

# Amateur Tape Recording

VIDEO & HI-FI

February 1966 Vol 7 No 7 2/6

ADDING  
CINE  
TO  
SOUND

ON  
TEST  
THE  
SYNCHRODEK

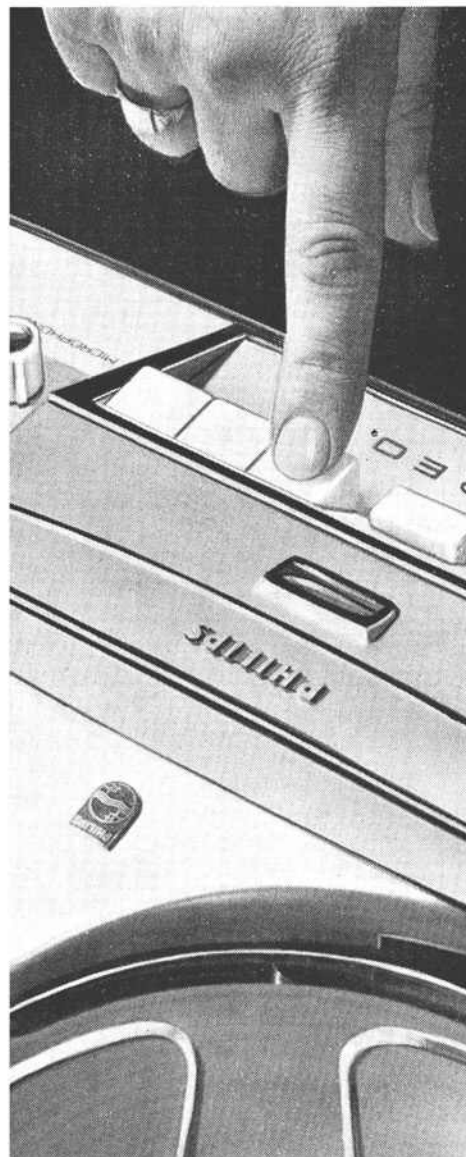
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# Amateur Tape Recording

Vol 7 Number 7  
February 1966

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## FRONT COVER

Our front cover this month shows a unique set-up for cine film projection through the wall from one room to another. The table containing the sound and projection equipment folds up into the wall space when not in use. The window between the two rooms excludes noise from the projector.

Equipment shown in the photo: Specto type PC projector, Tandberg Model 92 tape recorder and a Synchrodek tape and cine synchronization unit.

## Editorial Comment

The question as to whether pre-recorded music tapes will ever replace or even become as popular as the gramophone disc has been asked often enough. Any attempt to answer the question always provokes argument concerning the simplicity of the disc in use, particularly in being able to select required items quickly from any part of it. The latter applies more to LPs than to single 45s, but if one doesn't wish to continue playing one side of a disc it is so easy to just turn the record over. With tape, this ease of operation and selection is of necessity slightly more complicated and, of course, takes longer.

Most people, however, lose sight of the fact that the disc and magnetic tape employ completely different media for containing recordings. This alone creates the difference in usage so perhaps this comparison is after all not a very fair one. Of much greater concern is the quality of reproduction, and here we can make a direct comparison because the end product is, or should be, equal. But is it? A recent listening session with various makes of pre-recorded tapes clearly indicated that by and large the disc still

offers better quality of reproduction than the pre-recorded tape. Now all master discs (those used to make the pressings we buy) are copied directly from an original master tape recording, as made in the recording studio. A tape copied from this original (master) tape recording should be equal to or better than the disc, particularly with regard to noise level and frequency response. Yet the majority of pre-recorded tapes when played on the finest possible equipment (the same equipment used for discs in our tests) showed a much higher noise level, a poorer overall frequency response as well as distortion and even hum from amplifiers, etc., used in the process of copying. Why? Some loss of quality, etc., is due to the method of copying which involves the use of high tape speeds in order to reduce the time taken to make the copy tapes. Knowing the technical difficulties and problems involved, we should be prepared to accept what amounts to a slight inherent loss in reproduction *but we should not be prepared to accept grossly inferior recordings made on makeshift equipment.* Neither should we be prepared to accept recordings which in the first instance come from a disc, i.e., where the master tape

from which the selling tape copies are made, was in fact made from a selling copy of the disc.

Quite a number of pre-recorded tapes now on the market have been taken from selling copies of the disc versions. This is painfully obvious on some, because even the sound of the stylus on the run-on and run-off grooves can be heard in addition to the familiar stylus and groove noise. On others we have heard turntable rumble as well.

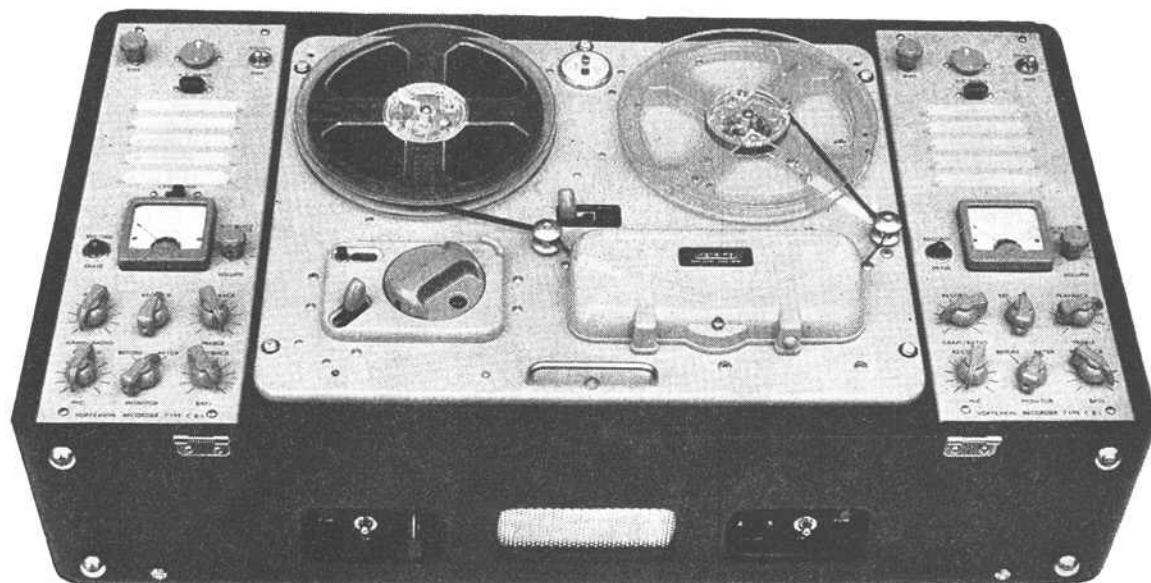
In future our tape record reviewers will be including more comments on the quality of reproduction as well as assessing the entertainment value of the material on pre-recorded tapes.

F.C.J.

Editor: F. C. Judd, A. Inst.E. Assistant Editor: Kim Cook, Art Editor: Robert Morley, Production Director: Dennis Curtis, Advertisement Director: Lindsay Masters, Advertisement Manager: E. McKeown, Circulation Manager: David Hughes, Editorial, Advertising and Subscriptions: Amateur Tape Recording, Haymarket Press Ltd, 9 Harrow Road, London W2, Ambassador 3200. Amateur Tape Recording is published by Haymarket Press Ltd. © 1966 Printed by The Sidney Press Ltd, Bedford. Title registered at Stationers' Hall. Subscription Rates throughout the world 30s. post paid for twelve issues.

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	Low frequency sensitivity	High frequency sensitivity	Output at 2% distortion	H/F response at 12,000 c/s against a 400 c/s reference	Erase level	Modulation noise
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Brand 'B'	- 0.3	- 5.0	- 2.3	+ 2.4	74	55
Brand 'C'	- 1.0	- 5.7	- 1.7	+ 2.4	74	54.5
Brand 'D'	- 2.8	- 10.9	- 3.5	- 1	72.5	55
Brand 'E'	- 1.9	- 4.7	- 5.0	+ 4.3	76	51.5
Brand 'F'	- 0.5	- 5.0	- 2.9	+ 2.6	78	54.5
Brand 'G'	- 2.3	- 4.8	- 3.0	+ 4.6	75.5	55
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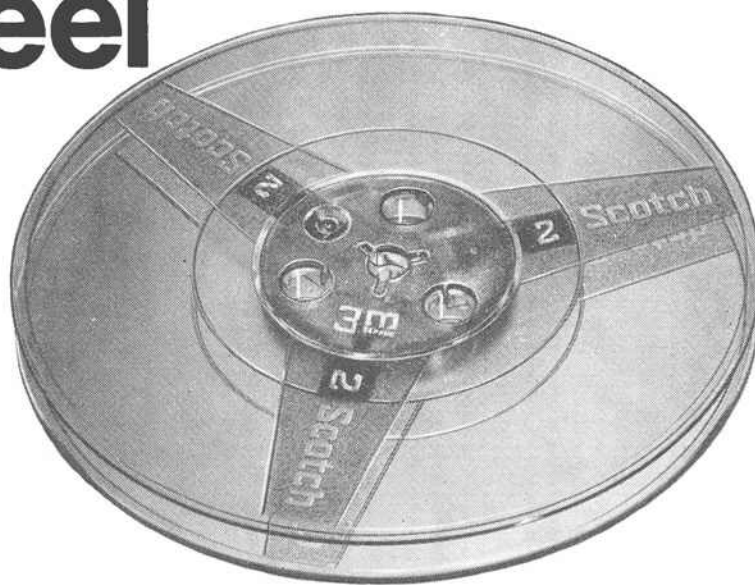
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	3 hours per track, 12 hours in total at $1\frac{1}{2}$ ips
Reels:	7 inches or smaller
Frequency response:	40–15,000 cps at $7\frac{1}{2}$ ips 40–12,000 cps at $3\frac{1}{2}$ ips 40– 6,000 cps at $1\frac{1}{2}$ ips
Flutter and wow:	Less than 0.12% RMS at $7\frac{1}{2}$ ips Less than 0.2% RMS at $3\frac{1}{2}$ ips
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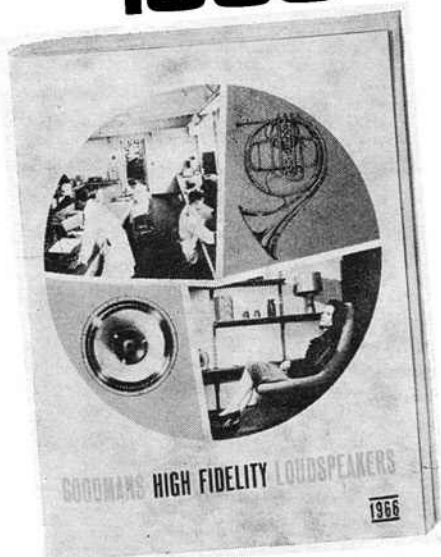
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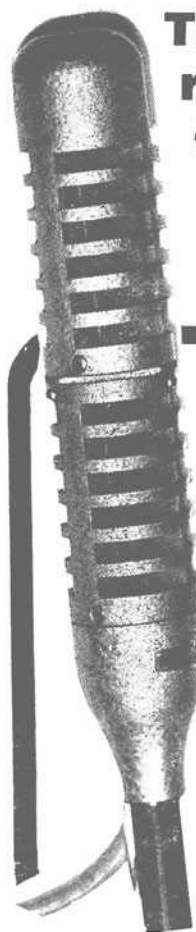
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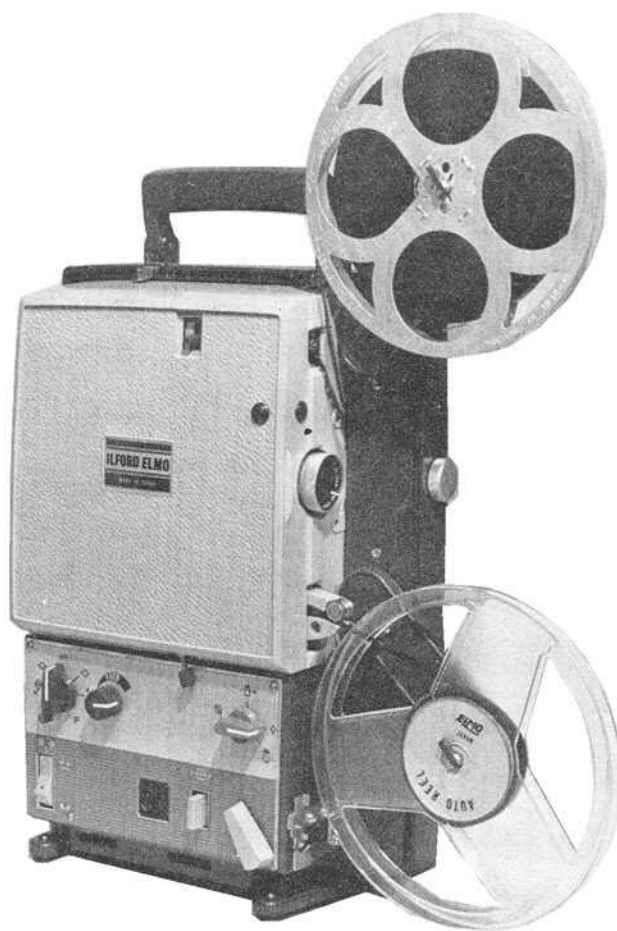
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# ADDING SOUND TO CINE

**Peter Dean, editor of *8mm Magazine*, continues his discussion of the various techniques of adding cine to sound with a more detailed look at some of the techniques that the enthusiast can use. The cost can be a few shillings or hundreds of pounds – the choice offered is wide and depends on the requirements of the individual. Snags and advantages of each system are clearly outlined, and there is a checklist of names and addresses for further information**



*Above: well-designed and beautifully made, the Ilford Elmo AP-8 projector may be used with its own synchronizer for adding taped sound. Not for the budget-minded, it extracts top quality from the tiny 8mm frame.*

Last month I dealt with the various systems which are available to the amateur who is interested in making sound films. From the response to this, it is clear that many people do not find it easy to sort out which method is best for them, and in some cases they may find out too late that the type they have chosen will not enable them to do exactly what they want. It is also worth bearing in mind the equipment which one has available *now*, and whether it is worth incorporating it into a system, or whether it would be better to start from scratch.

## **Quick recap**

(Just to refresh your memory about some important points):

- 10 1. Sound is normally added to cine *after*

the film has been taken.

2. You may choose two separate methods. One uses an existing tape recorder, the other involves buying a complete sound projector because the sound is actually recorded on the film.

What are the limitations?

It may seem odd (if not off-putting) to say what you *can't* do, but if you bear in mind that every system is capable of doing satisfactorily the job of synchronizing sound and picture, then it really is much easier to tackle the particular limitations of each, since these are what will make you decide for or against it.

## **Tape**

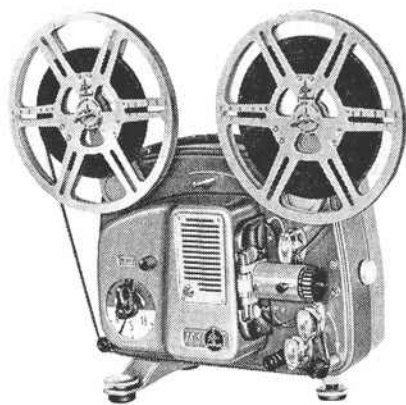
I assume that if you are reading this you already possess a tape recorder or are at

least thinking of getting one. The big advantage of tape is that it gives a quality of sound far superior to any other method, and for very little extra outlay. However, even a tape recorder has certain limitations. To make an adequate sound track you will probably need to combine the following types of sound: music, speech, special effects. It must be possible to record all three so that they stay in step with the picture. If your tape recorder does not have adequate mixing, superimpose, or track-to-track recording facilities, you cannot do this – at least, not single-handed. It is simply not feasible to cue in music, fade it up and down, watch the screen and read a commentary all at the same time, let alone add sound effects. So the various parts of your sound track will have to be



added one by one.

By far the best tape recorder for your purpose is a quarter-track machine with inter-track transcription. (Track-to-track re-recording as on some stereo tape recorders.) This will enable you to build up each section at leisure, and only when it is completed to your satisfaction transfer it to the final track. The standard procedure is to record a 'pilot' commentary, with recorder and projector synchronized. This consists of a description of the film, and cues for sound effects and music changes. Its purpose is to allow you to build up the track without any further showings of the film (tape doesn't mind being run backwards and forwards. Film does, and it soon shows signs of wear.) This 'pilot' commentary may be used in two ways.



*Above: the Bolex 18-5 is another high-quality projector which has a tape coupler available. There is also a Super 8 version of this projector, which has notably good optical performance.*

You can build up the sound track by listening to the commentary and cueing in at the same time (you will need an assistant) or, if you are a lone worker, you can prepare a tightly-timed script from the 'pilot'. It is then possible to record the commentary or music at leisure and cut and splice the tape so that its timing corresponds exactly to that of your script. A second run-through follows, this time recording on the second track, and again using the script for timing. Since the two tracks are independent, a mistake does not matter and can be re-recorded. When the second track is satisfactory it can be dubbed on to the first. At the third run-through, effects can be added in a similar way. Although it is rather more troublesome, I recommend the practice of cutting and splicing the tape because it does allow very exact timing, and eliminates the clicks or buzzes often caused by stopping and starting the recorder. Generally speaking, the music track is best treated in this way, since the transition between passages of music is much more difficult to manage than a commentary, which is seldom continuous. However, this depends on individual circumstances, and there

are no hard and fast rules.

This is fine if you have a quarter-track recorder with track-to-track re-recording and mixing facilities. But what if you haven't? Let's run through the possibilities.

1. You can record the music, and then superimpose speech. The quality of the music recording will suffer, and there may be some switching clicks but this is tolerable. Effects can be added at a third run-through, unless they occur at the same time as the commentary or your recorder does not have a superimpose control which can be switched in and out whilst recording. In both these cases, the effects will have to be laid over the music and the commentary recorded last. Trouble is, that superimposing twice makes the music sound very woolly, although this is not so important if the speech is crisp. (With all methods of simultaneous recording, a mistake at any time can ruin the whole effect.)

2. If you have a separate mixer, or mixing controls on the recorder, two sections may be recorded simultaneously. This again usually means an assistant, or assistants. The ideal set-up is to have three people – someone to look after the music, and someone else to read the commentary, while you give them their cues and do the actual mixing.

3. If your recorder has neither mixer nor superimpose you are faced with the choice of speech or music only. A dodge you may employ is acoustic mixing. The music can come from a separate loudspeaker, and be recorded via the microphone used for the commentary. To fade down the music, either reduce the volume, or turn the microphone away from the loudspeaker, cutting down the amount of sound it picks up. The latter method allows more control if you are single-handed, as is most probable. Obtaining suitable assistants when you want them is never the easiest of tasks.

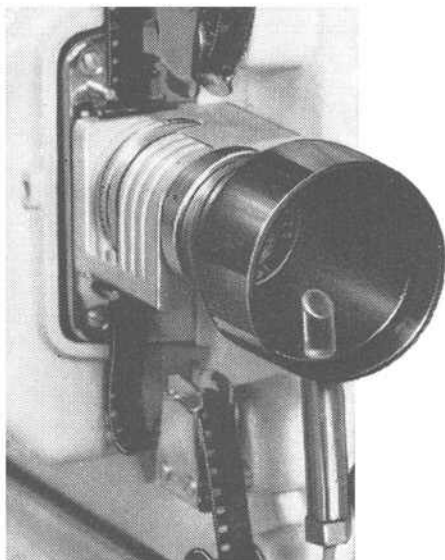
At first glance it may seem that similar advantages would be obtained by using two recorders. Unfortunately, even though recorders have substantially *constant* speed, they may not be precisely the *same*, which can upset sync in long passages. Two recorders are, nevertheless, very useful for building up sound tracks, provided that the script timing is adhered to on playback.

All the above methods can be used in conjunction with the pilot commentary technique. Many cine workers are not prepared to take the time this entails, and record direct while watching the picture. Quite apart from the fact that the film will not be improved by frequent run-throughs, there is always the problem of projector noise. Elaborate methods are devised for projecting through windows, via mirrors and so forth, but these must be regarded as makeshifts, and are rarely fully successful. Played back on their own, many tape sound tracks reveal an extremely high level of background noise. Even so, it is

quite amazing how much goes unnoticed when there is also a picture to watch. This doesn't mean I advocate sloppy recording techniques, but it is comforting when, for some reason or other, one just cannot get a 100% recording to know that minor faults will not be picked up by the audience. At this stage, it is worth mentioning that a recorder has been developed specifically for cine sound tracks. Called the Cinerecorder, it features separate speaker, built-in synchronizer, superimpose, mixing, and two features which are, as far as I know, unique (tape deck manufacturers could well note them). The BSR single-speed deck – a rather basic specification but simple to use and gives good results – has been modified by the addition of 'shiftrack' and 'tape lift' controls. The shiftrack allows the recording area to be continuously varied up to half-track width. (A mechanical device alters the relative positions of the tape and the recording head.) This offers most of the advantages of intertrack transcription (except for monitoring) and combines it with simultaneous mixing. The music may be recorded on full half-track, and the commentary then recorded using the shiftrack, so that a completely separate track, continuously variable in width, carries the speech content. On replay the volume of the music will depend on the extent to which the first track has been wiped out by the second recording, but note that the tracks remain independent, and the second track can be re-recorded if a mistake has been made, without affecting the first track. As the Cinerecorder also has facilities for mixing and superimposition, and tone control *on recording*, the compilation of a sound track is considerably simplified. The second feature, the tape lift, is designed to eliminate the clicks caused by stopping and starting the recorder. It consists of an arm which pulls the tape away from the heads, at the same time switching off the drive at the end of its travel. This gives, in effect very rapid fade. Used in reverse it gives a fade-in. Both these controls are invaluable, mechanically simple, and offer no disadvantages as far as I am aware.

We now pass from a consideration of what is possible with the tape recorder to the question of synchronizing it with a projector. (For a summary of the various methods, see last month.)

Here are some general points about all methods of synchronizing. The simplest way of all is 'wild', in which the recorder and the projector are set up quite independently of one another. The speed constancy of a tape recorder is good. But many cine projectors have series motors which change speed considerably according to mains voltage and how long they have been running. Such projectors include a variable speed control, but the actual speed at which they run has to be judged: it is rarely marked. There is, however, a second type normally with a single fixed-speed. These use an induction motor,



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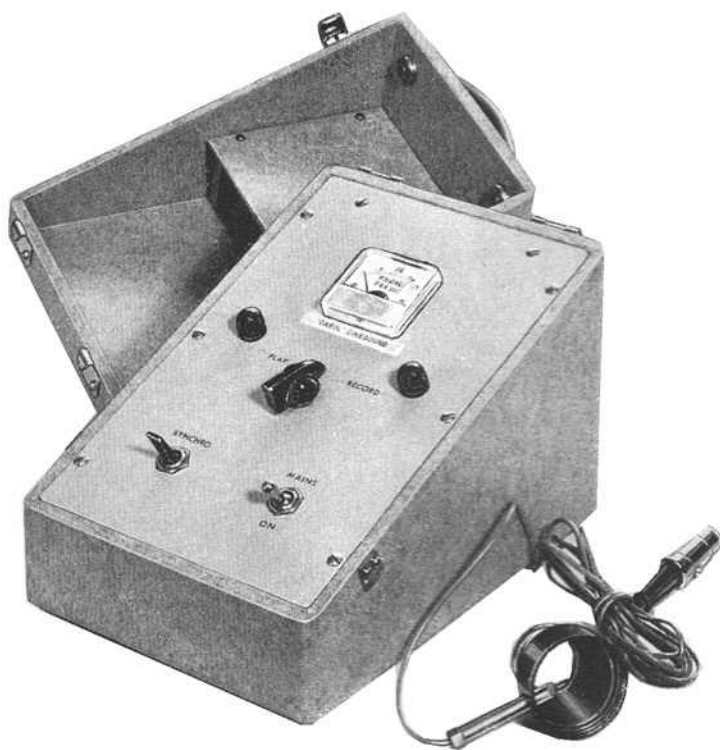
### **SOUND SYNCHRONIZATION**

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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- Your present projector and tape recorder may be suitable.
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which is not only relatively unaffected by voltage changes, but also runs very constantly even from cold. One can, therefore, rely on them to project a film for substantially the same time, give or take a few seconds, on each showing. A loosely synchronized soundtrack can be added very successfully, provided recorder and projector are both started up together and that some form of start mark is provided for both. The disadvantage of fixed-speed projectors is that, if the synchronization falls out, nothing can be done to bring it back into line. However, I have shown 15-minute films in this way with ex-



*Above: the Eumig Phonomatic Novo has a built-in tape coupler of a type proved over the years by a great number of amateur (and even semi-professional) enthusiasts.*

cellent results. A few projectors (the Silma, the Eumig Mark M) incorporate fixed speed motors but vary the projection speed by a system of gearing. Fixed speeds present the snag that the majority of synchronizers work by slowing down the motor to a predetermined speed of 16 fps. If the motor can't be slowed down, the synchronizer won't work. So you may buy a fixed-speed projector for 'wild' tracks, only to find it cannot be more closely synchronized should you wish it. Even with a variable speed motor, 'wild' tracks can be made, provided one is sufficiently familiar with the film to recognize when the projector is drifting out of sync. They are quite a good introduction to the business of adding sound, as they add no extra cost to the basic equipment. But you cannot let your attention wander during the film. The same limitation applies to the strobe. This is a strobe wheel fixed to the recorder and driven by the tape but illuminated by stray light from the projector beam. The flickering light will cause the strobe to appear stationary when the projector is correctly adjusted. But, of course, the strobe must be watched throughout. This method is very accurate, though somewhat tedious; it has few snags in use, other than positioning the projector and recorder accurately. In fact, after a public

showing of amateur films, using various methods of obtaining synchronism, the harrassed projectionist declared that in future he would stick to the strobe as being the most reliable!

Apart from a few curiosities like the system of interleaving tape with film and the efforts of dedicated amateurs which are outside the scope of this article, the commercially available synchronizing units fall into very recognizable types: mechanical links between recorder and projector, electrical links, combinations of the two.

The mechanical links are used with variable speed projectors. They work on the principle that the speed of the tape is very constant, and make use of this to control the projector. A loop of tape is passed from the recorder to a unit attached to, or alongside, the projector in which is incorporated a capstan and pinchwheel driven by the projector. When the projector is running at the same speed, this capstan pulls the tape through at the same speed as it leaves the tape recorder. Before it reaches the capstan, however, the tape passes over a swinging arm, which is in effect a variable resistance controlling the projector speed. If the projector is running fast, the capstan will pull the tape through more quickly than it is supplied by the recorder. It will therefore tighten up on the swinging arm, which will move accordingly and slow down the motor speed. If the motor runs too slowly the tape becomes slack, so the arm moves the other way and speeds up the projector. A *status quo* is very rapidly established, and thereafter recorder and projector run happily at their fixed speeds, and will do so ever after, *provided the same synchronizing unit is employed.*

Snags of this method are that the projector and recorder need to be mounted alongside one another; there are quite a number of points at which one can make a mistake and mangle the tape; exact synchronization is not possible with plain tape because it slips and stretches; there is no guarantee that if the tape and film are played on another machine they will stay in sync; a broken film or tape means complete loss of sync; the deck of the recorder must not be recessed or the tape cannot be led into the projector.

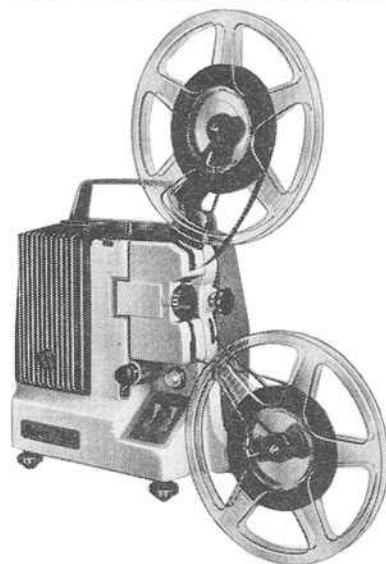
It all sounds pretty formidable, doesn't it? And yet this system (which is used on the Eumig Phonomatic) is probably the most widely known of all. Reasons? It was the first to come out, and the Eumig is a very popular projector with an excellent reputation.

The electrical system is used on the Bauer T10R. It is unfortunately more expensive, but highly convenient, since the projector and recorder are linked only by a cable. Moreover, there is no chance of mechanical damage to the tape should a mistake be made. Since the Bauer is a quite excellent projector, I would recommend it to anyone interested primarily in quality and

simplicity. Much less expensive (in fact only about the same cost as the Bauer synchronizer alone) would be a Luch projector and synchronizer. This, too, has an electrical connection, not quite as accurate as the Bauer but good enough for its purpose. The same disadvantages about tape slip, replay on different machines and loss of sync through broken tape or film apply as with mechanical synchronizers. The only certain way of making synchronization tight enough to allow exact matching of sound to picture (accurate enough for speech) is to use perforated tape. This does away with slip or stretch by replacing the capstan with a toothed roller which engages perforations in the tape (where track 3 is on a four-track machine). Many synchronizers can be modified to take perforated tape, but that of the Noris projector (an otherwise excellent machine) cannot.

There are three systems of synchronizing tape which deserve separate treatment. These are the Eumig Phonomatic, the Synchrodek and the Carol Cinesound.

The Phonomatic I shall discuss next month, and the Synchrodek will fall to the expert pen of *ATR's* editor, who is trying out its many applications for himself (see page 24). I propose to leave discussion of the Carol Cinesound, which is a purely



*Above: the Bauer T/10R has a notably high-quality lens, excellent performance and is very quiet-running. It uses a tape synchronizer of the electrical link type.*

electronic method of synchronization, very similar to the pulse-sync systems used professionally, also until next month, when I shall be able to treat it in the detail it deserves. Meanwhile, you will find their address in the checklist and if you are interested please write to them. I have found them helpful and their literature is very informative.

*continued overleaf* 13

### Magnetic stripe

Magnetic stripe projectors dispose instantly of most of the disadvantages of separate recorder/projector combinations. Synchronization is always 100% and is not upset by a broken film. The unit is complete and as simple to operate as a normal projector. Against this must be set the higher cost, lower sound quality and rather primitive recording facilities. You may find the challenge of compiling a complicated sound track on stripe stimulating, but this is evidently *not* what the manufacturers of the machines have anticipated. They have gone all out to simplify. The best example of this is the Eumig Mark S, one of the first machines to sell for under £100. The thinking behind it is clear. The designer has obviously expected the user to record both speech and music together, while the film is actually running. I mentioned projector noise as a bugbear under such conditions. The Eumig suppresses all signal from the microphone under a given level. This means that, by speaking fairly close to the mike, background noise just isn't recorded. *Mixing* is automatic – the microphone input takes precedence over the gramophone input, reducing the volume of the latter instantly, but allowing it to return gradually to maximum when speech stops. Recording volume is also automatic, and highly efficient. Here, again, there is an extremely rapid initial setting, followed by a slow return to maximum sensitivity. This prevents unpleasant rises in background noise during short pauses in speech. AVC (automatic volume control) recording helps to obtain the best response from the stripe, and relieves the user of watching the magic eye constantly.

The Eumig is extremely efficient at the job for which it has been designed, but cannot begin to compare with a tape recorder in facilities. If you prefer a machine which is not quite so automatic, and has manual record level and mixing, the Silma Sound 2 would be worth looking at. It is about the same price and gives similar results.

Many tape enthusiasts will have thought about recording on tape, and transferring to stripe. This presents problems which are too complicated to go into here; it is not easy to make the projector and the tape run at exactly the same speed, partly because many stripe projectors are designed to run at 18 frames per second, whereas tape is synchronized at 16, and partly because the normal method of governing the projector speed cannot be applied to a stripe machine without the possibility of introducing speed changes which will affect the reproduction. If tape to stripe transfer is contemplated, I would advise you to buy one of the devices which allow fuller control of the projector/recorder, such as the Synchrodek, or the Carol Cinesound.

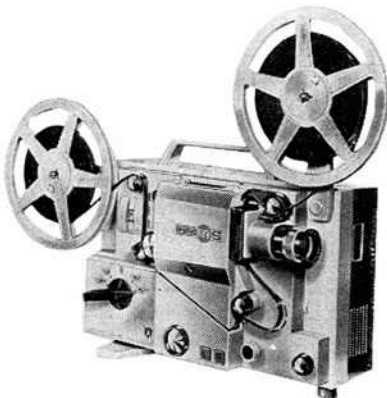
The same general remarks apply to add-on stripe units as to integrated stripe machines.

worth considering if you have a projector already. But do make sure that it is suitable for your projector, by asking for a demonstration of the two working together. If the salesman won't do this, don't buy!

Although it is better, if in doubt, to let the professionals apply a stripe to your precious film, there are machines available cheaply for this purpose. Results appear quite satisfactory in practice.

### Super 8

By the time this appears, the words 'Super 8' may have penetrated your consciousness. This is a new system of 8mm filming which offers ultra-simple cartridge loading



*Above: this is the Eumig Mark S, which has done much to popularize the use of magnetically striped film, since it is especially easy to use and gives good results.*

and a larger film area, for sharper pictures. At the time of writing there are no built-in tape synchronizers for Super 8 equipment, though it is possible that a Bauer machine may become available. So for synchronized tape you would have to rely upon a Synchrodek or Cinesound. The exception is a dual-gauge machine, the Ilford Elmo FPA, which has a tape synchronizer like that for the AP-8 shown on page 10. Stripe machines are promised – the Eumig and Carena are particularly interesting – and the quality of Super 8 stripe is better than that of 8mm. If you do not already own any regular 8mm cine equipment I would advise you to look at Super 8 before deciding. On the other hand, the introduction of the new gauge means that much first-class standard 8mm equipment is going for a song and if quality on a strict budget is what you want, you will pick up bargains either new or second-hand. However, do not spend heavily on standard 8 unless you intend to keep the equipment: its resale price will be disappointingly low.

### Strobe wheels

'Drumsync': H. S. Engineering Co, 134 Malvern Gardens, Kenton, Harrow, Middlesex.

**Projectors with couplers built-in or available**  
Eumig Phonomatic: Johnsons of Hendon Ltd, Hendon Way, London W4.

Noris Super and Synchroder and Synchroder TS: Luminos Ltd, 1 Belsize Crescent, Hampstead, London NW3.

Bauer T10R: Pullin Photographic, 11 Aintree Road, Perivale, Greenford, Middlesex.

Cinovid: E. Leitz (Instruments) Ltd, 30 Mortimer Street, London W1.

Elmo FP: Ilford Ltd, Ilford, Essex.

Paillard-Bolex 18-5: Cinex Ltd, Bolex House, Burleigh Gardens, Southgate, N14. Zeiss Ikon Movilux: Degenhardt & Co Ltd, Carl Zeiss House, 20-22 Mortimer Street, London W1.

Luch 2: Technical & Optical Equipment Ltd, 15-17 Praed Street, London W2.

### Tape couplers for use with a wide range of projectors

Synchrodek: Synchrodek (1964) Ltd, Tilehurst Lane, Binfield, Bracknell, Berks.

Carol Cinesound: Contronics Ltd, Garth Works, Deepcut Bridge Road, Blackdown, Nr Aldershot, Hants.

### Perforated tape

KGM Electronics Cinetape A: KGM Electronics Ltd, Bardolph Road, Richmond, Surrey.

### Sound stripe projectors

Eumig Mark M: Johnsons of Hendon Ltd, Hendon Way, London W4.

Silma Sonik, Silma Sound 2: David Williams (Cine Equipment) Ltd, 5-9 Glasshouse Yard, London EC1.

Kodak Sound 8: Kodak Ltd, Victoria Road, Ruislip, Middlesex.

Toei Talkie: Dixons Photographic Ltd, Dixon House, 18-24 High Street, Edgware, Middlesex.

Elmo TP8: Ilford Ltd, Ilford, Essex.

Carena Concerto: Photopia Ltd, Hempstalls Lane, Newcastle, Staffs.

Agfa Sonectorphon: Agfa Ltd, 27 Regent Street, London SW1.

### Add-on stripe units

Paul Plus: Paul Plus Ltd, 29 King Street, Newcastle, Staffs.

Topsonic: Technical & Optical Equipment Ltd, 15-17 Praed Street, London W2.

### Stripping machines

Supersound: Supersound Electronic Products, 114 Mount Pleasant Road, Hastings, Sussex.

Harringay: Harringay Photographic Ltd, 435 Green Lanes, London N4.

### Professional striping services

Zonal Film Facilities Ltd, Zonal House, Heron Trading Estate, Westfields Road, London W3.

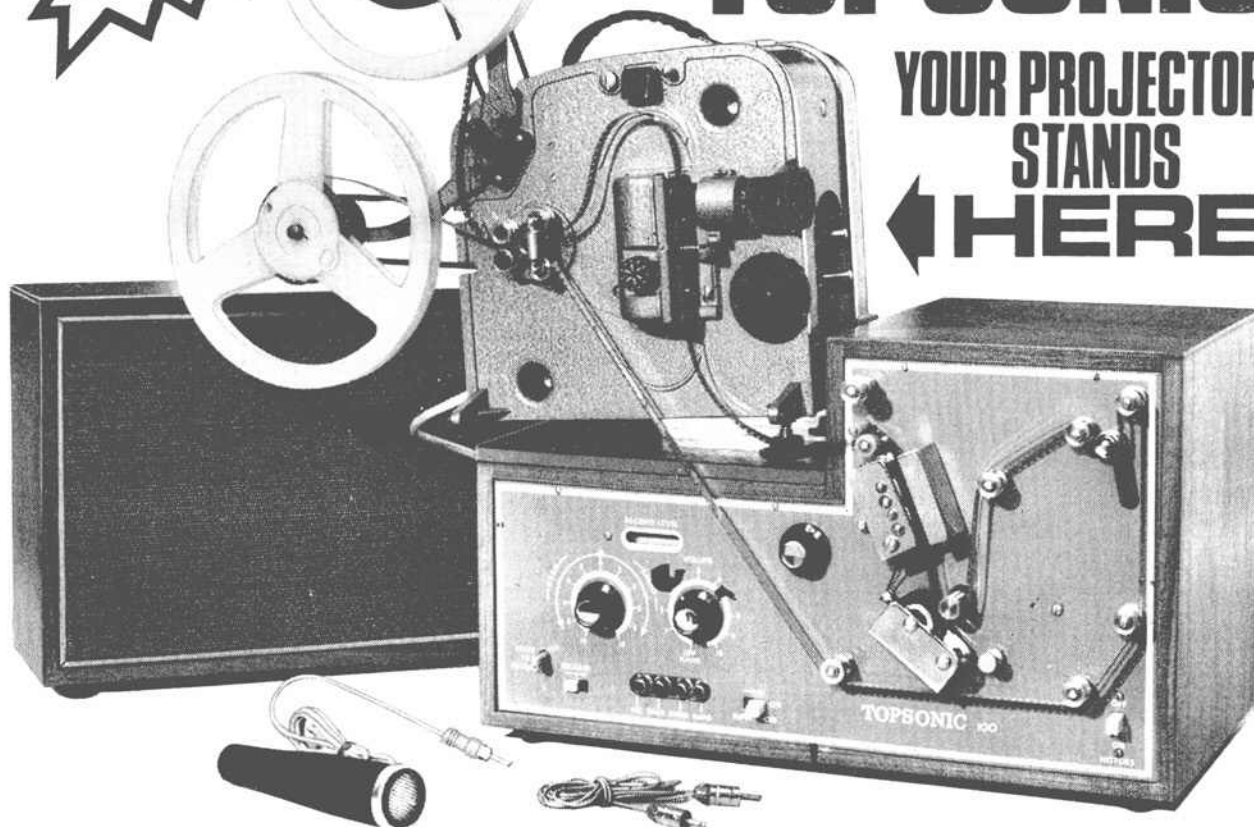
Agfa Ltd, 27 Regent Street, London SW1. (Through photographic dealer.)

EVT Magnetics, 157 Long Lane, Bexleyheath, Kent.

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# Circuit for Constructors

## HIGH INPUT IMPEDANCE PRE-AMPLIFIER

By R. F. Spriggs

With more and more transistorized equipment coming on to the market, it is often necessary to use a high impedance microphone in conjunction with a tape recorder or amplifier with a low input impedance. The pre-amplifier described in this article enables this to be done. Another use is when a high impedance microphone is to be used with a long length of cable. As the input impedance is in the order of 100 Kohms, a crystal microphone can be used in an emergency, although there will be a loss of bass. When recording speech a reduction in bass response does sometimes improve the intelligibility of the recording.

### Circuit description

The circuit, shown in Fig.1, is a simple two-stage direct-coupled pre-amplifier using a low noise transistor in the first stage which feeds a very high gain second stage with a low impedance output. Both stages work at very low collector current to give maximum signal to noise ratio. This is possible due to the direct coupling and the dc stabilization from T2 emitter to T1 base via R6 and R2.

An example of how this works will be given. Should a rise in temperature cause T1 collector current to increase, the voltage at the collector will fall. As T2 base is direct coupled, its voltage will also fall, reducing the current in T2, in turn causing the emitter voltage to become less. This reduces the bias on T1 base which reduces the collector current, tending to restore it to its normal value. Study of the circuit will show that the circuit remains balanced for a change of collector current, either increase or decrease, in either transistor.

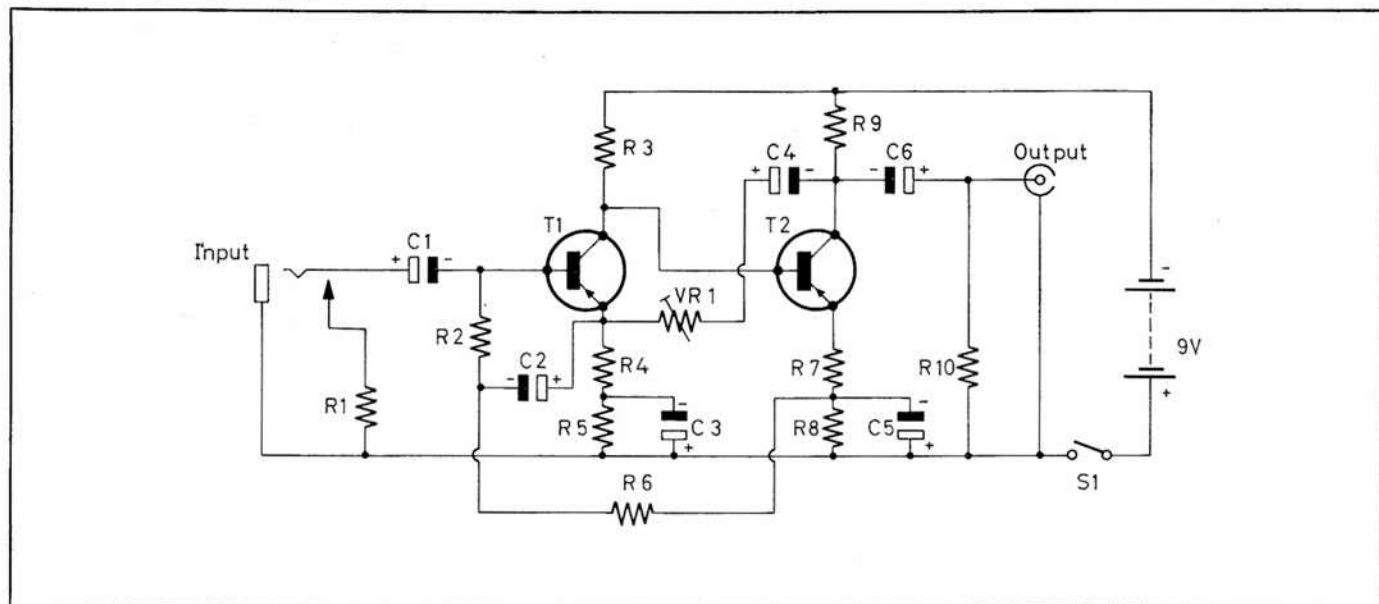
A high impedance is obtained by a large degree of negative feedback from the emitter of T1 to its base via C2. As the circuit is so stable, overall feedback via C4 and VR1 can be used to adjust the gain without causing instability. This feedback also reduces noise and improves the frequency response. As the circuit is self-balancing, about 5 to 10 seconds elapse before correct operation begins.

### Construction

The original pre-amplifier was built in an Eddystone Diecast box type 896. This provides a robust case and also completely screens the unit. Almost all the components can be mounted on sub-miniature group boards as shown in Fig.2. The component types specified should be used or difficulty may be experienced in fitting the components on to the boards. As the layout is rather cramped, care should be taken when soldering the transistors and other components to avoid damaging them by overheating. Most of the components can be mounted on to the group boards before they are fitted into the box. A layer of very thin foam rubber is fitted inside the lid. This holds the battery in place and prevents the lid touching any components. When the lid of the box is fitted care should be taken not to trap any wires.

The unit consumes about 750 micro-amps, so the battery life is very long. VR1 should be adjusted to give lowest noise consistent with required gain. Its value can then be measured and a resistor of equal value fitted in its place if required.

Fig.1. Circuit of the pre-amplifier.



In use, the pre-amplifier is simply connected between the microphone and the amplifier or recorder. If a long lead is to be used with the microphone, the pre-amplifier should be connected as close as possible to the microphone with the long length of lead between the pre-amplifier and the equipment being used. The output lead is fitted with a plug to match the sockets on the amplifier or recorder. If an input socket other than a jack is used the switch can be dispensed with and a resistor of 100 Kohms fitted in place of R1 across the input.

Although the unit was designed primarily for use with high impedance microphones it will serve as a useful booster amplifier with any microphone from 25 ohms upwards.

#### Components List

C1	125 $\mu$ F	25 V wkg
C2	64 $\mu$ F	25 V wkg
C3	64 $\mu$ F	25 V wkg
C4	64 $\mu$ F	25 V wkg
C5	64 $\mu$ F	25 V wkg
C6	64 $\mu$ F	25 V wkg

(All Mullard miniature electrolytics)

R1	47 ohms
R2	68 Kohms
R3	27 Kohms
R4	680 ohms
R5	5.6 Kohms
R6	100 Kohms
R7	100 ohms
R8	5.6 Kohms
R9	10 Kohms
R10	33 Kohms

(All Radiospares  $\frac{1}{2}$  watt 'hystab')

One Eddystone die-cast box type 896

One switched jack socket

T1 AC107 or 2GT102

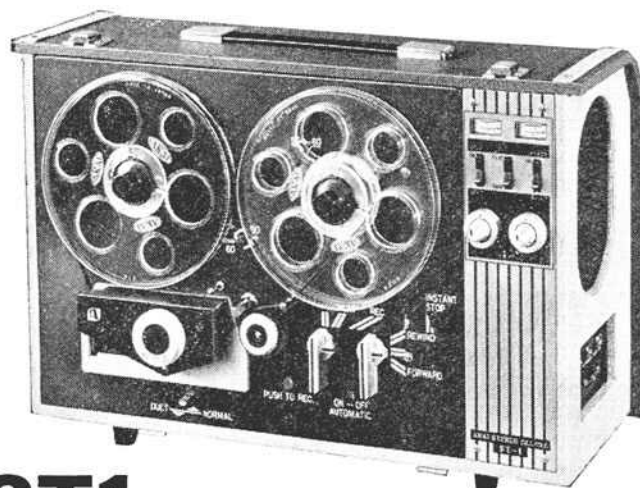
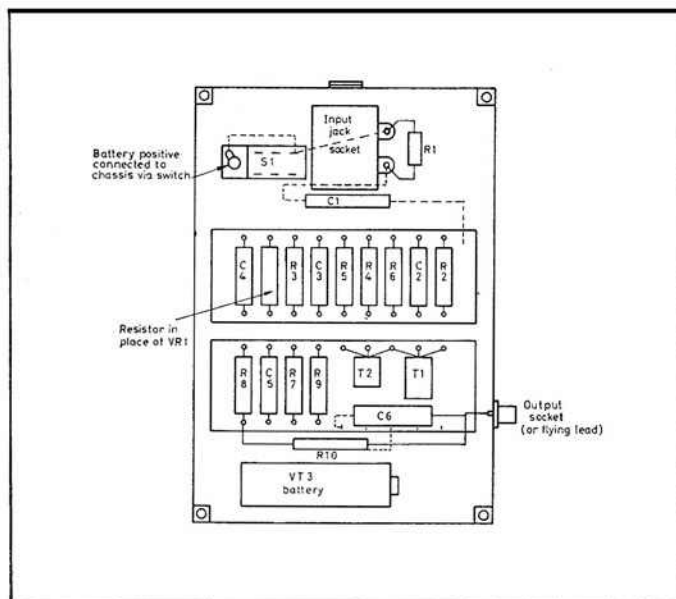
T2 AF117 or NKT676

Output socket or lead

One 18-way sub-miniature group board

Battery, Vidor VT3

Fig.2. Layout of the pre-amplifier.



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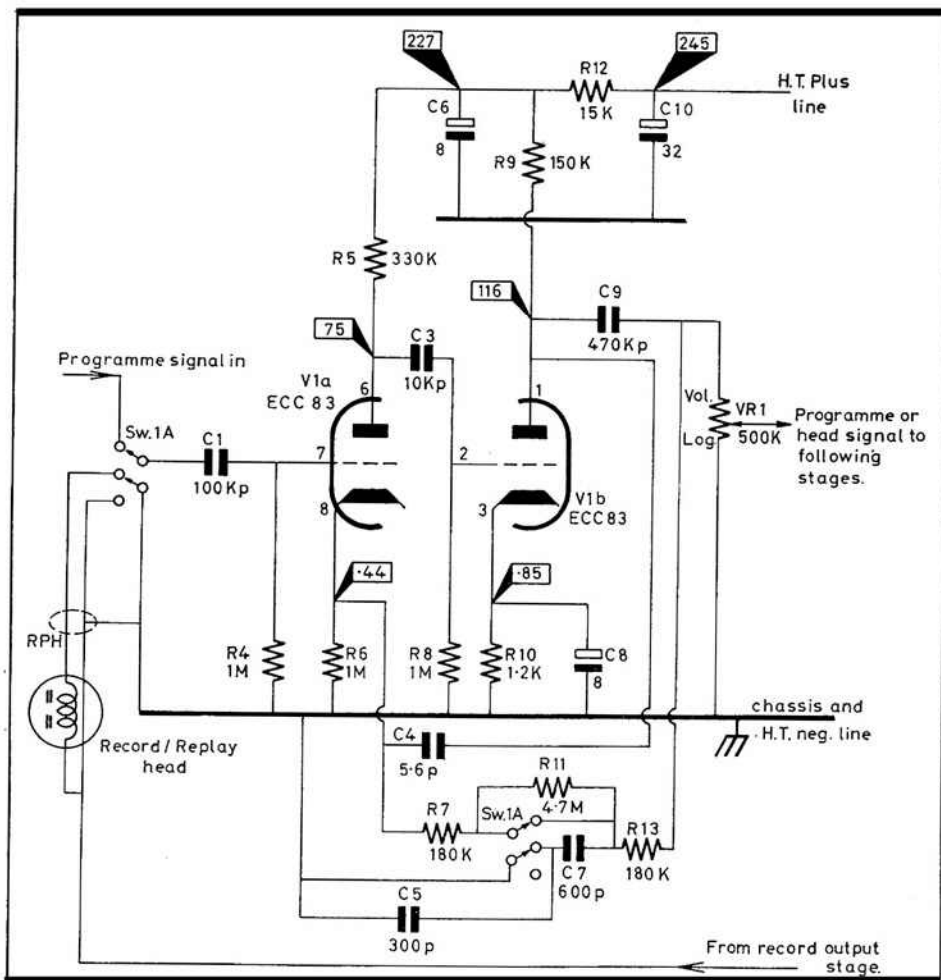
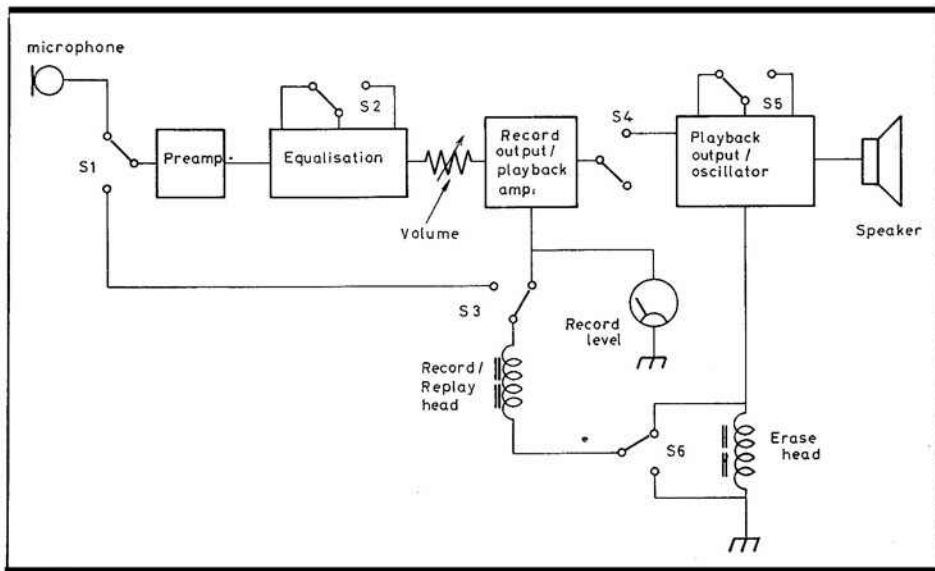
# TAPE RECORDER SERVICING

Last month we investigated the symptom of *No Record or Playback - Motor Circuit Normal* in terms of ht supply failure. It was also shown in last month's article that failure anywhere in the electronics section power supply would cause the trouble and that a fault in, say, the mains transformer primary circuit would result in unlit heaters in the valves and magic-eye record level indicator. Of course, the normal motor circuit means that mains power must be getting into the recorder, clearing the mains socket, mains lead and general switching in the recorder; but it must be remembered that the electronics section may have its own mains fuse. This possibility should be checked.

## Further ways of analysing recorder faults, and how to put things right, by Gordon J. King

*Fig.1. Block diagram of typical tape recorder showing the stages which are common to both record and playback.*

*Fig.2. Circuit section of Sobell Model S601 tape recorder. Here a double-triode valve (ECC 83) acts as an equalized pre-amplifier for the programme signal on record and the head signal on playback. The text reveals how a fault in this section can cause failure of both record and playback, and how the faulty part can be located. The voltages refer relative to chassis.*





If the heaters are lit a quick check with a dc voltmeter will tell the state of the ht supply circuit. If ht volts are zero (or almost so), last month's article tells what should be done to find and clear the trouble. Incidentally, it is worth noting that the state of the ht supply can be gleaned to some extent in recorders featuring magic-eye record level indicators. The heater in this device can often be seen glowing, as already told. However, in the record position it is the ht supply that produces the fluorescent display – whatever kind it may be. Thus, if the heater is lit yet there is no fluorescent glow in the record position, and the recorder exhibits the symptoms of lack of record and replay, it is very likely that the ht supply is at fault. Some machines have two fuses in their electronics, one in the main supply circuit and the other in the ht supply circuit. Failure of the former would kill all power to the amplifiers, including the heater supplies of course, while failure of the latter would cut off only the ht supply without affecting the valve heaters.

Now, both the record and replay sections of a tape recorder can fail altogether even though the power supply remains normal. This is because the majority of models feature circuit sections that operate both on record and replay, a system of switching from one function to the other. There are usually three main sections, excluding the power supply, which, of course, is common to both. These are (i) a frequency-equalized preamplifier that amplifies the input signal on record (such as from a microphone or other programme source) and the tape head signal on replay, (ii) an audio amplifier section that operates as the recording head driver on record and as a voltage amplifier or audio driver on replay and (iii) a power stage that provides the hf bias and erase signals on record and the audio power output (for operating the speaker) on replay.

#### Block diagram

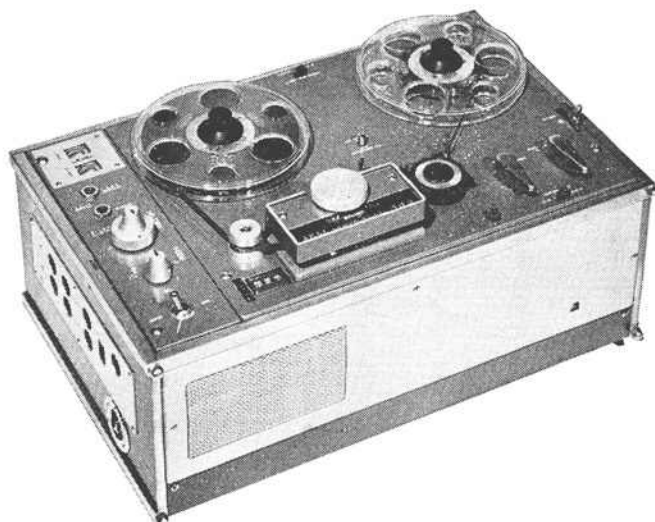
These main stages are shown in the block diagram in Fig.1. Incidentally, block diagrams will be used extensively throughout this series, as they are extremely useful in showing the various stages and signal paths without the complications of the associated circuits. Circuits will also be given, of course, but it is often instructive first to consider the basic circuit paths before examining the circuits for possible faults.

In Fig.1 switches S1, S2, S3, S4, S5 and S6 are in the record position. These switch sections are the basic ones needed for record replay changeover and are all operated by the record/playback control knob or switch. The various sections are ganged together to form an often complex switch assembly. It is here that quite a few faults seem to occur.

Now, let us look at Fig.1 in the record position. We see that the microphone signal is coupled to the pre-amplifier through S1, and that the output of the pre-amplifier goes to the equalizing stage, set by S2 to give proper correction for the record signal. More will be said about correction later. The output of the equalizer is fed via the volume control (which, incidentally, sometimes acts as the record level control in the record position) and thence to the record output amplifier. The output signal from this section is directed to the record/replay head through switch section S3, and it is to this circuit that the record level indicator, whatever type it may be, is connected.

Switch section S4 disconnects the signal in the record output stage from the playback output stage, while switch S5 changes the playback output stage into an hf oscillator for bias and erase. Switch S6 serves to couple some of the hf signal into the tape head in the record position as bias. There we have the set-up for record.

On replay all the switch sections change over. Thus, the head signal is now coupled to the pre-amplifier via S1 and S3, while S2 changes the equalization to suit replay. The volume control really acts as the volume control and applies the required level of replay signal to the playback amplifier. The output here is now coupled through S4 to the playback output stage, while S5 switches off the hf oscillator action of the stage and the speaker receives the playback signal in terms of power and response accordingly. Note that S6 switches the bottom of the record/replay head to



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chassis and effectively removes the hf bias circuit which is needed only on record, of course.

### Stage doubling

This résumé of tape recorder switching reveals, then, the common stages which double on record and replay. In practice, the switching may be somewhat more complex, depending on just how many common circuits are adopted, which is often a measure of the nature and quality of a machine. Ideally, completely separate and isolated record and replay sections would be used, but the economics of the average domestic machine demand the doubling of certain stages. More expensive machines may double-up less than their lower-priced counterparts; some really expensive studio-type machines do, in fact, run isolated record and playback sections, the latter giving a signal for basic monitoring only or for applying to a high quality reproducing channel.

For the time being we shall be considering the type of machine that is in majority use and that employs common stages of the nature shown in Fig.1. From this block diagram we can now appreciate that a fault in a common stage will affect both record and playback. Whether or not both functions will be cut off completely to cause the symptom under discussion – i.e., *No Record or Playback – Motor Circuit Normal* – will depend on the precise nature of the trouble and the section in which it exists.

The symptom could result from trouble in the common pre-amplifier, for instance, for if this section developed an open-circuit for some reason or other no signal would get through for recording or replay. The machine would thus be dead on both functions.

### A common first-stage circuit

Many popular tape recorders feature a double-triode valve in the preamplifier and equalization stages, and a circuit section of this kind is given in Fig.2. Here SW1A switch section selects either the programme signal (for recording) or the signal in the playback head (for replay). It is drawn in the record position. Thus, programme signal, wherever it is derived, is applied to the grid of V1A through C1. The signal appears in amplified form at the anode of this triode and is passed to the grid of the second triode section, V1B, through C3. The signal is thus further amplified and appears at the anode of V1B, from whence it is conveyed to the volume control (record level control in the record position) through C9. This, then, gives us the condition up to the volume control in Fig.1, on the block diagram.

Equalization, however, has not yet been considered. This is accomplished by the resistor-capacitor network round switch section SW1A at the bottom of the circuit. It operates by virtue of frequency-selective negative feedback from the anode of V1B to the cathode of V1A.

With the switch in the record position, as drawn, the feedback network is after the style of that shown in Fig.3. This is essentially a low-pass filter (C4 being a very small value), meaning that the feedback increases towards the lower audio frequencies and rises (as limited by C4) towards the higher frequencies. In that way, therefore, the gain of the section falls towards the bass and effectively rises towards the treble, which is what is required in the record position, i.e., treble boost.

With the switch in the playback position the network changes to that in Fig.4. The low-pass characteristics are considerably altered due to the presence of C5 and R11 across C7, and C4 assumes more importance in causing a fall in treble gain, thereby modifying the treble response and giving some degree of bass lift which is what is required on playback.

### Checking the fault symptom

Clearly, then, should a fault develop in the section shown in Fig.2 the machine will neither record nor playback. The first move, however, is to prove conclusively that both the record and playback functions are completely dead. From the recording point of view this is not difficult, for after applying the programme signal in the ordinary way we shall end up with a blank tape. How do we know that the tape is blank, though, for it could be that the trouble is in the replay section?

Well, first, a defective first section would fail to give an indication on the record level indicator because there would be no record programme signal arriving at the record output stage and thus no signal at the record level indicator. Secondly, a tape record (known to be properly recorded) would fail to reproduce on the machine when switched to the playback position. It is always a good plan to test any suspect machine with a tape record of known performance. This can save much time and false diagnosis.

We are now considering the symptoms that would exist due to first-stage trouble, and to recapitulate they are (a) *no record or playback – motor circuit normal*, (b) *heaters alight*, (c) *ht line voltage correct* and (d) *failure of the record level indicator*. Would there be any additional symptoms or factors that we should look for?

In most cases there are probably one or two other things that would verify our original diagnosis of first-stage failure. Since the power supply and audio output stage are working correctly, we should be able to hear, with an ear close to the speaker, a low-level residual hum with the machine switched to the playback position. Lack of all life on playback would indicate trouble in the playback audio section and output stage or in the power supply rather than in the first stages common to both record and playback.

Also the playback voltage amplifier (or output stage drive) would be working normally, so we should be able to hear a slight sizzle or change in level of residual hum as the volume control is turned from minimum to maximum when the machine is switched to playback. All these simple tests have some bearing on our original diagnosis. The idea is to find out as much as possible about the fault before applying detailed fault-finding procedures and, most important, to locate the faulty section, stage or circuit with the minimum of testing, having in mind that we are not possessors of elaborate testing equipment.

### Finding the fault

So far, so good. We have located the first two stages (i.e., pre-amplifier and equalization) as being responsible for the trouble. Now it remains to clear the trouble. Before we can do this, of course, we must find out exactly what has gone wrong and this is where it is handy to have a circuit diagram of the machine. A block diagram is all right to help locate the faulty section or stage, but a circuit of the suspect stage (such as that in Fig.2) can avoid the time taken in tracing the circuit wire by wire and component by component. Moreover, circuits often have indications of voltages (and sometimes currents) that should be expected in various parts of them.

Having diagnosed the trouble to a section such as in Fig.2, the first move would be to have the double-triode valve tested or to test it by substituting it with one known to be in good condition. A faulty valve in this stage is not uncommon. Remember that a valve is not necessarily good because its heater is alight. Its heater could be glowing happily and yet its emission may be finished. On the other hand, of course, if the valve in the suspect stage is not showing a glowing heater and the envelope is cold, the heater is almost probably open-circuit. Not in absolutely every case, though, because an unlit heater could be due to a faulty valve holder cutting off the heater supply from the low-tension winding on the mains transformer. Another trouble in this respect is poor connection between a heater wire and the heater tag on the valve holder. These troubles, for some reason, are often overlooked!

Let us suppose that the valve is all right and that its heater is glowing. The various components in the suspect section should be examined visually and for temperature with a finger (taking extreme care to avoid electric shock). It often happens that a resistor is discovered in a very burnt-up condition due to it passing excessive current as the result of a short-circuit. R12 in Fig.2, for instance, would overheat badly due to a short-circuit in C6. All the ht current would flow through R12 and back to ht negative (chassis) through C6. Apart from burning the resistor, the ht supply to the first stages would be cut off, thereby causing the trouble. Just how hot a resistor in such a circuit would be under conditions of a short-circuit would depend essentially on its value and on the voltage of the supply line. A high value would barely show

abnormal heating, while a low value would quickly pass a very high current and burn out the resistor.

#### Voltage analysis

If the ht voltage is normal (or at least present), useful information as to the stage's dc conditions can be gleaned by checking the valve's cathode voltage, provided the circuit features a cathode resistor, such as R6 and R10 in Fig.2. When the valve is passing current, current flows in the cathode resistor and thus a voltage is produced across the resistor. The voltage is fairly low generally because both the cathode current and the value of the cathode resistor are low. The voltage across the resistor is equal to the current in milliamperes times the value of the resistor in thousands of ohms (Kilohms). Thus, 1 mA through 1,000 ohms (1 K ohm) would give rise to 1 volt. The current in milliamperes can be discovered by dividing the voltage across the cathode resistor by the value of the resistor in Kilohms. Thus, 0.44 V across 1 K signifies a current of 0.44 mA, which is the condition of the cathode circuit of V1A in Fig.2.

If the voltage here is reasonably correct, the dc conditions of that stage can be considered as fairly normal. The same applies, of course, to the second stage in Fig.2, that of V1B.

If the cathode volts are high, too much current is passing through the valve. This could be caused by a valve fault or by a fault in the grid bias, such as a leak in a grid coupling capacitor (we shall have more to say about this kind of fault later). For instance, a leak in C3 of Fig.2 would put a positive voltage on V1B grid from the anode of V1A. This would counteract the negative bias derived from the cathode resistor and thus cause the valve current to rise considerably. A high cathode voltage is also caused by an open-circuit cathode resistor.

Conversely, a low cathode voltage or zero voltage could mean that the valve is lacking in emission or that the ht supply at the anode is missing. Ordinary tests with a voltmeter relative to ht negative (chassis) would soon bring such trouble to light which is usually a fault in the ht feed circuits or an open-circuit anode resistor.

Next month we shall learn how cathode bias works and then consider signal analysis in the suspect stage.

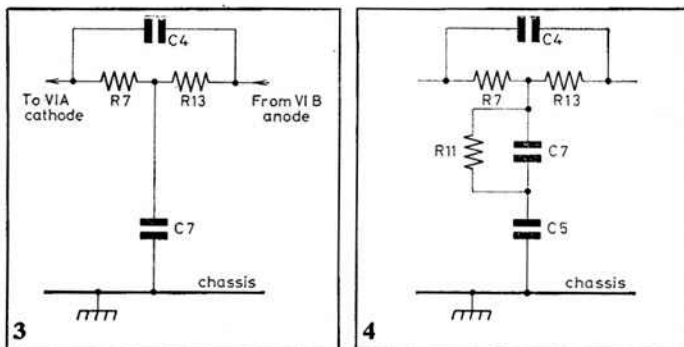


Fig.3. The equalization network of Fig.2 in the record state.

Fig.4. The equalization network in Fig.2 in the playback state.

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# PLAYING TIME CALCULATOR

by B. E. Wilkinson

Taking into account variations of hub diameter, this rule is designed to provide rapid assessment of the playing time available on any standard spool (up to 7 in diameter), containing any amount of tape up to the maximum it will hold. Two scales are provided, representing the most widely used combinations of speed and tape thickness, and from them other combinations can be readily computed by reference to a table.

The ideal material for construction is white perspex ( $\frac{1}{16}$  in thick), with the scales and figures chased in the surface and blackened, but a serviceable and durable rule was made from strong, white card. Fig.1 shows an exploded view of the rule, with measurements. Three pieces of card were cut to the shape of the baseboard, and the upper two modified as shown. The slider should be longer than the rule, so a separate strip was needed here. The pieces were glued in position to form the body of the rule with a channel for the slider. It is not wise to 'clamp' the assembly under weights

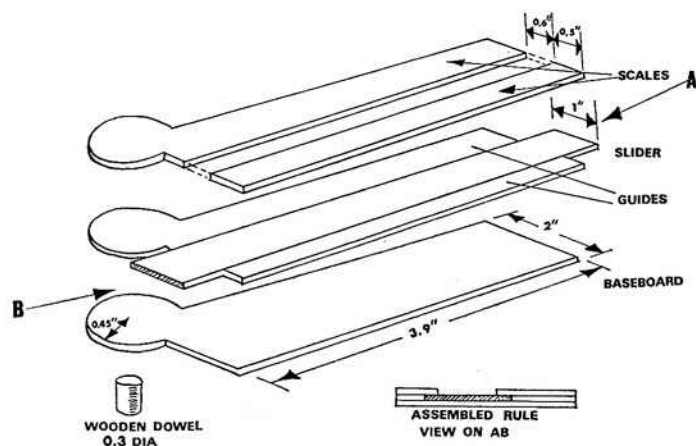


Fig.1. Exploded view of the construction of the slider.

while the glue is setting, because of the possibility of the components moving and constricting the slider channel. Clothes pegs provided better clamping, and three to each side ensured that the pieces were held in close contact.

For the purpose of constructing the scales, a 5 in spool of standard tape was used. It was first assumed that the spool contained tape to the centre - i.e., there is no hub - and the available playing time calculated on this basis. A small strip of paper was stuck along the radius of the spool. It was next necessary to calculate how much playing time is represented by the hub area, and this was effected by winding tape from the spool on to a pencil, until the diameter of the pile equalled that of the hub. The tape was then marked at this point, wound back on the spool and then played to the mark, the time being noted. For a hub radius of 0.9 in, the playing time is about  $5\frac{1}{2}$  minutes. The spool was then placed on the take-up platform of the recorder, and almost all the tape transferred to an empty spool. A clock was set to  $5\frac{1}{2}$

minutes past the hour, and the recorder started. After  $4\frac{1}{2}$  minutes, that is at ten-past, the recorder was stopped briefly, and 10 indicated on the paper strip at the tape edge. This procedure was

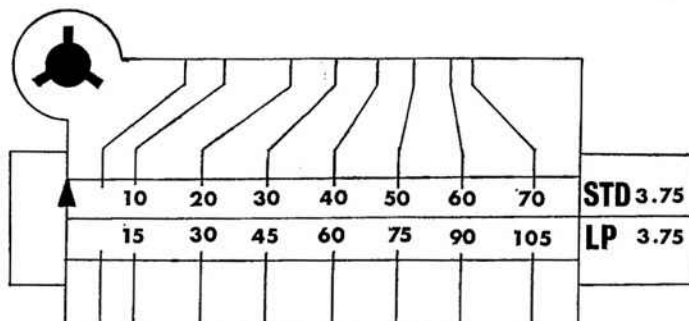
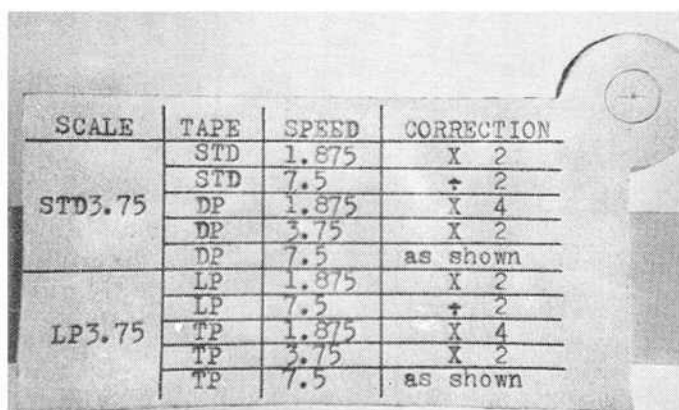


Fig.2. Enlarged view of the calibration of the rule.

continued at 10-minute intervals, until all the tape had been transferred at just over 40 minutes. If the recorder had had the capacity for a 7 in spool, the time would have gone to at least 70 minutes, but as only 5 in spools could be accommodated, the 50, 60 and 70 points were added to the scale by calculation. This is simple enough, since the playing time is proportional to the radius squared, so that if we double the playing time the radius increases by  $\sqrt{2}$ . In going from 40 to 50, the radius increases by  $\sqrt{5/4}$ , and so on.

The scale obtained was then 'transferred' to the rule, the zero falling at the centre of the circular projection. It is clear that the scale is of little value as it stands, because it assumes that tape is piled on to the spool in to the centre. In order to get the time correct, it is necessary to subtract the time lost due to the hub area, and since hubs may vary in size, some variable arrangement is required. A slide rule is a satisfactory method of subtraction, if the scales are evenly divided (you can try this with a couple of foot rules). The top scale then was converted into an evenly-divided one, slightly below. Since the maximum time indicated by the rule is 70 minutes, it was convenient to make the second scale  $3\frac{1}{2}$  in long. The scales were then joined - the non-parallel lines. A third scale, identical to the second, was constructed on the slider which is divided longitudinally to accommodate a further scale below. At the right-hand end of the slider, the characters STD 3.75 indicate the type of tape and the speed represented by the scale. The values on the additional scale are  $3/2$  times as great, and represent 3.75 ips with long play (LP) tape. (See Fig.3.)

The scales were marked on the slider by typing the figures on a strip, which was cut out and stuck in position. Typewriters have 10 or 12 characters to the inch, depending on the size of typeface, so that it is simple to space the figures  $\frac{1}{2}$  in apart. At the left of the rule, the circular projection carries a wooden dowel (Fig.1), which is intended to fit the hole at the centre of the spool, thus correctly locating the scales. The reverse of the spool carries a table, so that a correction factor can be applied if the tape and speed are different from those given on the slider. The table was



SCALE	TAPE	SPEED	CORRECTION
STD3.75	STD	1.875	X 2
	STD	7.5	+ 2
	DP	1.875	X 4
	DP	3.75	X 2
	DP	7.5	as shown
LP3.75	LP	1.875	X 2
	LP	7.5	+ 2
	TP	1.875	X 4
	TP	3.75	X 2
	TP	7.5	as shown

Fig.3. Correction scale on reverse side of the calculator rule.

typed on a piece of paper, which was then cut to shape and stuck to the body of the rule.

The completed rule is used as follows:

- Insert the dowel into the hole at the spool centre.
- Move the slider until the pointer is opposite the hub circumference, projected on the second scale.
- Now project the tape circumference from the top to the second scale, and read off the playing time on the slider. The photograph (Fig.4) shows the rule in position on a spool, and the playing time indicated is about 12 minutes. If you are not using standard or LP tape at 3.75 ips, turn the rule over, select the appropriate tape and speed, and apply the relevant correction factor.

As regards accuracy, errors in assessment have a greater effect at the larger tape radii, because a small change at the circumference represents more tape than the same change near the hub. On a spool playing for 32 minutes, the error was 1 minute, while a spool assessed as 52 minutes actually played for 47 minutes.

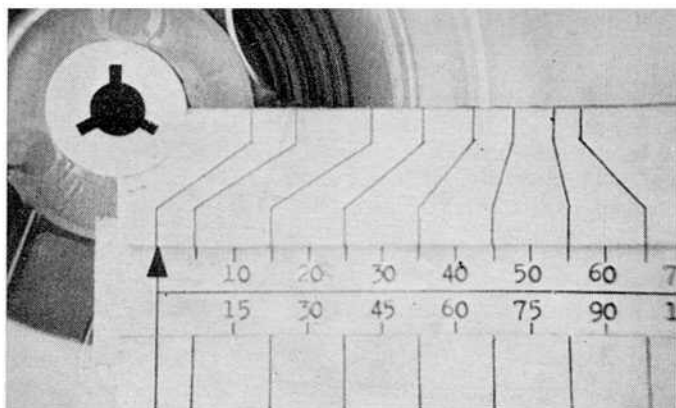
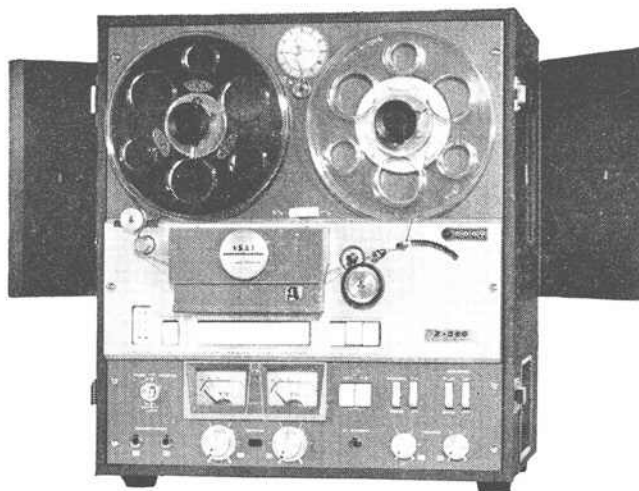


Fig.4. Calculator in position on tape spool.



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# SYNCHRONIZING SOUND TRACKS

The Synchrodek system, how it works, and its advantages for the sound enthusiast, discussed by F. C. Judd

*Fig.1. The Synchrodek coupled up with a Tandberg Model 62 tape recorder and a Specto projector. (Note that the two tape guides mounted on the Synchrodek are a modification made by the author for special purposes.)*

This and last month's issue of *ATR* which both contain introductory articles on sound and cine by Peter Dean, would not be complete without specific reference to at least one popular method of synchronizing a cine film with a recorded sound track. This can, of course, be accomplished quite easily with sound striped film but it does mean buying the rather more expensive sound stripe projector to begin with. Tape recording enthusiasts who take up cine filming are half-way to the making of 'talkie films', since they already have the vital sound recording and replay equipment and perhaps even other necessary items such as a mixer and record player. All that is needed is a method of synchronizing the film projector with the tape recorder.

As Peter Dean has pointed out in his articles, there are various methods of obtaining synchronization between projector and tape recorder. One of the most popular but rather more expensive is the Synchrodek system; expensive, that is, if you have to purchase a tape recorder as well as a projector. Those who already own a tape recorder and other sound equipment may indeed find, as I have, that the Synchrodek system is less costly in the long run especially in view of the high degree of accuracy of synchronization particularly when sprocketed tape is used. (Sprocketed tape is standard quarter inch wide tape with little holes punched along one edge which exactly match the sprocket holes on 8mm cine film.)

## Making the sound tracks

Now what about the sound tracks themselves? Does one have to record whilst actually filming? Can effects and dialogue be recorded after the film is taken, i.e., in conjunction with the finished and edited film? Can actual lip synchronization be achieved with speech? How can sound effects, dialogue and music, etc., be mixed on to one sound track with one tape recorder? How does one get the appropriate sound or music to begin and end at the right place? The answers to most of these questions depend on how much sound recording equipment you have or may be prepared to buy in addition to the tape recorder which will be used for recording and replaying the finished sound track.

Let's assume for the moment that only one tape recorder and a microphone are to be used. The tape recorder should have (a) a superimposing facility which allows one recording to be made over another or (b) dual channel mixing - microphone and radio or record player - or (c) both these facilities. With superimposing one is more or less limited to a music background with dialogue and/or sound effects superimposed upon the music and the process of recording everything in synchronization with the film is somewhat tricky. However, with a bit of pre-planning, a quite effective sound track can be built up. Music may have to be recorded live. Sound effects will also have to be made on the spot with the microphone, but here we run up against the problem of projector noise since the film may have to be run for cueing purposes. The only other way around this is to time accurately the various sequences of film over which music and effects, etc., are



to be used and then make the recordings accordingly. From here a little careful editing on the finished sound track will help to establish close timing between film and tape. Incidentally, all editing should be completed on the film before any sound recording is begun.

With extra equipment, such as a portable tape recorder, a turntable and pick-up and a mixer, the scope is widened considerably. Some of the sound could be recorded whilst filming (Fig.1) with other sound effects and selected music from discs being mixed on cue whilst the projector is running. The biggest problem is adding dialogue in lip sync. It may not be possible to record whilst filming because of local conditions and background noise. Recording the dialogue against the projected film entails keeping the sound of the projector away from the microphone and this is possible only if the projector can be operated within a sound-proof box or in a separate room. This necessitates some way of projecting the film through from one room to the other, i.e., through a small window in the wall. The alternative would be to put the commentator in a sound-proof box in the projector room. (Take a look at Peter Dean's article on page 10, because that also deals with recording problems.)

## How the Synchrodek works

Until one begins to make sound tracks for cine film the problems involved are not fully realized and anyone who contemplates doing serious film and sound track work is well advised to obtain a good textbook on the subject. The Synchrodek, however, is an excellent system and one worth adopting by those who already have tape recording equipment. I have had one in use for some time now and have found it quite reliable. It will operate with almost any make or type of 8mm projector and a tape recorder running at 3½ ips. (Some can be adapted for tape speeds of 7½ ips, but this depends on the projector.) The Synchrodek can also be used with modified clockwork and electrically driven cameras to obtain lip sync whilst filming, but advice on this should be obtained from Synchrodek Ltd first. They will tell you whether your camera can be modified. It can also be operated in conjunction with a film editor-viewer for timing runs of film for which sound track has to be made (see Fig.2).

Using a 15 minute test film, consisting of many different scenes and sequences, a somewhat complicated sound track was required which called for background music of different moods, sound effects in sync, background sound and some lip sync dialogue. All the music and most of the sound effects were recorded



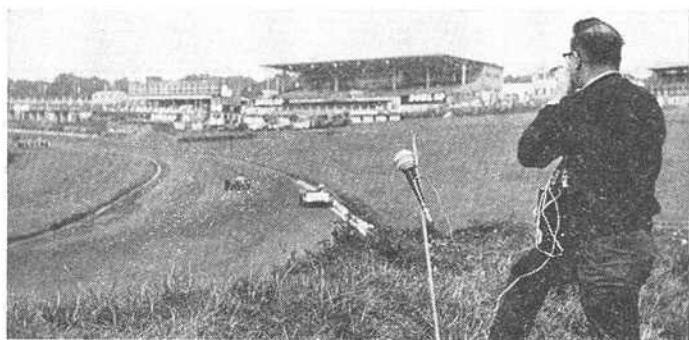


Fig.2. Recording whilst filming at Brands Hatch motor racing circuit. (Note the microphone suspended on a stick.)

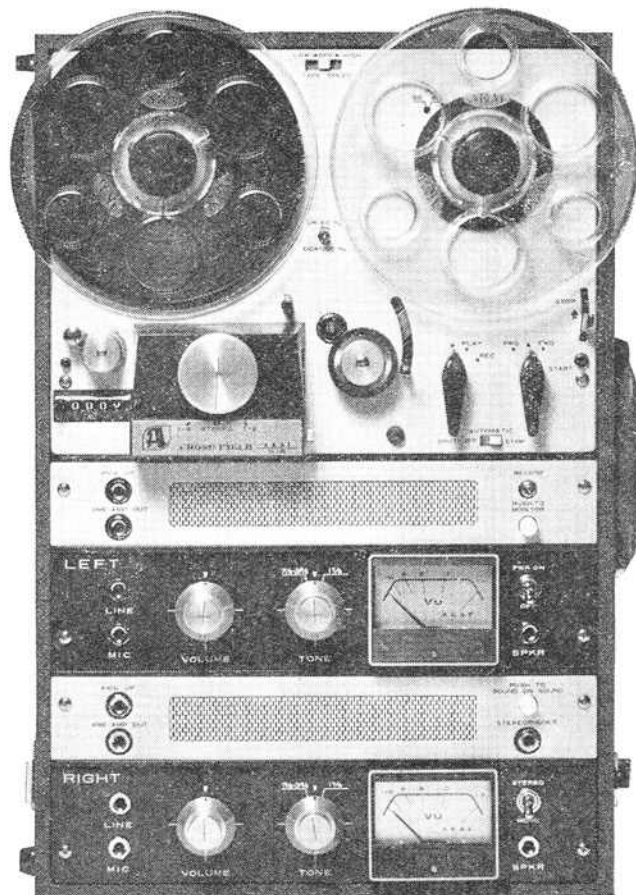
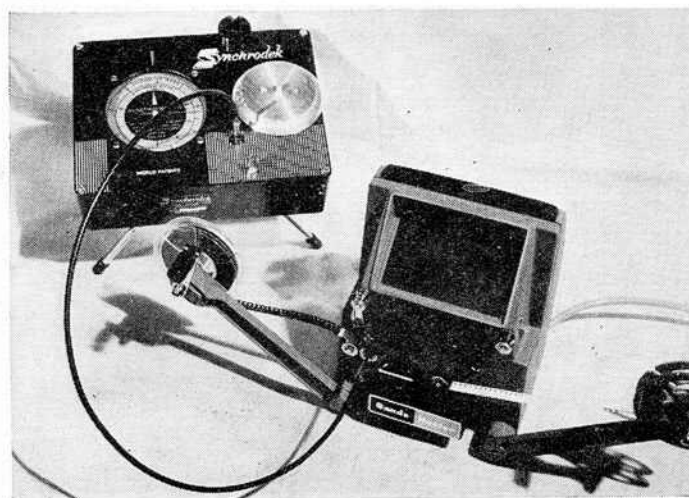
against the projected film. The dialogue and some sounds were recorded whilst filming, but without actual synchronization between the camera and the tape recorder. Provided the film takes are limited to say 30 seconds or so, a sound track recorded whilst filming will maintain reasonable synchronization. All that is required here is accurate starting when copying the track against the projected film or alternatively accurate splicing into the master sound track.

Using the Synchrodek with ordinary recording tape and the standard Synchrodek tape capstan, synchronization to within about half a second is possible. Slight variation one way or the other can be due to inaccurate starting or cueing whilst recording in the first instance or tape slippage or stretching. By using sprocketed tape (as mentioned earlier) absolute synchronization is possible, provided of course everything is accurately timed to begin with. Synchrodek Ltd supply the special sprocketed capstan and sprocketed tape as well (see Fig.3). The punched tape is rather expensive but I understand that Synchrodek Ltd are soon to market a small machine which will enable one to punch the sprocket holes in any standard quarter inch wide tape.

To sum up, here are more technical points and details covering the operation of the Synchrodek. Only one or two modifications to the projector are necessary which can be carried out at home without special tools, etc. One is the addition of the drive pin which couples a flexible drive cable between the projector and the Synchrodek. This drive pin can be fitted to the inching control of the projector or one of the film sprockets, depending on the speed at which either of these rotates. The second modification is to break one lead to the projector motor (at the motor itself). The two leads, one from the incoming mains and one to the motor, are connected back to the Synchrodek via a cable and plug. One point is stressed by the makers of the Synchrodek. The

*continued overleaf*

Fig.3. The Synchrodek coupled to a cine-film editor-viewer.



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projector must be capable of running at 16, 18 or 24 frames per second. If the projector is rated for 16 frames per second but for some reason reaches only 15 frames per second, the Synchrodek may not function correctly. Variable speed projectors that will run up to 24 frames per second are ideal.

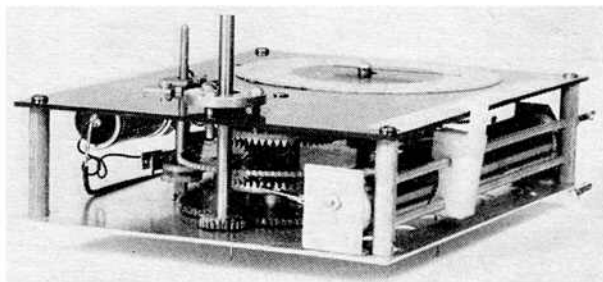
*Fig.4. Using the Synchrodek with sprocketed magnetic standard  $\frac{1}{4}$  in tape together with a sprocketed (toothed) capstan on the Synchrodek itself.*



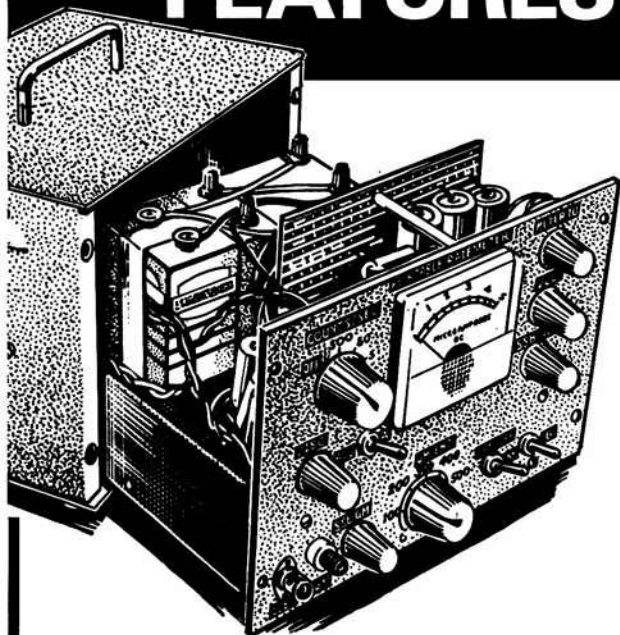
The Synchrodek mechanism is simple yet ingenious and its basic element is a differentiating gear system (see Fig.4). This senses any difference in running speed between the projector and the tape recorder and by means of a cam and contact brings a resistance in or out of circuit with the projector motor. The necessary slowing down or speeding up to keep the projector in synchronization with the recorder is effected in a small fraction of a second. In fact, it takes place so rapidly that the projector does, to all intents and purposes, run at constant speed.

The two modifications, the setting up and operation, are fully described in the instructions supplied, but I should mention one other application. The Synchrodek can be used to synchronize a sound stripe projector with a tape recorder whilst the taped sound tracks are being copied on to the film's magnetic sound stripe. This means that if one invested in a projector and Synchrodek now and decided later to go over to sound stripe, all the tape tracks could be transferred in sync to the film stripe. F.C.J.

*Fig.5. The Synchrodek mechanism.*



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# ON TEST BEOCORD 2000T

This month Peter Knight turns his attention to one of the models from the new Bang & Olufsen range



Fig.1. Top view of the recorder, showing spools, speed-control (top centre) and control panel.

It is sometimes difficult to classify a tape recorder accurately, and this is particularly true of the Bang & Olufsen 2000 series. Machines designed purely for the domestic market are fairly easy to define, as also are those created essentially for the recording profession – the former being in a popular price bracket and the latter usually falling some distance away from the pocket of the average enthusiast.

The B & O 2000 series does *not* register between these two fundamental types, though the price may be considered by some to represent a fair average between the domestic machine and its sophisticated professional counterpart, and closer to the professional end of the scale by others, depending on the way that one views tape recorders.

Nevertheless, the 2000 series is an instrument that most certainly approaches professional standards and yet it has more to offer – and is singularly more exciting – than a machine that is

basically professional. It is directed more towards the real tape enthusiast rather than the radio-to-tape dubbing man or the down-to-earth professional operator. This is not to say, however, that it could not be used to produce professional quality material – indeed, the critical professional user would not find it easy to fault, even from his standards.

The series is available in either a so-called 'luggage case' or as a table model. The luggage case model is a poor attempt towards portability with lid-mounted speakers, the clip-on lid being made in two sections so that the two speakers can be displaced in stereo formation. It was a sample of that model that was made available for test. The table model does not embody its own speakers. Both models are available with two- or four-track heads, thereby making four versions in all.

The electronics are solid-state (i.e., transistorized with no valves at all) and there are three tape speeds,  $1\frac{7}{8}$ ,  $3\frac{3}{4}$  and  $7\frac{1}{2}$  ips. An interesting and convenient feature of the series is the employment of slider-type fader controls instead of the conventional rotating knobs. The sliders are clearly calibrated and it is simple to reset a control to a critical setting at any time, which is more than can be said for the majority of rotating knobs, unless they happen to be blessed with a pointer and a scale. All versions are dual-channel stereo.

The series embodies the basic elements of the Stereomaster 610, *plus* certain desirable electronic and mechanical modifications (improvements). It is not intended to mention them all, but they include a separate control for echo gain, a frequency-compensated replay gain control (i.e., loudness control), input transformers for microphones (improving the signal/noise performance), the choice of a balanced microphone input circuit for hum-free, long-line working, and VU meters with the glass higher above the scale to prevent static build-up on the glass causing spurious deflections on the meter.

## PLUG-IN MODULES

The internal development of the instrument is worthy of note, for it is composed of a wired overall circuit network frame into which plug solid-state, printed-circuit board modules for the various functions. These are easily accessible and changeable when the need for repair arises. There is a total of eight such modules, providing (i) dual-channel record amplifiers, (ii) dual-channel playback amplifiers, (iii) dual-channel microphone amplifiers, (iv) dual-channel gramophone pre-amplifiers, (v) dual-channel radio pre-amplifiers, (vi) right-hand playback output amplifier, (vii) left-hand playback output amplifier and (viii) hf oscillator and power supply. Each module uses the latest transistor techniques and features some of the best transistors available for low-noise, quality amplifier audio applications. The two VU meters are moving-coil and arranged in conjunction with circuits that integrate the signals in each channel, thereby causing the meters to deflect to the sum of the signals. The scales are dual-coloured, clearly revealing normal and high record levels. They are illuminated when the machine is energized.

Four heads are employed, separate heads for record and playback and two for erase, the latter ensuring that the tape is completely erased over its entire width, including the middle. Magnetic impulses remaining along the middle of the tape can add to the general noise.

This combination of heads and dual channels in conjunction with some very clever switching endows the machine with the powers of all the electronic and tape trickery that one can think up. These things are possible without adding to the machine.

## ECHO AND MULTIPLAY

For echo, for instance, it is a simple matter to programme the machine – just by pressing a button. This directs some of the signal picked up by the playback head back to the record head



*Fig.2. Head assembly of the 2000 series. The two on the left are erase and then, left to right, record and playback.*

along with the original signal when a recording is being made. Thus, the record head receives two signals, the main programme signal plus some of that same signal a small period time later. In that way – as is well known – reverberation or echo is introduced into the recording.

The amount of echo signal fed back can be controlled by a separate knob. If too much signal is fed back, however, a feedback loop tends to occur, which is a characteristic of this technique, and low-frequency instability results. This threshold becomes apparent when the echo gain control is advanced by the VU meter deflection rising above the normal record signal level.

Multiplay is also made possible by the separate heads for record and replay and by the system of switching and amplifiers. The idea is that the first recording is processed on one track which is then wound back and the second recording processed on another track while the replay head is introducing the first recording back to the record head along with the material of the second recording. In that way the track finally recorded will be composed of an original signal of both the second and first recordings.

The strength of the first recording fed back to the record head while it is processing the final track is controllable by the same control that serves as echo gain. Facilities are available for the use of monitor 'phones while processing a multiplay recording, for, of course, it is necessary to sync the second recording accurately to the first one.

### **SYNCHRONIZED RECORDINGS**

The instrument also caters for syncro playback so that two recordings, not necessarily to be mixed by re-recording (multiplay), can be lined-up or synchronized on separate tracks. This feature is useful for language laboratory applications, for instance, where one language may be recorded on one track and a synchronous translation on the other track, and for the introduction of control pulses on one track for operating, say, an automatic slide-change projector while the commentary is recorded synchronously on the other track. Bang & Olufsen, incidentally, manufacture a fully transistorized Synchrobox for this latter application. This is connected to the radio input socket of the recorder.

The playback output amplifiers each provide a power of eight watts of audio into an impedance of 4 ohms (speaker impedance), and this is arranged by virtue of transformerless Class-B push-pull output transistor circuits. The distortion was found to be in the order of 1% at 4 to 5 watts output, rising with increase in output to full power.



*Fig.3. The B & O stereo microphone, Model BM5. This has a phase reversing switch (plus – minus) with a centre 'O' off position. This microphone is composed of two ribbon units with figure-of-eight polar response.*

### **INS AND OUTS**

This is a reasonable specification for dual-channel inbuilt amplifiers, and for users satisfied with medium power audio these amplifiers could, in fact, solve most of the hi-fi amplifier problems. Inputs are available for 33 Kohm low-level pick-ups (i.e., low impedance magnetic cartridges), the input sensitivity being quoted as 2 mV/1000 c/s, for piezo pick-ups, though for these the magnetic pick-up pre-amplifier needs to be changed for one with suitable equalization and matching. For low-impedance microphones (50 to 200 ohms), the sensitivity is 50  $\mu$ V and for radio tuners at 45 Kohms there is a sensitivity of 2 mV. Here a printed-circuit adaptor is also available as an extra which changes this input to 10 Kohms at 45 mV, and which is used when the input signal at the radio socket is likely to rise to a level that would overload the standard amplifier module. The higher-level module would be used, for instance, when recording from a second Beocord, whose line output is as below.

Outputs, in addition to those for the speakers, are high impedance (45 Kohms) delivering 0.775 volt. The signals here (dual-channel) can be fed to a line circuit or to other amplification equipment or to a second recorder, as may be required.

Regarding the speaker outputs, a useful attribute is the provision of two outputs for the right-hand channel and two for the left-hand channel, switchable. Thus, one stereo pair may be set up near to the recorder as monitors if required, and a second pair of quality units properly disposed in the listening room. Monitor 'phones can be plugged in either at the high-impedance line output socket or at the speaker sockets.



DIN sockets are used for all inputs and the line output, while the speaker outputs have the special version of this type of socket, non-reversible with flat socket.

## CONTROLS AND SWITCHES

All the inputs are separately controllable by the slider faders and can easily be mixed, while the fourth slider controls the overall output of the system. In addition, treble, bass and balance controls for playback are featured. These adopt ordinary rotating knobs, and a fourth control of this kind serves on the echo and multiplay channel. Controls, therefore, comprise four sliders and four rotating knobs, the latter consisting of dual potentiometers.

The diversity of functions detailed are under the control of push-button-type switches. Two banks of four (eight in all) are located on the left-hand side of the control panel, while a bank of three on the opposite side switch the speaker outlets.

Special features include transistorized auto overload protection, splicing gap built into the sound head cover and an auto-stop system that comes into action at the finish of the tape or in the event of breakage. In addition, there is an effective pause control that can be locked and a press-button reset digital tape counter. The input and output DIN sockets and the speaker sockets are located either side of the case, while the mains input is at the rear.

The sample instrument was tested on all functions and fully came up to expectations for a machine of this calibre. In view of its complexity, however, more than a few minutes need to be devoted to the instruction manual, and although this publication is exhaustive there would appear to be room for improvement. An ideal feature, though, is 'instructions for 41 applications'. These are given diagrammatically at the rear of the book and should help considerably those operators who wish to work the machine without being fully aware of what is actually happening in the works.

For the more technical types, a very useful diagram integrated into a transparent plastic protective covering is supplied. This adequately explains the functions and switchings of the instrument. On the reverse side is a diagram in detail of the various controls, revealing exactly what they do.

The sample was remarkably noise-free – in terms of the mechanics! The substantial Papst synchronous ac motor is heavily damped by a massive flywheel in wonderful dynamic balance. This motor operates from a nominal 42 volts, but a voltage step-up occurs on rewind (to 48 volts). The net result of the system is a good wow and flutter performance of about 0.2% RMS at the lowest tape velocity, falling to as low as 0.075% at 7½ ips, and a wind speed in the order of 120 seconds.

Once the machine has been programmed for record, operation is a delight. The faders permit very accurate record level control in conjunction with the nicely damped VU meters. When the machine is mains energized the VU meters show illumination, a very useful feature being the addition of red illumination in the record position. The machine cannot inadvertently be switched to record, since two simultaneous operations are needed (three for stereo – two tracks) to secure this function.

The machine supplied has a magnetic pick-up pre-amplifier and operated well with a variable reluctance cartridge. A Deram (Decca) pick-up was also tried, and quite good results were obtained on that also. This cartridge is low-loaded and exhibits velocity (magnetic) characteristics, anyway.

Several STC moving-coil microphones were tried with good results, but by far the best performance was obtained through the B & O BM5 stereo microphone. This is a wonderful instru-

ment, the two elements being mounted one above the other so that they may be orientated relative to each other.

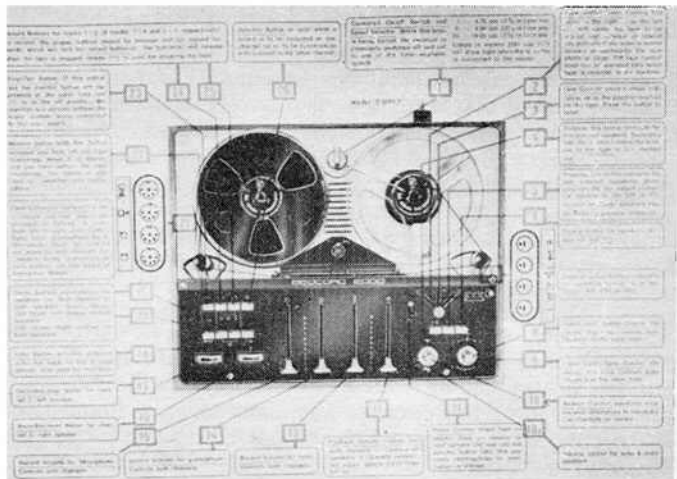
Various radio and tuner units were connected to the machine with good results, and tape records were made by mixing three programme signals. It is interesting to note, incidentally, that the 2000 series can be arranged so that all the pre-amplifier modules take microphone signals, thereby turning the machine into a quality tape recorder with three microphone channels individually controllable. This could be of great use to the professional operator seeking the best of live sounds, orchestral or otherwise. The machine is also capable of catering for electric guitar signals on one of its inputs.

After living with the machine for a short while, one quickly appreciates its great versatility. Its electronic circuits endow it with basic hi-fi amplification attributes and apart from the fact that it is a tape recorder, it can be used to deliver high quality audio from any programme source to a stereo speaker system. Coupled with this is the high quality tape deck. It is, in fact, a complete hi-fi system within itself, and ideal for the enthusiast whose wish it is to get into hi-fi with tape as the main interest. For the best results, of course, properly loaded speaker systems are essential, and the amplifiers have what it takes to do full justice to these.

## TECHNICAL SPECIFICATIONS

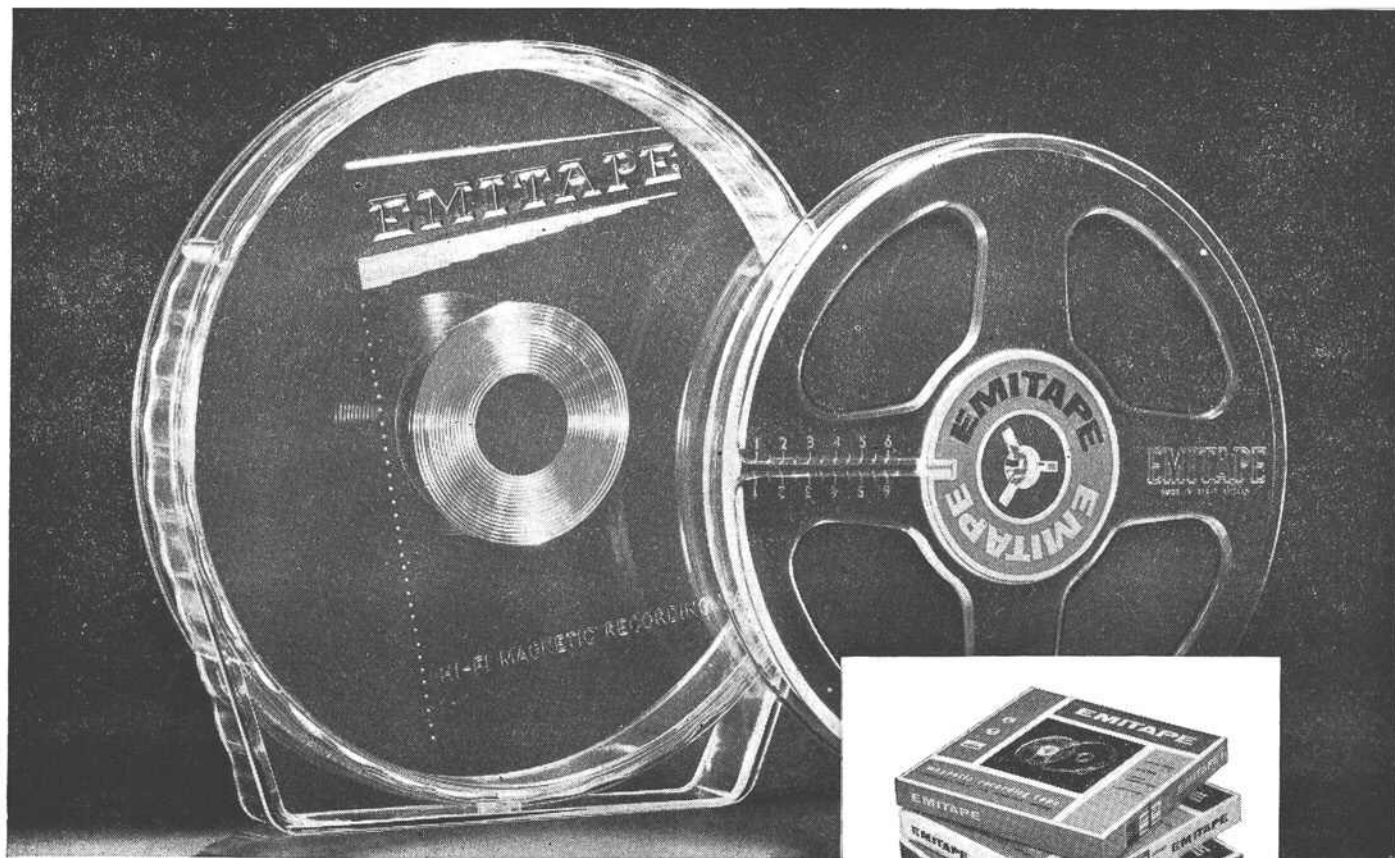
**Tape Speeds** 1½, 3¾ and 7½ ips. **Tracks** two or four according to version. **Spools** maximum size 7 in. **Wind time** 120 seconds. **Inputs:** microphone 50–200 ohms, unbalanced or balanced according to pre-amplifier, 50 µV; pick-up 33 Kohms magnetic at 2 mV/1,000 c/s or piezo with suitable pre-amplifier; radio 45 Kohms at 2 mV or 10 Kohms at 45 mV with suitable pre-amplifier. **Outputs:** line 0.775 V at 47 Kohms; speakers 8 watts maximum at 4 ohms. **Heads** one record and one playback (two or four track) plus two erase. **Bias and Erase Frequency** 100 Kc/s. **Frequency Response** to +2 dB 1½ ips, 50 to 6000 c/s; 3¾ ips, 40 to 12,000 c/s; 7½ ips, 40 to 16,000 c/s. **Signal/Noise Ratio** better than 55 dB as measured at recording level for 3% distortion (50 dB four-track versions). **Channel Separation** better than 45 dB. **Wow and Flutter Peak Value** 0.2% at 7½ ips, 0.3% at 3¾ ips and 0.5% at 1½ ips (measured with reproduction adjusted for normal listening and with wow frequencies above 4,000 c/s attenuated at the rate of 3 dB/octave). **Power Input** 220 V at 50 c/s, taking 90 watts at full power. The B & O Beocord 2000 K retails at 112 gns. The model 2000 T with loudspeakers retails at 117 gns. Further details concerning both models are available from Bang & Olufsen UK Sales Division, Eastbrook Road, Eastern Avenue, Gloucester.

Fig.4. An impression of the detailed, plastic-covered operating card supplied with the recorder.





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# EIGHT YEARS

## EIGHT YEARS IN THE TAPE-SWOPPING BUSINESS (and that's a lot of wow and flutter!) by David Lazell

A small bewhiskered man with a battery tape recorder tripped me up the other day, and, thrusting a small Japanese microphone before my eyes, asked the all-important question: 'What have you discovered through swapping tapes all these years?'

My answer can be summarized thus:

- (1) Plastic spools are no match for the GPO;
- (2) Most normal people reveal their eccentricities as soon as they get near a tape recorder;
- (3) It's high time I took elocution lessons.

I've been swapping tapes for some eight years now, having worn out two tape recorders – to say nothing of the patience of my 'tape acquaintances' – in the process. And I can say there's no hobby like it!!

There was my bright Texas friend who spoke only to loud musical accompaniment. In his last tape to me, his voice faded into a selection from 'Porgy and Bess'. I never heard from him after that, and still wonder if his high-fidelity had fallen on top of him half-way through track two. Then there was another cheerful American who dubbed long excerpts from patriotic speeches (and LPs on selling – I found it hard to tell the difference!) on his tapes. They were very long tapes, and, as they were poorly spliced, invariably fell apart half-way through the prolonged applause. Once, he sent me a tape which looked, and sounded, like a reel of thick brown paper. My recorder never recovered from that assault. Then there was a casual acquaintance in the West Country who enrolled me in several spontaneous 'round robin' tapes, large spools of home-brewed music, chats and the inevitable dubbed discs. I sympathized with the idea... but found it hard going trying to keep up with them all. At one time, I considered employing someone on a part-time basis to keep up with the 'round robins'. However, I moved away from the district (in a sealed furniture van at dead of night) without changing my listing in the tape magazines...!

But I still believe that tape-swapping is one of the very best interests anyone can have. Just like my dear mother said: 'I feel so much better when I've told you all my troubles on tape.' Or words to that effect. I recall once making a tape to a friend in Israel in the middle of immediate domestic discord. The children were fighting in the kitchen, the man next door, involved in home improvements, was hammering on the wall, and diverse clatters came from the passage where spring-cleaning was in progress. I despatched the tape with a certain reluctance. To my surprise, my tape was received with great delight.

'Hearing those everyday noises of your home made your tape so much more *real*,' the friend explained in his reply. Maybe he's got noisy neighbours, I thought. Perhaps it's a mistake to seal out external noises when you're making tapes. I had a tape-acquaintance whose messages were made to the accompaniment of a dog howling.

'My dog always howls when I make a tape to you, Dave,' he replied. 'Ever since I put your photograph on the mantelpiece.'

The best compliment I ever had paid to me was that of a close relation who said that, having commenced to hear my tape, she fell fast asleep. It's not everyone who can claim such a relaxing voice!

During my eight years in the tape-swapping game, I must have sent, on average, at least three tapes per week (and nearer twice that number in the first year or two, before wearing out my first machine!). That makes about 150 tapes per year, and 1,200 in all. It makes me think it's time the GPO produced a suitable stamp noting the accomplishments of Britain's thousands of tape-swappers. (Any design suggestions will be gratefully received!)

I wouldn't consider being without a tape recorder now. I'd sooner sell my 1957 Ford! I've made some very good friends on tape. One of the great things about tape is its *personal* approach. Without doubt, you certainly get to know people very well indeed, just by swapping a tape every week or fortnight.

There's not much advice one can give to those lucky enough to have their first glistening tape recorder. It's important to reply to tapes (but not too promptly!) and equally important to keep the size of tapes to a manageable length. If you send a tape-swapper friend a 600-ft length, he probably feels obliged to fill it... *somehow*. And that's where the problems start. Be as natural as possible and, when you know your tape-acquaintance well enough, don't hesitate to talk about controversial issues about which you feel strongly.

And don't use too many gimmicks. I heard of a bloke who spent half his time trying to think up unusual locations for his tapes, e.g. 'Hello, Fred, I am talking to you from a Turkish Bath in Balham...'. He got so weary travelling about, he never had much to say on his tapes. I believe he had an accident with his machine near a vat of boiling rice pudding in a catering establishment (or something like that!).

One last point... always listen carefully to the tapes that you receive. Once, when I drove to work in Nottingham every day (and found myself wedged in traffic jams not infrequently) I decided to play-back some of the tapes received on the battery machine kept in my car. It's a strange thing, but those tapes always sounded agitated when I heard them from my driving seat. It must have been my driving... You really need to sit down, relax, make notes and reflect.

That sums up my long years sitting behind a tape recorder. It may not be very bright, but, since I've been using tape, I find it a lot harder to *write* these days. But, brother, you should just hear me *talk* about it...

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# THE THINGS YOU SAY

## It doesn't cost a fortune

Some amateurs, after hearing the 'Soundhunter' programme on BBC last November, may still feel that in order to make tapes of a technical quality suitable for broadcasting a great deal of very expensive equipment is necessary.

Part of my tape 'The Real Thing' was included in this programme. The original material was recorded at  $1\frac{7}{8}$  ips on a two-year-old Philips EL 3585 portable with microphone supplied (new, cost 24 gns). It was dubbed and edited at  $3\frac{1}{2}$  ips on to a Philips AG8109 (made in 1959 and bought second-hand for £10), using a Lee Electronics mixer (57s 6d).

The original tape – itself a dubbing from  $1\frac{7}{8}$  ips – was copied to 15 ips by the International Contest Committee and from that copy yet another dubbing was made, again at 15 ips, for the BBC programme as it went out.

In turn I recorded the 'Soundhunters' programme at  $3\frac{1}{2}$  ips on the AG8109 from my tuner, and do you know there is not much drop in quality from the original material to my final version of the BBC programme!

The mains Philips, a very well designed model and sturdy, can still be found for about £10–£12. The EL 3585 can be bought second-hand for about £14–£15, so it really doesn't cost a fortune does it?

London SW1

H. J. Bradley

## I can do anything!

As a subscriber to your magazine, may I take the liberty of sending you a photo of my amateur studio and myself in the hope that you will publish it in your columns?

As president of the Recording Society of Australia, I maintain regular tape exchanges with most countries of the world. My equipment includes a Telefunken KL 85, Uher Royal stereo with stereo mixer, Uher 4000 S Report, National RS 773, National turn-table, Sennheiser microphones, National microphones, Wharfedale speakers, Rola speakers as well as equalizer, mixer, pre-amps, etc. With all this equipment I am able to record at any speed, half or quarter track, mono or stereo.

My main interests lie in making life recordings – for instance, interviewing famous people from stage, screen or TV. I also enjoy recording bird song, musical bands, island scenes, theatre shows, folk singing groups and almost anything else I can find tape-worthy.

Melbourne, Australia

Harry Jay

## Cheap tape boxes

I have a number of tape friends to whom I send 3 in long-play and double-play tapes. Although these tapes are supplied by the manufacturers in quite sturdy boxes, they do, after continuous handling by the GPO, get in quite a state and become quite unfit for further journeys through the post. However, recently I found that these tapes will fit inside an empty cigarette packet. The packets in question are, of course, the sliding kind, not the new flip-top type as these are too small.

St Helens, Lancs

A. Highcock

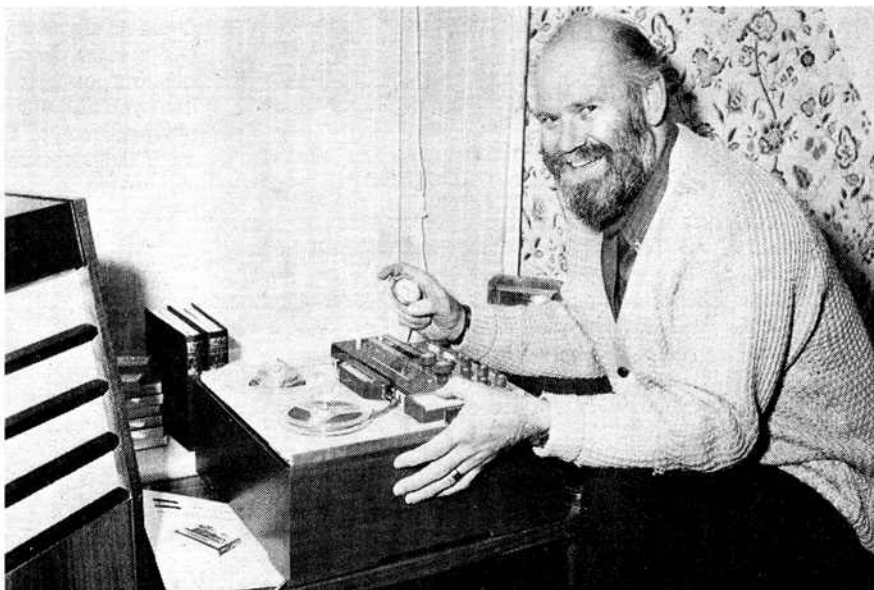
Harry Jay of Melbourne, seen here among the array of equipment in his recording studio. (See 'I can do anything!')





# TAPE REVIEWS

by Russ Allen



Russ Allen times a stereo tape on the Truvox PD 104 deck.

At great expense, last winter I re-equipped myself with hi-fi and, while I was going bankrupt, made it stereo as well. In order to test out the results of my squandering, a couple of stereo LPs were 'obtained'. I must confess that at the time I was absolutely delighted by the sound that emerged but alas now, nearly a year later, I have still got only those two selfsame stereo LPs. Knowing that I'd got all this new gear, a certain Mr Judd, who shall be nameless, suggested that I should now begin to review stereo tapes – a splendid idea except that I didn't have a stereo tape deck!

My visit to the Audio Fair proved unsuccessful as, despite the wearing of a voluminous overcoat with poacher's pockets, the alertness of the various manufacturers' staff made it impossible for me to obtain the equipment I desired.

Luckily, before becoming completely criminal, I have acquired by quite honest means a Truvox PD 104.

To say that I'm delighted is the understatement of the year. The workmanship and finish are absolutely tip-top.

My wife, prone to complain if there are too many odd bits of gear and wire drifting about, has made only the most approving of sounds and we have both become somewhat pro stereo tape.

To begin with, I expected there would be all sorts of snags in the mating of the Truvox with my stereo amplifier. When I tell you that the only snag encountered was the mains lead being too short, you may think I'm joking. It is the truth and, having attached a sufficiently long lead, I plugged in, switched on, and, 'presto', you have instant stereo.

Technically the machine has all the facilities I'm likely to need. It will record (as, of course, it should) from either my other tape deck or gramophone or through microphones, either mono or stereo. There are large, illuminated record level meters for left and right-hand channels, left and right monitoring and mixing facilities. All the controls are simple to manipulate and positive in action. Rewind is but fast!

The deck is housed in a good solid wood cabinet and my only complaint is the lack of a lid.

Honour to be first tape through went to **Panoramic Stereo Spectacular** by **Recotape**. It is a demonstration and sound effects tape and it does just what it sets out to do, demonstrating how effective stereo can be.

On tracks like 'The Bowling Alley', when you hear the bowler's footsteps as he runs up, the crash down of the released ball, the roll and finally the falling skittles, it does really this, right across the end of my studio! Several other tracks, such as the 'Russian Roulette' one, are amusing as well as good stereo. But perhaps most interesting of all is the one which gives a sweep of audio frequency from 50 cycles to past the limit of audibility. It is done in sections and gives you an opportunity to find out just how much your ear can appreciate.

It's a must tape for stereo beginners. Another Recotape is 'Eight of the Great Original Dixieland Jazz Band Numbers', Not played by the ODJB, but by Rosie McHargue, clarinet, Tommy Thunen, cornet, Warren D. Smith, trombone, Larry Marcus, piano,

with Lou Drummond on drums. Lots of fun as the boys blow enthusiastically on 'Livery Stable Blues', 'Clarinet Marmalade', etc.

All bright stuff, though not particularly stereophonic.

The next tape in this batch was from an American company, *Pickwick*. 4 track stereo tape, **Music of Leroy Anderson** played by **The Royal Farnsworth Symphony Pops Orchestra** conducted by Warren Edward Vincent.

Magnificently packaged in a jumbo-size box, cellophaned and with interesting informative sleeve notes, it contains a 7 in spool with what looks a rather measly amount of tape wound around a larger-than-usual centre hub. Running times were printed beside the titles and on side two they totalled just over 18 minutes. However, timed by my stop watch the total running time was only 14 minutes. Recording was clean and the stereo effect was good, though not spectacular, and I would say it was tastefully done. General result was a pleasant selection of that kind of music which is 'hummmable' but not particularly erudite.

My only musical criticism was of the sandpaper block welder on 'Sandpaper Ballet' who seemed a bit of a drag and not always spot on.

Mr Anderson's top pops are 'Blue Tango', 'Serenata', 'Sleigh Ride', 'Forgotten Dreams', etc., and they're all here and they are the composer's own arrangements.

It is interesting to read on the sleeve that the recording was done on a specially modified high-speed Ampex duplicating equipment at 60 ips. Wow! Makes 7½ ips seem sort of slow, doesn't it?

# THE PROFESSIONALS

Few amateur tape recording enthusiasts have attained, or are ever likely to attain, professional status in sound recording. However, I would hasten to add that a good many amateurs do in fact achieve professional quality and artistry in what they record. To encourage those recording enthusiasts with aspirations to professional quality recordings, *ATR* is presenting a series of features which will attempt to highlight tape recording in some of its most creative and polished forms. Each article will concentrate on one particular exponent and his recording techniques.

To a musician the tape recorder has endless possibilities and many talented instrumentalists have been very quick in catching on to this. One such musician whose name is very well known in this country, throughout Europe and in the United States is Wout Steenhuis, a tall Dutchman who began playing the guitar in 1941 whilst at university in Holland. Many people do not realize that it was Wout who formed the now famous Dutch Swing College Band.

Unfortunately, the invasion and occupation of Holland by the Germans forced Wout (like many other Dutch students) to give up his studies at university, but he continued playing his guitar for the Dutch Swing College Band.

It was during his time in Holland during the German occupation that Wout nearly had his musical career ruined. As a member of the local Dutch underground resistance movement, Wout often took part in dangerous anti-Nazi missions, and during one such mission found himself in the midst of a running gun battle with the Germans. Wout received an arm injury which could have meant the end of his guitar-playing days, but fortunately he was able to persuade a local doctor to perform the necessary operation, and in time his arm healed completely.

Eventually, Wout managed to come to England to join members of his family who were already over here, and for a while made very little use of his guitar. Even when he joined a local group this did not fulfil his enthusiasm for the guitar or his own talents as a solo artiste.

It was at this stage that Wout took to using a tape recorder. This he felt solved all his problems, for it allowed him to record chord and harmony parts and then play with them his own intricate solo parts for Hawaiian and plectrum guitars. But to Wout at this time multi-track guitar recording was merely a hobby, albeit an expensive one, for he found himself buying more equipment to enable himself to produce multi-track recordings with up to eight parts.

At about this time Wout heard a BBC programme demonstrating how anyone could play solo guitar with the accompanying chord progression recorded on tape. This in itself was of course nothing new to Wout, but it did demonstrate the commercial possibilities of multi-track recordings.

In fact, at first Wout himself (now married) was not convinced that such commercial possibilities existed. His wife had other ideas and it was she who persuaded him to send a multi-track tape to the BBC. Within a week Wout and his multi-guitars were featured in a BBC programme. Now, of course, his records can be heard in many radio programmes and he has appeared on stage and television shows as well.

Wout has developed a style of playing and presentation all of his own. He has never tried to imitate other artistes such as Les Paul (who uses recording speed techniques to give the impression of extremely rapid playing and so on). Instead, he has adopted direct yet extremely pleasant and harmonious combinations of



Wout Steenhuis at work in his studio

the Hawaiian and plectrum electric guitars. Although he demonstrated his style and technique for me in the studio, I find it impossible to describe just what he can really do. I can only suggest that if you like well-played guitar music then buy some of his records, especially if you happen to be interested in playing the guitar and in making multi-track recordings.

One thing that has impressed me, however, is the great care that Wout takes over the making of a recording. Assisted by a competent recording engineer who does the balancing and mixing, etc., he completes a whole recording in one session in the studio whenever possible. The final recording is then checked for quality by replaying it through a 120-watt amplifier and two enormous loudspeakers. 'There's nothing like hearing the recording at giant size,' says Wout, 'when you have to check on the reproduction.'

Finally Wout offers a word of advice to those who attempt multi-track. Record the chord foundation first and then add the bass and/or harmony parts. Then follow with the melody line and special effects such as echo and so on, but don't overdo the effects. Watch out for tape and amplifier noise transfer and, above all, mains hum which can creep in from the most unexpected places. It took Wout and his assistant quite some time to trace a persistent mains hum to the underfloor heating system below his studio! If you would like to hear his superb playing and recording you'll find him on 'Easy Beat' and 'Stay Late', both of which are BBC radio programmes. He has made many records which are distributed all over the world, including three LPs by Columbia, and by the time this appears in print yet another LP of Wout Steenhuis multi-track guitar music will be added to the list. Listen and learn!

## THE EASY WAY TO TRANSFER TAPE TO STRIPE

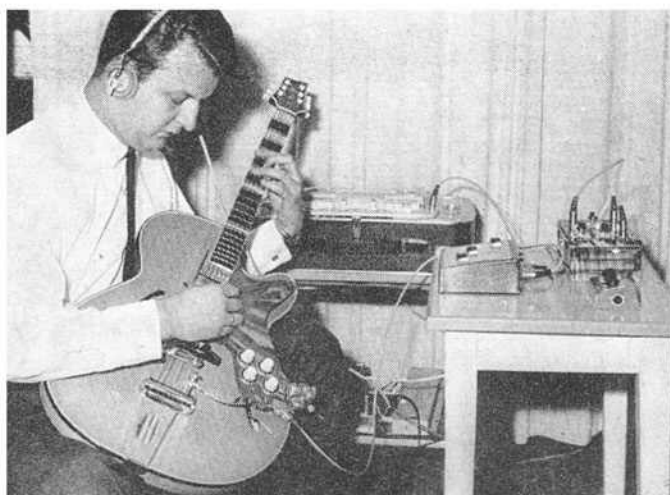
Own a stripe projector? If you have a tape recorder as well, you can easily transfer tape-records to stripe with 100% accuracy ... with Synchrodek. Write for FREE literature, to

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# GRAND PRIX TAPER

What makes a winning contest tape? To help readers with an eye on the 1966 British Amateur Tape Recording Contest (announced on opposite page), *ATR* has a look at the two Grand Prix winners in last year's International. This month we meet Jürgen Sprotte, German winner of the Mono Grand Prix, seen above recording some of his favourite guitar music. On the right is another view of Jürgen's small, but very efficient, studio corner



At about this time of the year all tape enthusiasts worthy of the name start thinking about their entries for the 1966 British Tape Recording Contest and the subsequent International. By now you will all be familiar with the details of last year's National and International Contests and the names of the winners in each. But what exactly are these 'Grand Prix Tapers' like, and how do they work?

Winner of the Mono Grand Prix in last year's International was Jürgen Sprotte, an airline pilot from the Schleswig-Holstein province of West Germany. His winning entry was the brilliant 'Guitarra Rapida', so it is not surprising to learn that his speciality is guitar recording.

Jürgen started playing the guitar when he was fourteen and a member of a local Boy Scout group. Later he graduated from the Scout group to an amateur jazz band, and in fact played with several amateur groups during his twenties.

Now Jürgen is nearly thirty, married, and has a little daughter, and when home commitments meant that he had to give up playing with amateur bands, he decided to form his own one-man band. He had read of other artists, particularly the famous American Les Paul, using tape recorders to record their music, virtually in layers of sound, on tape.

Fired with enthusiasm for his one-man band idea, Jürgen bought a stereo recorder and set to work. Here he had his first great disappointment. He confesses: 'My recordings were really bad.' He hadn't used any reverberation or frequency correction when dubbing one track on top of the other! A Hammond system reverberation unit with springs helped him to put things right. Jürgen himself built a number of frequency correcting filters, without amplification, which he made up from descriptions in a

book.\* He also made his own three-channel mixer, again without amplification. With these he used a Grundig amplifier, and his stereo recorder is also a Grundig. Jürgen chose the TK47 stereo model for its sound-on-sound facilities.

Needless to say, Jürgen is very particular about all his equipment, but he is especially fussy about the magnetic pick-ups for his guitar. Two of these are German Framus ones, and the other is an American de Armond. Jürgen will never use any others in his recording work.

Before actually starting to record, Jürgen (who, as you will have gathered, is an extremely skilled musician) writes his own arrangements in as many parts as he requires. As is usual with multi-track or sound-on-sound recording, he starts with the rhythm, for this will take the worst quality, and ends up with the main melody line. Normally he makes five or six re-recordings, which is the maximum his equipment will allow before background noise and distortion creep in.

Good (but not fantastically expensive) equipment, accurate recording techniques and plenty of practice have made Jürgen Sprotte a grand prix taper. They could do the same for you too.

\* The book Jürgen Sprotte referred to is *Electronic Music and Musique Concrète* by F. C. Judd, published by Neville Spearman, and available through the ATR Postal bookshop, price 17s. 0d., including postage and packing. At that time unaware of Mr. Judd's position as Editor of *ATR*, Jürgen described this as 'A book that I really can recommend to all tape recording amateurs being interested in trick technique'.

Next month meet Kürt Felix, Swiss winner of the 1965 Stereo Grand Prix.



# 1966 BRITISH AMATEUR TAPE RECORDING CONTEST

Following last year's experimental changes in the national tape contest, further refinements to the rules have been made. Notable is the abolition of the professional class, and, as a result, the word 'Amateur' returns to the title of the contest. This year the three sections are for Novice Amateurs, Advanced Amateurs and Group Entries. Novice Amateurs are those who have only recently bought a tape recorder or who have never entered a tape recording contest before. Advanced Amateurs are those who make a hobby of tape recording, or who have entered a similar contest in the past. Group entries cover submissions from schools, clubs of every kind, and other groups working together. This section is open to all amateur groups, irrespective of the amount of taping experience they have had. It is also understood that judges will not be allowed to enter the contest.

Prize for the winner of the 1966 'Tape of the Year' award is £100 cash, a silver trophy, a free trip to London, and a chance to hear the tape broadcast.

Prizes in each of the three groups are identical. In each section the first prize is a silver trophy, £10 cash, £15 worth of magnetic tape and a free trip to London. The three second prizes consist of a silver trophy and £10 worth of tape, and the third prize winner in each section will receive a silver trophy. Winners and runners-up will be notified immediately the judging has been completed and a complete list of awards will be circulated to all entrants.

Closing date for the receipt of all tapes is Saturday, 30 July 1966, and all tapes must be accompanied by a completed entry form, necessary copyright clearance and return postage for the tape. Here, then, is the official list of rules:

1. Classes of entrants will be as follows:  
*Novices:*

Those who have owned a tape recorder for under one year or have never entered a tape recording contest before. Maximum playing time for entries; four minutes.

*Advanced Amateurs:*

Those who have owned a tape recorder for more than one year but for whom tape recording is only a hobby. Maximum playing time for entries; eight minutes.

*Group Entries*

Schools, clubs of every kind, and other groups working together. This section is open to all amateurs, irrespective of experience. Maximum playing time for entries; eight minutes.

2.

No tapes submitted may contain anything taken from radio or TV transmissions or commercial recordings. Any competitor who has fully or in part used any literary or musical production of which he is not the author or composer and which is still in copyright, must obtain authorization from the author, composer or organization owning or controlling the copyright and must produce proof of such authorization. This proof must be sub-

mitted with this form and must state expressly the author, composer, or the organization owning or controlling the recording. (This does not imply that, in the countries where they apply, the normal rights of payment arranged by the organization owning or controlling the copyright are relinquished.)

3.

The programme must commence at the beginning of the tape and only one track may be used. (When judging, there will be no reversal of spools to hear second tracks.) Tape should be prepared between white or coloured 'leader' tapes.

4.

Recordings must be made on  $\frac{1}{2}$  in tape at either 15,  $7\frac{1}{2}$ ,  $3\frac{3}{4}$ , or  $1\frac{7}{8}$  ips. Stereo recordings may be entered.

5.

All tapes will be returned to competitors, provided adequate return postage is sent with entries. But the Contest organizers will retain copies of the winning tape and of the runners'-up tapes. Copyright of these will be the property of their owners, but the Contest organizers reserve the right to arrange for the publication of the whole, or parts, or any or all of them, by radio, disc or tape, or by any other means.

6.

The Contest is open only to residents in the UK. The decision of the judges will be final and no appeal may be made, nor correspondence entered into.

7.

The closing date for receipt of tapes will be Saturday, 30 July 1966. No entries received after that date can be considered in any circumstances. The winners and the runners-up will be notified immediately judging is completed and a complete list of awards will be circulated to all entrants.

8.

Every tape entered must be adequately packed and properly stamped and addressed to the British Amateur Tape Recording Contest, 7 Tudor Street, London EC4, and a completed entry form and return postage included with the tape. Name and address should be also written on a small label firmly affixed to the tape spool and to the containers.

## Entry Form: British Tape Recording Contest 1966

Name (Block Letters): \_\_\_\_\_

Address: \_\_\_\_\_

Age: \_\_\_\_\_

Occupation: \_\_\_\_\_

How long have you been recording: \_\_\_\_\_

Special Interests: \_\_\_\_\_

Title (if any) of entry: \_\_\_\_\_

Duration: Mins \_\_\_\_\_ Secs \_\_\_\_\_

Category: Novice/Advanced/Group

Recorder(s) used: \_\_\_\_\_

Tape speed: \_\_\_\_\_ ips Tape used: \_\_\_\_\_

Other equipment: \_\_\_\_\_

When recorded: \_\_\_\_\_ Where: \_\_\_\_\_

Titles of works used: \_\_\_\_\_

Authors/composers: \_\_\_\_\_

Duration: Mins \_\_\_\_\_ Secs \_\_\_\_\_

Names of any assistants and how they helped: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

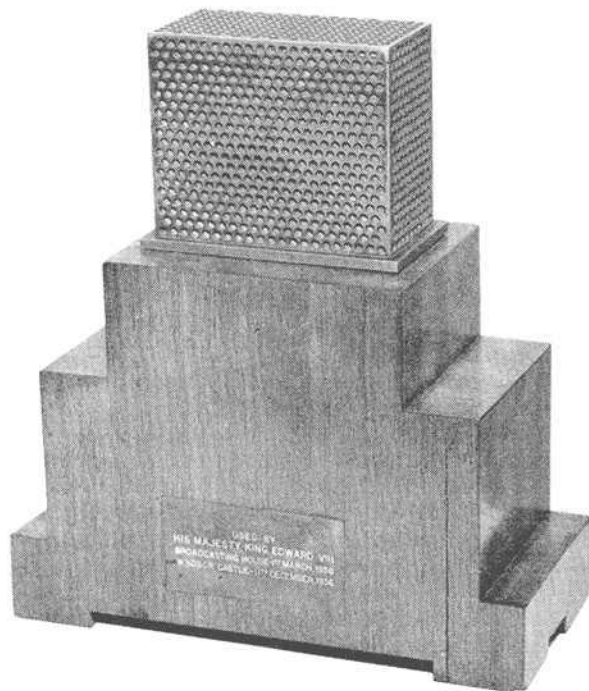
**Declaration** (cross out whichever is not applicable)

I declare that the enclosed tape is entirely my own work, and that I have not included on the tape any copyright material from radio, commercial recording, or any other source.

I declare that I hold documentary authorization to use any copyright material.

Signed \_\_\_\_\_

# SOUND SCENE



*Above: The microphone used by the Duke of Windsor (then King Edward VIII) for broadcasts from London and Windsor.*

## New General Manager

Bosch Ltd (UK sales agency of Robert Bosch GmbH of Stuttgart) have appointed Mr Helmut Jaspart as General Manager. He replaces Mr H. Thum, who is returning to Germany to take up a more senior job with the parent company.

## Talking Microphone

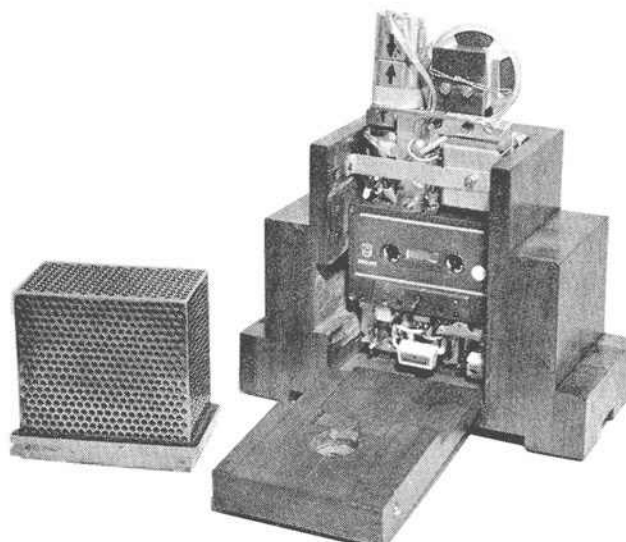
The microphone shown above left, instead of being used for recording speech, is now used for playing it back! This microphone is the one used by the Duke of Windsor when he was King Edward VIII for broadcasts from London and Windsor Castle in 1936, and it now belongs to Mr Jack Le Vien, producer of the film *A King's Story*, dealing with the life of the Duke. Mr Le Vien asked a London company, Recording Machines Ltd, to fix a tape recorder inside the microphone. This they did, using a Philips EL 3301 cassette machine, converted as shown above right. Now the microphone appropriately plays back a pre-recorded message from the 1936 Abdication Speech.

## New Liaison Officer

The Sony Corporation of Japan has appointed Mr Masakazu Namiki as Sony Liaison Officer for the UK. Mr Namiki will operate from Debenhams Electrical & Radio Distribution Co Ltd at Mercia Road, Gloucester.

## Goodmans Abroad

Goodmans Industries Ltd have been participating extensively in overseas trade fairs this winter. In Barcelona 80,000 people poured into the Sonimag 3 exhibition where Goodmans' agents, Messrs Vieta, had a demonstration room.



*Top: Part of the Goodmans display on the Shiro stand at the Tokyo Audio Fair.*

*Bottom: The interior of the microphone (shown left) showing the modified Philips EL 3301 which has been inserted to play back part of the 1936 Abdication Speech.*

At the Tokyo Audio Fair 100,000 people filed through the exhibition halls, and the technical staff of Messrs Shiro (Goodmans' Tokyo agents) were hard put to it to cope with the enormous interest shown and resultant enquiries.

## 1966 Audio Fair

The 1966 International Audio Festival and Fair will take place at the Hotel Russell from Thursday, 14 April to Sunday, 17 April. Trade viewing is on Thursday (14) from 11 am-4 pm. Public viewing is from 4 pm-9 pm on Thursday, 11 am-9 pm Friday and Saturday, and 11 am-8 pm on Sunday.

This year the organizers of the Fair have booked additional accommodation on a further floor where more large rooms are available and where it is also quieter.

## New VHF Station

The BBC's new VHF sound relay station serving the Brecon and Llanspyddid areas has now been brought into service. The three services are Welsh Home Service, 93.3 Mc/s; Light Programme 88.9 Mc/s; and Third Network 91.1 Mc/s.

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# NEW PRODUCTS

**ATR looks at some of the latest audio products to come on the market**

## Bib in New Container

For the latest in their range of Bib products, Multicore Solders have chosen a new container. Their Bib Instrument Cleaner is in a special low-density Bakelite polythene bottle which was specially chosen for its ease of handling and unbreakability. Application of the cleaner is made easy by virtue of a small-bore dispensing nozzle which also prevents excessive spillage should the bottle be dropped with the cap removed. A 4 oz bottle of Bib Instrument Cleaner costs 4s 6d.

## New for Video

A new low-cost professional video tape recorder and a mobile video tape recording system for closed-circuit use in education, training and various industrial applications have been introduced by Ampex. The VR-7000 video recorder is the cheapest yet produced by Ampex. The VR-7100 Videotrainer combines the new recorder with equipment necessary for the production and display of video tape programmes. USA price for the VR-7000 is \$3,150 and for the VR-7100 \$5,945. At the time of going to press UK prices have not been announced. This is because of uncertainty as to which duty category the customs authorities will place the machines in.

## Tandberg Speakers

Elstone Electronics Ltd of Leeds have now introduced into the UK the Tandberg range of loudspeakers. The Model TAN 8 is capable of dealing with input power of up to 20 watts and a frequency range of 45 c/s to 16,000 c/s. The incorporated HT116 tweeter is coaxially mounted in front of the large woofer, and a filter network is used, with crossover at 3,000 c/s. The TAN 7 has been designed to take the full output of a 10-watt amplifier, and again has coaxial system with crossover at 3,000 c/s. Model TAN 9 is a 5-watt extension loudspeaker incorporating a chassis which has a dual cone. The TAN 8 costs £31 4s 7d, the TAN 7 costs £23 2s 0d and the TAN 9 £13 13s 0d.

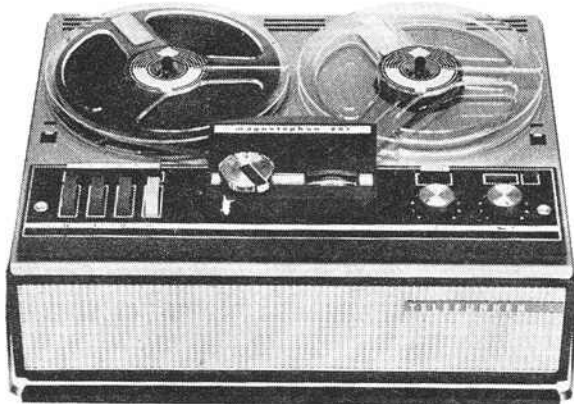
## Wyndors Vanguard

The new Wyndors Vanguard is a four-track, three-speed machine with 7 in spool capacity, a three-head system and track-to-track recording facilities. Frequency response is given as 40-6,000 c/s  $\pm$  4 dB at 1½ ips, 40-9,000 c/s  $\pm$  3 dB at 3½ ips and 40-15,000  $\pm$  3 dB at 7½ ips. Signal-to-noise ratio is better than 50 dB. The Vanguard has separate 8 in round Axiette twin cone speakers mounted in the recorder's detachable lid. Retail price of 59 gns includes 1,800 ft LP tape, BASF tape manual and two spare jack plugs, but does not include microphone. Further details from Wyndors Recording Co Ltd, Wyndors Works, 2 Bellvue Road, Friern Barnet, London N11.



*Top: Bib Instrument Cleaner in its new unbreakable container. Middle: The Ampex VR-7100 video trainer in action. Bottom: The new four-track Wyndors Vanguard.*





Above: The new Telefunken Magnetophon 201 four-track all-transistor recorder. A two-track version of this, the Magnetophon 200, with similar specification will be available shortly at 39 gns.

#### Magnetophon News

The Magnetophon 201, recently introduced by Telefunken, is a four-track all-transistor model, with a spool capacity of 7 in. The single speed of 3½ ips gives a frequency response of 16-13,000 c/s, a signal-to-noise ratio of not less than 46 dB, and a wow and flutter figure of not greater than 0.2%. The 201 incorporates pause control, tone control and VU meter, has a 5 in. x 3 in. speaker, and

an output of 2½ watts. Price is 44 gns, including tape, spare spool, lead and microphone.

Also new from Telefunken is the Operette all-transistor 15-watt tuner/amplifier, with four wave bands and a multiplex decoder for stereo broadcasting. Price is 85 gns.

Further details on any Telefunken product can be obtained from AEG (Great Britain) Ltd, 27 Chancery Lane, London WC2.

#### Tape Adaptor Plugs

Tape recorder adaptor plugs for the Perkeo Automat-J and J 150 projector are now being marketed by Johnsons of Hendon. The plugs allow remote control focusing with the cable supplied with the projector, even when a synchronizer is being used. Retail price is £1 8s 6d.

#### Dual Format Projector

Ilford Ltd have introduced their first Super 8 cine projector, the Ilford Elmo FP-A. This projector is one of the first dual format Super 8 machines to be marketed in this country. The FP-A offers the amateur and professional cine enthusiast the facility of using either Super 8 or Standard 8mm film on the same projector without modification. Finished in two-tone grey, the FP-A features a newly computed Elmo Zoom lens, fully-automatic threading and take-up, and provides for tape synchronization when used with the Ilford Elmo Tape Synchronizer.

With the projector linked to a tape recorder by means of the Elmo Tape Synchronizing unit, and all controls in their operating positions, switching on the tape recorder starts the projector in synchronization.

The Ilford Elmo FP-A dual-format projector is supplied complete with metal side covers, vinyl cloth slip-over cover, lamp, auto take-up spool, film cutter, mains lead and instruction manual. Price: £65. 0s 0d.

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		£ s. d.	Gns.	
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Coscor CR 1607	9 0 0	4 9 9	57	
Sony TC200	11 7 0	5 7 1	72	
Beocord 1500	14 0 6	6 12 5	89	
Philips EL3534	14 10 0	6 16 10	92	
Tandberg 74	14 13 0	6 18 4	93	
Sony TC500	16 10 9	7 16 3	105	
Grundig TK46	16 17 1	7 19 2	107	
Beocord 2000TM	18 19 0	8 16 8	119	
Beocord 2000SC	19 8 0	9 2 11	123	
Akai M8	23 0 0	10 17 2	146	

<b>MAINS 2-TRACK</b>				
Ferguson 3210	3 15 9	1 15 9	24	
Fidelity Playmatic 2	4 8 3	2 1 8	28	
Wyndor 707 II	5 1 0	2 7 7	32	
Grundig TK18L	6 9 6	3 1 0	41	
Tandberg 823	8 10 3	4 0 4	54	
Reps. R10 Mk. II	9 6 0	4 7 9	59	
Tandberg 92	10 17 6	5 2 8	69	
Brenell V Series 3	11 13 6	5 10 1	74	
Truvox R102	11 19 6	5 13 1	76	
Brenell 5/3 Mtr.	12 9 0	5 17 6	79	
Ferrograph 631	13 17 3	6 10 11	88	
Brenell 5/3 'M'	14 13 0	6 18 4	93	
Revox 736	19 11 0	9 4 5	124	

<b>STEREO TAPE UNITS</b>				
Beocord 1500 Teak	14 0 6	6 12 5	89	
Truvox PD 104	14 0 6	6 12 5	89	
Ferrograph 632 2-T	18 18 0	8 18 6	120	
Ferrograph 634	18 18 0	8 18 6	120	

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<b>MAINS 4-TRACK</b>				
Fidelity Playmatic 4	4 18 0	2 6 1	31	
Elizabethan LZ34	5 1 0	2 7 7	32	
Ferguson 3212	5 4 0	2 9 1	33	
Philips EL3558 Teak	6 13 0	3 2 5	42	
Grundig TK17L	6 15 6	3 4 0	43	
Ferguson 3214	6 19 0	3 5 5	47	
Grundig TK400	7 9 0	3 9 10	47	
Grundig TK23L	7 14 6	3 12 11	49	
Tandberg 843	9 6 0	4 7 9	59	
Philips EL3556 Teak	9 15 6	4 12 3	62	
Reps R10 Mk. II	10 17 6	5 2 8	69	
Truvox R 104	12 9 0	5 17 6	79	
Grundig TK40	13 14 6	6 9 5	87	

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#### BATTERY

Philips "Pocket"	4 2 0	1 18 8	26	
Philips EL3586	4 2 0	1 18 8	26	
Optacord 408 Bat/Mns.	6 3 0	2 15 6	39	
Telefunken 300 2-Track	7 14 6	3 12 11	49	
Telefunken 301 4-Track	8 10 3	4 0 4	54	
Ficord 202A	10 8 0	4 18 2	66	
Grundig TK6 Bat/Mns.	10 17 6	5 2 8	69	
Uher 4000L Report	16 14 6	7 13 3	103	
Akai X4 Stereo 4-T	21 11 0	9 13 4	131	



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# tape club news

## Brighton

Chairman of Brighton Tape Recording Club Mr R. Vivian is hoping that members will help to make alterations and improvements to the club rooms. Volunteers have been appealed for, but as yet the result of this appeal is not known. Mr Vivian has also been busy demonstrating his equipment and recording techniques in the first of a series of contributions by club members. Club members are also planning to visit SME Ltd at Steyning to see the firm's factory there. Tape/slide shows have been a recurring feature of the club's timetable. A fifteen-minute show of the famous Lewes firework celebrations was the first, followed by a show of the Brighton Speed Trials. The club meets every Wednesday at 7.45 pm at 14a St George's Place, Brighton. Club secretary is Ken Upton of 47 Kingsley Road, Brighton 5.

## Dartford

At the request of Mr Stanley Atkins, Dartford Borough Librarian, members of the Dartford TRS recently spent an evening in the museum recording an ancient polyphon. This instrument looks like a cross between an ordinary gramophone and a musical box, using metal discs with spikes punched out and turned upwards which strike a metal cone as it goes round. About a dozen polyphon discs were recorded including 'The Lost Chord', the march from 'Tannhäuser' and 'The Old Folks at Home'. A copy of the recording is to be kept in the library archives and will be used in programmes for the blind, hospitals and old people's homes. A further visit to the museum is planned, at which members hope to record other old musical instruments.

The club also spent a very pleasant evening as the guests of their president, Daphne Oram, at Wrotham. Miss Oram gave a fascinating demonstration of the equipment she uses for her electronic music competitions.

## Derby

Hand-bell ringers were the focus of microphone attention at a recent location recording session organised by Derby TRC. The ringers were those of nearby Chaddesden Parish Church, where members also recorded a carol service complete with hand-bells. Club members have now compiled a complete set of the best recordings of the opera 'Il Trovatore' for members of the opera group. They also had a good opportunity to record Handel's 'Messiah' at a recent concert in Derby and were able to return home with excellent recordings both in mono and stereo.

This month I have been particularly pleased to hear from so many clubs—it makes a good start to what I hope will be a good championship year. Unfortunately, although 1964 was a bumper year for clubs, things weren't quite so bright last year, with only 65 clubs entering the League charts. However, we are already off to a better start, with 17 clubs featured in this issue, as against 10 last February. I'd particularly like to hear from

## Ferrograph Owners

Members of the British Ferrograph Owners' Club have been voicing their opinions on last year's National Recording Contest, about which they don't seem very happy. However, as can be seen from page 37, this year's rules have been changed and I am sure members of this club and every other will be happily entering for the 1966 contest. Plans are going ahead for the club to hold a meeting in London during Audio Fair week but the exact date and venue have not yet been decided. The ladies' round robin tape is now successfully under way, despite the family commitments of the various members—four members between them claiming fifteen children!

## Great Yarmouth

'Synthetic Sound' was the title of a recent competition organized by the Great Yarmouth and District TRS. As opposed to a natural sound hunt, this competition set members to record certain sound effects by artificial means. I understand that some peculiar horses were heard trotting around, one of which had apparently only three legs! Also, judging by the water splashes on some tapes, ships must have dropped anchor in the local pond! Overall winner of the contest was Ron Wain, with C. Anson close runner-up. Members have also been given the task of each compiling a tape which will hold the interest of other members for one hour. More difficult than it sounds, this, but A. Hewitt and T. Smith came out very well with their presentation of a mixed bag of music and songs linked by good commentary and spiced with touches of humour.

## ITAC

Among the new services that the International Tape and Cine Society now offers to its members is a special technical advice service on all audio matters. Another innovation is the master welcome tape. This is to be a tape on which every member of the club is recorded introducing himself, and a complete tape of this kind will be sent to every new member on joining the club. Round robin tapes are also in the offing.

Unfortunately, the club's 1965 tape contest attracted only six entries from four people. The competition was on a set subject—'Instructional Talk'—limited to twelve minutes' playing time. Winner of the contest was Roger Pirie with his entry 'How to Become Known in Tapesponding Circles', a satirical account of the methods you should adopt with your tape pals. Runner-up was John Styles with 'The Driving Instructor'.

those clubs who managed one mention last year and then apparently dozed off again. That's almost all those with a total of 15 points or less for last year. How about it?

Finally, I must apologize to members of the Walthamstow club for not mentioning their club last month among the best clubs of last year. The 1965 League Championship chart (see overleaf) should put the score right.

K.C.

## Leeds

The chairman of the Leeds and District TRC, Mr M. E. Plant, and fellow member Mr Roe, recently visited Allerton Grange night school to give a talk and demonstration on the club's activities to the tape recording class run by Dr Woodhouse in conjunction with the local education authorities. Equipment used during the demonstration included a Revox 736, an Akai X4 and a Butoba MT5. Local OAP clubs have been delighted to hear the tape club's recordings of 'The Edwardian Follies'. These are a group of senior citizens, average age nearly 70, who travel throughout England, Scotland and Wales giving concerts to fellow OAPs. Club members had travelled to Bradford to record the 'Follies'. Following recent correspondence in *ATR*, club secretary W. H. Rowe felt that other groups might like to know more about the book used to record 'Western Saga'. This book is entitled *Plays for Reading and Recording* by T. S. Love and W. D. Cumming, published in 1960 by Harrap. Price is believed to be about 3s 6d.

## London

Members of the London Tape Recording Club recently welcomed Mr Conn Ryan, senior documentary producer at the Central Office of Information. Mr Ryan talked about the work he does at COI and played extracts from some of his programmes. Cine film shows have also been in evidence. Ken Blake spent some time showing amateur films with taped sound tracks.

## Middleton

Following the AGM of the Middleton TR group, the new general secretary and librarian is Mr T. Brown of 67 Sherbourne Road, Middleton, Manchester. The group has noted the results of the 1965 National Contest and feels that there must have been other good tapes which are not placed among the winners. If anyone would care to send copies of such tapes to Mr Brown, the group will be pleased to circulate them in their tape magazine 'Playback' which has a countrywide circulation and is heard by (among others) a BBC editor, and a feature writer who is a regular writer on tape recording subjects.

## Newcastle

Recently five brave members of the Newcastle Tape Club battled through thick snow for a club meeting on microphone comparison. On the last occasion when such comparisons were attempted the club did not have an audio signal generator, but the recent acquisition of one meant that this time members were able to



get far more accurate results. First job was the checking of the responses of the two amplifiers being used. The first amplifier was a stereo model and it was found that one channel dropped to about - 25 dB at 8 Kc/s, whereas the other shot up to + 10 dB and stayed there until about 30 Kc/s. Bass response was equally varied. However, by switching channels and putting a meter across the output of this 'hi-fi' amplifier, they managed to achieve a fairly level response by adjusting the gain control to suit. Once actual microphone testing had started it was discovered that the cheapest microphone performed twice as well as an expensive German model costing many times more. Club secretary is Malcolm R. Watts, Studio A, 31 Ridgewood Gardens, South Gosforth, Newcastle upon Tyne 3.

#### North London

Eighteen members of the North London Tape and Hi-fi Club attended the club's recent AGM. Reviewing the past year, the chairman totted up visits to Philips record factory and to Teletape, manufacturers' demonstrations including Grundig and Truvox, a Mullard film show, and a disc cutting session as well as nine live recording sessions. The final of the club's league contest and tape of the year playback were held recently. Winners of the club's league championship were the Goodwin brothers, Ron and Den, with 37 points. These two also won the club's tape of the year contest and to complete their hat-trick also won the end-of-season raffle!

#### Overseas Students

Meetings of the Overseas Students' Tape Club have continued under the direction of Derek Chatterton of the British Council. A very appropriate session was held at which members recorded personal messages to their families overseas.

#### Park

This new club, based in the Richmond area, now has a very keen nucleus with several others who originally showed interest still to discover the full benefits of membership. For the time being meetings are being held at Ye White Hart, The Terrace, Barnes, but it is still hoped that accommodation in Richmond itself can be found. Unfortunately, other organizations have the same idea and accommodation is scarce and expensive. The first real meeting of note was a visit from John Hassell, who has his own recording studio and disc cutting service in Barnes. He came along and talked to members for the best part of two hours about microphones and recording. A further and more detailed programme of microphones followed, as well as a couple of outdoor recording sessions.

Club Secretary is John Tibble, 29 Meadlands Drive, Petersham, Surrey.

#### Top Ten for February

1 Newcastle	6 Park
2 Leeds	7 Brighton
3 Thornton Heath	8 Dartford
4 Rugby	9 ITAC
5 Great Yarmouth	10 Derby

#### Reading

With her first-ever entry for Reading Cine and Tape Recording Society's Abbey Cup for tape and slide shows, Miss Marjorie Davies was the winner this year by a useful margin. Her entry, 'A Tale of our Swallows' managed to convey the thrill she and her friends experience each year as swallows arrive to nest in their garage. This year's entry was a large one, and tape accompaniments were noticeably more ambitious. It has always been a somewhat controversial point as to whether sound effects should be used to match slide pictures, since these might accent their static nature, but nevertheless the runner-up, Derek Holt, proved that a full sound track can work if carefully chosen. He matched sounds of the zoo and its animals very effectively.

#### Rugby

Over 60 members and guests attended the club's annual Christmas meeting held at the Central Hotel. Entertainment was provided by a number of guests including Hildegard Jennings, Barry Jones, John Elliott, Alan Mynall, Eric Rigby, Miss May Salt (a blind guest) and assisted by Tom Reader and Arthur Harding.

We were dismayed to hear from members of the Rugby club that Trevor Gilbert of B-TRAC and secretary of the Midland Association has suffered injuries as a result of a car accident. We join with all other tape club members in wishing him a speedy recovery.

I see that in their latest bulletin 'Tape Life', Rugby have reprinted an article by Rosemary Scott on the subject of tape widows, who (she feels) are rather more avoidable than fishing or golfing widows. Rosemary gives many tips and items of advice to wives on how to keep up with husbands and their tape recording activities. Ladies please note!

#### South Reach

The tape group of the South Reach County Youth Centre is still being run by the centre's warden, Mr T. C. Butler. Recently a talk and practical session was given to senior boys on a Kent Association of Boys' Clubs training weekend held at Wimbledon House, Herne Bay. Technical details of a tape recorder, its functions and a practical session on splicing were given by Club Secretary Denis Burrage using a Truvox. This was followed by a practical demonstration in which the boys participated in the use of a portable tape recorder for interviewing under different conditions. This was carried out on a Stella by Tom Butler.

#### Thornton Heath

Once again members of the Thornton Heath TRC have had many busy work sessions, particularly now that their second hospital programme is under way. The club's outside recording teams have been busy recording a local choral society and supplying sound and music for the Croydon Municipal employees' annual party. Member Alf Grover was deeply involved with a pantomime presented by the Boy Scouts, which was so stiff with sound effects that he had to make recourse to other members to supply some of them. Mr G. V. Smith, director of Hammonds, visited the club in January with the Revox 736, stereo amplifier, etc, and demonstrated these remarkable machines which were responsible for so many winning tapes in this year's International. The local amateur dramatic group, the Selsdon Stagers, is planning a full-scale review for June, and intend to use the club's services as sound providers to the full.

## ATR LEAGUE CHAMPIONSHIP 1965

1 Thornton Heath	151
2 Rugby	148
3 Birmingham	113
4 Radio Club of Scotland	73
5 Walthamstow	64
6 North London	63
7 Derby	59
8 London	57
9 Newcastle upon Tyne	55
10 Brighton	53
11 Southall	45
12 Montrose	43
13 South Devon	37
14 ITAC	36
15 Reading	31
16 Ipswich	30
17 Boston Soundhunters	29
18 Norwich	28
19 Leeds	25
20 Park (Richmond)	23
21 Bath	21
21 IVAS	21
23 Dartford	20
24 Dundee	19
25 Coventry	18
25 Doncaster	18
25 Harlow	18
25 Hinckley	18
25 Overseas Students	18
30 Ferrograph Owners	16
30 Great Yarmouth	16
30 Uxbridge	16
33 Singapore	15
34 Ulster	13
35 South Reach	12
36 Blackburn	10
37 Bedford	9
38 Bournemouth	8
38 Croydon SR Group	8
38 Friern Barnet	8
38 Furness	8
38 Millom	8
38 New Circle	8
38 Slade	8
38 World Round Robin	8
46 Barnsley	7
47 Catholic TR International	4
47 Edinburgh	4
47 Elmwood	4
47 Epping	4
47 Esperanto	4
47 Fi-Cord Owners	4
47 Gateway	4
47 Hazells	4
47 Kettering	4
47 Leicester	4
47 Middleton	4
47 North Manchester Soundtrackers	4
47 Recording Society of Australia	4
47 St Helens	4
47 Sheppey	4
47 Stereo International	4
47 Thanet	4
47 Westbury	4
47 Widescreen	4



# 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.

## SOUTH AFRICA

Philip Bateman, 20, medical technician, 42 Buckingham Road, Port Elizabeth, South Africa. Music, art, radio, science, photography, psychology; light classical, operetta, shows. Philips EL3551, 5½ in, 3¾. England, Italy, Germany, France.

## VENEZUELA

Rafael Meza, 32, teacher, PO Box 1194, Maracaibo, Venezuela. Latin-American and British folk music. Fidelity Tapemaster 4, 7 in, 1½, 3¾, 7½. Anywhere English or Spanish.

## USA

Paul Porcaro, 30, radio operator, 328 Central Avenue, Brooklyn, NY 11221, USA. Photography, ham radio; all types. V-M 750A, 7 in, 3¾, 7½. Any.

## ZAMBIA

Mack Hunter, 41, personnel manager (copper mines), Box 1884, Kitwe, Zambia. Amateur dramatics, current affairs, Africa; serious. Vortexion stereo, 7½ in, 3¾, 7½. Any.

## BRITISH FORCES

Gwilym Griffith, 22, RAF, 37 Jalan Sungei Kelian Hillside, Penang, Malaysia. 35mm photography, hi-fi; all kinds. Akai 44S, 7 in, 1½, 3¾, 7½. Any.

David Hogg, 21, general mechanic, R1940070 SAC Hogg D, Station Workshops, RAF Changi, Singapore. Motorcycling, humour; c/w, blues, folk. Philips EL3547A stereo, 5½ in, 1½, 3¾. Any English speaking.

## CHESHIRE

Keith Tulloch, 22, salesman, Hill Top, Manor Road, Irby, Heswall, Wirral, Cheshire. Tape recorders, people, rambling, electronic music; folk songs, classics, pop. Philips EL3549, 7 in, 1½, 1¾, 3¾, 7½. Germany, Holland, USA.

## CO DURHAM

William Gasper, 18, schoolboy, 8 Eamont Road, Ferryhill, Co Durham. Driving, photography; pops. Elizabethan 400 4-track, 5½ in, 3¾. Any (English speaking).

## HAMPSHIRE

Michael Burkitt, 17, printer, 65 Fromond Road, Winchester, Hants. Hi-fi, photography, French pops; most. Ferrograph 631, Grundig TK5, 8½ in, 1½, 3¾, 7½. UK, Luxembourg, France, Belgium, Switzerland.

Anthony Mitchell, 26, demolition top man, 1 Salisbury Road, Fordingbridge, Hants. Grasstrack, scrambles, touring, tape recording; most types. Fidelity 4-track, 5½ in, 3¾. Any English speaking, no need to write.

## HERTFORDSHIRE

David Wakefield, 25, bandsaw operator, 69 Farland Road, Adeyfield, Hemel Hempstead, Herts. SWL, amateur radio, hi-fi, comedy shows, tapesponding; Beatles to Beethoven. Modeck Special, 5½ in, 3¾, 7½. USA or anywhere.

## KENT

John Chisman, 22, sales rep, 115 St Lukes Avenue, Ramsgate, Kent. Photography, electronics, language, tape recording; popular, film tracks. Martin, 7 in, 1½, 3¾, 7½. All countries.

John Rimington, 47, mechanical engineer, 39 Elmstone Road, Rainham, Kent. Photography, cine and still, outdoor life, ingenious gadgets, general chit-chat; light classical and jazz. Ferrograph, 7 in, 3¾, 7½. Anywhere English speaking.

## LANCASHIRE

Michael Summers, 18, cinema projectionist, 36a Pedder Street, Morecambe, Lancs. Stereo, tape recording, films, books; all types. Brenell MK 5M, Grundig TK18, 8½ in, all speeds. Anywhere.

## LEICESTERSHIRE

James Frounks, 18, hosiery, 83 Wannington Road, New Parks Estate, Leicester. Tape recording; pop, electrical instruments. Fidelity Playmaster, 5½ in, 3¾. Anywhere.

## LONDON

W. White, 54, sales assistant, 234 Chase Side, Southgate, London N14. Fishing, cacti; popular. Stella battery portable, 3 in, 1½. Anywhere.

John Wilkinson, 31, London transport inspector, 34 Gregory Crescent, Eltham, London SE9. Motoring, tape recording; light classical and pop. Fidelity Playmaster 2, 5 in, 3¾. Anywhere.

S. W. Woods, 36, accounts supervisor, 28 Fernwood Avenue, London SW16. Conversation, general knowledge of Germany, travel; light classics. Grundig TK14, 5½ in, 3¾. Germany.

Norman Woolf, 28, dress pattern cutter, 43 Coleraine Road, Blackheath, SE3. Oil painting, tenpin bowling; opera, ballads, all. Elizabethan LZ102, 7 in, 1½, 3¾, 7½. Israel, USA, Europe.

## NORFOLK

Nigel Armiger, 18, audit clerk, 30 Jubilee Avenue, Fakenham, Norfolk. All sports, tape recording; popular. Ferguson 3204, 5½ in, 1½, 3¾. USA, Australia, New Zealand.

## NOTTINGHAMSHIRE

William Hayward, 33, stock keeper, 73 Randolph Street, Carlton Road, Nottingham. Theatre, 8mm cine; light classical and pop. Sound 444 2-track, Cossor stereo, 5 in, 3¾. UK, Holland, Belgium.

## SHROPSHIRE

Edwin Prime, 26, school teacher, 9 Church Road, Baschurch, Salop. Hi-fi, Welsh, French, travel; classical. Brenell MK5, 8½ in, 1½, 3¾, 7½, 15. Wales, France.

## SURREY

Sidney Amos, 29, projectionist, 30 Stokee Road, Guildford, Surrey. 35mm photography, cinema, tape recording; all music except opera. Cossor 4-track stereo, 7 in, 1½, 3¾. English-speaking anywhere.

George Nevill, 60, clerical worker, 68 Brighton Road, Redhill, Surrey. Tape recording, radio, music; all but pop. Philips EL3548, 7 in, 1½, 3¾. Canada, USA, Bermuda, Hawaii, Zambia.

## YORKSHIRE

Tom Fieldhouse, inspector (engineering), 524 Stanningley Road, Stanningley, Pudsey, Yorks. Writing and listening to humour; none. Truvox 2-track, 7 in, 3¾, 7½. UK only.

Christopher Redhead, 17, TV salesman, 4 Bainbridge Road, Doncaster, Yorks. Radio, TV techniques, photography, taping; mainly pop. Grundig TK18, 5½ in, 3¾. Anywhere English-speaking.

## IRELAND

Gerard McDonnell, 18, student, 22 Bachelors Walk, Dundalk, Co Louth, Ireland. Space exploration, cinema, acting, coin collecting; pop, c/w, Irish and English folk songs, ballads. Portogram Minitape MK11, 5½ in, 3¾. America, England, Ireland and anywhere English-speaking.

Dennis Nickell, 22, salesman, 63 Dunraven Park, Belfast 5. Breeding budgerigars, chess, 35mm colour photography, ghost stories; light classical, some pop. Philips 4-track EL3541, 7 in, 3¾, 7½. Canada, America, Australia, New Zealand. Male only, 20-25.

## SCOTLAND

Selwyn Cowan, 37, salesman, Braidholm Court, Grifnock, Glasgow. Broadcast performances, SWL musical films; Benny Goodman, Louis Armstrong, Tommy Dorsey, Artie Shaw, early Frank Sinatra. Stella 459 4-track, 7 in, 1½, 3¾, 7½. UK, USA, Canada, France, Australia, Sweden, Spain.

Thomas Lowe, 22, burner, c/o Lennox Hostel, Faslane, Dumbartonshire. General interests; old time, Latin-American. Ultra 4-track, 5½ in, 1½, 3¾. Trinidad or any country south of the border.

Ian Robertson, 19, civil servant, 13 Parkside Street, Edinburgh 8. Tapesponding, corresponding, scouting, breeding mice, outdoor activities and active church work with youth; sacred, classical and folk-songs. Cossor CR 1604, 7 in, 1½, 3¾. Anywhere abroad English-speaking.

## WALES

Robert Anderson, 17, police cadet, 60 Thomas Street, Aberbargoed, Bargoed, Glam. Dancing, driving, photography, stereo. Ferrograph 5A, Philips EL3549, 7 in, 1½, 1¾, 3¾, 7½. Britain, America.

John Bennett, 42, mechanic, 15 Garnon Street, Caernarvon, North Wales. Sea fishing, woodwork, people; light, trad jazz, classical. HMV, 5½ in, 1½, 3¾. European and Australian. Raymond Jones, 34, railway shunter, 51 Williams Street, Newport, Monmouth. Photography, drawing, Swiss and Austrian music; yodelling, Jim Reeves. Philips stereo, 7 in, 1½, 3¾, 7½. Austria, Switzerland, America.

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Unbiased guide. Our latest sixty-five page, photographically illustrated hi-fi catalogue (4s 6d). Advisory service preferential terms to Members. You'll be glad to have consulted Audio Supply Association, 10 Clifford Street, London W1.

Ex-dem equipment at bargain prices. All goods in perfect condition and fully guaranteed. Offered subject to being unsold. We quote the substantial amounts saved on each item as follows: Revox 736, £18. Telefunken 105, 14 gns. Cossor Transistor Battery Portable Recorder, £5. Philips EL3301 Pocket Transistor Recorder, £4. Armstrong 227, £7. Radford STA 12, £2 10s 0d. STA 15, £14. Radford Bookshelf Speakers Mk 2, £3. Radford Auditorium Speaker, 35 gns. KEF G4 Speakers, £4. G4 Equipment Cabinet, £4. N.R.S., 16 King's College Road, off Adelaide Road, London NW3. PRI 3314.

## PRE-RECORDED TAPES

American 4 track stereo tapes covering most famous labels at realistic prices. Why pay more? Imported directly by us, saving distributors' profits. Vast selection at 75s each - send SAE for free lists or call at London showrooms. Teletape of Marble Arch, 33 Edgware Road, W2.

American pre-recorded stereophonic 4-track tapes supplied. Send 5s for catalogue of over 4,000 tapes. American Tapes, 17 Temple Road, Blackrock, Co Dublin, Ireland. (6/66)

Two-track tapes. Armed forces radio broadcasts. Rare radio broadcasts and jam sessions. Air checks and out of print recordings by all the great bands. Bill Ordowski, PO Box 121, Port Huron, Michigan, USA.

The perfect companion to ATR is 8mm Magazine - an unbeatable combination for the sound and cine enthusiast. 8mm tells you all you need to know on how to take cine films and where to look for subjects. Packed with news of the latest cine developments, unbiased test reports and hints on sound and cine. All for only 2s 6d a month, or special introductory subscription offer of 25s a year from Subscription Dept, 8mm, Haymarket Press Ltd, 9 Harrow Road, London W2.

## AMATEUR TAPE RECORDING SUBSCRIPTION FORM

Make certain you receive your copy of AMATEUR TAPE RECORDING Video and Hi-Fi by completing this form and sending it, with your annual subscription, to:

AMATEUR TAPE RECORDING, SUBSCRIPTION DEPT,  
9 HARROW ROAD, LONDON W2

Please send AMATEUR TAPE RECORDING Video and Hi-Fi for one year, commencing with the next (.....) issue, to the address below. I enclose the annual subscription of thirty shillings (30s). ATR will pay the postage.

Name .....

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Tape Club members wishing to avail themselves of the special Club Subscription rate of 25s per annum should apply to their local Club Secretary. All Club orders must bear the Club Secretary's signature and be sent to the Subscription Department.



## SOUND EFFECTS RECORDS Now available from Amateur Tape Recording

**CASTLE**, 7" 45 rpm records, approximate playing time 5 minutes. Each contains selection of sound effects in separate tracks. Complete with sleeve and paper inner jacket. Sleeve includes description of each sound effect and playing time in seconds

### A ABX/1—BELLS AND SIRENS Price 7/6

Side 1—Fire engines with bells Fire engine—alarm and sirens  
S.S. Queen Mary siren Factory siren Telephone bell Door bell  
Side 2—Clock chime Alarm clock Westminster chime Bow bells

### B AFX/1—WILD ANIMALS Price 7/6

Side 1—Male and female lions Gibbons Chimpanzees Bell bird  
Rattlesnake Baboon Viper Emperor geese Fish eagles Mountain lion (puma) Kookaburra (laughing jackass)  
Side 2—Elephants Mississippi alligator Indian tiger Sea lions  
Male lion In the jungle (a background of typical sounds)

### C BGX/1—BACKGROUND SOUND EFFECTS Price 7/6

Side 1—Sea (breakers) Wind (howling—eerie) Thunder (light rain)  
Side 2—Rain (heavy shower) Factory sounds (industrial) Traffic (busy street)

### D EFX/1—ELECTRONIC SOUNDS AND MUSIC Price 7/6

Side 1—Space ship—take off Space vehicle—imaginary take-off  
Space vehicle—imaginary landing Ring modulation—tonal Modulated tone glide (descending) Modulated tone glide (ascending)  
Sibilant—white noise (pitch octave low) Sibilant—white noise (pitch octave high) Three-tone modulation Filtered tone Stridor (tonal) Ring modulation and sibilant

### E EFX/2—ELECTRONIC THEMES AND MUSIC CONCRETE Price 7/6

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Side 1—Thunderstorm Mysterious Fright  
Side 2—Spooks Intruder Creaks Fright Dungeon Ghosts Ghouls Maniac laughter

### G MFX/1—AUTHENTIC HIGH-FIDELITY SOUND EFFECTS Price 7/6

Side 1—Lion roaring Twin piston aircraft landing Building and 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 Price 7/6

Side 1—American police car with siren—arriving American police car with siren—departing American police car escort with sirens—passing American police motor-cycle patrol with siren—stopping 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

### I MPX/1—MILITARY PARADE AND WARFARE SOUNDS Price 7/6

Side 1—March past—Guards and crowd sounds, etc. Royal Salute—Parade commands and National Anthem Drums and pipes—with parade commands  
Side 2—Aircraft—low level attack (bombs, machine-gun fire, aircraft) Artillery—tanks—ride fire, etc.

### J TFX/1—AUTHENTIC BRITISH TRAIN SOUNDS Price 7/6

Side 1—Train departure—main line Train arrival—main line Express train passing—with whistle Fast goods train passing—with whistle Express train passing Small tank loco—passing  
Side 2—Local passenger—arrive and depart Fast goods train—passing Central London tube train—arrive and depart Train over points and crossing Slow goods train passing—with whistle

### K MFX/3—HORSES Price 7/6

(10 effects) Trotting Walking Jumping Composite recording of foxhounds, calls, horns, etc. Cows Cats Pigs Blacksmith's shop

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Guards, Bow Bells, River, Markets etc., etc., with linking commentary. Ideal for cine films and colour slides

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## ATR TAPE DIRECTORY SERVICE

If you wish to be included in the Tape Directory, fill in this form and send it in. Your particulars will be published as soon as possible.

To: The Tape Directory, ATR, Haymarket Press Ltd,  
9 Harrow Road, London W2.

I would like you to include the following particulars in the Tape Directory, and agree to acknowledge all replies I receive in response to my entry. (USE BLOCK LETTERS)

Name .....

Age..... Occupation.....

Address .....

Special interests.....

Tastes in music .....

Tape recorder used .....

Maximum spool size..... Speeds.....

Countries you wish to contact .....

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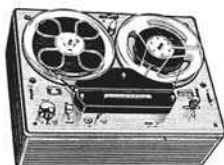


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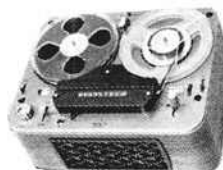
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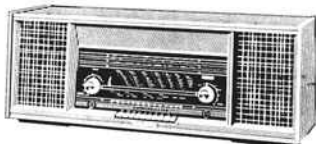
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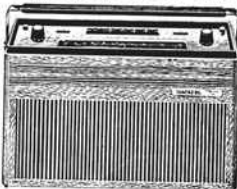
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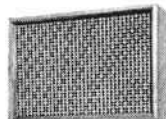
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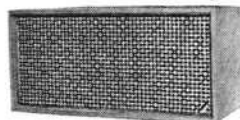
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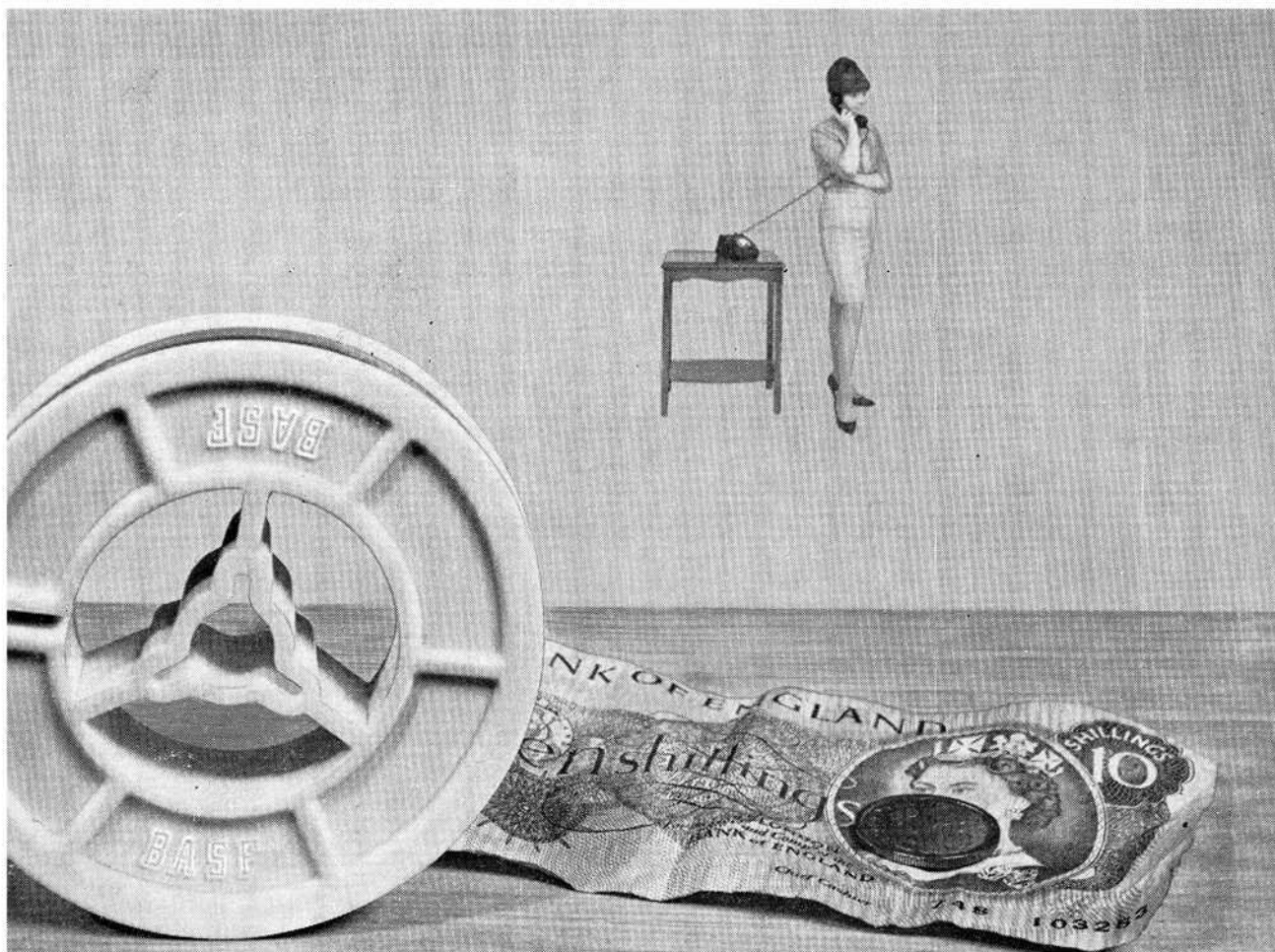
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