Impedance: 8 ohms. Size:  $17\frac{3}{4} \times 9\frac{7}{8} \times 7\frac{1}{2}$  in. Weight: 12 lb. Neat teak cabinet with fabric front grille. To match Audio Plan System. Price: £20 15s. 5d. (including U.K. purchase tax).

**GL.561.** Floor-standing enclosure with one unit. One 8 $\frac{1}{2}$  in. dual-cone unit. Impedance: 7 ohms. FR 70 c/s-17 Kc/s. HC 15W. Size:  $23\frac{3}{8} \times 11\frac{3}{4} \times 8\frac{5}{8}$  in. Weight: 17 lb. Teak cabinet with fabric front grille. To match Audio Plan System. Price: £22 7s. 5d. (including U.K. purchase tax).

**GL.562.** Floor-standing enclosure with three units. One 12 in. bass driver with polystyrene cone, two 7 × 5 in. dual cone mid-range and treble units. Crossover: 800 c/s. HC 20W. FR 40 c/s-20 Kc/s. Impedance: 8 ohms. Size:  $26 \times 14\frac{1}{2} \times 11\frac{3}{8}$  in. Weight: 38 $\frac{1}{2}$  lb. Teak cabinet with fabric front grille. To match Audio Plan System. Price: £39 18s.

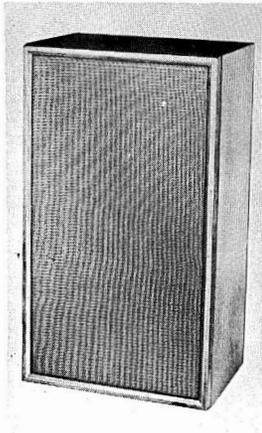


**PIONEER.** Distributors: Swisstone Ltd., 48a Station Road, Cobham, Surrey. Tel: Cobham 2853 and 4214.

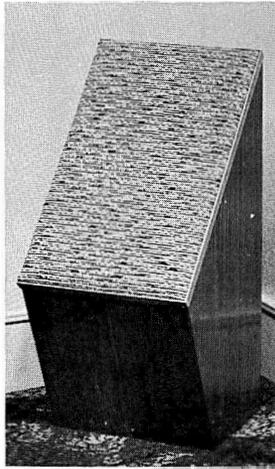
**CS-51.** Miniature infinite baffle enclosure. One 5 in. unit, one 2 $\frac{1}{2}$  in. tweeter. FR 50 c/s-20 Kc/s. HC 20W music. Impedance 16 ohms. Size:  $9\frac{7}{8} \times 5\frac{7}{8} \times 6\frac{1}{2}$  in. Weight: 8 $\frac{1}{2}$  lb. Oiled walnut finish with perforated metal grille. Supplied with wall mounting brackets. *Price on request.*

**CS-A50.** Infinite baffle five unit enclosure. One 12 in. bass unit, one 5 in. mid-range unit, two cone tweeters, one horn tweeter. Crossover frequencies 500 c/s and 3.5 Kc/s. FR 30 c/s-20 Kc/s. HC 40W. Size:  $26 \times 15\frac{1}{2} \times 12\frac{3}{8}$  in. Weight: 34 lb. Oiled walnut finish with aluminium trim. Impedance 8 ohms. *Price on request.*

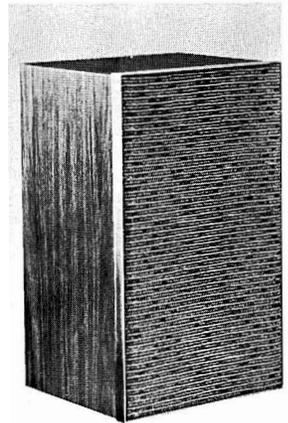
**CS-20.** Bookshelf enclosure with two units. 4 $\frac{3}{8}$  in. high compliance bass driver, 2 $\frac{1}{4}$  in. tweeter. FR 70 c/s-20 Kc/s. HC 15W. Impedance 8 ohms. Size:  $13\frac{3}{8} \times 8 \times 8\frac{3}{8}$  in. Weight: 7 $\frac{1}{2}$  lb. Finish: oiled walnut with black net grille. *Price on request.*



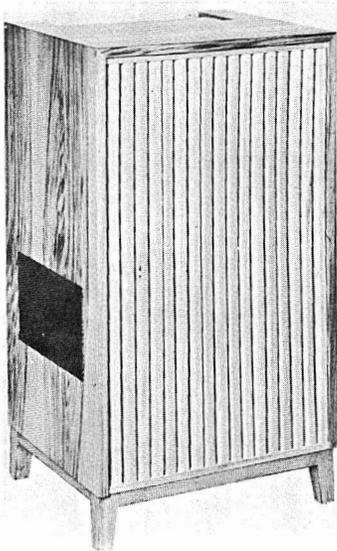
*Radford Executive or Monitor*



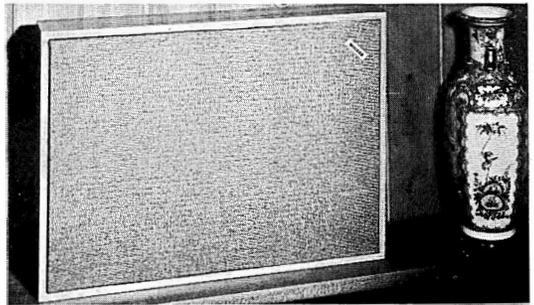
*Rectavox Omni Mk. II*



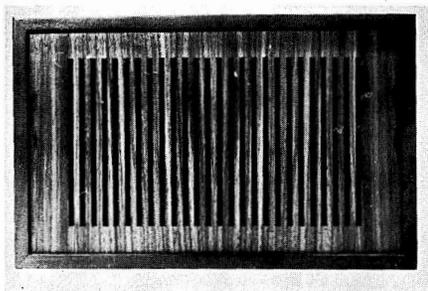
*Rectavox Ambi enclosure*



*R.T.M. Acoustics 20-20*



*Rogers Wafer speaker*



*Sonotone Solent*



*Sansui SP300*

**RADFORD ELECTRONICS LTD.**, Ashton Vale Road, Bristol 3. Tel: Bristol 662301/2.

**Bookshelf.** Two drive units equalised and integrated by an eight-element network. Flat-faced expanded polystyrene foil-stressed bass driver. 2 in. voice coil. Gap flux 13,500 gauss. Sealed direct radiator pressure type HF unit. Enclosure sealed and internally lagged. Flat response down to 60 c/s with gradual roll off below. HC 30W. Size: 21 × 12 × 8 in. Weight: 28 lb. Price: £30.

**Executive.** Identical to Bookshelf in respect of drive units and crossover network but with larger enclosure allowing low frequency response to be extended to 40 c/s. Delayed responses in the lower mid-range are also reduced due to increased front-to-back dimensions. HC 30W RMS. Weight: 49 lb. Price: £39 10s.

**Monitor.** Three drive units and 18 element network. Crossover at 500 c/s and 5 Kc/s. Response 40 c/s-13.5 Kc/s ±2 dB. Cabinet 1 in. thick Afromosia. HC 45W. Size: 25 $\frac{3}{4}$  × 15 × 11 $\frac{1}{2}$  in. Weight: 38 lb. Price: £52 10s.

**Studio.** Acoustic line enclosure speaker using four drive units extending full response to below 30 c/s. Size: 40 × 20 × 17 in. Weight: 60 lb. Price: £85.

**Auditorium.** Speaker enclosure using four drive units as fitted to Studio model but in sealed cabinet of small size. FR flat 35 c/s-24 Kc/s. Complex frequency dividing and equalising network. HC 40W RMS. Size: 30 × 16 × 14 in. Price: £65.



**RECORD HOUSING**, Brook Road, London, N.22. Tel: Bowes Park 7487.

**Folded Horn Enclosure.** Forward facing free-standing. One 8 in. unit. Rec Goodmans Axiette 8 or Wharfedale Super 8. Size: 27 $\frac{1}{2}$  × 16 $\frac{1}{4}$  × 10 in. Finish: walnut, mahogany or teak. Price (cabinet only): £11 19s.

**Hi-flex 10/12.** Reflex enclosure with slotted wood fascia. Two drive units (10 in. or 12 in.) with tweeter. Rec units: Celestion CX.15/12 and CX.20/12 or Wharfedale Super 12. Size: 32 × 17 × 10 $\frac{1}{2}$  in. Finish: walnut, mahogany or teak. Price (cabinet only): £12 19s.

**Scan speaker enclosure.** Reflex cabinet with slotted wood fascia. One 8 in. unit. Recommended: Wharfedale Super 8 or Goodmans

Axiette 8. Size: 19 $\frac{3}{4}$  × 15 × 8 in. Finish: teak, walnut or mahogany. Price (cabinet only): £8 19s.



**THE RECTAVOX COMPANY**, Central Buildings, Wallsend, Northumberland. Tel: Wallsend 624845 (STD ONE-2).

**Omni 8.** Specially shaped reflex enclosure providing unique versatility of positioning. Designed for 8 in. drive unit with provision for tweeter. Frequency range dependent on drive unit employed. Finish: Teak, walnut or mahogany laminated plastic veneers with satin chrome brass frame. Size: 24 $\frac{1}{2}$  in. maximum dimension. Price: (enclosure only) £12. May be converted to Omni Mk II by adding tweeter and changing driver unit.

**Omni Mk II.** Reflex enclosure with special shape giving low resonant frequency and unique versatility of positioning. Units: K.E.F. B139 foil-stressed expanded polystyrene diaphragm bass and mid-range driver, K.E.F. T15 hemispherical dome tweeter. Crossover five-element  $\frac{1}{2}$ -section 1 Kc/s. FR 30 c/s-20 Kc/s ±3 dB. Imp 15 ohms. HC 15W. Finish: Teak, walnut or mahogany laminated plastic wood grain veneers, Tygan fret material, satin-chrome brass frame. Size: 24 $\frac{1}{2}$  in. maximum dimension, fret front 18 $\frac{3}{4}$  × 11 $\frac{5}{8}$  in. Weight: 40 lb. Price: £30 19s. 6d. units; (enclosure only £18).

Comprehensive information available on matching to transistor amplifiers.

**Ambi.** Similar performance to the Omni but in a compact enclosure of more orthodox rectangular shape. Size: 18 $\frac{3}{4}$  × 11 $\frac{5}{8}$  × 9 $\frac{3}{4}$  in. Weight: 35 lb. Price (with units): £29 8s.; (enclosure only): £10 10s.

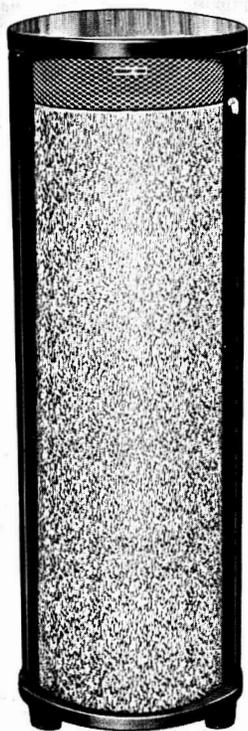
Comprehensive information available on request regarding matching to transistor amplifiers.

**Wall brackets.** Special wall fixing devices for Omni Mk II and Ambi. Price (set of four): 15s.

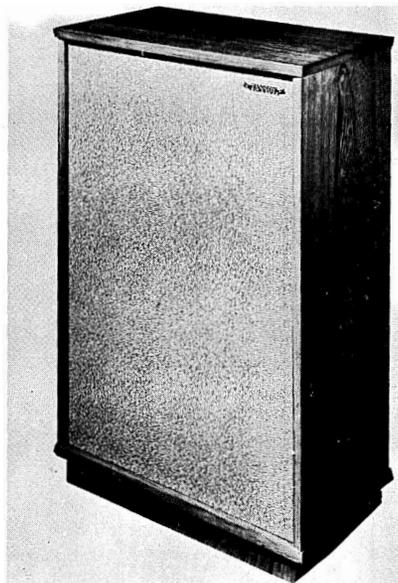
**Matching transformer.** Type AA2 20W. 25 c/s-20 Kc/s, zero dB down at 25 c/s. Price: £3 3s.

**Bass corrector C60.** Neutralises excessive corner gain and flattens impedance curve. Price: £3 10s.

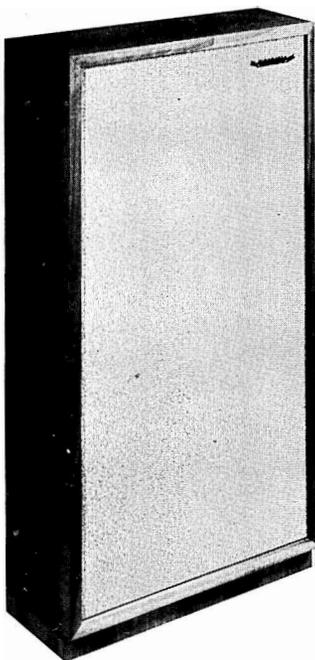
The Rectavox accessories listed above are designed specifically for use with Omni and Ambi speakers.



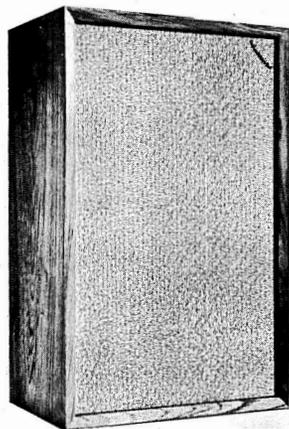
*Sugden Craftsman Major*



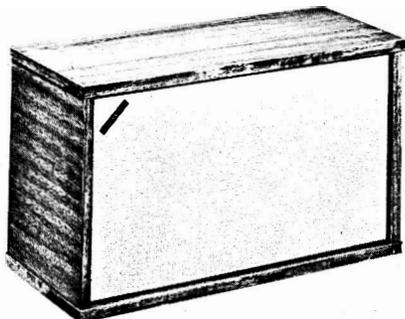
*Tannoy Lancaster 12 or 15*



*Tannoy Audiometric*



*Tannoy Monitor III LZ*



*Tannoy III LZC*

**ROGERS DEVELOPMENTS (ELECTRONICS), LTD.**, Rodevco Works, 4-14 Barmenton Road, Catford, S.E.6. Tel: 698-7424/4340. Cables: Rodevco, London.

**Compact speaker system.** Shelf or floor-standing enclosure. 12 in. bass unit with separate tweeter. Enclosure internally damped with Fibroceta. FR 30 c/s-18 Kc/s. HC 10-12W. Imp 15 ohms. Finish: Teak or dark Australian walnut Formica laminate with Vynair front. May be used horizontally or vertically. Size: 20 × 13 $\frac{3}{4}$  × 9 in. Price (either finish): £25.

**Wafer speaker system.** Infinite baffle. 5 in. unit plus tweeter. FR 40-16,000 c/s. HC 12W. Imp 15 ohms. Size: 13 $\frac{1}{8}$  × 16 $\frac{5}{8}$  × 2 $\frac{1}{2}$  in. Wood-grain finish Formica. Price: £16 (U.K. purchase tax £3 0s. 1d.).

★

**R.T.M. ACOUSTICS**, 387 Mare Street, Hackney, London. E.8. Tel: Amherst 9591.

**RTM 20-20.** Exponential horn. 12 in. bass driver,  $\frac{1}{2}$  in. Vitavox treble driver. Two separate horns with mechanical and electrical crossover at approximately 600 c/s. FR 20 c/s-20 Kc/s. HC 18W. Imp 15 ohms or switched transformer to order. Adjustable polar diagram from highly directional to completely omnidirectional. Independent controls for middle and top frequencies. Mahogany, walnut or teak. Other finishes to order. Size 35 × 20 × 16 $\frac{1}{2}$  in. Weight: 74 lb. Price: £61 19s.

★

**SANSUI.** Distributors: Technical Ceramics Ltd. (Sonotone), Building 102, Cheyney Manor Estate, Swindon, Wilts.

**Sansui SP100.** Reflex enclosure with three units. 10 in. bass driver, 5 in. mid-range unit, 2 in. horn tweeter. Crossover: 1.5 Kc/s and 5 Kc/s. FR 45 c/s-20 Kc/s. Impedance: 8 ohms. HC 25W RMS. Three-position level control. Finish: American walnut. Size: 14 $\frac{1}{8}$  × 11 $\frac{7}{8}$  × 24 $\frac{1}{2}$  in. Weight: 34 $\frac{1}{2}$  lb. Price to be announced.

**Sansui SP200.** Reflex enclosure with five units. 12 in. bass driver, two 5 in. mid-range units, two 2 in. horn tweeters. Crossover: 1.5 Kc/s and 5 Kc/s. FR 35 c/s-20 Kc/s. Impedance 8 ohms. HC 40W RMS. Three-position level control. Finish: American walnut. Size: 14 × 12 × 25 in. Weight: 40 $\frac{1}{2}$  lb. Price to be announced.

**Sansui SP300.** Reflex enclosure with four units. 12 in. bass driver, 5 in. mid-range unit, two 2 in. horn tweeters. Crossover: 1 Kc/s and 6 Kc/s. FR 30 c/s-20 Kc/s. Impedance 8 ohms. Special pipe ducted bass reflex design. HC 50W RMS. Finish: American walnut. Size: 18 × 27 $\frac{1}{2}$  × 16 $\frac{1}{2}$  in. Weight: 78 $\frac{1}{2}$  lb. Price to be announced.

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**SONOTONE.** Technical Ceramics Ltd., Building 102, Cheyney Manor Estate, Swindon, Wilts.

**Solent.** Infinite baffle two-unit miniature enclosure. 6 $\frac{1}{2}$  in. bass unit with 1 in. diameter voice coil and 10,000 gauss magnet. 3 $\frac{3}{8}$  in. acoustically loaded tweeter. L/C crossover at 2 $\frac{1}{2}$  Kc/s. FR 40 c/s-20 Kc/s. Handling capacity 12W. Impedance 8 ohms (suitable for valve or transistor amplifiers with output 8-15 ohms). Matt walnut Scandinavian style cabinet with slotted front. Size: 14 × 9 × 8 $\frac{1}{2}$  in. Weight: 9 $\frac{3}{4}$  lb. Price: £15 8s. (U.K. purchase tax £2 12s.).

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**SOUNDCRAFT.** See Mordaunt Sound Sales.

★

**STENTORIAN.** See Whiteley Electrical.

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**A. R. SUGDEN & CO. (ENGINEERS) LTD.**, Market Street, Brighthouse, Yorks. Tel: Brighthouse 2142. Cables: Connoisseur, Brighthouse.

**Connoisseur Craftsman Minor.** Column reflex with upward facing ports. Omni-directional 360°. 15 ohms impedance at 400 c/s. One unit, 8 in. foam surround with HF dome. 812/FS recommended. Response 40-12,000 c/s. Size: 36 × 11 $\frac{1}{2}$  in. max dia. Weight: 17 lb. Price: enclosure, £10 10s.; 812/FS 8 in. unit £2 15s. (U.K. purchase tax 10s. 2d.).

**Connoisseur Craftsman Major.** Column reflex with upward facing ports. Omni-directional 360°. 15 ohms impedance at 400 c/s. One 8 in. foam surround unit, one 3 in. tweeter. G8/FS and LPH/65 recommended. Capacitor filter. Response 30-17,000 c/s. Size: 43 × 14 $\frac{1}{2}$  in. max dia. Price: enclosure only £15 10s. 9d.; G8/FS unit £3 7s. 6d. (U.K. purchase tax 12s. 6d.); LPH/65 tweeter £2 (U.K. purchase tax 7s. 2d.).

**Connoisseur "Junior".** Column reflex. Upward facing port, omnidirectional 360°. One unit: 3 or 15 ohm available. 6 $\frac{1}{2}$  in. foam surround. FR 50 c/s-12 Kc/s. Size: 26 × 9 in. max dia. Weight: 10 lbs. Price: (with unit) £7 11s. 10d.

**TANDBERG.** Distributors: Elstone Electronics Ltd., Hereford House, North Court, Vicar Lane, Leeds 2. Tel: Leeds 39834/6. Grams: Elstone, Leeds.

**Model 9.** Shelf mounting enclosure with unit.  $6\frac{1}{2}$  in. dual cone speaker. FR 80 c/s-14 Kc/s. HC 5W RMS. Impedance 5 ohms. Teak cabinet. Size:  $14\frac{5}{8} \times 10\frac{3}{8} \times 9\frac{3}{4}$  in. Price: £11 13s. 8d. (U.K. purchase tax £1 19s. 4d.).

**System 113/106-10.** Miniature shelf mounting enclosure incorporating two units.  $6\frac{1}{2}$  in. bass driver, 2 in. tweeter. Crossover 3 Kc/s. FR 60 c/s-16 Kc/s. HC 8W RMS. Impedance 4 ohms. Teak cabinet. Size:  $7\frac{1}{8} \times 9\frac{1}{8} \times 9\frac{1}{8}$  in. Price: £11 18s. 8d. (U.K. purchase tax £2 1s. 4d.).

**System 113/106-11.** Similar to 113/106-10 except dimensions are  $12\frac{1}{2} \times 6 \times 8\frac{1}{2}$  in. Price: £11 18s. 8d. (U.K. purchase tax £2 1s. 4d.).

**System 112-7.** Compact shelf or floor mounting enclosure incorporating dual coaxial unit.  $10 \times 6$  in. bass driver, 2 in. tweeter mounted coaxially. FR 60 c/s-16 Kc/s. HC 10W RMS. Impedance 3-2 ohms. Crossover 3 Kc/s. Teak cabinet. Size:  $20\frac{1}{2} \times 10\frac{1}{4} \times 9\frac{3}{4}$  in. Price: £19 16s. 8d. (U.K. purchase tax £3 5s. 4d.).

**System 114/116-8.** Shelf or floor mounting enclosure incorporating dual coaxial unit. 10 in. bass driver with 2-5 in. tweeter mounted coaxially. FR 45 c/s-16 Kc/s. HC 20W. Crossover 3 Kc/s. Impedance 4 ohms. Teak cabinet. Size:  $27\frac{5}{8} \times 13\frac{3}{8} \times 11$  in. Price: £26 15s. (U.K. purchase tax £4 9s. 7d.).



**TANNOY PRODUCTS LTD.,** West Norwood, London, S.E.27. Tel: Gipsy Hill 1131. Cables: Tannoy, London.

**Audio Metric.** Infinite baffle. Forward facing. One 12 in. bass and mid-range unit, single suspension small diaphragm presence unit. HC 15W RMS. Frequency response 40 c/s-16 Kc/s. Size:  $32\frac{1}{2} \times 17 \times 7$  in. Price: £27 10s.

**III LZC. Mk II.** Infinite baffle forward facing. Tannoy III LZ dual concentric unit. Response 30-20,000 c/s. Size:  $14 \times 10\frac{3}{4} \times 23\frac{1}{4}$  in. Price: £32 10s.

**Lancaster.** Reflex (single port) forward facing. Free standing. One 12 in. Monitor. Size:  $33\frac{1}{2} \times 21\frac{1}{2} \times 12\frac{1}{2}$  in. with 2 in. plinth. Price: £50.

**Lancaster.** Reflex (single port) forward facing. Corner placing. One 12 in. Monitor. Size:  $33 \times 25 \times 16\frac{3}{4}$  in. with 2 in. plinth. Price: £50.

**Lancaster.** Aperiodic free standing enclosure. One Monitor 15 in. drive unit. Size:  $33\frac{1}{2} \times 21\frac{1}{2} \times 12\frac{1}{2}$  with 2 in. plinth. Price: £57 10s.

**Lancaster.** Aperiodic corner enclosure. One Monitor 15 in. drive unit. Size:  $33 \times 25 \times 16\frac{3}{4}$  in. with 2 in. plinth. Price: £57 10s.

**Rectangular York.** Reflex (single port). Forward-facing. Complete with 15 in. dual concentric unit (Monitor 15). Crossover 1,000 c/s. FR as for speaker units. Size: (front to back)  $15 \times 23\frac{1}{2} \times 42$  in. Price: £75.

**York.** Reflex. Forward facing unit, dual throated ports, for corner placing. 12 in. or 15 in. dual concentric unit. Response 35-20,000 c/s. Size:  $45\frac{1}{2} \times 32 \times 22\frac{1}{2}$  in. Price: with 12 in. unit, £66; with 15 in. £75.

**Rectangular GRF.** Single folded horn. Forward-facing with front exits. Complete with 15 in. dual concentric unit (Monitor 15). Special crossover 1,000 c/s. FR as speaker unit. Size: (front to back):  $17\frac{1}{4} \times 23\frac{1}{2} \times 42$  in. Price: £105.

**G.R.F.** Folded horn. Rear horn loaded, forward-facing unit, for corner. One 15 in. dual concentric unit. Response 20-20,000 c/s. Size:  $48 \times 38 \times 29$  in. Price: £122.

**Guy R. Fountain Autograph.** Folded horn. Front and rear horn-loaded unit, forward-facing for corner placing. 15 in. dual concentric unit. Response 20-20,000 c/s. Size:  $58\frac{1}{2} \times 43 \times 26\frac{1}{2}$  in. Price: £165.



**TRUVOX LTD.,** Hythe, Southampton. Tel: Hythe (0421-24) 3265.

**LS120.** Hermetically sealed infinite baffle compact enclosure. Special 5 in. bass unit,  $1\frac{1}{2}$  in. pressure HF unit. Crossover: 3-5 Kc/s half-section four-element L/C network. FR 35 c/s-15 Kc/s. HC 12W RMS. Imp 15 ohms. Finish: teak. Size:  $13 \times 8 \times 7$  in. Weight: 12 lb. Price: £17 1s. 6d. (U.K. purchase tax £3 3s. 3d.).



**VAN DER MOLEN,** 42 Mawney Road, Romford, Essex. Tel: Romford 41904.

**Sonic 10.** Compact speaker enclosure with built-in 10W amplifier. Five transistor amplifier.

Output: 10W from signal sources down to 1 mW. Input impedances: 3, 8, 15 and 600 ohms. Maximum output produced with 0.5V to these inputs. A high sensitivity unterminated input is provided which requires only 120 mV for full output. Speakers:  $6\frac{1}{2}$  in. long-throw bass unit, separate tweeter. Size:  $16\frac{3}{4} \times 8\frac{1}{2} \times 8\frac{1}{2}$  in. Finish: polished teak or walnut. Price: £20 9s. 6d. (including U.K. purchase tax).



**VARILINE.** See V. J. Monk Ltd.



**VITAVOX LTD.,** Westmoreland Road, London, N.W.9. Tel: Colindale 8671. Cables: Vitavox, London, N.W.9.

**Klipschorn.** Double channel horn system. Folded LF horn with AK152 drive unit. Forward-facing HF horn with S2 pressure unit. Filter network incorporated. Crossover 500 c/s. Response 30 c/s-15 Kc/s. High translational efficiency. Size:  $51 \times 30 \times 27$  in. Weight: 210 lb. with drive units. Price: £165 (nett).

**Bitone Series 3200.** Double channel sound system comprising three-cell horn (distribution  $60^\circ$  wide  $\times$   $20^\circ$  high) with 12 in. LF driver in vented enclosure. Filter network 1 Kc/s crossover attenuation 12 dB per octave. HF balance control 0.8 dB attenuation. HC 20W FR 50 c/s-15 Kc/s. Size:  $24 \times 20 \times 19$  in. Weight: 70 lb. Price: from £60.

**Bitone Series 6200.** Similar specification to 3200 but with six-cell horn giving distribution  $60^\circ$  wide  $\times$   $40^\circ$  high. Size:  $29 \times 20 \times 20$  in. Weight: 78 lb. Price: £73.



**WHARFEDALE.** Rank Wharfedale Ltd., Idle, Bradford, Yorkshire. Tel: Bradford 612552. Cables: Wharfedale, Idle, Bradford. Telex: 51407.

**Linton.** Two-speaker system, incorporating 8 in. Flexiprene-surround bass unit, 3 in. treble unit. Acoustic suspension loading. Crossover 3 Kc/s. FR 40 c/s-20 Kc/s. Impedance 8-15 ohms. HC 10W RMS. Finish: oiled walnut, polished walnut or oiled teak. Size:  $19 \times 10 \times 9\frac{1}{2}$  in. Weight: 18 lb. Bookshelf or free-standing. Price: £15 15s. (U.K. purchase tax £2 17s. 7d.).

**Dalesman.** Two-speaker slim-line system, incorporating 12 in. Flexiprene-surround bass driver, 5 in. treble unit. Acoustic suspension

loading. Crossover 1.7 Kc/s. FR 30 c/s-15 Kc/s. Impedance 8-15 ohms. HC 15W RMS. Finish: oiled walnut, polished walnut or oiled teak. Size:  $25 \times 20 \times 6\frac{1}{4}$  in. Weight: 31 lb. Free-standing or wall mounting. Price: £25 10s.

**Dovedale.** Two-speaker floor-standing system, incorporating 12 in. Flexiprene-surround bass driver, Super 5 in. treble unit. Tuned reflex enclosure. Crossover 1 Kc/s. FR 25 c/s-17 Kc/s. Treble control at rear. Impedance 15 ohms. HC 15W RMS. Finish: oiled walnut, polished walnut or oiled teak. Size:  $24 \times 14 \times 12$  in. Weight: 37 lb. Price: £31 10s.

**Teesdale.** Three-speaker floor-standing system, incorporating 15 in. bass unit, 5 in. mid-range unit, 3 in. treble unit. Acoustic suspension loading. Wide-angle high note reflectors. Crossover: 800 c/s and 3 Kc/s. FR 25 c/s-20 Kc/s. Mid-range and treble attenuator controls at rear. Impedance 15 ohms. HC 20W RMS. Size:  $34\frac{1}{2} \times 18\frac{1}{2} \times 11\frac{1}{2}$  in. Weight: 51 lb. Finish: oiled walnut, polished walnut or oiled teak. Rosewood finish at slightly higher price. Price: (teak and walnut) £52 10s.; (rosewood) £55.

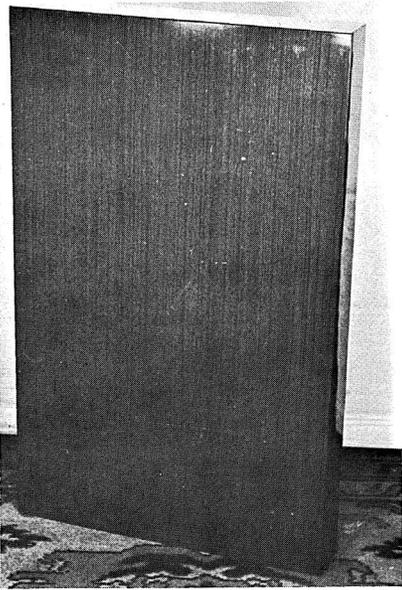
**Airedale.** Omni-directional three-speaker system, incorporating 15 in. bass driver, 8 in. mid-range radiator, 3 in. treble unit. Acoustic resistance loading. Crossover: 400 c/s and 3 Kc/s. FR 20 c/s-20 Kc/s. Mid-range and treble attenuator controls at rear. Impedance 15 ohms. Size:  $39 \times 27 \times 14$  in. Weight: 91 lb. HC 20W RMS. Finish: oiled walnut, polished walnut or oiled teak. Price: £69 10s.



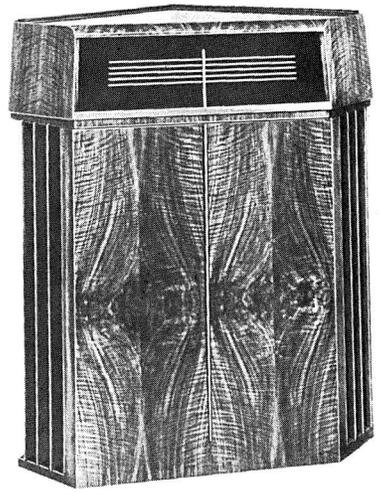
**WHITELEY ELECTRICAL RADIO CO., LTD.,** Victoria Street, Mansfield, Notts. Tel: Mansfield 1762/3/4/5. Cables: Whitebon, Mansfield.

**Model C3. Stentorian Junior Console.** Bass reflex for corner position. 1 or 2 drive units. Rec HF816 or HF1012 with T10 tweeter, if required. Crossover 3,000 c/s. Response HF816. 50-14,000 c/s; HF1012 and T10 30-14,000 c/s. Size:  $33 \times 22\frac{1}{2} \times 18\frac{1}{2}$  in. Price without units: £13 18s. 3d. (U.K. purchase tax £1 2s. 1d.).

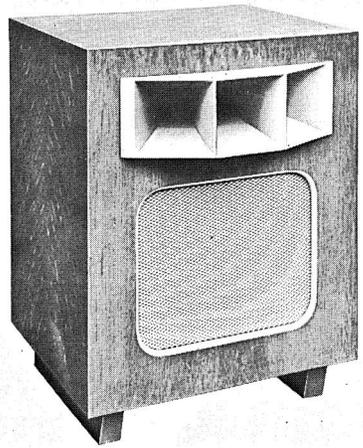
**Model C2. Stentorian Senior Corner Console.** Bass reflex for corner position. 10 in. or 12 in. drive unit with tweeter, if required. Crossover 3,000 c/s. Response with HF1012 and T10 30-14,000 c/s; with HF1214 and T12 25-17,000 c/s. Size:  $35 \times 30 \times 19$  in. Price without units: £17 4s. 9d. (U.K. purchase tax £1 7s. 5d.).



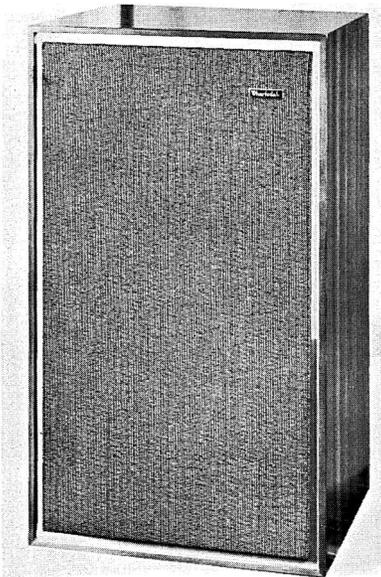
*Variline folded column*



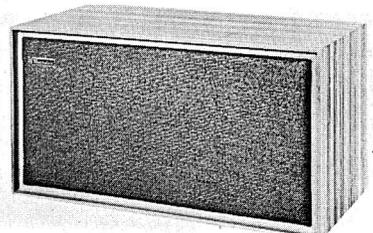
*Vitavox Klipschorn*



*Vitavox Bitone 3200*



*Wharfedale Dovedale*



*Wharfedale Linton*

**Model C4. Corner Console.** Similar design to Model C2 but suitable for smaller room. Designed for Stentorian HF810 or HF812. Size:  $26 \times 17 \times 7\frac{1}{2}$  in. Price without unit: £7 11s. 3d. (U.K. purchase tax 12s.).

**Model C14. Thoresby Bass Reflex Corner Console.** Designed to utilise acoustic properties of walls. Takes 8 in. or 10 in. units with provision for tweeter. Size:  $31 \times 19\frac{3}{8} \times 17$  in. Choice of mahogany (C14) or walnut (C14A) finish. Price: (mahogany) £14 7s. 6d. (U.K. purchase tax £1 2s. 10d.); (walnut) £14 13s. 6d. (U.K. purchase tax £1 3s. 3d.). Cabinet only without units.

**Model C15. Thoresby Bass Reflex Console.** Designed for 8 in. or 10 in. units with provision for tweeter. Size:  $31 \times 19\frac{3}{8} \times 18$  in. Choice of mahogany (C15) or walnut (C15A) finish. Prices: (mahogany) £15 11s. 6d. (U.K. purchase tax £1 4s. 9d.); (walnut) £16 0s. 9d. (U.K. purchase tax £1 5s. 6d.). Cabinet only without units.

**Model C17. Thoresby Slim Line.** Designed to accommodate any of the Stentorian range of 8 in. or 10 in. units. Provision made for cone type or pressure tweeter and crossover. Substantially constructed and acoustically proportioned for balanced response. Size:  $31 \times 20 \times 9\frac{1}{2}$  in. Choice of mahogany (C17) or walnut (C17A). Price: (mahogany) £12 8s. (U.K. purchase tax 19s. 9d.); (walnut) £12 14s. (U.K. purchase tax £1 0s. 2d.).

**Stentorian LC93.** Infinite baffle enclosure with unit. One 9 in. HF912-67 speaker unit. FR 60 c/s-20 Kc/s. HC 10W RMS. Impedance 15 ohms. Acoustically loaded cabinet. Speaker has graded melaminated cone with silicon rubber-over-cambic suspension. Size:  $19 \times 12\frac{1}{2} \times 8\frac{1}{2}$  in. Weight: 20 lb. Finish: teak or rosewood. Price: (teak) £11 10s. 3d. (U.K. purchase tax £22s. 9d.); (rosewood) £12 8s. 1d. (U.K. purchase tax £2 5s. 11d.).

**Stentorian LC94.** Labyrinth enclosure with unit. One 9 in. HF917-67 speaker unit. FR 45 c/s-20 Kc/s. HC 10W RMS. Impedance 15 ohms. Acoustic labyrinth with acoustic resistance incorporated in pipe. Special 9 in. speaker as fitted in LC93. Size:  $29\frac{1}{2} \times 23\frac{3}{4} \times 6\frac{1}{8}$  in. Weight: 39 lb. Finish: oiled teak or rosewood. Price: (teak) £17 14s. 4d. (U.K. purchase tax £3. 5s. 8d.); (rosewood) £18 17s. 6d. (U.K. purchase tax £3 10s.).

**Stentorian LC95.** Reflex enclosure with units. One 12 in. HF1214-67 bass driver, one 8 in. T812-67 mid- and upper-frequency speaker. Crossover:  $\frac{1}{4}$  section L/C 1 Kc/s. FR 27 c/s-20 Kc/s. HC 15W RMS. Impedance 15 ohms. Acoustically loaded bass reflex cabinet. 12 in. unit melamine treated paper cone with cambic surround, 8 in. unit melamine treated paper ribbed cone and surround. Size:  $31\frac{1}{2} \times 20\frac{3}{4} \times 13\frac{1}{2}$  in. Weight: 62 lb. Finish: oiled teak or rosewood. Price: (teak) £40 1s. 6d. (U.K. purchase tax £7 8s. 6d.); (rosewood) £41 15s. 3d. (U.K. purchase tax £7 14s. 9d.).



**L. G. WOOLLETT & COMPANY LTD.,**  
21 Anerley Station Road, London, S.E.20. Tel: Sydenham 9003.

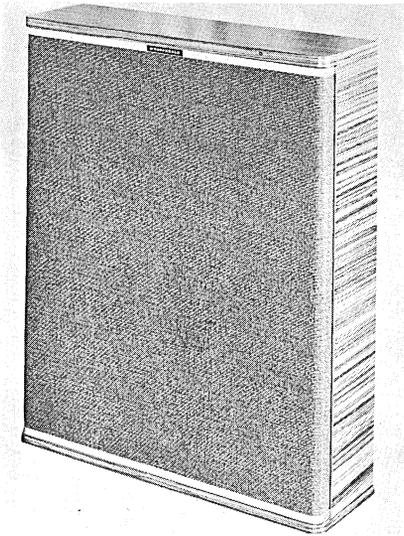
**Leven.** Electrostatic mid-range and HF system. Constant charge push-pull electrostatic unit using high-voltage dust protected membrane. Crossover 1.5 Kc/s, -6 dB/octave. FR 1.5 Kc/s-20 Kc/s. HC 15W RMS. Imp 15 ohms. Cabinet contains mains polarising unit, crossover, phase correcting network, depolarising circuit, pre-set treble attenuator (12 dB range). Mains 200-250V (100-125V to order). Finish: Veneered wood. with white/brown flecked gold Vynair. Size:  $11\frac{1}{2} \times 8\frac{3}{4} \times 8\frac{1}{4}$  in. Weight: 4 lb. 12 oz. Price: £17 17s.

**Kelsey Bass.** Infinite baffle front-loaded enclosure intended for use as a bass speaker. Unit 12 in. foam surround. FR 20 c/s-5 Kc/s. HC 15W RMS. Imp 15 ohms. Finish: veneered wood. Size:  $33\frac{3}{4} \times 18 \times 14$  in. Weight: 52 lb. Price: £42.

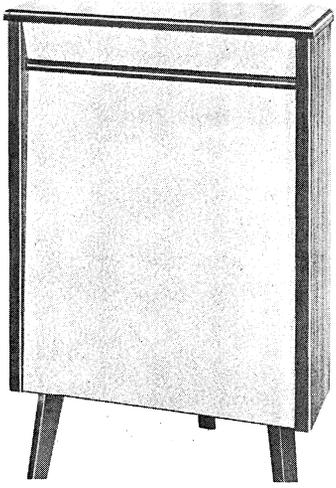
**Kelsey Full Range.** Infinite baffle. Two units. constant charge push-pull electrostatic unit with high-voltage dust-protected membrane and 12 in. foam surround bass driver. Crossover  $\frac{1}{4}$ -section 1.5 Kc/s. FR 20 c/s-20 Kc/s. HC 15W RMS. Imp 15 ohms. Mains polarising unit integral. Mains 200-250V (100-125V to order). Finish: veneered wood with brown flecked Vynair. Size:  $33\frac{3}{4} \times 18 \times 14$  in. Weight: 56 lb. Price: £55 13s.

**Frensham Bass.** Similar specification to Kelsey Bass but in horizontal cabinet on 6 in. legs. Cabinet size:  $31 \times 14\frac{3}{4} \times 16$  in. Price: £42.

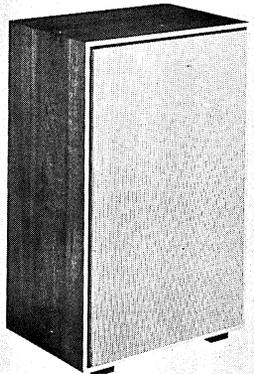
**Claremont.** Similar specification to Leven but in rectangular cabinet  $10 \times 8\frac{1}{2} \times 8\frac{1}{2}$  in. Price: £21.



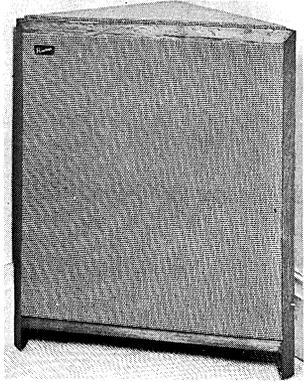
*Wharfedale Dalesman*



*Whiteley Thoresby bass reflex*



*Whiteley LC95*



*Worden Panosona—three versions*



*Woollett Kelsey*



*Woollett Frensham and electrostatic*

**WORDEN AUDIO DEVELOPMENTS LTD.,**  
54 Chepstow Road, London, W.2. Tel: 01-229  
4996.

**Panosona Reproducer.** Double horn with diffusing chamber. Corner reproducer, designed for near plane-wave distribution from one speaker unit. Available in three versions: (Model A) Size: 54 in. high, 24 in. wide, 14½ in. to corner. FR (with Lowther PM6 or PM7) 30 c/s to over 18 Kc/s; (Model B) Size: 48 in. high, 21½ in. wide, 12½ in. to corner. FR (with Richard Allan CG8T) 30 c/s-17 Kc/s; (Model C) Size: 27 in. high, 24 in. wide, 13 in. to corner. FR (with Richard Allan CG8T) 30 c/s-17 Kc/s. Prices: Model A and Model B (enclosure only) £30 including U.K. purchase tax; Model C (enclosure only) £24 including U.K. purchase tax; Lowther PM6 £18 18s., PM7 £28; Richard Allan CG8T £6 6s. 5d. including U.K. purchase tax.

**Panosona Bookshelf Speaker.** Designed in accordance with the principles of the Panosona Corner Reproducers. Size: 16 × 9 × 9½ in. Recommended drive units: Richard Allan CG8T (£6 6s. 5d. tax paid) or Richard Allan CB8T (£4 2s. 4d. tax paid). Finish: light, medium or dark mahogany, teak, walnut or

oak. Contrasting Tygan or Vynair front covering. Price: (enclosure only) £10 10s. including U.K. purchase tax.



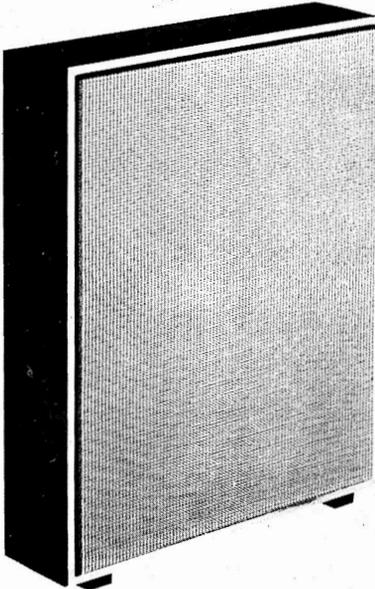
**WYE ELECTRONICS LTD.,** Queen Street North, Chesterfield, Derbyshire.

**Stereo 500.** Compact two-unit enclosure. 6½ in. high flux bass driver, 3⅜ in. tweeter. Rear mounted socket and 9 ft connecting lead. Finish: rosewood or teak. Size: 13¼ × 8½ × 8½ in. Price: £12 1s. 6d. (U.K. purchase tax 6s. 10d.).

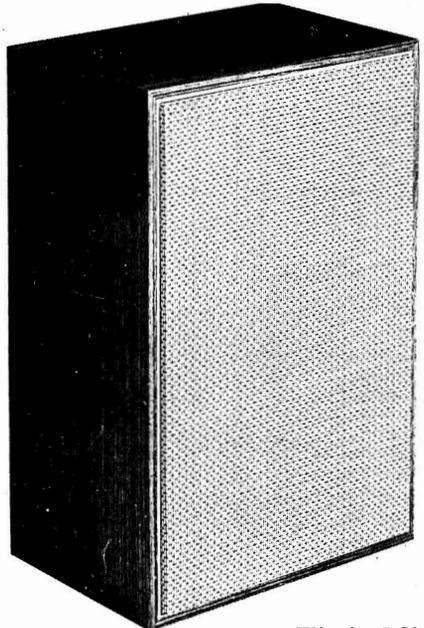


**ZENITH RADIO CORPORATION.** Distributors: United Mercantile Co. Ltd., 13/14 Queen Street, London, W.1. Tel: Grosvenor 4901. Cables: Ramsaco, Telex, London.

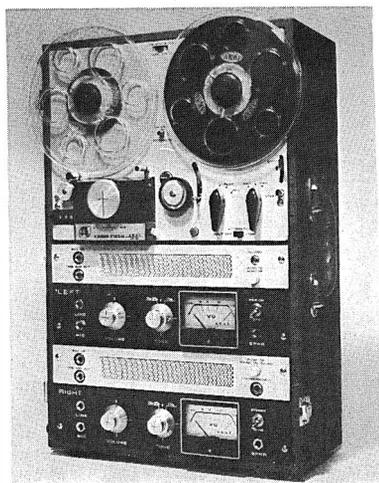
● **Stereo Speaker Kits.** Two sets of Zenith speakers, each set consisting of one 12 in., one horn, two 3½ in. units, Supplied complete with crossovers. Price: £93 (U.K. purchase tax £16 8s. 3d.).



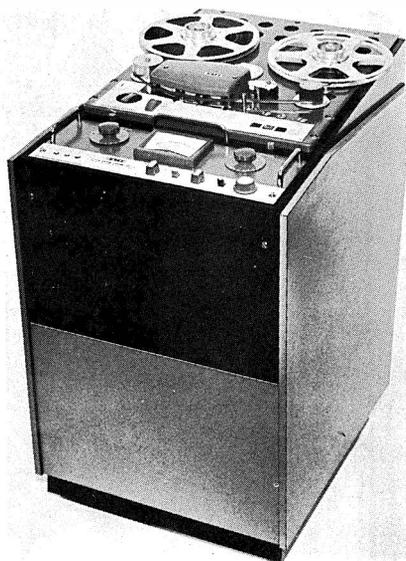
Whiteley LC94



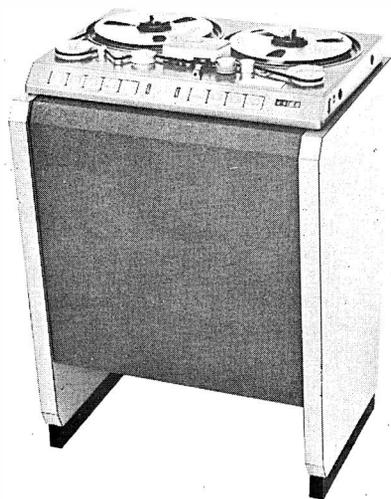
Whiteley LC93



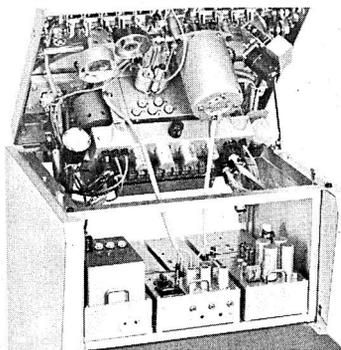
*Akai M8*



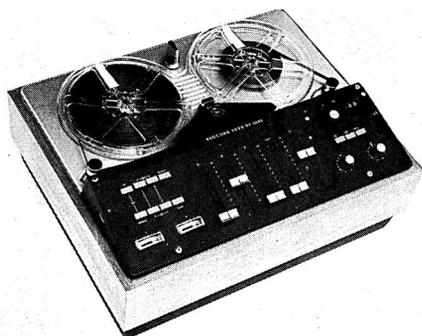
*EMI BTR4*



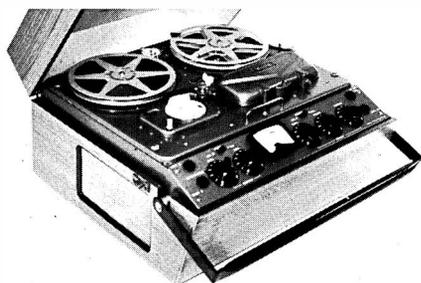
*EMT Studer C37 Console*



*EMT Studer C37 (interior view)*



*Beocord 2000 De Luxe*



*Clarke & Smith TR 634*

# DIRECTORY OF TAPE RECORDERS

★ The abbreviations used for the specifications in this directory are as follows: **FR**=frequency response; **i/s**=inches per second; **Psn**=power supply needed; **<**=better than; **ME**=magic eye; **W** and **F**=wow and flutter; **Replay char**=replay characteristic; **H** and **N**=hum and noise. ● =Stereo equipment.

## PROFESSIONAL and SEMI-PROFESSIONAL

**AKAI.** Distributors: Pullin Photographic Ltd., 11 Aintree Road, Perivale, Greenford, Middlesex. Tel: Alperton 1541. Cables: Pullinfo, Greenford, Middlesex.

● **Akai PT5011.** Professional  $\frac{1}{2}$ -track or full-track recorder and reproducer. Mono or stereo. Choice of two speeds between  $3\frac{3}{4}$  i/s and 30 i/s. Max spool  $10\frac{1}{2}$  in. W and F  $7\frac{1}{2}$  i/s  $<0.15\%$ , 15 i/s  $<0.1\%$ . H and N better than 55 dB. FR 15 i/s 30 c/s-18 Kc/s  $\pm 2$  dB,  $7\frac{1}{2}$  i/s 40 c/s-12 Kc/s  $\pm 2$  dB. Replay char NARTB or CCIR. Inputs: mic 70 dBm 600 ohms, line 20 dBm 600 ohms and 10K. Outlet: line 600 ohms, level +4 dBm. Three motors: hysteresis two-speed motor for capstan drive, two six-pole motors for tape transport, fast wind and fast rewind. Own deck. All push-button operation. Monitoring. Mains 100-240V 50/60 c/s. Size:  $37\frac{3}{4}$  in. high,  $23\frac{1}{2}$  in. wide,  $26\frac{3}{8}$  in. deep. Weight 132 lb. Further details from distributors. Price (mono): £600. Also available less cabinet for rack mounting. Price: £540. Stereo price on application.

● **Akai X-355.** Professional  $\frac{1}{4}$ -track or  $\frac{1}{2}$ -track transistorised mains recorder. Mono or stereo. Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  in./sec. Max spool  $7\frac{1}{2}$  in. ( $10\frac{1}{2}$  with extra arms). W and F 15 i/s  $<0.06\%$ ,  $7\frac{1}{2}$  i/s  $<0.08\%$ ,  $3\frac{3}{4}$  i/s  $<0.14\%$ . H and N better than 50 dB at all speeds. FR  $7\frac{1}{2}$  i/s 30 c/s-24 Kc/s  $\pm 3$  dB. Replay char NARTB. Professional VU meters (2). Rewind time 45 secs 1,200 ft. Inputs: mic 0.5 mV 10K, line 50 mV 100K. Output 17W RMS per channel. Speakers: two  $6\frac{1}{2}$  in. Outlets: line 1.22V 2K, ext speakers 8 ohms, phones. Own deck. Three motors: two-speed hysteresis for capstan drive, two four-pole induction for fast forward and rewind. Superimpose. Pause can be fitted. Four-digit tape counter. Straight-through amplifier. Monitoring. Input mixing. Printed circuit amplifiers. Facilities for automatic reverse, repeat and shut-off. Sound on sound. Sound with sound. Echo chamber effects. Vertical or horizontal operation. Remote control. Crossfield head. Mains 100-240V AC. Size:  $17\frac{3}{8} \times 16 \times 12$  in. Weight  $62\frac{3}{4}$  lb. Price: £250 19s.

● **Akai X300.** Studio type  $\frac{1}{4}$ ,  $\frac{1}{2}$ , or full-track mains recorder. Mono or stereo. Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool  $10\frac{1}{2}$  in. W and F 15 i/s  $<0.04\%$ ,  $7\frac{1}{2}$  i/s  $<0.05\%$ ,  $3\frac{3}{4}$  i/s  $<0.15\%$ . H and N better than 50 dB at all speeds. FR  $7\frac{1}{2}$  i/s 30 c/s-24 Kc/s  $\pm 3$  dB,  $3\frac{3}{4}$  i/s 30 c/s-18 Kc/s  $\pm 3$  dB. Replay char NARTB. VU meter. Rewind time 45 secs 1,200 ft. Inputs: mic 0.5 mV 10K, line 50 mV 100K. Output: 17W RMS per channel. Speakers: two  $6 \times 4$  in. Outlets: line 1.22V 2K, phones, ext speakers 8 ohms. Transistors. Three motors. One external-rotor motor for capstan drive, two induction motors for fast forward and reverse. Superimpose. Four-digit tape indicator. Monitoring. Input mixing. Built-in tape cleaner. Three heads (plus crossfield). Auto-stop. Biased and filtered for stereo multiplex radio. Mains 100-240V AC. Size:  $13\frac{3}{8} \times 16\frac{1}{8} \times 9$  in. Weight: 47 lb. Price: £194 5s.

● **Akai M8.** Semi-professional  $\frac{1}{4}$ - or  $\frac{1}{2}$ -track mains recorder. Mono or stereo. Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool  $7\frac{1}{2}$  in. W and F  $7\frac{1}{2}$  i/s  $<0.15\%$ ,  $3\frac{3}{4}$  i/s  $<0.25\%$ ,  $1\frac{7}{8}$  i/s  $<0.35\%$ . FR  $7\frac{1}{2}$  i/s 40 c/s-21 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-18 Kc/s,  $1\frac{7}{8}$  i/s 40 c/s-10 Kc/s, all  $\pm 3$  dB. Replay char NARTB. Two VU meters. Rewind time  $1\frac{1}{2}$  mins 1,200 ft. Inputs: mic 2.0 mV 500K, line 200 mV 1 megohm. Output: 6W RMS per channel. Speakers: two  $4 \times 2$  in. Outlets: line 800 mV 3K, ext speakers 8 ohms. Valves and transistors. Own deck. One motor. Superimpose. Pause. Four-digit tape indicator. Straight-through amplifiers. Monitoring. Built-in tape cleaner. Horizontal or vertical operation. Crossfield head. Mains 100-240V AC. Size:  $20 \times 13 \times 9$  in. Weight:  $47\frac{1}{2}$  lb. Price: £131 5s. (or £141 15s. with accessories).

**Akai 910 and 1710.** See General Purpose Recorder section.

**Akai X-IV.** See Battery Operated Portable section.

**AMPEX (GREAT BRITAIN) LTD.**, Acre Road, Reading, Berkshire. Tel: Reading 84411. Cables: Videotape, Reading.

**Ampex AG-300 Series.** Transistorised professional mastering recorders. One to eight tracks. Speeds: 30 and 15 i/s or 15 and  $7\frac{1}{2}$  i/s. Three motors. Spool 14 in. Accommodates tape up to 1 in. wide. FR 15 i/s 30 c/s-18 Kc/s  $\pm 2$  dB. Large scale VU meter. H and N -60 dB full track, -57 dB multi-track. W and F <0.07% RMS at 15 i/s. Prices on application.

**Ampex AG-350 Series.** Transistorised professional recorders. Console, portable or rack mounted versions. Full track, half track or stereo. Speeds: 15 and  $7\frac{1}{2}$  i/s or  $7\frac{1}{2}$  and  $3\frac{3}{4}$  i/s. Three motors.  $10\frac{1}{2}$  in. spools. FR 15 i/s 30 c/s-18 Kc/s  $\pm 2$  dB. Large scale VU meter. H and N -60 dB full track, -55 dB half track. W and F <0.11% RMS at 15 i/s. Prices on application.

**Ampex 602.** Professional portable recorder. Speed  $7\frac{1}{2}$  i/s. One motor. 7-in. spools. FR 40-10,000 c/s  $\pm 2$  dB. Large scale VU meter. H and N -55 dB full track, -50 dB half track. W and F less than 0.17%. Size:  $16\frac{1}{2} \times 13\frac{3}{4} \times 8$  in. Weight: 28 lb. Price on application.

● **Ampex 602-2.** Stereo version of Ampex 602. Size:  $24\frac{1}{2} \times 13 \times 8$  in. Weight: 42 lb. Price on application.

● **PR-10.** Professional recorder. Stereo or mono versions. Full or  $\frac{1}{2}$ -track.  $\frac{1}{4}$ -track version available shortly. Speeds 15,  $7\frac{1}{2}$  i/s or  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. W and F 15 i/s, 0-15%;  $7\frac{1}{2}$  i/s, 0-18%;  $3\frac{3}{4}$  i/s, 0-25%. H and N -60 dB at 15,  $7\frac{1}{2}$  i/s, full track. FR 15 i/s, 30 c/s-15 Kc/s  $\pm 2$  dB;  $7\frac{1}{2}$  i/s, 30 c/s-12 Kc/s  $\pm 2$  dB. Replay char NAB/CCIR/AME (15 i/s only) plug-in equalisers. Various inputs by plug-in transformers and pre-amps. Outlet from pre-amp +4 dBm into 600 ohms. One motor. 7-in. spool. Rewind  $1\frac{1}{2}$  mins. VU meter. Remote control. Size (transport);  $19 \times 8\frac{3}{4} \times 6$  in.; (electronics):  $19 \times 5\frac{1}{4} \times 5\frac{3}{8}$  in. Weight (unmounted): 44 lb.; (in case): 53 lb. Price on application.

**Ampex AG-100.** Cuematic magnetic disc recorder/reproducer. Transistorised. FR 70 c/s-12 Kc/s  $\pm 3$  dB. H and N -50 dB. W and F <0.15% RMS. Playing time  $3\frac{3}{4}$  mins.

● **E65.** Transistorised stereo recorder.  $\frac{1}{2}$ -track. Speeds  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. W and F 0.3%,  $7\frac{1}{2}$  i/s. H and N -50 dB,  $7\frac{1}{2}$  i/s; -44 dB,  $3\frac{3}{4}$  i/s. FR  $7\frac{1}{2}$  i/s, 150 c/s-10 Kc/s  $\pm 2$  dB;  $3\frac{3}{4}$  i/s 150 c/s-5 Kc/s  $\pm 2$  dB. Replay char NAB. Inputs: line 0.5V, mic 0.5 mV. Outlets from pre-amp: 1, headset 2K, 1V; 2, line 2K, 1V; 3, to speaker/amplifier.

One motor. 7-in. spool.  $1\frac{1}{2}$  mins rewind. Special educational and language study recorder. Size:  $8 \times 13\frac{3}{4} \times 16\frac{1}{2}$  in. Weight: 30 lb. Price on application.

**MR70.** Professional standard console style master recorder. Speeds:  $7\frac{1}{2}$  and 15 i/s or 15 and 30 i/s. Tape sizes:  $\frac{1}{2}$  in. 1 or 2 channels,  $\frac{1}{2}$  in. 2, 3, or 4 channels, 1 in. 3, 4, 6, or 8 channels. Spool size  $11\frac{1}{2}$  in. EIA, NAB or CCIR reels. Automatic equalisation. Fully Nuvistorised. FR 30 c/s-20 Kc/s  $\pm 2$  dB ( $\pm 1$  dB 50 c/s-15 Kc/s) at 15 i/s. Plug-in 150 Kc/s bias/erase oscillator. W and F 15 i/s less than 0.05% RMS,  $7\frac{1}{2}$  i/s less than 0.08% RMS. Start time: tape speed within  $\pm 0.2\%$  of nominal speed in 0.5 sec. Timing accuracy better than  $\pm 0.15\%$ . Mains 115-242V in six steps. Wide range of versions to order. Prices on application.

● **Ampex 1100 Series, Model 1153.** Stereo tape unit comprising deck with pre-amps only. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s.  $\frac{1}{4}$ -track. FR 30 c/s-18 Kc/s  $\pm 2$  dB. Signal to noise -52 dB. W and F  $7\frac{1}{2}$  i/s 0.01%. Automatic threading. Automatic reverse. Dual capstan drive. Three heads. Transistorised. Price from £144 5s.

● **Ampex 1100 Series, Model 1163.** Portable recorder with 6W power amplifiers in each channel. Specification as for 1153. Price on application.

● **Ampex 1100 Series, Model 1165.** As 1163 but in walnut case. Prices on application.

● **Ampex 2100 Series, Model 2153.** Stereo tape unit comprising deck with pre-amps only. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s.  $\frac{1}{4}$ -track. FR 30 c/s-20 Kc/s  $\pm 2$  dB. Signal to noise -54 dB. W and F  $7\frac{1}{2}$  i/s 0.001%. Automatic tape threading. Dual capstan drive. Four heads. Transistorised. Rack mounting. Suitable for operation with PA systems. Input mixing. Operates in any position. Fully tropicalised. Price on application.

● **Ampex 2100 Series, Model 2163.** Portable recorder with 6W power amplifiers in each channel. Specification as for 1153. Price on application.

● **Ampex 2100 Series, Model 2165.** As model 2163 but in walnut case. Price on application.

● **800 series.** Stereo tape recorders available as deck with pre-amplifiers, deck with pre-amplifiers and power amplifiers, or deck with pre-amplifiers and power amplifiers in oiled walnut cabinet. Straight-line threading. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Twin VU meters. Independent

controls for each channel. Dual capstan drive. Fully transistorised. Automatic switch off. Digital position indicator. Prices on application.



**BANG & OLUFSEN U.K. DIVISION**, Eastbrook Road, Gloucester. Tel: Gloucester 21591.

**Beocord 1000.**  $\frac{1}{2}$ -track all-transistor three-speed recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. W and F  $7\frac{1}{2}$  i/s 0.2%,  $3\frac{3}{4}$  i/s 0.3%,  $1\frac{7}{8}$  i/s 0.6%. SN better than 50 dB. FR  $7\frac{1}{2}$  i/s 30 c/s-20 Kc/s,  $3\frac{3}{4}$  i/s 30 c/s-16 Kc/s,  $1\frac{7}{8}$  i/s 30 c/s-8 Kc/s. VU meter. Inputs: mic 35 mV 50-200 ohms, PU 75 mV 2-2K, PU 2 mV 47K, radio 1.6 mV 47K. Output: 10W RMS. Straight-through amplifier. Automatic or manual record level. Bass and treble controls. Pause control with editing position. Tape position counter. Outlets for external speaker or low Z phones. Finish: teak or Brazilian rosewood. Mains 220-240V AC. Size:  $17\frac{3}{4} \times 11\frac{1}{2} \times 7\frac{3}{4}$  in. Price:

● **Beocord 2000K De Luxe.** All-transistor three-speed recorder.  $\frac{1}{2}$ -track record,  $\frac{1}{4}$ - and  $\frac{1}{2}$ -track playback. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. Fast wind:  $2\frac{1}{2}$  mins LP tape. Inputs: mic 50 mV 50-200 ohms, PU 2 mV 47K, PU 40 mV 4 meg-ohms, radio 5 mV 47K, radio 100 mV 100K, crystal mic pre-amplifier 0.5 mV 500K, line 250 mV 50K. Outlets: line 600 mV 10K, speakers 4 ohms, phones 100 ohms. Output: 8W RMS per channel. Output impedance 4 ohms. Available in portable carrying case or on plinth. Price: (portable) £135 9s.; (plinth) £131 5s.



**BRAUN AG.** Distributors: Fi-Cord International, Charlwoods Road, East Grinstead, Sussex. Tel: East Grinstead 21351.

● **TG.60.** Semi-professional stereo tape recorder. Three motors. Automatic tape tension fine adjustment. Servo brakes. Capstan drive motor and head-support rigidly mounted on robust diecast bridge.  $\frac{1}{2}$ -track record and playback. Three heads. Separate dual channel record and playback amplifiers. All transistor. Pushbutton operation via relays and magnetic circuits. Operates in any position. FR 20 c/s-16 Kc/s. Distortion at full recording level below 3%. SN better than 55 dB. W and F below 0.1%. Size:  $16\frac{7}{8} \times 6\frac{3}{4} \times 11\frac{1}{4}$  in. Mains 220V 50 c/s. Price: £262 15s.

**BRENELL ENGINEERING CO. LTD.**, 231 S  
Liverpool Road, London. N.1. Tel: 01-607  
8271 (5 lines).

**Mk 5. Type M. Series 3.** Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Three motors.  $8\frac{1}{4}$  in. spools. FR 15 i/s. 40-20,000 c/s;  $7\frac{1}{2}$  i/s. 40-18,000 c/s;  $3\frac{3}{4}$  i/s 40-13,000 c/s;  $1\frac{7}{8}$  i/s. 40-6,000 c/s. Level meter. H and N -45 dB. W and F  $1\frac{7}{8}$  i/s, <0.25%;  $3\frac{3}{4}$  i/s, <0.15%;  $7\frac{1}{2}$  i/s, <0.1%, 15 i/s, <0.05%. Outlet from pre-amp. Mixing. Superimposing. Tape monitoring, Input monitoring. Size:  $18 \times 18 \times 9$  in. Weight: 40 lb. Price: £97 13s.

**Mk 5. Series 3.** 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  and  $1\frac{7}{8}$  i/s. Three motors,  $8\frac{1}{4}$  in. spools. FR 15 i/s, 40-15,000 c/s,  $\pm 2$  dB;  $7\frac{1}{2}$  i/s, 40-14,000 c/s;  $3\frac{3}{4}$  i/s, 40-11,000 c/s;  $1\frac{7}{8}$  i/s, 40-6,000 c/s  $\pm 3$  dB. ME level ind (Meter available). H and N -45 dB. W and F 0.05% at 15 i/s. Hi-fi outlet 500 mV into 47K. Straight-through amp. Switched frequency correction. Pause control and monitoring. Size:  $18 \times 18 \times 8$  in. Weight: 38 lb. Price: £77 14s.; with meter £82 19s.

● **STB2.** Stereo/mono recorder. See Tape Units section.



**CLARKE & SMITH MANUFACTURING CO. LTD.**, Melbourne Works, Wallington, Surrey. Tel: Wallington 9252/7.

**TR634.** Transistorised mono recorder.  $\frac{1}{2}$ -track. Speeds  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. W and F  $7\frac{1}{2}$  i/s, 0.2%;  $3\frac{3}{4}$  i/s, 0.3%. H and N  $7\frac{1}{2}$  i/s, -50 dB;  $3\frac{3}{4}$  i/s, -48 dB. FR  $7\frac{1}{2}$  i/s, 50 c/s-15 Kc/s;  $3\frac{3}{4}$  i/s, 50 c/s-9 Kc/s ( $\pm 3$  dB). Replay char CCIR. Inputs:  $1\frac{1}{2}$  mV, 15  $\mu$ V, 60 mV. Outlet from pre-amp. Outputs: 10W into 15 ohms, 70V line and 1V at 5K. Three motors,  $8\frac{1}{4}$  in. spools. Level meter. Mixing. Tone controls. Size:  $17\frac{1}{2} \times 17 \times 10$  in. Weight: 45 lb. Price: £113.

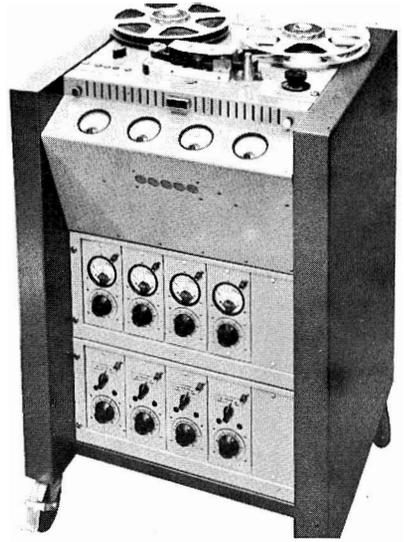


**CROWN INTERNATIONAL.** Distributors: Carston Electronics Ltd., 71 Oakley Road, Chinnor, Oxon. Tel: Kingston Blount (OTH45) 8561.

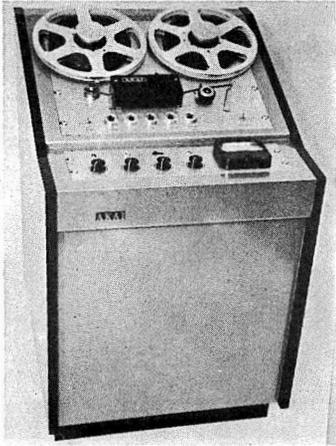
● **Crown International 800 Series.**  $\frac{1}{4}$ -track and  $\frac{1}{2}$ -track mono and stereo professional recorders. Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool:  $10\frac{1}{2}$  in. W and F 15 i/s 0.06%,  $7\frac{1}{2}$  i/s 0.09%,  $3\frac{3}{4}$  i/s 0.18%. H and N 15 i/s better than 60 dB,  $7\frac{1}{2}$  i/s better than 60 dB,  $3\frac{3}{4}$  i/s better than 55 dB. FR 15 i/s 50 c/s-30 Kc/s  $\pm 2$  dB,  $7\frac{1}{2}$  i/s 30 c/s-20 Kc/s  $\pm 2$  dB,  $3\frac{3}{4}$  i/s 30 c/s-10 Kc/s  $\pm 2$  dB. Replay



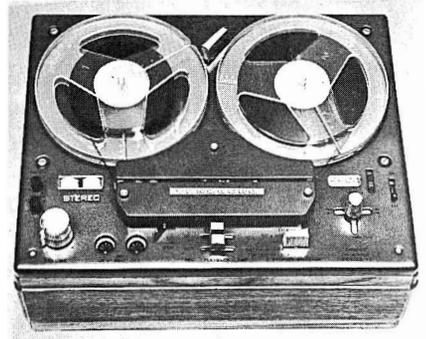
*EMI TR52*



*Leavers-Rich H444M*



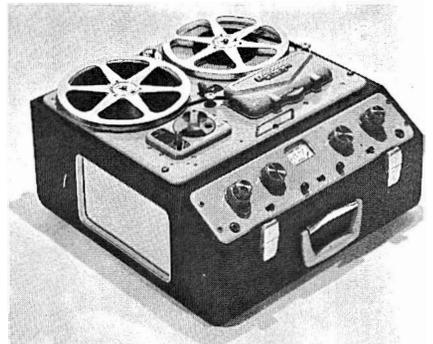
*Akai PT.5011*



*Tandberg Series 12*



*Brenell Mk. 5 type M Series 3 recorder*



*Ferrograph Connoisseur 633*

char NAB or CCIR. Level indicator: 5 in. VU meter each channel. Rewind time: 1,200 ft 38 secs, 2,400 ft 58 secs. Inputs: line or high Z mic  $-25$  dB (45 mV) 100K, high Z mic  $-70$  dB 0.2 mV 100K, low Z mic  $-85$  dB or 80 dB 50 ohms or 250 ohms. Outputs: line 0.7V 5K unbalanced, line  $+26$  dBm 600 ohms bal or unbal, monitor  $+8$  dBm 50 ohms. Audio output: 0.5W. Transistorised. Three AC torque capacitor motors. Superimpose. Inching. Input mixing. Treble and bass boost and cut each channel. Individual channel bias adjustment. A-B monitoring and source and tape mixing. Echo. Size:  $17\frac{1}{2} \times 19 \times 8$  in. Weight: 50 lb. Mains: 117 or 230V 50 or 60 c/s. Consumption: 230W. Price: £550 to £1,300.



**EMI ELECTRONICS LTD.**, Hayes, Middx.  
Tel: Hayes 3888. Cables: Emidata, London.

● **TR52/2CT.** Professional portable stereo/mono recorder. Speeds  $7\frac{1}{2}$  and  $3\frac{3}{4}$  i/s. One motor, 7-in. spools. FR  $7\frac{1}{2}$  i/s, 50-10,000 c/s;  $3\frac{3}{4}$  i/s, 50-6,000 c/s, both  $\pm 2$  dB. W and F less than 0.25% at  $7\frac{1}{2}$  i/s. Crosstalk.  $-45$  dB. VU meter. Size:  $20 \times 17\frac{1}{2} \times 13\frac{1}{2}$  in. Weight: 80 lb. Price: £165.

● **Type BTR4.** Professional stereo/mono recorder. Full and half-track, mono and stereo. Speeds  $3\frac{3}{4}/7\frac{1}{2}$  or  $7\frac{1}{2}/15$  i/s. W and F 15 i/s, better than 0.1%;  $7\frac{1}{2}$  i/s, 0.1%;  $3\frac{3}{4}$  i/s, 0.15%. H and N (2% distortion)  $-60$  dB unweighted. FR 15 i/s, 30 c/s-20 Kc/s;  $7\frac{1}{2}$  i/s, 30 c/s-12 Kc/s;  $3\frac{3}{4}$  i/s, 40 c/s-8 Kc/s ( $\pm 2$  dB). Replay char CCIR, NARTB, IEC. Input 10K bridging, and 200 or 600 ohm line. Balanced floating output at 35,200 or 600 ohms. Three motors,  $11\frac{1}{4}$ -in. spools (European). Rewind (NAB spool)  $1\frac{1}{2}$  mins. VU meter. Size (deck):  $19 \times 17 \times 12$  in., 80 lb; (amplifier):  $19 \times 16\frac{1}{4} \times 7$  in., 32 lb. Price on application.



**EMT WILHELM FRANZ GMBH**, Switzerland. Sole U.K. Agents: F. W. O. Bauch Ltd., Holbrook House, Cockfosters, Herts. Tel: 01-440 3277.

● **Studer A62.** Professional transistorised studio recorder. Stereo/mono. Full track or  $\frac{1}{2}$ -track. Speeds, 15,  $7\frac{1}{2}$  i/s. W and F 15 i/s, 0.04%;  $7\frac{1}{2}$  i/s, 0.06%. H and N 15 i/s,  $-60$  dB;  $7\frac{1}{2}$  i/s,  $-56$  dB. FR 30 c/s-15 Kc/s  $\pm 1.5$  dB. Replay char CCIR or NARTB (either by request). Inputs:  $-6$  dBm to  $+22$  dBm, balanced 1K. Outlet from pre-amp. Three motors. 10-in. spools.

$1\frac{1}{2}$  mins rewind. No speaker or power amplifier. Size:  $19 \times 14 \times 8\frac{1}{4}$  in. Weight: 57 lb (complete chassis). Price on application.

**Studer C37.** Professional studio-recorder. Interchangeable head blocks: full-track, stereo and switchable. Erase head stereo, also available with pilot tone head. Speeds: 15,  $7\frac{1}{2}$  i/s. W and F 15 i/s  $\pm 0.015\%$ ,  $7\frac{1}{2}$  i/s  $\pm 0.025\%$ . SN 15 i/s  $-70$  dB,  $7\frac{1}{2}$  i/s  $-66$  dB. FR 30 c/s-15 Kc/s  $+1$  dB  $-2$  dB. Replay char switchable CCIR to NAB or CCIR to AME. Inputs: 0.7-7V (0 dBm to  $+20$  dBm) balanced input. Impedance  $>15$ K. Separate equalisation for  $7\frac{1}{2}$  and 15 i/s CCIR and NAB. Output from pre-amp. Three Papst motors. Max spool 12 in. Rewind time 2 mins 2,400 ft. No power amplifiers or speakers. Size:  $21 \times 26 \times 17$  in. Weight: 172 lb. Price on application.

**Studer J37.** Professional studio recorder.  $\frac{1}{2}$  in. or 1 in. tape Interchangeable head blocks. Three-track or four-track. Speeds: 15,  $7\frac{1}{2}$  i/s. W and F (1 in. tape, weighted) 15 i/s  $\pm 0.075\%$ ,  $7\frac{1}{2}$  i/s  $\pm 0.1\%$ . H and N 15 i/s  $-76$  dB,  $7\frac{1}{2}$  i/s  $-70$  dB. FR 15 i/s (CCIR) 30 c/s-15 Kc/s,  $7\frac{1}{2}$  i/s 45 c/s-12 Kc/s. Replay char switchable from CCIR to NAB. Inputs: 0.7-7V (0 dBm to  $+20$  dBm). Balanced input. Impedance  $>15$ K. Output: 0.7-7V into 200 ohms balanced. Separate equalisation for  $7\frac{1}{2}$  and 15 i/s CCIR and NAB. Three Papst motors. Guide track amplifier. Monitoring before and after recording. Four synchro playback amplifiers. Max spool size 12 in. Rewind time 3 mins 3,300 ft 1 in. tape. No power amplifiers or speakers. Size:  $27 \times 25\frac{1}{2} \times 40$  in. (high). Console style. Weight: 330 lb. Price on application.

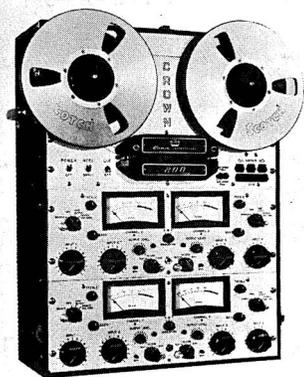


**FERROGRAPH CO. LTD.**, Ferrograph House, 84 Blackfriars Road, London, S.E.1. Tel: Waterloo 1981.

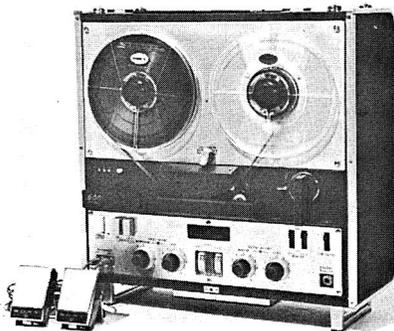
**631.**  $\frac{1}{2}$ -track mono recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{1}{8}$  i/s. Spool size  $8\frac{1}{2}$  in. W and F less than 0.16% at  $7\frac{1}{2}$  i/s. H and N  $-52$  dB. FR  $7\frac{1}{2}$  i/s 30 c/s-15 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-10 Kc/s, both  $\pm 3$  dB,  $1\frac{1}{8}$  i/s 50 c/s-5 Kc/s  $\pm 8$  dB. Inputs: 3 mV at 1 megohm. 150 mV at 80K. Outputs:  $2\frac{1}{2}$ W into internal  $10 \times 6$  in. speaker or into external 15 ohms load, 0.75V at 80K. Three motors. Synchronous capstan motor with ball-bearing races. Rewind time 1 min for  $8\frac{1}{2}$  in. spool. Sustained-peak record level meter. Single-screw azimuth adjustment. Pause control. Gear-driven angled tape position indicator. Bias and erase links fitted. Tropicalised. Takes endless loop cassette. Auto-stop at end of reel. Space for additional head.



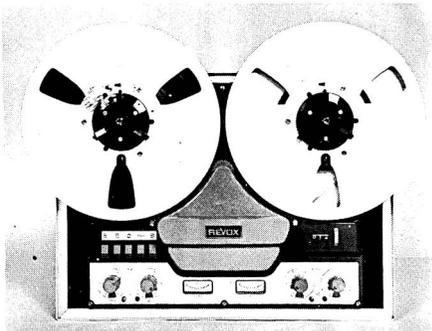
*Ampex 2165*



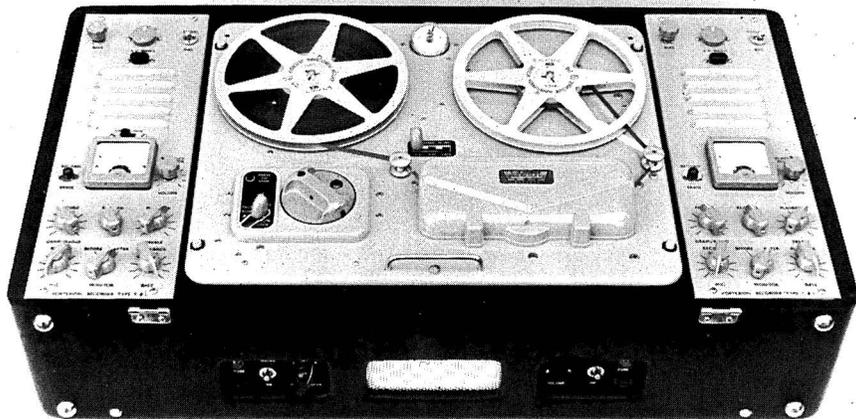
*Crown 800*



*Sony TC600*



*Revox*



*Vortexion C.B.L.*

Separate bass and treble. Mains 200-250V 50 c/s standard. Suffix A 117V 60 c/s, suffix E 110V 50 c/s. Size:  $17\frac{3}{4} \times 18\frac{1}{4} \times 9\frac{5}{8}$  in. Weight: 48 lb. Price: £99 15s.

**631H.** Similar specification to 631 but having speeds of 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s and CCIR characteristics of 200, 100 and 35  $\mu$ secs. Price: £105.

● **632.**  $\frac{1}{2}$ -track stereo recorder having separate record, replay heads and amplifiers and an output monitor stage with built-in speaker. Inputs: 2 mV at 1 megohm, 35 mV at 500K. Outputs (single channel): 1W into 5 in. internal monitoring speaker, 1V per track at approximately 1K. Input/output comparison switch. Input-mixing facilities with separate controls. Other details similar to 631 model. Price: £132 6s.

● **632H.** Specification as for 632 but with tape speeds 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s and recording characteristics as for model 631H. Price: £138 12s.

● **634.** Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Intended especially for the North American market. Provides facilities for twin  $\frac{1}{4}$ -track recording and playback. Layout and controls similar to other stereo models. Price: £138 12s.

**633.** Monophonic instrument approaching professional standard. Specification includes all Series 6 features plus the following. Separate record and replay heads and amplifiers to provide direct comparison of recorded and live performance and for echo effects. Level meter operates on both record and replay. Mixing facilities for two signals with separate gain controls. Compensated input socket for magnetic pickups. 3W output. Headphone monitor socket on front. Spot erase facility. Modular construction. Individual test certificate supplied with each machine. Guaranteed three years. Price: £126.

**633H.** Similar specification to 633 but with tape speeds  $3\frac{3}{4}$ ,  $7\frac{1}{2}$  and 15 i/s. Price: £131 5s.



**LEEVERS-RICH EQUIPMENT LTD.,** 319 Trinity Road, Wandsworth, London, S.W.18. Tel: Vandyke 9054. Cables: Leemag, London, S.W.18.

Series E  $\frac{1}{4}$  in. professional recorders. Available in rack mounting (R), console (M), or portable (P) versions.

**E141, E142.** Speeds: 15 and  $7\frac{1}{2}$  i/s, or 30 and 15 i/s, or  $7\frac{1}{2}$  and  $3\frac{3}{4}$  i/s. Spool  $11\frac{1}{2}$  in. Three

motors. Full track, half track or dual track. FR 30 c/s-18 Kc/s at 15 i/s  $\pm 2$  dB. Noise: full track -62 dB, half track -58 dB. W and F better than 0.1%. VU level meter, PPM to order. Plug-in record, replay and monitor amplifiers. Prices from £550.

Series H  $\frac{1}{2}$  in. professional recorder.

**H444.** Four track heavy duty recorder suitable for high quality master recordings. Speeds: 15 and  $7\frac{1}{2}$  i/s. Spools  $10\frac{1}{2}$  in. NAB. Three motors. Four tracks. FR to BS 1568:1960. NAB to special order. Noise better than -55 dB. Crosstalk better than 45 dB below adjacent track level at 1 Kc/s. Input: 80 mV into 600 ohms (terminating) or 20K (bridging). Plug-in record, replay amplifiers. VU meter in each channel. Prices from £1,060.



**NAGRA.** See Battery Tape Recorder section.



**NATIONAL.** Matsushita Electric Co., Japan. Distributors: Unamec Ltd., United Africa House, Blackfriars Road, London, S.E.1. Tel: Waterloo 2070.

● **National RS 775.** Stereo/mono  $\frac{1}{4}$ -track mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool 7-in. FR  $7\frac{1}{2}$  i/s 70 c/s-15 Kc/s,  $3\frac{3}{4}$  i/s 70 c/s-10 Kc/s,  $1\frac{7}{8}$  i/s 70 c/s-5 Kc/s. Inputs: two mics 20K, two aux 1.2 megohms. Outputs: two 3W 8 ohms, two 50 ohm lines. Two VU meters. Automatic reverse. Automatic tape direction. Automatic programming. 12 hours recording time. Continuous playback. Four heads. One motor. Four separate speakers. Size:  $16\frac{1}{4} \times 15\frac{1}{8} \times 10\frac{1}{2}$  in. Weight:  $50\frac{3}{4}$  lb. Price: £208 19s.

● **National RS 1000S.** Professional stereo  $\frac{1}{4}$ -track mains recorder. Speeds:  $7\frac{1}{2}$  i/s (high),  $3\frac{3}{4}$  i/s (low). Spool 7 in. W and F  $7\frac{1}{2}$  i/s <0.15%,  $3\frac{3}{4}$  i/s <0.25%. FR  $7\frac{1}{2}$  i/s 25 c/s-20 Kc/s,  $3\frac{3}{4}$  i/s 25 c/s-12 Kc/s. Inputs: mic 20K, aux 80K. Outputs: two 2.5K line. Separate 10W speaker amplifiers. Two full size professional VU meters. Twenty transistors, three diodes. Four heads. Three motors. Feather-touch push-button control. Automatic reverse, automatic shut off. Four unit and output level controls. Tape head or sound source monitoring. Remote control unit optional. Automatic tape direction. Sound-on-sound recording. Size:  $16 \times 21 \times 9$  in. Weight:  $55\frac{1}{2}$  lb. Price: £399.

● **National RS 773.** Stereo  $\frac{1}{4}$ -track mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool 7 in. FR  $7\frac{1}{2}$  i/s

40 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-12 Kc/s,  $1\frac{7}{8}$  i/s 50 c/s-5 Kc/s. Inputs: two mics 20K, two aux 1.2 megohm. Outputs: two 3W 8 ohm. Two VU meters. Twenty transistors. Three heads. One motor. Up to 12 hours recording on 7 in. 1,200 ft. Push-button operation. Size:  $11 \times 16 \times 15\frac{1}{2}$  in. Weight: 44 lb. Price: £153 6s.

See General Purpose and Battery Recorder sections for other National models.



**PHILIPS.** Distributors: Peto Scott Ltd., Addlestone Road, Weybridge, Surrey. Tel: Weybridge 45511. Cables: Megacycle, Weybridge. Telex: London 262319.

● **Philips PRO.35.** Professional recorder, console mounted. Full-track mono, half-track stereo. Speeds: 15,  $7\frac{1}{2}$  i/s. W and F 15 i/s 0.05% peak,  $7\frac{1}{2}$  i/s 0.075% peak. FR 60 c/s-12 Kc/s  $\pm 1$  dB, 40 c/s-15 Kc/s  $\pm 1.5$  dB,  $7\frac{1}{2}$  i/s 60 c/s-10 Kc/s  $\pm 1$  dB, 40 c/s-15 Kc/s  $\pm 1.5$  dB. Signal-to-noise ratio 15 i/s -66 dB,  $7\frac{1}{2}$  i/s -64 dB. Distortion: <2%. Record/replay char switchable NAB or CCIR. Line in/line out 0 dBm, 600 ohms. Fully transistorised. Modular electronics. Long life ferrite heads. Optional control panels with VU meters. Mono/stereo change-over switch. Headphone monitoring. Takes 11 in. spools. Provision for adding pilot tone head. Three Papst motors. Tape counter in minutes and seconds. 19 in. rack mounting. Remote stop and start. Size:  $29 \times 22\frac{1}{2} \times 35$  in. Weight: 135 lb. Further details and prices on application.



**REVOX.** Distributors: C. E. Hammond & Co. Ltd., 90 High Street, Eton, Windsor, Berks. Tel: Windsor 63388. Telex: 84316.

● **Model 736.** Stereo recorder.  $\frac{1}{2}$ - or  $\frac{1}{4}$ -track versions. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. W and F less than 0.1% at  $7\frac{1}{2}$  i/s. H and N -60 dB. FR  $7\frac{1}{2}$  i/s, 30 c/s-18 Kc/s  $\pm 2.3$  dB;  $3\frac{3}{4}$  i/s, 40 c/s-12 Kc/s  $\pm 2.3$  dB. Replay char DIN. Inputs (3 per channel): mic 3 mV, 2 megohms, diode 3-50 mV, 47K; radio 50 mV, 1 megohm. Outlet from pre-amp. Three motors.  $10\frac{1}{2}$  in. NAB spool.  $1\frac{1}{2}$  min rewind, 2,400 ft. 2 VU meters. Three heads, remote control, switchable tape tension, superimpose, mixing, echo, on and off tape monitoring, multiplex. Size:  $18\frac{1}{2} \times 12\frac{1}{4} \times 11\frac{1}{2}$  in. Weight: 45 lb. Price (chassis model): £131 5s. (with portable case): £133 7s.

● **Model 736/HS.** Details as for Model 736. but with 15 i/s tape speed. Price: £163 13s.

**SONY U.K. DIVISION,** Eastbrook Road, Gloucester. Tel: Gloucester 21591.

**TC777M.** Transistorised mono recorder.  $\frac{1}{4}$ -track. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. W and F  $7\frac{1}{2}$  i/s, 0.15%. FR  $7\frac{1}{2}$  i/s, 30 c/s-17 Kc/s;  $3\frac{3}{4}$  i/s, 30 c/s-10 Kc/s ( $\pm 2$  dB). Replay char NARTB. Inputs: mic low impedance, aux high impedance. Outlet from replay head. Three motors. 7 in. spools. VU meter. Three heads. Remote control. Size:  $16\frac{3}{8} \times 10\frac{11}{16} \times 18\frac{3}{4}$  in. Weight: 42 lb. Price: £214 15s.

● **TC600.**  $\frac{1}{4}$ -track valve and transistor mains operated stereo recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Spool 7 in. W and F 0.15% at  $7\frac{1}{2}$ , 0.2% at  $3\frac{3}{4}$ . FR 30 c/s-18 Kc/s at  $7\frac{1}{2}$  i/s, 50-15 Kc/s at  $3\frac{3}{4}$  i/s. Replay char CCIR. Low imp input -72 dB, high imp input 80 mV. Line output 1.5V. VU meter. Rewind time  $3\frac{1}{2}$  mins 1,800 ft. Superimpose. Pause. Position indicator with PB reset. One motor. Own deck. Mains 110-240V 50 c/s. Size:  $16\frac{3}{4} \times 18\frac{3}{16} \times 10\frac{3}{4}$  in. Weight: 48 lb. Price: £141 15s.



**TANDBERG.** Distributors: Elstone Electronics Ltd., Hereford House, North Court, Vicar Lane, Leeds 2. Tel: Leeds 39834/6. Grams: Elstone, Leeds.

● **Tandberg Series 6.** Stereo tape unit in  $\frac{1}{4}$ - and  $\frac{1}{2}$ -track versions. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s <0.1%,  $3\frac{3}{4}$  i/s <0.15%,  $1\frac{7}{8}$  i/s <0.25%. SN  $7\frac{1}{2}$  i/s 62 dB,  $3\frac{3}{4}$  i/s 55 dB. FR  $7\frac{1}{2}$  i/s 30 c/s-20 Kc/s,  $3\frac{3}{4}$  i/s 30-13 Kc/s,  $1\frac{7}{8}$  i/s 30 c/s-7 Kc/s. Two level indicators. Inputs: (each channel) mic 1.5 mV 5 megohms, radio/PU 50 mV 1 megohm, radio/PU 4 mV 100K. Outlets: cathode follower 1.5V at 2K, 0.5V at 50K. Centre channel output: 1V at 200 ohms. Nine valves, two rectifiers. Own deck. Hysteresis synchro-motor. Separate record, playback and erase heads. Bias frequency: 78 Kc/s  $\pm 2$  Kc/s. Off-tape monitoring. Sound-on-sound recording. No power amplifiers or speakers. Echo effects. Input mixing. Single joy-stick tape transport control. Four-digit tape indicator. Push-button controls. Pause. Auto-stop. Optional remote control. Size:  $15\frac{1}{4} \times 11\frac{7}{8} \times 6$  in. approximately. Weight: 25 lb. Price: (Model 62,  $\frac{1}{2}$ -track in teak cabinet) £115 10s.; (Model 64,  $\frac{1}{4}$ -track in teak cabinet) £115 10s.; (Model 62X,  $\frac{1}{2}$ -track with bias head and multiplex filter. in teak cabinet) £120 15s.; (Model 64X,  $\frac{1}{4}$ -track with bias head and multiplex filter. in teak cabinet) £120 15s.

● **Tandberg Series 12.** Stereo tape recorder in  $\frac{1}{4}$ -track and  $\frac{1}{2}$ -track versions. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s < 0.15%,  $3\frac{3}{4}$  i/s < 0.2%,  $1\frac{7}{8}$  i/s < 0.3%. H and N - 55 dB. FR  $7\frac{1}{2}$  i/s 40 c/s-20 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-12 Kc/s,  $1\frac{7}{8}$  i/s 40 c/s-7 Kc/s. Level indicators: two EAM86. Rewind time: 2 mins 1,200 ft. Inputs: two mics 1.5 mV 200 ohms, line 75 mV 1 megohm, line 7.5 mV 100K. Output: 10W RMS each channel. Outlets: amplifier 300 mV 10K (two), centre channel amplifier 750 mV 82 ohms. Speakers: two  $7 \times 4$  in. (power on internal speakers limited to 3W each channel). 35 transistors. Erase and bias frequency 85.5 Kc/s. Stereo multiplex filter. Bass control: -12 dB at 80 c/s. Treble control: -15 dB at 15 Kc/s. All input connections parallel for British, American or Continental plugs. Size:  $15\frac{3}{8} \times 11\frac{7}{8} \times 6\frac{7}{8}$  in. Weight: 23 lb. Price: (Model 1221,  $\frac{1}{2}$ -track in teak cabinet) £110 5s.; (Model 1222,  $\frac{1}{2}$ -track in portable case) £117 12s.; (Model 1241,  $\frac{1}{4}$ -track in teak cabinet) £110 5s.; (Model 1242,  $\frac{1}{4}$ -track in portable case) £117 12s.



**TEAC.** Distributors: C. E. Hammond & Co. Ltd., 90 High Street, Eton, Windsor, Berks. Tel: Windsor 63388.

● **Teac 4010S.** Transistor  $\frac{1}{4}$ -track stereo semi-professional recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s 0.12%,  $3\frac{3}{4}$  i/s 0.15%. Signal-to-noise ratio 50 dB. FR  $7\frac{1}{2}$  i/s 30 c/s-20 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-12 Kc/s. Replay char NAB. VU meters. Rewind time: 90 secs for 1,200 ft. Four-digit tape indicator, PB reset. Three motors: one dual-speed hysteresis capstan drive, two six-pole outer-rotor reel drive. Automatic reverse play. Tape tension control. Auto shut-off. Inputs: mic 0.25 mV 10K, 140 mV 100K. Monitoring. Input mixing. Four heads. Mains 100, 117, 220-240V 50/60 c/s. Consumption: 110W. Size:  $17\frac{1}{2} \times 17\frac{1}{2} \times 9\frac{3}{4}$  in. Weight: 48 lb. Price: £152 5s.

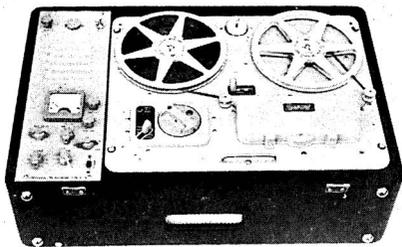
● **Teac Series 310.** Professional mains recorders. Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool  $10\frac{1}{2}$  in. SN better than 60 dB (full track), 55 dB (half track). FR 15 i/s 30 c/s-18 Kc/s  $\pm 3$  dB,  $7\frac{1}{2}$  i/s 40 c/s-15 Kc/s  $\pm 3$  dB. W and F better than 0.15% at 15 i/s, better than 0.2% at  $7\frac{1}{2}$  i/s. Large VU meter. Full remote control facilities. Price (R311 full-track mono): £295; (R313 half-track stereo): £385.

**VORTEXION LTD.**, 257/263 The Broadway, Wimbledon, London, S.W.19. Tel: Liberty 2814, 6242/3. Cables: Vortexion, London, S.W.19.

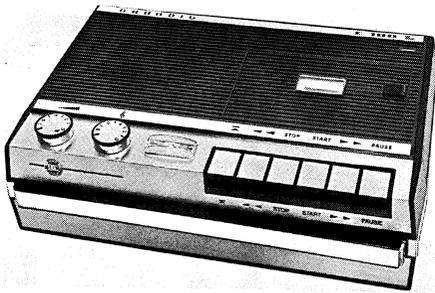
**Model WVA.** Complete semi-professional mono  $\frac{1}{2}$ -track recorder. Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s or  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. W and F  $7\frac{1}{2}$  i/s, 0.16%;  $3\frac{3}{4}$  i/s, 0.2%. H and N (after erasure) - 50 dB. FR 15 i/s, 40 c/s-20 Kc/s,  $7\frac{1}{2}$  i/s, 40 c/s-15 Kc/s,  $3\frac{3}{4}$  i/s, 40 c/s-12 Kc/s,  $1\frac{7}{8}$  i/s, 40 c/s-6 Kc/s. All  $\pm 3$  dB. Replay char CCIR. Inputs: mic, 12  $\mu$ V on 30 ohms; gram/radio 20 mV on  $\frac{1}{2}$  megohm. Output 15 ohms at  $3\frac{1}{2}$ W. Three motors,  $8\frac{1}{2}$  in. spools, less than 1 min rewind for 1,750 ft tape. Level meter. Size:  $8\frac{1}{2} \times 22\frac{1}{2} \times 15\frac{3}{4}$  in. Weight: 51 lb. Pause control. Price: £96 7s. with speeds of  $1\frac{7}{8}$ ,  $3\frac{3}{4}$ ,  $7\frac{1}{2}$  i/s; £107 3s. with speeds  $3\frac{3}{4}$ ,  $7\frac{1}{2}$ , 15 i/s.

**Model WVB.** Details as for WVA, but facilities for monitoring, adding echo, superimpose. Price: £115 10s. with speeds of  $1\frac{7}{8}$ ,  $3\frac{3}{4}$ ,  $7\frac{1}{2}$  i/s; £128 with speeds of  $3\frac{3}{4}$ ,  $7\frac{1}{2}$ , 15 i/s.

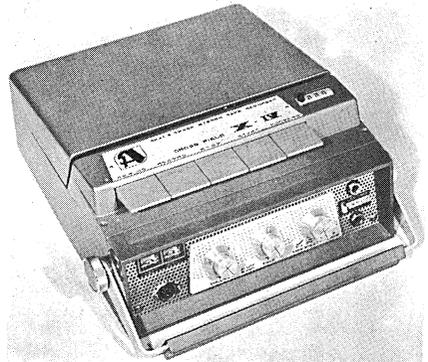
● **Model CBL.** Stereo/mono  $\frac{1}{2}$ -track recorder. Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s, or  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. W and F  $7\frac{1}{2}$  i/s 0.16%;  $3\frac{3}{4}$  i/s 0.2%. H and N (after erasure) - 50 dB. FR 15 i/s, 40 c/s-20 Kc/s,  $7\frac{1}{2}$  i/s, 40 c/s-15 Kc/s,  $3\frac{3}{4}$  i/s, 40 c/s-12 Kc/s,  $1\frac{7}{8}$  i/s, 40 c/s-6 Kc/s. All  $\pm 3$  dB. Replay char CCIR. Inputs: mic 10  $\mu$ V on 30 ohms; gram/radio 60 mV on 300K (mixable on each amplifier). Output: 15 ohms at  $3\frac{1}{2}$ W each amplifier. Three motors.  $8\frac{1}{2}$  in. spools, less than 1 min rewind for 1,750 ft tape. Level meter. Size:  $16\frac{3}{8} \times 27\frac{1}{2} \times 8\frac{5}{8}$  in. Weight: 69 lb. Pause control, monitoring, mixing, echo, superimpose. Price: £172 with speeds of  $1\frac{7}{8}$ ,  $3\frac{3}{4}$ ,  $7\frac{1}{2}$  i/s; £180 with speeds of  $3\frac{3}{4}$ ,  $7\frac{1}{2}$ , 15 i/s.



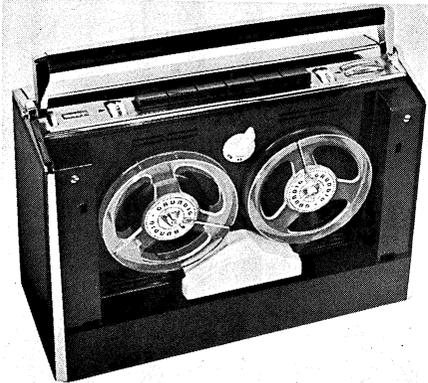
Vortexion W.V.B.



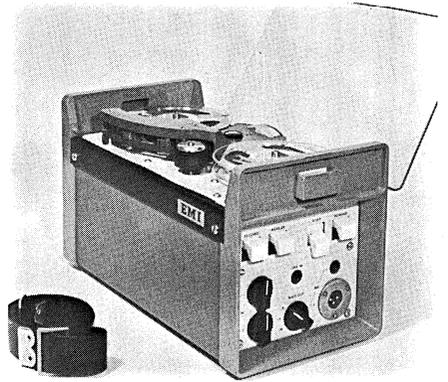
Grundig C100



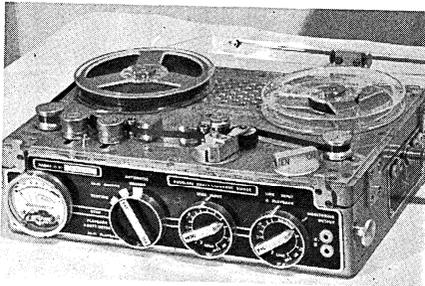
Akai X-IV



Grundig TK6L



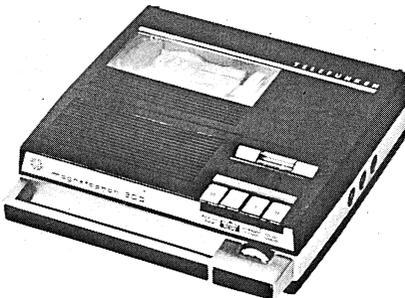
EMI L4



Nagra 111B



Loewe-Opta Optacord 416



Telefunken Magnetophon 300



Telefunken Magnetophon 301

## BATTERY OPERATED PORTABLES

**AKAI.** Distributors: Pullin Photographic Ltd., 11 Aintree Road, Perivale, Greenford, Middlesex. Tel: Alperton 1541. Cables: Pullinfo, Greenford, Middlesex.

● **Akai X-IV.**  $\frac{1}{4}$  or  $\frac{1}{2}$ -track mains/battery recorder. Mono or stereo. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$ ,  $\frac{15}{16}$  i/s. Max spool 5 in. W and F  $7\frac{1}{2}$  i/s <0.16%,  $3\frac{3}{4}$  i/s <0.17%,  $1\frac{7}{8}$  i/s <0.28%,  $\frac{15}{16}$  i/s <0.35%. H and N 40 dB at all speeds. FR  $7\frac{1}{2}$  i/s 40 c/s-20 Kc/s  $\pm 3$  dB,  $3\frac{3}{4}$  i/s 40 c/s-17 Kc/s  $\pm 3$  dB,  $1\frac{7}{8}$  i/s 30 c/s-11 Kc/s  $\pm 3$  dB,  $\frac{15}{16}$  i/s 30 c/s-5 Kc/s  $\pm 3$  dB. Replay char NARTB. Two VU meters. Rewind time:  $1\frac{1}{4}$  mins 600 ft. Inputs: mic 0.1 mV 600K, line 60 mV at 4K. Output: 2W RMS per channel. Speaker 5  $\times$  3 in. Outlets: line 700 mV 4K, phones, ext speakers 8 ohms. Transistors. One DC micro-motor (maintains tape speed deviation within 0.8% even after 1,000 hours continuous operation). Three-digit tape indicator. Monitoring. Power from 6V rechargeable battery or mains adaptor 100-240V AC. Size: 4  $\times$   $9\frac{1}{4}$   $\times$  10 in. Weight: 11 $\frac{1}{4}$  lb. Price (with all accessories): £123 18s.



**ALBA (RADIO AND TELEVISION) LTD.,** Tabernacle Street, London, E.C.2. Tel: Clerkenwell 1322. Cables: Abalgramo, London.

**R19.** Battery/mains  $\frac{1}{2}$ -track portable recorder. Mono. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Capstan drive. Automatic recording level. Eight transistor circuit. Built-in monitoring system. Controls: volume on/off, tone, rotary lever for deck. Remote control mic. Sockets for mic, radio, monitoring and extension speaker. Operates from 9V (six  $1\frac{1}{2}$ V cells) or AC mains. Moulded case with carrying handle and chrome trim. Size: 10 $\frac{5}{8}$   $\times$  8 $\frac{1}{4}$   $\times$  3 in. Weight: 6 lb. Waterproof cover included. Price: £24 3s.



**C. BRADDOCK (BLACKPOOL) LTD.,** 266 Waterloo Road, Blackpool, Lancs. Tel: Blackpool 45049.

**Q-Cord 203.** Transistorised mono recorder. Battery-mains with adaptor.  $\frac{1}{2}$ -track. Speed:  $3\frac{3}{4}$  i/s. W and F <0.5%. H and N -50 dB. FR 60 c/s-10 Kc/s  $\pm 3$  dB. Replay char NARTB. Inputs: radio/mic/gram/tele-adaptor 2 mV 50K. Straight-through amplifier. Outlet from pre-amplifier at 10K. One motor. 4 $\frac{1}{2}$  in. spool.

Rewind 4 mins. DM70 level indicator. Pause control. Can be used in any position. 6 or 12V battery/mains with adaptor. Remote control. Size: 10  $\times$  4  $\times$  10 $\frac{1}{2}$  in. Price: £34 13s. with basic accessories; (machine only) £28 7s.

**Saja.** C. Braddock (Blackpool) Ltd. is sole U.K. agent for spares for now obsolete Saja recorders. Spares for M5 Xport, M40/45 and Mk 50 deluxe by return service. 24-hour telephone answering service, Blackpool 45049.



**BUTOBA**—Sole U.K. distributors: Denham & Morley Ltd., Denmore House, 175 Cleveland Street, London, W.1. Tel: Euston 3656. Cables: Denmorl, Wesdo, London.

**Butoba MT225.** Transistorised portable recorder operating on dry batteries, car battery, rechargeable battery or AC mains. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s.  $\frac{1}{2}$ -track. 17 transistors 4 diodes. Spool size 6 in. with lid closed. FR  $7\frac{1}{2}$  i/s 40 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-15 Kc/s,  $1\frac{7}{8}$  i/s 40 c/s-9 Kc/s. H and N  $7\frac{1}{2}$  i/s -50 dB,  $3\frac{3}{4}$  i/s -46 dB,  $1\frac{7}{8}$  i/s -40 dB. Output: 1.5W at 3.0% distortion, 1W at 1.5% distortion. Inputs: mic 200-500 ohms at 0.15 mV, radio 100K at 20 mV. VU meter. Three motors. Digital tape indicator. Auto-stop. 7 in. speaker. Size: 12 $\frac{1}{4}$   $\times$  10  $\times$  5 in. Weight: 12 lb. Price: to be announced.



**DANSETTE PRODUCTS LTD.,** Dansette House, Honeyput Lane, Stanmore, Middlesex. Tel: Wordsworth 0021.

**JTR909 Magazine.** Battery recorder with mains operation by optional adaptor. Twin track. Drop-in cartridge loading. AC bias. 2 $\frac{1}{2}$  in. speaker. 400 mW output. Power supply: four U2 cells. Dynamic mic with on/off switch. Meter level and battery indicator. Push-button operation. Carry handle. Size: 8  $\times$  5 $\frac{3}{4}$   $\times$  2 $\frac{1}{4}$  in. Weight: 3 lb. Price: £27 6s.

**JTR93 Executive.**  $\frac{1}{2}$ -track battery/mains recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Capstan drive. 3 in. speaker. Output: 800 mW. Automatic recording level. Power supply: four U2 cells or 110-125V or 220-240V AC mains. Stick mic with on/off switch stored in handle. Moulded case with carrying handle. Size: 8 $\frac{1}{4}$   $\times$  10  $\times$  2 $\frac{3}{8}$  in. Weight: 5 lb. Price: £23 2s.

**EAGLE PRODUCTS.** Distributors: B. Adler and Sons (Radio) Ltd., 32a Coptic Street, London, W.C.1. Tel: Museum 9606. Cables: Reldab, London.

● **TP.1004.**  $\frac{1}{2}$ -track cassette mains/battery stereo recorder. Speed:  $1\frac{3}{8}$  i/s. FR up to 10 Kc/s. Philips Compact cassettes. Playing time: C60 cassette 60 mins, C90 cassette 90 mins. Piano-key controls, interlocked. Individual volume and tone controls each channel. Inputs: mic and aux for each channel. Two detachable speakers. Two remote control microphones. Two record level meters. Fully transistorised. Supply: 240V mains, 6V DC. Price: £46 4s.

**TP.712.**  $\frac{1}{2}$ -track two-speed mono mains/battery recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 5 in. FR up to 12 Kc/s at  $3\frac{3}{4}$  i/s. VU meter for record level and battery check. Remote control mic. Push-button operation, interlocked. All transistor. Supply: 240V mains, 6V DC. Price: £27 16s. 6d.



**EMI ELECTRONICS LTD.,** Hayes, Middx. Tel: Hayes 3888. Cables: Emidata, London.

**L4.** Professional portable transistorised recorder in four versions. Type A  $\frac{1}{2}$ -track, Type B full-track, Types C and D adapted for film and sound sync. Spool  $4\frac{1}{2}$  in. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. W and F better than 0.2% at  $7\frac{1}{2}$ , 0.25% at  $3\frac{3}{4}$ . H and N better than 50 dB. -45 dB. FR  $7\frac{1}{2}$  50 c/s-12 Kc/s  $\pm 2$  dB,  $3\frac{3}{4}$  50 c/s-5 Kc/s  $\pm 6$  dB. Inputs: Two mic 50  $\mu$ V 30-50 ohms, line 250 mV 20K. Outputs: line 600 ohms, LS 200 mW 65 ohms. Meter. Rewind time 2 min  $4\frac{1}{2}$  in. standard tape. One motor. Own deck. Four heads. Remote control. Operates with lid closed. Power: 14V rechargeable lead acid accumulator. Size:  $7 \times 11\frac{1}{2} \times 5\frac{3}{4}$  in. Weight:  $10\frac{3}{4}$  lb. Price: Type A £125, Type B £138, Type C £195, Type D £195.



**ELIZABETHAN ELECTRONICS LTD.,** Crow Lane, Romford, Essex. Tel: Romford 64101. Cables: Elizabethan, Romford.

**LZ9102T.** Cassette  $\frac{1}{2}$ -track battery recorder. Philips Compact cassettes. Speed:  $1\frac{7}{8}$  i/s. Meter level indicator. Output: 250 mW. Speaker:  $2\frac{1}{2}$  in. Outlet: line. Philips deck. Remote control mic. Size:  $8 \times 4\frac{3}{4} \times 2\frac{1}{2}$  in. Weight: 3 lb. Supplied with dynamic mic. Price: £28 7s.

**LZ612.** Cassette  $\frac{1}{2}$ -track 12V battery/mains recorder. Philips Compact cassette. Speed:  $1\frac{7}{8}$  i/s. Meter level indicator. Output: 5.5W.

Speaker: 10 in. Straight-through amplifier. Monitoring. Outlets: line, ext speaker 3 ohms. Mains: 110/240V AC. Battery: 12V car battery. Size:  $17\frac{1}{2} \times 12\frac{1}{2} \times 7\frac{1}{2}$  in. Weight: 18 lb. Supplied with dynamic mic. Price: £47 5s.



**GRUNDIG (GREAT BRITAIN) LTD.,** Newlands Park, Sydenham, London, S.E.26. Tel: Sydenham 2211.

**C100L.** Battery-operated cassette recorder.  $\frac{1}{2}$ -track DC International cassettes. Speed: 2 i/s. Output: 2W. FR 40 c/s-10 Kc/s. SN better than 45 dB. Speaker:  $6 \times 3\frac{1}{2}$  in. Playing time: DC90 cassette  $1\frac{1}{2}$  hours, DC120 cassette 2 hours. Tone control. Speaker switch built into phone socket. Socket for external power supply, car or mains unit. Pause control. Automatic cassette rejection. Electronically controlled DC motor. Compensating flywheels permit operation on the move. Supplied with dynamic microphone. Size:  $11\frac{1}{2} \times 7\frac{1}{2} \times 3\frac{3}{4}$  in. Weight:  $7\frac{3}{4}$  lb. Finish: charcoal and silver. Price: £41 9s. 6d.

**TK6L.** Transistorised battery/mains  $\frac{1}{2}$ -track mono recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool  $4\frac{1}{2}$  in. W and F  $3\frac{3}{4}$  i/s  $\pm 0.5\%$ ,  $1\frac{7}{8}$  i/s  $\pm 0.8\%$ . FR  $3\frac{3}{4}$  i/s 50 c/s-13 Kc/s,  $1\frac{7}{8}$  i/s 50 c/s-9 Kc/s. Replay char NARTB. Inputs: mic 0.3-20 mV 10K, radio diode 5-100 mV 10K, pickup 50-1,500 mV 500K with special lead. Outputs: 0.5W on battery, 1.6W on mains. High impedance outlet: 550 mV 18K. Meter level indicator. Rewind time 2 mins 10 secs for 1,200 ft. Own deck. Pause control. Position indicator. Monitoring. DC brushless motor. Supply: 110-240V 50 c/s, six LPU2 batteries. Size:  $12\frac{3}{4} \times 5\frac{1}{4} \times 9\frac{1}{2}$  in. Weight:  $13\frac{3}{4}$  lb. Price: £69 6s.



**GOLDEN EAGLE.** Distributors: Perry and Pharo Ltd., 95a Wolverhampton Road, Stafford. Tel: Stafford 3940 and 2527.

**TR-1001.**  $\frac{1}{2}$ -track two-speed battery/mains recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 5 in. Meter level indicator. Six transistors and one diode. FR  $3\frac{3}{4}$  i/s 100-8 Kc/s,  $1\frac{7}{8}$  i/s 100-6 Kc/s. Speaker:  $4 \times 2\frac{1}{2}$  in. Output: 500 mW. Inputs: mic, remote control, aux. Outlets: ext speaker, phones (8 ohms). Moving coil mic with remote control. Three-digit tape indicator. W and F  $3\frac{3}{4}$   $< 0.5\%$ , HD  $3\frac{3}{4}$  i/s 5%, AC recording bias, DC erase bias. Push-button control. Supply: 6V internal batteries, 200-240V AC mains. Size:  $11 \times 8 \times 4$  in. Weight: (without batteries) 8 lb. Finish: dark leather case with carry handle. Price: £28 7s.

**LOEWE-OPTA.** Sole U.K. distributors: High-gate Acoustics, 71/73 Great Portland Street, London, W.1. Tel: Museum 2901.

**Optacord 408.**  $\frac{1}{2}$ -track transistorised mono mains/battery recorder. Speed:  $3\frac{3}{4}$  i/s. Spool size  $4\frac{1}{4}$  in. FR 90 c/s-10 Kc/s. Inputs: mic, radio/diode, aux. Output: 800 mW. Rewind time 2 mins 20 secs. One motor. Own deck. High frequency controlled motor. Push-button controls. Record level and battery meter. W and F less than 0.3%. 10 transistors plus 4 diodes. Operates from AC mains 110V/240V 50-60 c/s, four 1.5 batteries or car battery 6V or 12V. Size:  $9\frac{1}{2} \times 7\frac{1}{2} \times 3\frac{3}{8}$  in. Weight:  $6\frac{1}{2}$  lb. Price: £40 19s.

**Optacord 416.**  $\frac{1}{2}$ -track transistorised mono mains/battery recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool size  $4\frac{1}{4}$  in. FR 50 c/s-12 Kc/s at  $3\frac{3}{4}$ , 90 c/s-6 Kc/s at  $1\frac{7}{8}$ . Inputs: mic, radio/diode, aux. Output: 1.8W. Rewind time 2 mins 20 secs. One motor. Own deck. Operates from AC mains 110V/240V 50-60 c/s, five 1.5V batteries, five rechargeable Deac cells, or car battery 6V or 12V. Meter level indicator and battery voltage check. Push-button control. Operates while carried. Remote-control mic facility. Internal speaker can be switched off. Shock proof polyester case. Size:  $15 \times 9\frac{3}{4} \times 4\frac{1}{2}$  in. Weight: 9 lb. Price: £53 11s.

**Optacord 416 DIA.** Specification as for 416 but plus built-in synchronising unit for use with slide projector. Upper track records commentary, lower track takes pulses to control slide changes. Pulse frequency 50 c/s. Projector control relay. SP 7A contact. Four additional transistors. Price: £65 2s.

**Optacord 450.** Battery/mains  $\frac{1}{2}$ -track cassette recorder. Mono. Takes compact cassettes. Speed:  $1\frac{7}{8}$  i/s. FR 50 c/s-8 Kc/s. Playing time: (C60 cassette)  $2 \times 30$  mins, (C90 cassette)  $2 \times 45$  mins. Controls: volume, tone, level, single knob for playback, fast forward and rewind. Sockets for headphones and external speaker. 10 transistor circuit. Output: 1.8W. Dynamic mic LDM7. Moulded case. Size:  $11\frac{1}{2} \times 8\frac{1}{2} \times 3$  in. Weight:  $6\frac{1}{2}$  lb (less batteries). Supply: mains 110/220V AC, five 1.5V cells, 6V or 12V car battery via adaptor. Price: £40 19s.



**NAGRA.** Distributed by: Hayden Laboratories Ltd., East House, Chiltern Avenue, Amersham, Bucks. Tel: 0240-5-6565.

**Nagra III BH.** Professional battery portable recorder. Mono. Full track. Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$

i/s. W and F  $7\frac{1}{2}$  i/s, 0.08%, H and N 15,  $7\frac{1}{2}$  i/s -62.5 dB. FR 15 i/s, 30 c/s-18 Kc/s  $\pm 1$  dB;  $7\frac{1}{2}$  i/s, 40 c/s-15 Kc/s  $\pm 1.5$  dB;  $3\frac{3}{4}$  i/s, 50 c/s-7 Kc/s. Replay char CCIR and NAB supplied. Inputs: mic 0.2-10 mV, 200 ohms, or 0.1-5 mV, 50 ohms; line 0.5-10V, 100K, or 10 mV-1V, 2.5K. Outlet from pre-amp. One motor. 5 in. spool (7 in. with lid raised). Level meter. Mixing of various inputs. 3 heads. Monitor speaker. Batteries, twelve 1.5V torch cells, life approx 2 hours continuous. Size:  $8\frac{3}{4} \times 12\frac{1}{2} \times 4\frac{1}{4}$  in. Weight: approx  $15\frac{1}{2}$  lb. Price: £325.

**Nagra III PH.** Similar to III BH but fitted with the "Neopilot" system which provides the additional capability of achieving lip sync in filming. The "Neopilot" head is used to record a 50 c/s or 60 c/s signal transversely on the tape. Price: £347.



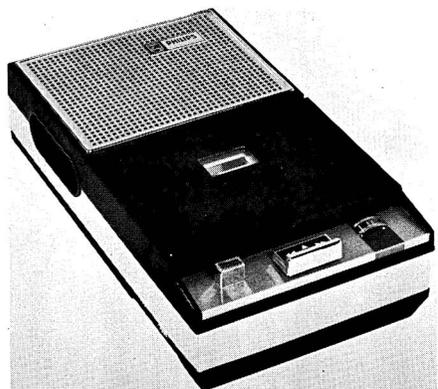
**NATIONAL.** Matsushita Electric Co., Japan. Distributors: Unamec Ltd., United Africa House, Blackfriars Road, London, S.E.1. Tel: Waterloo 2070.

**National RQ 105S.**  $\frac{1}{2}$  track mono battery recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool size  $3\frac{1}{4}$  in. FR  $3\frac{3}{4}$  i/s 100 c/s-7 Kc/s,  $1\frac{7}{8}$  i/s 100 c/s-4 Kc/s. Output: 1W. Speaker: 3 in. 8 ohms. Six transistors. Push-button operation. Supply: four LPU11 batteries or from 6V adaptor. Size:  $10\frac{1}{4} \times 7\frac{3}{4} \times 2\frac{5}{8}$  in. Weight: 4 lb. Price: £21.

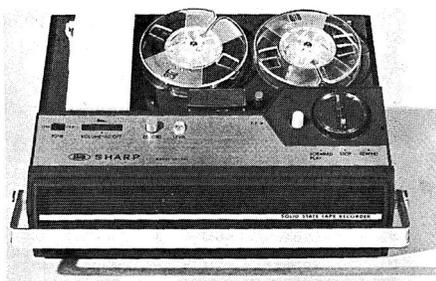
**National RQ 102S.** Battery/mains  $\frac{1}{2}$ -track mono recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool  $3\frac{1}{4}$  in. FR  $3\frac{3}{4}$  i/s 100 c/s-7 Kc/s,  $1\frac{7}{8}$  i/s 100 c/s-4 Kc/s. Input: mic 20K. Output: 700 mW 8 ohms. Speaker:  $3\frac{5}{8}$  in. Record level and battery check meter. Single lever control. Remote control mic or foot switch. Supply: six 1.5V batteries or AC mains via built-in adaptor. Size:  $9\frac{3}{8} \times 8\frac{1}{2} \times 3$  in. Weight: 4 lb. Price: £25 4s.

**National RQ 158S.** Battery  $\frac{1}{2}$ -track mono recorder. Mains operation via AC adaptor supplied. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool 5 in. FR  $3\frac{3}{4}$  i/s 120 c/s-8 Kc/s,  $1\frac{7}{8}$  i/s 120 c/s-5 Kc/s. Input: mic 8K. Output: 1.5W. Speaker:  $6 \times 3$  in. 8 ohms. Record level and battery check meter. Eight transistors. Remote control and voice-operated microphone system. Automatic reverse. Supply: six U2 batteries or AC mains adaptor. Size:  $11 \times 13 \times 3$  in. Weight: 10 lb. Price: £57 15s.

See Semi-professional and General Purpose Recorder sections for other National models.



*Philips EL3302*



*Sharp RD303*



*Q-Cord 203*



*Sony TC900*



*Sony TC800*



*Sharp RD504*



*Sony TC900 recorder*



*Sanyo Mountie MR.212*

**PHILIPS ELECTRICAL LTD.**, Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437 7777. Cables: Phillamps, London.

**EL3302.**  $\frac{1}{2}$ -track cassette loading battery recorder. Speed:  $1\frac{1}{8}$  i/s. Compact cassettes. W and F  $\pm 0.4\%$ . SN  $>45$  dB. FR 80 c/s-10 Kc/s. Meter level indicator. Rewind time: 70 secs with C60 Cassette. Inputs: mic 0.3 mV 2K, radio 0.3 mV 2K, PU 200 mV 1.5m. Outlet: phones. Output: 400 mW. Speaker:  $2\frac{1}{2}$  in. Transistor. Battery voltage indicator. Size:  $8\frac{1}{4} \times 6\frac{1}{2} \times 2\frac{1}{2}$  in. Weight: 4 lb. Moulded polystyrene black and silver case. Price: £28 7s.

**EL3303.**  $\frac{1}{2}$ -track battery cassette recorder. Speed:  $1\frac{1}{8}$  i/s. Compact cassettes. W and F 0.4%. H and N -45 dB. FR 80 c/s-10 Kc/s  $\pm 6$  dB. Meter indicator. Rewind time: 70 secs. C60 cassette (300 ft). Inputs: mic, radio, PU all 0.2 mV 2K. Outlets: radio 0.5V 20K, speaker 800 mW 5-8 ohms, phones 200 mV 1.5K. Transistors. Philips deck. One motor. Tape scale on cassette. Remote stop-start. Battery voltage indicator. Connection for mains unit. Size:  $11\frac{1}{4} \times 9\frac{1}{2} \times 2\frac{3}{4}$  in. Weight: 5 lb. Supply: six 1.5V U2 or equivalent. Price: to be announced.

**Stella ST473.** Similar specification to EL3303 except output 400 mW, size  $8 \times 4\frac{3}{4} \times 2\frac{1}{2}$  in. and weight 3 lb. Supply: five 1.5V U2 or equivalent. Price to be announced.

**Stella ST9112AT.** Battery/mains cassette recorder.  $\frac{1}{2}$ -track. Speed  $1\frac{1}{8}$  i/s. Compact cassette. W and F  $\pm 0.4\%$ . SN  $>45$  dB. FR 80 c/s-10 Kc/s  $\pm 6$  dB. Meter level indicator. Rewind time  $<70$  secs C60 cassette (300 ft). Inputs: mic, radio, PU all 0.2 mV 2K. Outlets: radio 0.5V 20K, speaker 800 mW 5-8 ohms, phones 200 mV 1.5K. Output: 800 mW. Speaker: 4 in. Own deck. One motor. Scale on cassette. Remote stop-start control. Supply: six 1.5V U2 or equivalent, or mains 110, 127, 200-250V AC. Size:  $12\frac{1}{2} \times 8\frac{1}{2} \times 2\frac{3}{4}$  in. Weight: 6 lb. Price: to be announced.

**4200.** Mono  $\frac{1}{2}$ -track transistorised recorder. Speed:  $1\frac{1}{8}$  i/s. Spool 4 in. W and F  $<1\%$  (p-p). H and N -40 dB. FR 80 c/s-8 Kc/s  $\pm 3$  dB. Input: combined mic, diode, PU 0.3 mV 20K. Outputs: 0.5V 20K, 0.5V 1.5K for playback phones. Meter indicator. Rewind time  $1\frac{1}{2}$  mins for 300 ft. One motor. Own deck. Battery voltage indicator. Batteries: six U2 or equivalent. Size:  $11\frac{1}{2} \times 8\frac{3}{8} \times 3\frac{3}{4}$  in. Weight: 8 lb. including batteries. Price: £27 6s.



**Q-CORD.** See C. Braddock (Blackpool) Ltd.

**RADIONETTE.** Distributors: Denham and Morley Ltd., Denmore House, 173-175 Cleveland Street, London, W.1. Tel: Euston 3656/7. Cables: Denmorl, Wesdo, London.

**Multicorder.** Battery-operated mono  $\frac{1}{2}$ -track portable. Speeds:  $1\frac{1}{8}$ ,  $3\frac{3}{4}$  i/s. W and F  $3\frac{3}{4}\%$  i/s better than 0.2%  $\pm 3$  dB at 10 Kc/s. Level indicator. Inputs: mic and PU/radio. Speaker:  $6 \times 4$  in. Transistorised. 5 in. spool. Supply: batteries or Radionette stabilised mains unit. Size:  $10 \times 8 \times 4\frac{1}{2}$  in. Weight:  $6\frac{1}{2}$  lb. Optional extras include dynamic microphone, mains unit and carrying case. Price: £51 9s. (mains unit £5 10s. extra).



**SANYO.** Sole U.K. agents: Marubeni-Iida Co. Ltd., Marubeni-Iida House, 164 Clapham Park Road, London, S.W.4. Tel: 01-720 1911.

**MR212.**  $\frac{1}{2}$ -track transistorised battery recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{1}{8}$  i/s. Max spool  $3\frac{1}{4}$  in. W and F  $3\frac{3}{4}\%$  i/s 0.35%,  $1\frac{1}{8}$  i/s 0.45%. SN better than 40 dB. FR  $3\frac{3}{4}$  i/s 150 c/s-6 Kc/s,  $1\frac{1}{8}$  i/s 150 c/s-3 Kc/s. Rewind time  $2\frac{1}{4}$  mins. Input: mic. Outlet: monitor ext speaker. Output: normal 500 mW, max 600 mW. Speaker:  $4 \times 2\frac{5}{8}$  in. One motor. Own deck. Automatic level control. Batteries: six U11 (9V). Monitoring. Mains adaptor available. Size:  $7\frac{7}{8} \times 9\frac{3}{4} \times 3\frac{1}{8}$  in. Weight: 4 lb. Price: £17 17s.

**MR101 Reporter Mk III.**  $\frac{1}{2}$ -track transistorised battery recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{1}{8}$  i/s. Max spool  $3\frac{1}{4}$  in. W and F less than 0.4%. SN better than 40 dB. FR  $3\frac{3}{4}$  i/s 200 c/s-5 Kc/s,  $1\frac{1}{8}$  i/s 200 c/s-3 Kc/s. Meter level indicator. Rewind time  $2\frac{1}{2}$  mins. Inputs: mic, radio, phone adaptor. Outlet: earphone. Output: 650 mW. Speaker  $4\frac{1}{4} \times 2\frac{3}{4}$  in. One motor. Own deck. Batteries: six U11 (9V). Mains adaptor available. Provision for foot control. Size:  $8\frac{7}{8} \times 10 \times 3$  in. Weight: 6 lb 10 oz. Price: £29 8s.

**MR130.**  $\frac{1}{2}$ -track transistorised mains/battery recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{1}{8}$  i/s. Max spool 5 in. W and F less than 0.4%. SN better than 40 dB. FR  $3\frac{3}{4}$  i/s 100 c/s-7 Kc/s,  $1\frac{1}{8}$  i/s 100 c/s-4 Kc/s. Meter level indicator. Rewind time  $2\frac{1}{2}$  mins. Inputs: mic, radio, remote control. Outlet: monitor. Output: 800 mW undistorted, 1W maximum. Speaker:  $4\frac{1}{8} \times 2\frac{3}{4}$  in. One motor. Own deck. Automatic level control. Mains: 110, 117, 220, 240V AC. Provision for foot control. Batteries: six U2 (9V). Size:  $11\frac{1}{2} \times 10\frac{1}{2} \times 3\frac{5}{8}$  in. Weight: 8.6 lb. Price: £30 9s.

**M18.**  $\frac{1}{2}$ -track battery tape recorder. Speed:  $1\frac{7}{8}$  i/s. Compact cassette 300 ft. W and F 0.5%. FR 100 c/s-6 Kc/s. Meter level indicator. Rewind time (300 ft) 2 mins. Inputs: mic, aux. Outlet: extension speaker or phone. Speaker:  $2\frac{3}{4}$  in. Output: 550 mW. Transistor. One motor. Size:  $8\frac{3}{4} \times 5 \times 2\frac{1}{4}$  in. Weight: 3.3 lb. Complete with leather carrying case. Price: £24 3s.



**SHARP.** Distributors: Wholesale Supplies (Swinton) Ltd., 16/18 Worsley Road, Swinton, Manchester. Tel: Swinton 3232.

**Sharp RD-303.** Battery/mains  $\frac{1}{2}$ -track recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 3 in. Recording level lamp. AC bias 35 Kc/s. DC magnetic erase. Six transistors, one diode. Input: mic. Outlet: ext speaker. Speaker:  $4 \times 2\frac{5}{8}$  in. Output: 1W. Remote control microphone. Tone switch. Supply: 110/200/220/240V AC 50 c/s or 60 c/s, or 6V DC (four 1.5V batteries). Size:  $11\frac{5}{8} \times 7\frac{1}{2} \times 3\frac{3}{4}$  in. Weight: 5.5 lb. Price: £19 19s.

**Sharp RD-504.** Battery/mains  $\frac{1}{2}$ -track recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 5 in. VU meter level indicator. Input: mic, PU/radio. Outlet: ext speaker or phone. Speaker:  $6\frac{3}{8} \times 2\frac{3}{8}$  in. Output: 1W. Remote control microphone. Tone switch. Six transistors. Supply: 220/240V AC 50 c/s or 9V DC (six 1.5V batteries). Size:  $12 \times 9\frac{1}{4} \times 3\frac{3}{4}$  in. Weight: 7 lb 12 oz. Price: £27 6s.



**SONY U.K. DIVISION,** Eastbrook Road, Gloucester. Tel: Gloucester 21591.

**TC900.**  $\frac{1}{2}$ -track transistorised battery/mains recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 3 in. Inputs: mic, remote control. Automatic recording level. Monitor socket. Size:  $8\frac{1}{2} \times 8\frac{1}{2} \times 4\frac{1}{2}$  in. Price: £30 9s.

**TC800.**  $\frac{1}{2}$ -track transistorised battery/mains recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Inputs: mic, aux. DC servo-controlled motor. Automatic or manual recording level. Price: £61 19s.



**STANDARD.** Distributors: Denham and Morley Ltd., Denmore House, 173-175 Cleveland Street, London, W.1. Tel: Euston 3656/7. Cables: Denmorl, Wesdo, London.

**Standard SR-100.** Battery-operated cassette loading  $\frac{1}{2}$ -track portable. Speed:  $1\frac{7}{8}$  i/s. Philips

type Compact cassette. FR 100 c/s-6 Kc/s. Playing time: 30 mins each track. Tape position scale. Output: 300 mW. Speaker: 2 in. Transistorised. Supply: 9V (six U11 batteries). AC bias. DC erase. Fast forward and rewind. AC mains unit available. Remote control switch on mic. Leather carrying case. Size:  $6\frac{3}{4} \times 4\frac{1}{2} \times 2$  in. Weight: 2.6 lb with batteries. Price: £26 5s.

**Standard SR-200.** Battery-operated  $\frac{1}{2}$ -track portable. Speed:  $1\frac{7}{8}$  i/s. FR 300 c/s-3 Kc/s. Playing time 30 mins each track. Tape position scale. Output: 300 mW. Speaker:  $2\frac{1}{4}$  in. Spool: 2 in. Five transistor circuit. DC bias and erase. Pilot lamp level indicator. Push-button controls. Supply: 9V (six U11 batteries) or from AC mains via adaptor unit. Remote control. Carrying case. Size:  $7\frac{1}{2} \times 4\frac{1}{4} \times 2\frac{1}{4}$  in. Weight: 2.2 lb including batteries. Price: £18 18s.

**Standard SR-250.** Battery/mains two-speed  $\frac{1}{2}$ -track portable. Speeds:  $3\frac{3}{4}$  and  $1\frac{7}{8}$  i/s. Spool: 3 in. FR 200 c/s-6 Kc/s. AC bias. DC erase. Output: 1W. Speaker:  $2\frac{1}{4}$  in. Nine transistor circuit. Supply:  $7\frac{1}{2}$ V (five U2 batteries) or AC mains. Size:  $8\frac{1}{8} \times 8\frac{1}{8} \times 3\frac{1}{4}$  in. Weight: 5 lb. Price: £29 8s.



**STELLA.** See Philips Electrical Ltd.



**TELEFUNKEN.** Distributors: A.E.G. (Great Britain) Ltd., Lonsdale Chambers, 27 Chancery Lane, London, W.C.2. Tel: Chancery 9944. Cables: Welmcors, London.

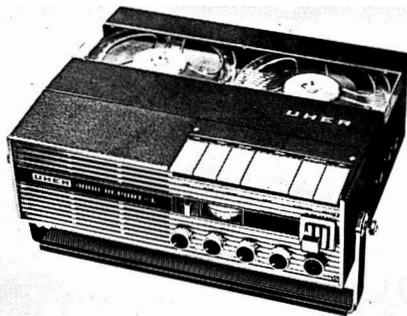
**Magnetophon 300.**  $\frac{1}{2}$ -track mono mains/battery recorder. Speed:  $3\frac{3}{4}$  i/s. FR 40 c/s-14 Kc/s. W and F 0.2%. H and N -50 dB. Speaker:  $4 \times 2\frac{3}{4}$  in. Ten transistors, one rectifier. Push-button operation. Records and plays back in horizontal or vertical position. Easy-to-read tape position scale. Pause control in handle. Built-in splicing groove. Speaker muting switch. Power supply: 6V dry batteries, storage battery, mains unit or car adaptor unit. Replay char NARTB. Inputs for radio and mic. Spool size: 5 in. VU meter. Size:  $10\frac{1}{2} \times 3 \times 10\frac{3}{4}$  in. Weight: 7 lb. Price: £51 9s., mains adaptor £9 19s. 6d., rechargeable battery £5 17s. 6d.

**Magnetophon 301.**  $\frac{1}{4}$ -track version of model 300. Push-button selection for tracks. Parallel track play-back. Other details as for 300. Price: £56 14s.

**Magnetophon 302.**  $\frac{1}{4}$ -track battery recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 5 in. W and F  $3\frac{3}{4}$  i/s 0.2%,  $1\frac{7}{8}$  i/s 0.3%. H and N  $3\frac{3}{4}$  i/s -50 dB.

FR  $3\frac{3}{8}$  i/s 40 c/s-14 Kc/s,  $1\frac{7}{8}$  i/s 40 c/s-8 Kc/s. Replay char NARTB. Meter level indicator. Rewind time: 3 mins 885 ft 5 in. Inputs: radio 150  $\mu$ V 2-2K, mic 150  $\mu$ V 2-2K, PU 150 mV 2-2 megohms. Outlets: radio 1.5V 18K, phone 0.4V 5K, ext speaker 4.5 ohms. Output: 1W RMS. Speaker:  $4 \times 2\frac{3}{4}$  in. 14 transistors, 6 diodes, 1 rectifier. Own deck. Electronically controlled DC motor. Pause. Tape position scale. Monitoring. Parallel track replay. Electronic speed change and control. Operates vertically and horizontally. Two contra-rotating flywheels. Supply: five leakproof cells or rechargeable battery. Mains/charger unit. Size:  $10\frac{5}{8} \times 11 \times 3$  in. Weight: 8 lb. Price: £61 19s.

**Magnetophon 4001.** Battery-operated  $\frac{1}{2}$ -track cassette recorder. Speed:  $1\frac{7}{8}$  i/s. W and F  $1\frac{7}{8}$  i/s 0.3%. H and N  $1\frac{7}{8}$  i/s -45 dB. FR 80 c/s-10 Kc/s  $\pm 3$  dB. Replay char NARTB. Meter level indicator. Rewind time: 1 min for 30 min cassette. Inputs: radio 200  $\mu$ V 2K, mic 200  $\mu$ V 2K, PU 150 mV 1.5 megohms. Outlets: radio 500 mV 20K, phone 500 mV 20K, ext speaker 5-8 ohms. Output: 400 mW. Speaker:  $2\frac{1}{2}$  in. 10 transistors, three diodes. Philips deck. One DC motor. Compact cassettes: playing time  $2 \times 30$  mins and  $2 \times 45$  mins. Tape scale on cassette. Pause. Remote control mic. Separate record and play level controls. Supply: five leakproof cells or mains unit. Size:  $4\frac{1}{2} \times 2\frac{3}{8} \times 7\frac{3}{8}$  in. Weight: 3 lb. Price: £28 7s.



*Uher 4000 Report-L*

**UHER.** U.K. distributors: Bosch Ltd., 205 Great Portland Street, London, W.1. Tel: Langham 2672/5.

**4000 Report L.** Transistorised mono battery portable recorder.  $\frac{1}{2}$ -track. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$ ,  $\frac{1}{16}$  i/s. W and F  $7\frac{1}{2}$  i/s,  $\pm 0.15\%$ . H and N -55 dB. FR  $7\frac{1}{2}$  i/s, 50 c/s-20 Kc/s;  $3\frac{3}{4}$  i/s, 50 c/s-17 Kc/s;  $1\frac{7}{8}$  i/s, 50 c/s-10 Kc/s;  $\frac{1}{16}$  i/s, 50-4,500 c/s. Replay char NARTB. Inputs: mic 0.1 mV, 2K; radio 1.3 mV, 47K; gram 25 mV, 1 megohm. Outlet direct from pre-amplifier. One motor. 5 in. spool. Means of operation: mains, car battery, 1.5V cells, rechargeable accumulator. Size:  $10\frac{1}{2} \times 8\frac{1}{2} \times 3\frac{1}{4}$  in. Weight: 7 lb. Price (including mic and tape): £108 3s. Combined mains unit and battery charger: £12 4s.

## DECKS—GENERAL PURPOSE and SEMI-PROFESSIONAL

**ADASTRA ELECTRONICS LTD.,** 167 Finchley Road, Swiss Cottage, London, N.W.3. Tel: Maida Vale 8164/5.

● **Adastra.** Mono or stereo  $\frac{1}{2}$ -track and  $\frac{1}{4}$ -track mains tape decks. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. W and F  $7\frac{1}{2}$  i/s 0.15%,  $3\frac{3}{4}$  i/s 0.25%. Two heads fitted as standard, space for third head. One four-pole induction motor. Max spool 7 in. Rewind time  $2\frac{1}{2}$  mins for 1,200 ft. Three-digit tape position indicator. Pause control. Size:  $13\frac{1}{2} \times 11$  in. Weight: 10 lb. Supplied with 7 in. 1,200 ft. Synchronotape and spare spool. Recommended prices ( $\frac{1}{2}$ -track): £14 3s. 6d.; ( $\frac{1}{4}$ -track) £15 15s.



**BRENELL ENGINEERING CO. LTD.,** 231/5 Liverpool Road, London, N.1. Tel: 01-607-8271 (5 lines).

**Mark 5 Series 3.** G.P. tape deck, 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  and  $1\frac{7}{8}$  i/s. Three motors.  $8\frac{1}{4}$  in. spools. W and F 0.1% at  $7\frac{1}{2}$  i/s accommodates up to four heads.

Size:  $15 \times 11\frac{1}{2} \times 5$  in. Weight: 16 lb. Price: £38 with two heads.

**Mark 510 Series 2.** Deck mechanism.  $\frac{1}{2}$ - or  $\frac{1}{4}$ -track. Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. W and F 15 i/s, <0.05%;  $7\frac{1}{2}$  i/s, <0.1%;  $3\frac{3}{4}$  i/s, <0.15%;  $1\frac{7}{8}$  i/s, <0.25%. Three motors (synchronous type for capstan).  $10\frac{1}{2}$  in. NAB spools, 60 secs per 1,200 ft rewind. Pause. Accommodates 4 heads. Size:  $15 \times 11\frac{1}{2} \times 6$  in. Weight: 16 lb. Price (less heads): £46 12s. (Prices with heads on application).



**BSR LTD.,** Monarch Works, Powke Lane, Old Hill, Staffs. Tel: Cradley Heath 69272. Telex: 33282.

**BSR TD2.** G.P. deck  $3\frac{3}{4}$  i/s. One motor.  $5\frac{3}{4}$  in. spools. FR: with good amplifier equalisation 30-10,000 c/s  $\pm 3$  dB. 2 heads. W and F better than 0.26%. RMS. Size:  $13 \times 8\frac{1}{4}$  in. Price: £12 12s.; with 4 track head: £14.

**BSR TD10.** G.P. deck.  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. One motor. 7 in. spools. FR 30 c/s-10 Kc/s  $\pm 3$  dB. Two or three heads. W and F  $7\frac{1}{2}$  i/s, 0-15%;  $3\frac{3}{4}$  i/s, 0-26%;  $1\frac{7}{8}$  i/s, 0-3%. Size:  $12\frac{1}{4} \times 8\frac{3}{8}$  in. Price: £14; (with 4-track heads): £15 15s.

**BSR TD20.** G.P. deck.  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Mains. Mono or stereo.  $\frac{1}{4}$ -track or  $\frac{1}{2}$ -track. Two heads. FR:  $1\frac{7}{8}$  i/s 30 c/s-5 Kc/s,  $3\frac{3}{4}$  i/s 30 c/s-10 Kc/s,  $7\frac{1}{2}$  i/s 30 c/s-12 Kc/s, all  $\pm 3$  dB. One motor. Pause control. Max spool  $5\frac{3}{4}$  in. Three-digit tape position indicator with PB reset. Approximate size:  $12\frac{1}{2} \times 10 \times 4\frac{3}{8}$  in. Price: ( $\frac{1}{2}$ -track) £14.; ( $\frac{1}{4}$ -track) £15 15s.

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**GRAMDECK.** See Tape Unit section.

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**THE MAGNAVOX ELECTRONICS CO. LTD.,** Alfred's Way, By-pass Road, Barking, Essex. Tel: Rippleway 5533. Cables: Magnavox, Barking.

**363.** GP tape deck. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. W and F 0-15% at  $7\frac{1}{2}$  i/s, 0-25% at  $3\frac{3}{4}$  i/s.  $\frac{1}{4}$ -track or  $\frac{1}{2}$ -track heads. Accommodation for three heads. Mains 100-125, 200-250V, 50 c/s. One four-pole induction motor. Rewind time  $2\frac{1}{4}$  mins 1,200 ft. 7 in. spool. Three-digit position indicator. Pause control. Size:  $13\frac{1}{2} \times 11$  in. Weight: 10 lb. Prices: ( $\frac{1}{2}$ -track) £13 10s. ( $\frac{1}{4}$ -track) £15 10s.

★

**PLANET PROJECTS LTD.,** Goodman Works, Belvue Road, Northolt, Middlesex. Tel: Viking 1775.

● **C.D.2.** Tape deck. Speed:  $3\frac{3}{4}$  i/s ( $1\frac{7}{8}$  i/s to special order). W and F Less than 0-2% at both speeds. Miniflux heads.  $\frac{1}{2}$ -track mono or  $\frac{1}{4}$ -track stereo. Two heads, one for each track. FR dependent on speed and heads. Papst hysteresis motor. Spool size 7 in. Automatic track change and reversal of tape direction at end of spool, no fast rewind required. Uses standard  $\frac{1}{4}$  in. tape. Single knob control. Provides over  $8\frac{1}{2}$  hours uninterrupted playing at  $1\frac{7}{8}$  i/s. Mains 220-230V 50 c/s. Size:  $14\frac{3}{4} \times 11\frac{3}{4} \times 6$  in. Weight approximately: 10 lb. Price: £68 5s. (ex works).

★

**SCOPETRONICS LTD.,** Crown Works, Church Road, Kingston-upon-Thames, Surrey. Tel: Kingston-upon-Thames 1275/4135.

**Scopetronics 825.** General purpose mains tape transport. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool  $8\frac{1}{4}$  in.

W and F 0-15% at  $7\frac{1}{2}$  i/s, 0-2% at  $3\frac{3}{4}$  i/s. Three motors. Capstan motor Papst. Superimpose. Pause. Inching. Three-digit tape indicator. Takes up to four Scopetronics heads. Size:  $16\frac{3}{4} \times 14$  in. Price: £49 10s.

★

**TEAC.** Distributors: C. E. Hammond & Co. Ltd., 90 High Street, Eton, Windsor, Berks. Tel: Windsor 63388.

● **Teac 4000.**  $\frac{1}{4}$ -track stereo semi-professional tape deck. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s 0-12%,  $3\frac{3}{4}$  i/s 0-15%. Signal-to-noise ratio 50 dB. FR  $7\frac{1}{2}$  i/s 30 c/s-20 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-12 Kc/s. Replay char NAB. VU meters. Rewind time 90 secs for 1,200 ft. Four-digit tape indicator, PB reset. Three motors: one dual speed hysteresis capstan drive, two six-pole outer-rotor reel drive. Automatic reverse play. Tape tension control. Auto shut-off. Four heads. Price to be announced.

**Teac Series 310.** Professional tape deck. Speeds: 15,  $7\frac{1}{2}$  i/s. Max spool  $10\frac{1}{2}$  in. W and F better than 0-15% at 15 i/s, better than 0-2% at  $7\frac{1}{2}$  i/s. Full remote control facilities. Full specification on request. Price: £220.

★

**TAPE RECORDER DEVELOPMENTS LTD.,** 7 King George Avenue, Bushey, Herts. Tel: Bushey Heath 2331.

● **TRD.1 Series.** Four-speed mono or stereo tape decks. W and F 15 i/s 0-05%,  $7\frac{1}{2}$  i/s 0-08%,  $3\frac{3}{4}$  i/s 0-13%,  $1\frac{7}{8}$  i/s 0-2%,  $\frac{1}{8}$  i/s 0-35%. Mains operated.  $\frac{1}{4}$ - or  $\frac{1}{2}$ -track. Accommodation for four Bogen heads. Drive motors: Papst hysteresis synchronous. Rewind motors: Papst R.O.T. Spool capacity: 3 in. cine to  $10\frac{1}{2}$  in. NAB. Four-digit tape position indicator. Silicon transistor tape pre-amplifier/oscillator unit available (see Tape Units section).

● **TRD.1/S.** Specification as above. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$ ,  $\frac{1}{8}$  i/s. Solenoid operation.

● **TRD.1/V.** Specification as above. Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Mechanical operation: Variable speed spooling.

● **TRD.1/S/15.** Specification as above. Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Solenoid operation.

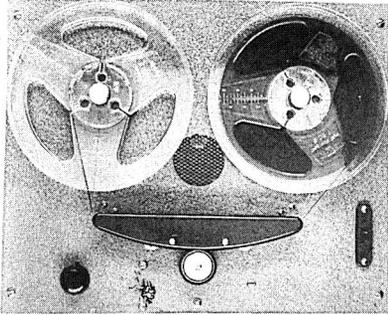
● **TRD.1/VR/15.** Specification as above. Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Mechanical operation. Variable speed spooling.

● **TRD.1/S/30.** To special order only. Specification as above. Speeds: 30, 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Solenoid operation.

● **TRD.1/S/15P.** To special order only. Specification as above. As TRD.1/S/15 but for  $\frac{1}{2}$  in. tape.

● **TRD.1/VR/15P.** To special order only. Specification as above. As TRD.1/VR/15 but for  $\frac{1}{2}$  in. tape.

Full specifications and prices of TRD decks and electronic units on request.

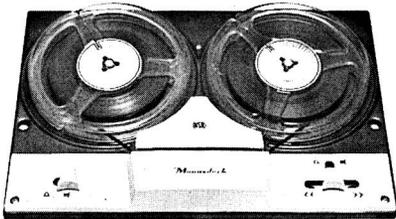


*Planet CD2*

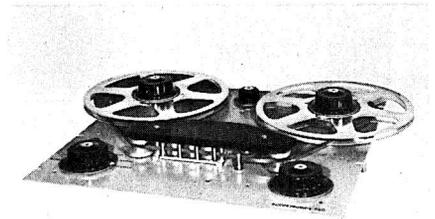
**WRIGHT AND WEAIRE LTD.,** 84 Blackfriars Road, London, S.E.1. Tel: Waterloo 1981. Cables: Writewea, London, S.E.

**Series 6.** Semi-professional tape deck. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s (see Series 6H below). W and F <0.16% at  $7\frac{1}{2}$  i/s, <0.2% at  $3\frac{3}{4}$  i/s. Space for third head. FR  $7\frac{1}{2}$  i/s 50 c/s-14 Kc/s,  $3\frac{3}{4}$  i/s 50 c/s-8 Kc/s,  $1\frac{7}{8}$  i/s 50 c/s-4 Kc/s, all  $\pm 3$  dB. Three motors. Synchronous capstan motor with ball-bearing races.  $8\frac{1}{4}$  in. spools. Rewind time 1 min for 1,750 ft. Full or half-track. Automatic stop at end of spool or if tape breaks. Instantaneous stop and start. Clock type tape position indicator, angled for easier viewing. Safety record-lock button. Takes continuous loop cassette. Single knob operation. Hinged head cover. Erase head: 160 ohms at 68 Kc/s. Record head: 12,000 ohms at 10 Kc/s. Size:  $16\frac{3}{4} \times 13 \times 1$  in. above deck and  $6\frac{1}{2}$  in. max below. Weight: 22 lb. 6A half-track; 6B half-track plus additional monitoring head; 6C two-track R/P, full-track erase; 6E half-track stereo (stacked erase, stacked record, stacked replay). Prices: 6A £44; 6B £49; 6C £53 10s.; 6E £57 10s.

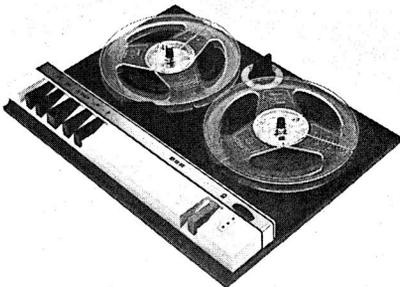
**Series 6H.** Specification as for Series 6 but with tape speeds 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Prices: 6AH £49; 6BH £54; 6CH £58 10s.; 6EH £62 10s.



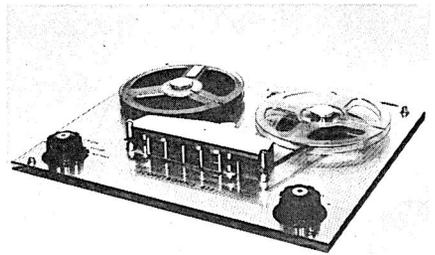
*BSR Monardeck TD2*



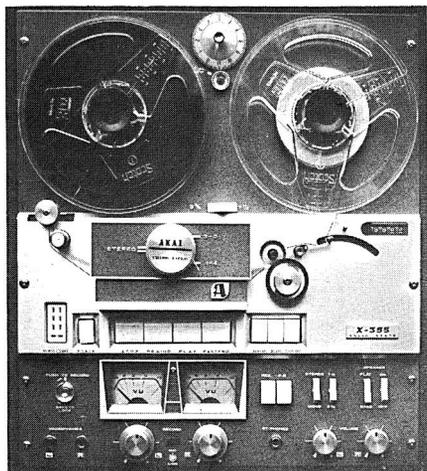
*Scopetronics 1150*



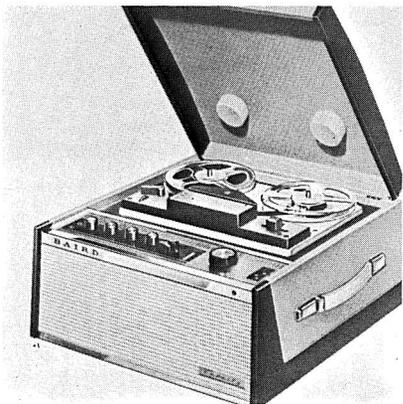
*B.S.R. TD20*



*Scopetronics 825*



*Akai 910*



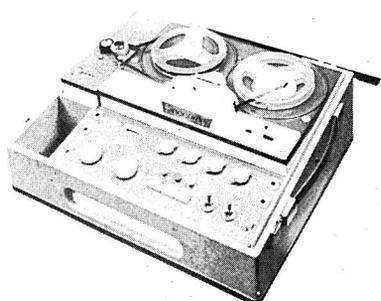
*Baird Varsity 101*



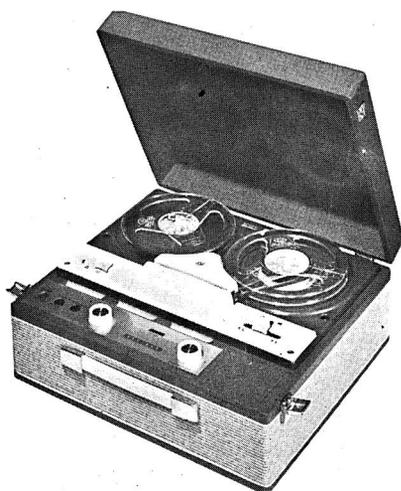
*CWS Defiant T 18*



*Astronic tape player*



*Cinecorder model A*



*CWS Defiant T 15*

## GENERAL PURPOSE TAPE RECORDERS

**AKAI.** Distributors: Pullin Photographic Ltd., 11 Aintree Road, Perivale, Greenford, Middlesex. Tel: Alperton 1541. Cables: Pullinfoto. Greenford, Middlesex.

**Akai 910.**  $\frac{1}{4}$ - or  $\frac{1}{2}$ -track mono mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool  $7\frac{1}{2}$  in. W and F  $7\frac{1}{2}$  i/s  $<0.15\%$ ,  $3\frac{3}{4}$  i/s  $<0.25\%$ . FR  $7\frac{1}{2}$  i/s 40 c/s-12 Kc/s  $\pm 3$  dB,  $3\frac{3}{4}$  i/s 40 c/s-8 Kc/s  $\pm 3$  dB. Replay char NARTB. Meter level indicator. Rewind time  $2\frac{1}{2}$  mins for 1,200 ft. Inputs: mic 1.0 mV 500K, line 100 mV 250K. Output: 3.2W RMS. Valves. Own deck. One motor. Outlet: ext speaker 8 ohms. Pause. Three-digit tape indicator. Straight-through amplifier. Monitoring. Input mixing. Tone control. Horizontal or vertical operation. Mains 100-240V AC. Size:  $15\frac{1}{2} \times 13\frac{3}{4} \times 7\frac{1}{2}$  in. Weight: 27 $\frac{1}{2}$  lb. Price: £59 17s.

● **Akai 1710.**  $\frac{1}{4}$ -track mains recorder. Mono or stereo. Max spool 7 in. Speeds:  $1\frac{7}{8}$ ,  $3\frac{3}{4}$ ,  $7\frac{1}{2}$  i/s (15 i/s with optional accessories). W and F  $7\frac{1}{2}$  i/s  $<0.18\%$ . H and N better than 42 dB at all speeds. FR  $7\frac{1}{2}$  i/s 40 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-14 Kc/s. Replay char. NARTB. VU meter. Rewind time  $2\frac{1}{2}$  mins. 1,200 ft. Inputs: mic 1.5 mV 2.2 megohms, line 100 mV 2.2 megohms. Output: 6W RMS total. Speakers: two  $7 \times 5$  in. Outlets: amplifier 700 mV 100K, ext speakers 8 ohms, phones. Valves and transistors. Own deck. One motor. Pause. Three-digit tape indicator. Monitoring. Input mixing. Suitable for FM multiplex radio. Vertical or horizontal operation. Auto-stop. Mains 100-240V AC. Size:  $13\frac{1}{2} \times 13\frac{1}{2} \times 9$  in. Weight: 33 lb. Price: £82 19s.

See also Professional Recorder section and Battery Operated Portable section.



**ALBA (RADIO AND TELEVISION) LTD.,** Tabernacle Street, London, E.C.2. Tel: Clerkenwell 1322. Cables: Abalgramo, London.

**R.18.** Mains mono recorder.  $\frac{1}{4}$ -track BSR TD2 deck. Speed:  $3\frac{3}{4}$  i/s.  $5\frac{3}{4}$  in. spool. W and F less than 0.26%. FR 70 c/s-10 Kc/s. Tape position indicator. Inputs: mic, radio. Outputs: monitor, extension speaker. Output: 4W. Speaker:  $8 \times 5$  in. Four valve circuit. One motor. Controls: volume, bass, treble, on/off, track change. Automatic recording level. Bias oscillator 50 Kc/s. Crystal mic included. Mains 200-250V AC 50 c/s. Consumption: 60W. Two-

tone grey leathercloth covered wood cabinet. Size:  $14 \times 12\frac{1}{2} \times 7$  in. Weight: 18 lb. Price: £29 18s. 6d.

**R.19.** See battery mains section for full specification.



**ASSOCIATED ELECTRONIC ENGINEERS LTD.,** 10 Dalston Gardens, Stanmore, Middlesex. Tel: Wordsworth 4474/5/6. Telegrams: Astronic, Stanmore.

**Astronic Auto-music.** Mains mono tape playback unit with automatic track change at end of tape. Specially adapted Brenell deck.  $8\frac{1}{4}$  in. spools. Output: 10W 100V to external speakers. Controls: push-button track change, treble  $\pm 12$  dB, bass  $\pm 12$  dB, volume. FR 40 c/s-12 Kc/s. Fully tropicalised transformers. Mains 110-250V AC 50 c/s. Additional add-on power amplifiers available. Hammertone black and silver grey finish. Full specification and price on request.



**BAIRD.** Radio Rentals Ltd., Seymour Mews House, Wigmore Street, London, W.1. Tel: Welbeck 9191.

**Baird Varsity 101.**  $\frac{1}{4}$ -track mono three-speed recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool size 7 in. W and F 0.3% RMS. H and N -42 dB at  $7\frac{1}{2}$ , -36 dB at  $3\frac{3}{4}$ , -30 dB at  $1\frac{7}{8}$  i/s. FR 70 c/s-11 Kc/s  $\pm 3$  dB at  $7\frac{1}{2}$ , 70 c/s-8 Kc/s  $\pm 3$  dB at  $3\frac{3}{4}$ , 70 c/s-4.5 Kc/s  $\pm 3$  dB at  $1\frac{7}{8}$ . Replay char NARTB. Inputs: mic 1 mV 20K, radio/PU 200 mV 250K. Inputs may be mixed by means of independent controls. Output: 3.5W. Strip indicator. Transistor pre-amp, remainder valves. Rewind time  $2\frac{1}{2}$  mins for 850 ft. One motor. BSR TD10 deck. Superimposition by recording separate tracks and playing back in parallel. Position indicator. Pause. Mains 210-250V 50 c/s. Size:  $16 \times 16\frac{1}{2} \times 8$  in. Weight: 24 lb. Price: £34 13s.

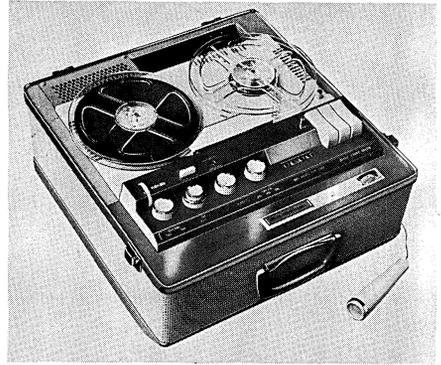


**C. BRADDOCK (BLACKPOOL) LTD.,** 266 Waterloo Road, Blackpool, Lancs. Tel: Blackpool 45049.

**Q-Cord.** Battery/mains recorders. For details see Battery Operated Portables section.



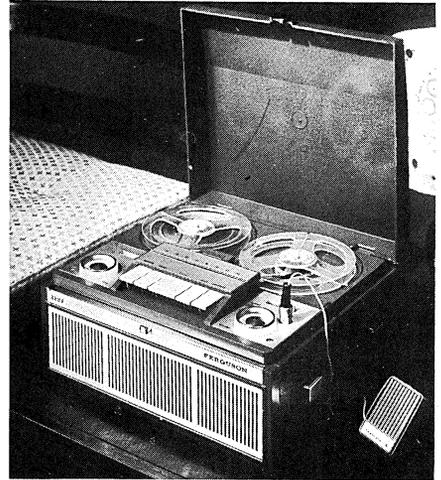
*Ferguson 3216 and Thorn TA/01*



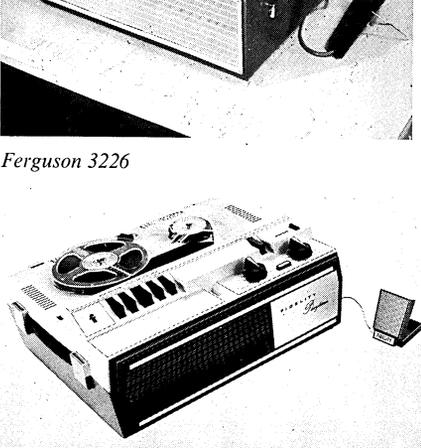
*Elizabethan LZ-102*



*Ferguson 3226*



*Ferguson 3224*



*Fidelity Playtime*



*Ferguson 3230*

**BRENELL ENGINEERING CO. LTD.**, 231/5 Liverpool Road, London, N.1. Tel: 01-607-8271 (5 lines).

**Mk 5 Series 3.** See Professional and Semi-Professional Tape Recorder section.

**Mk 5 Type M. Series 3.** See Professional and Semi-Professional Tape Recorder section.

● **STB2.** See Tape Units section.



**BRITISH RADIO CORPORATION.** See entries under brand names Ferguson, H.M.V., Marconiphone and Ultra.



**BUTOBA.** See Battery Tape Recorder section.



**CINECORDER.** Murray Electronics Ltd., 5 Selkirk Road, Tooting, London, S.W.17. Tel: 01-672-8267. Sole Distributors: R.E.W. (Earlsfield) Ltd., 266-268 Upper Tooting Road, London, S.W.17. Tel: 01-672-8267.

**Cinecorder Model A.** Mono recorder with BSR deck.  $\frac{1}{2}$ -track. Speed  $3\frac{3}{4}$  i/s. W and F 0.4%. FR 60 c/s-10 Kc/s. Replay char CCIR. Two channel mixing with two inputs per channel. 4W, 15 ohms output. One motor.  $5\frac{3}{4}$  in. spools. 10 in. elliptical speaker housed in detachable lid with 24 ft cable. Separate bass and treble controls. Boost and cut. Superimposition. "Shift-track" tape control for dual recordings. Tapelift/Pause control for cueing, cross-fading. Remote control. Accessories: mic and ext cables, perforated Cinetape, tape sprockets. Size:  $16\frac{1}{2} \times 14 \times 8\frac{1}{2}$  in. Weight: 28 lb. Price: £61 19s.



**CLARKE AND SMITH MFG. CO. LTD.**, Melbourne Works, Wallington, Surrey. Tel: Wallington 9252/7.

**TR634.** See Professional and Semi-Professional Tape Recorders section.



**CONTRONICS LTD.**, Garth Works, Deepcut Bridge Road, Blackdown, Camberley, Surrey. Tel: Deepcut 336.

**Carol TR4.** Mono recorder.  $\frac{1}{2}$ -track. Speed:  $3\frac{3}{4}$  i/s. W and F 0.4%. FR 50 c/s-8 Kc/s. Re-

play char CCIR. Inputs: mic radio, gram. Outlet from pre-amp. One motor.  $5\frac{3}{4}$  in. spools. ME. Line outlet. Size:  $13\frac{3}{4} \times 12\frac{3}{4} \times 7$  in. Weight: 20 lb. Price: £20 9s. 6d.

**Carol TR/7.** Similar specification as TR4 but with built-in synchronising circuit for 8 mm cine projectors. Weight: 25 lb. Price: £45.

See Tape Accessories section for Carol cine sync unit.



**COUSINO.** Distributors: D.T.V. Group, 126 Hamilton Road, West Norwood, London, S.E.27. Tel: 01-670-6166.

**Audio Announcer.** Continuous loop tape recorder and playback units. Cartridge loading. Comprehensive range of accessories. Full details on request. Prices: £52 to £113.



**C.W.S. LTD.**, Radio and Television Department, Alma Park, Warley Street, Upminster, Essex. Tel: Upminster 3200.

**Defiant T15.** Mono recorder.  $\frac{1}{2}$ -track. Speed:  $3\frac{3}{4}$  i/s. W and F 0.2%. H and N -40 dB at 1 Kc/s. FR 100 c/s-8 Kc/s  $\pm 3$  dB. Compromise replay char. Inputs: mic 4 mV, radio 100 mV. One motor.  $5\frac{3}{4}$  in. spools. 3 min rewind. DM70 tuning indicator. Tape counter. Size:  $6\frac{1}{8} \times 13\frac{3}{8} \times 12\frac{3}{8}$  in. Price: £23 2s.

**T18.** Mono  $\frac{1}{4}$ -track recorder. Speed:  $3\frac{3}{4}$  i/s. Spool  $5\frac{3}{4}$  in. W and F 0.26%. H and N -40 dB. FR 80 c/s-10 Kc/s  $\pm 3$  dB. Inputs: 180  $\mu$ V 2K, 5 mV 47K, 100 mV 1 megohm. LS socket 10-15 ohms. Meter indicator. Transistorised. BSR TD2 deck. Superimpose. Mains. Size:  $14\frac{1}{2} \times 12\frac{1}{2} \times 6$  in. Weight:  $16\frac{1}{2}$  lb. Price: £32 11s.



**DANSETTE PRODUCTS LTD.**, Dansette House, Honeypot Lane, Stanmore, Middx. Tel: Wordsworth 0021.

**New Consort Four.**  $\frac{1}{4}$ -track mono mains recorder. Speed:  $3\frac{3}{4}$  i/s. W and F 0.4%. H and N -50 dB. FR 60 c/s-10 Kc/s. Replay char CCIR. Inputs: high imp for mic, medium imp for radio/gram. One motor.  $5\frac{3}{4}$  in. spools,  $3\frac{1}{2}$  min rewind. ME. Size:  $14 \times 12\frac{1}{2} \times 7$  in. Weight:  $16\frac{1}{2}$  lb. Price: £27 6s.

See Battery Operated Portables section for Dansette battery/mains recorders.

**DYNATRON RADIO LTD.**, St Peter's Road, Furze Platt, Maidenhead, Berks. Tel: Maidenhead 23331.

● **STR.1.**  $\frac{1}{4}$ -track stereo mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool: 7 in. W and F  $7\frac{1}{2}$  i/s 0-15%,  $3\frac{3}{4}$  i/s 0-16%,  $1\frac{7}{8}$  i/s 0-2%. Signal/noise: 52 dB weighted. FR  $7\frac{1}{2}$  i/s 50 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 50 c/s-10 Kc/s,  $1\frac{7}{8}$  i/s 50 c/s-6 Kc/s. Level indicators: two moving coil meters. Inputs: mic 0.7 mV at 5K, radio 15 mV at 150K, PU 150 mV at 680K. Outlets: two 0-5V, two 100-2,000 ohms headphones, two 3-5 ohms speakers. Output: 2.5W per channel. Built-in monitor speaker with channel change-over switch. Three heads; erase, record, playback. Three-digit tape position indicator. Pause. Parallel playback. Push-button bass and treble controls. Multiplay. Mixing. 16 transistors, four diodes. Mains: 195-250V 50 c/s. Consumption: 50W. Size:  $15 \times 13\frac{1}{8} \times 6\frac{3}{4}$  in. Price: £82 19s.



**EAGLE PRODUCTS.** See Battery Tape Recorder section for Eagle mains/battery recorders.



**ELIZABETHAN ELECTRONICS LTD.**, Crow Lane, Romford, Essex. Tel: Romford 64101. Cables: Elizabethan, Romford.

**LZ32 Mk II.**  $\frac{1}{2}$ -track mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s 0-15%,  $3\frac{3}{4}$  i/s 0-25%,  $1\frac{7}{8}$  i/s 0-35%. H and N  $7\frac{1}{2}$  i/s -40 dB. FR  $7\frac{1}{2}$  i/s 50 c/s-12 Kc/s,  $3\frac{3}{4}$  i/s 50 c/s-8 Kc/s,  $1\frac{7}{8}$  i/s 50 c/s-4 Kc/s. Replay char CCIR. Magic eye. Rewind time  $3\frac{1}{2}$  mins 1,200 ft. Inputs: mic 2 mV 2 megohms, radio/pickup 250 mV 250K. Output: 3W RMS. Outlets: Monitor 5V 220K, ext LS 3W 3 ohms. Speaker  $10 \times 4$  in. One two-pole motor. BSR TD10 deck. Digital position indicator. Straight-through amplifier. Monitoring. Valves. Superimpose. Mains 200-250V 50 c/s. Size:  $15 \times 15\frac{1}{2} \times 7\frac{3}{4}$  in. Weight: 24 lb. Price: £33 12s.

**LZ34. Mk II.** Specification as LZ32 except  $\frac{1}{4}$ -track and no superimpose. Price: £35 14s.

**LZ102.**  $\frac{1}{4}$ -track mono mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s <0-15%,  $3\frac{3}{4}$  i/s <0-25%. H and N -45 dB. FR  $7\frac{1}{2}$  i/s 60 c/s-15 Kc/s,  $3\frac{3}{4}$  i/s 60 c/s-8 Kc/s,  $1\frac{7}{8}$  i/s 60 c/s-5 Kc/s. Replay char CCIR. Meter level indicator. Rewind time 2 mins 1,200 ft. Inputs: mic 3 mV high impedance, radio/phone 250 mV high impedance. Output: 5W RMS. Outlets: amplifier 200 mV 10K, ext stereo 2.5

mV tape head, ext LS 5W 15 ohms. Transistorised. Speaker  $10 \times 4$  in. plus tweeter. Magnavox 363 deck. Digital tape indicator. Pause. Monitoring. Size:  $16 \times 16\frac{1}{2} \times 9$  in. Weight: 26 lb. Price: £51 9s.

● **LZ711.**  $\frac{1}{4}$ - and  $\frac{1}{2}$ -track mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. Two meters for recording level. Output: 3W per channel. Speaker: two  $8 \times 5$  in. Magnavox deck. Straight-through amplifier. Superimpose. Monitoring. Sockets for ext speakers. Tape position indicator. Records  $\frac{1}{4}$ -track mono or stereo, plays back  $\frac{1}{4}$  and  $\frac{1}{2}$ -track mono and stereo. Sound-on-sound recording. Supplied with two crystal mics and two recording leads. Size:  $25 \times 16 \times 9$  in. Weight: 40 lb. Price: £78 15s.

**Elite 2.**  $\frac{1}{2}$ -track mains mono recorder. Speed:  $3\frac{3}{4}$  i/s. Max spool  $5\frac{3}{4}$  in. Strip level indicator. Output: 3W. Speaker:  $7 \times 4$  in. BSR deck. Monitoring. Outlets: line, ext speaker. Size:  $17\frac{1}{2} \times 14 \times 5$  in. Weight: 18 lb. Supplied with crystal mic. Price: £24 3s.

**Elite 4.** Similar specification to Elite 2 but  $\frac{1}{4}$ -track. Price: £26 5s.

**LZ9102T.** See Battery Recorder section.

**LZ612.** See Battery Recorder section.



**ELTRA.** Distributors: C. E. Hammond and Co. Ltd., 90 High Street, Eton, Windsor, Berks. Tel: Windsor 63388. Telex: 84316.

**Model 1001.**  $\frac{1}{2}$ -track mains mono recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s 0-2%,  $3\frac{3}{4}$  i/s 0-25%,  $1\frac{7}{8}$  i/s 0-35%. Signal-to-noise:  $7\frac{1}{2}$  i/s >54 dB,  $3\frac{3}{4}$  i/s >50 dB,  $1\frac{7}{8}$  i/s >45 dB. FR  $7\frac{1}{2}$  i/s 50 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 50 c/s-12.5 Kc/s,  $1\frac{7}{8}$  i/s not quoted, all  $\pm 3$  dB. Replay char DIN 45513. Magic eye level indicator. Rewind time: 5 mins standard tape 1,200 ft. Inputs: mic 300  $\mu$ V 1 megohm, radio 5 mV 100K. Outlets: ext speaker 6W 3-5 ohms, diode. Output: 6W RMS. Speaker:  $9 \times 5$  in. Valves. One motor. BSR TD10 deck (modified). Pause. Three-digit tape indicator. Straight-through amplifier. Monitoring. Input mixing. Independent bass and treble controls. Red and green record/playback lights. Mains 220-240V AC, 60W. Size:  $16\frac{1}{8} \times 11\frac{1}{4} \times 7\frac{3}{8}$  in. Weight:  $24\frac{3}{4}$  lb. Price: £51 9s.

**FERGUSON.** British Radio Corporation Ltd., 284 Southbury Road, Enfield, Middlesex. Tel: Howard 2477.

**Ferguson 3224.**  $\frac{1}{2}$ -track mono recorder. Speed:  $3\frac{3}{4}$  i/s. W and F better than 0.2%. Signal-to-noise ratio 40 dB. FR 60 c/s-10 Kc/s. Replay char CCIR. Inputs: mic 1.5 mV 10 megohms, radio 1.5 mV 68K, PU 75 mV 3.3 megohms. Outlet from pre-amp. One motor, Thorn deck. Max spool  $5\frac{3}{4}$  in. Rewind time:  $2\frac{1}{2}$  mins 900 ft. Magic eye level indicator. Pause. Output: 3W RMS. Mains 230-250V AC. 50 c/s, consumption 60W. Supplied with microphone, reel of tape, spare spool and connecting lead. Size:  $13\frac{1}{2} \times 12 \times 6\frac{3}{8}$  in. Finish: grey PVC leathercloth, moulded front, metal grille. Price: £26 5s.

**Ferguson 3226.**  $\frac{1}{4}$ -track mono recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool  $5\frac{3}{4}$  in. FR  $3\frac{3}{4}$  i/s 60 c/s-10 Kc/s,  $1\frac{7}{8}$  i/s 60 c/s-6 Kc/s. Magic eye level indicator. W and F better than 0.2% at  $3\frac{3}{4}$  i/s, better than 0.3% at  $1\frac{7}{8}$  i/s. Auto-stop. Three digit tape indicator, PB reset. Remote pause control. Fast wind or rewind  $2\frac{1}{2}$  mins 900 ft. Inputs: mic 1.5 mV 10 megohms, radio 1.5 mV 68K, PU 75 mV 3.3 megohms. Outlets: line 500 mV 22K, ext speaker 3W 3 ohms, record output (without bias), 30V 50 mA DC. Output: 3W. Speaker:  $7 \times 3\frac{3}{8}$  in. Valves. Thorn deck. One motor. Inching both directions. Pause control on deck. Parallel track-replay. Monitoring. Superimpose. Mains 200-250V AC 50 c/s, consumption 60W. Size:  $13\frac{1}{2} \times 12 \times 6\frac{3}{8}$  in. Supplied with microphone (with remote pause switch), reel of tape, spool and connecting lead. Finish: grey PVC leathercloth, moulded front, metal grille. Price: £35 14s.

**Ferguson 3228.** Similar specification to 3226 but in walnut veneered cabinet with slotted speaker grille. Tinted perspex lid. Price: £37 16s.

**Ferguson 3230.**  $\frac{1}{4}$ -track three-speed mono recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s better than 0.15%,  $3\frac{3}{4}$  i/s better than 0.2%,  $1\frac{7}{8}$  i/s better than 0.25%. Signal-to-noise ratio 40 dB. FR  $7\frac{1}{2}$  i/s 40 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-14 Kc/s,  $1\frac{7}{8}$  i/s 40 c/s-7 Kc/s. Meter level indicator. Auto-stop. Rewind time  $2\frac{1}{2}$  mins 1,200 ft. Inputs: radio 1.5 mV 68K, PU.1 180 mV 200-500K, PU.2 75 mV 3.3 megohms, mic 1.5 mV 10 megohms. Outlets: 1V 22K, ext speaker 3W 3 ohms. Output: 3W. Speaker:  $7 \times 4$  in. Thorn deck. Valves and transistors. Locking pause control on deck. Four-digit position indicator, PB reset. Straight-through amplifier. Monitoring. Input mixing. Remote pause control. Parallel track replay. Automatic head defluxing. Auxiliary DC supply for ex-

ternal transistorised equipment (i.e. slide projector synchroniser). Size:  $16\frac{1}{2} \times 14\frac{1}{4} \times 7\frac{1}{2}$  in. Mains 200-250V 50 c/s, consumption 60W. Supplied with microphone (with remote pause control), reel of LP tape, spare spool and connecting leads. Finish: blue/grey leathercloth with metal speaker grille. Partially transparent lid reveals controls when closed. Price: £46 4s.

**Ferguson 3216.** Similar specification to 3230 but in Australian walnut veneered furniture-style cabinet with tinted acrylic lid, to match Ferguson Unit Audio. Price: £51 9s.

● **Ferguson 3232.**  $\frac{1}{4}$ -track three-speed stereo recorder. Two  $5 \times 3$  in. internal monitoring speakers. External speaker sockets. Output: 5W per channel. All transistor (22 semi-conductors). Max spool 7 in. W and F  $7\frac{1}{2}$  i/s better than 0.15%,  $3\frac{3}{4}$  i/s better than 0.2%,  $1\frac{7}{8}$  i/s better than 0.25%. Signal-to-noise ratio 45 dB. FR  $7\frac{1}{2}$  i/s 40 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-14 Kc/s,  $1\frac{7}{8}$  i/s 40 c/s-7 Kc/s. Crosstalk: 60 dB. Inputs: mic/radio 250  $\mu$ V 47K, PU 5 mV 1 megohm, aux 100 mV 100K. Outlets: line 500 mV 10K, ext speaker 5W 8 ohms. Rewind time:  $2\frac{1}{2}$  mins 1,200 ft. Auto-stop. Remote pause on mic and locking pause on deck. Twin record level meters. Each channel individually controlled. Dual concentric controls. Four-digit tape position indicator, PB reset. Track transfer. Second channel monitoring. Suitable for vertical or horizontal operation. Supplied with two dynamic microphones, reel of tape, empty spool and connecting leads. Finish: Australian walnut veneered furniture-style cabinet with tinted acrylic lid, to match Ferguson Unit Audio. Price to be announced.

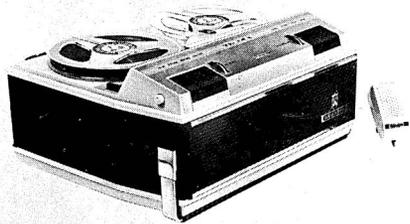


**FIDELA.** Distributors: Denham and Morley Ltd., Denmore House, 173/5 Cleveland Street, London, W.1. Tel: Euston 3656/7.

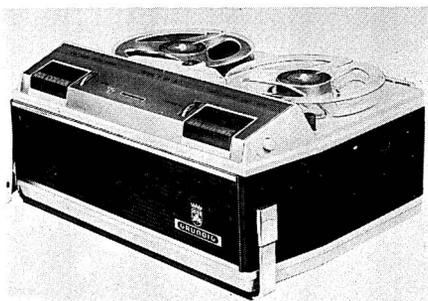
● **Fidela 715.** Transistor  $\frac{1}{4}$ -track mains stereo recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s <0.25%,  $3\frac{3}{4}$  i/s <0.35%. SN better than 45 dB. FR  $7\frac{1}{2}$  i/s 40 c/s-15 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-10 Kc/s. Meter record level. Inputs: mic 0.2 mV 10K, aux 100 mV 500K. Outlets: ext speakers 16 ohms. Output: 2.5W per channel. Speakers: two  $5 \times 3$  in. Vertical and horizontal operation. Single control for tape transport. Separate controls for each channel. Sound-on-sound recording. Mains 100-240V AC 50/60 c/s. Consumption: 50W. Size:  $12 \times 12 \times 7$  in. Weight: 17 lb. Finish: black leatherette covered wood cabinet, silver and black control panel. Price: £78 15s.



Grundig C110



Grundig TK14L



Grundig TK18L



Grundig TK23L



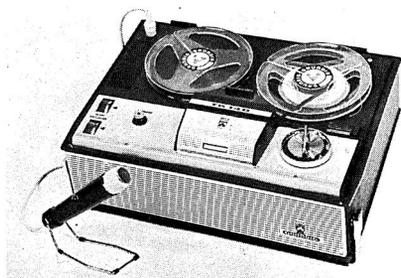
Grundig TK120



Grundig TS340



Grundig TK340



Grundig TK140

● **Fidela 760.** Transistor  $\frac{1}{4}$ -track mains stereo recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s  $<0.15\%$ ,  $3\frac{3}{4}$  i/s  $<0.25\%$ . SN better than 53 dB. FR  $7\frac{1}{2}$  i/s 30 c/s-22 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-16 Kc/s. Two VU meters. Inputs: mic 0.2 mV 10K, PU (mag) 0.2 mV 45K, aux 100 mV 500K. Outlets: line 400 mV 3K, ext speaker 8 ohms, phones 8 ohms. Output: 6W per channel. Speakers: two  $7 \times 5$  in. Vertical and horizontal operation. Sound-on-sound recording. Single control for tape transport. Monitoring. Auto shut-off. Three-digit tape indicator, PB reset. Mains 100-240V 50/60 c/s. Size:  $15\frac{3}{4} \times 14 \times 7\frac{3}{4}$  in. Finish: black leatherette covered wood case, silver and black control panel. Weight:  $26\frac{1}{2}$  lb. Price: £144 18s.



**FIDELITY RADIO LTD.**, Olaf Street, London, W.11. Tel: Park 0131. Cables: Amplify, London, W.11.

**Playmaster-2TR.** Transistorised mono mains portable recorder.  $\frac{1}{2}$ -track. Speed:  $3\frac{3}{4}$  i/s. Max spool  $5\frac{3}{4}$  in. Rewind time 3 mins 850 ft. FR 60 c/s-10 Kc/s. Output: 3W RMS. Speaker  $8 \times 3$  in. Magic eye level indicator. W and F 0.25% RMS. SN -50 dB. Output transistors: two AC128. Oscillator 50 Kc/s. Erase damping -70 dB at 1 Kc/s. Crystal microphone. Inputs for mic, radio/pickup. Outlets for ext speaker (15 ohms) and monitor headphones. Size:  $15 \times 12 \times 5\frac{3}{4}$  in. Weight: 15 lb. Price: £23 2s. (tape position indicator 2 gns extra).

**Playmaster-4TR.** Features and specification as for Playmaster-2TR but  $\frac{1}{4}$ -track and with tape position indicator fitted as standard. Price: £26 5s.

**Playtime-2TR.** Mains operated  $\frac{1}{2}$ -track tape recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool  $5\frac{3}{4}$  in. W and F  $7\frac{1}{2}$  i/s 0.15%,  $3\frac{3}{4}$  i/s 0.25%,  $1\frac{7}{8}$  i/s 0.35%. Signal-to-noise: -50 dB. FR  $7\frac{1}{2}$  i/s 70 c/s-15 Kc/s,  $3\frac{3}{4}$  i/s 70 c/s-9.5 Kc/s,  $1\frac{7}{8}$  i/s 70 c/s-7 Kc/s. Magic eye level indicator. Inputs: mic, PU/radio. Outlets: ext speaker 3-5 ohms, line or phones 2V at 1 megohm. Speaker  $7 \times 3\frac{3}{8}$  in. Output: 3W RMS. Valves. BSR deck. Press-button control. Mains 200-250V 50 c/s. Bias oscillator 50 Kc/s. Crystal mic. Pause. Superimpose. Three-digit tape position indicator. Size:  $15\frac{1}{4} \times 12\frac{1}{4} \times 5\frac{3}{4}$  in. Price: £26 5s.

**Playtime-4TR.** Features and specification as for Playtime-2TR but  $\frac{1}{4}$ -track. Price: £28 7s.

**GRUNDIG (GREAT BRITAIN) LTD.**, Newlands Park, Sydenham, London, S.E.26. Tel: Sydenham 2211.

**CI10.** Mains operated  $\frac{1}{2}$ -track cassette recorder. Speed: 2 i/s. DC International cassette. W and F better than  $\pm 0.4\%$ . SN better than 45 dB. FR 50 c/s-10 Kc/s. Rewind time: 2 mins. Input: 0.25-20 mV 5K. Outlets: 600 mV 15K, 1.5V 15K. Six transistors, three diodes. Meter level indicator. Playing time: DC90 cassette  $1\frac{1}{2}$  hours, DC120 cassette 2 hours. Speaker  $7 \times 4\frac{1}{2}$  in. Output: 2W. Mains 110-220V 50 c/s. Consumption: 21W. Supplied with dynamic mic GDM304, diode lead and DC90 cassette. Size:  $13\frac{3}{4} \times 9 \times 4\frac{1}{2}$  in. Weight: 10 lb. Finish: black and silver. Price: £50 8s.

**TK14L.** Mono  $\frac{1}{2}$ -track recorder. Speed:  $3\frac{3}{4}$  i/s. Spool  $5\frac{3}{4}$  in. W and F  $\pm 0.2\%$ . H and N -47 dB. FR 60 c/s-12 Kc/s +3 -5 dB. Replay char NARTB. Inputs: mic, 2 mV 0.5 megohm, diode 100 mV 1 megohm. Outputs: 500 mV 15K, LS 5 ohms. ME. Valves. Rewind time 3 mins. One motor. Own deck. Size:  $13\frac{1}{4} \times 10\frac{1}{2} \times 6\frac{3}{4}$  in. Weight: 22 lb. Pause control. Position indicator. 110-240V 50 c/s. Price: £38 17s.

**TK18L.** Mono  $\frac{1}{2}$ -track recorder. Speed:  $3\frac{3}{4}$  i/s. Spool  $5\frac{3}{4}$  in. W and F  $\pm 0.2\%$ . H and N -48 dB. FR 60 c/s-12 Kc/s +3 -5 dB. Replay char NARTB. Inputs: mic 2-45 mV 1.5 megohms, diode 100 mV-1V 1 megohm. Outputs: 700 mV 15K, LS 5 ohms. Valves. Rewind time 3 mins. One motor. Own deck. Pause. Position indicator. Fully automatic recording level. 110-240V 50 c/s. Size:  $13\frac{1}{4} \times 10\frac{1}{2} \times 6\frac{3}{4}$  in. Weight: 22 lb. Price: £40 19s.

**TK23L.** Mono  $\frac{1}{4}$ -track recorder. Speed  $3\frac{3}{4}$  i/s. Spool  $5\frac{3}{4}$  in. W and F  $\pm 0.2\%$ . H and N -45 dB. FR 60 c/s-12 Kc/s +3 -5 dB. Replay char NARTB. Inputs: 2 mV 1.5 megohms, diode 2 mV 22K, PU 100 mV 1 megohm. Outputs: 700 mV 15K, LS 5 ohms. ME. Valves. Rewind time 3 mins. One motor. Own deck. Superimpose. Pause. Position indicator. Automatic and manual recording level. Synchronous recording. 110-240V 50 c/s. Size:  $13\frac{1}{4} \times 10\frac{1}{2} \times 6\frac{3}{4}$  in. Weight: 22 lb. Price: £51 9s.

**TK120.** Mono  $\frac{1}{2}$ -track recorder. Speed:  $3\frac{3}{4}$  i/s. Max spool  $5\frac{3}{4}$  in. W and F  $\pm 0.2\%$ . FR 40 c/s-12.5 Kc/s. H and N -48 dB. EM84 level indicator. Output:  $2\frac{1}{2}$ W. Own deck. One motor. Easy-to-use single control. Price: £30 19s. 6d.

**TK125.**  $\frac{1}{2}$ -track mono mains recorder. Speed:  $3\frac{3}{4}$  i/s. Max spool:  $5\frac{3}{4}$  in. W and F  $<0.2\%$ . FR 40 c/s-12.5 Kc/s. Automatic and manual record

level. Input: 100 mV 1.5 megohms. Speaker: 6×4 in. Output: 2.5W 5 ohms. Outlet: 500 mV 15K. Four valves, magic eye and three diodes. Four-digit tape position indicator, PB reset. Superimposition. Single dial control. Supplied with dynamic mic, 1,200 ft tape and multi-purpose lead. Size: 15½×11½×7 in. Weight: 18¾ lb. Mains: 110, 130, 220-240V 50 c/s. Consumption: 50W. Finish: charcoal and ivory. Price: £41 9s. 6d.

**TK140.** Similar specification to the TK125 but ¼-track. Price: £39 18s.

**TK220.** ½-track two-speed mono recorder. Speeds: 7½, 3¾ i/s. Max spool: 7 in. W and F 7½ i/s <±0.15%, 3¾ i/s <±0.2%. SN better than 50 dB. Magic eye. Inputs: mic 2-100 mV 1.5 megohms, diode 4-80 mV 44K, PU 90-1, 800 mV 1 megohm. FR 7½ i/s 50 c/s-50 Kc/s, 3¾ i/s 50 c/s-12.5 Kc/s. Outlets: 1V 22K, 2V 22K, 4W 5 ohms. Speaker: 6¾×3¾ in., 2¼ in. tweeter. Output: 4W. Four valves, magic eye, three rectifiers. Four-digit tape indicator. Press-button operation. Automatic and manual recording level. Separate bass and treble controls. Input mixing. Superimposition. Supplied with dynamic mic, 1,800 ft tape, spare spool and record/playback lead. Mains: 110, 130, 220-240V 50 c/s. Consumption: 70W. Size: 16¼×13¾×7¾ in. Weight: 29 lb. Finish: square-cut teak cabinet with chrome fold-away handle. Price: £78 15s.

●**TK245.** Two-speed four-track automatic stereo recorder. Speeds: 7½, 3¾ i/s. Max spool 7 in. W and F <0.2%. SN better than 48 dB. FR 7½ i/s 50 c/s-16 Kc/s, 3¾ i/s 50 c/s-12.5 Kc/s. Two magic eyes. Inputs: two mic 2-40 mV 1.5 megohms, two diode 4-80 mV 44K, two-pickup 40-1,800 mV 1 megohm. Output: 4W. Speakers 6×4 in. with 2 in. tweeter. Outlets: two 1V 22K, two 2V 22K, 4W 5 ohms. Four-digit tape indicator. Automatic or manual recording level. Automatic stop. Synchronous recording, multiple recording, monitoring via tape, stereo playback through external amplifier. Size: 16¼×13¾×7¾ in. Weight: 30 lb. Mains 110, 130, 220-240V c/s. Consumption: 70W. Supplied with 2,400 ft tape, spare spool and record/playback lead. Finish: square cut polished teak cabinet with silver trim. Price: £87 3s.

●**TK340/TS340.** Stereo ¼-track recorder employing 6 valves and 12 transistors. Speeds: 7½, 3¾, 1⅞ i/s. W and F 7½ i/s ±0.1%, 3¾ i/s ±0.12%, 1⅞ i/s ±0.2%. FR 7½ i/s 40 c/s-18 Kc/s, 3¾ i/s 40 c/s-15 Kc/s, 1⅞ i/s 40 c/s-10 Kc/s. Output: 8W per channel, also two 600 mV high impedance outlets. TS340 has natural walnut case

with fold-away handle and thick polished perspex lid. Prices: TS340 £156 9s.; TK340 £152 5s.

**C100, TK6L.** Battery/mains recorders. For details see Battery Operated Portables section.



**H.M.V.** British Radio Corporation Ltd., 248 Southbury Road, Enfield, Middlesex. Tel: Howard 2477.

**H.M.V. 2208.** ¼-track three-speed recorder. Speeds: 7½, 3¾, 1⅞ i/s. Max spool 7 in. W and F 7½ i/s better than 0.15%, 3¾ i/s better than 0.2%, 1⅞ i/s better than 0.25%. Signal-to-noise ratio 40 dB. FR 7½ i/s 40 c/s-18 Kc/s, 3¾ i/s 40 c/s-14 Kc/s, 1⅞ i/s 40 c/s-7 Kc/s. Meter level indicator. Auto-stop. Rewind time: 2½ mins 1,200 ft. Inputs: radio 1.5 mV 68K, PU.1 180 mV 200-250K, PU.2 75 mV 3.3 megohms, mic 1.5 mV 10 megohms. Outlets: 1V 22K, 3W 3 ohms. Output: 3W. Speaker 7×4 in. Valves and transistors. Thorn deck. Locking pause control on deck. Four-digit tape position indicator, PB reset. Straight-through amplifier. Monitoring. Input mixing. Remote pause control. Parallel track replay. Automatic head defluxing. Auxiliary DC supply for external transistorised equipment (i.e. slide projector synchroniser). Size: 16¼×14¼×7½ in. Mains 200-250V 50 c/s, consumption 60W. Supplied with microphone (with remote pause control), 1,200 ft LP tape, spare spool and connecting leads. Finish: Maroon leathercloth covered cabinet with contrasting anodised aluminium speaker grille, padded detachable lid with white lining. Price: £47 5s.

**H.M.V. 2210.** ¼-track two-speed mono recorder. Speeds: 3¾, 1⅞ i/s. Max spool 5¾ i/s. FR 3¾ i/s 60 c/s-10 Kc/s, 1⅞ i/s 60 c/s-6 Kc/s. Magic eye level indicator. W and F 3¾ i/s better than 0.2%, 1⅞ i/s better than 0.3%. Auto-stop. Three-digit tape position indicator, PB reset. Remote pause control. Fast wind or rewind: 2½ mins 900 ft. Inputs: mic 1.5 mV 10 megohms, radio 1.5 mV 68K, PU 75 mV 3.3 megohms. Outlets: line 500 mV 22K, ext speaker 3W 3 ohms, record output, 30V 50 mA DC. Output: 3W. Speaker 7×3⅝ in. Valves. Thorn deck. One motor. Inching in both directions. Pause control on deck. Parallel track replay. Monitoring. Superimpose. Size: 13½×12×6¾ in. Mains 200-250V AC 50 c/s, consumption 60W. Supplied with microphone (with remote pause control), reel of tape, spare spool and connecting leads. Finish: walnut veneered sides, base and lid black leathercloth. Price: £37 16s.

**KORTING.** Distributors: Europa Electronics Ltd., Howard Place, Shelton, Stoke-on-Trent. Tel: Stoke-on-Trent 29316.

● **MT3624.**  $\frac{1}{4}$ -track mains operated stereo tape recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool size 7 in. H and N -54 dB at  $7\frac{1}{2}$ , -52 dB at  $3\frac{3}{4}$ , -48 dB at  $1\frac{7}{8}$ . W and F  $\pm 0.12\%$  at  $7\frac{1}{2}$ ,  $\pm 0.2\%$  at  $3\frac{3}{4}$ ,  $\pm 0.3\%$  at  $1\frac{7}{8}$ . FR 30 c/s-18 Kc/s at  $7\frac{1}{2}$ , 40 c/s-14 Kc/s at  $3\frac{3}{4}$ , 40 c/s-7 Kc/s at  $1\frac{7}{8}$ . Inputs: mics (2) 70  $\mu$ V 200 ohms, PU 150 mV 1 megohm, radio (A) 300  $\mu$ V 2K, radio (W)  $2 \times 700$  mV 33K. Outputs: crystal headphones 220K, hi-fi amplifier  $2 \times 700$  mV 33K, LS  $2 \times 3W$  4 ohms. Transistors and valves. Position indicator. Bass and treble controls. Monitoring. Dubbing. Reverberation. Rewind time 4 mins for 2,400 ft. Electro-magnetic pause. Automatic stop at end of tape. Two ME. Three stereo sound heads. Size:  $20\frac{3}{4} \times 14 \times 8$  in. Weight: 35 lb. Price: £102 18s. (less mic), No. 169 dynamic mic £4 4s.

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**LOEWE-OPTA.** Sole U.K. distributors: Highgate Acoustics, 71/73 Great Portland Street, London, W.1. Tel: Museum 2901.

**Optacord 408, 416, 416 DIA.450.** Battery/mains recorders. For full details see Battery Operated Portables section.

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**LUXOR INDUSTRI AKTIEBOLAG.** Motala, Sweden. Distributor: Britimpex Ltd., 16-22 Great Russell Street, London, W.C.1. Tel: Museum 7600.

**Luxor MP-283.** Mains  $\frac{1}{2}$ -track mono recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s W 0.01%, F 0.1%,  $3\frac{3}{4}$  i/s W 0.02%, F 0.2%,  $1\frac{7}{8}$  i/s W 0.04%, F 0.3%. H and N -50 dB. FR  $7\frac{1}{2}$  i/s 50 c/s-19 Kc/s,  $3\frac{3}{4}$  i/s 50 c/s-12 Kc/s,  $1\frac{7}{8}$  i/s 80 c/s-6 Kc/s, all  $\pm 4$  dB. Replay char NARTB. Magic eye level indicator. Rewind time  $3\frac{1}{2}$  mins 1,800 ft. Inputs: mic 0.5 mV 1 megohm, PU 20 mV 1 megohm, radio 20 mV 1 megohm. Output: 3W RMS. Speaker  $6 \times 4$  in. Outlets: amplifier 1V 47K, ext speaker 8 ohms. Valves. Own deck. One Luxor A22 four-pole motor. Digital position indicator. Pause. Straight-through amplifier. Size:  $14\frac{3}{4} \times 12\frac{1}{2} \times 6\frac{1}{2}$  in. Weight: 23 lb. Price: £62 9s. 6d.

● **Luxor MP-463.** Mono/stereo  $\frac{1}{4}$ -track mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s W 0.01%, F 0.1%,  $3\frac{3}{4}$  i/s W 0.02%, F 0.2%,  $1\frac{7}{8}$  i/s W 0.04%, F 0.3%. H and N -50 dB. FR  $7\frac{1}{2}$  i/s 50 c/s-19 Kc/s,  $3\frac{3}{4}$  i/s 50

c/s-12 Kc/s,  $1\frac{7}{8}$  i/s 80 c/s-6 Kc/s, all  $\pm 4$  dB. Replay char NARTB. Magic eye indicator. Rewind time  $3\frac{1}{2}$  mins 1,800 ft. Inputs: mics (2) 7 mV 1 megohm, PU (2) 100 mV 1 megohm, radio (2) 50 mV 1 megohm. Output: two 2W RMS. Speaker  $6 \times 4$ . Outlets: amplifier (2) 0.5V 20K, phones 10K, three speakers 6 ohms. Valves. Own deck. One luxor A-22 four-pole motor. Pause. Digital position indicator. Straight-through amplifier. Size:  $14\frac{1}{2} \times 11\frac{1}{2} \times 6$  in. Weight: 25 lb. Price: £82 19s.

● **Luxor MP-464.** Mono/stereo  $\frac{1}{4}$ -track mains recorder. Similar specification to MP-463 except  $8 \times 3$  in. speaker and weight 29 lb. Price: £80 17s.

● **Luxor MP-473.** Mono/stereo  $\frac{1}{4}$ -track mains recorder in table cabinet with moulded perspex lid. Specification similar to MP-463 except no speakers and size and weight different. Size:  $15\frac{1}{2} \times 12\frac{3}{4} \times 7\frac{1}{2}$  in. Weight: 28 lb. Price: £83 9s. 6d.

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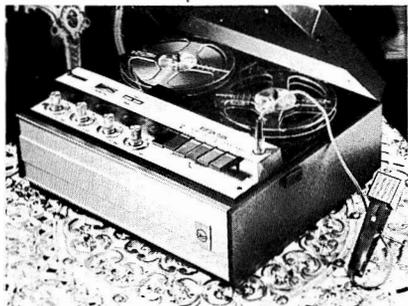
**MARCONIPHONE.** British Radio Corporation Ltd., 284 Southbury Road, Enfield, Middlesex. Tel: Howard 2477.

**Marconiphone 4214.**  $\frac{1}{2}$ -track mono recorder. Speed  $3\frac{3}{4}$  i/s. W and F better than 0.2%. Signal-to-noise ratio 40 dB. FR 60 c/s-10 Kc/s. Replay char CCIR. Inputs: mic 1.5 mV 10 megohms, radio 1.5 mV 68K, PU 75 mV 3.3 megohms. Outlet from pre-amp. One motor. Thorn deck. Max spool  $5\frac{3}{4}$  in. Rewind time  $2\frac{1}{2}$  mins 900 ft. Magic eye level indicator. Pause. Output: 3W RMS. Mains 230-250V AC 50 c/s, consumption 60W. Supplied with microphone, reel of tape, spare spool and connecting lead. Size:  $13\frac{1}{2} \times 12 \times 6\frac{3}{8}$  in. Finish: black leathergrain PVC. transparent Perspex lid. Price: £28 7s.

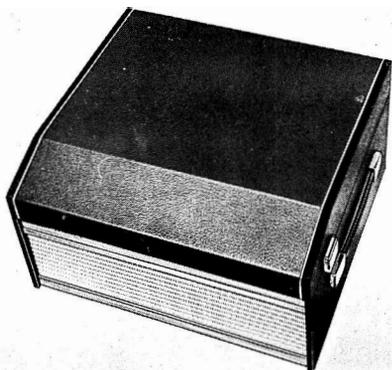
**Marconiphone 4216.**  $\frac{1}{4}$ -track mono recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool  $5\frac{3}{4}$  in. FR  $3\frac{3}{4}$  i/s 60 c/s-10 Kc/s,  $1\frac{7}{8}$  i/s 60 c/s-6 Kc/s. Magic eye level indicator. W and F better than 0.2% at  $3\frac{3}{4}$  i/s, better than 0.3% at  $1\frac{7}{8}$  i/s. Auto-stop. Three-digit tape indicator, PB reset. Remote pause control. Fast wind or rewind  $2\frac{1}{2}$  mins 900 ft. Inputs: mic 1.5 mV 10 megohms, radio 1.5 mV 68K, PU 75 mV 3.3 megohms. Outlets: line 500 mV 22K, ext speaker 3W 3 ohms, record output (without bias), 30V 50 mA DC. Output: 3W. Speaker  $7 \times 3\frac{3}{8}$  in. Valves. Thorn deck. One motor. Inching both directions. Pause control on deck. Parallel track replay. Monitoring. Superimpose. Mains 200-250V AC 50 c/s, consumption 60W. Size:  $13\frac{1}{2} \times 12 \times 6\frac{3}{8}$  in.



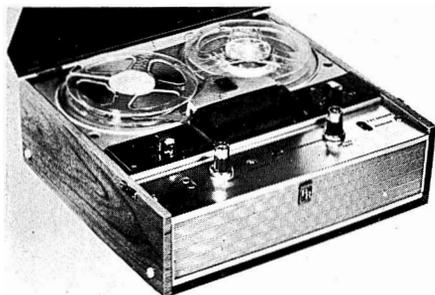
*Marconiphone 4216*



*Marconi phone 4212*



*Robuk Statesman (closed)*



*Portadyne TRI800*



*Robuk Statesman*



*Sharp RD706*



*Sony TC530*



*Sony TC135 recorder*

Supplied with microphone (with remote pause switch), reel of tape, spool and connecting lead. Finish: black leathergrain PVC, transparent Perspex lid. Price: £32 11s.

**Marconiphone 4212.**  $\frac{1}{4}$ -track three-speed mono recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s better than 0.15%,  $3\frac{3}{4}$  i/s better than 0.2%,  $1\frac{7}{8}$  i/s better than 0.25%. Signal-to-noise ratio 40 dB. FR  $7\frac{1}{2}$  i/s 40 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-14 Kc/s,  $1\frac{7}{8}$  i/s 40 c/s-7 Kc/s. Meter level indicator. Auto-stop. Rewind time  $2\frac{1}{2}$  mins 1,200 ft. Inputs: radio 1.5 mV 68K, PU.1 180 mV 200-500K, PU.2 75 mV 3.3 megohms, mic 1.5 mV 10 megohms. Outlets: 1V 22K, ext speaker 3W 3 ohms. Output: 3W. Speaker  $7\times 4$  in. Thorn deck. Valves and transistors. Locking pause control on deck. Four-digit position indicator, PB reset. Straight-through amplifier. Monitoring. Input mixing. Remote pause control. Parallel track replay. Automatic head defluxing. Auxiliary DC supply for external transistorised equipment (i.e. slide projector synchroniser). Size:  $16\frac{1}{4}\times 14\frac{1}{4}\times 7\frac{1}{2}$  in. Mains 200-250V 50 c/s, consumption 60W. Supplied with microphone (with remote pause control), reel of LP tape, spare spool and connecting leads. Finish: black leathercloth covered cabinet, partially transparent acrylic lid. Price: £46 4s.



**NATIONAL.** Matsushita Electric Co., Japan. Distributors: Unamec Ltd., United Africa House, Blackfriars Road, London, S.E.1. Tel: Waterloo 2070.

**National RQ 300S.** Mains  $\frac{1}{2}$ -track mono recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool  $3\frac{1}{4}$  in. FR  $3\frac{3}{4}$  i/s 100 c/s-7 Kc/s,  $1\frac{7}{8}$  i/s 150 c/s-4 Kc/s. Input: mic 10K. Output: 700 mW. Speaker 4 in. 8 ohms. Transistor. Capstan drive. Three-in-one head. Push-button operation. Mains 240V 50-60 c/s. Size:  $7\frac{1}{2}\times 8\frac{1}{4}\times 3\frac{7}{8}$  in. Weight:  $4\frac{3}{8}$  lb. Price: £19 8s. 6d.

● **National RS 753.** Stereo/mono  $\frac{1}{4}$ -track mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool 7 in. FR  $7\frac{1}{2}$  i/s 60 c/s-15 Kc/s,  $3\frac{3}{4}$  i/s 60 c/s-10 Kc/s,  $1\frac{7}{8}$  i/s 60 c/s-5 Kc/s. Inputs: two mics 20K, two aux 1 megohm. Outputs: two 2.5W 8 ohms, two 47 ohm lines. Two VU meters. Six transistors, three valves. Own deck. One motor. Multi-track recording and playback. Push-button controls. Mains 100, 115, 125, 200, 250V 50-60 c/s. Size:  $14\times 9\frac{1}{2}\times 3\frac{3}{8}$  in. Weight:  $34\frac{1}{2}$  lb. Price: £84.

● **National RS 755S.** Stereo  $\frac{1}{4}$ -track transistor mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Spool 7 in. FR  $7\frac{1}{2}$  i/s 60 c/s-15 Kc/s,  $3\frac{3}{4}$  i/s 60 c/s-8 Kc/s. Input: mic 20K. Output: two 2W 8 ohms, two 47 ohms lines. Two VU meters. Twelve transistors. One motor, Automatic stop. Double recording. Push-button controls. Mains 100, 115, 125, 200, 230, 250V 50-60 c/s. Input mixing. Size:  $18\times 14\frac{1}{4}\times 7\frac{7}{8}$  in. Weight: 23 lb. Price: £114 9s.

See Semi-professional and Battery Recorder sections for other National models.



**PHILIPS ELECTRICAL LTD.,** Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437-7777.

**EL3310.**  $\frac{1}{2}$ -track furniture style mains recorder. Speed:  $1\frac{7}{8}$  i/s. Compact cassettes. W and F  $\pm 0.3\%$ . SN >45 dB. FR 60 c/s-10 Kc/s  $\pm 6$  dB. Meter level indicator (automatic and manual control). Rewind time 60 secs C60 cassette. Inputs: mic 0.25 mV 4.5K, radio 0.25 mV 4.5K, PU 100 mV 1.5 megohms. Outlets: line 1V 20K, speaker 1.8W 5-8 ohms. All transistor. Philips deck. Three-digit tape indicator. Pause, tone controls. Output: 1.8W. Speaker 5 in. Mains 110, 127, 200-250V AC 50 c/s (adaptable for 60 c/s). Size:  $14\frac{1}{2}\times 8\frac{1}{2}\times 3\frac{3}{4}$  in. Weight: 8 lb. Finish: black polystyrene and teak. Price: £36 15s.

● **EL3312.**  $\frac{1}{2}$ -track cassette loading stereo recorder with output stages but no speakers. Compact cassettes. W and F  $\pm 0.3\%$ . SN >45 dB. FR 60 c/s-10 Kc/s. Meter level indicator. Rewind time 60 secs C60 cassette. Inputs: two mic 0.25 mV 1K, two radio 0.25 mV 1K, two PU 100 mV 1 megohm. Outlets: two line 1V 20K, two speakers 1.8W 5-8 ohms. All transistor. Three-digit tape indicator. Pause. Tone control. Mains 110, 127, 200-250V AC 50 c/s (adaptable for 60 c/s). Size:  $12\frac{3}{4}\times 8\frac{1}{2}\times 3\frac{1}{2}$  in. Weight: 7 lb. Finish: black polystyrene and teak. Price: £50 8s.

**4304.**  $\frac{1}{2}$ -track mains recorder. Speed:  $3\frac{3}{4}$  i/s. Max spool  $5\frac{1}{4}$  in. Magic eye. W and F  $\pm 0.3\%$ . SN >45 dB. FR 80 c/s-10 Kc/s. Rewind time <180 secs 1,200 ft. Inputs: mic, radio, PU all 0.25 mV 2K. Outlets: radio 0.75V 20K, speaker 1.5W 3-7 ohms. Output: 1.5W. Speaker 4 in. Own deck. One motor. Tape counter. Automatic recording level. Pause. Size:  $14\frac{1}{2}\times 10\times 5$  in. Weight: 13 lb. Mains 110, 127, 200-250V AC. Price: £26 5s.



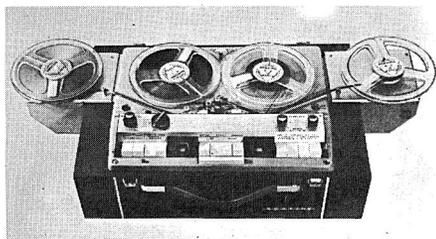
Grundig TK125



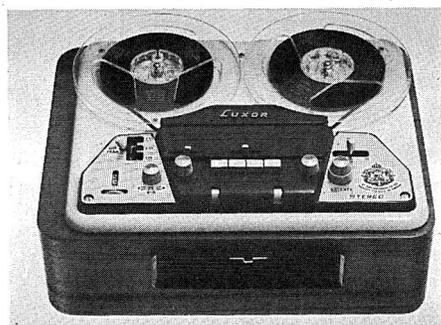
Grundig TK245



Korting MT 3624



Korting MT.3624



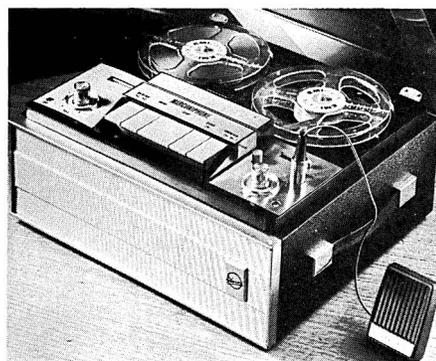
Luxor MP-463



Luxor MP-473



Luxor MP-464



Marconiphone 4214

**4305.**  $\frac{1}{4}$ -track mains recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $\pm 0.3\%$ . SN  $> 45$  dB. FR  $3\frac{3}{4}$  i/s 60 c/s-15 Kc/s  $\pm 6$  dB,  $1\frac{7}{8}$  i/s 60 c/s-8 Kc/s  $\pm 6$  dB. Meter level indicator. Rewind time  $< 180$  secs 1,200 ft. Inputs: mic 0.2 mV 2K, radio 2 mV 20K, PU 70 mV 680K. Outlets: radio 0.75V 20K, speaker 1.8W 3-7 ohms, phones 0-1.5V 50 ohms. Output: 1.8W. Speaker  $8 \times 3$ . Transistors. Own deck. One motor. Pause. Tape position indicator. Straight-through amplifier. Monitoring. Input mixing. Parallel track replay. Size:  $16 \times 11\frac{3}{4} \times 5\frac{1}{2}$  in. Weight:  $15\frac{1}{2}$  lb. Mains 110, 127, 200-250V AC. Price to be announced.

**4306.**  $\frac{1}{4}$ -track mains recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Specification similar to 4305 except for size and finish. Price to be announced.

● **4408.**  $\frac{1}{4}$ -track stereo mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $\pm 0.2\%$ . SN  $> 45$  dB. FR  $7\frac{1}{2}$  i/s 40 c/s-18 Kc/s. Two level indicators (meters). Rewind time  $< 180$  secs 1,800 ft. Inputs: two mic 0.25 mV 2K, two radio 2 mV 20K, two PU 100 mV 500K. Outlets: radio 1V, phones 0-1.5V 1K, two speakers 6W 4-8 ohms. Output: 6W per channel. Own deck. One motor. Pause. Straight-through amplifier. Monitoring. Input mixing. Parallel track replay. Vertical or horizontal operation. Mains 110, 127, 200-250V AC. Size:  $19 \times 13 \times 8\frac{3}{4}$  in. approx. Price to be announced.

**EL3576.**  $\frac{1}{4}$ -track mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$ ,  $\frac{15}{16}$  i/s. Max spool 7 in. W and F  $\pm 0.3\%$ . SN  $> 45$  dB. FR  $7\frac{1}{2}$  i/s 40 c/s-18 Kc/s. Magic eye. Rewind time  $< 180$  secs 1,800 ft. Inputs: mic 0.25 mV 2K, radio 2 mV 20K, PU 100 mV 500K. Outlets: radio 1V 50K, speaker 4W 3-7 ohms, phones 0-1.5V 1.5K. Output: 4W. Speaker  $7 \times 5$  in. Transistors and valves. Own deck. One motor. Tape position counter. Straight-through amplifier. Pause. Monitoring. Input mixing. Parallel track replay. Mains 110, 127, 200-250V AC. Size:  $17\frac{1}{2} \times 13\frac{1}{4} \times 6\frac{1}{2}$  in. Weight: 22lb. Price to be announced.

● **EL3555.**  $\frac{1}{4}$ -track stereo recorder. Valves and transistors. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $< 0.6\%$ . H and N  $> 45$  dB. FR  $7\frac{1}{2}$  i/s 40 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 60 c/s-15 Kc/s,  $1\frac{7}{8}$  i/s 60 c/s-8 Kc/s. Magic eye. Rewind time  $< 3$  mins 1,800 ft. Inputs: mic 0.25 mV 2K, radio (diode) 2 mV 20K, pickup 200 mV 500K. Output: 2.5W RMS per channel. Outlets: amplifier 1V 50K, phones 0-1.5V 1.5K, ext speaker 3-7 ohms. Own deck. One motor. Pause. Tape position counter. Straight-through amplifier. Monitoring. Input mixing. Parallel track

replay. Multiplay. Second channel speaker in detachable lid. Size:  $17\frac{1}{2} \times 13\frac{1}{2} \times 8\frac{1}{2}$  in. Weight: 24 lb. Price: £78 15s.

**Stella ST461.**  $\frac{1}{2}$ -track mono recorder. Speed:  $3\frac{3}{4}$  i/s. Max spool  $5\frac{3}{4}$  in. W and F  $< 0.6\%$ . H and N  $> 40$  dB. FR 80 c/s-12 Kc/s. Magic eye. Rewind time  $< 2$  mins 1,200 ft. Input: mic/radio/PU 0.2 mV 3K. Output: 1.5W. Speaker 4 in. Outlet: 750 mV 20K. Valves and transistors. Own deck. One motor. Pause. Scale for tape position. Mains 110, 127, 200-250V AC 50 c/s. Size:  $15 \times 10\frac{1}{2} \times 5$  in. Weight: 13 lb. Price: £25 4s.

**Stella ST462.**  $\frac{1}{4}$ -track mono recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$ ,  $\frac{15}{16}$  i/s. W and F  $< 0.6\%$  (p-p). H and N  $> 47$  dB. FR  $7\frac{1}{2}$  i/s 40 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 60 c/s-15 Kc/s,  $1\frac{7}{8}$  i/s 60 c/s-8 Kc/s,  $\frac{15}{16}$  i/s 60 c/s-4.5 Kc/s, all  $\pm 3$  dB. Magic eye. 7 in. spool. Rewind time  $< 3$  mins 1,800 ft. Inputs: mic 0.25V 2K, radio (diode) 2 mV 20K, pickup 100 mV 500K. Output: 4W RMS. Speaker  $7 \times 4$  in. Transistors and valves. Outlets: amplifier 1V 50K, phones 0-1.5V 1.5K, ext speaker 3-7 ohms. Own deck. One motor. Tape position counter. Straight-through amplifier. Monitoring. Pause. Input mixing. Parallel track replay. Headphone playback. Stereo playback, multiplay, etc. with EL3787A pre-amplifier. Mains 110, 127, 200-250V AC 50 c/s. Size:  $17\frac{1}{2} \times 13\frac{3}{4} \times 7\frac{3}{4}$  in. Weight: 21 lb. Price: £65 2s.

**Stella ST463.**  $\frac{1}{4}$ -track mono recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $< 0.6\%$  (p-p). H and N  $> 45$  dB. FR  $3\frac{3}{4}$  i/s 60 c/s-13 Kc/s,  $1\frac{7}{8}$  i/s 60 c/s-8 Kc/s  $\pm 3$  dB. Magic eye. Rewind time 1,800 ft. Inputs: mic 0.2 mV 2K, radio (diode) 2 mV 20K, pickup 200 mV 500K. Output: 2.5W. Speaker  $8 \times 3$  in. Outlets: amplifier 1V 50K, phones 0-1.5V 1.5K, ext speaker 3-7 ohms. Valves and transistors. Own deck. One motor. Pause. Tape position counter. Straight-through amplifier. Monitoring. Input mixing. Parallel track replay. Headphone playback. Automatic recording level. Stereo playback, duoplay, multiplay with EL3787A pre-amplifier. Mains 110, 127, 200-250V AC 50 c/s. Size:  $16\frac{3}{8} \times 13\frac{1}{4} \times 6\frac{3}{8}$  in. Weight: 18 lb. Price: £40 19s.

**Stella ST9111A.**  $\frac{1}{2}$ -track mains cassette recorder. Speed:  $1\frac{7}{8}$  i/s. Compact cassette. W and F  $\pm 0.3\%$ . SN  $> 45$  dB. FR 60 c/s-10 Kc/s  $\pm 6$  dB. Meter level indicator. Rewind time  $< 60$  secs C60 cassette (300 ft). Outlets: radio 1V 20K, speaker 1.8W 5-8 ohms. Inputs: mic, radio, PU all 0.25 mV 4.5K. Output: 1.8W. Speaker 5 in. Transistors. Own deck. One motor. Pause. Tape position scale. Mains 110, 127, 200-250V

AC. Size:  $14\frac{1}{2} \times 8\frac{1}{2} \times 7\frac{1}{4}$  in. approx. Weight: 8 lb. Price to be announced.

● **Stella ST9114A.**  $\frac{1}{2}$ -track mains stereo cassette recorder. Speed:  $1\frac{1}{8}$  i/s. Compact cassette. W and F  $\pm 0.3\%$ . SN  $> 45$  dB. FR 60 c/s-10 Kc/s  $\pm 6$  dB. Meter level indicator. Rewind time  $< 60$  secs C60 cassette (300 ft). Inputs: two mics 0.25 mV 1K, two radio 0.25 mV 1K, two PU mV 1 megohm. Outlets: two radio 1V 20K, two speakers 1.8W 5-8 ohms. Output: 1.8W per channel. Transistors. Own deck. One motor. Pause. Tape position scale. Straight-through amplifier. Mains 110, 127, 200-250V AC. Size:  $14\frac{1}{2} \times 8\frac{1}{2} \times 7\frac{1}{4}$  in. approx. Weight: 7 lb. Price to be announced.



**PORTADYNE RADIO.** Portadyne Works, 30-34 Gorst Road, North Acton, London, N.W.10. Tel: Elgar 7541-3.

**TR1800.** Mono recorder.  $\frac{1}{2}$ -track. Speed:  $3\frac{3}{8}$  i/s. W and F 0.4%. H and N - 50 dB. FR 100 c/s-10 Kc/s  $\pm 3$  dB. Replay char CCIR. Inputs: mic 2 mV. 1 megohm, radio 100 mV 47K. Output from pre-amp 1 mV 200K. One motor.  $5\frac{3}{8}$  in. spool. Rewind time 3 min 850 ft. Neon level indicator. Size:  $13\frac{3}{4} \times 12\frac{1}{2} \times 5\frac{1}{2}$  in. Price: £22 1s.

**Q-CORD.** See Battery Operated Portables

**REPS (TAPE RECORDERS) LTD.,** Colville Road, Acton, London, W.3. Tel: Acorn 4141.

**R.10 Mark III.** Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. FR  $7\frac{1}{2}$  i/s 40 c/s-16 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-10 Kc/s,  $1\frac{7}{8}$  i/s 50 c/s-6 Kc/s. Level meter. Signal to noise:  $\frac{1}{2}$ -track - 55 dB at  $7\frac{1}{2}$  i/s,  $\frac{1}{4}$ -track - 50 dB at  $7\frac{1}{2}$  i/s. W and F 0.15% at  $7\frac{1}{2}$  i/s. Spool 7 in. Eight valve circuit plus two contact-cooled rectifiers. Inputs: mic 0.8-60 mV at 1 megohm, PU/radio 60 mV-2V at 500K. Speaker  $9 \times 5$  in. Outlet: 500 mV at 1K. Rewind time 2 mins for 1,200 ft. Auto-stop. Monitoring. Output: 10W push-pull. Bogen heads. De-flux button. Mains 200-240V 50 c/s or 100-120V 60 c/s (export). Size:  $15\frac{1}{2} \times 17 \times 9$  in. Weight: 35 lb. Guarantee: two years. Cabinet: two-tone grey with chrome fittings. Price: ( $\frac{1}{2}$ -track) £61 19s.; ( $\frac{1}{4}$ -track) £72 9s.



**ROBUK ELECTRICAL INDUSTRIES LTD.,** 559/561 Holloway Road, London, N.19. Tel: Archway 1022.

**Regal RK5.**  $\frac{1}{2}$ -track three-speed mono mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in.

W and F 0.2% at  $7\frac{1}{2}$ , 0.3% at  $3\frac{3}{4}$  i/s. FR  $7\frac{1}{2}$  i/s 40 c/s-15 Kc/s  $\pm 3$  dB,  $3\frac{3}{4}$  i/s 50 c/s-9 Kc/s  $\pm 3$  dB,  $1\frac{7}{8}$  i/s 50 c/s-4 Kc/s. Signal-to-noise better than 45 dB. Replay char CCIR. Inputs: mic 1.8 mV high Z, radio/pickup 350 mV 250K. Output: 5W RMS push-pull. Output stage two ECL82. Outlet: 15 ohms ext speaker. Internal speaker 8 in. elliptical. Magic eye level indicator (EM84 or EM87). Input mixing. Own deck. Three motors. Pause. Superimpose. Monitoring with independent control. Three-digit tape position indicator. Piano key controls. Four-track version uses Miniflux heads. Size:  $20\frac{1}{2} \times 14\frac{1}{2} \times 8\frac{1}{2}$  in. Weight: 30 lb. Price: £46 4s.

**Regal RK54.**  $\frac{1}{4}$ -track version of RK5. Similar specification. Price: £49 7s.

**Statesman RK6.**  $\frac{1}{2}$ -track four-speed mono mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$ ,  $\frac{3}{8}$  i/s. Spool  $5\frac{3}{8}$  in. W and F 0.17% at  $7\frac{1}{2}$  i/s, 0.2% at  $3\frac{3}{4}$  i/s, 0.35% at  $1\frac{7}{8}$  i/s. FR  $7\frac{1}{2}$  i/s 60 c/s-14 Kc/s  $\pm 3$  dB,  $3\frac{3}{4}$  i/s 60 c/s-8 Kc/s  $\pm 3$  dB,  $1\frac{7}{8}$  i/s 60 c/s-4 Kc/s,  $\frac{3}{8}$  i/s speech frequencies. Signal-to-noise better than 37 dB. Replay char CCIR. Inputs: mic 1.8 mV high Z, radio 200-250 mV. Output: 1.5W. Outlets: two external speakers 3 ohms, line 1V. Touch tab controls. Digital tape position indicator. Rewind time less than 2 $\frac{1}{2}$  mins 1,200 ft. Safety record lock. Pause control. Valve circuit, ECL82 output: Magic eye. Monitoring. Tone control. Speaker  $7 \times 3\frac{5}{8}$  in. Motek heads. Size:  $13\frac{1}{4} \times 12\frac{1}{2} \times 7\frac{1}{2}$  in. Weight: 18 lb. Price: £33 12s.

**Statesman RK64.** Similar specification to RK6 but  $\frac{1}{4}$ -track. Features include parallel track playback. Miniflux heads. Price: £36 15s.



**SANYO.** Sole U.K. agents: Marubeni-Iida Co. Ltd., Marubeni-Iida House, 164 Clapham Park Road, London, S.W.4. Tel: 01-720-1911.

**MR701. Brigadier.**  $\frac{1}{2}$ -track mains recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. W and F  $3\frac{3}{4}$  i/s 0.35%,  $1\frac{7}{8}$  i/s 0.45%. SN better than 40 dB. FR  $3\frac{3}{4}$  i/s 100 c/s-8 Kc/s,  $1\frac{7}{8}$  i/s 100 c/s-4 Kc/s. 7 in. spools. Meter indicator. Rewind time 3 mins 1,200 ft. Inputs: mic, radio. Output: 2.4W. Speaker  $6\frac{1}{4} \times 3\frac{1}{2}$  in. Transistorised. One motor. Digital tape position indicator. Monitoring. Mains 110-117V, 220-240V, AC. Size:  $12\frac{1}{2} \times 10 \times 5\frac{7}{8}$  in. Weight: 12 lb. Price: £30 19s. 6d.

● **MR929.** Twintone De-Luxe.  $\frac{1}{4}$ -track mono,  $\frac{1}{2}$ -track stereo mains recorder. Transistorised. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool 7 in. W and F

$7\frac{1}{2}$  i/s less than 0.25%,  $3\frac{3}{4}$  i/s less than 0.35%. SN better than 40 dB. FR  $7\frac{1}{2}$  i/s 30 c/s-13 Kc/s,  $3\frac{3}{4}$  i/s 70 c/s-7 Kc/s. Replay char NARTB. Meter level indicator. Rewind time 3 mins 1,200 ft. Inputs: mics (2), auxiliary. Outlet: line. Output: 3W RMS each channel. Speakers  $4 \times 2$  in. One motor. Digital tape position indicator. Monitoring. Mains 90/100/117/220/240V AC 50/60 c/s. Consumption 40W. Size:  $13 \times 12\frac{3}{4} \times 5\frac{1}{2}$  in. Weight: 38 lb. Price: £82 19s.

See Battery Portables section for details of Sanyo mains/battery models.



**SHARP.** Distributors: Wholesale Supplies (Swinton) Ltd., 16/18 Worsley Road, Swinton, Manchester. Tel: Swinton 3232.

**Sharp RD-503.** Mains tape recorder.  $\frac{1}{2}$ -track. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 5 in. W and F <0.35% at  $3\frac{3}{4}$  i/s. FR 120 c/s-8 Kc/s at  $3\frac{3}{4}$  i/s. Pilot lamp level indicator. Rewind time 33 secs. All transistor. 1W output. Speaker  $4\frac{3}{8} \times 2\frac{1}{4}$  in. Three motors. Own deck. Monitoring by phone or internal speaker. Size:  $9\frac{1}{2} \times 5\frac{7}{8} \times 9$  in. Weight: 7 lb. Complete with dynamic mic, tape, spare spool, radio lead, splicing tape. Price: £26 5s.

**Sharp RD-706.** Mains tape recorder.  $\frac{1}{2}$ -track. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. Meter level indicator. Inputs: mic, aux. Outlet: ext speaker. Speaker  $7\frac{1}{2} \times 4$  in. Output: 3W. Vertical or horizontal operation. Seven transistors, one diode. Automatic shut-off. Monitoring. Tone control. Three-digit tape indicator. Rewind time 2 mins 1,200 ft. Mains 120V AC 60 c/s, or 110/200/220/240V AC 50 c/s or 60 c/s. Size:  $15\frac{1}{2} \times 13\frac{3}{4} \times 7\frac{1}{2}$  in. Weight: 22 lb. Price: £47 5s.

● **Sharp RD-707.** Mains stereo tape recorder.  $\frac{1}{4}$ -track. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. Twin meter level indicators. Inputs: mic, aux. Outlets: ext speaker, amplifier. Speakers two  $7\frac{1}{2} \times 4$  in. Output: 3.5W per channel. Vertical or horizontal operation. 14 transistors, two diodes. Automatic shut-off. Monitoring. Tone control. Three-digit tape indicator. Rewind time 2 mins 1,200 ft. Mains 120V 60 c/s, or 110/200/220/240V AC 50 c/s or 60 c/s. Size:  $24\frac{3}{4} \times 15\frac{1}{2} \times 7\frac{1}{8}$  in. Weight: 35 lb. Price: £78 15s.



**SONY U.K. DIVISION,** Eastbrook Road, Gloucester. Tel: Gloucester 21591.

● **TC200.** Stereo recorder.  $\frac{1}{4}$ -track. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. W and F  $7\frac{1}{2}$  i/s, less than 0.19%;  $3\frac{3}{4}$  i/s,

less than 0.25%. FR  $7\frac{1}{2}$  i/s, 50 c/s-14 Kc/s;  $3\frac{3}{4}$  i/s, 50 c/s-11 Kc/s ( $\pm 2$  dB). Replay char NARTB. Inputs: mic low impedance, aux high impedance. Outlet from pre-amp. One motor. Sound-on-sound recording. Tapeteaching facilities. 7 in. spool. 2 VU meters. Size:  $15 \times 9 \times 15\frac{7}{8}$  in. Weight: 27 lb. Price (inc ext speakers, 2 mics, leads): £75 12s.

● **TC250A.** Transistorised  $\frac{1}{4}$ -track stereo/mono recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. FR  $7\frac{1}{2}$  i/s 30 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 30 c/s-13 Kc/s. SN better than 50 dB. W and F  $7\frac{1}{2}$  i/s <0.19%,  $3\frac{3}{4}$  i/s <0.25%. Bias frequency 55 Kc/s. Two VU meters. Inputs: mic 0.2 mV 250-1,000 ohms, aux 0.2V high impedance. Outlets: low impedance and aux. Size:  $14\frac{1}{2} \times 11\frac{1}{2} \times 6\frac{3}{8}$  in. Weight: 17 lb. approx. Three-digit tape position indicator. Auto-stop. Price: £59 17s.

● **TC260.** Transistorised  $\frac{1}{4}$ -track mains-operated stereo recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool 7 in. W and F <0.19% at  $7\frac{1}{2}$  i/s, <0.25% at  $3\frac{3}{4}$  i/s. FR 30 c/s-18 Kc/s at  $7\frac{1}{2}$  i/s, 30 c/s-13 Kc/s at  $3\frac{3}{4}$  i/s. Replay char new CCIR. Inputs: mic (low Z) -68 dB, high Z aux -16 dB. Output: 5W per channel. Outlets: line (low Z), extn speakers (8 ohms). Integrated record/playback connector. Stereo monitor jack. One motor. Own deck. Two VU meters. Mains 110-240V AC 50/60 c/s. Size:  $21\frac{1}{4} \times 15\frac{1}{2} \times 7\frac{7}{8}$  in. Price: £101 17s.

**TC135.**  $\frac{1}{2}$ -track mains-operated mono recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 5 in. Inputs: mic, aux. Monitor outlet. Automatic recording level. Size:  $9\frac{1}{2} \times 5\frac{1}{2} \times 11$  in. Price: £26 5s.

**TC357/4.**  $\frac{1}{4}$ -track mains-operated mono recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s <0.12% RMS,  $3\frac{3}{4}$  i/s <0.2% RMS. FR  $7\frac{1}{2}$  i/s 40 c/s-15 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-12 Kc/s,  $1\frac{7}{8}$  i/s 40 c/s-6 Kc/s. Replay char new CCIR. Inputs: mic (high Z), aux. Outlets: line (high Z), extn speaker 8 ohms. Tape position indicator. Automatic or manual recording level. Size:  $15 \times 12 \times 8$  in. Price: £51 9s.

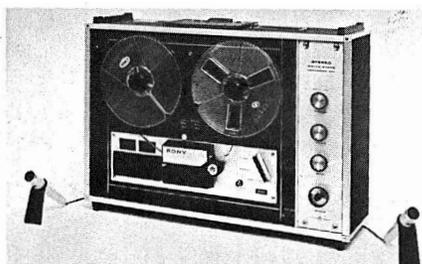
● **TC530.**  $\frac{1}{4}$ -track transistorised mains-operated mono/stereo recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s <0.17% RMS,  $3\frac{3}{4}$  i/s <0.3% RMS. FR  $7\frac{1}{2}$  i/s 30 c/s-20 Kc/s,  $3\frac{3}{4}$  i/s 30 c/s-13 Kc/s,  $1\frac{7}{8}$  i/s 30 c/s-10 Kc/s. Replay char new CCIR. Two VU level indicators. Inputs: mic 0.19 mV (-72 dB) 250-1,000 ohms, aux 60 mV (-22 dB) 100K, integrated record/playback connector 0.6 mV (-62 dB) 10K. Outlets: line 775 mV 100K, stereo monitor 10K phones, integrated record/playback connector 775 mV 10K. One motor. Own



*Sharp RD.503*



*Sharp RD-707*



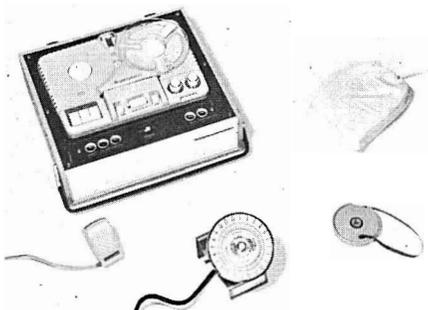
*Sony TC 260 recorder*



*Sony TC200*



*Sony TC260*



*Symphony Pre-Sleep Study Outfit*



*Sony TC 357/4 recorder .*



*Telefunken Magnetophon 201*

deck. Pause. Three-digit tape indicator. Monitoring. Straight-through amplifier. Sound-on-sound recording. Tape teaching facility. Four speaker system. Mains 110-240V AC. Consumption: 65W. Size:  $19\frac{3}{4} \times 15\frac{1}{2} \times 10$  in. Price: £126.



**SOUND.** See Tape Recorders Electronics Ltd.



**SPOTMASTER.** Distributors: D.T.V. Group, 126 Hamilton Road, West Norwood, London, S.E.27. Tel: 01-670-6166.

**Spotmaster.** Continuous loop broadcast-standard tape recorders. Wide range of attachments and accessories. Full details and prices on request.



**STELLA.** See Philips Electrical Ltd.



**SYMPHONY AMPLIFIERS LTD.,** 16 Kings College Road, London, N.W.3. Tel: Primrose 3314/5.

**Symphony Pre-Sleep Study Outfit.** Comprises: Special recorder with full electronic control to permit time-switch control without incurring "flats". Large dial time switch for easy setting. Dynamic mic. Data tape, 900 ft; Induction tape (learning). Pillow speaker included. Price: £37 16s.



**TANDBERG.** Distributors: Elstone Electronics Ltd., Hereford House, North Court, Vicar Lane, Leeds 2. Tel: Leeds 39834/6. Grams: Elstone, Leeds.

**Tandberg Series 8.** Portable tape recorders in  $\frac{1}{2}$ -track and  $\frac{1}{4}$ -track versions, fabric covered or teak cases. Valves. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Speed tolerance  $\pm 2\%$ . FR  $3\frac{3}{4}$  i/s 30 c/s-13 Kc/s ( $\pm 2$  dB 60 c/s-10 Kc/s),  $1\frac{7}{8}$  i/s 30 c/s-7 Kc/s ( $\pm 2$  dB 80 c/s-5.5 Kc/s). W and F better than 0.2% at  $3\frac{3}{4}$  i/s, better than 0.3% at  $1\frac{7}{8}$  i/s. Distortion at maximum output 5%. Signal-to-noise: four-track 50 dB, two-track 53 dB. Inputs: mic 2 mV 1 megohm, radio 2-7 mV adjustable. 300K-500K. Output: 3W. Size: (portable case)  $15\frac{3}{4} \times 7\frac{1}{8} \times 11\frac{7}{8}$  in., (teak cabinet)  $15 \times 6\frac{1}{2} \times 11\frac{5}{8}$  in. Weight: (portable case) 22 $\frac{1}{2}$  lb.; (teak cabinet) 20 $\frac{1}{2}$  lb. Price: (Model 823,  $\frac{1}{2}$ -track in teak cabinet) £56 14s.; (Model 823F,

$\frac{1}{2}$ -track in teak cabinet with remote and foot control facilities) £82 19s.; (Model 826,  $\frac{1}{2}$ -track in portable case) £65 2s.; (Model 843,  $\frac{1}{4}$ -track in teak cabinet) £61 19s.; (Model 843F,  $\frac{1}{2}$ -track in teak cabinet with remote and foot control facilities) £88 4s.; (Model 846,  $\frac{1}{4}$ -track in portable case) £65 2s.

**Tandberg Series 9.** Portable recorders in  $\frac{1}{2}$ -track and  $\frac{1}{4}$ -track versions, fabric covered or teak cases. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Speed tolerance  $\pm 1.5\%$ . Record/playback char NAB. FR  $7\frac{1}{2}$  20 c/s-20 Kc/s,  $3\frac{3}{4}$  80 c/s-13 Kc/s,  $1\frac{7}{8}$  30 c/s-7 Kc/s. W and F  $7\frac{1}{2}$  0-15%,  $3\frac{3}{4}$  0-2%,  $1\frac{7}{8}$  0-3%. Distortion 5% at rated output. Signal-to-noise 56 dB. Inputs: mic 2 mV 1 megohm, radio adjustable 2-7 mV 300K-500K. Output: 3W. Size:  $15 \times 6\frac{3}{4} \times 11\frac{3}{8}$  in. Weight: 20 $\frac{1}{2}$  lb. (with carrying case 25 $\frac{1}{2}$  lb.). Price: (Model 923,  $\frac{1}{2}$ -track in teak cabinet) £72 9s.; (Model 923F,  $\frac{1}{2}$ -track in teak cabinet, with remote and foot control facilities) £99 14s.; (Model 926,  $\frac{1}{2}$ -track in portable case) £79 16s.; (Model 943,  $\frac{1}{2}$ -track in teak cabinet) £75 12s.; (Model 946,  $\frac{1}{4}$ -track in portable case) £79 16s.

**Tandberg Series 6 and Series 12.** See Professional Tape Recorder section.



**TAPE RECORDERS ELECTRONICS LTD.** 197 Lower Richmond Road, Richmond, Surrey. Tel: Prospect 4463. Cables: Rudionics, Richmond, Surrey.

**Sound TRE14.** Mono  $\frac{1}{2}$ -track mains recorder. Speed:  $3\frac{3}{4}$  i/s. Spool 5 $\frac{3}{4}$  in. FR 60 c/s-13 Kc/s  $\pm 3$  dB. Inputs: mic 1 mV 1 megohm, radio diode 3 mV 2.5K, radio/PU 150 mV 1 megohm. Output: 3W. Outlets: LS 3 ohms, line 100 mV 1K. Signal-to-noise ratio better than 40 dB. Tape position indicator. Tone control. Volume/record level control. DIN sockets. Size:  $14\frac{3}{4} \times 13 \times 6$  in. Strip indicator. Price: £25 4s.

**Sound TRE23.** Same specification as TRE14 but  $\frac{1}{4}$ -track. Price: £28 7s.

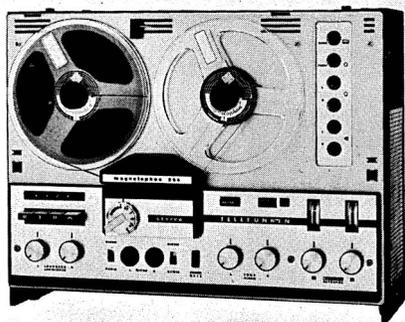
**Sound TRE32.** Mono  $\frac{1}{2}$ -track mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool 7 in. Tape position indicator. Otherwise specification as for TRE14. Size:  $15\frac{3}{4} \times 13\frac{1}{2} \times 6\frac{1}{2}$  in. Price: £31 10s.

**Sound TRE34.** Same specification as TRE32 but  $\frac{1}{4}$ -track. Price: £34 13s.

**Sound TRE40.**  $\frac{1}{4}$ -track mono mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool 7 in. FR 60 c/s-13 Kc/s  $\pm 3$  dB. Inputs: mic 1 mV 1 megohm,



*Telefunken Magnetophon 203*



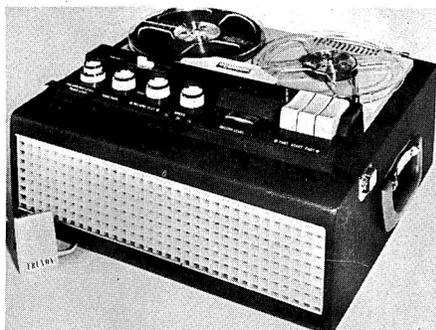
*Telefunken Magnetophon 204.E*



*Telefunken Magnetophon 200*



*Magnetophon 85*



*Truvox R44*

radio diode 3 mV 2.5K, radio PU 150 mV 1 megohm. Output: 3W. Outlets: LS 3 ohms, line 100 mV 1K. Signal/noise ratio better than 40 dB. DIN sockets. Strip level indicator. Separate bass and treble controls. Three speakers. Parallel track superimposing. Mixing. Straight-through amplifier. Tape position indicator. Size:  $15\frac{3}{4} \times 13\frac{3}{4} \times 6\frac{1}{2}$  in. Price: £47 5s.



**TEAC.** Distributors: C. E. Hammond & Co. Ltd., 90 High Street, Eton, Windsor, Berks. Tel: Windsor 63388.

● **Teac A-1500.** Transistor  $\frac{1}{4}$ -track stereo recorder (less speakers). Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s 0-12%,  $3\frac{3}{4}$  i/s 0-15%. SN 50 dB. FR  $7\frac{1}{2}$  i/s 30 c/s-20 Kc/s  $\pm 3$  dB,  $3\frac{3}{4}$  i/s 30 c/s-14 Kc/s  $\pm 3$  dB. Dual meter level indicator. Rewind time 90 secs for 1,200 ft. Inputs: mic 1 mV 10K, line 100 mV 100K. Outlets: speaker 2W 8 ohms, line 100K. Three motors: one dual-speed hysteresis capstan drive, two six-pole outer-rotor reel drive. Four-digit tape indicator, PB reset. Monitoring. Input mixing. Stereo echo. Automatic reverse. Four heads. Simultaneous play and record on separate tracks. Auto shut-off. Size:  $16\frac{7}{8} \times 15\frac{1}{8} \times 11\frac{3}{8}$  in. Weight: 48 lb. Mains 100, 117, 220-240V 50 or 60 c/s. Consumption: 110W. Price: £141 15s.

● **Teac A-1600.** Transistor  $\frac{1}{4}$ -track stereo recorder. Specification same as A-1500 except speakers included. Price: £166 19s.



**TELEFUNKEN.** Distributors: A.E.G. (Great Britain) Ltd., Lonsdale Chambers, 27 Chancery Lane, London, W.C.2. Tel: Chancery 9944. Cables: Welmcor, London.

**Magnetophon 85 de Luxe.** Mono recorder.  $\frac{1}{2}$ -track. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. W and F  $7\frac{1}{2}$  i/s, 0-15%;  $3\frac{3}{4}$  i/s, 0-2%. H and N -55 dB. FR  $7\frac{1}{2}$  i/s, 40 c/s-18 Kc/s;  $3\frac{3}{4}$  i/s, 40 c/s-16 Kc/s. Replay char CCIR and NARTB, selected by switch. Inputs: radio 2 mV, 47K; mic 2 mV, 2 megohms. Outlet from pre-amp. One motor. 7 in. spools, 3 min rewind (long play tape). Fluorescent bar level indicator. Mixing facilities. Size:  $7\frac{3}{8} \times 17\frac{3}{8} \times 16\frac{1}{8}$  in. Price: £95 11s.

**Magnetophon 200.**  $\frac{1}{2}$ -track mono mains recorder. Speed:  $3\frac{3}{4}$  i/s. FR 60 c/s-13 Kc/s. Speaker:  $5 \times 3$  in. Six transistors, one rectifier. Meter level indicator. Inputs for radio, mic, pickup. Outlets for radio, phones, ext speaker. Mains 110, 127, 220, 240V AC (50 c/s convert-

ible to 60 c/s). Max spool 7 in. Push-button operation. Pause control. Three-digit counter. Tone control. Built-in splicing groove. Storage space for two extra spools. Compartment for audio lead, mic, etc. Size:  $15\frac{1}{2} \times 12\frac{1}{4} \times 6\frac{1}{4}$  in. Weight: 21 lb. Price: £33 12s.

**Magnetophon 201.**  $\frac{1}{4}$ -track version of model 200. Track selector provides: mono 1, mono 2, parallel playback. Price: £46 4s.

● **Magnetophon 203.**  $\frac{1}{4}$ -track stereo mains recorder. Max spool 7 in. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Equalisation NARTB. FR 40 c/s-15 Kc/s at  $3\frac{3}{4}$  i/s, 40 c/s-8 Kc/s at  $1\frac{7}{8}$  i/s. Speaker  $5 \times 3$  in. twelve transistors, one rectifier. Stereo recording. Stereo playback with ext amplifier. Multi-play. Inputs for radio, mic, pickup. Output for ext speaker. Pause. Monitoring. Three-digit counter. Auto-stop. Level indicator. Mains 110, 127, 220/240V AC (50 c/s convertible to 60 c/s). Size:  $15\frac{1}{2} \times 12\frac{1}{4} \times 6\frac{1}{4}$  in. Weight: 21 lb. Price: £72 9s.

● **Magnetophon 203 Studio 2.**  $\frac{1}{2}$ -track stereo mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s 0-2%,  $3\frac{3}{4}$  i/s 0-3%. H and N  $7\frac{1}{2}$  i/s -52 dB,  $3\frac{3}{4}$  i/s -48 dB. FR  $7\frac{1}{2}$  i/s 40 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-15 Kc/s. Replay char NARTB. Illuminated meter level indicator. Rewind time 4 mins 7 in. LP. Inputs: radio (two) 200  $\mu$ V 2-2K, mic (two) 200  $\mu$ V 2-2K, PU/tape (two) 150 mV 2-2 megohms. Outlets: radio (two) 2V 2K, phone (two) 2V 15K, ext speaker 4-5 ohms. Output: 2-5W. Speaker  $5 \times 3$  in. 12 transistors, one rectifier. Own deck. One motor. Four-digit tape indicator. Pause. Monitoring. Parallel-track replay. Meets DIN 45500 requirements at  $7\frac{1}{2}$  i/s. Red and green indicator lights for record and playback. Mains 110, 200, 220V AC 50 c/s, 117V AC 60 c/s. Size:  $15\frac{3}{8} \times 6\frac{3}{8} \times 12\frac{3}{8}$  in. Weight: 21 lb. Price: £78 15s.

● **Magnetophon 203 Studio 4.**  $\frac{1}{4}$ -track stereo mains recorder. Specification as for Magnetophon 203 Studio 2 except H and N  $7\frac{1}{2}$  i/s -50 dB,  $3\frac{3}{4}$  i/s -45 dB. Price: £78 15s.

● **Magnetophon 204E.**  $\frac{1}{4}$ -track stereo mains recorder designed for vertical and horizontal operation. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool 7 in. FR  $7\frac{1}{2}$  i/s 40 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-15 Kc/s. Two  $7 \times 4\frac{1}{2}$  in. speakers. 18 transistors, 2 diodes, 1 rectifier. Stereo output sockets for ext amplifiers, phones, ext speakers (10 ohms). Stereo input sockets for radio, pickup, mics. Controls: volume, tone, level. Two VU meters. Push-button deck controls. Output: 6W RMS per channel. W and F  $7\frac{1}{2}$  i/s <0-15%,  $3\frac{3}{4}$  i/s <0-2%. Distortion <6%. SN  $7\frac{1}{2}$  i/s >50 dB,



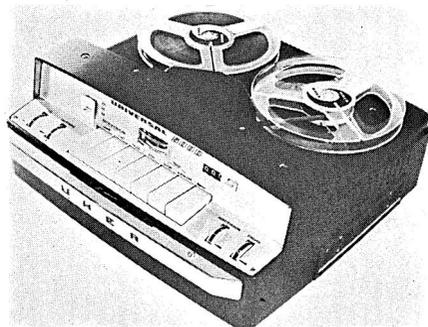
*Truvox R102*



*Uher 724/1 recorder*



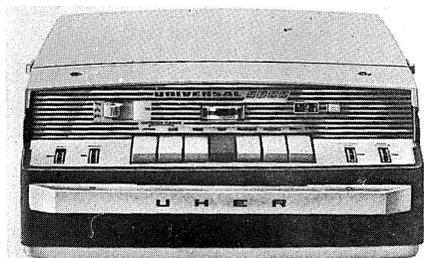
*Uher 22 Special*



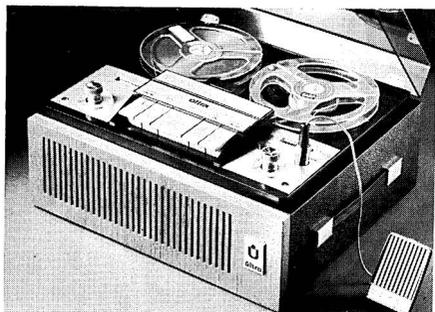
*Uher Universal 5000*



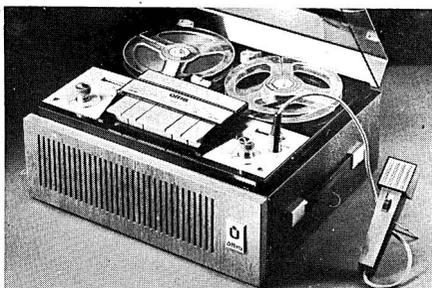
*Uher 724L*



*Uher 5000*



*Ultra 6214*



*Ultra 6216*

3 $\frac{3}{4}$  i/s >45 dB. Multiple sound on sound. Auto-stop. Mains 110, 127, 220, 240V AC 50/60 c/s. Size: 18 $\frac{1}{2}$  × 8 $\frac{1}{4}$  × 13 $\frac{3}{4}$  in. Weight: 30 $\frac{1}{2}$  lb. Price: £111 6s.

**Magnetophon 300, 301, 401.** See Battery Operated Portables section.



**TRUVOX LTD.**, Hythe, Southampton. Tel: Hythe (0421-24) 3265.

**R44.** Transistorised mains operated  $\frac{1}{4}$ -track mono recorder. Speeds: 7 $\frac{1}{2}$ , 3 $\frac{3}{4}$ , 1 $\frac{7}{8}$  i/s. Spool capacity 7 in. W and F 7 $\frac{1}{2}$  i/s <0.15%, 3 $\frac{3}{4}$  i/s <0.25%, 1 $\frac{7}{8}$  i/s <0.35%. H and N -42 dB at all speeds. FR 7 $\frac{1}{2}$  i/s 40 c/s-15 Kc/s ±3 dB, 3 $\frac{3}{4}$  i/s 40 c/s-10 Kc/s ±3 dB, 1 $\frac{7}{8}$  i/s 40 c/s-5 Kc/s ±3 dB. Replay char New CCIR. Meter level indicator. Rewind time 2 mins 1,200 ft. Inputs: mic 50  $\mu$ V 25K, radio/PU 100 mV 100K. Outlets: ext speaker 15 ohms 3W, ext amplifier 0-1V variable 10K. Output: 3W RMS. Speaker 8 × 5 in. One motor. Magnavox deck. Pause. Three-digit tape counter. Straight-through amplifier. Monitoring. Input mixing. Parallel track replay. Mains 100-120V, 200-250V, 50/60 c/s. Consumption 75W. Size: 16 $\frac{1}{2}$  × 14 × 8 in. Weight: 22 lb. Price: £49 7s.

**R42.**  $\frac{1}{2}$ -track version of R44. All details the same except no parallel track replay. Price: £49 7s.

**R104.** Transistorised  $\frac{1}{4}$ -track mono recorder. Speeds: 7 $\frac{1}{2}$ , 3 $\frac{3}{4}$ , 1 $\frac{7}{8}$  i/s. Spool 7 in. W and F <0.1% at 7 $\frac{1}{2}$ , 0.15% at 3 $\frac{3}{4}$ , 0.25% at 1 $\frac{7}{8}$ . H and N -50 dB. FR 7 $\frac{1}{2}$  30 c/s-17 Kc/s ±2 dB, 3 $\frac{3}{4}$  40 c/s-10 Kc/s ±2 dB, 1 $\frac{7}{8}$  60-8 Kc/s ±3 dB. Replay char new CCIR. Inputs: mic 1 mV 500K, rad/PU 50 mV 100K. Outputs: LS 5W, amp 1V 100 ohms. Level meter. Rewind time 1,200 ft. 1 min. Three motors, capstan motor outer-rotor type. Own deck. Superimpose. Pause. Four-digit position indicator. Straight-through amplifier. Source/tape monitor. Three heads. Multi-play. Mains 200-250V AC. Size: 16 × 17 $\frac{3}{4}$  × 8 $\frac{1}{2}$  in. Weight: 34 lb. Price: £93 9s.

**R102.** Transistorised  $\frac{1}{2}$ -track mono recorder. Specification as for R104. Price: £93 9s.



**UHER.** U.K. distributors: Bosch Ltd., 205 Great Portland Street, London, W.1. Tel: Langham 2672/5.

**Uher Universal 5000.** Transistorised mono recorder.  $\frac{1}{2}$ -track. Speeds: 3 $\frac{3}{4}$ , 1 $\frac{7}{8}$ ,  $\frac{15}{8}$  i/s. W and

F ±2%. H and N -50 dB. FR 3 $\frac{3}{4}$  i/s, 40 c/s-16 Kc/s; 1 $\frac{7}{8}$  i/s, 40 c/s-8 Kc/s;  $\frac{15}{8}$  i/s, 40 c/s-4 Kc/s. Replay char NARTB. Inputs: mic 0.1 mV, 4K; radio 1 mV, 47K; gram 30 mV, 1 megohm. Outlet direct from pre-amp. One motor. 5 $\frac{3}{4}$  in. spools. Rewind 2 mins. Three figure counter. Price (incl 4-position remote control, mic and 5 $\frac{3}{4}$  in. tape): £99 15s.

● **Uher Royal Stereo 784.** Transistorised stereo recorder.  $\frac{1}{4}$ -track. Speeds: 7 $\frac{1}{2}$ , 3 $\frac{3}{4}$ , 1 $\frac{7}{8}$ ,  $\frac{15}{8}$  i/s. W and F 7 $\frac{1}{2}$  i/s ±0.15%. H and N -50 dB. FR 7 $\frac{1}{2}$  i/s, 50 c/s-20 Kc/s; 3 $\frac{3}{4}$  i/s, 50 c/s-16 Kc/s; 1 $\frac{7}{8}$  i/s, 50 c/s-9 Kc/s;  $\frac{15}{8}$  i/s, 50 c/s-4 Kc/s. Replay char NARTB. Inputs: mic 0.15 mV, 2K; radio 5 mV, 50K; gram 300 mV 1 megohm. Outlets direct from replay head, and pre-amp. One motor. 7 in. spool. Rewind 3 mins. Four figure counter. Pause control. 11-position selector. Mixing. Size: 15 × 14 × 7 in. Weight: approx: 23 $\frac{1}{2}$  lb. Price: £135 9s.

● **724L.** Mains operated mono-stereo  $\frac{1}{4}$ -track recorder. Speeds: 7 $\frac{1}{2}$ , 3 $\frac{3}{4}$  i/s. Spool 7 in. Fully transistorised. W and F ±0.2%. FR 40 c/s-18 Kc/s at 7 $\frac{1}{2}$  i/s, 40 c/s-14 Kc/s at 3 $\frac{3}{4}$  i/s. Volume intensity range 50 dB. Inputs for mic, diode and PU. Output: 2 × 2W. Mains 110, 130, 150 and 220V. Price: £78 15s.

● **Hi-Fi 22/24.** Transistorised stereo  $\frac{1}{4}$ -track and  $\frac{1}{2}$ -track recorders. Speeds: 7 $\frac{1}{2}$ , 3 $\frac{3}{4}$  i/s. W and F 0.1% H and N -53 dB. FR 7 $\frac{1}{2}$  i/s 20 c/s-20 Kc/s, 3 $\frac{3}{4}$  i/s 20 c/s-15 Kc/s. Replay char NARTB, CCIR.1, CCIR.2. Inputs: mic 0.15 mV 1K, radio 3.5 mV 47K, pickup 150 mV 1 megohm. Outlet: pre-amp. One motor. 7 in. spool. Rewind time 3 mins. Four-digit tape position indicator. Price to be announced.



**ULTRA.** British Radio Corporation Ltd., 284 Southbury Road, Enfield, Middlesex. Tel: Howard 2477.

**Ultra 6214.**  $\frac{1}{2}$ -track mono recorder. Speed: 3 $\frac{3}{4}$  i/s. W and F better than 0.2%. Signal-to-noise ratio 40 dB. FR 60 c/s-10 Kc/s. Replay char CCIR. Inputs: mic 1.5 mV 10 megohms, radio 1.5 mV 68K, PU 75 mV 3.3 megohms. Outlet from pre-amp. One motor. Thorn deck. Max spool 5 $\frac{3}{4}$  in. Rewind time 2 $\frac{1}{2}$  mins 900 ft. Magic eye level indicator. Pause. Output: 3W RMS. Mains 230-250V AC 50 c/s, consumption 60W. Supplied with microphone, reel of tape, spare spool and connecting lead. Size: 13 $\frac{1}{2}$  × 12 × 6 $\frac{1}{2}$  in. Finish: black PVC leathercloth, teak veneer grille, transparent lid. Price: £28 7s.

**Ultra 6216.**  $\frac{1}{4}$ -track mono recorder. Speeds:  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool  $5\frac{3}{4}$  in. FR  $3\frac{3}{4}$  i/s 60 c/s-10 Kc/s,  $1\frac{7}{8}$  i/s 60 c/s-6 Kc/s. Magic eye level indicator. W and F better than 0.2% at  $3\frac{3}{4}$  i/s, better than 0.3% at  $1\frac{7}{8}$  i/s. Auto-stop. Three-digit tape indicator, PB reset. Remote pause control. Fast wind or rewind  $2\frac{1}{2}$  mins 900 ft. Inputs: mic 1.5 mV 10 megohms, radio 1.5 mV 68K, PU 75 mV 3.3 megohms. Outlets: line 500 mV 22K, ext speaker 3W 3 ohms, record output (without bias), 30V 50 mA DC. Output: 3W. Speaker  $7 \times 3\frac{5}{8}$  in. Valves. Thorn deck. One motor. Inching both directions. Pause control on deck. Parallel track replay. Monitoring. Superimpose. Mains 200-250V AC 50 c/s, consumption 60W. Size:  $13\frac{1}{2} \times 12 \times 6\frac{3}{8}$  in. Supplied with microphone (with remote pause switch), reel of tape, spool and connecting lead. Finish: black PVC leathergrain effect, teak veneer grille, detachable transparent lid. Price: £36 15s.

**Ultra 6212.**  $\frac{1}{4}$ -track three-speed mono recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s better than 0.15%,  $3\frac{3}{4}$  i/s better than 0.2%,  $1\frac{7}{8}$  i/s better than 0.25%. Signal-to-noise ratio 40 dB. FR  $7\frac{1}{2}$  i/s 40 c/s-18 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-14 Kc/s,  $1\frac{7}{8}$  i/s 40 c/s-7 Kc/s. Meter level indicator. Auto-stop. Rewind time  $2\frac{1}{2}$  mins 1,200 ft. Inputs: radio 1.5 mV 68K, PU.1 180 mV 200-500K, PU.2 75 mV 3.3 megohms, mic 1.5 mV 10 megohms. Outlets: IV 22K, ext speaker 3W 3 ohms. Output: 3W. Speaker  $7 \times 4$  in. Thorn deck. Valves and transistors. Locking pause control on deck. Four-digit position indicator, PB reset. Straight-through amplifier. Monitoring. Input mixing. Remote pause control. Parallel track replay. Automatic head defluxing. Auxiliary DC supply for external transistorised equipment (i.e. slide projector synchroniser). Size:  $16\frac{1}{4} \times 14\frac{3}{4} \times 7\frac{1}{2}$  in. Mains 200-250V 50 c/s, consumption 60W. Supplied with microphone (with remote pause control), reel of LP tape, spare spool and connecting leads. Finish: natural teak veneered cabinet, acrylic lid, partially transparent. Price: £46 4s.

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**VAN DER MOLEN LTD.**, 42 Mawney Road, Romford, Essex. Tel: Romford 41904.

**Van der Molen VR4.**  $\frac{1}{4}$ -track mains mono recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s 0.15%,  $3\frac{3}{4}$  i/s 0.25%,  $1\frac{7}{8}$  i/s 0.35%. H and N better than 40 dB on all

speeds. Frequency response:  $7\frac{1}{2}$  i/s 40 c/s-15 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-10 Kc/s,  $1\frac{7}{8}$  i/s 60 c/s-5 Kc/s, all  $\pm 3$  dB. Replay char DIN. Meter level indicator. Rewind time 3 mins. 1,800 ft. Inputs: mic 2 mV 50K, radio 30 mV 1 megohm, aux 200 mV 100K. Output: 4W RMS. Speaker 8 in. high flux. Outlets: pre-amplifier 1-4V 10K, alternative head 2 mV at 1 Kc/s, ext LS 8 ohms. Three-digit tape position indicator. Straight-through amplifier. Monitoring. Input mixing. Parallel track replay. One motor. Polished teak vertical style cabinet. Mains 200-250 50 c/s or 110V 60 c/s. Size:  $15\frac{1}{4} \times 12\frac{1}{4} \times 7\frac{3}{4}$  in. Price: £61 19s.

**Van der Molen VR7.**  $\frac{1}{4}$ -track mains mono recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s 0.15%,  $3\frac{3}{4}$  i/s 0.25%,  $1\frac{7}{8}$  i/s 0.3%. H and N better than 40 dB on all speeds. FR  $7\frac{1}{2}$  i/s 60 c/s-15 Kc/s  $\pm 3$  dB,  $3\frac{3}{4}$  i/s 60 c/s-10 Kc/s  $\pm 3$  dB,  $1\frac{7}{8}$  i/s 60 c/s-4 Kc/s. Replay char CCIR. Magic eye. Rewind time 3 mins 1,200 ft. Inputs: mic 2 mV 1 megohm, PU/radio 2 mV 1 megohm, mix 200 mV 1 megohm. Outlets: ext speaker 3.5W 3 ohms, hi-fi 1.3 volts 220K. Output: 3.5W RMS. Speaker  $8 \times 4$  in. Hybrid valve and transistor circuit. Own deck. One motor. Three-digit tape counter. Straight-through amplifier. Monitoring. Input mixing. Parallel track replay. Vertical operation. Size:  $18\frac{3}{4} \times 11\frac{1}{2} \times 7$  in. Weight: 21 lb. Mains 200-250V AC. Consumption 50W. Price: £40 19s.

● **Sonic Seven.** Cassette loading mains/battery stereo playback unit. Speed:  $1\frac{7}{8}$  i/s. Philips Compact cassette. W and F 0.3%. H and N better than 40 dB. FR  $1\frac{7}{8}$  i/s 60 c/s-10 Kc/s  $\pm 3$  dB. Replay char Philips. Rewind time 75 secs. Outlets: line 100 mV 10K, ext speakers 4W 15 ohms. Output: 4W each channel. Speaker 5 in. Philips deck. One motor. Transistorised. Straight-through amplifier. Separate speaker housed in main cabinet. Supply: 110, 205, 225, 245V AC, 20-25V DC. Size:  $21 \times 7\frac{1}{2} \times 5$  in. Weight: 15 lb. Price: £40 19s.

● **Sonic Eight.** Cassette loading mains/battery stereo recorder. Speed:  $1\frac{7}{8}$  i/s. Philips Compact cassette. W and F  $1\frac{7}{8}$  i/s better than 40 dB. FR 60 c/s-10 Kc/s  $\pm 3$  dB. Replay char Philips. Meter level indicators. Rewind time 70 secs. Inputs: two mic 70  $\mu$ V 2K, PU/radio 70  $\mu$ V 2 megohms. Outlets: ext speakers 4W 15 ohms, line 100 mV 10K. Output: 4W each channel. Speaker 5 in. Transistorised. Philips deck. One motor. Straight-through amplifier. Separate speaker housed in main cabinet. Supply: 110, 205, 225, 245V AC, 20-25V DC. Size:  $21 \times 7\frac{1}{2} \times 5$  in. Weight: 15 lb. Price: £51 9s.

**WYNSOR RECORDING CO. LTD.**, (inc. Magnetic Recording Co.), Wyndsor Works, 2 Bellevue Road, Friern Barnet, London, N.11. Tel: Enterprise 2226/7. Cables: Wyndreco, London.

**Sabre II.** Mono  $\frac{1}{2}$ -track. Speed:  $3\frac{3}{4}$  i/s. Spool  $5\frac{3}{4}$  in. FR 40 c/s-10 Kc/s  $\pm 3$  dB. Inputs: 2 mV 1 megohm, 250 mV 1 megohm. Outputs: 500 mV 1 megohm, 2.5W 3 ohms. Strip indicator. BSR deck. Superimpose. Pause. Size:  $15 \times 13\frac{3}{4} \times 7$  in. Weight:  $18\frac{1}{2}$  lb. Price: £25 4s.

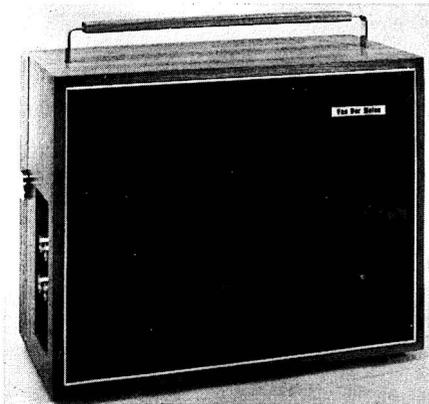
**Vanguard.**  $\frac{1}{4}$ -track mains recorder. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s 0.16%,  $3\frac{3}{4}$  i/s 0.25%,  $1\frac{7}{8}$  i/s 0.3%. SN better than 50 dB. FR  $7\frac{1}{2}$  i/s 40 c/s-15 Kc/s,  $3\frac{3}{4}$  i/s 40 c/s-9 Kc/s,  $1\frac{7}{8}$  i/s 40 c/s-6 Kc/s, all  $\pm 3$  dB. Meter record level indicator. Inputs: mic 2 mV 1-2 megohms, radio/gram. 0.25V 1 megohm. Out-

put: 4W RMS. 8 in. speaker in detachable lid. Outlet: 0.5V 10K. Valves. Pause. Straight-through amplifier. Monitoring from tape or signal. Parallel track replay. Track-to-track recording. Three heads. Separate record and play-back amplifiers. Bass and treble controls. Push-button operation. Digital tape counter. Oscillator 66 Kc/s. Stereo output socket 0.3 mV (uncorrected). Mains 110-240V 50 c/s. Size:  $18 \times 14 \times 18$  (packed). Weight: 40 lb. Price: £61 19s.

See Tape Accessories section for details of stereo pre-amplifier WPA for use with Vanguard recorder.



*Van Der Molen Sonic Eight*



*Van Der Molen VR4*



*Wyndsor Sabre II*

## TAPE UNITS

**AKAI.** Distributors: Pullin Photographic Ltd., 11 Aintree Road, Perivale, Greenford, Middlesex. Tel: Alperton 1541. Cables: Pullinfoto, Greenford, Middlesex.

● **Akai X-100D.**  $\frac{1}{4}$ -track transistorised tape unit. Mono or stereo. Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool  $7\frac{1}{2}$  in. W and F  $7\frac{1}{2}$  i/s  $<0.15\%$ ,  $3\frac{3}{4}$  i/s  $<0.25\%$ ,  $1\frac{7}{8}$  i/s  $<0.35\%$ . H and N  $7\frac{1}{2}$  i/s 45 dB. FR  $7\frac{1}{2}$  i/s 40 c/s-21 Kc/s  $\pm 3$  dB,  $3\frac{3}{4}$  i/s 40 c/s-18 Kc/s  $\pm 3$  dB,  $1\frac{7}{8}$  i/s 40 c/s-10 Kc/s  $\pm 3$  dB. Replay char NARTB. Two VU meters. Rewind time  $1\frac{1}{2}$  mins 1,200 ft. Inputs: mic 20 mV 500K, line 200 mV 1 megohm. Outputs: amplifier 800 mV 3K, phones. Own deck. One motor. Pause. Three-digit tape indicator. Monitoring. Built-in tape cleaner. Auto-stop. Crossfield head. Horizontal or vertical operation. Mains 100-240V AC. Size:  $13\frac{1}{2} \times 13\frac{1}{2} \times 9$  in. Price: £103 19s.

**Akai X300.** Available as tape unit only. See Professional and Semi-professional Recorders section. Price on application.

**Akai X355.** Available as tape unit only. See Professional and Semi-professional Recorders section. Price on application.



**BANG & OLUFSEN U.K. DIVISION,** Eastbrook Road, Gloucester. Tel: Gloucester 21591.

● **Beocord 1500 De Luxe.** Transistorised stereo tape unit in  $\frac{1}{2}$ -track record and playback,  $\frac{1}{4}$ -track playback only versions. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool size 7 in. W and F 0.075% at  $7\frac{1}{2}$ , 0.11% at  $3\frac{3}{4}$ , 0.18% at  $1\frac{7}{8}$ . H and N  $\frac{1}{2}$ -track -55 dB,  $\frac{1}{4}$ -track -50 dB. FR 40 c/s-16 Kc/s at  $7\frac{1}{2}$  i/s, 40-12 Kc/s at  $3\frac{3}{4}$  i/s, 50-6 Kc/s at  $1\frac{7}{8}$  i/s. Replay char CCCR. Inputs: mic 150  $\mu$ V 200 ohms, mag PU 2 mV 33K, crystal PU IV 220K, rhm diode 2 mV 45K. Output: line 800 mV. Rewind time 3 mins 1,800 ft. One Papst motor. Own deck. Superimpose. Pause. Position indicator. Two VU meters. Mains 110-240V 50 c/s. Size:  $17\frac{3}{4} \times 13\frac{1}{4} \times 8\frac{3}{8}$  in. Weight: 33 lb. Price: £101 17s.



**BRENELL ENGINEERING CO. LTD.,** 231/5 Liverpool Road, London, N.1. Tel: 01-607-8271 (5 lines).

● **STB2.** Stereo/mono deck mechanism with pre-amplifiers. 2/2 and 2/4 playback heads.

Speeds: 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. W and F 15 i/s,  $<0.05\%$ ;  $7\frac{1}{2}$  i/s,  $<0.1\%$ ;  $3\frac{3}{4}$  i/s,  $<0.15\%$ ;  $1\frac{7}{8}$  i/s, 0.25%. Outlet from pre-amp. Three motors,  $8\frac{1}{4}$  in. or  $10\frac{1}{2}$  in. NAB spools to order. Two illuminated level meters. Twin record and replay pre-amps. Tape monitoring facilities. Price: ( $8\frac{1}{4}$  in. spools) £150; ( $10\frac{1}{2}$  in. spools) £170.

● **STB2.** Monitor amplifier for use with STB2 tape unit. 3W per channel. Response 40 c/s-25 Kc/s  $\pm 3$  dB. Noise level -60 dB. Input: 1V for 3W output. Transistorised. Bass and treble controls. Output impedance 15 ohms. Complete with two  $5 \times 3$  in. speakers. Price: £25.



**DUAL ELECTRONICS LTD.,** Radnor House, London Road, Norbury, S.W.16. Tel: 01-764-9465/6.

● **Dual TG.27-CV.** Stereo tape unit.  $\frac{1}{4}$ -track. Transistorised. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool 7 in. Sound-on-sound recording. Mono/stereo record and playback. Inputs: two mics, pickup, radio. Outputs: stereo amplifier, stereo receiver, phones. Input mixing. Synchronous and independent channel level controls. Automatic monitoring reset while recording. Teak or rosewood plinth with cover. Price: £61 19s.



**FIDELA.** Distributors: Denham and Morley Ltd., Denmore House, 173/5 Cleveland Street, London, W.1. Tel: Euston 3656/7.

● **Fidela 707.** Transistor  $\frac{1}{4}$ -track mains tape unit. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. Three heads. W and F  $7\frac{1}{2}$  i/s  $<0.15\%$ . SN better than 50 dB. Crosstalk: better than 60 dB. FR  $7\frac{1}{2}$  i/s 30 c/s-22 Kc/s, 40 c/s-17 Kc/s  $\pm 2$  dB. Two VU meters. Inputs: mic 0.5 mV 10K, PU (mag) 1.5 mV 45 ohms, aux 200 mV 500K. Output: 500 mV 3K. Separate record and playback pre-amps. Separate controls for each channel. Tape and source monitoring. Vertical and horizontal operation. Sound-on-sound recording. Auto shut-off. Three-digit tape indicator. PB reset. Single control for tape transport. Size:  $11\frac{3}{8} \times 8\frac{1}{2} \times 6$  in. Weight: 16 lb. Mains 100-240V AC 50/60 c/s. Price: £124 19s.

● **Fidela 780.** Transistor  $\frac{1}{4}$ -track mains tape unit. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s  $<0.15\%$ . SN  $>53$  dB. FR  $7\frac{1}{2}$  i/s

30 c/s-22 Kc/s.  $3\frac{3}{4}$  i/s 40 c/s-12 Kc/s.  $1\frac{7}{8}$  i/s 40 c/s-9 Kc/s. Two VU meters. Inputs: two mics, two mag PU, two aux. Output: two 400 mV 10K. Separate record and replay pre-amps. Three heads per channel. Separate controls. Tape and source monitoring. Vertical and horizontal operation. Sound-on-sound recording. Auto shut-off. Three-digit tape indicator, PB reset. Single control for tape transport. Size:  $15\frac{3}{4} \times 14 \times 7\frac{3}{4}$  in. Weight: 22 lb. Price: £152 5s.

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**GRAMDECK.** U.K. distributors: Andrew Merryfield Ltd., 29/31 Wright's Lane, Kensington, London, W.8. Tel: Western 3603. Cables: Technology, Kens, London.

**Gramdeck.** Head and drive mechanism for attachment to gramophone turntable. Speeds:  $7\frac{1}{2}$ , 4-33, 3-2 and 1-6 i/s for the standard disc speeds.  $5\frac{3}{4}$  in. spools. FR 60-10,000 c/s  $\pm 3$  dB at  $7\frac{1}{2}$  i/s. W and F 0-15%. Mic to be used. Lustraphone LD61 medium impedance. Size:  $13\frac{1}{2} \times 6$  in. Weight: approx 2 lb. with tape. Price (including transistor pre-amplifier, tape and mic): £9 19s. 6d.

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**HEATHKIT.** See Kit section.

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**LL. ELECTRONICS LTD.,** 5 Shakespeare Road, Finchley, London, N.3. Tel: 01-346-3332.

**TR1000.** Magnavox tape deck built into low-line console with LL Electronics transistor amplifier. Perspex lid. Space for radio tuner or tape storage. Full specification and prices on request.

★

**LUXOR INDUSTRI AKTIEBOLAG.** See General Purpose Tape Recorder section for details of Luxor MP-473 mono/stereo  $\frac{1}{4}$ -track recorder without speakers.

★

**PHILIPS ELECTRICAL LTD.,** Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437-7777. Cables: Phillamps, London.

● **Philips 2500.**  $\frac{1}{2}$ -track mains tape unit. Speed:  $1\frac{7}{8}$  i/s. Cassette loading. W and F  $\pm 0.3\%$ . SN  $> 43$  dB. FR 60 c/s-10 Kc/s  $\pm 6$  dB. Rewind time

180 secs 300 ft. Outlet: 1V 20K. Transistors. Own deck. One motor. Mains 110-117, 127, 220, 240V AC. Size:  $8 \times 4\frac{1}{2} \times 2\frac{1}{2}$  in. approx. Price to be announced.

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**PLANET PROJECTS LTD.,** Goodman Works, Belvue Road, Northolt, Middlesex. Tel: Viking 1775.

**C.D.2.P.A.** This comprises model C.D.2. tape deck (see Tape Deck section) with built-in pre-amplifier and power supply. Power supply provides correct voltages for operating both relays and also a stabilised supply for the pre-amplifier. Pre-amplifier is three-stage direct coupled block using high frequency silicon planar transistors. Equalisation and stability is achieved with multiple feedback loops operating down to DC. Average output: 250 mV. Output impedance: 200 ohms to be fed into a load not less than 2.5K. FR 30 c/s-12 Kc/s  $+3$  dB. HD not greater than 3 dB. Signal-to-noise ratio 50 dB. Price: £80 (ex works).

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**SCOPETRONICS LTD.,** Crown Works, Church Road, Kingston-upon-Thames, Surrey. Tel: Kingston-upon Thames 1275/4135.

● **Scopetronics 1150.** Professional mains tape unit with pre-amps. Mono or stereo.  $\frac{1}{2}$ -track or full-track. Speeds:  $7\frac{1}{2}$ , 15 i/s. Max spool  $11\frac{1}{2}$  in. W and F 0-08% at 15 i/s, 0-14% at  $7\frac{1}{2}$  i/s. FR 15 i/s 40 c/s-15 Kc/s  $\pm 3$  dB,  $7\frac{1}{2}$  i/s 40 c/s-15 Kc/s  $\pm 3$  dB. Replay char NARTB and CCIR. Broadcast type peak programme meter. Rewind time  $1\frac{3}{4}$  mins for 2,400 ft NAB spool. Input: record input  $+8$  dB or 1 mW at 600 ohms. Output: 1 mW at 600 ohms. H and N  $7\frac{1}{2}$  i/s  $-54$  dB, 15 i/s  $-57$  dB. Valves. Three motors (ext rotor type). Superimpose. Pause. Inching. Straight-through pre-amplifier. Monitoring. Variable speed spooling. Removable head bridge. Drop-in loading. Mains 250V 50 c/s. Price (rack mounting): £319 16s.; (full-track stereo): £451 7s.

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**SONY U.K. DIVISION,** Eastbrook Road, Gloucester. Tel: Gloucester 21591.

● **Sony TC.350.**  $\frac{1}{4}$ -track mains-operated stereo tape unit. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Max spool 7 in. W and F  $7\frac{1}{2}$  i/s  $< 0.17\%$  RMS,  $3\frac{3}{4}$  i/s  $< 0.25\%$  RMS. FR  $7\frac{1}{2}$  i/s 30 c/s-20 Kc/s, 50 c/s-15 Kc/s  $\pm 3$  dB. Replay char New-CCIR. Two VU

meters fitted. Inputs: mic 0.19 mV (-72 dB) 250-1,000 ohms, aux 60 mV (-22 dB) 100K, integrated record/playback connector 6-15 mV (-42 dB) 100K. Outlets: line 0.775V 100K, binaural monitor 0.692V 10K (for headset), integrated record/playback connector 0.775V 500K. Transistorised. One motor. Own deck. Pause. Monitoring. Sound-on-sound recording. Three heads. Mains 110-240V. Consumption 50W. Size:  $15\frac{3}{4} \times 13 \times 6\frac{1}{4}$  in. Weight: 17 lb. Price: £78 15s.

● **TC250A.**  $\frac{1}{4}$ -track mains operated transistorised stereo tape unit. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  i/s. Spool 7 in. W and F less than 0.19% at  $7\frac{1}{2}$  i/s, less than 0.25% at  $3\frac{3}{4}$  i/s. FR 30 c/s-18 Kc/s at  $7\frac{1}{2}$ , 30 c/s-13 Kc/s at  $3\frac{3}{4}$ . Replay char CCIR. Low impedance inputs -72 dB, high impedance inputs -12 dB. Output: 1V at 600 ohms. VU meter. Rewind time  $3\frac{1}{2}$  mins 1,800 ft. One motor. Own deck. Superimpose. Pause. Position indicator. Mains 110-240V 50 c/s. Size:  $14\frac{1}{4} \times 6\frac{1}{4} \times 11\frac{1}{2}$  in. Weight: 16 $\frac{1}{2}$  lb. Price: £59 17s.

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**TANDBERG.** Distributors: Elstone Electronics Ltd., Hereford House, North Court, Vicar Lane, Leeds 2. Tel: Leeds 39834/6. Grams: Elstone, Leeds.

● **Tandberg Series 6.** See Professional Tape Recorder section.

**TAPE RECORDER DEVELOPMENTS LTD.,** 7 King George Avenue, Bushey, Herts. Tel: Bushey Heath 2331.

● **TRD Stereo tape unit.** See Tape Deck section and Tape Amplifier section for full specification.

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**TEAC.** See General Purpose Tape Recorder section for details of Teac A-1500 recorder

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**TRUVOX LTD.,** Hythe, Southampton. Tel: Hythe (0421-24) 3265.

● **PD104.**  $\frac{1}{4}$ -track transistorised stereo tape unit. Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Spool 7 in. W and F <0.1% at  $7\frac{1}{2}$ , 0.15% at  $3\frac{3}{4}$ , 0.25% at  $1\frac{7}{8}$ . H and N -50 dB. FR  $7\frac{1}{2}$  30 c/s-17 Kc/s  $\pm 2$  dB,  $3\frac{3}{4}$  40 c/s-10 Kc/s  $\pm 2$  dB,  $1\frac{7}{8}$  60-8 Kc/s  $\pm 3$  dB. Replay char new CCIR. Inputs: mic 1 mV 50K, rad/PU 50 mV 100K. Outputs: two 1V across 100 ohms. Two level meters. Rewind time 1,200 ft 1 min. Three motors, capstan motor outer-rotor type. Own deck. Pause. Four-digit position indicator. Straight-through pre-amplifier. Source-tape monitor. Three heads. Mixing. Track-to-track copying. Mains 200-250V AC. Size:  $16 \times 16\frac{5}{8} \times 8$  in. Weight: 28 lb. Price: £110 5s.

● **PD102.**  $\frac{1}{2}$ -track transistorised stereo tape unit. Specification as for PD104. Price: £110 5s.

## TAPE AMPLIFIERS AND MIXER UNITS

**AMPEX (GREAT BRITAIN) LTD.,** Acre Road, Reading, Berkshire. Tel: Reading 84411. Cables: Videotape, Reading.

**Ampex 622 Speaker/amplifier.** Comprises 8 in. drive unit in special enclosure. Acoustically flat from 60 to 10,000 c/s. The built-in amplifier has 10 watts' output. FR 20-20,000 c/s  $\pm 0.5$  dB. Price on application.

● **Ampex MX10.** Stereo mixer unit. Inputs: 4 mic, or 2 mic 2 line. Mic 200 ohms, Line 100K bridging. Gain -67 dBm mic, -27 dBm line will produce 1V output. Up to 4 mixers may be coupled to give 12 in., 2 out channels. Output: 1V normal, 30V max unbalanced. FR 40-15,000 c/s. Signal/noise 65 dB for inputs of -55 dBm. Controls: 4 pots, two gang master gain. Key switches, Line/Mic AC line switch, mixer couple switch. Key switches, channel A, B or both. Four channels in, two out. Self-powered 105-125V, 30W. Size:  $5\frac{3}{2} \times 19 \times 5\frac{3}{8}$  in. Price on application.

● **Ampex MX35.** Identical to MX10, except in physical appearance.

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**BINSON.** See Modern Electrics Ltd.

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**BRENELL ENGINEERING CO. LTD.,** 231/5 Liverpool Road, N.1. Tel: 01-607-8271 (5 lines).

**Mk 5 Series 3 Record/playback amplifier.** Inputs: mic 2 Series 2 mV, radio/gram 75 mV, both high imp. Outputs: 500 mV into 47K. and 3W into 15 ohms for direct connection to loudspeaker. Headphone monitoring ME level ind. or meter if required. Price: £26. Meter: £5 5s. extra.

**Brenell Mixer Unit.** Three channel unit. High imp sources. There are 4 sockets for jack plugs

for the three inputs and the output lead, each input having a volume control. Price: £2 18s.

● **Hi-Fi Tape Link.** Stereo tape pre-amplifier and oscillator unit. 9 valves. Input (record): 75 mV stereo, 100 mV mono, into 1 megohm. Input (playback): 1.5 mV. Output: variable up to 1V at 47K. FR 40 c/s-14 Kc/s at tape speed  $7\frac{1}{2}$  i/s  $\pm 3$  dB. Equalisation to new CCIR at all speeds. Two level meters. H and N -50 dB. Controls: Tape speed compensation switch, variable bias, record track selector, monitor original/tape, record gain, playback gain, function. Separate mains unit 110-250V. DC heater supply. Suitable for Brenell three-head stereo decks,  $\frac{1}{4}$ - or  $\frac{1}{2}$ -track. Sizes: tape link  $13\frac{3}{4} \times 4 \times 8\frac{3}{4}$  in., front panel  $15\frac{1}{2} \times 4\frac{1}{2}$ . Power unit  $6\frac{1}{2} \times 4 \times 4$  in. Weight: 18 lb. including power unit. Separate record and playback pre-amplifiers. Price: £46.

● **STB2 Monitor amplifier.** See Tape Units section.



**DEIMOS LTD.,** 8 Corwell Lane, Hillingdon, Middx. Tel: Hayes 3561.

● **Deimos Tape Amplifier.** Stereo/mono Flexible tape amplifier system available with many alternative features to suit various decks and tape heads. Separate playback and record amplifiers. Basic input sensitivity: radio 50 mV, mic 0.5 mV. Cathode follower output. Equalisation for any standard speed or playback characteristic. Level indicator optional, meter or ME. Separate power supply available. Full details and prices on request.



**EAGLE PRODUCTS.** Distributors: B. Adler & Sons (Radio) Ltd., 32a Coptic Street, London, W.C.1. Tel: Museum 9606/7. Cables: Reldab, London.

**Model MM.4 4-Channel Microphone Mixer.** 4 high imp. inputs, with individual gain controls; max signal 1.5V. One output, max signal 2.5V. Self-powered (9V battery). Size:  $6 \times 3\frac{1}{4} \times 2$  in. Price: £2 12s. 6d.



**ELECTRONIC & SCIENTIFIC INSTRUMENTS (WORTHING) LTD.,** Distributors: Shirley Laboratories Ltd., 23 Ripley Road, Worthing, Sussex. Tel: Worthing 49098.

**Esimix Major.** Four-channel electronic mic and signal mixer. FR at full gain: 15 c/s-20 Kc/s  $\pm 2$  dB. H and N better than -50 dB. Channels

1 and 2 (mic): 2 mV input for 200 mV output; channels 3 and 4 (radio, etc): 100 mV input for 200 mV output. Cathode-follower output, permitting the use of long connecting lines without risk of hum. Self-powered. 230-250V AC. Price: £19 19s.; (4 mic version): £21.



**ESIMIX.** See Electronic and Scientific Instruments (Worthing) Ltd.



**A. R. FRANKLIN,** Audio Engineer, 41 Camden Mews, London, N.W.1. Tel: Gulliver 2340.

● **Mixers and tape amplifiers.** Built to customers' specific requirements. Wide range of facilities offered. Quotations on request.



**GRAMPIAN REPRODUCERS LTD.,** 19 Hanworth Trading Estate, Feltham, Middlesex. Tel: 01-894-9141/3. Cables: Reamp, Feltham.

**Grampian 18/4.** Four channel pre-amplifier mixer. Transistors. Inputs: 0.2 mV 25 ohms, 0.8 mV 600 ohms, 10 mV high impedance, 100 mV high impedance. Output: 0.775V. Output impedance: 600 ohms floating. Distortion <1.5%. Bass control: -8 dB at 100 c/s on mic,  $\pm 8$  dB on aux at 100 c/s. Treble control: +8 dB -25 dB at 10 Kc/s. FR 100 c/s-10 Kc/s  $\pm 3$  dB (tone controls level). Noise: -60 dB. Supply: PP9 (or equivalent) 9V battery. Consumption: average 18 mA. Jack socket outlet at rear. Size:  $11\frac{3}{8} \times 7 \times 2\frac{7}{8}$  in. Weight:  $4\frac{1}{2}$  lb. Price on application.

**Grampian 16/6.** Six-channel pre-amplifier mixer for professional sound engineers. Six independently controlled microphone inputs. On-off key switch for each input permits gain control to be preset if desired. Master gain control normally controls all channels but there is provision for some inputs to operate independently. Sensitivity: 0.2 mV input for 0.775V output. Output meter scaled for 1V with overload warning on scale, 1 mW indicated by red marker at 0.775V. Specially damped movement. Output impedance: 600 ohms floating. Distortion: <0.1% for 0.775 output. FR 100 c/s-15 Kc/s  $\pm 2$  dB with tone controls level. Bass cut: -10 dB at 100 c/s. Treble cut: -12 dB at 10 Kc/s. Treble lift: +6 dB at 10 Kc/s. H and N better than -65 dB. Input impedances from 200  $\mu$ V at 25 ohms to 100 mV at high impedance to order. Mains: 200-250V AC. Size:  $19\frac{1}{4} \times 7\frac{1}{8} \times 6\frac{3}{8}$  in. Weight:  $12\frac{1}{4}$  lb. Price and full specification on request.

**GRUNDIG (GREAT BRITAIN) LTD.**, Newlands Park, Sydenham, London, S.E.26. Tel: Sydenham 2211.

● **Stereo/Mono Mixer Type 608.** FR substantially flat, 30 c/s-20 Kc/s. Fully transistorised. Fed from two batteries type PP3 (or equivalent). Connecting sockets for two mics (left-hand and right-hand channels), a further mic, and connection of radio and stereo pickup. Mono/stereo output socket provided. Linear fading controls. Inputs from mono mic or radio connected to appropriate socket can be mixed with stereo programme, and with aid of a "Directional Control" these mono inputs may be mixed with either left- or right-hand channels, or combined with both. Coarse level controls provided, and two press buttons select appropriate mono signal and feed this to directional control. Size:  $9\frac{1}{2} \times 8 \times 3$  in. Weight:  $3\frac{3}{4}$  lb. Price: £18.



*Eagle MM.4 microphone mixer*

**HEATHKIT.** See Kit section.



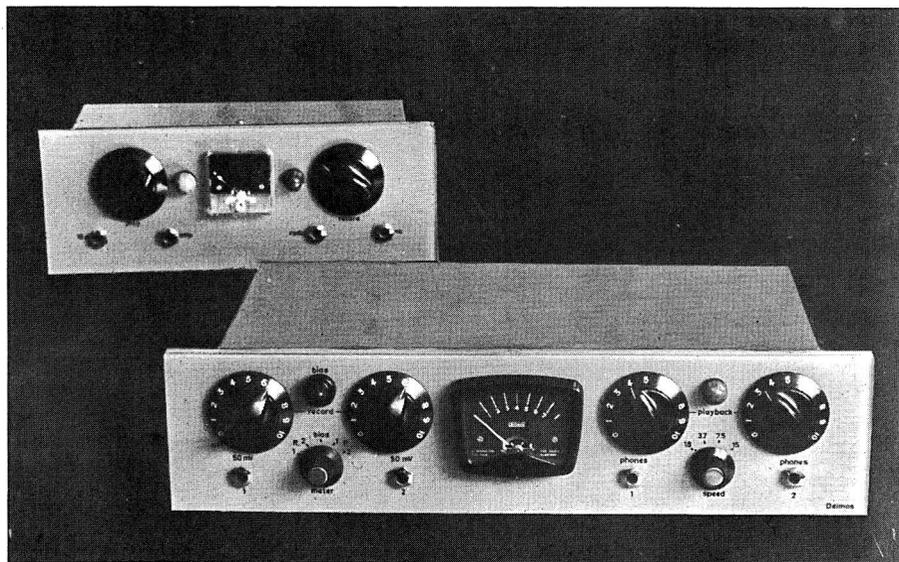
**THE LOWTHER MANUFACTURING CO.,** St Mark's Road, Bromley, Kent. Tel: Ravensbourne 5225. Cables: Lowther, Bromley.

**Companion Supply Unit No. 2.** HT and LT power supply suitable to power radio tuners. Pre-amp and tape bias amplifier. Output: 250V at 40 mA, 6.3V at 3 amps. Price: £8 15s.

**Companion Supply Unit No. 3.** HT and LT power supply suitable to power radio tuners. Pre-amp and tape bias amplifier. Output: 350V at 35 mA, 6.3V at 3 amps. Price: £8 15s.



*Binson Echorec Mk. 2*



*Deimos tape amplifier*

**LUSTRAPHONE LTD.**, St George's Works, Regent's Park Road, London, N.W.1. Tel: Primrose 8844. Cables: Lustraphon, London.

**M.U.577.** Transistor mixer unit. Inputs: 1 and 2 are balanced and are suitable for low imp. mics (line or high imps to order). 3 and 4 are high imp and suitable for radio or pu. High imp output. FR substantially flat 50-14,000 c/s. Power by mercury cell with 1,000 hours life. Alternative input and output imp to specification. Price, standard model: £22.

A range of transistorised power amplifiers, up to 50 watts, and complete public address systems. Model PPA/570. Price: £60. Details on application.

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**MODERN ELECTRICS (RETAIL) LTD.**, 120 Shaftesbury Avenue, London, W.1. Tel: Gerrard 9692. Cables: Modcharex, W.1.

**Binson Echorec Mark 2.** Pre-amplifier and echo unit. Enables echo to be imposed on any audio signal in a wide choice of timing. Facilities for the imposition of swell and reverberation. Three channels which can be selected as required. Completely portable. Operates from AC Mains supply. An exclusive design of magnetic wheel with transistorised circuitry. Price: £176 8s.

**Binson Echorec Export.** Simplified version of the Mark 2, for echo and swell. Price: £115 10s.

★

**PENCO PRODUCTS.** 36 Coniston Road, Kings Langley, Herts. Tel: Kings Langley 3134.

**Epigram mixers.** All-transistor circuits, battery operated. All models now made to order. Example: three-channel unit in case 12×3×2½ in. £16. Quotations on receipt of detailed requirements.

★

**PHILIPS ELECTRICAL LTD.**, Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437 7777. Cables: Phillamps, London.

**Philips EL3787A tape pre-amplifier.** Used in conjunction with Philips EL3553, EL3558, EL3556 and Stella ST462 and ST463 mono mains recorders the EL3787A pre-amplifier, together with additional equipment, offers the following facilities: playback of pre-recorded

stereo tapes; duoplay (playback of one track while recording on the parallel track); multiply (copying from one track to another and simultaneously adding an accompaniment). Price: £6 10s.

★

**SHIRLEY LABORATORIES LTD.**, 23 Ripley Road, Worthing, Sussex. Tel: Worthing 49098.

**TW/PA4.** Recording amplifier for use with high quality power amplifier. Inputs: 1.5 mV and 60 mV. Bias and erase oscillator. Full corrections. Valve voltmeter modulations level ind. For use with Wearite or Ferrograph tape decks (TW/PA4U for Planet decks), can be supplied to order for any deck. Size: 10×5½×5½ in. Psn from main amp or power pack can be supplied at £6 16s. 6d. Price: £34 13s.

● **TWA/1515HG.** Complete stereo record and replay amplifier. Inputs: radio 50 mV, gram. 5 mV (RIAA), mic 2 mV, tape 3 mV. Output: 12W per channel (17W peak). FR 45 c/s-25 Kc/s ±1 dB on radio input. Low distortion bias and erase oscillator included. Valve voltmeter level indicator. H and N -85 dB. Controls: bass, treble, vol., pre-set balance, meter pre-set, bias pre-set, sel, rec/replay, equalisation, mono/stereo. Heavy duty power pack on separate chassis. Size (control unit): 23×7½×7 in.; (power unit): 10×8×7½ in. TWP/1515HG for Planet decks. TWA/1515HG for Ferrograph decks. TWH/1515HG for Brenell and similar decks. Price: £115 10s.

★

**SOUND NEWS PRODUCTIONS**, 10 Clifford Street, New Bond Street, London, W.1. Tel: Regent 2745.

**Unimixer 1.** 3 channel unit. Channels 1 and 2 have independently controlled duplicate sockets for low or high imp mics 30 ohms or 400K approx. Recommended load imp not less than 500K ohms. FR from 30 ohm input 50-10,000 c/s ±3 dB. Price: £9 9s.

**Unimixer 2.** 3 channel unit. Inputs as above but high imp is 5 megohms in channels 1 and 2. Power supply needed 200/300V DC at 5 mA, 6.3V at 0.3 amps balanced. Special connectors available to obtain power supplies direct from Ferrograph or Vortexion recorders without any alteration. Price: £15 15s.

**STERN-CLYNE LTD.**, Head Office and mail order, 3-5 Eden Grove, Holloway, London, N.7. Tel: North 8161. Branches throughout: London, Liverpool, Manchester, Sheffield, Bristol and Nottingham.

**HF/TR3 Mk II.** Tape amplifier. Inputs: mic 25 mV, radio/pickup 300 mV. FR 35 c/s-17 Kc/s  $\pm 3$  dB at 15 i/s. Equalisation available for 15,  $7\frac{1}{2}$  and  $3\frac{3}{4}$  i/s or  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  and  $1\frac{3}{8}$  i/s. 3W output into 3,  $7\frac{1}{2}$  or 15 ohms. To Mullard design. Suitable for Brenell and Magnavox decks. Price with separate power unit: £19 (also available in kit form): £13 13s.

**Type C Mk II.** Tape pre-amplifier. Inputs: mic 0.5 mV, radio/pickup 250 mV. FR 30 c/s-17 Kc/s  $\pm 3$  dB at 15 i/s. Equalisation available for 15,  $7\frac{1}{2}$  and  $3\frac{3}{4}$  i/s or  $7\frac{1}{2}$ ,  $3\frac{3}{4}$  and  $1\frac{3}{8}$  i/s. Audio output: 250 mV. To Mullard design. Suitable for Brenell and Magnavox decks. Price with separate power unit: £19 10s. (also available in kit form): £14.



### TAPE RECORDER DEVELOPMENTS

**LTD.**, 7 King George Avenue, Bushey, Herts. Tel: Bushey Heath 2331.

● **TRD Tape Unit.** High quality stereo tape unit with self-contained oscillator and power pack. Output: 1V 600 ohms. Inputs: two mics (low impedance), two 100 mV into 470K. Input mixing. Variable bias readable on meter. Peak programme meter. Four-speed frequency correction on front panel. FR 15 i/s 40 c/s-25 Kc/s  $\pm 2$  dB,  $7\frac{1}{2}$  i/s-17 Kc/s  $\pm 2$  dB,  $3\frac{3}{4}$  i/s 40 c/s-9 Kc/s  $\pm 2$  dB,  $1\frac{3}{8}$  i/s 40 c/s-4.5 Kc/s  $\pm 2$  dB. SN (unweighted) 54 dB below normal max record level. HD 1% at max record level. Replay char DIN. Record and replay on upper or lower tracks, or both together. Output level control. Designed for use with TRD.1 Series tape decks (see Tape Deck section).

Full specifications and prices of TRD tape pre-amplifiers and decks on request.

**TELE-RADIO (1943) LTD.**, 189 Edgware Road, London, W.2. Tel: 01-723-4455.

● **Master Mixer.** Mono or stereo. Four-channel mono or two-channel stereo self-powered electronic mixer. Four inputs at high impedance: 3 mV in, 250 mV output. Cathode follower output. FR 20 c/s-20 Kc/s. All connections at rear by GPO type jack sockets. Mono/stereo switch. Valves: ECC83's and EZ81. Special input and output impedances (i.e. mag/ceramic PU, 30-50 or 600 ohms, etc) to order at from £3 10s. per channel. Size:  $14\frac{3}{4} \times 3\frac{3}{4} \times 9$  in. Finish: hammer grey case, black/gold perspex front panel. Cabinet mounting or free-standing. Price: (basic high impedance version) £26 5s.



**TRIPLETONE MANUFACTURING CO. LTD.**, 241a The Broadway, Wimbledon, S.W.19. Tel: Liberty 1189.

**Transistorised Pre-Amplifier.** For details see Amplifiers Section.



**UHER.** Distributors: Bosch Ltd., 205 Great Portland Street, London, W.1. Tel: Langham 2672/5.

● **A121.** Stereo/mono mixer unit. Input: 0.1 mV, 2K. Output approx: 30 mV. FR 20 c/s-20 Kc/s. Five glider controls. Five channels. Psn 9V. Price: £47 6s. 9d.



**VORTEXION LTD.**, 257/263 The Broadway, Wimbledon, London, S.W.19. Tel: Liberty 2841, 6242/3. Cables: Vortexion, London, S.W.19.

**Electronic mixers.** Various types of mixers available: 3-channel with accuracy within 1 dB. Peak programme meter. 4- 6- 8- 10- and 12-channel mixers. Also twin 5- 4- 3- 2-channel stereo. Tropicalised controls. Built-in screened supplies. Balanced line mic inputs. Outputs: 0.5V at 20K, or alternative 1 mW 600 ohms, balanced, unbalanced or floating. Prices on application.

## TAPE ACCESSORIES and COMPONENTS

**AGFA-GEVAERT LTD.**, 27 Great West Road, Brentford, Middlesex. Tel: Isleworth 2131. Cables: Artoveg, Brentford, Hounslow.

**Tape Accessory Kit.** Plastic case containing red, green and white leader tape, adhesive splicing tape, silver stop foil, non-magnetic scissors, tape clips and splicing template. Price: £1 10s.

**Splicing tape dispenser.** Price: 6s.

**Splicing Tape.**  $\frac{1}{4}$  in.  $\times$  80 ft. 7s. 6d.;  $\frac{1}{2}$  in.  $\times$  80 ft. 16s.

**Leader Tape.**  $\frac{1}{4}$  in.  $\times$  80 ft. Available in red, green, white and yellow. Price: 3s. 6d.

**Silver Stop foil.**  $\frac{1}{4}$  in.  $\times$  33 ft. Price: 6s. 6d.

**Novodur Plastic Library Boxes.**  $4\frac{1}{4}$  in. 6s.; 5 in. 6s.;  $5\frac{3}{4}$  in. 7s. 6d.; 7 in. 8s. 8d.

**Agfa Magnetron Empty Spools.** 3 in. 3s.; 4 in. 3s. 9d.;  $4\frac{1}{4}$  in. 4s.; 5 in. 4s. 3d.;  $5\frac{3}{4}$  in. 4s. 6d.; 7 in. 4s. 9d.;  $8\frac{1}{4}$  in. 7s.; 10 in. 12s. 3d.



**AKAI.** Distributors: Pullin Photographic Ltd., 11 Aintree Road, Perivale, Greenford, Middlesex. Tel: Alperton 1541. Cables: Pullinfoto, Greenford, Middlesex.

**Endless Tape AE-1.** Continuous spool formed by splicing together the two ends of the tape. Price: £3 11s.

**Telephone Pickup AS-2.** Miniature pickup coil with rubber suction attachment, screened lead and jack-plug. Price: £2 3s.

**Tape Splicer AS-3.** Easy action and rapid splicing. Price: £1 1s. 6d.

**Personal Phone AM-4 and AM-4P.** Personal phone complete with lead and plug. AM-4 has right-angled plug, AM-4P has perpendicular plug. Price (both models): 16s. 6d.

**Head de-magnetiser AH-6.** Mains-operated head de-magnetiser. Price: £2 10s.

**Bulk tape eraser ATE-7.** Compact mains-operated eraser accommodating reels from 3 in. to  $10\frac{1}{2}$  in. Push-button operation for power and tape rotation. Price: £13 2s.

● **Stereo Headphones ASE-8S.** Lightweight comfortable headphones specially designed for use with Akai recorders. Price: £5 19s.

**DIN Jack Connection Cord D100.** Consists of screened lead terminated at one end with a DIN plug and at the other with a DIN socket. Price: £1 6s.

**Remote Control 345-RC-11.** Designed for use with Akai recorder Model 345 and tape decks 345D and 345-NC. Provides remote operation of all essential controls. Price: £8 11s. 9d.

**$10\frac{1}{2}$  in. Extension Arms.** Permit the use of  $10\frac{1}{2}$  in. spools. Suitable for Model 345 recorder and 345D and 345-NC tape decks. Price: £12 15s.



**AKG. (Akustische und Kino-Geräte GmbH).** Distributors: Politechna (London) Ltd., 182-184 Campden Hill Road, Kensington, London, W.8. Tel: Park 0711/3, 5008.

**A.K.G. K50.** Dynamic headphones. FR 20-25,000 c/s. Impedance 75 ohms per earpiece. Suitable for stereo or mono. Weight: 80 grams. Price: £7 10s. Ear pads available.



**AMOS OF EXETER LTD.**, Weircliffe Court, Exwick, Exeter. Tel: Exeter 72132. Cables: Amos, Exeter.

**Weircliffe Bulk Erasers.** Models 6, 7, and 8. Model 6 accepts reels up to  $8\frac{1}{2}$  in. diameter of  $\frac{1}{4}$ -1 in. tape. Capacity 180-400 reels per hour. Model 7 accepts  $8 \times 8$  in. cassettes of  $\frac{1}{4}$  in. tape. Model 8 accepts reels of up to  $14\frac{1}{2}$  in. diameter containing tape from  $\frac{1}{4}$  in. audio up to 2 in. video including  $\frac{1}{2}$  in. and 1 in. instrument tape and 16 and 35mm film. Capacity 100-400 reels per hour. (NATO catalogue No. 5835-99-972-5371). Sizes (Models 6 and 7):  $11\frac{1}{2} \times 12\frac{1}{4} \times 7\frac{1}{2}$  in. Weight: 43 lb. Size (Model 8):  $20\frac{1}{2} \times 20\frac{1}{2} \times 10\frac{1}{2}$  in. Weight: 92 lb. Prices: Models 6 and 7 £32 (ex works), Model 8 £90 (ex works). Models available for 115V 60 c/s.

**Model 30.** Miniature bulk eraser for tape cassettes up to  $3\frac{3}{8}$  in. square and reels up to  $3\frac{1}{2}$  in. diameter. Suitable for  $\frac{1}{8}$  in. and  $\frac{1}{4}$  in. tape. Special quantity discounts on application. Price: £11 10s.

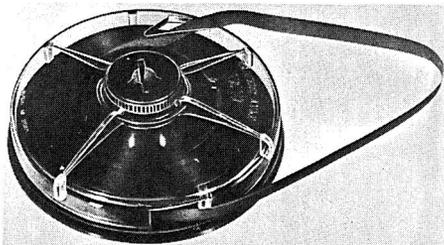
**Model 404.** Highly sophisticated automatic tape eraser for reels up to 16 in. diameter and all types of tape up to 70 mm. Capable of continuous 24-hour operation. Price (ex works): £410.



*Akai AP-2 telephone pickup*



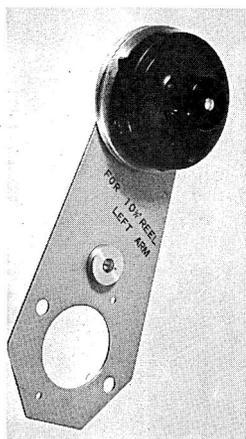
*Akai AS-3 tape splicer*



*Akai AE-1 endless tape*



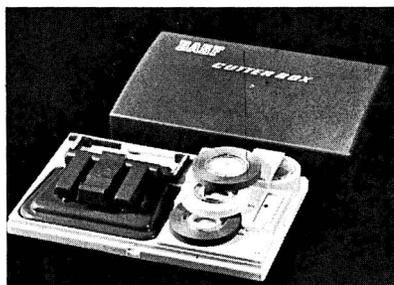
*AKG K50 headphones*



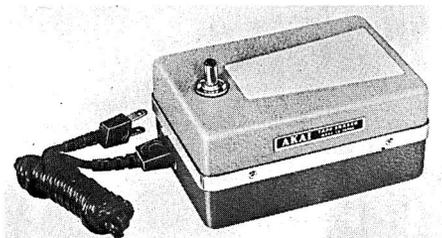
*Akai 10 1/2 in extension arm*



*Akai 345 remote control*



*BASF tape editing kit*



*Akai ATE-7 tape eraser*

**AMPLIVOX LTD.**, Beresford Avenue, Wembley, Middlesex. Tel: Wembley 8991. Cables: Amplivox, Wembley.

**Jetlite JL26.** Lightweight moving coil headphones. FR 20 c/s-20 Kc/s. Sensitivity: 0.5 mW produces comfortable listening level. Power input: 700 mW for 2% total distortion (3W momentary overload). Impedance: 200 ohms per earphone, may be connected in series, parallel or wired independently for stereo. Contoured earshells with detachable foam cushions. Fully adjustable headband. Special version with boom mic (JL266). Price on application.



**BASF UNITED KINGDOM LTD.**, 5a Gillespie Road, London, N.5. Tel: Canonbury 2011.

**Cutter Box.** Contains semi-automatic splicer, marking pencil, 33 ft 0.7 in. splicing tape, 80 ft each of red, white, green leader tapes, 50 6 in. lengths of stop foil and 25 spool labels in green and red. Price: £2 12s. 6d.

**Leader Tape Set.** Red and green leader tapes and 25 strips of stop foil. Price: 8s. 6d.

**Leader Tape.** In green, red or white for indicating track. 984 ft on plastic centre. Price: £1 10s.

**Splicing Tape.** 33 ft  $\frac{1}{4}$  in. 4s. 6d.; 80 ft  $\frac{1}{4}$  in. 11s.; 33 ft 0.7 in. 8s. 6d.

**Plastic Tape Clips.** Box of 10 clips. Price: 2s. 6d.

**Splicing Set.** Plastic box with bonding groove and 33 ft splicing tape. Price: 5s.

**Splicing Adhesive LG.** 1 oz bottle of splicing fluid for PVC tapes. Price: 7s. 6d.

**Spare Spools.** 3 in. 2s. 6d.;  $3\frac{1}{4}$  in. 3s.; 4 in. 3s.;  $4\frac{1}{4}$  in. 3s.; 5 in. 3s. 6d.;  $5\frac{1}{4}$  in. 3s. 9d.; 7 in. 4s.;  $8\frac{1}{4}$  in. 9s.;  $8\frac{3}{4}$  in. 9s.; 10 in. 11s.;  $10\frac{1}{2}$  in. 15s. 6d.



**BEYER.** Distributors: Fi-Cord International, Charlwoods Road, East Grinstead, Sussex. Tel: East Grinstead 21351.

**DT48.** Studio quality dynamic headphones. Response 16 c/s-18 Kc/s. Output level  $\pm 1$  dB 114 dB/mW. Impedance 5 or 25 ohms. Price: £30 15s. 6d.

**DT49.** Dynamic single earpiece. Response 30 c/s-13 Kc/s. Output level 111 dB/mW at 400 c/s. Impedance 15 ohms. Price: £10 5s.

● **DT96.** Ultra-lightweight dynamic headphones. Response 30 c/s-17 Kc/s. Output level: 110 dB/mW  $\pm 3$  dB at 400 c/s. Impedance  $2 \times 100$  ohms. Price: £10 14s. 6d.

**DT98.** Type DT96 lightweight headphones with lip mic attached. Designed primarily for use in language laboratories. Price: £21 9s.

**DT508.** Lightweight headphones with LR7 lead and potentiometer. Price: £10 5s.



**BRADMATIC LTD.**, 338 Aldridge Road, Streetly, Sutton Coldfield, Warwickshire. Tel: Streetly 3171.

A range of twin track high impedance sound heads, single hole fixing, pole pieces are cylindrically ground flush with caps. Screening cans available.

**Type 5 RP.** Combined record/replay head 0-0004 in. gap. Price: £3 5s.

**Type 6 RP.** Super fidelity record/replay head 0-0002 in. gap. Price: £3 15s.

**Type 5R.** Record only 0-0007 in. gap. Price: £3 5s.

**Type D5E.** Erase head. Price: £3 5s.

Full track versions of the above are also available.

● **Type ST-RP.** Stereo record/replay head. Price with screen can, without fixing stem: £6.



**A. BROWN & SONS LTD.**, 24-28 George Street, Hull. Tel: Hull 25413.

Tape recorder covers to suit most makes from £1 15s. to £9 9s.



**S. G. BROWN LTD.**, King George's Avenue, Watford, Herts. Tel: Watford 23301. Cables: Radiolink, Watford.

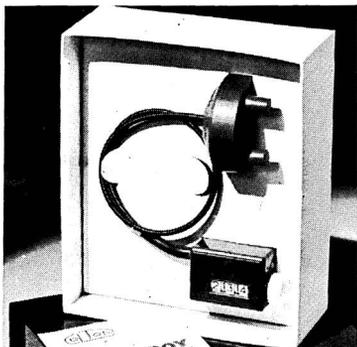
A range of headphones suitable for recording and dictating equipment, e.g. lightweight miniature model. Price: from £3 5s.



*A. Brown recorder cover*



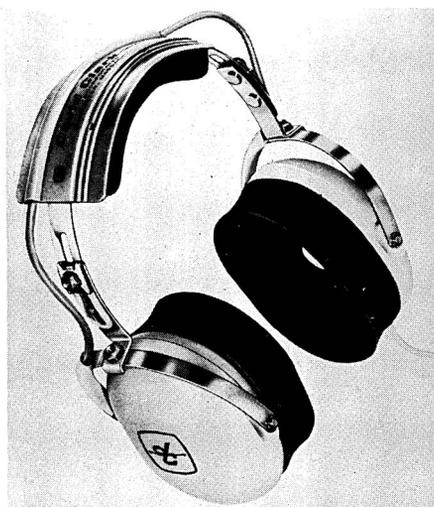
*Amplivox Jetlite JL26*



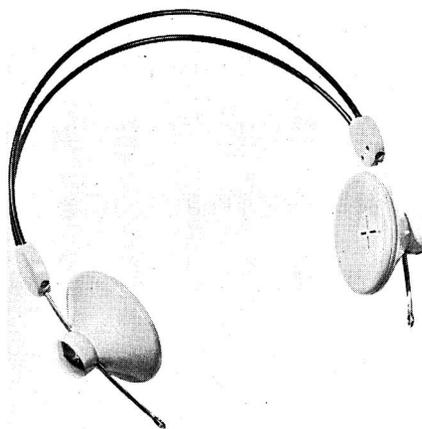
*Colton Call Boy*



*S. G. Brown dynamic headset*



*Clark 100*



*S. G. Brown diplomat headset*

**Super "K".** Moving coil headphones. Available as monaural or binaural. Price: £6 17s.

**Diplomat.** Lightweight, high quality headset. Frequency response substantially flat from 30 c/s-12 Kc/s. Price: £6 6s.

**Dynamic headset 4C 701 series.** High fidelity dynamic headset for both mono and stereo reproduction. Particularly applicable for language laboratories, recording studios and the partially deaf. Low impedance receivers. Robust construction. Wide range of adjustment enables headset to be fitted to small child or large adult. Circumaural earpads ensure weight taken on bone structure of the head rather than on the ears. Generous dimensions of earpads provide maximum comfort with large degree of ambient noise exclusion. Price: £6.

**Headset 102190.** Identical appearance to 4C 701 but capable of handling sound pressure level of 130 dB. Approved by Royal National Institute for the Deaf. Prices on request.

**Control Unit for use with headphones.** Stereo or mono. Separate volume control for each channel, allows compensation for hearing deficiencies. Channel-blend device for stereo use. Isolation transformer. Impedance matching to 15 ohms or 600 ohms. Price to be announced.



**BRUSH CLEVITE CO. LTD.,** Thornhill, Southampton. Tel: Southampton 48055. Telex: 47687.

● **Clevite headphones.** Lightweight stereo headphones with soft pliable ear cushions (removable for washing). FR 20 c/s-16 Kc/s. Impedance: 4-16 ohms. Distortion less than 1% at normal listening level. Weight: 10 oz. 10 ft cord with standard stereo plug. Price on request.



**CLARK.** Distributors: Elstone Electronics Ltd., Hereford House, North Court, Vicar Lane, Leeds 2. Tel: Leeds 39834/6.

● **Clark Model 100.** Moving coil headphones. FR 10 c/s-20 Kc/s. Distortion <0.2% at 100 phon level. Sensitivity: 1 mW input at 1 Kc/s produces 100 dB reference 0.0002 microbar (per phone). Maximum power input: 1W per phone. Impedance: 8 ohms. Weight: 16 oz. Eight-foot cord and two-circuit stereo plug. Moulded Cyclocac housings. Cushioned stainless steel headband. Highly compliant polyvinyl chloride ear cushions. Price: £21.

● **Clark Model 103.** Same specification as Model 100 except nominal impedance 300 ohms. Price: £21.

● **Clark Model 112.** Same specification as Model 100 except nominal impedance 1,200 ohms. Price: £23 2s.

● **Clark Model 200.** Moving coil headphones. FR 20 c/s-17 Kc/s. Sensitivity: 1 mW input produces 105 dB reference 0.0002 microbar (per phone). Maximum power input: 1W per phone. Impedance: 8 ohms. Weight: 17 oz. Six-foot cord with two-circuit stereo plug. Price: £15 15s.



**COLTON & CO. (LAPIDARIES) LTD.,** The Crescent, Wimbledon, London, S.W.19. Tel: Wimbledon 9401.

**Call Boy.** Counter-type position indicator, incorporating three-figure counter and reset wheel. Provides accurate cueing for tape recorders with no counter device. Fitted by means of a suction pad. Drive taken direct from spool, obviating slip and ensuring accuracy. Coupling device, used to connect the counter with the spool, can be placed into position, or removed, swiftly and without disturbing tape. Available in two spool fitting. Price: £2 2s.

**Precision level.** Spirit level of circular bubble type in white plastic case 1  $\frac{3}{16}$  in. diameter,  $\frac{1}{2}$  in. high. Three fixing holes provided or it may be secured with adhesive. Ensures accurate levelling in all directions. Price: 6s. 9d.

**Tape storage rack.** Constructed in heavy gauge welded wire finished in black polythene with matching or contrasting feet. May be used for tapes and books. Accommodation for 21 tapes. Sliding "tidy" keeps tapes upright when smaller quantity stored. Price: £1 1s. (U.K. purchase tax 1s. 6d.).



**CONTRONICS LTD.,** Garth Works, Deepcut Bridge Road, Blackdown, Camberley, Surrey. Tel: Deepcut 336.

**Carol CS/1.** Electronic synchronising unit for use with 8 mm cine projectors and stereo tape recorders. Price: £25.



**COUSINO.** Distributors: D. T. V. Group, 126 Hamilton Road, West Norwood, London, S.E.27. Tel: 01-670-6166.

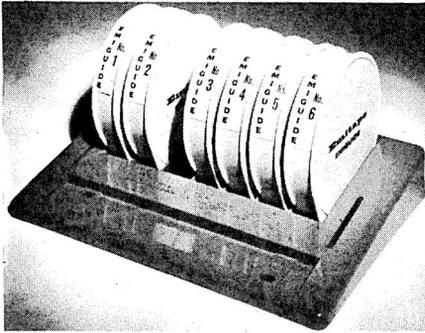
**Audio Vendor.** Single reel continuous loop tape magazine complete with friction-free tape.



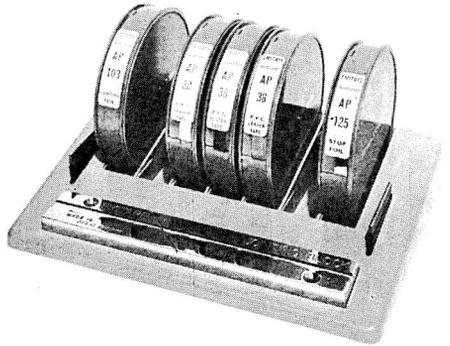
Clark 200



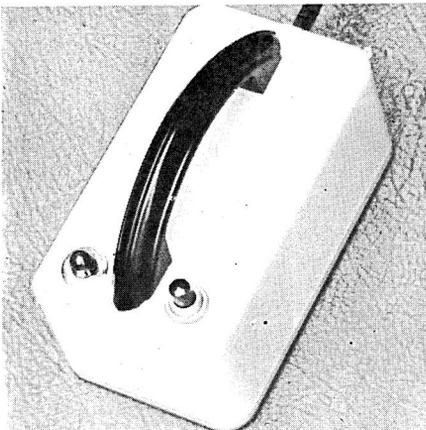
Eagle SE1 stereo headphone



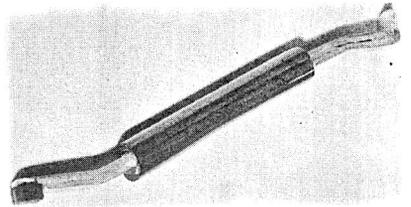
Emiguide AP 128



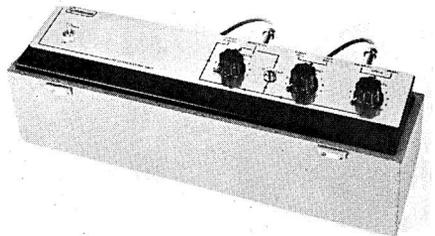
Emitape accessory kit API24



Global Mk. 2 bulk eraser



Global tape head cleaning tool



Gramplan reverberation unit

Versions for 3, 5, 8, 12, 15 or 30 mins running. Model C for clockwise feed reel rotation, Model CC for counter-clockwise. Prices: 3 min £3 7s. 6d., 5 min £3 15s., 15 min £4 16s., 30 min £9.

Various mounting accessories, spare magazines, anti-friction tape, etc. Details on request.



**CORAL.** Distributors: Denham and Morley Ltd., Denmore House, 173/5 Cleveland Street, London, W.1. Tel: Euston 3656/7.

● **Coral E-102.** Moving coil stereo headphones. Impedance: 16 ohms (matches to 1-30 ohms). Power input: 0.25W. FR over all audible range. Dampless moving coil cone units with flexible surround. Two yards four-core cable with jack plug. Weight: 0.85 lb. Price to be announced.

● **Coral E-103.** Similar specification to E-102 phones but with independent acoustic volume control on each earpiece. Price: £7 17s. 6d.



**EAGLE PRODUCTS.** Distributors: B. Adler & Sons (Radio) Ltd., 32a Coptic Street, London, W.C.1. Tel: Museum 9606/7. Cables: Reldab, London.

**TD.79 Tape Head Demagnetiser.** 250V mains operation. Price: £1 5s.

**T.635 Tape Splicer.** Complete with cutting and trimming blades. Price: 14s.

**S.E.1. Professional Stereo Headphones.** FR 25 c/s-14 Kc/s. 3 in. dynamic speakers. Isolated right and left channels. "Flexifoam" seals. Dual adjustment.  $\frac{1}{2}$ W input. Complete with control box for remote operation and impedance matching network. Price: £6 15s.

**S.E.21. Professional Two-way Stereo Headphones.** FR 25 c/s-18 Kc/s. Each headphone contains 2½ in. LF unit and  $\frac{5}{8}$  in. treble unit. Level controls and built-in attenuator to protect ears. Impedance 16 ohms. Stereo cable and plug. Adjustable headband. Foam rubber earpads. Price: £8 8s.

Prices quoted for Eagle products are approximate.



**ELSTONE ELECTRONICS LTD.,** Hereford House, North Court, Vicar Lane, Leeds 2. Tel: Leeds 39834/6.

**WAL Tape Eraser.** A mains operated tape demagnetiser, accommodates from 5 to 10 in. reels,

push button operated. Erases both tracks in a few seconds. Available for 200-250V 50 c/s or 111-125V, 60 c/s. Price: £6 18s. 6d.

**WAL D-MAG.** A mains operated head demagnetiser providing complete degaussing circuit. Suitable for erasing short passages from tape or striped film. Price: £2 10s.



**E.M.I. TAPE LTD.,** Blythe Road, Hayes, Middlesex. Tel: Hayes 3888. Cables: Emitape, London.

**Emiguide AP128.** Set of 6 instructional tapes, giving practical guidance in tape recording. Price: £2 11s. Available separately: 8s. 6d. each.

"**Emitape Guide to Better Recording**". All elements of tape recording described in straightforward terms by John Borwick. 56 pages fully illustrated. Price: 2s. 6d.

**Emitape Jointing Compound.** AP35 for CA base tape. AP77 for PVC base tape. A jointing fluid for making permanent welded joints in magnetic tape. Price: 7s. 6d. per bottle.

**Emitape Jointing Tape.** Adhesive jointing tape for simple and quick splicing and editing of magnetic tape. Price (AP102,  $\frac{3}{32}$  in. wide): 4s. 9d. per reel; (AP103,  $\frac{1}{2}$  in. wide): 7s. 6d. per reel.

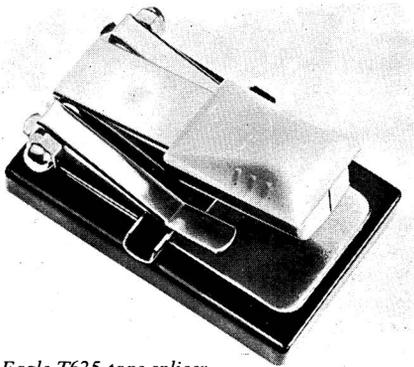
**Emitape PVC Leader Tapes.** A range of six coloured tapes to enable colour code references to be inserted in a reel of recorded tape for quick editing and indexing purposes. Packed in plastic dispensers. AP38/1 white; AP38/2 red; AP38/3 yellow; AP38/4 blue; AP38/5 orange; AP38/6 green; AP38/7 grey. Price: 4s. 6d. per reel.

**Emitape Jointing Block AP123.** The undercut channel holds the tape securely enabling a clean cut at 45° or 90°. Price: 10s. 6d.

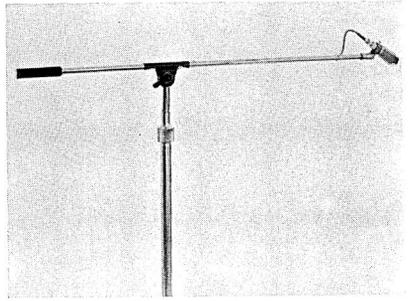
**Emitape Non-magnetic Scissors.** AP39. Made of non-ferrous metal, the scissors may be used for splicing magnetic tape without risk of magnetising, so ensuring a completely noiseless joint. Price: 16s.

**Emitape Accessory Kit AP124.** Holds three reels of coloured leader tape, 1 reel of jointing, 1 reel of stop foil, 1 Emitape jointing block, 2 cutters. Packed in plastic rack (to hold 7 spools), designed for the workbench. Price: £1 17s. 6d.

**Emitape Metallic Stop Foil.** AP125. Sufficient for 50 tapes. In plastic container. Price: 6s. 6d.



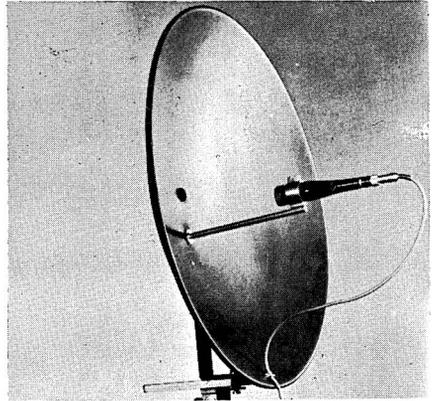
*Eagle T635 tape splicer*



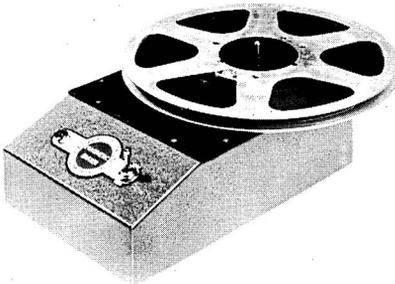
*Grampian boom arm*



*Grampian G7 matching unit*



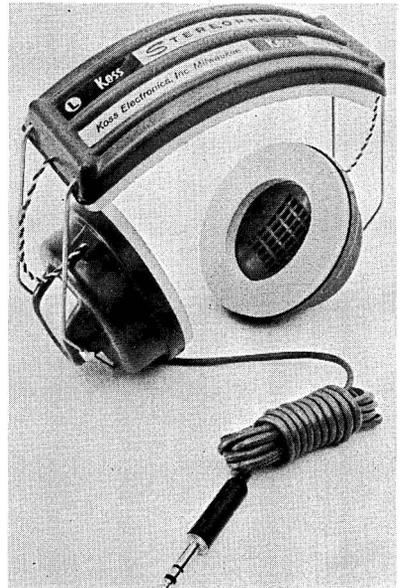
*Grampian Parabolic reflector*



*Harvey bulk eraser*



*Koss T5 remote control*



*Koss SP3X stereo phones*

**Emitate Plastic Spools in cartons.** Price (AP93, 3 in.): 2s. 6d.; (AP93N,  $3\frac{1}{4}$  in.): 3s.; (AP84, 4 in.): 3s.; (AP85, 5 in.): 3s. 6d.; (AP86,  $5\frac{3}{4}$  in.): 3s. 6d.; (AP87, 7 in.): 4s.; (AP88,  $8\frac{1}{4}$  in.): 8s. 6d.

**Emicase.** Polystyrene containers. Price (AP113, 3 in.): 2s.; (AP114, 4 in.): 3s.; (AP115, 5 in.): 3s. 6d.; (AP116,  $5\frac{3}{4}$  in.): 3s. 6d.; (AP117, 7 in.): 4s.

**Emitate plastic spool in library case.** Self-standing library case with empty spool and index. Compact programme storage. Price (AP143, 3 in.): 2s. 6d.; (AP144, 4 in.): 4s.; (AP145, 5 in.): 5s.; (AP146,  $5\frac{3}{4}$  in.): 5s.; (AP147, 7 in.): 6s.



**FERROGRAPH CO. LTD.,** Ferrqgraph House, 84 Blackfriars Road, London, S.E.1. Tel: Waterloo 1981.

**Tape heads.** FP16 stereo stacked. Price: £7 7s. FR7A upper track. Price: £4 14s. 6d. CL7 lower track. Price: £5 15s. 6d.

**Head lift transformers.** Suitable for FP17, FR7A and CL7 heads. Price: £2.

**Carrying case.** Waterproof canvas case with zip fastener. Price: £3 18s.

**Plugs.** SP7 screened plug with aluminium body and cable clamp. Price: 7s. UP7 unscreened plug with insulated body. Price: 5s.

**Endless loop cassette.** Permits Ferrograph to be operated continuously on an endless loop of 8 mins duration at  $7\frac{1}{2}$  i/s. Price: £7.

**Defluxer.** For depolarising heads, capstans and guides. Ensures maximum signal/noise ratio. Prevents hiss and protects tapes from cumulative background noise. Price: £3.

**Ferrotape spools.** Aluminium, anodised grey. Hublok gives instant tape attachment and locks reel on spindle to prevent chatter. Prices: 7 in. 10s. 6d.;  $8\frac{1}{4}$  in. 12s. 6d.



**GEVAERT.** See Agfa-Gevaert Ltd.



**GLOBAL PRODUCTS,** P.O. Box No. 1, Rothwell, Kettering, Northants.

**Bulk eraser Mk 2.** Hand-operated bulk eraser housed in die-cast aluminium case  $4\frac{1}{2} \times 3\frac{1}{2} \times 3\frac{1}{2}$

in. finished in hammer blue. Single push-button control with neon indicator to show when "on". Transformer double-insulated and instrument earthed via two yards three-core mains lead. Versions for 100-130V and 200-250V. AC only. Weight: 3 lb 2 oz. Price: £5 14s. 6d.

**Head assembly cleaning tool.** Felt polisher and fibre scraper mounted on aluminium shaft with centre plastic grip enables heads, guides, pinch-wheels, etc. to be reached for cleaning. Special materials cannot harm tape head faces. Price: 5s.



**GRAMPIAN REPRODUCERS LTD.,** Hanworth Trading Estate, Feltham, Middx. Tel: 01-894-9141. Cables: Reamp, Feltham.

**Grampian G.7.** Matching units, consisting of double wound transformer in a Mu-metal case with jack socket on the primary and a screened lead on the secondary. Dimensions:  $3\frac{3}{8} \times 1\frac{1}{4}$  in. diameter. Versions available for matching 15/30 ohms, 600 ohms and 50,000 ohms or greater. Price: £3 10s.

**Grampian Parabolic Reflector.** Diameter 24 in., depth 5 in. Gain 14 dB over range of 500 c/s to 5,000 c/s. To take Grampian DP4 and DP6 mics. Weight:  $4\frac{3}{4}$  lb. Price: £6 10s.

**Grampian Reverberation Unit.** Self-contained portable unit, transistorised and operated from internal dry batteries. Independent input channels, low level and high level. Output 1V, 600 ohms. Size (including detachable lid):  $17\frac{1}{2} \times 5\frac{1}{4} \times 6\frac{1}{4}$  in. Weight: 12 lb. Price: £52 (batteries extra). Mains unit available.

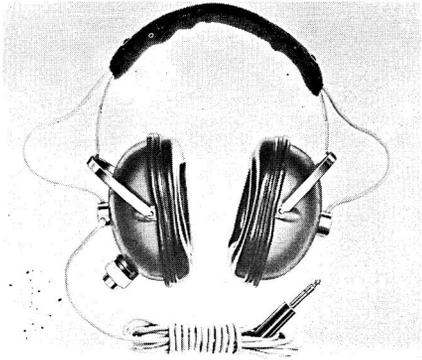
**Boom arm.** Suitable for use with various types of mics and stands. The clamp, locked by a single lever, allows the reach and angle to be readily adjusted as required. Length: 34 in. Weight:  $1\frac{3}{4}$  lb. Thread termination for mic  $\frac{5}{16}$  in. BSF male, thread termination for stand  $\frac{3}{8}$  in.  $\times$  27 tpi female. Supplied with adaptor to  $\frac{1}{16}$  in. BSF female. Adaptors for other sizes available. Price: £5.

**Windshields.** For use with DP4, DP6 and DP8 mics. Pressure moulded cage with an inner lining and acoustic resistance network to reduce air turbulence to a low value. Size:  $2\frac{3}{4}$  in. diameter. Weight:  $\frac{3}{4}$  oz. Price: 17s. 6d.

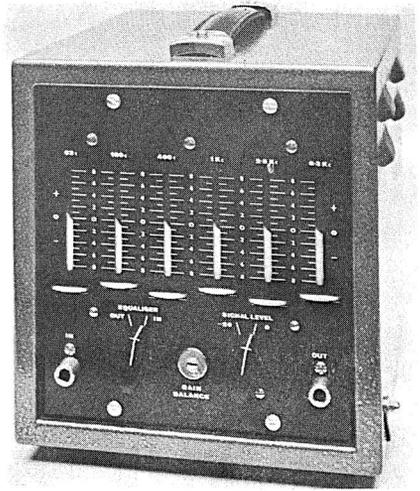


**GRUNDIG (GREAT BRITAIN) LTD.,** Newlands Park, Sydenham, London, S.E.26. Tel: Sydenham 2211.

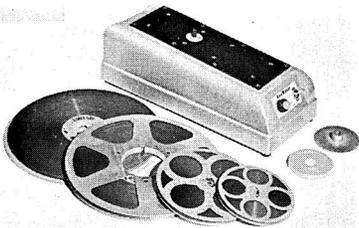
**Sona Dia.** Designed to synchronise a tape recorder with automatic slide change projector.



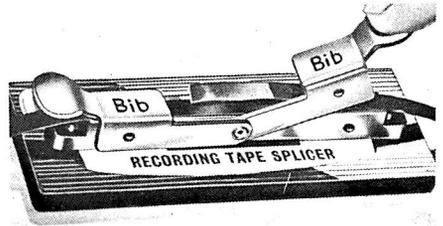
*Koss PRO-4 stereo phones*



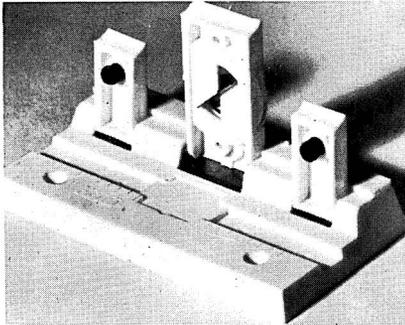
*Leavers-Rich six-band equaliser*



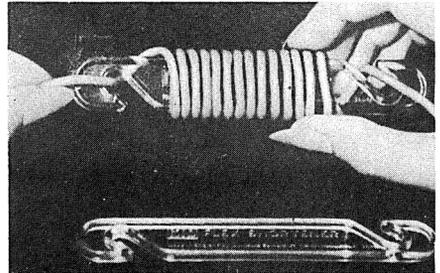
*Leavers-Rich Leeraser ER32B*



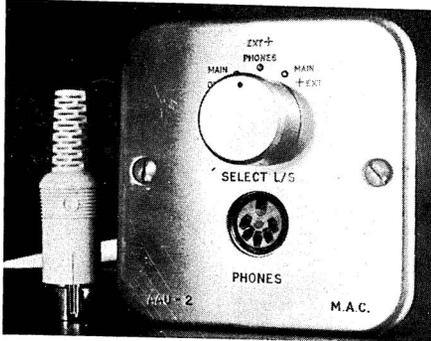
*Bib tape splicer*



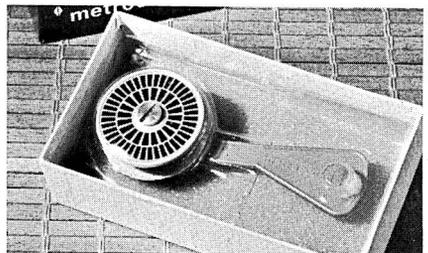
*Metro-Splicer*



*Multicore "Bib" flex tidy*



*M.A.C. Adapter Units*



*Metro-Sound tape strobe*

Recording sense: lower  $\frac{1}{4}$ -track. Power consumption 3W. Control Pause Frequency 100 c/s. Price: £15 15s.



**HARVEY ELECTRONICS LTD.**, 308 Farnborough Road, Farnborough, Hants. Tel: Farnborough (01-AL2) 41129. Cables: Harvelec, Farnborough, Hants.

A range of bulk erasers for 200-250V or 100-130V mains, 40-60 c/s. Smallest model will take  $3\frac{1}{4}$  to 5 in. spools of  $\frac{1}{4}$  in. tape, and the largest  $3\frac{1}{4}$  to 12 in. spools of 1 in. tape. Special versions for wider tapes up to 35 mm. Prices: from £6 5s. to £15 10s.



**ILFORD.**, 201/3 Wardour Street, London, W.1. Tel: Regent 8731.

**Splicing tape.** 108 ft  $\times$   $\frac{1}{4}$  in. Price: 3s. 6d.

**Metallic Stop Foil.** 100 ft  $\times$   $\frac{1}{4}$  in. Price: 4s. 6d.



**KOSS.** Distributors: Tape Music Distributors Ltd., 11 Redvers Road, London, N.21. Tel: Bowes Park 0152.

● **SP3X.** Stereo headphones. Response 10 c/s-15 Kc/s. Impedance 4-16 ohms. Moving coil. Sponge foam earpads. Distortion less than 1% at maximum audio output. 8 ft 4-way lead. Weight: 15 oz. Supplied with adaptor plate to facilitate use with mono and stereo systems. Colour: dark brown with beige ear and head cushions. Price: £9 18s.

● **PRO-4.** Professional quality stereo headphones. Response 30 c/s-20 Kc/s. Impedance 4-50 ohms. Moving coil. Fluid-filled ear cushions. Boom mic attachment. Distortion less than 1% at maximum audio output. 8 ft 4-way lead. Weight: 19 oz. Ear cushions removable for washing. Colour: grey-green cups with green ear cushions. Price: £17 10s.

● **T-5.** Remote control listening station. The T-5 box can be placed in the most convenient spot and separate gain controls for each channel enable balance and volume to be set precisely at the listening position. Switch to cut off speakers and jacks for stereophones. Size:  $5\frac{7}{8} \times 3\frac{1}{8} \times 2\frac{7}{8}$  in. Weight: 14 oz. Price: £4.

● **KO-727.** Sensitive stereo headphones. Will accept up to 60W (music) per channel. Suitable for 4, 8 or 16 ohms output. Removable foam filled ear cushions. Eight-foot coiled cord for

added convenience. Distortion < 1% at maximum output. Fully adjustable earpieces. Price: £13 15s.

● **T-1.** Matching unit comprising neat moulded case containing matching transformers for monitoring 600-10,000 ohm outputs. Jacks for two sets of Koss stereophones. Price: £4.

● **EC-20.** Extension cord fitted with stereo jack-plug and socket. Adds 20 ft to the length of normal stereophone lead. Price: £3.



**LEEVEERS-RICH EQUIPMENT LTD.**, 319 Trinity Road, Wandsworth, London, S.W.18. Tel: Vandyke 9054/6. Cables: Leemag, London, S.W.18.

**LeeRaser.** Junior ER30A; Standard ER31B; Senior ER32B. Ultra rapid demagnetisers for spools of tape and accessories. Price: £7 10s.; £10; £20.

**6 Band Audio Equaliser Model 46X.** Wide range equaliser covering spectrum in 6 separately adjustable and overlapping bands, suitable for use in transcription to match widely differing recordings to a common quality standard. Price: £166.



**LENNARD DEVELOPMENTS LTD.**, 7 Slades Hill, Enfield, Middlesex. Tel: Keats 0601.

**Dry-splice.** Pre-cut splicing tape for editing, repairing and splicing magnetic recording tape. No need for splicing block, scissors, razor blades, etc. Applied in same manner as self-adhesive plasters. Especially suitable for beginners and where speed is required. Supplied in packets of 24 splices with cardboard applicator. Price: 3s. 9d.



**M.A.C. ELECTRONIC COMPANY**, Villacosta, Portsmouth Road, Ripley, Surrey. Tel.: Ripley 3377.

**Audio Adaptor Units**, providing input and output connections for tape recorders, etc. Satin chrome front panel measuring 3 by 3 ins, depth 3 ins.

**AAU-1.** Front panel fitted with 2 DIN sockets, for record/replay. Four 24-in. screened leads fitted with phono plugs. Price: £3 12s. 6d.

**AAU-2.** Front panel fitted with selector switch and DIN socket for headphones. Screw terminals at rear for connecting two pairs of speakers. Switching between headphones and speakers. Price: £3 19s. 6d.

**AAU-3.** Front panel fitted with selector switch and DIN socket. Four phono sockets at rear for inputs 1 and 2. Two 24-in. screened leads fitted with phono plugs. Switching three inputs and two outputs. Suitable for tape, tuners, pick-ups, etc. Price: £4 2s. 6d.

**AAU-4.** Front panel fitted with selector switch and DIN socket. Four phono sockets at rear for connecting internal recorder, four 24-in. screened leads fitted with phono plugs. Switching record/replay between two tape recorders. Price: £4 7s. 6d.



**MASTERTAPE (MAGNETIC) LTD.,** Colnbrook, Slough, Bucks. Tel: Colnbrook 2431.

**Splicing kit.** Contains five reels leader tape, one reel metallic strip, one reel adhesive, plastic splicer. Price: £1 1s.

**Empty spools in boxes.** 3 in. 2s. 3d.; 4 in. 3s.; 5 in. 3s. 6d.; 5½ in. 3s. 9d.; 7 in. 4s. 4d.; 8¼ in. 5s. 6d.

**Leader Tape.** Colours: red, white, blue, green, yellow. Price: 2s. 6d.

**Metallic Strip.** Price: 4s. 6d.



**MBELECTRONIC.** Distributors: Denham and Morley Ltd., Denmore House, 173/5 Cleveland Street, London, W.1. Tel: Euston 3656. Cables: Denmorl, London, W.1.

●**K64.** Dynamic headphone for mono or stereo. FR 20 c/s-17 Kc/s. Impedance 200 ohms. Power requirements 60 mV/system. Weight: 5 oz. Round or oval earpads. Connection: two single screened leads 5 ft 9 in. long. Price: £6 6s.

●**K65.** Dynamic headphone for mono or stereo. Similar specification to K64 but with the addition of boom mounted moving coil mic K84N. Price: £10 10s.

●**K85.** Dynamic headphone for mono or stereo. Standard model 200 ohms. Other impedances available 50, 100, 700 and 1,500 ohms. FR 20 c/s-17 Kc/s. Power requirements 60 mV/system. Weight: 5 oz. Round or oval earpads. Price: £13 2s. 6d.

**METRO-SOUND MANUFACTURING CO. LTD.,** Bridge Works, Wallace Road, Canonbury, London, N.1. Tel: Canonbury 8641. Cables: Metrosound, London, N.1.

**Metrostrobe.** New design stroboscope for checking accuracy of tape recorder speeds at 3¾-7½ i/s and 15 i/s. Dials included for 50 c/s and 60 c/s. Price: 12s. 6d.

**Klenzatape.** Cleaning outfit for removing oxide deposits, dirt, etc. from tape heads *in situ*. Comprises a length of brushed velvet rubber-backed cleaning tape, two 3 in. spools and a bottle of cleaning fluid. Price: 13s. 6d. Replacement fluid 4s., replacement tape 6s.

**Metro-Tabs.** Set of coloured identifying tabs for affixing to recording tape. Visible on the wound spool and may be catalogued on the folder supplied. Price: 3s. 11d.

**Metro-Brush.** Made with specially angled Feathersoft Nylon for cleaning inaccessible places on tape decks, ciné cameras, projectors, etc. Price: 2s. 6d.

**Metro-Splicer.** Suitable for splicing tape and 8 mm ciné film. Cuts at any angle. Non-magnetic blade. Price: 15s.

**Leader Tapes.** Five colours. Price (each): 4s. 6d.

**Stop Foil.** Price: 4s. 6d.

**Spirit Level.** Price: 6s.

**Lubricating Kit.** Price: 6s.

**Tape Accessories Set.** Contains Klenzatape, Metro-Splicer and Metro-Brush. Price: £1 10s.

**Tape Splicing Block.** Precision splicer with stainless steel non-magnetic cutter. Price: 9s. complete.

**Maintenance Kit.** Tape recorder mechanical maintenance kit. Price: £1 16s.



**MINNESOTA MINING AND MANUFACTURING COMPANY LTD.,** 3M House, Wigmore Street, London, W.1. Tel: Hunter 5522. Cables: Minnesota, London.

**Scotch Accessory Kit.** Contains Splicer, roll of No. 41 Splicing tape on dispenser, roll of No. 24 White Leader and Timing tape, cutter. 10 magnetic tape fastening clips. Price:

£1 14s. 6d. Available separately: Tape clips. Price (per packet of 10): 2s. 6d. No. 24 Leader and Timing Tape. Price ( $\frac{1}{4}$  in.  $\times$  100 ft): 6s. No. 41 Splicing Tape ( $\frac{1}{2}$  in.  $\times$  150 in.): 3s. 6d., ( $\frac{7}{32}$  in.  $\times$  66 ft): 4s. 6d., ( $\frac{1}{2}$  in.  $\times$  66 ft): 6s. 6d. No. 51 Sensing Tape. Price ( $\frac{7}{32}$  in.  $\times$  150 in.): 14s.

**Scotch Empty Spools.** 7 in. 5s.;  $5\frac{3}{4}$  in. 4s. 6d.; 5 in. 4s.; 4 in. 3s. 9d.; 3 in. 3s.

**Scotch Self-Threading Spools.**  $5\frac{3}{4}$  in. 7s. 11d.; 7 in. 8s. 11d.

**Scotch Tape albums.** See magnetic tape section.



**MULTICORE SOLDERS LTD.,** Multicore Works, Hemel Hempstead, Herts. Tel: Hemel Hempstead 3636.

**The "Bib" Tape Splicer.** This splicer enables the tape to be joined easily and to be edited to the accuracy of a syllable. Supplied complete with razor cutter and mounted on flock-covered panel. Price: 18s. 6d.

**The "Bib" instrument cleaner.** Ideal for cleaning tape heads, plastics, instrument panels, etc. Does not smear, is anti-static. Size A plastic bottle. Price: 4s. 6d.

**The "Bib" flex shortener.** Keeps your equipment leads neat, tidy and out of harms way. Made in clear plastics and supplied in packs of four. Price: 2s. 6d. per pack.

**The "Bib" tape head maintenance kit.** Applicators, polishers, brush, cleaner, tissues and instructions. Packed in blue plastic wallet. Price: 12s. 6d.



**OSMABET LTD.,** 46 Kenilworth Road, Edgware, Middlesex. Tel: Stonegrove 9314.

**"Instant" Bulk Tape Eraser and Recording Head Demagnetizer.** Operates from AC mains to provide rapid and complete erase of tapes prior to making quality recordings. Weight: 18 oz. Price: £1 15s.



**PHILIPS ELECTRICAL LTD.,** Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437-7777. Cables: Phillamps, London.

● **EL3787 pre-amplifier.** Designed for use with Philips and Stella  $\frac{1}{4}$ -track mono mains-operated

recorders which have stereo socket and first stage input transistor circuit. The EL3787 pre-amplifier, together with additional equipment, offers the following facilities: playback of pre-recorded stereo tapes, duo-play (playback of one track while recording on parallel track), multiplay (copying from one track to another and simultaneously adding an accompaniment). Price: £6 10s.

**EL1995 slide synchroniser.** For use with most tape recorders and automatic slide projectors (max voltage 30V, max current 1A). Supply: 9V battery. Price: £12 12s.

**EL1998 supply unit.** Mains supply unit (switchable  $7\frac{1}{2}/9V$ ) for operating Philips and Stella battery tape recorders and record players from the mains. Price: £5 12s.

**EL3794/00A.** Car housing unit for use with EL3300, EL3301 and EL3301T tape recorders. Price: £12 12s.

**EL3794/00B.** Car housing unit for use with EL3302 tape recorders. Price: £12 10s.

**EL3962/02.** Two-way mono microphone connection/extension box. Price: £1 15s.

**Empty spools.** 3 in. 2s. 6d., 4 in. 3s., 5 in. 3s. 6d.,  $5\frac{3}{4}$  in. 3s. 9d., 7 in. 4s.

**Leader Tapes.** White, green, red, blue. 32 ft reels. Price: 2s. each.

**Switching foil.** 16 ft reels. Price: 2s. 9d.

**Adhesive jointing tape.** 32 ft reel. Price: 5s.

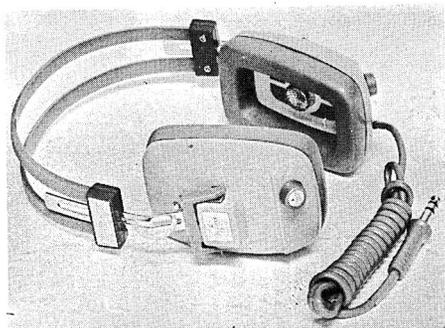
**EL1901/50. Splicing kit.** Contains white, green, red and blue leader tape, switching foil, adhesive tape, adhesive labels, cutting blade, splicing jig and instructions. Contained in plastic case. Price: £1 3s.

**Stethoscope headphones.** Various models. For use with Philips and Stella recorders. Price: (mono) £3 10s.; (stereo) £5 10s.



**PIONEER.** Distributors: Swisstone Ltd., 48a Station Road, Cobham, Surrey. Tel: Cobham 2853 and 4214.

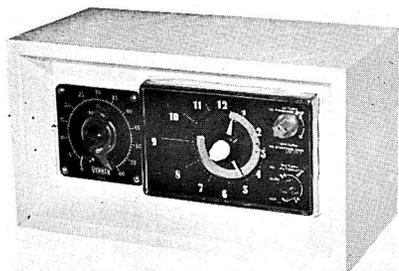
● **SE-21.** Two-way stereo headphones. Each earpiece comprises  $2\frac{1}{2}$  in. LF unit and  $\frac{3}{8}$  in. HF unit. Individual level controls. Built-in overload protection attenuator. Fully adjustable. Lightweight with soft rubber earpads. *Price on request.*



*Pioneer SE-21 P headphones*



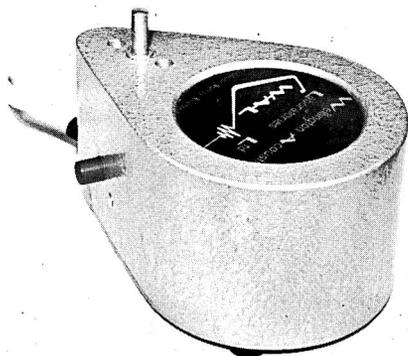
*Sennheiser HD.110*



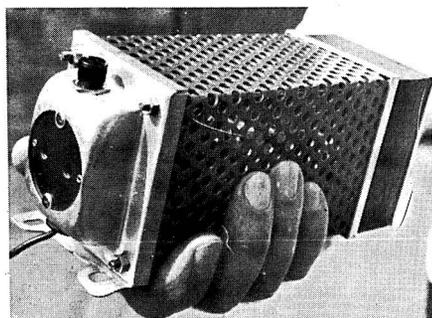
*Symphony model B tape timer*



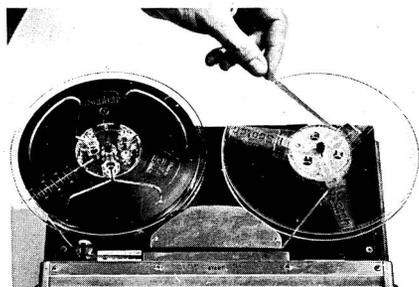
*Wearite Defluxer*



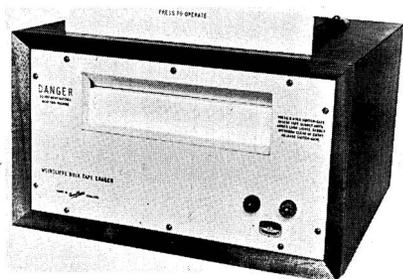
*WAL tape eraser*



*Valradio type 12/35T DC converter*



*Scotch self-threading reel*



*Weircliffe bulk eraser*

**REVOX.** Distributors: C. E. Hammond & Co. Ltd., 90 High Street, Eton, Windsor, Berks. Tel: Windsor 63388. Telex: 84316.

**Slide-o-matic.** Transistorised accessory for the Revox 736 stereophonic tape recorder which enables pulses to be recorded for the remote control of automatic transparency projectors. Price: £17 17s.

**Multiplex filter.** Transistorised, for recording stereo multiplex broadcasts. Price: £12.



**SCOPETRONICS LTD.,** Crown Works, Church Road, Kingston-upon-Thames, Surrey. Tel: Kingston-upon-Thames 1275/4135.

**Scopetronics Tape Heads.** Full-track,  $\frac{1}{2}$ -track, stereo  $\frac{1}{2}$ -track, stereo  $\frac{1}{4}$ -track. All heads same size and fixing. Impedances to suit customers' requirements. Also commercial heads for drum and ciné use. Prices and further details on application.



**SCOTCH.** See Minnesota Mining and Manufacturing Co.



**SENNHEISER ELECTRONICS.** Distributors: Audio Engineering Ltd., 33 Endell Street, London, W.C.2. Tel: Temple Bar 0033.

● **HD.110 Stereo Headphones.** Wired for mono and stereo. Robust design. Removable washable ear cushions. Easily replaceable cable. FR 20 c/s-20 Kc/s. Impedance: 200 ohms  $\pm 15\%$  per earpiece. Output: 1 mW per capsule produces 98 dB (16  $\mu$ bar) at 1 Kc/s. Maximum output: 120 dB (200  $\mu$ bar) for 1% distortion. Weight: 258 gms. Price: £19 17s.



**SHURE ELECTRONICS LTD.,** 84 Blackfriars Road, London, S.E.1. Tel: Waterloo 6361.

● **Solophone SA-2E.** Provides personal stereo listening for one or two people. Gives sufficient amplification to accept output from any high quality cartridge (for example Shure Stereo Dynetic range), tape deck or FM tuner. There are input selector switch, separate volume controls for each channel and two headphone jacks mounted on the front panel. Size:  $10\frac{1}{2} \times 3\frac{1}{2} \times 3$  in. Weight: 2 lb. Mains 240V 50 c/s. Price: £16 16s.

● **M61 Series.** Stereo pre-amplifiers designed to permit magnetic cartridges and tape heads to be used with amplifiers not having the necessary input sensitivity. M61 Series amplifiers provide amplification and equalisation for tape and discs. Also suitable for mic input. FR 25 c/s-15 Kc/s  $\pm 2.5$  dB. Input impedance: 47K at 1 Kc/s. Output impedance: low ( $< 1K$  at 10 Kc/s). Separation:  $> 50$  dB at 1 Kc/s. H and N  $-50$  dB. Size:  $5 \times 5\frac{1}{2} \times 2$  in. Price: (M61-2 mains operated) £12; (M61-3 battery operated) £9 10s.

● **Jensen HS2 headset.** High quality headset. Fully adjustable. Wired for stereo or mono. Full details on request. Price: £14 14s.



**STC LTD.,** Acoustic Sub-Division, West Road, Harlow, Essex. Tel: Harlow 26811.

● **Stereo headset.** FR 30 c/s-15 Kc/s  $\pm 4$  dB. Sensitivity 1 dyne/volt  $+ 50$  dB. Impedance 300 ohms. Transformer fitted. Foam rubber earpads. Price: £7 7s.



**SYMPHONY AMPLIFIERS LTD.,** 16 King's College Road, London, N.W.3. Tel: Primrose 3314/5.

● **Model A Tape Timer Unit.** Contains special electric Timer Unit with normal 12 hour dial. Neon Indicator. Fitted to take 13 amp or 15 amp socket for mains output on the back of the cabinet. Mains input is by flying lead. Price: £10 10s.

**Model B.** Similar to Model A, but in place of the neon indicator there is a special Process Timer with readings in one minute divisions up to 60 minutes. Price: £16 16s.



**TAPE RECORDER SPARES LTD.,** Harmsworth House, 9 Harmsworth Street, London, S.E.17. Tel: 01-735-9683.

● **Tape Head Cleaning Brush.** Specially designed slim style brush with angled head for cleaning heads and guides, inside recorder sound channel, etc. Price: 4s. 3d.

Comprehensive range of plugs, sockets, jack-plugs, connecting leads and inter-connecting leads for all makes and models. Available through all tape recorder retailers. Illustrated list on request.

**TELEFUNKEN.** Distributors: A.E.G. (Great Britain) Ltd., Lonsdale Chambers, 27 Chancery Lane, London, W.C.2. Tel: Chancery 9944. Cables: Welmcor, London.

**Endless Tape Cassette.** Price: £2 17s. 6d.



**THORN ELECTRICAL INDUSTRIES LTD.,** Thorn House, Upper St Martin's Lane, London, W.C.2. Tel: Temple Bar 2444.

**Synchro-amp adaptor TA/01.** Pre-amplifier unit for second channel stereo playback. Monitoring one track whilst recording on another. Automatic slide projector synchronisation. For  $\frac{1}{4}$ -track machines only. Price: £9 9s.

**Stereo amplifier SA100.** General purpose transistor amplifier for use with  $\frac{1}{4}$ -track recorders for playback of pre-recorded stereo tapes. Supplied complete with connecting leads. Price: £13 2s. 6d.

**Foot switch TA/03.** Facilitates use of recorder as dictating machine. Recorder runs when switch is depressed. Price: £3.

**Monitoring Stethoset TA/15.** Stethoscope type earpiece to monitor programme during recording (7 in. spool machines only). Price: £1 3s. 6d.

The tape recorder accessories listed above are primarily for use with machines marketed under the Thorn brand names Ferguson, HMV, Marconiphone and Ultra.



**TUTCHINGSELECTRONICSLTD.,** 14 Rook Hill Road, Friars Cliff, Christchurch, Hants. Tel: Highcliffe 2019.

**Tapesponder's kit.** Magnetic rubber for completely erasing tape and 40 ft white noise azimuth alignment tape. Price: 5s. including postage.



**UHER.** Distributors: Bosch Ltd., 205 Great Portland Street, London, W.1. Tel: Langham 2672/5.

**W211.** Midget earphones. Price: £1 14s. 6d.

●**W671.** Stereo magnetic headphones. Price: £7 10s.



**VALRADIO LTD.,** Browells Lane, Feltham, Middlesex. Tel: 01-890-4837/4242. Service agents: Vibro Supply, 57 Fortess Road, London, N.W.5. Tel: Gulliver 5165.

**D.C. converters.** Designed for operating tape recorders and similar mains equipment from ship's supply 110V DC and/or 220V DC. Prices from £14 14s. 6d.

**Transverter B12/35T.** Input 12V DC. Output: 230V 40 c/s at 30W. Suitable for negative or positive earthed input. Built-in switch socket. Supplied complete with input lead. Size:  $8 \times 2\frac{5}{8} \times 3\frac{1}{4}$  in. Weight:  $4\frac{1}{2}$  lb. Price: £9 16s. 6d.

**Transverter B12/120S.** Input: 12V DC. Output: 115-230V 50 c/s  $\pm\frac{1}{4}$  c/s sine wave at 120W. Price: £47 2s.

**Transverter B12/200S.** Input: 12V DC. Output: 115-230V 50 c/s  $\pm\frac{1}{4}$  c/s sine wave at 200W. Price: £67 12s.

**Resonator X1.** Synchroniser for incorporating into S type transverters to provide frequency regulation of better than 0.005%. Price: £35.



**WELLINGTON ACOUSTIC LABORATORIES.** See Elstone Electronics Ltd.



**WRIGHT & WEAIRE LTD.,** 84 Blackfriars Road, London, S.E.1. Tel: Waterloo 1981. Cables: Writewea, S.E.

**Wearite Defluxer.** For depolarising heads of tape recorders and players. It ensures maximum signal/noise ratio from any tape recorder and protects recorded tapes from cumulative background noise and the gradual attenuation of the higher frequencies. Price: £3.



**WYNSOR RECORDING CO. LTD.,** (inc Magnetic Recording Co.). WyndSOR Works, 2 Bellevue Road, Friern Barnet, London, N.11. Tel: Enterprise 2226/7. Cables: Wyndreco, London.

**Headphones WB/10.** High impedance headphones designed for use with the WyndSOR Vanguard but equally suitable for monitoring with other makes and models of recorder. Supplied complete with lead and jack plug. Price: £3 10s.

**Pre-amplifier WPA.** Designed for connecting to stereo output socket of WyndSOR Vanguard recorder. Provides frequency correction and pre-amplification to permit stereo replay via external amplifier and speaker. Input: 3 mV. Output: 300 mV. Two silicon transistors. Equalisation switched for  $7\frac{1}{2}$  and  $3\frac{3}{4}$  i/s. Power supply: PP3 battery. Consumption: 1 mA. Price: £6 6s.

# DIRECTORY OF MAGNETIC TAPE

**AGFA-GEVAERT LTD.**, 27 Great West Road, Brentford, Middlesex. Tel: Isleworth 2131. Cables: Artoveg, Hounslow.

**Agfa Magneton PE31.** Long Play. 4 in. spool 450 ft £14s.; 4½ in. spool 600 ft £11; 5 in. spool 900 ft £16s.; 5¾ in. spool 1,200 ft £113s.; 7 in. spool 1,800 ft £27s.; 8¾ in. spool 2,400 ft £35s.; 10 in. spool 3,280 ft £45s.; 10½ in. spool 4,200 ft £57s. 6d.

**Agfa Magneton PE31K.** As PE31 but supplied in Novodur plastic library boxes. In the following sizes only: 3 in. 8s.; 4½ in. £12s. 6d.; 5 in. £18s. 6d.; 5¾ in. £115s. 6d.; 7 in. £29s. 6d.

**Agfa Magneton PE31R.** As PE31 but supplied in round clear plastic pack. In the following sizes only: 5 in. £13s. 6d.; 5¾ in. £110s. 6d. 7 in. £24s. 6d.

**Agfa Magneton PE41.** Double Play. 4 in. spool 600 ft £14s.; 4½ in. spool 900 ft £113s.; 5 in. spool 1,200 ft £21s.; 5¾ in. spool 1,800 ft £214s.; 7 in. spool 2,400 ft £314s.; 8¾ in. spool 3,280 ft £515s.; 10 in. spool 4,600 ft £7.

**Agfa Magneton PE41K.** As PE41 but supplied in Novodur plastic library cases. In the following sizes only: 3 in. 13s.; 4½ in. £115s. 6d.; 5 in. £22s. 6d.; 5¾ in. £216s. 6d.; 7 in. £316s.

**Agfa Magneton PE41R.** As PE41 but supplied in round clear plastic pack. In the following sizes only: 5 in. £117s. 6d.; 5¾ in. £211s. 6d.; 7 in. £311s. 6d.

**Agfa Magneton PE65.** Triple Play. 4 in. spool 900 ft £116s.; 4½ in. spool 1,200 ft £25s.; 5 in. spool 1,800 ft £35s.; 5¾ in. spool 2,400 ft £47s.; 7 in. spool 3,600 ft £55s.

**Agfa Magneton PE65K.** As PE65 but supplied in Novodur plastic library cases. In the following sizes only: 3 in. £11; 4½ in. £27s. 6d.; 5 in. £32s. 6d.; 5¾ in. £42s. 6d.; 7 in. £57s. 6d.

**Agfa Magneton PE65R.** As PE65 but supplied in round clear plastic pack. In the following sizes only: 5 in. £217s. 6d.; 5¾ in. £42s. 6d.; 7 in. £57s. 6d.

**Agfa Magneton PE31S.** Special sound editing tape. 5 in. spool 600 ft. Price: £15s.

**Agfa Magneton PE31G.** Endless tape loop 200 ft. Price: £218s.

**Agfa Magneton PE41G.** Endless tape loop. 300 ft. Price: £3.

**Agfa Magneton Compact Cassettes.** (Fit Philips type deck). C60 19s. 6d.; C90 £17s. 6d.

**Agfa Magneton International Cassettes.** (DC International System). DC90 £19s. 6d.; DC120 £112s. 6d.

See Tape Accessories section for details of empty spools etc.



**BASF UNITED KINGDOM LTD.**, 5a Gillespie Road, London, N.5. Tel: Canonbury 2011

**LGS52.** Standard Play. In round pack. 5 in. spool 600 ft 18s. 6d.; 5¾ in. spool 900 ft £15s. 6d.; 7 in. spool 1,200 ft £112s. 6d.

**LGS52.** Standard Play. In plastic swivel box. 5 in. spool 600 ft £11s.; 5¾ in. spool 900 ft £18s.; 7 in. spool 1,200 ft £115s.

**LGS35.** Long Play. In round pack. 3 in. spool 210 ft 7s. 4d.; 4 in. spool 450 ft 12s.; 4½ in. spool 600 ft 18s. 6d.; 5 in. spool 900 ft £15s. 6d.; 5¾ in. spool 1,200 ft £112s. 6d.; 7 in. spool 1,800 ft £27s. 6d.

**LGS35.** Long Play. In plastic swivel box. 4 in. spool 450 ft 14s. 6d.; 4½ in. spool 600 ft £11s.; 5 in. spool 900 ft £18s.; 5¾ in. spool 1,200 ft £115s.; 7 in. spool 1,800 ft £210s.

**LGS26.** Double Play. In round pack. 3 in. spool 13s.; 4 in. spool 600 ft £12s. 6d.; 4½ in. spool 900 ft £17s. 6d.; 5 in. spool 1,200 ft £119s. 6d.; 5¾ in. spool 1,800 ft £212s. 6d.; 7 in. spool 2,400 ft £315s.

**LGS26.** Double Play. In plastic swivel box. 4 in. spool 600 ft £15s.; 4½ in. spool 900 ft £110s.; 5 in. spool 1,200 ft £22s.; 5¾ in. spool 1,800 ft £215s.; 7 in. spool 2,400 ft £317s. 6d.

**PE318.** Triple Play. In round pack. 3 in. spool 450 ft £11s.; 3½ in. spool 600 ft £19s. 6d.; 4 in. spool 900 ft £116s. 6d.; 4½ in. spool 1,200 ft £26s. 6d.; 5 in. spool 1,800 ft £33s. 6d.; 5¾ in. spool 2,400 ft £47s. 6d.; 7 in. spool 3,600 ft £512s. 6d.

**PE318.** Triple Play. In plastic swivel box. 4 in. spool 900 ft £119s.; 4½ in. spool 1,200 ft £29s.;

5 in. spool 1,800 ft £3 6s.; 5 $\frac{3}{4}$  in. spool 2,400 ft £4 10s.; 7 in. spool 3,600 ft £5 15s.

**Tape Library box.** Holds three tapes in separate swivel-open sections.

With one LGS35 LP tape. 5 in. £1 11s.; 5 $\frac{3}{4}$  in. £1 18s. 6d.; 7 in. £2 15s.

With one LGS26 DP tape. 5 in. £2 5s.; 5 $\frac{3}{4}$  in. £2 18s. 6d.; 7 in. £4 2s. 6d.

Library boxes without tape. 5 in. 12s. 6d.; 5 $\frac{3}{4}$  in. 15s.; 7 in. 17s. 6d.

**DC International Cassette.** DC90 (45 mins each track): £1 7s. 6d.; DC120 (60 mins each track): Price on request.

**Compact Cassette** (Philips pattern). C60 (30 minutes each track): 19s. 6d.; C90 (45 minutes each track): £1 7s. 6d.

**Letter Tape.** 2 $\frac{1}{4}$  in. spool with 150 ft long play tape. Complete with mailing container. Total weight less than 2 oz. Price: 5s. 6d.

**BASF Special Tape.** A range of standard play, long play and double play tapes in spool sizes from 4 in. to 10 $\frac{1}{2}$  in. is available for special requirements. Full details and prices on application.



**C.B.S. TAPES.** Distributors: Denham and Morley Ltd., Denmore House, 175 Cleveland Street, London, W.1. Tel: Euston 3656.

**CIP Standard Play.** Acetate base. 3 in. spool 150 ft 6s. 6d.; 5 in. spool 600 ft £1 1s.; 5 $\frac{3}{4}$  in. 900 ft £1 8s.; 7 in. 1,200 ft £1 13s.

**CMXP Double Play.** Mylar base. 3 in. spool 300 ft 12s. 6d.; 5 in. spool 1,200 ft £1 16s.; 5 $\frac{3}{4}$  in. spool 1,800 ft £2 10s.; 7 in. spool 2,400 ft £3 8s.

**CMT36 Triple Play.** 7 in. spool 3,600 ft £5 5s.



**DE VILLIERS (ELECTRONIC WORLD) LTD.,** 16-20 Strutton Ground, Westminster, London, S.W.1. Tel: 01-222-5960.

**Standard Play.** PVC base. 3 in. spool 150 ft 4s.; 4 in. spool 300 ft 6s.; 5 in. spool 600 ft 12s.; 5 $\frac{3}{4}$  in. spool 900 ft 15s.; 7 in. spool 1,200 ft 17s. 6d.

**Long Play.** Polyester base. 3 in. spool 225 ft 5s.; 4 in. spool 450 ft 9s. 6d.; 5 in. spool 900 ft 16s. 6d.; 5 $\frac{3}{4}$  in. spool 1,200 ft £1 2s. 6d.; 7 in. spool 1,800 ft £1 9s.

**Double Play.** Pre-stressed polyester base. 3 in. spool 375 ft 9s.; 4 in. spool 600 ft 13s. 6d.; 5 in. spool 1,200 ft £1 5s.; 5 $\frac{3}{4}$  in. spool 1,800 ft £1 13s.; 7 in. spool 2,400 ft £2 2s. 6d.

**Triple Play.** Pre-stressed polyester base. 3 in. spool 500 ft 11s.; 3 $\frac{1}{4}$  in. spool 700 ft 13s. 6d.; 4 in. spool 900 ft 18s.; 5 in. spool 1,800 ft £1 12s.; 5 $\frac{3}{4}$  in. spool 2,400 ft £2 2s. 6d.; 7 in. spool 3,600 ft £3 2s. 6d.

An economy range of tapes suitable for recordings which do not need the extended frequency response of the "Electronic World" tapes listed above is offered under the brand name "Manx". These tapes are supplied without leaders or tails.

**Manx Standard Play.** Polyester base. 5 in. spool 600 ft 7s. 6d.; 5 $\frac{3}{4}$  in. spool 900 ft 10s.; 7 in. spool 1,200 ft 13s.

**Manx Long Play.** Polyester base. 5 in. spool 900 ft 10s. 6d.; 5 $\frac{3}{4}$  in. spool 1,200 ft 13s. 6d.; 7 in. spool 1,800 ft 18s. 6d.

**Manx Double Play.** Pre-stressed polyester base. 5 in. spool 1,200 ft 13s. 6d.; 5 $\frac{3}{4}$  in. spool 1,800 ft 18s.; 7 in. spool 2,400 ft £1 4s.

All "Electronic World" and "Manx" tapes are sold by mail order direct from De Villiers Ltd. Packing and postage per order: U.K. 2s. 6d., Europe 6s. 6d., Commonwealth 4s. 6d.



**E.M.I. TAPE LTD.,** Blythe Road, Hayes, Middlesex. Tel: Hayes 3888. Cables: Emitape, London.

**"88" Standard Play.** PVC base. 3 in. spool 175 ft 7s. 6d.; 3 $\frac{1}{4}$  in. spool 175 ft 7s. 6d.; 4 in. spool 300 ft 10s. 6d.; 5 in. spool 600 ft £1 1s.; 5 $\frac{3}{4}$  in. spool 900 ft £1 8s.; 7 in. spool 1,200 ft £1 15s.; 8 $\frac{1}{4}$  in. spool 1,800 ft £2 17s. 6d.; 10 $\frac{1}{2}$  in. spool £3 18s. 9d.; 11 $\frac{1}{2}$  in. spool £3 13s 6d.

**"99" Long Play.** PE base. 3 in spool 210 ft 9s.; 3 $\frac{1}{4}$  in. spool 210 ft 9s.; 4 in. spool 450 ft 14s. 6d.; 5 in. spool 900 ft £1 8s.; 5 $\frac{3}{4}$  in. spool 1,200 ft £1 15s.; 7 in. spool 1,800 ft £2 10s.; 8 $\frac{1}{4}$  in. spool 2,400 ft £3 12s. 6d.; 10 $\frac{1}{2}$  in. spool £5 10s.

**"100" Double Play.** Polyester base 3 in. spool 300 ft 14s.; 3 $\frac{1}{4}$  in. spool 300 ft 14s.; 4 in. spool 600 ft £1 5s.; 5 in. spool 1,200 ft £2 2s.; 5 $\frac{3}{4}$  in. spool 1,800 ft £2 15s. 6d.; 7 in. spool 2,400 ft £2 17s. 6d.

“300” Triple Play. Polyester base. 3 in. spool 450 ft £1 2s.; 4 in. spool 900 ft £1 18s.; 5 in. spool 1,800 ft £3 16s.

**Emitape Type 60 Cassette.** 60 minutes playing time. Designed for use with Philips Compact and similar tape decks. Price: 19s. 6d.

**H.M.V. Voice-Letter V2/2.** 3 in. lightweight spool in special mailing pack. 40 mins playing time on  $\frac{1}{4}$ -track recorder at  $3\frac{3}{4}$  i/s. Price: 5s.



**FERRANIA.** Minnesota Mining and Manufacturing Co. Ltd., 3M House, Wigmore Street, London, W.1. Tel: Hunter 5522. Cables: Minnesota, London.

**Standard Play.** Polyester base. 3 in. spool 150 ft 4s. 6d.; 5 in. spool 600 ft 16s.;  $5\frac{3}{4}$  in. spool 850 ft £1 2s. 6d.; 7 in. spool 1,200 ft £1 8s.

**Long Play.** Polyester base. 3 in. spool 300 ft 7s. 6d.; 5 in. spool 900 ft £1 2s. 6d.;  $5\frac{3}{4}$  in. spool 1,200 ft £1 7s. 6d.; 7 in. spool 1,800 ft £1 19s. 6d.



**FERROGRAPH CO. LTD.,** Ferrograph House, 84 Blackfriars Road, London, S.E.1. Tel: Waterloo 1981.

**Ferrotape.** Standard Play. Type A. AN7 7 in. spool 1,200 ft £2 5s.; AN8  $8\frac{1}{4}$  in. spool 1,800 ft £3 3s.

**Ferrotape.** Long Play. Type A. AL7 7 in. spool 1,800 ft £3 2s.; AL8  $8\frac{1}{4}$  in. spool 2,400 ft £4.

**Ferrotape.** Standard Play. Type B low-noise extended response. BN7 7 in. spool 1,200 ft £2 10s.; BN8  $8\frac{1}{4}$  in. spool 1,800 ft £3 11s.

**Ferrotape.** Long Play. Type B low-noise extended response. BL7 7 in. spool 1,800 ft £3 10s.; BL8  $8\frac{1}{4}$  in. spool 2,400 ft £4 10s.

**Spare spools.** Aluminium, anodised grey. Hublok gives instant tape attachment and locks reel on spindle to prevent chatter. Prices: 7 in. 10s. 6d.;  $8\frac{1}{4}$  in. 12s. 6d.



**ILFORD LTD.,** 201/3 Wardour Street, London, W.1. Tel: Regent 8731.

**Zonatape.** Standard Play. PVC base. 3 in. spool 150 ft 5s. 9d.;  $3\frac{1}{4}$  in. spool 175 ft 7s. 6d.;

4 in. spool 300 ft 10s. 6d.; 5 in. spool 600 ft £1 1s.;  $5\frac{3}{4}$  in. spool 900 ft £1 8s.; 7 in. spool 1,200 ft £1 15s.;  $8\frac{1}{4}$  in. spool 1,800 ft £2 17s. 6d.;  $10\frac{1}{2}$  in. spool 2,400 ft £3 18s. 6d.

**Zonatape.** Extra Play. Polyester base. 3 in. spool 225 ft 9s.;  $3\frac{1}{4}$  in. spool 300 ft 12s.; 4 in. spool 450 ft 14s. 6d.; 5 in. spool 900 ft £1 8s.;  $5\frac{3}{4}$  in. spool 1,200 ft £1 15s.; 7 in. spool 1,800 ft £2 10s.;  $8\frac{1}{4}$  in. spool 2,400 ft £3 12s. 6d.;  $10\frac{1}{2}$  in. spool 3,600 ft £5 8s.

**Zonatape.** Double Play. Polyester base. 3 in. spool 300 ft 13s. 6d.;  $3\frac{1}{4}$  in. spool 400 ft 17s.; 4 in. spool 600 ft £1 5s.; 5 in. spool 1,200 ft £2 5s.;  $5\frac{3}{4}$  in. spool 1,800 ft £2 17s. 6d.; 7 in. spool 2,400 ft £3 17s. 6d.;  $8\frac{1}{4}$  in. spool 3,600 ft £6.

**Zonatape.** Triple Play. Polyester base. 3 in. spool 450 ft £1 2s.;  $3\frac{1}{4}$  in. spool 600 ft £1 7s. 6d.; 4 in. spool 900 ft £1 19s.; 5 in. spool 1,800 ft £3 6s.;  $5\frac{3}{4}$  in. spool 2,400 ft £4 10s.



**KODAK LTD.,** Kodak House, Kingsway, London, W.C.2. Tel: Holborn 7841.

**T100.** Standard play. Triacetate base. 5 in. spool 600 ft 18s.;  $5\frac{3}{4}$  in. spool 900 ft £1 4s. 6d.; 7 in. spool 1,200 ft £1 10s.

**P150.** Long play. Pre-stretched polyester base.  $3\frac{1}{4}$  in. spool 300 ft 11s.; 5 in. spool 900 ft £1 8s.;  $5\frac{3}{4}$  in. spool 1,200 ft £1 15s.; 7 in. spool 1,800 ft £2 10s.

**P200.** Double play. Pre-stretched polyester base.  $3\frac{1}{4}$  in. spool 400 ft 17s.; 4 in. spool 600 ft £1 4s. 6d.; 5 in. spool 1,200 ft £2 5s.;  $5\frac{3}{4}$  in. spool 1,650 ft £2 15s.; 7 in. spool 2,400 ft £4.

**P300.** Triple play. Pre-stretched polyester base. 3 in. spool 450 ft £1 1s. 6d.;  $3\frac{1}{4}$  in. spool 600 ft £1 7s. 6d.; 4 in. spool 900 ft £1 18s. 6d.; 5 in. spool 1,800 ft £3 5s. 6d.;  $5\frac{3}{4}$  in. spool 2,400 ft £4 10s.; 7 in. spool 3,600 ft £5 15s.

**P400.** Quadruple play. Pre-stretched polyester base. 3 in. spool 600 ft £1 13s. 6d.;  $3\frac{1}{4}$  in. spool 800 ft £2 2s.; 4 in. spool 1,200 ft £2 18s. 6d.



**LEDA TAPES,** 30 Baker Street, London, W.1. Tel: Welbeck 0441/2.

**Standard Play.** PVC base. 3 in. spool 150 ft 2s. 3d.; 4 in. spool 300 ft 3s. 9d.; 5 in. spool 600 ft 8s. 3d.;  $5\frac{3}{4}$  in. spool 900 ft 10s.; 7 in. spool 1,200 ft 12s. 3d.

**Long Play.** PVC base. 3 in. spool 225 ft 3s.; 4 in. spool 450 ft 5s.; 5 in. spool 900 ft 9s. 9d.; 5½ in. spool 1,200 ft 12s. 3d.; 7 in. spool 1,800 ft 17s. 3d.

**Double Play.** Polyester base. 3 in. spool 300 ft 4s. 3d.; 4 in. spool 600 ft 8s. 3d.; 5 in. spool 1,200 ft 15s. 3d.; 5½ in. spool 1,800 ft 19s. 3d.; 7 in. spool 2,400 ft £1 1s. 9d.

**Triple Play.** Polyester base. 3 in. spool 600 ft 8s. 9d.; 4 in. spool 900 ft 12s. 6d.; 5 in. spool 1,800 ft £1 2s. 6d.; 5½ in. spool 2,400 ft £1 8s. 6d.; 7 in. spool 3,600 ft £1 18s. 6d.

Leaders, trailers and stop foils fitted to all tapes of 5 in. and above.

Leda Tapes are supplied direct to users from the above address.



**MAGNETON.** See Agfa-Gevaert Ltd.



**MASTERTAPE (MAGNETIC) LTD.,** Colnbrook, Slough, Bucks. Tel: Colnbrook 2431.

"Master-Stik" leaders are fitted to all Master-tapes except the Mini Voice Letter and Send-message tapes.

**Standard.** 3 in. spool 150 ft 6s.; 4 in. spool 300 ft 10s.; 5 in. spool 600 ft 17s.; 5½ in. spool 900 ft £1 2s. 6d.; 7 in. spool 1,200 ft £1 11s. 6d.

**Long Play.** 3 in. spool 225 ft 8s. 6d.; 4 in. spool 450 ft 12s. 6d.; 5 in. spool 900 ft £1 5s.; 5½ in. spool 1,200 ft £1 11s.; 7 in. spool 1,800 ft £2 2s.; 8¼ in. spool 2,400 ft £3 12s. 6d.

**Double Play.** 3 in. spool 300 ft 12s. 6d.; 4 in. spool 600 ft £1 1s.; 5 in. spool 1,200 ft £1 19s.; 5½ in. spool 1,800 ft £2 9s.; 7 in. spool 2,400 ft £3 9s.

**Triple Play.** 3 in. spool 600 ft £1 2s.; 4 in. spool 900 ft £1 18s. 6d.; 5 in. spool 1,800 ft £3 6s.; 5½ in. spool 2,400 ft £4 10s.; 7 in. spool 3,600 ft £5 15s.

**Mini Voice Letter.** 3 in. spool 100 ft standard tape. With box and two labels. 1 oz. Price: 3s. 3d.

**Sendmessage.** 1¾ in. spool 100 ft triple play tape. Special two-way envelope. Weight: under ½ oz. Price: 3s.

**MINNESOTA MINING AND MANUFACTURING COMPANY LTD.,** 3M House, Wigmore Street, London, W.1. Tel: Hunter 5522. Cables: Minnesota, London.

**Scotch 111.** Standard Play. Acetate base 4 in. spool 300 ft 9s.; 5 in. spool 600 ft 18s.; 5½ in. spool 850 ft £1 4s. 6d.; 7 in. spool 1,200 ft £1 10s.

**Scotch 175.** Standard Play. Polyester base. 5 in. spool 600 ft £1 0s. 6d.; 5½ in. spool 850 ft £1 7s. 6d.; 7 in. spool 1,200 ft £1 15s.

**Scotch 150.** Long Play. Polyester base. 3 in. spool 300 ft 9s. 6d.; 4 in. spool 450 ft 14s. 6d.; 5 in. spool 900 ft £1 7s. 6d.; 5½ in. spool 1,200 ft £1 14s. 6d.; 7 in. spool 1,800 ft £2 9s.; 8¼ in. spool 2,400 ft £3 12s. 6d.

**Scotch 200.** Double Play. Tensilised polyester. 3 in. spool 400 ft 16s. 6d.; 4 in. spool 600 ft £1 4s. 6d.; 5 in. spool 1,200 ft £2 1s. 9d.; 5½ in. spool 1,800 ft £2 15s.; 7 in. spool 2,400 ft £3 16s. 6d.

**Scotch 290.** Triple Play. Tensilised polyester. 3 in. spool 600 ft £1 4s. 9d.; 4 in. spool 900 ft £1 18s. 6d.

**Scotch Dynarange 202.** Standard Play. Polyester base. 5 in. spool 600 ft £1 4s.; 5½ in. spool 850 ft £1 12s. 3d.; 7 in. spool 1,200 ft £2 1s.

**Scotch Dynarange 203.** Long Play. Polyester base. 5 in. spool 900 ft £1 12s. 3d.; 5½ in. spool 1,200 ft £2 0s. 6d.; 7 in. spool 1,800 ft £2 17s. 6d.; 8¼ in. spool 2,400 ft £4 3s. 6d.

**Scotch Tape Albums.** Gold-embossed green leatherette book type tape storage. Available in three sizes: 5 in., 5½ in., 7 in. Albums supplied with one tape and room for another. Self-adhesive spine and spool labels included. Built-in index.

**Standard Play Album.** Acetate base. With one tape. 5 in. £1 0s. 9d.; 5½ in. £1 7s. 6d.; 7 in. £1 13s. 3d.

**Standard Play Album.** Polyester base. With one tape. 5 in. £1 3s. 3d.; 5½ in. £1 10s. 6d.; 7 in. £1 18s. 3d.

**Long Play Album.** Polyester base. With one tape. 5 in. £1 10s. 3d.; 5½ in. £1 17s. 6d.; 7 in. £2 12s. 3d.

**Double Play Album.** Polyester base. With one tape. 5 in. £2 4s. 6d.; 5½ in. £2 18s.; 7 in. £3 19s. 9d.

**PHILIPS ELECTRICAL LTD.**, Electro-acoustics Division, Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437-7777. Cables: Phillamps, London.

**Standard Play (Green).** 3 in. audio letter, 150 ft 5s. 6d.; 4 in. spool 300 ft 10s. 6d.; 5 in. spool 600 ft £1 1s.; 5½ in. spool 900 ft £1 8s.; 7 in. spool 1,200 ft £1 15s.

**Long Play (Red).** 3 in. spool 210 ft 9s.; 4 in. spool 450 ft 14s. 6d.; 5 in. spool 900 ft £1 8s.; 5½ in. spool 1,200 ft £1 15s.; 7 in. spool 1,800 ft £2 10s.

**Double Play (Blue).** 3 in. spool 300 ft 14s.; 4 in. spool 600 ft £1 5s.; 5 in. spool 1,200 ft £2 2s.; 5½ in. spool 1,800 ft £2 15s. 6d.; 7 in. spool 2,400 ft £3 17s. 6d.

**Triple Play (Grey).** 3 in. spool 450 ft £1 2s.; 4 in. spool 900 ft £1 19s.; 5 in. spool 1,800 ft £3 6s.

**CE.10 Endless Loop.** Approximately 195 ft. Playing time 40 mins at 1⅞ i/s. Price: £3 10s.

**C.60 Compact Cassette.** Playing time one hour. Price: 19s. 6d.

**C.90 Compact Cassette.** Playing time 1½ hours. Price: £1 7s. 6d.



**R.C.A. GREAT BRITAIN LTD.**, Lincoln Way, Windmill Road, Sunbury-on-Thames, Middlesex. Tel: 01-SM8-5511.

**Vibrant Series Audio Tape.** Standard Play. Acetate base. 5 in. spool 600 ft 15s. 6d.; 5½ in. spool 900 ft £1; 7 in. spool 1,200 ft £1 4s.

**Vibrant Series Audio Tape.** Standard Play. Mylar base. 5 in. spool 600 ft £1 5s. 6d.; 5½ in. spool 900 ft £1 15s.; 7 in. spool 1,200 ft £2 1s.

**Vibrant Series Audio Tape.** Long Play. Acetate base. 5 in. spool 900 ft 19s.; 7 in. spool 1,800 ft £1 15s. 6d.

**Vibrant Series Audio Tape.** Long Play. Mylar base. 5 in. spool 900 ft £1 2s.; 5½ in. spool 1,200 ft £1 11s.; 7 in. spool 1,800 ft £2.

**Vibrant Series Audio Tape.** Double Play. Tensilised Mylar base. 5 in. spool 1,200 ft £1 15s.; 5½ in. spool 1,800 ft £2 8s.; 7 in. spool 2,400 ft £3 1s.

Professional low noise tapes in ¼ in., ½ in. and 1 in. widths. Full details and prices on application.



**RECOTAPE.** Distributors: Transatlantic Music Tapes Ltd., 250 Grand Buildings, 1 Strand, London, W.C.2. Tel: Whitehall 6331.

**Standard Play.** Polyester base. 3 in. spool 150 ft 4s. 9d.; 5 in. spool 600 ft 19s.; 5½ in. spool 900 ft £1 4s.; 7 in. spool 1,200 ft £1 10s.

**Long Play.** Polyester base. 3 in. spool 300 ft 6s. 9d.; 5 in. spool 900 ft £1 4s.; 5½ in. spool 1,200 ft £1 10s.; 7 in. spool 1,800 ft £2 2s.

**Double Play.** Polyester base. 3 in. spool 400 ft 9s. 6d.; 5 in. spool 1,200 ft £1 17s. 6d.; 5½ in. spool 1,800 ft £2 11s.; 7 in. spool 2,400 ft £3 3s.



**SCOTCH.** See Minnesota Mining and Manufacturing Co.



**SYNCHROTAPE.** Sole distributors: Adastra Electronics Ltd., 167 Finchley Road, Swiss Cottage, London, N.W.3. Tel: Maida Vale 8164.

**Standard Play.** PVC base. 3 in. spool 150 ft 4s. 9d.; 5 in. spool 600 ft 15s.; 5½ in. spool 900 ft 18s. 6d.; 7 in. spool 1,200 ft £1 2s. 6d.

**Long Play.** PVC base. 2⅝ in. spool 200 ft 5s. 9d.; 3 in. spool 225 ft 6s. 3d.; 4 in. spool 450 ft 12s.; 5 in. spool 900 ft 18s. 6d.; 5½ in. spool 1,200 ft £1 2s. 6d.; 7 in. spool 1,800 ft £1 8s. 6d.

**Double Play.** Tensilised polyester base. 2⅝ in. spool 300 ft 8s. 9d.; 3 in. spool 300 ft 8s. 9d.; 4 in. spool 600 ft 18s.; 5 in. spool 1,200 ft £1 8s. 6d.; 5½ in. spool 1,800 ft £1 16s.; 7 in. spool 2,400 ft £2 8s.

**Triple Play.** Tensilised polyester. 3 in. spool 450 ft 13s. 9d.; 4 in. spool 900 ft £1 7s.

Except for 2⅝ in. and 3 in. spools, all Sychrotape tapes have leader, trailer and double metallic stop-foils.

Free insurance cover against theft or fire loss of tape recorder is given with all Sychrotape tapes from 5 in. to 7 in.

**TAPE 70.** Distributors: Leda Tapes, 30 Baker Street, London, W.1. Tel: Welbeck 0441/2.

**Standard Play.** PVC base. 3 in. spool 150 ft 3s. 3d.; 4 in. spool 300 ft 6s. 6d.; 5 in. spool 600 ft 11s. 6d.; 5 $\frac{3}{4}$  in. spool 900 ft 14s. 6d.; 7 in. spool 1,200 ft 17s. 6d.

**Long Play.** PVC base. 3 in. spool 225 ft 4s. 3d.; 4 in. spool 450 ft 7s. 6d.; 5 in. spool 900 ft 14s. 6d.; 5 $\frac{3}{4}$  in. spool 1,200 ft 17s. 6d.; 7 in. spool 1,800 ft £1 5s.

**Double Play.** PVC base. 3 in. spool 300 ft 6s. 6d.; 4 in. spool 600 ft 12s.; 5 in. spool 1,200 ft £1 2s. 6d.; 5 $\frac{3}{4}$  in. spool 1,800 ft £1 9s. 6d.; 7 in. spool 2,400 ft £1 17s. 6d.

**Triple Play.** PVC base. 3 in. spool 600 ft 13s.; 4 in. spool 900 ft 17s. 6d.; 5 in. spool 1,800 ft £1 15s.; 5 $\frac{3}{4}$  in. spool 2,400 ft £2 8s. 6d.; 7 in. spool 3,600 ft £3 2s. 6d.



**TELEFUNKEN.** Distributors: A.E.G. (Great Britain) Ltd., Lonsdale Chambers, 27 Chancery Lane, London, W.C.2. Tel: Chancery .9944. Cables: Welmcor, London.

**Telefunken. Long Play.** PVC base. 5 in. spool 900 ft £1 12s. 6d.; 5 $\frac{3}{4}$  in. spool 1,200 ft £1 17s. 6d.; 7 in. spool 1,800 ft £2 12s. 6d.

**Telefunken. Double Play.** PVC base. 5 in. spool 1,200 ft £2 4s.; 5 $\frac{3}{4}$  in. spool 1,800 ft £2 17s. 6d.; 7 in. spool 2,400 ft £4.

**Telefunken Endless Tape Cassette.** Price: £2 17s. 6d.

**TONEMASTER TAPES.** Messrs Chart Edge Ltd., 18/21 Jermyn Street, London, S.W.1. Tel: Regent 1443.

**Standard Play.** PVC base. 3 in. spool 150 ft 2s. 3d.; 4 in. spool 300 ft 5s.; 5 in. spool 600 ft 6s. 6d.; 5 $\frac{3}{4}$  in. spool 900 ft 8s.; 7 in. spool 1,200 ft 9s. 9d.

**Long Play.** PVC base. 3 in. spool 225 ft 2s. 8d.; 4 in. spool 450 ft 5s. 6d.; 5 in. spool 900 ft 9s. 5 $\frac{3}{4}$  in. spool 1,200 ft 11s. 3d.; 7 in. spool 1,800 ft 13s. 9d.

**Double Play.** Polyester base. 3 in. spool 300 ft 5s.; 4 in. spool 600 ft 7s. 3d.; 5 in. spool 1,200 ft 13s. 3d.; 5 $\frac{3}{4}$  in. spool 1,800 ft 17s. 9d.; 7 in. spool 2,400 ft £1 1s. 9d.

**Triple Play.** Polyester base. 3 in. spool 600 ft 9s. 6d.; 4 in. spool 900 ft 13s.; 5 in. spool 1,800 ft £1 5s.; 5 $\frac{3}{4}$  in. spool 2,400 ft £1 15s.; 7 in. spool 3,600 ft £2 5s.

Leaders and stop foils on LP, DP and TP 5 in. to 7 in. All Tonemaster Tapes are British made and supplied sealed in individual boxes. 2s. 9d. postage on orders up to £3; over £3 post free. By-return postal service.



**UHER.** Distributors: Bosch Ltd., 205 Great Portland Street, London, W.1. Tel: Langham 2672/5.

**Long Play.** 5 in. spool 900 ft £1 8s.; 5 $\frac{3}{4}$  in. spool 1,200 ft £1 15s.; 7 in. spool 1,800 ft £2 10s.

## DIRECTORY OF TEST TAPES & DISCS

**AMPEX (GREAT BRITAIN) LTD.,** Acre Road, Reading, Berkshire. Tel: Reading 84411. Cables: Videotape, Reading.

**31334-01.** 3 $\frac{3}{4}$  i/s, 200  $\mu$ Sec characteristic tape.

**31331-01.** 3 $\frac{3}{4}$  i/s. 120  $\mu$ Sec characteristic tape.

**31321-01.** 7 $\frac{1}{2}$  i/s. NAB characteristic tape.

**31321-04.** 7 $\frac{1}{2}$  i/s. NAB characteristic tape, for four-track recorders.

**31323-01.** 7 $\frac{1}{2}$  i/s. CCIR characteristic tape.

**31336-01.** 3 $\frac{3}{4}$  i/s. flutter test tape.

**31326-01.** 7 $\frac{1}{2}$  i/s. flutter test tape.

All these tapes are priced at £8.



**BASF UNITED KINGDOM LTD.,** 5a Gillespie Road, London, N.5. Tel: Canonbury 2011.

**Calibration Tape 19.** 7 $\frac{1}{2}$  i/s, 100  $\mu$ Sec characteristic. Azimuth alignment section included, also an unrecorded section for adjustment of bias, etc. Price: £11.

**Calibration Tape 9.** 3 $\frac{3}{4}$  i/s, 120  $\mu$ Sec (high) and 3-180  $\mu$ Sec (low) characteristics. Other details as for Tape 19. Price: £11.

**Calibration Tape 38.** 15 i/s. 35  $\mu$ Sec. characteristic. Other details as for Tape 19. Price: £11.



**EMI ELECTRONICS LTD.,** Hayes, Middx. Tel: Hayes 3888. Cables: Emidata, London.

**SRT.17.** Professional frequency test tape, 15 i/s, 35  $\mu$ Sec. CCIR characteristic. 20 Kc/s-30 c/s with 16 Kc/s for azimuth alignment. 3 Kc/s band for wow and flutter checking has total wow and flutter contents better than 0.08% RMS. Length of tape with strobe markings for speed check included. Price: £11 10s.

**SRT.18.** Professional frequency test tape. 7½ i/s 70  $\mu$ Sec. CCIR characteristic. 16 Kc/s-30 c/s with 10 Kc/s tone for azimuth alignment. 3 Kc/s band for wow and flutter checking has total wow and flutter content better than 0.08% RMS. Length of tape with strobe markings for speed check included. Price: £11 10s.

**SRT.14.** Professional frequency test tape, 3¾ i/s, 120  $\mu$ Sec characteristic as proposed by I.E.C. (British 3¾ i/s pre-recorded tapes use this). Other details as for SRT.13, but no strobe section. Price: £10.

**TBT.1A.** Domestic frequency test tape. 7½ i/s, 100  $\mu$ Sec characteristic. 12 Kc/s-40 c/s. Price: £4.

**TBT.2.** Domestic frequency test tape 3¾ i/s, 120  $\mu$ Sec characteristic. 8 Kc/s-40 c/s. Price: £4.



**EMI LTD.,** Tape Record Department, Hayes, Middx. Tel: Hayes 3888. Cables: Emitron, London.

**Type TBT 1.** Full track tape, 7½ i/s, 100  $\mu$ Sec. CCIR characteristic. Range 40 c/s-10 Kc/s, with 8 Kc/s Azimuth alignment band. Price: £3.



**EMI RECORDS** (The Gramophone Co. Ltd.), EMI House, 20 Manchester Square, London, W.1. Tel: Hunter 4488.

**TCS 101.** 12 in. stereo (45/45) frequency test disc covering the range 30 c/s to 20 Kc/s, with fixed bands on alternate left and right channels. Follows RIAA curve, with level reduced by 6 dB above 10 Kc/s. Both sides identical. Price: £1 17s. 6d.

**TCS 102.** 12 in. stereo (45/45) frequency test disc covering same range as TCS 101, but with gliding tone. Side A, left channel; side B, right channel. Price: £1 17s. 6d.

**TCS 104.** 12 in. mono (lateral) frequency test disc covering same range as TCS 101, with fixed bands on one side and gliding tone on the other. Price: £1 17s. 6d.

**TCS 105.** 12 in. vertical-cut frequency test disc covering same range as TCS 101, with fixed bands on one side and gliding tone on the other. Price: £1 17s. 6d.



**TUTCHINGS ELECTRONICS LTD.,** 14 Rook Hill Road, Friars Cliff, Christchurch, Hants. Tel: Highcliffe 2019.

**Test Tape No. 1.** Pure tones 40 c/s-10 Kc/s with voice identification of each band. Recorded to new CCIR 70  $\mu$ Sec characteristic at 7½ i/s. Track 2 carries continuous 7.5 Kc/s tone for azimuth alignment.

**Test Tape No. 2.** Pure tones 40 c/s-7.5 Kc/s with voice identification of each band. Recorded to new CCIR 140  $\mu$ Sec characteristic at 3¾ i/s. Track 1 carries four identical frequency runs. Track 2 is recorded with continuous 5 Kc/s tone for azimuth alignment.

**Test Tape No. 3.** White noise, one third octave bands 40 c/s-10 Kc/s with voice identification of each band. Recorded to new CCIR 70  $\mu$ Sec characteristic at 7½ i/s.

**Test Tape No. 4.** White noise, one octave bands 100 c/s-6.4 Kc/s centre frequencies with voice identification of each band. Track 2 carries full range unfiltered white noise. Recorded to new CCIR 70  $\mu$ Sec characteristic at 7½ i/s.

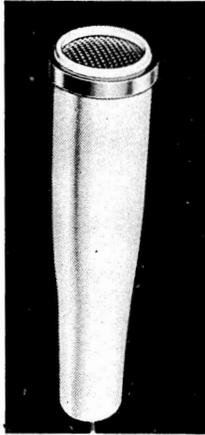
**Test Tape No. 5.** Azimuth and vertical head alignment tape. Full track unfiltered white noise with track 3 blank. Can be used without test equipment at all tape speeds on two- or four-track recorders.

All tapes on 3 in. spools. Price: £1 10s. each including postage.

Full-track recordings of any single frequency can be supplied with low wow and flutter content at £1 5s. per 3 in. reel.



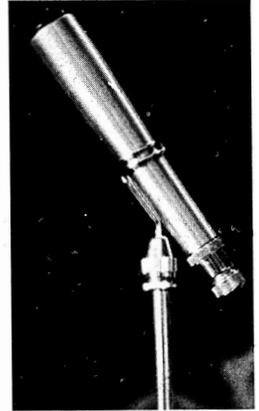
*Acos Mic 39-1*



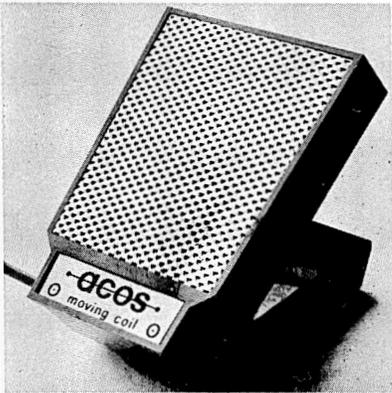
*Acos Mic 60*



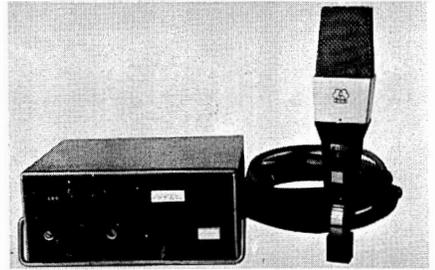
*Acos mic 70*



*Acos mic 80*



*Acos Mic 95*



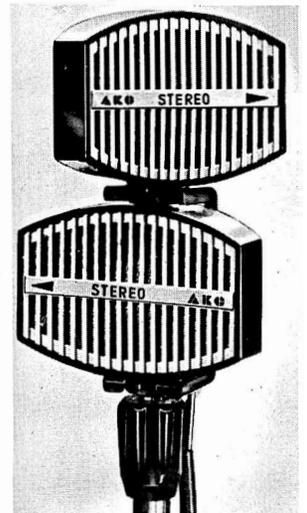
*AKG C12A professional condenser*



*Acos Mic 91*



*AKG D119CS cardioid dynamic*



*AKG D66 stereo moving coil*

# DIRECTORY OF MICROPHONES

★ In these abridged specifications, the following abbreviations are used: **Imp**=microphone source impedance. **Rec load imp**=recommended load impedance, and sensitivity is given in dB with reference to 1 volt/dyne/cm<sup>2</sup>, unless otherwise stated. ● Stereo.

**AKAI.** Distributors: Pullin Photographic Ltd., 11 Aintree Road, Perivale, Greenford, Middlesex. Tel: Alperton 1541. Cables: Pullinfoto, Greenford, Middlesex.

**Akai 345-CM15.** Hand or stand condenser microphone. FR 50 c/s-15 Kc/s  $\pm 3$  dB approximately. Sensitivity  $-50$  dB. Impedance about 200 ohms. Rec load  $>500K$ . Size: approximately 6 in. long, 1 in. dia. Satin chrome finish. Weight: about 1 lb including cable. Pre-amplifier:  $7\frac{3}{4} \times 5\frac{1}{2} \times 5\frac{3}{4}$  in. Weight:  $7\frac{3}{4}$  lb. Mono or stereo. Mains 100, 110, 117, 200, 220, 230V AC. Microphone DC bias 170V. Price: approximately £104.

★

**A.K.G. (Akustische und Kino-Geräte GmbH).** Distributors: Politechna (London) Ltd., 182-184 Campden Hill Road, Kensington, London, W.8. Tel: Park 0711/3, 5008.

**C12A.** Professional condenser microphone. Variable polar diagram covering cardioid, omni, figure-of-eight and six intermediate positions. FR 10 c/s-20 Kc/s. Sensitivity  $-68$  dB. Impedance 50 and 200 ohms. Rec load  $\geq 150$  and 500 ohms. Fitting:  $\frac{3}{8}$  in. Whit,  $\frac{1}{2}$  in. 26 tpi,  $\frac{5}{8}$  in. 27 tpi. Metal case finished matt silver. Price: £125.

● **C24.** Stereo condenser. Sensitivity 1 mV/bar. Imp 200 or 500 ohms. Response 30-20,000 c/s. Omni-directional cardioid; bi-directional, hyper-cardioid. Plus 5 intermediate patterns. Sensitivity approx 1 mV per microbar (at 200 ohms output terminals)  $-33$  dB re 1 milliwatt at a sound pressure of 10 dynes/cms. Crosstalk between channels  $<40$  dB throughout entire range. Imp  $<200$  ohms when delivered. 50 ohms by changing solder connections. N.24 power supply unit. Remote control unit. Twin remote control cable. Price: £230.

**C28C.** Condenser studio. Cardioid or omni-directional. Response 30 c/s-30 Kc/s. Sensitivity (with CK28 cardioid capsule)  $-58$  dB (with CK26 omni-capsule),  $-60$  dB. Imp 50 ohms or 200 ohms, from built-in transformer. Low noise, professional standards. Variations C29C, C30C.

Price (including N28A power unit, 22 yds microphone cable, 2 yds power cable, and wood carrying case): C28C: £98; C30C: £123 10s.; C28/29/30C: £134 10s.

**C61.** Cardioid or omni condenser microphone. FR 20 c/s-18 Kc/s  $\pm 2.5$  dB. Sensitivity  $-64$  dB. Impedance 50 and 200 ohms. Rec load  $\geq 150$  and 500 ohms. Stand fitting:  $\frac{3}{8}$  in. Whit,  $\frac{1}{2}$  in. 26 tpi,  $\frac{5}{8}$  in. 27 tpi. Supplied with stabilised power supply, 22 yds microphone cable, 2 yds power cable. Metal case finished matt silver. Price: £84.

**D11C.** Moving coil with cardioid directional pattern. Response 80-12,000 c/s. Imp 200 ohms or 50K ohms. Fitted with collapsible stands and 5 ft screened cable. Price: £6.

**D12.** Moving coil with cardioid directional pattern. Response 40-12,000 c/s  $\pm 4$  dB. Front to back ratio 15 dB. Sensitivity  $-77$  dB. Imp 60 ohms, or to order. Price: £28.

**D14.** Dynamic cardioid microphone. Imp 60-40,000 ohms. Response 50 c/s-15 Kc/s. On/off switch swivel joint fits all stand threads. Supplied with  $5\frac{1}{2}$  yds two-core screened lead. Weight: 8 oz. Price: £10.

**D19C.** Moving coil with cardioid directional pattern and bass cut switch. Response: 40 c/s-16 Kc/s. Impedance: 60 or 200 ohms. Price: £17 10s.

**D19E.** Moving coil with cardioid directional pattern. Response 40 c/s-16 Kc/s. Built-in transformer provides 3 different impedances: 50, 200 ohms, 50K. Price: £21 10s.

**D58.** Moving coil, close-talk microphone. Response 50-12,000 c/s. Sensitivity 0.1 mV/bar. Imp 60 or 200 ohms. Price: £11 10s.

● **D66.** Stereo moving coil. Cardioid diagram. FR 50 c/s-15 Kc/s  $\pm 4$  dB. Sensitivity  $-73$  dB. Impedance 200 ohms. Rec load  $\geq 400$  ohms. Stand fitting  $\frac{3}{8}$  in. Whit. Supplied with two desk stands. Microphones can be detached and used separately. Moulded cases. Price (complete with stands): £11 10s.



*AKG D14 cardioid*



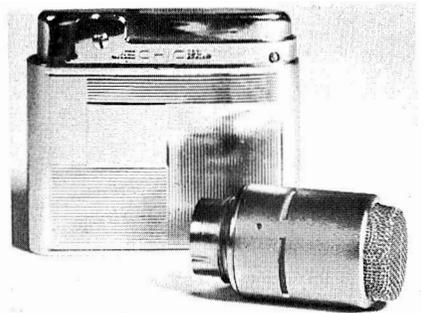
*AKG D501 cardioid moving coil*



*AKG D12 moving coil*



*AKG D202 moving coil*



*AKG D58 moving coil*



*AKG D503 moving coil cardioid*



*AKG C12A*



*AKG D19E moving coil*

**D109.** Omni-directional moving coil. FR 50 c/s-15 Kc/s  $\pm 3.5$  dB. Sensitivity  $-98$  dB. Impedance: 60 and 200 ohms. Rec load  $\geq 400$  ohms. Hand and lavalier type. Supplied with lavalier cord. Higher frequencies boosted when lavalier attached. Metal case nickel plated. Price: £11.

**D119CS.** Dynamic cardioid microphone. "Sophisticated" version of D19C. Black finish with chrome stripes. Higher sensitivity. On/off switch. Imp 200 ohms. Response 40 c/s-16 Kc/s. Front-to-back ratio better than 15 dB at 180 degrees sound incidence at 1 Kc/s. Price: £20 10s.

**D119ES.** Same specification as D119CS but with built-in transformer for 60-200 ohms and high impedance. Sand blast finish. Price: £24 10s.

**Dynamic cardioid microphone with built-in reverberation unit (Echo microphone). Reverb effect can be controlled during pick up from 0 to  $2\frac{1}{2}$  seconds. Connects to low and high impedance amplifiers. 9V Ever Ready battery recommended for built-in amplifier. Supplied with  $5\frac{1}{2}$  yds three-core cable. Weight: 14 oz. Price: £30 10s.**

**D202ES.** Moving coil microphone with marked cardioid response ( $-20$  dB minimum). FR 30 c/s-15 Kc/s  $\pm 2$  dB. Sensitivity  $-53$  dB. Impedance 200 ohms. Rec load  $\geq 400$  ohms. Stand fitting swivel adaptor,  $\frac{3}{8}$  in. Whit,  $\frac{1}{2}$  in. 26 tpi,  $\frac{5}{8}$  in. 27 tpi. On-off switch and variable bass control providing 0 to  $-20$  dB at 50 c/s. Strong black metal case with sintered bronze grille. Price: £30.

**D501.** Moving coil cardioid and omni-directional microphone. FR 50 c/s-15 Kc/s  $\pm 3.5$  dB. Sensitivity  $-73$  dB. Impedance 200 ohms. Rec load.  $\geq 400$  ohms. Hand or stand type. Fitting:  $\frac{3}{8}$  in. Whit,  $\frac{1}{2}$  in. 26 tpi,  $\frac{5}{8}$  in. 27 tpi. Omni/cardioid switch. Remote control switch. Built-in windshield. Quick release adaptor. Leatherette carrying bag. Moulded case with metal grille. Price: £12 10s.

**D503.** Moving coil cardioid stand microphones. FR 50 c/s-15 Kc/s  $\pm 3.5$  dB. Sensitivity  $-73$  dB. Impedance: 200 ohms. Rec load  $\geq 400$  ohms. Fitting:  $\frac{3}{8}$  in. Whit,  $\frac{1}{2}$  in. 26 tpi,  $\frac{5}{8}$  in. 27 tpi. Supplied with attached flexible shaft. Moulded case with metal grille. Price: £15.

**D505.** Moving coil omni-directional hand microphone. FR 50 c/s-15 Kc/s  $\pm 3.5$  dB. Sensitivity  $-74$  dB. Impedance: 200 ohms. Rec load  $\geq 300$  ohms. Fitting:  $\frac{3}{8}$  in. Whit,  $\frac{1}{2}$  in.

26 tpi,  $\frac{5}{8}$  in. 27 tpi. Remote control switch. Anti-noise. Quick release adaptor. Moulded case with metal grille. Price: £13 15s.

**D507.** Moving coil omni-directional stand microphone. FR 50 c/s-15 Kc/s  $\pm 3.5$  dB. Sensitivity  $-74$  dB. Impedance: 200 ohms. Rec load  $\geq 300$  ohms. Fitting as for D505. Anti-noise. Supplied with attached flexible shaft. Moulded case with metal grille. Price: £15.

**ST200.** Microphone floor stand. Telescopic. Height: 42 to 77 in. Three collapsible feet with main support locking device. Anti-vibration characteristics. Microphone may be clamped to face any direction. Price: £13 10s.

**K58.** Microphone headset. Incorporates microphone D58 and headset K50 (see Tape Recorder Accessories). Price: £13 10s.

**D200E.** Two-system cardioid microphone. Incorporates two moving coils, one covering the low and the other the high frequencies. FR 40 c/s-16 Kc/s. Sensitivity 0-16 mV/microbar. Imp 200 ohms. Supplied with Cannon XLR-3-11C plug. Price: £21.



**AMPLIVOX LTD.,** Beresford Avenue, Wembley, Middlesex. Tel: Wembley 8991. Cables: Amplivox, Wembley.

**Amplivox Elite.** Hand or stand pencil type moving coil microphone. Omni-directional. FR 50 c/s-15 Kc/s  $\pm 5$  dB. Sensitivity  $-82$  dB. Imp 400 ohms. Rec load 400 ohms or higher. Clip-on stand. Light grey moulded case. Available without switch or with various switching arrangements. Prices on application.

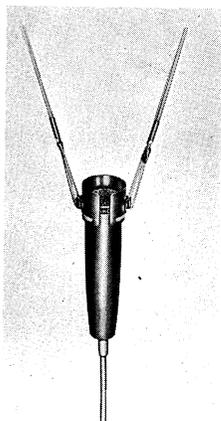


**BANG & OLUFSEN U.K. DIVISION,** Eastbrook Road, Gloucester. Tel: Gloucester 21591.

**MD8.** Moving-coil omni-directional. FR 50 c/s-17 Kc/s  $\pm 5$  dB. Sensitivity: 80 dB below 1V/microbar. Imp 200 ohms at 1 Kc/s. Supplied with desk stand and lavalier cord. Can be used as hand microphone. Price: £9 9s.

**BM6.** Pressure gradient ribbon microphone. Figure-of-eight. Three-position switch for speech, music and off. Impedance 180 ohms. FR 30 c/s-13 Kc/s  $\pm 2.5$  dB. Size: 7 in. high, 1 in. diameter. Price: £13 2s. 6d.

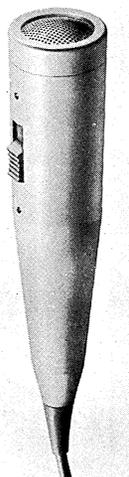
**BM7.** Adding the BM7 microphone converts the BM6 to a BM5 mono/stereo microphone. Records in both MS and A-B method. Size:  $10\frac{1}{2}$  in. high, 1 in. diameter. Price: £11 0s. 6d.



AKG D109



AKG D200E



Amplivox Elite with switch



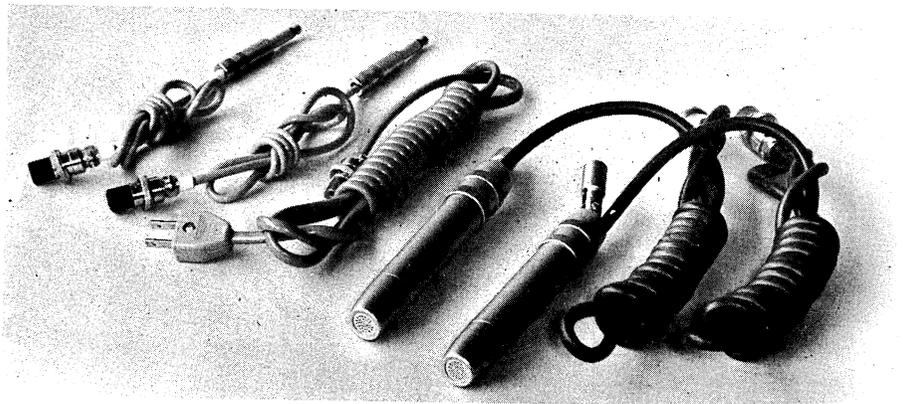
AKG C61 condenser



AKG C24 stereo



Akai condenser mic pre-amp



Akai condenser mics

● **BM5.** Stereo microphone comprising BM6 and BM7. FR 30 c/s-13 Kc/s  $\pm 2.5$  dB. Imp 200 ohms per channel. Price: £23 2s.



**BEYER.** Distributors: Fi-Cord International, Charlwoods Road, East Grinstead, Sussex. Tel: East Grinstead 21351.

**M57.** Moving coil hand microphone. Imp 200 ohms. Fitted  $4\frac{1}{2}$  ft lead. Price: £13 16s.

**M64.** Moving coil. Directional. Imp 37.5 or 200 ohms. Supplied with 16 ft or  $4\frac{1}{2}$  ft leads respectively. Price: (37.5 ohms) £19 2s., (200 ohms) £18 3s.

**M69.** Moving coil. Directional. Imp 37.5, 200 ohms, or 50K. Supplied with 16 ft,  $4\frac{1}{2}$  ft, or 12 ft leads respectively. Price: (37.5 ohms) £29 4s., (200 ohms) £28 5s., (50K) £32 17s.

**M88.** Moving coil. Directional. Imp 200 ohms or 50K. Fitted  $4\frac{1}{2}$  ft lead or 12 ft lead respectively. Prices: (200 ohms) £60 5s., (50K) £64 17s.

**M100.** Moving coil. Omni-directional. Response 40 c/s-18 Kc/s  $\pm 2$  dB. Sensitivity 0.1 mV/microbar. Imp 37.5 (16 ft lead), 200 ohms ( $4\frac{1}{2}$  ft lead), 50K (12 ft lead). Prices: (37.5 ohms) £61 4s., (200 ohms) £60 5s., (50K) £64 17s.

**M110.** Moving coil. Lavalier. Directional. FR 60 c/s-12 Kc/s. Imp 200 ohms. Fitted  $4\frac{1}{2}$  ft lead. Price: £28 11s.

**M119.** Moving coil. Omni-directional. Response 50 c/s-16 Kc/s  $\pm 2.5$  dB. Sensitivity 0.22 mV/microbar. Imp 200 ohms. Fitted  $4\frac{1}{2}$  ft lead. Price: £15 4s.

**M130.** Ribbon. Figure-of-eight. Imp 200 ohms. Fitted  $4\frac{1}{2}$  ft lead. Price: £61 16s.

**M160.** Double ribbon. Cardioid. Response 40 c/s-18 Kc/s  $\pm 2.5$  dB. Sensitivity 0.08 mV/microbar. Imp 37.5, 200 ohms or 50K. Prices: (37.5 ohms) £62 18s., (200 ohms) £61 19s., (50K) £66 11s.

**M260.** Ribbon. Directional. Imp 37.5, 200 or 50K ohms. Supplied with 16 ft,  $4\frac{1}{2}$  ft or 12 ft leads respectively. Prices: (37.5 ohms) £24 11s., (200 ohms) £23 12s., (50K) £28 4s.

**M610.** Moving coil. Directional. Built-in switch. Imp 37.5, 200 ohms or 50K. Prices: (37.5 ohms) £24 13s., (200 ohms) £23 14s., (50K) £28 6s.

**M55.** Moving coil. Omni-directional. Dual imp 200 ohms and 50K. Supplied with stand and lead. Price: £8 5s.

**M80.** Moving coil. Cardioid. FR 50 c/s-16 Kc/s. Dual imp 200 ohms and 50K. Supplied with table stand and cable. Price: £12 18s.

● **M808.** Stereo microphone system incorporating two M80 units. Price: £25.

**Microphone stands.** ST260 table stand £3 12s. 6d. ST201/1 standard adjustable £8 4s. 6d. ST201A/1 heavy duty £10 15s. ST199 portable telescopic £6 7s. SCH211 boom arm £5 7s. 6d. SH126 gooseneck  $8\frac{1}{4}$  in. lightweight with plug £5 5s. SH127 gooseneck 16 in. heavy duty with plug £7 3s. 6d. KV24 and KV6 adaptor clamp for all stands 9s. 6d.

**Accessories.** Windshields, plugs, sockets, cables, adaptors, etc.



**BOUYER.** Distributors: Douglas A. Lyons and Associates Ltd., 32 Grenville Court, Dulwich, London, S.E.19. Tel: Gipsy Hill 2833. Cables: Daliona, London, S.E.19.

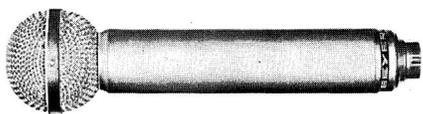
**709.** Moving coil microphone with marked cardioid response. Rear to front attenuation 20 dB. FR 150 c/s-14 Kc/s  $\pm 3$  dB. Sensitivity -63 dB reference 1V/dyne/cm<sup>2</sup>. Impedance 20 ohms. Rec load 20-150 ohms. Robust construction. Stand fitting with flexible stem. Hand grip available. Price: (cardioid head) £12 10s. Fittings extra as required.

**710.** Similar to 709 but with extended bass response and super cardioid response pattern. Suitable for close-talking applications. Impedance 200 ohms. Price: (cardioid head) £25 10s. Fittings extra as required.

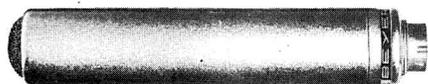


**S. G. BROWN LTD.,** King George's Avenue, Watford, Herts. Tel: Watford 23301. Cables: Radiolink, Watford.

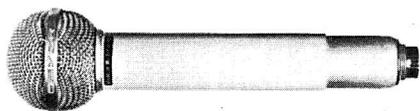
**Dual Function (IC.600/1).** Stick type dynamic microphone suitable for hand or stand use. Operation of a shutter mechanism changes characteristic from a conventional pressure-operated configuration to differential operation. This renders the microphone sensitive only to sounds originating close to it. Designed to deal with all types of programme situation. Directional pattern figure-of-eight. Response: 50 c/s-12 Kc/s. Output: 0.6 mV. Impedance 150K. Price: £6 6s.



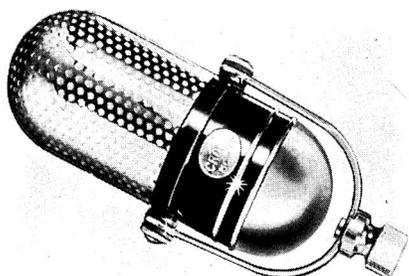
*Beyer M160 double ribbon*



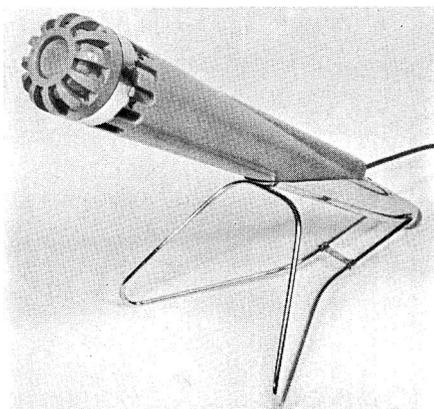
*Beyer M100 moving coil*



*Beyer M260 ribbon*



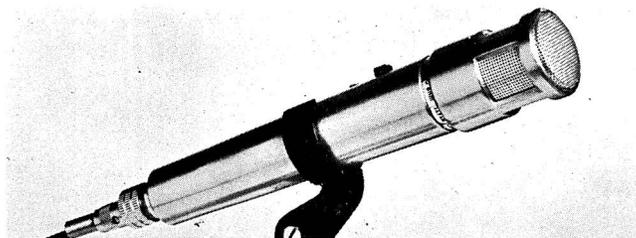
*Eagle MC70 crystal*



*S. G. Brown dual-function*



*Bouyer cardioid moving coil*



*Eagle DM34C*



*Eagle DM31C*



*Electro-Voice 655C*

**COSMOCORD LIMITED**, Eleanor Cross Road, Waltham Cross, Herts. Tel: Waltham Cross 27331. Cables: Acos, Waltham Cross.

**Acos Mic 39-1.** Crystal. Response 40 c/s-15 Kc/s  $\pm 6$  dB. Sensitivity  $-60$  dB. Imp equals 800 pF capacity. Rec load imp not less than 4.7 megohms. 8 ft cable. Desk stand and lavalier neck cord included. Price: £3 3s.

**Acos Mic 55.** Lapel microphone. Available in three versions: Crystal, ceramic, magnetic. Crystal: Response 30 c/s-10 Kc/s. Sensitivity  $-58$  dB. Rec load 47 megohms. Ceramic: Response 20 c/s-10 Kc/s. Sensitivity  $-58$  dB. Rec load 10 megohms. Magnetic: Sensitivity  $-75$  dB. Rec load 2K. Prices: Crystal £2 2s., ceramic £2 7s., magnetic £2 15s.

**Acos Mic 60.** Stick microphone. Available in three versions: Crystal, ceramic, magnetic. Specifications and prices as for Mic 55.

**Acos Mic 70/1.** Moving coil. FR 80 c/s-12 Kc/s (10 dB down at 50 c/s and 15 Kc/s). Impedance 200 ohms. Sensitivity  $-80$  dB. Price: £7 10s.

**Acos Mic 70/4.** Moving coil. FR as for Mic 70/1. Impedance 50K nominal. Sensitivity  $-58$  dB. Price: £8 8s.

**Acos Mic 80.** Robust moving coil microphone particularly suited for PA. Satin chrome finish. FR 50 c/s-12 Kc/s. Sensitivity  $-87$  dB. Impedance: 30-50 ohms balanced. Other impedances to order. Price: £12 10s.

**Acos Mic 91.** Crystal omni-directional. FR 40 c/s-7 Kc/s. Sensitivity  $-50$  dB (3.2 mV). Capacitance: 1150 pF. Rec load 1 megohm. Price to be announced.

**Acos Mic 92.** Crystal cardioid. FR 40 c/s-7 Kc/s. Sensitivity  $-50$  dB (3.2 mV). Capacitance: 1150 pF. Rec load 1 megohm. Price to be announced.

**Acos Mic 93.** Ceramic omni-directional. FR 40 c/s-7 Kc/s. Sensitivity  $-61$  dB (0.9 mV). Capacitance: 750 pF. Rec load 2 megohms. Price to be announced.

**Acos Mic 95/5.** Moving coil omni-directional FR 30 c/s-9 Kc/s. Sensitivity:  $-74$  dB. Impedance 500 ohms. Rec load 500-20,000 ohms. Price to be announced.

**Acos Mic 95/50.** Moving coil omni-directional. FR 30 c/s-9 Kc/s. Sensitivity:  $-54$  dB.

Impedance 50K. Rec load 50K-2 megohms. Price to be announced.

**Acos Mic 96/5.** Moving coil cardioid. FR 100 c/s-9 Kc/s. Sensitivity:  $-72$  dB. Directional deviation: 10 dB overall frequency range. Impedance 500 ohms. Rec load 500-20,000 ohms. Price to be announced.

**Acos Mic 96/50.** Moving coil cardioid. FR 100 c/s-9 Kc/s. Sensitivity:  $-52$  dB. Directional deviation: 10 dB overall frequency range. Impedance 50K. Rec load 50K-2 megohms. Price to be announced.



**EAGLE PRODUCTS.** Distributors: B. Adler & Sons (Radio) Ltd., 32a Coptic Street, London, W.C.1. Tel: Museum 9606. Cables: Reldab.

**DM.16HL.** Moving-coil. Cardioid. Response 40 c/s-15 Kc/s. Sensitivity  $-62$  dB. Imp 500 ohm (low), 50K (high). Transformer fitted. Built-in high/low impedance switch. Price: £5 9s. 6d.

**DM.18HL.** Moving-coil microphone for hand, desk or floor stand use. Response 70 c/s-12 Kc/s. Dual imp, 600 ohms and 50K. Tapered body. Removable desk stand. Supplied with desk stand, adaptor for floor stand and cable. Price: £6 6s.

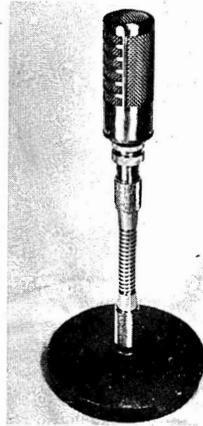
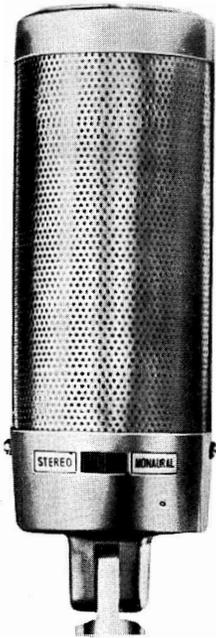
**UD.19HL.** Moving-coil. Undirectional cardioid. Range 100 c/s-14 Kc/s. Sensitivity  $-75$  dB  $\pm 3$  dB at 600 ohm;  $-55$  dB  $\pm 3$  dB at 50K. Imp 600 ohm (low), 50K (high). Transformer fitted. Price: £15.

● **S.M.D100 Stereo.** Moving-coil, with two units angled at  $90^\circ$ . Response 50 c/s-15 Kc/s. Sensitivity  $-60$  dB. Imp 50K. Built-in transformers. Stereo/mono switch. Price: £8 5s.

**MC70.** Crystal. Omni-directional. Response 50 c/s-12 Kc/s  $\pm 3$  dB. Sensitivity  $-75$  dB. Price: £2 19s. 6d.

**DM.20H.** Extra slim dynamic microphone in solid cast tapered case. Response: 40 c/s-15 Kc/s. Sensitivity  $-52$  dB. Pear-shaped response pattern. Impedance: 50K. Built-in switch. With cable and stand adaptor. Price: £4 17s. 6d.

**DM.21M.** High output omni-directional dynamic microphone. Response: 50 c/s-11 Kc/s. Built-in switch. Impedance: 600 ohms. Satin chrome finish. Stand adaptor, table base and screened lead. Price: £4 5s.

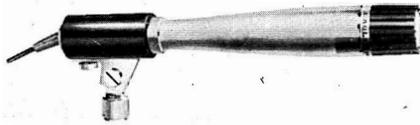


*Film Industries M8 ribbon  
on S.6 desk stand*



*Film Industries M8S ribbon  
on S.6 desk stand*

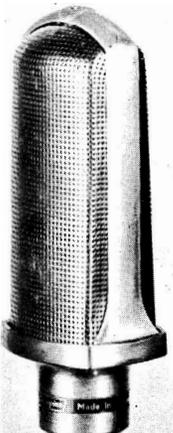
*Eagle SM.D100 stereo*



*Eagle UD 19HL moving coil*



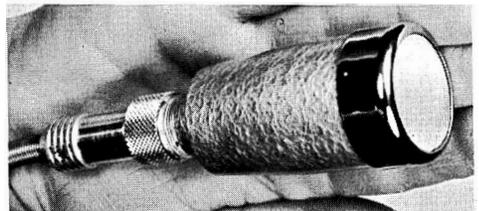
*Film industries M8S*



*Grampian GR2 ribbon*



*Grampian DP8*



*Grampian DP6*

**DM.14S.** Miniature wide range pencil dynamic microphone. Response: 40 c/s-13.5 Kc/s. Sensitivity - 52 dB. Size:  $3\frac{1}{2} \times \frac{7}{8}$  in. Impedance 50K. With cable, desk stand and adaptor. Price: £2 15s.

**100.C.** Three-way crystal stick type microphone. Response: 60 c/s-10 Kc/s. For hand, stand or desk use. Locking on-off switch. 7 ft cable, stand adaptor and lavalier cord. Size:  $5 \times 1\frac{1}{8}$  in. Price: £1 19s.

**DM.17HL.** Dual impedance cardioid dynamic microphone. Response: 40 c/s-15 Kc/s. Sensitivity - 52 dB. Impedance: 600 ohms and 50K. Special grille for close-talking applications. Ideal pop singers. On-off switch. Stand adaptor and cable. Size:  $7\frac{1}{4} \times 1\frac{7}{8}$  in. Price: £6 15s.

**DM.12.** Streamlined dynamic microphone. Response: 60 c/s-12 Kc/s. Sensitivity - 52 dB. Impedance: 50K. Omni-directional used vertically, cardioid when tilted. Swivel mounting. On-off switch. Size:  $10 \times 1\frac{1}{4}$  in. With cable and stand adaptor. Price: £5 12s. 6d.

**DM.31C.** High impedance dynamic cardioid microphone. Sensitivity - 52 dB. FR 40 c/s-13 Kc/s. Imp 50K. Built-in on-off switch. Supplied with screened cable and stand adaptor. Price: £7 7s.

**DM.34C.** High impedance dynamic cardioid microphone. Sensitivity - 55 dB. FR 50 c/s-13 Kc/s. Imp 50K. Built-in on-off switch. Supplied with screened cable and stand adaptor. Price: £6 6s.

**DM.38C.** Miniature omni-directional dynamic microphone. Stand and lavalier type. Sensitivity - 52 dB. FR 40 c/s-13 Kc/s. Imp 50K. Supplied with screened cable and neck halter. Built-in on-off switch. Price: £5 5s.

Table, desk and floor stands available.  
All prices quoted are approximate.



**FI-CORD LTD.,** Charlswold Road, East Grinstead, Sussex. Tel: East Grinstead 21351.

**FC 1200.** Condenser microphone with cardioid or omni-directional pattern. FR 30 c/s-20 Kc/s  $\pm 2.5$  dB. Interchangeable head. Front to back response differential pattern 20 dB. Output imp 300 ohms or 30 ohms balanced. Polarising voltage 60V DC. One Nuvistor type 7586 or 6CW4. Sizes: Capsule 1 in. diameter  $1\frac{1}{8}$  in. long,

pre-amplifier 1 in. diameter,  $5\frac{3}{8}$  in. long, complete microphone 1 in. diameter  $6\frac{7}{16}$  in. long. Weight: 10 oz. Finished in satin chrome or satin nickel. Supplied with windshield, microphone stand clamp, power unit and leads. Price: £98.



**FILM INDUSTRIES LTD.,** Station Avenue, Kew Gardens, Surrey. Tel: Richmond 8078.

**M7.** Moving coil. Response: 60 c/s-9 Kc/s. Imp 20 ohms. 12 ft twin screened cable standard, other lengths if required. Table, desk and floor stands available. Price: £8 15s., (with on/off switch): £10 7s. 6d.

**M8.** Ribbon. Response: 50 c/s-13 Kc/s. Figure-of-eight polar diagram. Available matched to all impedances up to 57K. Plug and socket joint between microphone head and flexible. Fitted with 12 ft screened cable, other lengths to order. Table, desk and floor stands available. Price (all impedances): £9 9s., (with on/off switch): £11 11s.

**M8A.** Ribbon. Similar unit to M8 but without plug and socket connection between head and flexible. Small detachable desk stand provided. Other stands available. Available in all impedances up to 57K. Price: £9, (with on/off switch): £10 12s. 6d.

**M8S.** Ribbon. Similar unit to M8 but with angled base in place of flexible. Small detachable desk stand provided. Other stands are available. Available in all impedances up to 57K. Price: £8 15s., (with on/off switch): £10 7s. 6d.

**Microphone stands.** Desk, table and floor stands. Grey hammer finish with cast iron bases. Stems in satin chrome. Prices from £1 5s.

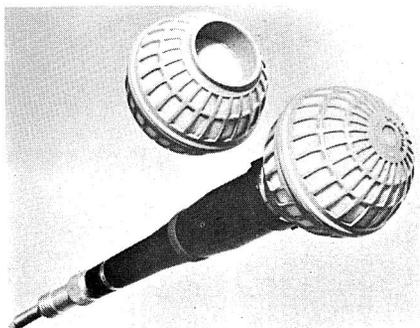
**Matching transformer.** In mu-metal screened case for fitting into microphone lead. Impedance ratio: 30 ohms to 60K. Price: £3 10s.

**Microphone switch assembly.** Suitable for use with M7 and M8 microphones. Price on request.



**GRAMPIAN REPRODUCERS LTD.,** Hanworth Trading Estate, Feltham, Middx. Tel: 01-894-9141. Cables: Reamp, Feltham.

**DP4/H.** Moving coil. Response: 50-15,000 c/s. Sensitivity - 52 dB, -70 dB, -86 dB, for high, medium and low impedance. 50,000, 600



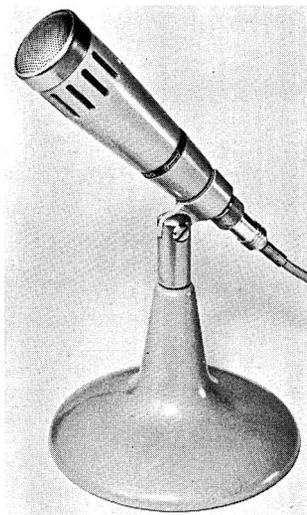
*Grampian DP4 and windshield*



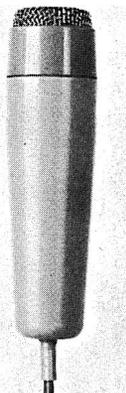
*Lustraphone VR64*



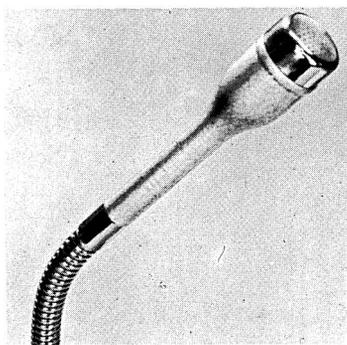
*Lustraphone LD/66 moving coil*



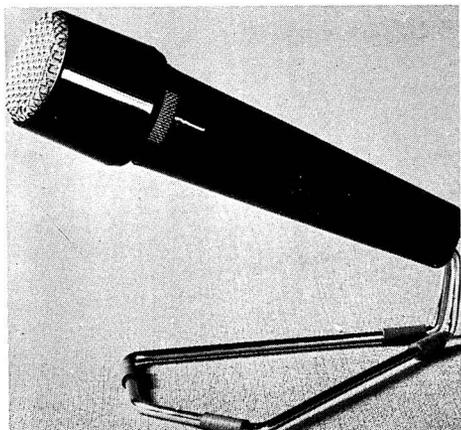
*Grampian cardioid*



*London Microphone Co. LM-100*



*Lustraphone LFV/59 moving coil*



*London Microphone LM200*



*Lem DO35 moving coil*

and 25 ohms. Tubular case. Price including lead: high or medium impedance: £9 5s.; low impedance: £8 5s.

**DP6.** Moving coil. Omni-directional. Response 200 c/s-15 Kc/s. Sensitivity -87 dB (25 ohms), -75 dB (200 ohms), -50 dB (600 ohms), -52 dB (50K). Built-in transformer fitted to all but low impedance model. Price (low impedance): £8 5s.; (other three models): £9 5s.

**GR1.** Ribbon. Unequal figure of eight. Response 40 c/s-15 Kc/s. Sensitivity -90 dB (25 ohms), -81 dB (200 ohms), -76 dB (600 ohms), -58 dB (50K). Imp 25, 200, 600 ohms, 50K. Built-in transformer. Easily replaceable ribbon. Price (including lead, swivel holder, case): £11 15s.

**GR2.** Details as for GR1, but equal figure of eight response.

**GCI series.** Moving coil cardioid microphones. Response: 40 c/s-12 Kc/s  $\pm 5$  dB. Non-metallic diaphragms. Interchangeable leads. Various stands and accessories. Imp GC1/L 25 ohms, rec load 15-50 ohms; GC1/X 200 ohms, rec load 150-300 ohms; GC1/M 600 ohms, rec load 500-1,000 ohms; GC1/50K, rec load 50K and upwards. Sensitivities: GC1/L -86 dB, GC1/X -75 dB, GC1/M -70 dB, GC1/H -52 dB. Prices: GC1/L £14; GC1/X, GC1/M, GC1/H £15.

**DP8 series.** Moving coil omni-directional microphones. Response: 50 c/s-15 Kc/s  $\pm 5$  dB. Built-in on/off switch. Interchangeable leads. Hand type with swivel holder for stand use. Sensitivities, impedances and rec loads as for DP4 series. Prices: DP8/L £9 10s.; DP8/X, DP8/M, DP8/H £10 10s.



**GRUNDIG (GREAT BRITAIN) LTD.,** Newlands Park, Sydenham, London, S.E.26. Tel: Sydenham 2211.

**GDM304.** Moving coil omni-directional general purpose hand mic. Price: £5 5s.

**GDM312.** Moving coil omni-directional. Response: 100 c/s-11 Kc/s  $\pm 5$  dB. Impedance 200 ohms and 55K (built-in transformer). Sensitivity 0.15 mV/microbar and 2.2 mV/microbar. General purpose hand stick microphone. Price: £7 7s.

● **GDSM330.** Moving coil figure-of-eight stereo microphone assembly. Price: £11 11s.

**HAMMOND & CO. LTD.,** 90 High Street, Eton, Windsor, Berks. Tel: Windsor 63388. Telex: 84316.

**Hammond M.100.** Condenser microphone with omni-directional response. Mono version M.100 +SU1. Stereo version M.100 +SU2. Freq response: 50 c/s-20 Kc/s  $\pm 3$  dB. Impedance 60 ohms. Replaceable capsules. Cannon connectors. Transistorised power supply. Price: £30 9s. (mono), £51 9s. (stereo).



**KEF ELECTRONICS LTD.,** Tovil, Maidstone, Kent. Tel: Maidstone 58361. Cables: KEF.

**Electro-Voice 642.** Moving coil. Cardiline, uni-directional. Response: 30 c/s-10 Kc/s. Sensitivity -68 dB. Imp 50, 150 and 250 ohms. Transformer fitted. Cardioid up to 500 c/s, sharply directional above. Price: £107 18s.

**Electro-Voice 655C.** Moving coil. Omni-directional. Response: 40 c/s-20 Kc/s. Sensitivity -77 dB. Imp 50, 150, 250 ohms. Transformer fitted. Very slim design with non-reflecting finish for TV work. Price: £70 2s.

**Electro-Voice 635A.** Moving coil. Omni-directional. Response: 70 c/s-10 Kc/s. Sensitivity -57 dB. Imp high or 150 ohms. Transformer fitted. Price: £28 17s. 6d.

**Electro-Voice 666.** Moving coil. Cardioid. Response: 40 c/s-15 Kc/s. Sensitivity -75 dB. Imp 50, 150, 250 ohms. Transformer fitted. Slim cardioid with single moving element. Price: £89 6s.

**Electro-Voice 649B.** Moving coil. Omni-directional. Response: 100 c/s-9 Kc/s  $\pm 3$  dB. Sensitivity -81 dB. Imp 20-250 ohms. Transformer fitted. Only  $\frac{1}{2}$  oz less cable. Price: £28 17s.

**Electro-Voice 668.** Moving coil. Cardioid. Response 30 c/s-16 Kc/s. Sensitivity -78 dB. Imp 50, 150, 250 ohms. Transformer fitted. Specially designed for boom operation. Price: £175 7s.

**Electro-Voice 652.** Moving coil. Omni-directional. Response 100 c/s-7 Kc/s. Sensitivity -80 dB. Imp 50, 150, 250 ohms. Transformer fitted. Semi-rigid tube microphone. Price: £42 15s.

**Electro-Voice 643.** Moving coil. Super cardiline. Response 30 c/s-10 Kc/s. Sensitivity -67 dB. Imp 50, 150, 250 ohms. Transformer fitted. Super directional with inbuilt 100 c/s high-pass filter. Long range pickup. Price: £460.

**LEM.** Distributors: Douglas A. Lyons and Associates Ltd., 32 Grenville Court, Dulwich, London, S.E.19. Tel: Gipsy Hill 2833. Cables: Dalia, London, S.E.19.

**DH80.** Miniature moving coil. Omni-directional. FR 70 c/s-14 Kc/s  $\pm 4$  dB. Imp 50 ohms or 80K. Sensitivity (low imp)  $-82$  dB, (high imp)  $-52$  dB. May be used as hand microphone, desk stand, or attached to floor stand. Price: (low imp) £6 5s.; (high imp) £7 18s. 6d.

**DO35.** Miniature Lavalier moving coil microphone. Omni-directional. FR 80 c/s-12 Kc/s  $\pm 3$  dB. Sensitivity  $-80$  dB. Imp 200 ohms. Can also be used as hand or stand microphone. Size:  $2\frac{1}{2}$  in. long,  $\frac{7}{8}$  in. diameter. Weight:  $1\frac{1}{4}$  oz. Price: £18 10s.

**DO21B.** Studio-quality omni-directional moving coil microphone. FR 30 c/s-16 Kc/s  $\pm 3$  dB. Imp 50 ohms or 200 ohms. Sensitivity (200 ohms)  $-77$  dB. Individually calibrated response curves. Suitable for hand or stand use. Price: £18 15s.

**DO20.** Hand or stand type moving coil microphone. Omni-directional. FR 40 c/s-15 Kc/s. Impedance 50 ohms, 200 ohms or 80K. Sensitivity 50 ohms  $-82$  dB, 200 ohms  $-76$  dB, 80K  $-50$  dB. Internal element resiliently mounted to avoid mechanical shock. Price: £12 10s.

★

**LENNARD DEVELOPMENTS LTD.,** 7 Slades Hill, Enfield, Middlesex. Tel: Keats 0601.

**Microphones.** Table and stick type crystal and ceramic microphones for tape recorders, hi-fi, PA, etc. Full details on request.

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**LONDON MICROPHONE CO. LTD.,** Eardley House, 182/4 Campden Hill Road, Kensington, London, W.8. Tel: Park 0711/3, 5008. Telex: 23894.

**LM.100.** Dynamic omni-directional microphone. FR 50 c/s-15 Kc/s. Impedances: 50-60, 200, 500, or 50K. Sensitivity 60 ohms 0.1 mV, 200 ohms 0.2 mV, 500 ohms 0.3 mV, 50K 3 mV. Cable: two yards twin screened. Finish: two-tone grey moulded plastic. Size:  $4\frac{1}{2}$  in. long,  $1\frac{1}{4}$  in. diameter. Weight: 3 oz. Suitable for hand, table stand and lavalier use. Price: LM.100/200 ohms £2 19s. 6d., LM.100/500 ohms £2 19s. 6d., LM.100/50-60 ohms £3 2s. 6d., LM.100/50K £3 14s. 6d. Accessories: keyhole wire stand 1s. 6d., table wire stand 3s. 9d., lavalier attachment 7s. 6d.

**LM.200.** Dynamic cardioid hand or stand microphone. FR 50 c/s-15 Kc/s  $\pm 4$  dB related to published curves. Sensitivity 60 ohms  $-80$  dB 0.1 mV/ $\mu$ bar, 200 ohms  $-74$  dB 0.2 mV/ $\mu$ bar, 500 ohms  $-66$  dB 0.3 mV/ $\mu$ bar, dual  $-50$  dB 3 mV/ $\mu$ bar. Discrimination 18-20 dB at 1 Kc/s. Case: high-impact polystyrene. Two yards twin screened lead. Size:  $5\frac{1}{2}$  in. long,  $1\frac{1}{4}$  in. dia tapering to  $\frac{3}{4}$  in. dia. Weight:  $4\frac{1}{4}$  oz including cable. Price: LM.200 500 ohms £4 14s. 6d., LM.200 60 ohms £4 17s. 6d., LM.200 dual (200 ohms and 50K) £5 9s. 6d. Prices include slide-in wire table stand. Various accessories available.

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**LUSTRAPHONE LTD.,** St Georges Works, Regents Park Road, N.W.1. Tel: Primrose 8844. Cables: Lustraphon, London.

**Lustrette LD/61.** Series. Moving coil. Response 70-12,000 c/s. Source imp low, line and high. Built-in trans, when required. 6 ft cable. Price: £4 4s. (low), £4 14s. 6d. (line and high).

**Master C51.** Moving coil. Response 50-8,000 c/s. Source imp low, line and high. Built-in trans for line and high. 3-pin moulded mic plug. Stand as required. Price: low £6 6s.; line and high £6 16s. 6d.

**Master C48 and C48/S with Switch.** Moving coil. Response 50-8,000 c/s. Source imp 20 ohms. 3-pin moulded mic plug. 6 ft cable. Price: C48 £7 7s.; C48/S £8 18s. 6d.

**Hand Pencil LFV/H59.** Moving coil. Response 100-14,000 c/s. Source imp low, line and high. Built-in trans for line and high. 20 ft cable for low and line. 9 ft for high. Price: £8 18s. 6d. (low), £9 9s. (line and high).

**Full-Vision LFV/59.** Moving coil. Response 100-14,000 c/s. Source imp low, line and high Built-in trans for line and high. 20 ft cable with low and line. 9 ft with high. Stand as required. Price: £9 9s. (low), £9 19s. 6d. (line and high).

**Lavalier LV/59.** Neck halter moving coil. Response 100-14,000 c/s. Low, line and high imp. Price: £9 9s. (low), £9 19s. 6d. (line and high).

**LD/66.** Moving coil. Response 70-12,000 c/s. Sensitivity  $-88$ ,  $-75$ , and  $-52$  dB, for low line and high imp respectively. Price: £5 5s. low imp; £5 15s. 6d. line and high imp. Stand fitting 15s. extra.

**Tubular Hand TH59/SB.** Moving coil with switch. Response 100-14,000 c/s. Sensitivity

—88 dB at 25 ohms, —75 dB at 600 ohms, and —54 dB at 50,000 ohms. Transformer as required. Price: £10 10s. (low), £11 11s. (high).

**Studio VR/53.** Ribbon velocity. Response substantially flat to 14,000 c/s. Source imp low, line and high. Built-in trans 3-pin moulded mic plug. 6 ft cable. Stand as required. Price: £11 11s.

**Ribbonette VR/64.** Ribbon. Response substantially flat 50 to 13,000 c/s. Source imp low, line and high. Built-in transformer. 20 ft cable for low and line. 9 ft for high. Table base. Price: £8 18s. 6d.

● **Stereolus VR/65NS.** Dual head ribbon. Response 50-13,000 c/s. Sensitivity stereo —90 dB at 20 ohms. Price: £17 17s.

**Lapel Mic LP/62.** Electro-Magnetic. Response, substantially maintained up to 6,000 c/s. Source imp 30 and 1,000 ohms. 6 ft cable. Price: £4 4s. (30 ohms), £4 14s. 6d. (1,000 ohms).

**Chest Harness D59/BS.** Moving coil. Response, substantially flat from 100-14,000 c/s. Source imp, low, line, high. 6 ft cable. Price: £15 15s.

**Velodyne VC52/THSB.** Noise cancelling moving coil with switch. Response rising to 1,700 c/s, flat to 3,500 c/s then falling. Source imp 25 ohms or as required. Transformer as necessary. Price: £10 10s.

**Contadyne Model CMC/68.** Moving coil. Small contact microphone with noise cancelling feature. Imp 20 ohms at 1 Kc/s. Price: £8 18s. 6d.

**Microdyne Model CDA/72.** Miniature electro-magnetic contact transducer. Price: £8 18s. 6d.

**LT/59.** Tubular hand model with P/1467 flexible tube support and table base. Price: £9 9s. (low), £9 19s. 6d. (high Z).

**LV59/UV.** Lavalier unit with adjustable neck halter. Dynamic. Low impedance. Price: £9 19s. 6d.



**MB ELECTRONIC.** Distributors: Denham and Morley Ltd., Denmore House, 173/5 Cleveland Street, London, W.1. Tel: Euston 3656. Cables: Denmori, London, W.1.

**MB101.** Moving coil. Omni-directional. Imp 200 ohms. FR 40 c/s-18 Kc/s. Sensitivity —74 dB. Size: cap  $1\frac{1}{8}$  in. dia, shaft  $\frac{7}{8}$  in. dia,  $5\frac{1}{2}$  in. long. Weight: 4 oz. Price: £14 14s.

**MB201.** Moving coil. Cardioid. Imp 200 ohms. FR 50 c/s-18 Kc/s. Front to back ratio 15-18 dB. Sensitivity —76 dB. Size and weight as for MB101. Price: £15 15s.

**MB215.** Moving coil. Cardioid. Imp 200 ohms. Response 50 c/s-18 Kc/s  $\pm 2.5$  dB. Front to back ratio 15-18 dB. Sensitivity —76 dB. Size: head  $1\frac{1}{2}$  in. dia, shaft  $\frac{7}{8}$  in. dia, length 6 in. Weight: 5 oz. Price: £16 16s.

**MB150TR.** Omni-directional. Dual impedance (200 ohms and 50K). Moving coil. Stick microphone with table stand. Complete with lead and 3-pin plug. Price: £3 3s.

**MB250TR.** Cardioid. Moving coil. FR 100 c/s-16 Kc/s. Front-to-back ratio 12-15 dB. Sensitivity —76 dB. Dual impedance (200 ohms and 50K). Size:  $1\frac{1}{2} \times 1\frac{1}{2} \times 5\frac{1}{2}$  in. Stick type with table stand. Price: £4 14s. 6d.

**MB301.** Cardioid. Studio quality ribbon stick microphone. 200 ohms. Complete with blast screen and MB-TSK mounting clamp. Price: £22 1s.

Accessories including leads, plugs, matching transformers, folding table stands, etc. Details and prices on application.

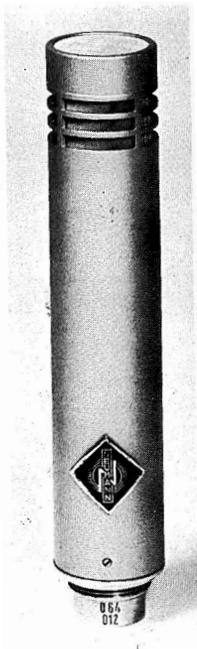


**NEUMANN GMBH.** Sole U.K. Agents: F. W. O. Bauch Ltd., Holbrook House, Cockfosters, Herts. Tel: 01-440-3277.

**U67.** Condenser. Switchable: omni-directional, cardioid, figure-of-eight. Response: 30 c/s-16 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 2mV/dyne/cm<sup>2</sup> in cardioid, 1.1 mV/dyne/cm<sup>2</sup> in omni-directional, 1.4 mV/dyne/cm<sup>2</sup> in figure-of-eight. Impedance 50 and 200 ohms. Built-in transformer. Special sensitivity and bass cut switches. Printed circuit. Pressure gradient mic. Price on application.

**M269c.** Condenser. Remote controlled: omni-directional, cardioid, figure-of-eight (continuously variable). Response 30 c/s-16 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 0.9 mV/dyne/cm<sup>2</sup> in omni-directional, 1.0 (1.55) mV/dyne/cm<sup>2</sup> in cardioid, 1.1 mV/dyne/cm<sup>2</sup> in figure-of-eight. Impedance 50 and 200 ohms. Built-in transformer. Special sensitivity and bass cut switches. Printed circuit. Remote controlled pressure-gradient mic. Price on application.

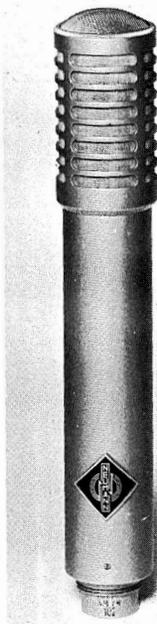
**M49c.** Condenser. Remote-controlled: omni-directional, cardioid, figure-of-eight (continuously variable). Response 35 c/s-15 Kc/s  $\pm 2$



*Neumann U64*



*Neumann U67*



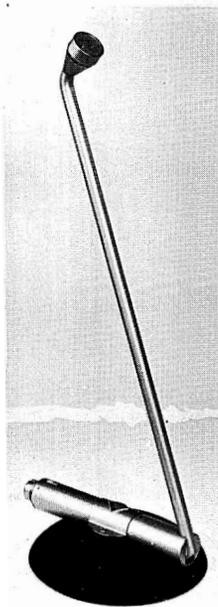
*Neumann KM74*



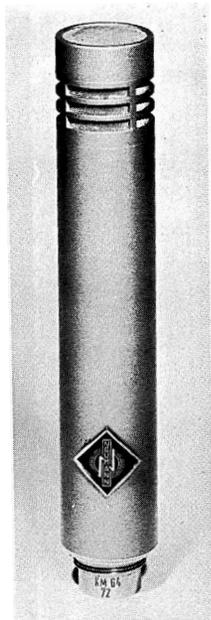
*Neumann SM69*



*Neumann KM76*



*Neumann KM64P*



*Neumann KM64*



*Neumann SM2c*

dB. Sensitivity across 1K: 0.7 mV/dyne/cm<sup>2</sup>. Imp 50 and 200 ohms. Built-in transformer. Remote-controlled pressure-gradient mic. Price on application.

**M50c.** Condenser. Omni-directional. Response 40 c/s-16 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 1.5 mV/dyne/cm<sup>2</sup>. Imp 50 and 200 ohms. Built-in transformer. Pressure mic. Price on application.

**KM53c.** Condenser. Omni-directional. Response: 40 c/s-15 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 1.5 mV/dyne/cm<sup>2</sup>. Impedance 50 and 200 ohms. Built-in transformer. Printed circuit. Miniature pressure mic. Price on application.

**KM54c.** Condenser. Cardioid. Response 40 c/s-15 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 1.2 mV/dyne/cm<sup>2</sup>. Impedance 50 and 200 ohms. Built-in transformer. Printed circuit. Miniature pressure-gradient type mic. Price on application.

**KM56c.** Condenser. Switchable: omni-directional, cardioid, figure-of-eight. Response 40 c/s-15 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 0.8 mV/dyne/cm<sup>2</sup>. Imp 50 and 200 ohms. Built-in transformer. Printed circuit. Miniature pressure-gradient mic. Price on application.

**KM253, KM254, KM256.** Condenser mics. RF-proof miniature microphones, otherwise specification as for KM53, KM54, KM56c.

**KM63.** Condenser. Omni-directional. Response 40 c/s-18 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 0.9 mV/dyne/cm<sup>2</sup>. Impedance 50 and 200 ohms. Built-in transformer. Special sensitivity switch (-10 dB). Printed circuit. Miniature pressure mic. Price on application.

**KM64.** Condenser. Cardioid. Response 40 c/s-18 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 0.9 mV/dyne/cm<sup>2</sup>. Imp 50 and 200 ohms. Built-in transformer. Special sensitivity switch (-10 dB). Printed circuit. Miniature pressure-gradient mic. Price on application.

**KM64P.** Announcer desk condenser microphone. Cardioid. Response up to 18 Kc/s with bass cut for better intelligibility. Sensitivity across 1K: 0.9 mV/dyne/cm<sup>2</sup>. Impedance 50 and 200 ohms. Built-in transformer. Special sensitivity switch (-10 dB). Printed circuit. Pressure-gradient mic. Price on application.

**SRM64.** Condenser. Cardioid. Response 40 c/s-18 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 0.8 mV/dyne/cm<sup>2</sup>. Impedance 50 and 200 ohms. Built-in transformer. Special sensitivity switch

(-10 dB). Printed circuit. Miniature pressure-gradient mic. Adjustable-height stand. Price on application.

**KM66.** Condenser. Switchable: omni-directional, cardioid, figure-of-eight. Response 40 c/s-16 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 2.6 mV/dyne/cm<sup>2</sup>. Impedance 50 and 200 ohms. Built-in transformer. Printed circuit. Miniature pressure-gradient mic. Price on application.

**U64.** Condenser. Cardioid. Response 40 c/s-18 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 1.1 mV/dyne/cm<sup>2</sup>. Imp 50 and 200 ohms. Built-in transformer. Special sensitivity switch (-10 dB). Printed circuit. Miniature pressure-gradient mic. Available with combined power units for two or six microphones. Price on application.

● **SM2c.** Stereo condenser. Both systems separately remote controlled: omni-directional, cardioid, figure-of-eight. Response 40 c/s-15 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 1 mV/dyne/cm<sup>2</sup>. Imp 50 and 200 ohms. Built-in transformers. Printed circuit. Pressure-gradient mics. Price on application.

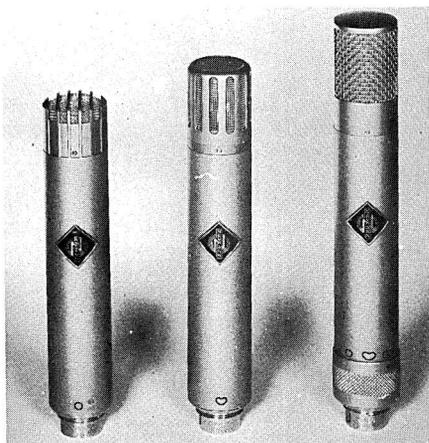
● **SM23c.** Double or stereo condenser. Both systems separately remote-controlled: omni directional, cardioid, figure-of-eight. Response 40 c/s-15 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 1 mV/dyne/cm<sup>2</sup>. Impedance 50 and 200 ohms. Built-in transformers. Printed circuit. Pressure-gradient mics. Price on application.

● **SM69.** Double or stereo condenser. Both systems separately remote-controlled: omni-directional, cardioid, figure-of-eight. Response 30 c/s-16 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 1.5 mV/dyne/cm<sup>2</sup>. Imp 50 and 200 ohms. Built-in transformers. Printed circuit. Pressure-gradient mics. Price on application.

**KM73.** Transistor (FET) condenser. Omni-directional. Response 40 c/s-16 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 2.5 mV/dyne/cm<sup>2</sup>. Impedance 200 ohms without transformer. Printed circuit. Miniature pressure mic. Price on application.

**KM74.** Transistor (FET) condenser. Cardioid. Response 40 c/s-16 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 2.5 mV/dyne/cm<sup>2</sup>. Impedance 200 ohms without transformer. Printed circuit. Miniature pressure-gradient mic. Price on application.

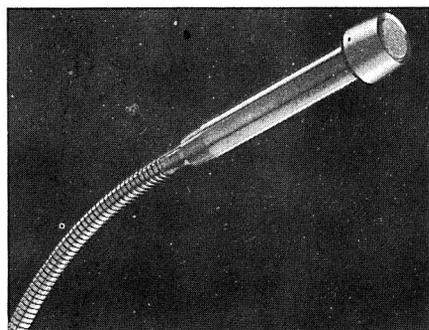
**KM76.** Transistor (FET) condenser. Switchable: omni-directional, cardioid, figure-of-eight. Response 40 c/s-16 Kc/s  $\pm 2$  dB. Sensitivity



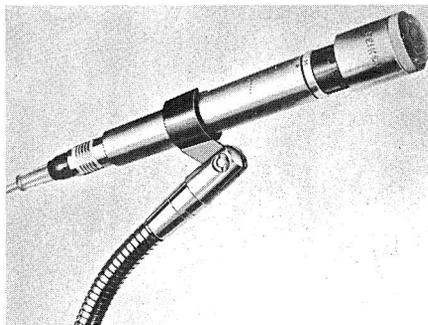
(left to right) Neumann KM53c, KM54c, KM56c



Neumann KML



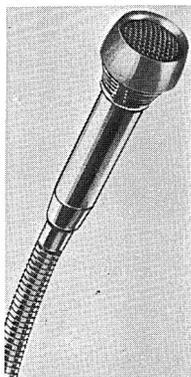
Peiker TM.15 dynamic



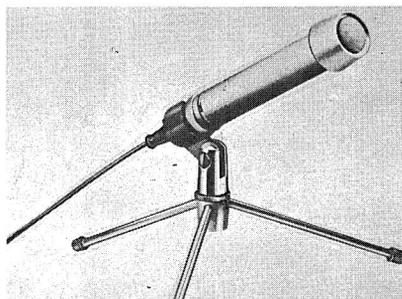
Peiker TM.17 dynamic



Peiker TM.135 dynamic



Peiker TM.35 moving coil



Peiker TM.3 dynamic

across 1K: 2.6 mV/dyne/cm<sup>2</sup>. Impedance 200 ohms without transformer. Printed circuit. Miniature pressure-gradient mic. Price on application.

**KML.** Lavalier transistor (FET) condenser. Cardioid. Response 40 c/s-16 Kc/s  $\pm 2$  dB. Sensitivity across 1K: 0.5 mV (18V) or 1.8 mV (45V) per dyne/cm<sup>2</sup>. Impedance 50 or 200 ohms. Built-in transformer. Printed circuit. Battery driven (18V or 45V). Miniature pressure-gradient mic. Price on application.



**PEARL.** Distributors: C. E. Hammond & Co. Ltd., 90 High Street, Eton, Windsor, Berks. Tel: Windsor 63388. Telex: 84316.

**LD14.** Moving coil. Omni-directional. Response 95 c/s-18 Kc/s. Sensitivity -54 dB. Output imp 30-200 ohms. Transformer fitted. Price: £12 18s.

**LD18.** Moving coil. Omni-directional. Response 80 c/s-18 Kc/s. Sensitivity -54 dB. Output imp 30-200 ohms. Transformer fitted. Price: £14 6s.

**RD16.** Moving coil. Cardioid. Response 50 c/s-18 Kc/s. Sensitivity -54 dB. Output: imp 30-200 ohms. Transformer fitted. Price: £14 14s.

**RD34.** Moving coil. Cardioid. Response 30 c/s-20 Kc/s. Sensitivity -54 dB. Output imp 30-200 ohms. Transformer fitted. Price: £15 15s.

**RD32.** Moving coil. Cardioid. Response 60 c/s-18 Kc/s. Sensitivity -55 dB. Output imp 30-200 ohms. Price: £29 5s.

**Flexible Swan-neck connectors.** For dynamic microphones. Model 1903 less switch. 3 pole connector. Length 175 mm. Price: £3 17s. 4d.

**HM47.** Moving coil lavalier. Omni-directional. Response 95 c/s-10 Kc/s. Sensitivity -76 dB. Output impedance 200 ohms. Price: £19 19s.



**PEIKER ACUSTIC.** Distributors: Britimpex Ltd., 16-22 Great Russell Street, London, W.C.1. Tel: Museum 7600.

**Peiker TM3.** Moving coil omni-directional hand, stand or lavalier microphone. FR 40 c/s-14 Kc/s  $\pm 2.5$  dB. Sensitivity (low Z): -70 dB; (high Z): -45 dB. Impedance 200 ohms and/or 80K. Fitting:  $\frac{5}{8}$  in. 27 tpi. Metal case chrome finish. Price (low Z): £14 14s.; (high Z): £14 14s.

**Peiker TM15.** Moving coil omni-directional studio microphone. FR 30 c/s-18 Kc/s  $\pm 2$  dB. Impedance 200 ohms and/or 80K. Sensitivity (low Z): -72 dB, (high Z): -47 dB. Swan neck with  $\frac{5}{8}$  in. 27 tpi fitting. Built-in switch. Metal case finished anodised chrome. Price (low Z): £37 16s., (high Z): £39 18s.

**Peiker TM17.** Moving coil cardioid stand microphone. 15 dB back suppression. FR 40 c/s-16 Kc/s  $\pm 3$  dB. Impedance 200 ohms and/or 80K. Sensitivity (low Z): -72 dB, (high Z): -47 dB.  $\frac{5}{8}$  in. 27 tpi fitting. Variable bass control (20 dB). Built-in windshield (15 dB). Anti-echo. Metal case finished matt chrome. Price: £16 16s.

**Peiker TM35.** Moving coil cardioid stand microphone. 15-24 dB back suppression. FR 50 c/s-14 Kc/s  $\pm 2.5$  dB. Impedance 200 ohms and/or 80K. Sensitivity (low Z): -70 dB, (high Z): -45 dB. Swan neck with  $\frac{5}{8}$  in. 27 tpi fitting. Built-in switch. Metal case finished chrome. Price (low Z): £19 19s., (high Z): £21.

**Peiker TM120.** Moving coil omni-directional studio stand microphone. FR 50 c/s-15 Kc/s  $\pm 2.5$  dB. Impedance 200 ohms and/or 80K. Sensitivity (low Z): -70 dB, (high Z): -45 dB. Swan neck with  $\frac{5}{8}$  in. 27 tpi. Built-in switch. Metal case finished chrome hammer. Price (low Z): £17 17s., (high Z): £18 18s.

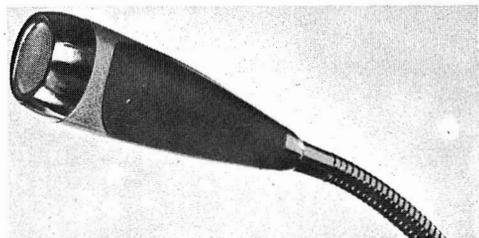
**Peider TM135.** Moving coil cardioid stand microphone. 15-18 dB back suppression. FR 35 c/s-16 Kc/s  $\pm 2$  dB. Impedance 200 ohms and/or 80K. Sensitivity (low Z): -72 dB, (high Z): -47 dB. Swan neck with  $\frac{5}{8}$  in. 27 tpi fitting. Variable bass control (20 dB). Built-in windshield (15 dB). Anti-echo. Metal case finished matt chrome. Price (low Z): £26 5s., (high Z): £28 7s.



**PETO SCOTT LTD.,** Addlestone Road, Weybridge, Surrey. Tel: Weybridge 45511. Grams: Megacycle, Weybridge. Telex: London 262319.

**Philips EL.6015/10.** Moving coil cardioid microphone. FR 90 c/s-16 Kc/s. Impedance 500 ohms. Sensitivity: -71 dB. On-off switch. Quick-release holder for stands with  $\frac{3}{8}$ ,  $\frac{1}{2}$  or  $\frac{5}{8}$  in. Whit threads. 16 ft twin screened lead. Price: £14.

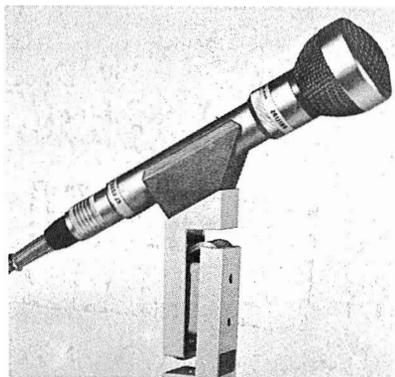
**Philips EL.6016/10.** Moving coil omni-directional microphone. FR 60 c/s-18 Kc/s. Impedance 500 ohms. Sensitivity: -71 dB. On-off switch. Quick-release holder for stands with  $\frac{3}{8}$ ,  $\frac{1}{2}$  or  $\frac{5}{8}$  in. Whit threads. 16 ft twin screened lead. Price: £11.



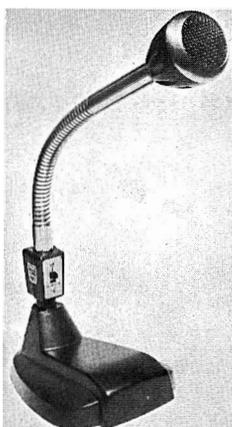
*Peiker TM.120 dynamic and PM.16 crystal*



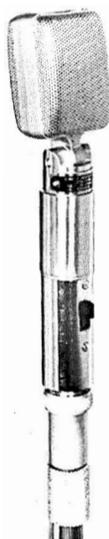
*Pearl LD14 moving coil*



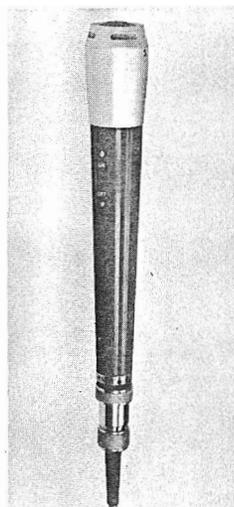
*Philips EL.6033 studio moving coil*



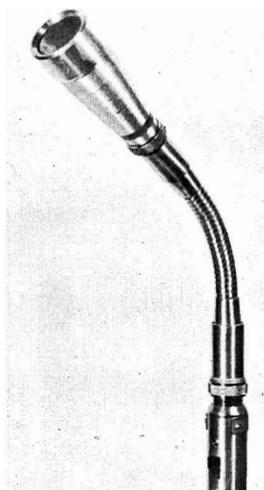
*Philips P.31 hyper-cardioid moving coil*



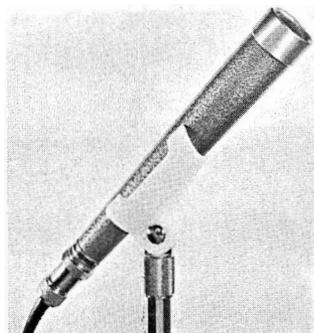
*Reslo RBTS/L*



*Reslo CPD cardioid pencil dynamic*



*Reslo type MPD*



*Reslo PD/L moving coil*

**Philips EL.6025/00.** Moving coil cardioid microphone. FR 125 c/s-16 Kc/s. Impedance 500 ohms and 25K. Sensitivity: 500 ohms — 71 dB, 25K — 54 dB. Combined on-off and impedance selector switch. Fitted flexible shaft and 16 ft twin screened lead. Finish: brushed satin stainless steel head and chromium plated shaft. Fits stand with  $\frac{3}{8}$ ,  $\frac{1}{2}$  or  $\frac{5}{8}$  in. Whit threads. Price: £18 10s.

**Philips EL.6026/10.** Moving coil cardioid microphone. Similar specification to EL.6025/00 except for panel mounting (or stand mounting with LBC.1201 adaptor) and single impedance (500 ohms). No on-off switch. Price: £15.

**Philips EL.6031/50.** Moving coil. Hyper cardioid. Response 70 c/s-15 Kc/s. Source impedance 500 ohms or 25K. Sensitivity — 74 dB or — 58 dB. On/off switch and flexible shaft. Price: £17.

**Philips EL.6033/10.** Moving coil. Studio quality. Switchable cardioid or omnidirectional. Response 80 c/s-15 Kc/s. Sensitivity — 72 dB. Source impedance 500 ohms (EL.6033/00 50 ohms). Special vibration damper optional extra. Supplied with cable and stand adaptor. Price: £24; vibration damper £3 extra.

**Philips EL.6035/10.** High quality moving coil cardioid microphone. FR 60 c/s-17 Kc/s. Impedance 500 ohms. Sensitivity: — 71 dB. On-off switch. Quick-release holder for stands  $\frac{3}{8}$ ,  $\frac{1}{2}$  or  $\frac{5}{8}$  in. Whit threads. Three-pole plug (Tuchel T3261/1) for detachable cable. Price: £24.

**Philips EL.6036/10.** High quality omnidirectional moving coil. FR 50 c/s-19 Kc/s. Impedance 500 ohms. Sensitivity: — 71 dB. On-off switch. Quick-release holder for stands with  $\frac{3}{8}$ ,  $\frac{1}{2}$  or  $\frac{5}{8}$  in. Whit threads. Three-pole plug (Tuchel T3261/1) for detachable cable. Price: £20.

**Philips EL.6042/05.** Professional quality omnidirectional moving coil. FR 40 c/s-20 Kc/s. Impedance 200 ohms. Sensitivity: — 79 dB at 1 Kc/x reference 1V/ $\mu$ bar. Size:  $5\frac{3}{8} \times \frac{3}{4}$  in. Finish: matt chrome plate. Quick-release holder-clamp for stands with  $\frac{3}{8}$ ,  $\frac{1}{2}$  or  $\frac{5}{8}$  in. Whit threads. Three-pole plug for twin screened cable. Individually calibrated frequency response. Price: £29 10s.

**Philips EL.6061/02.** Moving coil, noise cancelling. On/off and control switch. Response 200 c/s-10 Kc/s. Source impedance 500 ohms. Mounting bracket. Price: £7 15s.

**Philips EL.6204.** Universal microphone table stand. Provided with  $\frac{3}{8}$  in. Whit thread and possibility of mounting signal lamps or switches, etc. Price: £3 10s.

**Philips EL.7500.** Moving coil microphone kit. Includes table stand, on/off switch and neck cord. Source impedance 200 ohms, 500 ohms or high Z. Price (kit): £7 7s.

**Philips P.31.** Moving coil Hyper-cardioid. Response 70 c/s-15 Kc/s. Sensitivity — 74 dB or — 58 dB. Source impedance 500 ohms or 25K. On/off switch and table base with flexible shaft and cable. Price: £18 18s.

**Philips P.33.** Moving coil. Switched cardioid or omnidirectional pattern. Response 80 c/s-15 Kc/s. Impedance 500 ohms. Sensitivity — 72 dB relative to 1V/ $\mu$ bar. In cardioid position sensitivity 17 dB more to the front compared with the rear. Quick release holder for stands with  $\frac{3}{8}$  in.,  $\frac{1}{2}$  in., or  $\frac{5}{8}$  in. Whit threads. 16 ft detachable twin screened lead. Vibration-damper mount optional extra. Price (microphone): £24; (vibration damper): £3.



**PHILIPS ELECTRICAL LTD.,** Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437-7777. Cables: Phillamps, London.

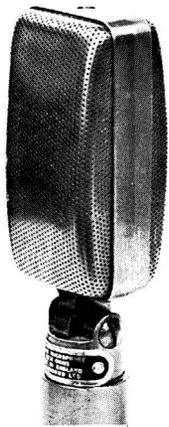
**EL3755.** Moving coil. Cardioid. Response 150 c/s-10 Kc/s. Output: 0.34 mV/microbar at 1 Kc/s. Imp 500 ohms. Price: £3 10s.

**EL3782.** Moving coil. Cardioid. Response 150 c/s-10 Kc/s. Output: 0.22 mV/microbar at 1 Kc/s. Imp 500 ohms. Speech/music switch, bass cut in speech position. Price: £5.

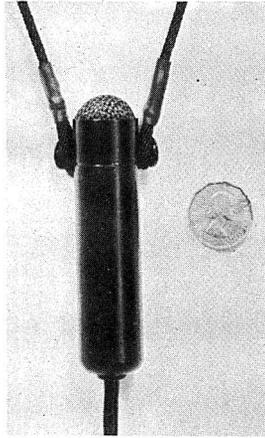
**EL1976.** Moving coil omnidirectional hand mic. FR 120 c/s-16 Kc/s. Output: 0.34 mV/microbar at 1 Kc/s. Impedance 500 ohms. Price: £3 10s.

● **EL1979.** Moving coil stereo hand or stand mic. Cardioid. FR 180 c/s-9 Kc/s. Output: 0.19 mV/microbar at 1 Kc/s. Impedance 500 ohms. Microphones can be separated from stand. Black plastic moulded body. Price: £10 10s.

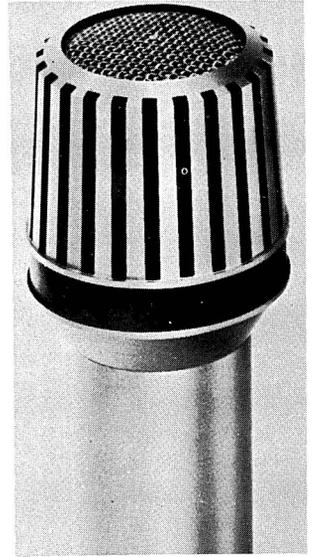
**EL1980.** Moving coil stick mic with table stand. Omnidirectional. FR 50 c/s-18 Kc/s. Output: 0.32 mV/microbar at 1 Kc/s. Impedance 600 ohms. Grey and black plastic body. Price: £3 10s.



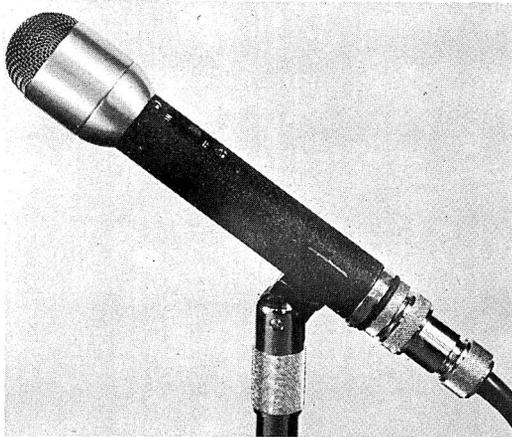
*Reslo Studios SR1 ribbon*



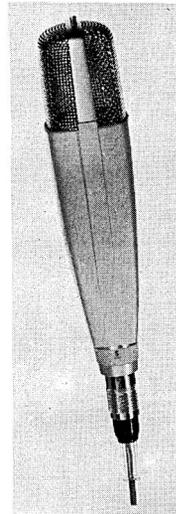
*Reslo MMD.1*



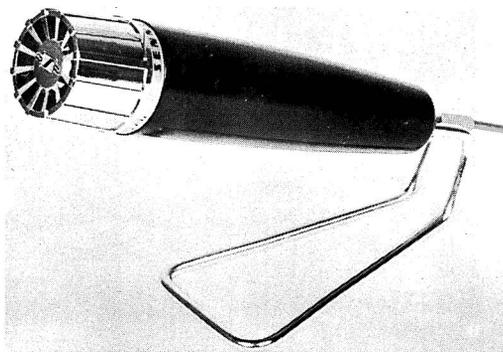
*Sennheiser MD420N*



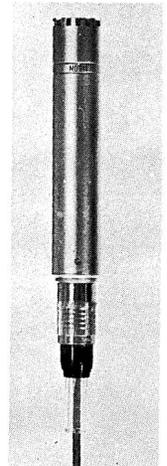
*Reslosound EC.1*



*Sennheiser MD421HN*



*Sennheiser MD611LM*



*Sennheiser MD211*

**EL3755/50.** Moving coil hand mic. Cardioid. FR 120 c/s-16 Kc/s. Output: 0.3 mV/microbar at 1 Kc/s. Impedance 500 ohms. Two-tone plastic case. Price: £3 10s.

**EL3782.** Moving coil hand mic. Cardioid. Speech/music switch. Grey plastic case. Price: £5.

**EL3797.** Moving coil hand mic. Omni-directional. Specially designed for use with Philips battery cassette recorders. Includes EL3976 remote control (detachable). FR 180 c/s-9 Kc/s. Output: 0.19 mV/microbar at 1 Kc/s. Impedance 500 ohms. Price: £4 5s.



**RESLOSOUND LTD.,** Spring Gardens, London Road, Romford, Essex. Tel: Romford 49087/46645.

**RBT Series.** High quality miniature ribbon. FR 40 c/s-14 Kc/s  $\pm 3$  dB. Figure-of-eight, modified as required by filter pads. Sensitivity 58 dB below at 40K. Imp RBT/L 30-50 ohms; RBT/M 250 or 600 ohms; RBT/H 30-50 ohms or 40K. A switched model also available with the switch included in a slightly longer body (RBTS/L, RBTS/M, RBTS/H). Finish: Satin chrome or silver grey hammertone enamel. Acoustic filter pad for close-talking use. Prices: RBT/L £11 11s., RBT/M and RBT/H £12 2s. For switched models add £2 12s.

**CR2 Series.** High quality miniature ribbon. FR 40 c/s-16 Kc/s ( $-2$  dB at 60 c/s,  $+10$  dB at 16 Kc/s). Cardioid, figure-of-eight partially suppressed at the rear. Sensitivity 58 dB below for high-Z model. Imp: L, M and H as for RBT Series. Flexible swan neck stem. Finish: Satin chrome perforated front, diecast case, silver grey hammertone enamel. Prices: CR2/L £12 2s., CR2/M and CR2/H £12 12s.

**SR1 Series.** Professional studio ribbon. FR 30 c/s-20 Kc/s  $\pm 2$  dB. Nominal figure-of-eight. Damping pads available. Sensitivity 73 dB at 300 ohms. Imp: SR1/L 30-50 ohms, SR1/M 250 or 300 ohms. Developed for use by broadcasting authorities and recording studios. Finish: satin Florentine bronze. Other finished to quantity order. Price: (both models) £28 7s.

**VRT Series.** Special miniature ribbon. FR 30 c/s-16 Kc/s,  $-2$  dB at 40 c/s,  $+2$  dB at 16 Kc/s. Nominal figure-of-eight. Damping pads available. Sensitivity 81 dB below at 300 ohms. Developed for broadcast and recording studios. Satin chrome finish. Price: £17 17s.

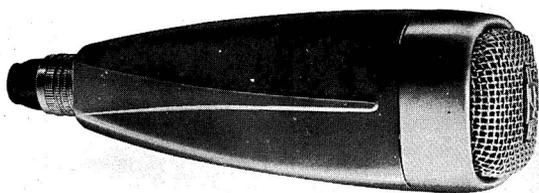
**PD Series.** Pencil moving coil with lightweight tapered housing. FR 50 c/s-15 Kc/s,  $-4$  dB at 100 c/s,  $+4$  dB at 14 Kc/s. Omni-directional with microphone vertical. With microphone horizontal rear response  $-18$  dB at 11 Kc/s. Sensitivity 88 dB below at 30-50 ohms. Imp: PDL 30-50 ohms, PDM Dual 250 or 600 ohms, PDH Dual 30-50 ohms or 40K. Switched version available; PDS/L, PDS/M, PDS/H. Finish: Silver grey hammer or black crackle. Prices: PDL £8 15s., PDM and PDH £9 15s. For switched versions add 10s.

**MPD Series.** Miniature pencil moving coil. FR 50 c/s-15 Kc/s,  $-12$  dB at 100 c/s,  $+4$  dB at 14 Kc/s. Omni-directional with microphone vertical, rear response  $-18$  dB at 11 Kc/s with microphone horizontal. Sensitivity 88 dB. MPD/H high impedance (comprises MPD head, LTU1 line transformer, A922 flexible stem and C930 cable set). Suitable close-talking applications without additional filters. Finish: Satin tint laquer. Other finishes to quantity order. Prices: MPD/H £14 14s., MPD head only £6 17s. 6d.

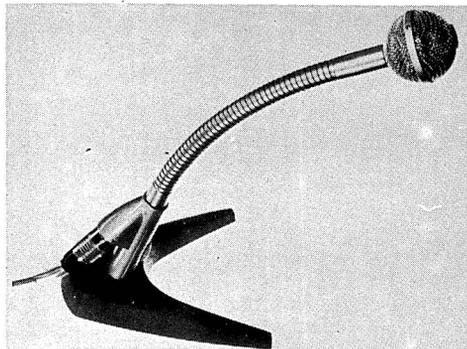
**MMD.1.** Miniature dynamic lavalier lightweight microphone. FR 50 c/s-17 Kc/s  $\pm 4$  dB. Presence hump between 2.5 Kc/s. Omni-directional. Sensitivity:  $-89$  dB at 30-50 ohms. Dimensions:  $3\frac{1}{4}$  in. long,  $\frac{3}{8}$  in. diameter. Weight: 2 oz including cord clip and one yard cable. Finish: matt black stove lacquered. Impedance 30-50 ohms only. 18 ft miniature extension cable complete with DIN plug supplied. Price: £10 10s.

**CPD Series.** Cardioid pencil dynamic microphone. FR 15 c/s-17 Kc/s. Uni-directional partly suppressed at rear. Rear pick up  $-10$ - $20$  dB over range 200 c/s-15 Kc/s. Sensitivity  $-88$  dB at 30-50 ohms. Size:  $8\frac{1}{2}$  in. overall length,  $1\frac{1}{2}$  in. maximum diameter (head). Impedances (switched model): L = 30-50 ohms, M = dual 250 or 600 ohms, H = dual 30-50 ohms or 40K. Unswitched model in low impedance only. Finish: Fine-grain black shrivel case with matt silver head and cap. Supplied with cable set and plastic stand holder. Prices: CPD/L £15 15s., CPD/M and CPD/H £16 16s. Unswitched low impedance model £14.

**EC.1.** Cardioid hand or stand microphone. FR 50 c/s-17 Kc/s  $-4$  dB at 100 c/s,  $+8$  dB at 16 Kc/s. Uni-directional. Rear pickup  $-10$  to  $-20$  dB between 200 c/s-15 Kc/s. Sensitivity  $-88$  dB at 30-50 ohms. Output: average voice 6 in. from front of mic 150  $\mu$ V (low imp), 250-450  $\mu$ V (medium imp), 2-4 mV (high imp). Output increases approximately 10 times at one inch from microphone. Impedances: EC.1/L



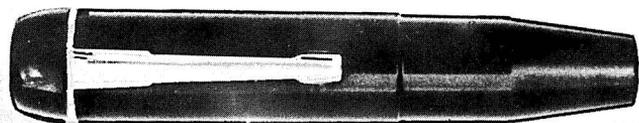
*Sennheiser MD21HN*



*Sennheiser MD408*



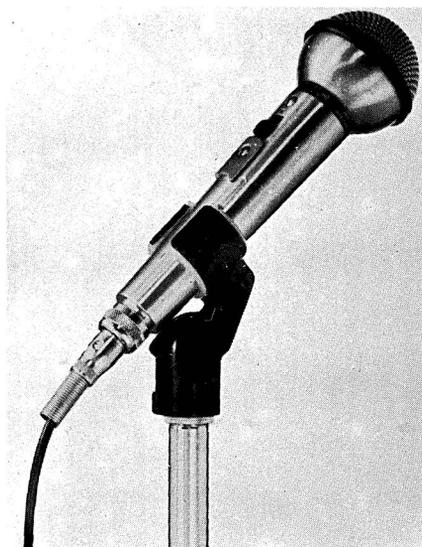
*Shure 581SA Unidyne A*



*Sennheiser MM61*



*Sennheiser MD214*



*Shure 533SA Spher-o-dyne*

30-50 ohms, EC.1/M 250 or 600 ohms, EC.1/H dual impedance 30-50 ohms or 40K. Finish: fine grain black wrinkle tubular case, head and front cap matt silver. Supplied with close-talking acoustic shield and plastic and chrome stand holder. Price: £18.

**VMC2.** High-output moving coil. Rugged construction. FR 50 c/s-16 Kc/s  $\pm 5$  dB. Imp 15 ohms. On/off switch. Price: £9 14s.

**HM Series.** THM1/L moving coil insert in high-impact off-white plastic case for hand use. Input load 30-50 ohms. Price: THM1/L £6 11s., THM1/M £7 7s.

**CHM.1.** Tape recording crystal microphone with high quality insert. Locking type on-off switch. Low capacity coaxial cable. Suitable for domestic tape recorders. Price: £3 8s.

**Coupler unit GE1.** Suitable for use with any impedance microphone. Designed for external use adjacent to the tape recorder or amplifier. Gain 35-40 dB. Response 50 c/s-20 Kc/s  $\pm 1$  dB. Fitted 36 in. screened lead and jack plug. Self-contained PP4 battery with average life of 1,500 hours. Price: £8 8s.

**Coupler unit GE2.** Similar to GE1 but with addition of a 30-50 ohm input transformer for balanced-to-earth input. Permits use of long microphone lines with low noise and hum. Price: £12 12s.

**Coupler transformer LTU1.** Designed for use between a low impedance microphone (15-50 ohms) and a high impedance microphone-input socket. Nominal input 40 ohms, nominal output 100K for valve grid circuit. Response 50 c/s-15 Kc/s. 1 dB. Price: £4 12s.

**Microphone transformers MT101, MT102.** Designed for internal mounting in equipment having only high impedance inputs. Input imp: MT101 15-50 ohms, MT102 300-600 ohms. Nominal output imp 100K. Response 50 c/s-15 Kc/s 2 dB. Price: MT101 £2 18s., MT102 £3 3s.

**MS. 100A.** Adjustable floor stand. Minimum height 3 ft 4 in., maximum height 5 ft 2 in. Grey hammertone base and outer stem, chrome inner extension piece. Price: £7 18s.

**MS. 110A.** Similar to the MS. 100A but with chrome stem. Price: £7 18s.

**MS. 111.** Lightweight folding floor stand. Finish: legs and lower outer tube black stove enamel, inner tube polished chrome. Price: £6 15s.

**MS. 175.** Boom arm fitting available for use with Reslo floor stands. Price: £7 7s.

**MS. 200.** Adjustable table stand. Minimum height 1 ft 4 in., maximum height 2 ft 2 in. Grey hammertone base with chrome stem and extension piece. Price: £4 9s.

**MS. 300.** Circular desk stand. Grey hammertone base fitted with 3 in. chrome stem. Price: £2 7s.

**MS. 400.** Rectangular desk base. Fitted foam pads. Finished in silver grey hammertone. Muting switch optional extra. Price: £2 2s.; with switch £2 18s.

**MS. 500.** Rectangular desk base. Similar to MS.400 but fitted with rubber feet. Price: £1 17s.; with switch £2 13s.

Other accessories available include mounting units, cables, reducers, adaptors, etc. All prices include packing and postage.

**RM18/19.** Transistorised battery operated radio microphone system. GPO approved. Full details and prices on request.



**RONETTE.** U.K. Distributors: H. K. Harrison and Co. Ltd., 140 Park Lane, London, W.1. Tel: Hyde Park 9363.

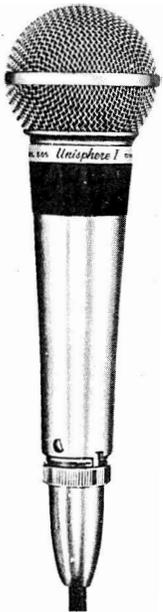
**Ronette MM-65.** Crystal. Omni-directional. Response 30 c/s-10 Kc/s. Imp 5 megohms. 300 pF. Small and rugged. Price: £2 5s.



**SENNHEISER ELECTRONIC.** Distributors: Audio Engineering Ltd., 33 Endell Street, London, W.C.2. Tel: Temple Bar 0033.

**MD.21HN.** Omni-directional moving coil hand or stand microphone. FR 50 c/s-15 Kc/s  $\pm 3$  dB. Sensitivity -53 dB. Impedance 200 ohms and 30K. Rec load 200 ohms or 100K. Light alloy case finished hammer stove enamel. Windshield MZW22 optional extra. Price (microphone): £22 15s.; (windshield MZW22): £3 18s.; (desk stand MZT21): £2 19s.

**MD.211.** Omni-directional moving coil miniature studio microphone. Hand or stand use. FR 40 c/s-20 Kc/s  $\pm 2.5$  dB. Sensitivity -57 dB. Impedance 200 ohms. Rec load 200 ohms. Metal case with satin chrome finish. Windshield MZW211 optional extra. Price (microphone): £35 15s., (windshield MZW211): £4 15s.; (small tripod desk stand MZT102): £4 18s.



*Shure 565 Unisphere I*



*Shure 55S small Unidyne*



*Shure 585SA Unisphere*



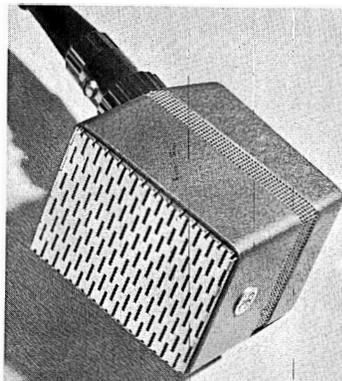
*STC 4108 condenser*



*Shure 545 Unidyne III*



*STC 4037-A moving coil*



*STC type 4113 ribbon*

**MD.214.** Omni-directional moving coil lavalier microphone. Built-in "natural voice" equaliser to studio standards. FR specially designed for lavalier operation. Sensitivity —59 dB. Impedance 200 ohms. Rec load 200 ohms. Metal case finished special "non-glare" enamel. Price: £29 17s.

**MD.408.** Super cardioid moving coil microphone with flexible shaft. FR 100 c/s-14 Kc/s  $\pm 3$  dB. Impedance 200 ohms. Sensitivity —55 dB. Case of light gauze woven wire cloth. Price: £19 2s.

**MD.411HLM.** Super-cardioid moving coil mono microphone. FR 50 c/s-14 Kc/s  $\pm 4$  dB. Impedance: (low) 200 ohms, (medium) 800 ohms, (high) 25K. Sensitivity: 0.12 mV/ $\mu$ bar, 0.25 mV/ $\mu$ bar, 1.25 mV/ $\mu$ bar. Rec load: (low) 50-200 ohms, (medium) 1-2K, (high) 80K. Hand and stand microphone with base fitting clip. Sound from sides and rear heavily attenuated. Case of hardened plastic round metal sleeve. Finish: matt silver. Price: £13 9s.

**MD.420N.** Super-cardioid noise cancelling moving coil mono microphone. FR 200 c/s-10 Kc/s (special response curve for noise cancellation). Impedance 200 ohms. Sensitivity 0.18 mV/ $\mu$ bar. Hand or stand microphone with goose neck and large Tuchel plug. Metal case with silver finish. Model MD.420NT has built-in switch. Price: (unswitched) £16 5s.

**MD.421HN.** Cardioid moving coil hand or stand microphone. Special frequency response with built-in variable bass attenuator. Impedance 200 ohms or 24K. Rec load 200 ohms or  $> 50K$ .  $\frac{3}{8}$  in. thread adaptor supplied. Light grey die-cast case. Windshield MZW22 and heavy desk stand MZT421 optional extras. Price (microphone): £32 10s.; (windshield MZW22): £3 18s.; (desk stand MZT421): £2 19s.

**MD.611LM.** Omni-directional moving coil mono microphone. FR 60 c/s-12 Kc/s  $\pm 3.5$  dB. Impedance 500 ohms. Sensitivity 0.25 mV/ $\mu$ bar. Hand or stand microphone; supplied with desk stand. Black plastic case. Price: £5 19s.

**MD.722LM.** Super-cardioid moving coil mono microphone. FR 80 c/s-12 Kc/s  $\pm 3.5$  dB. Impedance 500 ohms. Sensitivity 0.25 mV/ $\mu$ bar. Hand or stand microphone; supplied with desk stand. Sound from sides as well as rear heavily attenuated. Black plastic case. Price: £6 9s.

● **MDS.1.** Cardioid stereo moving coil stand microphone. FR 60 c/s-15 Kc/s  $\pm 5$  dB. Sensi-

tivity —57 dB. Impedance 200 ohms.  $\frac{3}{8}$  in. female thread. Microphones can be removed from their respective arms. Grey moulded plastic case. Price: £26 5s.

**MM.23.** Omni-directional moving-iron lapel microphone. FR 400 c/s-4 Kc/s  $\pm 3$  dB. Impedance 2K. Sensitivity —61.5 dB ref 1 mW/10 microbar. Metal case, supplied with miniature cable and jack-plug. Price: £5 15s.

**MM.61.** Omni-directional moving-iron fountain pen microphone. Specification as for MM.23. Black plastic "fountain pen" case with pocket clip. Price: £5 19s.

**MZS.142.** Lightweight telescopic tripod microphone stand with neat carrying case. Price: £6 3s.



**SHURE ELECTRONICS LTD.**, 84 Blackfriars Road, London, S.E.1. Tel: Waterloo 6361.

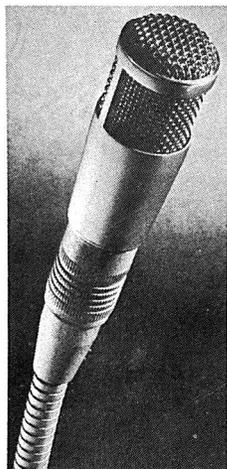
**55S Small Unidyne.** Cardioid moving coil. Response 50-15,000 c/s. Sensitivity —57 dB at high impedance. Source imps 35-50, 150-250 ohms, and high. Switched transformer built-in. Price: £27 13s. 4d.

**545 Unidyne III.** Cardioid moving coil. Response 50-15,000 c/s. Sensitivity —55 dB. Source impedance 25-250 ohms and high. Built-in transformer. Price: £28 6s. 8d.

**533SA Sphero-dyne.** Moving coil omnidirectional microphone. FR 40 c/s-11 Kc/s. Sensitivity —54.5 dB. High impedance (a low 25 ohms version is available). Hand or stand. Built-in wind/breath filter. On-off switch with lock-plate. Finish: satin chrome body with plated steel grille. Size: 6 $\frac{5}{8}$  in. long, 2 $\frac{1}{2}$  in. diameter over head. Price: (533SA high impedance) £16 13s. 4d.; (533SF low impedance) £15 16s. 8d.

**565 Unisphere I.** Moving coil. Cardioid (with polar diagram uniform with frequency, symmetrical about axis). FR 50 c/s-15 Kc/s. Dual impedance (50-250 ohms and high). Sensitivity: (low Z) —78 dB, (high Z) —55 dB. Hand or stand. Built-in wind/breath filter. Available with or without switch. Detachable 18 ft three-core screened lead. Finish: satin chrome body with plated steel grille. Size: 6 $\frac{1}{2}$  in. long, 2 in. diameter over head. Price: (565 less switch) £31 13s. 4d.; (565S with switch) £33 6s. 8d.

**581SA Unidyne.** Moving coil. Cardioid. FR 50 c/s-12 Kc/s. Impedance: High Z (a low 25



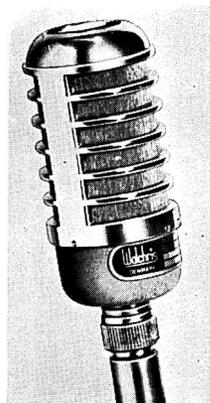
*STC 4126 capacitor mic*



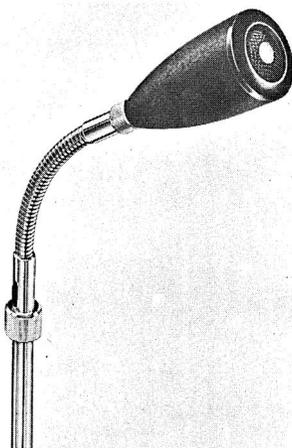
*STC 4033 moving coil and ribbon*



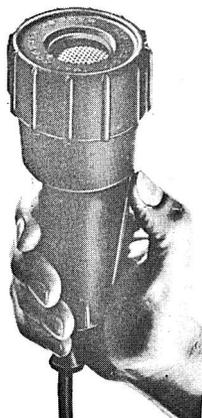
*STC 4038 A ribbon*



*Walchris 63M*



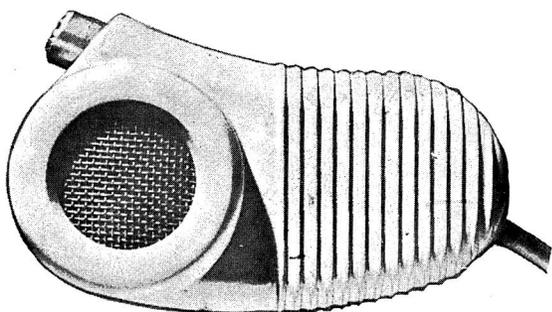
*Vitavox M100*



*Vitavox B64 moving coil*



*Woollett stereo condenser*



*Vitavox B50 moving coil*

ohms version available). Sensitivity: (high Z) —56.5 dB, (low Z) —87 dB. Hand or stand. Built-in on-off switch with provision for locking on. Matched pairs available for stereo recording. Size:  $6\frac{7}{8}$  in. long,  $1\frac{3}{4}$  in. diameter. Finish: satin chrome and grey, diecast zinc and "Armo-dur" case. Price: (581SA high Z) £19 13s. 4d.; (581SF low Z) £18 13s. 4d.

**585SA Unisphere A.** Moving coil. Cardioid. FR 50 c/s-12 Kc/s. Impedance: high Z (a low 150-250 ohms version available). Sensitivity: (high Z) —56.5 dB, (low Z) —79.5 dB. Hand or stand microphone supplied with swivel stand adaptor. Built-in switch with provision for locking on. Wind/breath filter. Detachable 18 ft cable. Finish: satin chrome with steel mesh grille. Size:  $6\frac{3}{4}$  in. long,  $2\frac{1}{2}$  in. diameter. Price: (585SA high Z) £21 13s. 4d.; (585SB low Z) £19 6s. 8d.



**STC LTD.,** Acoustic Sub-Division, West Road, Harlow, Essex. Tel: Harlow 26811.

**4021-J.** Spherical omni-directional moving coil. Flat response 30-15,000 c/s. Impedance 30 ohms. Sensitivity —80 dB. Price: £16 10s.

**4033-A.** Cardioid microphone. Moving coil and ribbon element which can be used individually or in combination. Flat response 30-10,000 c/s. Impedance 50 ohms. Sensitivity —80 dB. Front to back ratio 15-20 dB. Price: £65.

**4037-A.** Moving coil unobtrusive pencil microphone. Flat response 30-15,000 c/s. Impedance 30 ohms. Sensitivity —84 dB. Price (long or short model): £22.

**4038-A.** Studio ribbon microphone. Accurate figure-of-eight response. Flat frequency response 30-15,000 c/s. Impedance 30 ohms. Sensitivity —85 dB. Non-linear distortion 0.1%. Controlled transient response. Price: £50.

**4104-B&C.** Commentator's lip microphone. High degree of noise cancellation. Flat response 70-10,000 c/s. Impedance 30 ohms. Output: —82 dB ref IV for 10 dyne/cm. Price: £70.

**4105-A.** Cardioid moving coil microphone specially designed for speech. Flat response 60-10,000 c/s. Impedance 30 ohms. Sensitivity —82 dB. Front to back ratio 15-20 dB. Price: £22 10s.

**4108.** Cardioid condenser microphone. Response 30-16,000 c/s. Sensitivity —60 dB. Impedance 30 or 300 ohms. Transformer fitted. Small size directional studio microphone. Price: £96.

**4113.** Ribbon cardioid microphone. 60-15,000 c/s. Specially suitable for speech and music recording. Two versions available. 4113-A: 30 ohms impedance. Output: —87 dB. 4113-B: 50K impedance. Output: —54 dB. Suitable most domestic recorders. Price: £11 11s. (both models).

**4119.** Double ribbon (for improved sensitivity) hand-held or stand-mounted microphone. High quality suitable for studio and domestic hi-fi, speech and music. Available 30-300 ohms or 50K. Complete with nine feet cable and zip case. Price: £26 (both models). 30-300 ohms model with switch. Price: £27.

**4126.** Cardioid condenser microphone using field effect transistor head amplifier. Very high quality. Response 30-16,000 c/s. Sensitivity —84 dB. Impedance 30 or 300 ohms. Complete kit comprising transit cases, mains power pack, 30 ft cable, and outlet plug. Price: £108 6s. 6d. With battery power pack instead of mains unit, £94 16s.

**THORN ELECTRICAL INDUSTRIES LTD.,** Thorn House, Upper St Martin's Lane, London, W.C.2. Tel: Temple Bar 2444.

**Cardioid microphone TA/02.** Dynamic microphone with directional properties. Speech and music switch. Designed for Thorn Group two- and four-track machines. Price: £6 6s.



**TRIX.** Ultra Electronics Ltd., Telecommunications Division, Western Avenue, London, W.3. Tel: 01-992-3434. Cables: Radwaves, London.

**G7823.** Ribbon. Response 50-12,000 c/s. Source imp 30 ohms. 18 ft cable, 3 pin locking type plug. Stands as required. Price: £10 7s.

**G7852.** Moving coil. Response 50-9,000 c/s. Source imp 30 ohms. Cable and connector. Price: £10 10s.

**G7852/F.** Moving coil. Similar to G7852 but incorporating flexible stem. Cable and connection. Price: £11 2s.

**G7852/FP.** Moving coil. Similar to G7852 but priority microphone on base with switch. Price: £16 10s.

**G7854.** Moving coil. Response 100 c/s-11 Kc/s. Imp 30 ohms. Hand-type, complete with cable. Price: £8 2s. Can be used with neck sling attachment G7977/N, also with stand fitting with swivel clip attachment G7979/C: £1.

**G7871/D.** Moving coil. Response 50 c/s-8 Kc/s. Source imp 30 ohms. 18 ft cable, with switch. Stands as required. Price: £8 7s.



**TURNER.** Distributors: Auriema Ltd., 23-31 King Street, London, W.3. Tel: 01-992-5388. Acorn 8762.

**SR90D.** Robust hand type pressure-operated dynamic unit. Response 200 c/s-10 Kc/s. Imp 200 ohms or 25K. Built-in switch with spare contacts. Die-cast case finished brushed chrome. Weight: 1 lb 6 oz including self-coiling lead. Price: £14 8s. 10d.

**58.** Miniature dynamic designed for lavalier use. Omni-directional. Response 60 c/s-13 Kc/s. Imp interchangeable 150 ohms and 30K. Size: 4 in. long, 1 in. diameter. Weight: 3½ oz. Desk stand optional extra. Price: £19 7s. 4d.

**500.** Hand or stand dynamic unit with cardioid response. Frequency response 40 c/s-15 Kc/s. Imp 150 ohms and 40K. Die-cast alloy case finished satin chrome. Size: 6¾ in. long, 1½ in. diameter. Weight: 12 oz (excluding cable). Price: £29 14s. 4d.

**510.** Hand or stand dynamic unit with cardioid response. Frequency response 40 c/s-15 Kc/s. Imp 50 ohms and 200 ohms. Designed for broadcast use. Shock mounted. Die-cast alloy case finished matt blue-grey. Size: 6¾ in. long, 1½ in. diameter. Weight: 12 oz (excluding cable). Price: £50 19s. 4d.



**UHER.** Distributors: Bosch Ltd., 205 Great Portland Street, London, W.1. Tel: Langham 2672/5.

**M153.** Dynamic microphone with remote control switch providing: record, stop, start, rewind. FR 50 c/s-10 Kc/s. Impedance 200 ohms. Price: £8 6s. 8d.



**VITAVOX LTD.,** Westmoreland Road, London, N.W.9. Tel: Colindale 8671. Cables: Vitavox, London, N.W.9.

**B50.** Moving coil. Response 60 c/s-8 Kc/s. Sensitivity -85 dB. Source imp 25 ohms. 6 ft cable. Built-in control switch. Price: £6 17s.

**B54.** Moving coil incorporating built-in transformer. Response 60 c/s-8 Kc/s. Sensitivity -85 dB (excluding transformer). Source imp 200, 500, 10K, 100K ohms according to transformer. Built-in control switch. Price: £8 5s.

**B60.** Similar specification to B50 but weather-proof version. Price: £8 17s.

**B64.** Similar specification to B54 but weather-proof version. Price: £10 5s.

**M100.** Moving coil incorporating tapped transformer giving choice of 25, 200, 10K ohms and high impedance. Response 50 c/s-15 Kc/s ±3 dB. Sensitivity -80 dB, -71 dB, -54 dB, -44 dB according to impedance. 9 ft cable and flexible support. Price: £15.



**WALCHRIS.** Distributors: Britimpex Ltd., 16/22 Great Russell Street, London, W.C.1. Tel: Museum 7600. Cables: Brytron, London, W.C.1.

**63M.** Velocity type studio microphone available in high or low impedance versions. Figure of eight. Response 30 c/s-18 Kc/s ±2.5 dB. Sensitivity (high Z) 1 mV/microbar. Imp: 50 ohms, 200 ohms, or 80K. Special impedances to order. Weight: 7 oz. Resilient mounting isolates unit from shocks or vibration through the support. Price: £16 16s.

Base: semi-flexible stand, 10 ft cable and connector. Available in chrome and grey or black crackle finish. £4 4s. Shielded transformers, connectors, extension leads, switch units, etc.



**L. G. WOOLLETT & COMPANY LTD.,** 21 Anerley Station Road, London, S.E.20. Tel: Sydenham 9003.

●**Stereo/condenser.** Separate plug-in cells. Stereo or mono. Figure of eight, velocity. Stand type units fits international photographic thread (¼ in. Whitworth). Specification not available at time of going to press. Price: Velocity head £14 14s. (two required for stereo), Head amplifier £18 18s., isolator power supply £23 2s.



**WYNDSOR RECORDING CO. LTD.,** (inc. Magnetic Recording Co.), WyndSOR Works, 2 Bellevue Road, Friern Barnet, London, N.11. Tel: Enterprise 2226/7. Cables: Wyndreco, London.

**WyndSOR WL.30.** Ribbon hand or desk-stand microphone. FR 50 c/s-13 Kc/s. High impedance with built-in transformer. Finished satin chrome. Supplied with 12 ft screened cable and jack plug. Recommended for use with WyndSOR Vanguard recorder. Price: £8 15s.

# DIRECTORY OF CONSTRUCTIONAL KITS

**DYNACO.** See amplifier and radio tuner sections for details of Dynaco models available in kit form.



**HART ELECTRONICS,** 321 Great Western Street, Manchester, 14. Tel: Rusholme 2212/3.

● **Bailey 20W amplifier.** Power amplifier: 20W with total HD 0.1% at 1 Kc/s. H and N — 80 dB. Proof against damage by short circuits. Four transistors. Pre-amplifier: five-transistor circuit with feedback triple front end giving 23 dB overload capacity with HD less than 0.02%. Described in "Wireless World" Nov and Dec 1966. Price: (kit for power amplifier) £7 15s. 10d.; (kit for mono pre-amp) £7 9s. 3d.; (kit for stereo pre-amp) £14 19s. 6d.; (kit for power supply) £4 2s. 6d.

● **Dinsdale 10W amplifier.** Output: 10W per channel into 15 ohms. Printed circuit construction, six transistors per power amplifier, three transistors per pre-amp. Described in "Wireless World" Jan and Feb 1965 (reprints available from Hart Electronics price 5s. 6d. post paid). Price: (kit for mono pre-amp and amplifier) £9 18s.; (kit for stereo pre-amp and amplifier) £20 8s.; (kit for power supply unit) mono £4 10s. 6d., stereo £5 8s.

**Mullard 10W Pi-mode amplifier.** Printed circuit boards for power amplifier 7s. a pair, printed circuit board and components (excluding controls) for pre-amp £3 15s., all other parts available. Full details on request.



**HEATHKIT.** Manufactured by Daystrom Ltd., Bristol Road, Gloucester. Tel: Gloucester 20217.

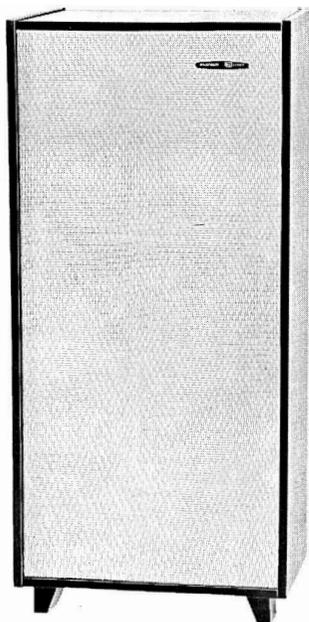
● **AA-22U.** Transistorised stereo integrated amplifier. Inputs: PU 6 mV, radio 250 mV, tape 250 mV, aux. 1. 250 mV, aux. 2. 250 mV. Controls: Balance, selector switch, mode switch, volume, bass, treble, filter, filter (3-position; flat, 4 Kc/s, 8 Kc/s 12 dB/octave). Noise — 50 dB on PU, — 65 dB all other inputs. Output: 20W per channel RMS. Distortion 0.3% at 20W. FR 15 c/s-30 Kc/s  $\pm$  1 dB. Feedback 35 dB. Output: imp 4, 8 or 16 ohms. Pre-set gain controls accessible from the front. Mains 110, 200-250V 50-60 c/s. Size:  $15\frac{1}{2} \times 3\frac{3}{8} \times 12\frac{1}{8}$  in. Price (kit): less cabinet £39 10s.; cabinet £2 5s. extra; (assembled) complete £68 16s.

● **S-99.** Stereo amplifier kit. Output: 9W, 3 or 15 ohms, per channel. Distortion 0.2% at 1 Kc/s, 0.35% at 4 Kc/s, 0.42% at 40 c/s. FR 30 c/s-20 Kc/s  $\pm$  0.5 dB. Feedback 26 dB. H and N pickup 1 (magnetic) — 55 dB; pickup 2 (crystal) — 55 dB; Aux (microphone, etc) — 60 dB; radio, tape — 65 dB. Inputs: pickup 1, 4 mV, 100K continuously variable; pickup 2, 180 mV, 47K continuously variable; Aux 20 mV, 500K linear; radio, tape 100 mV 350K linear. Psn 100-125, 200-210, 220-230, 240-250V, 50-60 c/s. 100W. Printed circuit boards for easy assembly. High sensitivity to suit all types of pickups. Variable filter. Price (kit): £28 9s. 6d.; (assembled): £38 9s. 6d.

● **S-33H.** Stereo/mono amplifier. Output: 3.5W. Distortion, less than 0.6% at 1,000 c/s for 3W. H and N gram — 55 dB, radio — 60 dB (referred to 3W). Sensitivity: gram 50 mV (high imp), aux 150 mV, radio 100 mV. Psn 100-125, 200-210, 220-230, 240-250V AC 40-60 c/s. Size:  $11\frac{3}{4} \times 5\frac{1}{4} \times 10$  in. Based on Model S-33, but an extra stage is incorporated to increase the sensitivity required for the new high quality Ceramic pickups. Choice of three inputs provided, and close matched twin ganged potentiometers used for volume and tone controls. Price (kit): £15 17s. 6d.; (assembled): £21 7s. 6d.

**MA-5.** Monaural amplifier. Output: 5W. Distortion less than 0.5% at 1,000 c/s; less than 1% at 5 Kc/s. Sensitivity: radio 200 mV, 0.5 megohms; gram 200 mV, 0.5 megohms. Rec imp 2-4 and 14-16 ohms. H and N less than — 60 dB referred to 5W. Output stages: ECC83, EZ81, 2  $\times$  EL84. Psn 100-110, 200-210, 220-230, 240-250V AC 40-60 c/s. Size:  $11 \times 6\frac{5}{8} \times 4\frac{3}{4}$  in. Panel  $11\frac{3}{4} \times 5\frac{1}{4}$  in. Suitable for most crystal pickups. Provision for connection of radio tuner or tape recorder. Price (kit): £10 19s. 6d.; (assembled): £15 10s.

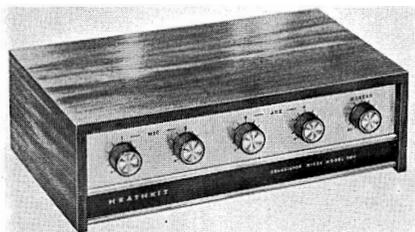
**MA-12.** Mono amplifier. Output: 10W RMS (12W max) between 30 c/s and 10 Kc/s. Distortion: less than 0.1% at 10W, 1 Kc/s; less than 0.2% at 10W, 5 Kc/s; less than 0.4% at 10W, 40 c/s. FR 20 c/s-30 Kc/s  $\pm$  1 dB. Feedback mains loop 26 dB, subsidiary loop 6 dB. H and N — 85 dB at 10W. Input: 120 mV for 10W output. Output: imp 2-4, 8-11, 14-16 ohms. Valves, EF86, ECC83, EL84 (2), GZ34. Psn 100-117V, 200-250V AC, 40-60 c/s, 100W. Size:  $11\frac{3}{8} \times 6\frac{3}{4} \times 5\frac{3}{4}$  in. Weight: 12 $\frac{1}{2}$  lb. Price (kit): £11 18s.; (assembled): £15 18s.



*Heathkit Cotswold MFS*



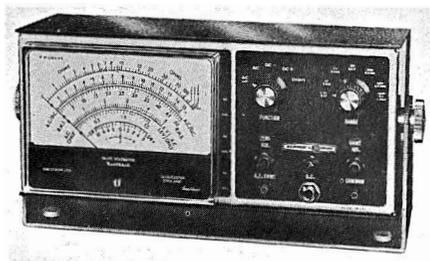
*Heathkit Malvern*



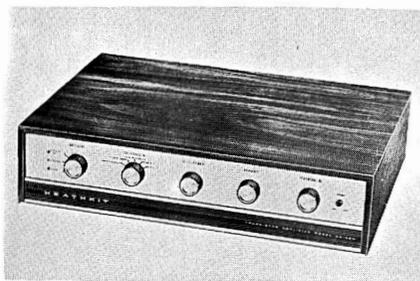
*Heathkit TM-1 four-channel mixer*



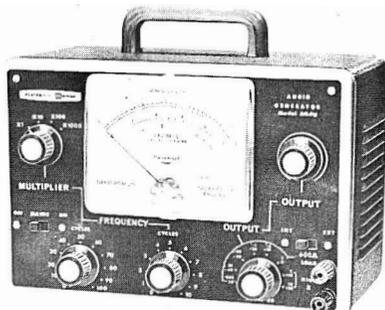
*Heathkit MGP-1 power unit*



*Heathkit IM-13U valve voltmeter*



*Heathkit AA-22U stereo amplifier*



*Heathkit AG-9U audio signal generator*

● **USC-1.** Stereo pre-amplifier. Inputs: pickup 1, 3-4 mV 50K; pickup 2, 150 mV 1 megohm; tape 1, 2-5 mV 80K CCIR, tape 2, 150 mV 100K; radio 150 mV; mic 3 mV, 1 megohm; aux. 4-150 mV, 1 megohm. Controls: bass, treble, rumble filter, variable low pass filter, balance, volume, function, channel reverse. Power required, 250V 10 mA, 6-3V 1-5 amps. Output voltage: 1-3V RMS. Price (kit): £19 10s.; (assembled): £26 10s.

**UMC-1.** Mono control unit. Inputs: mag pu 9 mV, 100K, RIAA; crystal pu 50 mV variable, 1 megohm linear; Aux 120 mV, 500K linear; mic 4 mV, 130K linear; radio 100 mV variable, 330K linear. Output up to 0-25V. Controls: sel, bass, treble, filter, volume on/off. Low pass filter. H and N -65 dB. Psn 180-300V. 3 mA DC, 6-3V, 0-6 amps AC. Suitable for free standing or cabinet installation. Price (kit): £8 12s. 6d.; (assembled): £13 12s. 6d.

**USP-1.** Booster amplifier. Suitable for stereo and monaural sources of low sensitivity, e.g. pickups, tape heads or microphones. Input sensitivity: 2-20 mV. Output: adjustable from 20 mV to 2V. Maximum gain 100. Power requirements 180-250V, 3-5 mA; 6-3V 0-5 amps. Price (kit): £7 7s. 6d.; (assembled): £10 9s. 6d.

**TM-1.** Four-channel mixer. Two high imp inputs with sensitivity 1-5 mV and two aux inputs with sensitivity 180 mV. Output: 200 mV at approximately 600 ohms. Individual and master volume controls. Walnut veneered cabinet. Size:  $11\frac{1}{4} \times 3\frac{3}{4} \times 7\frac{1}{2}$  in. Price (kit): £11 16s. 6d.; (assembled): £16 17s. 6d.

**TA-1M.** Pre-amplifier. Inputs: Mic 0-5 mV. Radio 250 mV. Switched controls, record/replay, bias, level, mic, radio. HD <0-1% for 500 mV. H and N -60 dB for 500 mV. Power supply required 290V 20 mA DC 6-3V 1 amp per channel. Size:  $4\frac{1}{2} \times 13\frac{1}{2} \times 12$  in. Price (kit): £19 18s.; (assembled): £28 18s.

● **TA-IS.** Stereo version of TA-1M. Price (kit): £25 10s.; (assembled): £35 18s.

**TA-1C.** Conversion Unit for TA-1M to convert to TA-IS. Price: £6 15s.

**V-7A.** Valve voltmeter kit. Printed circuit. Measures AC volts (0-1-5, 5, 50, 150, 500, 1,500) RMS, AC volts (0-4, 14, 40, 140, 400, 1,400, 4,000). Peak-to-peak, DC volts (0-1-5, 5, 15, 50, 150, 500, 1,500). Ohms (with 10 ohms centre)  $\times 1, 10, 100, 1,000, 10K, 100K, 1$  megohm 0-1 ohms to 1,000 megohms with internal battery. Input resistance: 11 megohms. 200  $\mu$ A

meter movement. Price (kit): £13 18s. 6d.; (assembled): £19 18s. 6d.

**IM-13U.** Laboratory valve-voltmeter kit. Printed circuit. Gimbal mounting, for viewing from any angle. Measures AC volts (0-1-5, 5, 15, 50, 150, 500, 1,500 RMS; AC volts (0-4, 14, 40, 140, 400, 1,400, 4,000) peak-to-peak). DC volts (0-1-5, 5, 15, 50, 150, 500, 1,500). Ohms (with 10 ohms centre) X1, X10, X100, X1000, 10K, 100K, 1 megohm. 0-1 ohms to 1,000 megohms with internal battery. Input resistance: 11 megohms. 200  $\mu$ A meter movement. Price (kit): £18 18s.; (assembled): £26 18s.

**MGP-1.** Power supply unit. 200, 250, 270V, 120 mA; 6-3V, 2-5 amps. Price (kit): £5 2s. 6d.; (assembled): £6 12s. 6d.

**OS-2.** Service oscilloscope.  $2\frac{3}{4}$  in. tube. Vertical bandwidth 2 c/s to 3 Mc/s. Automatic lock-in sync. Mu-metal CRT shield. Printed circuit. Switched ext/int Y plate connections. Vertical amplifier: sensitivity 100 mV/cm, input impedance: 3-3 megohms shunted by 20 pF, response 2 c/s-3 Mc/s  $\pm 3$  dB. Horizontal amplifier: sensitivity 100 mV/cm, input impedance: 10 megohms shunted by 20 pF, response 2 c/s-3 Mc/s. Time base: 20 c/s-200 Kc/s in four steps. Size:  $5 \times 7\frac{3}{8} \times 12$  in. Weight:  $9\frac{3}{4}$  lb. Price (kit): £22 18s.; (assembled): £30 8s.

**IO-12U.** General purpose oscilloscope kit. 5 in. flat face CR tube. Printed circuits. Vertical band-width 3 c/s to 4-5 Mc/s. Built-in IV calibrator. Y-sensitivity 10 mV RMS per cm at 1 Kc/s, X-sensitivity 50 mV RMS per cm at 1 Kc/s. Price (kit): £35 17s. 6d.; (assembled): £45 15s.

**S-3U.** Electronic Switch (oscilloscope trace doubler). Converts a single beam oscilloscope to double beam. Switching rates 150, 500, 1,500, 5,000 and 15,000 c/s. Signal frequency response 0-100 Kc/s  $\pm 1$  dB. Signal input range 0-1 to 1-8V RMS. Price (kit): £12 18s. (assembled): £18 10s.

**C-3U.** Resistance-capacitance bridge. Self-contained and powered. Capacitance range 0-00001 to 1,000 microfarads. Resistance range 100 ohms to 5 megohms. Power factor and leakage also indicated. Polarising voltages available from 5 to 450V. Price (kit): £10 10s.; (assembled): £16.

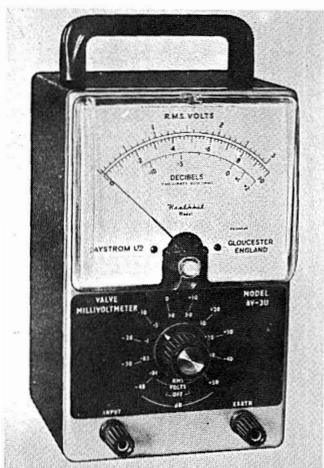
**AV-3U.** Audio valve millivoltmeter. Measure voltages as low as 1 mV to a maximum of 300V at high impedances in 10 ranges. Frequency range 10-400,000 c/s. Uses a  $4\frac{1}{2}$  in. meter. Cathode follower output. Price (kit): £16 10s.; (assembled): £22 18s.



Heathkit AO-1U audio generator



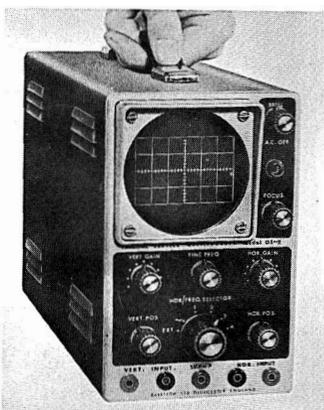
Philips EL.7500/00 moving coil mic kit



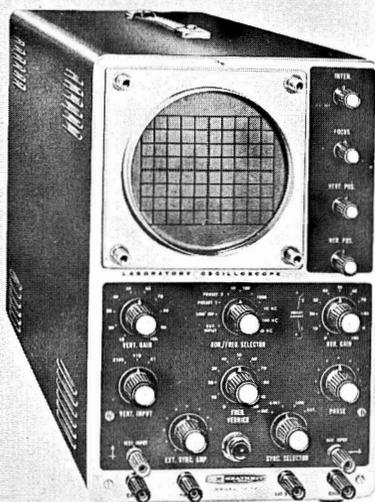
Heathkit AV-3U audio millivoltmeter



Jason JTV2



Heathkit OS-2 service oscilloscope



Heathkit 10-12U oscilloscope

**309-CU.** RF probe. Extends the range of a valve voltmeter to 100 Mc/s. Uses a printed circuit board. Price (kit): £1 13s. 6d.; (assembled) £2 2s.

**AW-1U.** Audio wattmeter. Uses external loads or the following internal loads: 3, 8, 15 and 600 ohms. 5 power ranges from 0.5 mW to 50 watts.  $4\frac{1}{2}$  in. meter calibrated in watts and dB. Price (kit): £17 5s.; (assembled): £23 18s.

**AO-1U.** Inexpensive audio generator covering 20 c/s-150 Kc/s sine wave, 20 c/s-25 Kc/s square wave. Output up to 10V RMS sine wave or 80V peak-to-peak square wave. Size:  $9\frac{1}{2} \times 6\frac{1}{2} \times 5$  in. Price (kit): £14 15s.; (assembled): £21 5s.

**IM-12U.** Low-priced audio distortion meter. Simple to use. Measures distortion at frequencies between 20 c/s and 20 Kc/s. Size:  $13 \times 7 \times 8\frac{1}{2}$  in. Price (kit): £24 15s.; (assembled): £34.

**IG-82U.** Audio generator covering 20 c/s-1 Mc/s. Sine and square wave available simultaneously. Sine wave output up to 10V RMS, square wave output up to 10V peak-to-peak. Rise time 0.15  $\mu$ Sec. Size:  $13 \times 8\frac{1}{2} \times 7$  in. Price (kit): £24 10s.; (assembled): £36 10s.

**AG-9U.** Audio signal generator. Range 10 c/s to 100 Kc/s. Distortion less than 0.1% from 20 c/s to 20 Kc/s. Decade switching over 8 voltage ranges from 3 mV to 10V monitored. Uses  $4\frac{1}{2}$  in. meter. Price (kit): £22 10s.; (assembled): £30 10s.

**AFM/1.** AM/FM tuner. Variable tuning. FM frequency range 88-108 Mc/s. AM frequency range 16-50, 200-550, 900-2,000 metres. Wide band ratio discriminator plus two limiters. Magic eye tuning indicator. Self-powered. Size:  $10\frac{3}{4} \times 11\frac{1}{8} \times 4\frac{1}{2}$  in. Price (kit): £27 5s. (for both units.)

**FM tuner.** Comprises model FMT-4U tuner unit and FMA-4U IF strip and power supply. Flywheel tuning, thermometer tuning indicator, three IF stages with two limiters, printed circuit board and prealigned coils. Tuning range 88-108 Mc/s. Sensitivity 2.5  $\mu$ V for 20 dB quieting. Price (kit): £16 8s. (for both units).

● **TFM-1.** Tuner. Comprises TFM-T1 tuner unit, TFM-1M (mono) IF strip and power supply, or, TFM-1S (stereo) IF strip and power supply. TFM-1C stereo conversion unit available separately. Range: 88-108 Mc/s. Variable tuning. Ratio detector. Sensitivity: 2  $\mu$ V for 20 dB quieting. Aerial input 75 ohms coaxial. Output: 250 mV. Multiplex decoder fitted. All

transistor. Mains. Size:  $15\frac{5}{8} \times 3\frac{7}{8} \times 10\frac{1}{4}$  in. Price (kit): mono (less cabinet) £20 19s. for both units; (kit) stereo (less cabinet) £24 18s.; cabinet £2 5s. extra. Also available ready assembled.

● **SD.1.** Multiplex stereo decoder. Self-contained mains-operated unit for free-standing use. Size:  $3\frac{1}{4} \times 3\frac{1}{4} \times 9$  in. Price (kit): £8 10s.

**SSU-1.** Speaker system kit. Comprises 8 in. and 4 in. matched drive units, and ducted-port bass reflex cabinet. Response 40-16,000 c/s  $\pm 5$  dB, crossover frequency 3,000 c/s. Imp 15 ohms. Size:  $23 \times 11\frac{1}{2} \times 11\frac{3}{4}$  in. Available for horizontal or vertical mounting. Price complete (kit): £12 12s.; without legs (kit): £11 17s. 6d.

**Cotswold.** High fidelity three speaker system. Drive units are 12 in. bass,  $8 \times 5$  in. elliptical, and pressure tweeter. Range 30-20,000 c/s. Two volume controls. Celotex lined enclosure. In white wood ready cut and drilled. Dimensions:  $26 \times 23 \times 14\frac{1}{2}$  in. Price complete with crossover unit, etc. (kit): £25 12s.; assembled in the white: £33 17s.

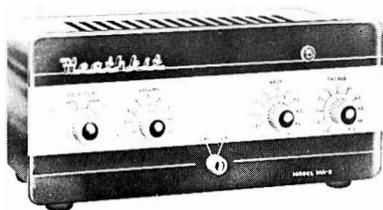
**Cotswold MFS.** Almost identical to the Cotswold, but specially designed to occupy minimum floor space. Slight reduction in output below 40 c/s with smaller source area. Recommended for small rooms. Dimensions:  $36 \times 16\frac{1}{2} \times 14$  in. plus two legs. Price (kit): £25 12s.; assembled in the white: £33 17s.

**Gloucester.** Cabinet for hi-fi equipment. Space available to house records, tapes, etc. Mk I accommodates tape deck or record player, FM tuner, and stereo amplifier. Mk II accommodates both tape deck and record player, FM tuner and stereo amplifier. Dimensions:  $46\frac{1}{8} \times 30 \times 21$  in. Price (kit): £18 10s.

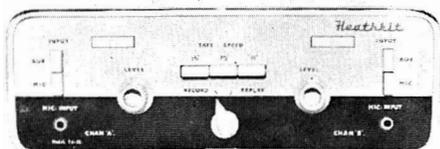
**Malvern.** Cabinet for hi-fi equipment. Space available for transcription record player, tape deck, radio tuner, audio amplifier (or control unit and separate power amplifiers) and tape record/replay amplifier. Price (kit): £18 1s.

**Berkeley.** Infinite baffle hi-fi enclosure with speakers and cross-overs. One 12 in. low-resonance bass unit, one 4 in. middle and top unit. Inductance/capacitance cross-over at 900 c/s. Handling capacity 15W RMS. Kit includes ready finished cabinet shell. Finish: oiled walnut veneer. Size: 26 in. high, 17 in. wide,  $7\frac{3}{4}$  in. deep. Price (kit): £18 10s.; (assembled): £23.

**Avon.** Infinite baffle bookcase enclosure with two units. One 6 in. high compliance bass driver, one 3 in. tweeter. Fully finished walnut veneered cabinet. Size:  $7\frac{3}{4} \times 13\frac{3}{4} \times 8\frac{3}{4}$  in. Price (kit): £13 16s. including purchase tax.



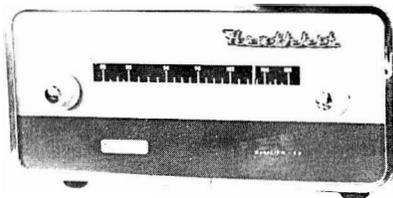
Heathkit MA-5 monaural amplifier



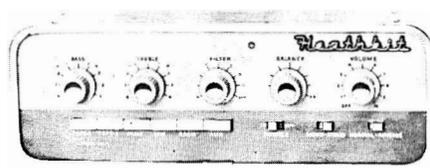
Heathkit TA-1M tape amplifier



Heathkit AFM/1 AM/FM tuner



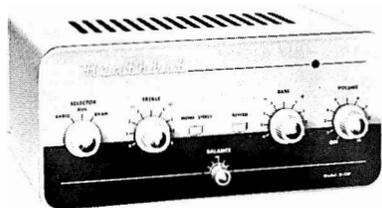
Heathkit FM tuner



Heathkit USC-1 stereo control unit



Heathkit USP-1 booster amplifier



Heathkit S-33H stereo amplifier



Heathkit S-99 stereo amplifier



Henry's MP3



Henry's SP6-2

**HENRY'S RADIO LTD.**, 303 Edgware Road, London, W.2. Tel: 01-723-1008.

**Hi-fi 12/25.** Transistorised amplifier kits. Nine models: MPA12/3, MPA12/15, MPA25, MPA12+12, MP3, SP6-2, PS24/40, MU24/40, MU60.

**MP3.** Mono pre-amplifier. All silicon transistor low-noise zener stabilised circuit. Full range of controls. Inputs for crystal PU, crystal or dynamic microphone, tuner, tape head and pre-amp replay. Output: 250 mV. Supply: 12-60V DC. Consumption: 3 mA. Size:  $9\frac{3}{8} \times 1\frac{3}{8} \times 1\frac{1}{8}$  in. Supplied ready-built on metal chassis with silver/grey front panel and matching knobs. Price: £6 19s. 6d. (post and packing 3s. extra).

● **SP6-2.** Mono/stereo pre-amplifier. Eight silicon/germanium devices. Zener stabilised. New low-noise circuit. Full range of controls and filters. Inputs: magnetic, crystal or ceramic cartridge, tuner, tape pre-amp, microphone, tape head. Input sensitivity: 3 mV. Tape record outlet socket. Output: 250 mV per channel. Supply: 9-60V DC. Consumption: 4 mA. Supplied ready-built on metal chassis with silver/grey front panel and matching knobs. Size:  $12 \times 3\frac{1}{2} \times 3\frac{1}{4}$  in. Price: £14 19s. 6d. (post and packing 5s. extra).

**MPA12/3 and MPA12/15.** 12W low-distortion power amplifiers for use with MP3 and SP6-2 pre-amplifiers. Silicon and germanium semiconductors. Input: 100 mV for 12W output. FR 30 c/s-20 Kc/s  $\pm 1$  dB. HD 0-2% at 12W RMS. High-gain stable push-pull output stage. MPA12/3 for 3-5 ohms speakers and 24-28V supply. MPA12/15 for 10-16 ohm speakers and 40-45V supply. Ready-built on metal chassis. Size:  $5 \times 2 \times 3\frac{1}{4}$  in. Price: MPA12/3 £4 10s.; MPA12/15 £5 5s. (post and packing 2s. 6d. extra in either case).

● **MPA12+12.** Twin amplifier for mono or stereo. Designed for use with MP3 or SP6-2 pre-amplifiers. Consists of two MPA12/15 amplifiers on single chassis. Output: 10-16 ohms. Supply: 40-45V DC. Other details as for separate amplifiers. Size:  $10 \times 2 \times 3\frac{1}{4}$  in. Price: £9 19s. 6d. (post and packing 4s.).

**MPA25.** 25W power amplifier. 10 silicon and germanium semiconductors. Output impedance: 7.5-16 ohms. Input sensitivity: 180 mV for 25W output. Supply: 50-60V DC. Size:  $8 \times 2 \times 3\frac{1}{4}$  in. Price: £7 10s.

**PS24/40.** Mains power supply unit. Input: 110/240V 40-60 c/s. Fully smoothed and isolated output. AC and DC fused. Output: 24V and

45V at 1A. Suitable for one MPA12+12 or one or two MPA12. Mounted on metal chassis. Price: £3 10s. (post and packing 3s.).

**MU24/40.** Mains power supply unit. Similar to PS24/40 but with additional choke/capacitor filtering and panel voltage selectors. Price: £4 7s. 6d. (post and packing 3s. 6d.).

**MU60.** Mains power supply unit. Choke smoothed output 50V 1A. Suitable for use with one or two MPA25 amplifiers. Price: £4 15s. (post and packing 4s.).

**Transistorised FM Tuner.** Geared slow motion full tuning. Range 87-105 Mc/s. AGC, AFC. Ratio detector. Multiplex adaptor. Aerial imp 75 ohms. Output: max 80 mV for 100  $\mu$ V aerial; min  $2\frac{1}{2}$  mV for 1 $\mu$ V aerial. Psn 9V. 9 mA. Size:  $3\frac{1}{2} \times 2\frac{1}{4} \times 4$  in. Price (kit): £7 19s. 6d.



**JASON.** Technical Trading Co. Ltd., Devonian Court, Park Crescent Place, Brighton, Sussex. Tel: 0273-680722. Branches at London, Portsmouth, Southampton, Worthing.

**F.M.T.I. Standard F.M. tuner kit.** 4 valves only are used, giving an aerial sensitivity of better than 100  $\mu$ V. A ratio detector is combined with a limiter for low distortion and good noise rejection. Price without valves and power supply: £5 19s. Power Pack kit: £2 14s.

**F.M.T.2.** This is the same unit as the F.M.T.1., but built into a shelf-mounting case. Price, less valves, but with power supply: £9 9s.

**F.M.T.3.** A fringe FM tuner with automatic frequency control. Two limiters combat the effects of aeroplane flutter and car interference. Price with case but less seven valves required: £10 9s.

**JTV2.** Tuner kit. See details of built model in Radio Tuner section. May be built for £14 0s. 4d. Inc purchase tax 18s. 1d. Four extra valves required.

**Mercury 2.** Tuner kit. See details of Monitor in Radio Tuner section. May be built for £9 15s. 4d. Inc purchase tax 18s. 1d. Three extra valves required.



**MARTIN ELECTRONICS LTD.**, 154-155 High Street, Brentford, Middx. Tel: Isleworth 1161/2.

**Audiokit 1/4.** Transistorised mono control unit. Inputs: from 3 mV according to signal

input requirements; RIAA correction on pu input. Output: 200 mV. Controls: sel. switch (tape head, mag pu, crystal pu, radio, aux, mic). Filters: bass cut and lift, treble cut and lift, low pass 20 Kc/s. Response 45 c/s-20 Kc/s. H and N -70 dB. Psn 9-15V DC. Easily adapted to stereo. To operate with Audiokit 5. Size:  $8 \times 3\frac{1}{4} \times 1\frac{1}{4}$  in. Price: £5 10s.

● **Audiokit 1/4/S.** Transistorised stereo control unit. Details as for 1/4. Size:  $8 \times 3\frac{1}{4} \times 3\frac{3}{4}$  in. Price: £11.

**Audiokit 1/2.** Transistorised mono control unit. Inputs: from 3 mV according to signal input requirements; RIAA correction on pu input. Output: 200 mV. Controls: sel. switch (tape head, mag pu, crystal pu, radio, aux, mic). Response 40 c/s-20 Kc/s. H and N -70 dB. Psn 9-15V DC. Easily adapted to stereo. To operate with Audiokit 5. Size:  $5\frac{3}{4} \times 3\frac{1}{4} \times 1\frac{3}{4}$  in. Price: £4 5s.

● **Audiokit 1/2/S.** Transistorised stereo control unit. Details as for 1/2. Size:  $5\frac{3}{4} \times 3\frac{1}{4} \times 3\frac{3}{4}$  in. Price: £9 10s.

**Audiokit 5.** Transistorised mono amplifier. 10W. HD 0.25%. Response 40 c/s-20 Kc/s. Feedback 60 dB. NL -85 dB. Input: 100 mV. LS matching 3 ohms. Psn 24V DC, 0.8 amps. To operate with Audiokits 1/2, 1/4, 2/3, 3/4. Size:  $4\frac{1}{2} \times 4 \times 3\frac{1}{2}$  in. Price: £5 12s. 6d.

**Audiokit 7.** Similar to Audiokit 5 but for 15 ohms speaker. Operates from 40V.

**Audiokit 3/4.** Transistorised mono 3-channel pre-amplifier/mixer. Plug-in adaptors available to match almost any input. Output: 200 mV, 8K. FR 45 c/s-20 Kc/s. Controls: one per channel plus bass, treble, vol. Psn 9-15V DC. Size:  $11\frac{3}{8} \times 2\frac{1}{8} \times 3\frac{1}{2}$  in. Price: £8 7s. 6d.

● **Audiokit 3/4/S.** Transistorised stereo 3-channel pre-amplifier/mixer. Details as for 3/4. Price: £16 15s.

**Audiokit 2/3.** Transistorised mono 3-channel pre-amplifier/mixer. Plug-in adaptors to match almost any input. Output: 200 mV, 8K. FR 45 c/s-20 Kc/s. Controls: one per channel plus volume. Psn 9-15V. Size:  $11\frac{3}{8} \times 2\frac{1}{8} \times 2$  in. Price: £7 2s. 6d.

● **Audiokit 2/3/S.** Transistorised stereo 3-channel pre-amplifier/mixer. Details as for 2/3. Price: £14 5s.

**Audiokit 15, 16 and 17. FM/VHF tuner.** Variable tuning 88-108 Mc/s. Ratio detector. Sensitivity 2  $\mu$ V for 20 dB quieting. Aerial input: 75 ohms balanced or coaxial. Output: 100 mV 100K. Multiplex decoder will be available when service starts. AFC. Power supply 9V battery. Consumption 12 mA. Size:  $9\frac{1}{2} \times 3\frac{1}{2} \times 4$  in. behind panel. Supplied as three units for home assembly into cabinet. Price: £12 0s. 3d. (U.K. purchase tax 19s.

★

**PETO SCOTT LTD.,** Addlestone Road, Weybridge, Surrey. Tel: Weybridge 45511.

**Philips EL.7500.** Moving coil microphone kit. Includes table stand, on/off switch and neck cord. Source impedance 200 ohms, 500 ohms or high Z. Price (kit): £7 7s.

★

**SINCLAIR RADIONICS LTD.,** 22 Newmarket Road, Cambridge. Tel: Cambridge 52731.

**Sinclair Z-12.** Transistorised mono amplifier. Eight transistors. Output into 3 ohm load: 5W RMS at 12V, 8W RMS at 15V, 13W RMS at 18V. Output into 1.5 ohm load: 10W RMS at 12V, 16W RMS at 15V. FR 15 c/s-50 Kc/s  $\pm 1$  dB. Sensitivity: 2 mV into 2K. Signal to noise: better than 60 dB. Total distortion less than 1%. Size:  $3 \times 1.8 \times 1.3$  in. Quiescent consumption on 12V: 15 mA. DC supply required 6-20V. Price: £4 9s. 6d. (ready built). Power pack £3 19s. 6d. extra.

★

**STERN-CLYNE LTD.,** Head office and mail order: 3-5 Eden Grove, Holloway, London, N.7. Tel: North 8161. Branches throughout: London, Liverpool, Manchester, Sheffield, Bristol and Nottingham.

**Type C Mk II Tape pre-amplifier.** To Mullard design (see Tape Amplifier section). Price: £11; power supply unit £3 extra.

**HF/TR3 Mk II Tape Amplifier.** To Mullard design (see Tape Amplifier section). Price, including power supply unit: £13 13s.

**Mullard 2 Valve Pre-amplifier Tone Control Unit.** (See Amplifier section). Price: £6 6s.

**Mullard 3-Valve Pre-amplifier.** (See Amplifier section). Price: £10.

**FM1.** FM tuner. (See Radio Tuner section). Price: £7 9s. 6d.

# DIRECTORY OF FM/VHF AERIALS

**AERIALITE LTD.**, Hargreaves Works. Congleton. Cheshire. Tel: Congleton 2471/3.

**Aerloft.** Band II loft mounting dipole with rigid elements. Light, easily fitted, adjustable base. Price: (86A three-element) £1 4s.; (86B two-element) £1.

**Aerpole 900/MU.** Band II outdoor dipole with stand-off arm and universal bracket to fit up to 2 in. diameter masts. Price: £1 12s.

**Aeraitch 901/XU.** Band II wide-spaced H array with attachment to fit masts up to 2 in. diameter. Price: £2.

**Aerfringe 902/XU.** Band II three-element array comprising director, folded dipole and director. Bracket for mast attachment up to 2 in. diameter. Price: £2 17s. 6d.

**FM adaptors 616.** Comprises two add-on units for clamping to existing Band I dipole with  $\frac{1}{2}$  in. diameter vertical elements. Price: 12s. 6d.



**ANTIFERENCE LTD.**, Bicester Road, Aylesbury. Bucks. Tel: Aylesbury 2511.

**Loft 233.** Band II three-element loft aerial with folded dipole. Universal mounting clamp with stand-off arm. Fully adjustable for angle and direction. Price: £2 1s.

**214/1A.** Band II single dipole array with 7 in. stand-off arm and universal "grip-on" clamp to fit masts up to 2 in. diameter. Price: £1 11s. 3d.

**214/2B.** Band II wall mounting single dipole array. 15 in.  $\times$  1 in. stand-off arm and universal fitting bracket. Price: £1 15s.

**214/9C.** Band II chimney mounting single dipole array. 3 ft  $\times$  1 in. swan-neck arm and single lashing. Price: £2 16s. 9d.

**224.** Band II dipole and reflector array with universal clamp to fit masts up to 2 in. diameter. Price: £2 1s.

**224/9M.** Band II dipole and reflector array with 5 ft  $\times$  1 in. cranked mast and single chimney lashing. Price: £4 0s. 3d.

**234.** Band II three-element array comprising folded dipole, director and reflector with universal clamp for masts up to 2 in. diameter. Price: £2 18s.

**234/9M.** Band II three-element array with 5 ft  $\times$  1 in. cranked mast and single lashing. Price: £4 17s. 3d.

**Addex-FM.** Adaptor stubs for adding to vertical Band I, III or Band I/III arrays with  $\frac{3}{8}$  in. or  $\frac{1}{2}$  in. diameter elements. Price: 10s. 6d. pair.



**ARRELL ELECTRICAL ACCESSORIES LTD.**, Demmings Works, Brookfield Road, Cheadle, Cheshire. Tel: Gatley 3235/6. Depots at: Bristol, Dublin, Glasgow, London, Newcastle, Sheffield, Wolverhampton.

**2AO.** FM stubs for attaching to existing Band I or III aerial. Price: 11s.

**DV/2.** Loft mounting inverted V  $\frac{1}{4}$ -wave aerial. Price: 15s. 4d.

**2UA.** Band II single dipole with universal clamp for fixing to masts up to 2 in. diameter. Price: £1 3s. 6d.

**2WA.** Band II wall mounting dipole with stand-off arm and fixing bracket. Price: £1 10s. 8d.

**2CA.** Band II single dipole with 3 ft cranked alloy arm and chimney lashing equipment. Price: £2 8s.

**2HA.** Band II dipole and reflector with 5 ft 6 in. straight alloy mast and chimney lashing equipment. Price: £2 6s. 6d.

**2UH.** Band II dipole and reflector with universal clamp for fixing to masts up to 2 in. diameter. Price: £1 17s. 3d.

**2SA3.** Band II three-element array with 5 ft 6 in. cranked alloy mast and chimney lashing equipment. Price: £4 13s.

**2UA3.** Band II three-element array with universal clamp for fixing to existing masts up to 2 in. diameter. Price: £2 7s. 1d.

Full range of straight and cranked masts, U-bolts, lashing wire, chimney and wall brackets, wall nails and complete lashing kits.

**1075 BII.** Band II low-noise mast-head amplifier. Gain 16 dB. Bandwidth 6 Mc/s  $\pm$  1.5 dB. Battery powered via feeder. Price: £5 16s. 3d.

**BELLING-LEE AERIALS LTD.**, Heysham Road, Netherton, Bootle 10, Liverpool, Lancs. Tel: Aintree 1736. London Sales Office: Belling-Lee Aerials Ltd., Great Cambridge Road, Enfield, Middlesex. Tel: Enfield 5393.

**1F/FM.** Band II dipole for indoor use. Two-element array with elements adjustable to form V if required. Swivel base. Vertical or horizontal mounting. Suitable for room or loft use. Price: 18s. 6d.

**1A/FM.** Band II dipole array for outside use. Price: £1 0s. 6d.

**2A/FM.** Band II H aerial comprising dipole and reflector mounted on boom. Universal clamp to fit all masts. Price: £1 6s. 9d.

**3A/FM.** Band II three-element array comprising director, dipole and reflector with feeder matching link. Universal clamp to fit all masts. Price: £2 12s. 6d.

**A1/FM.** Band II stubs for attaching to Band I dipoles. Price: 10s. 6d. pair.

Wide range of masts, stand-off arms, mounting brackets and lashings available.



**BEN NEVIS AERIALS**, Andrew Sloss Ltd., Belmont Works, Belmont Site, Lewis Street, Stranraer, Scotland. Tel: Stranraer 2677/8.

**Ben Nevis V1.** Band II single dipole with stand-off arm and universal mast clamp for 1-2 in. masts. Price: £1 6s. 6d.

**Ben Nevis V2.** Band II dipole and reflector with boom and stand-off arm and universal mast clamp. Price: £1 16s.

**Ben Nevis V3.** Band II three-element array comprising director, folded dipole and reflector, with stand-off arm and universal mast clamp. Price: £2 10s.

**Ben Nevis V4.** Band II four-element array comprising two directors, folded dipole and reflector, with stand-off arm and universal mast clamp. Price: £3.

**Regal RV1.** Similar to V1 but aerial array plastic-coated by Plastalux process and fitted anti-vibration insulators. Ideal for exposed locations or where subject to corrosion. Price: £1 16s.

**Regal RV2.** Similar to V2 but array plastic-coated and fitted anti-vibration insulators. Price: £3.

**Regal RV3.** Similar to V3 but array plastic-coated and fitted anti-vibration insulators. Price: £4 11s.

**Regal RV4.** Similar to V4 but array plastic-coated and fitted anti-vibration insulators. Price: £5 11s.



**J. BEAM ENGINEERING LTD.**, Rothers-thorpe Crescent, Northampton. Tel: Northamp-ton 62147.

**FM1.** Band II dipole with screw connection for attachment to any diameter mast. Tunes whole FM Band.  $\frac{3}{8}$  in. dia aluminium elements. Price: 13s.

**FMG.1.** Band II dipole with 7 in. stand-off aluminium arm with universal grip to fit any mast up to 2 in. diameter.  $\frac{3}{8}$  in. aluminium elements with heavily plated universal clamp. Price: £1 1s. 6d.

**FM2.** Band II dipole with reflector, 1 in. diameter aluminium boom, heavily plated universal clamp to fit any mast up to 2 in. diameter.  $\frac{3}{8}$  in. aluminium elements. Rustproof precision-cast fittings and waterproof junction box. Price: £1 12s.

**FM3.** Band II dipole, reflector and director mounted on 1 in. diameter aluminium boom. Heavily plated universal clamp for fitting to any mast up to 2 in. diameter.  $\frac{3}{8}$  in. diameter aluminium elements. Rustproof precision-cast fittings and waterproof junction box. Price: £2 4s.

● **FM4.S.** Band II folded dipole, two directors and folded reflector. Specially designed for stereo radio which calls for a larger signal input to overcome the drop in signal-to-noise ratio due to the multiplex stereo system. Each array is peaked on local stereo frequency. High front-to-back ratio and clean polar diagram. 1 in. diameter aluminium crossbar.  $\frac{1}{2}$  in. diameter elements. Waterproof junction box. Die-cast element clamps with aluminium securing bolts. Heavily plated universal clamp for masts 1 in.-2 in. diameter. For extreme range two FM4.S can be stacked one above the other (6 or 7 ft apart) and connected together by PM/3 phasing and matching harness. Price: FM4.S aerial array £4 7s., PM/3 harness £1 10s.

**K.V.A. ELECTRONICS**, 27 Central Parade.  
New Addington. Surrey. Tel: Lodge Hill 2266.

**FML**. Band II loft dipole. Two-screw fixing bracket. rotatable base. arms of dipole adjustable to V for optimum results or to clear obstructions. Price: 12s. 6d.

**FM.SD/W**. Band II wall mounting single dipole with fixing bracket. stand-off arm and provision for swivelling aerial for optimum results. Price: £1 10s.

**FML/H**. Band II loft-type H aerial comprising dipole, reflector, mounting boom and stand-off arm. Fixing bracket permits aerial to be orientated for best results. Price: £1 10s.

**FML/Y3**. Band II three-element loft array comprising director, folded dipole and reflector with stand-off arm and fixing bracket. Particularly suitable in areas where signal strength is poor or where "ghosting" causes distortion. Price: £2 12s. 6d.

**FML/Y4**. Similar to FML/Y3 but with two directors. Price: £2 17s. 6d.

**FM/HC**. Band II horizontally polarised outside H aerial comprising dipole, reflector, boom, cranked arm mast and chimney lashing equipment. Price: £3 8s. 6d.



**LABGEAR LTD.**, Cromwell Road, Cambridge.  
Tel: Cambridge 47301.

**Labgear 202**. Band II dipole with single reflector. Price: £1 11s.

**Labgear 203**. Band II three-element array comprising director, folded dipole and reflector. Price: £2 15s.

**Labgear 205/W**. Band II dipole with cranked arm and wall bracket. Price: 13s.

**Labgear 205/L**. Band II dipole for loft mounting. Price: 9s.

Alloy masts from 6 ft × 1½ in. to 16 ft × 2 in., cranked arms and single and double chimney lashings.



**MAXVIEW AERIALS LTD.**, Maxview Works.  
Setch. Kings Lynn. Norfolk. Tel: Watlington  
(Norfolk) 376.

**Maxview D/DW**. Band II wall-mounting dipole with stand-off arm and adjustable swivel fitting. Price: £1 10s. 6d.

**Maxview D/DM**. Band II dipole array with bracket for mast fitting. Price: £1 5s.

**Maxview D/HM**. Band II array comprising dipole and reflector on boom. Bracket for mast mounting. Price: £1 15s.

**Maxview D/S3**. Band II three-element array comprising director, dipole and reflector. Bracket for mast mounting. Price: £2 2s.

**Maxview D/FD3**. Band II three-element array comprising director, folded dipole and reflector. Bracket for mast mounting. Price: £2 10s.

**Maxview D/STB**. Band II Twig stub add-on units for TV aerials to boost Band II reception. Price: 10s. 6d.

Full range of alloy poles, steel poles, chimney lashings, wall brackets, ground installation equipment and accessories. All component parts of Maxview aerials available separately.



**TELECRAFT LTD.**, Quadrant Works. Wortley Road. Croydon. Surrey. Tel: Thornton Heath 1191/3.

**Telecraft FM1**. Band II single dipole with stand-off arm and wall mounting swivel bracket. Price: approx £1 2s. 6d.

**Telecraft FM2**. Band II array comprising dipole and reflector with universal mast-head fixing bracket. Price: approx £1 10s.

**Telecraft FM2-MB**. Similar to FM2 but supplied with mast and chimney bracket. Price: approx £2 5s.

**Telecraft FM3**. Band II yagi array comprising dipole, reflector and director. Price: approx £2 2s.

**Telecraft FM3-MB**. Similar to FM3 but supplied with mast and chimney bracket. Price: approx £2 17s.



**TELEFIELD MANUFACTURING CO. LTD.**,  
2 Tucker Street, Bristol 2. Tel: Bristol 28339.

**Telefield D2/FM**. Band II outdoor single dipole with stand-off arm for wall, eaves or fascia mounting. Price: £1 3s. 9d.

**Telefield D2.U.** Band II outdoor single dipole with universal clamp for mast attachment. Price: £1 6s.

**Telefield S2.** Band II stub adaptors for attaching to existing Band I or Band III aerial. Price: 9s.

**Telefield H2/FM.** Band II dipole and reflector array. Price: £1 15s.

**Telefield 3FD2/FM.** Band II three-element array comprising director, folded dipole and reflector. Complete with clamp for mast attachment. Price: £2 10s.

**Telefield 4FD2/FM.** Band II four-element array comprising two directors, folded dipole and reflector. Complete with mast fixing clamp. Price: £3 2s. 6d.

Accessories include straight and cranked steel or alloy masts, wire clamps, single and double lashing kits, universal mounting clamps and wall stand-off brackets.



**VISTA GAIN SALES CO.,** St Mary-le-bow House, 54 Bow Lane, London, E.C.4. Tel: City 3376/1878.

**Vista Gain K.2.** Band II indoor dipole. Heavily-plated three-step telescopic dipoles adjustable for optimum results. Capacity coupled elements for complete safety. Heavy base. Supplied with three yards low-loss coaxial cable. Price: £2 5s.

**WOLSEY ELECTRONICS,** Division of AB Metal Products Ltd., Dinas, Rhondda, Glamorgan, South Wales. Tel: Porth 2711 (4 lines).

**FM/DU.** Band II dipole array to fit all masts. Price: £1 4s.

**FM/DW.** Band II dipole array with 27 in. stand-off arm for wall or loft mounting. Price: £1 7s.

**FM/DL/2.** Band II dipole array with 3 ft × 1 in. cranked mast and lashing equipment for chimney mounting. Price: £2 13s.

**FM/HU.** Band II horizontal H array to fit all masts. Price: £1 13s.

**FM/HL/1.** Band II horizontal H array with 4 ft 6 in. × 1 in. cranked mast and lashing equipment for chimney mounting. Price: £3 6s.

**FM/4U.** Band II four-element array with folded dipole. To fit all masts. Price: £2 18s. 6d.

**FM/4L/1.** Band II four-element array with folded dipole and 4 ft 6 in. × 1 in. cranked mast and lashing equipment for chimney mounting. Price: £4 7s. 6d.

**FM/CS.** Conversion stubs. To fit Band I dipole or H aerial. Complete with fitting clamps. Price: 10s. 6d. pair.



# HI-FI CABINETS

**BARZILAY CO.** Distributors: Howland-West Ltd., 2 Park End, South Hill Park, London, N.W.3. Tel: Swiss Cottage 6666.

**Design 1B.** Complete hi-fi cabinet assembly comprising contemporary upright style equipment cabinet and two speaker enclosures. Speakers can be placed at each end of main cabinet to from single unit, or placed separately in the room. Main cabinet has one-piece lift-up lid and three front sliding doors. Accommodation for all types of equipment plus record and tape storage. Size: 81 in. wide, 18 $\frac{3}{4}$  in. deep, 28 $\frac{3}{4}$  in. high. Finish: American walnut. Price: £189 10s. 10d. (U.K. purchase tax £13 17s. 2d.).

**Design 2.** Complete hi-fi cabinet incorporating reflex enclosures for 12 in. or 15 in. units at each end. Lift-up lid to centre portion giving access to accommodation for tuner, amplifier, control unit and record deck or tape deck. Front sliding doors conceal storage space for records and tapes. Distinctive grille to speaker enclosures. Size: 102 in. wide, 18 $\frac{1}{2}$  in. deep, 28 $\frac{3}{4}$  in. high. Finish: American walnut. Price: £133 (U.K. purchase tax £9 14s. 7d.).

**Design 5.** Contemporary hi-fi cabinet available with matching speaker enclosures, the whole plinth mounted. Supplied ready built or in kit form. Front-opening sliding tambour panelled doors. Accommodation for all equipment and speaker units up to 15 in. Size: 96 in. wide, 18 in. deep, 29 in. high. Speaker cabinets 24 in. wide, main cabinet 48 in. wide. Finish: American walnut. Price: £180 10s. (U.K. purchase tax £13 4s. 1d.).

**K.89.** Contemporary low-line hi-fi cabinet for stereo equipment or record storage. Sliding front tambour doors. Accommodation for all units or records. Designed to permit stacking of one unit on top of another. Size: 72 in. wide, 18 in. deep, 17 $\frac{1}{2}$  in. high. Finish: American walnut. Price: £82 (U.K. purchase tax £6).



**A. DAVIES & COMPANY,** 3/11 Parkhill Place, off Parkhill Road, Hampstead, London, N.W.3. Tel: Gulliver 5775.

**Contemporary horizontal.** Horizontal style cabinet with full-width lift-up lid in choice of sapele, oak, walnut, or teak. Rosewood front if desired. Pneumatic lid stay. Overall size: 29 in. high (including 12 in. legs), 20 in. deep, and in

widths of 25 $\frac{1}{2}$  in., 36 in., 48 in., 60 in., and 72 in. Prices: (25 $\frac{1}{2}$ ) £17 10s., (36) £21. (48) £26 5s., (60) £33 10s., (72) £42. Extra for rosewood front.

Will quote for special cabinets to customers requirements.



**DESIGN FURNITURE LTD.,** Calthorpe Manor, Banbury, Oxford. Tel: Banbury 4726.

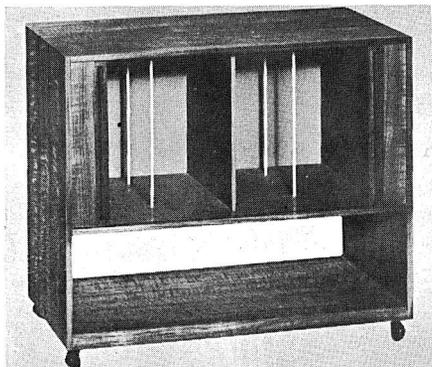
**EQC.7.** Popular amplifier/equipment cabinet. Removable control panel behind tambour doors. Inner top shelf adjustable to depth of 6 in. Lift-up lid with two stays. Size: control panel 35 × 13 $\frac{1}{8}$  in., set back  $\frac{3}{4}$  in. at bottom, 2 in. at top; inner top shelf 41 $\frac{3}{8}$  × 19 in.; overall 43 × 21 × 28 $\frac{1}{2}$  in. (including 6 in. legs). Finish: walnut, mahogany (medium colour satin finish), oiled teak. Price: £42 5s.

**EQC.8.** Similar to EQC.7 but modified to provide accommodation for approximately 130 records of all sizes. Record storage behind right-hand tambour door, control panel behind left-hand door. Size: control panel 17 $\frac{1}{8}$  × 13 $\frac{1}{8}$  in., storage compartment 13 $\frac{1}{8}$  high × 17 in. wide. Other dimensions and also finishes as for EQC.7. Price: £43 0s. 9d.

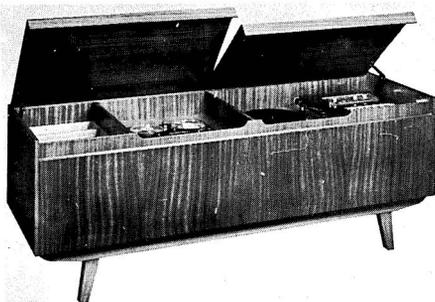
**EQC.9.** Inexpensive upright style amplifier/equipment cabinet. Lift-up lid with inner top shelf adjustable to a depth of 6 in. Removable control panel. Size: inner top shelf 19 $\frac{3}{8}$  × 16 in.; control panel 19 $\frac{7}{8}$  × 14 in.; cabinet 20 $\frac{7}{8}$  in. wide, 17 in. deep, 28 $\frac{3}{4}$  in. high (including 6 in. legs). Finish: polished medium walnut, inner top shelf and well covered grey Suwide. Price: £17 5s.

**EQC.11.** Amplifier/equipment cabinet designed by Paul D. Read (Des. R.C.A.). Lift-up lid and two front-opening doors giving free access to inner top shelf and removable front control panel. Inner top shelf adjustable to a depth of 6 in. Size: inner top shelf 39 $\frac{7}{8}$  × 19 in.; control panel 40 × 8 $\frac{3}{4}$  in.; cabinet 41 $\frac{1}{2}$  in. wide, 21 in. deep, 29 in. high (including 8 $\frac{1}{2}$  in. legs). Finish: polished medium walnut or mahogany. Matching record storage cabinet RC77. Price: £40 10s.

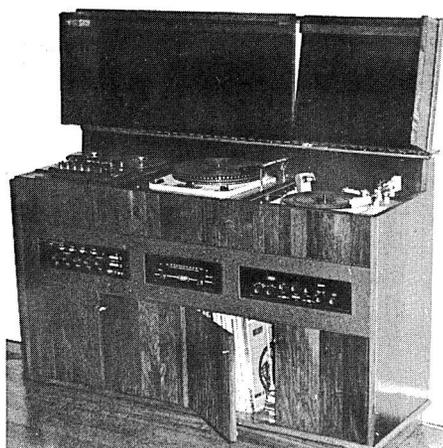
**EQC.14.** Low-line equipment cabinet with accommodation for both transcription turntable and tape deck. Motor board can be divided and stepped in height using loose division supplied. Two lift-up lids, two control panels—one



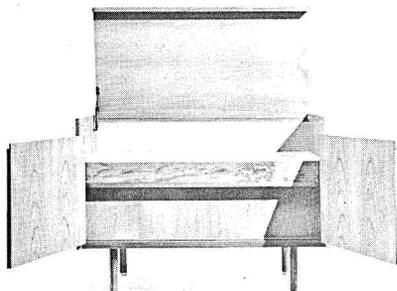
*Design furniture RC 192*



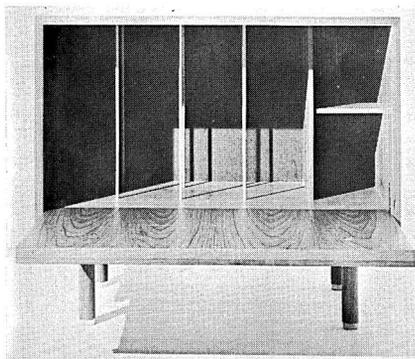
*Largs Quartette*



*Holder Pearce free-standing assembly*



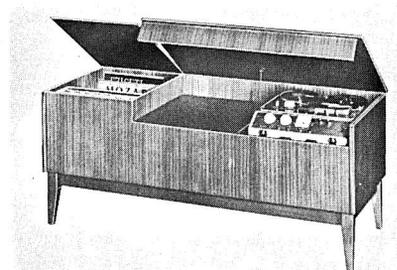
*Design furniture EQC 11*



*Design furniture RC77*



*Imhofs W.S.1*



*Record Housing Lowflex*

sloping, one horizontal. Size: motor board  $37\frac{1}{2} \times 19\frac{1}{2}$  in., sloping control panel  $20 \times 10\frac{1}{2}$  in., rear control panel  $20 \times 8$  in.; cabinet 59 in. wide, 21 in. deep,  $24\frac{1}{2}$  in. high (including  $9\frac{1}{2}$  in. legs). Finish: polished medium walnut or mahogany, oiled teak. Price: £38 10s.

**EQC.15.** Similar style to EQC.14 but shorter and with space for turntable or tape deck. Removable motor board is adjustable. Single lift-up lid. Size: motor board  $19\frac{7}{8} \times 19\frac{1}{2}$  in., sloping control panel  $20 \times 10\frac{1}{2}$  in., rear control panel  $20 \times 8$  in.; cabinet  $41\frac{7}{8}$  in. wide, 21 in. deep,  $22\frac{1}{2}$  in. high (including  $7\frac{1}{2}$  in. legs). Finish: polished medium walnut or mahogany, oiled teak. Price: £31.

**EQC.17.** Reproduction equipment cabinet with hand-carved frieze. Suitable for most types of equipment. Motor board adjustable for height. Panelled front, single lift-up lid. Size: motor board  $49\frac{1}{2} \times 17$  in.; cabinet  $54\frac{1}{2}$  in. wide,  $21\frac{1}{2}$  in. deep,  $24\frac{1}{2}$  in. high. Finish: polished medium oak. Price: £59 15s.

**EQC.18.** Compact modern-style cabinet of elegant appearance. Lift-up lid and drop front. Accommodates most types of hi-fi equipment and is particularly suitable for transistorised units. Two interchangeable motor boards can be mounted flat, stepped or sloped. Registered design. Size: lefthand motor board  $16\frac{3}{4} \times 15\frac{1}{2}$  in., righthand motor board (or equipment panel)  $18 \times 15\frac{1}{2}$  in., front inside panel  $35 \times 7\frac{3}{4}$  in.; cabinet  $36\frac{1}{2}$  in. wide,  $18\frac{3}{4}$  in. deep,  $27\frac{1}{2}$  in. high (including  $14\frac{1}{2}$  in. legs). Finish: walnut with rosewood drop front or oiled teak. Price: £26 18s.

**EQC.20.** Dual-purpose cabinet with storage space below for approximately 220 records behind tambour doors. Upper section will accommodate tuner and amplifier behind removable front panel. Size: control panel  $34\frac{1}{2} \times 9$  in.; cabinet  $35\frac{1}{2}$  in. wide,  $17\frac{1}{2}$  in. deep,  $26\frac{1}{4}$  in. high. Finish: polished medium walnut or mahogany, oiled teak. Price: £27 10s.

**Sheraton.** High quality reproduction furniture style cabinet made in limited quantities by specialist craftsmen. Lift-up lid and two front-opening doors. Comfortably accommodates turntable or tape deck together with amplifier, control unit and tuner. Front portion below control panel removes to provide record storage space. Size: control panel  $34\frac{1}{2} \times 9\frac{3}{8}$  in., motor board  $36 \times 16\frac{1}{2}$  in., height from motor board to lid  $6\frac{1}{2}$  in.; cabinet 39 in. wide,  $22\frac{1}{2}$  in. deep, 36 in. high (including 4 in. legs). Finish: inlaid mahogany only with matching veneers inside.

mahogany serpentine fronted with two false drawers in frieze, inlaid with boxwood lines. Price: £112 15s.

**EQC.21.** Equipment cabinet based on Sheraton design and with similar accommodation but having shaped folding doors. Three lower compartments suitable for record storage or for equipment. Veneered panel to centre portion can form back to storage compartment or panel for controls. Side compartment panels can be used the same way. Size: top mounting board  $40\frac{1}{2} \times 18\frac{1}{8}$  in., control panel  $40\frac{1}{2} \times 11$  in., clearance to underside of lid  $7\frac{3}{4}$  in., lower front panel  $18 \times 13\frac{1}{2}$  in., side panels each  $10\frac{3}{8} \times 13\frac{1}{2}$  in.; cabinet  $42\frac{1}{2}$  in. wide,  $22\frac{1}{2}$  in. deep,  $37\frac{1}{2}$  in. high. Price: £68.

**RC.144.** Neat compact inexpensive record storage cabinet with accommodation for up to 144 records. Size:  $19\frac{3}{4}$  in. wide,  $14\frac{1}{8}$  in. deep,  $24\frac{3}{4}$  in. high including legs. Finish: light walnut, mahogany or oiled teak. Price: £8 6s. 6d.

**RC.522.** Sturdily built storage cabinet with drop front. Space for 144 10 in. or 12 in. records and 96 7 in. records, or by removing a shelf a further 46 12 in. records can be added. Size: 26 in. wide,  $14\frac{1}{2}$  in. deep,  $27\frac{1}{4}$  in. high. Finish: polished medium walnut or mahogany, oiled teak. Price: £12 10s.

**RC.77.** Designed by Paul D. Read (Des. R.C.A.) to match EQC.11. Drop front with combined hinge and stay. Space for 170 10 in. or 12 in. records and 100 7 in. records. Size: 30 in. wide, 16 in. deep, 25 in. high. Finish: polished medium walnut or mahogany, oiled teak. Price: £17 12s. 6d.

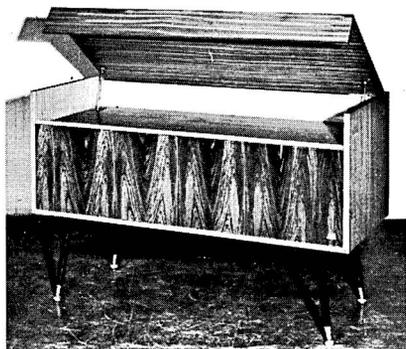
**RC.192.** Multi-purpose cabinet, fitted with castors and with space for approximately 192 records concealed behind tambour doors. Matches EQC.20 cabinet. Size: 30 in. wide,  $14\frac{1}{2}$  in. deep,  $24\frac{1}{2}$  in. high. Finish: polished medium mahogany or walnut, oiled teak. Price: £21 7s. 9d.

**RC.300.** Bow fronted storage cabinet with tambour doors. Tapered legs with brass ferrules. Interior lined with Storoflex. Space for 280 records of all sizes. Size:  $30\frac{1}{2}$  in. wide, 15 in. deep, 27 in. high. Price: £21 15s. 3d.

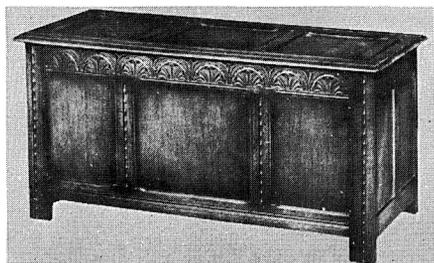


**EXPERT GRAMOPHONES (SERVICES) LTD.,** 30 Vincent Road, Kingston-upon-Thames, Surrey. Tel: Kingston 6011.

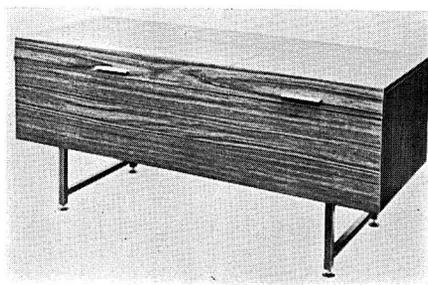
Specialists in top quality tailor-made high fidelity installations. Special control units, etc.



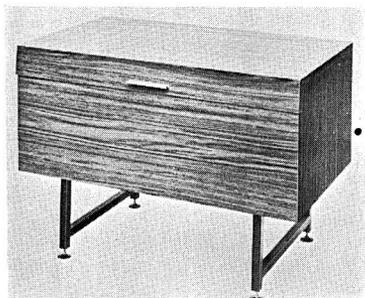
*A. Davies contemporary horizontal*



*Design Furniture EQC 17*



*GKD Anglian Mk. II*



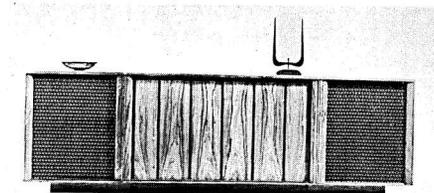
*GKD Huntingdon Mk. II*



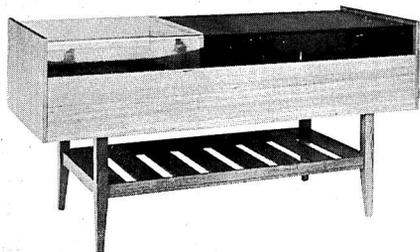
*Franklin Queen Anne-style chest*



*Hampstead*



*Barzilay Design 5*



*Howland-West Viking Major*

designed and made to customers' exact requirements. Commissions undertaken to design and manufacture modern furniture and/or built-in units for high fidelity housing.

Import and also manufacture unusual and interesting types of hi-fi housing. Typical examples include brass inlaid Indian drowy boxes and reproduction stripped pine chests.



**A. R. FRANKLIN**, Audio Engineer, 41 Camden Mews, London, N.W.1. Tel: Gulliver 2340.

**Lowline.** Finish in wood-grained material. Accommodation for turntable, tuner, main amplifier, control unit. Table top for tape. Hinged perspex lid which can be lifted off. Based on coffee table principle on castors with shelf to carry large main amplifier. Overall dimensions 42 in. long, 18 in. wide. Lid section 20 × 16 in. Legs 12 in. with castors. Price: £25 4s.

**Transcription Box.** In unpolished oiled teak to match "Ladderax" furniture. Lift-off or hinge-back tinted perspex lid. Size: 23 × 15½ × 8 in. (or to special order, quotation on request). Price: £12 12s.

**Transcription Box.** Finished hard wearing wood-grained material. Lift-off or hinge back tinted perspex lid. Size: 18 × 16 × 8 in. Price: £10 10s.

**Special cabinets.** Individually styled cabinets to customers' requirements. Equipment built-in to existing furniture. Cabinets or shelves built-in, any shape or size. Matching Period style equipment cabinets and speaker enclosures made to individual requirements. Quotations on request.



**G.K.D. LTD.**, 45 Crawley Green Road, Luton, Beds. Tel: Luton 26661/2.

**Leak shelf cabinet.** Shelf-mounting cabinet to take Leak pre-amplifier or tuner. Finish: selected teak or walnut. Size: 12½ × 9½ × 5 in. Price: £4 4s. (U.K. purchase tax 6s. 11d.).

**Leak Stereo 30 shelf cabinet.** Shelf-mounting cabinet to take Leak Stereo 30 integrated amplifier. Finish: selected teak or walnut. Size: 13½ × 9½ × 5 in. Price: £4 12s. 6d. (U.K. purchase tax 7s. 8d.).

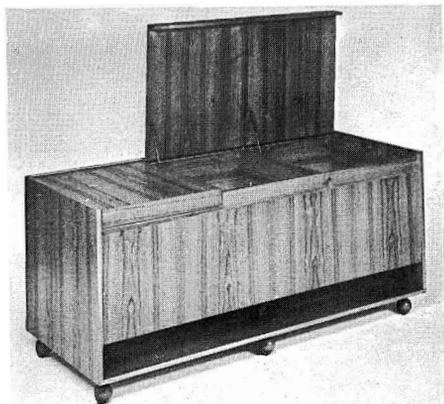
**Southdown Mk II.** Lowline cabinet designed exclusively for all current Leak equipment (including Stereo 30), gram unit or tape deck. Finish: selected teak or walnut. Lift-up lid. Sprung motor board. Concealed spring-loaded drawer houses equipment and control knobs. Amplifier section free for storage when Stereo 30 used. Size: 34 × 21 × 25 in. (including legs). Motor board 18½ in. wide, 19½ in. deep, 4 in. above, 8½ in. below. Price: £30 9s. (U.K. purchase tax £2 10s. 3d.).

**Huntingdon Mk II.** Lowline cabinet suitable for most equipment including Quad, Leak, Rogers, Armstrong, Truvox, Chapman, etc. Finish: selected teak or walnut. Lift-up lid giving easy access to controls, gram unit and tape deck. Size: 35¾ × 21⅞ × 25¼ in. (including legs). Motor board 17¾ in. wide, 19¾ in. deep, 4 in. above, 8½ in. below. Price: £30 9s. (U.K. purchase tax £2 10s. 3d.).

**Chiltern Mk II.** Lowline cabinet designed exclusively for all current Leak equipment including Stereo 30. Finish: selected teak or walnut. Lift-up lid. Spring-loaded drawer houses equipment and controls. Top compartment takes gram unit, tape deck, or complete recorder in its case. Size: 54 × 21 × 25 in. (including legs). Motor board 18½ in. wide, 19½ in. deep, 4 in. above, 8½ in. below. Price: £40 19s. (U.K. purchase tax £3 7s. 7d.).

**Anglian Mk II.** Lowline cabinet suitable for most equipment including Quad, Leak, Rogers, Armstrong, Truvox, Chapman, etc. Finish: selected teak or walnut. Lift-up lid giving easy access to controls, gram unit and tape deck. Size: 55½ × 21⅞ × 25¼ in. (including legs). Combined motor board and tape section 37 in. wide, 19¾ in. deep, 4 in. above, 8¾ in. below. Price: £40 19s. (U.K. purchase tax £3 7s. 7d.).

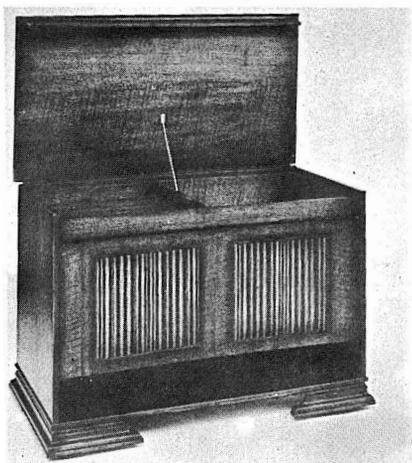
**Duette.** Wall or free-standing cabinet assembly. Can be used as room divider. Comprises two units: upper cabinet for control units, tuner or integrated amplifier; lower cabinet for gram unit, tape deck and main amplifiers. Suitable for Leak Stereo 30 or other similar integrated amplifiers. Top cabinet has drop-down lid, lower cabinet has lift-up lid. Finish: Formica, natural teak or dark Australian walnut. Size: 38 × 21 × 58 in. Lower cabinet 34 in. wide, 19 in. deep, 11 in. high (motor board height adjustable). Upper cabinet (internal) 33½ in. wide, 13½ in. deep, 7½ in. high. Fascia panel 34 × 7½ in. Price: £47 5s. (U.K. purchase tax £3 17s. 7d.). Extension frame and two shelves to extend up to ceiling £4 4s. extra.



*Imhofs Trolley type 10*



*Imhof HFU|IL*



*Imhofs Trolley L (Jacobean)*



*Largs Caithness*



*Largs Olympic*



*Largs Hepplewhite 'A'*

**HAMPSTEAD HIGH FIDELITY**, 91a/91b Heath Street, Hampstead, London, N.W.3. Tel: 01-435-6377.

**Hampstead.** Low upright cabinet with separate lift-up lids for gram unit and tape deck compartments. Pull-out front hopper for tuner and control unit or integrated amplifier. Will accommodate gram unit, tape deck, tuner, control unit and amplifier. Takes any pre-amplifier or integrated amplifier not exceeding 14 in. in depth. Available with tape section made into well to hold complete recorder up to 9 in. in height. Special version for Ferrograph and Revox with professional size spools 2 in. longer. Size (standard model): 36×26×20 in. Prices: (mahogany, walnut or teak) £38. Special model for Revox and Ferrograph £44 (all finishes).

Special cabinets and fittings made to order. Designs and drawings prepared for complete room or house hi-fi schemes.



**HEATHKIT.** Manufactured by Daystrom Ltd., Bristol Road, Gloucester. Tel: Gloucester 20217.

**Malvern.** Horizontal cabinet. Available in kit form or assembled "in the white". Takes gram unit, tape deck, tuner and amplifier. Lift-up lid, sliding doors. Overall size: 39½×21¾×32 in. Price: £18 1s. kit form.

**Gloucester.** Horizontal cabinet. Available in kit form or assembled "in the white". Takes gram unit or tape deck, tuner and amplifier. Lift-up lid. Overall size: 46½×21×30 in. Price: £18 10s. kit form.

**Chepstow.** Upright cabinet. Available in kit form or assembled "in the white". Takes gram unit, tuner and amplifier. Lift-up lid. Overall size: 18×34×32¾ in. Price: £11 12s. 6d. kit form.



**HOLDER PEARCE LTD.**, 66 Grove Road, Eastbourne, Sussex. Tel: Eastbourne 26565.

Built-in or free-standing equipment cabinets designed and built to meet customers' exact requirements. Lift-up or drop-down lids, accommodation to suit any equipment, all standard finishes and also special finishes to blend with furnishings. Details and prices on application.

**HOWLAND-WEST LTD.**, 2 Park End, South Hill Park, London, N.W.3. Tel: Swiss Cottage 6666.

**Oslo II.** Upright cabinet in teak, walnut or teak with rosewood front panel. Takes gram unit or tape deck and amplifier. Single lift-up lid. Plinth can be stowed inside for transport. Overall size: 21×22×25¾ in. Prices: Teak or walnut £14 14s. (U.K. purchase tax £1 1s. 6d.); teak with rosewood front panel £15 4s. 6d. (U.K. purchase tax £1 2s. 3d.).

**Karelia de Luxe.** Lowline cabinet in rosewood with beech interior or teak with beech interior. With anodised aluminium skids. Takes all combinations of equipment. Lift-up lid and front opening door. Overall size: 60×20¼×16 in. plus legs 8 in. Small compartment 16½ in. wide. Price: £51 9s. (U.K. purchase tax £3 15s. 3d.).

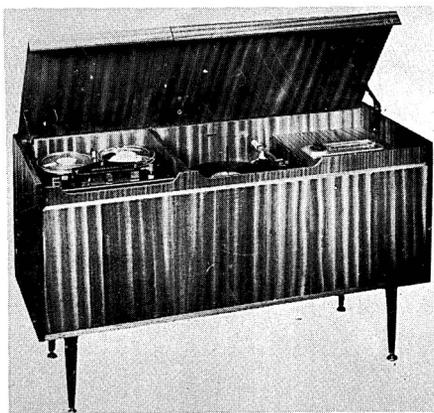
**Malmo II.** Horizontal cabinet in teak or walnut. Takes all combinations of equipment. Lift-up lid and front opening doors. Overall size: 36 in. wide, 22 in. deep, 26 in. high (inc 9 in. legs). Motor board 34¾×20 in. Front panel 35×8½ in. Front panel is recessed 2 in. Magnetic door catches. Motor board adjustable to maximum clearance of 6 in. above. Price (both finishes): £26 5s. (U.K. purchase tax £1 18s. 5d.).

**Trondheim II.** Horizontal cabinet in teak, walnut or teak with rosewood front panel. Takes any combination of equipment. Two lift-up lids. Overall size: 66×22×25¾ in. Prices: Teak or walnut £43 1s. (U.K. purchase tax £3 3s. 3d.); teak with rosewood front panel £45 3s. (U.K. purchase tax £3 6s. 1d.).

**Tromso II.** Lowline cabinet in teak, walnut or teak with rosewood front panel. Takes gram unit or tape deck, tuner and amplifier. Two lift-up lids. Overall size: 48×20×14 in. less plinth. Price: teak or walnut £30 9s. (U.K. purchase tax £2 4s. 6d.); teak with rosewood front panel £31 10s. (U.K. purchase tax £2 6s. 1d.).

**Viking Standard.** Lowline shelf-mounting equipment cabinet. Sliding perspex lid to record or tape deck compartment. Accommodation for amplifier, control unit, record unit or tape deck. Size: 39 in. wide, 19½ in. deep, 12 in. high (14 in. plinth optional extra). Amplifier compartment: 18½×16¾×10½ in. Motor board: 18×19 in. Control panel: 17½×6 in. Finish: teak and matt black. Price: £21 (U.K. purchase tax £1 10s. 9d.); plinth £6 6s. (U.K. purchase tax 9s. 2d.).

**Viking Major.** Lowline shelf- or plinth-mounting equipment cabinet. Sliding perspex



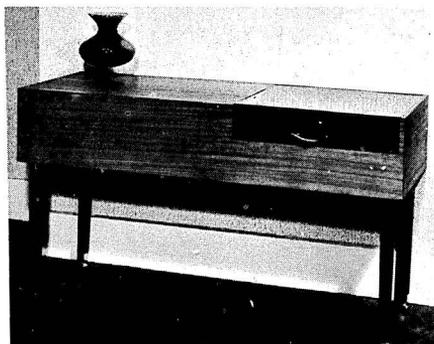
*Largs Trio*



*Lowther 3 cabinet*



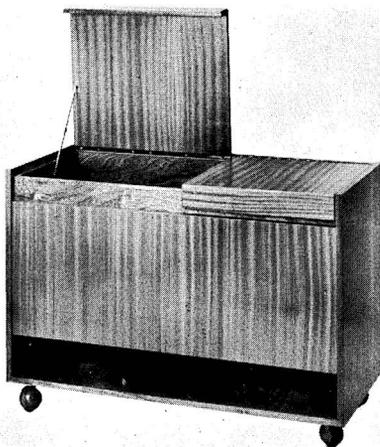
*PWB model A2*



*Monk Equipment cabinet*



*Staples Ladderax Hi-Fi*



*Imhof trolley type L*

lid to record or tape deck compartment. Accommodation for amplifier, control unit, tuner, record unit or tape deck. Size: 51 in. wide, 19½ in. deep, 12 in. high (14 in. plinth optional extra). Amplifier compartment: 30½ × 16¾ × 10½ in. Motor board: 18 × 19 in. Control panel: 29½ in. wide, 6 in. high. Finish: teak and matt black. Price: £25 4s. (U.K. purchase tax and surcharge £1 17s.); plinth £6 6s. (U.K. purchase tax 9s. 2d.).

**Clearview H.W.1.** Cabinet in teak, walnut or rosewood. Takes gram unit or tape deck. Lift-off perspex lid. Overall size: 18¼ × 16½ × 8½ in. Clearance above board 3¾ in., below board 4½ in. Price: £8 19s. 6d. (U.K. purchase tax 13s. 2d.).

**Clearview H.W.4.** Amplifier cabinet in teak only. Takes gram unit or tape deck with amplifier/control unit beneath. Ventilated bottom and rear. Overall dimensions: 18¼ × 16¼ × 14½ in. high. Space above motor board 3¾ in., space below 9 in. Matching Clearview record storage cabinet also available. Price: £11 19s. 6d. (U.K. purchase tax 17s. 6d.); (legs optional extra £2).

**Clearview H.W.5.** Gram unit or tape deck cabinet in teak only. Lift-off perspex lid. Overall size: 18¼ × 16½ × 7½ in. Space above motor board 3¾ in., space below 3¾ in. Price: £6 19s. 6d. (U.K. purchase tax 10s. 3d.).

**Extra high top.** Special versions of the H.W.1, H.W.4 and H.W.5 provide 6 in. clearance above motor board. Additional cost £1 2s. 6d.

**Clearview H.W.7.** Shelf- or table-mounting gram unit cabinet. Perspex lid. Motor board cut for Garrard SP25, AT60 etc. Size: 15¾ in. wide, 14½ in. deep, 7½ in. high at edges rising to 8¼ in. at the centre. Finish: teak. Price: £5 17s. 6d. (U.K. purchase tax £1 1s. 6d.).

**Clearview H.W.8.** Similar to H.W.7 but with uncut motor board. Height available above motor board 3¼-4¼ in.; depth below top of motor board 3 in. Price: £6 9s. 6d. (U.K. purchase tax 9s. 6d.).

**Clearview H.W.12.** Cabinet in teak. Takes gram unit or tape deck. Lift-off perspex lid. Overall size: 23½ in. × 19 × 8½ in. Clearance above board 3¾ in., below board 4½ in. Price: £11 19s. 6d. (U.K. purchase tax 17s. 6d.).



**IMHOFS.** 112-116 New Oxford Street, London, W.C.1. Tel: 01-636-7878. Cables: Imcase, London, W.C.1.

**HFU/10.** Control cabinet with three compartments. Will house the largest of control equipment including tape decks. Finish: Light or dark

sapele mahogany, walnut, bleached pine or teak. Separate lift-up lid to each of the three compartments. Size: 52 × 27 × 21 in. (including legs). Compartments 15 in., 18 in., and 16½ in. wide, all 19½ in. deep. Prices: £37 10s. 9d. (U.K. purchase tax £2 7s. 3d.).

**HFU/12.** Modern sideboard style equipment cabinet with accommodation for tape deck, transcription motor, amplifier, tuner and over 250 records. Centre sliding section conceals instrument panel and two other panels give access to storage space. Centre portion of top surface hinges up to provide access to turntable or tape deck. Size: 60 in. wide, 22 in. deep, 30 in. high (including 6 in. base). Two 19 × 19 in. motor boards. Control panel 19 in. wide, 15½ in. high. Lefthand compartment 19 in. wide, 19 in. deep, 11 in. high. Righthand compartment 19 in. wide, 19 in. deep, 18 in. high. Finish: teak, walnut, sapele. Price: £53 19s. 2d. (U.K. purchase tax £3 15s. 10d.).

**HFU/12 Regency.** Similar to HFU/12 but in Regency styling. Size: 61 in. wide, 24 in. deep, 30 in. high (including 6 in. legs). Price: £74 14s. 10d. (U.K. purchase tax £5 1s. 2d.).

**HFU/16M.** Two compartment cabinet with drawer for tape recorder. Either side will accommodate any transcription motor (or auto-changer) and is large enough for the SME3012 arm. Finish: Teak and rosewood; two-tone sapele mahogany; walnut. Single lift-up lid at top. Righthand side has drop-down panel with withdrawable deck. Size: 41¼ × 22 × 28 in. (including 7½ in. legs). Compartments all 19 in. wide, 20 in. deep. Height above tape recorder deck is 12 in. Price: £38 8s. 5d. (U.K. purchase tax £2 10s. 7d.).

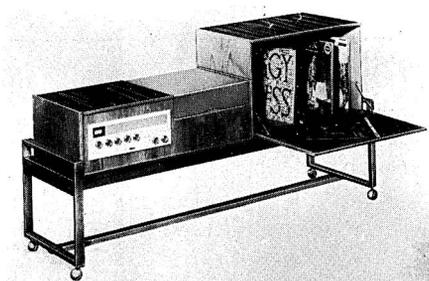
**HFU/16M Jacobean.** Similar to HFU/16M but in Jacobean styling. Size: 42 in. wide, 22½ in. deep, 27 in. high (including legs). Price: £41 5s. (U.K. purchase tax £2 15s.).

**HFU/1L.** Control cabinet. Designed to allow a tuner to be fitted alongside a transcription motor. Finish: Walnut, mahogany, bleached pine, teak. Lift-up lid. Size: 28 × 19 × 26 in. (including 10 in. legs). Price: £23 2s.

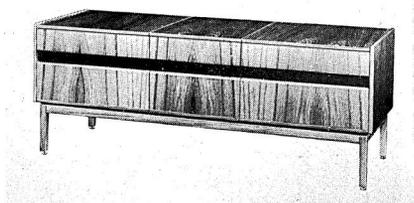
**Type L.** Trolley cabinet with two compartments. Easy-running finger-tip movement. Finish: Light or dark sapele mahogany, two-tone mahogany, walnut, teak. Two lift-up lids. Size: 35½ × 18 × 24 in. (including castors). Compartments 17½ in. and 15½ in. wide, both 16 in. deep. Price: £31 11s. 4d. (U.K. purchase tax £2 0s. 8d.).



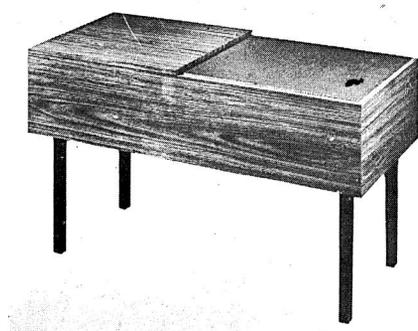
*Imhofs wall unit*



*Record Housing Caprice*



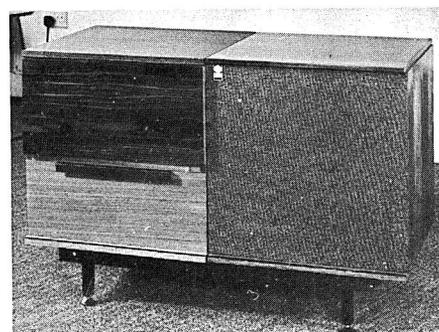
*Record Housing Andante*



*Rogers lowline with legs*



*Largs Sheraton 'B'*



*Musicraft modular tape and speaker cabinets*



*Rogers case for HG88 Mk. III stereo amplifier*

**Type L Jacobean.** Similar to Type L but in Jacobean style. Size:  $36\frac{1}{2}$  in. wide, 19 in. deep, 24 in. high (including 3 in. concealed castors). Internal sizes as trolley L. Price: £33 14s. 11d. (U.K. purchase tax £2 5s. 1d.).

**Type 10.** Trolley equipment cabinet. A larger version of the trolley L cabinet. A third compartment has been added to accommodate a tape recorder or to provide storage space for records. Three separate lids, each with a stay, give access to the compartments. Size:  $54\frac{1}{2}$  in. wide, 21 in. deep, 24 in. high (including 3 in. castors). Motor boards: left 17 in. wide, centre  $18\frac{3}{4}$  in. wide, right 16 in. wide, all 19 in. deep. Finish: light or dark sapele mahogany, two-tone mahogany or walnut. Teak or Jacobean styling at slight extra cost. Price: £41 7s. (U.K. purchase tax £2 15s.).

**HFU/18 Mk II.** Compact upright style cabinet with lift-up lid and two front opening doors concealing control panel. Designed to house the average small hi-fi system. Ideal unit for modern homes. Size: 24 in. wide, 19 in. deep, 28 in. high (including 6 in. legs). Motor board  $21\frac{3}{4}$  in. wide, 17 in. deep. Control panel  $21\frac{3}{4}$  in. wide, 14 in. high. Finish: mahogany, teak or walnut. Price: £18 17s. (U.K. purchase tax £1 2s.).

**Imhof W.S.1.** Wall or shelf mounting unit suitable for transistorised or smaller type valve equipment. Size: 24 in. high, 16 in. wide, 15 in. deep. Motor board: 15 in. wide,  $13\frac{3}{4}$  in. deep, 3 in. below. Maximum amplifier size:  $15 \times 12\frac{1}{2} \times 6$  in. Finish: oiled teak (to match BS/4 speaker), walnut or sapele mahogany. Price: £13 19s. 2d. (U.K. purchase tax £1 0s. 10d.); (cut-outs to suit motor and control units, as selected: £2 2s. extra).

**Imhof Wall Unit.** Two upper shelves for speaker, tuner, amplifier, etc. Lower swivel-front compartment for motor unit. Size (overall): 34 in. wide, 12 in. deep, 72 in. high. Finish: mahogany or walnut. Price: £35 7s. 8d. (U.K. purchase tax £2 8s. 4d.).

**IMIII/AT6.** Designed to house the Garrard AT6 motor. Finish: walnut or mahogany. Lift-up lid. Size:  $17 \times 9\frac{1}{2} \times 15\frac{1}{2}$  in. Price: £8 18s. (U.K. purchase tax 11s.).

**IMIIIB.** Similar to above but measuring  $19 \times 8 \times 18\frac{1}{4}$  in. Price: £8 18s. (U.K. purchase tax 11s.).

Most Imhof cabinets can be supplied in finishes other than those listed to special order. Enquiries invited.

**LARGS OF HOLBORN,** 76-77 High Holborn, London, W.C.1. Tel: Chancery 2626.

**Fidelia.** Upright cabinet in sapele or mahogany veneer (other finishes by arrangement). Takes gram unit, amplifiers and tuner. Lift-up lid. Overall size:  $30 \times 18 \times 14$  in. (plus 15 in. for legs). Price: £22.

**Libretto.** Upright cabinet complete with room divider, in teak veneer. Takes gram unit, tuner, amplifiers, tape deck. Lift-up lid with brass/nylon lid stays. Overall size:  $37\frac{1}{2} \times 18 \times 26\frac{1}{2}$  in. Control panel (lower section) covered by sliding doors. Super-structure 6 ft 2 in. high, two shelves 36 in. wide by  $8\frac{1}{4}$  in. deep, one shelf 18 in. wide by  $8\frac{1}{4}$  in. deep. Price: £48.

**Olympic.** Upright cabinet with pull-out control panel in sapele or mahogany veneer (other finishes by arrangement). Takes gram unit, tape deck, tuner and amplifiers. Lift-up lid with tensioned lid stays. Fitted with Shepherd castors. Overall size:  $40 \times 22 \times 29$  in. Particularly suitable for Quad, Leak, and Ferrograph equipment. Price: £55.

**Small Olympic.** Similar in style and appearance to Olympic but slightly smaller. Size:  $37\frac{1}{2}$  in. long, 18 in. deep, 26 in. high (plus 3 in. castors). Finish: oiled teak, satin mahogany/walnut. Price: £48.

**Quartette.** Lowline cabinet in oiled teak or mahogany/walnut satin. Two lift-up lids with tension stays. Takes gram unit, tape deck, tuner, control unit and records. Size: 66 in. long, 18 in. deep, 26 in. high. Price: £45.

**Large Quartette.** Similar in style and appearance to Quartette but especially suitable for larger equipment, i.e. Ferrograph, SME, etc. Size: 70 in. long, 26 in. high, 22 in. deep. Price: £52.

**Classic.** Traditional style upright equipment cabinet with top lid for gram or tape unit and two front opening doors giving access to front panel with record storage below. Overall size:  $24\frac{3}{4}$  in. wide,  $19\frac{1}{2}$  in. deep, 39 in. high including plinth. Motor board  $23\frac{1}{2}$  in. wide,  $16\frac{1}{2}$  in. deep, 4 in. below lid. Control panel 23 in. wide,  $9\frac{1}{2}$  in. high. Finish: Walnut, sapele or mahogany veneer. Price: £48. (Record storage £3 3s. optional extra.)

**Sheraton B.** Reproduction style cabinet in walnut or mahogany. Two front-opening doors with record storage. Lift-up lid. Space for tuner, control unit and turntable. Size:  $38\frac{3}{4}$  in. long,  $18\frac{3}{4}$  in. deep, 32 in. high including legs. Price: £85.

**Hepplewhite A.** Reproduction chest of drawers in curled mahogany or walnut. Lift-up lid with two stays. Dummy drawers. Will accommodate tuner, control unit and turntable. Size: 38 in. long, 20½ in. deep, 31½ in. high including legs. Price: £115.

**Caithness.** Modern lowline cabinet made in three sections: main equipment cabinet, record and tape storage cabinet, plinth. Main cabinet will accommodate tuner, control unit, turntable and tape deck. Two lift-up lids. Storage cabinet has fixed top and being slightly lower than main cabinet provides ideal setting for ornament or flowers. Size: 78 in. long, 22 in. deep, 26 in. high including 9 in. plinth. Price: £78.

**Sutherland.** Designed to take large amount of big equipment together with comprehensive record library. Lift-up lid with two stays covers space for turntable and tape deck, drop-down front conceals panel for tuner and control unit. Two front-opening doors at bottom give access to record storage. Size: 40 in. long, 21½ in. deep, 35 in. high. Finish: oiled teak or satin mahogany/walnut. Price: £60 18s.

**Stirling.** Compact-looking modern cabinet with room for tuner, control unit, turntable and smaller types of tape unit, also space for record storage. Lift-up lid with two stays and sliding doors at front. Size: 40 in. long, 20 in. deep, 26 in. high including 2 in. castors. Finish: oiled teak or satin mahogany/walnut. Price: £50.

**Trio.** Two lift-up lids cover three compartments, the third compartment being fitted for tape deck or record storage whilst first two accommodate turntable, tuner and control unit. Modern clean style cabinet finished in oiled teak, or satin mahogany/walnut. Size: 48 in. long, 18 in. deep, 26 in. high including 9 in. legs. Price: £42.

**Large Trio.** Similar in style and appearance to Trio but designed for larger equipment, i.e. Ferrograph, SME etc. Size: 54 in. long, 18 in. deep, 26 in. high including 9 in. legs. Price: £49.

**Largo.** Similar style to Trio but without third compartment for tape deck or record storage. Size: 36 in. long, 18 in. deep, 26 in. high including 9 in. legs. Price: £32.

The high fidelity equipment cabinets listed and illustrated represent only a small selection of Largs' tailor-made products. Largs operates its own cabinet factory and invites enquiries for cabinets to customers own specifications.

Prices quoted include delivery in Great Britain.

**LOWTHER MANUFACTURING CO.,** Lowther House, St Mark's Road, Bromley, Kent. Tel: Ravensbourne 5225. Cables: Lowther, Bromley.

**Model 1.** Lowline compact cabinet. Block-board construction. Finished in walnut, sapele, oak, tola. Lift-up lid. Detachable unit mounting board, rear panel and legs. Size: 36 × 19 × 29 in. Mounting board 34½ × 17½ in. On short legs with adjustable brass feet. Price: £33 ex works (plus U.K. purchase tax).

**Model 2.** Lowline cabinet with similar specification to Model 1 but larger. Size: 50 × 19 × 29 in. (including 11½ in. for legs). Mounting board 48 × 17½ in. Depth inside lid 3¾ in. Single lid with two pneumatic stays. Price: £55 ex works (plus U.K. purchase tax).

Special model 56 in. wide made to order. Price on request.



**MEDLEY MUSICAL LTD.,** 134 Plumstead Road, London, S.E.18. Tel: Woolwich 1738.

**TP1.** Teak plinth with vacuum-formed tinted perspex dust cover. Suitable for BSR tape deck or other similar equipment. Base size: 14½ × 15¼ × 3½ in. Overall height: 7½ in. Price: £6 6s.

**TP2.** Large teak plinth with vacuum-formed tinted Perspex dust cover. Suitable for Sony TC250A tape deck or other similar equipment. Base size: 16½ × 19 × 4 in. Overall height: 7½ in. Price: £8 8s.

**Teak cases.** Shelf mounting teak cases in various sizes. Perspex cover will hinge or can be removed completely when desired. Will accommodate most tape decks and other similar equipment. TP8: 18 × 16 × 8½ in. Price: £8 8s.; TP9: 16 × 15 × 8½ in. Price: £7 15s.; TP10: 18 × 16 × 10 in. Price: £9 9s.; TP12: 24 × 18 × 8¾ in. Price: £10 10s.

**Perspex covers.** Dust covers in tinted Perspex for small tape recorders or Garrard bases. Small: 13½ × 14½ × 3½ in. Price: £3 5s.; Large: 15½ × 14¼ × 3½ in. Price: £3 15s.

**Leak Case.** Teak case to accommodate Leak Stereo 30 amplifier. Price: £3 3s.

**Medley Fidelio.** Lowline cabinet on legs. Designed to accommodate Leak, Rogers, Armstrong, etc. Amplifier mounts behind drop down wooden panel which conceals knobs and is fitted with magnetic catch. Fitted Perspex lid will hinge and is removable. All-wood version

available. Finish: teak (other finishes to order). Size: 39 in. wide,  $16\frac{1}{2}$  in. deep,  $24\frac{1}{2}$  in. high (including  $12\frac{1}{2}$  in. legs). Price: (with Perspex cover) £18 18s. (U.K. purchase tax 19s. 10d.); (with wooden lid) £19 19s. (U.K. purchase tax 19s. 10d.).

**Medley M.M. Unit.** Compact wall mounting shelf and player cabinet unit. Shelves (three) can be arranged as desired. Turntable housed in cabinet which folds up when not in use. Shelves rebated for leads. Ideal space saver. Finish: medium teak. Shelves available in 2 ft 6 in., 3 ft, 4 ft lengths. Illustrated leaflet on request. Price: (with 13 ft 6 in. shelf length, gram unit cabinet, bearers, screws, etc) £22 1s.

**Medley Table Cabinet.** Equipment is set into recessed teak panel. Knobs discreetly covered by tinted perspex panel held by magnetic catch. Accommodates most makes of equipment including Rogers, Leak, Fisher, Armstrong, etc. Front edge bevelled to take off the square look. Finish: teak. Size: 26 in. wide, 14 in. deep,  $6\frac{1}{2}$  in. high. Full details on request. Price: £9 (U.K. purchase tax 10s. 8d.).



**V. J. MONK LTD.,** 140-141 Plumstead Road, London, S.E.18. Tel: 01-845-2369.

**Monk Lowline.** Designed to take the majority of modern equipment. Can be custom built to suit customer's requirements. Standard size:  $41 \times 17 \times 8$  in. (plus legs and Perspex lid). Finish: teak or mahogany. Price: £12 12s.

Individual speaker cabinets and equipment cabinets designed and made at competitive prices. Enquiries welcomed.



**MUSICRAFT HI-FI CENTRE,** 63 High Street, Hounslow, Middlesex. Tel: 570-4640

**Sutton.** Lowline cabinet in teak with lid and supporting frame in white or black. Takes gram unit, amplifier and tuner. Lift-up box lid for player. Lift-up slab lid for controls. Overall size:  $42 \times 20 \times 24$  in. (inc  $13\frac{1}{2}$  in. frame). Price: £30 9s.

**Dorking.** Lowline cabinet in oiled teak. Takes gram unit, tuner, amplifier and tape deck. Two lids, which fold away from centre section then lift up. Overall size:  $60 \times 20\frac{3}{4} \times 19\frac{1}{4}$  in. (inc  $8\frac{1}{2}$  in. legs). Can be used in centre of room. Price: £34 13s. with black vynair front panel, £36 15s. with teak front panel.

**Modular Tape Unit.** One of five 20 in. cube module cabinets. Finished in rosewood/sapele, mahogany or teak. Top and upper half of front open to provide easy access for a portable tape recorder. Lower drawer. Cutaway back to take leads. Matching speaker and amplifier cabinets available. Size:  $20 \times 20 \times 20$  in. with 7 in. base frame with adjustable feet. Price: £18 18s. (cabinet), single base unit £3, double base unit £3 10s.

**Modular Amplifier Unit.** 20 in. cube module cabinet in rosewood/sapele, mahogany or teak. Satin black handles. Lift-up lid, drop-down half front. Matching cabinets can be added as equipment grows. Size:  $20 \times 20 \times 20$  in. with 7 in. base frame with adjustable feet. Price: £18 18s. (cabinet), single base unit £3, double base unit £3 10s.



**P.W.B. AUDIO LTD.,** 33 Call Lane, Leeds 1, Yorkshire. Tel: Leeds 28559.

**Model A1.** Lowline style with single lift-up lid. Takes gram unit, tuner and amplifier. Finish: Teak, walnut, mahogany or oak. Matching or black legs. Rosewood drop on front of lid optional extra. Size:  $36 \times 16\frac{1}{2} \times 27$  in. Motor board  $17\frac{1}{2} \times 15$  in. deep. Amplifier section  $17\frac{1}{2} \times 15$  in. deep. Price: £25.

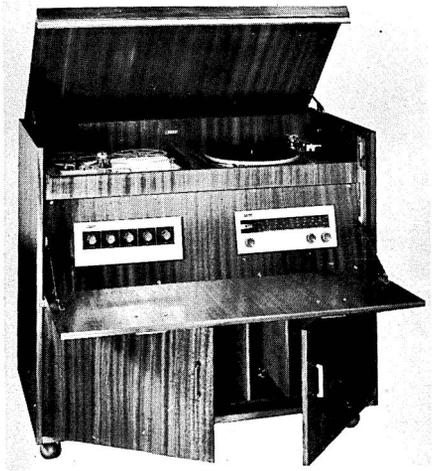
**Model A2.** Lowline style with twin lift-up lids, smaller lefthand lid over amplifier and tuner section, larger righthand lid over gram unit and record storage section. Finish: Teak, walnut, mahogany, oak. Matching or black legs. Rosewood drop on front of lids optional extra. Takes gram unit, tuner, amplifier, and has provision for record storage. Record storage section lifts out to permit tape deck to be fitted. Size:  $52 \times 16 \times 27$  in. Internal sections dimensioned as required. Price: £35.



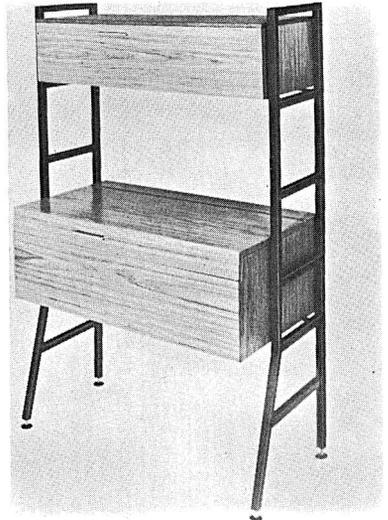
**RECORD HOUSING,** Brook Road, Wood Green, London, N.22. Tel: Bowes Park 7487.

**Longfellow.** Lowline cabinet in walnut, mahogany or teak. Takes gram unit, tape deck, tuner, amplifier. Record storage (150). Two lift-up lids. Overall size:  $76\frac{1}{2} \times 21 \times 14$  in. (plus 9 in. for legs). Will take complete tape-recorder and largest players, transcription or autochange. Price (walnut, mahogany or teak): £49 17s. 6d.

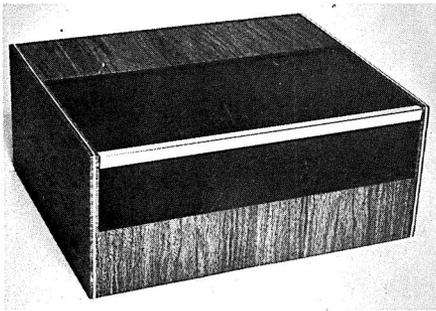
**Nielsen.** Upright cabinet in walnut, mahogany or teak. Takes gram unit, tuner, amplifier,



*Largs Sutherland*



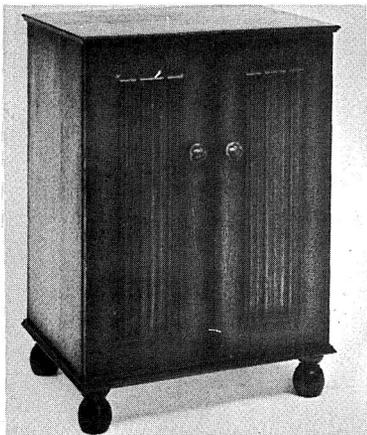
*GKD Duette*



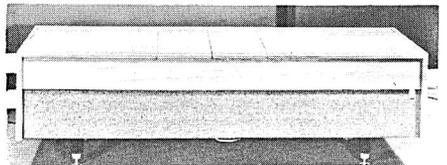
*Franklin transcription box*



*Largs Largo*



*Imhofs HFU/18 Jacobean*



*Musicraft Dorking*

etc. Lift-up lid. Overall size:  $19\frac{3}{4} \times 18\frac{1}{2} \times 29$  in. Motor board size:  $18\frac{1}{2} \times 16\frac{1}{2}$  in. Moves on castors. Price (walnut, mahogany or teak): £19 19s.

**Lowflex.** Lowline cabinet in walnut, mahogany or teak. Takes gram unit, tape deck, tuner, amplifier, etc. Lift-up lids, one with pneumatic stay. Overall size:  $59 \times 21 \times 14$  in. (plus 9 in. for legs). Record storage on left. Partition removable if not required. Price (walnut, mahogany or teak): £36 15s.

**Schubert.** Upright cabinet in walnut, mahogany or teak. Takes gram unit, tape deck or complete recorder, tuner, amplifier and record storage. Lift-up lids, fold-back doors, righthand compartment for storage. Overall size:  $42 \times 21 \times 25$  in. (plus 6 in. for legs). Price (walnut, mahogany or teak): £44 2s.

**Hi-Flex Equipment Unit.** Lowline equipment with optional legs. One lift-up lid. Accommodation for gram unit (or tape deck), amplifier and tuner. May be used with legs as free-standing cabinet or combined with others to form matching system. Finish: teak, walnut or mahogany. Price: (without legs) £17 17s.; (with legs) £18 18s.

**Scan Equipment Cabinet.** For use as shelf unit or with optional legs. One lift-up lid. Accommodation for gram unit (or tape deck), tuner and amplifier. Size:  $19\frac{3}{4}$  in. wide,  $16\frac{1}{2}$  in. deep, 15 in. high. Finish: teak, walnut or mahogany. Price: (without legs) £9 9s.; (with legs) £10 10s.

**Lowline Two.** Lowline equipment cabinet. Single lift-up lid controlled by pneumatic stay. Accommodation for (1): gram unit, tuner, amplifier and records, or (2): complete tape recorder, gram unit, tuner, amplifier. Space for complete Ferrograph recorder or turntable unit with SME 12 in. arm. Size: 42 in. wide, 21 in. deep, 15 in. high (plus 6 in. legs). Finish: teak, walnut. Price: £26 5s.

**Britten.** Upright style equipment cabinet with record storage. One lift-up lid. Accommodation for gram unit (or tape deck), tuner and amplifier plus 150 records. Size: 20 in. wide,  $19\frac{1}{2}$  in. deep, 36 in. high. Finish: teak, walnut or mahogany. Price: £26 5s.

**Playview.** Shelf unit to accommodate gram turntable. Patented hinge or lift-off lid. Size: 19 in. wide, 19 in. deep, 8 in. high. Price: £9 9s.

**Andante.** Long lowline equipment cabinet comprising three sections. Lift-up lids to right-

and lefthand sections, drop front to centre section. Accommodation for turntable and pick-up, including 12 in. SME arm; largest tape recorders, e.g. Ferrograph or Revox with 10 in. spools; tuner, amplifier and control unit. Size: 63 in. wide, 21 in. deep, 14 in. high (plus 11 in. legs). Finish: teak. Adjustable glides to legs provide firm level standing even on irregular floors. Price: £38 17s.

**Caprice.** Equipment cabinet, record storage and trolley. Equipment cabinet may be shelf-mounted. Particularly suitable for transistorised equipment. Two lift-up lids, one tinted perspex which can be lifted right off when desired. Accommodation for gram unit, tuner and amplifier. Size: (equipment cabinet) 38 in. wide, 17 in. deep, 12 in. high. Record unit: clean-lined cabinet with drop-front and accommodation for 175-225 12 in. records. Size: 26 in. wide, 17 in. deep,  $16\frac{3}{4}$  in. high. Trolley: modern style piece of furniture with easy-run castors. Size: 65 in. long, 17 in. deep, 18 in. high. Finish: (all units) teak, walnut or mahogany. Price: (cabinet) £16 16s.; (record storage) £10 18s.; (trolley) £11 11s.

**Fanfare.** Similar to the Caprice equipment cabinet but fitted with 12 in. screw-in legs. Price: £17 17s.

**Maestro.** Equipment cabinet comprising three sections. Lift-up lid to centre portion, front opening doors to left- and righthand sections. Lefthand section accommodates 100 records, righthand section takes tuner and amplifier, etc., centre compartment is for turntable or tape deck. Space for 8 in. forward-facing speaker below turntable compartment. Size: 54 in. wide,  $18\frac{1}{2}$  in. deep,  $27\frac{3}{4}$  in. high (including 11 in. integral legs). Finish: teak, walnut or mahogany. Price: £36 15s.



**ROGERS DEVELOPMENTS (ELECTRONICS) LTD.,** 4/14 Barmeston Road, Catford, London, S.E.6. Tel: 698-7424/4340. Cables: Rodevco, London, S.E.6.

**Lowline.** Lowline cabinet in teak or dark Australian walnut. Takes gram unit, tuner, control unit and main amplifier. Lift-up lid. Designed especially for Rogers Cadet III or HG88 III. Square section black steel legs optional extra. Overall size:  $36\frac{1}{4} \times 17\frac{1}{4} \times 8\frac{3}{4}$  in. Price: (cabinet) £14 6s. (U.K. purchase tax £1 1s. 6d.); (legs) £1 10s. (U.K. purchase tax 2s. 3d.).

**STAPLES & CO. LTD.**, Staples Corner, Junction Edgware Road and North Circular Road, London, N.W.2. Tel: Gladstone 1144/7.

**Ladderax.** Unit system hi-fi cabinet designed to fit Staples Ladderax assembly. Lift-up main lid giving access to space for tuner, control unit and record or tape deck. Front panel removable to facilitate installation. Will accept most modern equipment. Size: 35 in. wide, 17 in. deep, 18 $\frac{3}{4}$  in. high. Motor board: 33 $\frac{3}{4}$  × 16 ×  $\frac{1}{2}$  in., height above 5 $\frac{3}{4}$  in. Finish: teak veneered only. Full details of other matching units on request. Price: £23 19s. 6d.



**TYSONS**, 41 Russell Street, Leamington Spa. Tel: Leamington Spa 24935.

**Tysonic Dower Chest.** Lowline style in oak. Suitable for gram unit, tape deck, tuner, ampli-

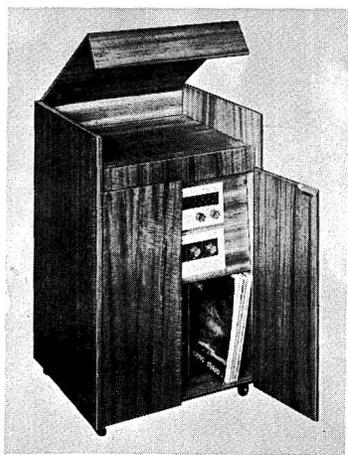
fier. Lift-up lid. Generally 36 in. to 48 in. long. Prices: £35 to £50.

Equipment installed in antique or reproduction furniture to customers' requirements. Dower chests, a speciality.

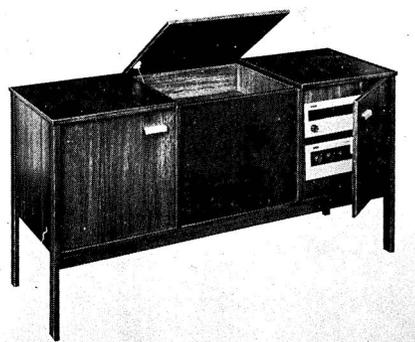


**WHITELEY ELECTRICAL RADIO CO. LTD.**, Victoria Street, Mansfield, Nottinghamshire. Tel: Mansfield 1762-5. Cables: Whitebon, Mansfield.

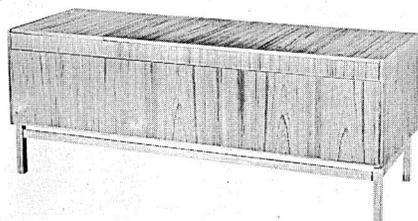
**C16 Thoresby Equipment Console.** Upright style equipment cabinet with lift-up lid. Takes most makes of gram unit or tape deck, amplifier, control unit and tuner. Available in mahogany or walnut. Supplied packed flat and easily assembled in a few minutes with a screwdriver only. Size: 19 $\frac{3}{8}$  × 18 × 31 in. Price: (mahogany) £18 3s. (U.K. purchase tax £1 8s. 9d.); (walnut) £18 15s. (U.K. purchase tax £1 9s. 10d.).



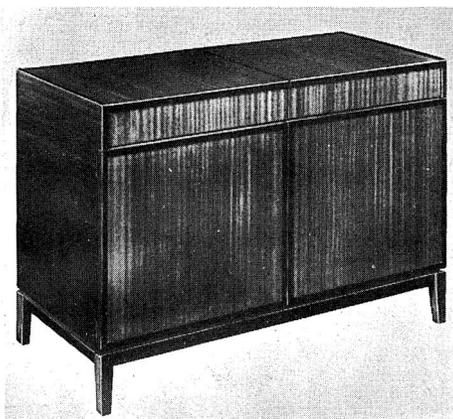
*Record Housing Britten*



*Record Housing Maestro*



*Howland-West Trondheim II*



*Record Housing Schubert*

# COMPLETE-SYSTEM HI-FI

Important development since the publication of the last edition of the Hi-Fi Year Book has been the sharp increase in the number of firms offering "complete-system hi-fi".

This section of the book gives a selection of such equipment with abbreviated technical details. As many of the units are available also as separate items more comprehensive specifications will be found under the appropriate headings.

The list is not necessarily fully comprehensive and other makers who offer equipment which meets the requirements are invited to submit details for inclusion in future editions.

The minimum requirements qualifying a system for mention in this section are:—

1. Sound quality of hi-fi standard.
2. Fully stereophonic record reproduction and/or tape playback.
3. FM or AM/FM radio tuner.
4. Record turntable or tape deck (or both).
5. Matched units (electronically and aesthetically).
6. Marketed as a complete system by one manufacturer.
7. Ready for use by purchaser without fitting parts or wiring up (apart from plugging in mains supply and connecting speakers).
8. Speakers in separate acoustic enclosures. Make and type of speakers can be optional but must be recommended.

In the abridged specifications of these directory entries the following abbreviations have been used: **Mc/s**=Megacycles; **AFC**=Automatic frequency control; **Ind**=tuning indicator; **Mpx**=multiplex decoder; **W**=Watts (RMS); **FR**=frequency response; **HD**=harmonic distortion.

**BRAUN.** Fi-Cord Ltd., Charlwoods Road, East Grinstead, Sussex. Tel: East Grinstead 21351.

**Braun Audio 2 and TC20.** System comprises neat shelf-mounting cabinet containing record deck and tuner/amplifier. Designed for use with any Braun speaker enclosures.

**System TC20.** All-transistor tuner/amplifier covering VHF, LW and MW. Output: 4.5W per channel. Stereo decoder available. Three-speed PS2 record deck. Adjustable playing weight. Price: £121 16s. 2d. (including U.K. purchase tax).

**System Audio 2.** All-transistor tuner/amplifier covering VHF, LW, MW and SW. Output: 12W per channel. HD < 1%. Stereo decoder and indicator incorporated. P400 record deck with Shure M44-7 cartridge. Fine speed control. Cueing device. Price: £199 3s. 4d. (including U.K. purchase tax).

**Recommended speakers.** Braun L25, L40, L60/4, L250, L450, L700, L800, L900, L1000.



**DUAL.** Dual Electronics Ltd., Radnor House, London Road, Norbury, London, S.W.16. Tel: Pollards 9465/6.

**DUAL HS-31.** System comprises radio tuner, amplifier, tape unit and record deck in cabinet. Designed for use with Dual speaker enclosures. All-transistor. AM/FM tuner covering VHF, LW, MW, SW and 49m band. Variable tuning. AFC. Meter tuning indicator. Stereo decoder fitted. Output: 8W RMS per channel. Dual 1009SK and 1015 record equipment. Shure pickup cartridge. Dual TG-27-CV tape unit. Cabinets finished in teak, rosewood or walnut. Price of complete system. From £154 7s. (£216 6s. with tape unit).



**DYNATRON.** Dynatron Radio Ltd., St Peter's Road, Furze Platt, Maidenhead, Berks. Tel: Maidenhead 23331.

**DYNATRON AUDIO SEPARATES.** System consists of tuner/amplifier, record deck, tape deck and choice of speakers and cabinets.

**Tuner/amplifier SRX-24.** AM/FM stereo tuner covering VHF, MW, LW. Variable tuning. AM and FM tuning meter. Multiplex decoder fitted. Output: 10W RMS per channel. Output impedance: 3-15 ohms. FR 30 c/s-24 Kc/s. HD less than 1% at rated output. 30 transistors and 17 diodes. Stereo indicator. AFC.

**Record player P80.** Garrard LAB80 Mk II record deck available in separate shelf-mounting case or in cabinet with tuner/amplifier. Two-



*Dynatron HFC3 and ST16 stand*



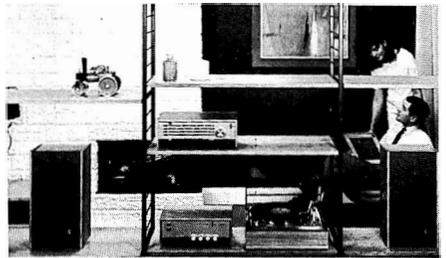
*Ferguson Unit Audio System*



*Grundig Studio 80*



*Ferguson Unit Audio System*



*Philips Audio Plan units*



*Wharfedale Selby speakers with Linton*



*Wharfedale Howard System*

speed unit (33 $\frac{1}{3}$  and 45 rpm) with manual and auto-change facility. Picking stereo cartridge with diamond stylus.

**Tape unit STR.1.**  $\frac{1}{4}$ -track stereo mains recorder. Speeds: 7 $\frac{1}{2}$ , 3 $\frac{3}{4}$ , 1 $\frac{7}{8}$  i/s. Max spool 7 in. Two level meters. Built-in monitoring speaker. Tape position indicator. Pause. Input mixing. 16 transistors and 4 diodes. Price: £82 19s.

**Speaker LS.100.** Wall or shelf-mounting. 6 $\frac{1}{2}$  in. bass driver and 3 $\frac{3}{8}$  in. tweeter. FR 20 c/s-40 Kc/s. Impedance: 3 ohms. Size: 13 $\frac{3}{4}$  × 7 $\frac{1}{2}$  × 10 $\frac{1}{4}$  in. Price: £12 15s. 6d. (including U.K. purchase tax).

**Speaker LS.200.** Floor-standing reflex enclosure incorporating 8 in. bass driver and 3 $\frac{1}{2}$  in. tweeter. FR 20 c/s-40 Kc/s. Impedance: 3 ohms. Size: 26 $\frac{3}{4}$  × 10 $\frac{1}{4}$  × 10 $\frac{1}{2}$  in. Price: £19 3s. 3d. (including purchase tax).

**Price of complete system.** From £112 10s. approximately.



**FERGUSON.** British Radio Corporation Ltd., 284 Southbury Road, Enfield, Middlesex. Tel: Howard 2477.

**FERGUSON UNIT AUDIO.** System offers choice of FM or AM/FM tuner/amplifier, record unit and/or tape unit, bookshelf or floor-standing speaker enclosures. All units in Queensland walnut.

**Tuner/amplifier 206STA.** FM/VHF tuner with five preset tuning buttons. Incorporates stereo decoder and stereo indicator. 27 transistors and 12 diodes. Output: 7W per channel. FR 30 c/s-20 Kc/s. Output impedance: 8 ohms. HD < 1%. Price: £48 19s. 5d. (including U.K. purchase tax).

**Tuner/amplifier 205STA.** AM/FM tuner amplifier covering VHF, LW, MW and SW. Incorporates stereo decoder and stereo indicator. 26 transistors and 16 diodes. Output: 7W per channel. FR 30 c/s-20 Kc/s. Output impedance: 8 ohms. HD < 1%. Price: £53 4s. 6d. (including U.K. purchase tax).

**Playing deck 202RP.** Shelf-mounting cabinet with Perspex lid and incorporating Garrard SP25 deck with Sonotone 9TA ceramic cartridge. Diamond LP and sapphire 78 styli. Price: £28 14s. 10d. (including U.K. purchase tax).

**Tape unit 3216.**  $\frac{1}{4}$ -track recorder in matching furniture style cabinet. Speeds: 7 $\frac{1}{2}$ , 3 $\frac{3}{4}$ , 1 $\frac{7}{8}$  i/s.

Max spool 7 in. Piano key operation. Pause. Meter indicator. Auto-stop. Input mixing. Price: £51 19s.

**Speaker 204SS.** Compact shelf-mounting enclosure. 6 $\frac{1}{2}$  in. bass driver and 3 $\frac{1}{2}$  in. tweeter. FR 30 c/s-15 Kc/s. Crossover: 3 Kc/s. Size: 16 $\frac{3}{4}$  × 7 $\frac{1}{2}$  × 8 $\frac{1}{2}$  in. (can be used vertically or horizontally). Price: £12 15s. 6d. (including U.K. purchase tax).

**Speaker 203SL.** Floor-standing enclosure incorporating 13 × 8 in. bass driver and 3 $\frac{1}{2}$  in. tweeter. FR 30 c/s-15 Kc/s. Crossover: 3 Kc/s. Size: 15 $\frac{1}{2}$  × 11 $\frac{1}{4}$  × 25 $\frac{1}{8}$  in. Price: £19 8s. 6d.

**Price of complete system.** From £105 5s. 3d. to £172 5s. 4d.



**GOODMANS.** Goodmans Loudspeakers Ltd., Axiom Works, Wembley, Middlesex. Tel: 01-902-1200.

**GOODMANS AUDIO SUITE.** System comprises AM/FM tuner, record unit, stereo integrated amplifier and choice of three Goodmans speakers.

**Stereomax tuner.** All-silicon transistor AM/FM tuner covering VHF and MW. Separate tuning systems for AM and FM. Stereo decoder available. AFC switchable and operative on both bands. 18 transistors and 18 diodes. Tuning meter. Quiet tuning. Automatic stereo indicator. Price: £60 (U.K. purchase tax £11 18s. 3d.).

**Maxamp 30 amplifier.** All-silicon transistor stereo amplifier. Output: 15W RMS per channel. HD < 0.3% at 15W. FR 20 c/s-20 Kc/s ± $\frac{1}{2}$  dB. Output impedance: 4-8-15 ohms. Price: £49 10s.

**Record unit MT1000.** Teak cabinet with lift-up lid incorporating inspection window. Thorens TD150A two-speed turntable and Shure M75-MB cartridge. Pickup lowering device. Mono and stereo diamond stylus. FR 20 c/s-20 Kc/s. Price: £49 2s. (U.K. purchase tax £8 13s. 3d.).

**Recommended speakers.** Goodmans Maxim, Mezzo II or Magnum K.

**Price of complete system.** From £214 14s. 8d. to £252 13s. 6d.



**GRUNDIG.** Grundig (Great Britain) Ltd., Newlands Park, Sydenham, London, S.E.26. Tel: Sydenham 2211.

**GRUNDIG STUDIO 40M and STUDIO 80.** System comprises radio tuner, amplifier and record deck in neat cabinet on metal stand. Designed for use with Grundig speaker enclosures.

**Studio 40M.** RT40 tuner covering VHF, MW, LW and two SW bands. Stereo decoder with indicator. Duplex FM and AM tuning. Tuning meter. Switched AFC. 27 transistors and 19 diodes. Variable selectivity. SV40 amplifier. Output: 15W RMS per channel. Output impedance: 4-16 ohms. 25 transistors and 13 diodes. Dual 1019 four-speed record deck. Fine speed control. Shure M44MG cartridge with diamond stylus. Teak cabinet. Size:  $32 \times 14\frac{5}{8} \times 13$  in. Price: £245 7s. 6d. (including U.K. purchase tax). Walnut finish £239 19s. 6d. (including U.K. purchase tax).

**Studio 80.** Contains the same tuner unit and record deck as the Studio 40M but has higher power amplifier. SV80 amplifier. Output: 30W RMS per channel. Output impedance: 4-16 ohms. 29 transistors and 15 diodes. Teak cabinet. Wooden or black metal legs. Size:  $35 \times 17\frac{1}{2} \times 24\frac{1}{2}$  in. Price: £327 17s. 3d. (including U.K. purchase tax). Walnut finish £321. 8s. 6d. (including U.K. purchase tax).

**Recommended speakers:** Box 4, Box 5A, Box 8, Box 25, Box 30A, Box 40A, Box 80.



**MUSICRAFT.** Musicraft hi-fi, 63 High Street, Hounslow, Middlesex. Tel: Hounslow 4640.

**Musicraft 10.10.** All transistor. Waveband: VHF 88-108 Mc/s. Variable tuning. Controls: tuning, bass, treble, volume, balance, selector and on/off. Output: 10W per channel. FR 40 c/s-18 Kc/s. Record unit: Garrard SP25. Pick-up cartridge: Shure M3D with diamond stylus. Size: 27 in. wide,  $17\frac{3}{4}$  in. deep,  $24\frac{3}{4}$  in. high. Finish: oiled teak.

**Recommended speakers:** Radford BCS3 or Celestion Ditton.

**Complete system.** With Celestion Ditton speakers: £140 14s.; (with Radford BCS3 speakers) £156 9s.



**PHILIPS.** Philips Electrical Ltd., Century House, Shaftesbury Avenue, London, W.C.2. Tel: 01-437-7777. Cables: Phillamps, London.

**PHILIPS AUDIO PLAN.** System offers choice of three tuners, one tuner/amplifier, three stereo amplifiers, three record players and four speaker enclosures.

**Tuner GH.926.** Mono VHF tuner with variable tuning and three preset stations. Switchable AFC. Transistors. Price: £24 10s.

**Tuner GH.927.** Stereo FM tuner with variable tuning. Stereo decoder incorporated. Switchable AFC. Transistors. Price: £37 5s. 8d.

**Tuner GH.924.** Stereo AM/FM tuner covering VHF, LW, MW and SW. Variable tuning. Stereo decoder incorporated. Tuning indicator. AFC on FM. Quiet tuning. Automatic stereo indicator. Price: £62 16s. 11d. (including U.K. purchase tax).

**Tuner/amplifier GH.930.** Stereo tuner/amplifier with specification identical to GH.924 tuner and GH.923 amplifier. Price: £99 1s. 2d.

**Amplifier GH.925.** Output: 4W RMS per channel. Output impedance: 4-8 ohms. FR 40 c/s-20 Kc/s. HD <10%. 14 Transistors and diodes. Price: £23 2s.

**Amplifier GH.923.** Output: 7W RMS per channel. Output impedance: 4-8 ohms. FR 35 c/s-20 Kc/s. HD <0.8%. 10 Transistors and diodes. Price: £39 18s.

**Amplifier GH.919.** Output: 20W RMS per channel. Output impedance: 4-8 ohms. FR 25 c/s-20 Kc/s. HD <0.25%. 22 transistors and diodes. Price: £59 17s.

**Record player GA.230.** Philips GC.030 record deck in shelf-mounting case with Perspex lid. Four speed. Plug-in magneto-dynamic stereo and LP head. 78 head available. Single player. Price: £52 3s. 10d.

**Record player GA.145.** Philips GC.045 four-speed auto-change record deck on plinth. Stereo crystal head. Price: £24 10s. (including U.K. purchase tax).

**Record player GA.228.** Philips GC.028 four-speed single player deck on plinth with clear plastic lid. Stereo crystal head. Price: £17 11s. 6d. (including U.K. purchase tax).

**Speaker enclosure GL.564.** Compact shelf-mounting enclosure. One 5 in. unit. FR 90 c/s-20 Kc/s. HC 6W. Impedance: 8 ohms. Size:  $10\frac{1}{2} \times 7\frac{1}{2} \times 7\frac{1}{2}$  in. Price: £10 13s. 1d. (including U.K. purchase tax).

**Speaker enclosure GL.564.** Shelf- or floor-mounting enclosure. One 7 in. bass driver and one 4 in. tweeter. FR 60 c/s-20 Kc/s. HC 15W. Impedance: 8 ohms. Size:  $17\frac{3}{4} \times 9\frac{7}{8} \times 7\frac{1}{2}$  in. Price: £20 15s. 5d. (including U.K. purchase tax).

**Speaker enclosure GL.561.** Floor-standing enclosure. One  $8\frac{1}{2}$  dual-cone unit. FR 70 c/s-17 Kc/s. HC 15W. Impedance: 7 ohms. Size:  $23\frac{5}{8} \times 11\frac{3}{4} \times 8\frac{5}{8}$  in. Price: £22 7s. 5d. (including U.K. purchase tax).

**Speaker enclosure GL.562.** Floor standing enclosure. One 12 in. dual-cone bass driver and two  $7 \times 5$  in. HF units. FR 40 c/s-20 Kc/s. HC 20W. Impedance: 8 ohms. Size:  $26 \times 14\frac{1}{2} \times 11\frac{3}{8}$  in. Price: £39 18s.

**Price of complete system.** From £62 9s. 6d. to £253 1s.



**TRUVOX LTD.,** The Hythe, Southampton. Hants. Tel: Hythe 3265 (0421-24-3265).

**TRUVOX SERIES 100.** System comprises radio tuner, integrated stereo amplifier, stereo tape unit and two enclosures.

**Radio tuner FM100.** FM/VHF tuner with variable tuning. Decoder available. Switched AFC. Price: £33 12s. (including U.K. purchase tax).

**Amplifier TSA100.** Output: 10-18W RMS per channel. Impedance: 4-15 ohms. FR 20 c/s-20 Kc/s. HD <0.25%. Price: £51 9s.

**Tape unit PD102.**  $\frac{1}{2}$ -track ( $\frac{1}{4}$ -track available). Speeds:  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ ,  $1\frac{7}{8}$  i/s. Max spool 7 in. Piano key operation. Auto-stop. Cue control. VU meters. Price: £97 13s.

**Speaker LS100.** Reflex enclosure with 12 in. bass driver and Celestion HF unit. Can be used vertically or horizontally. FR 40 c/s-15 Kc/s. Crossover: 4 Kc/s. Size:  $27\frac{1}{4} \times 18 \times 7\frac{1}{2}$  in. Price: £26 5s.

**Price of complete system.** Approximately £208 19s. (mono), £235 4s. (stereo).



**WHARFEDALE.** Rank Wharfedale Ltd., Idle. Bradford, Yorks. Tel: Bradford 612552/3.

**WHARFEDALE SYSTEM 20.** System comprises stereo tuner, stereo amplifier, turntable and speakers. Tuner, amplifier and player available in separate shelf-mounting cases or in choice of two different cabinets. Standard finish teak, other veneers offered to special order.

**Tuner WFM-1.** Stereo tuner covering VHF 87.5-108 Mc/s. Variable tuning. Stereo indicator. Tuning meter. Quiet tuning. All-transistor. Flywheel tuning. Price: £65 (including U.K. purchase tax).

**Amplifier WHF-20.** Output: 20W RMS per channel. Output impedance: 8 ohms. FR 10 c/s-60 Kc/s. HD <0.2%. Silicon transistors. Price: £85.

**Record player WTT-2.** Shelf-mounting cabinet with lid, incorporating Garrard LAB80 record deck and Shure M75-6 cartridge. Transcription manual player with auto-change facility. Fingertip tab controls. Bias and stylus pressure adjustments. Price: £54 (including U.K. purchase tax).

**Record player WTT-1.** Shelf-mounting cabinet with lid, incorporating Thorens TD124 transcription turntable and Shure M75-E cartridge. Four-speed with fine control. Pickup raising and lowering control. Illuminated stroboscope. Level indicator. Price: £94 2s. (including U.K. purchase tax).

**Wharfedale Selby.** Contemporary low-boy table style cabinet supplied complete with WFM-1 tuner, WHF-20 amplifier and choice of Garrard or Thorens turntables. Price: (with Garrard LAB80) £290 (including U.K. purchase tax); (with Thorens TD124) £320 (including U.K. purchase tax).

**Wharfedale Howard.** Modern-style cabinet with lift-up lid and pull-out front, supplied complete with tuner, amplifier and Thorens turntable. Price: £320 (including U.K. purchase tax).

**Recommended speakers.** Wharfedale Linton, Dovedale or Teesdale.

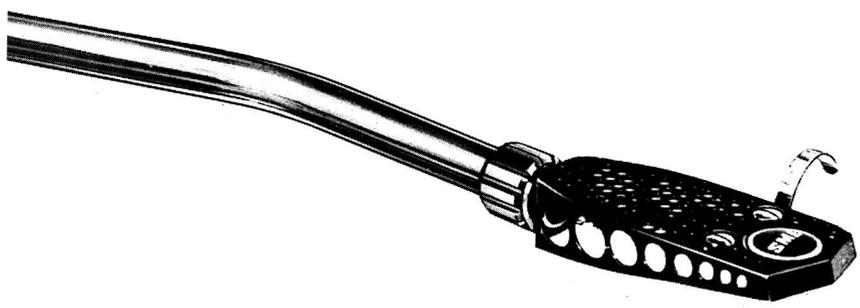
**Price of complete system.** From £241 5s. to £435.

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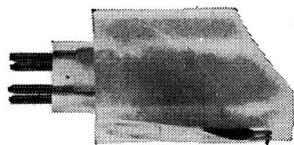
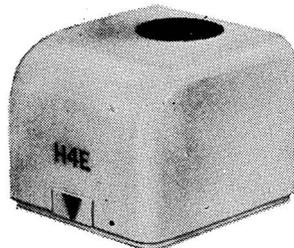
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 BERRY'S RADIO LTD, 25 High Holborn, W.C.1  
 BOWMAN BROS. LTD, Camden High Street, N.W.1  
 CHELSEA RECORD CENTRE, 203 King's Road, S.W.3  
 CUSTOM HIGH FIDELITY, 371 Green Lanes, Palmers Green, N.13  
 DAVENSETT RADIO, 2 Burnt Ash Parade, Lee Green, S.E.12  
 DAVIS & KAYS LTD, 115 Kingsway, London, W.C.2; 5 Turnpike Parade, London, N.15; 857 High Road, Finchley, London, N.12; 4 High Street, Walthamstow, London, E.17; 152, Rye Lane, Peckham, London, S.E.15; 21 London Road, Barking, Essex  
 H. NORMAN DAVIS LTD, 91 The Broadway, Mill Hill, N.W.7  
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 FRANCIS OF STREATHAM, 169-173 Streatham High Road, S.W.16  
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 HAMPTONS OF KENSINGTON, 7 Kensington High Street, W.8  
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 ALFRED IMHOF, 112-116 New Oxford Street, W.C.1  
 LARGES OF HOLBORN, 76-77 High Holborn, W.C.1  
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 LEE ELECTRONICS, 400 Edgware Road, W.2  
 LEWIS RADIO, 100 Chaseside, Southgate, N.14  
 MAC'S CAMERA SHOPS LTD, 250-252 King Street, Hammer-smith, W.6  
 MASSEYS CENTRE OF SOUND, 121-123 High Road, W.4  
 MODERN ELECTRICS LTD, 120 Shaftesbury Avenue, W.1  
 V. J. MONK LTD, 140-141 Plumstead Road, S.E.18  
 NATIONAL RADIO SERVICE & TELEVISION CO, 82 St. John's Wood High Street, N.W.8  
 NEWBURY RADIO (FOREST GATE) LTD, 272 and 305 Romford Road, Forest Gate, E.7  
 NORTHERN RADIO SERVICES, 16 Kings College Road, N.W.3  
 NUSOUND, 93 Mortimer Street, W.1; 242-244 Pentonville Road, N.1; 228 Bishopsgate, E.C.2; 36 Lewisham High Street, S.E.13; 2 Maryland Station, E.15; 205 High Street North, E.6; 82 High Holborn, W.C.1  
 THE PARKFIELD STUDIO, 20 Parkfield Road, New Cross, S.E.14  
 THE RECORDER CO, 188 West End Lane, West Hampstead, N.W.6  
 RECORD RETAILERS LTD, Music Man Record Centre, 487a Oxford Street, W.1  
 R. E. W. EARLSFIELD, 266 Upper Tooting Road, S.W.17  
 R. S. C. (MANCHESTER) LTD, 238 Edgware Road, W.2  
 R.T.M. (RADIO & TELEVISION) SERVICE LTD, 387b Mare Street, E.8  
 SANDS HUNTER, 45 Hare Street, Woolwich, S.E.18  
 SHEEN TAPE RECORDER CENTRE, 3 and 4 Station Parade, Sheen Lane, S.W.14  
 H. L. SMITH & CO LTD, 287-289 Edgware Road, W.2  
 SOUND ELECTRIC CONSULTANTS, 19a Harpenden Road, Wanstead Park, E.12

STERN-CLYNE LTD, 9 Camberwell Church Street, S.E.5; 309 Edgware Road, W.2; 109 Fleet Street, E.C.4; 18 and 23 Tottenham Court Road, W.1  
 STUDIO 99, 57 Fairfax Road, Swiss Cottage, N.W.6  
 STUDIO TAPES LTD, 199 Hoe Street, E.17; 248 Fore Street, N.18  
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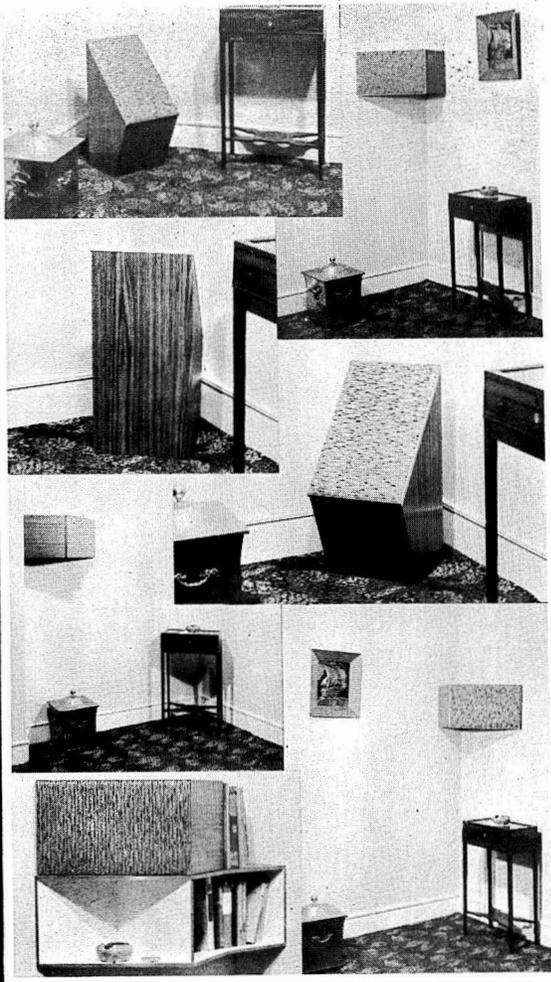
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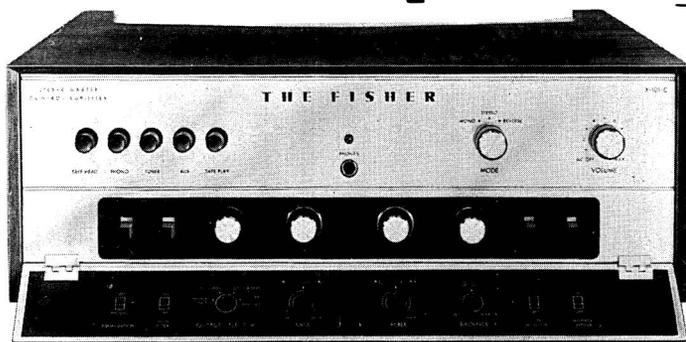
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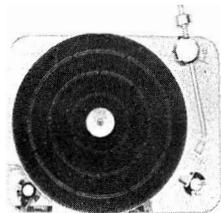
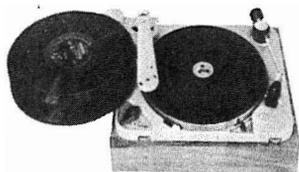
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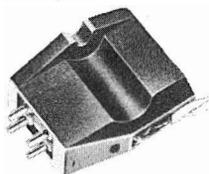
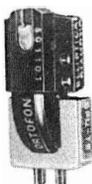
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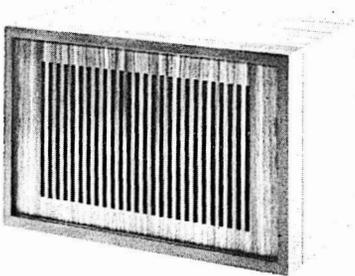
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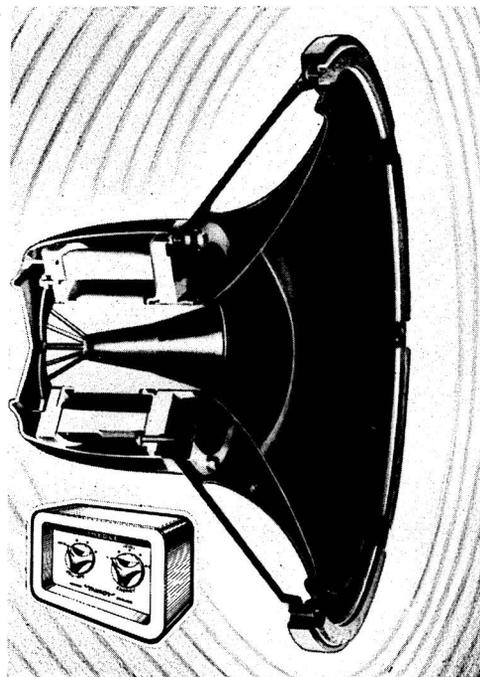
12" 30 watts

III LZ 15 watts

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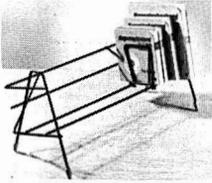
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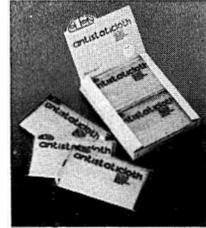
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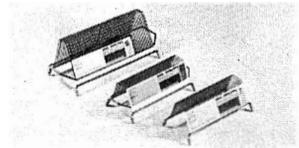
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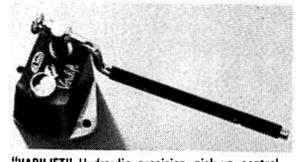
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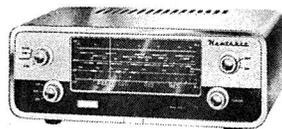
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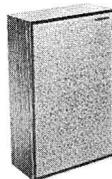
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\* Delivers 40 watts

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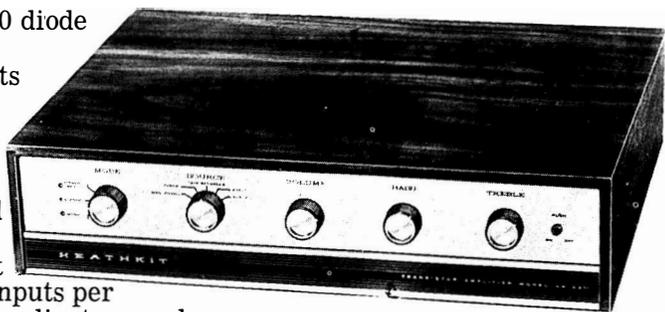
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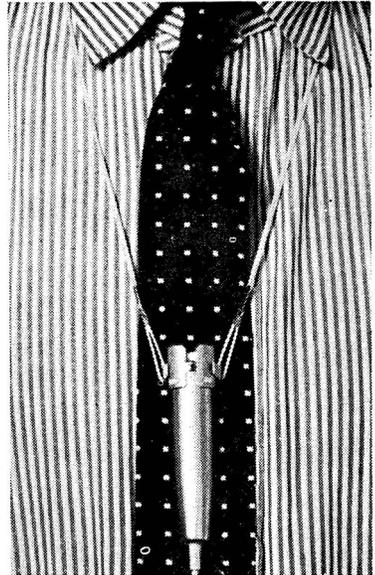
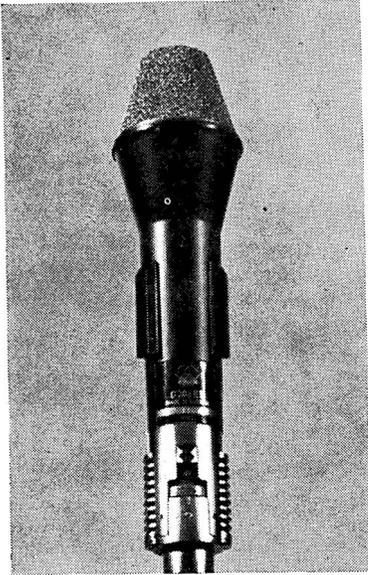
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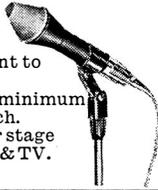
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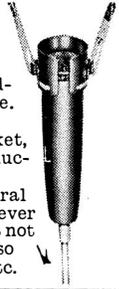
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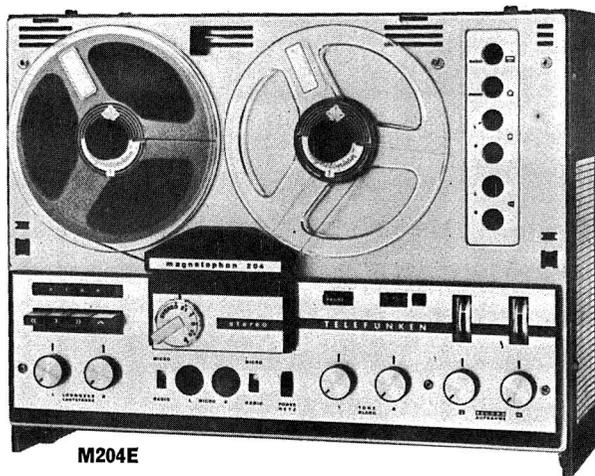
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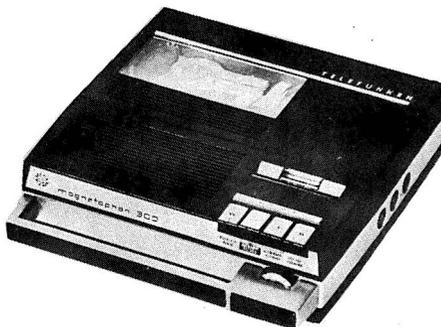
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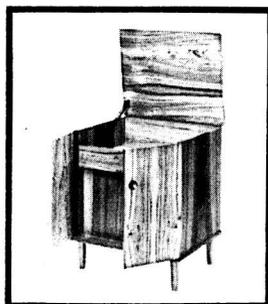
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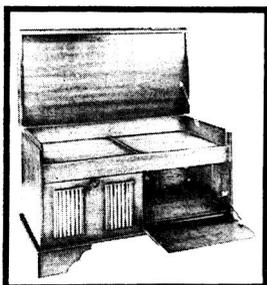
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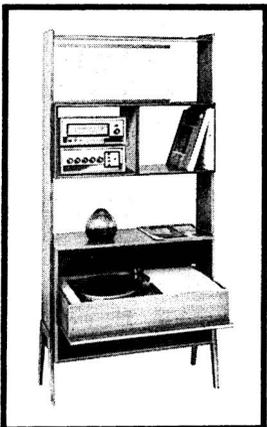
HFU/12 Regency £79.16.0



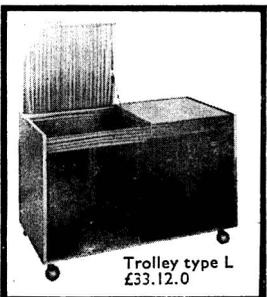
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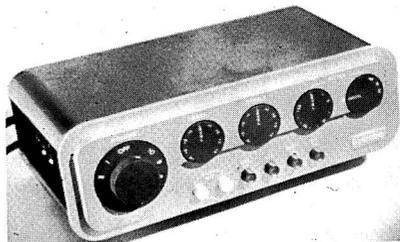
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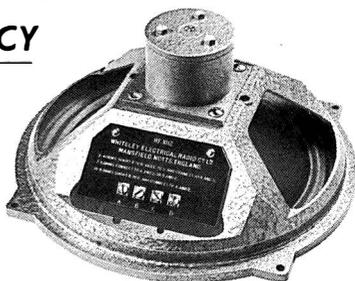
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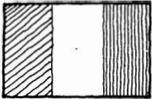
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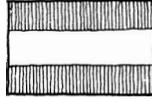


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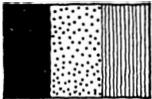
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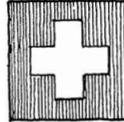
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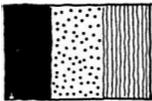
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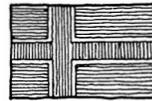
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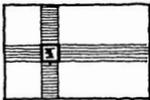
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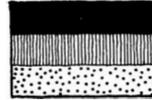
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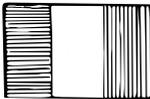
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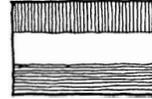
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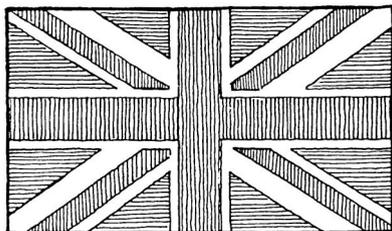


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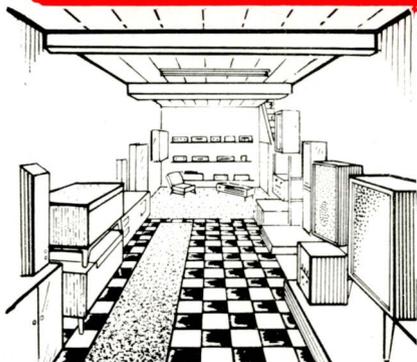


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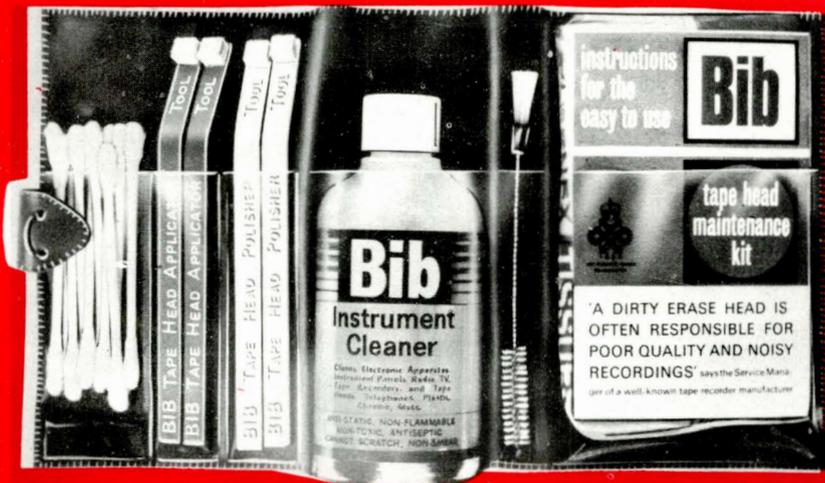
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Everything to help keep your tape recorder and hi-fi equipment reproducing that 'new' sound. 10 Applicator and Polisher Sticks, 2 White Tape Head Polisher Tools, 2 Blue Tape Head Applicator Tools, 1 Bottle of Bib Instrument Cleaner, 1 Double-ended Brush, 1 Packet of Cleaning Tissues, and five page Instruction Leaflet, all in blue plastic wallet. 12/6 each. (Replacements available).

## and also use these useful accessories



### Bib Model 8 Wire Stripper & Cutter with 8 Gauge Selector

Strips insulation without nicking wire, cuts wire and splits plastic twin flex. 8/6 each.



### Bib Recording Tape Splicer

Precision-made chrome. Tape Splicer for quick and accurate editing. No editing clicks. Mends broken tapes neatly, saving tape wastages. Mounts direct on most tape decks. Complete with razor cutter. 18/6 each.



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21 ft. coil of 60/40 Alloy, 22 s.w.g. Ideal for transistors, diodes and small components. 3/- each. All prices shown are recommended retail.

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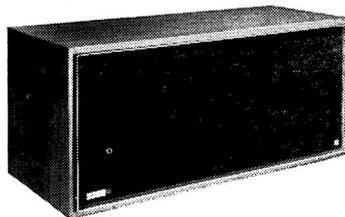
The 'Dittons' have extended the benefits of true high fidelity to the smaller home.



The 'Ditton 10' set a new standard for compact high fidelity loudspeaker systems.

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Size 12 $\frac{3}{4}$ " x 6 $\frac{3}{4}$ " x 8 $\frac{1}{2}$ "  
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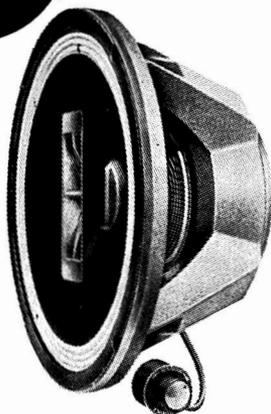
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*"... among my  
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(Clement Brown "Records and Recording"  
December 1966)

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12 inch co-axial loudspeaker  
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12 inch co-axial loudspeaker  
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Both these units feature:

- high flux ceramic magnets
- two voice coils
- pure electrical crossover
- high compliance surrounds

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*"... just about the 'flattest'  
tweeter in the business"*  
(B. J. Webb; "Hi-Fi News", Feb. '67)

Recommended price £5.10.0

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*to complete the perfectly  
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Air-tight crossover and terminal  
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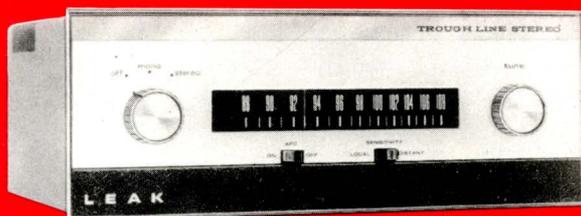
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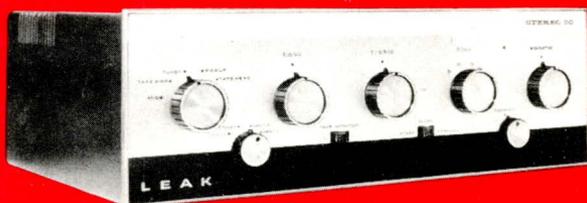
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*Above:* **Trough Line Stereo Tuner** £39.10.0. (plus P.T. £7.12.1.)



*Below:* **Stereo 30 Transistorised Integrated Amplifier** £49.10.0.

# Britain's best Hi-Fi Equipment



**"Mini-Sandwich"  
Loudspeaker (18½ × 11 × 7in.)**  
£27.10.0

The Trough Line Stereo is the Stereo version of the Trough Line Tuner which gained acceptance as Britain's best F.M. Tuner.

A breakthrough in price and reliability, the Stereo 30 Transistorised Integrated Amplifier is designed to give optimum results from records, tape, radio and microphone. With its superb styling and faultless performance the Stereo 30 has received enthusiastic acceptance throughout the world.

**LEAK**



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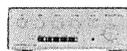
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## Garrard LAB 80 Mark II

The LAB 80 Mark II is a transcription turntable with record-changing facilities. Features include low-resonance wood pick-up arm, fine stylus-pressure adjustment, and cueing facilities on manual. Further refinements are new automatic play of single records, record repeat adaptor and bias compensator with half gram markings.

The unit is supplied less cartridge.

Available as optional extras—attractive teak finish base WB2; also rigid clear plastic cover SPC2.



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The SP25 is a single-play unit of outstanding quality designed to give exceptional performance at moderate cost. A special feature is the integral cueing device, which provides the facility for raising or lowering the pick-up at any point on the record. This cueing is coupled with the switch control which has three positions—Off, Play and Lift. On completion of a record, the pick-up arm automatically lifts and returns to its rest and the motor switches off.

The unit is supplied less cartridge.

Available as optional extras—attractive teak finish base WB1; also rigid clear plastic cover SPC1.



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*Now possibly the best showrooms in the world for choosing a good radiogram.*

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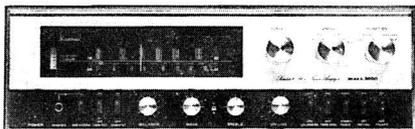
We make more than a dozen quality stereo receivers,  
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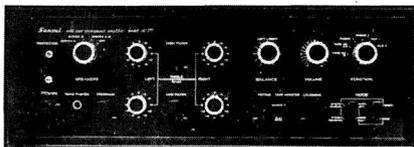
They're keeping us in a pretty sound business.



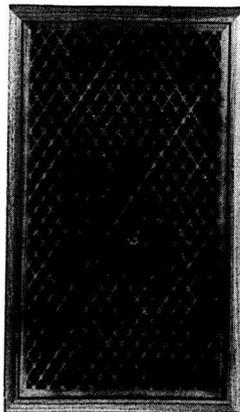
**Model 3000** Solid-State AM/FM Multiplex Stereo Tuner Amplifier. Total power output: 130 watts. RMS power: 48/48 watts Stereo RMS power: 45 watts  $\times$  2. Bandwidth: 20 to 20,000 Hz. Distortion: less than 0.8% at all levels.



**Model 400** Compact Solid-State AM/FM Multiplex Stereo Tuner Amplifier. Total power output: 60 watts (IHF). Continuous power: 25/25 watts (IHF). Bandwidth: 20 to 50,000 Hz. Distortion: less than 1% at rated output.



**Model AU-777** Solid-State Stereo Main Amplifier. Total power output: 70 watts. RMS power: 30/30 watts. Stereo RMS power: 25 watts  $\times$  2. Bandwidth: 20 to 50,000 Hz. Distortion: less than 0.5%.



**Stereo Speakers** Woofers designed to match pipe-ducted bass reflex type enclosures. Midranges designed with magnetic circuits. Tweeters feature horn-type speakers for a frequency response up to 20,000 Hz. Model SP-200: 40 watts. Model SP-300: 50 watts.

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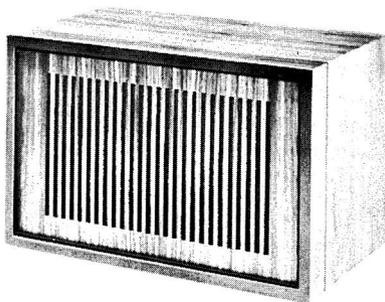
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**Sonotone Solent—unbeatable value. Compare the technical details... and the price—£18.**

Woofer: 6", 10,000 gauss, 1" pole  
Free air resonance: 50Hz  
Tweeter: 3 $\frac{3}{8}$ " acoustically loaded to match cabinet  
Frequency response: 40Hz to 20kHz  
Sensitivity: 94 db at 12W (microphone 6ft)  
Power handling: 12W programme level  
Impedance: 8 ohm system suits 8 or 15 ohm amplifiers  
Stylish veneered cabinet, 14" × 9" × 8 $\frac{1}{2}$ "



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## **Sonotone 9TAHC Stereo Ceramic Cartridge**

An extremely high compliance cartridge yet it offers twin styli. Low mass stylus blade is mounted in resilient rubber seat. Tracking weights as low as 1–3gm suit heavily modulated records.

Sensitivity: 55–85 mV/cm/sec at 45° and 1000Hz measured on Decca SXL2057.

Lateral compliance:  $8.5 \times 10^{-6}$  cm/dyne measured on CBS STR100 with SME arm.

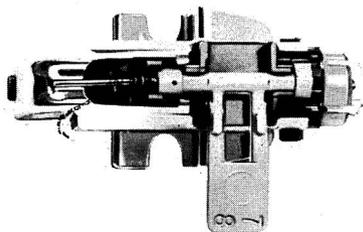
Average channel separation:

21db at 1000Hz

Channel to channel uniformity: better than 4db

Effective stylus mass: 2.5mgm

Sonotone produce cartridges for most



makes oī pick-up and are currently fitted to 92 British record players and radiograms.

## AM/FM multiplex stereo tuner-amplifier model 1000A 130 gns.

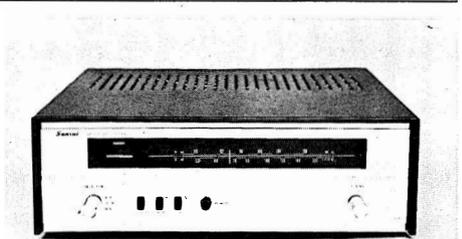
50 watts output per channel  
FM coverage from 88 to 108MHz  
AM coverage from 535 to 1605kHz  
Hi and low cut filters eliminate interference  
AFC eliminates drift  
Muting to reduce noise  
Direct tape connection  
Attractive 'diamond-cut' finish  
Bass, treble, loudness, low and high pass filters, presence, mode selection  
Direct tape monitor and head phone monitoring  
Dimensions:  $17\frac{7}{8}'' \times 5\frac{1}{2}'' \times 14\frac{1}{4}''$   
Weight: 44.7lb  
Nuvistor cascode input stage  
Harmonic distortion: 1% at 1000Hz (RMS) rated output



Frequency response: 20 to 20,000Hz  $\pm$  1db  
Output impedance: 8,16 ohms  
Input sensitivity: phono 0.5mV and 1.5mV  
tape 1.5mV  
mic 1.8mV  
aux 65mV and 100mV

## AM/FM multiplex tuner model TU-70 72 gns.

Special noise limiting circuits cut motor interference etc. Muting switch eliminates noise between programmes. AFC. 2 Nuvistor input stage. Built-in ferrite a.m. aerial.  
Tape connection, Silver tone finish.  
14 valves, 21 semi-conductors.  
FM coverage 88 to 108 MHz  
Bandwidth: 230kHz (-3db)  
Sensitivity: 1.1 $\mu$ V (S/N 30db at 100% mod at 75 ohms)  
Image rejection: above 52db  
Frequency response: 30 to 15000Hz  $\pm$  2db  
AM coverage 535 to 1605kHz  
Bandwidth: 7kHz (-3db)  
Sensitivity: 6 $\mu$ V (S/N 20db at 30% mod)



Output level: greater than 1.2V for 10 $\mu$ V input  
Built-in power supply.  
Dimensions: 12.6"  $\times$  5.59"  $\times$  15.95"  
Weight: 16.5lb

## Stereo headphones model SS-2 7 gns.

Specially developed cone ensures faithful reproduction of frequencies down to 20Hz.  
Lightweight, washable vinyl finish.  
Moving coil  
Impedance: 8 ohm  
Frequency response: 20 to 18000Hz  
Distortion: less than 1% at 1mW input  
Input power: 1mW  
Max rated power input: 500mW



Weight: 12.6 oz  
3 phase plug for different power inputs

UK Distributors: Sansui Products  
**Technical Ceramics Limited (Sonotone)**  
Cheney Manor Estate, Swindon, Wiltshire.  
Telephone: Swindon 6251

Accredited Northern Distributors to the retail trade **Audio Distributors Limited**  
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Telephone: Kidderminster 3293

UK Distributors: Sonotone Products  
**Metrosound Manufacturing Co., Ltd.**  
Bridge Works, Wallace Road, London, N.1.

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# Magneton Tape for sound value

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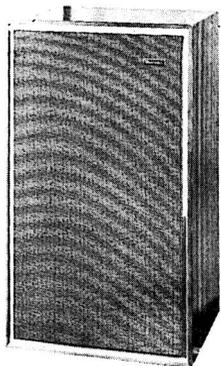
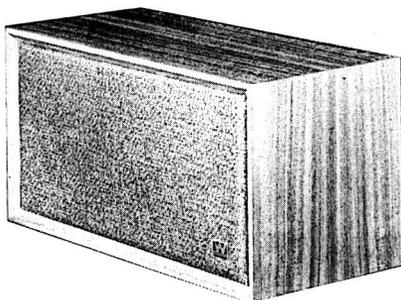
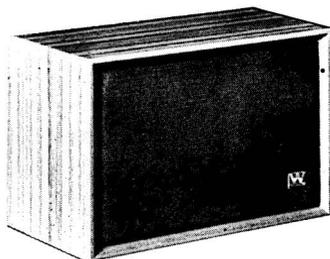


AGFA-GEVAERT

# WHARFEDALE

- equipment for quality music reproduction

cleaner, clearer treble, a full bodied bass and a wide range with perfect balance.



## DOVEDALE

This two-speaker system is extremely versatile. It can be mounted on floor, shelf or table either vertically or horizontally. Frequency range 25 Hz—17,000 Hz. Power handling capacity: 15 watts rms or 30 watts peak. Size: 24" x 14" x 12". Prices from £31.10.0.

## STEREO AMPLIFIER

The fully transistorised WHF20 puts 20 watts per channel into 8 ohm load with less than 0.2% total distortion. Power response -3 db at 10 Hz and 60 kHz. Tone control range  $\pm 15$  db at 40 Hz and  $\pm 14$  db at 10 kHz. Price: £75.0.0.

## THE NEW DENTON

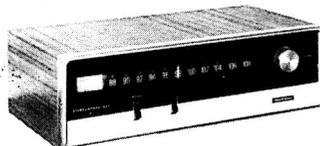
Compact cabinet measures only 14" x 9 $\frac{3}{4}$ " x 8 $\frac{3}{4}$ ", but gives you big performance. A new pressure unit and a new 8" bass gives a frequency range of 65 Hz—17,000 Hz. Power handling capacity: 15 watts. Price: 30 gns per matched pair.

## THE NEW SUPER LINTON

A completely re-designed and improved 'Super' system. Sensational new pressure unit and powerful bass give a frequency range of 50 Hz—17,000 Hz. Power handling capacity 15 watts. Size: 19" x 10" x 10". Price: £19.19.0.

## F.M. TUNER

WFM 1 transistorised stereo tuner has a range of 87.5—108 mHz. Suitable for either 300 ohm balanced or 75 ohm unbalanced aerial systems. Signal to noise ratio and sensitivity is extremely high.



The above are but a few of the comprehensive Wharfedale range of Hi-Fi systems and loudspeakers.



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**CRAFTSMAN III CHASSIS ONLY**

Variable 3-speed transcription turntable 33 $\frac{1}{3}$ , 45, 78 r.p.m.

Can also be supplied complete on plinth with perspex cover. Incorporating choice of either the SAU 1 or SAU 2 Arm, with lifting device, with or without cartridge fitted.



**CRAFTSMAN II COMPLETE ASSEMBLY**

Two-speed transcription turntable 33 $\frac{1}{3}$ , 45 r.p.m. Complete on plinth with perspex cover, SAU 1 Arm and SCU 1 cartridge.

Alternatively available with the SAU 2 Arm. All items are available separately.



**CLASSIC TURNTABLE ASSEMBLY**

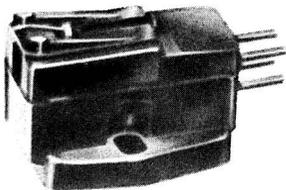
Two-speed turntable on plinth with lightweight pick-up arm and perspex dust cover.

Alternatively available with the SAU 1 or SAU 2 pick-up arm, with or without cartridge fitted. Turntable chassis unit available separately.



**SAU 2 PICK-UP ARM**

Complete with lifting device, head shell, set of leads with phono plugs fitted and precision stylus balance.



**SCU 1 STEREO CARTRIDGE**

With Diamond stylus .0005/6 in. Mono LP type also available with Diamond stylus .001 in. Mono standard 78 r.p.m. available with sapphire stylus .003 in.

*See classified section for specifications and prices. Free leaflets available on request.*

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**Phone: Brighouse 2142**

# AKAI X-300

WITH THE UNIQUE CROSSFIELD HEAD



**How does a 10½" reel playing at 3¾ ips giving 18,000 cps and 20 watts per channel, yet costing only 185 gns sound to you?**

The Akai X 300 is a 4 track stereo/mono studio-type tape recorder. It has 4 heads - erase, record, playback/monitor, and Crossfield; and 3 motors - one hysteresis synchronous direct drive capstan, two torque for fast forward and rewind. It has two speeds - 3¾ ips which will give you 30 to 18,000 cps  $\pm$  3db; and 7½ ips which will give you 30 to 24,000 cps  $\pm$  3 db. The X 300 also has Akai's unique Crossfield Head. On conventional recording heads the bias current tends to erase the higher frequencies. On the Akai Crossfield however the bias current is fed into a separate head opposite the recording head, in such a way that it can't interfere with the higher frequencies. This makes possible true high fidelity recording at much slower tape

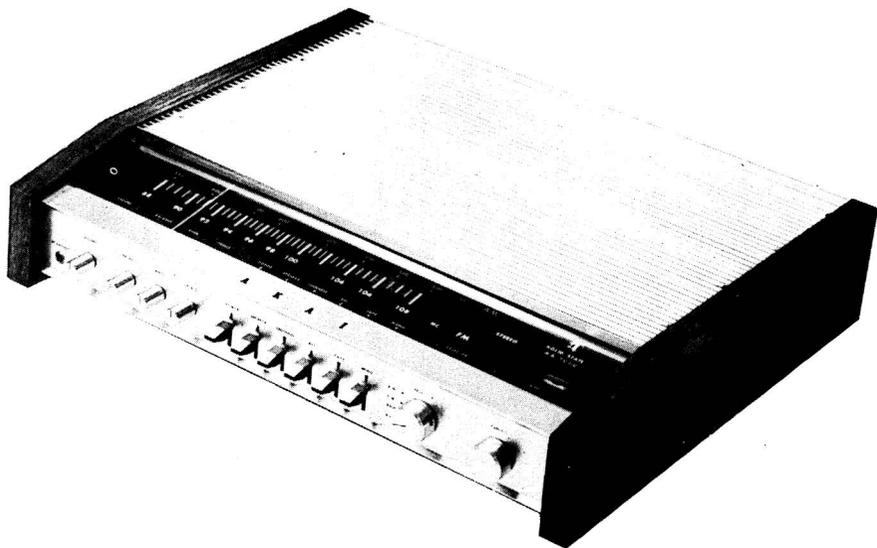
speeds than normal. Add to these features - piano key controls, tape cleaner, sound over sound, 10½" reel space, automatic stop and shut off, 4 digit index counter with reset button, vertical or horizontal operation. And all Akai stereo tape recorders are already biased to receive FM Multiplex Stereo broadcasts. So we hope you'll agree that the Akai X 300 gives you quite a lot of equipment for 190 gns. For further details on the Akai X 300, write to Pullin Photographic Ltd., 11, Aintree Road, Perivale Middlesex.

(A company within the Rank Organisation)

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# LISTEN

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Modern styling to suit "with-it" homes. Extra sensitivity. Fully transistorised 80 watts music power amplifier. All silicon transistors. Built-in FM decoder. Muting switch. Moveable antenna bar. FM multi-stereo electronic selector. FM-AFC selector. FM input sensitivity selector. Easy to read stereo indicator.

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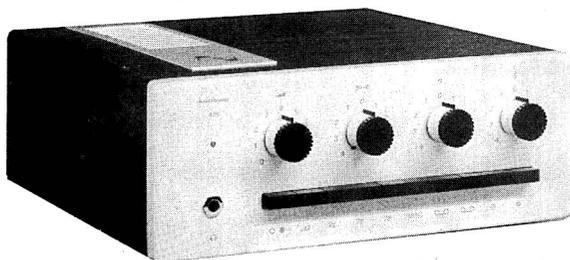
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# Armstrong

## high fidelity sound

series 400



421 Stereo Amplifier



423 AM-FM Tuner

## ONE AND ONE MAKES FIVE

In the new Armstrong all-transistor range, one amplifier, two tuners and two tuner-amplifiers are all derived from the same basic circuit. Thus, the 421 Stereo Amplifier and the AM-FM Tuner are equivalent to the 426 Tuner-amplifier just as the same amplifier and the FM Tuner are equivalent to the 425 Tuner-amplifier.

This series 400 is a new concept in high fidelity. For the first time, it brings top quality transistor performance into a reasonable price range.

Superb audio performance with 20 watts output each channel, high AM and FM sensitivity, an optional plug-in stereo decoder and all the controls and facilities you could wish for. Whatever your sound requirements there is a unit to suit you in series 400.

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423 AM-FM Tuner	£38- 6-0
424 FM Tuner	£29-18-8
425 FM Stereo Tuner-Amplifier	£72- 0-9
426 AM-FM Stereo Tuner-Amplifier	£79- 2-9
M4 Stereo Radio Decoder	£ 9-10-0

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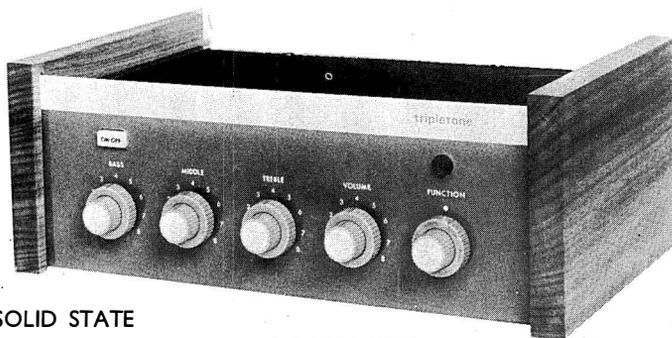
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*Audio & Record Review*



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*First Edition 1968*

**Radio Year Book** takes over where **Hi-Fi Year Book** leaves off—and so expands the coverage to include the whole of the audio, radio and video fields. This is a period of great change and development, as semi-conductors move in to replace valves, as colour replaces black and white on TV screens, and as stereo demands its place in radiograms. There is a tremendous choice for buyers—and, as with the products listed in *Hi-Fi Year Book*, the small outlay for a comprehensive buyer's guide should be the first move in every case where money is to be wisely spent.

### RECORD PLAYERS

### RADIOGRAMS

### PORTABLE RADIOS

### CAR RADIOS

### TELEVISIONS

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### TAPE RECORDERS

**Radio Year Book** lists and illustrates many hundreds of models available in the U.K. market. Its well written and informative articles should not be missed. This new Year Book may be ordered through radio and Hi-Fi dealers, through bookshops, or direct from the publishers.

TRADE AND DEALER ENQUIRIES ARE INVITED

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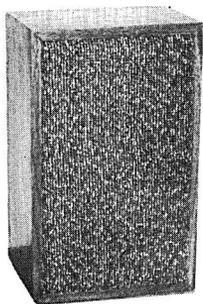
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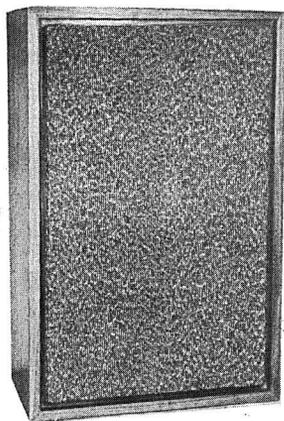
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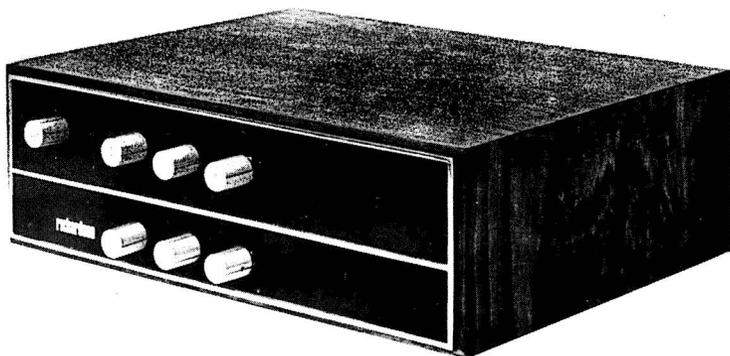


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Valve Power Amplifier with solid state power supply. Distortion 0.1% at 30 Watts, 0.25% at 35 Watts R.M.S. at 1 KHz. Input 250mV for 25 Watts into 4, 8 or 16 ohms frequency response 20Hz to 20 KHz.

Recommended retail price £55

## **STEREO PRE-AMPLIFIER SCP 1**

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Tel : 01-727 5096

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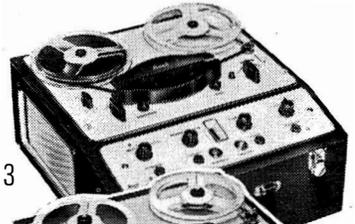
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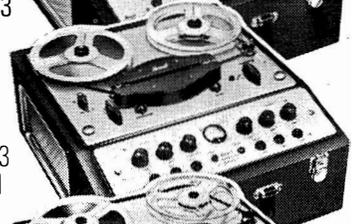
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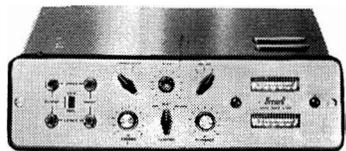
Mk. 5  
Series 3



Mk. 5  
Series 3  
Type M

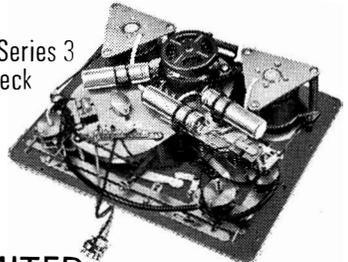


STB2  
Mono/Stereo

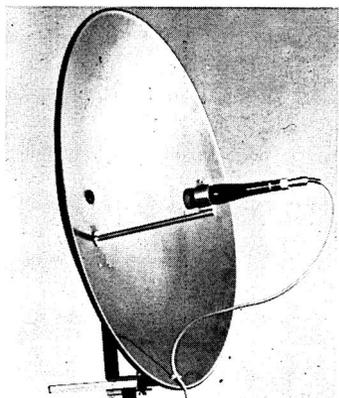


Mono/Stereo Hi Fi Tape Link

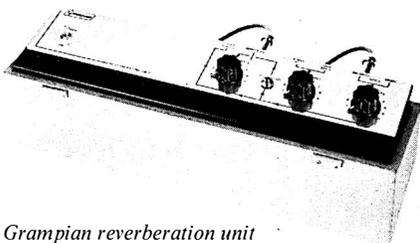
Mk. 5 Series 3  
Tape Deck



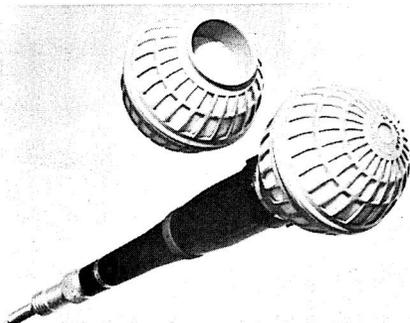
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*Grampian Parabolic reflector*



*Grampian reverberation unit*



*Grampian DP4 and windshield*

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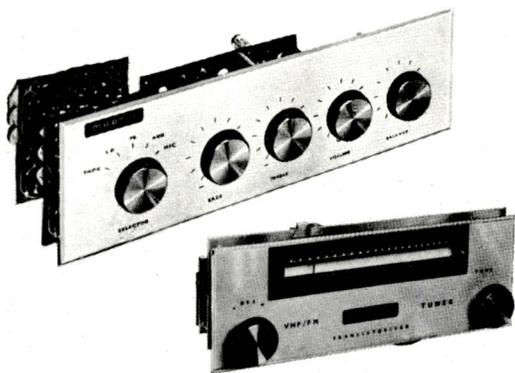
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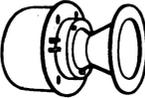
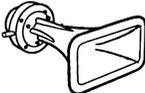
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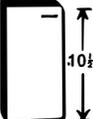
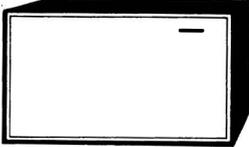
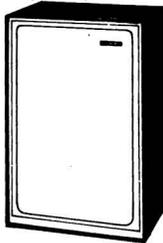
THE name is

# GOODMANS

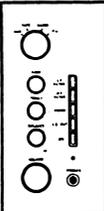
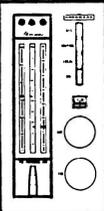
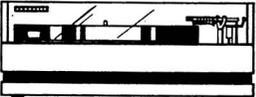
				
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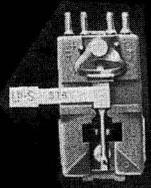
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surprise



surprise



Perhaps you will be as surprised as the pundits when you hear the facts\* about the BSR C1 ceramic cartridge "... another milestone on the public right-of-way to high fidelity" — said *The Gramophone*.

You could even be surprised to know that the BSR UA70 manual/automatic turntable unit is fitted with such a splendid cartridge and that its all round performance is equal to such high standards. But maybe not ... you could be one of those sensible people who knew all along that BSR don't just make a lot of autochangers but a lot of *very good* autochangers.

*\* If you'd like to read the independent test reports write to Arthur Nicholls at:*

**BSR Limited,  
Monarch Works, Cradley Heath, Warley, Worcs.**

## BSR UA70 SPECIFICATION

### Turntable

Wow.....Less than ·2%  
Flutter.....Less than ·06%  
Long term speed variation  
Less than ·5%  
(mains voltage ± 10%)

Rumble (ref. 1kHz) — 29 dB

### Pick-up arm

Counterbalanced lightweight arm with calibrated tracking pressure control, integral cueing device and automatic lock, bias compensator. Tracking pressure (depending on cartridge) 2 grams. min.

### Cartridge

The now famous C1 ceramic

Compliance 5·2 x 10<sup>-6</sup> cm/dynes  
Frequency response 20-15,000 Hz  
± 2 dB

Standard UA70 player £12. 18. 3.\*

### C1 Ceramic Cartridge

sapphire stylus £2. 7. 0.\*  
diamond stylus £3. 1. 9.\*

\*Inc. P.T.

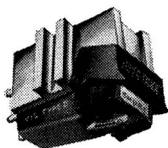


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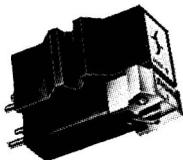


**The Shure V15-Type II Super-Track**

An impeccable new cartridge with a new and meaningful specification of total performance – TRACKABILITY.

For the connoisseur of recorded sound – £35. 0. 0.

**TRUE ELLIPTICAL STYLUS PERFORMANCE  
AT AN ECONOMICAL PRICE**



**Shure M55E and M44E Stereo Dynetic**

“Can be recommended to the most fastidious enthusiast without reservation for mono, as well as stereo use” – Audio and Record Review. Now at reduced prices.

M55E –  $\frac{3}{4}$ – $1\frac{1}{2}$  grammes – £17.10.0

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**Shure M80 Series GARD-A-MATIC**

High quality Bi-Radial elliptical stylus cartridges in retractile safety suspension systems for use with automatic turntables.

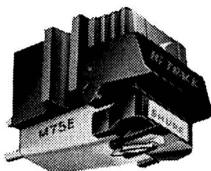
M80E – For Garrard LAB 80

M80E-D – For Dual 1009

M80E-D19 – For Dual 1019

New low price – £18.15.0.

**HIGH TRACKABILITY AT  
COMPETITIVE COST**



**Shure M75 Series Hi-Track**

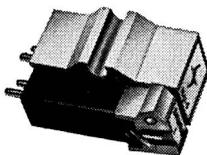
From the new generation of cartridges providing high TRACKABILITY at minimum tracking pressures.

M75E – Elliptical Stylus,  $\frac{3}{4}$ – $1\frac{1}{2}$  grammes – £22.10.0

M75G – Conical Stylus,  $\frac{3}{4}$ – $1\frac{1}{2}$  grammes – £15.0.0

M75-6 – Conical Stylus,  $1\frac{1}{2}$ –3 grammes – £15.0.0.

**CONICAL STYLUS CARTRIDGES  
COMBINING QUALITY AND ECONOMY**



**Shure M44 Series Stereo Dynetic**

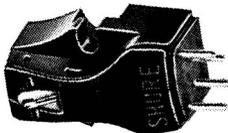
All feature 15° tracking: all have received widespread critical acclaim.

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Provides extremely musical and transparent sound at a rock-bottom price. Tracks at 3–6 grammes. Now only £7.10.0.

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# NEW SHAPES OF SOUND

## The Goldring-Lenco G.99

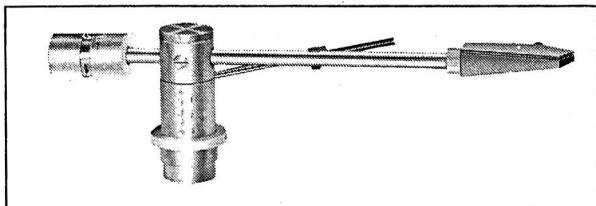
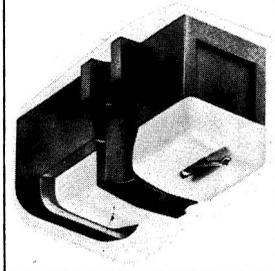
This is the transcription unit for the enthusiast who wants the proven features of Goldring-Lenco turntable units but prefers to mount an arm of his choice. Beautifully styled and proportioned, the G.99 has the unique continuously variable speed and vertical drive features, an 8 lb. non-magnetic turntable and push-button on/off control which also disengages the idler. A neon-lit stroboscope is built into the unit to facilitate speed settings and the speed variation is less than 1% for up to 13% mains voltage change. A pilot light gives the sophisticated G.99 an added touch of refinement.  
 £18.18.0d. + £3.1.5d. P.T.



\* Recommended transcription arms: Goldring-Lenco P77 and G65. † Recommended cartridges: Pickering V15AM1, V15AME1, 380A, Goldring CS90 and CS91E.

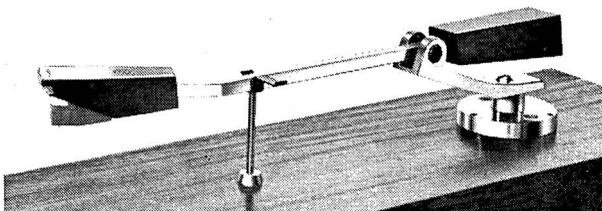
### Recommended Cartridge

The new Goldring "800" Free Field stereo magnetic cartridge, tracking at 1-33 gm, with 0.0005" diamond stylus and 15 vertical tracking angle. Very smooth frequency response 20 Hz—20 kHz.



\* **Goldring-Lenco P77 Transcription Arm**  
 A magnificently engineered precision arm with provisions for balancing in every plane. Calibrated stylus pressure adjustment. Hydraulically damped positioning and lowering device. Removable plug-in head shell.  
 £25.6.0d. + £4.12.6d. P.T.

\* **Goldring G.65 Transcription Arm**  
 Low mass tubular construction. Miniature ball race bearings. Stylus pressure adjustment by means of sliding counterweight. Full height adjustment. Interchangeable head slide with self-cleaning wiper contacts.  
 £6.6.0d. + £1.0.6d. P.T.



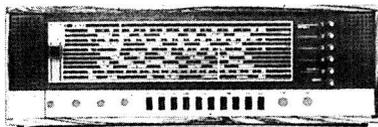
Goldring Manufacturing Company (G.B.) Ltd.  
 486-488 High Road Leytonstone, London, E 11. Telephone Leytonstone 8343

# Arena

## DANISH HI-FI STEREO EQUIPMENT AT IT'S BEST!

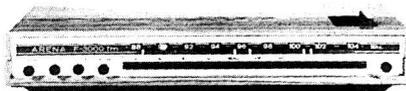


**Lab 80 Mark II.** Superb semi-professional transcription player with Garrard changer. 45 and 33 r.p.m. Hydraulic pick-up lift. Distinctively styled cabinet in teak, Brazilian rosewood or oak. Dimensions 19 x 41 x 38 cm. ( $7\frac{1}{2}$  x  $16\frac{1}{8}$  x 15 in.). Supplied with dynamic pick-up and with or without transistorised pre-amplifier.



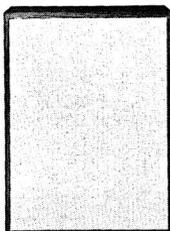
**T 2500 F TUNER/AMPLIFIER** Module built transistorised stereo for LW, MW, SW, 49m. and FM, with 18 diodes and 25 silicon transistors. Specially engineered for easy service. Built-in AM/FM aerial. Electronic programme scanning on FM. Push-button selection of pre-tuned FM station. Connections for tape recorder,

gramophone, AM and FM aerials, and three speakers. Power output: 2 x 15 watts, sine-wave. Cabinet: Teak or Brazilian rosewood. Dimensions: 15 x 75 x 20 cm. ( $5\frac{3}{8}$  x  $29\frac{3}{8}$  x  $7\frac{7}{8}$  in.).



**T 2400** Module-built transistorised stereo amplifier and FM radio with 17 diodes and 24 transistors, radicator, electronic programme scanning, push-button selection of pre-tuned FM stations. Connections

for tape-recorder, microphone, FM aerial, and five speakers. Danish-style cabinet in teak or Brazilian rosewood. Power output: 2 x 15 watts, sine-wave. Dimensions: 9 x 50 x 25 cm. ( $3\frac{3}{8}$  x  $19\frac{3}{8}$  x  $9\frac{7}{8}$  in.).



**HT 18** Pressure-Chamber Speaker system. Employs one 2.5 in. one 5 in. and one 10 in. speaker. Power handling capacity: 25 watts. Frequency response: 20-20,000 c/s. Cabinet: Teak or Brazilian rosewood. Dimensions: 61 x 41 x 25 cm. ( $24\frac{1}{2}$  x  $16\frac{1}{8}$  x  $9\frac{7}{8}$  in.).

### AGENCY ENQUIRIES INVITED

For further details and illustrated Brochure of the Arena range write to

## HIGHGATE ACOUSTICS

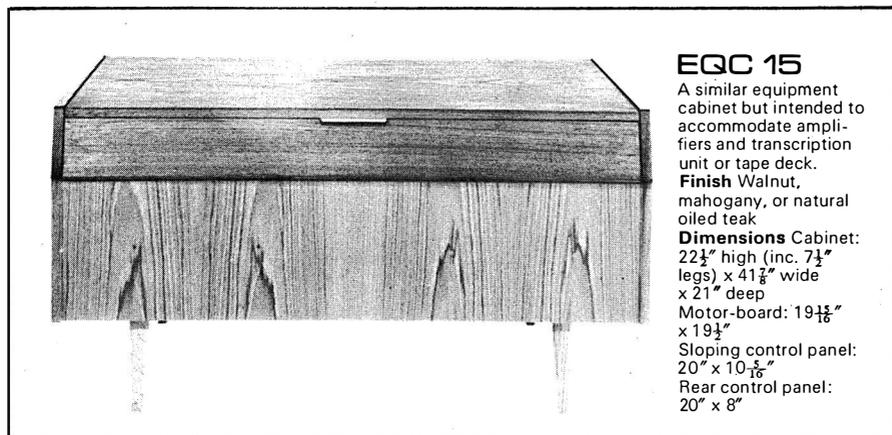
71-73 GREAT PORTLAND STREET,  
LONDON . W.1

Telephone 01-636- 2901/5

# SOUND FURNITURE BY DESIGN



**EQC 14**  
A very popular equipment cabinet which can accommodate amplifiers, transcription unit and tape deck side by side. The motor-board can be divided and stepped in height using the loose division supplied.  
**Finish** Walnut, mahogany, or natural oiled teak  
**Dimensions** Cabinet:  $24\frac{1}{2}$ " high (inc.  $9\frac{1}{4}$ " legs) x 59" wide x 21" deep  
Motor-board:  $37\frac{1}{16}$ " x  $19\frac{1}{2}$ "  
Sloping control panel:  $20$ " x  $10\frac{5}{16}$ "  
Rear control panel:  $20$ " x 8"

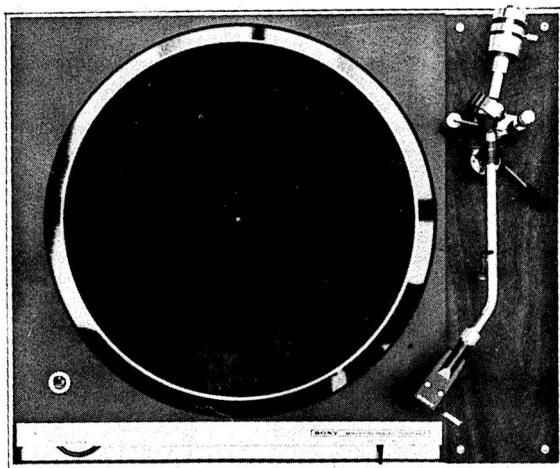


**EQC 15**  
A similar equipment cabinet but intended to accommodate amplifiers and transcription unit or tape deck.  
**Finish** Walnut, mahogany, or natural oiled teak  
**Dimensions** Cabinet:  $22\frac{1}{2}$ " high (inc.  $7\frac{1}{2}$ " legs) x  $41\frac{1}{8}$ " wide x 21" deep  
Motor-board:  $19\frac{1}{16}$ " x  $19\frac{1}{2}$ "  
Sloping control panel:  $20$ " x  $10\frac{5}{16}$ "  
Rear control panel:  $20$ " x 8"

Our full range of cabinets can be seen at our showrooms in Banbury and London. Our catalogue and current price list sent on request.



**DESIGN FURNITURE LIMITED**  
CALTHORPE MANOR · BANBURY · OXON  
TELEPHONE: BANBURY 4726



# Ultimate precision

If you were a professional audio engineer your requirements for a transcription turntable unit would be critical, probably only satisfied by the specifications and features of the Sony 'ULTIMATE PRECISION' transcription unit, Type TTS3000. A D.C. servo motor system ensures that the turntable speed constancy is within .05%. The belt driven 12" diecast turntable weighs no less than 3lb. 5oz. and has an integrated neon illuminated and magnified strobe.

Price **65 gns.\***

Complementary to the Transcription unit are the 'ULTIMATE PRECISION' tone arms Types PUA237 (10") and PUA286 (12"). Most professional tone arms incorporate a number of compensating features but none have all the features incorporated in the Sony 'ULTIMATE PRECISION'. These include the gimbel mounting tone arm with an ultimate bias compensator cam device, independent balancing weights, integral cueing and precision hydraulic lowering device.

Price PUA237 (10") **39 gns.\***

PUA286 (12") **44 gns.\***

Finally to complete the 'ULTIMATE PRECISION' turntable system the VC8E cartridge. This is a high compliance moving coil magnetic cartridge fitted with an elliptical diamond stylus and designed to be fitted into head shells with standard  $\frac{1}{2}$ " fixing centres.

Price **27gns.\***

Essential to this standard of disc reproduction equipment is a compatible amplifier.

Recently developed techniques using the silicon transistor have enabled Sony research engineers to perfect the 'ULTIMATE PRECISION' amplifiers type TA1080 and TA1120. The output from these amplifiers is high—30 and 50 watts RMS respectively with the very low distortion figure of less than .1% at full rated output. Comprehensive connection facilities are provided with variable input sensitivity. The presentation is functional yet aesthetically in keeping with today's requirements in styling.

Price TA1080 **99 gns.\***

TA1120 **135 gns.\***

*\* Recommended retail price*

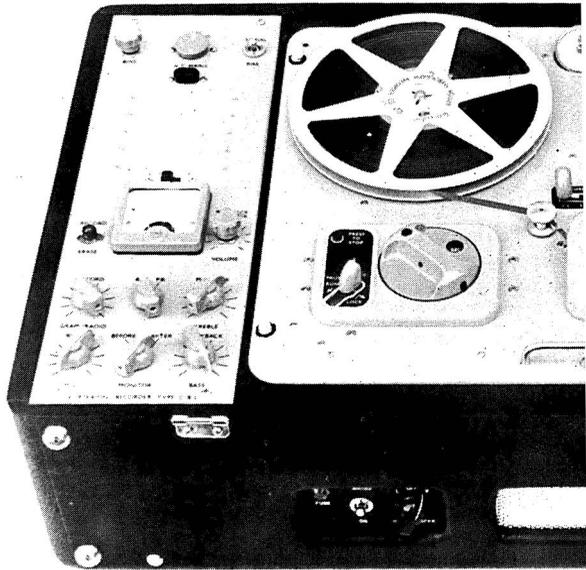
It is not possible to describe here in full detail the Sony 'ULTIMATE PRECISION' range. For comprehensive information see your Sony Dealer now or write to:

**SONY U.K. DIVISION,**  
Eastbrook Road, Gloucester.  
Tel: Gloucester 21591.

London Showrooms:  
70-71 Welbeck Street, London, W.1.  
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# Vortexion Quali



Here is a versatile stereophonic recorder which has no equal in its price group.

IT CAN record monaurally or stereophonically with its own mixed inputs from Gram, Radiac microphones, etc., the result is a suitable master for disc manufacturers. "Before and After

IT CAN also make a recording on one track and then transfer it to the other track while

IT CAN repeat the process and transfer this combined signal to the first track with one or two and the other cueing signals or commentary and either may be altered without the other.

IT CAN playback stereophonically or monaurally with its own amplifiers of  $3\frac{1}{2}$  watts each.

Speeds  $1\frac{7}{8}/3\frac{3}{8}/7\frac{1}{2}$  i.p.

Speeds  $3\frac{3}{8}/7\frac{1}{2}/15$  i.p.

The Vortexion W.V.B. is a high quality monaural machine with "Before and After" monitoring and a high impedance socket for radio, etc., either of which can be selected by a switch. requirements. This model cannot be converted for stereo playback, but it is a thoroughly re

Speeds  $1\frac{7}{8}/3\frac{3}{8}/7\frac{1}{2}$  i.p.

Speeds  $3\frac{3}{8}/7\frac{1}{2}/15$  i.p.

The Vortexion W.V.A. is a monaural machine which has a performance equal in sound quality. "Before and After" monitoring, Dubbing and Echoes. The recording being made can be heard on the int

Speeds  $1\frac{7}{8}/3\frac{3}{8}/7\frac{1}{2}$  i.p.

Speeds  $3\frac{3}{8}/7\frac{1}{2}/15$  i.p.

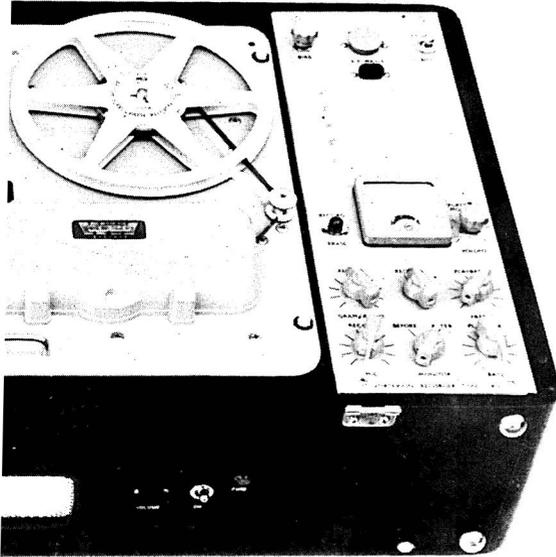
All tape recorders have adjustable bias controls, low impedance mic. inputs for unlimited le bias.

## VORTEXIO

257-263 The Broadway, Wi

Telephones: LIBerty 2814 and 6242-3.

# ty Equipment



TYPE C.B.L.

or other sources and from high grade low impedance balanced line microphones. With good " monitoring is provided together with adjustable metered bias for perfection. measuring and listening to it and adding one or two more signals also metered. o more signals. Composers use it for this purpose. One track may have music or commentary

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ing. The recording inputs are a high sensitivity socket for moving coil or ribbon microphone superimposing and echo work can be done and the playback has reserve gain for abnormal liable machine for the engineer specialising on monaural work.

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lity to the other models. It possesses all the features of the W.V.B. except for "Before and ernal loudspeaker as in the W.V.B. and C.B.L. The controls are uncomplicated.

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ngths of cable, highly accurate position indicators and meters to measure recording level and

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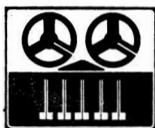


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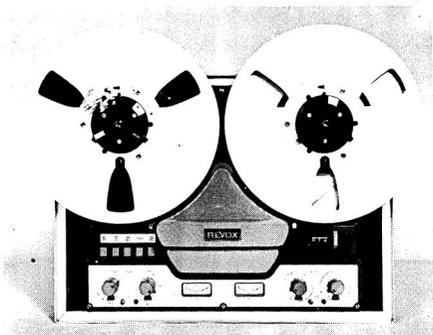
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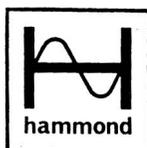
“ In terms of performance it is, however, superior to such an extent that it makes the rest seem toys ”

*David Kirk—"Tape Recorder", May 1967*



“ My comment on this 736HS is to admit that I have squandered the housekeeping money for months to come by investing in it as a reference standard and yardstick against which all future recorders will be judged ”

*Alex Tutchings—"Tape Recorder", May 1967*



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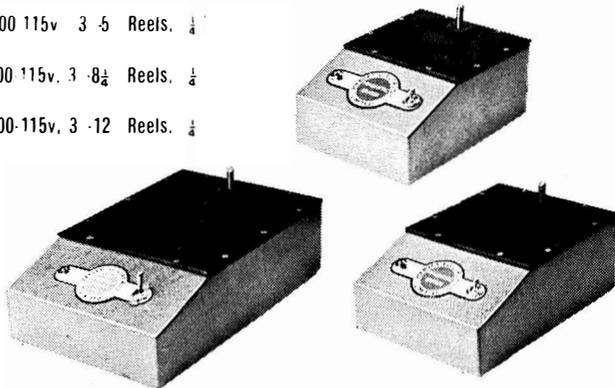
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A clear neutral tape for quality recording.  
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The solenoids illustrated above are just two from our very large range. The small type 45 is suitable for  $\frac{1}{8}$ " spacing, the larger (type 38)  $1\frac{1}{8}$ " wide gives a pull of 40 oz. over  $\frac{1}{2}$ " on AC, or 14 oz. over 1" on DC (25% duty cycle). A complete range of AC and DC solenoids is available including push and pull types, spring return, models fitted with changeover switches at the rear for intermittent duty performance on continuous duty applications, and DC fitted with fully damped silicon rectifier units for AC supplies.



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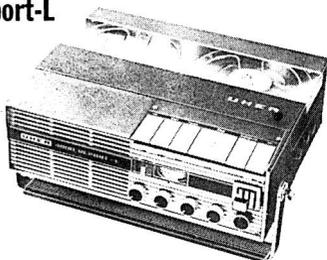
## the simple, single aim

behind the manufacture of these and every UHER Tape Recorder. The production of tape recorders for every amateur and professional need is the sole pre-occupation of the UHER Company, whose specialisation has led to many outstanding developments, including the first application of printed-circuit techniques in tape recorder manufacture.



### 4000 Report-L

**UHER**



An extremely versatile battery portable that gives virtually every facility of a mains-operated recorder—with many exceptional new features. Four tape speeds provide an infinite variety of recordings. Collectorless motor. Weighs only 8 lbs. Price, including microphone and tape, 103 gns.

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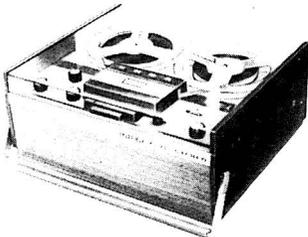
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A tape recorder of the highest standard, specially manufactured for professional use. Ideal size, weight, performance and exceptional quality reception. Can be used to synchronise sound with film as well as reporting under professional conditions, on a wide range of voltages. Remote control stop/start. Full track. Collectorless motor. Automatic volume control. Price on application.

### 724L Stereo (New!)

**UHER**

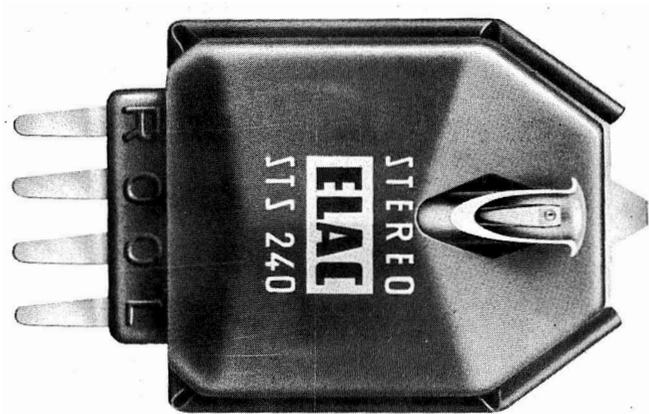


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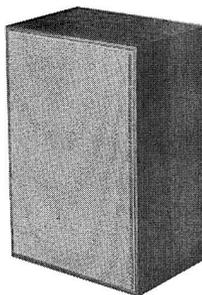
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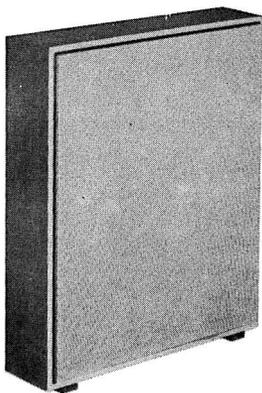
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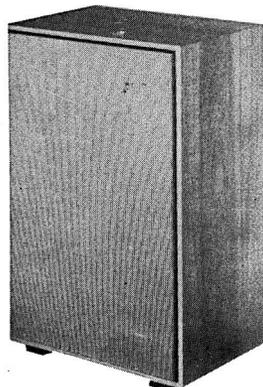
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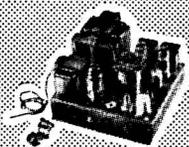
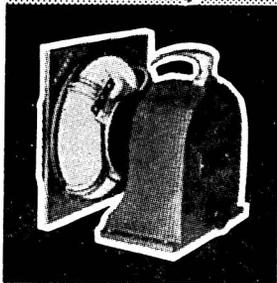
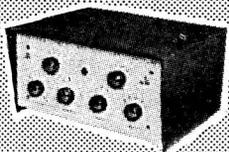
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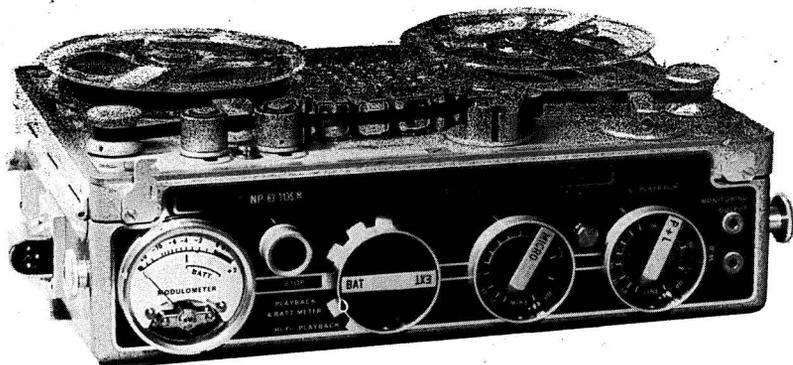
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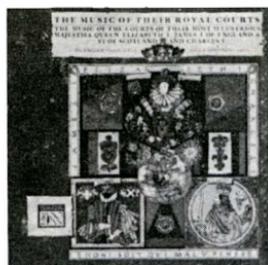
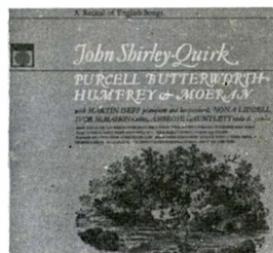
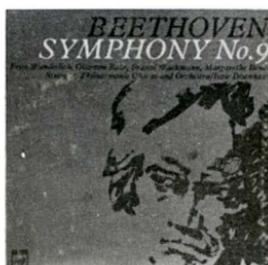
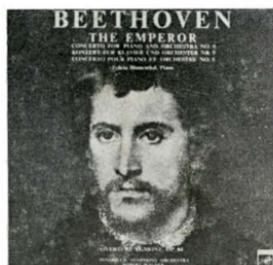


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