

the TAPE

PRICE 1/6

JANUARY 1962
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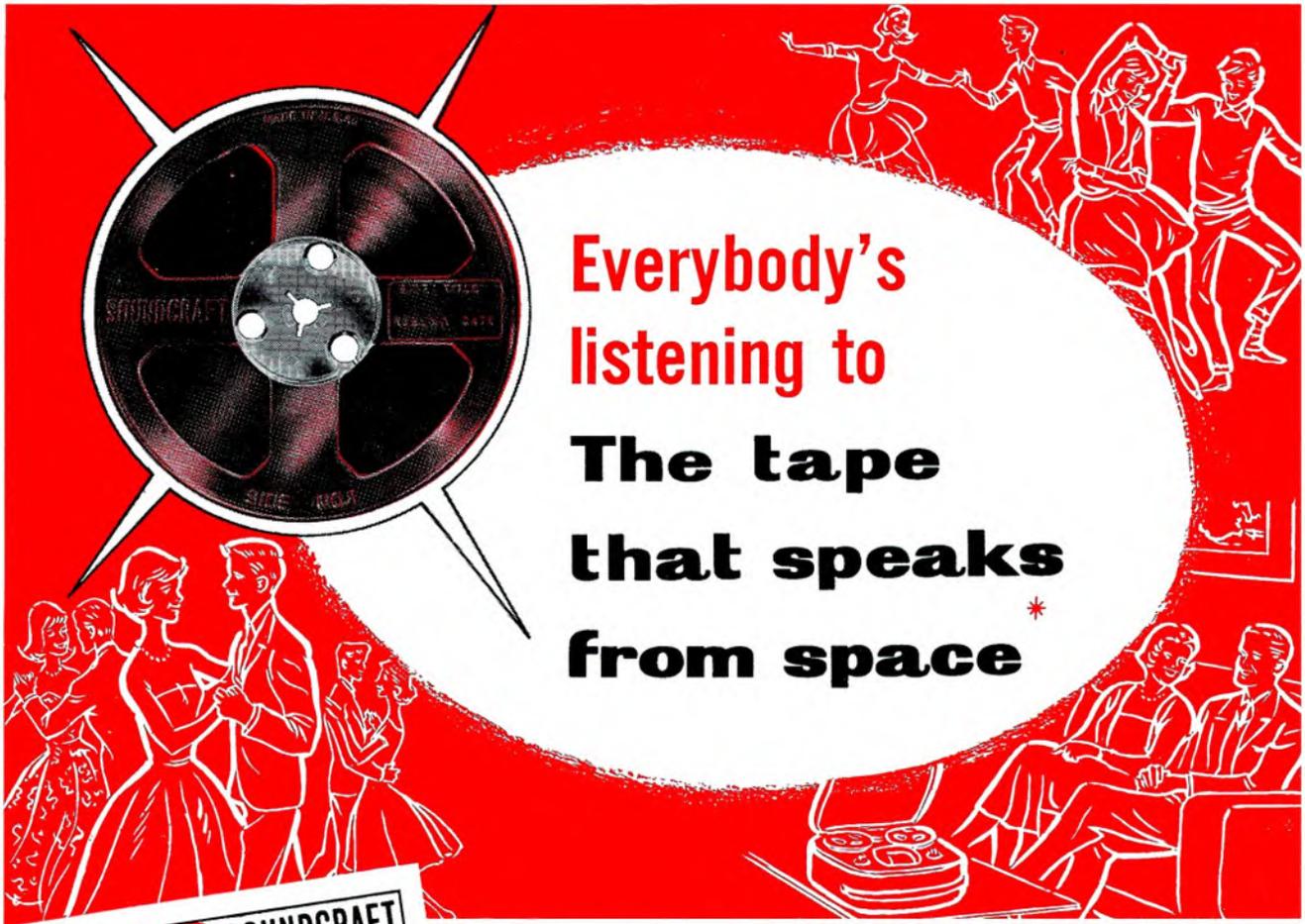
RECORDER

INCORPORATING "SOUND AND CINE"



IN THIS NUMBER

- A New Add-on Sound-for-Cine (Part 2)
- Tape Recorder Workbench
- Details of New Products
- Stripe-it-yourself-first details of new machines for amateurs and professionals
- Equipment Reviewed
- Servicing Tape Recorders
- Our Readers' Write
- Sound and Cine
- Here and There and Everywhere



**Everybody's
listening to
The tape
that speaks
from space ***



Because everybody appreciates the new recording experience that SOUNDCRAFT Magnetic Recording Tape can give. Its special FA4 formulation captures and then reproduces the full frequency spectrum, enabling you to enjoy the majesty of your favourite orchestra or the subtle musical variations of East Coast jazz. In clarity too SOUNDCRAFT is remarkable—famed for its 'Background of Silence'.

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HI-FI ENTHUSIASTS**

Our wide range does not permit adequate coverage of all models. A FREE CATALOGUE and full specifications of any particular model will be gladly sent on request without obligation on your part. WIRED AND TESTED MODELS NOW AVAILABLE. PRICES ON REQUEST.

All prices include free delivery in U.K. Deferred terms available on orders over £10.

TAPE RECORDING AND REPLAY HI-FI AMPLIFIER

Mono. model TA-IM, Stereo model TA-IS

For use with most tape decks. Thermometer type recording indicators, press-button speed compensation and input selection, 3-position bias level and printed circuit construction.

TA-IM	£18. 2.6
TA-IM and Collaro "STUDIO"...	£30.10.0
TA-IM and Truvox Mk. 6 ...	£46.17.6
TA-IS (Illustration Centre)	£23. 6.0
TA-IS and Collaro "STUDIO"...	£35.14.0
TA-IS and TRUVOX Mk. 6 ...	£52. 1.0

A WHOLE RANGE OF PACKAGED DEALS (INCLUDING "CONNOISSEUR" TURNTABLES and DECCA ffs PICK-UP) NOW AVAILABLE TO SAVE YOU FURTHER MONEY.

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A range of equipment cabinets is now available to meet the differing needs of enthusiasts. All are accurately machined for ease of assembly and left "in the white" for finish to personal taste. Designed for maximum operating convenience or for where room space is an overriding consideration, this range has at least one model to meet your requirements. Why not send for full details?



THE "MALVERN"

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This is an acoustically designed enclosure 26 in. x 23 in. x 14 1/2 in. housing a 12 in. bass speaker with 2 in. speech coil, elliptical middle speaker, together with a pressure unit to cover the full frequency range of 30-20,000 c/s. Capable of doing justice to the finest programme source, its polar distribution makes it ideal for really Hi-Fi Stereo. Delivered complete with speakers, cross-over unit, level control, Tygan grille cloth, etc. All parts pre-cut and drilled for ease of assembly and left "in the white" veneered for finish to personal taste. Can be easily assembled in an evening and you then have a system fully comparable with any in the £40-£75 class. Assembled weight 61 lb.



COTSWOLD

Here are some other interesting Heathkit Models for you:



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HI-FI SPEAKER SYSTEM Model SSU-1. This kit is easily assembled. It contains twin speakers and balance control in its direct ducted port reflex cabinet. It is equally suitable for stereo or mono in average room. (Legs £1 1s. 0d.) Less legs. £10 17s. 6d.



S-33

HEATHKIT ELECTRONIC WORKSHOP KIT, Model EW-1. This new kit will help your boy to understand electronics, by making at least 20 exciting experiments, including Transistor Radios, Intercom Sets, Burglar Alarm, Electric Eye, etc. £7 18s. 0d.



AG-9U

HI-FI STEREO 6-WATT AMPLIFIER Model S-33. Attractively styled, completely self-contained. Printed circuit makes it easy to build. Only 0.3% distortion at 2 1/2 W/chal. U/I output, ganged controls. £12 8s. 6d.

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POWER AMPLIFIER 12-WATT Model MA.12. Single channel, ideal for stereo conversion. £10 19s. 6d.

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USP-1

COLLARO "STUDIO" TAPE DECK. Two tracks. "Wow" and "flutter" not greater than 0.15% at 7 1/2" p.s. Long Term Speed Stability better than 0.5%. £17 10s. 0d.

SUGDEN MOTOR UNIT "CONNOISSEUR". Heavy duty motor, operating at 33 1/3 and 45 r.p.m. Very heavy 12" turntable. £17 1s. 5d.

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HI-FI STEREO 16-WATT AMPLIFIER Model S-88. within its power rating, this is the finest stereo amplifier available, regardless of price. U/L push-pull output. 0.1% distn. at 6 w/chal. £26 12s. 6d.

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STEREO CONTROL UNIT Model USC-1. A deluxe stereo control unit with variable filter, switched rumble filter, printed circuit boards and many other refinements. Operates direct from tape heads. £18 18s. 6d.



TA-IS

TRANSISTOR PORTABLE RADIO Model UXR-1. Superbly styled hide case, with golden relief and crystal easy-to-tune dial; this completely self-contained 6-transistor dual-wave set performs brilliantly everywhere, even in a car. Reproduction is exceptionally good. Printed circuit. £14 18s. 6d.



TRUVOX MK 6

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STUDIO

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S-88



RSW-1



UXR-1



GL-58



F.M. TUNER

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FULL DETAILS OF MODEL(S)

Kindly write below in BLOCK CAPITALS

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ADDRESS

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AUDIO VALVE MILLIVOLTMETER	Model AV-3U	£13.18.6
AUDIO WATTMETER	Model AW-1U	£14.14.0

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THE LARGEST-SELLING ELECTRONIC KITS IN THE WORLD

4 REASONS THAT MAKE THE **Garrard** TAPE SYSTEM SO SIMPLE



1 SIMPLE TO OPERATE

Anyone can operate the Garrard system. Controls have been simplified. There are three positions only—PLAY—RECORD—WIND.

2 MAGAZINE LOADING

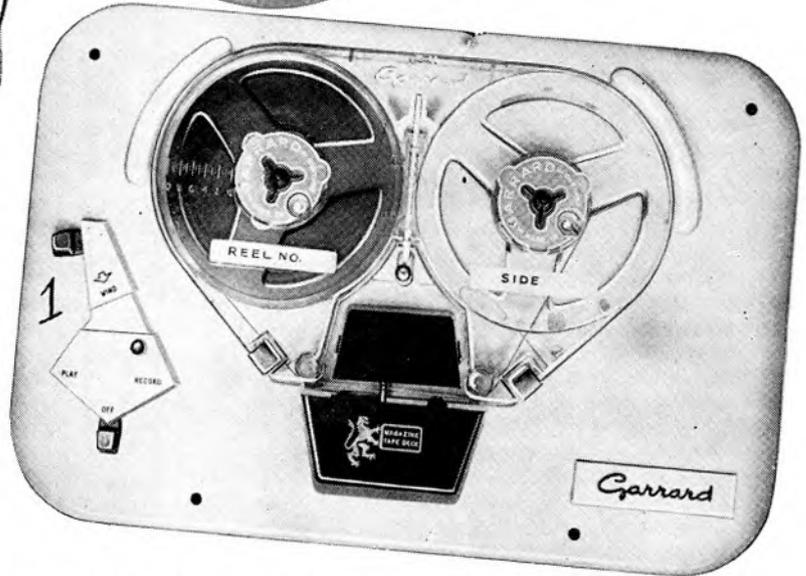
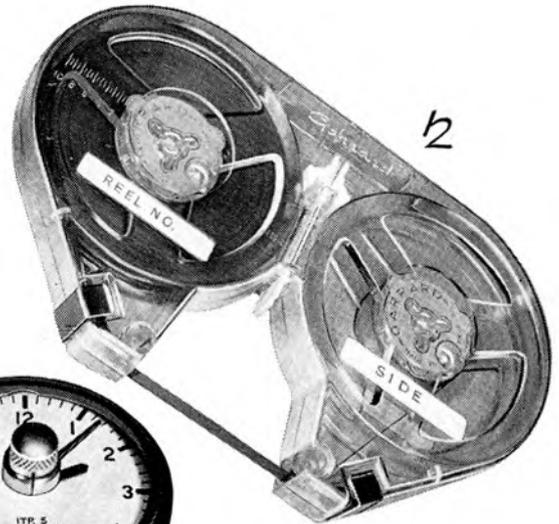
No tape threading. No spilling. No anchoring of tape. Just place the magazine on the deck and it is ready to operate.

3 EASY STORAGE

The Magazine is the same size as an average book. It fits neatly on a bookshelf using the Library Storage Unit.

4 GARRARD TAPE POSITION INDICATOR

Gives precise and accurate indication of recordings on the tape.



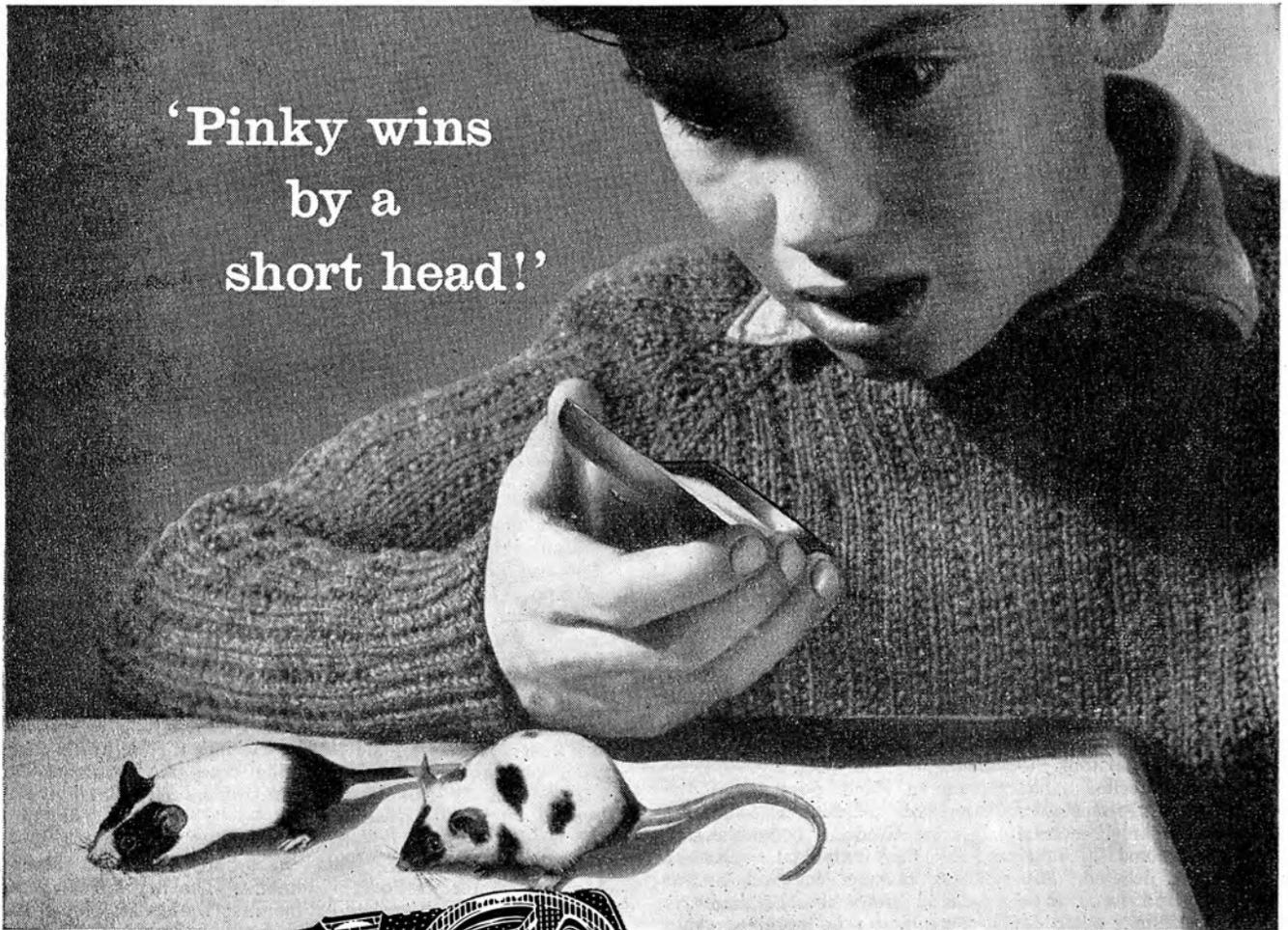
CONTINUOUS-EASY TAPE RECORDING & PLAYBACK WITH THE GARRARD MAGAZINE METHOD

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Magazine containing 650 ft. Double Play Tape in container ...	1	13	4
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Reel of 650 ft. Double Play Tape ...	1	4	0
Garrard Spool only	3 3
Library Storage Magazine Container	3 6
Tape Position Indicator ...	1	19	6

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'Pinky wins
by a
short head!'



PHILIPS

FAMILY TAPE RECORDER

A PRODUCT OF PHILIPS—THE FRIEND OF THE FAMILY

Young Roy's quite the star sports commentator since we got our Philips Family Tape Recorder. That commentary of his on his White Mice Derby, for instance . . . and his Cup Final imitation seems better every time we play it!

Roy has to take his turn, though—because there's no doubt about it being the *family* tape recorder. Mum's using it to rehearse her lines for the next show at the Amateur Dramatic Society. Janet's making terrific progress with her piano-playing now she can listen to her own efforts with a critical ear. And as for Dad—well, you'd almost take him for a Frenchman since he's been practising his accent.

In fact, the whole family's agreed about one thing: no other instrument in its class gives you such faithful reproduction and such simple, efficient operation as Philips Family Tape Recorder. Not to mention four-track recording that provides up to eight hours' sound from a single 7" reel of D.P. tape—Philips tape, of course!

ONLY 34 GNS. including microphone, 5" reel of tape, and 5" take-up spool. (Made in Holland)

*There are countless uses for
PHILIPS FAMILY TAPE RECORDER
that may interest you, including these:*

- Practising public speaking.
- Party games on tape.
- Non-stop music for parties.
- Sound-track for amateur films.
- Spoken letters to relatives overseas.

the TAPE RECORDER

Editor ----- MILES HENSLOW
 Advertising Editor ----- Julian Berrisford
 News Editor ----- Alan Lovell
 Editorial Offices - - - 99 Mortimer Street, London, W.1
 Telephone ----- MUSEum 3967 to 3969



★
EDITORIAL

MEMBER OF THE
 AUDIT BUREAU
 OF CIRCULATIONS

IT is now very clear, from the increasing number of dealers who are writing to us, that anything we are able to do to promote a better understanding of "after-sales-service" will be welcomed by a large section of the trade. It is equally apparent that tape recorder owners are just as keen—if not more so—to see the whole business properly ironed out.

Customers' main complaints seem to stem from the delays and misunderstandings which occur when machines have to be returned to the makers for repair. Dealers appear to suffer most from customers who have not (apparently) read or studied a maker's guarantee. Both dealers and customers are often exasperated because of the widely-differing interpretations of the word "service"—as a result of which one dealer's policy may be made to look foolish beside the more liberal offers of another, and so on.

If we may leave tape recorders for a few lines, and take the example of motor cars, we can cite the recent case of a friend whose cooling fan bracket fractured. The fan flew off and lacerated the radiator, and also dented the bonnet for good measure, cutting the fan belt beyond repair in the process. Under the terms of his guarantee, he received a free fan bracket (value about 17s. 6d.) and was obliged to pay nearly £20 for the labour and time involved for repairs. This type of guarantee—"replacement of faulty materials, only: nothing for time and labour"—is a mockery. But it is widespread. And, in the case of a motor car, only the very best of the reputable firms will give, and implement, a full guarantee.

Returning to tape recorders, with the above in mind, we can see that things could be a lot worse. As with most other electronic appliances, the maker's guarantee usually extends for one year, often excludes transport and labour, and stipulates that the valves are covered only by the customary BVA warranty. With few exceptions, therefore, the purchaser should realise that his own peace of mind depends very largely upon the status of the dealer with whom he deals.

Some dealers offer no service at all, and merely route defective machines to the makers. Other dealers offer a period of full and free service (regardless of maker's guarantee). Others give full and free service during the guarantee period, over-riding the maker's contract, and then charge for service after that date. How a dealer operates his service department, in terms of profit or loss, is up to him entirely. The fact that he runs such a department and does good work on or near the showroom premises, is a fact that should influence all potential purchasers.

We feel—and very strongly—that the customer should watch his own interests in this matter; and if he is in any doubt, then he should think again before buying. We also feel that—bearing in mind the very limited liability of an average guarantee—the purchaser of any piece of equipment which is liable to need

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service might happily subscribe to some form of after-sales-service or maintenance scheme, which would cost him very little, but which would guarantee him a specified period (2, 3 or 5 years) of all-in maintenance. Such schemes have been operated very successfully by some of the more conscientious and reputable radio and television dealers, and we recommend the idea for tape recorders. It is *not* an imposition on customers, as might at first be thought by some people. It is an advantage which many can share at small cost, by making it possible for a dealer to expand and maintain a better workshop service for their direct benefit.

We will pursue this service theme, as promised: and in the meantime please see page 581 for the first addresses of dealers who undertake to provide good service for their customers.

COVER PICTURE

THE jumble of bits and pieces on the editorial workbench at the beginning of December gave us the idea for this picture, so we suspended experiments and rigged up the camera. One item of equipment is very new and is, we think, illustrated photographically here for the first time—the latest Brenell deck with N.A.B. spools (which hold 3,600 feet of long play tape). We shall be dealing with this deck later and at greater length in the magazine; but for those who cannot wait for the full details, let us explain that the professional-sized spools are locked to the shafts by means of two pairs of metal plates. When these are removed, the deck accepts all other standard spools.

NEXT MONTH

BECAUSE of the pre-Christmas rush which (annually) holds everyone at panic stations in order to ensure that both December and January papers are completed before everyone—printers, distributors, editorial and advertising staff included—begin to concentrate on Christmas cards and crackers, it has been impossible for us to put the screws on all our contributors in time for us to state reliably what the final contents of our February number will be! Pressure has, however, been applied to contributors Tutchings, Balmain, Bartlett-Still and Golding and others; and all of them have promised to deliver the goods in time for Vol. 4, No. 1. In the meantime we wish you all a really Happy, Prosperous and Peaceful 1962.



John Borwick presents
EMIGUIDES
 6 demonstration tapes that pave
 the way to better recording

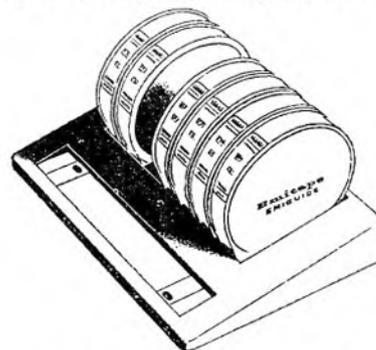
John Borwick, the well-known writer and broadcaster on all aspects of tape recording, has devised, written and recorded six EMIGUIDES. With these, you can *make your tape recordings as good as his.*

How are you on microphone technique? Ever tried trick recording? Whatever you want to know is almost certainly on EMIGUIDES, brought to you by the makers of EMITAPE. On them, John Borwick illustrates the answer to every problem with examples: you hear the sounds you should be getting and those you shouldn't, learning as you listen, how to achieve the first and how to avoid the second.

All six tapes make a first-rate introduction to tape recording but each EMIGUIDE is available separately and is completely self-contained. Each spool can be used again for your own recordings, and is very good value at 8/6.

FREE OFFER

Start collecting your EMIGUIDES *now.* Every spool carries a coupon. Six coupons bring you *free* a special Emi-tray for storing the complete set.



EMIGUIDES BY

Emitape



EMITAPE DIVISION, EMI SALES AND SERVICE LTD,
 HAYES, MIDDLESEX. HAYES 3833

NEWS FROM THE WORLD OF TAPE

Marketing Change for E.M.I. Sound Division

FOLLOWING a revised agreement between Electrical and Musical Industries Ltd., and Thorn Electrical Industries Ltd., the British Radio Corporation will handle all domestic sound products carrying the "His Master's Voice" and "Marconiphone" trade marks. E.M.I. announce that their domestic sound products and components will continue to be available, mainly under the E.M.I. trade mark, for the home and export markets.

The present E.M.I. range consists of the luxury Glyndebourne Mk. IV Stereogram, a range of record players, the recently introduced "Voicemaster" 65A tape recorder, and the EPU 100 precision pickup for the hi-fi connoisseur. E.M.I. components available include loud speakers, playing decks and specialised electric motors.

Reslo PR Microphone



THE photograph shows the Reslo PR ribbon microphone which was reviewed in the November issue. The microphone shown at the top of the review was the Reslo RB microphone. We regret any inconvenience caused to the manufacturers and readers. The price of the PR microphone is £7 10s. (low impedance), £8 (medium and high).

The manufacturers are Reslosound Ltd., 24 Upper Brook Street, Mayfair, London, W.1.

R.C.A. Introduce Tape to U.K.

R.C.A. Great Britain Limited announce that they are marketing R.C.A. Red Seal Professional Quality Magnetic Tape manufactured at the R.C.A. plant in Indianapolis.

With their widespread background and experience in the field of high quality recording, R.C.A. have concentrated on the production of top quality tape. It is planned to extend the present range of acetate and mylar based $\frac{1}{4}$ in. tape by the introduction of instrumentation and television tapes in the near future.

Tape Recorders Demonstrated

A VERY successful evening was had at the "Princess Louise," High Holborn, W.C.1, where the L.C.A. (Distributing) Co. Ltd. held a Trade Show to introduce the latest tape recorders from their current range, and demonstrations were given by the manufacturers of the new Telefunken 95 (59 gns.), new Truvox R84 (59 gns.), the Brenell "M" (88 gns.), and a completely new Deck and Machine was introduced by Veritone Ltd., the Veritone "Sixteen" (107 gns.), which created wide interest when they carried out a completely impromptu live piano recording with a member of the L.C.A. staff.

Among the audience were many leading specialists in the tape recording retail trade, together with several professional sound recording studios. Also on display were 40 other recorders by leading manufacturers. It is the intention of this company to hold further shows to introduce future new models.



Ready for take-off. Instructor and pupil, members of the Kent Gliding Club, use a Grundig TK1 for instructional purposes at West Malling aerodrome.

G.E.C. Tape Recorder

G.E.C. have announced their first-ever tape recorder to complete their range of radio, television and stereo for 1961. It is the G 701 recorder fitted with a B.S.R. Monardeck, with a tape speed of $3\frac{1}{2}$ i/s and two track recording. The deck accommodates reels of up to 5 $\frac{1}{2}$ in. diameter. Other features listed are: Separate tone controls, external speaker sockets, magic eye level indicator, 7 x 3 $\frac{1}{2}$ in. speaker, power output 2 $\frac{1}{2}$ watts. The claimed frequency response is 60 to 8,000 c/s. The size of the recorder is 14 x 14 x 6 $\frac{1}{2}$. Price £26 5s. complete with 600 ft. tape, 1 empty spool, microphone and radio lead. Manufacturers G.E.C. Ltd. (Radio and Television) Ltd., Langley Park, Slough, Bucks.



JANUARY NUMBER

Contents include:
A Modified Mullard
3 Watt Amplifier
Horn Loaded Loudspeakers
Readers' Letters

NOW ON SALE

HERE THERE AND EVERYWHERE



THE thirty-two children of the Pennington Junior Mixed School, Hampshire, who took part in making the winning tape in the Schools Section of the British Amateur Tape Recording Contest, were entertained by Grundig (Great Britain) Limited at a special party held at The Pavilion, Bournemouth, on Monday, November 6th.

During tea, the Grundig Shield was presented as a permanent memento to the Head Boy and Head Girl of the school by Mr. Alan Stableford, Chairman of the Federation of British Tape Recording Clubs, and one of the judges of the contest.

Mr. R. B. Cruse, who submitted the winning tape, and also carried off first prize in the Schools Section of the International Contest, had previously received the Grundig Cup at a special ceremony held in London earlier in the year.

French T.V. Play in Stereo Sound

AT 9 p.m. on the evening of Wednesday November 1st, the French television service presented a play, "The Persians", in stereophonic sound, based on a story more than two thousand years old.

It was an unusual transmission in that there were no left- or right-hand channels, but rather a "front" and a "back" channel. The front channel was transmitted on the television sound channel with the receiver facing the viewer in the usual manner, whilst the back channel was transmitted on FM by the France IV Haute-Fidélité programme, with the radio set up behind the viewer.

The TV sound channel carried the speech, and the FM programme the various sound effects required, as well as a choir.

Before the play began, the R.T.F. introduced a "TV family" who showed how to position the television and radio receiver for optimum results.

This experimental transmission combining stereo sound with a visual image is believed to be the first of its kind in Europe.

Any readers who would be interested in hearing a short stereo tape extract from this transmission should contact either Mr. R. V. Huddleston, 9 College Avenue, Melton Mowbray, Leicestershire, or Bernard Stevens, 74 rue de Trazegnies, Pont-à-Celles, Hainaut, Belgium, for further details.

The Tape Circle for the Blind

WHEN, in 1954, Charles Standen received through the post, from Canada, something that resembled a spool of celluloid tape, he had no idea what it could be. It might have been a reel of film, but as both he and the sender were blind this seemed unlikely; then it suddenly occurred to him that it might possibly be the peculiar substance called recording tape which was just beginning to get publicity in the newspapers as the sound medium of the future. If it were so, it still presented

a problem as he had no means of listening to it. However he managed to borrow a recorder from one of the big companies and settled down to hear what his Canadian friend had to say. Nothing but a jumbled conglomeration of sounds came out, the tape obviously having been recorded on a very different type of machine to the one on which Mr. Standen was trying to play it back, but at least it proved that it was a recording. In order to make sense of it he decided that the only thing to do was to buy a machine of his own, even if it did seem a case of putting the cart very much before the horse!

Once in possession of a machine he became, inevitably bitten by the recording bug and not only did he reply on tape to his friend in Canada, but he wrote in Braille to his many blind friends all over the world enthusing about his new hobby. They in turn became interested, purchased their own machines, and soon taped messages were flying in from the four corners of the earth.

Many Volunteers to Help

Thus the Tape Circle for the Blind was born, for he decided that what interested him would probably be of interest to the others, and so instead of replying to each contact individually he made up composite tapes from all his correspondents and sent them round the group, leaving space on the tapes for more comments as each reel did the rounds. Many of these founder members in Australia, America, Canada and Germany are still included in the circle, and of course there are now many members in this country.

By 1956 the circle had grown to such proportions that a meeting was called for all those able to reach London, to discuss finance. Up to this time all expenses had been paid by Charles Standen himself, but as the organisation grew this was obviously an impossible situation, and it was decided that henceforth each member should contribute twenty-five shillings a year to help cover the cost of postage, damaged tapes, reels lost or broken in transit and other incidental expenses.

The scope of the organisation began to broaden out to include the services of sighted readers and volunteers were asked for through the columns of a tape-recording magazine. Many came forward, and though some have since fallen by the wayside most of those first volunteers are still reading away. Bill Rawle was one who did some sterling work in those early days as Secretary of the Blind Section of the British Tape Recording Society, and he is still a regular reader to-day. In all there are now about twelve regular readers and Mr. Standen has a further fifty or sixty names on his books of people who can be called on whenever needed.

Distribution

With the general tapes, rules are strict. They are distributed on a library basis and a member is only allowed to keep a tape three days, after which, whether he or she has had time to play it or not, it must be returned to headquarters. In the early days the reels were passed on by a rota system from member to member, but the Postmaster General objected to this, and in order to take advantage of the cheap postal rates charged on articles for the blind it was decreed that each reel had to go back and forth to Charles Standen for distribution, thus multiplying his work many times over. When it is realised that he handled well over a hundred general tapes alone in 1960 it gives some idea of the amount of time he has to devote to the organisation. Every package must bear the special label carrying the legend "Tape Reading Service for the Blind" (the title which now embraces all the activities of the Tape Circle) in green print on the front. Likewise all packages have to be left unsealed at one end so that, should the fancy take him, the Postmaster General can at any time extract the contents and have a little listen. This later regulation of course falls into line with the rules governing the printed paper rate in this country.

As tape recording becomes more and more popular the members of the tape circle become more numerous and its activities become more widespread. Other clubs are beginning to take advantage of its services. To quote one instance, a master tape, an hour and a half long, consisting of selected items from the tape circle is now distributed monthly to the members of the Cultural Society for Disabled. All in all it would seem that a chain of happiness was started for many people when that first, small, mysterious parcel plopped through Charles Standen's letter-box way back in 1954.

Grasshopper Group Winter Programme

A glance at the programme shows the following highlights: January 6th, Film show—"Les Visiteurs du Soir" and "Dustbin Parade". January 22nd, Lecture on the Magnasync Nomad by Paul Hansard. January 27th, Experimental Films. February 3rd, Film show—including "The Boy Kumasenu" (Ghana). Every Thursday is production evening. Details from: Hon. Secretary, 35 Endell St., W.C.2.

Voicespondence Appoint New Officers

A THREE-MAN team of administrative officers now fully represent the ever growing numbers of Voicespondence club members in this country. In a recent election for the vacant position as District Deputy for the U.K.—Robert Shipman was voted into office. One of his main duties will be to send out a three-inch "Welcome to Voicespondence" tape which he has made up in conjunction with the U.K. publicity chairman, to extend a hand of welcome and help to new members getting started in this hobby.

Other duties within Voicespondence are carried out by Fred Gazeley who performs a marathon task for the blind members in this country by reading the club publications on to tape, and is the service committee representative in this country.

Third member of the team is Londoner Robert Coote who as publicity chairman is enrolling new members to this International Hobby club which claims the largest number of active members of any tape club in the world.

Simon Equipment Produce Booklet

SIMON EQUIPMENT LTD., have produced a new booklet entitled "Tape Recording is Fun" dealing with tape recording since the earliest days, providing those considering purchasing a recorder with a simple straightforward guide.

The book covers the principles of recording, points to remember when selecting machines and microphones, methods of recording and an explanation of the terms used by the enthusiast.

Tape Recording is fun is obtainable, free of charge from Simon Equipment Ltd., Recorder House, 48 George Street, London, W.1.

Committee Member Appointed

DURING the Annual General Meeting of the London Tape Recording Club it unanimously voted to elect Alan Stableford to the position of President, and Roger Aslin as Vice-President. The Secretary and Treasurer were re-elected for another year, and Ken Blake was given the position of Chairman.

This left three vacancies in the committee and these positions were filled by Bill Groves, Frederick Fowle, and Godfrey Mousset, who has occupied the post of Programme Secretary.

The venue for the club remains at the Abbey Community Centre, but the meetings are now only once a month. This will be on the fourth Thursday of every month. Details can be obtained from T. Devereux, 32 Windmill Lane, Southall, Middlesex.



Rev. R. Hughes (left), President of Lee College, Chattanooga, and the Rev. Douglas B. Gray, conductor of the London Crusader Choir, being interviewed by R. Mayor using a Grundig T.K.1 recorder.

London Choir Visits North America

BRITAIN'S leading gospel choir, the London Crusader Choir renowned for its radio and television recording and prison visiting, have recently returned from a North American tour. Altogether they travelled over 13,000 miles in 17 days, starting in Montreal, and visiting Toronto, Niagara Falls, Georgia, Washington and New York. The choir gave over twenty-five concerts, including some on radio and television.

World-wide Tape Club

BRITAIN'S newest tape exchange organisation "Worldwide Tapetalk" has now been in existence for six months and its membership increase from zero in June to the present figure of over 200 is a worthy achievement due in no small measure, the secretary feels, to the pulling power of advertising, combined with a modest membership fee and the organisation's friendly approach. Any reader wishing to obtain details is invited to write to the secretary: Mr. C. L. Towers, 35 The Gardens, West Harrow, Middlesex.

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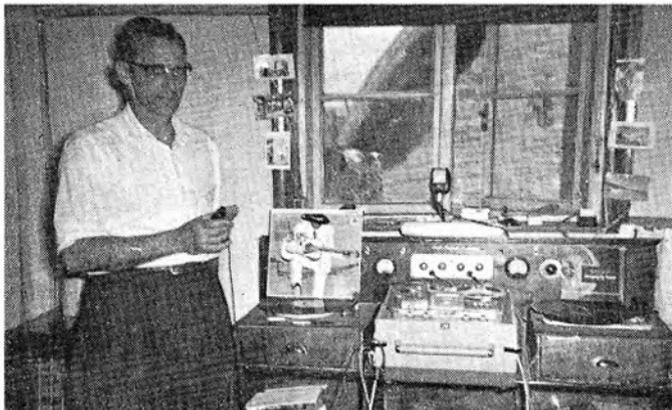


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AROUND THE TAPE CLUBS



Nelson Woerner, a member of the Rugby Amateur Tape Recording Society seen recording in his home at Dunchurch.

TWELVE members of the Walsall and District Tape Recording Club recently visited the Coventry Tape Recording Club and saw a tape and slide demonstration given by Mr. S. Day. It is hoped a return visit will be arranged shortly.

It is now twelve months since the club was formed and at the annual general meeting there were a few committee changes. Prospects for the coming year are good. One of the members has written a script for the Christmas Pantomime to be acted and recorded by members of the club. Once again the club has moved to new premises at The Stand Tavern, Newport Street, Walsall. Meetings are held on Wednesday evenings and times can be obtained from Mrs. J. Walford, 41 Mill Road, Pelsall.

AT the meeting held recently, the Cotswold Tape Recording Society welcomed Mr. Allen and Mr. Cowley, representing Simon Equipment, Ltd., who gave a comprehensive demonstration of recording equipment manufactured by their firm. The principal exhibit was the new SP5, only recently announced by the company; a monophonic recorder with full provision for conversion to stereo record and replay, and with many features not as yet found on the majority of recorders. The SP4, an automatic track-change machine, was also shown, together with the cheaper recorders of the range, the Minstrelle and the Cymbal. Ribbon and crystal microphones were also on show.

Prominent in the demonstration was a recording of the organ of Cheltenham College, made by Peter Turner on Simon equipment—SP4 and Cadenza ribbon microphone. Recordings made by Peter Duddridge of an operatic group and orchestra were also featured.

John Yeates announced that he had been able to secure an interview with Finlay Currie, the actor, who was visiting Gloucester and Cheltenham in connexion with the film "Ben Hur". This is to be featured in the Hospital Service, together with excerpts from the sound track, by special permission of the company. Further details may be obtained from P. D. Turner, Cave Cottage, Oakridge Lynch, Stroud, Glos.

THE recording section of the Richmond and Twickenham Arts Club Little Theatre is now entering the third season of its existence. Quoting popular statistics, if all the recordings made during that time were laid end to end they would add up to just under four miles of tape recorded full track at 15 i/s, an unknown quantity of leader tape and an astronomical number of joints.

The latest task to be undertaken by the members is to provide each member of the cast with a 7 in. 33 $\frac{1}{2}$ r.p.m. disc of their songs in an original show to be given its premiere in the Club's

theatre on 11th December. Copies of the musical score were not available and the producer of the show was relieved of what could have been a serious rehearsal problem. Recently, through the courtesy of the makers, members were given an opportunity to examine the latest E.M.I. portable stereo machine, the RE 301, which is as impressive in appearance as it is in performance. Several members have since been seen making frantic efforts to save money. Further details can be obtained from Miss June Goodman, Arts Club Little Theatre, Oddfellows Hall, Parkshot, Richmond, Surrey.

MR. H. P. SPRING, the Chief Engineer of Grundig (Great Britain) Ltd., recently visited the Coventry Tape Recording Club, accompanied by Mr. Plume, the Southern Area Sales Manager and Mr. Armstrong, the Midland Area Representative. Mr. Spring had brought a number of recorders in the Grundig range—the TK 60 machine, the TK 1 and the latest addition to the Grundig range—the TK 14. After reading the specification of each machine he demonstrated the quality of reproduction of each one in turn. Also on view was the Grundig GMU 3 electronic mixer, and a tape recorded on the TK 60, using this, was played.

After the interval Mr. Spring told something about the likely future trends in tape recorder manufacture and emphasised that for some time there was likely to be no new startling developments. With the aid of a blackboard and some chalk he illustrated in a most lucid way the bias effect on low and high frequencies. This talk could have continued much longer but it was felt that there should be some time devoted to questions and twenty-five minutes was allocated for this purpose. Further details available from Mr. L. S. Day, 41 Moseley Avenue, Coventry.

MEMBERS of the Bristol Tape Recording Club have visited the Bath club with a view to obtaining ideas and planning future recordings in the West of England. It has been decided that events worthy of recording will be duplicated by both clubs and played back later in a competitive spirit. So far recordings made during the last few months have been a "Rock 'n' Roll" session whose four microphones, two recorders and an echo chamber had to compete with guitars playing through amplifiers totalling 200 watts; a harvest festival, recording bells at Wells Cathedral and St. Nicholas, Bristol and a visit to the Bristol Fire Brigade Headquarters.

The Bristol Club would like to hear from other clubs throughout the country in order to exchange programmes. Details can be obtained from M. E. Hollier, 27 Dean Lane, Southville, Bristol 3.

THE North London Tape and Hi-Fi Club recently received a request from a Belgian soldier in a military hospital at Brussels, for sound effects of London to complete a cine-film he made during a visit to England in the summer.

In a letter to the secretary, the soldier, 27-year-old Bernard Stevens, said he would not be able to leave the Army until July, 1962, and asked if members could record sounds of buses, tube trains, aeroplanes landing and taking off at London Airport, the chimes of Big Ben, traffic and people in Piccadilly Circus and music particularly associated with London . . . to give him back the atmosphere of the "wonderful big city."

Mr. Stevens, details of whose equipment appeared in *Hi-Fi News* (August, 1961), says that Belgium has a marked lack of tape recording clubs.

Since then, London Airport has been visited and aeroplane sounds as well as other effects recorded. An editing session will be held to put them in a definite order.

Sound effects were also the keynote of a recent competition, when entries—three-minute stories on tape—had to include the

AROUND THE TAPE CLUBS

following sounds: guitar music, a gun-shot, baby crying, train sounds and running water. Winner was Ray Maslin, of Boreham Wood, already with one first to his credit, who said, "Since I've been a member of a tape club my recordings have improved tremendously, and I'm sure it's the competitions that have helped me such a lot."

Other meetings have included a visit from Alan Lovell, of *The Tape Recorder*, and a quiz programme answered by members of the club. Further details can be obtained from R. Collinson, 30 Ridler Road, Forty Hill, Enfield, Middlesex.

THE members of the **Crawley and District Tape Recording Club** visited the Eastbourne Tape Recording Club during last month and were impressed by the club room and the recordings produced. Mr. F. Whittingham played some of the recordings which featured in the recent Crawley Talent Competition. The meeting was enjoyed by all members and the Eastbourne club will shortly repay the visit.

The club also welcomed members of the Thornton Heath Tape Recording Club to a recent meeting and they have been invited to join them in a social evening at a later date. Details of club evenings can be obtained from R. C. Watson, 32 Southgate Drive, Crawley, Sussex.

WHAT surprised and delighted many of the **Walthamstow and District Tape Recording Society** members was a handwritten note asking operators to be especially helpful to a blind subscriber on the Exchange. This was noticed by members during a visit to the Coppermill Telephone Exchange in Hoe Street, Walthamstow, recently.

Members of the Society took battery portable recorders to the modern Exchange which controls a large part of Walthamstow's telephone traffic and routes calls from the town to London exchanges by dialling codes and by manual operation to Exchanges throughout Britain.

Material collected by the Tape Society members will be edited and compiled into a short feature tape, this together with photographs taken in the Exchange will go into the rapidly expanding library made by the club.

THE **Friern Barnet and District Tape Recording Club** recently presented a programme of entertainment on tape to the local branch of the British Red Cross this was in addition to the regular Hospital Programmes provided by the club.

Members have been asked to assist in recording a commentary for a slide programme showing details of Friern Barnet which will be sent to their twin town of Chaville in France. New members will be welcome and further information can be obtained from A. S. Andrews, 13 Hartland Road, Friern Barnet, London, N.11.

CLAB member A. Greenway of the **South Birmingham Tape Club** has produced a magazine on tape for members of the Boy Scout and Girl Guide movements. This is called "Scouting Around" and is distributed to Scouts in Germany, South Africa, Australia, Ceylon, Holland, America, and to most parts of England. The contents include a discussion on a badge which scouters take (the Wood Badge)—this is divided into two parts—*theoretical and practical*. The first issue of the tape magazine deals with the Rover Scout theory section with the Aston Villa Rover Crew (of which Albert is a member) providing an interesting talk.

Other programmes which have been produced and are to come during the next six months include Jack Skillen and Mrs. Addis (both of Boy Scout HQ London) giving a talk on Rovering and



Roy Coyston, a blind member of the Walthamstow and District Tape Recording Society being directed round the Coppermill telephone exchange by M. Dudley. Members C. Stares and T. Norton look on.

Cubbing respectively. Another contribution is to come from a warrant officer, train conducting in Berlin, who has produced an international Scout tape directory giving details of persons wishing to tapespond in the movement. With Scouting being an International movement Mr. Greenway thinks that tape recording is the natural way of developing world friendship. The tape magazine is produced quarterly and is available to any *bona fide* members of the movement. They should send him a 3½ in. tape (250 ft.) (this tape remains their property) and they will receive a copy of the tape. Albert can also supply copies of the directory to any scouts interested. Contributions on any item in which scouts are interested (from 1-15 min.) are welcome. They should preferably be original (plenty of tips for camp fires etc).

13 years of age and with more know-how than many others Jim Tetlow has produced another tape of sounds which mystified the club members. Together with Dennis Osborne and Albert Greenway, Jim has been touring Birmingham's redevelopment areas to make a cine film. Soundtrack is also being added via a Fi-cord. Further details of club activities can be obtained from E. Judd, 1 Jeremy Grove, Sheldon, Birmingham.

A MOST enjoyable evening was held by members of the **Kettering and District Tape Recording Club** recently, when they visited the nearby, and historical village of Rushton. Portable machines were used to gather a sound picture of the village, also a nearby railway siding was visited. A supper and social evening followed at the Thornhill Arms. The landlord supplying the inevitable story of the ghost that walks the Inn from time to time. All this has made a most interesting tape for our club library. Information regarding club nights can be obtained from A. M. Webb, 93 Regent Street, Kettering, Northants.

AT a recent meeting of the **Phoenix Drama and Tape Recording Society** it was decided to extend membership overseas, and the first two to be enrolled were Mr. Ken Maddocks and Miss Jan Nachnacky of Spokane, Washington, U.S.A.

Both have been tapespondents of the secretary for the past three or four months, and are already taking an active part in the affairs of the club with communal tapes plying back and forth across the Atlantic and America.

The Society now holds its meetings every Thursday at 7.30 p.m. at the Guildhall, Windsor. Correspondence and enquiries regarding the society should be addressed, to the secretary, A. C. C. Smith, 73 Kings Road, Windsor.

By Graham Balmain

ONLY FOR BATS!

NEXT to distortion, more nonsense has been talked about the frequency response of tape recorders than anything else in audio. Now that the fashion for arguing about the subject has passed, or at least retired temporarily in favour of some other topic, it can be examined with perhaps a little less passion than it used to arouse. Although it hasn't, unfortunately, reached the stage where *everyone* can regain a sense of proportion. Students of tape recorder leaflets may have noticed a rather odd relationship between frequency range and price; as the one goes up, the other tends to come down.

Thus at the top end of the scale we find a £100-plus machine with a quoted frequency range of 40-12,000 c/s ± 3 dB, at 7½ in./sec., and somewhere about the middle a £50 odd machine giving 40-16,000 c/s ± 3 dB, at *half the speed* of the other. Still going down, one sees at least one recorder with a range of 50-20,000 c/s (no tolerance quoted), and then the figures are apt to disappear altogether—forestalling disbelief? On this basis, a priceless recorder presumably has an immeasurable frequency range!

Unfair Comparisons

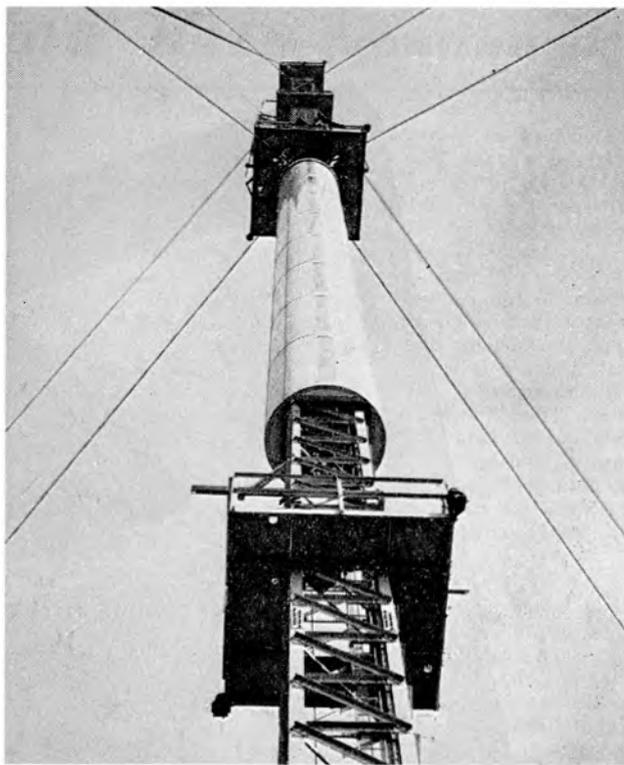
Put this way, these comparisons are, of course, quite unfair to the machines concerned. The heads and amplifiers of the three examples are of similar quality, up to the playback pre-amplifier outputs at least, and most of the price differences are taken up in differing mechanisms, facilities and casework, which are mentioned in the leaflets. But the inexperienced amateur is nevertheless likely to ask himself whether the more obvious characteristics of a domestic recorder—wow and flutter, distortion, noise, and particularly frequency response—should not *worsen* as the price goes down, and to suspect the specifications when they don't. (Not without reason, in some cases.)

As it happens, frequency response is the easiest factor to improve, within limits. CBS has already demonstrated a 1½ in./sec. tape system reported as giving tolerable reproduction up to 10 Kc/s and more. It would be easy enough to extend the frequency range at 7½ in./sec. to 40 or 50 Kc/s, without skimping the mechanism unduly, for perhaps £150. No more boxy reproduction; no transient distortion; everything—but **everything**—emerging with unsurpassed clarity. The snag? It would probably be the nastiest hi-fi ever; I fancy even the bats would be disgusted.

"The Wider You Open the Window . . ."

The B.B.C.'s first chief engineer put his finger very neatly on this problem many years ago: "The wider you open the window", he said, "the more muck blows in". How wide, then, should we open the window, and why do we have to worry at all?

The most obvious limitations on the frequency range of programme material arise in the microphones we use (or our radio transmission/reception set-up) and the loudspeakers through which we reproduce it. Of the two, the input end is the more restrictive. Microphones, for instance, cut off at much lower frequencies than one imagines. Cheap crystal microphones give little above a sharp peak at 6-7 Kc/s, good ones perhaps 10 Kc/s. Moving-coil units give up at about 10 Kc/s, unless you are prepared to pay £25 or more for an extra 2-3 Kc/s. Ribbons behave similarly. Good condenser microphones show up best—at a price—with average responses up to 15 Kc/s. The



V.H.F. from Wrotham—the best radio transmissions, average upper limit, 12 Kc/s.

widest-range unit in my lists is a condenser microphone priced at £110 which is said to cut off at 18-20 Kc/s; not to be confused with those supplied with some domestic tape recorders, which have perhaps half this range.

"Oh well", you think, "there is always VHF radio!" The average cut-off of an FM transmission appears to be about 9 Kc/s, the maximum about 12 Kc/s—if you have a good tuner. AM radio is hopeless, of course. There is nothing worth having above 6 Kc/s, and any attempt to get more merely produces more interference: a 9 Kc/s whistle one degree more annoying than a T.V. line-timebase whistle and a lot of monkey-chatter from the station next along in the band. The B.B.C. can offer a great deal in the way of artistes, orchestras and studios and a vast amount of experience in using them, but if anyone wants a really wide frequency range, he should go and buy himself a condenser microphone and another half-octave in the musical (?) scale. Or better still, a season ticket for the Festival Hall.

In spite of all this, many people (including even hi-fi enthusiasts) greatly enjoy FM transmissions and recordings whose frequency range has been thus restricted. They do not necessarily have cloth ears, but they do recognise that well-engineered reproduction can be *good* even if it is not as *faithful* as it might be. One regular exhibitor at the Audio Fair makes a point in its demonstrations of restricting the upper frequency limit of its tape reproducer firmly, but not too sharply, at 10-12 Kc/s. The only serious complaint so far has been that the *bass* was not quite as firm as it should have been! Otherwise it has received many compliments on the smoothness of its sound, from

(Continued on page 569)

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experts (including this journal's reviewer), musicians, amateurs, laymen, and the girl who does the flowers ("I could curl up on the sofa with that. Not like some here; make you feel you want blinkers on your ears"). One is made to feel like that too often.

"But surely", you may ask, "there is no harm in having a tape recorder with a really wide frequency range? If the input is restricted, the unused part of the range can't possibly cause trouble, and I may need it one day". This may well be true as far as it goes, although I might dispute the bit about the unused range not causing trouble. It is quite common for extraneous ultrasonic noise to filter into wide-range recording circuits, for instance, modulate the tape heavily and leave very unpleasant intermodulation products within the audio range, without otherwise making itself evident at all. And it is even more common for really wide-range input material to do the same thing on its own account.

Domestic Heads

With the kind of heads usually used on domestic recorders it is, you see, practically essential either for the input signal to be rather fiercely boosted at the highest frequencies or for the tape to be underbiased, or perhaps both at low speeds. One cannot otherwise achieve a wide frequency range which looks good on paper. Either increases the risk of gross distortion, and the latter also emphasises the very rapid signal fluctuations (arising from the granular composition of the tape coating and from variations in head/tape contact) which are labelled "modulation noise" and realised as a perceptible roughness in reproduction.

On cheaper "wide range" machines, in addition, it is rare to find the bias frequency set high enough to avoid trouble with intermodulation between it and harmonics of the highest recorded frequency. "At least five times the highest audio frequency" is the working rule. Perhaps we may be forgiven for doubting whether it is always observed, for a high bias frequency is usually expensive.

At this point it may be of interest to see what an authority has to say. James Moir, in "High Quality Sound Reproduction" page 65: "At first sight these data (on the frequency spectra of some every-day sounds and musical instruments) would appear to define the minimum frequency range for which equipment should be designed, but . . . the only pleasure to be derived from a system having an unlimited frequency range is that of studying the response curves and meditating upon the skill exhibited in designing such a system". Later, after observing public preferences for astonishingly narrow frequency ranges in the reproduction of disc and film records, he writes: "The lower inherent distortion levels in a magnetic tape recording system allow the reproducer to be operated with a response that is only 2-3dB down at 12 Kc/s". And this after very carefully-designed tests using first-class professional equipment and impeccable programme sources!

One wonders how much of that £50-worth of 40-16,000 c/s at 3½ in./sec. would have been filtered off by the listening panels who took part in those tests.

Evidently the general run of listeners to canned music find they need blinkers on their ears. The average listener is aurally

ONLY FOR BATS—(continued)

neither a freak nor a moron—on the contrary, he is inclined to enjoy hearing real orchestras, brass bands, jazz bands and so on under conditions which encourage a high-frequency spectrum content well beyond the capabilities of all but the most elaborate reproducing systems, without wincing. Our reproducing systems must be at fault, therefore, at some point or other.

Part of the answer almost certainly lies in small-source loudspeakers. One doesn't like sound beamed out of a small hole as a homogeneous cylinder in which one can't separate what were originally its direct and reflected components; unless (as we have seen) the high-frequency content, which is least easily controlled in a studio or concert hall, is attenuated. This idea is supported by one's greater tolerance of "hi-fi" quality in a stereophonic reproducer, or for that matter in any other arrangement which spreads the reproduced sound over a larger area. Even though the latter cannot possibly separate the original components, it at least gives one's ears the chance to go through the motions of doing so in the listening room.

Intermodulation

However, the fact that the listening panels chose upper cut-off frequencies differently for different kinds of recording system means that inherent system characteristics must have some effect as well. It is also fair to assume that the effect is associated with the part of the range above the chosen cut-off frequency. In a tape system, it may be intermodulation products or modulation noise which cause the trouble, as suggested above, or it may in individual cases be something else. Exactly what it is probably matters less to you than its being there at all. In the circumstances, you will probably agree that it is sensible to accept gratefully the benefits of your relatively distortion-free tape system and not to push your luck too far.

How far? It would certainly be unwise to assume, for instance, that the *usable* frequency range of a tape recorder (as opposed to the *available* frequency range) goes up in direct proportion to the speed, as is so often implied in textbooks on tape recording. You will have realised by now that the usable frequency range is loosely determined by a combination of subjective aural effects, which seem to be truly frequency-dependent, and the objective frequency-response capabilities of the recorder, which fundamentally hardly depend on frequency at all, but on wavelength. (I hope to enlarge on this latter point some other time.)

Some Reasonable Limits

At high speeds, therefore, the subjective factor is mainly in control, and the objective factor at low speeds. In terms of figures, I would personally offer the following as reasonable upper frequency limits (i.e. 3dB or so down) for good domestic reproduction: 12 Kc/s at 15 in./sec.; 10 Kc/s at 7½ in./sec.; 7-8 Kc/s at 3½ in./sec.; and, if you must, about 5 Kc/s at 1½ in./sec., although I am rather doubtful of using this lowest speed for anything more serious than speech or background music at present.

If this shocks your hi-fi souls, I am sorry but unrepentant. I, too, can hear a 16 Kc/s tone if it is forced upon me, but I and probably many other music-lovers would willingly forgo the experience in exchange for something less pretentious but better-engineered; something to curl up with on the couch, in fact. For me, 15 Kc/s and beyond is strictly for the bats, man.

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STRIPE - IT - YOURSELF!

FIRST DETAILS OF NEW MACHINES FOR AMATEURS AND PROFESSIONALS

OUR friends at Zonal (who are responsible for the magnetic striping of the bulk of the amateur and professional cine film in this country), will undoubtedly raise their eyebrows when they learn that the amateur is to be offered a machine to enable him to do this work himself! The machine is the "Cinemaphon" and it is made in Munich, Germany. It is to be imported and handled in England by Miniflux Electronics Ltd.

Primarily Designed for Professional Use

We have yet to see these machines, but we have been able to study the literature and photographs; and they certainly seem to hold interesting possibilities. Nevertheless, the price for the individual amateur is high (£100), and at the current price of one penny-halfpenny per foot for striping, it would require a footage budget of 16,000 (not counting tape supplies) to make it a worthwhile proposition for a private user. However, having made that point in fairness to readers, who may have had their appetites whetted unduly by our headline, let us discuss and describe the machines which are, of course, primarily designed for professional users or (in the case of the amateur model referred to above) clubs or film groups.

The process of film striping is well understood by most of

our readers, for it has been discussed many times in these pages during the past three years. By way of a brief re-cap, however, the most popular method of adding a magnetic stripe to a film is to apply it "wet"—i.e. to spread a mixture of the magnetic oxide and lacquer along a carefully controlled width of the film, so that it extends from the beginning to the end in an unbroken ribbon. As it sets, the mixture thus becomes a part of the whole film—a built-on sound track.

Striped film is obviously the best answer to most sound-film problems, because synchronisation is permanent for as long as the recording is required. Striped film also has advantages over an optical sound track, including a better quality of reproduction. With those facts assumed, it is understandable that many attempts have been made to discover and perfect methods of film striping; and, in addition to the method briefly described in the previous paragraph, there have been several processes for the application of the magnetic stripe. Most of these have been based upon the use of acetate-type magnetic tape, which can be chemically bonded, or cemented, to the acetate cine film.

Adhesive Applied Automatically

The "Cinemaphon" machines exploit this latter method. Reels of recording tape, pre-slit to the required width, provide the sound track. The shiny (base) side of the film is wound into contact with the shiny side of the tape. An adhesive is applied automatically, and the two surfaces are bonded as they pass round a drying drum.

Several advantages are claimed by the manufacturers for this laminating process, as developed in the "Cinemaphon". First because a flat strip of tape is used, the sound track presents a flat surface (and hence a greater area of contact) to the magnetic recording and replay heads. Second, it is possible to lay the sound stripe flush with the film emulsion, thus obviating the need for a second balancing stripe.

This latter facility is available on the professional machine, and may be seen in detail in fig. 1. The special grooving adaptor, with steel or diamond-tipped tool, cuts away a channel in the

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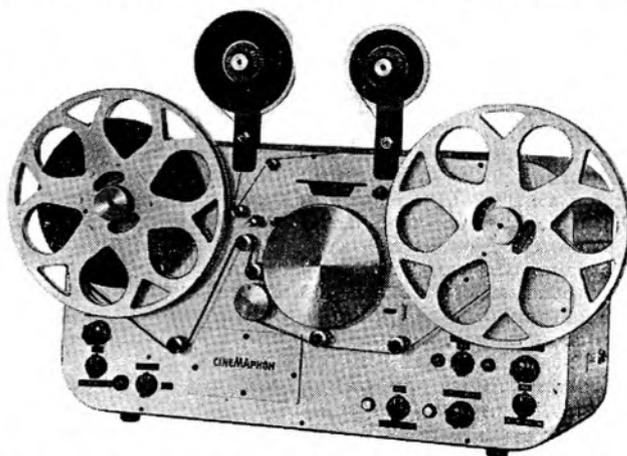


Fig. 2 shows the professional machine loaded up with 16 mm film and also two spools of tape of different widths for the application of a main stripe and a balancing stripe.

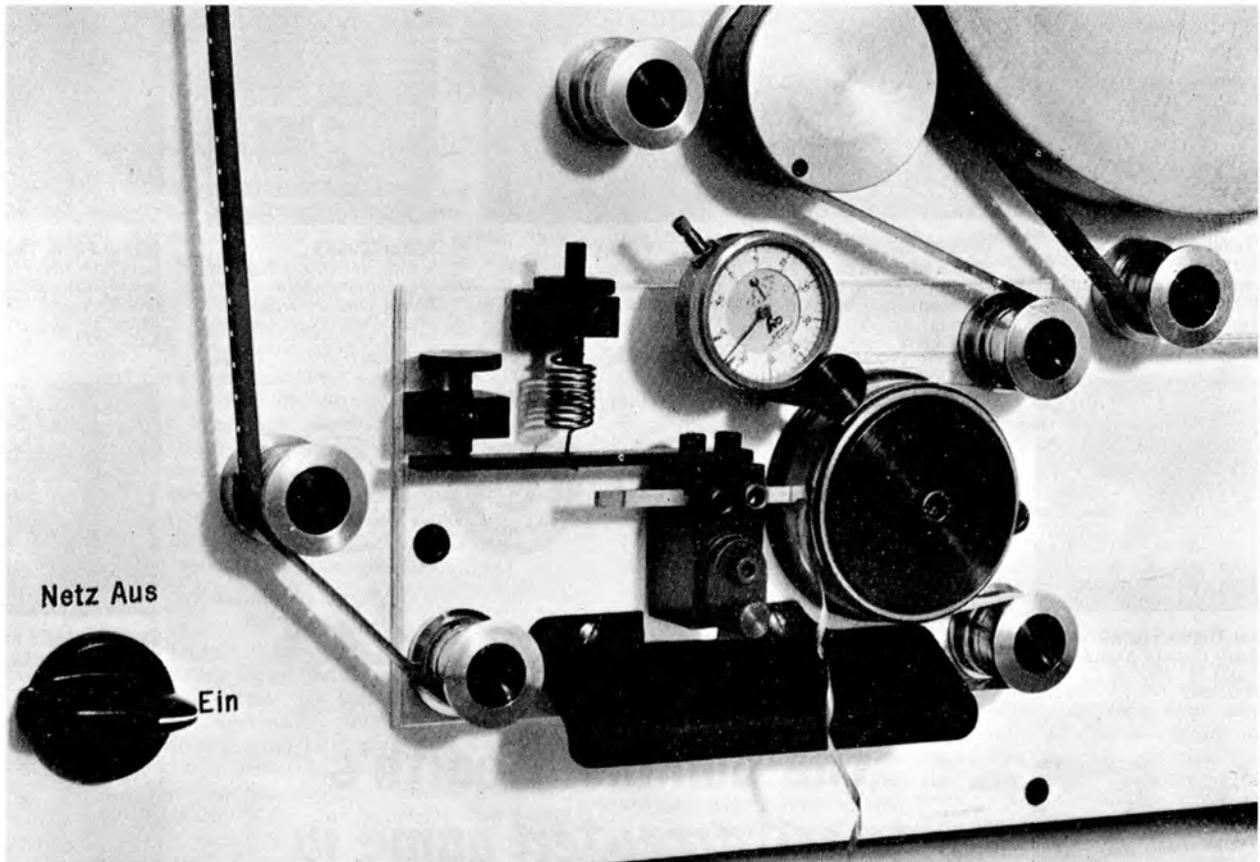


Fig. 1 gives a close-up view of the grooving adaptor which is shown fitted in the model in Fig. 3 below.

film emulsion, so that the tape strip falls precisely into the groove after the application of the adhesive. The dimensions of the groove are controlled within fine limits by micrometer tests and adjustments. Fig. 3 shows the location of this grooving device on the professional model.

As the basis for good lamination must depend very largely upon a good, even application of adhesive, a stroboscope disc is fitted above the drying drum, which provides a continuous "stationary" view of the bonded pair.

The general pattern of operation can be followed from the

photos. The film stock is placed on the left-hand spool, and looped backwards and forwards over the guide pulleys until it reaches the take-up spool on the right. The spool of slit tape is placed on the arm at the top (or two spools, if a balance stripe is to be added). The tape picks up its measured dose of adhesive from a capillary just to the left of the large-diameter heated drying drum. Film and tape strip then meet at the drum, pass round it together, and finally end up as one bonded whole on the take-up spool.

Footnote

This feature is of course a "news item", and must in no way be read as a review or a recommendation. As we remarked in an earlier paragraph, we have not yet handled or seen any of the models mentioned above. If, in the course of time, the importers decide to send us a machine for test and review, we shall report upon it in our Equipment Reviewed pages.—Editor.

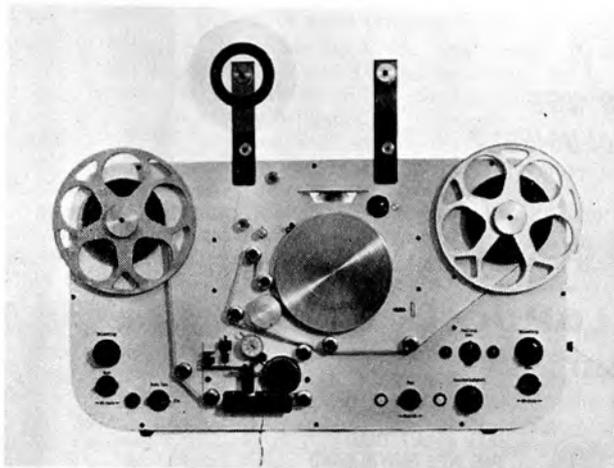


Fig. 3 is the professional type machine, type 8/16SF for simultaneous grooving and striping on the emulsion side of film. This machine can stripe film of 8 mm or 16 mm gauge.

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... tape recorder workbench

Practical suggestions for the tape handyman

by A. Bartlett Still

No. 30 ————— CHECKING AND ADJUSTMENTS

LAST month I made a start on the subject of tape recorder adjustment, getting the right results from a newly assembled series of electronic components. With the aid of a rather uninteresting looking block diagram I tried to split the assembly up into its constituent sub-units, and give some idea of their purpose.

Having finished wiring the amplifier, and connected it to the tape deck, there will be a great temptation to switch on and see if it works; but remember that time spent in checking the wiring and connections once more may save the cost of replacing a costly component. At this stage, assuming all is well, the machine should work—though you may perhaps be disappointed with the results. This is the stage at which a systematic procedure of checking and adjustment should be adopted, such as I shall try to outline. How well this can be done will depend to some extent on the equipment available, but the method I propose (by no means the only one) relies largely on your own ears.

Start at the output stage

The secret is to start at the *end* and work back to the beginning, so let us look once more at the block diagram I gave last month. The first check covers the output stage and loudspeaker, units 14, 15 and 16. Here I suggest that the coupling connection in the amplifier is broken temporarily and a new connection made from a known source, a radio tuner would be ideal. You can now check that the tone control(s) cover a suitable range and that enough volume can be produced without distortion. This part of a tape recorder is so straightforward that in all probability you will just spend time proving all is well, but the time will not be wasted. You will know the range of bass and treble to expect, and be able, later, to rule out the output valve as a cause of distortion. Obviously, if all is not well, there is no point in going further until any faults have been corrected.

The next check embraces units 10, 11, 12 and 13, completing the playback amplifier. For this a tape record is required, either a piece of music, or, if a valve voltmeter is available, a CCIR test tape. The piece of music should, if possible, contain both bass and treble notes over a fair range, and should, preferably, be an item that you *know* so that you can recognise when it sounds right. Such a tape can be kept as a test piece to be used as a check at any time later. The equalising amplifier should have provision for adjusting the bass level, and this can be set as the music is played, remembering what the tone controls effect was on a radio signal.

Adjust for a flat response

If a test tape and meter are used, the meter should be connected at the junction of 13 and 14 and adjustment made for a flat response. The adjustment of the head alignment should be set to give maximum brilliance to the high treble notes. Assuming that all has gone well so far, the playback will be correct to CCIR standards and the machine will replay tape records or tapes from any other standard machine.

Not until this has been done can we turn our attention to the record amplifier, starting with the bias oscillator (7). The first step is to set the oscillator to the correct frequency, and here I would refer my readers to my article in *The Tape Recorder* of last October, devoted to this subject.

Next, and remember that the order of all these tests is important, we can set the bias level. This, quite frankly, can be a tedious business, but perseverance is necessary since the whole recording performance will depend on it. Provided that the machine will record, we can go ahead. Two things are necessary, a 1 Kc/s source and an A.C. voltmeter. The former can be an oscillator of the simplest kind or the BBC tuning signal on the radio, but unfortunately this does not last for very long. Almost any A.C. meter will do because relative values at this one frequency only are all that are needed.

Make a recording at a fairly low level and note the playback voltage as indicated. Take care now to touch nothing except the Record/Replay switch and the bias adjustment. Adjusting the bias each time, make a series of recordings until you have found the bias setting that gives maximum replay signal for the set input signal. The final bias setting we shall use is greater than this, so *increase* the bias feed until the output signal obtained, all other conditions still the same, has fallen by 2dB, which is 0.8 times the maximum value you obtained. This is "optimum bias" which gives us the best compromise between tape sensitivity and distortion level. To set the distortion level we should now turn our attention to the Record Level Control (3) that we will vary and, still using a 1 Kc/s signal, try to make a recording at the level at which audible distortion has just been introduced. This is easier than it sounds, as a distorted waveform sounds distinctly "edgy" and this is noticeable at about 6-7 per cent. Turn the Level Control back slightly and then set the Indicator to show full record level at that setting. If such a signal is never exceeded distortion will be kept in reasonable bounds.

Setting the record amplifier

We now come to the setting of the Record Equalising Amplifier (4). This will (or should) have provision for altering the treble pre-emphasis used in recording and should be set according to the results of a series of test recordings of music from (say) the radio. This is admittedly not quite as easy as setting the replay amplifier, because you have first to make the recording and then replay it to find the effect, hence the reason for setting replay conditions first.

Now all this cannot be done in five minutes, but I will guarantee that if you follow this procedure carefully you will get the best out of your equipment that is possible without proper test gear. But, lacking such test gear, do *not* expect to improve a commercially built and aligned machine.

If you have any queries concerning these testing principles, drop me a line—I know that I cannot cover the subject fully in the space available. But, please, any questions about a *particular* adjustment on a *particular* unit should be referred to the designer who knows it so much better than I do.

Correcting a circuit

Finally, for this month, I must start 1962 with a correction and apology. In the February issue last I gave a circuit for an electrical auto-stop. Unfortunately the electrolytic capacitor has been shown with its polarity reversed. Connected in this manner the unit may work, but the capacitor could easily break down preventing correct operation. I should have checked my drawing more carefully and do apologise to any who may have been inconvenienced or puzzled by this. Doubtless my New Year Resolution is obvious!

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AN ADD-ON CINE SOUND UNIT PART TWO...THE ELECTRONICS

LAST month I described a simple tape attachment which could be fitted to any 8 mm projector to allow commentary and sound effects to be added to a short 8 mm film. The portable recorder electronics are very suitable for recording and for playback pre-amplification, and, like the earlier unit, will give a quality limited mainly by the microphone used. However, in this application something less ambitious would suffice, as the main requirement is for good clean intelligible speech quality which will over-ride the projector noise together with small compact units which are easy to handle and set up for a recording session or film show.

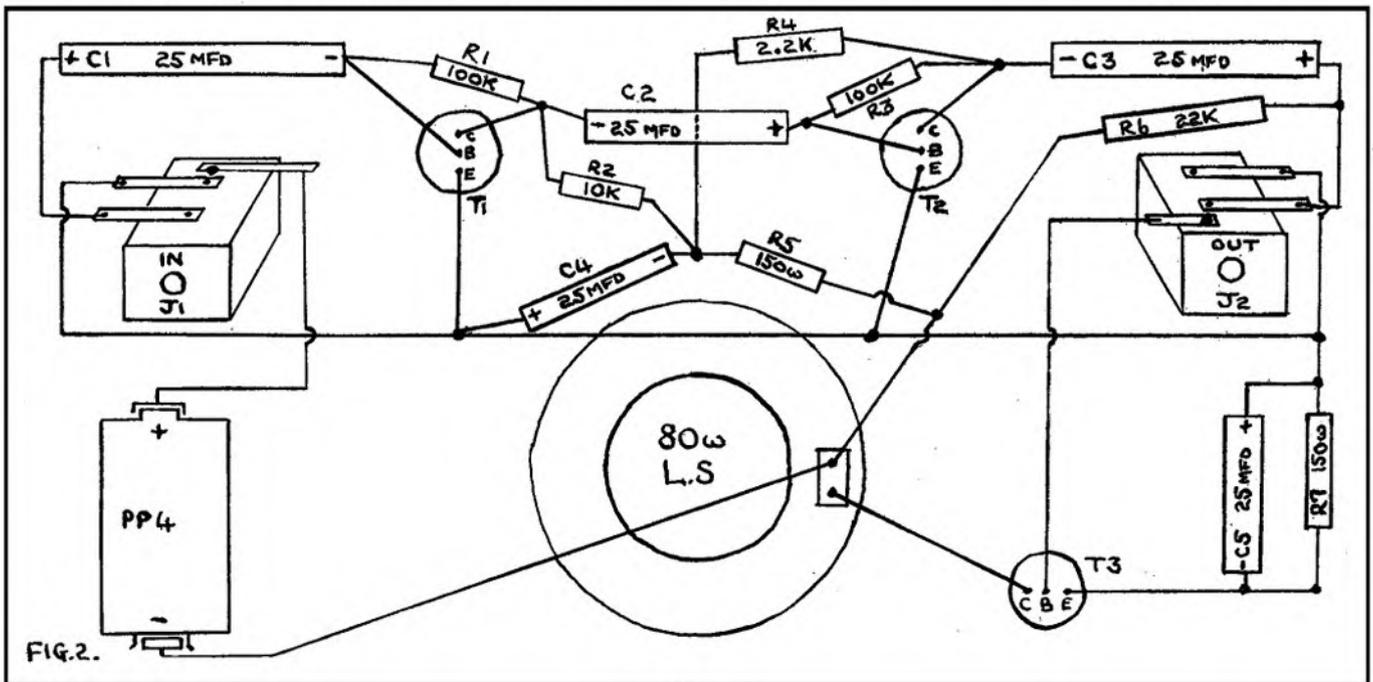
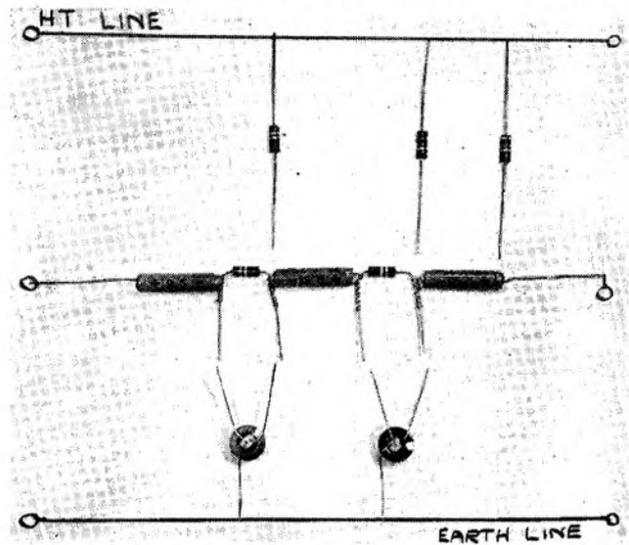
The microphone selected is a special Acos 600-ohm unit Type Mic 46 fitted to the standard Mic 40 case. Let me emphasise that it is *not* the standard Mic 40 crystal microphone which *can* however, be used with an external matching transformer to match the low input impedance of the transistor amplifier. Such a transformer was described in my Portable Recorder articles.

In the prototype model shown in the photograph this is contained in a small plastic case, but it can, if desired, be made up in any convenient form. All necessary switching is done by the jacks; for recording the microphone is plugged into the left-hand input jack and the projector head unit into the right-hand output jack; for playback the projector is plugged into the input jack and the recording is heard on the speaker, which can be placed near the screen for best effect. The microphone can also be used as a headphone and used for checking a recording, or the output jack can be used to feed a larger power amplifier and speaker where a bigger audience has to be covered.

The circuit is very simple and consists of a two-stage transistor amplifier for recording and playback pre-amplification, with a power transistor feeding a 3-inch speaker for family level listening which comes into action when the low-level output jack is withdrawn. D.C. bias is used for recording as the slight background noise is masked by the projector noise. Gain is fixed so that normal commentary speech a few inches from the microphone is reproduced at about normal voice level by the loudspeaker during replay. Fig. 1 shows the circuit. It will be seen that the battery circuit is broken when the input jack is

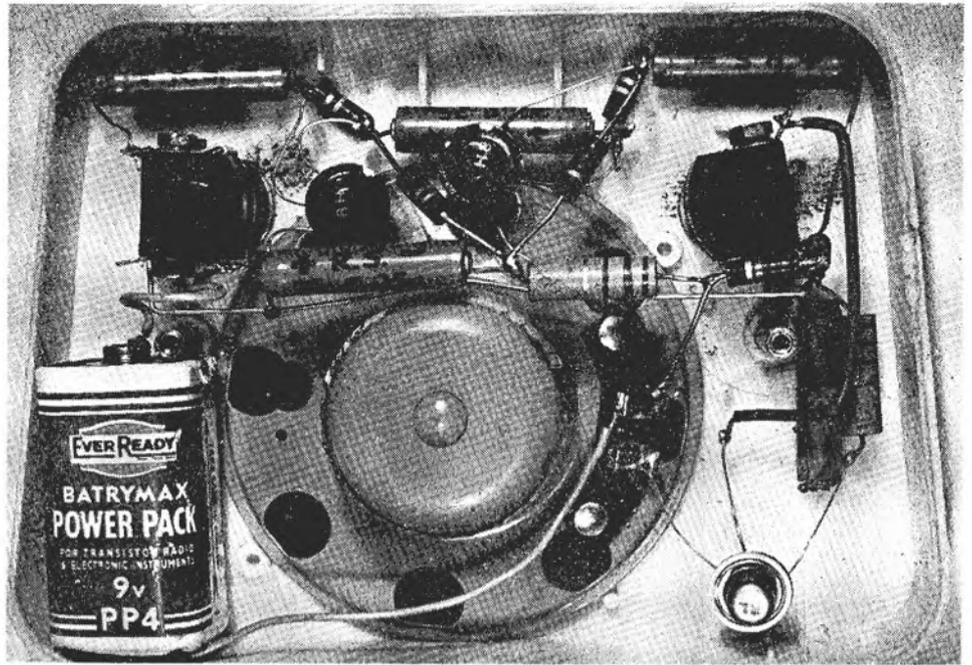
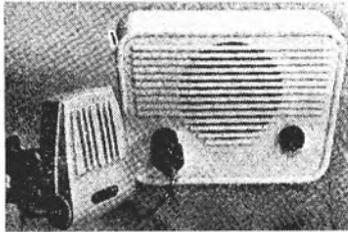
withdrawn so that there is little risk of running down the battery by forgetting to switch off. The current drain on the battery is 2 to 3 mA during recording and output jack replay, and rises to 15 or 20 mA when the output stage is used.

The output stage may be omitted if pre-amplifier facilities only are desired, and an external power amplifier is available; this leads to considerable economy because the special 80-ohm speaker is subject to purchase tax and is the dearest single item in the parts list. The relatively high voice coil impedance allows the speaker to be wired directly into the collector circuit of the output power transistor, with resultant efficiency due to the elimination of the usual output transformer. If, however,



AN ADD-ON CINE SOUND UNIT

PART TWO.... THE ELECTRONICS



a more normal 3-ohm speaker is available, it may be used in combination with a suitable matching transformer.

One of the photographs shows the internal wiring of the speaker box, and fig. 2 is a line drawing which should make the connections to the various components quite clear. A further photograph shows the pre-amplifier components in "straightened-out" form. It is suggested that the centre line of components be twisted together exactly as shown, paying particular attention to the polarity of the 25 mfd electrolytic condensers, and then folded slightly to go into the case and wired between the "live" contacts of the input and output jacks. The transistors have also been turned over to show the connections clearly.

The collector electrode of each transistor is marked with a white spot. The transistors can easily be damaged by bad soldering where the heat from the iron travels up the wires to the sensitive germanium element. For initial tests it is strongly recommended that the transistors be hooked or twisted lightly into position, so that they may be interchanged or replaced without a lot of unnecessary soldering. When it is established that all is well they may be fixed finally in position by gripping each electrode wire firmly with a heavy pair of pliers, to act as a heat sink, and then soldering by a brief application of the iron at the twisted junction point. If you are at all doubtful about your soldering ability—leave them twisted—it's cheaper!!

If the amplifier-speaker unit is working properly a slight hiss

should be heard when the microphone jack is partly inserted into the input jack socket; when pushed fully home there will probably be violent acoustic feedback between the loudspeaker and the microphone, giving rise to a high pitched whistle which changes in pitch as the microphone is moved. If the microphone is moved away from the speaker to the full extent of the lead, feedback should only be slight, and, in a well-damped room it should be possible to use it as a miniature "public address" system to do live commentary to the film. If feedback still persists it may be necessary to place the microphone just outside the door and check voice quality by having someone speak a few inches from the microphone and listen with the door nearly closed to avoid acoustic coupling between the two units.

If the headphones are available, operation of the microphone and pre-amplifier may be tested by plugging in to the output jack. If the projector unit is loaded with blank tape and plugged into the output jack it should be possible to get some kind of results by running the projector and connecting the microphone. Proper results will not be obtained, however, until the tape is prepared for recording by passing it over a magnet, so that it is saturated in the right direction to match the polarising current in the record head (see Experiment 9 in "Magnetic Recording for Beginners" or earlier articles). Alternatively, in next month's instalment we shall again discuss erasing, fading, mixing, superimposing, etc.

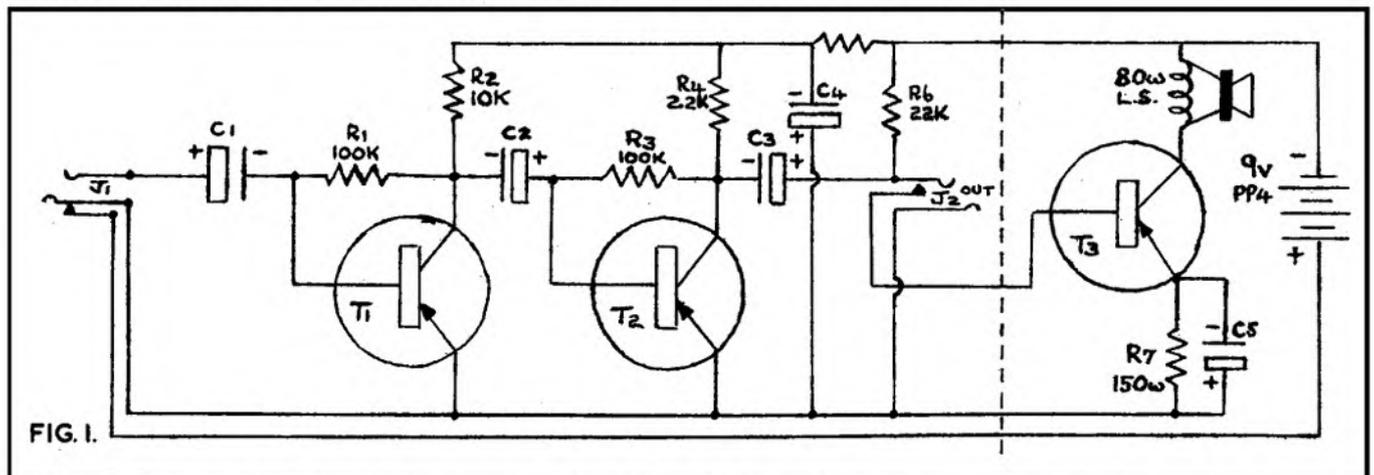


FIG. 1.

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SOUND and CINE

Blimps, Barneyes and Tea-Cosies

by Richard Golding

THE problem of shooting short dialogue scenes for later insert on in a film containing narration, music and effects or just effects is highlighted by a question from reader J. Robson of Newcastle. "Is it possible", he asks, "to insert short lengths of perforated tape into a reel of ordinary tape and still get lip-sync with the *Cinecorder* system"? The reason for this query is that expense is involved with the higher costs of perf tape and, quite naturally and in common with many other readers, J. Robson wants to keep his expenditure down.

Now the success of the system employed by the *Cinecorder* depends on the constant speed of the tape recorder, the correct calibration of the camera to the tape timing indicator (which is sprocket driven), and a true synchronised start of both recorder and camera. The indicator is extremely accurate but it does not drive the tape: but once the camera has been calibrated to this counter, both camera and recorder should keep in perfect step throughout the sound take.

As the tape is driven by the normal capstan method there is no reason why the sprocket attachment on the tape timer should not be removed and replaced by an ordinary capstan for running ordinary tape with spliced-in perf tape inserts, so that synchronisation can be obtained with the usual loop-coupler. With a top-class coupler such as the *Baur*—and a true synched start—this could provide good results; but it does mean that one of the vital links in the system is removed. For the system to remain completely tight, then the correct procedure should be carried out to the full; in other words, on playback the tape should be perforated throughout, the *Cinecorder* tape timer should carry the sprocket attachment, and the loop-coupler should be modified accordingly.

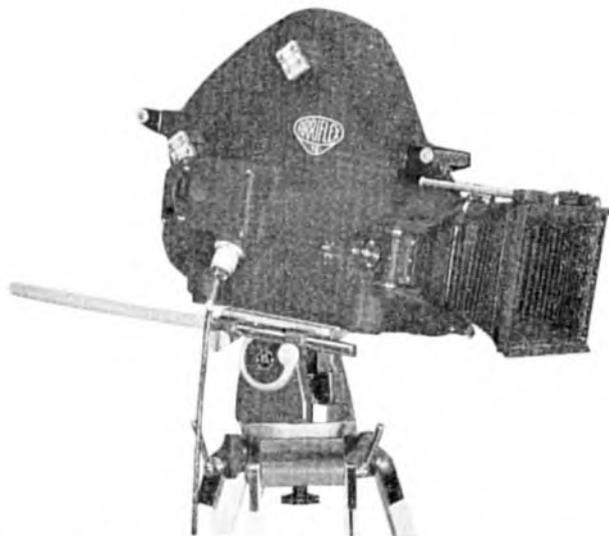
Lip-sync under any circumstances is difficult to achieve, and with a system such as the *Cinecorder*, where there exists no interlock between mechanisms after the synched start, I would suggest that the correct procedure be carried out. Film making is a rather expensive business—even on 8 mm., and although d.i.y. and short cut methods can help out from time to time, to achieve desired results, the expense has to be met.

Soundproofing the camera

Lip-sync really means the post synchronisation of a voice to match the visual lip movements of the actor speaking. However it is a term that is misused everywhere in amateur and professional circles, both here and in the U.S.A., and is now taken to mean *both* live sound recording and filming on set or on location—and studio post synchronisation, where the speakers listen to guide tracks through their headsets while recording short lip-sync passages to the screened film loops.

The professional has none of the problems of the amateur whether (a) using the *double system*, which employs sound recording equipment set apart from the camera but working in interlock, or (b), the *single system* where the recording mechanism is within the camera housing and the sound is recorded magnetically or photographically on the same film at the same time that the picture is being photographed. Lip-sync, for him, is taken for granted and his apparatus either contains its own soundproofing or is fitted with a heavy blimp.

The normal professional blimp is usually constructed of some material like cast-magnesium alloy. The internal walls are



The Arri 16 Blimp is of precision-machined aluminium alloy, the inside is lined with alternating layers of sheet lead and goat skin, and finished in grey corduroy.

lined with corduroy velvet and all doors are secured by heavy clamp locks and sealed with foam rubber. There is external control for focus and aperture. Sometimes the regular cover and optical system is removed from the camera and replaced with a special cover which permits reflex focusing when the camera is blimped.

The custom-made blimp is a fairly heavy piece of apparatus, and for reasons of convenience a sound muffling "barney" is often used. The barney is usually constructed of kapok, lead foil, flannel and foam rubber covered with heavy duty green duck. It is light and fits snugly over the camera, and it reduces camera noise to about half. This is an extremely useful unit but is quite expensive, costing about £30 at least.

Simple experiments

Camera soundproofing is a set part of the professional scene, but for some reason or other it seldom enters the amateur's mind, and it is hard to find a film with lip-sync inserts that does not have some sort of camera whirr in the background. The reason for this is not hard to find. The ready-made blimp for the amateur does not exist, and if it did the normal amateur is not really aware that he needs one. The fact is that he gets so used to the noise of his camera that he forgets that it is there, and when on playback he hears the noise in a new context (that is, away from the camera and part of a complete film) he is liable to dismiss this lightly as room sound or distortion.

A simple experiment that can be carried out almost while you sit reading this article is to see how much an ordinary cushion will deaden the sound of your camera mechanism. It will take only a moment for you to flatten the cushion and fold it around the camera. If you press the camera release while alternatively opening and shutting the cushion you will hear the immediate effect of your improvised barney. An extension of this test would be to place a tea-cosy over the telephone the next time it rings. The ringing will of course be much louder than your camera noise, but it will be deadened to a certain extent just the same.

The tea-cosy method is just about the simplest way of reducing camera noise, it is extremely easy to make, all that is needed are two extra holes for lens and viewfinder, and the remote control cable release can hang down from the cosy body. It may look a bit weird but it is certainly better than nothing.

The amateur blimp

There are ways and means of avoiding the picking up of camera noise, but these mainly concern the placement of microphones. On location it is possible to eliminate all camera

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This Unit is supplied new and boxed—with spare connecting cables—Cut-Out Template and Tape Spool.

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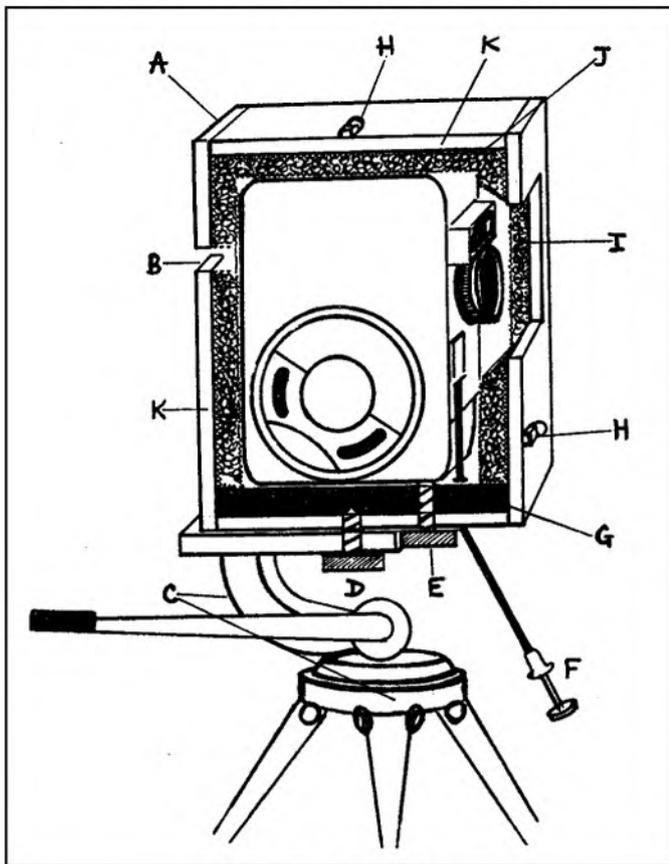
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Sound and Cine — continued

noise by using a microphone in a parabolic reflector, and by angling it so that there is some air displacement between the two instruments; but in the confined space of a studio a blimp is essential.

Pioneer Productions, the South London film group headed by Peter Davis of Balham, and responsible for some very successful



Design for an 8 mm. blimp

lip-sync films, have just received delivery of their second blimp—made to their own specifications by a small local engineering firm for under £10.

A blimp of this order could consist of a casing of solid cast aluminium, lined with thick felt and sponge rubber and containing a dural platform strong enough to take both camera and motor. The window could be of $\frac{1}{4}$ inch plate glass and the whole of the front of the blimp could be detachable by means of slackening off self-tightening catches. If anyone felt disposed to have such a blimp constructed, Peter Davis would be only too pleased to help them out with specifications. I have his address and will pass your queries on to him.

Design for the 8 mm. blimp

On the other hand, a do-it-yourself blimp, designed for a normal 8 mm. camera, is very much cheaper and can be made easily at home. See the line drawing. The outer casing (A) can be of three or five plywood and the main soundproofing material can be of $\frac{3}{8}$ or $\frac{1}{2}$ inch sponge rubber (J). The overall dimensions should be as small as possible allowing the camera to fit snugly into the blimp but without fouling any working part or shielding any part of the optic system. The window (I) can be of $\frac{1}{4}$ inch plate glass, but it must be cemented to the box in such a fashion that it is completely airtight and parallel to the lens surface. A lens hood made from a piece of painted card

may be fixed to the window exterior. The glass must be kept clear of smears and dust at all times.

The viewing aperture (B) must be treated in the same manner; but as some camera viewfinders operate only if the eye is in almost direct contact, it may be necessary to bevel the aperture edges to allow the eye to get closer. In some extreme cases it may be necessary to build an auxiliary tube or double frame viewfinder that can sit at the side of the box.

The camera should be held firmly by the blimp screw (E) which pulls it firmly home into the toughened rubber base (G). This layer should be more substantial than the foam rubber, but should not be too hard, otherwise camera vibration may be transmitted to blimp and tripod. The tripod screw (D) must fit the blimp bush perfectly or the blimp will wobble, and if there is no easy way to fit a bush then a nut and bolt must be used. The tripod must be fairly heavy and the pan and tilt head should be strong enough to take the extra strain (C).

The fitting of a cable release (F) is essential for obvious reasons. The lid is best fitted to the side which opens on to the camera winder. It can be hinged to open in any direction but when closed should be airtight. This can be done by fitting a rubber gasket over the box edges (K), and applying tension by means of self tightening catches (H).

"Intermezzo in the Night" and UNICA

Readers may remember the account in the September issue of *The Tape Recorder* I gave of Per Ormer's struggle to complete a film in one weekend and how he went on to win the Norwegian National Competition three weeks later. "Intermezzo in the Night" has now been awarded the second prize in the scenario section of this year's UNICA Congress at Mulhouse, France. Per Ormer is a familiar figure in London Ciné circles and is expected shortly here on holiday and he will be bringing his film with him for screening to some clubs in the London area.

The Grand Prix of UNICA was taken by our old friend Herman Wuyts of Antwerp with his genre film "Aether". Herman and his "Filmgroep 58" have now made over 60 films in the last three years and number, in fact, only twenty-five members, each paying just over £2 each as annual subscription. This money pays for the running expenses of their studio, fortnightly discussion meetings at a café and entrance fees for various competitions. Club sponsored films are not popular for it is considered that a team paying for its own film has greater incentive to see the production through to a successful end.

Sound alphabet

Abstract sound: bears no relationship to real life and therefore can only suggest a certain atmosphere in setting a mood for a scene.

Accent: is the emphasis of a certain sound to give added interest or special impact somewhere within a flat or uniform section of the sound track.

Acoustics: refers to the science of sound but is used to indicate the particular characteristics of reverberation in a sound recording room or studio.

Assembly: is the first step in sound editing where the separate sections of the sound track are dubbed together in required sequence.

Background: is any layer of sound used as subsidiary matter behind or incidental to the main sound source to establish atmosphere. For example, noises of a street market, a railway station, etc.

Background noise: is any unwanted or unintended sound that creeps into a recording session, sometimes this noise is inherent in tape that has not been properly demagnetised.

Baffle: is the name of a portable flat or barrier soundproofed in a fashion to dampen a too live studio.

Balance: refers to the correct placement of the component parts of the sound sources in a recording session and the location of the various microphones in regard to this.

To be continued.



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★ **C. W. Hopwood & Sons**, 23 Church Street, Basingstoke, Hants., inform us that they have on their staff engineers of considerable experience with tape recorder servicing. One of their staff has the Grundig servicing diploma and has been on other manufacturers' courses, so as to keep up to date on the latest models.

* * *

★ **J. Collier & Sons Ltd.** of 421, 429, 431 Brixton Road, London, S.W.9, rebuke us for a note in our November editorial column which, they feel, is unfair. So we quote their Managing Director, Mr. S. C. Collier, who writes as follows: "I should like to draw your attention to the fact that we, as a furnishing company with radio and electrical departments, offer servicing facilities which we believe to be as good as can be obtained anywhere, including the specialist radio and electrical dealers. We have a Service Department with Service Manager, fourteen fully qualified engineers and fourteen service vans. We feel that on reflection you will agree that your comments are quite unfair and we feel it not unreasonable to ask that in addition to publishing this letter you should make editorial reference correcting your statement".

Sorry, Mr. Collier! We are delighted to learn of these facilities and have pleasure in letting our readers know about them. **Editor.**

* * *

★ **The Tape Recorder Centre**, 266 Waterloo Road, Blackpool, which is under the enthusiastic direction of Mr. Colin Braddock, has also informed us of its willingness to co-operate on these matters.

★ **City & Essex Tape Recorder Centres**, of: 228 Bishopsgate, E.C.2; 2 Maryland Station, Stratford, E.15; and 205 High Street North, East Ham, E.6, notify us that they offer a comprehensive two year free servicing guarantee to all potential customers. They state "... we are more than able to comply with your requirements. Our service department is normally staffed by two full time experienced tape recorder engineers together with a junior engineer. All repairs are collected from the branches and serviced in our Central Service Department which is entirely independent and separate from the shops".

* * *

★ **The Tape Recorder Centre Ltd.** of: 447 Green Lanes, Harringay, London, N.4 (Head Office), with showrooms at: 75 Grand Parade, Harringay, Green Lanes, London, N.4, and 82 High Holborn, London, W.C.1, write: "I have read with interest your editorial in the December issue of your magazine, and am one hundred per cent. in agreement with you that retail outlets of tape recorders should have service facilities in order to give an adequate after sales service. We, ourselves, employ three engineers plus secretarial and transport personnel in our Service Department. We undertake the servicing of all makes of tape recorder where spares are available, and also carry a stock of spares somewhere in the retail value of £1,000.

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our readers write . . .

. . . about large hubs

From:—**J. R. Beswick**, 20 Chapel Lane, Stretford, Lancs.

Dear Sir:—Why is it at all necessary for the manufacturers of tape spools to make a large area of waste in the centre of the spool? If only this was filled with tape what an improvement there would be in the playing time of the tape. On some reels the space is as much as 2½ in. in diameter. Surely it would not be impossible to fill up this gap with tape and in this way it would be possible to get another half an hour's recording time on a reel.

I own a battery portable recorder and am restricted to 3¼ in. reels and even though the machine runs at 1½ in. per second this only allows half an hour per track. This is useless for recordings of any length where there is no time to turn the tape over in the middle. I am sure that many other owners of portable recorders, like myself, would find great comfort in that extra few minutes recording time per track. *Yours truly,*

* * *

. . . about sound effects

From: **D. Milburn**, Pegasus Film Unit, 1 Micawber Court, Windsor Terrace, London, N.1.

Dear Sir:—Members of this group are producing a war fiction sound film, and need recordings of the following: bren gun firing, sten gun firing, German Schpandeur machine guns, German Schmeiser firing, and any battle sounds such as artillery shells falling and explosions.

If any reader of your magazine has any of these recordings that we could borrow to have copies made, it would greatly assist us. Tape speeds can be 1½, 3¼ or 7½ i/s, postage will be paid both ways and great care will be taken with the originals.

Yours faithfully,

* * *

EDITOR'S NOTE

Due to the letters we received on servicing tape recorders, a number of readers' letters have been held over until next month.



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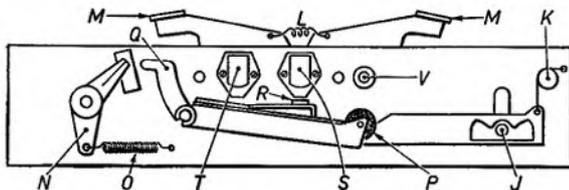
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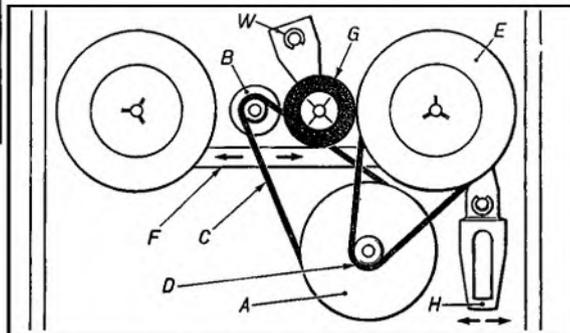
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TAPE RECORDER SERVICE

by H. W. HELLYER



No. 1
The BSR
MONARDECK



SERVICING the modern tape recorder is mainly a matter of common sense. Unlike radio, television and electronic equipment, tape recording design techniques have moved, in a comparatively short time, from their clumsy beginnings to functional, efficient, and, in many cases, artistic adjuncts to home, office and business. But common sense alone is not enough. Whereas any competent engineer or enthusiast can patiently track down trouble, the quest is made simpler by the provision of fundamental information. In our case this includes deck layouts, switch operations and circuit diagrams.

These are not always available, and because a number of manufacturers have gone out of business, while others have no data available, and yet others are only prepared to deal through an agent, this series of articles is intended to spotlight the principle features of particular domestic machines. Special servicing procedures will be detailed, where they are applicable. Such figures, measurements, etc., that are given will be those recommended by the manufacturers.

There could hardly be a better place to start than at the immensely popular, but quite unpretentious deck made by Birmingham Sound Reproducers (BSR), and brought out with little change for the past three years under the trade name "Monardeck". Official title, TD1/2 or TD2. The keynote of this design is simplicity, as a glance at the "works" soon makes obvious.

Access to the deck plate is obtained by removing the top cover plate. To do this, take off the push-fit knobs and head-cover, taking care that the pulling movement for the latter is directly upwards—a certain amount of stiffness is to be expected; then there are only three 4 BA screws (filigree headed) to remove and the deck is exposed.

Actually, there are two decks. The lower, main assembly bears the spools, motor, idler pulley, flywheel and coupling rods. The upper, sub-assembly, carries heads, capstan, pinch wheel, operating levers, and beneath it, the brake levers.

Fig 1 shows how the deck looks when stripped and ready for our action. Only the essentials are shown in the drawing, which is not exactly to scale. Beginning with the drive, this is provided by a small motor of conventional design, with a dynamically balanced rotor. In the event of motor breakdown, check first that the fault is not an open circuited joint at the end cleeks of the coils. A little judicious work with razor blade and soldering iron can save delays and postage. Similarly, if the trouble has been a burned out coil, always check for possible external causes *before* completing the replacement.

These motors, like most modern types, require the absolute minimum of oiling. Indeed, more damage is caused to rubber belts, idler pulleys, drive tyres and such by the indiscriminate flourishing of oilcans, than by most normal wear and tear. Concentrate on keeping moving parts scrupulously clean, and you won't go far wrong on electro-mechanical equipment.

The drive pulley (B in **fig. 1**) is held on the motor spindle by a circlip at the top. Above the grooved section in which belt C runs, is a fixed tyre. This is used to obtain direct drive to the L.H. spool when in the "Fast Rewind" function. The rewind time thus obtained is in the region of three minutes for a full 5-inch spool.

The belt from pulley B drives capstan A, which is a 3-inch

diameter, $\frac{1}{4}$ -inch flywheel with central capstan spindle mounted so that its greater length is, like an iceberg, out of sight. The bearing sleeve is a cylinder more than two inches long, which may account for there being no argument with the published wow and flutter figure of 0.4 per cent., r.m.s. total. Call it a contributory factor, if you like. This main drive is around the flywheel rim, and the secondary drive is from the step D on the capstan, via another elastic belt to the take-up spool E. Again, a more direct action is obtained during "Fast Forward", when the take-up spool is driven by the engagement of idler pulley G on its swivel bracket.

This is brought about by a sliding action of the coupling bar F, which moves the spools in opposite sense to the motion of lever H. The main selector control is responsible for operating this lever. But, as can be seen from **fig. 1**, the slot enables rod J to travel freely in a forward direction for both Recording and Replaying. Thus, the drive is forward, via capstan, belt D and spool E, whilst the tape is driven by normal engagement of the pinch wheel P and the capstan (shown at V in its re-assembled position).

At the same time, the main bracket operated by J is pivoted forward on its left-hand end. This brings the pressure pad R to bear and moves the tongue Q in opposite sense (i.e. to the lower direction). This tongue locks the upper end of bracket N in the Record position. The spring O normally holds it in the "Playback" position. This simple arrangement does away with a safety lock for Recording, but can lead to erratic action if spring O weakens or is damaged. At its worst, this can cause inadvertent recording.

There is quite a positive movement on this main bracket, reminiscent of the earlier Philips' arrangement. This has the salutary effect of leaving plenty of clearance between heads and pinch wheel when the mechanism is at neutral. As stated, contact of the tape with recording head S is aided by pressure pad R. Contact with the erase head T is made by the positioning of the tape along the guides and the record head face. This eliminates a good deal of friction and has not, to my knowledge, led to any complaints in practice.

Whilst still on the subject of the "Record/Replay" position, it might be as well to mention the spring K, which is located at the right-hand end of the sliding base of the bracket. Fracture of these springs has several times brought machines to our workshop. The effect is that the bracket tends to ride "up" towards the R/P position, even when Rewind is engaged, causing intermittent engagement of brakes and a general snarling up of the tape transport system. A temporary expedient of a coiled-type spring from the anchor hole to the right-hand angle of the sub-assembly mounting flange has been known to save the day in an emergency.

Intermittent engagement of brakes was mentioned above. This is perhaps one of the most baffling faults with no apparent

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reason. Studying fig. 1, we see that the brakes M are mounted on shaped levers and held at their "elbow joint" by spring L. When the selector switch is returned to neutral, the brake arms are allowed to move forward, the spring draws them together and pressure is applied to both drums. Consequently, any weakness at L will result in erratic operation. A spring that is too tight can lead to premature braking. It is imperative to adjust to the correct pressure, so that the brakes snap into place with the quite positive action of the switch lever. In all, it can be said that there are only those three "wear-and-tear" faults to look for—wakening or fracture of springs K, O and L.

Adjustments are as simple as the layout of the machine would lead us to expect. Azimuth setting, which can cause so many headaches, is a one-screw adjustment. First remove the mumetal head cover, then adjust the screw without the spring washer for maximum output of a test tone. Eight Kc/s tone is recommended for this type of work, but any tone of constant level enables one to approach exactitude pretty reasonably.

The heads were, on the original decks, single gap (0.0002-inch and 0.09-inch), and were supplied in medium and high impedance versions. The high impedance head takes about 0.75 mA bias current and a signal current of about 50 microamps. The medium impedance head needs twice this current. Bias frequency is at 50 Kc/s at a voltage of approximately 20 volts, r.m.s. Current for the low impedance erase head should be between 75 and 100 mA.

The response, at this machine's fixed speed of $3\frac{1}{2}$ i/s, is quite impressive—and borne out during early subjective tests. Plus-or-minus 3dB from 30 c/s to 10Kc/s is not to be sneezed at, for a machine as simple, yet so appealing as this. Remember, however, that the efficiency of a deck depends greatly upon its associated equipment. Some manufacturers have incorporated the "Monardeck" in tape recorders that are not always capable of doing it justice. Before condemning the deck, use a little of that common sense we spoke about—and check the equipment as a whole. But more of that later.

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TAPE, RECORDERS & ACCESSORIES

FIRST DETAILS OF NEW PRODUCTS

● We remind our readers that notices of equipment listed and illustrated in this monthly feature are in no sense reviews. When figures, specifications and diagrams are published, these data are extractions from manufacturers' lists. When samples of this equipment are submitted for test, they are passed to our technical contributors, whose reports are published in a separate section.

TWO VOLMAR RECORDERS



TWO new tape recorders have been announced by Volmar—the Gainsborough and the Vista. The Gainsborough, priced at £40 19s., uses the Collaro Studio deck with speeds of 7½, 3½ and 1½ i/s. Features include: 4-watt amplifier; tone controls; 9 × 5 in. speaker; monitoring; magic eye recording indicator; and a pause control. The frequency response claimed is up to 12,000 c/s at 7½ i/s. A microphone and 1,200 ft. reel of tape and spare spool is supplied.

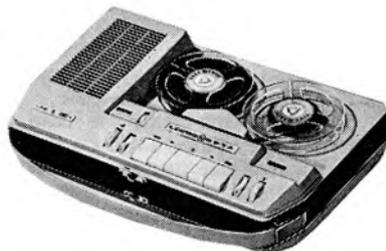
The Volmar Vista is a lower priced instrument using the BSR Monardeck and fitted with a printed circuit amplifier. This is available in a two- or four-track version at £25 4s. and £30 9s. respectively, including microphone and tape. Manufacturers Volmar Ltd., 154 High Street, Brentford, Middlesex.



T.K.1 MAINS UNIT

GRUNDIG (GREAT BRITAIN) LTD., have just introduced a mains unit for use with the TK1 tape recorder as an alternative to batteries. The unit clips on to the bottom of the machine when the batteries have been removed, and allows mains operation wherever normal A.C. supply is available. The unit weighs 2½ lb. and costs £8 8s. Details are available from the manufacturers Grundig (Great Britain) Ltd., 39/41 New Oxford Street, London, W.C.1.

LOEWE- OPTA PORTABLE RECORDER



SEVERAL new tape recorders have arrived in this country, manufactured by Loewe-Opta of Germany. The first of these is the Optacord 403, a two track, two speed (3½ and 1½ i/s)

recorder with press button controls and maximum spool size of 5 inches. Features include: automatic stop at the end of tape; magic eye level indicator; 5 watts output; and facilities for remote control. Frequency response claimed is 40-16,000 c/s at 3½ i/s and 40-8,000 at 1½ i/s. The dimensions are 14½ × 13½ × 7½ in. Weight 21 lb. Price £45 3s. A four track version is available called the Optacord 404, price £61 19s.

In the mains/battery class there is the Optacord 412, a two track single speed (3½ i/s) recorder. Using a spool of 4½ in. loaded with double play tape, a maximum playing time of 45 minutes per track can be obtained. Frequency response claimed is 50-12,000 c/s. Power output is 1 watt. The internal speaker measures 6 × 3½ in. and the machine can be operated from six 1.5v batteries or from 110 or 220 volt A.C. The size of the 412 is 14½ × 9 × 4 in. Weight 9½ lb. The price will be announced at a later date. Further details will be sent on request from The Highgate Optical Manufacturing Co. Ltd., 71/73 Great Portland Street, London, W.1.

FILM INDUSTRIES M8A RIBBON MICROPHONE

FILM INDUSTRIES LTD. have produced a table model version of the M8 ribbon microphone called the M8A especially for the tape recording market. The only difference is that the table model is less plug and socket coupling between the head and flexible section.

Twelve feet of cable is fitted to each microphone but extra lengths can be supplied on request. Details can be obtained from Film Industries Ltd., 90 Belsize Lane, London, N.W.3.



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(See articles in this and previous issue.)

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2-stage pre-amplifier, less output stage and speaker	2	10	0
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* Experimental Recording for Beginners*, p. & p.	5	6	

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EQUIPMENT REVIEWED

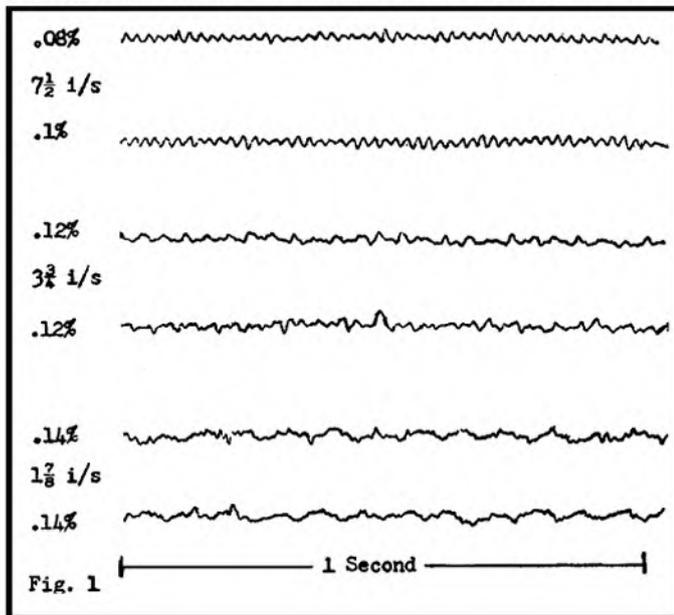


*
TANDBERG
SERIES 3B
MONAURAL
RECORDER
*

Manufacturer's Specification: Frequency response: $7\frac{1}{2}$ i/s 40-16,000 c/s, $3\frac{3}{4}$ i/s 50-9,000 c/s $1\frac{7}{8}$ i/s 70-4,000 c/s all plus or minus 2dB. **Wow and flutter:** better than 0.15% r.m.s. at $7\frac{1}{2}$ i/s, 0.2% at $3\frac{3}{4}$ i/s and not worse than 0.3% at $1\frac{7}{8}$ i/s. **Signal noise ratio:** 55dB below highest recording level (4% dist.). .00025 in. rec-play head gap. **Power output:** 2 watts at 1%. 3.3 watts at 5% dist. See September issue for further technical details. **Price:** £79 16s. **Distributors:** Elstone Electronics Ltd., Edward Street, Templar Street, Leeds, 2.

THE circuit of this recorder might be that of any one of a dozen £25 recorders: A high gain pentode first stage, followed by a double triode amplifier with feedback for correction, and an output pentode which doubles as a bias erase oscillator. In the same way, the deck uses only a single motor, has a joystick control and is fitted with a .00025 in. gap head. "Not very impressive", you might say—but the actual performance is very impressive indeed and once again underlines the fact that "it's not what you do, but the way that you do it" that counts. This, together with the meticulous testing and alignment procedure applied to every Tandberg machine accounts for the following very satisfactory test report. In each section I shall try and mention the salient design features which together make the overall performance so impressive.

Wow and flutter: Fig. 1 shows the fluttergrams for the three speeds. The traces are remarkably free from tape flutter caused by friction of the tape on the heads or tapes guides, and the high surface finish of the heads, together with the lack of a



pressure pad on the record/play head, accounts for much of this smoothness. There is a small cyclical flutter caused by some rotating component which varies directly with the tape speed, i.e. capstan or idler wheel—if it were the motor or stepped pulley it would remain constant in frequency for all speeds—but it does not correspond to the rotational speed of either of these parts. Indeed the disturbance occurs twice per revolution of the idler

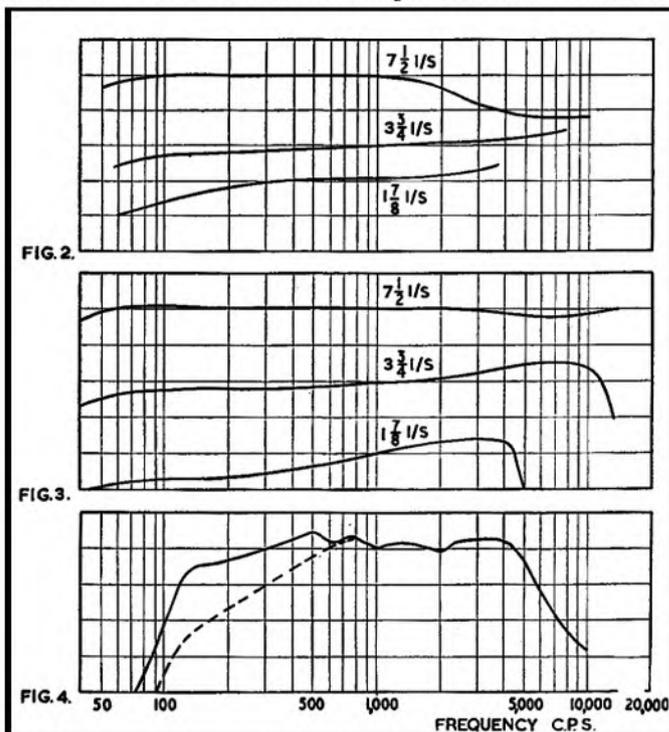


Fig. 2 Play only response. Fig. 3 Overall record/replay response. Fig. 4 Acoustic response.

wheel and is possibly due to a small flat or bump on the tyre which causes a momentary change in speed as it passes the motor pulley, and another as it contacts the rim of the flywheel.

Despite this the readings are well within the specification, and the very slight ripple can only just be heard on a pure tone at the lowest speed. At $3\frac{3}{4}$ i/s and $7\frac{1}{2}$ i/s the tone is remarkably pure and steady and is the nearest I have ever heard to a direct oscillator signal.

Replay only responses: The test tape play only responses are shown in fig. 2. The $7\frac{1}{2}$ i/s curve indicates that the playback equalisation is matched to a 50 microsecond characteristic which corresponds to the N.A.R.T.B. curve for this speed. A pre-recorded C.C.I.R. tape would need some top lift to bring it level, but the machine can be supplied with a 100 microsecond characteristic if desired. The two lower speeds are equalised very closely to the specified 200 and 400 microsecond characteristics. The head losses are so slight that both gap and eddy current losses are compensated by tuning the head to resonance at the top of each frequency range, so that a simple RC series network from plate to earth of the first valve provides the necessary equalisation at each speed.

Record replay responses: Fig. 3 indicates the overall record/replay responses for the three speeds. The curves lie within the specified plus and minus 2dB limits for the two higher speeds, but at $1\frac{7}{8}$ i/s there is a rise in middle top response which tends to compensate for the high frequency cut off at 4 Kc/s. The magic eye beams just closed at a tape level 11dB above standard test

tape level of 10 gauss at 1 Kc/s, and the level could be raised a further 3dB before waveform distortion of the recorded signal became evident. This indicates that the bias was set for maximum output and low distortion rather than for a very extended frequency response.

Signal noise ratio: The measured signal noise (and hum) ratio was precisely the same at each of the three speeds: 39dB below test tape level or 50dB below magic eye peak level. As mentioned in the preceding paragraph, the 5% distortion level was a little above the indicator peak, so that a figure of 52dB unweighted signal noise ratio is obtained. Most of the meter reading is given by very low level mains hum so that if the response of the meter is weighted to compensate for the normal hearing characteristic the readings approach 60dB.

Acoustic response: In this machine an effort has been made to overcome the usual limitation of the monitor speaker within the recorder case. The back of the elliptical speaker is covered by half an inch of foam rubber which tends to isolate it from the component-filled cavity of the small case. The effect of this combined compliance and acoustic resistance is to cause a steady fall in response below 500 c/s. (dotted curve fig. 4). A 6dB per octave bass rise can be provided in the main amplifier by switching a suitable condenser into the negative feedback circuit.

The resultant overall response is shown by fig. 4 solid curve, and seen to be remarkably level from 120 c/s to 5 Kc/s. The price paid for this modification is a reduction in acoustic power output caused by overload at low frequencies where the power fed to the speaker is at a maximum. The internal speaker can thus be used for low level listening or monitoring of a recorded programme, but a good quality extension speaker is essential to make use of the full capabilities of the recorder.

Comment: The objective tests detailed above are the easiest part of this review to put over. Much more difficult is the impression of absolute cleanness and transparency in the sound quality on a wide range speaker system. It is difficult to put one's finger on any one reason for this effect. For instance it is not a matter of exact equalisation or optimum bias in the recording operation, because tapes recorded on other machines still sound outstandingly good. In the same way, material recorded on the 3B sounds just that little bit cleaner on any other machine. Rather is it a matter of every step in the overall recording and reproduction process being just right: low wow and flutter, properly screened head, D.C. on 1st valve, mu metal screening can on 1st valve, exact equalisation, heavy negative feedback around output stage, large and adequate output transformer, optimum bias, etc. etc. I suspect that this is not a brand new design but the culmination of many years of slow development—but, after all, so is a Rolls-Royce!

A. Tutchings.



BRENELL
MARK V
TYPE M
RECORDER

Specification. Four tape speeds: 1½, 3½, 7½ and 15 i/s. Separate record and replay heads. Separate record and replay amplifiers. Internal speaker 9 in by 5 in elliptical. Wow and flutter less than .05 per cent. at 15 i/s, 0.1 per cent. at 7½ i/s, 0.15 per cent. at 3½ i/s, 0.25 per cent. at 1½ i/s. Record replay response: 15 i/s 40 c/s to over 20,000 c/s ±3dB, 7½ i/s 40 c/s to over 18,000 c/s, 3½ i/s 40 c/s to over 13,000 c/s, 1½ i/s 40 c/s to 6,000 c/s. Signal noise ratio: unweighted including hum: 50dB at 7½ i/s. Output external speaker 15 ohms. External amplifier output 200

Mv at 50K. Rewind time approx. 40 secs. per 1,200 ft. of tape (controllable). Power output 2.5 watts. Treble control 12dB variation at 15Kc/s. Bass control 12dB variation at 70 c/s. Nett weight 40 lb. Overall dimensions 18 in. by 17 in. by 9 in. Price £92 8s. Manufactured by Brenell Engineering Co. Ltd., 1a Doughty Street, London, W.C.1.

ONLY three speeds are available by operation of the panel speed control; an overlapping range is obtained by replacing the capstan sleeve. The control is calibrated in such a way that either range may be read. Rewind is fast and smooth and a push button brake is provided to slow the reels down near the end, or to control the rewind tension. A safety button is fitted to prevent accidental erasure and this has to be pressed to allow the switch to be moved to the record position. All input and output jack sockets are on the front panel but the mains switch is

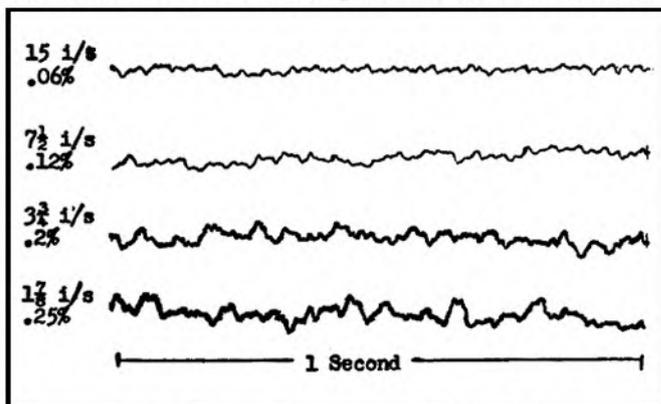
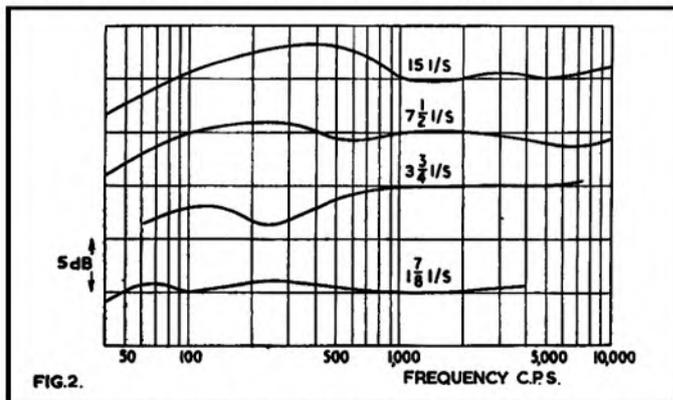


Fig. 1. Fluttergram readings for the four speeds.

hidden away at the back of the machine. A peak reading meter, fed from the record amplifier, allows precise control of recording level and the damping is such that it can be used for long periods without fatigue or eye strain.

Wow and flutter: The four speeds were found to be exactly as specified within the limits of my test gear. Wow and flutter were commendably low and remained constant over the full extent of the reel. Fig. 1 shows the fluttergrams for the four speeds; it will be seen that there is no cyclical component to



add or cancel, and that most of the flutter is random in character and is due to slight longitudinal stretch of the tape as it passes the three heads and pressure pads.

Play only responses: Fig. 2 shows the playback only responses of test tapes with surface induction characteristics of 35, 100, 200 and 400 microseconds, at tape speeds of 15, 7½, 3½ and 1½ i/s respectively. The dip and peak effect at low frequencies, which moves down in frequency as the tape speed is reduced, is a wavelength effect which is a function of the pole face length of the playback head. The high frequency responses are close to the recommended CCIR characteristics. These responses are from the external amplifier jack socket. It was noticed that this outlet is fairly sensitive to loading capacity; a few feet of low capacity co-ax screened lead dropped the output at 10 Kc/s by

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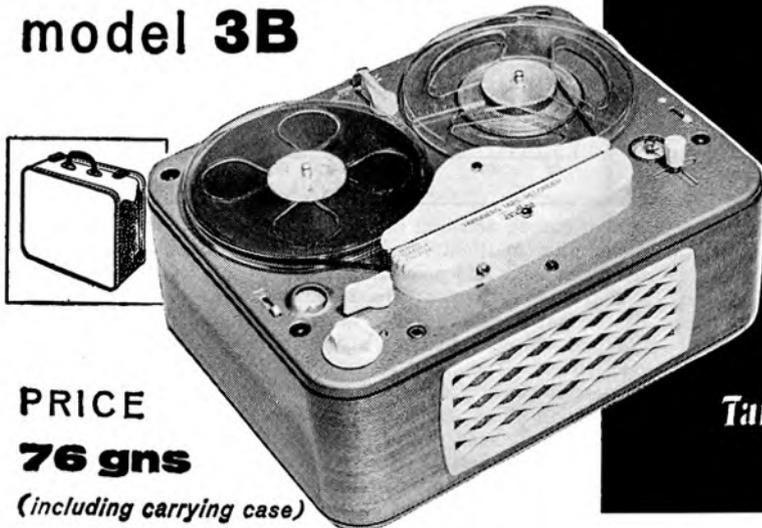
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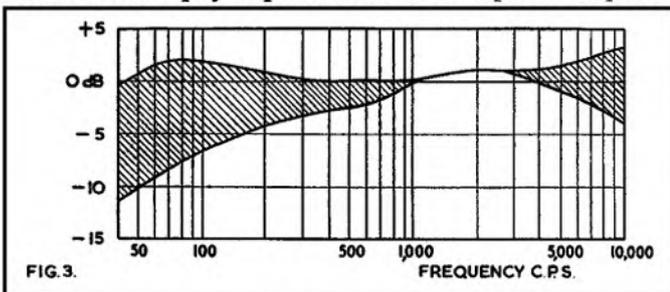
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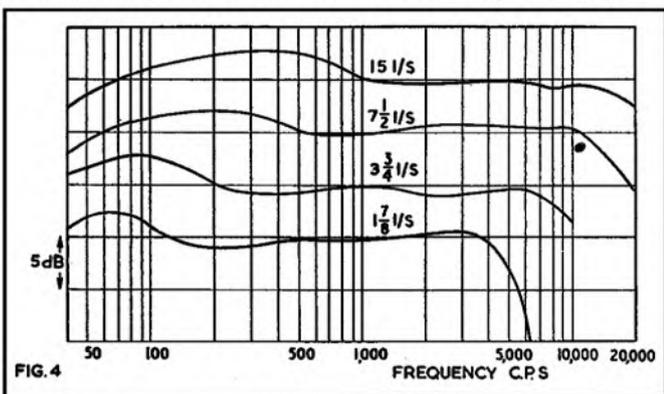
3dB. The responses shown are open circuit voltages measured with a low-capacity valve voltmeter. Fig. 3 demonstrates the action of the tone controls, which act on the output stages, and shows the response at $7\frac{1}{2}$ i/s across the Ext. L/S outlet loaded with a 15-ohm load. The negative feedback ensures that this response will be obtained with any reasonable speaker load.

Record replay responses: The curves of Fig. 4 indicate the overall record replay responses from Radio input to Amplifier



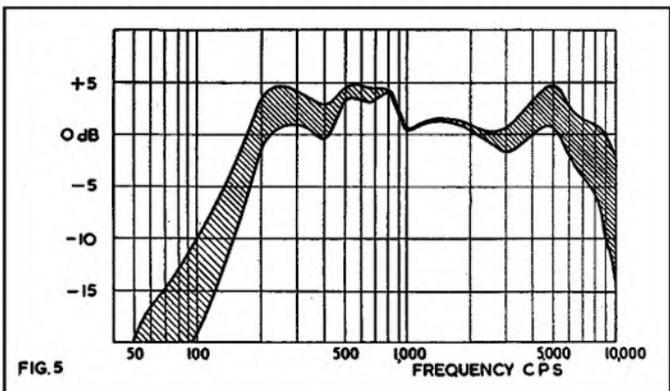
output. These also show the playback head wavelength effect, but the low note response below 200 c/s is better maintained by slight bass pre-emphasis in the recording process. The high note response at the slower speeds is sensitive to bias, and these responses were taken with the bias set for maximum output at 1 Kc/s at a tape speed of $3\frac{1}{2}$ i/s.

If the machine is to be used mainly at the higher range of tape speeds the bias should be increased slightly by setting for maximum output at $7\frac{1}{2}$ i/s. This curtails the high note response



at $3\frac{1}{2}$ i/s to 6-7 Kc/s, but lowers the distortion and tape modulation noise at the higher speeds with no sacrifice of frequency response. Overload tests showed that a level 8dB above test tape level could be recorded on any make of tape, but that waveform distortion was evident at about +10dB level; this distortion was not affected by changing the tape or the bias on any given tape sample. Further measurement at the monitor jack showed that the record amplifier overloaded before the tape so that full peak tape level could not be reached.

Signal noise ratio: The unweighted signal to noise ratio was 43dB below standard test tape level, and peak signal noise ratio,



as indicated by the record level meter, met the specification at 51dB. *But*, if true tape peak recording level could be reached, this could be improved to 55dB.

Acoustic response: The overall acoustic response was plotted by loading the machine with a white noise test tape and measuring the sound level one foot from the speaker set with the tone controls at their cut and boost limits, Fig. 5. Thus for pre-recorded CCIR tapes figs. 3 and 5 would seem to indicate that both controls should be set for maximum lift. On the machine's own recordings, however, the bass control is best set midway.

Comment: This is a well designed and beautifully made recorder. I was particularly impressed by the extreme accessibility of the various amplifier units. The whole control panel lifts clear of the cabinet by releasing the two securing screws, and adequate length leads are provided so that it may be turned over for examination of the record or replay amplifiers, or placed safely in front of the recorder whilst adjusting the bias control or changing valves in the power unit.

I would have preferred the recording level meter to be connected to the output of the playback amplifier, prior to the gain control, so that it indicated the recorded level *on the tape* in true professional fashion but failing this a small adjustment should be made to the circuit so that full scale meter reading corresponds to true peak recording level and to ensure that the tape overloads before the record amplifier. Apart from this relatively minor criticism (a gain of 3-4dB in S/N ratio or recorded level would be barely audible) I have nothing but praise for this excellent machine and have no hesitation in recommending it where a robust, well engineered, semi-professional recorder is required.

A. Tutchings

Manufacturers Comment. We trust that the readers of this review realise that to connect the meter to the replay amplifier (as preferred by the reviewer) would deprive one of the invaluable facility of ascertaining the correct recording level *before* the recording commences. A preset control is incorporated to enable the signal to the meter to be adjusted if so desired as outlined by the reviewer.

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TAPES REVIEWED

THREE tapes from Saga this month, "Dancing and Dreaming" (STG 8041); "Silk, Satin And Strings" (STG 8045); "Favourite Show Tunes" (STG 8044). The first two of these were so good that I did not believe them. I therefore ordered a second copy of all three from Teletape Ltd., in order to check the "over-the-counter" product with the review copies. (This, by the way is our standard practice—whenever an item is either "too good" or "really bad"—and no offence is therefore intended by publishing the fact!) It can save accidental misrepresentation in both directions. Anyway the second set of tapes completely confirmed first impressions; and the result is that the first of our new monthly "Plum" awards goes without hesitation to Saga for "Silk, Satin And Strings." It is one of the best that 3½ i/s recordings of light music that I have heard in a long, long while. The quality of both the programme material and the recording are excellent. If you have yet to sample a tape record, make this "Plum" your introduction.

"Dancing And Dreaming" is very nearly as good, and may well out-sell the "Plum" selection on account of its programme content. "Favourite Show Tunes" is quite good, but not in the same top bracket; and it loses these marks because of a wobbly bit of recording in one tune ("Dancing In The Dark").

New Dubbing Equipment

I was particularly pleased to receive these latest Saga tapes because the company has suffered a lot of complaints in the past as a result of uninspired and sometimes even poorly-recorded tapes. We were promised better things, once their new masters were available and once their new duplicating arrangements were completed. If this is what we have been told to wait for, the wait was worthwhile. And if Saga maintain this standard they should soon have a big following. The details of the three tapes are as follows:

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Saga STG 8041. "Dancing And Dreaming". Played by The Jay Norman Quintet. A monotape. 5-in. spool. 3½ i/s. Playing time 31 mins. Price 32s. 6d. (Track one) *Time On My Hands; Green Eyes; Out of Nowhere; It Had To Be You; How Deep Is The Ocean; Amor.* (Track two) *Sombody Loves Me; Don't Blame Me; The Breeze And I; The Way You Look Tonight; Solamente: Easy To Love.*

Saga STG 8044. "Favourite Show Tunes". A monotape. 5-in spool. 3½ i/s. Playing time 37 mins. Price 32s. 6d. Played by Sorkin Strings. (Track one) *Surrey With The Fringe On Top; Someday I'll Find You; Adios; Midnight Bells; Fascinating Rhythm; Dancing In The Dark; What Is This Thing Called Love.* (Track two) *If There Is Someone Lovelier Than You; Blue Moon; Oh What A Beautiful Morning; Long Ago And Far Away; I Got Rhythm.*

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All advertisements for the February issue must arrive not later than January 4th.

Legal Notices

Associated British Tape Recording Club Ltd. Notice is hereby given that the creditors of the above-named Company, which is being voluntarily wound up, are required, on or before the 31st day of January, 1962, to send in their full Christian and surnames, their addresses and descriptions, full particulars of their debts or claims, and the names and addresses of their Solicitors (if any), to the undersigned, Ralph Michael Morris of 8 Fulwood Place, London, W.C.1, the Liquidator of the said Company, and, if so required by notice in writing from the said Liquidator, are, personally or by their Solicitors, to come in and prove their debts or claims at such time and place as shall be specified in such notice, or in default thereof they will be excluded from the benefit of any distribution made before such debts are proved.

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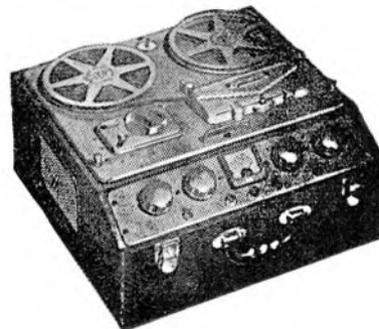
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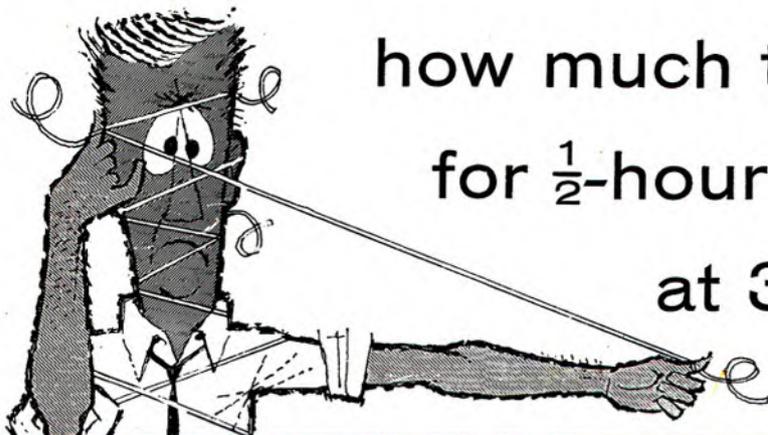
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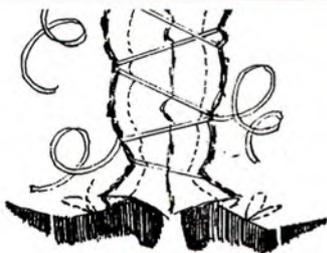
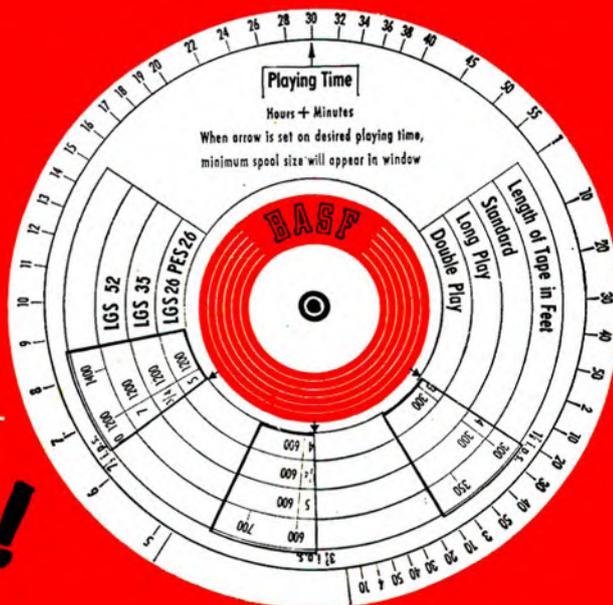
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