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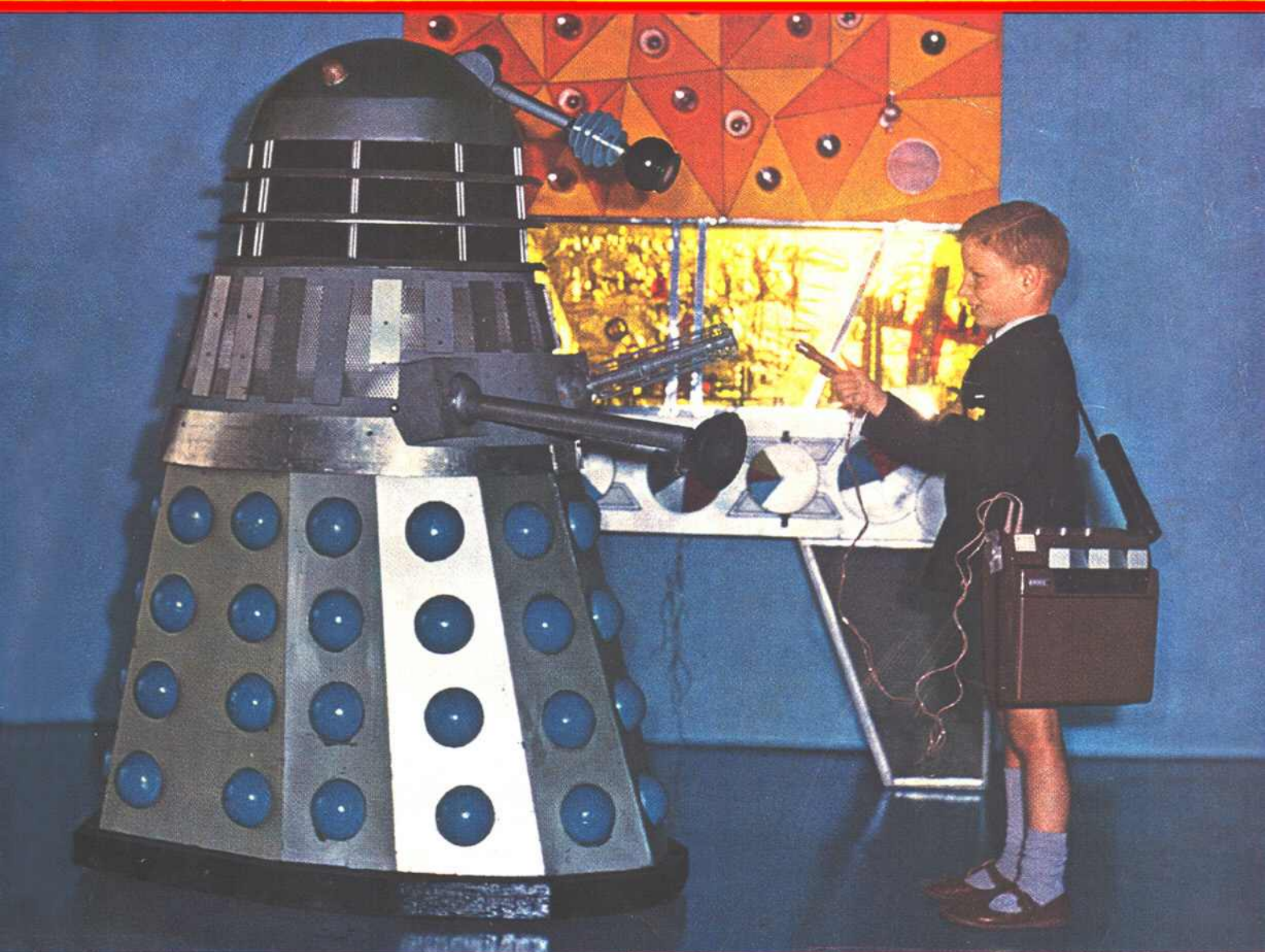
NUMBER 3

2/6

Amateur

Tape Recording

VIDEO & HI-FI



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REPRODUCING TAPE PICTURES

GUIDE TO TURNTABLES: AKAI ON TEST



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Amateur Tape Recording

Video and Hi-fi

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This month you will find extensive comment in *ATR* on the British Tape Recording Contest. Was the BTR Contest a success? Certainly the number of entries received was double that of last year. Publicity for the Contest has been greater this year and it is likely that the winning tapes will be heard in radio broadcasts. But this alone doesn't make it an unqualified success. Among other things the Contest needs even stronger support from you. Why not start working on your tape for 1966 now? Don't be reluctant to enter because you have only one machine. The eternal problem of copyright again rears its head and we'd like to hear from all our readers just how much sense you think

the present copyright situation makes. Send us your comments favourable or otherwise, mark the envelope 'Copyright' and leave the rest to us.

Finally, a very interesting announcement for all tape recording do-it-yourself enthusiasts.

We will shortly be publishing the *ATR* Book of Circuits for Audio and Tape Recording – a fine collection that caters for just about every type of tape and audio equipment. Every circuit published has been previously constructed and tested and there will be a special section dealing with building from kits and circuits for experimental work in sound. At only 7s 6d a copy this book will be a sell-out, so make sure of your copy by ordering now!

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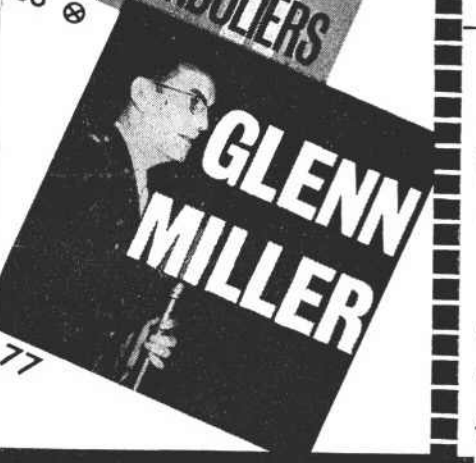
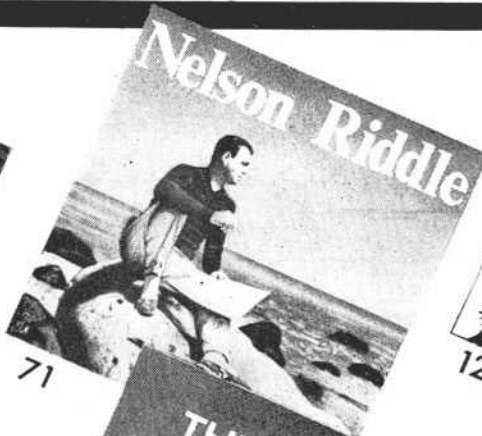
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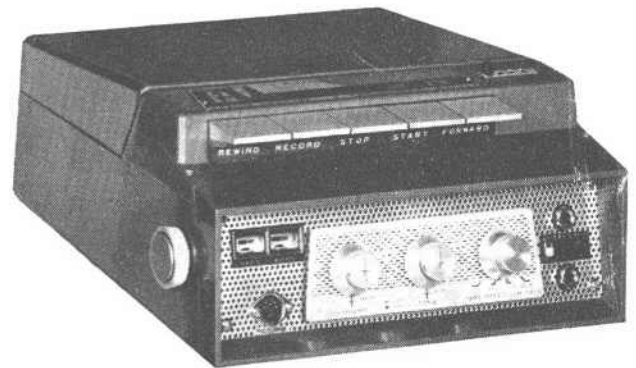
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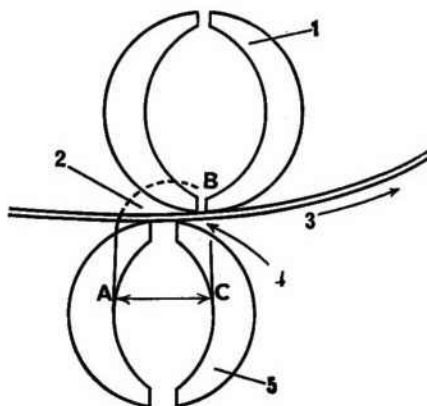


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It will be seen from the construction of the Akai Crossfield Head assembly that, as the signal head is arranged obliquely apart from the bias

head, across the tape, the amount of bias may be selected without regard to the functioning of the signal head. This means that the tape can be modulated over the entire frequency spectrum with maximum fidelity since the recorded signal is entirely unaffected by the bias field.

The maximum audio frequency that can be recorded on tape is usually around 790 c/s. at a tape speed of 1 centimetre per second, rising to about 2,000 c/s. at 1 inch per second. For Standard tape speeds: 9.5 cm/s. ($3\frac{3}{4}$ i.p.s.) —7,500 c/s. and for 19 cm/s. ($7\frac{1}{2}$ i.p.s.) —15,000 c/s.

The Akai Crossfield head makes possible the recording of a signal frequency of up to 2,750 c/s. at a tape speed of 1 cm/sec. or 7,000 c/s. per inch. In other words, the Akai Crossfield head — makes it possible to record 18,000 c/s. at a speed of $3\frac{3}{4}$ i.p.s. or 21,000 c/s. at $7\frac{1}{2}$ i.p.s. With the low speed of $1\frac{1}{2}$ i.p.s. (4.75 cm/sec.) now available on the M8 and X4 models, it is practicable to record up to 11,000 c/s.

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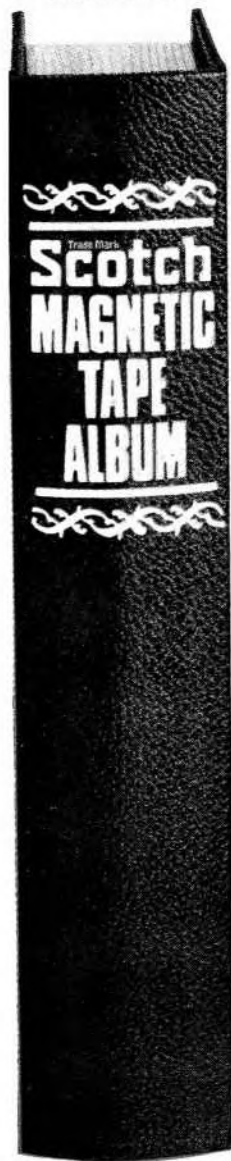
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ATR.1

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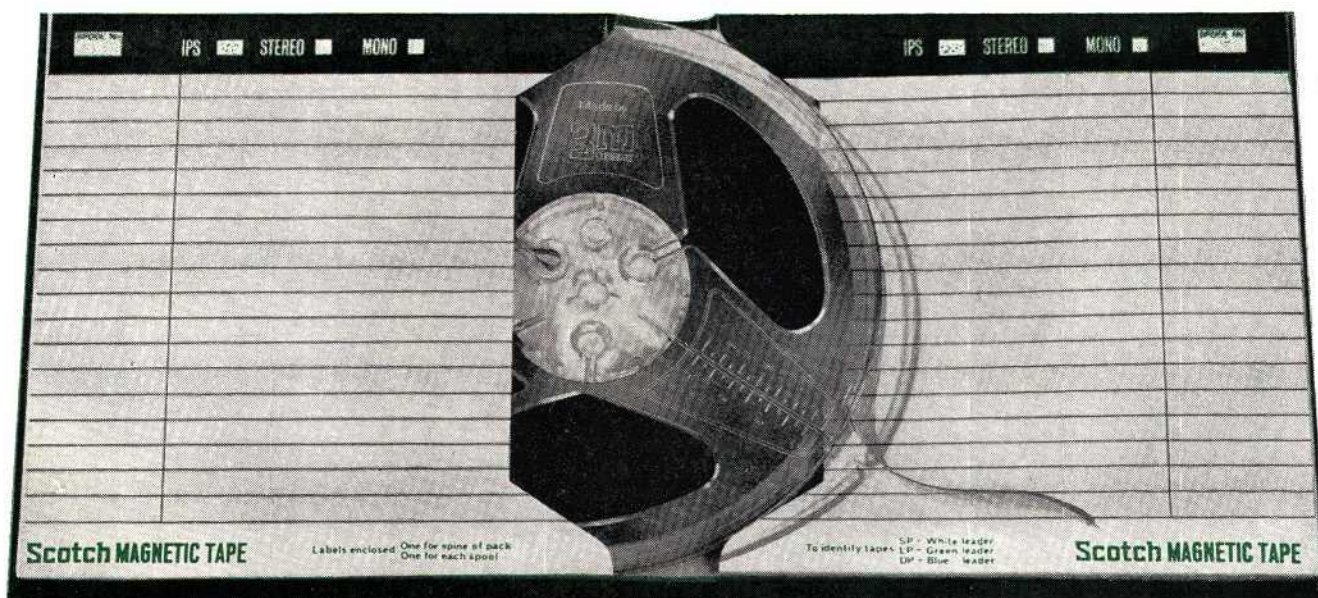
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GUIDE TO TURNTABLES

D. J. Barnett discusses transcription units and auto-change turntables and the differences between them



Until recently, good quality turntables could be divided into two main classifications – transcription units and auto-change models. In the last few years, however, a new category of auto-change turntables has appeared with transcription model quality. For the purpose of this article, I will include the transcription auto-change models in the auto-change section.

Transcription Units

It is somewhat puzzling to me how the name transcription unit came to be applied to the best quality turntables. The Oxford dictionary defines 'transcribe' as 'to copy out in writing' and a transcription is thus the result of transcribing. Obviously a transcription must have been a faithful reproduction and I must assume that the transcription units are those that do likewise for high fidelity recordings.

What are the qualities required of a top quality turntable? The record must obviously be rotated at a constant true speed without any deviation due to changes in the record passage or in the voltage applied to the motor. The ear is exceptionally sensitive to changes of frequency and this is exactly what is reproduced when the turntable speed fluctuates. The fault that occurs as a result of inconstant turntable speed is known as flutter.

Flutter is defined as 'the change in frequency divided by the absolute frequency being reproduced', and is usually expressed as a percentage. When the flutter is rapid, it causes a wavering to be superimposed on to the normal musical pitch and this can be very unpleasant. In transcription units a figure of about 0.05% would be expected, while most commercial units have a flutter content of near 0.2%.

The causes of flutter are numerous and can be traced to faults in the motor drive, changes of load imposed by the pickup, or because the record is either off centre or not flat. It has even been known for flutter to be present on commercial gramophone records, but this is not very likely. The only precautions that the enthusiast can take are to accord special care to the gramophone records and also to ensure that the turntable control is always returned to the 'off' position when not being used. This will make sure that no flats are formed on the rubber idler wheel which on most motors drives the turntable rim. These flats are probably the most common cause of flutter.

Fig.1. The Garrard 401 transcription turntable is produced to the highest technical specifications and will maintain its original standard of performance through many years of use.

Fig.2. This Garrard model has a cast turntable.



Fig.3. The Goldring Lenco GL70 transcription unit with a Pickering arm and pick-up. This unit features four speeds with adjustments for exact rpm.

Wow is similar to flutter in that it is caused by changes of the replaced speed, but it is particular to low frequency changes. This is very disturbing and sounds like a low drone. The precautions to avoid flutter would also help to avoid wow, but with both these faults, if the cause of the trouble is built into the unit, then no amount of care will stop the reproduction being distorted.

The other major trouble that can occur in turntables is rumble. This is another low frequency fault which is produced generally by the turntable bearings. This noise is then transmitted through the turntable

Fig.4. The Garrard 3000 high quality record changer. Fully automatic or manually controlled, it represents one of the most advanced types of record player in its class.

by the pick-up arm or cartridge to the amplifier and the low frequency distortion is then reproduced. In order to minimize the degree of rumble, bearings with very good surface finish must be used. This naturally makes the turntable more expensive, but inferior bearings will only lead to future trouble. Many amplifiers have rumble filters in order to attenuate signals below about 20 cycles. There is, of course, very little musical content below this frequency, and apart from the unpleasant noises, rumble also reduces the power handling capacity of both amplifiers and loudspeakers.

Most transcription units have heavy turntables. These give a flywheel effect and iron out any slight changes in speed that might be caused by the glowing effect of the load imposed by the pick-up when different degrees of modulation are present on the record surface. Typical table weights vary from 5 lb to 11½ lb.

The majority of motor units will drive at four speeds – 16, 33, 45 and 78 revolutions per minute. In order to save some money a cheaper motor that handles only 33 and 45 revolutions per minute records can be obtained. If this is suitable for the particular application, then there is nothing to be gained by buying a more versatile unit.

Other facilities offered by good quality motors are built-in stroboscopic effect to ensure that the speed is absolutely correct, and automatic lowering devices for the pick-up arm. The latter facility is usually reserved for those units where the pick-up arm is built on to the motor board as an integral unit. (Fig.2.) These types of motor are advantageous in that the pick-up must be correctly aligned with the turntable, but often the choice of pick-up arm and cartridge is somewhat limited. If the motor is not to be built into a complete control cabinet, then suitable plinths with perspex dust covers are available, in order to allow the unit to be free-standing.

Auto Change Models (Fig.3)

At one time any form of auto-change record player was severely criticized by high fidelity enthusiasts. These units used to be primarily for commercial radiograms and had very poor flutter and rumble performance, as well as being very severe on the handling of the records. Recently, however, the performance figures of these turntables have been almost equal to the best transcription units, and now that the techniques of record changing have improved, these units can be considered for serious high fidelity applications. The most refined unit of Swiss manufacture no longer stacks the records on the centre spindle, as was usual, but has a mechanism which transfers the records from the side of the player. This ensures that the pick-up arm and cartridge are always at the correct playing angle. I am sure that further units will be designed on this principle and will probably be seen in the near future.

To sum up, when buying a turntable, make sure that the unit has all the facilities you require. Remember that the more versatile the unit, then the more expensive it will be. Pay attention to the weight of the turntable, the construction of the base board and the mounting of the motor and bearings. Finally, always take into account which pick-up arm you expect to use. It could affect your choice of turntable.

A CASE FOR CRYSTAL

Cosmocord reply in defence of the Crystal Microphone.

In the June issue of *ATR* you did rather slate the crystal microphone did you not? Firstly we had Mr G. Jones on page eight complaining about lack of low-frequency response and inability to work with long cables and then we had Mr Beard on page fifteen complaining about lack of both low and high frequency response.

Cosmocord Limited have manufactured crystal microphones in large quantities for many years and this situation has only existed precisely because the crystal microphone is basically a very satisfactory device. As we also supply other types of microphones, including moving-coil, we have no particular axe to grind in respect of the crystal microphone, but it would be a pity if it was dismissed unnecessarily or for the wrong reasons.

Mr Jones states that the crystal microphone suffers from a diminution of the lower frequencies. This statement is by no means necessarily correct and our own products are never permitted to be more than 3 dB down at 100 c/s as measured across a suitably high load impedance. The capacitance of a typical crystal microphone is of the order of 1,000 pF, and thus even feeding into a mere 0.5 megohm load the response will only be 3 dB down at about 300 c/s. Higher load impedances will of course improve the low-frequency response and certainly for on-location sound recording this sort of low-frequency response would be perfectly adequate. It is worth noting here that many moving-coil microphones, especially those having cardioid polar response, suffer from far greater diminution of the lower frequencies than do crystal microphones. Those moving-coil microphones which do possess extended low-frequency response unfortunately often achieve this response by means of a fairly high Q acoustic resonant circuit, and this can lead to very unnatural reproduction.

Mr Jones has unfortunately made a completely erroneous statement in stating that the capacitance of a long cable attenuates the lower frequencies. Because the crystal microphone has a capacitive source impedance, the effect of cable capacitance is basically to lower the microphone sensitivity without affecting frequency response at all. In practice, if the microphone is being used with an unduly low load impedance, the effect of a long cable will be to *increase* the low frequency sensitivity of the microphone. The reproduction of sensitivity which occurs with a long cable is very often unimportant because crystal microphones normally have high sensitivity in any case, and further, the use of a



One of the popular ACOS crystal microphones manufactured by Cosmocord.

low capacitance cable will restrict the effect. If for instance a cable with a capacitance of 30 pF/ft be used, then 33 ft of cable will only reduce the microphone sensitivity by 6 dB. The high-frequency response of a modern crystal microphone should certainly be perfectly adequate for on-location sound recording. It would be unusual to find that such a microphone did not have a satisfactory response to 6-8 Kc/s and it is doubtful whether any extension of this response would add to the reproduced quality.

Nobody would pretend that the crystal microphone, or any other one type, is suitable for all conditions, but a modern crystal microphone has quite a number of virtues, as can be seen by comparing with Mr Jones's list of desirable characteristics. Frequency response is very adequate, the polar diagram is as constant as any other microphone of similar physical size, signal-to-noise ratio is excellent as also are transient response and dynamic range. Modern crystal microphones are unaffected by the climatic conditions likely to be experienced, are not sensitive to magnetic fields and, if properly constructed, are not sensitive to electrical fields. No power supply is required, the stability in the presence of wind is as good as any other type of microphone and considerably better than some; crystal microphones can be quite small, are among the lightest types available and are quite robust and reliable. They can certainly be used in any position and harmonic distortion is very satisfactory. Finally, crystal microphones are certainly the cheapest types available and are far more able to work over long distances without extra attachments than they are given credit for.

We would be very happy to let Mr Jones and Mr Beard have a commercial-quality crystal microphone for trial, which we are sure they would find as satisfactory for many purposes as a moving-coil type.

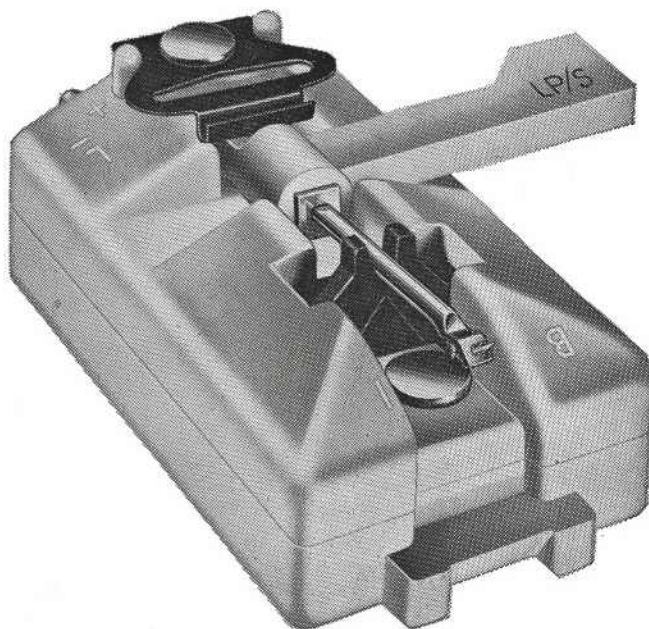
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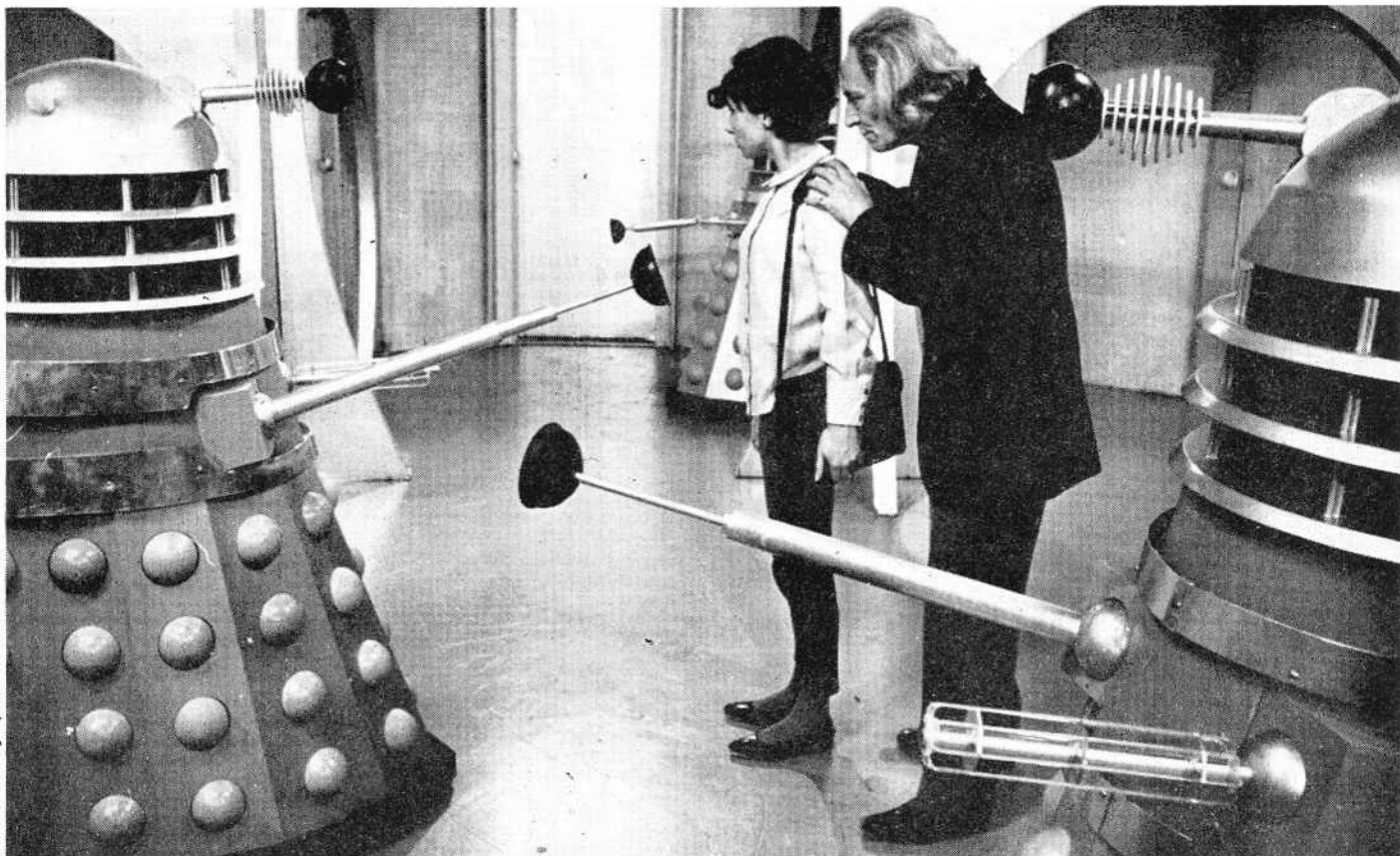


Fig.1. Doctor Who, Susan and their two passengers land on the planet Skara, which has suffered a Neutron war. The Daleks survive in a magnificent city, living in machines to ward off radiation. Daleks designed by RAYMOND CUSICK, CAROLE ANN FORD as Susan and WILLIAM HARTNELL as Dr Who.

SOUNDS FOR SCIENCE FICTION

Our front cover this month depicts one of the now famous Daleks from the television film series of 'Dr Who'. Although this series is thought of as being primarily intended for children, one finds that a good many adults are also faithful and serious followers of the adventures of actor William Hartnell and his colleagues. (Fig. 1.) Then of course we have 'Stingray' and 'Space Patrol' (on the other channel) most of which are enacted by puppets but which seem to fascinate both young and old alike. The studio props, models, puppets and so on call for some pretty extensive imagination and vast teams of specialists do nothing else but design and produce the fabulous sets used for these science fiction programmes. But what of the special sound effects and music required to create the highly fictional atmosphere? How are the peculiar toneless voices of the Daleks produced, the sounds of space vehicles of the future, the sounds of animals on another planet, the noises made by futuristic-looking electronic brains and so on?

Well, having made all the 'weirdy' sounds for the ITV series 'Space Patrol' and quite a few for 'way out' TV advertisements and trailers, etc., I can at least describe from first-hand knowledge how to begin, but as a rule the final results are usually very different from the original ideas. Naturally all the sounds and perhaps some 'space age' music are created on magnetic tape. Many of the recording techniques are already well known to electronic music enthusiasts and have been described before in *ATR*. But suppose you were asked to provide the sound tracks and possibly some 'Dalek'-type voices for a science fiction sound broadcast or a film. How would you set about it?

You Need Imagination

14 First you must have some idea of what the story is about, its

characters and shape and nature of weird beings if any or of space vehicles or machines and so on. From then on one's imagination and recording know-how must work to full capacity. As an example let's take an early space age vehicle, one of the old-fashioned rocket variety! The sound of a take-off will most likely be required and this can be produced by simply blowing across the front of a microphone, preferably a crystal type. Record at 7½ ips and gradually fade off on the volume control. Replay at 3½ ips but cut the tape immediately after the sound starts which will provide some impact to the point of 'lift-off'. For the sound of a more futuristic space vehicle such as I had to produce for 'Space Patrol' we must resort to electronics by using two low frequency sine-wave generators fed into a ring modulator. One generator is set to about 3 or 4 cps whilst the other is set to around 200 c/s. The lower frequency generator is run up slowly to about 20 c/s with simultaneous fade off. A similar sound effect can be produced by recording a low-pitched sound such as a deep piano note and form this into a small loop. Re-record for the duration required and fade off. Almost any deeply pitched undulating sound can be used for a great variety of 'weirdy' noises off by making a loop of the sound and replaying this at different speeds.

Bleeps and Ominous Sounds

As I said imagination is the most important tool for this kind of work. So from spaceships we go to fictional scientific machinery, computers, electronic brains and the like. Here we may require something to synchronize with flashing lights or wavering pointers on dials, revolving discs and heavens knows what cunning devices the props department are likely to think up. Many of these visual

effects will suggest the required sound which may be bleeps, pulsing sounds, whistles with rising pitch, staccato sounds, ominous sounds, gentle tinkling sounds, siren like sounds and so on *ad infinitum*. Here of course special equipment will reduce the time involved in initial experiment, for with tone generators, a ring modulator and monitor amplifier the sounds can be produced over the loudspeaker, listened to and decided upon before recording.

Without special equipment, a little more time may be required since the sounds may have to be recorded and the tape cut to produce the desired sequence. For instance, suppose we require a bleeping sound at about three or four bleeps per second. Record a few short sharp whistles or repeated piano notes or any medium pitched fairly pure tone. Cut out three or four from the tape and join in a loop with blank or leader tape of equal length between each. Now run the loop at twice the original recording speed. Again some experiment will be required to get the right combination of sound and repetition rate. Remember that sounds can be changed by tape cutting after which they may be echoed or mixed with others, re-run in reverse, slowed down, speeded up – the transformations are almost unlimited. For ominous sounds a deep sustained piano note formed into a long loop and run at slow speed will provide quite dynamic effect.

Any violently echoed noise formed into a long loop can also provide a tense atmosphere if the volume of the re-recorded sound is allowed to build up gradually and the whole thing is ended with a harsh noise such as a cymbal crash.

Weird Voices

Now what about weird voices like those of the 'Daleks'? Well an exact imitation of the 'Dalek' voice requires the use of a ring

recorder. Try doing this with echo and then run the tape in reverse or take real animal sounds such as a dog barking or lion roaring (sound effects records) and give these similar treatment.

Finally what about some music for your science fiction recording? There are of course a number of electronic music records available with a wide variety of compositions ranging from the completely weird, through the ethereal to recordings such as 'Time Beat' (BBC Radiophonics) which have a rather more modern beat and melodic content. I was recently asked by the British Ferrograph Owners' Club to provide them with a short tape recorded talk

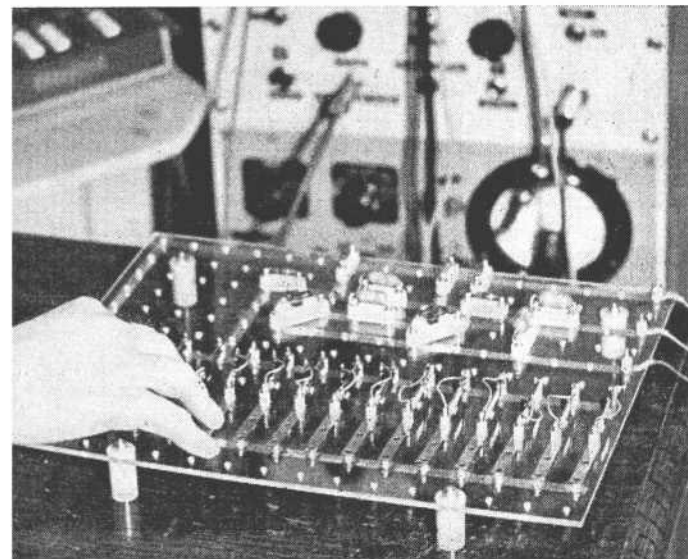


Fig.3. A simple 'electronic organ' built from a Radionic Kit.

and examples of tape loop rhythms for 'way out' music. By now they may have unravelled the secret of making rhythms on tape like the one that is used in 'Time Beat'.

For anyone with a knowledge of music and two tape recorders the task is not difficult. Experiment and imagination are necessary but the basis of a complex electronic sounding rhythm is first to record two beats out of four, that is two percussive sounds. These are cut and spliced with leader tape of equal length and formed into a loop. This provides the basic four beats, i.e. beat 1 – sound, beat 2 – no sound, beat 3 – sound and beat 4 no-sound. This loop is re-recorded at a slower or half speed whilst further sounds are added in tempo—that is in exact time with the basic rhythm. From here on a good deal of experiment will be required to achieve any desired rhythm. Percussive sounds for your rhythm? Well try large and small cardboard boxes, small drums, pieces of metal, pieces of hard wood, anything that will produce a staccato sound. Now for the melodic line. Conventional musical instruments played against the rhythm loop can be recorded together and afterwards speeded up – or slowed down. I sometimes use a small electronic instrument with 48 notes which key a multi-vibrator. This produces a sound not unlike an electronic organ but with a very high harmonic content. A simple keyboard organ of this kind can be built from a Radionic kit (Fig.3) but is rather limited as to pitch range. However, those with some technical knowledge of tone oscillators should not find it difficult to utilize an old piano keyboard and build up a keyed tone system covering the normal tempered music scale.

Finally I should mention that examples of BBC Radiophonics music including the theme music of 'Dr Who' are available on disc records (Time Beat is on Parlophone 45-R-4901. Dr Who theme is on Decca F.11837.

The Radionic electronic organ kit shown in (Fig. 3) is produced by Radionic Products Limited, Stephenson Way, Three Bridges, Crawley, Sussex.

Circuits for a ring modulator, tone oscillator and other devices for producing electronic music will be found in the *ATR Tape Recording and Audio Circuit Handbook*, available this month from Haymarket Press Limited.

F.C.J.

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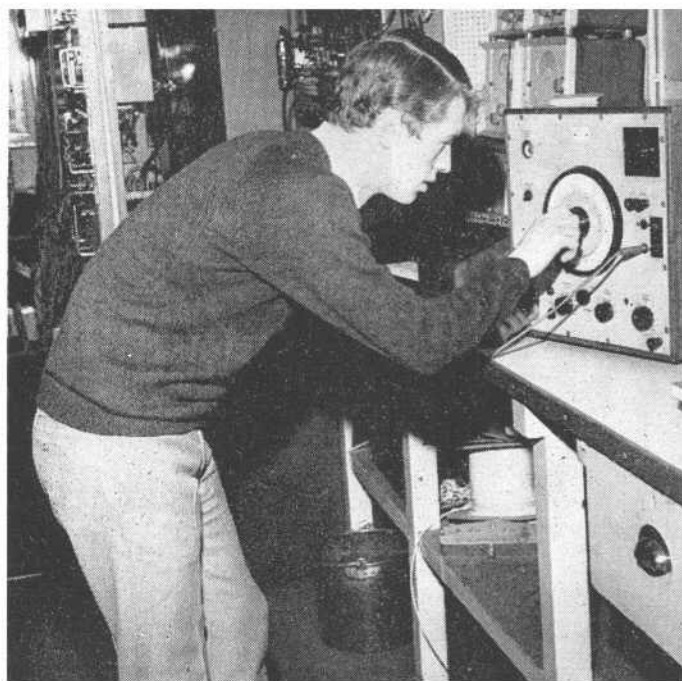
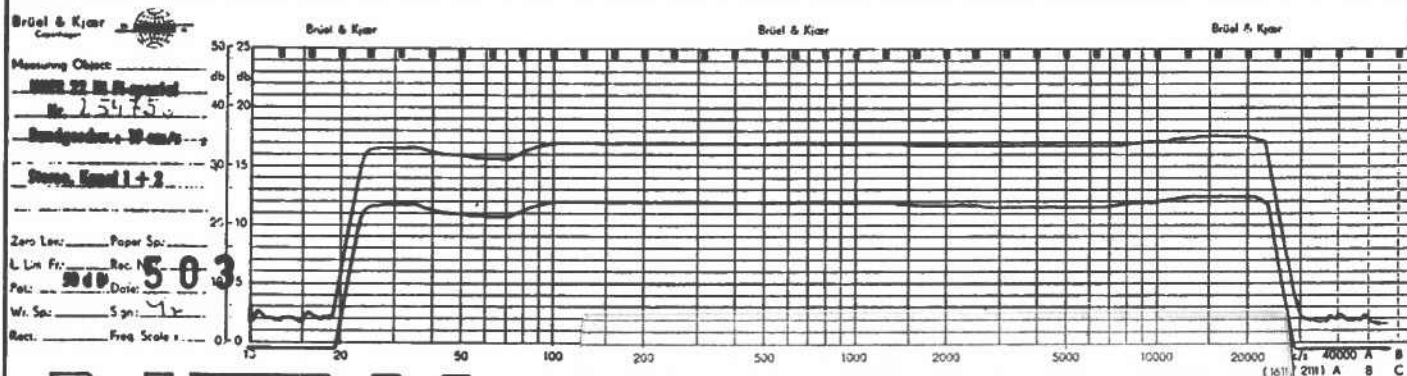


Fig.2. A corner of the BBC Radiophonics workshop.

modulator and sine-wave generator covering 20–30 cps. The low frequency sine-wave is fed into one leg of the ring modulator and the pre-amplified ordinary human voice into the other. The sine-wave will modulate the voice but the person speaking must do so in a slow, flat toneless voice. The end product, on tape, is a 'Dalek' voice. The 'Dalek' voices are produced for the TV 'Dr Who' series by means of a combined ring modulator-speech amplifier designed and supplied by the BBC Radiophonics workshop. (Fig.2.)

Weird animal voices are not difficult at all and anyone who has recorded ordinary speech at $7\frac{1}{2}$ ips and replayed it at $1\frac{1}{2}$ ips will confirm the peculiar animal like sounds that come from the tape

THE HI-FI RECORDER WITH A TEST CERTIFICATE AND ORIGINAL FREQUENCY RESPONSE CURVE SHEET FOR HI-FI SYSTEMS....



NEW FROM UHER

THIS exciting—and in some ways quite unique—recorder from the UHER factory satisfies the most exacting demands of a normal home sound studio. Both the 22 HI-FI SPECIAL (two track) and the 24 HI-FI SPECIAL (4 track) embody vast engineering knowledge and technical experience and as documentary evidence of quality a Test Certificate and an Original Frequency Response Curve Sheet accompany every model which leaves the factory.

The HI-FI SPECIAL is an all-transistor recorder for mains operation, featuring push button control, mono or stereo recording and playback, multiplay two track or (in the case of the HI-FI 24) four track recording. Tape speeds $3\frac{3}{4}$ ips and $7\frac{1}{2}$ ips; reel sizes up to 7"; Equalization: CCIR 70 microseconds, CCIR 100 microseconds, NARTB 50 microseconds ($3\frac{3}{4}$ ips); push-pull r-f generators. Frequency ranges: 20 to 20,000

cps ($7\frac{1}{2}$ ips), 20 to 15,000 cps ($3\frac{3}{4}$ ips).

The many refinements incorporated include an ingenious tape cleaner associated with the tape-tension control, equalizer switching facilities (from CCIR to NARTB) and vernier adjustment of playback head.

JUST LOOK AT THESE SPECIFICATION DETAILS

Wow and flutter: max. $\pm 0.1\%$ (max. $\pm 0.08\%$ rms) at $7\frac{1}{2}$ ips, max. $\pm 0.15\%$ (max. $\pm 0.11\%$ rms) at $3\frac{3}{4}$ ips.

Deviation of average tape speed from nominal speed: max. $\pm 0.2\%$ at $7\frac{1}{2}$ ips.

Monitoring: Straight monitoring and off-the-tape monitoring also for stereophonic operation.

The 22/24 HI-FI SPECIAL is supplied in an attractive Teak veneer finish case, and with transparent Plexiglass cover. Price—to be announced. Literature and full specification details are available on request.



and introducing

THE NEW UHER 724 STEREO

A four track all-mains recorder—attractively priced at only 75 gns—and specially designed to satisfy the demand for an instrument particularly easy to understand and to handle. Please send for fully descriptive literature and specification.

BOSCH LIMITED

Radio & Domestic Appliance Division

205, Gt. Portland Street, London W.1. LAN 1809 · 1100 · 6708



VOLUME COMPRESSOR CIRCUIT

A handy unit for the technical enthusiast

When used with a public address amplifier the volume compressor has the advantage of maintaining 'talk power', i.e. the average voice level can be held to a maximum thus employing the full output of the amplifier following. Any peak voice levels which would otherwise overload an amplifier are compressed to a safe or desirable level.

In compressor amplifiers using valves, use is made of the variable μ characteristics of a valve to adjust the gain automatically from rectified audio voltage. With transistors the gain can be varied by reducing the emitter current or by reducing the collector voltage. Neither is particularly satisfactory although both methods are used for automatic gain control, particularly in audio work.

The gain of a transistor amplifier may however, be controlled by shunting its output element, usually resistive, by a parallel but otherwise variable resistor. In this case the 'resistor' may be a nearly saturated transistor connected in parallel with the collector load of a transistor amplifier. The control transistor is biased to operate just above the 'knee' in its operating characteristic curve. The audio signals are taken from the amplifier and further amplified and then converted to negative dc. This dc voltage is then applied to the base of the control transistor and when this reaches a certain pre-determined value the control transistor conducts. The internal resistance rapidly falls and presents itself as a shunt resistance across the output load of the amplifier.

The connection between the control and controlled transistors is made via a large capacitor. The ac part of the signal is therefore shunted to ground leaving the dc working point of the controlled stage unchanged. Clipping cannot occur unless the amplifier is considerably overloaded.

Construction

The volume compressor may be constructed on strip printed circuit board such as Veroboard or West Hyde boards. The resistor R may have to be adjusted and could in fact be replaced by a small potentiometer of about 25 K.ohms. Layout of the components should follow the circuit generally, i.e. working from left to right stage by stage. After the wiring is completed the current for the whole circuit should be checked and should be between three and five mA depending on the types of transistor used.

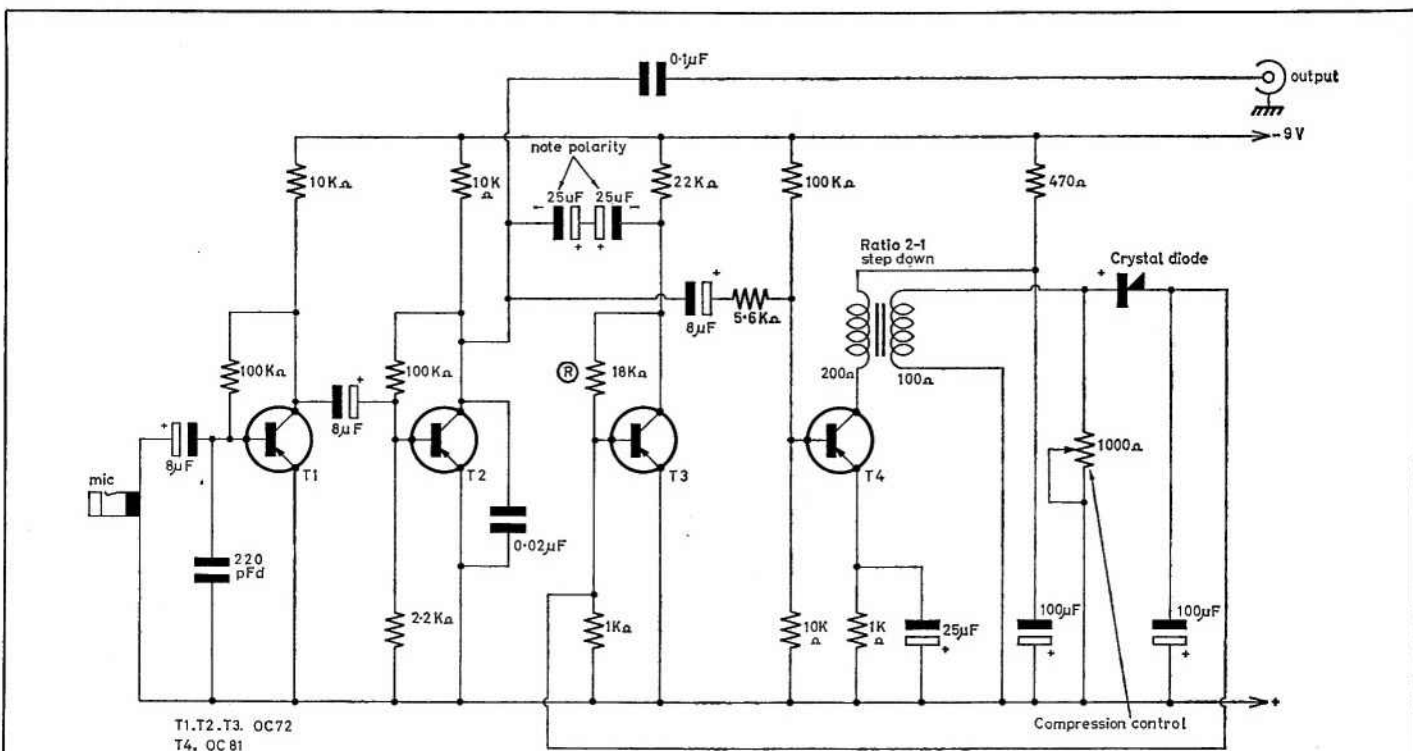
Operation

Turn the compression control to the 'off' position and connect an audio tone generator to the input. The microphone pre-amplifier has a sensitivity of some 5 to 10 mV and the audio generator should be set to this value of output voltage (sine wave). Adjust R until the output signal just starts to fall; this indicates that the bias has been set to operate the transistor on the 'knee' of its operating curve. If the transistors specified are used the resistor R may remain at 18 K.ohms. Now adjust the compression control as required but note that excessive compression will produce unpleasant distortion and background noise will become excessive. The transformer should have a step-down ratio of 2:1 and the leads to the secondary may have to be reversed if the compressor becomes unstable. The input impedance of the compressor is low, i.e. suitable for microphones of up to 600 ohms.

Transistors

Various types and makes of audio transistors have been tested in the circuit and of these the following are recommended:

	Siemens	Mullard	Texas	NKT
T1, T2, T3	AC151	OC72	2N281	NKT222
T4	AC153	OC81	2G381	NKT271



A volume compressor with microphone pre-amplifier

INQUEST ON THE CONTEST

Kim Cook takes an objective look at the 1965 British Tape Recording Contest, its structure and organization, and suggests points for improvement with regard to judging, publicity and sponsorship



Judging the final tapes in the B.T.R. contest calls for a lot of concentration . . .

The 1965 British Tape Recording Contest is over, the prizes have been presented and the organizers are already thinking ahead to 1966.

But was the contest a success? And if not, why not? Many people are asking these questions and even more are privately thinking them.

First, was it a success? That depends. If by a success you mean a blazing triumph, an unqualified success, then certainly it wasn't. On the other hand, it was by no means a complete failure. This year's contest fell somewhere between the two – a moderate success. It should have been a lot better.

To be really successful, a contest must be handled in such a way as to attract the maximum number of good entries. This means having clearly defined rules, attractive prizes, fair open judging and publicity, publicity and more publicity.

Certainly the rules of the 1965 BTR Contest could have been a lot better thought out. The abolition of categories, instead of making the rules simpler, only made them more complicated. In many cases, it was obvious that a tape had been made aiming at two sections or more in the hope that the judges would put it in the category in which it stood more chance. In actual fact, such a half-and-half tape never really stands a chance in either section, if only because it's aimless. Also, in at least one case the preliminary judges had gone sadly astray in placing one tape in the humour section when it was obviously intended by its composer (to my mind and in the opinion of many of the judges) to be a documentary. Admittedly this tape had some humorous patches, but then many documentaries have, and indeed need, a touch of humour. Straightforward hard-and-fast rules always simplify a contest rather than complicate it, and here a concise category system (actuality, documentary, humour, music, stereo, clubs, schools, electronic music) would have given entrants a clearer idea of what they were aiming at, and would have made the judges' job a lot easier.

As far as attractive prizes go, the sponsors have certainly contributed well, and if the contest was not the success it might have been, the fault certainly doesn't lie here. However, I do feel, along with many others, that recording enthusiasts, like any other creative artists, prefer the honour and glory to the money. If an artist paints a really good picture he doesn't want it covered

in tarpaulin and left to rot in an attic. He might like to sell it to hang in a private house, but his greatest ambition is to have it hung in a public gallery. In the same way a recordist who paints a really good picture in sound will live for the day that a tape of his can be played on the radio. If the BBC would dare to commit themselves to the extent of promising a hearing on the air for, say, the winner in each section, this would be a terrific incentive to increased entries and higher standards.

You will notice that the third of my main points concerning the success of a contest refers to fair open judging. This does not mean that I think the judging is in any way rigged. I know that a few ill-informed mutters have been heard on this subject, but to anyone who is in any doubt whatever, I can honestly say that there was never any question of favouritism or pre-formed opinions in any case.

There is also the question of whether all tapes, irrespective of what make and type of tape recorder they were made with, should or should not be played on high-grade, professional tape recorders. The answer to this comes from *ATR* Editor F. C. Judd, who maintains that all tapes entered in a contest should be re-played for judging on the best equipment available. It does not follow, as some seem to think, that a tape sounds better on the machine on which it was recorded. It remains, of course, that re-play level and azimuth should be properly adjusted for each tape, since one does not expect every recorder used for competition entries to be perfect in this respect.

Also, the tapes should be heard all through and heard in silence. There has in the past been a tendency for judges to ask for a tape to be stopped if they feel that it doesn't stand a chance against those already heard. This is all wrong. The opening moments of a tape may be bad – whether you're writing a letter or making a tape the opening paragraph is always a stumbling block. But once you warm to your subject everything flows and in many cases a tape improves as its creator warms to his subject. One very interesting documentary, very well presented in spite of its rather uninspired opening, was discarded in this way by the judges. Had they had the time to hear it through it may be that they'd have thought differently.

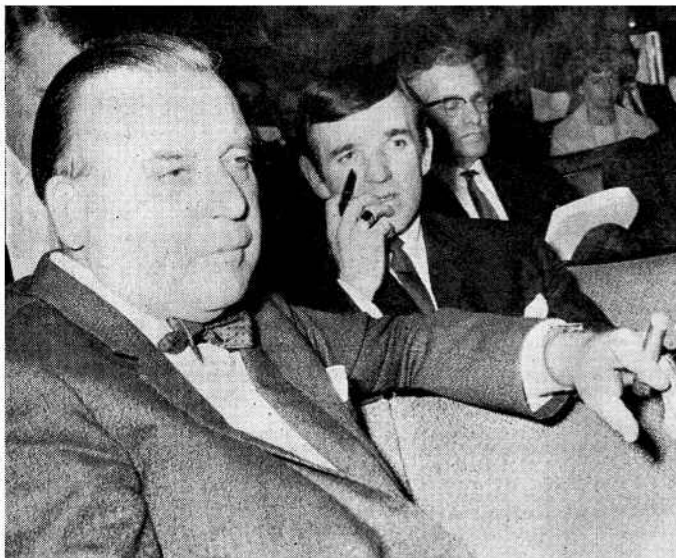
The question of silence was a very sore point as far as I was concerned. It is inevitable that the judges should want to discuss

the tapes they have heard, but they should be allowed to finish their comments before the next tape is started, and once the discussion is over, no afterthoughts should be voiced. Again a very good tape (which I had heard all through on a previous occasion) was ruined because the judges missed the opening words which set the scene for the whole tape. This was because the playback apparatus was switched on without any warning, and this could have been avoided by the use of a buzzer or something similar to warn the judges (and observers) that a tape was about to be played. And while on the subject of observers I must say I was ashamed of the behaviour of some of them. Because they had heard all the tapes at the preliminary judging, some of them seemed to think this entitled them to sit and make facetious comments throughout the judging. Fortunately the judges were considerably nearer the front of the auditorium and did not appear to be disturbed by the mutterings behind them. Other observers, forced (as I was) to sit near the offenders, had their whole enjoyment of the tapes and the judges' comments ruined by the behaviour of a few ill-mannered guests.

I felt, too, that the judges could have been given a clearer brief on what to look for in each section. A typed copy listing the different sections and the points to be watched for (in order of importance) would have been more than useful. As it was, some of the less experienced judges had to rely on the guidance and suggestions of old hands like Timothy Eckersley, Eric Robinson and John Borwick. The final judging session is no place to start arguing about what constitutes stereo – with a clear written brief



... and still more concentration



*expert appraisal and listening . . .
(Eric Robinson and Alan Freeman)*

the judges would not have had to thrash this point out before getting down to actual judging.

I would stress, though, that the above comments reflect in no way upon the judges themselves or on the Mullard Company.

Mullard Ltd and all the judges did the very best they could within the organizational limits of the contest. It needs the organizing committee to acknowledge the shortcomings of the present set-up and to set in motion the appropriate machinery for improvements.

And this machinery certainly needs to roll as far as publicity for the contest is concerned. This year no advertising space for the contest was booked in any of the audio magazines. When I spoke to the organizers on this point I was assured that extensive publicity had been used by the manufacturing sponsors. This had involved the distribution of leaflets, posters and entry forms to all the retail outlets handling the products of the sponsors. This sounded an excellent scheme that should have brought the

contest to the notice of millions. However, a snap check of ten major London-area dealers revealed that ten out of twelve had received no information on the contest whatever. Of the other two, one said they 'had vaguely heard something about it', the other said that a representative from a manufacturer brought in some leaflets and posters.

This just isn't good enough. Considerable sums of money had been spent on the designing and printing of posters, leaflets and entry forms. If the London area is anything to go by (and why shouldn't it be?), it would seem that only one out of the twelve dealers actually received the publicity material. In other words, 91½% of it was wasted – probably ending up in waste paper baskets, dustbins or collecting dust in the car boots of company reps. I am quite sure that the companies concerned haven't hitherto realized this, but now that they do, I hope they'll investigate among themselves.

All in all, there is a lot that could be done to improve the contest, and I'm sure the organizers will attend to as many of these problems as they can before the next contest comes around. But just because there is room for improvement, don't run away with the idea that the contest was a failure. As I said to start with, it was a moderate success. At 200, the number of entries has not only doubled that of last year – it is also the highest entry ever received by any member country of the International contest. The tapes heard (allowing for the differences between recording and playback machines) were of a high quality and I feel sure that the winning tapes should get a good airing on radio and television. With just a little more vigour we should soon be able to hoist this contest up to, and even beyond, the level of success attained in photographic and other national contests. And when we've done that, we really will be able to sit back and say 'unqualified success'.

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AGFA THE PERFECTLY BALANCED TAPE



Agfa tape is produced to give perfectly balanced reproduction over the whole tonal range. It is manufactured in three basic types all on pre-stressed polyester base.

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AGFA

AGFA LIMITED

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GL 2560

PRODUCING THE ADS ON TAPE

You'd be surprised how useful tape is in the advertising business. Bright, progressive copy men (they write all the words for the adverts!) can get their inspiration down on tape before these flashes of genius rush into the subconscious mind. As a tape-minded copywriter, I keep a Japanese portable recorder right behind my typewriter, ready for that instant inspiration that strikes me during tea-break, at least one morning in three. Professional ethics make it impossible for me to type during tea-break; hence, the recorder.

Seriously, the tape recorder is very useful at letting the humble copy man hear what a commercial will *sound* like, e.g. on radio or television. Words that *look* impressive on paper may have the aural impact of a bowl of rice pudding dropping on to a commentator from the BBC. The recording of the main sales copy, i.e. those few cheerful sentences of good advice on how to keep the floor clean and the family happy, and subsequent play-back gives the unrecognized advertising genius – like myself! – a good idea of its merit. That's why the erase button on my machine gets such a lot of wear, by the way. When the number of actual possibilities for a commercial has been reduced to three or four approaches, other members of the agency staff – e.g. the heavy-lidded studio artists who draw the pictures for the adverts – may be asked to give their opinion, which is, after careful consideration, carefully ignored in favour of consumer research. An agency director that I knew always reckoned that the ideas most disliked by the studio artists were those most likely to succeed. He worked this out on the basis that, being ready to

David Lazell in another humorous (?) application of the tape recorder

leave for the South Bank of the Seine at the earliest opportunity, the brush-wielders of the studio were not sympathetic towards advertising. Anything which they disliked, he argued, would therefore go down with right-minded people. I don't entirely accept his approach. He



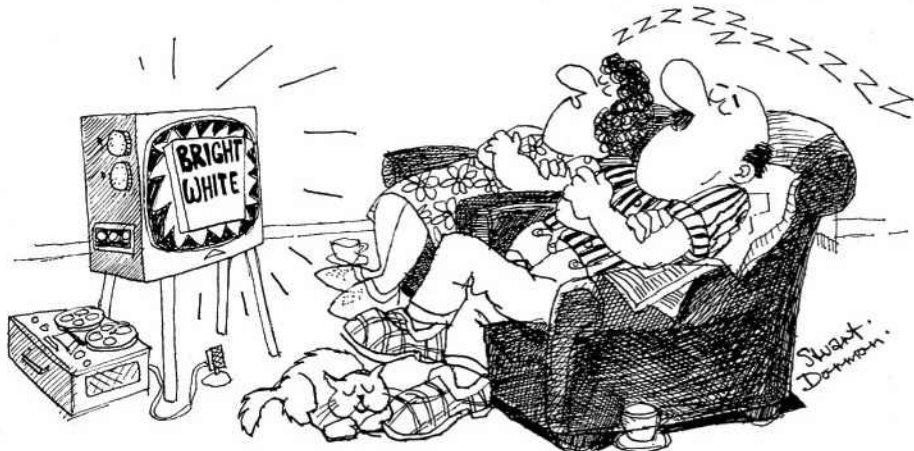
always kept clear of the studio where his appearance tended to provoke instant rebellion. Maybe he should have sent them a tape of gentle apology and recognition of their abilities, etc.

Another use of the tape recorder in the advertising business (I nearly said 'game' – it amounts to the same thing) is that of recording the lengthy and sometimes heated meetings where policy is discussed. Usually, a group of people responsible for handling the account gather in the Manager's office to decide how a sales campaign should be conducted (e.g. whether 'Japanese Tape Recorder Week' can be linked to 'Jamaican Banana Fortnight' – and how!). The resulting decisions are said to be 'the policy'. On average, you get two or three ideas from every person present at a 'policy meeting'

plus those put forward by the Manager on behalf of his wife, who, whilst not being in the advertising business, nevertheless, considers herself more expert than her husband. The Manager is therefore biased, as he expects a difficult domestic situation if he returns home to inform his spouse that her ideas were thrown out of the window after three minutes' discussion. Unless the policy meeting is tape-recorded (it's impossible to capture in shorthand) the real sparks of genius (usually from the copy man, like myself!) can get overlooked. Not only that, but the mere presence of a microphone on the table tends to make the excitable gents from the studio a little more restrained. Above all, the playback of the recording on the following day puts the procedure into perspective. If you were editing the tape for later use, you'd probably keep 150 feet or so, of a double-play 7 in reel. The playback shows up any lack of logic, any promising ideas that are really impracticable, e.g. like giving a free packet of breakfast cereals with every plastic soldier sold at ninepence. Of course, some agency directors would like to dispense with these recurring travails of composition altogether, producing a cross between a computer and a tape-recorder for instant playback of completely original ideas. Personally, I think that day isn't far distant, and am already saving up for a powerful bulk eraser to be left at strategic points!

Some agencies use tape recorders in their research, e.g. in asking people what they think about specific products, or what they think about advertising campaigns. But so many people use tape recorders for research these days that it's getting a bit 'played out'. Produce a machine in any public place and people think you've turned up from 'Panorama'. When they find out that you haven't, they look disdainful and wander away. I've always thought that it would be a wonderful idea to install – with due permission, of course – tape recorders attached to TV sets, and designed to record people's reactions to the commercials. The results would probably turn many a devoted copy man to desperate ways (e.g. painting unsaleable canvases on the South Bank – Waterloo, that is).

For all that, I still regard the tape recorder as a 'must' to any advertising man. Yes, it's even more important than that grey flannel suit with the narrow turnups. . . .



HOW TAPED PICTURES ARE REPRODUCED

Gordon J King continues his series on video recording

In a previous article it was shown how the video camera translates the scenes which it 'sees' into corresponding electrical signals. It was shown how the TV camera is, in fact, the visual counterpart of the microphone and how it is necessary for the camera system to decompose the scene into elements by a scanning process so as to form the overall video signal.

We shall now consider the reproducing end of the system. Let us suppose that the video signal and sync pulses have been taped and that on playback the tape head is delivering a faithful replica of the original signal produced previously by the camera system.

The scenes, of course, are built up in terms of light and shade on the screen of a cathode-ray tube. This is exactly the same as the screen used in ordinary television sets. Indeed, as we shall see later, any ordinary television set can be adapted to play back the taped picture – and sound. It is now common to call the tubes used in television sets, picture tubes, to distinguish them from the true cathode-ray tubes used in oscilloscopes and similar test equipment.

THE PICTURE TUBE

We all know what a picture tube looks like. It has a slender neck which flares out at one end to form the screen on which the pictures are displayed. The other end of the neck terminates in a base – rather like a valve base. The pins on this base connect to the various elements inside the neck. There is also a connection somewhere on the flare for applying the extra high voltage (eht) necessary to work the tube. The tube neck encloses an electrode assembly, called the 'electron gun'. It will be recalled that the camera tube, too, has an electrode assembly of the same name. The electron gun in each style of tube produces a thin beam of electrons,

as shown in Fig.1. The gun assembly in the picture tube is so arranged geometrically that the electrons of the beam impinge at a point in the centre of the screen. The electrons hit the screen at great force because they are accelerated from the gun at high velocity due to a positively charged final anode. It is that anode which is connected to the eht potential.

Although electrons are incredibly small, they nevertheless possess a value of mass. They also represent a *negative* electrical charge. This means, then, that they are attracted to a *positive* charge (from physics we will probably remember the axiom of unlike charges attracting and like charges repelling). The greater the positive charge, the greater is the attractive force subjected upon the electrons.

The final anode of the electron gun often has 18,000 volts of eht applied to it. One can thus imagine the force at which the electrons are attracted to it. The anode is arranged so that the electrons do not hit it but literally 'shoot' through a small aperture at its cylindrical end. The electrons then go speeding off through the space of the picture tube until they eventually hit the screen at the flare end, as we have seen. The way is made reasonably clear for the speeding electrons by the air being evacuated from inside the tube.

If the vacuum in the tube is poor, the high velocity electrons come up against gas molecules from time to time, and ionization occurs due to an electron or two being knocked off the gas atoms by impact with the beam electrons. This, of course, greatly impairs the efficiency of the picture tube. We need not get involved with this problem at the moment, however.

Now we must consider what happens when the electrons hit the screen. Energy is liberated and why this is so can be illustrated by considering a camper fixing a tent peg into the ground. He does not (normally) attempt to push the peg into the ground simply by applying pressure with a hand or foot. He uses a fairly

heavy mallet which he swings through the air so that impact occurs on the top of the peg. The peg then enters the ground quite easily.

When any object is accelerated it builds up a kinetic energy of value related both to its mass and velocity. The greater the mass or velocity, the greater the value of energy. Now, should the object be prevented from continuing its journey, all the energy that it has built up is suddenly liberated. If the object is of large mass and of high velocity, the sudden liberation of the built-up energy can cause quite a mess, as we know from car crashes.

The eht voltage applied to a picture tube does not accelerate the constant mass of the electron sufficiently to cause it to build up energy of a value which would fracture the glass screen of the tube. Indeed, too great a velocity would result in the production of X-rays which would be singularly dangerous.

HOW LIGHT ON THE SCREEN IS PRODUCED

The glass screen is coated with a special material which exchanges the kinetic energy of the electrons for light emission. This coating is called screen phosphor. The colour and intensity of the light emission depends on the type of phosphor, of course. Also the light emission is governed by the impact velocity of the electron beam and by the electron density of the beam.

It follows, therefore, that the greater the eht voltage, the brighter will be the spot produced in the centre of the screen. There is a limit, of course, depending on phosphor saturation in terms of light emission and on the power dissipation of the tube generally.

The beam velocity is fixed by the value of the eht voltage applied to the final anode. This is not adjustable. Nevertheless, the brightness of the spot of light in the screen centre is adjustable by varying the *density* of the electron beam.

This is accomplished at the electron gun. Here is a control or modulator grid which controls the quantity of electrons shot from the gun. When the charge on this grid (relative to cathode) is increased in a negative direction, the number of electrons making up the beam is decreased (note that the velocity remains unaltered). Indeed, the beam can be cut off completely by making the grid sufficiently negative.

This electrode, in fact, is akin to the control grid of an ordinary thermionic valve. By connecting a potentiometer and negative supply to it, the brightness of the spot of light can be adjusted from zero to maximum brightness. It is such a potentiometer that forms the basic brightness control in all television sets and video tape monitors.

So far, then, we have seen how the electron beam is produced, how it gives rise to a spot of light in the centre of the screen

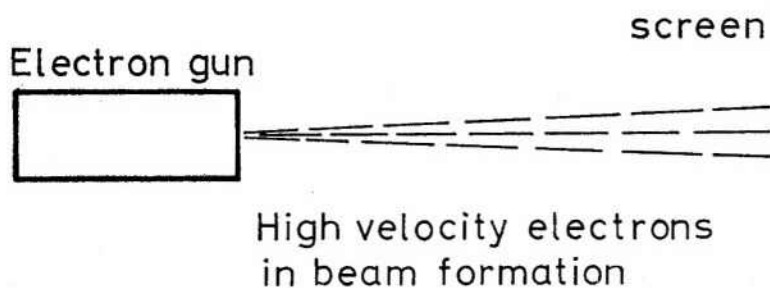


fig. 1 This diagram shows how the high-velocity electron beam is 'shot' from the electron gun to impinge upon the centre of the picture tube screen and thus produces a spot of light. The spot is called the 'scanning spot'. In practice, the beam is focused by an electromagnet or permanent magnet located on the tube neck. This acts as a magnetic lens.

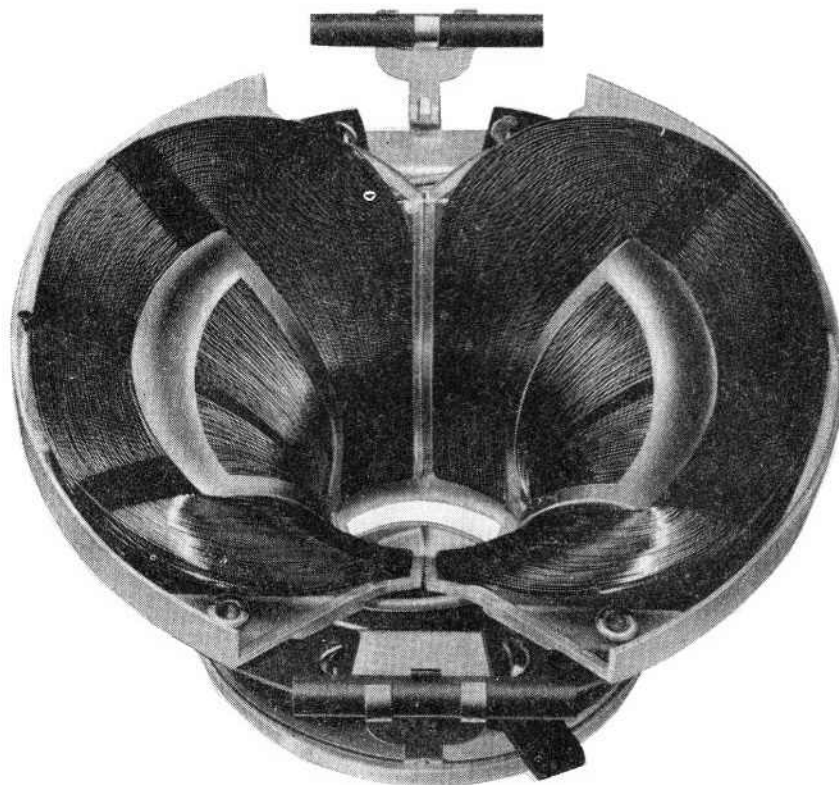


fig. 2 Scanning coil assembly carrying both the line and the field scanning coils. This fits on the picture tube neck, close to the flare of the tube.

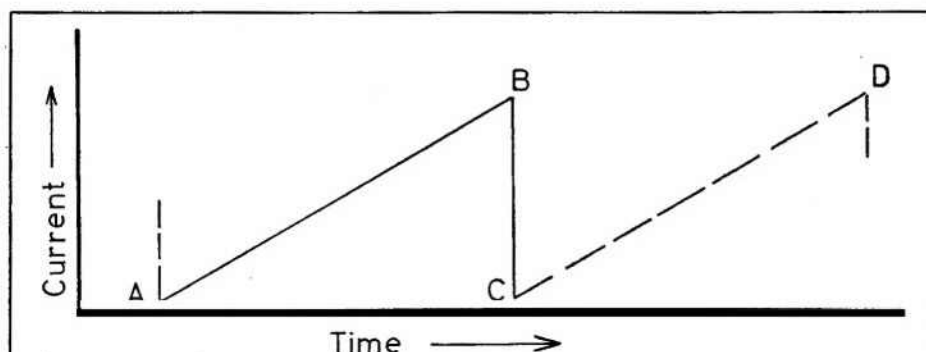


fig. 3 The sawtooth nature of the current applied to the scanning coils. The rising current A-B gives the scanning stroke and the rapidly falling current B-C gives the retrace stroke.

and how this spot of light can be adjusted in brightness.

SPOT DEFLECTION

However, just a little spot of light in the centre of the screen cannot produce a picture. The spot must be deflected over the entire screen area so that a picture composed of values of spot brightness between zero (black) and maximum white can be painted upon it. As in the camera system, the spot of light – known as the scanning spot – is deflected by two time-bases vertically and horizontally on the screen.

In the picture tube, the spot is deflected by the beam being caused to deflect under the influence of two magnetic fields. These fields are produced by scanning coils; a pair of line scanning coils to give the horizontal deflection and a pair of similar coils, but displaced 90 deg. from the line coils, to give the vertical deflection. These are called field scanning coils. Their former name was frame scanning coils.

The scanning coils are wound on a special former that fits snugly over the neck of the tube and up against the flare (see Fig.2). They thus produce two magnetic fields at right-angles to each other when an electric current is passing through their windings. When current is passed, say, through the line coils the scanning spot is deflected either to the right or to the left of the centre, depending on the direction of flow of current and hence on the polarity of the resulting magnetic field. When the current direction is reversed, the spot deflects the opposite way.

The field coils produce a similar action, but this time the scanning spot is deflected either above or below screen centre, again, depending on the direction of flow of current through the windings.

The magnetic field produced by the coils, of course, cuts through the neck of the tube and thus through the electron beam itself. Since the beam is composed of electrons, it can be considered as a conductor of electricity and it is deflected in exactly the same manner as a coil of wire passing an electric current is deflected in a magnetic field. This is the electric motor principle; and the same principle applies to the moving-coil loudspeaker. Electric current flowing through the coil gives rise to an encircling magnetic field which reacts against the field produced by the magnet itself. The coil thus moves in or out of the magnetic field, depending upon the polarity of the field and on the direction of the current through the coil. In the picture tube, it is the electron beam which is deflected in the same way as is the coil of the moving-coil loudspeaker.

SCANNING ACTION

The current fed into the scanning coils is of a sawtooth nature, as shown in Fig.3. The current starts at point A on the wave-form and rises with time to point B. This

continued overleaf

How taped pictures are reproduced *continued*

rise of current A-B produces a magnetic field that deflects the electron beam – and hence the scanning spot – either from the left to the right of the picture tube screen (line scan) or from the top to the bottom of the screen (field scan).

When the current reaches its maximum value at B, it suddenly drops almost instantaneously to point C, where a subsequent scanning stroke C-D is commenced. The fall of current B-C is called the retrace stroke. It happens in a very small period of time, as can be seen from the diagram. During this period the scanning spot is very rapidly deflected back to its starting position at the top (field scan) or at the left (line scan) of the screen. The scanning spot literally flies back, and the retrace action is often referred to as the fly-back.

The field scanning stroke is arranged in Great Britain to occur 50 times per second (60 times per second in America), while the line scanning stroke in Great Britain on the 405-line system occurs at a rate of 10,125 times per second and on the 625-line system at a rate of 15,625 times per second.

The electron beam is thus under the influence of both the line and field magnetic fields and the scanning spot is deflected from the left to the right of the screen while at the same time it is being deflected much more slowly from the top to the bottom of the screen. After the first line scan, the spot has moved only a little way down the screen, so the second line scan starts just a little bit under the first one, the third one just a little bit under the second one, and so on . . .

The scanning spot is thus caused to trace out a series of lines from the top to the bottom of the screen. An enlarged section of such tracing action is shown in Fig.4. This illustrates all that has so far been told about scanning.

INTERLACING

Now, at this time our mathematically-minded readers may be disputing the line scanning repetition frequencies mentioned earlier. If we divide 10,125 (the line scanning frequency of the 405-line system) by 50 (the field scanning frequency) our answer would be $202\frac{1}{2}$ – not 405. Similarly, we come up with $312\frac{1}{2}$ when we divide 15,526 (the line scanning frequency of the 625-line system) by 50. Not 625, as may be expected.

The reason for this is that a system of 'interlacing' is used in current television systems to avoid (or reduce) flicker effects. One complete picture is, in fact, made up of two complete frames, each frame having exactly half the number of lines of a complete picture. This means,

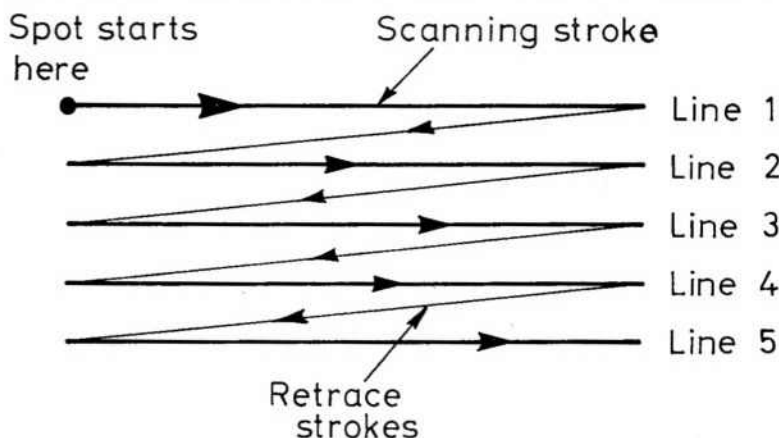


fig. 4 This diagram shows the nature of a sequential scan due to combined action of the line and field scanning fields.

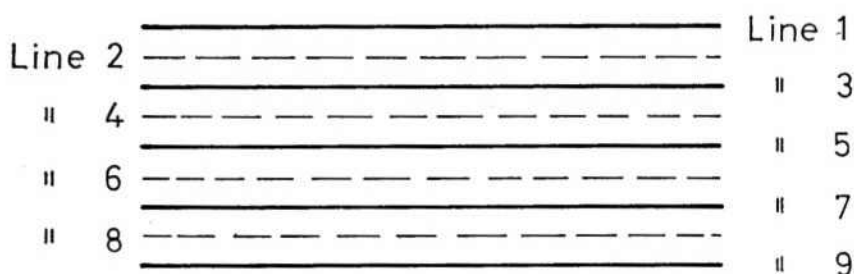


fig. 5 In high-quality video equipment the interlaced scan is employed. Here the lines of one frame are caused to fall between the lines of a subsequent frame, giving one complete picture every two consecutive frames.

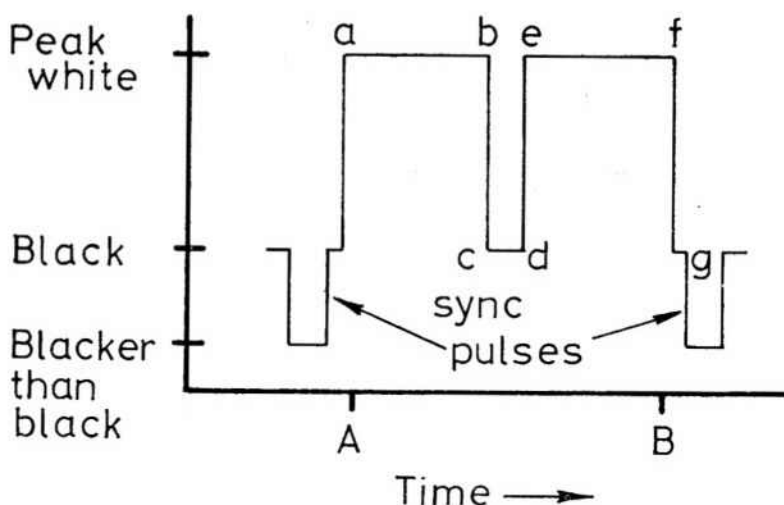


fig. 6 The video signal at (a) produces the screen display at (b). This is fully explained in the text.

then, that although 50 frames of half the picture information occur each second, there are only 25 complete pictures per second.

What happens is that the lines of the second frame interlace exactly with the lines of the first frame. The idea is shown in Fig.5. Here the first frame is made up of odd lines (1, 3, 5 and etc.) while the second frame is made up of even lines (2, 4, 6 and etc.), the two sets of lines interlacing.

On high quality television systems, including high quality video tape setups, extra special attention is paid to the interlace both at the source and at the receiver or monitor. So far as the video tape enthusiast is concerned, however, a system of random interlace is adopted. This means that no specific attention has been

In the earlier video camera article we saw how the video signal is produced, we saw the video waveform and the sync pulses. It may be a good idea to recheck on that article. Anyway, in Fig.6(a) we show a very simple video waveform such as would be produced by the camera looking at a white vertical bar on a black background.

THE PICTURE SIGNAL

The picture signal proper starts at point A on the time axis and finishes at point B. Time A-B coincides exactly with the time of an active line scan.

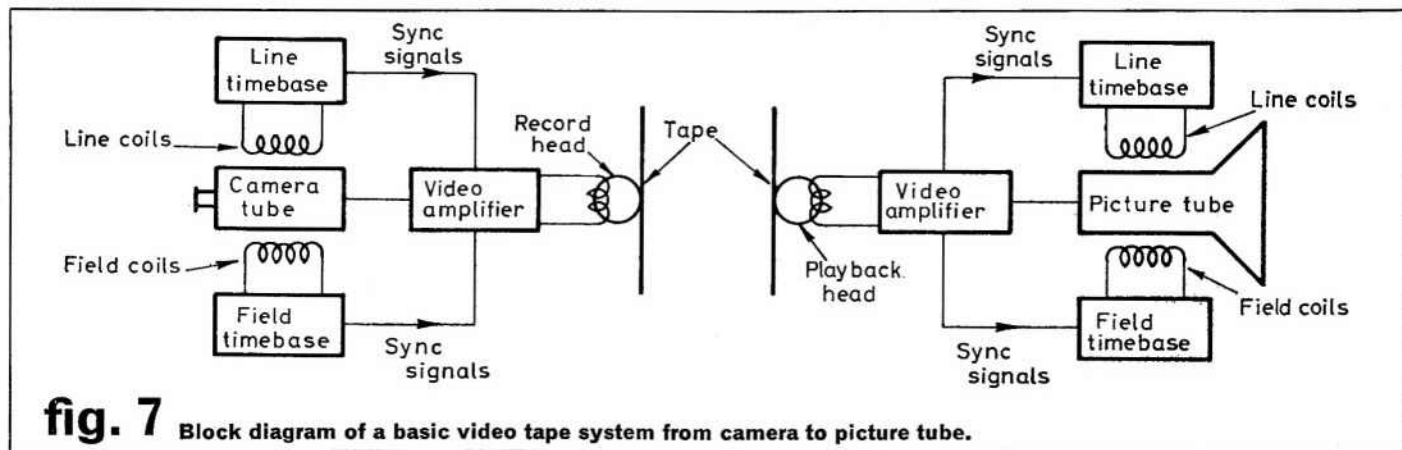
The video signal rises from the line sync pulse to peak white value a and it holds this value over time a-b, at b it drops to black level again at c and holds black from c to d. It then rises to peak white e

of exactly the same video signal would be a black bar on a white background, as shown in Fig.6(b). This, we will recall, was what the camera saw!

A more complex video signal would give varying degrees of scanning spot brightness, and different signal characteristics over each line would represent a complex scene. However, the method of reproduction is exactly the same as expounded for the simple vertical black bar on the white background.

SYNCHRONIZATION

Each line of video signal as produced by the camera system is kept in absolute step with each line of video signal presented to the picture tube by means of the sync pulses following each line of signal. The line sync pulses, as these are called, initiate



paid to the interlace performance and that interlace occurs in a random manner. Sometimes the lines of the two frames will pair (making just one line), while at other times a perfect interlace will occur. Between these times there will be variations between line pairing and perfect interlacing.

Inexpensive closed-circuit television systems – without recording facilities – employ the random method of interlace, but in spite of this very good quality pictures are possible. The BBC and ITV, of course, transmit perfectly interlaced video signals. The interlacing is a function of the timing of the sync pulses as sent out from the transmitter and the ability of the receiver to do full justice to the accurately timed signals. We shall deal with this problem again in a future video article.

We have now arrived at the stage where we can see how the whole area of the picture tube screen is covered in illumination. The scanning spot, of course, is deflected so rapidly that it loses its identity as a spot of light and changes into a continuous line, or series of very closely spaced horizontal lines. This line – formed rectangular illumination on the screen is called the raster. This is a curious word, but is worth remembering as we shall hear quite a lot about it in future video tape articles.

and holds this value over time e-f, where it then drops to black again at g, this being the finish of the line scan.

Now, this picture signal is amplified by a video amplifier in the monitor set, and the output of the video amplifier is fed to the modulator or control grid of the picture tube. The brightness control is set so that when a signal corresponding to black level is applied to the modulator the raster is just blacked out.

Now let us trace out a line of signal relative to the scanning spot brightness. The spot at the start of the scan is blacked out. It then suddenly goes peak white owing to the rise in video signal to point a, which reduces the standing negative bias on the modulator grid, thereby greatly increasing the density of the electron beam. It holds this peak white level while travelling across nearly half the screen. The video signal then drops to black at point c. This puts negative bias back on the modulator grid and cuts off the illumination of the spot. The illumination remains cut off from c to d, but then comes back again to peak white value at e and is held to point f. The spot is extinguished at g by the video signal putting the negative bias back on to the modulator grid.

All this happens very quickly, of course, and the result if each line was composed

the retrace stroke and thus ensure that the line scanning stroke at the receiver commences at exactly the same time as the line scanning stroke at the camera system. It will be noted that the sync pulses fall to a level corresponding to 'blacker than black'. This causes the scanning spot to black out during the synchronizing periods and thus the fly-back is suppressed. There are other artifices at the receiver which facilitate this action. Field synchronization is accomplished similarly. That is, a series of field sync pulses occur directly after a field scan and the combined effect of these synchronize or 'time' the retrace current in the field scanning coils.

The sawtooth current waveforms for the line and field coils are produced by line and field timebase generators, and it is these generators that the sync pulses control. A later article will tell more about the actual circuits.

To conclude this article we show in Fig.7 a block diagram of a complete video tape system, from the camera system to the tape and from the tape to the picture tube.

The next article, which will be complete in itself, will reveal how an ordinary domestic television set can be adapted to cater for the video and sound signals derived from a video tape recorder.

Faithfully yours



To record and reproduce faithfully are important requisites of any Tape Recorder, but alone they are not enough.

The ability to do these things for long periods—under the most arduous conditions of usage—withstanding the rigours of unfavourable climates and robust handling pinpoints another important Ferrograph feature—Endurance.

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Ferrograph is an instrument for the music lover—for the discerning recordist—for the professional user and for the man to whom *reliability* and *endurance* are features that mean much, and that will reward him for the extra price he will be called upon to pay.

The Complete Manual of the Ferrograph, a sixty-four page illustrated quarto volume, bound in cloth, and containing full operational and technical data is supplied without charge to every Ferrograph owner on receipt of a completed registration card. It can be made available in advance to others interested however, price £1 on direct application. This sum will be refunded on the return of the registration card of any instrument subsequently purchased. (State Stereo or Mono).

To: The FERROGRAPH CO. LTD.
84 Blackfriars Road, London S.E.1.

Please send me a copy of the "Manual of the Ferrograph" for which I enclose £1.

Please send me a copy of the Ferrograph leaflet.

NAME

ADDRESS

ATR 10

The Enduring **Ferrograph**

Brandenburg Concerti. J. S. Bach. No 1 in F, No 2 in F and No 3 in G. HMV ALP-1755. £2 0s 0d.

Yehudi Menuhin and the Bath Festival Chamber Orchestra. If you like Bach I need say little more than that this is all most delightfully done. Immaculately performed, with authentic Bach trumpet, harpsichord etc.

Mr Menuhin is still a virtuoso!

If you don't like Bach, you have my sympathy and if you don't know him – ye Gods this is a fine tape to acquaint yourself with a splendid example!

Second favourite this month is quite the opposite end of the scale. 'Hootin' the Blues' by Lightnin' Hopkins. Stateside SL-10110. £1 15s 0d.

With so much pseudo R & B around, Hopkins comes on like a breath of fresh air.

His acoustic guitar playing alone is worth the price of the tape. It's a cross between jazz and primitive, but even when it doesn't quite come off we at least feel that he really tried. His singing, with its not-so-sly innuendoes, is most attractive, though you do have to listen rather closely to understand the words.

This recording, taken live during a concert (or concerts) has a fine recording quality and the right amount of audience atmosphere.

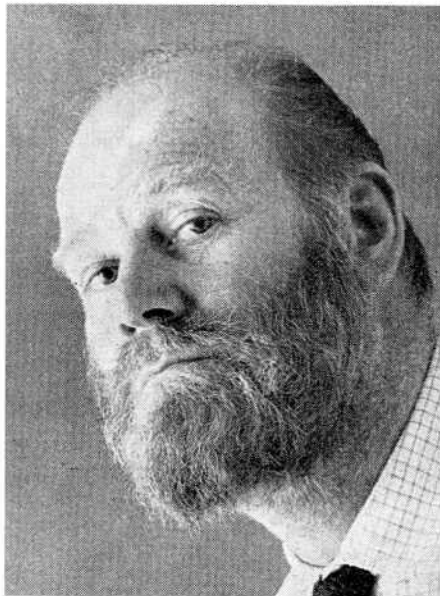
I like it, I like it!

Tribute to Woody Herman. The Al Goodman Orchestra. Tempotape No 26. £1 1s 0d. Unfortunately I am a great fan of the Herman Herd that made famous the tunes here recorded by the Goodman group. It is seldom that an imitation is as good as the original and this is no exception.

Had I not known the originals so well then I might have been impressed. Mind you, Al's boys do their very best, but they are following in the footsteps of a big league team and they don't quite measure up, especially where the rhythm section is concerned. Chubby Jackson, the Herd's bassist was, at the time, a sensation and Al's bassist falls very short indeed. Perhaps because of this, the recording has been given an overdose of bass control, making

TAPE REVIEWS

by Russ Allen



the whole tape sound somewhat tubby. If you've never heard the Woody Herman groups you'll find this a very meaty dish. Incidentally Tempotapes are the people who record only on one track of the tape so leaving room for your stuff. Also, there was 60ft of run-in before the music began, so don't start to dismantle your set until you've waited a while.

Ella Fitzgerald Sings the Jerome Kern Song Book. (Arranged and conducted by

Nelson Riddle.) Verve VLP-9080. £1 1s 0d. Ella's pitch and diction are superb and she can make something of even the most mediocre material. Riddle is a past master at the art of big band backing.

Together these two should have made a fabulous record, but it hasn't quite come off and I'm not quite sure why. Maybe it lacks something really wild, typical of the Ella we hear on Jazz at the Philharmonic Concerts, or maybe it's the overall mood of the material. Maybe it's me?

But in spite of this, it certainly has some fine singing and several of my favourite numbers.

'On Wings of Song.' Joan Hammond – Soprano. HMV-2068. £2 0s 0d.

Miss Hammond sings fifteen songs tastefully accompanied by Ivor Newton on the piano. The selection includes 'Ave Maria', 'Home Sweet Home', 'Green Hills of Somerset' and 'Bird Songs at Eventide'.

Not my cup of tea, but I know that my mother would have adored it, every moment.

For those who like their vocals à la Grand Hotel.

Last, but not by any means least, we have **Gerry and the Pacemakers in Ferry Cross the Mersey, with Cilla Black and introducing Julie Samuel. Also the Fourmost and Jimmy Saville. Musical Director George Martin. Columbia SX-1693. £1 15s 0d.**

That's what it says on the back of the box, but try as I might, I couldn't hear a word from Miss Samuel nor, I'm glad to say, Mr Saville. You do hear the others but only one track each of Cilla and the Fourmost. I'm delighted they were there too, as I find that G and the Pacemakers become a little samey when you hear three or four tracks on the trot.

Having not seen the film, hearing the tape brings back no sentimental memories and I can only say that it is pleasant without rising to any great height.

Super for Scous fans an' thut, like!

All the tapes reviewed in these columns are available, to personal callers and by mail order, from Teletape Ltd. of Marble Arch, London.

SPECIAL LOW-PRICE OFFER!

To match the new, larger ATR we have produced a larger binder which will keep your copies clean and neat, and ever-ready for reference. Normal price for these binders will be 15s 0d (including postage and packing), but if you send in your order before 30 November the price will be only 10s 0d. So hurry up and place your order now.
Amateur Tape Recording, 86-88 Edgware Rd, London W3

COMBINING 2 HOBBIES

by Marjorie Couzens

Having indulged myself in the pleasure of owning a tape recorder – and the fun of finding out how it works – I have now combined this hobby with my original one of writing. This has opened up fresh avenues in my pursuit of new subjects. Previous to having my tape machine I had done very little daytime listening, preferring to enjoy music from radio, television or our records, in the evenings. I am not one for 'background' of any sort while doing my housework.

Wishing to try out my new toy, I turned to the radio programmes, such as 'Listening Post', 'This Time of Day', 'Woman's Hour', 'Information Please', and 'Home This Afternoon'. I was amazed to find that I had been missing a wealth of free ideas for writing about. Here were people from all walks of life talking on every subject under the sun, stating their likes and dislikes, giving opinions on topics in the news and harking back to the old days.

Anything that I think will be of interest and use to me for working into an article – or even a letter to an editor – I record and play back in the evening so that my husband can also enjoy things he has missed. I jot down, in shorthand, any sections that might come in useful and then 'scrub' the tape, leaving it ready for the next session. What a marvellous invention it is.

Should a visitor call or the telephone ring during the recording my 'listener' can carry on, while we talk in the other room; thus I am no longer frustrated at having to turn it off and never hear the end.

Of course I made all the usual mistakes at first, but the miracle of the tape being 'scrubbable' avoids having to buy a new one when mistakes are made or the information is no longer needed. I once recorded a programme from the radio and was astonished to find that nothing had been recorded. I had forgotten to adjust the gain level from zero when erasing a previous recording! Another time my effort was spoilt by the recorder being too near to an electric fire, the 'hum' of which came out above the recording. Trial and error is the answer to this sort of problem.

I find the most difficult obstacle to overcome is that of conquering shyness when recording. One feels so ridiculous talking to an empty room and two soulless spools. I try to imagine I am reading my work over to a friend, and this usually enables me to feel more relaxed, so that the recording sounds less stilted.

Yet another problem is that of cutting out extraneous noises – children's voices, dogs barking, lawn mowers and sometimes even an aeroplane. Closed windows seem ineffective in cutting out these intrusions.

On those inevitable occasions when I am desperately trying to record against a background of noise that suddenly seems like bedlam, I can't help thinking how wonderful it must be to have a secluded house in the country and be able to record the dawn chorus.

Since my hobby really got a grip on me, I find life is apt to revolve around the recorder. Shopping and household chores have to be fitted in when there is nothing to tape.

Many of my friends own recorders and find, as I do, that they are exciting and invigorating machines. It is obvious that the recorder is here to stay, both for the professionals and for amateurs who, like myself, use a recorder to combine two hobbies.

RECORDING DIARY

when and where to record in October

Michaelmas Fairs are upon us once again, almost as a warning that October sees the last of the open-air fairs. This year there are notable Michaelmas fairs at Abingdon, Berks (4, 5), Banbury, Oxon (13–15), and Newbury, Berks (13–16). Also associated with the Michaelmas season, particularly in Worcestershire, are the Mop Fairs. Stratford-upon-Avon has a Mop Fair (12) and a Runaway Mop Fair (22), while Warwick itself has a Mop Fair with traditional ox roasting (16) and a Runaway Mop Fair (23). Other autumn fairs include the Bridge Fair at Peterborough (5), Nottingham Goose Fair (7–9), Hall Fair (9–16), Pack Monday Fair (18–20), Annual October Fair at Ilkeston (21–23) and a Carnival and Torchlight Procession at Faversham (23).

Animals and auctioneers provide the basic sounds at a number of agricultural shows this month. For pig-like grunts and squeals try the National Pig Breeders' Association Sale at Banbury (4), the Balmoral (Belfast) Cattle and Pig Show (5–7), the Welsh-Pig Show and Sale at Peterborough (6), the Wessex-Saddleback Pig Show at Reading (13) and the British Landrace Pig Society Show and Sale at

Peterborough (19). Cattle shows include the Beef Shorthorn Show at Perth (6), Devon Cattle-Breeders' Show, Exeter (6), Sussex Cattle Show, Maidstone (7), Jersey Cattle Show at Reading (7), Highland Cattle Show at Oban (11) and, of course, the Royal Dairy Show at Olympia, London (26–29).

Ploughing Matches are a natural accessory to cattle shows and there are two notable ones this month. The 109th Isle of Thanet Ploughing Match takes place at Sarre, Nr Margate (27), and the National Ploughing Match at Bottlesford, Nr Newark, Notts (27, 28).

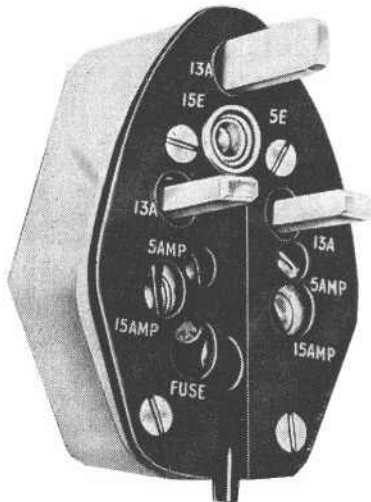
Music and Drama have many centres this month. London, Glasgow, Cardiff and Liverpool all have showings of the Commonwealth Arts Festival (16 Sept–2), and the Malvern Festival Theatre Season continues (until 3). In Largs, Ayrshire, there is the National Gaelic Mod (throughout month), and Cheltenham has its famous Literary Festival (4–8). Other music and drama festivals occur at Amersham (8–10), Swansea (11–16), Stroud (17–24), Bath (23–30), Hexham (23–30) and Liverpool (30, 31).

continued opposite.

AUDIOVIEW NEW PRODUCTS

Fittall universal plugs

The Fittall five-in-one fused plug has been on the market for some months now and has proved very successful. This plug is tailor-made for anyone with portable mains equipment, for it can be plugged into any of five different sockets by a simple adjustment of the pins. The photograph (below) shows clearly how the pins are arranged and how the type of plug required can be brought into operation by use of the selector plate. This plate is arranged so that in any one position it obstructs all the pins except those required at the time. Our illustration shows the selector plate in the central position allowing the 13 amp square pins to be brought into use. Fittall plugs should now be available at all electrical and radio retailers.



Philips car unit

Philips Electrical Ltd have recently introduced a car mounting unit for their EL 3300 and EL 3301 cartridge battery portables. The mounting unit, EL 3794D/00, allows the recorder to operate in a car from the car battery supply or through the car radio amplifier and speaker system.

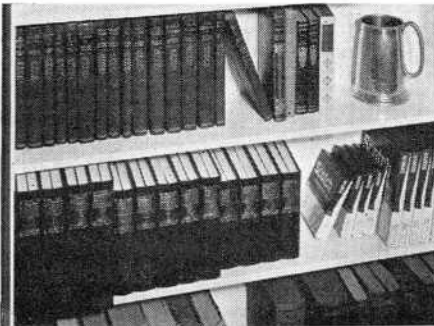
It can be mounted anywhere in the car, and fitted and connected takes up only 3 3/4 in x 8 3/4 in x 12 in. Through the mounting unit recordings can be made either with microphone or direct from car radio and can be replayed either through the car radio speaker or the recorder's own internal speaker.

The mounting unit alone costs £12 10s 0d,

or the complete car tape recorder kit, which consists of recorder, mounting unit and four tape cassettes costs 40 gns.

Scotch album pack (below)

Now available from all stockists of 3Ms Scotch products is the new tape album pack. This pack has the appearance of a well bound book with a dark green leather-like finish and gold block lettering and holds two reels of magnetic tape. Inside the pack there is ample space for each reel to be indexed in detail. Self-adhesive labels are supplied for the spools as well as for the spine of the book. Available in three sizes to take 5 in, 5 1/2 in and 7 in reels and supplied with one reel of tape already in position the album pack costs very little more than the ordinary standard boxed tape.



New Agencies

Highgate Acoustics Ltd have recently become agents for two new audio lines – Permaton magnetic tape, which is manufactured in West Berlin, and Arena audio equipment, which is Danish. Permaton tape is available in long, double or triple play at prices ranging from 9s 0d for a 3 in reel of long-play tape to £5 15s 0d for a 7 in reel of triple-play tape. Empty reels are also available from 3s 0d for a 3 in reel to 5s 0d for a 7 in one. Permaton leader tape in white, red or green is available at 6s 0d for 150 ft.

Arena of Denmark already produce radios, loudspeakers and record players, including a remarkable little stereo player with a Ganard deck that sells for only 11 gns. It is understood that they will shortly be introducing to the UK a new stereo tape recorder in the semi-professional class, but full details of this machine are not yet available.

PRICE LIST

TABLE MAINS RADIO:		Retail Price
T 1900 H Stereo (w/out Decoder)	65 gns	(inc. P. Tax)
T 1900 H Stereo with Decoder	72 gns	
Petite (Nov-Dec. 65)	to be announced	

TUNER/AMPLIFIER:	
T 1900 F Stereo (w/out Decoder)	59 gns
T 1900 F with Decoder	66 gns

RECORD PLAYER DESK:	
GFT-I-AC (with Amplifier)	22 gns
KTI on base	11 gns

TRANSISTOR PORTABLE RADIOS:	
PA 9 Automatic FM/AM 3 W.B.	29 gns
PA 13	FM/AM 5 W.B. 39 gns

SPEAKERS:

1. Pressure Chamber Speakers:	
HT 9	31 gns
HT 10	16 gns
HT 7	15 gns
HT 14 (use with T 1900 F)	12 gns
HT 15	21 gns
2. None Pressure Speakers:	
HT 4	5 gns
HT 6	11 gns
HT 12	9 gns

New from Lennard Developments Ltd is the Play-Fair stylus timer. This little gadget is self-adhesive and can be fixed to anywhere close to the turntable. Each time a record is played the timer should be clicked according to the length of the record. For 7 in records click once, for 10 in records twice, and for 12 in ones three times. As your stylus wears (and, incidentally, long before the wearing-down is bad enough to be heard) a red mark appears in the timer window. When the window is completely red, it's time to go out and buy a new stylus. This Swiss precision instrument will sell in this country for 19s 9d. Further details from Lennard Developments Ltd, 7 Slades Hill, Enfield, Middx.



RECORDING DIARY continued

Old Customs this month are limited. There is the installation of the new Master Cutler of the Company of Cutlers in Hallamshire at the Cutlers' Hall, Sheffield (6), and as we are verging on the Guy Fawkes season (how about those 'penny-for-the-guy' street cries?) there are the first two Bonfire Carnivals. In the Summerfield Park at Birmingham there is a Bonfire and Fireworks Carnival (30), and at Littlehampton a Bonfire and Torchlight Procession (30).

ON TEST AKAI X4

by Gordon J. King

The Akai X-IV is a very interesting machine indeed. It is a four-track stereo model of portable design. This means that it can make mono and stereo recordings and playback its mono efforts when under power from its own internal battery. An internal 5 in x 3 in elliptical speaker provides quite good quality mono replay. For really good quality – and the transistor playback amplifier is capable of this – a properly enclosed external speaker should be connected, a jack socket making this easily possible.

A stereo recording is played by the use of an ac adaptor which is supplied with the machine. This adaptor plugs between a socket at the rear of the recorder and the mains supply. It contains a mains power unit which effectively charges the battery and powers the recorder, and it also contains the driver and output stage of the second stereo replay channel. This means, then, that stereo playback is not a portable exercise, but requires the use of the ac adaptor and the mains supply – and, of course, a second speaker system.

It is possible to use the recorder's internal speaker for one stereo replay channel and an external (non-matching) speaker – connected to the ac adaptor – for the other. Of course, the best stereo reproduction calls for the use of a pair of matched external speakers. The internal speaker is muted automatically when the external speaker jack plug is inserted into the appropriate socket.

All this is very logical. For who would want to go portable on stereo replay? One may well want to do just that when making a recording which, as the opening paragraph reveals, is possible. What it boils down to is that one can go out collecting mono or stereo sounds, and



The Akai X-IV four track stereo portable tape recorder – 131 gns worth of portable hi-fi sound.

that one can listen to the results individually on each of the four tracks from the internal speaker while in the field. On returning home, the mono recordings can be played at very good quality from an external speaker, using either the internal battery or the mains supply (the latter with the ac adaptor), while the stereo recordings can be played by connecting the machine to the ac adaptor and a pair of external speakers (or one external speaker, using the internal speaker for the other channel), power then being taken from the mains supply.

Big Attribute

A big attribute of the X-IV is that the amplifiers are capable of good reproduction (2 watts maximum each channel – total 4 watts), meaning that the recorder can be used not only as the portable sound collector but also as the domestic tape player. Portables so often make good quality recordings yet are incapable of doing justice to them on replay. Not so with the Akai.

Before going on, a word or two about the ac adaptor would not be amiss. This is a neat little rectangular box containing the main right channel amplifier, the power conversion circuit and an automatic charging button. This latter is interesting. It is depressed to charge the recorder's battery, and when the battery is charged this blue button

automatically pops up and removes the main charge from the battery, thereby avoiding overcharging troubles.

The adaptor is suitable for ac mains only, but there is voltage selection switch which caters for the power systems found in all parts of the world.

The adaptor can be used solely to charge the recorder's internal battery or it can be used while the recorder is in operation. In this latter application, the recorder is effectively powered from the mains supply, for the battery is then under charge while the machine is drawing current. The battery serves as a very effective power reservoir and no trace of mains hum is present when the machine is so used. It would seem that the power output of the adaptor is such that even when the machine is running there is a margin of spare power which flows into the battery as a charge, as already intimated.

The battery used in the X-IV is of the lead-acid type with a solidified jelly-like electrolyte. It is sealed and thus unspillable. Its low rate of self-discharge means that it may be stored for long periods of time without damage provided it is in a charged condition.

When fully charged, the battery will run the machine on 'stereo record' continuously for about six hours. The discharge time on 'mono playback' depends on the setting of the volume

Manufacturer's Specification

Power: DC, rechargeable accumulator, 6 V 2.6 AH, AC, 100 V to 245 V. **Recording System:** Quarter-track mono and stereo with cross-field bias system. **Level Indicators:** Pair of VU meters, one used for battery voltage indication. **Speeds:** Four, $7\frac{1}{2}$, $3\frac{3}{4}$, $1\frac{7}{8}$ and $\frac{1}{2}$ ips. **Motor:** DC micro-motor with transistor control. **Distortion:** Within 5% total harmonic at 1 watt, 1,000 c/s. **Maximum output:** 2 watts maximum each channel (4 watts total). **Signal/Noise Ratio:** 40 dB. **Channel Separation:** better than 60 dB at 1,000 c/s. **Frequency Response:** (all within ± 3 dB) $7\frac{1}{2}$ ips 40 to 20,000 c/s; $3\frac{3}{4}$ ips 40 to 17,000 c/s; $1\frac{7}{8}$ ips 30 to 11,000 c/s; $\frac{1}{2}$ ips 30 to 5,500 c/s. **Equalization:** to the NARTB curve. **Sensitivity:** 100 μ V at 600 ohms and 60 mV at 250,000 ohms. **Speaker:** 5 in \times 3 in oval. **Microphones:** high sensitivity dynamic with small stands (these are supplied with the instrument). **Maximum Reel Size:** 5 in. **Wow and Flutter RMS:** less than 0.16%, 0.17%, 0.28% and 0.35% respectively at $7\frac{1}{2}$, $3\frac{3}{4}$, $1\frac{7}{8}$ and $\frac{1}{2}$ ips. **Rewind Time:** 75 seconds either direction 600 ft tape. **Weight:** 11.2 lbs less battery and case. **Battery** 1.3 lbs. **Size:** Height 4 in, width $9\frac{1}{2}$ in, depth with case closed 10 in.

control, since the playback main amplifier adopts a class B circuit, the current consumption of which is determined by the audio power output of the amplifier. At full power, however, a fully charged battery should give about three hours of playing time, and considerably more than this with the volume control turned down.

The automatic charging switch in the ac adaptor avoids excessive over-charging of the battery, and the current is regulated by a transistor circuit. The condition of the battery is continuously monitored on the VU meter (left) during playback. A demarcation line between red and black zones on the scale signifies that the battery is fully charged.

The battery is 90% charged when the blue charging button, mentioned earlier, pops out. To secure a 100% charge, the ac adaptor should be left connected to the power supply for a further two hours.

Four Speeds

The X-IV is a four-speed machine ($7\frac{1}{2}$, $3\frac{3}{4}$, $1\frac{7}{8}$ and $\frac{1}{2}$ ips). Capstan drive is from a small – yet powerful – low-voltage dc electric motor. The motor is controlled by a transistor circuit, and this coupled with the useful flywheel mass on the motor drive provides a remarkably good wow and flutter performance. The makers say that the rms wow and flutter is less

than 0.16% at $7\frac{1}{2}$ ips, rising to less than 0.35% at the lowest speed.

Tape speed is not unduly affected when the machine – set up to record – is subjected to quite violent movement. A truly portable machine, of course, should within reason provide acceptable quality when quickly moved around during the process of making a recording. The X-IV is held as any small suitcase or brief-case is held, while a recording is being made. The results are as good as if the machine had made the recording while standing flat on a motionless surface.

Wow and flutter could easily be detected when the machine was swung from side to side while it was recording. But of course one would not normally do such a silly thing! When recording in a car wow and flutter could barely be detected under normal conditions. As would be expected, however, it was more noticeable when the car was cornered, braked and accelerated violently. My views on this are that the machine is ideal for outside and portable record making. The motor also provides a rewind time (either direction) of about 75 seconds on 600 foot of tape. The sample machine took a little longer than this, but this was probably caused by a clutch misadjustment.

Cross-field Recording

The X-IV is one of the Akai models that features cross-field recording. Here, in addition to the record/playback head and the erase head, a third head is mounted directly opposite to the record/playback head, as shown in Fig.1. This head is arranged in such a way that it does not actually touch the tape, and to its winding is applied the record hf bias. Normally, of course, the hf bias is fed to the record/playback head along with the programme signal when the machine is recording, as such a bias is necessary to linearize the tape transfer characteristics. The non-linearity which would result without bias would cause very bad distortion, as most of us know.

However, when the hf bias is applied in the conventional way, along with the programme signal, a limit is set in terms of top frequency relative to head gap dimension and tape speed. To improve the treble the tape speed needs to be increased and the gap width reduced. It has been said that the direct application of hf bias tends to weaken the record field at the treble end of the spectrum.

With the cross-field technique, the hf bias field and the programme signal field interlink in the magnetic tape, and the required linearity correction results. However, there is less tendency for treble loss due to erasing effects, and the head gap can be reduced to very small values indeed. The net result is that good treble becomes possible at the low tape speeds which hitherto

were considered suitable only for dictation and low quality speech and music. How this works in practice is vividly revealed by the frequency response specification of the X-IV. At $7\frac{1}{2}$ ips this is 40 to 20,000 c/s, at $3\frac{3}{4}$ ips 40 to 17,000 c/s, at $1\frac{7}{8}$ ips 30 to 11,000 c/s and at $\frac{1}{2}$ ips 30 to 5,500 c/s (all ± 3 dB). Thus, good quality becomes available at the incredibly low speed of $1\frac{7}{8}$ ips, while even at the lowest speed fairly reasonable music quality is possible. Top quality response is available at $3\frac{3}{4}$ ips and the terrifically extended $7\frac{1}{2}$ ips response would have an application in the copying of a tape, where the very minimum of dubbing loss is desirable.

Octave Up

These figures show that cross-field recording can extend the response at a given tape speed to an octave higher than achieved by the conventional method. For example, the $3\frac{3}{4}$ ips response is comparable to that attainable from a good quality machine running at $7\frac{1}{2}$ ips. Tests have revealed that the claimed responses are obtainable in practice, though the type of tape employed does appear to influence the overall performance at the very high treble frequencies.

Each record/playback channel (excluding the main playback amplifiers) has a total of four transistors of the p-n-p type. There is also a transistor in each channel concerned with the VU meters. The main amplifiers each have three p-n-p transistors, one as driver and two in class B push/pull. The oscillator has a single p-n-p transistor in a transformer-coupled circuit, the motor control circuit has a p-n-p transistor and there is a transistor in the regulator circuit in the ac adaptor.

The microphone input amplifiers are arranged in the common-emitter mode, the 600-ohm microphone signal being applied to the base circuit. The input sensitivity at this impedance is 0.1 mV. The same input jack will also accept signals at 250,000 ohms impedance, but then the sensitivity is cut to 60 mV. A line/microphone switch caters for these two positions, a resistive attenuator being switched in on the line position.

One Jack Input

This is rather a jolly idea for it means that the one jack can be used for the microphone and for any high/medium impedance signal at higher level that may be originated from a programme signal line, radio set, tape recorder, record player and so forth. It is, of course, easily possible to feed in a high-level signal when the switch is in the microphone position. But this seems not to harm the input transistor, the effect being, as would be expected, very heavy distortion on the recorded signal.

continued overleaf

On test: Akai X-IV *continued*

The circuits are equalized at each tape speed to the NARTB characteristic. This is basically similar to the CCIR characteristic but involving some bass and treble cut to offset a specified recording pre-emphasis. A tape record made to the NARTB curve appears to have bass and treble emphasis when played on a machine equalized to the CCIR curve. Normal tone control adjustment, however, usually affords correction, one to the other.

Each main playback amplifier delivers a maximum of 2 watts of audio across 8 ohms. The distortion is less at 1 watt output, and is claimed to be within 5% at 1,000 c/s.

Very good channel separation in the order of 60 dB at 1,000 c/s is achieved. The signal/noise ratio, on the other hand, is said to be 40 dB relative to the recorded signal level. Tests indicate that a ratio a little below this was given by the test sample.

While perfectly acceptable for most applications, an unweighted signal/noise ratio of 40 dB may, on the face of it, seem a wee bit on the low side. A different complexion is given, though, when considered alongside the high microphone sensitivity of 0.1 mV (100 microvolts). Indeed, the X-IV is capable

of responding to sound so small as to be virtually unheard by less sensitive machines.

Playback Hiss

Viewed critically, playback hiss was somewhat higher than that given by high quality valve counterparts, but then overall microphone sensitivity may not be so high, and mains hum could be more of a problem.

With the test sample, general hum was not troublesome when the machine was mains powered. This is not to say that there was no hum present at all under this condition, but that it was of such a small level as to be audible only with the volume control full on in the absence of programme signal.

There are twin VU meters, for left and right channels. These indicate the record current in the heads (relatively), while the left meter serves also to indicate the voltage of the internal battery when the machine is playing back.

A three-digit tape index counter is incorporated for speedy location of a recording on a tape. Reset is by a push-button. This counter is visible even with the lid closed and with the machine operating under 'field' conditions.

When the jack plug of an external speaker is inserted into the appropriate socket at the rear of the recorder, the internal speaker is automatically disconnected.

Another useful fitment is a DIN socket

beneath the VU meters on the front panel. This socket provides terminations to the outputs of the preamplifiers of the left and right channels and to the outputs of the left and right record channels. With the earth terminations, these sockets allow the connection of monitor headphones while recording and outputs to the high-level inputs of an external stereo.

To sum up, the Akai is a very useful piece of machinery, and absolutely ideal for making out-and-about tape records, mono and stereo, returning home to play them at high quality, via external speakers. Immediate field replay, of course, is possible from the internal speaker (which gives quite reasonable quality on its own).

The only criticisms are the signal/noise ratio and the mechanical noise of the dc motor. The latter, however, is considerably muted with the lid closed. The former can easily be tolerated in view of the incredible performance of the machine generally. A tape made on the machine and then played on another machine (of different make, type, etc.) is a revelation. The quality is really outstanding, by far the best that your reviewer has yet heard on a machine as portable as the X-IV.

Here, then, is a machine that is so truly portable while being so domestically ambitious, and is highly recommended

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Side 2—City and Waterloo tube train—arriving City and Waterloo tube train—departing Footsteps (continuous track) In subway (mixed) In narrow streets (female) On pavement (mixed) Running in street (female) Running in street (male) Up and down (wooden stairs) Workmen hammering and sawing

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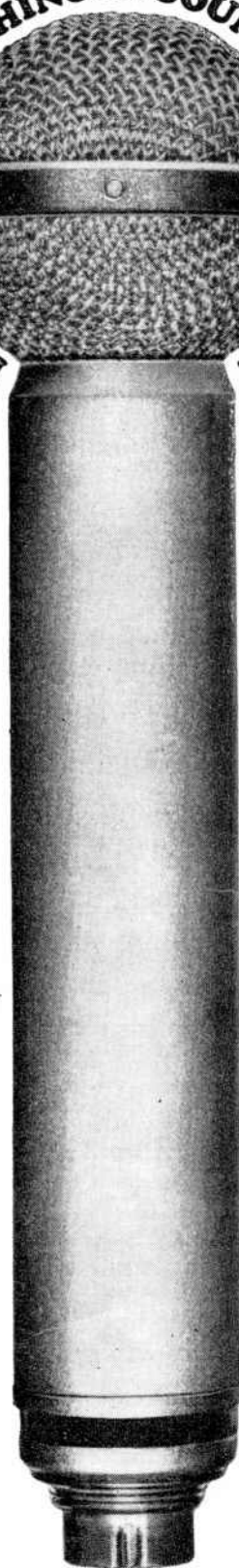
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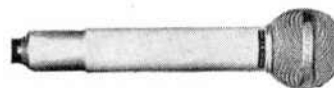
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Trams are becoming a rare sound. F.C.J with an AKAI X4 captures tram and traffic sounds in Ghent, the flower city of Belgium.

SOUNDS ALL AROUND

Sound perception is worth acquiring if your recording is to be successful

Are you really aware of the sounds that go on around you? When you are out and about recording for a holiday, travel or documentary tape, do you automatically become conscious of sounds that you might otherwise ignore?

Being aware of sound is most important when you set out, as I did recently on a tour of a strange city or resort. The city in which I found myself was the flower city of Ghent in Belgium. I had but a brief two hours in which to collect some of the continental sounds and atmosphere of this picturesque town, and I took the opportunity of field testing an Akai-IV. (Incidentally, there is a full test report by G. J. King on p. 30.)

Many owners of tape recorders complain of lack of subject material for recordings. Some have said that even after taking a portable on holiday or on a weekend jaunt they have returned with an almost blank tape. Lack of sounds? During my two hours in the town of Ghent I recorded 1,000 ft of sound track, mostly at 3½ ips. This contained sounds of all kinds and enough background and atmosphere material to make a complete sound

picture recording of my visit. Had I not been on the look out, or rather 'listen out', I could easily have missed many interesting and useful sounds.

Just as an inexperienced photographer can miss a chance of an excellent picture, so the inexperienced recordist can miss a lot of excellent sounds. This is largely because humans have what is known as 'selective hearing', which enables them to push into the background the sounds they are not specifically listening for. For example, if you are standing on a busy street talking to a friend, the actual volume of the traffic noise may be higher than that of your friend's voice, but by focusing your listening on to the voice you can almost 'not hear' the traffic noise. This ability to 'not hear' may be a good thing in the kind of situation I have just described, but it is a severe handicap to a recording enthusiast.

If you are to be at all successful in recording the sounds that exist all around you, you must discard your selective hearing and concentrate on listening to every sound. Imagine how you would feel in a dark, empty room, straining to hear

every sound. Strain your ears in the same way when you're out on the busy street in broad daylight – you'll be amazed at all the little sounds you've been missing. And as often as not it's these little background sounds (rather than the specific sounds like railway engines, zoo animals, etc.) that give a town so much of its atmosphere and can convey that atmosphere on to tape.

Listen carefully for the background sounds in the café, the exchange of words with the waiter, the loudspeaker announcements on the railway station or at the airport, the newsboy shouting the headlines of the latest edition. These are all sounds that can occur without prior notice, so train yourself to be almost 'trigger happy' with the record button. At the same time, of course, be ready to bring the volume control to the right level for a good recording and be able to estimate the loudness of the sound against the background noise. The ratio of wanted sound to background is most important. It won't be a good recording if the wanted sound is swallowed up in a background of other noises.

Here are two examples of being aware and ready. Whilst we were walking through the streets of Ghent I heard faintly but distinctly a typical continental warning siren. My two companions had not noticed, but my recorder was on and the volume control adjusted to take the ambient level of street noise. Would the siren come our way? It did and turned out to be an ambulance. My recorder was already switched on and I had warned my companions to keep quiet – by signs of course. They could easily have ruined the recording by speaking.

The trams running through the town were very easy to record for there were plenty of them, so a vantage point was chosen to achieve a good balance of tram sound against ambient traffic noise. But the special newsboy shouting the latest extra about the Tour de France (*Het volk met de ronde van Frankryk!*) seemed to appear from nowhere. After being politely requested to call out again for my recording, he very promptly went silent and walked away. Not to be outdone, I followed as unobtrusively as possible and very soon he started shouting out again. This was a recording full of atmosphere that I was very lucky to get.

So be aware of sound and be ready for it, and even be ready to pursue it. In this way one never fails to bring home something worth while. Get to know your recorder

too and practise with it often before you embark on any serious recording session.

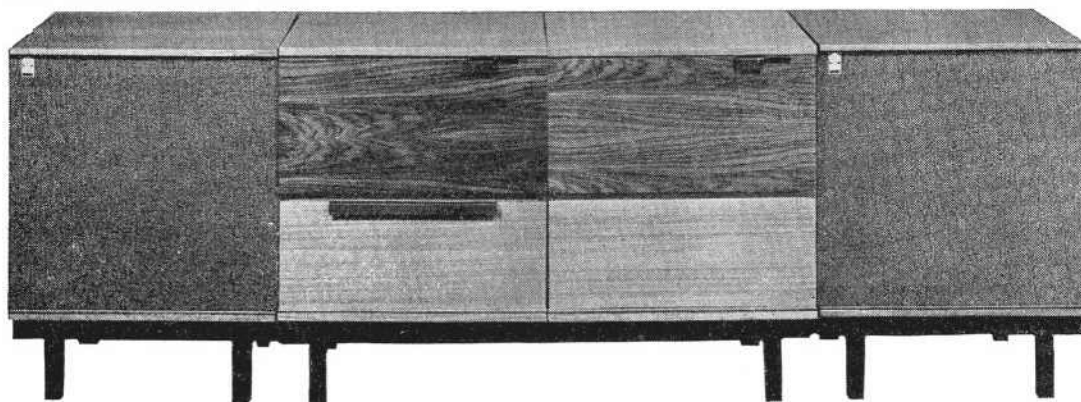
Although I had little opportunity of gaining real experience with the Akai X-IV, I found it capable of making an excellent recording. Owners are advised to take the battery charger with them on a trip away from home, particularly if recordings are to be played back on the spot for checking, etc. The mains voltage range of the battery charger covers all British and most continental supplies. For instance, in one part of Belgium I found the mains to be 250 volts and in another 125 volts. All my recordings were in mono and were eventually copied from the X-IV via the external amplifier socket. Since most of the sounds I had recorded were accompanied by ambient background the slightly higher noise level from quarter track recording was in no way noticeable.

However, I do have but one criticism; this concerns the awkwardness of pre-setting the recording level, since the tape must run whilst this is being carried out. There is no temporary tape stop or hold button. If your recorder has no temporary pause button, get round it as I did by leaving the record keys depressed and stopping everything with the main on/off switch until ready to actually record.

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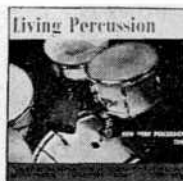
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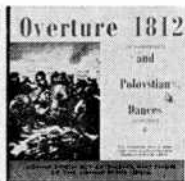
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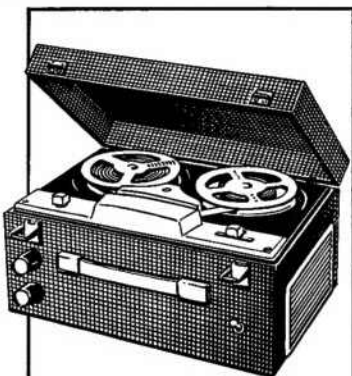
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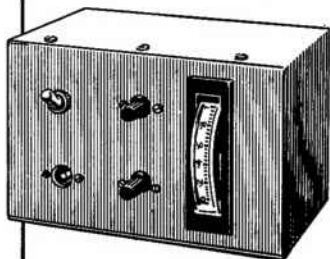
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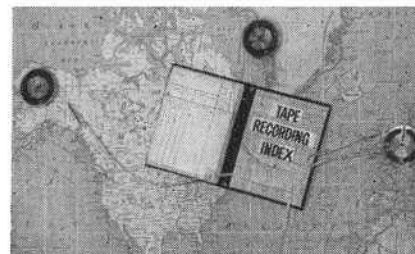
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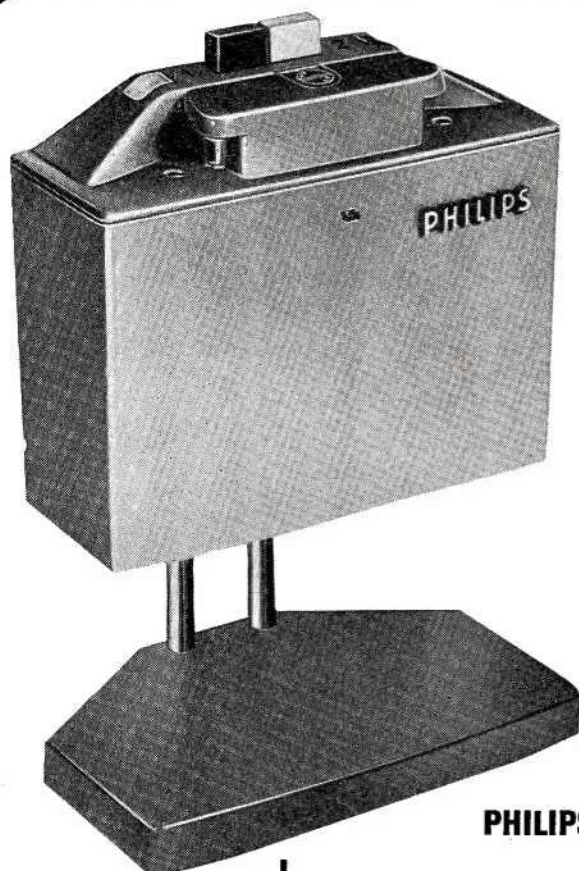
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SOUND SCENE

This month Sound Scene takes a look around some of the Audio Trade Shows that have been held in London in place of the discontinued Radio Show.

ARENA (Agents: Highgate Acoustics). This is a comparatively new name to audio enthusiasts in the UK. Arena is a Danish company producing a small range of hi-fi equipment which includes a variety of very neat loudspeakers. A number of their speakers are of the conventional type, but they have recently introduced a range of pressure chamber speakers. The model HT7 is a 6 watt pressure chamber speaker with an impedance of 4 or 16 ohms. The HT10 is a 20 watt speaker, again of 4 or 16 ohms impedance, the HT14 an 8 watt speaker of 4 or 16 ohms impedance and the HT15 a 12 watt speaker of similar impedance. Frequency response for the HT7 is 50-20,000 c/s, that of the HT14 is 60-20,000 c/s and of the HT10 and HT15 40-20,000. Prices are as follows: HT7 15 gns, HT10 16 gns, HT14 12 gns, HT15 21 gns



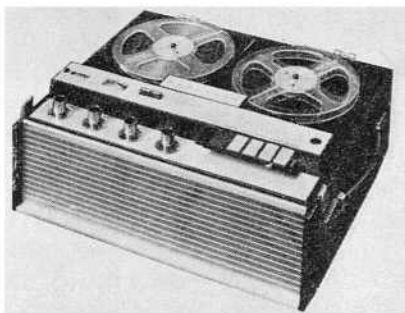
The B & O Beogram model 1000V

BANG & OLUFSEN (Agents: Debenham Electrical Ltd). B & O had no new tape recorders at their autumn trade show, but they have produced a number of new items of hi-fi equipment. The Beogram 1000 is a semi-professional version of the B & O four-speed stereo record player, now with 15° pick-up. It has been designed specifically for low-noise, non-vibrating and non-rumble operation which has been made possible by the inclusion of built-in anti-microphonic suspension. Speeds of 78, 45, 33½ and 16½ rpm are catered for. This model is also available in two versions – the Beogram 1000V for 220 volts a/c and the Beogram 1000VF for 220 volts a/c and with a built-in pre-amplifier. Price of the 1000V is 34 gns and of the 1000VF 39½ gns. The preamplifier is also available separately, price 5½ gns. Bang & Olufsen were also showing their all-transistor 2 × 15 watt combination of a hi-fi stereo amplifier and a highly selective FM radio. The Beomaster 1000 has a highly selective FM radio section with extended FM band up to 108 Mc/s and includes both input and output sockets for a tape recorder. Frequency response is from 30 c/s to 20,000 c/s ± 3 dB. Price of the Beomaster 1000 is 79 gns.

BLUE SPOT (Agents: Bosch). Blue Spot Ltd, a subsidiary of the Bosch organization, have introduced three new radiograms to their range. The newly styled Monte Carlo has a dual speaker system with two main speakers and two 4 in tweeters at each side. The 2 × 6W dual channel stereo output stages are fed by a Garrard automatic changer. The Monte Carlo costs 129 gns (including PT). The two other new Blue Spot models are the Philadelphia, which is a VHF/FM/S/M/L receiver with 2 × 6W output stages, separate bass and treble controls, six speakers, Garrard auto-change, sockets for multiplex stereo unit, large record storage and tape recorder compartment, and the Valencia de luxe which also has six speakers, 2 × 6W output, and a record storage/tape recorder compartment. The Philadelphia costs 159 gns, the Valencia 169 gns.

EAGLE. Eagle have shown two models at their autumn show, the ST 79 and the TP 703. The ST 79 is a two-speed twin-track all-transistor machine with heavy-duty 6 in × 4 in speaker. It incorporates push-button operation, digital tape counter, safety record button, volume controls, extension socket, monitor socket, direct radio and record player input and built-in storage compartment complete with dynamic microphone, crystal earphone, 7 in reel, mains lead and manual, the ST 79 costs £22 4s 10d. The TP 703 is again a two-speed twin-track machine incorporating push-button operation, VU meter recording level and battery condition indicator, input for microphone, extension speaker, earphone and radio. This model costs £13 15s.

FERGUSON. Main news from the Ferguson Trade Show is the introduction of a new three-speed four-track tape recorder, the model 3214. This is a larger and more ambitious model of last year's Mark 11 tape deck. Besides having three speeds and four-track



The super de luxe Ferguson 3214

recording facilities, the 3214 takes reels up to 7 in, includes an auto stop, input mixing controls, double track replay for stereo, pause control, tape position indicator, two-way fine tape inching and has full piano key control. There is also a remote stop/start/pause control on the microphone. The 3214 sells at 44 gns.

Also new from Ferguson is a solid state stereo radiogram with two 6½ in speakers, two 2½ in speakers and an audio power output of 7W per channel. Radio circuit covers long, short and medium wave bands and VHF and the auto changer incorporated in the unit is the latest Garrard 3000LM with

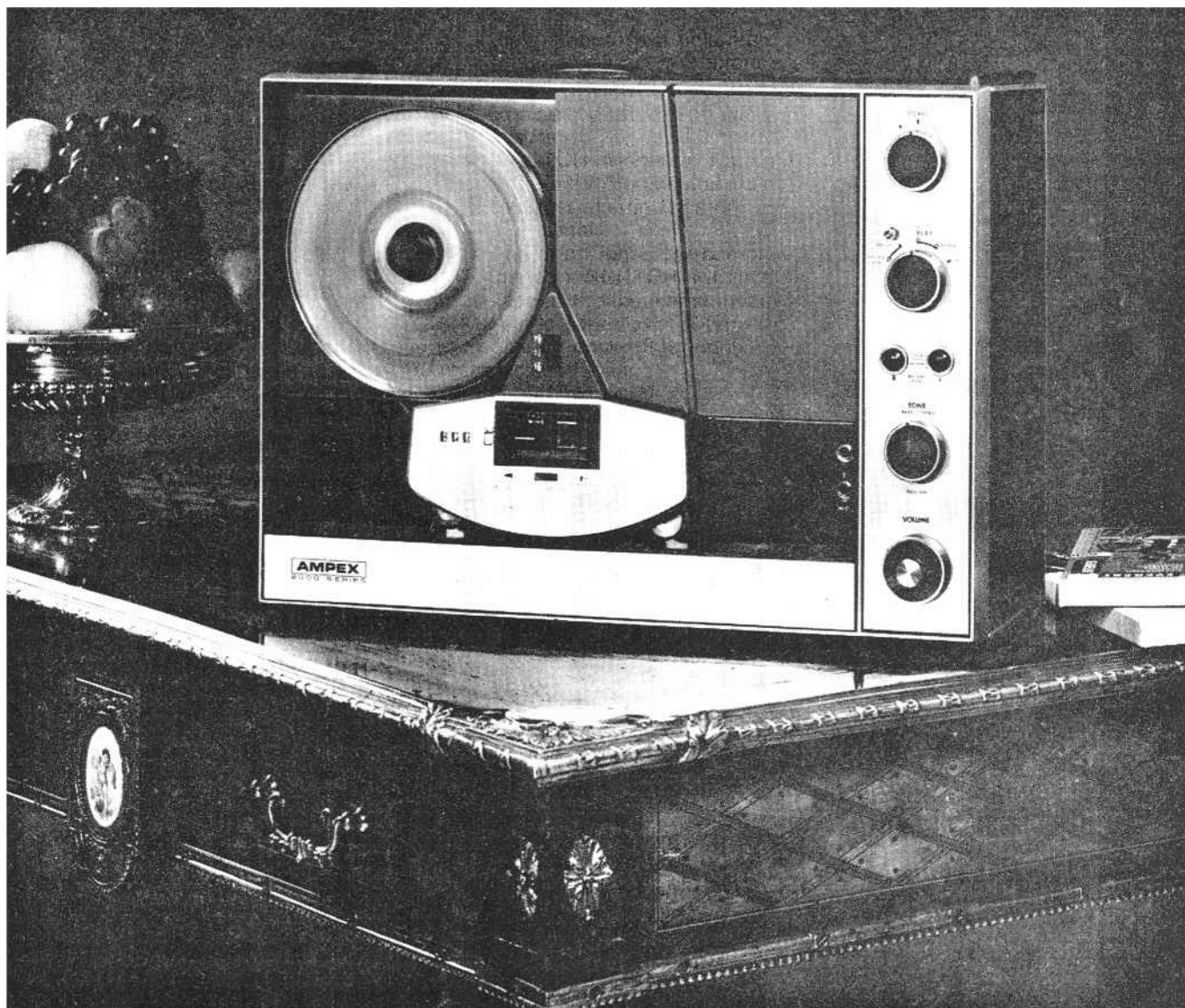
low mass pick-up arm and high compliance ceramic cartridge with diamond stylus. The price of this unit varies according to cabinet finish – 101 gns for teak and 104 for walnut.

GRUNDIG. Grundig (GB) Ltd have produced quite a number of new items of interest to audio enthusiasts. Notable among these is the new TK27L which has been designed to fit into the recorder compartment of a Grundig stereogram. The TK27L is very similar to the TK23L having automatic operation with optional manual facilities. It does, however, permit stereo recordings from the usual input sources and stereo playback through a stereogram. Alternatively stereo playback can be achieved by connecting the TK27L to a radio receiver or amplifier and loudspeaker, when the recorder will play back one channel and the radio or amplifier the other. The TK27L can, of course, be used as an ordinary mono portable, with multiple synchronous recording facilities. Price of the TK27L is 69 gns.

Of their many new hi-fi units, one of the most outstanding is the KS680. This is a beautiful studio unit containing ten strategically placed loudspeakers mounted in acoustically designed infinite baffle enclosures. Separate hi-fi units, HF10 tuner, NF10 stereo power amplifier and dual transcription auto changer are all incorporated. A pull-out platform provides easy access to any recorder which may be installed in the unit and space is also provided for the incorporation of a Grundig TM45 stereo tape chassis if preferred. Additional mains and signal sockets are also fitted for connection to auxiliary equipment. Provision is made for the connection of a reverberation unit, and there is ample space for record and/or tape storage. Price of the KS680 is 305 gns, or without stereo decoder (in which case it becomes KS580) 289 gns.

KÖRTING (Agents: Europa Electronics). Körting audio equipment, readily available in this country some years ago, disappeared from the British market for some time. Now, however, Körting have appointed new British agents, Europa Electronics Ltd, of Stoke-on-Trent, and their latest models are now available in the UK. These include three recorders, a tuner/amplifier, matching speaker enclosures and three stereograms. Most expensive of the recorders is the MT 3624, a three-speed, four-track machine with two 4 in × 7 in dynamic speakers. The machine is equipped with three stereo sound heads for record, playback and erase, bass, treble, dubbing and reverberation controls, and has a frequency response of 30-18,000 c/s ± 2 dB at 7½ ips. It also has provision for the attachment of a tape duplicator which, say Körting, can run a recorded tape and a clean tape through the same head at the same time. The end product is a duplicate tape of the original – in other words, copying without a second machine. The MT 3624 (less microphone) costs 98 gns and the tape duplicator for this model 15 gns. The Körting MT 3623 is a two-speed four-track full stereo recorder with two built-in loudspeakers, sound-on-sound dubbing facilities, pause control and 7 in reel capacity and costs 69½ gns. The MT 2223 is a four-track two-speed mono machine costing 56 gns.

continued on P 45 43



STRICTLY FOR THE EARS OF PERFECTIONISTS —the Ampex 2000 series stereo tape recorders

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Sound Scene *continued*

LOEWE-OPTA (Agents: Highgate Acoustics). This German company is still carrying the models most of us are already familiar with. These are the Optacord 408 mains/battery recorder at 39 *gns*, the Optacord 416 twin-track two-speed portable at 51 *gns* and the Optacord 416DIA which is the special version of the 416 incorporating a built-in remote control dia-changer for automatic slide synchronization. This sells at 62 *gns*. However, Loewe-Opta do have some new stereograms including the Botschafter-Stereo TR. This incorporates two loudspeaker groups each containing three concert speakers, FM automatic tuning, connection jacks for mono or stereo tape recorder and external speaker, stereo auto-changer handling ten records and antennae for all wave ranges. The cabinet is available in a choice of natural wood veneers and the unit costs 205 *gns* (inc PT).

MB ELECTRONICS (Agents: Denham & Morley). As reported recently in *ATR*, Denham & Morley have recently acquired the agency for this West German company of microphone manufacturers. A number of their models are available with built-in low-to-high transformer for connection to any type of recorder. Two models which incorporate this feature are the MB 150 TR which is a dynamic moving-coil microphone with omni-directional characteristics which can be used either as a hand-held or table unit. Frequency range is 80-16,000 cps and the microphone weighs approximately 3½ oz. The MB 250 TR is a directional moving-coil microphone with cardioid characteristics. The high 180° suppression eliminates background sounds, making it possible to achieve good recordings even in acoustically unsuitable conditions. This has a frequency range of 100-16,000 cps and weighs approximately 3½ oz. The MB 150 TR costs 3 *gns*, and the MB 250 TR 4½ *gns*.

NATIONAL (Agents: United Africa Mechanical & Electrical Ltd). New from National is what is believed to be the first completely automatic voice-operated portable tape recorder ever. Functions include automatic operation, automatic start, automatic stop, automatic slide and move synchronization, automatic dictation, automatic threading and remote control operation. It has two tape speeds, 5 in spools and claims an output of 700 mW. This model, the RQ 150, costs £48 6s 0d.

National are also showing a three-speed four-track stereo recorder. This can accommodate FM stereo recordings from multiplex tuners and has a reverberation adapter. It also has 2 VU meters, speaker monitoring, tone control and sound-on-sound facilities. This mains model, the RS 753, costs £84 0s 0d.

PHILIPS. This year Philips have produced three new recorders, the change in two of these being the use of teak in the styling of the cabinets. Their new high performance machine, the EL 3556, is a four-speed four-track machine which incorporates for the first time separate bass and treble tone controls for playback. Price is 62 *gns*.

The second of the new Philips recorders is a two-speed four-track automatic recorder, the EL 3558, which costs 42 *gns*. The final newcomer to the Philips range is a two-



The Philips EL 3556 four-track recorder



The Philips EL 3558 Automatic



The Philips EL 3553 tape recorder

speed four-track recorder weighing only 15½ lb. Unlike the other new models, this is finished in two-tone grey polystyrene, has a spring-loaded carrying handle and costs 36 *gns*

SANYO (Agents: Sanyo Service & Sales). This year Sanyo were showing five tape recorders ranging from the MR 909 at 72 *gns* to the MC2 at 14 *gns*. The MR 909 is a fully transistorized twin-channel stereo machine with a frequency response of 30-13,000 c/s at 7½ ips. It has two speeds, 3½ and 7½, can accommodate 7 in reels and is supplied complete with two microphones. Notable among the Sanyo portables is the MR 200 Reporter Mark 11. This is, in fact, a battery/mains machine, fully transistorized and will playback in any position. Only 8½ in × 10 in × 3 in, this model costs £35 14s 0d.

SHARP (Agents: Sharp Sales & Service). Sharp had two recorders in their show this year – the RD 501 and the RD 701. The 501 is a two-speed twin-track portable transistorized recorder weighing just over 11 lb. It has simple push-button controls, takes 5 in reels and costs 33 *gns*. The RD 701 is a three-speed twin-track machine with piano key control. Maximum reel size is 7 in and this model, too, is supplied with a moving-coil microphone. Price is 44 *gns*,

SONY (Agents: Debenham Electrical). Four new tape recorders and a new tape deck at prices ranging from 28 *gns* to 215 *gns* have been added to the Sony range. The TC 900 is a 4½ lb battery/mains portable, a twin-track two-speed machine with a 2½ in × 4 in dynamic speaker. It can be powered from the following supplies – ac 110, 120, 220 or 240 volts 3W 50/60 c/s or dc 6 volts, four standard flash-light batteries. The TC 900 weighs approximately 4½ lb and costs 32 *gns*. Another new mains portable machine is the TC 135 which weighs 7½ lb and comes complete with built-in carrying handle. This has two speeds, 3½ and 1½, and a specially



The new Sony-o-matic TC 900



The Sony-o-matic model TC 135



The Sony-o-matic model TC 357-4

engineered monitor circuit allows earphone monitoring while a recording is being made. Price, including microphone, tape and carrying case, is 28 *gns*. A new four-track mono mains machine is the TC 357/4. This incorporates automatic volume control system, self-threading reel and new retractable pinch roller for easy tape loading. The TC 357/4 costs 62 *gns*. The Sony TC 777/SJ4 has a three-head three-motor system for four-track stereo and mono recording and playback. Separate record and playback amplifiers permit instantaneous monitoring of a programme during recording and also sound-on-sound and sound-with-sound recording. Price is 215 *gns*.

continued on P 50 **45**

tape club news

Club of the month

A club with a hard-working and very down-to-earth outlook is the **Norwich Tape Recording Society**. Having admitted that the burden of organizing and carrying through their many and varied activities rests on the broad shoulders of a few stalwarts, they have decided to rearrange their organization to encourage more members, and more enthusiastic ones too. A new venue has been found in the Assembly House, Norwich, and the club will meet there on the fourth Thursday in every month (excluding December, when the meeting will be a week early). An extensive programme has been arranged through the winter months until the AGM in April, and club members will be looking forward to receiving newcomers to their ranks.

Coincident with these changes is the election of a new secretary, Mr J. F. Butcher, of 4 Hillvue Close, Costessy, Norwich, Norfolk, NOR 17K. This follows the resignation of the Club's founder, Mr D. F. G. Spinks, who continues as a member but is unable to remain on the committee because of pressure of business. The club is still providing a hospital tape service, and club members have been doing the rounds of other local clubs giving tape talks and demonstrations. The club is also participating in a local movement which is afoot to get parts of the local river and its banks cleaned up. This will involve taping sounds at certain sections of the river itself, as well as recording interviews with members of the public. These will then be edited down to a programme of about 20 minutes, which is to be dubbed a number of times on a 7 in reel of tape. This will be played continuously at a special exhibition to bring the problems of the river to the notice of the local authorities.

Worth paying for

Members of the **Thornton Heath TRC** were intrigued when club member Alan Brown brought along an audiometer to a recent meeting. This measured the frequency response sensitivity of the human ear, and all members had their hearing tested – with surprising results. Apart from some very young members who managed to detect sounds of 19,000–20,000 cps and a blind member whose audio range reached 18,000 cps, most members only managed 13,000–14,000 cps. The question then arose – is that elusive 15,000–20,000 sensitivity on hi-fi gear really worth paying that much extra for, when the odds are that you can't even hear it anyway? Interesting thought that! The exchange of tapes with other clubs continues to grow. Kidderminster, Boston and Catford have all been in tape contact with THTRC recently. However, not everything in the garden has been permanently rosy, for when the club's OB team (Morris Webb and Ed and Margaret Bashford) set about organizing music and P.A. for a local garden party, the gremlins really got in the works. Ed's car ran out of engine, so Morris (laden with his

usual spares of everything, 'just in case') and Margaret carried on alone. Having set up and switched on, they were rewarded with complete silence – the o/p transformer on the 30-watt linear amplifier had gone. Our came one of Morris's spares – a Tripletone 10-watt amplifier – which mysteriously gave out no sound at all. Finally (and before the cheerful guests had realized that anything was amiss) Morris brought out his TK 41 which has a straight-through P.A. output of 6-7 watts. This time the sweat and tears in the recording van paid off with glorious sound and everything in the garden (party) was rosy again.

Hospital visitors

Aside from their usual round of social work, members of **Rugby club** have been doing a little extra hospital visiting. Committee member John Bannister was admitted to a local hospital and found honorary member Sid Haskins in the same ward. Later they were joined by yet another member, Cyril Cook, and, needless to say, club messages found their way to all three. All are, I'm pleased to say, back home and on the road to recovery. In fact, I understand that John Bannister was back in his usual chair at the club meeting only a few days after his discharge. However, his usual chair has now changed somewhat, as Rugby, too, have recently changed their meeting place. All meetings are now held in the Assembly Room at the Central Hotel, Church Street, Rugby.

The first five years

On the assumption that the first five years are the hardest, members of the **North London Tape Club** can look forward to a fairly cushy time. Looking back on the club's first five years, secretary and founder member John Wilson has been able to record success after success. Membership of the club started with five (all enthusiasts who had answered Richard Collinson's appeal in *ATR*), and has now risen to over 30. When the club took over production of the 'Enfield Microphone' it had 12 listeners. Now there are over 60 blind people who receive this tape bulletin. The committee has always been successful in arranging a full and varied programme. Recent examples include a visit to the *Daily Mirror* building in Holborn, at which members taped a commentary on newspaper production from start to finish, an editing session in which groups of three or four members each were given a poor interview to edit into a usable feature, a play production, and a demonstration of how to make electronic music and special sound effects.

Practical sessions

Recent meetings of the **London TRC** have included a high proportion of practical sessions. After their editing evening with Richard Keen of the BBC, the club welcomed Mr Conn Ryan senior producer for the Central Office of Information. Mr Ryan is also in charge of world feature programmes at COI, and he gave a practical demonstration of how a really good feature tape should be made. Members have also had the opportunity of making quality recordings when Brian Myatt, a well-known Flamenco guitarist, visited the club for a recording session. 'Members Tape Time' evening was devoted to the playback of tapes illustrating how members spent their summer months.

Further disappointment

The local hospital management committee has again turned down the **Doncaster** and **District Tape Recording Club's** appeal to be allowed to produce a programme for hospital patients. However, to revive their flagging spirits, member Eric Kibblewhite held a wine and cheese party. The club has provided P.A. facilities and background music at four local

galas, two of which were organized by the **RSPCA** and the **British Legion** respectively. The club's chairman, Mr Robbie Hufton, recently gave away his only daughter at her wedding, and other club members were there in full force to record the whole ceremony. Afterwards a disc was cut for the 'happy couple'.

Next month sees the visit of both the **Beecholme Blind Tape Club** and the **Stoke Blind Club** to our headquarters for a full day's talk and tape playback (and also a recording session). This will be a unique opportunity for them to hear and record a wonderful Schultze organ which is in the local parish church of St. George.

Average attendance 70%

Although during the holiday season we expected our attendances to drop, the committee of **The Radio Club of Scotland, Tape Recording Section**, have been happy to see that the number of members at our weekly meetings have kept up to average. Our average attendance, by the way, is 70%. Some of the features at our recent meetings which brought this high attendance figure were a demonstration by Peter Douglas on the vast subject of microphone technique, a couple of light-hearted quizzes presented by members, a talk on tape editing by John Douglas (which made some members rush out to buy a splicer and jointing tape) and a tape by Donald Anderson, which let members hear, believe it or not, a recording of a fly walking.

Each week the committee works hard to put on an interesting and entertaining programme, and although they like doing this, they feel at times the members do not take enough part in the meetings. This is why, in the autumn, there is to be another 'Members take over' night. The committee can sit back and relax and enjoy some one else's programme for a change.

The club's AGM will be held in November.

at B-TRAC

On Saturday, 10 July, **B-TRAC** visited Hams Hall, one of the major power stations of the Midlands. Members collected many sounds and these are being edited for inclusion in a report on the tour. An atmosphere laden with coal dust is reported to have little effect on the recording quality and wear on the heads is only just apparent.

The first of a series of competitions was judged on 12 July, members giving marks to all entries other than their own. A plaque and prize will be presented to the member gaining maximum marks in competitions over the next twelve months and this first stage was won by Michael Dagnall who entered a taped report on the **ATR Soundtour** to Denmark. Second was Laurie Watson, who presented a very humorous tape on the production of records from hot-water bottles and, in particular, the discovery of a revolutionary oxide coating: LGS35. Yes, this magic tape ingredient rang a bell at B-TRAC too!

Association of clubs in the north-west

Nine months ago, the **Middleton Tape Recording Club** re-formed itself into a group with limited membership, allotting each person concerned a job to do within the organization. Group visits have been to the **BBC Sound Studios**, the *Daily Express* building, and a stereo recording made in the cathedral.

'The Glorious Minor' is the title of the work, produced on behalf of the group, for entry into this year's **British Tape Recording Contest**, as well as three more prepared by other members, individually.

At present we are trying to form an Association of Clubs in the north-west. Anyone interested should please contact the Secretary: Mr Harry Helm, 43 Park Road, Rochdale, Lancs. Meetings are held weekly on Thursday evenings at members' homes.

News in brief

Walthamstow and District Tape Recording Society recently visited the British Oxygen factories at Wembley and Cricklewood, and spent eight hours recording how different gases were made. Fifteen acres of factory grounds were covered during this session, and after being entertained to lunch, the four members left for Cricklewood to see and record the different ways of electric welding and gas cutting of metals. The trip was arranged by Don Cooper, who has the mammoth task of editing the recordings, which will then be used by Mr Ronald Hall, of Radlett, whose library of tapes are so well known. A recording contest between Ilford and Walthamstow is to be judged by *ATR* Editor F. C. Judd and John Ratcliff of Rapid Recording Service.

South Reach County Youth Centre

Interest at the Centre in the Tape Recording Group is still in full swing, with once-a-fortnight record request programmes being held at the Erith and District Hospital.

The group will be reopened on Tuesday, 7th September, at 7.30 pm with a new secretary, Mr Denis Burridge. The Group will meet every Tuesday at the Centre from this date when we hope any person interested in tape recording will come along; they will be most welcome.

Leeds and District TR Club

At a recent mystery evening meeting the days of the Wild West and gold mines were recreated by recording a western saga on tape. This was recorded on a Revox E36 from a book of Plays for Tape. Members took turns to record the play as well as reading different parts. Recordings were done using first one microphone, then two microphones. The best recording was done on one mike. Members all said that they had enjoyed it and departed, although not to the nearest L.P.H., as one member suggested.

Ferrograph owners' club

In addition to the excellent 12-page bi-monthly magazine *Ferro*, there will shortly be a quarterly tape version, which is to be called *Ferro Sound*. It will not compete with the printed magazine in any way, but will contain sections devoted to not only Club News but also various aspects of tape recording, i.e. interviewing, splicing and editing, making competition tapes, etc. The first *Ferro Sound* will be available in September.

A 'Home Construction Tape' is also planned for the near future and any member interested should contact either the secretary or Bob Panting, who will gladly furnish details. The 'Wives' Round Robin' is being circulated but it is not receiving the response which was hoped for; perhaps the women's section on *Ferro Sound* will improve matters.

Brighton Tape Recording Club

Films about motor car racing were the main subject of the last meeting of the Brighton Tape Recording Club. Supplied by Dunlop Ltd, they showed many great racing drivers and races in which they took part, including the 1955 le Mans. Projector was operated by two members, Mr Eric Savage and Mr Harry Draper. The latter shook the members on the previous week when he brought along his new Revox and put it through its paces.

As from now meetings including the club's annual general meeting, will take place at Downs School. Other activities are still going on and some members went to see the BBC's transmitting stations that were open on 31 July. Tapes are being prepared for a tapespondent in Jamaica, and for the Friern Barnet Tape Club, with whom the club hopes to keep in contact after first discussions at the AGM of the Federation.

Meanwhile all enquiries should be directed to the secretary, Keith Upton, 47 Kingsley Road, Brighton 5, Sussex.

TOP TEN

- | | |
|-------------------|-------------------|
| 1. Norwich | 6. Doncaster |
| 2. Thornton Heath | 7. Bath |
| 3. Rugby | 8. Radio Scotland |
| 4. North London | 9. ITAC |
| 5. London | 10 B-TRAC |

Copy dates for future editions of Tape Club News are as follows: November: 20 September; December: 25 October; January: 20 November. News should be addressed to Mrs Kim Cook, *ATR*, Haymarket Press Ltd, 86-88 Edgware Road, London W2

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Sound Scene continued

The new Sony tape deck, the TC 250A, is a four-track two-speed stereo solid-state all-transistor model designed to appeal to music lovers. The deck has a wooden base and is very simply connected to existing external power amplifier/speaker systems for playback and can be mounted horizontally or vertically. Retail price is 55 gns.

Also new from Sony is a dual standard 9 in portable TV. Although not strictly audio in itself, this set is capable of receiving video signals from a Sony video tape recorder, and reproduces excellent pictures. Circuitry includes almost 50 semi-conductors and enables the set to cover 1-13 VHF and 21-69 UHF channels.



The Sony two-speed model TC 250

STANDARD. This year Standard have only one new tape recorder—a miniature transistor portable. The Tiny Pal weighs only 2½ lb and is 7 in × 6 in × 3 in. This is a two-track

single-speed (1½) machine with a 500 mW output and maximum reel size of 2 in. Incorporating recording level and battery life meter, the Tiny Pal costs 15 gns.

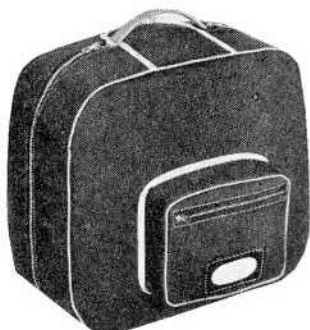
STELLA. Hard on the heels of the Philips cartridge portable is a similar model from Stella. This weighs only 3 lb and is housed in a simulated leather cabinet giving the recorder a camera-style appearance. Trailing wires for microphone connection are avoided by having them as an integral part of the shoulder strap which is adjustable and has a self-locking roller guide. This allows microphone to be held at arm's length while interviewing. The roller action is arranged so that the weight of the recorder acts as a counterbalance for the quick return of the recorder to the carrying position. The microphone is the slim pencil type with pen clip on one side and built-in remote stop/start switch on the other side. Cassettes are similar to those used on the Philips cartridge model and a plastic rack is available for housing the new cassette boxes. Power comes from five U11 type batteries which are stored in the base of the 8 in × 4½ in × 2½ in cabinet. Price is 26 gns.

UHER (Agents: Bosch). This year Uher have introduced three new tape recorders and of these the most outstanding is the new 4000 report L. This is a modified version of the report S, but incorporates a new motor system which eliminates all motor noise and vibration so that it is even possible to record with the microphone almost up against the recorder itself. This model has also been

re-styled in many ways, making it much more compact than the 4000 S. The lid now has a full width perspex window giving view of both reels to indicate the amount of tape still to be used. The front panel also incorporates a new tape position indicator and a recording level indicator which now registers level in dBs. Price is 103 gns including microphone. The other two new models are the 22 hi-fi special and the 24 hi-fi special, which are in fact two- and four-track models of the same machine. An interesting feature of these two models is the provision of a vernier for adjusting the playback head, making it possible to get exact azimuth alignment when monitoring tapes made elsewhere. It also offers optimum gain for all functions by use of separate record and playback amplifiers. In addition, straight monitoring and off-the-tape monitoring is made possible for stereo operation. Also in stereo operation the respective recording levels of both channels can be controlled separately. These levels are indicated by two VU meters with decibel scale. Price of both these models is 149 gns.

Correction – An Eight Channel Mic Mixer. ATR, Sept 65. The components list should have shown R55 as 1 Kohm and R53 (omitted from list) as 5-6 Kohm.

Pye HFS 30T amplifier, reviewed September ATR. Correction. In my test report on the above I inadvertently referred to 'printed circuit boards'. This should have read *wired, circuit boards*. Actually, the amplifier features very neat *wiring* on both channels. **GJK**



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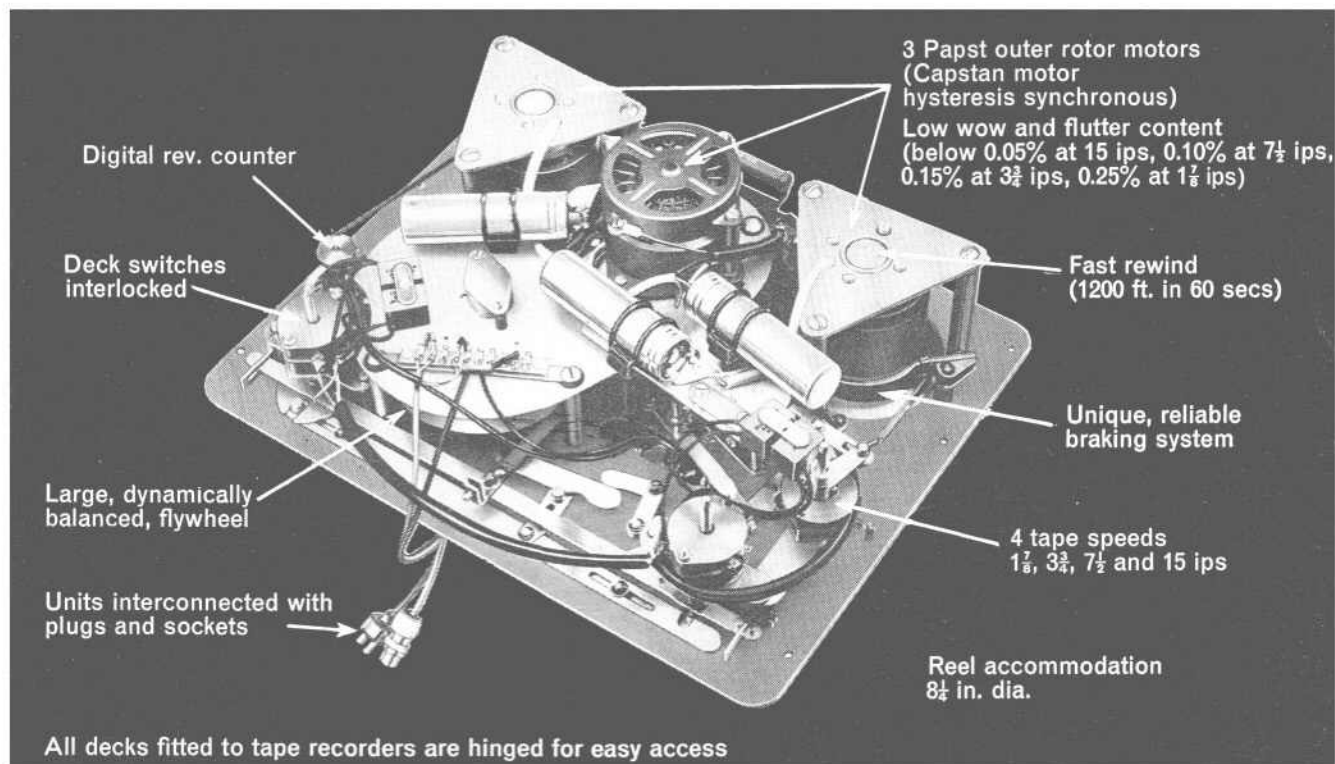
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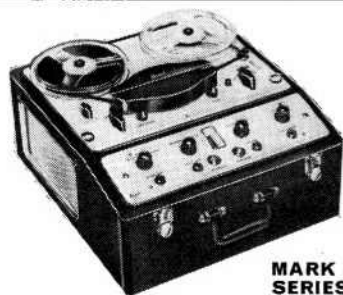
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of hiding our light under a bushel, the light being our superb 4 speed tape deck, so we have taken the hint and given you a large illustration pointing out some of its principle features. This deck is used on all Brenell models and there are versions available to take 10 1/2" NAB reels. Also we supply tape decks and matching amplifiers separately for building into your own equipment cabinet. Write for details of the Brenell range.



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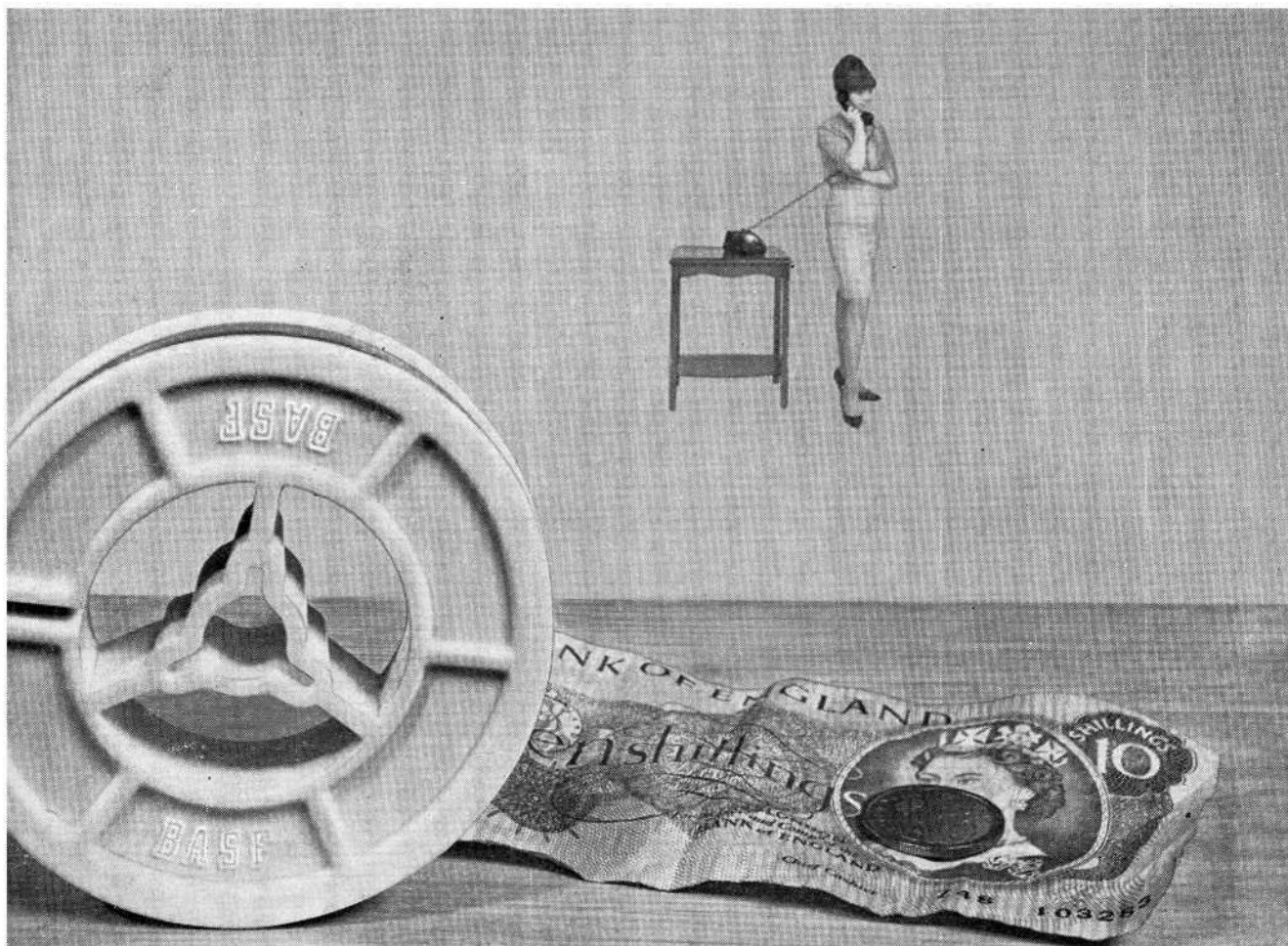
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