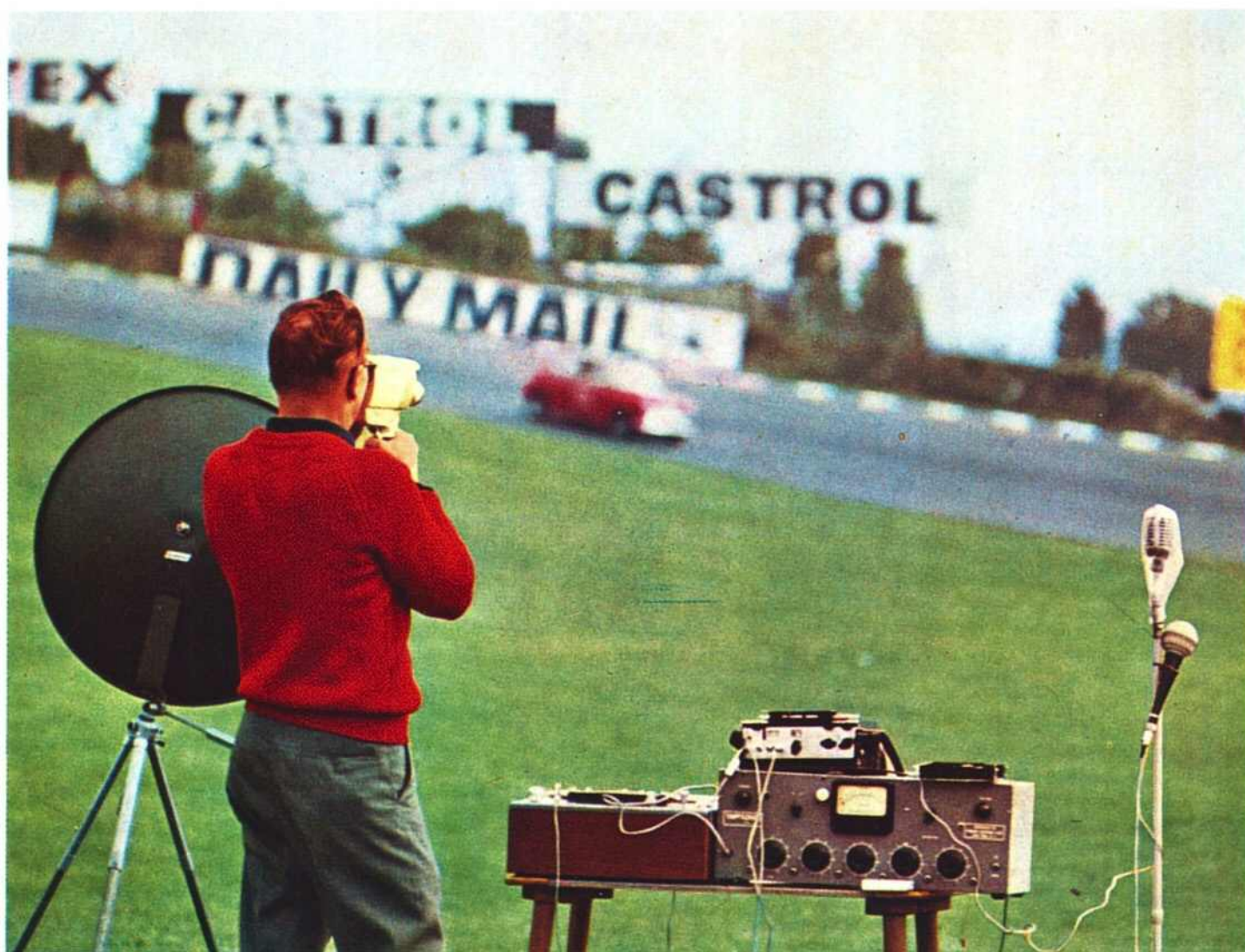


Amateur Tape Recording

VIDEO&HI-FI

January 1966 Vol 7 No 6 2/6



**SOUND
IN
ISRAEL**

REPORTED
BY BOB
DANVERS-
WALKER



**ADDING
SOUND
TO CINE**

A LOOK
AT THE
LATEST
SYSTEMS



**ON TEST
PYE ACHOIC
SYSTEM**

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Amateur Tape Recording

Vol 7 Number 6
January 1966



Our front cover this month depicts recording and cine filming at Brands Hatch motor racing circuit in Kent. Equipment shown in the photograph includes a Grampian DP4 microphone and reflector, a Tandberg Model 62 tape recorder, a Fi-Cord 202A portable, a Grampian three-channel mixer, a home-constructed six-channel mixer and a Shure Unidyne 55S ribbon cardioid microphone. The camera being used for filming is a Minolta Zoom-8 reflex model.

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Editorial comment: A BBC broadcast on 3 November last, called 'Soundhunters', demonstrated quite clearly the highly creative aspect of tape recording, yet, as was so rightly pointed out in this programme, there are still too many tape recorders lying around forgotten and unused. But what about those that are in use; are they really being exploited to the fullest extent? Disappointingly few recordings made by amateurs, even the majority of those entered in contests, show any real knowledge of recording and production techniques. Most noticeable is the reluctance to carry out proper editing by cutting and splicing. Many enthusiasts still believe that to cut a tape for editing will spoil it or that tape is too costly any-

way to slice up with a pair of scissors. But is it? Standard play tape at full price costs a little over one-third of a penny per foot. Compare this with 8-mm cine film at about sixpence per foot—and yet cine enthusiasts will cheerfully cut and re-join dozens of feet of film in order to achieve a presentable production. Cine film cannot be erased and used again, cut or uncut, but well-spliced tape can.

Standardization: Tape recorder manufacturers have so far managed to maintain an acceptable standardization for tape recorders. Standard running speeds, tape width, track designation, spool sizes, etc., make possible universal exchange of recordings including pre-recorded music tapes. Now it seems they have gone

off the rails by introducing cassette tape loading and cassette recorders with non-standard tape widths and running speeds. The tape cassette is an excellent development which could make tape more acceptable to the public at large, but they won't be very happy with non-compatible systems. Despite the fact that several different kinds of cassette recorders already exist, two of the largest tape recorder manufacturers in the world have now seen fit to introduce their own and entirely different versions in the UK. Their respective cassettes are *not* interchangeable. We wonder if this will occur with video tape recording too, for there are at present three or four different and quite incompatible systems on the market.



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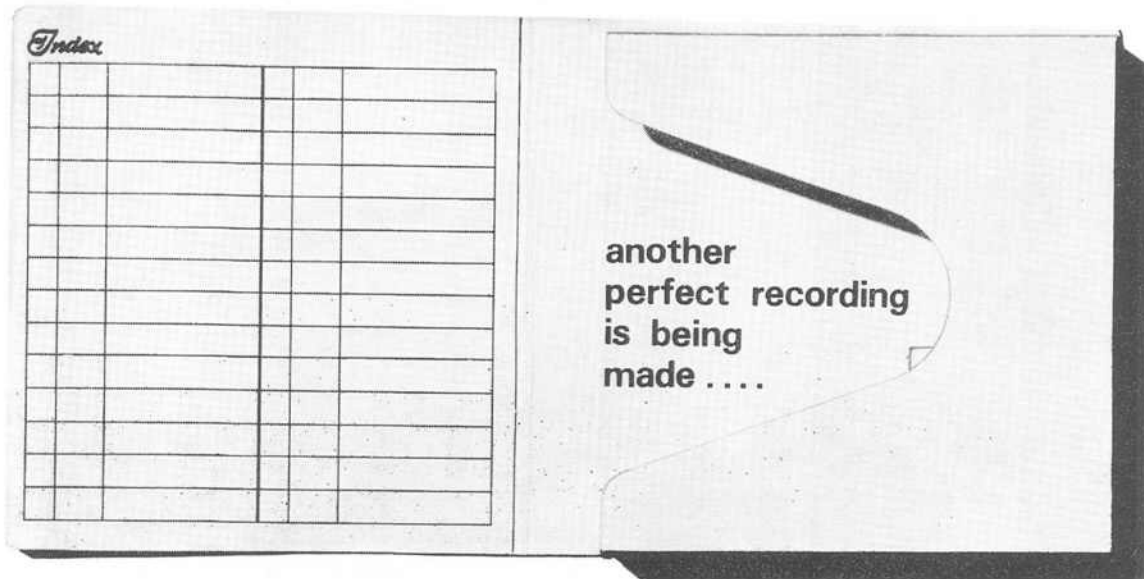
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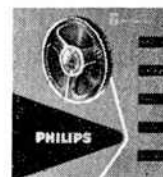
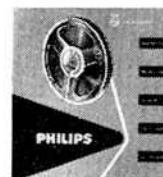
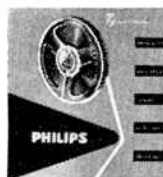
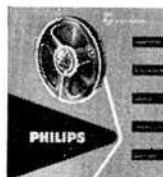
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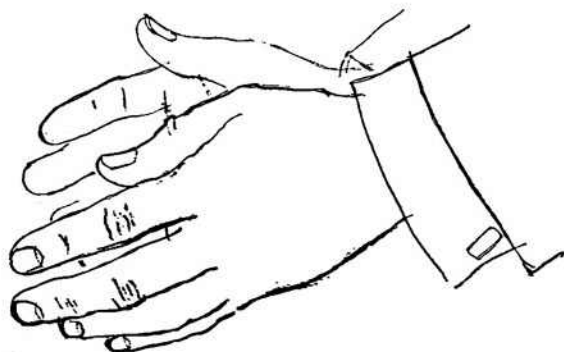


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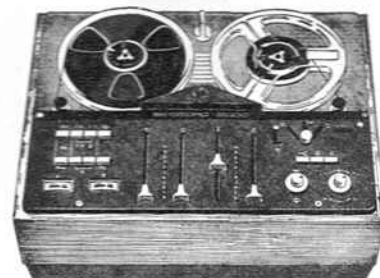
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Grundig TK23L ...	7 14 6	3 12 11	49
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Philips EL3556 Teak ...	9 15 6	4 12 3	62
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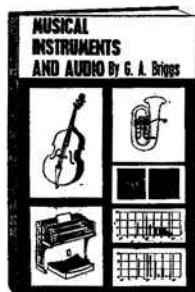


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ADDING SOUND TO CINE

By Peter Dean

A two-part guide for the tape enthusiast who is interested in taking up cine filming. Topics covered include: basic facts about cine; choosing a suitable camera; linking tape recorders with cine projectors; magnetic stripe; what to look for in a good projector.

The tape enthusiast who considers buying a cine outfit starts off with a big advantage. Compiling a tape recording is very similar to putting together a cine film, and anyone reasonably experienced with tape will find little difficulty in using cine. (In fact, a number of tape dramas and documentaries have been very successfully turned into films.) Moreover, the ability to make a technically competent sound track starts you off very definitely on the right foot. The sound quality of most amateur films can be summed up in one word – atrocious – and this is not because of poor equipment; it is simply due to bad technique. *You*, at least, should not be guilty of this!

As a tape enthusiast, you will be interested in putting sound to your films from the word 'go', so in these articles I will aim to describe *only* equipment which will allow you to do this. I have concentrated on 8mm because this is the film size used by most amateurs, and by far the cheapest in running costs.

There is one important fact to be borne in mind about sound and film. It is not possible, using the type of equipment on sale in a cine dealer's shop, to record dialogue or sound effects which are automatically synchronized as the film is taken. All sound, including speech, is normally post-synchronized, i.e. added after the film has been completed.

Unlike tape, which passes smoothly past the recording head, cine film moves through the camera and projector in a series of jerks. A cine camera takes a great number of pictures on a long strip of film. Each picture (frame) is exposed for about 1/30th of a second; the film is then pulled down very rapidly, and comes to rest again. Another picture is exposed, and so on. The inability of the eye to sort out rapid movements (known as persistence of vision) blends this series of separate frames into an apparently

smooth-flowing image. The film is transported by a claw, which engages with perforations in the edge of the film, one perforation per frame.

A camera can take pictures at speeds ranging from 8 to 64 frames per second, or even more. However, the usual filming speeds are 16, 18 or 24 frames per second. The latter provides rather better sound reproduction with magnetic stripe, but because it is more expensive to run is not often used. The standard speed at which tape is synchronized with film is 16 frames per second. Many cameras feature a speed of 18 frames per second which in future may become the standard instead of 16. The reasons for this are complicated, and need not bother us here. The difference on the screen between 16 and 18 frames per second is very small.

For a true reproduction of movement, however, the projector must be run at about the same speed at which the film was taken. This is especially so when sound is added, but since this is almost invariably done at a late stage, all that matters in practice is that the projector should match the camera speed with a fair degree of accuracy. Once the sound has been added, the projector *should* always be run at the same speed as when recording took place. Because most projector motors will not run sufficiently smoothly to allow this, it is necessary to govern them in some way, usually through a link with a tape recorder, since these have a very accurate running speed indeed. Where sound is added to the film itself, special induction motors are used which run at a fixed number of revolutions, and are very little affected by changes in the mains voltage.

Tape moves at various speeds, commonly 1½, 3½, 7½ ips, but the speed of film is 2·4 in (16 frames) per second. For this reason, most systems of linking tape and cine involve not a direct coupling, but a

method of keeping the relative speeds of the recorder and projector constant, so that, once started together, they keep pace. The closest speed on a tape recorder to that of the film is 3½ ips, and this has been adopted as the normal speed for tape work when synchronized with cine.



Top picture: a simple camera with fixed-focus lens, CdS meter and electric drive, the Elmo Pocketauto. Above: the high-priced Fujica Zoom 8 De Luxe has a specification it would be hard to bear.

Because sound is synchronized at the projector stage, almost any camera is suitable for use – and there is an enormous range to choose from. However, if you are at all experimentally minded, I would advise you to obtain a camera with *electric drive*. Not-too-complicated systems have been produced, by amateurs, for simultaneous shooting and recording, and it is possible that an adaptation of these may eventually be commercially introduced. All these systems work by controlling the speed of the camera with a tape recorder. This is quite easy to do when the camera has an electric motor, merely by slight changes in the power

Shown here, in descending order are the electrical synchroniser for the Luch projector; the electric pulse recording set-up of the Carol Cinesound and the electro-mechanical connection of the Synchrodek. Far right: the Minoltina, a medium-priced high quality zoom camera.



supply. A spring motor cannot be controlled in this way and is therefore not suitable for modification. The disadvantage of an electric motor is that it will not normally provide the 48 or 64 frames per second camera running speed necessary for slow motion. Even this has been overcome in some cameras, and as a whole the trend now is for all new cameras to have electric drive.

If you can afford it, here is what to look for on a modern camera: zoom lens, allowing you to focus down to at least 5 ft; (*beware of any fixed-focus zoom lens*) reflex viewfinder, which 'sees' through the lens – the better ones allow you to check whether your picture will be sharp as you adjust the focus; automatic exposure by CdS meter, preferably with an indicator in the viewfinder, so that you can see if it is working. These are the essentials. Other refinements are: a choice of running speeds, backwind, variable shutter, power zoom, built-in filters, cartridge loading. All these can be useful for advanced filming, but are not essential. Do not buy a cheap zoom camera. As a rough guide, anything under £30 is not worth having if you are serious about making films. Choose instead a fixed-focus camera without a zoom lens. They will give far sharper pictures than any zoom model

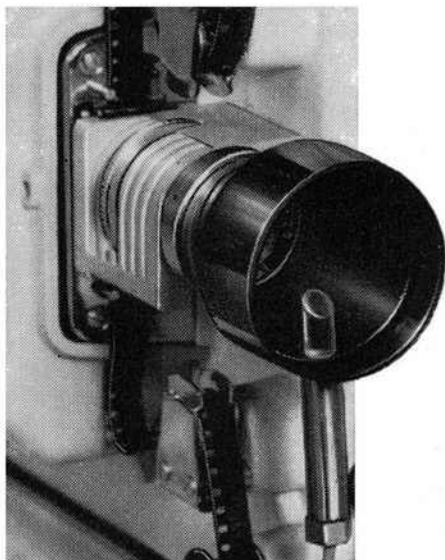


at a similar price – and in many cases sharper pictures than zooms costing considerably more. Again as a rough guide only, you will have to pay anything from £40 upwards for a good zoom camera with the features I have listed.

However, even if you have already bought, or been given, a camera which does not fit in exactly with what I have described, do not despair. It is the projector which is the major factor in putting sound to film. The choice here *is* important.

First of all we must consider the ways

continued overleaf 11



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The Carol Cinesound system utilizes the latest developments in solid-state electronics, and offers unlimited flexibility in recording techniques. Sound and Sync. tracks may be recorded independently, tape may be cut and spliced for editing, and even filming in synchronization is simple if a contact arrangement can be fitted to the camera.

The only requirements are that your projector must have a potentiometer type speed control and you must be able to record and playback two tracks on your tape recorder simultaneously (i.e. a stereo tape recorder, a four-track tape recorder, or a half-track tape recorder fitted with an additional half-track head).

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Adding Sound to Cine *continued*

in which sound can be added to a film once it has been shot. These are:

1. 'Wild'. A sound track is recorded on tape and played back at the same time as the film. The recorder and projector are not linked, and the only control possible is by altering the speed of the projector if it becomes obvious that the two are out of step. This method is only suitable for music background, with perhaps a very general commentary. A strobe wheel is sometimes fitted to the recorder and matched to the flicker of the projector beam for greater accuracy.

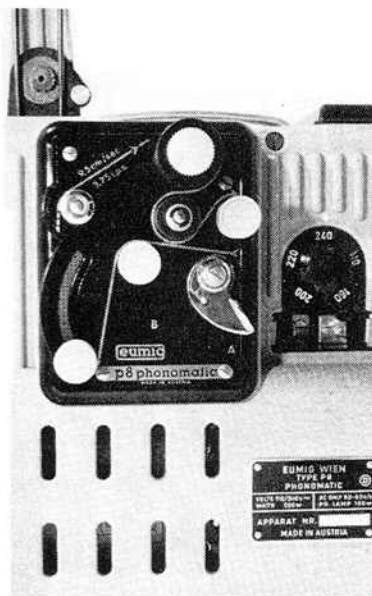
2. Mechanical link. The tape recorder is linked to the projector, and controls its speed, so that the tape and film are kept in step. This is usually achieved by passing the tape into a speed control device on the projector and then back to the recorder. Disadvantage is that the projector and recorder have to be alongside one another and at the same level. Synchronization is accurate to within a second or so, but is not good enough for dialogue.

3. Electrical link. Rather similar to the second method, in so far as the tape is used to control the projector speed. But the tape passes through an attachment which sets the projector speed by electrical impulses. Tape recorder and projector can be in different places, linked only by a cable, but the synchronizing device has to be fixed to the recorder or placed alongside it; as it is small, this is rarely a problem. Accuracy is about the same as system 2. (Note: Accuracy is upset by problems of tape stretch and slip. This can be eliminated by using perforated tape and sprocketed capstans, whereby completely accurate timing is possible, allowing lip-synchronization dialogue to be recorded.) There are quite a number of projectors available using systems 2 and 3.

4. Electro-mechanical. A very interesting device, called the Synchrodek, is linked to both projector and recorder. It 'sums up the difference' between their relative speeds, and shows this on a dial. When the dial is set, by the operator, the projector speed is kept constant. The set-up is about as convenient (or inconvenient) as system 2, but does have the advantage that almost any projector can be controlled. Moreover, the Synchrodek may be used in editing, or even in filming, and is therefore more versatile. Accuracy is about the same as systems 2 and 3. Perforated tape can be used, for lip-synch.

5. Electric pulse. The Carol Cinesound converts the flicker of the projected picture by an electric eye into pulses which are recorded on to tape at the same time as the sound track. On replay, these 'lock' the projector speed so that the pulses from the light beam occur at the same speed as those recorded on tape. The system is convenient and very accurate, but does require a four-track recorder, which has to be either bought or modified. May be used with any projector.

The advantage of all systems using a tape recorder is that the sound quality is just as good as your own equipment.



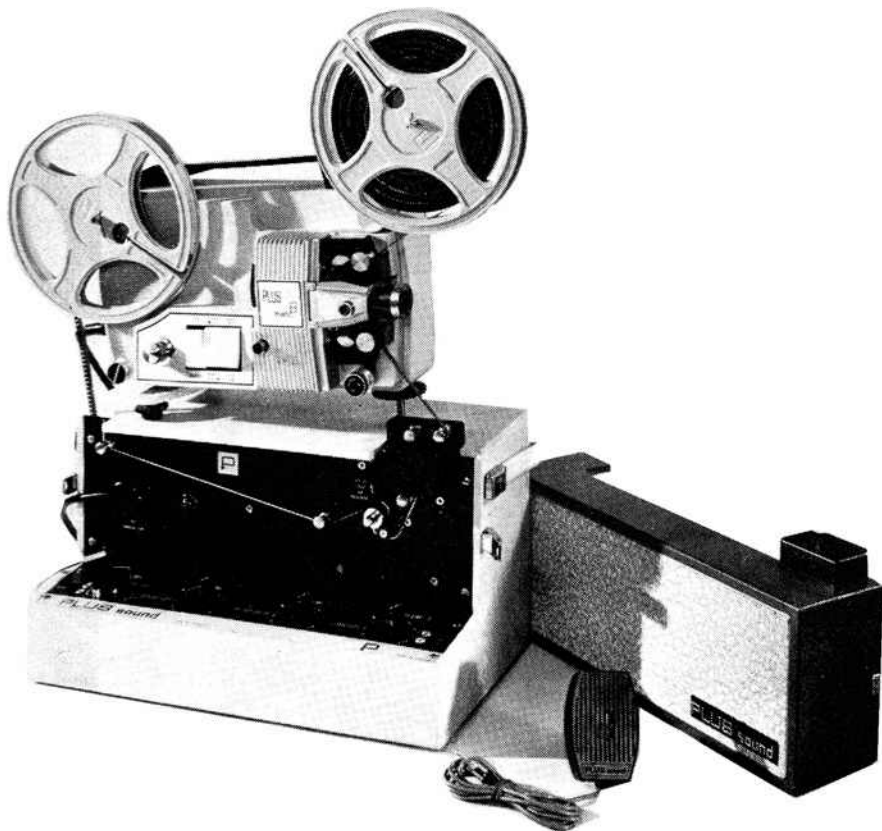
Moreover, the outlay is not greatly more than that for a projector.

In recent years, a totally different method of synchronizing sound has been introduced. In this, a very narrow band of tape is applied to one edge of the cine film, and the sound is recorded on to it. It has the supreme advantage that, once recorded, the sound and picture are one, and cannot go out of synchronization. Against this must be set the higher cost of a projector (which has to have a complete record/replay system built into it) and poorer sound quality than is obtainable from a tape recorder. Even so, magnetic stripe is fast ousting the more complex recorder/projector combinations. Complete synchronization of sound, including dialogue, is possible. The cost of striping the film is about 1d a foot. It will be readily appreciated that there is no reason why sound should not be recorded on pre-striped film in the camera, but so far there is no camera of this type available in this country, although one was introduced in America.

Certain technical problems have to be overcome when designing a stripe projector; in particular, the intermittent movement of the film. Obviously, any sound recorded on magnetic stripe while it was jerking through 16 times a second would be quite impossibly bad. The solution adopted is to record the sound well

continued overleaf

Left: The Eumig Phomatic projector uses a mechanical synchroniser controlled by tape from the recorder.



Right: Some projectors can be converted to magnetic stripe with an add-on unit, like the Plus Sound shown here.

Adding Sound to Cine *continued*

ahead of the picture to which it relates: the standard separation is 56 frames (a delay of $3\frac{1}{2}$ seconds). This allows the movement of the film to be smoothed out by the time it reaches the recording head. The usual procedure is to lead the film from the projector 'gate' (which holds the film steady while the picture is projected) in a soft loop out to the sound head. The loop absorbs much of the jerkiness, and the rest is smoothed out by a large flywheel and pinch roller, much as is done by a tape recorder capstan. In some cases the flywheel may be driven by a motor; in others, the film's own movement causes the flywheel to revolve and stabilize its speed. Both methods can work equally well. It is at this stage that the design and engineering of the projector needs to be first-class, because wow and to a lesser extent flutter are all too commonly found on stripe machines.

Two other factors can seriously affect the recording quality. These are the effectiveness with which the recording and reproducing heads are isolated from electrical interference and the correct setting of the record level. The very narrow width of a magnetic stripe, compared with that of even quarter-track tape (0.8mm and 1.0mm respectively) means that the signal must be recorded at optimum level for a good signal-to-noise ratio, but without overloading. One manufacturer has gone so far as to incorporate automatic volume control into the recording circuit, freeing the user completely from any need to set the record level. In other cases, 'magic eye' indicators are used, but these are not always completely reliable. Since most projectors are equipped with rather skimpy mixing facilities, and do not always have the best quality microphones, tremendous improvements in sound reproduction can often be obtained by full use of the facilities a tape recorder offers. On replay, too, it is often preferable to lead the signal direct into a high-quality amplifier and speaker system, by-passing the built-in unit (though they are capable of surprisingly good results, especially when used with an external loudspeaker). The frequency response from striped film is about 100 to 7,000 cps – not hi-fi but entirely acceptable when free of distortion or pitch variation. A heartening point about all stripe projectors is that *optically* they are excellent, the manufacturers wisely having concentrated on designing throughout for quality rather than extreme cheapness.

There are now on the market a number of units which will convert a silent projector into a sound machine. These

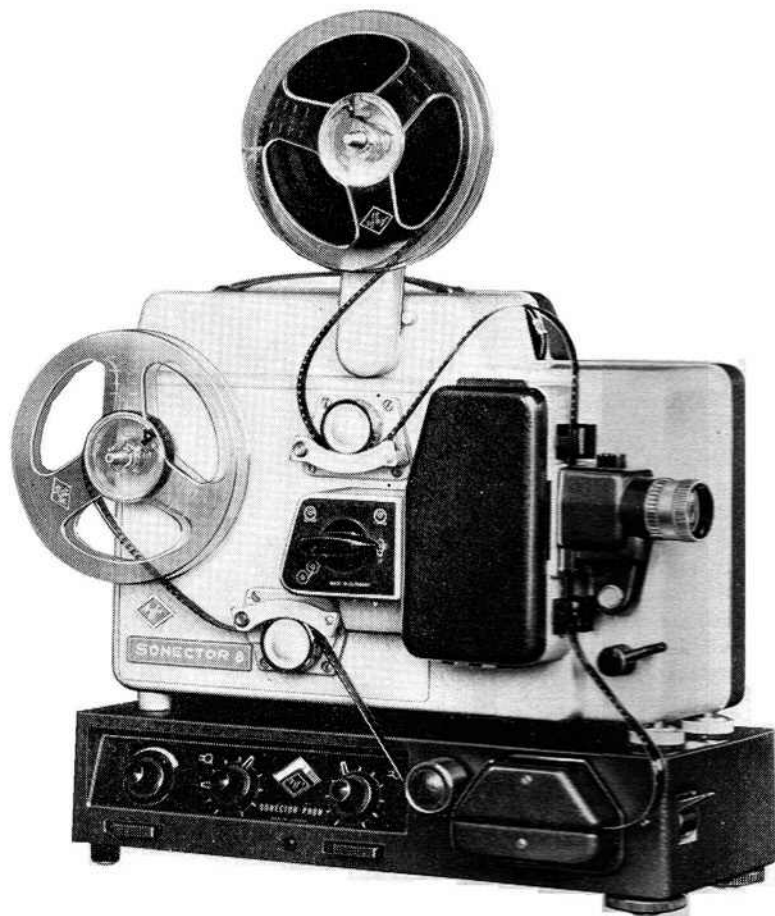
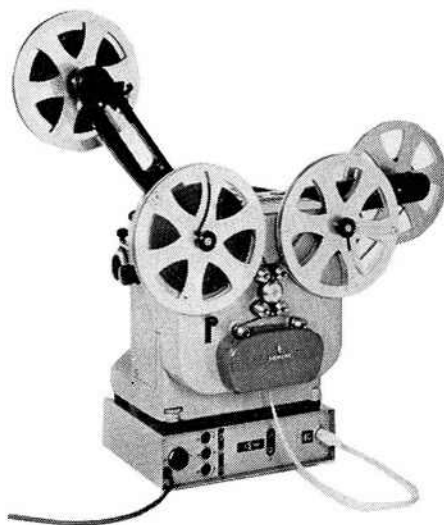
'add-on', forming a base on which the projector stands. The film threads from the projector gate through the unit, over the record/replay heads, and back to the projector. The facilities are very similar to those of an integral sound projector, although more care has to be taken with the smoothing arrangements, and the heads

must be heavily screened from interference. With the right projector such units can work very well, but care must be taken to ensure that they are suitable, because the variables that could affect sound reproduction are greater. An exception are the add-on units designed for a specific projector, which give results equal to, and in some cases better than, those from an integral machine.

Worthy of mention, although extremely rare, are 'double headed' machines, in which film and tape are used. These consist of a projector and a tape recorder driven by a common motor. The fact that the tape speed is non-standard, and their high price, have kept them from public favour, even though they combine the sound quality of tape with the perfect synchronization of stripe.

That covers the systems for adding cine to sound now in use. Next month I shall go into the question of choosing a suitable projector for the various methods. The choice here can make a lot of difference to your final results, so don't skip it. If any of you need advance information, or further advice of any kind, just write to me c/o ATR. I'll be happy to oblige.

Left: the Siemens projector is unique in using a separate system for tape and film in the same projector.



Right: the Agfa Sonectorphon is a machine which has a specially designed add-on sound base. Quality obtained in this way is very good.

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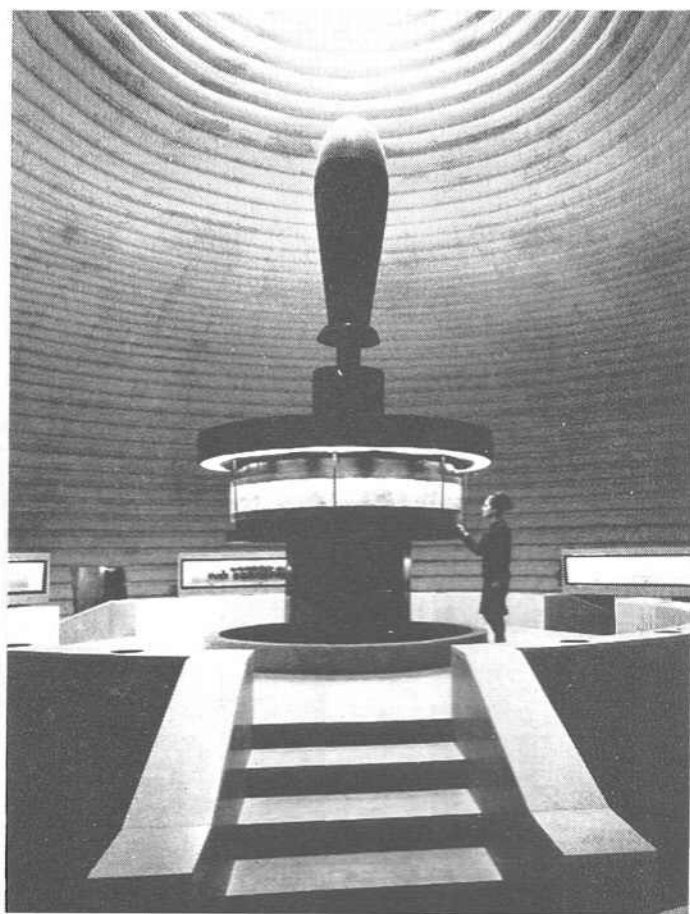
ASSIGNMENT TO ISRAEL

Bob Danvers-Walker

I had just got back from a mission to Snowdonia when the chief producer of outside broadcasts said to me: 'Now you can go to Israel and bring back material sufficient for two programmes – one, a documentary dealing with the development of the Independent Jewish Republic since its birth in 1948 and another for 'Holiday Hour' suggesting Israel as an exciting place to holiday in'. I contribute travel features to this series which are transmitted during January and February. A prerequisite of my journeys abroad is that I gather as much as possible in as short a time as possible. This involves very long hours, very long distances and very long preparation. In two weeks I travelled the full length (280 miles) and breadth (varying between 10 and 41 miles) of this fascinating country bordered by four unfriendly Arab states: Lebanon, Syria, Jordan and Egypt. It also has Saudi Arabia to its southern border. A state of arrested war exists, which I became conscious of at certain sensitive frontiers. In the upper Galilee I recorded interviews with British Jews now living on the Kefar-Hanassi Kibutz ('Village of the President'), one of many communal settlements which saw some of the fiercest fighting in the war of 1948.

I also visited a Druze village. The people of these villages form a religious sect which is about 850 years old. The women are strikingly beautiful and under no circumstances may one photograph them. They say nothing about recording them, but the two pieces of apparatus are far too much alike for their peace of mind. On the Sea of Galilee, or Lake Tiberias as it's also called, I taped the water skiers as I ate the tasty pilchard-like St Peter's fish at a lakeside restaurant where the Syrian frontier comes right down to the water's edge. So that I might claim to have bathed in the five waters

16 of Israel, I took time off from my tightly packed travel



itinerary to take a dip in the Sea of Galilee, the River Jordan, the Mediterranean, the Dead Sea and the Red Sea – all of which were on my route. I travelled 70 miles along the Mediterranean seaboard alone. From Ashkelon, whose annals include chapters of the history of the Philistines, the Israelites, the Greeks, the Romans, the Crusaders and the Moslems, I travelled up through Jaffa, Tel Aviv, Netanya, Caesarea and Mount Carmel to Haifa. And it was there at Haifa, the second largest city in Israel, that I made contact with 'Effi' Netzer who has distinguished himself as Israel's leading authority on folk music and who founded the group known as the Beit Rothschild Singers. It was later in the Negev Desert just outside Beersheba that I recorded the songs of Joseph Moustaky. I taped these in a Bedouin Sheikh's tent while his appreciative audience sat cross-legged about him sipping strong black coffee.

Another recording which was most unusual was in Acre, which got its name from the Greek word *aka*, meaning cure. Here it is said that Hercules found curative herbs to heal his wounds. Racial relationships are being healed here now. In the narrow, congested, spicy-smelling bazaar, vendors cry their wares in Hebrew, Arabic, French, Yiddish and Rumanian. It was nearby to this ancient seaport that young Arab girls had come for a Jew Arab Youth Seminar. I was invited to be present at this unique occasion, marking the first co-educational, inter-racial get-together. At a sing-song in the evening they sang a spirited Bedouin tribal song with cymbal and tom-tom accompaniment, the Jewish contingent replying with the celebrated Hora dance song 'Hava Nagila' – 'Let's Be Gay'.

Without doubt the most exciting part of my mission was to the Negev Desert and the Dead Sea. This is the vast hinterland

Far left: The Negev Desert, homeland of the nomadic Bedouin. Across such terrain Bob Danvers-Walker journeyed on his way to the Dead Sea.

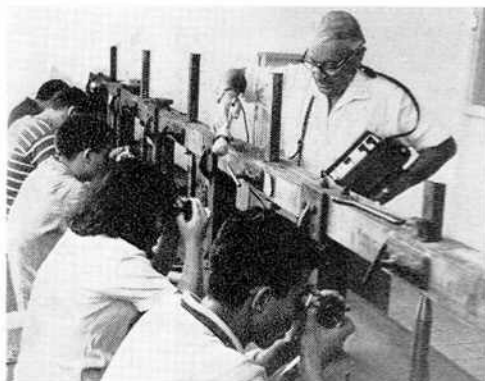
Left: The Dead Sea Scrolls are now housed in the Shrine of the Book in Jerusalem. In the event of fire the display pillar would sink into the well to protect the priceless relics.

Right: A trio of harnessed camels trample out the harvest grain near Beersheba, and provide Bob with a useful effects tape.

Below: Haifa, celebrated for its diamond polishing industry, provides high-frequency sounds for Bob's microphone as expert operatives shape the gems.



Below: Recording a group at a night club in the Old Quarter of Jaffa. This once-decrepit area is now being converted into a superb artists' quarter.



of the nomadic Bedouin. Through its great canyons, centuries ago, passed the Children of Israel under their leader Moses, trudging the sun-baked miles on their exodus from bondage in weary migration to the promised land. Ancient caravan routes may still be seen crossing the waterless wadis and snaking through tortuous passes and ravines with names like the Ascent of the Scorpions. Every now and then I came across small encampments of Bedouin tribesmen, the womenfolk watering the goats or herding the camels. Secretly I recorded their weird calls. Goat skin tents provide simple shelter for a primitive existence which never alters.

I made two visits to the Dead Sea – once by road and the second time by air. I will never forget either. The Land Rover came out of the desert and from an escarpment I looked down, as though from a mountain top, to the blue-green inland sea shimmering in the furnace heat five miles away. The lunar-like rocks, the mauve and violet coloured Mountains of Moab in the distance, secreted the past evil existence of Sodom and Gomorrah, while the mirage-trembling outlines of cliffs fashioned into grotesque shapes. There it all was spread out 1,300 ft below me like a panoramic view from an aircraft, and I was standing at sea level.

I then began to descend into the lowest place on the face of the earth. The air was heavy and impregnated with a stickiness from the fast evaporating sea. My Fi-Cord has known the rigours of Arctic cold and Sahara heat but now it was to be subjected to a form of pickling in salt and be oven baked at the same time. Stripping off my sweat-sodden shirt, I walked across the salt-encrusted shore and waded into the Dead Sea. The carrier case looked as though it was covered in dew. The water was hot and scratches on my legs, caused by hard-baked and salt-impregnated clay

at the water's edge, felt as though – well yes, as though salt was being rubbed into an open wound. Waist deep, I flopped in. And straight away popped out like a cork. Not only can you not sink in the water because of its extreme salt content, but you can't swim either – your bottom and legs just won't go under. So you float, and even sit on it. Higher up the beach at the recognized 'plage' bathers were lying in it with pillows for their heads. I then lashed the Fi-Cord across my chest and, microphone in hand, lay on my back. With my free hand I paddled over to record an interview with Jacob Danker, my Israeli courier. It was fine as far as it went, and the effect it had on a curious onlooker when I played back was quite remarkable. He'd never heard such a devil box before. But I know now that I never should have opened the lid to show him where it all came from. That salt-laden air must have formed a deposit on the tape face and record head. Surge effect developed on later recordings which I attributed to this. It was immune to methylated spirit and only carbon-tetrachloride would budge it. Even the lens of my companion's camera was affected. That's why I have no photo to show you.

In fourteen days I filled ten 4 in spools of LP tape and indexed sixty different items for my programmes – including the Beatles coming over the car radio as we drove through the Negev Desert on our way to King Solomon's copper mines!

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ON TEST THE PYE ACHOIC SYSTEM

Peter Knight examines the Pye Achoic System and puts it through its paces



Exterior view of the achoic 'box' player.

The Pye Achoic system is fundamentally an instrument of record player dimensions that enables stereo records to be reproduced in an ordinary-sized room without the need for extra or extension speakers. It is more than a mere stereo record player, however, for in spite of its small size, its powerful in-built transistor amplifier is capable of very good quality reproduction.

Distortion is less than 1% and the 5 watts maximum of each channel (10 watts overall) is adequately handled by two sets of three speakers (six speakers in all). The speakers are positioned three each side of an acoustically designed cabinet, as shown in Fig.1. Each stereo channel thus energizes a bass speaker, a mid-range speaker and a treble speaker and these are fed through special crossover filters from the transformerless solid-state, push-pull output stage. The disposition of the speakers at one side of the cabinet is shown in Fig.2. This is matched on the other side of the cabinet for the second stereo channel.

Interesting acoustics

The acoustics of the cabinet are interesting and, as seen in Fig.1, the mid-range and treble speaker units are mounted in an enclosure that is effectively isolated from the cabinet proper.

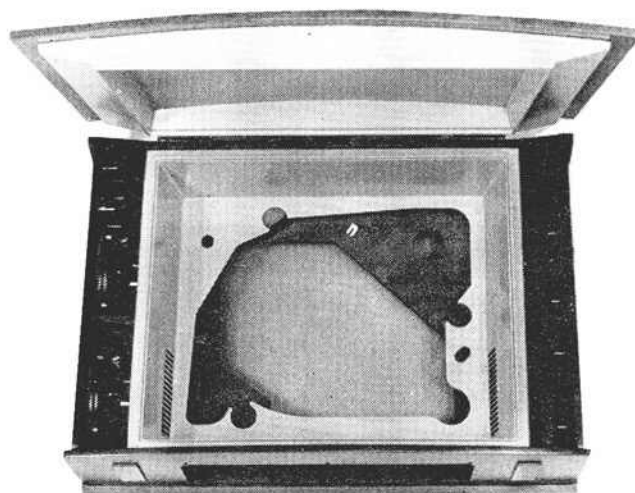


Fig. 1. Top view of the acoustic cabinet with electronics and changer removed, showing one set of three speakers on left-hand side.

The bass speaker units, on the other hand, are coupled acoustically to the whole of the cabinet through the grills in the plastic surround.

These speakers are thus pressure loaded to the cabinet and this is facilitated by a specially designed cabinet lid which closes tightly on to a seal-moulding. For correct bass response, therefore, the cabinet lid must be properly closed; indeed, a substantial drop in bass is obvious if the user fails to seal the lid after starting the motor. Sealing is by no means difficult, it being necessary simply to push the lid downwards into the retaining force of a spring.

The system has an overall frequency response from the disc to the speakers of about 40 to 16,000 c/s, the response being substantially flat from about 70 to 12,000 c/s, which can be proved by the use of a frequency test disc. The extended treble owes much to the nature of the treble speaker unit and its manner of loading, and the crossover frequency appears to be nicely chosen for a smooth take-over by the mid-range speaker. The bass speaker unit adopts a surround that provides a linear piston action over a large amplitude, and thus pulls the bass resonance down to a low frequency that fails to interfere with the action of the cabinet acoustics. Again, the change from mid-range to bass is unobtrusive.

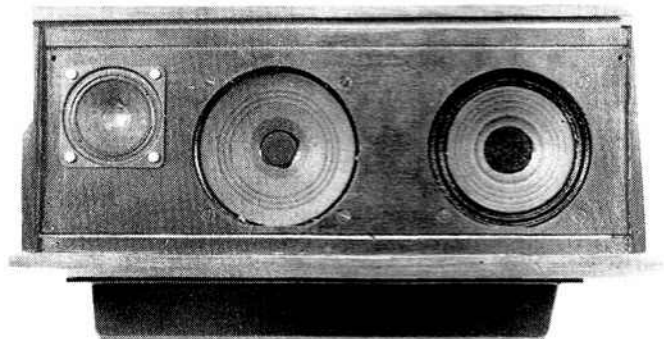


Fig. 2. Side view of the cabinet showing the three speakers of one channel.

Wall reflection

The cabinet is designed for placing either between two walls or in the corner of a room, the idea being that the sound emanating from the sides of the cabinet is reflected into the room by the

walls, thereby providing two isolated stereo channels from a relatively small enclosure. This reflecting idea is not new, of course, as many readers conversant with the hi-fi arts will appreciate. It is new, however, from the aspect of a self-contained record player.

Just how well the stereo effect is created depends considerably on the placement of the unit in the room, and also on the nature of the walls used for reflecting the sound. The stereo effect requires very little bass for its creation, but it does call for channel isolated mid-range and treble frequencies. Thus, if the unit is positioned to provide optimum reflection towards the highs, and the walls are conducive to reflecting such sounds, very pleasant stereo indeed is obtained. Some walls (or wall-papers) tend to absorb sound, which means that tonal balance demands the use of treble lift, and the amplifiers can provide this with considerable flexibility. A reasonably wide-range balance control also facilitates matching the two channels stereo-wise in the event of one reflecting wall being of different material or a greater distance away from the unit than the other one.

The transistor amplifier is of true hi-fi design and is mains-operated. Each channel incorporates its own circuit panel, and the complete assembly is easily accessible from the front of the cabinet, after removing the control knobs. The mains power unit is built on to a separate chassis.

As already said, each channel delivers a power of 5 watts at less than 1% distortion. The output stages feature transistors in class B push-pull with liberal use of negative feedback.

Loudness control

Instead of the conventional 'volume control', a 'loudness control' is adopted. This is really a frequency corrected volume control in that as the volume is decreased the bass response is increased. As many of our readers know, it is a phenomenon of our hearing mechanism that an apparent loss of bass occurs at low listening volume. This is usually countered by stepping up the bass control when the volume control is turned down. The Achoic loudness control thus handles this adjustment automatically by giving a progressive lift in bass as the control is retarded, thereby adjusting the aural balance of frequencies to provide the optimum realism at all sound levels. In addition to this, of course, there are 'bass' and 'treble' tone controls ganged conventionally to each stereo channel. The 'balance' control provides from ± 6 dB to -6 dB channel-to-channel.

When the instrument is switched on a small indicator light shows from a slot between the centre controls of the front control panel. A very interesting feature, which can only really be exploited on transistor equipment, is the absence of the conventional on/off switch. This is usually integrated in one of the controls, but the Achoic is switched on and off by operation of the autochanger unit. When this is switched on the transistor electronics are also switched on, and they are automatically switched off when the changer switches off at the end of a record programme!

The record changer can be used either manually or automatically. It is virtually noiseless in operation and simple to use. Its general performance is consistent with the quality of the audio system. Its speed retaining ability is good and even with the changer fully loaded with discs wow-and-flutter-free performance is achieved.

Four speeds – 16, 33, 45 and 78 rpm – are incorporated and selected by a speed control knob. At the other corner of the motor board is a control switch that selects 'auto', 'manual' and switches the motor on and off. The extended centre spindle type of record storage and the overarm 'sensing' lever system are adopted on the changer, as shown in Fig.3.

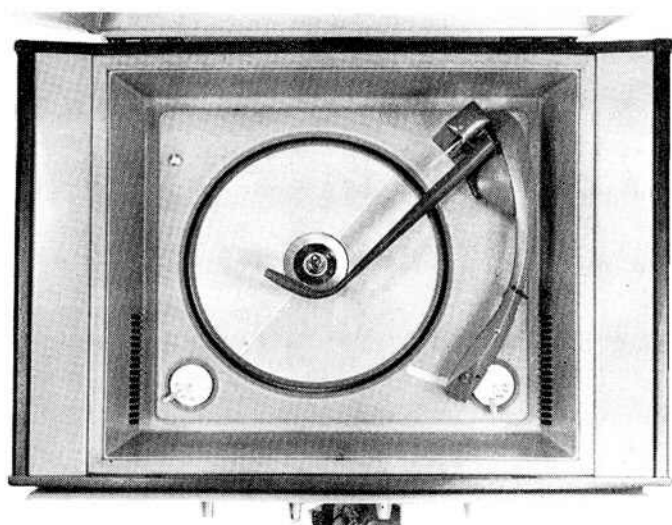


Fig.3. Top view of the record changer and pick-up.

Butterfly pickup

An interesting aspect of the record playing department is the pickup. This features the exclusive Pye 'butterfly' pickup arm and piezo ceramic dual element mono/stereo cartridge. The cartridge is retractable in its arm housing (Pye patent).

The arm is pivoted in the usual manner, and the cartridge is also pivoted in the arm head. The ratio of the weights relative to the arm proper and the cartridge is such that the cartridge just balances in its housing on its pivot when the stylus is resting on a record. In effect, the cartridge balances against the balance weight of the arm. This gives a remarkable double suspension action that is highly effective. The tracking weight on the disc is, in fact, that due to the pivoted weight of the cartridge and not of the arm.

The efficiency of this suspension system is such that even if the pickup is dropped on to the disc or skidded across it little or no harm comes to either the disc or the stylus. The tracking weight is adjusted to 2 grammes, thereby ensuring very little disc wear.

The cartridge employs matched pairs of ceramic elements and a 'turn-round' stylus assembly, one side for mono with a 0.001 in tip radius to avoid groove bottoming (which often happens when a mono disc is played with a stereo stylus) and the other side for stereo with a 0.0005 in tip radius.

To change from one stylus to the other a small button on the top of the cartridge housing is depressed and turned round as far as it will go in the appropriate direction.

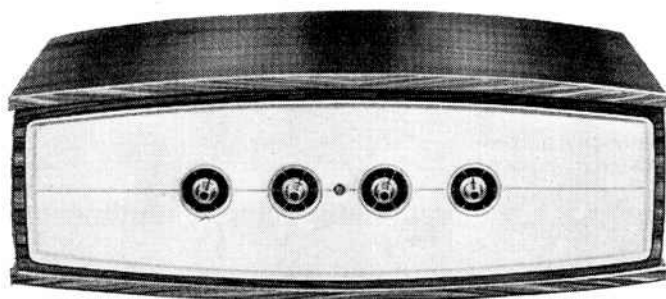
Incidentally, this 'butterfly system' – which is a very appropriate name in view of the manner that the stylus 'settles' on a disc should the arm be allowed to drop – is adopted in the 'Brahms' turntable unit, a hi-fi system by Pye incorporating the Goldring-Lenco GL70 transcription turntable, and has also been specially designed for use on BSR and Garrard record changers.

Test report

The instrument has been subjected to exhaustive examination and test over a period of several months, and has come up in all ways to expectations. Its overriding advantage is that it allows the reproduction of stereo discs without the large dimensions and extra speakers of more conventional high quality stereo systems. Of course, it is not expected to compete with costly and elaborate hi-fi stereo systems in which the speakers alone may well cost as much – if not more – than the complete Achoic. Nevertheless, the quality of reproduction

continued overleaf 19

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- * Solid-state twin-channel amplifier.
- * 5 watts output per channel.
- * Turntable unit with 'Butterfly' pick-up. Piezo electric (ceramic) retractable cartridge. Playing weight 2 grams.

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69 GNS

A JOINT DEVELOPMENT BY PYE OF CAMBRIDGE AND CBS OF AMERICA

Pye Achoic System *continued*

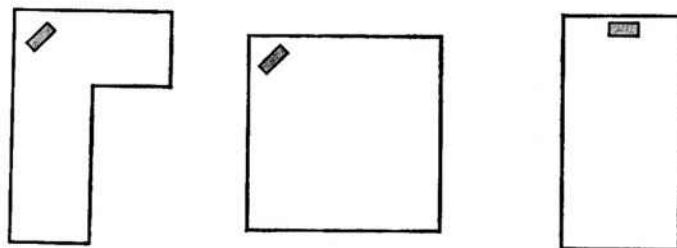


Fig.4. Suggested positioning for Pye Achoic System in various room shapes.

comes under the classification of *excellent domestic quality*. It produces far better sounds, of course, than the conventional mono record player of similar dimensions, and there is no doubt that the pickup and electronics are of hi-fi standard.

How one appraises the quality is somewhat dependent on the position of the instrument in the room and on how well the controls are adjusted. Fig.4 shows three ideal positions for the instrument, and when corner positioning is employed a clear space of about 2 feet should be left between the speakers and the walls.

Even under environments where the stereo action is somewhat suppressed, the twin speaker system encourages a spaciousness of sound and eliminates the 'hole-in-the-wall' effect that goes with a single loudspeaker.

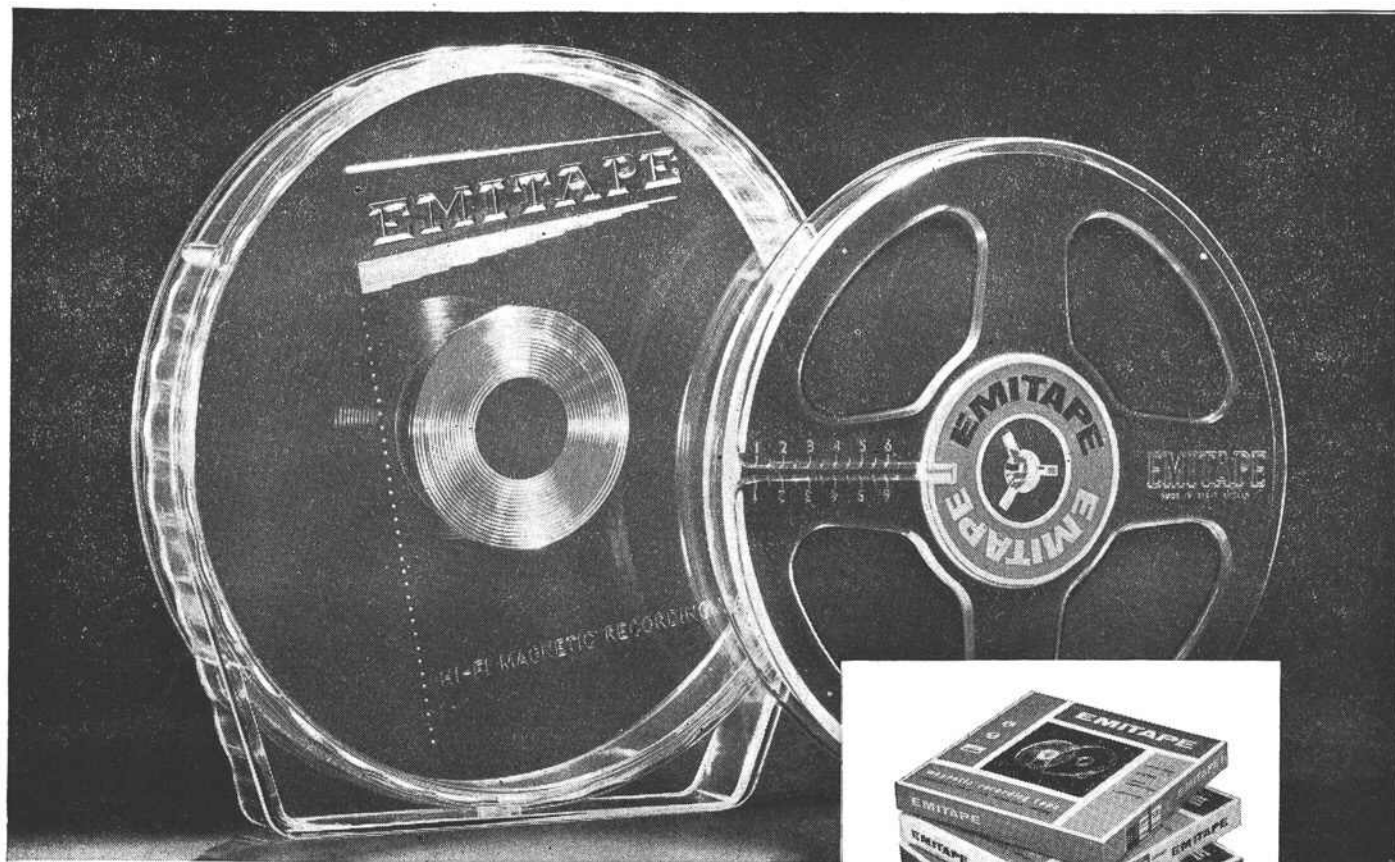
In spite of the bass pressure loading technique, mechanical vibration and rattle is essentially non-existent, even when playing discs containing large bass power, such as organ records. When playing this kind of record at full volume (as a test—poor neighbours!) trouble was experienced in keeping the lid down. The internal sound pressures were so high that they pushed the lid up and released the spring retainer, the symptom then being a distinct drop in bass response. Normally, of course, one would not run the instrument to such volume, but if the exercise is to impress the neighbours the weight of a book on the lid solves the problem!

The Achoic can be thoroughly recommended as a good quality record player with stereo facilities and for locations where space is limited and where one is not particularly concerned in going all the way towards hi-fi. The instrument, however, is not for the true hi-fi enthusiast, for he would almost certainly end up with external speakers and enclosures connected to the quality potential electronics.

Maker's Specification

Power output 5 watts into two channels. **Distortion** less than 1%. **Output stages** transformerless class B push-pull in feedback circuit. **Overall frequency response** from record to speakers 40 to 16,000 c/s, substantially flat from 70 to 12,000 c/s. **Controls** compensated loudness control with frequency response automatically adjusted in conjunction with volume. **Balance control** + 6 dB to - 6 dB channel/channel. **Treble control** increase or decrease from 'normal' mid-position. **Bass control** increase or decrease from 'normal' mid-position. **Speakers** six in acoustic chambers. **Pickup** hi-fi piezo ceramic retractable cartridge, playing weight 2 grammes, 40-16,000 c/s, 5 to 6×10^6 cm/dynes, cross-talk better than 20 dB at 1 kc/s, 65 mV at 1 kc/s for recorded level of 1 cm/sec (across 1 megohm load). **Power supply** 200-250 V 50 c/s in two ranges 200-225/226-250 V, approximately 30 watts. **Autochanger** four-speed, auto/manual. **Price** is 69 gns. Further information is available from Pye Ltd, Cambridge.

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SOME PROBLEMS OF VIDEO RECORDING

Some of the difficulties inherent in practical video recording and how to overcome them, discussed by Gordon J. King

In the previous article dealing with video tape recording, it was shown how all the little elements of information abstracted by the camera system are fitted together accurately at the receiver to give the illusion of a full, complete picture on the screen. We saw that each element occurs separately with time over a complete picture (two fields to a complete, interlaced picture), of which there are twenty-five each second with a field frequency of 50 c/s.

The way that the line and field sync pulses serve effectively to fit together each picture element in proper order was also revealed.

Now it is only because our eyes are unable to register the incredibly fast rates of changing brightness of the separate elements and follow the fantastic speed of the scanning spot as it scans the screen of the picture tube that we can discern a complete and moving picture without a great amount of flicker.

This results from an effect called *persistence of vision*, which is talked about quite a bit in television circles. If, for instance, a light is switched on and off relatively slowly, say several times a second, our eyes would register the periods that the light was on and off. However, if the switching rate were increased we would fail to see the off periods and we would get the impression of continuous illumination. At low switching speeds—say, below 50 c/s—we should be aware of a flicker, the effect of which would decrease up to and beyond 50 c/s.

During one-fiftieth of a second, one field made up of half the picture information (in the case of an interlaced scanning system), unfolds on the screen. Two of these fields interlace to build up the fully defined picture during one twenty-fifth of a second. Thus, the fundamental flicker rate is at 50 c/s, in spite of the fact that a complete picture takes one twenty-fifth of a second to unfold.

To produce fifty complete pictures each second by the use of *sequential scanning* the bandwidth of the video circuits would have to be double that of the video circuits of an *interlaced scanning* system for a given picture definition, and in spite of

these there would be no appreciable improvement in flicker over an interlaced system. Here, then, is the advantage of the interlaced system.

Now let us suppose that we have an ordinary tape recorder with a tape speed up to $7\frac{1}{2}$ ips and, say, a response up to 15,000 c/s and we record on this the video signal as present at the detector or the video amplifier of a television set, as shown in the previous article. What would we hear by playing back the tape recorded in this manner?

Video by ear

Yes, we can hear video signal! Actually, we should hear mostly a buzz with a fundamental frequency of 50 c/s, representative of the field sync pulses. Superimposed on this, we should also hear a buzz of changing frequency, this being due to the changing character of the video signal proper. We may also hear the 10,125 c/s line sync pulses, assuming that we are working on a 405-line system.

Just for the fun of it, let us suppose that we connected this signal to the input of the video amplifier in the domestic TV set. What would be the effect on the screen of the picture tube?

Well, for a start, we should be lucky to get even a resemblance of picture on the screen. I can recall such an experiment undertaken with a Grundig tape recorder some years ago, well before domestic taped video was contemplated. First, the video fed to the tape recorder to modulate the tape was monitored on a pair of headphones. Secondly, the video signal as taken off the tape was listened to in the Grundig speaker. Although this sounded very similar to the signal originally monitored, there was a definite difference. The original signal from the TV set had much more audio treble than could be heard from the tape. The buzz, too, had much more of a distinctive characteristic when monitored direct from the TV's video amplifier than when heard on tape playback.

An experiment in taping video

Thirdly, the video signal as taken off the tape was fed direct to the input of the

TV's video amplifier. This exercise produced shadowy effects on the TV screen and, with a bit of imagination, one could discern rolling frames of the pictures, rather like the effect resulting from maladjustment of the frame or field hold control of an ordinary TV set. Similarly, a tearing effect on the lines was present, and this could be varied—as with a proper signal—by adjusting the line hold control of the set.

Further, it was noticed that assuming one could get the frames or fields to lock (and the lines, for that matter) the lock would not hold at all well. While an experiment of this kind is not very fruitful in terms of performance, it does without any question of doubt reveal just what one is up against when making a video tape recording.

The picture appeared as undefinable shadows because the limited bandwidth destroyed the square- and triangular-wave nature of the video signal; the synchronizing was again destroyed, because of the bandwidth restriction—causing rounding of the square corners of the pulses—and because of some speed inconsistency in the mechanics of the recorder.

We must now analyse why the ordinary domestic tape recorder is unsuitable for video applications, and by so doing we shall discover exactly what is required of the video tape recorder for good performance. First of all let us look at the question of picture definition, and see just what this term means.

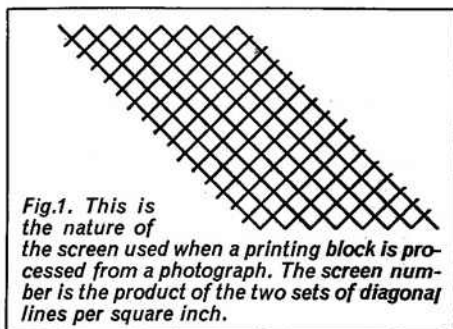
The limit of definition on any television system resolves fundamentally to the number of lines used. This means, then, that the definition potential of a 625-line system is greater than that of a 405-line system. It does *not* imply that a system employing 625 lines is bound to have better definition than a system employing 405 lines. Indeed, there are some 625-line TV sets in use on which the picture definition is below that of some 405-line sets. This is because something in the set or in the video signal is preventing the full definition potential of the 625-line system from being fully realized.

Definition, then, simply means just how well a TV system can define a picture of

detail. The greater the detail in any picture the greater needs to be the definition of the system to reproduce it. This has an analogy in the printing business. The half-tone block, for instance, has a specific definition in terms of the detail that it is able to impress upon the printed page.

Printing block analogy

A half-tone block is, in effect, the result of the original photograph etched on to a copper surface in the form of a multitude of tiny points. The original photograph is re-photographed on to a copper plate coated with a substance to make it 'photosensitive'—like the surface of a film; but the re-photographing takes place through a transparent screen on which are etched two sets of diagonal lines, as shown in Fig.1. The picture as 'seen' by the sensitized copper plate is thus broken down into a consistent pattern of diamond shapes.



After being exposed in the ordinary photographic manner the photosensitive copper plate is put into a bath of acid, the effect of which is to dissolve mostly those sections of copper corresponding to the bright parts of the picture while leaving unaffected those sections corresponding to dark parts of the picture. The amount of copper that is dissolved or 'etched' is governed, of course, by the amount of light that reached the photosensitive surface.

Because the sensitized copper surface was exposed through a screen of the nature described above the processed block has a printing surface composed of many tiny points of copper. The surface area of these points is greater in the darker than the lighter regions of the picture, which means that more ink is picked up on the former than the latter, thereby giving the correct relative shading of the printed picture.

Clearly, the definition of a picture printed with a block having a very large number of copper points is greater than the same picture printed with a block of smaller number of points. The printing block is referred to as so many screen. Printing paper of good quality can accommodate a block of greater screen than ordinary newspaper, for instance. A block commonly used for newspaper work is 80-screen, while a 200-screen block (or of

that order) would be used for high quality reproductions on glossy paper.

Picture elements

The screen number refers to the number of lines in each direction. An 80-screen has eighty lines to the inch in each direction, giving 80 times 80 points to the block per square inch. The dots that the points of the block make on the paper are sometimes called picture elements, and these have their analogy in television. A 405-line television picture has approximately 377 active picture lines. The missing thirty occur during the field sync pulses and are thus not available for the picture elements themselves. Ideally, the scanning spot of the TV picture tube should be square rather

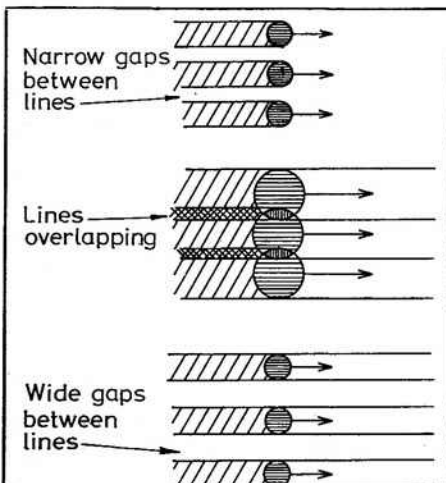


Fig.2. The theoretically ideal scanning spot would be square, but good results are achieved in practice when the spot diameter is very slightly less than the width of a line, leaving narrow gaps between the lines as at (a). If the spot is too large, a reduction in definition results due to overlapping and loss of information, since the spot cannot define picture elements smaller than itself; this condition is shown at (b). A spot whose diameter is considerably smaller than the effective width of a line will give rise to large gaps between the lines, and no useful increase in definition will result. This condition is shown at (c).

than round and it should be of a size to match a picture element. In practice, of course, it is round and it has a diameter slightly smaller than a picture element. If it were larger than a picture element, it could not define it, of course, and one line would overlap an adjacent one. If it were too small the dark gaps between the bright lines would be too noticeable. These three conditions are illustrated in Fig.2.

The vertical definition of a picture is thus set by the number of scanning lines; that is, by 377 lines in the case of a 405-line system. Supposing that the horizontal definition is made equal to the vertical definition, and that the picture were square, the number of picture elements would equal 377×377 , or 141,129.

The picture is not square, of course, and the standard width-to-height ratio (called the 'aspect ratio') is 4-to-3. Thus, to find out the number of picture elements in a practical 405-line picture we must multiply the number we got above by $4/3$ (i.e., $377 \times 377 \times 4/3$). This gives a figure of 183,172.

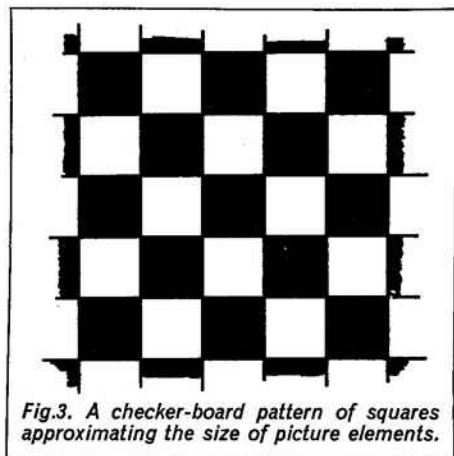


Fig.3. A checker-board pattern of squares approximating the size of picture elements.

Maximum definition

So far, so good. Now let us suppose that we wish to exploit to the very maximum the definition potential of the 405-line television system. This would mean that each element would be alternatively black and white, giving a checker-board pattern. A small but enlarged section of the screen would thus look like the drawing in Fig.3.

How would we get this pattern on the screen? Well, this would call for square-wave modulation at the tube of the nature of that shown in Fig.4. Here, to make the element white the tube grid would have to be made less negative by the signal, while to make the element black the tube would have to be pushed into beam current cut-off by the signal making the grid go more negative. Fig.4(a) shows four adjacent picture elements along one line, and (b) shows the square wave necessary to produce them as distinctively as shown. This is fair enough, but

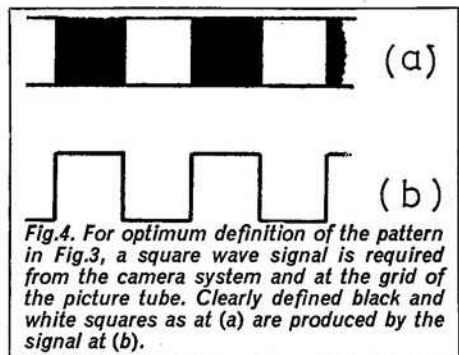
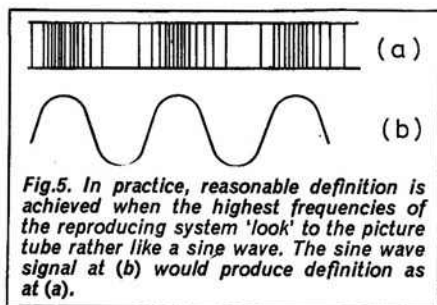


Fig.4. For optimum definition of the pattern in Fig.3, a square wave signal is required from the camera system and at the grid of the picture tube. Clearly defined black and white squares as at (a) are produced by the signal at (b).

what about the fundamental frequency of the square wave to produce this optimum definition display?

We can best understand this by referring to a sine wave instead of a square wave

for tube modulation. Fig.5(b) shows a sine wave used as picture tube modulation, and (a) shows how the adjacent picture elements are this time displayed. There is a general loss of clear-cut change from the black to the white squares, and vice versa. This, of course, is because the change of modulation at



the tube grid follows the sine wave instead of the square wave. The change is far less speedy with a sine wave.

We must, of course, remember that this is the optimum definition that we are

considering, when each and every picture element alternates from black to white over the entire screen! This would never happen in practice. Nevertheless, it reveals that adjacent picture elements can be reasonably black and white with sine wave tube drive.

From this aspect, there is an important point, which is that *one complete cycle* of sine wave modulation is responsible for an *adjacent pair* of picture elements. One element is formed when the sine wave swings positive and the other when it swings negative.

Maximum practical frequency

From the foregoing we can work out the frequency of the sine wave required to produce the modulation pattern in Fig.5(a). We have seen that the number of complete cycles of signal corresponding to a complete picture is half the number of picture elements. On 405 lines, this number is 183,172 (worked out earlier), half of which is 91,586. Now, since there are 25 complete pictures each second, the actual modulation frequency is $91,586 \times$

25 c/s, which works out to 2,289,650 c/s or, in round figures, approximately 2.3 M/c/s. This is the frequency of signal that would be produced by a camera system responding to a checker-board pattern of squares, with each square approximating the size of each picture element of the system. Actually, one would hope that the camera system would produce near square waves; but to carry these all the way through a video tape system would demand a bandwidth well in excess of the square wave fundamental frequency. Indeed, a bandwidth of at least ten or eleven times the fundamental frequency is required to preserve fully the square wave nature of the camera signal when the camera is responding up to its definition limit.

We can now begin to see some of the real problems that are associated with video tape recording. Future articles will explain how these problems can be resolved, and why a square wave requires such a wide passband to preserve its shape during its passage through a video tape recording system.

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'Tell Her You Love Her' / Frank Sinatra. Capitol TA-T 1919. £1 15s 0d.

Typical, gorgeous Franky mood music. Backing orchestra(s) is (are) superb and, as usual, EMI feel that tape buyers won't be interested in anything but the titles.

I cannot understand why it is that if you buy an LP you get arrangers, conductors, orchestra personnel, how they made it, where they made it, sometimes when, and often a load of other information. They call it 'sleeve notes'. Now, maybe I'm a nut, but, as I've said before, I like to know all the 'gen'. I like to know that the second trombone player's wife gave birth to triplets as they cut the third track. I like to know, and usually on LP covers I get it all, so why in Hades when they transfer the stuff back to tapes can't they reprint the sleeve note for 'tapophiles' benefit. Believe me, most of us can read. I do nag on about this and only because I know lots of others feel the same way and I hope that one day someone who manufactures pre-recorded tapes will actually read my little column and take note.

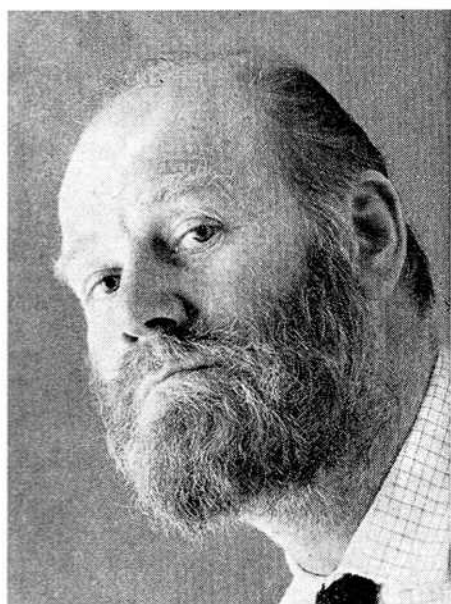
Ah! As they say, that's better, now I've got it off my chest, even tho' because of the lack of notes all I can tell you about this tape is the singer's name is Frank Sinatra. It doesn't say so on the label, but I can tell you that Nelson Riddle is the Orchestra on at least seven of the twelve tracks as they are re-issues from two oldish LPs, 'Songs for Swinging Lovers' and 'A Swinging Affair'. The remaining five titles are probably on another LP I haven't got. If you haven't got, get!

'The Unforgettable Nat King Cole' / Capitol TA-W 20666. £1 18s 0d.

A potted history of Nat's recording life, with a spoken commentary giving recording dates, etc., with eighteen delightful examples of his singing style. Quite a memory jerker and extremely well presented and tastefully commented.

Behind some of the early trio examples can be heard Nat's piano. He was first a jazz pianist and made quite a lot of non-vocal recordings before he began his successful trio. He went on to feature in films and top the hit parade. He came to Britain and appeared at the London Palladium. The world was truly his until, like so many, too many, he was struck down by that tragedy, cancer. Truly unforgettable and the best album of the month.

TAPE REVIEWS



Russ Allen reviews some of the latest tape record releases.

'Band Call' / Duke Ellington and his Orchestra. World Record Club TTP 86. £1 9s 6d.

Track one has Duke in a Latin American mood, Its good exciting stuff with a lot of stratospheric brass and bags of atmosphere. Originally issued on Parlophone 78s and possibly issued since on an LP, they haven't dated and the recording is pretty good. (There was a fault at the beginning of my tape, but I suspect it was something that just happened to me.) Track two is stuff I don't recall having heard before and is Duke at his worst, trying to sound commercial and trying to make jazz out of such horrors as 'Echo Tango'. There is a version of 'Blue Moon' with a ghastly vocalist. I could go on but had better confine my remarks to saying the A side is good and the B side is a B side. Suggest you get this and record something else on track two.

'In Love Again!' / Peggy Lee. Orchestra conducted by Max Bennet. Capitol TA-T 1969. £1 15s 0d.

Peggy first came to fame many years ago with the old Benny Goodman Orchestra with a number called 'Why Don't You do Right'. It was an absolute wow and it still sounds great today. Although now a star of films, radio and TV, she still slants most of her recording more jazzwise than some so-called jazz singers and has the ability to make even the dreariest song sound twice as good as it should. She's a real swinger that Lee girl and always good listening. Delicious.

'Some of My Best Friends are the Blues' / Jimmy Witherspoon. Stateside TA-SL 10114. £1 15s 0d.

Witherspoon has long been my favourite blues singer. He has the authentic 'sound'.

To some extent over the years he has mellowed, which is OK, but I just can't forgive him for recording what I feel is little more than a sugary load of commercial cod's-wallop. It is surely a travesty of the artistry of Witherspoon to use him this way.

The only number worth listening to is the title tune. For the rest, ugh! And what's more, aagh! Moral maybe is let blues singers sing the blues. This title is as misleading as its contents are disappointing. Jimmy spooning out a load of sugary goo!

'Ack's Back' / Mr Acker Bilk and His Paramount Jazz Band. Columbia TA-33SX1747. £1 15s 0d.

Dance band sax doubling clarinet men take the 'mick' out of his tone and vibrato. Dyed in the wool jazz men say he's not, but Acker continues unperturbed, making a little 'bomb' the while. Furthermore, Acker has a very good swinging mainstream sounding group that really makes your feet tap.

Personally I like Acker's clarinet playing, and his singing, in fact - I like Ack! If this makes me square, I don't care, and if Ack can come back again with more like this he'll be very welcome indeed.

EMI have gone to town a bit and given us the personnel on this and, if they'll pardon me for saying so, I feel they could have given us a little less echo on the recording.

Don't let that last remark put you off, it's a jolly good fun tape. Hooray for Acker and the boys.

BUYING A TAPE RECORDER

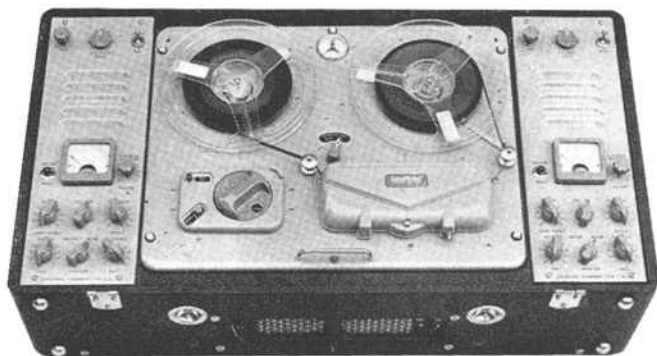
A. Lester-Rands continues his article on the points to bear in mind when buying a new machine. This month he deals with machines from £30 to £100.

The first part of this article ended with a few notes as to whether one should buy a half-track or quarter-track tape recorder. This applies to all tape recorders of course, mono or stereo, however expensive, and one should indeed consider this very carefully. May I repeat, however, that if you intend doing really serious and creative recording or if you want the highest possible quality of reproduction, then buy a half-track recorder.

Part 1 dealt with the least expensive tape recorders, those in the £25 to £30 price bracket, and from here we go to the price ranges £30 to £50. In the lower ranges of this price bracket, what does one get for the extra money? A slightly better performance perhaps but mainly such refinements as larger spools, up to 7 in in diameter, and a higher power output, together with a loudspeaker large enough to handle it. In other words, the available sound volume without distortion may be higher. Provision for mixing the input signals, microphone and radio, might be included and the recorder itself may be larger. It may have better deck facilities, i.e., fast rewind, pause control (temporary stopping arrangement whilst recording) or it may feature an automatic volume control system as on the Grundig TK18L which sells at 41 *gns*. There are also one or two battery/mains portables in this price range including the Sony TC900 at 32 *gns* and the Sharp RD501 at 33 *gns*. The latter is a two-speed half-track machine that will take 5 in spools.

Most, if not all, tape recorders have output sockets which allow connection to either an external loudspeaker or an external amplifier, or to both. The advantage of this is that a larger external loudspeaker will permit better quality of reproduction especially at the low frequencies (the bass). An external hi-fi amplifier together with an appropriate loudspeaker will also provide the basis for high fidelity (or at least good quality) reproduction, with extended bass and treble response. Even quite inexpensive tape recorders, given a good microphone or radio signal, are capable of making an excellent recording. The real quality of the recording may, however, never be realized because of the limited power output and small loudspeaker, limitations which are inherent in almost all tape recorders. In any portable recorder both the power output stage and loudspeaker are quite incapable of reproducing a more or less life-size version of a good recording. When the replay is made through an external hi-fi amplifier and speaker, however, the real quality of the recording is immediately apparent. A tape recorder coupled directly to a large external loudspeaker should be able to supply enough output power (at least 3 watts) to drive the speaker.

By and large, tape recorders in the £30 to £40 bracket are a good



buy if your recording intentions are not too serious. With various pieces of auxiliary equipment such as a better microphone, a microphone mixer, an additional amplifier and speaker or even only a loudspeaker, some advanced recording techniques are possible and good quality reproduction can be obtained.

Between £40 and £50 are a great variety of tape recorders with much about the same facilities but with a better overall performance. One also expects to get better accessories and larger tape spools, although the maximum size is generally 7 in. Stereo tape recorders start coming into this price range as well, but watch out here as some machines labelled 'stereo' may require an external amplifier and loudspeaker or a loudspeaker only for the second channel. Some stereo tape recorders feature the two loudspeakers necessary for the two replay channels like the Sanyo shown in Fig.1. A stereo recorder of this nature does, of course, have full facilities for stereo recording and replay and is supplied with a stereo microphone. If you contemplate stereo at all make sure you understand exactly what you will be getting or you may discover you need to purchase more equipment in order to get the full system working.

Also on the market are various *tape record/replay units* which in themselves are complete tape recorders but have no output stage or loudspeaker. They are intended for normal recording with a microphone or radio signal, etc., and in this respect are the same as any other tape recorder. For replay, however, they require an external amplifier and loudspeaker. They are designed to form part of a complete hi-fi system and, if you already have the necessary amplifier and speaker, are worth considering. Generally speaking, the performance of one of these units should be some-

Left: The Sanyo stereophonic tape recorder has twin record/replay channels including two loudspeakers and two microphones.

Below left: The Vortexion CBL Stereo tape recorder with separate record/replay amplifiers.

Below, top: The Brenell Mk 5 Series 2 mono tape recorder with mixing facilities.

Below, bottom: The Magnetophon 300 battery-operated portable tape recorder by Telefunken.



what better than a full tape recorder at the same price. Tape record/replay units such as those made by Truvox and Tandberg are available for mono or stereo with half-track or quarter-track recording.

Semi-professional tape recorders

Before I deal with the highest grade tape recorders that sometimes carry the tag *semi-professional* here is just another word of warning. Beware of low-priced tape recorders labelled semi-professional or quoted as being able to make a professional recording or being able to record to 'professional standard'. A small pro-

fessional studio tape recorder would cost at least £300. Most, if not all, tape recorders intended for professional studio work are full track machines in any case and operate at $7\frac{1}{2}$ ips and 15 ips only.

The label semi-professional is not always warranted even on some of the very expensive tape recorders that carry it, but, generally speaking, a mono half-track tape recorder costing in the region of £100 will make a recording of very high standard. There are also tape recorders priced at £100 or more than have a lot of extra facilities and a fancy case but are no better (reproduction wise) than some machines priced at around £50. Tape recorders more or less accepted as semi-professional machines usually have a somewhat technical appearance like the Vortexion shown in Fig.2 or the Brenell Mk5 in Fig.3. There is usually nothing fancy about these recorders, they are well engineered and perform to a very rigid specification. They all feature a VU or similar recording level meter and normally have provision for mixing two or more signal sources or may have a 'line' (600 ohm) input for use with an external mixer. Some have a built-in loudspeaker and output stage which, although capable of good quality on replay, is really intended only for monitoring.

Such recorders are the pride and joy of most keen enthusiasts and advanced amateurs but, like the best of all things, are costly. Price range would be around £80 to £200 or more.

Coupled with the top-grade mains recorders are a few battery portables such as the Magnetophon 300 shown in Fig.4 the Akai X-IV, the EMI L4 series, the Fi-Cord 202 and one or two more. These will all make a first-class recording but will only replay with moderate quality for monitoring and checking. Price range is again around £80 to £200.

Finally here are a few points to remember when you go to buy a tape recorder:

1. Buy the best tape recorder you can afford unless you are interested only in taping or casual recording from the radio, etc., in which case a tape speed of $3\frac{3}{4}$ ips is adequate.
2. Think twice before you buy a quarter-track tape recorder unless you merely wish to accommodate as much unedited recording as possible on one tape.
3. Spool size has some bearing on (2) since a larger spool will obviously carry more tape. This applies especially to those who wish to record long music items.
4. If you intend doing serious and creative recording make sure the recorder has such facilities as mixing, tape inching for finding a given point in a recording and provision for connecting to external equipment. A recorder that will take large spools is preferable. Tape speeds should include $7\frac{1}{2}$ ips.
5. A top grade (semi-professional) recorder will have such facilities as those in (4) but it should be mentioned that some require an external amplifier and speaker for replay. Microphones are generally not supplied. Tape speeds should include $7\frac{1}{2}$ ips.
6. Do insist on a thorough demonstration of all facilities before you buy. This should include recording and replaying, fast winding, the function of all controls and accessories, and replay through an external hi-fi amplifier.
7. Do make sure that the dealer or manufacturer can supply adequate after-sales service and spares.

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TAPE RECORDER SERVICE

by Gordon J. King

No record or playback – motor circuit normal

This symptom indicates definitely that mains supply current is reaching the recorder and that it is getting through to the motor circuit via the on/off switch. The amplifier section may incorporate an independent fuse which could have blown for some reason (see Part 1). Such would be revealed, however, by the heaters of a valved instrument being unlit. A clue in this respect is given by the magic-eye type of level indicator being devoid of heater glow. Often this can be observed without having to extract the electronics section from the instrument case or housing.

Number one operation here is to check the fuse by meter or replacement. If one is lucky it will be accessibly located on the rear panel of the machine. Failing this, it may be necessary to take panels off the case to get to the electronics and the fuse.

If the fuse has gone and a replacement blows straight away, a short-circuit somewhere in the amplifier electronics will almost certainly be responsible. How such trouble can be located was detailed in Part 1 of this series.

Let us suppose that the valve heaters are alight, indicating that the power supply current is getting into the amplifier sections, and yet the symptom as above is still present. What now?

Check the ht supply

One of the most likely causes of this trouble is lack of ht voltage. So, then, the first thing we should do is to check the ht voltage in the amplifier sections. This calls for a voltmeter or multi-range test meter, which is a handy thing to have about anyway. The voltmeter is adjusted for about 300–350 volts full-scale deflection and the test prods applied negative to the metal chassis of the electronics section and positive to the ht line. If there is no reading here, the positive prod should be transferred to the dc output side of the ht rectifier. Now, if there is a high voltage reading at this point, the lack of ht voltage is caused by an open-circuit in the inductive or resistive filter from the rectifier to the ht line. Let us look at this in a little detail.

Fig.1 shows the ht supply circuit of a typical recorder. This uses a mains transformer with a mains primary winding (connected via the switch, etc., to the mains supply (see Fig.1 of Part 1) and two secondary windings, one for supplying a bridge rectifier

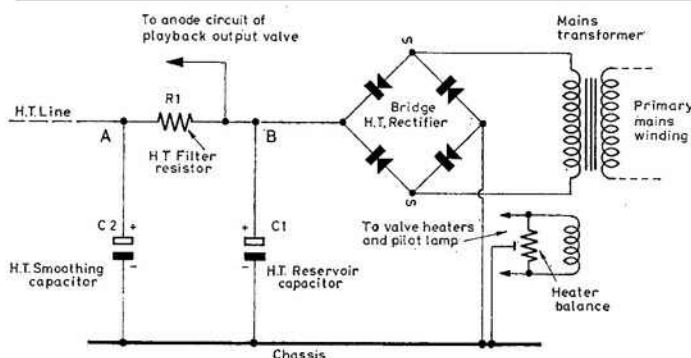


Fig. 1. Ht supply circuit in recorder using a full-wave bridge rectifier and heater balancing potentiometer.

system and the other for supplying the valve heaters and the pilot bulb.

We are assuming that the heaters are alight, which means that the mains transformer is energized and that the heater winding is delivering current as it should. Now, if there is no ht voltage reading at point 'A' in Fig.1, yet it is present at point 'B', we know at least that the ht secondary of the mains transformer and the bridge rectifier are in order. We also know that the reservoir capacitor, C1, is free from a short-circuit.

Under this condition, the trouble could be caused either by an open-circuit in the filter resistor R1 or a short-circuit in the smoothing capacitor C2.

A short in C2 would cause the flow of excessive current in R1, so that this would heat up considerably. Indeed, it is likely that it would go open-circuit. Thus, we may find R1 open-circuit *plus* a short-circuit in C2. Both possibilities must be checked.

It is also possible that a short-circuit may have developed elsewhere on the ht line proper. This would cause R1 to overheat or to go open-circuit. We can check for the location of the possible short by disconnecting the ht line from R1 and by using an ohmmeter (the low 'ohms' range of a multi-meter, for instance), connecting first between R1 and chassis (that is, across C2) and next between the ht line proper and chassis. Resistance readings anywhere in the region of tens or hundreds of ohms should lead to further investigation along these lines. Normally, however, an ht short is pretty 'solid', just a matter of a few ohms. Good insulation will be revealed by a reading of thousands of ohms or higher. It should be remembered, though, that when an ohmmeter is first applied the apparent resistance may be lower than expected due to charging current flowing through a 'highish' value electrolytic capacitor, such as C1 and C2. There are, of course, other high value electrolytics on the ht line. (Note: The tape recorder must be disconnected from the mains supply whilst tests of this nature are carried out.)

No ht at point B

If, on the other hand, it is discovered that there is no ht at point 'B' on the circuit, three causes are possible. One is an open-circuit in the ht secondary winding of the transformer, another is failure of the ht rectifier and the third is a short-circuit in the reservoir capacitor, C1.

The transformer can be checked by the use of an ac voltmeter connected across the ac tags of the rectifier or across the transformer winding direct. For this test, of course, the machine needs to be connected to the mains supply again and switched on.

Most multi-range test meters have ac voltage ranges, and a range with a full-scale deflection of at least 600 volts should be selected. If ac volts are present across the mains tags of the rectifier, yet no dc volts across the dc output terminals, the rectifier or C1 is at fault.

A short-circuit through C1 would most probably cause the rectifier to overheat badly, and in consequence fail. In the event of it holding out, the mains transformer would overheat and possibly discharge wax.

C1 is best checked disconnected from the rectifier on the positive

side with an ohmmeter. A definite kick of the meter's needle should be observed when the test prods are connected across its terminals, indicating that the capacitor is taking a charge from the meter's internal battery. The reading should then gradually drop to a high resistance value if the capacitor is good. A low resistance permanently indicated means that the capacitor is faulty and responsible for the trouble.

As said earlier, a short-circuit through C1 would probably ruin the rectifier, and this should also be replaced if the ht line voltage is abnormally low after replacing a faulty C1. It is always best whenever possible to use the correct replacement parts.

Some less expensive instruments use a single half-wave metal rectifier or silicon ht diode instead of a bridge rectifier system. The bridge arrangement shown in Fig.1 is adopted in many first-class machines, and the circuit is taken from the Elizabethan Auto 2 and 4 series. Nevertheless, the half-wave arrangement is capable of reasonable performance, and such a circuit, taken from the Fidelity Playmaster, is shown in Fig.2.

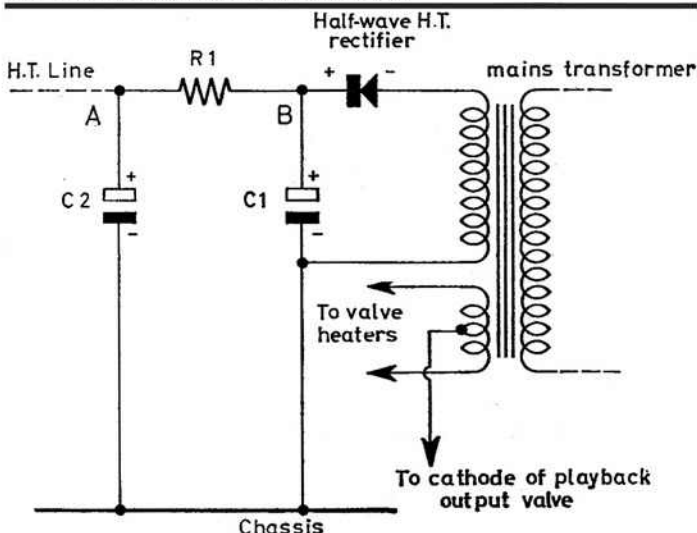


Fig. 2. In this h t supply circuit a single, half-wave rectifier is used and the heater hum is countered by a centre-tapped heater winding connected to the cathode of the playback output valve.

Here we have still the reservoir and smoothing capacitors, labelled C1 and C2 respectively, as in the previous circuit. We also have the filter resistor which, again, we have labelled R1. That electrolytic capacitor connected direct to the positive ht supply output of the rectifier in any power supply circuit is the reservoir capacitor. It is so named because it charges to a certain value of 'energy', and this is then drawn upon by the electronic circuits, it being replenished continuously by the dc pulses delivered by the rectifier. C1 eliminates a large degree of mains ripple, of course, while the supply is completely smoothed by the action of the smoothing (sometimes called filter) capacitor C2 and the filter resistor R1. Some models adopt valve rectification, as distinct from metal or semiconductor rectifiers. Fig.3 shows such a circuit, taken

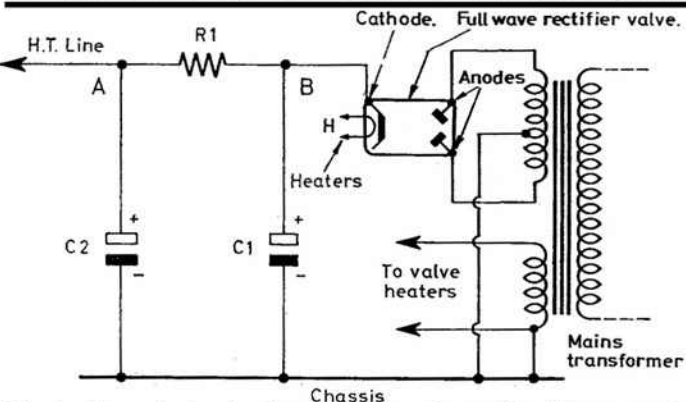
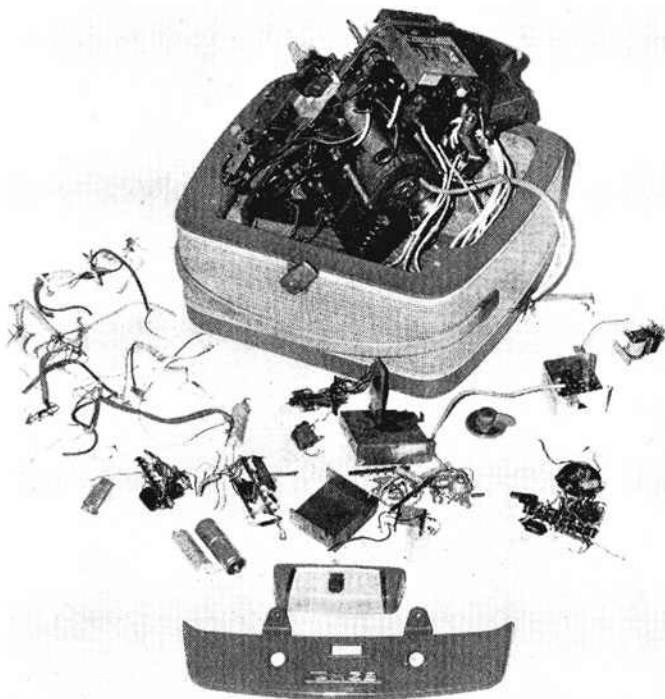


Fig. 3. Ht supply circuit using a full-wave valve rectifier. Here no special precaution is taken against heater hum, one side of the heater circuit being connected direct to chassis.



SERVICE! YES BUT THIS IS RIDICULOUS!

An old Grundig TK25 was recently received for repair by Grundig (Gt. Britain) Limited's Service Department. It had been completely destroyed and the wires appeared to have been ripped out one by one.

It was sent in by a Bristol dealer on behalf of a customer who, needless to say, soon had it returned as absolutely uneconomical to repair!

from the Alba R14 and R15 range of tape recorders. This differs transformer-wise from the previous circuits in that the ht secondary winding on the mains transformer has a centre-tap. This is necessary to achieve the full-wave rectification action, the tap being taken to 'earth' - or chassis. The bridge arrangement, of course, gives full-wave rectification without a centre tap.

Again we have the reservoir C1, the smoother C2 and the smoothing resistor or filter R1. The ripple voltage on half-wave systems is at 50 c/s, while on full-wave systems it is at 100 c/s. With the latter, therefore, the ripple can be muted more easily with smaller value capacitors than required on the former system for the same hum attenuation. Mostly, however, large value electrolytics are used on both full- and half-wave systems, the net result being that the hum level is that much better on the full-wave systems. This is not to say that it is not good on half-wave systems, though. Rectifier valves are not so much used nowadays, as the trend is towards the use of small metal and silicon rectifier units. These have the advantages of high efficiency and of not requiring heater power.

In the circuit of Fig.3 the mains transformer heater winding supplies also the current for the rectifier valve heater. This is possible because the rectifier valve is of the indirectly-heated variety. A separate winding for the rectifier is used when the valve is of the directly-heated type.

Overheating ht rectifier valve

A short-circuit on the reservoir or on the ht line in a machine with a valve rectifier may probably not damage the rectifier, but it would certainly make it get very hot, possibly with the anodes glowing red hot. Here, then, is a further clue to this trouble. If this is observed, switch off immediately.

Notice that the ht supply is taken from the cathode of a valve rectifier; this is equivalent to the positive wire or terminal of a

continued overleaf 29

semiconductor or metal rectifier. In fact, this electrode (the broad, short line on the rectifier symbol (see Figs.1 and 2) is referred to as the 'cathode', the anode being the arrow-head side of the symbol.

While there are other causes of the trouble mentioned at the start of this article, these will be considered later. Meanwhile we will deal with hum troubles arising from the ht circuits which have been illustrated.

Excessive hum

One of the chief causes of mains hum on both record and playback is low value or open-circuit of one of the primary electrolytic capacitors such as the reservoir or smoothing (C1 or C2 in the circuits detailed). If C1 goes very low in value or open-circuit, the loud hum on both record and playback will be accompanied by an abnormally low ht voltage. It is also possible for this fault to cause R1 to overheat as the resistor will be passing a heavy ripple current via C2. This ripple current, of course, normally flows into C1; but if this is down, then the current must go elsewhere.

If C2 is open-circuit or low value the ht voltage may not drop very much, but the hum will be of a high level. One of the best ways of quickly checking the condition of an electrolytic capacitor for hum troubles is to connect another of similar value and rating directly across it. Service departments keep a test capacitor with a couple of wires soldered to its terminals sometimes terminated in clips or prods, thereby facilitating a speedy shunt test.

When a good capacitor is connected across a faulty one the hum will undergo a dramatic fall in intensity, indicating that the suspect is in need of replacement. On no account should the old, faulty

capacitor be left in circuit. The complete unit should be replaced, even if this embodies more than one capacitor. Here it should be noted that C1 and C2 may be contained in a single can or container. If one section goes faulty, the complete unit should be replaced.

Typical electrolytic values in the ht section of the circuit range from 8 μ F to 50 μ F - sometimes higher. Remember that electrolytics are usually polarized, meaning that they must be connected with the positive terminal to ht positive and negative terminal to ht negative (usually the metal chassis).

Fig.1 shows that the anode circuit of the playback output valve gets ht positive direct from the reservoir capacitor. This is quite in order because the slight ripple current present in the output circuit does not contribute very much to the overall hum level. Much more important are the screen grid of the playback output valve and the earlier signal voltage amplifying circuits. These circuits, then, get full smoothing at point 'A', by virtue of R1 and the smoothing capacitor C2.

When the circuits are separated in this way R1 can be as high as 4,700 ohms, because the current through it is that much lower. However, when R1 is called upon also to pass the anode current of the playback output valve its value is typically 390 ohms.

Hum can also get in to the recorder via the heater supply and circuits. A heater balancing potentiometer is often featured to alleviate this trouble, as in Fig.1. The idea is to balance the heater supply about 'earth', the potentiometer thus being adjusted for minimum hum on playback.

Another arrangement incorporates a centre-tapped heater winding, as in Fig.2. Here the tap is taken to the cathode of the output valve instead of direct to earth. This applies a small positive voltage to the heaters, thereby reducing the potential difference between the valve cathodes and heaters, which is an artifice for the minimization of hum.

Less sophisticated circuits simply have one side of the heater line going straight to chassis, as in Fig.3.

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Side 2-Sibilant-white noise (pitch) Sibilant-white noise
(pitch octave high) Three-tone vibration Filtered tone Stridor (tonal)
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debris falling Road drills and compressor Ship's siren Steam train
leaving station Small steam loco and whistle Cell door, keys and
locks
Side 2-Police car and bell, chase Police launch and siren Steam
goods train and whistle Car door slam, and starter Storm at sea,
thunder, wind and gulls Tube train, stop, doors and start

H MFX/2-AUTHENTIC HIGH-FIDELITY SOUND EFFECTS

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Side 1-American police car with siren-arriving American police
car with siren-departing American police car escort with sirens-
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Applause (hand clapping) Orchestra tuning up Car crash Glass
breaking (repeat)
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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THE THINGS YOU SAY

The Jack flies lower

I was thinking of sending this in a bottle. Doing it this way would, I figured, give me time to forget it completely, and in this way I'd be saved the disappointment of another reply not received. Being on the outside looking in has many advantages; nevertheless, this outside-down-under-looking-in is becoming somewhat intricate.

There are many appearing in your magazine, advertising the fact that they want to exchange tapes with the intention of welding world friendship a fact substantiated by the explanation on your tape directory page.

'They' - those mysterious people found throughout the world - didn't tell me how to go about; at least, not in any degree of precision. So, being left to myself I (how stupid can a man become?) imagined that I should write first, just in case 'they' had died or gone into orbit. Instead of receiving the courtesy of a reply, I was ignored - a fact which led me to believe that I, somehow or other, had hurt them. 'Them', of course, are very closely related to 'they'. I planned my letters very carefully, I selected a paper which could not be used again, and which was only suitable for lighting fires, cigarettes, pipes, etc., and just to prevent the envelope from failure of delivery, I printed my name and address all over the back of it.

Had I sent a 3 in dp tape (BASF for preference) telling 'them' what I do, how old I am, how many wives I have, etc, etc, etc, it could be assumed, among other things, that I did not expect my tape to be returned. However, I even tried sending a tape at the request of one individual who had actually ordered - and I mean literally ordered - me to send a tape. Not knowing the peculiarities of the English, and imagining that this was part of the old tradition, something akin to eating peas with a knife, I complied with the order, only to find that I had again subscribed to English charity.

I have read letters printed in your magazine (for which you are to be admired) all similar and with the same well-founded accusation - a simple fact which clearly illustrates that mine is no isolated case. That fact appears to be that there are, in very large numbers, people who, under the guise of friendliness or of condescension, offer (and make use of your generosity at the same time) to people everywhere a willingness to participate in an interesting exchange of normal inclinations via tape. It also could be taken for granted that their measuring-stick of friendship is 10s - the sum which they are not prepared to pay to some international tape club, hence the choice of a free insertion in *ATR*. It has been said that because *ATR* had taken so long to print the personal insertions of taperspondents, the initial intention of the one concerned had thereby become lost. This is undoubtedly a manifestation of the real trouble. It is not a question of deliberate deception, or of tape 'collection'. It is that there are far too many with childish excitement and desires, full of apathy born of selfishness, and with a complete lacking of obligation. If these groups are encouraged, the Union Jack will continue to fly lower and lower.

Might I request that this letter or any part of it selected by you may be printed as an open letter to taperspondents everywhere?

Campbelltown, S. Australia

Richard H. Wilson

More copyright

In reply to your correspondent Mr L. Bolam (Things You Say - November 1965) I would ask him to remember that Parliament over the ages has introduced numerous laws, many being enacted to protect the varied interests of individuals, and which are of immediate benefit to him as a citizen. The Copyright Act 1956 is so designed to protect particular sections of the community, i.e. record manufacturers, composers and authors among others, against misuse and larceny where their material is concerned. I venture to suggest that if Mr Bolam were to be deprived of a right given to him in law, he would be the first to object.

Mr Bolam agrees that there is a loss of revenue to record manufacturers and to music composers by the unauthorised dubbing of music. Mr D. R. Wiseman goes further and admits that he does and will continue to tape music from discs and presumably from other sources. The latter gentleman appears to salve whatever conscience he may have by inferring that the record manufacturers and others concerned have so much money that his unauthorised use of their material does not matter, from which we can assume that he would not hesitate to steal from anyone richer than himself. Please let us have it quite clear that a record manufacturer in selling a record, and a composer whose music is reproduced thereon, do not sell to the purchaser any rights in the sound recording itself or in the music. All that a purchaser acquires is a copy of the recorded sound on disc or on tape, which he may use purely for his own personal enjoyment, and which does not include making copies thereof, or using it for public performance.

Mr A. Campbell Gifford is quite correct in saying that this Society does not represent all publishers, but it does represent 98% including Chappell & Co Ltd in the matter of certain aspects of recordings. For those who may be interested, the Society acts for over two hundred British publishers, practically all American publishers, all German copyright interests and a number of Italian and other European copyright owners. In addition numerous composers throughout the world have appointed the Society as their Agent. The BIEM organisation, British Copyright Protection Association, represents only a few British copyright owners, but all European owners excluding only the German and certain Italian.

In conclusion I am pleased to have Mr Bolam's assurance that he never dubs or records copyright music.

Streatham, London

B. W. Pratt General Manager
Mechanical Copyright Protection Soc Ltd

Breath of life

Please continue this correspondence column. Such a column is the most valuable feature of any magazine. Some editors forget this, and consequently miss out on the breath of life that different styles and opinions must bring.

Similar considerations apply to broadcasting. If listeners are ready to produce their own programmes on tape, it is a refreshing trend, a new look in audience participation. The BBC would save money. Mr Mansell's 'current pressures on airtime' is a feeble excuse.

Of course, proper amateur tape recordings are presupposed. But if the BBC were to give us more examples of outside professionals (more film soundtrack material, etc) this would give us a better quality-guide.

Who knows, one of these days we may hear 'Children's Hour' again. We are weary of puerile pop and dismal disc jockeys. Give the pirates some healthy competition.

Shrewsbury, Salop

Eric Sabin

New Zealand Club

I notice in the July copy of *ATR* that my name is listed in the taperspondent section of the International Tape Exchange Clubs as having my own club. This is not strictly true, as I am only the Library Director, as well as Auckland Branch Secretary, of the New Zealand Tape Recording Club.

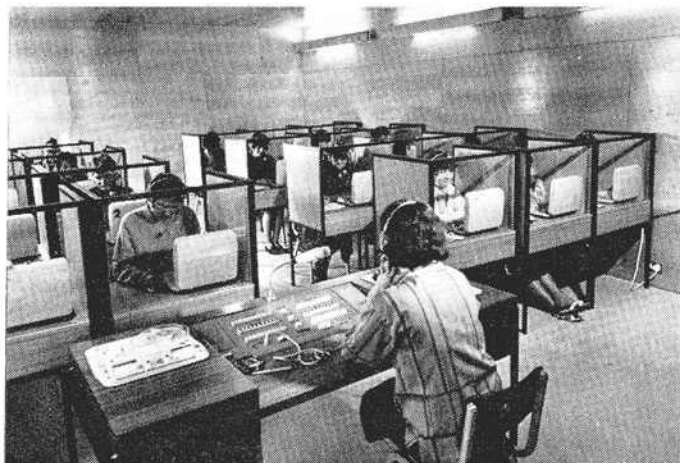
Auckland, NZ

Jan Grefstad 31

SOUND SCENE

Largest UK Language Lab

Grundig (GB) Ltd recently announced that they have equipped what is believed to be the largest language laboratory installation in the country.



One of two teaching rooms in the new language laboratory installation at Hull University

This installation, at Hull University, takes up a complete floor of one wing in the new Faculty of Arts building, and here students can be taught French, German, Hebrew, Italian, Russian, Spanish and Swedish. The two teaching rooms each contain twenty students' booths and a Grundig Language Master teacher's console. Each booth is equipped with a recorder, earphones and a microphone, and all booths are glass fronted to enable the student to see the lecturer, black board, and a screen for slides and films. Private studying booths, listening rooms, recording studio and technicians' room take up a further seven rooms in the language teaching unit. A tape library is also being built up to enable students to select tapes for private study.

Voltage Cuts

There is, it seems, to be yet another hindrance to the progress of video recording, and indeed of sound recording, in this country – that of unexpected voltage cuts. The Electronic Rentals Association, which represents all the major television rental companies in Britain, recently hit out at the London Electricity Board for its failure to maintain adequate supplies to householders.

A spokesman for the ERA, whose members cover 2,500 branches servicing television sets for well over 4 million homes, said of conditions in the London area: 'The position is getting steadily worse.' Some nights have been chaotic. 'Viewers attempt to adjust their sets, not realizing that the trouble with their picture quality is the low mains voltage. When the supply returns to normal, the picture naturally becomes worse, and rental companies are inundated with calls to service what are, in fact, perfectly sound receivers. This results in a complete waste of time and money.'

The ERA deplores the fact that no warning is ever given by the LEB and therefore the television companies are unable to make announcements advising viewers not to adjust their sets.

Anyone using a mains recorder will also suffer if there are unexpected mains voltage reductions. Lack of sufficient mains power will, among other things, reduce tape speed and ruin what

would otherwise have been a decent recording. So if you think there is any possibility of voltage reduction during a recording session, it's wise to keep checking by playing back.

Welmec Change

Welmec Corporation Ltd, distributors of Telefunken recording equipment, are now known under their new name of AEG (Great Britain) Ltd.

Welmec has always been a part of the AEG Group, and the change of name is simply to bring the British company in line with AEG companies on the Continent. Dr P. F. Stritzel, A.M.I.E.E., managing director of the British company has said: 'There will be no change in the policy of our company; we will continue to supply AEG's products to the British market, and to buy specialized equipment for AEG from British manufacturers.' AEG was founded in 1887. The group has 58 factories, employs 126,000 people and has associated companies all over the world.

Danish Holiday Winners

In conjunction with their recent trade exhibition at the Londoner Hotel, Welbeck Street, London W1, Bang & Olufsen Ltd held a draw in which all B & O dealers could participate. The prize of a week's holiday in Copenhagen was won by Mr and Mrs R. O. Berresford of Pearson Bros., Nottingham.



Mr. David Ashenden, Manager of Radio Rentals Hi-fi Showroom and Mr. J. P. Perkins, Marketing Manager of Goodmans, with some of the latest stereo equipment.

New Hi-fi Showroom

Since its opening in September, the new Radio Rentals hi-fi showroom in London has been most successful. Enquiries and visitors from places as far apart as Morecambe, Isle of Wight, Walsall, Leeds, and Wellington indicate that the showroom is certainly achieving its aim of supplying (either by cash sale or on easy hire-purchase terms) all the hi-fi enthusiast's needs.

The Radio Rentals showroom stocks equipment by Armstrong, Goldring, Goodmans, Leak and Rogers, and is open daily from Monday to Friday, 9 am to 5.30 pm, and on Saturday mornings until 1 pm. However, if this is not convenient for all visitors a telephone call to WELbeck 5387 will enable you to make a special appointment. The address is 70 Baker Street, London W1.

(continued overleaf)

New VHF Relay Station

The BBC's new television and VHF sound relay station to serve 140,000 people in Cheltenham and Gloucester is now in operation, transmitting BBC-1 on Channel 1 with horizontal polarization, and the three sound programmes on VHF with horizontal polarization on the following frequencies: Midland Home Service, 93.4 Mc/s; Light Programme, 89.0 Mc/s; Third Network, 91.2 Mc/s.

The VHF sound service provides reception which is much less susceptible to noise and interference than are the corresponding services on medium and long waves; it can also provide much better sound quality. Listeners wishing to take advantage of the VHF service should consult their dealers about the best way of doing so, and in particular about the best type of aerial to use.

Fi-Cord 1A Servicing

All servicing facilities for the Fi-Cord 1A tape recorders are now available at the Fi-Cord International UK headquarters at Charlwoods Road, East Grinstead, Sussex. The previous association between Fi-Cord and Audac-Audio Associates Ltd of Staines has now ceased.

New Test Card

The BBC has now introduced a new 405-line test card, which is a modified version of Test Card D. The new card, which can be identified by a white dot on each side of the letter D near the bottom, shows increased range of brightness in the frequency gratings.

Stolen!

Shortly before Christmas a lorry carrying £6,000-worth of Sony and B & O products was hi-jacked near Rickmansworth. The stolen vehicle was found the day after the robbery but needless to say not one machine remained inside. It is unlikely that the thieves will be able to dispose of such a large number of items

individually and it is possible that dealers may be offered quantities of Sony and/or B & O products at reduced prices. Should any dealer be offered any of these items from any source other than Debenhams Electrical Ltd (the only official B & O and Sony UK distributors) it would be appreciated if they would contact Mr J. Glover, Company Secretary at Debenhams, telephone Twiggworth 461. A reward is being offered for information leading to the recovery of this equipment.

New Address

The UK Sales Divisions of Sony and Bang & Olufsen have now moved to Mercia Road, Gloucester. The telephone numbers remain Gloucester 26841/2/3. Also now at Mercia Road is the publicity and sales promotion department (previously at Innsworth). The Service and Technical Department remains at Eastbrook Road with telephone numbers Gloucester 25428/9.

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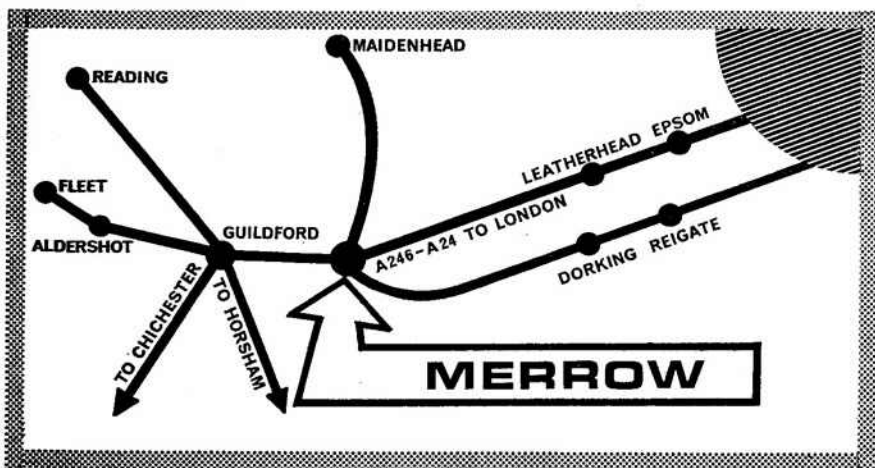
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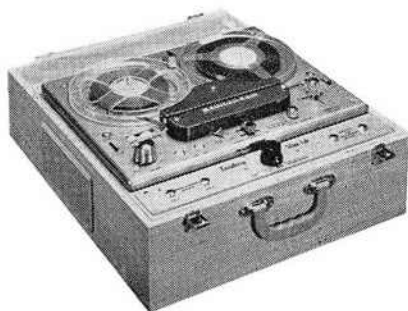
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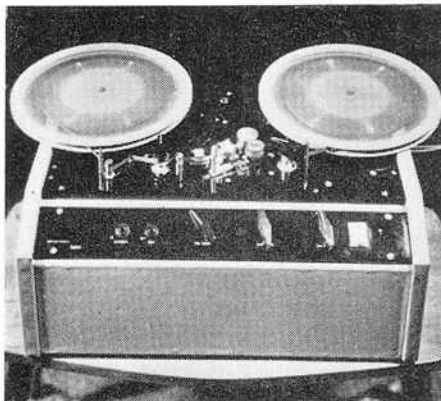


Tandberg Mini-Lab

New from Tandberg is a special educational tape recorder. Known as the Tandberg Mini-Lab, this is an adaptation of the existing Tandberg stereo model 72B, incorporating a large number of additions. A particularly useful educational aid is the translation switch. By turning the output switch to 'translation', the material to be translated can be heard in one ear-piece and the student's translation in the other. In addition, a lesson recorded on the top track is protected by a safety lock. The student plays back this top track through his headphones and records his answers on the lower track. After rewinding, upper and lower tracks can be played back simultaneously and heard either through the two speakers or through both the earphones. An extra jack socket headphone outlet has been fitted for use by a teacher visitor or second student. Tandberg are not quoting a retail price for this machine, as it is not available to the general public but only to schools, colleges and educational organizations.

EN3 Gift Case

Grundig (Great Britain) Ltd have announced that a luxury presentation case specially designed for their EN3 electronic notebook is now available. The hinged case is snap closing and is finished in black leatherette with chrome edging and satin silver and black trim. The lid is lined with white leatherette and silk binding and a specially soft surface has been incorporated into the lower half to hold the EN3. The case is 7 in \times 3 $\frac{1}{4}$ in \times 1 $\frac{1}{4}$ in and costs £2 2s 0d.



New Video Recorder from Wesgrove

Wesgrove Electric Ltd have recently announced a new version of their VTR700 video tape recorder, as shown above. This records both vision and sound signals on two tracks on standard magnetic tape. The two tracks occupy one half of the tape width, so that the other half of the tape may be used in the opposite direction.

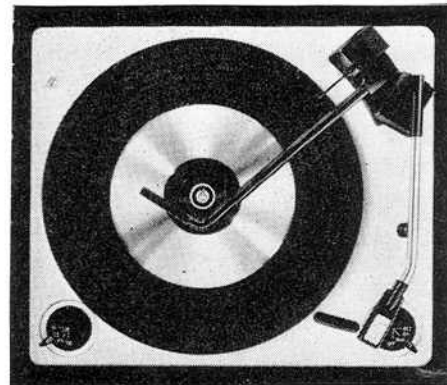
The video track records the video spectrum up to 2 megacycles, is 70 mils wide, and is positioned on the outside edge of the tape. Between the inside edge of the video track and the centre of the tape is the second track which is used for recording sound on an FM carrier, its width being 20 mils. Complementary to the VTR700 video tape recorder is the VC303 automatic transistorized television camera, available for 405, 525 or 625 line operation and with a bandwidth of 4.5 Mc/s. For further details write to Wesgrove Electrics Ltd, 1 Maddox Street, Regent Street, London W1.



The Grundig TK 120

A new tape recorder in the under-30-guineas price range has just been introduced by Grundig (Great Britain) Ltd. The TK 120 is a twin-track recorder operating at a tape speed of 3 $\frac{3}{4}$ ips, and all efforts have been concentrated on producing a high-fidelity recording and playback unit at an extraordinarily low price. This was achieved by using a very sophisticated electronic circuit and high precision drive unit, without excessive emphasis on facilities which are not considered essential for perfect sound recording and reproduction. With a frequency response extending from

40-12,500 cps, an output power of 2.5 watts, wow and flutter not exceeding 0.2% and a signal to noise ratio of not less than 45 dB, this machine represents a breakthrough in tape recorder design. The TK 120 (below left) is supplied with a high performance moving coil microphone, a screened multi-purpose connecting lead, 900 ft of long-play tape contained in a tape library cassette and a spare 5 in spool. The maximum spool size which the TK 120 will accept is 5 $\frac{3}{4}$ in. The machine and accessories retail at 29 $\frac{1}{2}$ gns complete.



BSR Record Changer

One of the record changers in the BSR range, the UA15 3B, is aimed at the discerning audio enthusiast and is designed for the more expensive, prestige type of radiogram. Many new design features are incorporated. A new, tubular, low-mass pick-up arm, applies such light pressure that record wear is reduced to the absolute minimum. Performance is unimpaired by the mass or resonance of the arm itself, which also provides stability against shock and vibration. The turntable is larger and heavier than on previous models ensuring vibration-free record movement. Control arm, spindle and selector mechanism housing have all been reduced in height to produce a Superslim changer ideally suited to the modern, low-line cabinet. Manual and automatic play facilities are incorporated.

Technical Data

Height of unit from top of motor board/3 $\frac{1}{4}$ in; Capacity/automatically plays 12 in, 10 in or 7 in records of the same speed, Intermixed in any order. Speeds/78, 45, 33 and 16 rpm. Play facilities/automatic or manual; turntable/a new large, heavier model; voltage/50 or 60 cycles; wow and flutter/below 0.3% RMS and 0.06% Gaumont-Kalee.

Fil-Magic Tape Products

An entirely new range of tape recorder maintenance products have now been released on the UK market. For years now the Fil-Magic products have enjoyed wide popularity in the United States, and have now been introduced to this country for the first time.

The Fil-Magic 'Pylon' comes in three types, with a base to suit any type of recorder deck, is capable of removing dust, abrasive debris and residues that otherwise might pile up on guides, heads and pressure rollers. The Fil-Magic Long Life fluid which is fed into the pylon has the effect of cleaning the tape as it passes, both lubricating the surface and preventing 'shedding' edges of tape. It will eliminate trouble from oozing splices, prevent curling, warping and reduce head wear. Consistent application will prevent wow and flutter building up by giving recorder parts longer life.

The kit comes complete with one of the three types of 'pylon', a bottle of tape conditioner fluid, a bottle of tape head and roller assembly cleaner and spare sleeves for the 'pylon', at 35s (p & p 1s 6d). The Fil-Magic FM 200 Long Life kit is designed for head cleaning and lubricating guides and heads in all cases where automatic lubrication of these parts is not available. Each Long Life kit contains a 2 oz bottle of red 'cleaner' fluid for use on all types of record and erase heads, and may be used on capstan pinch roller assembly maintenance which should be carried out every ten hours of recorder use.

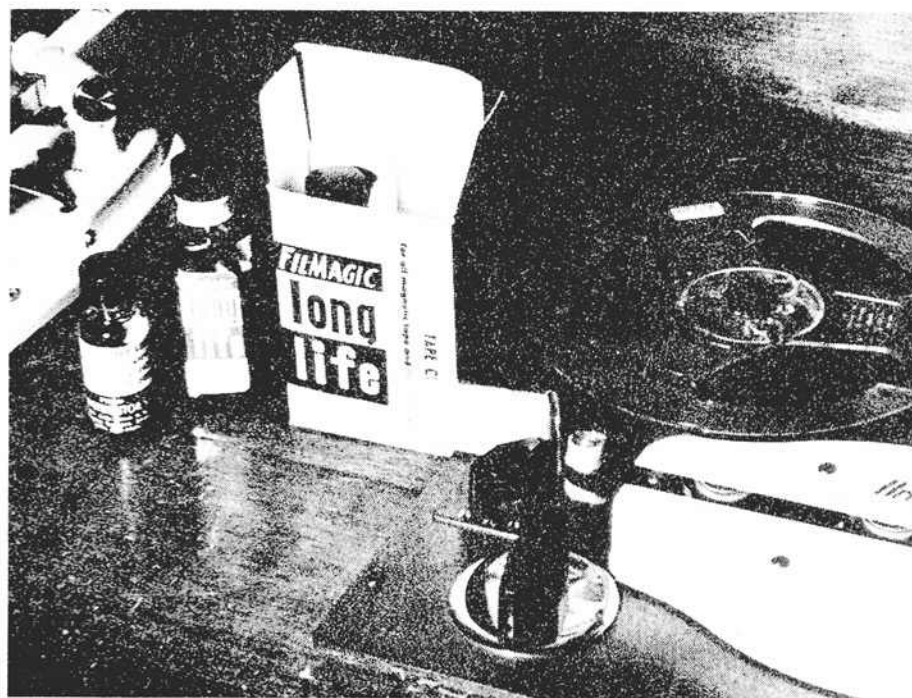
The kit also contains a 2 oz bottle of blue 'lubricant' fluid for use when the 'pylon' is not available. The kit sells at 17s 6d (plus 1s 6d postage). Both available now from Concordia, 117 Golden Lane, London, EC1, who will be glad to give fuller details on enquiry.

Tape Recorder Servicing Manual

This is the book everyone has been waiting for—a complete servicing guide to almost every recorder on the market. I say almost, because Mr Hellyer has obviously spent many, many months of research and preparation in the compilation of this volume and, as a result, some of the more recently imported models (Akai, Bang & Olufsen, etc.) have not been included.

Among the machines included, however, are many which are no longer in the shops. There must be any number of readers with old Moteck, Walter and even Soundmirror recorders lying idle because their owners have long since lost those all-important service sheets. Such owners need look no further.

The introduction to this book contains four very useful sections—on the basic principles of recording and recorders and the likely forms of trouble; practical



circuitry; practical repair procedure; and microphones and matching.

The main servicing section is divided alphabetically into makes of recorders and decks (62 all told) and each model is analysed under a series of headings including General Description, Power Supply, Type of Deck, Valves, Dismantling, Specifications, Adjustment, and Service Notes. Each model has its own circuit diagram as well as a number of line drawings of switching connections, etc., and cross-sectional diagrams of certain assemblies.

The book is excellently printed, the circuits are extremely clear and easy to follow and there is a comprehensive index of all the 281 models covered.

At three guineas this is a somewhat expensive, though very worthwhile, buy for the individual, but it must surely be an essential addition to the library of any tape club.

Telephone Amplifier

Master tape (Magnetic) Ltd have announced that, in addition to the manufacture of magnetic recording tape which carries the company's name, they are re-entering the audio equipment business with an acoustical telephone amplifier which will be marketed under the name Twinphone.

This inexpensive unique attachment device in an attractive black polished PVC instantly converts, by means of a simple spring clip, any telephone handset into a flexible dual receiver without the use of any form of power, wires, or moving parts.

This will give improved reception in noisy

areas or on an indistinct line, two-party listening, tape recording of two-way conversations and be an invaluable aid to the hard of hearing.

The retail price of the Twinphone is 25s including postage and packing.

'Musical Instruments and Audio'

This is the title of yet another excellent book by G. A. Briggs containing twelve chapters devoted to the performance and range of practically every known musical instrument. No hi-fi or tape recording enthusiast, or indeed musician, should be without this fascinating book, which deals with the important link between the real and the reproduced sound. The author has also taken the trouble to illustrate every chapter clearly and has given many additional references for those who wish to pursue the subject in one direction or another.

The first chapter, 'General Principles', covers the fundamentals of musical instruments. This is nicely followed by the Cause and Effect of Sounds' in chapter 2. From then on the characteristics of instruments are thoroughly covered, leading right through to distortion in reproduction. Electronic and pipe organs have a chapter each, as have pianos, and the book ends with a section devoted to music in schools. It certainly is an excellent reference book and one which offers enjoyable and instructive reading. *Musical Instruments and Audio* is available from bookshops and through the ATR postal bookshop. Price is 32s 6d, or 35s 0d including postage and packing if ordered through ATR.

tape club news

They've done it again! Thornton Heath Tape Recording Club can polish up that ATR trophy of theirs ready to hand it over to the new 1965 ATR Club Champions - Thornton Heath! In a very close, fighting finish with Rugby Tape Recording Society, the final scoring was Thornton Heath 151, Rugby 148. Both these clubs have been extremely busy during the past twelve months, yet have made the time to write to me with their news. Thus I have been able to pass on their ideas and suggestions which other clubs have been only too ready to utilize.

Fairly close behind these two was the Birmingham Tape Recording and Audio Club (B-TRAC to friends!), who amassed 111 points, but then comes a fair drop before the next contenders, Radio Scotland, with 72 points. Newcastle did well to come fourth with 55 points, for the club has not been in existence for very long, and didn't join the ATR race until September. A number of other clubs did well but I would like to mention Brighton, Derby, Doncaster, Leeds, London, North London, Montrose and Southall for their continued hard work. Keep it up - it could be your turn next year. But whether you're lucky in our contest or not, here's hoping you continue to get lots of pleasure and satisfaction from recording during the coming year. KC

Club of the Month

Top marks this month - and incidentally marks which helped to give the club such a good position in the final league placings - go to the Newcastle and District club. Following the club's recent AGM, the committee now stands (or sits) as follows: Chairman, Malcolm Hill; Secretary, Bob Turner; Treasurer, Malcolm Watt; Members, David Wright and Alistair Milne. Anyone interested in getting in touch with this young and lively club should contact Bob Turner at 43 Richmond Street, Gateshead 8, Co Durham. During a recent session devoted to the compilation of a tape to send to Rugby TRS, members were horrified by the bad acoustics in their clubroom, scrapped the first tape and recorded the final version in a cupboard!

attendance, the hard core of the club spent some very profitable hours finishing off all the little jobs that proved too fiddling to do when all members were trampling around. Now the loudspeaker enclosure is complete with castors and plastic adhesive surface, giving it a greatly improved appearance. Demonstrations of a Simon SP 5, by Derick Seward, and Beocord 2000 T, by Reg Barnett, made excellent programme material for two club nights, and at another meeting Malcolm Hill played back a highly amusing tape containing a pot-pourri of voices from the Goons, Tony Hancock, Steptoe and Bob Newhart shows *à la* Jack Jackson.

Visitors Galore

The clubrooms of the B-TRAC have seen a large number of distinguished visitors during recent weeks. The first was Peter Bastin, well-known tape enthusiast, humourist and past winner of the BATR Contest. He played back several of his award-winning tapes, including 'The Devil Undone', 'Little Siddley', and an 'Old Bessarabian Folk Story', as well as a selection of excellent location recordings, sound effects, tape loops and electronic music. Highlight of the evening was 'A left-handed tram on the B-TRAC', specially composed and produced for the club. Maurice Chambers, organizer of the Tapes for the Blind Scheme, was the Club's second visitor, illustrating his talks with extracts from tapes to and from blind people. Material for his tapes is often sent to him from as far afield as Germany, Nigeria and Japan. Third visitor was Mr Arthur, who revealed some fascinating facts about sound effects, microphone positions, local broadcasting, stereo broadcasts and BBC-2. Finally John Lowsley entertained club members with a specially prepared programme from his vast collection of folk music from all over the world. Quality of recording was excellent and the tape included live recordings of such well-known artists as Ian Campbell, the Clancey Brothers, Cameron and Pete Seeger.

Hospital Equipment

Members of the Thornton Heath Tape Recording Club (to whom go all our congratulations) were very impressed when the three young members who now operate the Croydon General Hospital Broadcasting programme demonstrated their set-up and how they use it to best advantage. Equipment included a Ferrograph 4 AN, Garrard turntable, AKG microphone and Clark & Smith tuner/amplifier, and was used to produce a complete dummy programme and observing members were roped in to act as guest announcers. Another group of members also produced a special programme, this time for members of the Overseas Students Club when they visited the British Council. The programme,

covering all aspects of the club's activities, was divided into three parts, taken in turn by Ed Bashford, Morris Webb and John Bradley and was appraised by a critical audience consisting of tape enthusiasts of all nationalities - including African, Nigerian, Greek, South African and Russian. Derek Chatterton, the club's host, then showed them one of the most impressive language laboratories in which some thirty tape decks all obeyed control desk commands. A useful evening was spent overhauling members' machines, including a number of old faithfuls that had been around for a few years. As usual, the club provided music and play-back for a local church at their Christmas social as well as recording a carol service there which was used to answer Christmas carol requests from the local Derby and Joan club.

Gobbledegook

A Professor Gobbledegook (otherwise known as Stanley Unwin) has been asked by the Rugby Tape Recording Society to visit the club to talk (?) on his approach and attitude to tape recording in both English and his own natural dialogue. Should be a highly unusual and entertaining evening. Other evenings arranged for the early part of the year include demonstrations of Scotch tape, Ferrania products, Ampex equipment and dealer displays from W. M. Tyson of Leamington and Benn Radio of Rugby. Members have enjoyed a particularly interesting evening of members' tapes when blind member Jack Willis brought along the Talking Book Machine he acquired recently. First winner of the club's new summer contest is Keith Fisher, who now holds the Len Stephen's trophy as well as the Terry Davis trophy awarded for the winter contest. Recent demonstrations from Armstrong and LNB as well as a visit to the Hinckley Club's Christmas party have completed a full 1965 programme.

Location for Corporation

Members of the Thanet International Recording Society recently spent some considerable time recording the sounds of Southend for the local corporation's publicity department. Nineteen members taped the sounds of the Kursaal, the local airport, hospital rescue services, mounted police and general seafront hubbub. All members were very pleased with the results, particularly with an excellent recording of a dance band in the Kursaal ballroom. This was made by Dave Payne using a Vortexion WVB with Grampian DP4 mic. The tape, which has been presented to Southend corporation, will be made available in the Information Bureau to applicants seeking further information about the resort. Following the club's recent AGM, Tony Robinson was elected Chairman, Chas Brown and George Watson were elected Joint Secretaries, Bill Odd as

Treasurer and Dave Lund as Public Relations Officer. New Vice-Presidents of the club are Mr Raine of the Brenell Engineering Co and Mr Smythe Rumsby of Dover.

Spotlight

'Spotlight', the sound magazine of the Radio Club of Scotland's tape recording section, which is issued to members each month, has now reached its eighteenth edition. The magazine has been run on the same lines as when it first started, but it is now hoped to change its appearance (or rather sound) and make it more streamlined and thus more interesting. Having heard a recent issue of this tape magazine, I must say those Scots' tones came over very well. Club meetings have as usual been very varied. Some weeks ago club members had fun filming the sparks and flashes and recording the bangs and crashes usually associated with Guy Fawkes. One member did suggest that setting light to the clubrooms might give a more spectacular result, but fortunately this light-hearted suggestion was outvoted. A further edition of the club's history, 'The Story that Never Ends', has been compiled by Chairman John Wood.

New Committee

This seems to be a popular time of the year for tape clubs' AGMs. Another club with committee changes is the Ulster Tape Recording Society of Belfast. Chairman is Jim Higgins, Secretary is Bill Boyd while Vic M'Ilveen was re-elected as Treasurer. Other new committee members were elected and it is hoped that the infusion of new blood will see a period of expansion in the club's membership and activities. The club has been taping with the Rugby Club and it is hoped to extend taping activities. Any club secretaries wanting to exchange tapes with the Emerald Isle should contact Bill Boyd at 90 Donegall Avenue, Belfast 12. The club is also operating an Old Folks' programme entitled 'Evergreen'. This programme is run especially for various old people's homes in the Belfast area and includes many specially requested items.

Trumps

The youngsters of the South Reach Youth Centre TR Group came up trumps when they successfully recorded all the boys' clubs' acts from the National Association of Boys' Clubs annual show 'Clubs are Trumps', held at the Royal Festival Hall recently. This was a particularly good achievement, as the RFH isn't the easiest of places in which to record. Personal interviews were carried out by members meeting the stars supporting the show. These included Frankie Vaughan, Benny Hill, Jimmy Tarbuck, Denny Piercey and others. An edited version of this show was compiled and included in the group's hospital service at Erith. Copies of the

show are also being sent to the boy performers who came from far afield (Belfast, Birmingham and Bristol included), so that the youngsters are being kept very busy. Equipment used at the recording session included a Brenell, a Bush and two Truvox mains machines, a Uher 4000S and a host of equipment made by club members themselves which included a five-channel mixer with peak programme meter, two pre-amps and a monitor amp.

The session in London was followed by the centre's own launching ceremony which was conducted by Councillor Mrs Marjorie E. Barron, JP, Mayoress of the London Borough of Bexley. A recording of this ceremony has been included in the club's library of special ceremonies and will also be used in the centre's History of Events in 1965.

Tape Teach-ins

Teach-ins have now joined the world of tape. Members of the Brighton Tape Recording Club joined in discussion of this kind on a variety of tape subjects including 'Spools or Cassettes?', 'Tape and Cine' and 'The Best Tape Speed'. Following this, the club's findings on these subjects were talked over with Ken Smith of Truvox Ltd, who was visiting the club to demonstrate the latest Truvox equipment. Club member Eric Savage has prepared a series of talks entitled 'How it all Started', covering tape recording techniques from early days up to the present time.

150th Programme

Members of the Bath South Recording Society recently chalked up the 150th request programme for the Bath Hospital Broadcast Society. Up to five programmes a week are relayed with regular request programmes twice a week and two special feature programmes are usually included in each week's broadcasts. Bath SRS is yet another club which has recently had an AGM. Club officers for the forthcoming year are: Chairman, Mr F. Herbert; Treasurer and Hospital Broadcast Director, Mr A. Tregale; Programme Director, Mr J. Fishlock; and Secretary, Mr C. Griffie.

On the Air

Conveniently for members of the Derby Tape Recording Club, the BBC broadcast 'The Soundhunters' coincided with one of the club's regular fortnightly meetings, so everyone was able to listen in. (Hope you all sent letters of appreciation to the BBC - let them know that this sort of programme is listened to and we might get some more. - KC).

Committee Problems

The hardcore of members of the London Tape Recording Club is having difficulty in replacing committee members who are having to retire for one reason or another.

Douglas Morris has had to give up his post as Secretary, and it is hoped that a replacement will volunteer (or be press-ganged?) shortly. Meanwhile, Doug's place as editor of the club's newsletter has been taken over by David Campbell, who is also a general committee member. The club is now in its ninth year of existence.

New Address

Contrary to our report in last month's issue, the New Circle Tape Recording Society is no longer at the address given. Club meetings are now being held at the LCC Evening Institute, Falkirk Street, London N1. Club membership has grown quite considerably since the move and average attendance has been about fifteen a week. A full programme of demonstrations by members and visiting speakers has been arranged. Club Secretary is Len Burchell, of 36 Nevitt House, New North Road, London N1.

Scout Group

A new tape and cine society, with the accent on scouts and scouting, is now in full swing. The Roland House Scout Cine and Tape Society meets on the second Monday in each month at Roland House, 29 Stepney Green, London E1. All Scouters, lay members and Scouts are eligible for membership, whether interests lie in making, taking part in, or in appreciation of, tapes and films on Scouting subjects. One of the main objects of the society is to produce Scouting films and tapes of rare quality, not only for the group's own satisfaction but also as a possible means of publicity and instruction. Anyone interested in joining should write to the Secretary, A. C. Coffin, 60 Hornchurch Road, Hornchurch, Essex.

Hobbies Club

A number of schoolboys attending a grammar school in Southend have formed a new local hobbies club, but need more members to support organized activities. Two of the main interests of club members are tape recording and electronics, and membership is open to anyone in the district of secondary school age. There are no membership fees. Prospective members should contact W. P. Conway, 12 Kensington Road, Southend-on-Sea, Essex.

Top Ten for January

1 Newcastle	6 Radio Scotland
2 B-TRAC	7 Ulster
3 Thornton Heath	8 South Reach
4 Rugby	9 Brighton
5 Thanet	10 Bath

Sorry there wasn't room for the final league placings this month—they'll be in the February issue. Meanwhile don't forget to send your club news to Mrs Kim Cook, ATR, 9 Harrow Road, London, W2. Copy dates for February and March issues are 28 December and 24 January.

THE TAPE DIRECTORY

Particulars of tapespondents are given in the following order: name, age, occupation, address; special interests, tastes in music; type of machine, spool sizes, speeds; area of tapesponding required.

Australia

Alex Marhinin, 18, trainee broadcasting studio technician, 30 Lade Street, Coorparoo, Brisbane, Queensland, Australia. Electronics, coin collecting, life in other countries, travel, camping; country and western, pop, band. Sony 357/4 4-track, AWA Magictape 2-track, 7 in, 1½, 3½, 7½. English-speaking except Australia. Young people only.
Hugo Schouten, 21, clerk, 164 Winston Avenue, Edwardstown, SA, Australia. Basketball, football, films; all. Grundig TK17, 5½ in, 3½. USA only. Girls welcome.
George Glendinning, 26, engine driver, 4 Hayes Lane, Mackay, Queensland, Australia. 35mm photography; country and western. Philips EL3541, 7 in, 3½. Anywhere.

New Zealand

Bruce Thomas, 16, student, 8 Esplanade, St Clair, Dunedin, New Zealand. Model racing cars, TV, sound effects, taping; pop and some classical. MRI, 7 in, 1½, 3½, 7½. England, USA.
Morris Rhys, 20, electrician, 50 Athlone Crescent, Lower Hutt, New Zealand. Taping, travel; pop, a little jazz. National, 7 in, 1½, 3½, 7½. Anywhere.

South Africa

T. K. Philips, 39, technician, PO Box 7703, Johannesburg, South Africa. Various; light classics. Philips EL3549, 7 in, 1½, 3½, 7½. Any.
John Fortune, 28, storeman, 16 Kornet Laan, Steenberg, Cape, South Africa. Bible studies; accordion music (classical). Hitachi (model 505), 5 in, 1½, 3½. USA, England.

Sweden

Kjell Nordqvist, 46, teacher, Folkhogskolan, Karlskoga, Sweden. Studying English, life in other countries; light classical. Uher 4000 Report-S, 5 in, 1½, 3½, 7½. Anywhere English speaking.

British Forces

Malcolm Weston, 25, driver RAF, MT Section, RAF Hospital, Wegberg, BFPO 40, Germany. Motoring, tape recording, music; light classical, beat. Grundig TK46 stereo, 38 7 in, 1½, 3½, 7½. England, USA.

L. Bithell, 22, Main Guardroom, RAF Gutersloh, BFPO 47, Germany. Tapesponding, humour, round robins; light classical. Philips EL3548, Philips EL3547, Unicorder 61 battery portable, 7 in, 1½, 3½. New Zealand, Australia, Western Europe, Hawaii, Nigeria, Scotland and Ireland.

Ronald Mott, 38, musical instrument and sound service, NAAFI 51031, BFPO 15, Germany. People and life in general; modern classical and jazz. Uher 720, 7 in, 3½, 7½. English, German, French speaking.

Bedfordshire

David and Jean Beswick, 35, attendants, old people's club, 63 Ashton Road, Luton. Friendship, taping to old people, blind and housebound; anything except pop. Cossor 2/4 track, 7 in, 1½, 3½. Britain, Africa, India, anywhere English speaking.

Cheshire

Anthony Jones, 15, schoolboy, 73 Newfield Drive, Crewe, Cheshire. Radio, SWL, taping, general; pop, R & B. Cossor CR1603, 5½ in, 3½. Anywhere.

Derbyshire

Peter Milner, 23, dispenser, 40 Hawthorn Street, Derby. Tape recording, photography; light classical. Cossor CR1605, 7 in, 1½, 3½, 7½. Anywhere English speaking.

Essex

Richard Turle, 20, student of chemistry and geography, 18 Oakleigh Park Drive, Leigh-on-Sea. Photography, science, books, evangelical christianity; orchestral, classical, light. Ferguson 3202, 5½ in, 1½, 3½. Malaysia, Singapore, Asia, USA, Australia, New Zealand, Canada.
John Sheehan, 41, sales representative, 9 The Maples, Woodbine Close, Waltham Abbey, Essex. Acting, writing, social comment; straight jazz, not pop. Philips EL3541, 7 in, 3½. UK, USA.

Hertfordshire

L. E. Painter, 43, plastic moulder, 302 Shephall Way, Bandle Hill 4, Stevenage. Amateur photography, record collecting; light orchestral, pop. Ferrograph, Stella, Grundig, 7 in, 1½, 3½, 7½. USA, Australia.
Dave Browne, 32, postman, 265 Mays Lane, Barnet, Herts. 2½-in square photography, motoring, reading, listening to radio, TV viewing; classical/popular. Robuk RK44, 7½ in, 1½, 3½, 7½. UK, USA, Canada, Australia, New Zealand.

Thomas May, 27, bus driver, 33 Gladstone Road, Watford, Herts. Folk music; accordion and military. Elizabethan stereo LZR511, 7 in, 3½. Austria and Germany.

Kent

Leonard Gellye, 37, window cleaner, 1 Ridge Way, Crayford, Kent. Photography, gardening; pop. Robuk RK3 twin track, 7 in, 1½, 3½, 7½. Holland, Belgium, America, Canada.

Lancashire

Guy Beechroft, 31, florist, 198 Walton Breck Road, Anfield, Liverpool 5. Witchcraft, incorporating black and white magic; pop and some classical. HMV 4-track mono, 7 in, 1½, 3½. Southern Ireland, USA, USSR.
Frederick Johnson, 36, precision fitter, 62 Cambria Street, Kensington, Liverpool 6. Art, hi-fi, stereo, going to jazz concerts;

modern jazz and female jazz singers. Grundig TK60, 7 in, 3½, 7½. Anywhere male or female.

London

John Wilkinson, 31, LTE inspector, 34 Gregory Crescent, Eltham, SE9. Tape corresponding, all sport, car driving, pop; light classical. Fidelity twin track, 5½ in, 3½. Anywhere English speaking.

Frank P. Smith, 44, resident porter, 4 Gooch House, Bourne Estate, Holborn EC1. 8mm, old-time music, tape recording; Hawaiian, old-time, C & W. Philips 3549 4-track, 7 in, 1½, 3½, 7½. Anywhere English speaking.
W. H. Smart, 45, switchboard operator, 33 Parkfield Road, Willesden, NW10. 35mm and 8mm photography, tape recording, motoring; all except rock and roll. Walter 101, 5 in, 3½. Anywhere English speaking.

Middlesex

Peter Woodley, 28, credit control clerk, 65 The Greenway, Uxbridge, Middx. Stamps; pop, light classical. Stella ST459 4-track, 4 in, 1½, 3½, 7½. Anywhere.

Northamptonshire

Keith and June Bellamy, 28 and 24, grocery manager, housewife, 18 Northampton Road, Wellingborough, Northants. Tapesponding, 35mm slides, records, radio; all except opera. 2 x Stellaphone ST450, 7 in, 1½, 3½, 7½. Anywhere.

Staffordshire

Ray Medford, 37, representative, 23 The Leasow, Aldridge, Staffs. General and modern jazz enthusiasts; modern jazz. B & O 2000, Tandberg 74B, 7 in, 1½, 3½, 7½. Anywhere.
Fred Parsons, 33, electrician, 136 Masefield Drive, Leyfields, Tamworth. 35mm transparencies, 8mm cine, amateur radio, SWL; light classical, Sinatra. Stella 485, 7 in, 1½, 3½. USA, Commonwealth, anywhere English speaking.

Eire

John Logue, 36, official of Irish International Airlines, 17 Shanboley Road, Santry, Dublin 9. Hypnotism, fishing, books; light classical, C & W, some pops but not beat music. Sony TC200 stereo/mono, 7 in, 3½, 7½. Anywhere, male or female.
Brendan Power, 21, apprentice fitter/welder, 12 Faughart Road, Crumlin, Dublin 12. Current events, radio, general; light classical, comedy. Ferrograph 45 2-track, 8½ in, 3½, 7½. Anywhere English speaking, preferably outside Ireland.

Northern Ireland

Samuel Fisher, 43, bus conductor, 46 Old Park Avenue, Belfast 14. Records, wireless, general interests; all music except rock and roll. Truvox 4-track, 7 in, 1½, 3½, 7½. Anywhere English speaking.

Scotland

Fiona Lockie, 32, nursery nurse, 4 Maryfield Place, Bonnyrigg, Midlothian. Places of historic interest, 35mm colour photography, stamps, travel; folk, classical and show. Philips Starmaker, 5 in, 3½. UK, USA, Orkney, Far East, Mexico, Hawaii, South America.
Bill Montgomery, 23, dairyman, 1 Carmethy Court Penicuik, Midlothian. Travel, photography, driving, swimming; pop, C & W, folk, Hawaiian. Philips 4-track, 7 in, 3½. Anywhere.

THERE'S A TIGER IN MY TAPE

or 'How to Drive Successfully using Wow and Flutter' by David Lazell

You've heard about that certain tiger in the tank, of course. Well, I'm in a position to reveal the truth. It's all done by tape, with the playback of a tiger's roar through a petrol-proof loudspeaker underneath all that high-octane stuff. Actually, I'm making experiments to obtain the sound of a herd of wild buffalo as soon as I lift the bonnet of my little car declaring: (*'There's buffalo under my bonnet'*).

I've always thought that the car manufacturers ought to equip every car with a tape recorder, twin-track as standard, four-track for the de-luxe models. Just think of all the benefits it would provide! Using pre-recorded tapes of assorted insults, for example, you could play back (through a large extension speaker perched on the car roof) appropriate phrases in the direction of those commonly-found drivers who rush across the lights at 'red', swerve across the road without making any signal, or who apparently passed their driving test on the Dodgems. This would help to curtail road accidents, as motorists would fear vocal embarrassment in public—especially with 4 watts output from that loudspeaker! (40 watts would be more effective.—Ed.)

Another useful idea would be the supply of a special pre-recorded tape, sold with the shiny new car, of all the funny noises and niggles that indicate trouble, *somewhere*. If, for example, the startled motorist heard a loud 'klunk' from the rear of his saloon, he could immediately listen to the tape of 'noises signifying trouble' until he found one to match. The suitably soothing commentary would quietly break the news that his rear axle had, alas, fallen in half! This would save a lot of fruitless effort, e.g. pushing the car to a glittering filling station, where a buck-toothed bloke professes utter ignorance of 'what makes cars go'.

'It's no use asking me about the car, sir,' such a fellow might sigh. 'I'm only here to service the tape recorders. Shall I check your wow and flutter, sir?'

I've always found it difficult to understand the instruction book, anyway. I'm sure that drivers would be more enlightened by a few tapes of full explanation, e.g. 'If you find, on starting the engine, that the car moves backwards, this means that the car is in reverse, or, if the car is stationed

on a steep hill, that something is wrong with your brakes.' After a pause for the driver's sober reflection, the tape would suggest a remedy; e.g., aiming the car at the nearest brick wall and hoping for the best! If 'commercials' were to be included on these tapes of instruction, a cheerful voice might interject, something helpful; for example, '*Use Grippem brake linings next time*'.

Yes, the idea offers endless possibilities... I think...

Quite a few people already use tape recorders in their cars. Commercial travellers often use them to record the results of their calls, sending the tapes to headquarters, as they go. These gentlemen are urged to be brief, of course, and to avoid long descriptions of the architecture of the local shop, the personal attributes of the young lady behind the counter, the gentle serenity of the High Street ten minutes before half-day closing, etc. I have heard of driving instructors who use tapes to record their comments on their students' progress during the lesson. In fact, that most successful recording by Bob Newhart gives you a pretty good idea! People who like driving in the country, but who live in the city, could play back tapes of country sounds, distant church bells, cows lowing, sheep bleating, and the low hum of bees about their business. And vice versa (but *who* enjoys driving through any city, these days?).

Finally, the tape recorder would be very useful during those half-yearly maintenance check-ups at the local garage. Somehow, the spoken list of things that need doing never seem as fearful as the long, typewritten list. I'm fortunate—I get my car serviced by an excellent mechanic with a most sympathetic speaking voice. He always manages to cheer me up at the same time as he indicates that the oil seals 'have gone'. So, get your mechanic to put his thoughts on to tape; you might be surprised at the result!

The only other suggestion for the motor manufacturers as they happily install tape recorders in their new models is this—how about a 'dead mike' in the rear for all those 'back seat drivers'? Now *that* would be the greatest thing for motoring since they sacked the man with the red flag (the chap who had to walk in front, remember?).

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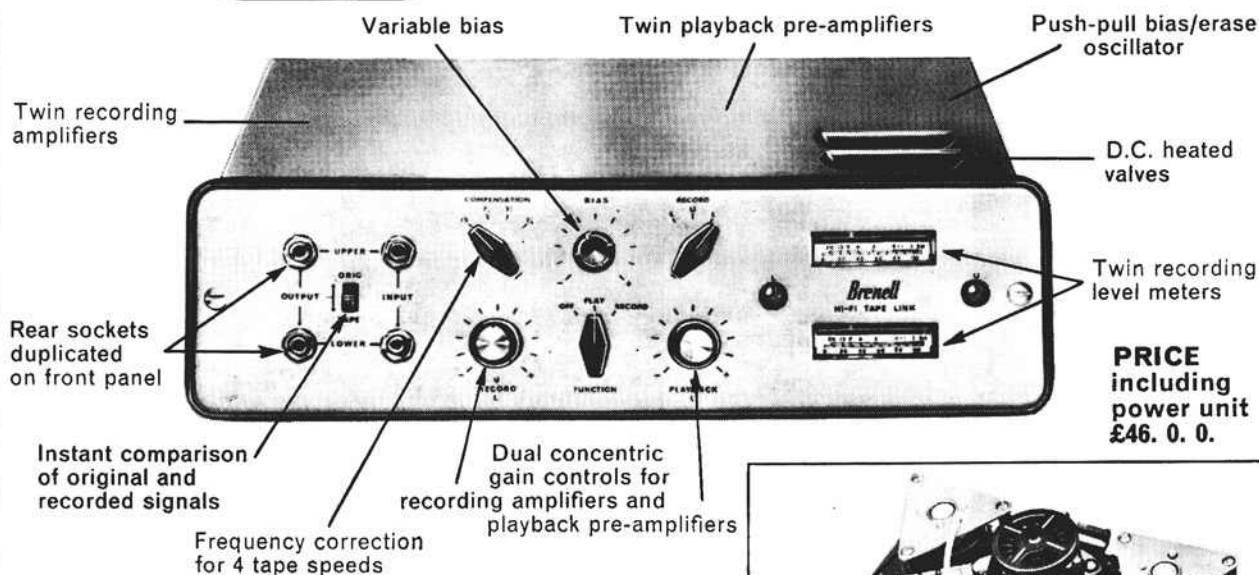
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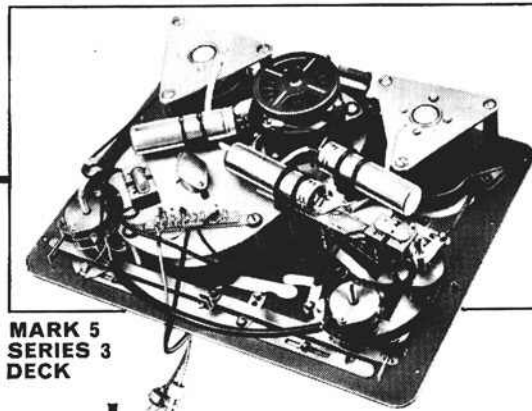
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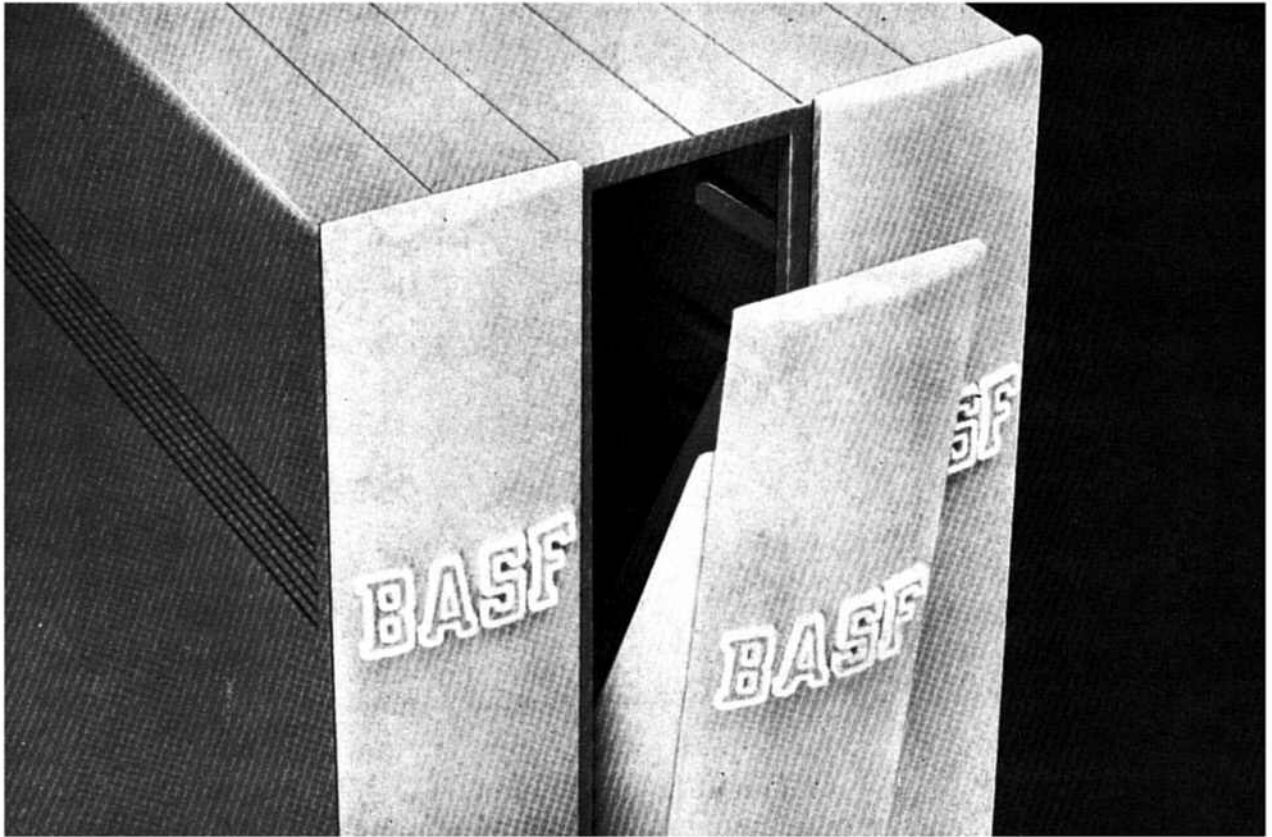
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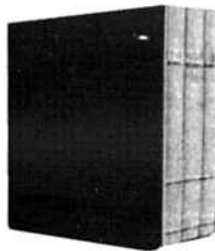
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