

the TAPE RECORDER

PRICE 1/6

January 1963
Vol. 4 No. 12

INCORPORATING "SOUND AND CINE"



— IN THIS NUMBER —

Tape Recorder Service • Details of New Products • Peak Programme Meters • Equipment Reviewed
News from the World of Tape • Sound and Cine • Readers' Problems • Tape Recorder Workbench
• Readers' Letters • News and Pictures from Clubs

You'll be glad you chose

GEVASONOR

MAGNETIC RECORDING TAPE



GEVAERT

GEVAERT LIMITED • GREAT WEST ROAD • BRENTFORD • MIDDX.

THE SOUND OF **SONY**... A WONDERFUL SOUND



The **SONY** 521 Stereophonic Tape Recorder

Here is brilliant engineering in sound. The Sony 521. Here is perfection in dimensional recording and reproduction. The Sony 521. Here are the many extras usually reserved for professional instruments—built-in amplifiers and speaker units, two and four track play-and-record features and trouble-free synchronous motor drive. The Sony 521. Here are sensitive level meters and split-second stop lever, assuring true fidelity, precise cueing and editing. The Sony 521.

- * $7\frac{1}{2}$ + $3\frac{3}{4}$ tape speeds
- * tape index indicator
- * instant stereo/mono switch
- * tone control
- * automatic cut-off
- * additional line outlet
- * headphone monitor jack
- * professional mixing

124 gns. including 2 dynamic microphones and all accessories

SONY® RESEARCH MAKES THE DIFFERENCE

Detailed specifications on the range of Sony tape recorders are available from the

Sole U.K. Distributors: **TELLUX LIMITED** A member of the K.G. (Holdings) Group of Companies
AVENUE WORKS, GALLOW'S CORNER, COLCHESTER ROAD, ROMFORD, ESSEX. Telephone: Ingrebourne 43971

WORLD RECORD CLUB OFFERS YOU THE CHOICE OF ANY 3 PRE-RECORDED TAPES



31. Rimsky-Korsakov: Scheherazade. Sir Eugene Goossens conducts the LSO in a breathtaking performance of this rich and exotic masterpiece. Also on disc: mono/stereo



32. Star cast and orchestra stage all the famous songs: Getting to Know You, Hello Young Lovers, I Whistle a Happy Tune, Shall We Dance, etc. Also on disc: mono/stereo



53. These two suites, containing some of Bizet's most thrilling music, are given magnificent performances by the Sinfonia of London under Muir Mathieson. Also on disc: mono/stereo



19. Look Over Your Shoulder, My Lean Baby, White Christmas, Don't Worry About Me, Melody of Love. 12 top numbers sung by the fabulous Sinatra. Also on disc: mono only



56. All the magic of old Vienna! starring Jacqueline Delman, John Larsen, Linden Singers and Sinfonia of London conducted by John Hollingsworth. Also on disc: mono/stereo



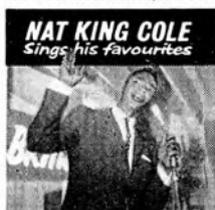
33. Beethoven 5th. plus Egmont. Josef Krips and LSO in a titanic interpretation which matches the tremendous power of this celebrated music. Also on disc: mono/stereo



30. Ian Carmichael, Joyce Blair, star cast/orchestra. As Long as He Needs Me, Consider Yourself, all the hit numbers from Lionel Bart's great show. Also on disc: mono/stereo



39. Great ballet conductor John Hollingsworth and the Sinfonia of London in a sparkling fresh interpretation of Tchaikovsky's famous Ballet. Also on disc: mono/stereo



20. Answer Me, Nature Boy, Ruby and the Pearl, these plus 8 more favourites sung especially for you by the unique Nat King Cole. Also on disc: mono only



40. Superb singing by Bruna Rizzoli and Giuseppe Savio with the chorus of the Teatro Nuovo di Milano and orchestra conducted by Napoleone Annovazzi. Also on disc: mono only



29. Me and My Shadow, Among My Souvenirs, Mean to Me, How About Me... the fabulous Judy Garland sings 11 of her greatest songs. Also on disc: mono only



25. Ian Wallace, Joyce Blair and chorus. Some Enchanted Evening, I'm In Love with a Wonderful Guy, and all the unforgettable songs from this great musical. Also on disc: mono/stereo



34. Stardust, How High the Moon, Nearness of You, Round Midnight, King David—eight numbers by the vibraphone genius, Lionel Hampton. Also on disc: mono/stereo



48. Deep in My Heart, Drinking Song, Serenade—all the old favourites fresher than ever with Marion Grimaldi, Linden Singers and Orchestra. Also on disc: mono/stereo



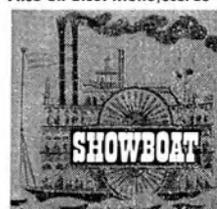
37. Revolutionary Study, Polonaises A and A-flat, Fantaisie-Improptu—12 favourites in all played by the pianist of Dirk Bogarde's 'Song Without End'. Also on disc: mono only



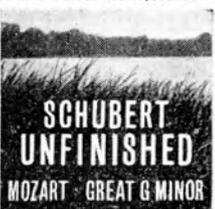
22. 12th St. Rag, Isle of Capri, Smile, Blue Moon, Bunny Hop Mambo, Satin Doll. 12 top numbers played in characteristic style by the Duke and his band. Also on disc: mono only



2. Grieg Piano Concerto. Alexander Jenner in an electrifying performance with the Bavarian State Radio Orchestra conducted by Odd Gruner-Hegge. Also on disc: mono only



35. Ol' Man River, Bill, Make Believe, many more well-loved numbers from this famous musical memorably sung and played by full star cast. Also on disc: mono/stereo



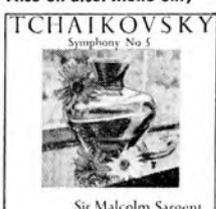
44. Leopold Ludwig and LSO combine brilliantly in an exciting 'double': two of the world's greatest symphonies receive vivid new interpretations. Also on disc: mono/stereo



45. Crazy Rhythm, Bijou, I Cover the Waterfront, Northwest Passage, Blowin' Up a Storm, etc. The master clarinetist plays 12 numbers in great style. Also on disc: mono/stereo



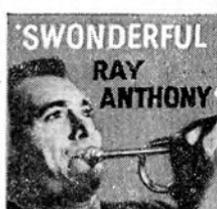
38. Hervey Alan, Ian Wallace, Marion Grimaldi and chorus sing the immortal favourites: Cobbler's Song, Robbers' Chorus, Chu Chin Chow, etc. Also on disc: mono/stereo



14. Tchaikovsky Symphony No. 5. Sir Malcolm Sargent and LSO combine to give this famous symphony a dramatic and colourful rendering. Also on disc: mono/stereo



43. Andy Cole, Barbara Leigh, Mike Sammes singers: High Society, Three Coins, Harry Lime, Gigi, The High and the Mighty. 11 top film hits. Also on disc: mono/stereo



41. Night and Day, King Porter Stomp, Pennies from Heaven, Christopher Columbus, Don't Be That Way, with the top American bandleader/trumpeter. Also on disc: mono only



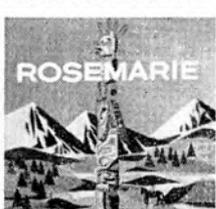
42. Jericho, Swing Low, Shadrak... 12 of the best loved Negro Spirituals movingly sung by George Browne, Isabelle Lucas and Linden Singers. Also on disc: mono/stereo



36. Beale Street Blues, After You've Gone, The Sheik of Araby, My Kind of Love, 12 tremendous hits by one of the world's greatest jazz trombonists. Also on disc: mono only



49. Beethoven's Fidelio Overture, Brahms' St. Anthony Vars, Mendelssohn's Hebrides, Wagner's Siegfried Idyll. All under Britain's greatest young conductor. Also on disc: mono/stereo



50. David Hughes, Barbara Leigh, Andy Cole and chorus sing Indian Love Call, Rose Marie, and all the other tunes from Friml's well-loved musical. Also on disc: mono/stereo



47. Brahms Violin Concerto. Superb playing by Endre Wolf and Sinfonia of London under the baton of Anthony Collins makes this a truly memorable performance. Also on disc: mono/stereo



46. Elizabeth Lerner, Andy Cole, Peter Knight singers. Exciting 'double' featuring highlights from two famous shows by Frederick Loewe and Cole Porter. Also on disc: mono/stereo

FOR ONLY 30/-

THE GREATEST BREAKTHROUGH SINCE TAPE RECORDING!

Here is the greatest World Record Club introductory offer ever made . . . a unique offer never before matched by any record club or company anywhere in the world!

EVERY ONE OF WORLD RECORD CLUB'S UNRIVALLED RELEASES AS 12" LPs IS NOW AVAILABLE ON 3½ ips TAPE!

Now you have the opportunity to play any WRC release on your tape recorder. Each of these 'tape records' runs at 3½ ips, mono, on 5" spools and can be played on either 2 or 4 track recorders. New electronic techniques of tape-to-tape transfer give these 3½ ips WRC pre-recorded tapes a standard of reproduction unattainable previously at less than 7½ ips.

WORLD RECORD CLUB 7-POINT PLAN MEANS BETTER LISTENING FOR YOU!

1. AN UNPARALLELED INTRODUCTORY OFFER.

Choose now, any three of the superb 3½ ips pre-recorded tapes shown here, for only 10/- each and number them on the attached coupon. (If you wish, of course, you can choose 12" LPs instead. Both disc and tape are the same price.) Please send no money until after you have received, played and approved them. We want you to prove to yourself, before paying, that our tapes are equal to the world's best.

2. THE OPPORTUNITY TO BUILD A UNIQUE TAPE COLLECTION.

The WRC plan offers you an exciting and varied annual repertoire of more than 60 selected tape releases, covering classics, jazz, shows, ballet music, light music and 'pops'. Every one is a superlatively recorded 3½ ips mono tape (or 12" LP—mono and stereo). Each is offered to you at the

privilege club price of 29/- (plus a small charge for post and packing)—much less than you would pay elsewhere for recordings of anything like this quality.

Your only obligation, as a Club member, is to agree to buy four more tapes (or 12" LPs) over the year. Beyond this, there is no subscription or membership fee.

3. A PLANNED PROGRAMME.

Every World Record Club release is hand-picked by an independent panel of Britain's top musical authorities. The Countess of Harewood, Lord Montagu of Beaulieu, Sir Arthur Bliss, Richard Attenborough, Cyril Ornadel, Ray Ellington, Leon Goossens, Malcolm Arnold, Steve Race, John Hollingsworth, Antony Hopkins—and, as special adviser on tape, Miles Henslow.

4. FREE MONTHLY MAGAZINE.

A monthly magazine, packed with fascinating musical articles, reviews, news and pictures, is issued free to all members.

5. SPECIAL CONCERT PRICE CONCESSIONS.

Many concert halls and theatres throughout the country (including the Royal Festival Hall) allow special concession rates to club members for many performances.

6. FREE BONUS TAPES.

The more you buy, the more you save! After fulfilling the minimum membership obligations, you earn another tape of your own choice free for every extra three you buy!

7. EXCLUSIVE EXTRA RELEASES.

In addition to the regular monthly selections, the club offers members exclusive extra tapes at the standard Club price.

World Record Club is unique—the first and greatest Record and Tape Club in Britain, with the largest show catalogue (on tape and mono/stereo disc) in the world. No other method of tape—or record-buying offers you so many additional benefits, so much freedom and variety of choice, with no 'high-pressure' selling. And, of course, there are no subscriptions or membership fees of any kind—only a small deposit of £1 (later refundable) when you become a tape member.

Don't miss this great opportunity. Send off the coupon today, for your 3 introductory selections for only 30/-



... AND IF YOU OWN A STEREO TAPE RECORDER

hear the fantastic reproduction of

STEREO 21

THE NEWEST, TRUEST SOUND ON TAPE TODAY!

Revolutionary new STEREO 21 pre-recorded tapes (7½ ips twin-track) are issued exclusively by World Record Club. But they are offered without membership commitments of any kind. The first list of all new STEREO 21 releases is now available. It features 30 superb stereophonic tapes ranging from Beethoven's Eroica with Josef Krips conducting the LSO, to a lavish full-cast production of Oklahoma.

As always, WRC prices present unparalleled value—all STEREO 21 releases cost either 50/- or 60/- depending on playing time (up to 50 minutes). STEREO 21 tapes are now obtainable through leading retailers or direct by post from World Record Club. Send for full catalogue now—STEREO 21 must be heard to be believed!

7-DAY FREE TRIAL OFFER—POST TODAY!

STEREO 21 FREE BROCHURE

To WORLD RECORD CLUB (Dept TRR7)
PARKBRIDGE HOUSE, RICHMOND, SURREY.
SEND NO MONEY NOW

3½ ips pre-recorded tapes	12" LPs
---------------------------------	---------

Tick which you want

Please send me, without obligation, on 7-day free trial, the three selections indicated. (Your 3 selections must be either all tape or all disc.) If satisfied, I will pay you 30/- plus 3/- postage, packing and insurance. Only at that stage may you enrol me as a full member of World Record Club, entitled to all the benefits described. My only obligation as a member would be to agree to purchase 4 more top quality 3½ ips tapes (or 12" LPs) over a 12-month period at the special club price of 29/- each. If I am not completely satisfied with my 3 selections, I will return them to you within 7 days, in good condition, and owe you nothing.

NOTE I understand I will be asked to pay £1 deposit when I become a tape member (this does not apply to disc members). This deposit is refundable.

Signed.....
this offer applies in Gt. Britain and N. Ireland only.

MY 3-SELECTION 'PACKAGE' COMPRISES

Choice No. 1 Choice No. 2 Choice No. 3



(place tape/disc key numbers only in the circles)

Tick here if stereo 12" LPs are required where available

Mr/Mrs/Miss
(BLOCK CAPITALS PLEASE)

ADDRESS

To WORLD RECORD CLUB (Dept TRR7)
Box 11 PARKBRIDGE HOUSE, RICHMOND, SURREY.

Please send me your free colour brochure, showing the full range of your new STEREO 21 releases.

NAME

ADDRESS



connoisseurs

----- **say**

SIMON



... the connoisseur with an eye for a bargain chooses the **SIMON SP5** because no other tape recorder in the price range gives him so much at professional standards!

Unrivalled facilities of the **SIMON SP5** include uni-directional twin track recording, two speeds, 7-inch spools, dual channel mixing, master fader, monitoring through loudspeaker and level setting, controlled echo, track to track recording, controlled bias, recording level meter.



SIMON SP5

Price from 93 gns

"Tape recording in the new age"

** You can buy the SIMON SP5 as a stereo recorder, or in a monaural version ready wired and fitted for easy conversion to stereo.*



... the connoisseur with an ear for performance chooses the **SIMON Cadenza Ribbon Microphone** because he gets studio class results in the middle price range.

The **SIMON Cadenza Ribbon Microphone** is a popular and successful conception of ribbon and magnet arrangement... output is flat to close limits over the very wide range 50-12,000 c.p.s., new shell design eliminates resonant peaks and troughs—especially the "bass hump". Can be used in LZ or HZ condition... though the ribbon area is four times the normal size, dynamic impedance is negligible.



**SIMON Cadenza
Ribbon Microphone**

Price 10 gns

"Makes a piano sound like a piano"

For full technical details of SIMON tape recorders and microphones, consult your dealer. In case of difficulty please write to:

SIMON EQUIPMENT LIMITED

48 GEORGE STREET LONDON W.1

Garrard



SOUND RECORDING



DANCING AT HOME



DICTATING



MEETINGS

BATTERY TAPE DECK

- * SMALL * LIGHT * PORTABLE * WILL PLAY AND RECORD IN ANY POSITION
- * IDEAL FOR HOLIDAYS AND PARTIES
- * FITS CAR POCKET * SIMPLE TO OPERATE
- * TAKES SPOOLS OR GARRARD MAGAZINES

A companion to your transistor radio

The Garrard Battery Tape Deck opens a new and exciting field for the manufacturer of tape recorders and the home constructor. Highly suitable for use with portable transistorized equipment it weighs only 3 lb. and measures 9" x 6 $\frac{5}{8}$ " x 1 $\frac{3}{8}$ " above and 2 $\frac{1}{2}$ " below top of Motor Board. Two speeds, two tracks—3 $\frac{3}{4}$ " and 1 $\frac{1}{2}$ " i.p.s. it plays for 1 hour 10 mins. per track using a 4" spool of double-play tape at 1 $\frac{1}{2}$ " i.p.s.

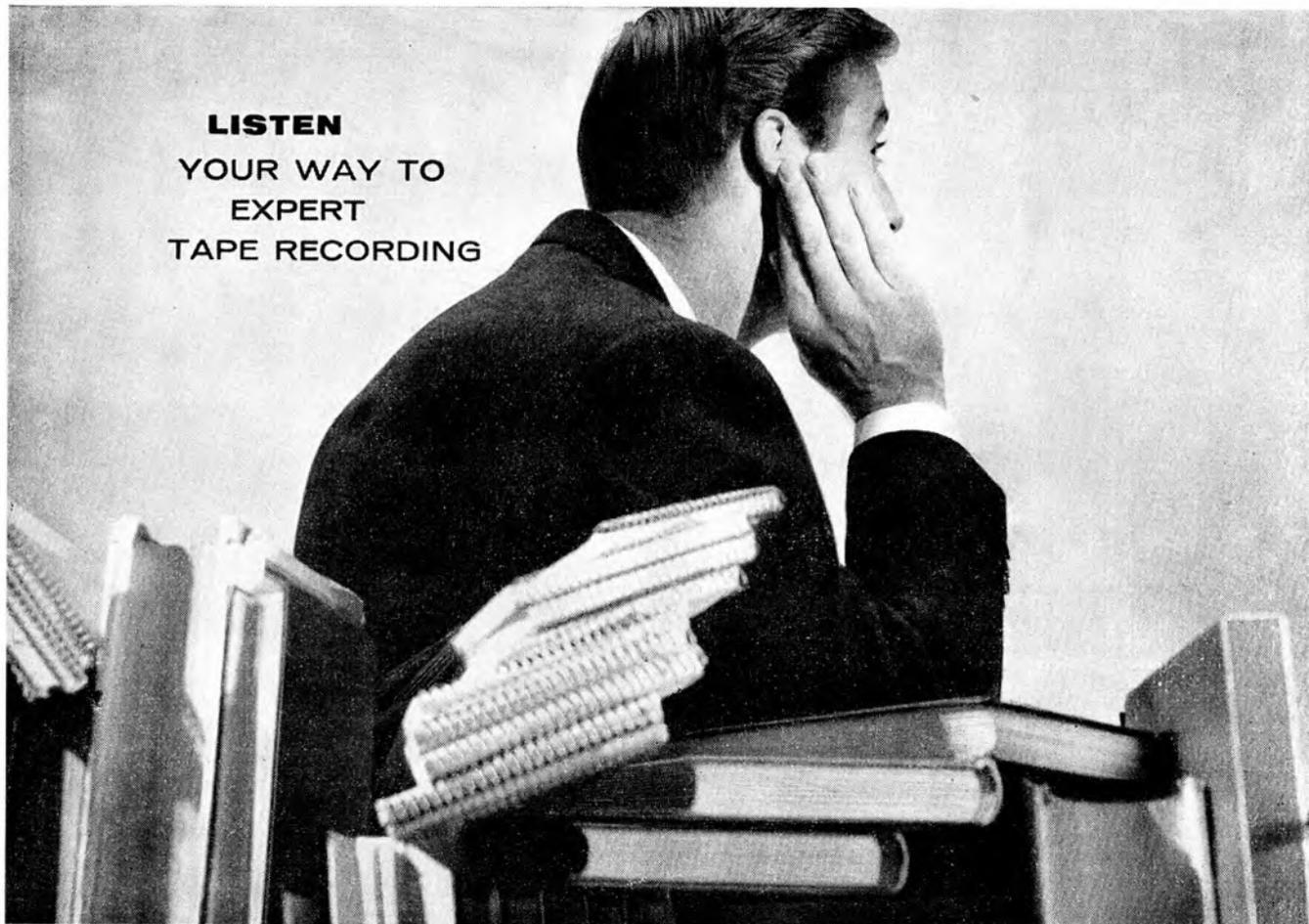
Half Track Battery Tape Deck £10 15 0

(SPOOLS OR MAGAZINES EXTRA)

Magazine containing 650 ft. Double Play Tape	£1 13 4
Magazine only with one empty spool	8 0
Reel of 650 ft. of Double Play Tape	£1 4 0
Garrard Spool only	3 3

THE GARRARD ENGINEERING AND MANUFACTURING CO., LTD. · SWINDON · WILTSHIRE

LISTEN
YOUR WAY TO
EXPERT
TAPE RECORDING

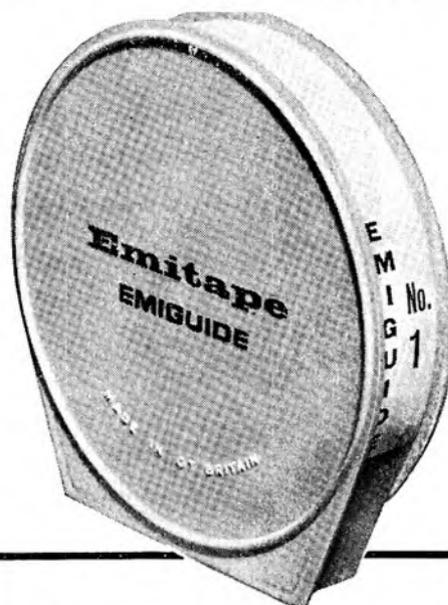


Emiguide's guide where books can't take you

The newest (and easiest) way to learn about sound is *through* sound. Learn while you listen—with Emiguide's.

These six instructional tapes were written and recorded by John Borwick. (At the instigation of the makers of Emitape.) All six of them make a unique introduction to expert recording. But each one is available separately, being completely self-contained. They are recorded full track at $3\frac{3}{4}$ " per second, can be used again for your own recording. You can get them at any radio or photographic shop, price 5/1/- the set of six (in a plastic tray), or separately at 8/6 each.

If you'd like to know more before you buy any—write to us for the Emiguide leaflet. Then put the books away!



To: EMI TAPE LIMITED · HAYES · MIDDLESEX
Please send me further details of Emiguide's

NAME

ADDRESS

T.R. 1

Emitape

EMI TAPE LIMITED · HAYES · MIDDLESEX · HAYES 3888

the TAPE RECORDER

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



★
EDITORIAL

MEMBER OF THE
 AUDIT BUREAU
 OF CIRCULATIONS

THIS is the twelfth and final number of our fourth volume, and we are sorry to have to announce that it must be the last number of the magazine to carry the *one-and-sixpenny* price tag. As from next month—Volume five, Number one—the price of *The Tape Recorder* will be two shillings. We do not believe in coating pills in sugar for intelligent people to swallow: hence the above straightforward facts in the minimum amount of words. However, the point made, we feel it only right to give the reasons.

First let us say that we are dead against the almost automatic procedure of passing on each and every increase to the customer, for we think that if this were done a little less often, and if a few more concerns (some large, some small) were to absorb a few of the increases themselves, there would inevitably be less need for increases all round. We not only feel very strongly about this, but we have always put our feelings into practice; and particularly so in the case of this magazine. During the four years of its publication our printers have twice asked us to accept price increases—the result of wage and other increases. Just over a year ago, because we were not satisfied with the quality of the paper on which the magazine was printed, we cancelled our supplies and introduced a much superior grade. This cost money. Only a few months after ordering the new paper, its price went up. We swallowed that one, too!

Now, however, our printers have asked us to accept yet another price increase—the third in four years—to take effect from January 1st, 1963. This is by no means the whole story, of course, for other things have gone up, too, including postage, delivery and other items which are involved in production; but

JANUARY ----- 1963
 VOL. 4 ----- No. 12

CONTENTS

	Page
News from the World of Tape	527
News and Pictures from the Clubs	528
Sound and Cine	
Sound Effects	
By Richard Golding	531
Our Readers Write	537
Tape Recorder Service	
No. 13. Ferrograph Recorders	
By H. W. Hellyer	538
Two Heads are better than One	
By D. G. Bishop	541
Tape Recorder Workbench	
No. 42. Checking the performance of Recorders	
By A. Bartlett Still	545
Details of New Products	547
Equipment Reviewed	549
Readers' Problems	553
Classified Advertisements	556
Advertisers' Index	558

it is enough to show that we have genuinely practiced what we preach for as long as it has been economically possible for us to do so. We have absorbed the lot, and have also improved quality in the meantime. But this time, much as we sincerely regret having to do so, we ask our readers to accept a price change.

We are fairly confident that the majority of our readers endorse our views and our policy on quality. If a thing is worth doing, or putting together, it is worth seeking out the best materials and the most skilful hands to match the effort. Nothing short of that interests us. We have written of future plans for this magazine, and we have other plans which we have not yet mentioned. We think that all these things should combine to make *The Tape Recorder* a very worthwhile paper. But this is not "sugar". Our real hope is that the majority of our readers will consider this magazine to be well worth its new price of two shillings in its present form.

And now, to end on a different note, as the telescopes of the world watch the accumulating bunch of satellites nearing the end of another 365-day journey round the sun, we wish you all a very happy and peaceful 1963.

COVER NOTE

HOW many miles of tape have passed the sound heads of *your* recorder during the past 12 months? How many spools will you fill during 1963? These were the thoughts that produced the idea for our cover picture as the sands of 1962 ran out. In actual fact the sand runs for precisely 2½ minutes in the glass on the cover, and was probably used for timing the eggs in some Austrian kitchen during the last century—once for soft, twice for normal, thrice for hard. But don't let that spoil the picture!

SUBSCRIPTION RATES

The subscription rate to *The Tape Recorder* is 27/6 per annum (U.S.A. \$4.00) from The Tape Recorder, 99 Mortimer Street, London, W.1. Subscription + Index, 30/- (U.S.A. \$4.25).

The subscription rate to *Hi-Fi News* is 27/6 per annum (U.S.A. \$4.00) from Hi-Fi News, 99 Mortimer Street, London, W.1. Subscription + Index, 30/- (U.S.A. \$4.25).



**JANUARY
NUMBER**

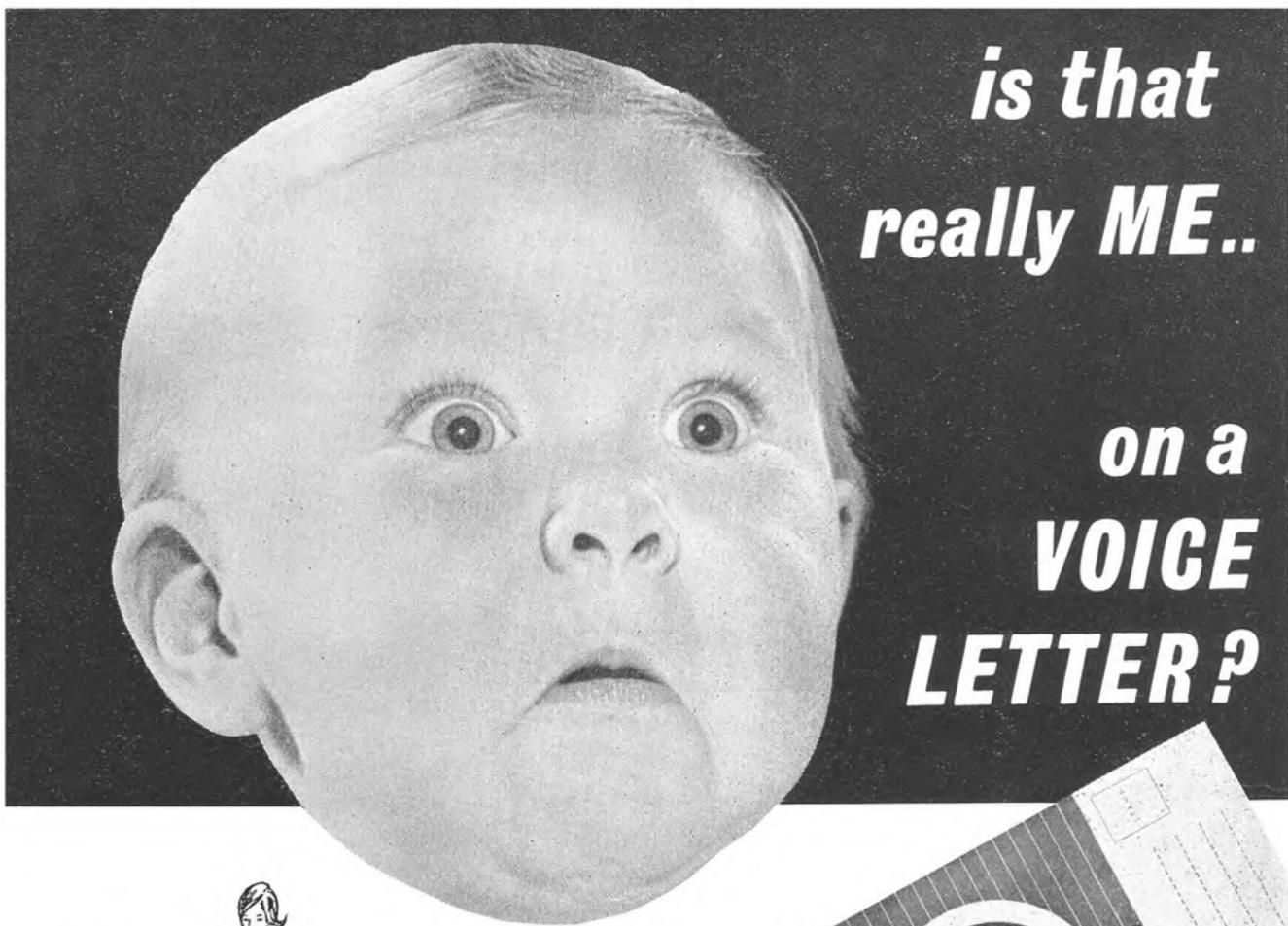
★

Contents include:

Can Hi-Fi be Truthful
 Tracking Problems
 Equipment Reviewed

★

NOW ON SALE



*is that
really ME..*

*on a
VOICE
LETTER?*



More and more people are getting their letter writing 'taped' with the Mastertape Voice Letter. Anywhere in the world far away friends and relations can receive and exchange a living, spoken message which can include the whole family—even down to the baby! Giving 20 minutes playing time at 3½ i.p.s. on a twin-track recorder, the Mastertape Voice Letter, complete with box and ready-to-address envelope weighing only 2 oz., costs only 5s. 3d.

**British Mastertape
Makes Sound Sense**

Mastertape voice letter

obtainable from stockists everywhere



M.S.S. RECORDING CO. LTD., COLNBROOK, BUCKS. Tel.: Colnbrook 2431

A MEMBER OF THE **BICC** GROUP OF COMPANIES

NEWS FROM THE WORLD OF TAPE

Ampex Introduce Portable Instrumentation Recorder

AMPEX have introduced the first portable instrumentation recorder designed as standard equipment for both research and other applications in medicine, industry and education. Designated the SP-300, it combines much of the advanced technology of Ampex's larger, more complex instrumentation recorders together with portability, compactness and economy.

In addition, its four tracks make it suitable as a teaching aid in medical studies such as that of the cardiovascular system. For example, cardiogram and blood pressure readings that have each been recorded on separate channels could be displayed on an oscilloscope while the simultaneous heart sounds and the instructor's voice, recorded on the other two channels, are played back through a loudspeaker.

Possessing solid-state circuitry throughout, its four channels, with electrically switched amplifiers, offer both direct and FM record/reproduce electronics. The direct record process allows recording of rapidly-varying phenomena over a range of 50 to 40,000 cycles per second. The FM circuitry complements the direct process by recording phenomena varying at low rates in the range of from 0 to 2,400 cycles.

Four tape speeds, between $1\frac{1}{2}$ and 15 i/s, are provided, permitting time-scale compression and expansion of all recorded phenomena. Each speed is electrically switched by a single front panel control. The SP-300 records on $\frac{1}{4}$ -in. tape on 7 or 10 $\frac{1}{2}$ -in. reels.

The SP-300 measures 22 x 13 x 19 $\frac{1}{2}$ in., and weighs 85 lbs.

Westrex Awarded Contract

THE Westrex Company, a division of Litton Industries, has been awarded a Contract by the British Broadcasting Corporation amounting to over £48,000, for the supply of magnetic sound reproducing and recording equipment. The equipment is intended for use with the British Broadcasting Corporation's new second television channel, which is to come into service during 1964.

There will be a total of thirty-four magnetic film reproducers and recorder/reproducers of the very latest Westrex design, incorporating special features required by the British Broadcasting Corporation. Some of the machines will be for use with 16 mm. and some with 35 mm. magnetic film.

E.M.I. Tape Recorders for Divorce Courts

PROCEEDINGS of divorce cases being held in one of the court rooms at the Law Courts in the Strand are being recorded as an experiment by professional tape recorders supplied by E.M.I. Electronics Ltd.

Six microphones are positioned in the court, for the witness box, for the judge, for the clerk of the court—the Associate—and three for the barristers. These are connected to an E.M.I. control console where the microphone outputs are mixed and passed to one of two RE 301 remotely-controlled tape recorders. Limiter amplifiers and correction networks are installed in the console to obtain a clear recording of the spoken words by reducing extraneous noises, such as the slamming of doors and the sounds of traffic outside the building.

Recording levels are pre-set to court conditions and the Associate need only operate a switch to start the recording system, when proceedings begin. Emitape type 100 on 8 $\frac{1}{2}$ in. tape reels is used and as each track on a reel can cope with at least three hours' recording time, a reel can contain a whole day's proceedings. Should more than three hours' continuous recording be required, the second RE 301 can be started up and the first stopped by the use of one switch on the console.

If any queries are raised on evidence given earlier in the hearing the E.M.I. tape recorders provide immediate play-back



During a visit to Llandudno, Mr. E. A. Elcock, of Liverpool, recorded an interview with a Welsh girl in national costume.

facilities, and the meanings behind voice inflections can be assessed as well as the exact wording.

Another E.M.I. tape recorder, a variable speed replay machine with stop/start spool, is used to transcribe the recorded tapes. If, as in most cases, a typewritten copy of the proceedings is not immediately required, the tapes can be stored for future reference. The experiment will show whether tape recorders offer a more economic means than present methods of recording court proceedings.

Preliminary List of Exhibitors

THE preliminary list of exhibitors for the 1963 International Festival and Fair has been issued by the organisers. It reads:—Acoustical Manufacturing Co. Ltd. A.K.G. Ampex Ltd. Armstrong Wireless and Television Co. Ltd. B.A.S.F. Brenell Engineering Co. Ltd. Butoba. Chapman Ultrasonics Ltd. Clarke and Smith Mfg. Co. Ltd. Cosmocord Ltd. Decca Record Co. Ltd. E.M.I. Ltd. Fi-Cord Ltd. Ferrograph Company Ltd. N.S.B. Field Ltd. Federation of British Tape Recording Clubs. G.K.D. Ltd. Garrard Engineering and Manufacturing Co. Gevaert Photo-Producten N.V. Goldring Manufacturing Co. (G.B.) Ltd. Goodmans Industries Ltd. Grampian Reproducers Ltd. Grundig (G.B.) Ltd. Instrumatic Ltd. K.E.F. Electronics Ltd. H. J. Leak and Co. Ltd. Lowe-Opta A.G. Long Playing Record Co. Ltd. Lowther Mfg. Co. Ltd. Lustraphone Ltd. Lockwood and Co. Ltd. M.S.S. Recording Co. Ltd. Mullard Ltd. Minnesota Mining and Manufacturing Co. Ltd. Miles Henslow Publications Ltd. Mordaunt Sound Reproducers Ltd. Ortofon A/S. Oriole Records Ltd. Philips Electrical Ltd. Planet Projects Ltd. Pye Ltd. Rola Celestion Ltd. Rogers Developments Ltd. Sherwood Electronic Laboratories Inc. Stuzzi. S.M.E. Ltd. A. R. Sugden Ltd. Shure Bros. Inc. Siemens. Sony Corporation of Tokyo. Standard Telephones and Cables Ltd. H. H. Scott (Ltd.) Inc. Simon Equipment Ltd. Twinsonic Ltd. Tannoy Products Ltd. Telefunken. Truvox Ltd. Tandberg. Thorens S/A. Vitavox Ltd. Vortexion Ltd. Waverley Records Ltd. Willi Studer (Revox) A/S. K. H. Williman and Co. Ltd. Wharfedale Wireless Works Ltd. Whiteley Electrical Radio Co. Ltd. Zonal Film (Magnetic Coatings) Ltd.

The festival will be held at the Hotel Russell, London, on April 18th, 19th, 20th and 21st.

NEWS AND PICTURES FROM THE CLUBS

THE Glasgow Tape Recording Club has produced a tape on the last day of Glasgow's famous trams, lasting three-quarters of an hour and including many tram sounds, a full description of the last tram procession and a number of interviews with tramway workers and members of the public.

The Glasgow club has now obtained the use of new and more suitable premises from the firm of M. and M. Electronics Ltd., 91 North Hanover Street, and meetings are now held on alternate Monday evenings at 7.30 p.m. A full syllabus of talks, demonstrations, competitions, etc., has been prepared and should keep members very busy during 1963. Further information can be obtained from *D. Anderson, 33 Millbrae Road, Glasgow, S.2.*

* * *

DURING the past month members of the Thornton Heath Tape Recording Club have had the second "Out and About" programme and owing to more members having portables than before, smaller groups were able to go out and move around more freely. The items needed this time were, a bus, a bell, a train sound and an interview on any subject. All teams had to be back by 9.30 p.m. when all the tapes were played, and some very good recordings were heard. Another "Out and About" is planned for the future, by request.

The club's new "Advisory Panel for Beginners" was in action at a "Beginners' Night" meeting, headed by E. J. Bashford. Mr. B. Marlow, secretary, gave hints on maintaining machines and cleaning the heads, etc. The third member of the panel, Mr. M. Webb, demonstrated some of his extension speaker cabinets, and explained how they were built and how much they cost to build.

Further details can be obtained from *E. J. Bashford, 4 Dunheved Road North, Thornton Heath, Surrey.*

* * *

SINCE moving into their new premises the Middleton Tape Recording Club has had quite a full programme. Its activities have included a sound hunt, a talk on echo effects with demonstrations given by George West, and a lecture on brass bands by Brian Gilbert. Both lecturers used their tape recorders to illustrate their talks.

Recently the club members were the guests of Oldham Gramophone Society at a film show which included a showing of "The Magic Tape"—a film describing the manufacture of recording tape. Further details can be obtained from *J. R. Witts, 119 Heywood Old Road, Rhodes, Middleton, Lancs.*

* * *

ON November 12th the Cotswold Tape Recording Society (Cheltenham) made its first attempts at play-reading and recording. Two victims—the hon. secretaries—were designated to read a short and very silly playlet, being produced by Mary Lamb. This was then played back and criticised; and on the basis of this experience, two further victims had a go—this time Farleigh Price and Mostyn Pryce.

After the interval a larger group tackled a Victorian melodrama. Two new members nobly tackled the effects side, which included hoofs galloping and a donkey braying. They had to improvise everything with whatever happened to be in the hall. The result was surprisingly good, with audience and recordists joining in with boos, hisses and cheers according to the state of victory of vice or virtue—which triumphed in the end.

One member—Colin Woods—recorded the play in stereo; and although there was a great deal of hilarity over the whole thing, valuable experience was gained in balancing readers at the microphones, cueing in effects, and voice-control in reading to a microphone, which is a very different thing from acting

from a stage. More ambitious efforts in this technique are planned for the future; and the weariest man of all at the end was Ernest Morris, who kept the whole thing going with consummate generalship.

The society's hospital service has now been extended to include Cheltenham General Hospital and the Cirencester Memorial Hospital. It is hoped that other foundations will be included before very long. Information is available from *P. D. Turner, Pike Cottage, Frampton Mansell, Stroud, Glos.*

* * *

AT the annual general meeting of the Bethnal Green Tape Recording Society, held recently, it was agreed that the society has made great progress during the past year, and this coming year, coupled with the new premises at the Bethnal Green Town Hall, even greater success is confidently expected.

Programmes are being prepared for 1963 and an effort is being made to encourage members to participate in more active recording sessions. In the technical field, apart from the normal demonstrations, etc. arranged with manufacturers, Mr. J. Burchell of the club is arranging a series of regular talks of a more technical nature.

Further information on the club can be obtained from *R. Gentle, 24 Hyde Road, Hoxton, London, N.1.*

* * *

AS a novel recruiting drive, Walsall Tape Recording Club has prepared a short "commercial" for give-away distribution by a local trader. Copies of the five-minute master tape will be prepared by M. L. Chambers, of Audio Electronics Ltd., and presented to purchasers of new machines.

The item brings the customer's attention to the existence and activities of the club, gives several brief examples of the uses of a recorder, invites listeners to visit the club, and offers them six months' free membership for doing so.

Details are available from *P. A. Clark, 20 Springvale Avenue, Parkhall, Walsall.*

* * *

ACTIVITIES in the South Birmingham Tape Recording Club have become very hectic over the past few weeks. Club meetings have taken place once a fortnight as usual, in addition there has been a visit to Kidderminster Club and the supplying of sound effects to the Alexandra Playgoers Club.

The Players were faced with the problem that they required numerous sound effects and approached the club for assistance. This soon proved to be more difficult than was first expected. There were over forty different cues.

The action of the play taking place in the Orkney Islands, required the sounds of gulls and rolling of the sea almost throughout. This was faded in and out on one tape recorder. In addition, a second recorder supplied such sounds as a horse and cart arriving and departing, a dog barking and a thunderstorm.

★ ★ ★ ★ ★ THIS MONTH'S PLUM

★ MUSKRAT RAMBLE

★ "DOC" EVANS AND HIS DIXIELAND BAND

SAGA MONO STG 8083

STEREO STE 3073

SELECTED BY "THE TAPE RECORDER"

NEWS AND PICTURES FROM THE CLUBS

The fact that one of the actors was required to play the piano, but was not a pianist presented no difficulty, as this was recorded and synchronised in a most convincing manner. Three or more members attended rehearsals twice a week and the play was presented for five performances.

This was the first time the South Birmingham Club has had the opportunity of helping the amateur theatre, but it proved a great success and already there have been requests for assistance from other societies.

Further details can be obtained from *J. T. Gilbert, "Woodcote," Box Trees Road, Dorridge, Solihull, Warwickshire.*

ONE of the latest clubs to be formed is the **West of Scotland Tape Recording Club**. Meetings are held every Monday in the Glasgow area. Founder members, secretary *A. McCallum* and chairman, *G. Wood*, have compiled a syllabus of meetings for a year ahead. Among the evenings planned are, the making of "Feature Tapes", "Getting more with a Portable" and the mixing of "Tape and Slides".

Anyone living within reach of Glasgow, who would like further details should contact the secretary *A. McCallum, 9 Glendevon Square, Glasgow, E.3.*

THE second November meeting of the **Whitstable and District Tape Recording Club** was the annual general meeting, and the reports of the secretary and the treasurer revealed that the club was in a healthy state both as regards members and funds. There were now 36 members, excluding the doubtfuls, and the average attendance in the first year of the club had been 16. Funds in hand amounted to £20, and in view of this satisfactory state subscriptions were to be reduced in the coming year from 20s. to 15s. As before, there would be no subscription payable by girl friends or wives of members, nor by junior members under the age of 17.

The present club officials were all re-elected for a further term, *Bill Blake* as chairman, *Tom Robinson* as secretary, and *Peter Hadley* as treasurer, and there was to be a new technical sub-committee set up, to offer technical advice and assistance to members. This would consist of boffins *Ken Pearce* and new member *Jim Campion*. It was announced that there would be a change of headquarters in the new year, and that meetings from Monday, January 14th, would be held fortnightly at The Record Centre, Oxford Street, Whitstable.

Further details may be obtained from *T. Robinson, 17a St. Anne's Road, Whitstable, Kent.*

A NUMBER of tape recording enthusiasts met in the Dorris Tearooms, Ayr, recently, with a view to forming a tape recording club for Ayr and district. Mr. Stanley J. Hourston proposed the formation and was seconded by Mr. E. W. Reid. Mr. H. Copinger, Kilmarnock, proposed that the club be named **Ayr and District Tape Recording Club** and Mr. Hourston seconded.

A proposed constitution was read and, with amendments, was put to a full meeting on Monday, December 17. An organising committee has been formed and consists of Messrs. Hourston, R. McDonald, J. Rae, E. W. Reid and W. Holmes.

All inquiries regarding the club should, in the meantime, be addressed to *S. J. Hourston, 93 Whitlatts Road, Ayr.*

THE **Reading Cine and Tape Recording Society** has welcomed more new members this season and is now well into an interesting series of weekly meetings. Combining, as it does, the worlds of the cinema and sound recording, it provides a meeting place for people with varying shades of interest in two arts



Daphne Oram, president of The Dartford Tape Recording Society, is seen demonstrating electronic music to club members during their visit to her studio.

which are frequently complementary to each other. Indeed the society can claim to be a pioneer in the application of tape sound to both colour slides and amateur films.

Recently invited to share an evening with the Kingston-on-Thames Cine Club, Reading arrived with a formidable array of equipment including *Doug. Noyes'* speciality, a device for fading slides on and off the screen in sync. with tape commentary and music. It was effectively used on this occasion to project *Jack Lee's* slide sequence "Paris". Also in the programme was *Derek Purslow's* award winning cartoon "The Runaway Train", with pictures and sound painstakingly drawn on the film.

The society encourages its members to play an active part in the proceedings and exercises are organised in which all can participate. At the moment everyone is feverishly working on their own interpretation of the title "Wheels", for film or tape.

Practical "How-to-do-it" sessions are a feature of the society's activities and already this season there have been evenings devoted to indoor filming, title-making and tape work. In the full programme ahead there is certainly something for everyone and newcomers will be well catered for. Meetings are held each Monday at 8 p.m. Details are available from *T. Fisher, 5 Maple-durham Drive, Purley, Reading.*

MEMBERS of the **Dartford Tape Recording Society** travelled to Wrotham for a demonstration of Electronic Music by Miss *Daphne Oram* in her studio, which is a converted oasthouse, packed with recording equipment and electronic devices.

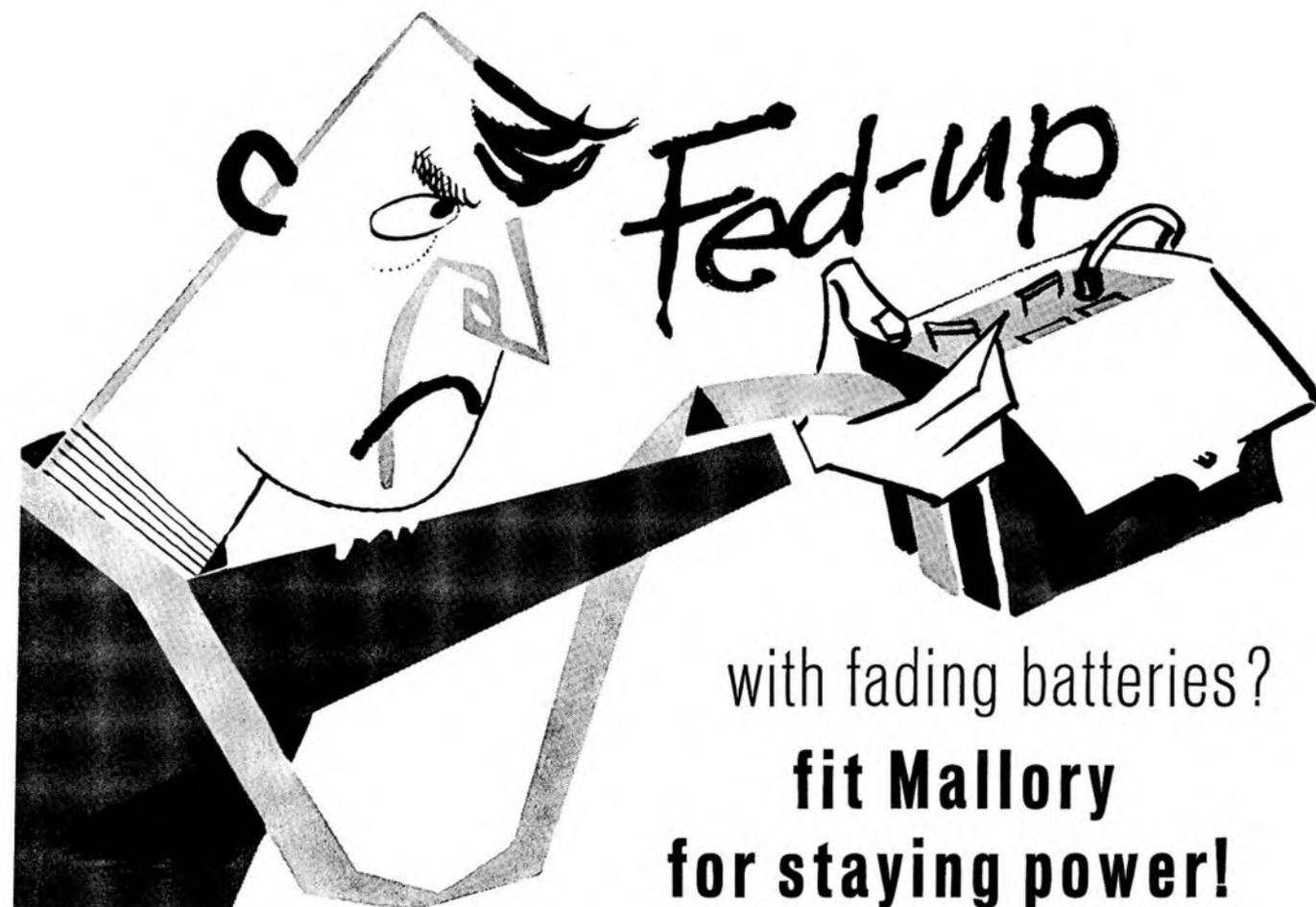
It is here that she composed the weird "out of this world" electronic music that has earned her the *Gulbenkian* grant which will be used on research for producing other ways for the creation of electronic music.

In the studio members were given a very interesting demonstration on the various ways of producing electronic music, such as speeding up, cutting the attack or delay of music or sound, playing the tape backwards, cutting and splicing the tape, echo or reverberation and the use of filters to cut out different parts of the frequency band.

Further information is available from *E. H. Foreman, 117 Westgate Road, Dartford.*

A SUGGESTION for the formation of an **Association of Midland Tape Clubs** has been approved by the following clubs: *South Birmingham Tape Recording Society, Birmingham Tape Recording and Audio Club, Kidderminster Audio and Tape Society, Warwick and Leamington Amateur Tape Recording Society and Cotswold Tape Recording Society.* It is hoped that such Association will further the activities and interests of tape recording and lead to a greater co-operation between clubs.

Seventeen clubs have now been notified. Any other clubs in the Midland area wishing to obtain further details should contact *J. T. Gilbert, "Woodcote," Box Trees Road, Dorridge, Solihull, Warwickshire.*



with fading batteries?
fit Mallory
for staying power!



Mallory batteries are the most important development in dry cell systems for over eighty years. They are leakproof and fade-free. They give more power for more hours than conventional types — *without* the need for rest periods. And for the first time they enable the discerning portable recorder enthusiast to choose just the right battery for the job.

MALLORY MERCURY BATTERIES

pack power in small spaces for miniature recorders — give them the full hours of service obtained with larger machines.

MALLORY MANGANESE ALKALINE

in standard sizes give *at least* three times the power of conventional types in all battery operated recorders.

The unique properties of Mallory batteries ensure better performance throughout their extended life. Insist on Mallory to eliminate those troubles that occur when normal batteries tire.



for new ideas in batteries

MALLORY BATTERIES LIMITED CRAWLEY SUSSEX Crawley 26041

by Richard Golding

SOUND AND CINE

"HOLD Back the Dark", the current 16 mm. sound film from the Ardleigh House Cine Group of Hornchurch, Essex, tells of a man who is dared, one evening in the local pub, to stay the night in a Haunted House. Weird things happen to him, emphasised in the film by an imaginative sound track containing quite an amount of lip sync.

The recording system used by Ardleigh House is quite impressive. The camera is driven by a synchronous *Parvalux* motor via a gearbox which drives through a dog-clutch into the *Bolex* external motor-drive socket. The system incorporates a synchronous starting unit which is a low voltage slave unit and which can operate either the camera motor or the projector motor (separate units are built into (a) the camera blimp and (b) the projector stand). The *Ferroglyph* recorder that the Group uses has been slightly modified in such that it has a micro-switch fitted under the start lever. Starting the recorder closes the contacts of the micro-switch thus completing the low voltage relay circuit. This in turn switches the mains to the camera motor so that the instant the recorder is started so is the camera.

Additional fittings to the blimp unit are a remote control for the camera operator and a flashing-run indicator consisting of a lamp operated from the low voltage supply via a micro-switch (this is operated by a cam fitted on the final motor drive shaft—the switch closing once per rev of the spindle). The need for a flashing indicator

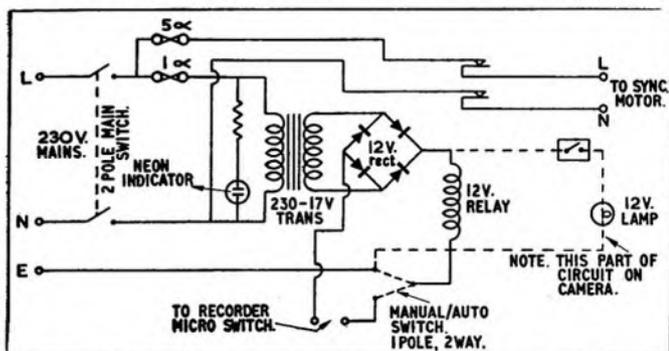


Diagram of the synchronous starting unit.

of this type is because the synchronous motor has a very low torque and sometimes stalls on start-up. Any trouble within the system is easily observed by the camera operator who can cut immediately. Low voltage D.C. is preferred for reasons of operator safety but also to prevent hum getting into the recording.

The Blimp

The blimp is constructed of $\frac{1}{4}$ in. ply with the camera gearbox and motor unit all mounted on a common panel, suspended on rubber blocks fixed within the blimp case. The only parts of the camera projecting from the blimp are the lens turret and the viewfinder. The whole of the blimp is insulated with half-inch plastic foam.

On projection the projector motor is disconnected from its transport mechanism and a *Framco* synchronous motor is used to drive the projector through a twin-ratio gearbox for 16 and 24 f.p.s. The *Ferroglyph*, with tape-sync marking pre-aligned at the recording head, is started up. This closes the low voltage circuit, pulling in the mains



Camera set-up showing the lower half of blimp with *Parvalux* motor and gearbox.

relay and thereby switching the mains to the synchronous motor and to the projector motor. The film, of course, having been positioned with a sync mark in the gate. As soon as the projector starts to run another indicator lamp is switched on showing that a synched start has been effected.

Ardleigh House do not claim that every shot that they have in the can is perfect as far as lip sync goes but results to date have been extremely encouraging. Encouraging enough to warrant extra outlay on sprocketed accessories and the replacement of all their press-fit rubber tubes on the drive spindles by flexible mechanical couplings. These improvements, they hope, will give them 100 per cent. lip sync at all times. Details of membership may be obtained from G. H. Morgan, Esq., 25, Cromer Road, Hornchurch, Essex.

Make Your Own Sound Effects

A reader asks if there is a standard system laid down for the creation of faked sound effects. There is no standard as such, laid down by any authority, as far as I know. There are, of course, many methods used in producing desired effects and the best of these have become recognised throughout sound recording circles, representing an unofficial standard to be followed. The creation of a sound effect is a prime tape technique which can be developed from any one of a number of prolific sound sources to be found in most households: a box of matches, an electric razor, a piano, a typewriter, a clock, a tap, a fan, an oven, a vacuum cleaner and a hair dryer. Consider the sound of an electric razor. Its sound changes from a buzz to a drone when pressed against a table surface. Try it against other types of surface—a window pane, a door, a coal bin. Record it inside a cardboard box, a cake tin and a glass jug. Play back these tests at the recorded speed, then at double speed, and, if your recorder has three speeds, to the extremes provided by these. Now, extend this experiment and bring in other sound sources, doing the same thing with each one. In this way you will begin to build-up an appreciation of the difference between sounds and, if you care to note down the impression produced by each source, you will have a valuable reference for whenever an unusual sound is required.

Analyse the Actual Sound

An important part in the reproduction of a sound effect is the correct analysis of what actually makes up the whole sound. Effects are usually made up from a number of other, smaller effects following a pattern or rhythm, examples of which are given in my glossary. The glossary, which has taken many weeks of experimentation to produce, is made up of most of the recognised methods and some new ones that have simply evolved through experiment. There is, however, room for additions and I should be pleased to hear from any reader who has something of his own to add to what, I believe, is the most comprehensive list to be published.

Aeroplanes: Fix a piece of card against the blades of an electric fan. When the blades are set in motion, they give the effect of a pre-war aeroplane engine starting up. For a modern pressurised cabin effect, try a hair dryer. The sound of a jet plane may be faked by tearing a strip of Sellotape from its roll or a sheet of glass. The actual tape recorder noise can be used. The hum of any domestic appliance or even the steady hum of the voice, provided that there is no break in

for Professional Performance.....

Tandberg

SERIES 6

STEREO TAPE DECK



3 SPEEDS
3 HEADS
4 AMPLIFIERS
***4 TRACK**
and 2 TRACK

- High and low level mixer inputs and cathode follower outputs.
- "On and off the Tape" monitoring.
- Sound-on-Sound simultaneous record and playback.

110 gns

Booklet of Technical Reviews on request.

SERIES 7

STEREO TAPE RECORDER



3 SPEEDS
2 HEADS
and 2 Power Amplifiers

- Two Indicators.
- Two Monitor Speakers.
- Two outputs for additional speakers or Hi-Fi.

***4 TRACK**
and 2 TRACK
 Send for leaflet.

BUILD-IT-IN OR CARRY-IT-AROUND!

93 gns

4 track model 74
 2 track model 72
 (Luggage type carrying case. £7 1s 8d. extra).

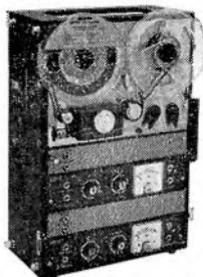
Tandberg GB

ELSTONE ELECTRONICS LIMITED,
 Edward St., Templar St., Leeds 2.
 Telephone: Leeds 3-5111 (7 lines)

18 Months to Pay

	Deposit	18 Monthly Cash Payments		Cash
	£ s. d.	£ s. d.	£ s. d.	Gns.
MAINS TWIN-TRACK				
Truvox R82 ...	5 15 6	2 17 9	55	
Reps. R.10 ...	6 4 0	3 2 0	59	
Brenell Mk. 5 ...	7 2 0	3 6 10	64	
Brenell 5 (Meter) ...	7 5 0	3 12 6	69	
Grundig TK41 ...	8 0 0	3 18 8	75	
Telefunken 85 de Luxe ...				
	8 15 0	4 7 2	83	
Brenell 5 Type "M" ...	9 5 0	4 12 5	88	
Simon SP/5 ...	9 16 0	4 17 8	93	
Reflectograph "A" ...	11 5 0	5 10 0	105	
4-TRACK MONAURAL				
Grundig TK23 ...	4 15 0	2 7 3	45	
Truvox R.84 ...	6 4 0	3 2 0	59	
Philips EL3549 ...	6 12 0	3 5 0	62	
International ...	7 5 0	3 12 6	69	
Reps. R.10 ...	7 5 0	3 12 6	69	
Grundig TK40 ...	8 0 0	3 18 8	75	
Akai Model 69 ...	8 6 0	4 3 0	79	
4-TRACK STEREO/MONAURAL				
Philips EL3534 ...	9 16 0	4 16 6	92	
Telefunken 97 ...	10 0 0	4 19 9	95	
Grundig TK46 ...	10 12 0	5 3 9	99	
Akai M.6 ...	13 13 0	6 16 6	130	

THE RECORDER CO. features the superb **AKAI M.6 Terecorder**



PRICE
130
GNS

Hi-Fidelity 2- or 4-track Stereo/Monaural, Two VU meters, Two Microphones, Automatic Tape Stop. Signal to noise ratio better than 54db.

We will be pleased to demonstrate this remarkable model. Send for full details.

- ★ INTEREST FREE terms
- ★ FREE INSURANCE COVERING YOUR PAYMENTS IN THE EVENT OF SICKNESS OR UNEMPLOYMENT
- ★ FREE DELIVERY
- ★ PART EXCHANGES

12 Months to Pay

	Deposit	12 Monthly Cash Payments		Cash
	£ s. d.	£ s. d.	£ s. d.	Gns.
MAINS TWIN-TRACK				
Elizabethan LZ30 ...	3 7 3	2 10 5	32	
Grundig TK14 ...	3 13 6	2 15 2	35	
Reps. R.10 ...	6 3 11	4 13 0	59	
Telefunken 95 ...	6 3 11	4 13 0	59	
Ferrograph 5A/N ...	8 19 0	6 13 0	85	
4-TRACK				
Philips "Star Maker" ...	2 16 9	2 2 7	27	
Ferguson 3202 ...	3 7 3	2 10 5	32	
Philips EL3541 ...	3 15 8	2 16 9	36	
Elizabethan LZ29 ...	3 15 8	2 16 9	36	
Truvox R64 ...	4 2 0	3 1 5	39	
Grundig TK23 ...	4 15 0	3 10 10	45	
BATTERY				
Philips EL3585 ...	2 10 5	1 17 10	24	
Stella ST470 ...	2 15 0	1 19 2	25	
Optacord 412 ...				
Battery/Mains	4 19 0	3 14 0	47	
Stuzzi Magnette ...	6 4 0	4 12 11	59	
Butoba MTS ...	7 0 0	5 3 10	66	
Ficord 202 ...	7 0 0	5 3 10	66	
TRUVOX HI-FI TAPE UNITS				
Twin Track				
PD.82 Standard ...	4 4 0	3 3 0	£42	
PD.87 Stereo ...	6 6 0	4 14 6	£63	
4-Track				
PD.84 Standard ...	4 12 0	3 9 0	£46	
PD.86 Stereo ...	6 6 0	4 14 6	£63	

Open all day Saturday—
 Friday 6.30 p.m.

THE RECORDER CO.

If unable to call, write for free brochure or send deposit now for quick delivery.

(Dept. R) 188 WEST END LANE, WEST HAMPSTEAD, LONDON, N.W.6

Telephone: SW1 4977

SOUND AND CINE — continued

continuity, can simulate the sound of a passing plane if the microphone can be moved in and out.

Birds: Record the sound of your own whistling or try rubbing a cork over a bottle, playing back at a higher speed.

Burning buildings: Crumple a sheet of cellophane close to the microphone, slowly for the most part but with energetic bursts at intervals. Cracking beams and woodwork can be produced by crushing matchboxes or sticks at various volume levels or mike distances. Play back at varying speeds for variety.

Cars: When recording effects for a crash it is possible to manufacture most of them without using a car at all. The screech of tyres can be produced by rubbing a finger over the surface of an inflated balloon. The impact, by crashing down a tin tray full of objects followed by the crumbling of a matchbox and the splintering of a drinking glass as it hits the floor. The sound of traffic, motor horns and gear changing is best recorded live or taken from disc. The *Doppler effect*, i.e., the change in pitch of a rapidly passing noise, can be introduced manually into the re-recording by slowing down the supply reel with the finger at the point where the effect begins. The sound of a car door can be simulated by briskly closing the oven door.

Church Bells: The typewriter bell recorded at top speed with intervals between each strike. Play back at lower speed.

Crowds: A small group of friends at some distance from the microphone murmuring the word "rhubarb" but, with the addition, now and again of something like "soda-syphon" to break up any rhythm that may creep in.

Doors: The effect of a door being opened and closed and the click of the catch may be easier to control if a small cabinet is used rather than a real door. Iron doors can be produced by sliding a dustbin lid over the bin rim and then replacing the lid with a clang to give the final shutting sound. For creaking doors try turning a wooden peg in a hole in a wooden slat.

Explosions: Are best arranged outdoors to avoid room echo but a really terrific explosion can be made with a piano by depressing all the low notes simultaneously with the loud pedal down. Outdoors, however, fireworks, bursting a paper bag, blowing quickly across the mike or even banging two large empty tins together will do the trick. Play back at lower speed.

Footsteps: The needed beats can be produced by any method you like but they should be most carefully done so that the walking rhythm and the material in or on which they are proceeding appears correct. For hard surfaces, pavements, etc., beats on very hard surfaces are needed.

Horses: The well-known method of using half a coconut shell in each hand is by far the best. Remember that the horse has four legs (this is where sound analysis comes in) and use the back and front rims just slightly out of step with each other. Fingers can be flicked on a hard surface (try a hollow one), the first and second fingers of both hands used together in a fast rhythm. The tongue can be clicked against the roof of the mouth in a double beat but care must be taken not to record the breathing. For running over grass the same methods can be used on a blanket covered surface. The harness may be reproduced by rattling a bunch of keys. The whinnying will have to be taken from disc or produced by the voice.

Ice Skating: Can be simulated by any number of methods from a very hard point on a sheet of glass to a pencil loosely run over the linoleum. Sound perspective is important here.

Lifts: Record a vacuum cleaner, starting, running and stopping at your fast speed. Play back at half speed and your lift will be heard setting off, travelling up or down (it's a two-way sound) and arriving.

Marching: Use an ordinary cardboard box containing a number of small objects; nuts and bolts, dried peas, rice, buttons, etc., and shake it in a steady marching rhythm (you can silently mark time yourself to keep this rhythm). The fade in and out of the passing marchers can be managed by bringing the box up from ground level close to the mike and then down again. The box may be muffled with a cloth layer if desired. The effect may also be produced by crunching sugar in a bowl close to the mike.

Monster voices: Recordings of cat or dog sounds replayed at a lower speed.

Rain: This is most easily reproduced by using the nearest equivalent—the bathroom shower or garden hosepipe and the surface on which

the rain is to fall should be as near the real thing as possible, i.e., for flat tin roof use a flat sheet of tin of not too great a thickness.

Radio Commentary: Tune the radio set so that only atmospherics are present. Use this sound as a background for your spoken commentary.

Rockets: The blast-off can be provided by a pressure cooker.

Rowing: Rowing or paddling can be manufactured in an open bath by hitting the water level with a flat piece of wood.

Sea: For surf try rocking a long shallow trough filled with rice to and fro combined with a background wind effect. A wire brush pushed along a rough surface (try dashing the brush down on the surface and then following through) will give a rough sea effect.

Ships: For creaking rigging stand on a loose floorboard and pivot back and forwards. Subsidiary creakings can be made by rubbing a tightly stretched string with a resin-coated cloth. **Ship's fog-horn:** Make the sound of "O" with the lips pursed and the sound coming from the back of the throat. As the deep sound emerges, allow the lower parts of the cheeks to quiver for added resonance. **Motorboats:** A recording of the exhaust pipe of an ordinary car engine idling overplayed at the same or higher speed. A lower speed play back will sound like a diesel engine.

Shots: All manner of violent blows on all sorts of materials can be used and all can be quite effective. Whatever method, bursting a paper bag or striking a cushion with a stick, etc., the associated reverberation time should be in harmony with the visuals and if the film shows the action taking place in a large empty room, for instance, then the sound effect should be manufactured in the same sort of acoustic conditions, producing a hollowness.

Space: To create an effect of space, distance must be used as a part of the effect itself. This is to say that when re-recording an already existing sound effect, the two recorders should be set-up in a long empty room or closed-in corridor with the recording microphone as far as possible from the amplifier of the other machine playing the effect back.

Swimming: Use the filled-up bath and make the motions of the desired stroke with the hands through the surface of the water. If close-ups are intended don't forget the swimmer's breathing. This is a difficult one and will probably require a lot of practice and many retakes.

Telephones, Trains and Thunder

Telephone Voice: Speak into a long narrow glass close up to the mike.

Thunder: Suspend a large sheet of tinplate over the microphone and shake it for periods from just under a second to just over a second. A double take, i.e., a fairly gentle shake which has a violent finish, is quite effective.

Trains: A steam engine can be simulated by puffing gently across the mike. The sound of the wheels striking the joints in the permanent way can be made by recording the sound of a roller skate running over the floorboards. This is best kept as a background loop and used as a constant noise. Other train engine noises can be supplied by domestic appliances. The pressure cooker was successfully used by Alan Sidi of Guiseley, Yorks, in his Gold Star award 4 minute film "Eight O'Clock Special" and the Walton film "Speed Crazy", has a vacuum cleaner sound source.

Underwater Caves: Record a tap dripping into a bowl at double the final speed required. Then superimpose on this the voices of your subterranean explorers recorded at the slower speed and with the microphone hanging inside the piano with the loud pedal depressed.

Water: Most water noises can be produced in the bath or even in the kitchen sink. Various types of waterfalls, slow or fast streams, babbling brooks or even raging torrents can be obtained by using a hose or rubber spout from the tap and allowing the jet of water to fall on various surfaces from various heights. A series of natural sounds of a small waterfall can be produced by running one bath tap full on and the other at half speed. Under both taps should be set glass receptacles at differing heights. For a gentle, lapping sound try drawing a wooden spoon through the surface of the bath water.

Wind: Moaning wind can sometimes be recorded at an open fireplace. A long, low whistle with the voice falling at the end of its breath will superimpose quite well but you will need more than one background loop as wind noise is never constant.

Your live effects may be supplemented by some of the many discs detailed in next month's *Sound & Cine* compilation of *Recorded Sound Effects*.

our readers write

. . . about two subjects

From: M. J. Lee, 28 Dickens Drive, Addlestone, Weybridge, Surrey.

Dear Sir:—As a regular reader of *The Tape Recorder*, I am getting just a little tired of the correspondence regarding “2-track or 4-track”, “ $3\frac{1}{2}$ i/s or $7\frac{1}{2}$ i/s” and professional versus domestic machines. I know your editorial policy is “no compromise”, and a very laudable one at that, but some of us just have not got the cash to use full track at 15 i/s on an Ampex. Anyway it cannot be so long ago that the correspondence was “full or half-track” at “15 or $7\frac{1}{2}$ i/s” and people were saying that man could not survive travel at 60 m.p.h.

As to the price of tape coming down as the demand goes up as Mr. Johns suggests, perhaps a look at the price of 1,800 ft. of LP tape four years ago and today might be enlightening. It is a very funny thing that when a certain American tape came over here the import duty and carriage brought the price up to exactly the same as British or Continental tapes. The price ring which decides just how high a price the market will stand is a very vicious one and the sooner it is stamped out the better.

Also, if the activities of a friend of mine are anywhere near typical, the increased sales of recorders have not increased the sale of tape. After 18 months he is still using the original 5 in. standard tape that came with the machine and has never bought another tape. “Top 20” each week from a certain Continental station and that is all. The amateur market can only be a drop in the ocean compared with the professional use of tape.

No, the old motto about cutting one’s coat according to the cloth is still true today as should be the one about live and let live.

Yours faithfully.

. . . about good service

From: S. W. Buxton, 14 Gloucester Avenue, Nuthall, Notts.

Dear Sir:—Rather belatedly perusing the October issue of your periodical, I was very pleased to read Mr. D. Herkes’ letter praising Messrs. Repts (Tape Recorders) Limited, for the excellence of their products and after-sales service. Although I am normally very slothful, nevertheless, his letter caused me to stir myself and add my praises in support.

My adventure into tape recording began some 18 months ago, when it occurred to me that perhaps I was missing something in not possessing a tape recorder—in consequence I invested in a machine bearing a name associated with the present era. This was a most astonishing machine, which for the first month in my possession never functioned and thereafter, having been returned twice to the makers, developed every possible fault from A to Z until eventually I decided that we could not exist together and for me to retain my sanity.

The decision made to change the equipment as a matter of great urgency, a trip to London ensued where most helpful advice was received from the manager of the City and Essex Tape Recorder Centre, Maryland Station. He spent nearly two hours explaining with the utmost patience, to me probably his most cynical and difficult customer, that there was something in tape recording and that the Reps R10 (4-track) which I had noted from the advertisement that usually appears in your magazine, would give me every satisfaction and was one he personally recommended very highly.

How true his advice has proved. In fact, the machine has given such excellent results of so high a standard that I have now invested in a Goodmans Sherwood Enclosure, complete with 12 in. Axiom speaker, tweeter, etc., which the Reps machine fully justifies, although it was an expense I never envisaged when first commencing with tape recording. The result is that there have been many enjoyable recording and listening hours.

Like Mr. Herkes, I have found their after-sales service really first class. They reply by return of post, almost within 48 hours, and once they sent a replacement valve, free of charge, without question, in fact their guarantee is a real guarantee, the like of which I have never experienced before. In conclusion I can

only repeat that the Reps R10 is very well made and gives an excellent Hi-Fi quality output. Their advertisement is most conservatively worded and the machine excels on every point they claim. For anyone interested in a tape recorder, they cannot do better in my opinion than invest in this make of machine.

However, I would mention that I have no connection whatsoever with the firm concerned, being merely a very satisfied customer.

Yours faithfully.

. . . about bad service

From: P. L. Bastin, 2 Canynge Street, Barbourne, Worcester.

Dear Sir:—From time to time, some conscientious editor will take up the cudgels on behalf of the public and mount an attack on shoddy and un-British practice in the tape recording industry. To date, these attacks have been aimed at the unscrupulous dealer and the sharp-practice repairer. But what about the manufacturer who does not measure up to his specifications, who puts a recorder on the market which is overpriced, unreliable and lacking in after-sales service?

I have a personal example of scandalous and unprofessional service by a manufacturer of what I always imagined to be first-class equipment. In November 1961, I bought an 88 gn., hysteresis-motor, two-track semi-professional recorder manufactured in London. As soon as I got it home, it refused to record. It was returned to the dealer who was unprepared to repair it and who returned it to the Works—without it ever having recorded a sound! I received it back two months later with a (requested) list of faults which would make the owner of a five-year-old machine blanch. For $5\frac{1}{2}$ months it behaved reasonably well until the VU meter suddenly packed up. The manufacturers replaced the meter without delay but this did not seem to be the trouble for, by now, the machine was dead in its audio stages. Back to the Works it went and returned two weeks later. I switched on. Nothing. Dead as a doornail.

By now, I was hopping mad. I have a small studio and the loss of one of my three machines was catastrophic. The manufacturers blamed the railway yet the machine was packed in a cardboard box which, it was claimed, was accepted as suitable packing by the railway. There were visits from inspectors, letters, accusations and all the flim-flam of responsibility-dodging from all sides.

By now, I had lost four months’ use out of the $9\frac{1}{2}$ months I had owned the machine, so I referred the matter to my solicitor who said that the machine was clearly not up to specification and should be replaced with a new one which was. The machine was last in my studio on September 17th, and has not been returned yet—3 months. The upshot of the whole disgusting business is that the manufacturers refuse point blank to replace the machine and I must make do with a patched-up thing which has already spent $6\frac{1}{2}$ months of its 12-month life in transit or Works.

I have owned 15 recorders since 1954, so I think I may be regarded as having some little experience of these machines. Certainly, I have found that continental machines are far more reliable than even the best (?) British machines. After all, if you spend 88 gns. on a semi-pro machine and it consistently gives atrocious service for the first six months or so of its life, you have, I think, every right to expect the thing to be exchanged on the basis that it is clearly a Bad one from the start.

I am sure there must be similar instances of bad behaviour and bad workmanship elsewhere and I think it is time that these irresponsible manufacturers were shown up in order to warn newcomers to recording where the dangers lie. I will willingly supply the name of the manufacturer to any who are interested.

Yours faithfully.

. . . about readers’ requests

From: C. Braddock, The Tape Recorder Centre (Blackpool), 266 Waterloo Road, Blackpool, Lancs.

Dear Sir:—I have been unable to obtain circuit diagrams and certain spares for the Saja range of machines, distributed by Perth Radios until liquidation. Could you please ask manufacturers and public alike if anyone has circuit diagrams, etc., for Saja machines for sale. Especially the Mk. 40.

Yours faithfully.

TAPE RECORDER SERVICE

No. 13 Ferrograph Recorders by H.W. Hellyer

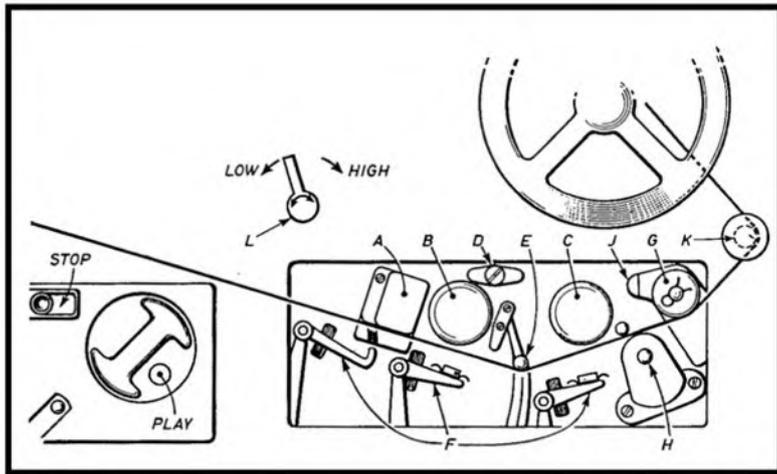


Fig. 1: The basic sound channel of the Ferrograph Series 4, showing the erase, record/replay and dummy heads.

THE tape recorder market falls neatly into three pigeon-holes. First, and cheapest, those machines that can only rightly be called "toys", which make no pretension to mechanical stability or electrical efficiency, and in which readers of this magazine are no doubt only faintly interested.

The largest group is the "domestic player", which contains a wide range of quality and facilities. In a price bracket below £50 it is still possible to get tape recorders with remarkably good mechanical construction and amplifiers that have a good frequency response. Indeed, by feeding the output from one of these models through a high quality power amplifier and loud-speaker system, results can be obtained that may satisfy even some of the erudite contributors to our companion periodical, *Hi-Fi News*.

The "professional" machine has a following that has increased greatly in the past couple of years. This may be a symptom of our affluent society: we like to think, however, it is indicative of the tape recording enthusiast's growing appreciation of the finer points of the art.

A number of readers write to ask for servicing details, or rather more specifications than appear in the advertisements for some of these "professional" machines, notably the Ferrograph.

These are not all Ferrograph owners: indeed, some readers have specifically asked for information on both the Wearite deck (which this machine incorporates) and the Truvox decks in current production, to which a later article will be devoted as space becomes available. The information is required to help them make up their minds before speculating a fair amount of cash. This article, then, is meant to serve the purpose of explaining the Ferrograph machines, pointing out the differences between models, and outlining some of the minor servicing details that have arisen in the writer's workshop.

The Wearite Deck

Ferrograph models are based upon the Wearite deck, which has altered little over the years. It is made by Wright and Weaire Ltd., a subsidiary of The Ferrograph Co. Ltd. The Series 4 is supplied in two alternative combinations, with speeds of $7\frac{1}{2}$ and 15 i/s or $3\frac{1}{2}$ and $7\frac{1}{2}$ i/s, with the small differences that this entails. Other differences include the provision of extra heads, stereo and "staggered head systems", and 110 volt, 60 c/s models with NARTB characteristics.

The basic sound channel of the Series 4 is shown in fig. 1. The erase head is A, the Record/Play head B and position C has a dummy head in the standard model. The R/P head, B, has a single-screw azimuth adjustment, D, but factory setting is carried out by precise adjustment of the four corner screws in the mounting plate, the head being mounted on a 0.05 in. roller. Normal adjustment is made, playing back a steady tone (1,000 c/s) and setting the head in the vertical and "front-to-back" sense for maximum output.

At this point it may be as well to remark that the correct adjustment of the R/P head, on any machine, is vital to good performance. This is not just a matter of loss of gain—the losses are greater at the higher frequencies and overall response

is greatly impaired by quite small misalignment factors. Playing back a recording of Grandma's birthday party and adjusting "by ear" is simply not good enough. A meter across the output will give distinct indications that the human ear cannot be trusted to detect—but which, in the final assessment, give an unsatisfactory quality to the reproduction. A steady tone is necessary to be able to judge variations accurately—but this can be made by recording the "test-tone" of the television transmitter during off-programme periods.

Between the R/P and dummy heads there is a tape guide pin, E in fig. 1. This works in conjunction with the pressure arms, F, with a leverage system above the deckplate, but the return springs are beneath the plate, and should be checked if overall sluggish action is noted. If there is individual sluggish action, check the separate levers, as the pressure pads are delicately sprung for fine contact. Make sure there is no binding of the leverage system, check the hinge points, and always re-check after fitting the top cover, ensuring that the ornamental screws are secure.

Emergency Stop Finger

The left-hand of these pressure arms has a "finger" which engages the tape and is sprung to ride in the slot of the erase head mounting if the tape breaks, applying an emergency stop. Note that any tests made on the machine with the tape removed will require this switch to be kept open by wedging the lever clear of the gap. The action of the auto-stop is to de-energise the hold-in solenoid (seen in a central position, just beneath the main cross-member F, in fig. 2). This solenoid is energised by closure of the motor switch G and pulls in when a current of between 25 and 90 mA flows. Before making too many mechanical tests for sluggish start and hesitant stop action, check this operating current. This applies especially to models that employ the Wearite deck in other equipment, where the solenoid may be included in the H.T. smoothing of the amplifier—an electrical fault bypassing the necessary solenoid energising current. Incidentally, the manual stop switch also short-circuits this solenoid.

Reverting to fig. 1, the capstan roller will be seen at H, with the outer surface of the tape running against it, pressure roller G engaging the active tape surface. From this it follows that a clean pressure roller is absolutely essential on these machines. Note the presence of the rocker arm J, which provides an extra tape guiding level, as well as its prime purpose of supplying a "Pause" facility when the push-rod in the head cover engages its end. Check that this is not loose, that the main lever system on which the roller is mounted does not foul the underside of the deckplate and that the circlip above the roller has not become dislodged or distorted.

The right-hand tape guide K has a knurled nut fixing arrangement. Other items in fig. 1 are the function switch, stop button and the start button at the lower left-hand side, with the speed-change selector L.

Operation of the start button slides the lever H, see fig. 2, closing the motor switch G and releasing the brakes. The auto-

TAPE RECORDER SERVICE

No. 13 Ferrograph Recorders by H.W. Hellyer

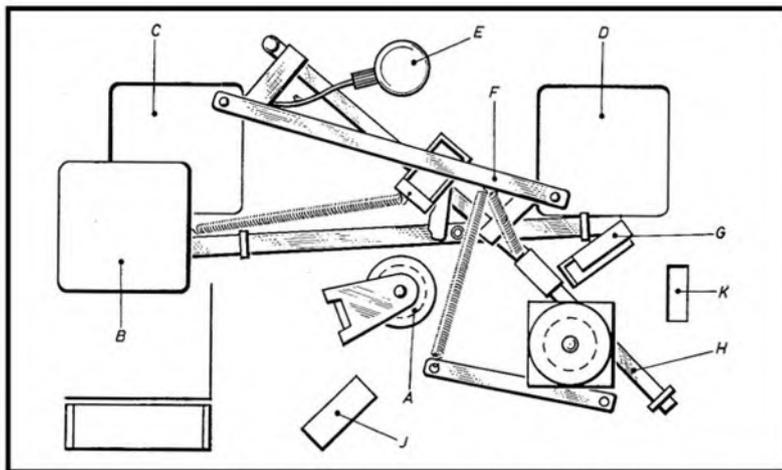


Fig. 2: The underside diagram of the deck showing solenoid, spooling motors, capstan motor and cueing indicator.

stop switch is seen at *J* and the manual stop at *K*. It will be noted that the lever linkage system beneath the deck is quite simple, and apart from checking the return springs there is little attention needed. The usual precautions should be taken, sliding members thoroughly cleaned and very lightly greased—but more about lubrication later.

The two spooling motors, *C* and *D*, are squirrel-cage induction type, which take full power during appropriate fast wind, the inactive motor being shorted. This gives a fast wind, less than a minute for a 1,200 ft. spool of standard tape. Note that it is quite normal for the spindles of these motors to get hot after a period of use, because of heat losses in the rotor.

“Octoquad” Synchronous Motor

The capstan motor *B* is a synchronous “Octoquad” type. Being synchronous, it is not sensitive to small changes in supply voltage, but the makers recommend that the 205 volt tapping on the tag panel be used for the $3\frac{1}{2}/7\frac{1}{2}$ i/s version, and the 245 volt tapping used for the higher speed version and also for supply to the take-up motors. If the machine has not been used for a period, there may be a delay before the capstan motor pulls in to synchronism, sometimes as long as a minute, during which the sound of the motor “hunting” may alarm the user. This is not serious, but if it persists, a check on mains supply voltage may be necessary. Measure the actual voltage at the tag panel whence the motor supply leads are taken.

A further possibility is misalignment of bearings. If the motor has been mechanically shocked, this may result in the symptom of sluggish drive. Raise the deck and spin the motor by hand—*don't forget to disconnect first!* If there appears to be any retardation, a slight tap with a small hammer or spanner on the bottom bearing strap of the motor on each pillar will free this.

The capstan motor carries a two-step pulley, against which a neoprene rimmed idler engages, contacting the heavy flywheel. The capstan is a brass cylinder with a bonded neoprene traction surface at its upper end, mounted in a bearing which contains a ball race and small spring. To remount the flywheel correctly, or to check its easy running, slacken back the top cap about one-eighth turn, check for end play by moving the flywheel up and down, fix the top cap to a position where there is no play, and replace the bracket. After running, with the stop switch pressed, the capstan should run on freely for at least twelve seconds. Less than this indicates the bearing is set too tightly. The speed of the flywheel at $7\frac{1}{2}$ i/s is approximately 177 r.p.m., for the correct capstan diameter of 0.810 in.

Lubrication

After these operations, it is advisable to check that the pressure roller is vertical to the capstan surface. With a bright lamp at one side, look at the vertical gap between the two surfaces and note that it closes completely when the machine is switched to Play. Check this with tape removed and the deck operating. Any gap indicates that the roller requires straightening. To do this, first remove the circlip and roller, fit

a piece of brass tubing over the spindle and bend the spindle gently—actually, this operation bends the bracket on which the spindle mounts, the rocker arm bracket. When refitting the roller, check that there is no tendency to ride hard down, or rise on the spindle when running, indicating that the adjustment has been overdone.

Lubrication of the motors may be necessary after 1,000 hours' running. But this should be done sparingly. The recommended lubricant is *Aeroshell No. 3* and only a few drops should be applied to the bearings. The flywheel bearing is packed with silicone grease, which does not normally require changing. The sliding members can be lightly smeared over the friction surfaces with a grease such as ordinary petroleum jelly. A small amount of lubrication may also help at the flexible drive and worm assembly to the cueing indicator *E*, fig. 2.

Wow and flutter on this deck is stated to be less than 0.2 per cent., a conservative figure when the deck is correctly aligned, lubricated and operated. In the Series 4 machine, the signal to noise ratio is better than 50 dB, in the range 200 c/s to 12 Kc/s. Unweighted, including hum, 45 dB. The frequency response at $7\frac{1}{2}$ i/s is 50-10,000 c/s \pm 2 dB. Input levels, for full depth recording are: Input 1, 0.003 v into 1 Megohm and Input 2, 0.1 v into 80 K-ohms. Output power is $2\frac{1}{2}$ watts into 15 ohms.

Electrical Checks

Electrically, the Ferrograph has a number of small differences between models, as follows:

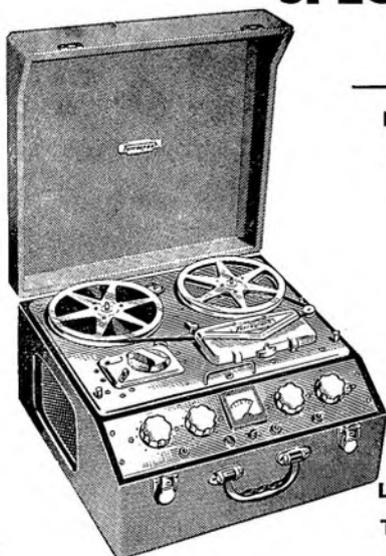
Series 4C/FN is two-channel, with staggered heads for simultaneous recording of both tracks 4S has additional stacked stereo head, type FP16. (The lower track has a red sleeve on its screened lead.) As an alternative arrangement, a standard FR7A head can be fitted in the place of the dummy, providing monitoring facilities.

The Stereo 808 combines the foregoing and has the recording level meter switched for upper and lower channel indication. Each channel gives 1.5 v output across 5,000 ohms for connection to a two-channel system. The 420 series is basically similar, but uses a different head configuration. The Series YD are portable instruments (if 53 lbs. weight can be regarded as portable these days!) for semi-professional standards. They operate into 600 ohms and a high-gain stage for direct recording from a high-impedance microphone.

Special features are the recording level meter circuit, arranged for rapid rise and slow fall-off. For further reference to these characteristics, see the current series of articles by Graham Balmain. To check a machine with unknown characteristics—as when purchasing a second-hand model—it is necessary to ensure that the maximum signal applied to the head network gives no more than 5 per cent. distortion on peaks, after checking correct bias.

The bias frequency is 53 Kc/s and a compromise between adequate bias voltage at the head and minimum bias voltage breaking through to the output valve circuits must be made. Referring to fig. 3, it will be seen that coil L3, in conjunction

SPECIALISTS IN



FERROGRAPH
VORTEXION
TANBERG
BRENELL
AMPEX
REPS
SONY
REVOX
PHILIPS
GRUNDIG
LOEWE OPTA
TELEFUNKEN
ETC.

FANTASTIC!!

FANTASTIC!! An understatement indeed, for so vast is the range of selection of new and secondhand recorders to be seen in our showrooms that no other word can describe it.

Call into any of our branches and see the largest and finest selection of recorders on display in Great Britain.

Every recorder can be seen, heard and compared and each member of our experienced and expert staff will be happy to offer you honest, unbiased advice in order to assist you in the selection of a recorder to suit your individual requirements.

- ★ HIGHEST PART EXCHANGE ALLOWANCES
- ★ OVER 250 NEW & S/H RECORDERS ON DISPLAY
- ★ H.P. TERMS OVER 9-24 MONTHS
- ★ FREE HOME DEMONSTRATIONS
- ★ TAPE RECORDER REPAIR SPECIALISTS
- ★ FREE DELIVERY. FREE TECHNICAL ADVICE

NOTE.—OUR CITY SHOP OPEN MON.-FRI. 9-6. CLOSED SAT. OPEN SUN. 9-2 p.m.

CITY & ESSEX T A P E RECORDER CENTRES

228 Bishopsgate, E.C.2. Opp. Liverpool St. Station. Bis 2609
 2 Maryland Station, Stratford, E.15. (Adj. Station) Mar 5879
 205 High St. Nth. (Opp. East Ham Station), E.6. Gra 6543

TAPE RECORDER SERVICE—(continued)

with the 460 pf capacitor, forms a "trap" circuit to reduce this undesirable breakthrough. There should be a low value of the 53 Kc/s bias component in the output from the EL84 output valve. No more than 0.5 v of HF at this point should be registered, and between 12 and 16 volts bias at the head should still be noted. The 5 K-ohm wire-wound potentiometer in the bias oscillator circuit can be adjusted for optimum results. If a steady 200 c/s tone is recorded, using different settings of

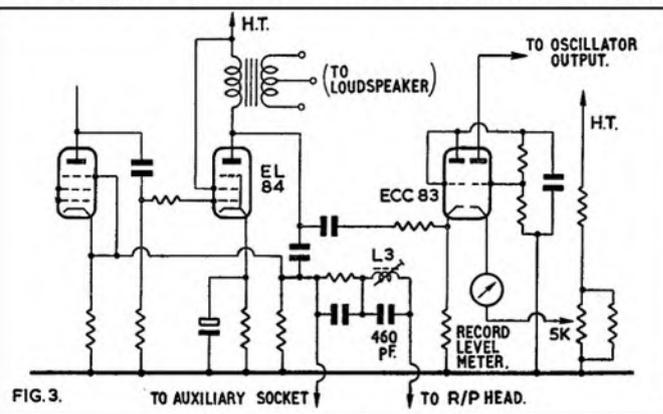


FIG. 3.

this preset and checking with a valve-voltmeter at the monitoring socket, when these recordings are played back it will be heard that the output signal rises as bias is increased. The correct setting is slightly higher than that producing maximum signal output

The bias, as set at the Works, is marked on a small label on a plate under the flywheel, and can be measured between the deck tags 1 and 3 with a valve-voltmeter. If the record level meter is adjusted to zero (switch to record with no signal input and zero with the knob on the panel—not the set zero on the meter itself), the correct recording level should maintain a reading of about 8 with a 400 c/s input to Input 1 at approximately 10 mV.

If hum is bothersome, check the position of the mains transformer, which can be rotated for minimum hum pickup. Make this adjustment with the motors running. Check that the hum does not vary with motors on and off, which would indicate hum-bucking (injection of hum voltage in anti-phase to that arising from another part of the circuit). If a good meter or cathode ray oscilloscope is available, the hum level can be measured across pins 1 and 3 of the auxiliary socket 1. Finally, move the mumetal wing on the R/P head pressure pad for minimum pickup.

These notes are really too brief to do full justice to a professional machine, but it is hoped that some guidance has been given to the readers who requested information.

ILFORD SOUND RECORDING SERVICE

445 HIGH STREET NORTH,
MANOR PARK, LONDON, E.12



WEDDINGS RECORDED
TAPE TO DISC
TAPE TO TAPE

STUDIO:—GRA 5107

OFFICE:—CRE 8947

TWO HEADS ARE BETTER THAN ONE

FITTING AN ADDITIONAL HEAD TO A FERROGRAPH

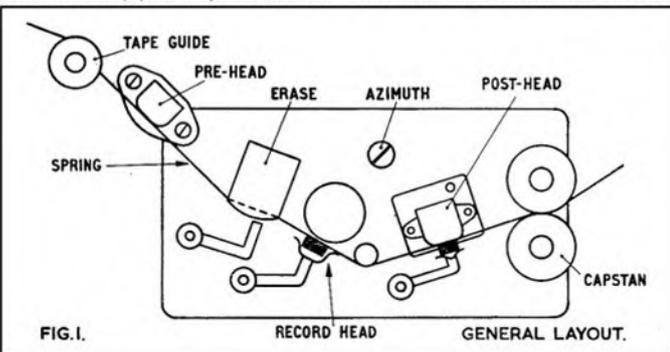
ALTHOUGH the Ferrograph is an excellent tape recorder, recording all that is set it with the utmost fidelity, there are still several useful facilities which are not included, but can be added at small cost, to give very interesting results. The cost, £4 maximum, the time required, two or three evenings (even for the veriest tiro!) The resulting benefits are exactly synchronised overlay with no loss of level (I think that this might well be called "Super-Superimposition"), monitoring of a recorded signal off the tape, and, of course the famous "Echo Effect". Thus it is possible to record a four-part harmony with echo, for only one singer.

Two heads are used, one being mounted before the erase head, the other after the playback head. The outputs of the two heads are brought to two jack sockets at the rear, and from there they are taken to be equalised, and pre-amplified, ready for feeding into a radio P.U. socket, or into an amplifier. The amplifier then feeds its contribution into the Ferrograph, where it is mixed with the new signal. The whole proceedings are monitored on headphones from the output socket on the front of the recorder, as the recording takes place.

Two Heads

The two heads used are B.S.R. low impedance playback heads, which were fairly easy to buy. They already have a base for azimuth adjustment, and they cost about £1 7s. 6d. each, these being the most expensive items.

The heads will be called the "Pre", and "Post" heads for ease of reference. The pre-head is fitted first. Remove the plastic head cover to give more room. Lace up a tape, and set the function knob to record. Place the head so that it deflects the tape an eighth of an inch between the tape guide and the erase head (fig. 1). The rocker, and one hole of the base should be over the grey deck, the other fixing hole over the bare metal plate beneath the head cover. Mark, and drill the two holes (3/32 in.). Take the head and file down the rocker



until the head is scanning the top tape track. Two 8 B.A. bolts, with a compression spring hold the head to the deck, and agile fingers the nut to the bit of bolt that penetrates the dark interior of the recorder. One head is fixed.

The post-head is mounted on a plate of Duralumin of the same shape as the dummy stereo head base. Bolt the head to the plate, (fig. 1) in such a position that the felt pad presses the tape snugly to it, not forgetting to file the rocker, so that the head scans as before. This new head assembly can now be screwed to the place previously occupied by the now redundant dummy head, using the same bolts.

The coils of the head are joined in parallel (see fig. 2), and the output taken by tightly twisted insulated wires, to a jack socket, which is fixed in a hole in the aluminium plate bearing

the model, and serial number. There is room for the two output jacks.

Transistor Pre-Amp

This is the well-known design, which works so well (fig. 3). The components are mounted on a 4 plus 4 tag strip, which can be mounted with the battery in a small case, the input lead

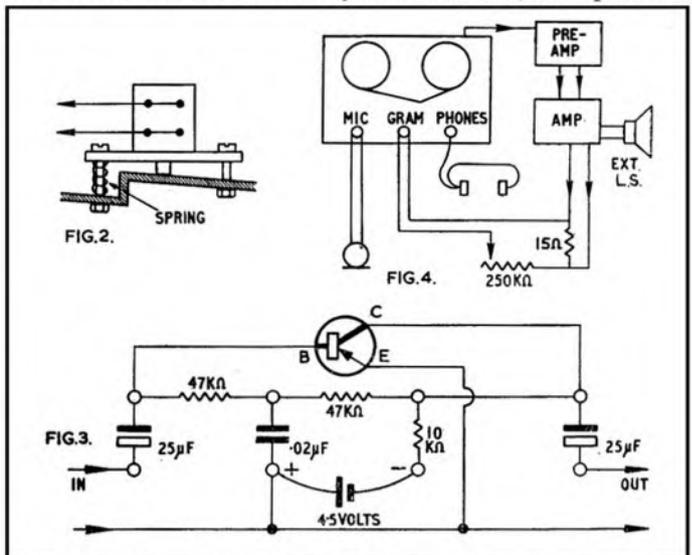


Fig. 2. Head connections. Fig. 3. Circuit of transistor pre-amplifier. Fig. 4. Recording set-up.

terminating in a standard jack plug, the output lead ending in a suitable plug for the radio, or amplifier.

The transistor should be an A.F. type of reasonable quality, and the usual precautions should be taken when soldering. Use a pair of pliers as a heat shunt. The capacitors are 12 volt D.C. working, notice being taken of their polarity. The total cost of the pre-amp, 10s.

Ready To Use . . .

All the units are ready to use. All that is required is a mixer, or the little gadget shown in the diagram (fig. 4), which is useful to have, even if you do not build the rest of the things. By turning the knob on the 250K potentiometer, the music input from the amplifier is faded down, and the microphone fades up. What could be more useful? Of course the relative levels of the two signals must be set beforehand, and the music must come from the low impedance (i.e. loudspeaker) socket on the amplifier. If the controls are set correctly, it is possible to change smoothly from music with no microphone signal, to background music, and the microphone at full level, ready for a commentary.

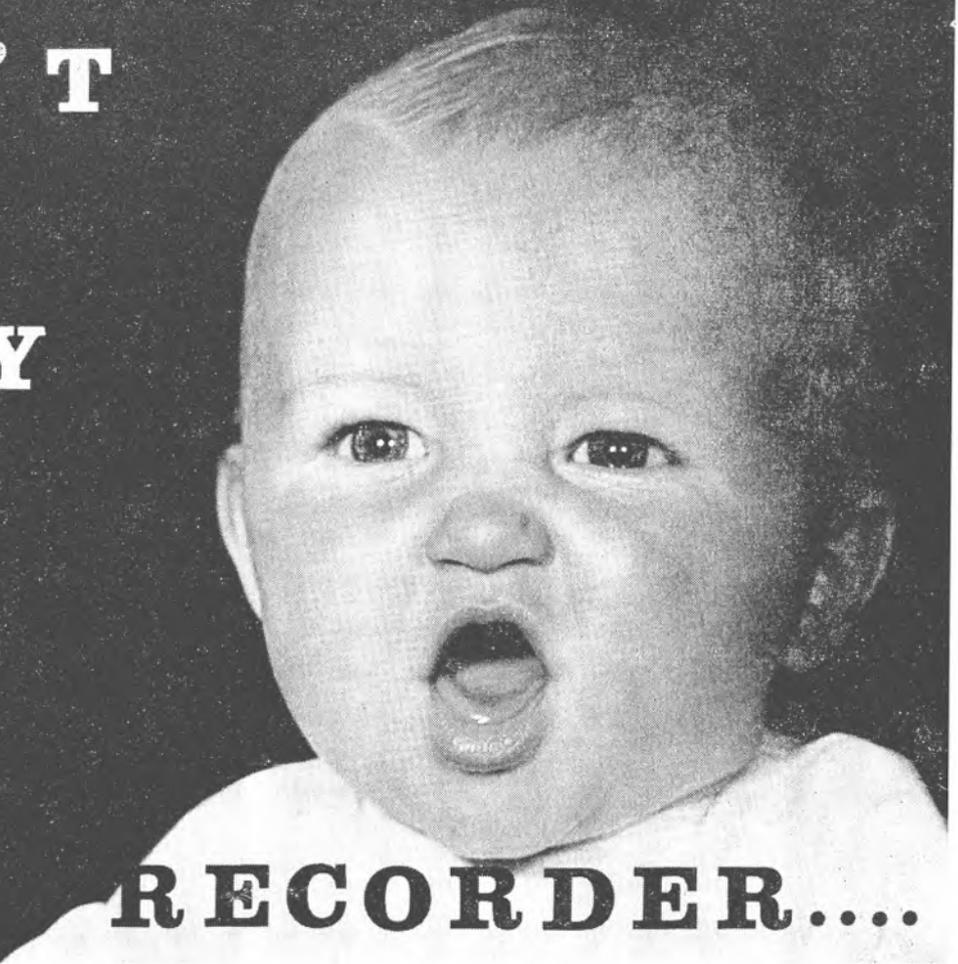
With everything joined up, take a deep breath, a good insurance policy, and a look at the polarity of the battery connections, then switch on. Check that each head is working by playing a tape using the head and pre-amp. When both heads have been shown to work, it will be necessary to adjust the azimuth, and you will need to brew up a couple of Phons of White-type Noise. Hiss sibilantly into your microphone, and record several feet of it at 7½ i/s. Play this back via the new head, and adjust to give maximum ssssss. This will mean loosening one bolt and tightening the other on the pre-head,

DON'T

BUY

A

TAPE RECORDER....



until you have tried us!

We offer—10 years' experience as the Biggest Specialists with the Largest Sales in the British Isles ★ Terms which include **NO INTEREST CHARGES** on most models ★ Any machine is yours for only 10% deposit ★ Up to 2 years to pay ★ Free Delivery anywhere in the U.K. ★ Special Insurance Policy on H.P. Sales ★ Free Home Demonstrations anytime, anywhere in Greater London Area ★ 500 machines, 80 different models—Mono, Stereo and Battery—in stock and on demonstration ★ We specialise in Mail-Order Customers—buy from us wherever you live ★ Special Cash Terms ★ 12 months Free Servicing ★ We also sell all Hi-Fi equipment, Tapes and Accessories, Cameras and Cine ★

Interested? Want full details? Then write, phone or call in for Free Brochures and terms:

HOWARD
TAPE RECORDERS

218 HIGH ST.,
BROMLEY,
KENT

RAVensbourne 4000/4477

TWO HEADS ARE BETTER THAN ONE — cont.

letting the spring do some work; and simply turning the knurled screw behind the record head, which has been generously provided by Ferrograph for the occasion for the post-head. This will rock the head for you.

No tape-guides are needed, as they are already there in the form of erase head, and fixed tape-guide. For the earlier Ferrographs with no proper tape-guides, special ones would have to be made. It may be necessary to file a little off the head cover to fit.

And Now To Record . . .

The "Echo" effect is achieved by feeding the signal from the "Post" head into the amplifier via the transistor pre-amp, and then mixing the output from the amplifier with the in-coming microphone signal, using the 250K Pot. It is found that better effects can be obtained by turning the amplifier tone controls to give maximum bass, and minimum treble. The combined

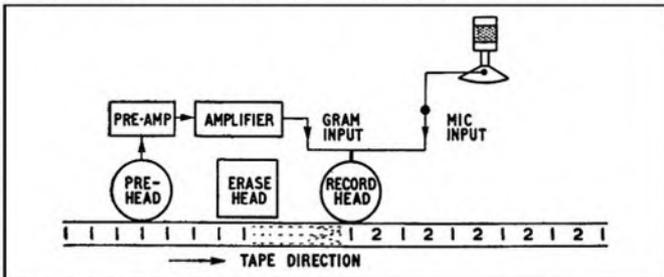


Fig. 5. Schematic diagram showing the super-superimposition process.

signals should be listened to using a pair of headphones plugged into the tape recorder output socket, the phones being loaded with a 15 ohm resistor; thus the degree of "echo" can be controlled with the volume control of the amplifier.

Balancing Recordings

The "Super-superimposition" is more difficult to control, and some test recordings will be needed to indicate the settings of the controls needed for a balanced recording. The first layer of sound is recorded in the normal way, leaving gaps of the right lengths if a dual conversation is being recorded. Play this recording back via the "Pre-" head and the Pre-amp and amplifier, adjusting the controls to give the best playback response. This is best done by setting the recorder to *play*, and turning the main gain control of the Ferrograph to zero, then the tape will be played back without using any of the Ferrograph's electronics. Set the Ferrograph to *record* (fig 5), adjust the gain control for the microphone signal, and set the tape in motion. On the headphones will be heard the old signal being played back via the "pre-" head, so that the second layer of sound can be recorded in exact synchronisation with the original signal, the level of which can be adjusted using the amplifier volume control. This overlaying of recordings can be repeated until the signal to noise ratio becomes unacceptable.

Finally

So there it is, in words and pictures. Why don't you try it in heads and transistors? The results are well worth the effort, and are almost unique on a domestic recorder, vast new fields being opened up for feature tapes . . . perhaps even prize-winning tapes. . . .

THE WAL D-MAG, head demagnetiser, long nylon covered probes. £2.10.0
 WAL GAIN transistorised pre-amplifiers, Mono £5.10.0, Stereo £7.10.0 and Hi-Gain (latter CCIR equalised). £7.16.0
 THE WAL BULK ERASER. £7.18.6
 Available from all leading dealers. (Wholesalers include A. C. Farnell Ltd., Leeds and Harris & Russell Ltd., London).



WELLINGTON ACOUSTIC LABORATORIES LTD.
 Farnham, Surrey (6461)

BRAND NEW TOP QUALITY 100% TESTED RECORDING TAPE

(As supplied to the Far East Broadcasting Corp.)

	Size	Length	Price
STANDARD	3"	160'	2/6
	5"	600'	9/-
	5 1/2"	900'	11/6
LONG PLAY	7"	1,200'	16/-
	3"	220'	3/-
	5"	900'	11/6
DOUBLE PLAY	5 1/2"	1,200'	16/-
	7"	1,800'	23/-
	5"	1,200'	23/6
	5 1/2"	1,800'	28/6
	7"	2,400'	41/-

Postage 1/- per spool 4 or more P.F. Refund Guarantee (never ever requested)
 Recorder repairs at reasonable prices. (Collected and delivered in London Area)

N. WALKER, 28 Linkcroft Avenue, Ashford, Middlesex

NUSOUND RECORDING CO.

Ferrograph

(Appointed Dealer)

Tape Recorder & Hi-Fi Specialists

Showrooms: First Floor
 3-8 BRIGSTOCK PARADE,
 LONDON ROAD,
 THORNTON HEATH,
 SURREY,
 (Opposite Thornton Heath LT Bus Depot)
 TELEPHONE: THO 7609

London Showroom
 35 CRAVEN STREET,
 TRAFALGAR SQUARE,
 LONDON,
 W.C.2
 TELEPHONE: TRA 2080

RAPID RECORDING SERVICE

78s and L.Ps. from your own tapes. (48 hour service).
 Master Discs and pressings.

Recording Studio. Mobile Recording Van.

Associated Company:

EDUCATIONAL RECORDINGS LTD.

Specialists in Sleep-learning and Audio-learning. Tapes on Mind Management; Positive Personality; Memory Training; How to Pass Examinations.

Manufacturers of the "Sleep-o-matic Unit" to be used with our Sleep-learning tape.

Foreign language courses available for Sleep-learning.

Brochures on request from:

RAPID RECORDING SERVICE, Dept. TR,
 21 Bishop's Close, Walthamstow, E.17. COP 3889

FOR BEST RESULTS USE

ferrania

MAGNETIC RECORDING TAPE

When it's new from Brenell it's *NEWS!*

When Brenell introduce a new development in the tape recorder field you can be sure that it's worthy of your attention. As you well know the development of a new machine takes time but below are a few details to whet the appetite.

THE STB I

A four speed deck with twin recording and twin replay pre-amplifiers.
In addition to Stereophonic recordings, with or without tape monitoring facilities, different recordings may be made simultaneously or either track may be used for recording purposes (with tape monitoring if desired) whilst the other track is replaying.
Sound on Sound—so eagerly sought (by the cine enthusiasts and keen musicians—is easily accomplished with perfect synchronisation between two or more recordings.

This is the ideal tape unit for incorporating in your Stereo High Fidelity installation. Eminently suitable for language studies and other tutorial purposes.

FULL INFORMATION WILL BE PUBLISHED SHORTLY

Models available:



**MARK 5
DECK**
28 Gns.

Brief Specification of Mark 5 Deck.

Four speeds— $1\frac{7}{8}$, $3\frac{3}{4}$, $7\frac{1}{2}$ and 15 ips : Selective frequency correction : 3 independent motors : Interlocked controls : Fast rewind (1,200 ft. in 45 secs) : Up to $8\frac{1}{2}$ " reels : Pause control : Provision for extra heads (mono or stereo) : Mark 510 will accommodate $10\frac{1}{2}$ " N.A.B. spools (7 gns. extra).



**MARK 5
Type M**
88 Gns.

OTHER MODELS:
MARK 5 64 gns.
MARK 5 Stereo £99.12.0

Write for details
to the sole
manufacturer:



BRENELL ENGINEERING CO., LTD.

1a DOUGHTY STREET, LONDON, W.C.1

Tel: HOLborn 7356 (3 lines)

ELECTRONIC WORLD

is by far the cheapest
HIGH QUALITY TAPE
on the market

* *Acclaimed by experts*

Reprints of reviews available

* *Backed by our Guarantee*

If you are not completely satisfied with any purchase, we undertake to refund the full price plus your return postage

POST COUPON NOW!

DE VILLIERS (Electronic World) LTD.

16d Strutton Ground, London, S.W.1

STANDARD PLAY (Acetate base)

3 in. spool 175 ft. 4 spools for 18/-
or 48/- dozen

4 in. spool 300 ft. 4 spools for 26/-

5 in. spool 600 ft. 2 spools for 26/-

5½ in. spool 850 ft. 16/- per spool

7 in. spool 1,200 ft. 19/- per spool

ARCHIVE GRADE (S.P. Polyester)

7 in. spool 1,200 ft. 22/6 per spool

LONG PLAY (Acetate Base)

7 in. spool 1,800 ft. 28/-

LONG PLAY (Polyester Base)

3 in. spool 225 ft. 4 spools for 22/-
or 60/- dozen

4 in. spool 450 ft. 2 spools for 21/-

5 in. spool 900 ft. 2 spools for 35/-

5½ in. spool 1,200 ft. 24/- per spool

7 in. spool 1,800 ft. 31/- per spool

DOUBLE PLAY (Special Polyester base)

3 in. spool 375 ft. 4 for 40/-
or 108/- per dozen

4 in. spool 600 ft. 2 for 30/-

5 in. spool 1,150 ft. 27/- per spool

5½ in. spool 1,750 ft. 35/- per spool

7 in. spool 2,400 ft. 45/- per spool

I enclose remittance for £ s. d.

Post Free

Name

Address

BLOCK LETTERS PLEASE

Cash with order

... tape recorder workbench

No. 42 CHECKING THE PERFORMANCE OF RECORDERS

by A. Bartlett Still

IT is probably realised by most of my readers that their tape recorder, much like any other device that "works," and is not completely passive, must deteriorate with use. Very often this can happen so slowly as to be unnoticeable, a falling off in performance that would be quite marked if immediately compared with that when new, but undetected with normal intermittent usage.

On the electrical side the effect, after some considerable time, may be no more than a loss of gain, which may very well be compensated by an increase in the volume control setting. There being no standard, no judgment is made. Should a stage be reached when the gain control is "full up," without the desired result, the trouble is now noticeable. The stop at the end of the control's travel has itself provided the "standard" required and called attention to the trouble. The chances are that a new set of valves will set the matter to rights and all will be well.

Apart from a sudden, unfortunate, component failure, what I have just described might be a typical *electronic* history of the average machine over anything up to two or three thousand hours of use. Incidentally, the average radio valve is expected to operate for upwards of one thousand hours, which sounds a great deal, but it is surprising how the time mounts up with anything like regular use.

Now it is, surely, reasonable to suppose that there is going to be deterioration in the performance of the mechanical functions of your machine, all the more rapidly if it is not looked after and cleaned regularly. Will *this* be noticeable?

Tape Speeds

The tape on a machine is supposed to be conveyed past the heads at a uniform speed. Whether the speed is exactly $7\frac{1}{2}$ i/s, or whichever standard is quoted, is not so important as the maintenance of a constant speed. Suppose a signal of constant frequency, 1,000 c/s, is recorded on a perfect machine, and then replayed on one that is not so good as regards tape speed. With a speed 1 per cent. below nominal the signal would play back as a steady 990 c/s tone, a difference of about $\frac{1}{10}$ of a tone, unnoticeable, except by comparison, to the average person. If the steady tone were replaced by normal programme material the relationship would hold for all the frequencies included and nothing would be, or, in many cases, is, noticed.

We now suppose, however, that the speed of the playback machine is *not* constant. Let us say that, due to some mechanical defect, during one second the speed is 1 per cent. low, but that in the next second the speed is 1 per cent. high. The tone is no longer steady, but wavering from 990 c/s to 1,010 c/s, a difference of twice as much. Many people could not discern this—if it were not for the fact that both notes are produced in sequence to make the comparison obvious, if not odious! Incidentally, the sort of variation I have quoted here would be, in actual fact, an unbearably high level, but it makes the principle easier to understand.

Comparing with my earlier remarks it will, perhaps, be seen that each note tends to act as a "standard" by which the other is judged, so that the detection of "Wow" or "Flutter," which is what we are talking about, is that much easier. This, in itself, is a blessing in disguise, because, although it can be most annoying, and possibly spoil a recording, it does warn of mechanical trouble at a stage when it can be easily rectified. From this it follows that a regular, if infrequent, check on the performance of your machine in this respect would be a good thing if it can be easily carried out, and, in reality, nothing could be simpler.

Test Tapes

It is very difficult to find out just how good, or bad, your machine is by playing normal programme material, a sustained single frequency note is far better. Those who like to invest in a frequency tape, such as the E.M.I. TBT1, will find a whole range of frequencies well recorded. But a lot can be discovered by recording the B.B.C. 1 Kc/s tuning signal, on for several minutes before the start of programmes. Try a recording at each of the speeds your machine may have, since

each speed is equally important from this point of view. You would also be well advised to ensure that you record at a level some little way below full modulation, we don't want the issue clouded by undue distortion.

Replay the tape, at not too loud a level, in a quiet room, and listen carefully and critically. If you cannot detect any warble or change of pitch, replay the slowest recording at the fastest speed and listen again. If you are still satisfied you can chalk up your machine as inside about 0.25 per cent., and you need read no further. Should you feel, however, that your machine does not pass this test, and you would like to find out why, you will have to follow certain principles of diagnosis.

The movement of the tape past the heads is initiated and controlled by a number of rotating parts, motors, capstan, pinch roller, spools, etc. By and large, it can be said that eccentricity of quite a small order on any of these moving parts will cause trouble. If you can relate the frequency of any wow or flutter signal to the rate of revolution of any part of the machine, nine times out of ten that part is the cause of the trouble.

Cleanliness

Where do we go from here? I have already hinted at the importance of cleanliness—let me now say, plainly, that no mechanical device, be it sports car, wrist watch, or tape deck, can give its best performance if it is dirty or ill-cared for. Now in nine cases out of ten thorough cleaning and *judicious* lubrication will cure noticeable wow or flutter, provided, of course, that the tape deck had an adequate performance in the first instance. What is to be done in the tenth case is a little more difficult to advise. There are some people who have a natural affinity for mechanical devices, without any service manual or instructions they would be able to sense the cause of trouble and cure it. If you are one of those it is unlikely you will need any help that I can offer. There are those, however, who could make the necessary checks and carry out adjustments with reasonable competence provided they are guided along the right lines. But, unfortunately, the right lines for one tape deck may be all wrong for another, so obtain the relevant information. This may be in one of the specific servicing articles that have appeared in *The Tape Recorder*, or it may be in the maker's service manual. These are often obtainable for a small charge on application.

If you are unable to obtain official guidance, or if you are one of those people who are hopeless with things mechanical, then it is better to let well alone for fear of making things worse. Get in touch with the maker's Service Department, telling them as fully, yet concisely, as possible what the trouble is, and be guided by them. Possibly the surest way to success in home servicing is to be able to make an accurate assessment of your own capabilities and, more important, your own, or your equipment's, limitations.



500 SERIES TAPE

	Standard Play Tape	Long Play Tape	Standard Play Mylar	Long Play Mylar	Double Play Mylar
5"	15s.6d.	£1. 2s.6d.	£1. 1s.0d.	£1. 6s.6d.	£2. 2s.0d.
5½"	£1. 2s.6d.	£1. 10s.0d.	Not available	£1. 13s.6d.	£2. 16s.0d.
7"	£1. 6s.6d.	£1. 19s.6d.	£1. 12s.6d.	£2. 5s.0d.	£3. 12s.6d.

Cash with order for immediate goods by return, post free

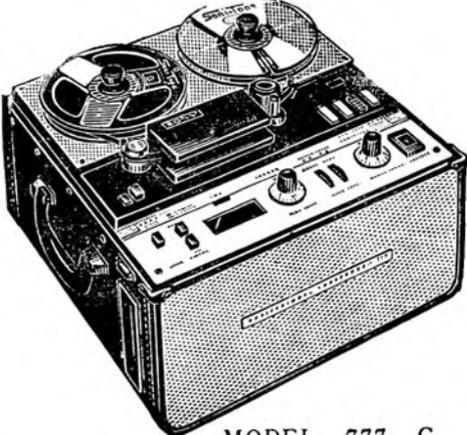
NUSOUND RECORDING COMPANY

35 CRAVEN STREET, W.C.2.

TELEPHONE TRA 2080

★ SONY ★ SONY ★ SONY ★ SONY ★ SONY ★ SONY ★

SONY



MODEL 777 C

SONY

SPECIALISTS IN RESEARCH!
OUTSTANDING PERFORMANCE!
NATURAL SOUND!
YOU BE THE JUDGE!

SEND FOR A FULLY DESCRIPTIVE LEAFLET OR CALL IN FOR A DEMONSTRATION.

WE SPECIALISE IN PART EXCHANGE!

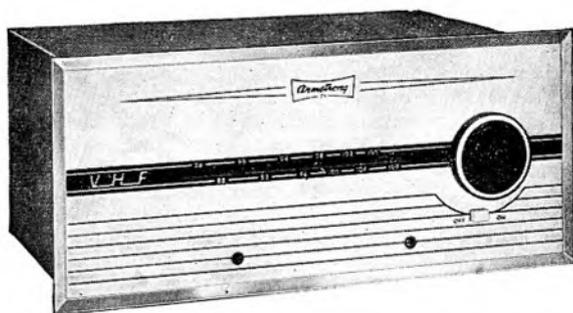
J. J. FRANCIS (WOOD GREEN) LTD.
123 ALEXANDRA ROAD, HORNSEY, N.8
 Telephone : BOWES PARK 1662

777

179 gns

★ SONY ★ SONY ★ SONY ★ SONY ★ SONY ★ SONY ★

Armstrong Quality Tuners



- T4B FM TUNER (illustrated) £21.18.0
- T4C FM TUNER (without case) £19.19.0
- ST3 Mk 2 AM/FM TUNER £27.16.0

We also make a wide range of high fidelity amplifiers and tuner-amplifiers, both mono and stereo, all of which offer top quality performance at reasonable prices.

Write for free descriptive literature to

ARMSTRONG (DEPT. TTJ), WALTERS ROAD, HOLLOWAY, LONDON, N.7.

Designed to match any amplifier or tape recorder

The T4B model (and uncased version—T4C) is a self-powered high fidelity FM Tuner. Automatic frequency control ensures complete stability and the cathode follower stage, together with the variable output control, enables it to be used with any amplifier or tape recorder. All these features are to be found also in the ST3 Mk. 2 AM/FM Tuner together with coverage of the medium and long wavebands. The AM section includes a ferrite aerial and two IF stages ensuring good Continental reception, and there is a miniature bright-line indicator for easy tuning.

For first class recordings from radio with absolute stability, there is nothing better than an Armstrong tuner and we confidently assert that there is no better value on the market.

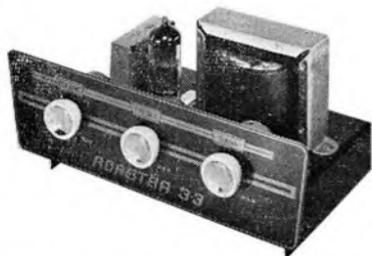
**AVAILABLE FROM LEADING HIGH
FIDELITY AND TAPE RECORDER
DEALERS THROUGHOUT THE COUNTRY**

NORTH 3213

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.



*
**ADASTR
 3-3
 AMPLIFIER**

A NEW 3 watt amplifier is announced suitable for use in conjunction with battery and mains operated tape recorders. Known as the Adastr 3-3 it is supplied ready for panel mounting in cabinets or free standing.

The controls fitted are Volume, Treble, Bass and Main on/off switch. The input impedance is 200 mV. Output impedance 3-5 ohms. The frequency response claimed is 75 to 20 Kc/s. Hum and Noise -70 dB. Operation is from 200 to 250 volt A.C. Size—8 x 5½ x 3½ in. Price £4 19s. 6d. Further details can be obtained from the Manufacturers: **Adastr Electronics Ltd., 167 Finchley Road, Swiss Cottage, London, N.W.3.**

manufacturers. Now a fluid, which can be painted on to tape, has been produced under the name of Metro-Stop. The liquid is dabbed on to the tape with the applicator and it can be removed if required with the clear fluid provided. Metro-Stop may be used on all grades of magnetic tape but the remover must *not* be used on Acetate-based tapes. The complete kit is priced at 17s. 6d. complete. Manufacturers: **Metro-Sound Manufacturing Co. Ltd., 19a Buckingham Road, London, N.1.**



*
**PHILIPS
 EL3549
 FOUR-TRACK
 FOUR-SPEED
 RECORDER**

THE trend in Philips towards all-transistor mains tape recorders in their higher-priced models is extended by the introduction of their latest four-speed four-track machine, model EL3549. The successor to the famous EL3542, this new design has a new low speed for speech recording and a larger loud-speaker.

As with other new Philips recorders, the super-imposition feature has been dropped as this is now considered inferior to the parallel track replay switch of the new models. This enables two recordings on separate tracks to be played back simultaneously.

The all-transistor amplifier gives many advantages, not the least being the elimination of warm-up time.

The new deck layout has all controls grouped on the forward panel of the tape deck, each clearly labelled for easy operation. In the centre is the new moving coil recording level meter which replaces the magic eye indicator. The four digit revolution counter at the rear of the tape deck is now illuminated to indicate On/Off position.

A stereo socket for the connection of the Philips pre-amplifier EL3787 (available shortly) is fitted.

The specification of the EL3549 supplied by the manufacturers reads as follows—Tape speeds: 15/16, 1½, 3½ and 7½ i/s. Frequency response: 60-4,500 c/s at 15/16 i/s; 60-10,000 c/s at 1½ i/s; 60-13,000 c/s at 3½ i/s; 60-16,000 c/s at 7½ i/s; all ±3 dB. Power output: 2.5 watts. Signal to noise ratio: better than 40 dB. Wow and flutter: less than 0.6 "peak to peak" at 3½ i/s. Outputs: external loudspeaker, 2.5 W. 3-7 ohms; diode 1 V. 20 K ohms; headphones, 200 mV. 1.5 K ohms; stereo, 0.4 mV. 200 ohms approx.; voltage supply for pre-amplifier, 23 volts D.C. Inputs: microphone, 1 mV. 1 K ohm; diode, 3 mV. 20 K ohms; pickup, 150 mV. 500 K ohms. Loudspeaker: one 5 in. x 7 in. elliptical in cabinet. Weight: 26 lb. Size: 16½ x 15½ x 8½ in. Price £65 2s. complete with microphone, reel of LP tape, take-up spool and radio connecting leads. **Manufacturers: Philips Electrical Ltd., Century House, Shaftesbury Avenue, London, W.C.2.**



*
**ILFORD LTD.
 ENTER THE
 TAPE FIELD**

A NEW long play magnetic recording tape suitable for all conventional recorders is announced by Ilford Limited.

Known as Ilfotape, the new tape is on P.V.C. base (¼ in. wide, .001 in. thick) of high flexibility. The tape, insensitivity to temperature and humidity variations, allows 50 per cent. longer playing time than standard tape on identical sized spools. The polished surface enables high quality results to be obtained at low speeds of 3½ and 1½ i/s.

Ilfotape is available on standard polystyrene spools supplied in heat sealed polyethylene bags enclosed in distinctive hinged cardboard boxes. Each tape is provided with a coloured leader and trailer incorporating metal contact foils for the operation of an automatic stop device.

Three sizes of spool are available and the prices are 5 in. 900 ft. £1 8s., 5½ in. 1,200 ft. £1 15s., 7in. 1,800 ft. £2 10s. **Manufacturers Ilford Ltd., Ilford, Essex.**

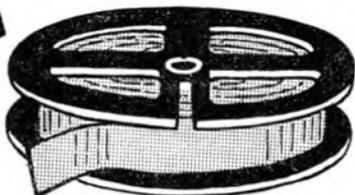
Metro-Sound Introduce Metro-Stop

TAPE recorders with automatic stop facilities using metal foil strips at both ends of the tape have been available for a considerable time. Owners of these machines, have up to the present time, had to splice metal foils on tapes supplied by many

PLEASE MENTION "THE TAPE RECORDER" WHEN REPLYING TO ADVERTISEMENTS.

MYLAR RECORDING TAPES ★

at PVC PRICES



THEY said it couldn't be done—but we did it!
THEY say it can't be good Tape—but repeat orders prove them wrong.

WE claim this is the finest Tape available.

WE guarantee complete satisfaction or your money back including return postage.

MYLAR 'PLAIN BOX' EXCLUSIVE TO US

Two sizes only at present

MYLAR 5½" 1200 ft L.P. 22/6
MYLAR 7" 1800 ft L.P. 32/6

ALSO IN ACETATE:

5½" 1200 ft L.P. 18/6
7" 1800 ft L.P. 28/6

SELFROND LTD. Dept. B.623

5 NEW BRIDGE STREET, LONDON, E.C.4

People in Search of Perfection Choose

FILM INDUSTRIES

Type M8

RIBBON MICROPHONE

In "The Tape Recorder" A. Tutchings wrote of the M8 "... this microphone shows evidence of careful design, and the workmanship, technical performance, and styling are excellent. It can be thoroughly recommended for studio or semi-professional use, or for home use where the associated equipment can do justice to its very wide range response."

PRICE

£8.15.0

ALL IMPEDANCES UP TO HIGH

ALSO AVAILABLE:

DESK, TABLE, FLOOR STANDS
IN-LINE MATCHING TRANSFORMER
M7 MOVING COIL MICROPHONE

Write for leaflet C.1.

FILM INDUSTRIES LTD.

90 BELSIZE LANE, N.W.3



HAM 9632



VR.70

MICRO-MINIATURE
RIBBON MICROPHONE

Outstanding in every respect

Here are genuine professional standards of design and performance brought within reach of all who use microphones. The VR.70 is the smallest and most efficient instrument of its type ever made, and the many unique features incorporated place it far ahead of all others in its class. The special tripod base gives it added versatility; shock proof mounting and blast screens give ideal protection.

BRIEF DESCRIPTION

- Response—Substantially flat from 50–14,000 c/s.
- Pattern—Figure of 8.
- Head Dimensions—2 1/8 in. × 3/8 in. × 1/8 in.
- Overall Height on base—7 3/4 in.
- In all impedances.

10 GNS.

LUSTRAPHONE LTD. ST. GEORGE'S WORKS,
REGENTS PARK ROAD, LONDON, N.W.1
Phone: PRImrose 8844

BINDERS

for
THE TAPE RECORDER



Semi-permanent Binders for

Volume 4 now available.

From the first number keep your copies clean and ready for easy reference. Semi-permanent binders are available for volume 4. Each case will take twelve copies plus index and will open flat at any page. They are covered in black buckram and gold blocked on spine with name and volume number. Also available, volume 3.

Price 15s. post free.

MILES HENSLOW PUBLICATIONS LTD

99 MORTIMER STREET, LONDON W.1

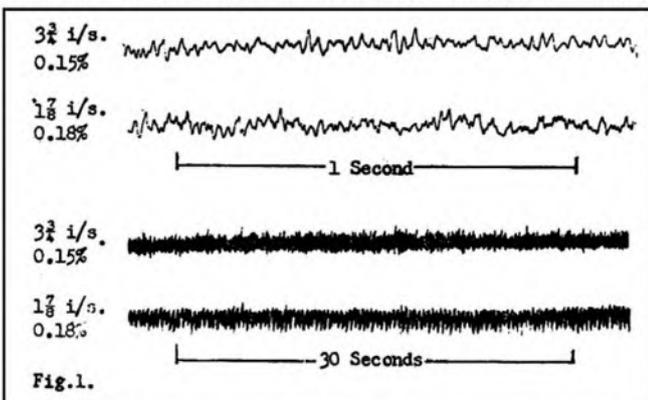
EQUIPMENT REVIEWED



★
**LOEWE-OPTA
 OPTACORD 403
 TWO-TRACK
 RECORDER**
 ★

Manufacturer's Specification: Power supply: A.C. of 50 c/s (on special demand also for 60 c/s. Instructions for subsequent modification available on request). Line voltages: 117, 150, 200, 220, 240 volts. Power consumption: about 45 watts. Safety fuses: 0.4 amp or 0.7 amp (117 v.). Tape speeds: 9.5 cm/sec. and 4.75 cm/sec. or $3\frac{3}{4}$ i/s and $1\frac{7}{8}$ i/s. Max. diameter of tape reels: 15 cm or 6 inches. Recording and playback: International standard double track. Playing time: 2 x 90 mins. at $3\frac{3}{4}$ i/s on D.P. tapes 2 x 180 mins. at $1\frac{7}{8}$ i/s on D.P. tape. Tape position indicator: Counting number of revolutions of reel. Three digit indicator with zero setting knob. Automatic stop: Electro-magnetically at both ends of the tape. Remote control: By foot switch. Rewind time: About 100 seconds for standard reel of 6 in. diameter. Frequency response: 40 to 16,000 c/s at $3\frac{3}{4}$ i/s; 40 to 8,000 c/s at $1\frac{7}{8}$ i/s. Premagnetisation: By H.F. current (100 Kc/s). Erasure: By H.F. current. Recording level indication: Magic light band indicator EM84. Input voltages: Microphone recording: 0.6 millivolts to 150 millivolts (1 megohm). Radio recording: 3 mV to 500 mV (150 K). Record player: 15 mV to 2 v. (1 megohm). Loudspeaker: P.M. dynamic speaker with powerful magnet and oval cone, with cut off switch. Plug in socket for extension speaker (about 5 ohms). Valve complement: EF86, ECC83, EC92, EL84, EM84, 2 dry rectifiers, 1 pilot light. Price: £45 3s. Distributors: Highgate Acoustics, 71-73 Gt. Portland Street, London, W.1.

ON this machine tape motion controls are grouped as a rotary knob and lever on the left-hand side of the keyboard; the press keys only select the recorder inputs. After a year or two of being conditioned to press key control of the tape motion, I occasionally



found myself frenziedly searching for the stop key only to realise after a second or two that I had to turn the knob instead, but a regular user would soon do this automatically.

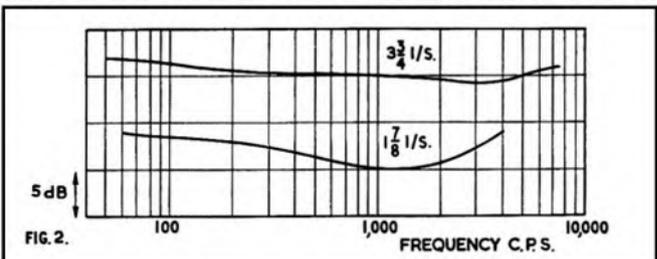
A more serious criticism must be made about the instruction book, which continually refers to the illustrations in the German operational manual—which was not supplied. The illustrations should in any case be contained in the translated instructions to avoid reference to

two leaflets. The magic eye is fitted with a cylindrical lens, presumably to make it more easily visible in a well lighted room. On the contrary I found it most distracting; the head has to be waved about like a snake charmer—or is it the snake—to see the beams at all.

The tone quality on the internal speaker sounded low pitched and rather muffled on speech but quite pleasant—if not Hi-Fi—on most music. I therefore set about the electronic and acoustic tests with some interest to see if they turned up a good reason for this effect.

Wow and Flutter

Fig. 1 shows one second and thirty second pen recordings of the short and long term speed variations of this machine at the two speeds of $3\frac{3}{4}$ i/s and $1\frac{7}{8}$ i/s. There is very slight evidence of a 5 c/s



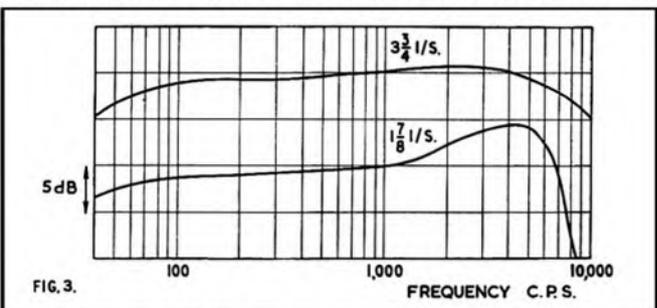
capstan wow at the lowest speed, but the total integrated wow and flutter figures of 0.15% and 0.18% *r.m.s.* are excellent for this class of recorder.

Play Only Responses

200 and 400 microsecond test tapes were played and the output measured at the low level line output. These are shown in Fig. 2 and are again very satisfactory. Hum and noise were 35 dB below test tape level.

Record Play Responses

The overall record replay responses were measured by feeding oscillator tones to the Phone input and measuring the output on replay at the line output. Fig. 3 indicates the curves so obtained.



The slight lift at 4-5 Kc/s at the lower speed helps to compensate for the sharper high note cut off. Peak level recording tests showed that a level 11 dB above test tape level was recorded when the magic eye beams just touched, and that a further 2 dB increase in level could be recorded before the onset of waveform distortion.

Signal Noise Ratio

Recorded tape noise was 3-4 dB worse than bulk erased tape noise, and this indicates some unbalance in the bias and erase oscillator waveform. The ratio of peak recorded signal, as indicated by the magic eye, to recorded tape noise, hum and system noise was 42 dB which is satisfactory as a specification measurement figure but which sounded fairly noisy—mainly tape hiss and rumble.

Acoustic Test

The test which really gave the game away was the overall acoustic test where twenty-one third octave bands of filtered white noise

FOR CINE AND HI-FI ENTHUSIASTS

two new hi-fi books

SOUND & CINE FOR BEGINNERS

An up-to-date guide for the beginner by Richard Golding with an introduction to some advanced methods including the latest means of producing experimental soundtracks. Contents include making up separate tape tracks; sound stripe; optical sound-on-film; special recording apparatus; recording sessions; how to write commentaries etc; with photographs and line illustrations. "The most comprehensive small book ever to be written on the subject of adding sound to film."

Price 8s. 3d. post paid



CABINETS FOR BEGINNERS

This book gives you all the necessary information for building your own Hi-Fi cabinet. Subjects covered include designing, timber, marking out, tools, materials, joints and finishes. The many photographs and diagrams help to make this book indispensable not only for Hi-Fi applications but also for general cabinet work encountered in the home. It is written by the well-known expert Wheeler Smith whose recent articles in Hi-Fi News have created considerable interest. "... highly recommended."

Price 8s. 3d. post paid

MILES HENSLOW PUBLICATIONS LTD. 99 MORTIMER STREET, LONDON, W.1

Two Years Guarantee

NOT MASS PRODUCED BUT VIRTUALLY HAND-MADE FOR RELIABILITY AND CONSISTENTLY HIGH STANDARD OF PERFORMANCE

R10 SPECIFICATION: 2 or 4 track version. 10 watts push/pull output.

Record Replay Responses—

7½ ips. 40–16,000 C.P.S. } ± 3 dBs.
3¾ ips. 40–10,000 C.P.S. } At optimum
1⅞ ips. 50– 6,000 C.P.S. } bias setting.

Signal/Noise ratio—

half track 50 dBs at 2¾ ips.
quarter track 45 dBs at 3¾ ips.

Modified Collaro Studio Deck. Microphone and Radio/Gram inputs each with separate gain controls for mixing. Separate bass and treble controls. ± 12 dBs at 50 cycles and 12 k/cs. Adjustable monitor volume control independent of record level. Peak signal level meter 2¼ in. square. Bogen heads. Record safety device. 600 ohms Cathode follower output. Two per cent total harmonic distortion on peaks. 200/250 volts 50 cycles or 100/120 volts 60 cycles. Valve line up: 3 EF86, 2 ECC83, 1 ECC82, 2 ECL86. Metal rectifier, contact cooled.

Prices: 2 Track 7" spools 59 gns.
4 Track 7" spools 69 gns.



Fully illustrated literature available on request to—

REPS (TAPE RECORDERS) LTD.

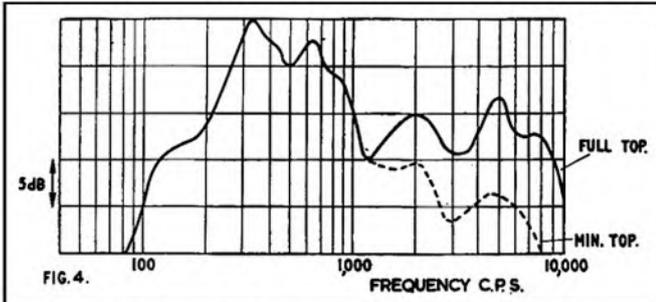
118 Park Road North, South Acton,
London, W3 Phone: Acorn 4141

EQUIPMENT REVIEWED — continued

were recorded at the highest tape speed and the sound output on the axis of the speaker measured on subsequent replay, Fig. 4. This shows a large bump in the response in the middle low frequency range and accounts for the rather heavy speech quality noted in my introduction.

Microphone Response

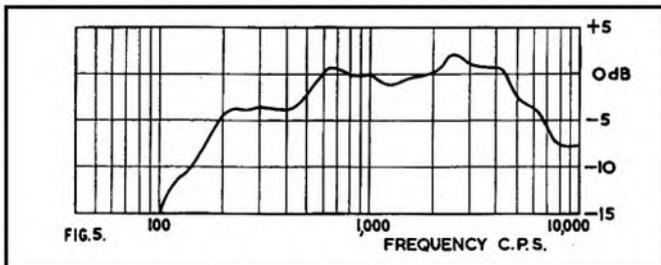
The microphone response was measured, Fig. 5, and is seen to be reasonably level from 200 c/s to 5 Kc/s. It sometimes happens that a microphone with a peaky high note response compensates to some



extent for a speaker or cabinet resonance in the low frequency range. In this case the microphone response does not help as the speaker peak is within the level range of the microphone.

Comment

In common with many other West German recorders all the design effort seems to have been concentrated into the early stages of the unit, with the loudspeaker and output stage thrown in almost as an afterthought. This is due, I think, to the fact that all radio sets and radiograms in Germany carry a standard D.I.N. socket wired to the detector volume control so that detector output is fed directly into the tape recorder, without going through the output stage of the radio unit,



and the line output of the recorder is fed to the same point so that the output stage and speaker of the radio or radiogram is used to reproduce the tape signal. Used in this way this recorder will give excellent results, but the quality on its own internal speaker is really pretty dismal and the raw pentode output stage can not be recommended for feeding a wide range extension speaker directly.

Plus points for this recorder are: extremely fine styling and finish, excellent mechanical design and tape handling, good quality line output for feeding a radio set or amplifier.

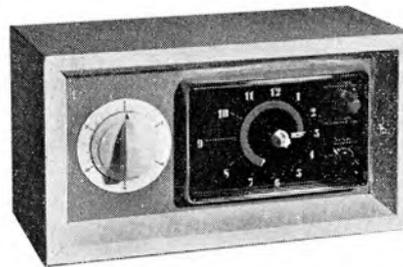
Minus points: High tape noise, poor speaker and output stage.

A. Tutchings.

EMI Tape Ltd., Statement

Many readers of the review of the Ferguson model 3202 recorder (December, 1962) may have recognised the tape shown in the photograph as being Emitape; EMI Tape Ltd., wish to state that the tape supplied with this particular machine was *not* Emitape.

Index to Volume 4 of THE TAPE RECORDER
Available shortly - - - - Price 2s. 6d.



★
**SYMPHONY
TAPE TIMER
UNIT**

★

TAPE recorder owners who have the misfortune to spend most of the time at work or, on the other hand, are fortunate enough to be able to spend most of the time touring the countryside will be interested in the Symphony Tape Timer Unit. This device switches a tape recorder on and off at any set time and, in fact, makes it completely automatic.

It consists of a special electric time unit with a twelve hour dial and two control knobs, one for setting "on" and "off" times, "off" only or manual operation. In addition there is a process timer with readings in one minute divisions up to 25 minutes. Situated on the back of the unit is a 13 amp socket for connecting the recorder. A heavy duty lead is provided for connection to the mains. An extra lead is fitted, terminated with a DIN plug for insertion in the remote control sockets of Continental recorders having electronically-controlled tape transport systems.

Operation

Operation of the unit is very simple. The electric clock is set to the correct time, by the white knob situated in the middle of the face. The red knob mounted in the top right hand corner is then adjusted in a clockwise direction until the "off" time is set. By turning the same knob in an anti-clockwise direction the second white indicator is then turned to the "on" time allowing for the warming-up time of the equipment. The automatic/manual control (bottom right) should then be turned fully anti-clockwise and the Process Timer should be set allowing the desired warming-up period. It is essential, of course, to ensure the correct recording level before setting the unit. If the recorder has facilities for remote control the machine will "warm-up" at the preset time, and the pressure pads and idler wheel will be brought into contact on the second command from the Unit. Periods from 5 minutes up to 8 hours' duration may be set.

Some difficulty may be experienced with recorders that have to be operated manually, but in some cases springs or elastic bands may be used to hold the start button in position. This, however, keeps the idler wheel in contact with the capstan and "flats" can result.

Check Tapes Beforehand

This Tape Timer Unit has been used daily for the last two months, recording items at various times during the day and night, and not once has it failed to obtain the required recordings. One most important thing to study before using this unit is the condition of the tape. Joints should be checked to make certain that breaks do not occur when recording. P.V.C. or polyester based tapes are most suitable as these are less likely to break during a recording.

Using this unit with a recorder is only one of the many possibilities open for consideration. It can be used for switching on any electrical device. High on the list of uses, in this summerless country, must be the switching on of electric fires one hour before returning home.

The unit is fitted in a rexine-covered wooden cabinet and operates on A.C. main voltages of 200 to 250, 50 cycles. Two models are produced, the Model A which is a Tape Timer without a Process Timer, but fitted with a neon indicator on the front panel and the Model B described above which has been developed specifically for use with Revox, Telefunken 75 and 85 and Stuzzi Magnette recorders. The prices are Model A £10 10s., Model B £15 15s. Manufactured by Symphony Amplifiers Ltd., 16 Kings College Road, London, N.W.3.

A.J.L.

For highest
quality equipment



at lowest
possible prices

HI-FI FM TUNER, Model FM-4U

Available in two units which for your convenience are sold separately: Tuning unit (FMT-4U—£3 2s. incl. P.T.), despatched wired and tested, and I.F. amplifier (FMA-4U—£12 6s.). Printed circuit for I.F. amplifier and ratio detector. Built-in power supply; 7 valves. Tuning range 88-108 Mc/s. (Illustrated bottom right). Total price **£15.8.0**

HI-FI AM/FM TUNER, Model AFM-1

Also available in two units as above: Tuning heart (AFM-T1—£5 5s. 6d. incl. P.T.) and I.F. amplifier (AFM-A1—£20 13s.). Printed circuit board; 8 valves; consecutive FM limiting and ratio detector. Tuning range FM: 88-108 Mc/s; AM: 16-50, 200-550, 900-2,000m. Switched wide and narrow AM bandwidth. Built-in power supply. Total price **£25.18.6**

**TO ALL MUSIC LOVERS AND
HI-FI ENTHUSIASTS**

Our wide range does not permit adequate coverage here of all models. A FREE CATALOGUE and full specifications of any particular model will be gladly sent on request without obligation on your part. **ASSEMBLED 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 Amplifiers
Models TA-IM (Mono) and TA-IS (Stereo)**

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	£19. 2.6
TA-IM and Collaro "STUDIO" ...	£30.10.0
TA-IM and Truvox D83 ...	£47. 2.6
TA-IM and TRUVOX D84 ...	£45. 5.0
TA-IS (Illustration Centre) ...	£24.10.0
TA-IS and Collaro "STUDIO" ...	£35.14.0
TA-IS and TRUVOX D83 ...	£52. 6.0
TA-IS and TRUVOX D84 ...	£50. 9.6

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

HI-FI EQUIPMENT CABINETS

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"

£11.12.6 to £18.10.0

"COTSWOLD" HI-FI FREE SUSPENSION SPEAKER SYSTEM

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.



COTSWOLD

COTSWOLD MFS SYSTEM

Similar performance to standard "Cotswold" but designed for the smaller room. Size 36 in. high x 16 1/2 in. wide x 14 1/2 in. deep. Either model. £23 4s. 0d.

Here are some other easy-to-build Heathkit Models for you:



S-33

NEW DELUXE 6 WATT STEREO AMPLIFIER Model S-33H. A low powered stereo/mono amplifier with the high sensitivity necessary for light-weight ceramic pickups (e.g. Decca Deram) Deluxe version of the S-33 with two tone grey perspex panel. £15 17s. 6d.



SSU-1

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. £13 7s. 6d.

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 14/6 optional extra). £11 5s. 0d.



AG-9U

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.

AUDIO SIGNAL GENERATOR Model AG-9U. Delivers up to 10 volts pure sine-wave (less than 0.1% distortion, 20 c/s to 20 kc/s). Decade switch-selected frequencies from 10 to 100,000 c/s. Internal 600 Ohm N/I load, or external. £21 9s. 6d.



MA-12

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

LOW INPUT HI-FI STEREO PRE-AMPLIFIER Model USP-1. An input of 2-20 mV will produce an output adjustable from 20 mV to 2 volts. This enables low-input p.u.s., etc., to load fully subsequent amplifiers of medium sensitivity. Negligible distortion. £7 7s. 6d.



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 CRAFTSMAN". Heavy duty motor, operating at 33 1/3 and 45 r.p.m. Very heavy 12" turntable. £18 3s. 6d.



USC-1

HI-FI STEREO 18-WATT AMPLIFIER Model S-99. Within its power rating, this is the finest stereo amplifier available, regardless of price. U/I push-pull output. Printed circuit construction. £27 19s. 6d.



TA-IS

TRANSISTOR INTERCOM. Models XI-1U and XI-1U. Ideal for office or home. Each Master operates up to five Remotes. 9v battery operated. XI-1U £10 19s. 6d. XI-1U £4 7s. 6d.



TRUVOX D83

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. £19 10s. 0d.

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 3s. 0d.



STUDIO

SHORTWAVE TRANSISTOR PORTABLE Model RSW-1. Four wave-band seven transistor portable with telescopic and ferrite aerials, slow-motion tuning. Covers Medium, Trawler, and 6-26 Mc/s in four switched bands. Uses printed circuit board and latest circuit technique. Superbly styled leather case. £22 8s. 0d.

TRUVOX D83 AND D84 TAPE DECKS. High quality mono/stereo Tape Decks. D83 2-track for highest-fidelity. £31 10s. 0d. D84 (identical presentation) 4-track for most economical use of tape. £29 8s. 0d.

"MOHICAN" GENERAL COVERAGE RECEIVER Model GC-1U. Fully transistorised. Four piezo-electric transistors. To overcome the problems of alignment, etc., the R.F. "front end" is supplied as a pre-assembled and pre-aligned unit. £39 17s. 6d.

GOLDRING-LENCO TRANSCRIPTION RECORD PLAYER Model G.L.58. Fitted with the G.60 pick-up arm, it has infinitely variable speed adjustment between 33 1/3 and 80 r.p.m. and four fixed speeds. 3 1/2 lb. turntable to reduce rumble, "wow" and "flutter". £19 12s. 3d.



S-99



RSW-1



UXR-1



GL-58



F.M. TUNER

JUST POST THIS COUPON FOR FURTHER INFORMATION

Without obligation please send me

★ **FREE BRITISH HEATHKIT CATALOGUE ...** TICK HERE

FULL DETAILS OF MODEL(S)

Kindly write below in BLOCK CAPITALS

NAME

ADDRESS

HT1

SOME OTHER HEATHKIT MODELS AVAILABLE

World's largest-selling VALVE VOLTMETER ...	Model V-7A	£13.18.6
G/P OSCILLOSCOPE (5 in. Flat-face screen) ...	Model O-12U	£38.10.0
"HAM" TRANSMITTER ...	Model DX-40U	£33.19.0
VARIABLE FREQUENCY OSCILLATOR ...	Model VF-1U	£11.17.6
TRANSISTOR RADIO for the youngsters ...	Model UJR-1	£2.13.6
RESISTANCE/CAPACITANCE BRIDGE ...	Model C-3U	£9. 5.0
AUDIO VALVE MILLIVOLTMETER ...	Model AV-3U	£14.17.6
AUDIO WATTMETER ...	Model AW-1U	£15.15.0

DAYSTROM LTD. DEPT. HTI GLOUCESTER, ENGLAND

A member of the Daystrom Group, manufacturers of THE LARGEST-SELLING ELECTRONIC KITS IN THE WORLD

READERS' PROBLEMS

★ Readers who encounter snags, or who run into trouble with their tape recording equipment, are invited to write to this editorial office for advice, marking the envelopes "Readers' Problems—Tape". Replies will either be sent direct by post, or published in this column if the subject is of general interest. However, we must emphasise that this advisory service cannot include requests for information about manufacturers' products when such information is obviously obtainable from the makers themselves. It is also essential to keep the queries reasonably short and to the point, and to limit them to one specific subject if at all possible. And, please, in no circumstances confuse such letters with references to other matters which may have to be dealt with by other departments in our office.

"Off Key" Recordings

Dear Sir:—I have in my possession a Sound Studio tape recorder, the deck of which is the Collaro Studio. Over the past week I have recorded direct from radio and on playing the recording back the tone is "off key". Could you please give any reasons for this?—*Yours faithfully, D.N., Accrington.*

Because the tape deck of any tape recorder is made up as a separate mechanical unit there cannot be any difference in tape speed that is directly attributable to whether the machine is set to record or replay. Other conditions remaining the same, a machine cannot record at one speed and replay at another. I note from your letter that earlier recordings are replaying at the correct speed. I would therefore assume that this has not altered due to any mechanical defect. We must therefore assume that on the recording in question the "other conditions" were not the same. One possible cause of a variation in tape speed would be a variation in mains voltage, alternatively one of the brakes might have been rubbing slightly.

Should this fault happen again it might be worth while having the deck serviced, but otherwise if the machine is now functioning satisfactorily, I think it would be well left alone.

Lubricating Synchronous Motors

Dear Sir:—I have one particular problem on a Ferrograph 2AN to which Messrs. Ferrographs appear to have fitted a die-casting to the top of the capstan bearing when they carried out a routine overhaul some two years ago. Otherwise the machine is standard.

The trouble is getting the machine to drop into synchronous speed, particularly when starting up from cold. The tape is running at a very inconstant speed with approximately a half-second cycle, with the motor itself obviously varying in the same manner. However, once getting the motor locked into synchronism, the performance is then perfectly satisfactory. The main flywheel is running perfectly freely and, on switching off, continues to rotate for some half minute or more, although sometimes there is the merest rumble from the bottom bearing. I have held the rubber idler wheels off the main motor when starting up under these conditions, and the motor itself still gives the changing note of a motor not running smoothly in synchronism. The queries are therefore as follows:—

1. Should the two bearings on the main driving motor ever require oiling?

2. After two years' use at the rate of—say—1,000 hours a year and no maintenance whatsoever, apart from just cleaning the heads, this trouble of not falling into constant speed occurred

(Continued on page 555)



VENNER
14 DAY
CLOCKWORK
TIME SWITCHES
Ideal for Tape Recorders
29/6 P & P
3/-

KINGSWOOD SUPPLIES (T.R.7), 4 Sale Place, London, W.2. PAD 8189

AUTOMATIC CONTROL over radio and/or tape recorder. Will switch ON/OFF or OFF/ON once every 24 hours at any manually pre-set time. Minimum time lapse 30 minutes. It has a current rating of 1 amp sufficient to carry radio and/or tape recorder. Complete with key and mounting bracket. Used but in perfect condition. Fully guaranteed.

YOUR TAPE DEALER

Specialists in Hi-Fi Equipment and Tape Recorders

CHELSEA RECORD CENTRE

203 KINGS ROAD, S.W.3 FLA 2596

Open till 8 p.m. (except Thursdays)

Disc and Tape Reproducing Equipment and Tape Recorders

by Leading Manufacturers

CUSTOM BUILT INSTALLATIONS

All High Fidelity Requirements and Services Available

Estimates Free

Personal Service

Custom High Fidelity

371 Green Lanes, Palmers Green, London, N.13

Tel. PALmers Green 5228

hifi

FOR ALL LEADING
AUDIO EQUIPMENT

call, write, or telephone

hampstead HIGH-FIDELITY

91a Heath Street, Hampstead, London N.W.3 Telephone HAMpstead 6377

ENGLAND'S BIGGEST SPECIALISTS:

HOWARD

218 HIGH STREET, BROMLEY RAV 4000

LASKY'S RADIO

ALL LEADING MAKES IN STOCK

Cash or Easy Terms

LONDON'S FINEST SERVICE

207 EDGWARE ROAD, W.2

PAD 3271/2

33 TOTTENHAM COURT ROAD, W.1 MUS 2605

SHEEN TAPE RECORDER CENTRE

SPECIALISTS IN TAPE RECORDERS, ACCESSORIES, HI-FI EQUIPMENT
YOUR CENTRE FOR FRIENDLY HELP—SALES AND SERVICE

8 STATION PARADE
SHEEN LANE, SHEEN
LONDON, S.W.14

Showrooms Open until 7 p.m.
PROSPECT 0985
(Opposite Mortlake Station S.R.)

Country and Provincial

BOURNEMOUTH

NATIONAL RADIO SUPPLIES

66 Holdenhurst Road,

Bournemouth

Tape, Hi-Fi & components

Tel. 25232



1



2



PHILIPS

T A P E R E C O R D E R S

at the

**CHELSEA
RECORD
CENTRE**

and all records and equipment

203 KINGS ROAD LONDON SW3 FLA 2596



3

1 The brilliant new battery-operated mobile recorder
24 GNS

2 The professional recorder at YOUR price 59 GNS

3 The Family Tape recorder! Four Tracks! Super-imposing facilities
36 GNS

TAPE RECORDER COVERS



Smart waterproof cover to give complete protection to your tape recorder. Made from rubberised canvas in navy, wine, tan, grey and bottle green with white contrasting pipings, reinforced base, handy zip microphone pocket and name panel.

Philips EL3536	...	70/-
" EL3515	...	57/6
" EL3541/15	...	57/6
" Starmaker	...	66/-
Cossor 1602	...	57/6
" 1601	...	63/-
Stella ST455	...	63/-
" ST454	...	57/6
Saja MK.5	...	57/6
Stuzzi Tricorder	...	58/-
Saba	...	63/-
Wyndson Viscount	...	55/-*
" Victor	...	60/-*
Elizabethan Princess	...	60/-
" Avon	...	60/-
" Escort	...	57/6*
" Major	...	63/-
" FT.1	...	66/-
" FT.3	...	75/-
Fi-Cord	...	52/6
Korting (4 track stereo)	...	63/-
Harting Stereo	...	66/-
Fidelity Argyle	...	55/-*
Simon SP4	...	63/-*
Clarion (with strap)	...	52/6
Brenell Mk.5	...	77/-
" 3 star	...	69/-
Minivox C	...	61/-
Robuk RK.3	...	67/6
Ferroglyph	...	80/-
Sony 521	...	90/-
Grundig TK.1	...	49/6
" TK.5	...	55/-
" TK.8	...	63/-
" TK.14 & 23	...	59/6
" TK.20	...	52/-
" TK.24	...	55/-
" TK.25	...	55/-
" TK.30	...	60/-
" TK.35	...	63/-
" TK.40	...	60/- †
" TK.50	...	60/-
" TK.55	...	63/-*
" TK.60	...	75/-*
" TK.830/3D	...	63/-
" Cub	...	35/-*
Telefunken 85	...	60/-
" 85	...	65/-
" 75/15	...	55/-
" 76K	...	55/-
" 95	...	69/6
Philips 8108	...	57/6
" 8109	...	63/-
" EL3538	...	63/-
" EL3542	...	63/-

*Without pocket. †Price to be announced

A. BROWN & SONS LTD.

24-28, GEORGE STREET, HULL TEL: 25413, 25412

USE YOUR TAPE RECORDER FROM ANY D.C. SUPPLY

You can operate your recorder from a car, caravan or boat battery, or from any D.C. mains supply with a VALRADIO D.C. CONVERTER. These D.C. converters enable you to operate T/RECORDERS, etc., for play-back music, telephone conversations and reports whilst on long journeys, in addition to making outside recordings.

Electronic types of converters are also available for 200/250 D.C. with outputs up to 200 watts 50 c/s. from ships' supply or D.C. mains.

Available for practically all makes of recorders, record players, radiograms, amplifiers, etc., with prices ranging from £7.3.0., VALRADIO D.C. CONVERTERS add versatility to your equipment.

For further details just post coupon below to:

Valradio

LIMITED,
Browells Lane,
Feltham, Middlesex.
Tel. Feltham 4242 & 4837



Valradio and Stereosonoscope are the registered trade marks of Valradio Ltd.

Please send me fully descriptive leaflet, ref: TR on D.C. CONVERTERS for tape recorders and other equipment.

NAME

ADDRESS

Make and type of equipment:.....

D.C. volts in:..... A.C. watts out:.....

NUSOUND RECORDING Co.

35 CRAVEN STREET, W.C.2.

TELEPHONE TRA 2080

Ferroglyph
(Appointed Dealer)

The new SERIES 5 Tape Recorder is on permanent demonstration, in addition to the 420 STEREO SERIES. Hear these recorders linked with QUAD Amplifiers and TANNYO Speakers.

See the range of accessories we carry:

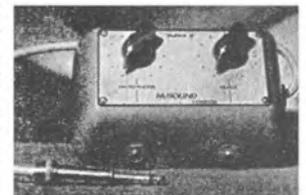
Mixers — Tapes — Microphones — Stands — Tuners, etc.

OUR TECHNICAL AND PRACTICAL EXPERIENCE IS AT YOUR DISPOSAL

IT PAYS TO DEAL WITH A SPECIALIST

The 'NUMIX 2' is a two-channel unit (Mic and other source) low- or high-impedance feeds. The 'NUMIX 2' can be used with ANY TAPE RECORDER WHICH WILL ACCEPT A HIGH-Z MICROPHONE. Near professional results are guaranteed.

Price: £6.10.0 complete.



Write for leaflet on 'NUMIX 1', 'NUMIX 2' and 'MONITOR' UNITS.

The 'NUMIX MK. 3' (fully transistorised) 2-channel Microphone Mixer is now available, price: £8-19-6

NUSOUND RECORDING COMPANY

READERS' PROBLEMS — continued

more and more frequently, and it was found that the main motor, when not switched on, was very stiff and could not be spun with the finger. By slackening off the retaining sleeve it was possible to move the rotor shaft some 1/4 in. upwards, when it was found that the shaft itself was encrusted with a hard layer of black material, presumably graphite. This was cleaned off, after which the motor ran quite freely and fell rapidly into synchronisation after switching on. I duly gave both bearings a drop of thin sewing machine oil on the head of a matchstick, which put the machine in perfect running order for a matter of a week or two. However, although the bottom bearing always remains perfectly clean and free, the black material is still picking up on the upper bearing and now requires cleaning daily. Does this mean (a) having to replace the bearings completely, or (b) taking the motor off and thoroughly cleaning it, or (c) is the small amount of machine oil which I put on washing out the graphite?

3. To thoroughly clean the bearings it will be necessary to remove the main motor from the deck. While three of the bolts can easily be removed, the fourth bolt is in rather an inaccessible position, and I was wondering whether the normal maintenance procedure was just to remove the motor and curse the detail draughtsmen responsible for the positioning of this bolt, or whether someone had found an easier way by removing the deck or some sub-assembly?

4. Although I possess the normal Ferrograph Manual, which covers the electronic side very well, the mechanical maintenance is hardly touched on and I was wondering whether you could recommend any other publication which would help in the mechanical maintenance of this equipment.—*Yours faithfully, D.S.B., Debden.*

Your problem does seem, as you surmise, to have its roots in the question of lubrication. Messrs. Ferrograph have said that a small amount of lubrication after 1,000 hours' use may be advisable. They recommend the use of Aeroshell 3, a small bottle of this being available as an accessory.

The black deposit you describe could be a mixture of oil and the sealing pitch from the stator, if the motor is getting overheated. But check that there is no entry of foreign matter through the upper vents of the motor housing—I had a case of a jamming rotor which proved, on investigation, to be the result of rubber scaling from a worn idler wheel getting between the angled slots of the rotor. Without seeing it, I should not dare to be too emphatic, but hazard a guess that you have lubricated a trifle too liberally, and with oil of too low a viscosity. If the motor is overheating, this could be due to a worn bearing, for which replacement is the only cure. Overheating would tend to aggravate the trouble you are getting, causing the oil to run more freely and the foreign matter to adhere more easily. Make sure the deck is adequately ventilated.

As to the dismantling enquiry, I cannot offer you an easy solution, except to suggest you partly dismantle by removing the sleeve and the lower bearing and withdraw the rotor; this, and the inner surface of the stator, can then be cleaned easily.

I have written to the manufacturers and will pass on to you any further comments they make. I cannot direct you to publication of more "mechanical" information on this deck; indeed, I do not believe a complete layout diagram has ever been published. I only wish I could keep a deck long enough in my workshop to prepare a detailed assembly sheet! But, as you will be well aware, the reliability of these models is such that they rarely land on our benches. The makers will never supply more than a "comprehensive" photograph.

Stereo hi-fi is cheaper than you think ●

a postcard will bring you IDEAS IN HIGH FIDELITY
LISTEN — LOOK — COMPARE — good sound and good looks — NEW SCANDINAVIAN LINE FURNITURE
 10 a.m. to 10 p.m. daily (Sundays from 6 p.m.) Closed Thursdays. MA1 8SS5

STUDIO 99 57, FAIRFAX ROAD, SWISS COTTAGE
 HAMPSTEAD · N.W.6 **LONDON**

YOUR TAPE DEALER

H. D. KIRK
Stereolectrics
 Specialists in High Fidelity
 150 HIGHER BRIDGE STREET
 Phone: 23093
BOLTON

R.E.S. (COVENTRY) LTD.
SPECIALISTS IN HIGH FIDELITY
and all makes of Tape Recorders

All leading makes of High Fidelity Equipment stocked and demonstrated under ideal conditions. ★ *The Best Selection—Terms and After Sales Service in the MIDLANDS.*
 R.E.S. (Coventry) Ltd. 128 Far Gosford St. Coventry 28781/2

FARNHAM, SURREY

- ★ Stockists of all the leading makes of High-Fidelity Equipment
- ★ Comparative Demonstrations
- ★ Cabinet Manufacturers and Designers
- ★ Personal service and satisfaction guaranteed
- ★ Specialists in custom-built Hi-Fi Equipment

LLOYD & KEYWORTH LTD, The Record Shop
 26/7 Downing Street, Farnham, Surrey. Telephone: Farnham 5534
 SURREY AND HAMPSHIRE'S HI-FI DEALERS

TAPE RECORDER CENTRE (HALIFAX)

Stock all the best Tape Recorders; Hi-Fi Equipment; Tape; L-P Records, etc.

DEMONSTRATIONS DAILY BY EXPERT STAFF
 2 years FREE SERVICE ON NEW RECORDERS over £35

30 King Cross Street, Halifax. 'phone 66832

MANCHESTER

LANCASHIRE HI-FI Limited

and now incorporating
 The Tape Recorder Specialists

DIXONS ELECTRONIC (Sales and Service)
 8 DEANS GATE - - - next to Grosvenor Hotel

LEICESTER

ALL YOUR HI FI REQUIREMENTS

Speakers by: H.M.V. QUAD LEAD ROGERS
 TANNAY MORDAUNT LOWTHER W.B.
 WHARFDALE GOODMANS.
 Tape: FERROGRAPH REFLECTOGRAPH GRUNDIG
 SIMON BRENNEL

Record Department: ALL LABELS-PARASTAT SERVICE.

LEICESTER CO-OPERATIVE SOCIETY LIMITED, High Street, Leicester. Tel: 20431

**TAPE
 RECORDERS
 and HI-FI**

The Largest Electrical store in the North



158, NEW BRIDGE STREET,
 NEWCASTLE UPON TYNE 1
 Telephone: 29866

WESTWOOD'S

of

46 GEORGE STREET
 PHONE: 47783

OXFORD

— YOUR TAPE DEALER —

PETERBOROUGH, NORTHANTS Tel: 5643/5644

CAMPKINS RECORD SHOP
RECORD TAPE AND HI-FI EQUIPMENT SPECIALISTS

NEW ADDRESS **15 LONG CAUSEWAY** LARGE STOCKS
(IN CITY CENTRE)

HAMILTON ELECTRONICS
HIGH FIDELITY TAPE RECORDERS **35 LONDON ROAD**
TEL. 28622 **SOUTHAMPTON**

18 QUEEN STREET **SALISBURY**
J. F. SUTTON
RECORDS — RECORDERS — HI-FI
421 SHIRLEY ROAD **SOUTHAMPTON**
111 EAST STREET

Audio Electronics (Midlands) Ltd.
Specialists in Dictation Mcs., Tape Recorders, Inter-Com., Tapes and Accessories
Full After Sales Service on all Equipment
PHILIPS, GRUNDIG, TRUVOX, UHER, ETC.
203 STAFFORD STREET WALSALL Tel.: 21086

WORTHING, SUSSEX
We stock Hi-Fi Equipment by Leak, Quad, Goodsell, RCA, Acos, Garrard, Collaro, Tannoy, Wharfedale and Goodman and give fully comparative Demonstrations
BOWER & WILKINS LTD.
1 Becket Bldgs., Littlehampton Road Worthington 5142

— TAPE TO DISC SERVICES —

The following are members of the Association of Professional Recording Studios who can be relied on to give satisfaction

MJB RECORDING & TRANSCRIPTION SERVICE
specialise in the production of microgroove records from Professional and Amateur recordings (Acetate copies; Processing Masters and Pressings at 16 $\frac{2}{3}$; 33 $\frac{1}{3}$ & 45 r.p.m.) Extended playing times achieved by controlled cutting. Editing, Label printing, Mobile and "Off the Air" Services.
7 HIGH STREET, MAIDENHEAD Tel: (230)

TAPE RECORDERS · AUDIO EQUIPMENT · DISC CUTTING STD & LP FROM TAPE · STUDIO FACILITIES · HIRE SERVICE · SALES · EXCHANGES
MAGNEGRAPH
1 Hanway Place, London, W.1 Tel.: LAN 2156

CLASSIFIED ADVERTISEMENTS

Advertisements for this section must be pre-paid and accompanied by a postal order, money order, or cheque. The rate is 6d. per word with a minimum charge of 7/6d. Box numbers may be used for an extra charge of 1/6d. The trade rate is 9d. per word, plus 2s. for a box number, conditions on application. Send replies to box numbers, c/o "The Tape Recorder", 99 Mortimer Street, London, W.1.

No responsibility will be accepted by the editor, the publishers, or the printers of The Tape Recorder for the quality of any goods offered, bought or exchanged through the medium of these columns, or for any failure in payment, etc., though the greatest care will be taken to ensure that only bono fide advertisements are accepted.

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

FOR SALE

Pre-recorded tapes. Unique complete catalogue listing all makes, mono, stereo. 7 $\frac{1}{2}$ and 3 $\frac{1}{2}$ i/s including World Record Club tapes. Call for free copy or send 1s. mailing fee. Dept. T.R.3 Teletape Ltd., 33 Edgware Road, W.2. PAD 1942.

Ask your dealer for American Ferrodynamics "Brand Five" recording tapes. The best tape value!

Find that review you want—get a copy of the index for "Tape Recorder", volumes 1, 2 and 3. Price 2s. each volume, post free.

Use up those odd lengths of tape, splice them together professionally after reading "How to Splice Tape", price 2s. 6d. posted, from The Tape Recorder, 99 Mortimer Street, London, W.1.

All makes of tape recorders repaired or modified. Miniflux heads supplied. "Audiomaster" equipment serviced. Audio installations built to your specification by John C. Latham, Deimos Ltd., 8 Corwell Lane, Hillingdon, Middlesex.

Tape Recorders. Save from 30 per cent. to 60 per cent. on the original price. Large stock of secondhand, new, shop soiled machines. All guaranteed. Obtainable on our No Interest Terms. Best part exchange allowances on your existing equipment. Call, write, 'phone today for free list. Quotation and details. Our mail order covers the whole country. R. E. W. Earlsfield Ltd., 266 Upper Tooting Road, London, S.W.17. Balham 7710.

Full building instructions for the remarkable "Tricolumn" loud-speaker are available in reprint form from Hi-Fi News, 99 Mortimer Street, London, W.1. Price 2s. 6d. post free.

Tape Bargains in all sizes. Example: Top Brand 5 $\frac{1}{2}$ in. 1,200 ft. 19s. 6d., P. & P. 1s. 3d. S.A.E. for list. Large choice of new and used recorders.—E. C. Kingsley & Co., 132 Tottenham Court Road, London, W.1. EUS 6500.

(Continued on page 558)

announcing . . .

EXPERIMENTAL RECORDING

for beginners

by A. Tutchings

This is the second book in our new "Hi-Fi Books" series and presents in convenient form the series of articles by A. Tutchings on "Twenty Practical Experiments in Magnetic Recording" and full instructions on "Building a fully portable recorder". This uses a clockwork motor and has been acclaimed from all parts of the world for its ingenious design and high quality recording. Limited print order.

NOW AVAILABLE

Obtainable only from the publishers, price 5/9 inc. p. & p.
HI-FI BOOKS, 99 MORTIMER STREET, LONDON, W.1

Alive to every sound



Like the ears of this wary fox, the Gramplan DP4 microphone is sensitive to an extremely wide range of sounds. With its uniform frequency response from 50 to 15,000 c/s, the reliable, medium-priced DP4 will greatly improve the standard of your recordings.

Gramplan DP4

—also for broadcasting, public address and call systems.

Low impedance microphone, complete with connector and 18 ft. screened lead **£8. 0. 0.**
Medium and high impedance models . . . **£9. 0. 0.**

A complete range of stands, swivel holders, reflectors and other accessories is available.

GRAMPIAN—sounds like the real thing!

Write or phone for illustrated leaflets:

GRAMPIAN REPRODUCERS LTD
Hanworth Trading Estate, Feltham, Middlesex. Feltham 2657.



FRANCIS OF STREATHAM

LEADING STOCKISTS OF EQUIPMENT FOR TAPE and HI-FI

... and NO EXTRA FOR CREDIT TERMS

- ★ Minimum Deposit
- ★ No Interest or Service Charges on H.P. up to 18 months
- ★ Free Service during Guarantee Period

Akai M6 1/2 & 1/4 Tr. St. ...	130 gns.
Akai de luxe 69 ...	79 gns.
Brenell Mk. V Model M ...	88 gns.
*Brenell Mk. V ...	64 gns.
Brenell 3 star ...	58 gns.
Cossor 4 Tr. 1602 ...	38 gns.
Cossor 4 Tr. 1601 ...	59 gns.
Cossor 1603 4 Tr. ...	28 gns.
Elizabethan 200 ...	22 gns.
Elizabethan 2230 ...	32 gns.
Ferguson 3200 ...	26 gns.
Ferguson 3202 2 sp. 4 Tr. ...	33 gns.
*Ferroglyph 5AN ...	85 gns.
*Ferroglyph 422 or 424 ...	110 gns.
*Ferroglyph 4A N ...	88 gns.
*Ferroglyph 4AN/S ...	88 gns.
Fidelity Minor ...	22 gns.
Grundig TK14 ...	35 gns.
Grundig TK23 4 Tr. ...	45 gns.
Grundig TK40 4 Tr. ...	75 gns.
Grundig TK41 2 Tr. ...	75 gns.
Loewe Opta 404 2 sp. 4 Tr. ...	53 gns.
Loewe Opta 403 ...	45 gns.
Philips 4 Tr. 3541 ...	36 gns.
Philips 4 Tr. 3542 ...	59 gns.
Philips 3514 4 Tr. ...	27 gns.
*Reflectograph 'A' 1/2 Tr. ...	105 gns.
Robuk ...	36 gns.
*Simon SP5 ...	93 gns.
Sony Stereo 462 4 Tr. ...	75 gns.
Sony 521 Stereo ...	124 gns.
Stella 4 Tr. 454 ...	38 gns.
Stella 4 Tr. 459 ...	62 gns.
Stella 456 ...	28 gns.
Stuzzi 4 Tr. Junior ...	26 gns.
*Tandberg Series VI Stereo 1/2 or 1/4 Track ...	110 gns.
*Tandberg Mono, 3B ...	76 gns.
*Telefunken 85 De Luxe ...	83 gns.

*Telefunken 95 ...	59 gns.
*Telefunken 96 4 Tr. ...	69 gns.
*Telefunken 98 1/2 Tr. St. ...	95 gns.
Truvox 60 2 or 4 Tr. ...	39 gns.
Truvox Series 80/2 Tr. ...	55 gns.
Truvox Series 80/4 Tr. ...	59 gns.
Truvox R7 ...	82 gns.
Uher Universal ...	83 gns.
*Vortexion WVA ...	£93.13.0
*Vortexion WVB ...	£110.3.0
*Vortexion C Stereo ...	£148.10.0
*Vortexion CBL Stereo ...	£160
Wyndors International ...	69 gns.

BATTERY PORTABLES

Cossor 1620 ...	25 gns.
Grundig Memorette ...	55 gns.
Philips Portable ...	24 gns.
Loewe Opta 412 ...	47 gns.
(Mains/Battery/Car)	
Butoba ...	66 gns.
Clarion Phonotrix ...	39 gns.
Fi-Cord 202 ...	66 gns.
Stella ...	25 gns.
Stuzzi Memo-Cord ...	25 gns.

*Microphone extra

Mains Power Pack for Philips or Stella ...	£5.0.0
Grundig Mains Power Pack ...	8 gns.
Truvox Decks with Pre-Amps PD 82—Standard Twin Tr. ...	£42.0.0
PD 85—Professional 4 Tr. ...	£52.10.0
PD 86—Professional 4 Tr. Stereo ...	£63.0.0

Tape Decks by Brenell, Wright & Weaire.
Tape to disc and copy service

Prices subject to alteration as announced by manufacturers.

Gramplan Reflector ... £5.15.0

● MICROPHONES AND MIXERS

Lustraphone VR/70 ...	£10.10.0
Lustraphone VR/64 ...	
Ribbon ...	£7.17.6
Lustraphone LFV/59 ...	
Dynamic ...	£8.18.6
Gramplan GR/2 as advertised	
Gramplan DP/4 Dynamic	£8.0.0
Simon 'Cadenza' Ribbon	£10.10.0
Reslo Ribbon or Dynamic	£9.12.6
Reslo Cardioid ...	£19.19.0
TSL 3 Channel Mixer ...	£2. 7.6
Grundig Mixer ...	£16.16.0
AKG K 50 Headphones ...	£7.10.0

Also in stock microphones by ACOS, FILM INDUSTRIES, TELEFUNKEN, A.K.G.

● ALL WALGAIN PRODUCTS

- Stands of all types and accessories
- TAPES by all leading makers in all grades and sizes as advertised.
- Pre-recorded by Columbia, H.M.V. Saga, Music-on-Tape.

HI-FI

- STEREO AND MONO AMPLIFIERS
 - Quad Chapman Rogers
 - Leak Dulci Armstrong
 - Tripletone
 - TUNERS
 - Quad Rogers Pye
 - Leak Dulci Armstrong
 - Chapman
 - LOUDSPEAKERS by
 - Quad Kelly
 - W.B. Wharfedale
 - Goodmans Tannoy
 - Mordaunt Leak
 - MOTORS, PICKUPS
 - Garrard Tannoy EMI
 - Goldring Lenco Shure
 - Connoisseur Decca Stereo
 - Decca Deram Mk. II
 - Philips Ronette
 - All-Balance B & O
 - Ortofan SME Mk. II
 - Acos
- All types of Diamond and Sapphire styli, stereo and mono. Microlifts, Garrard SPG3. Acos Dust Bug.

CABINETS
Record Housing
Leak 'Southdown'

169-173 STREATHAM HIGH ROAD, LONDON, S.W.16

Between St. Leonard's Church and Streatham Station

STReatham 0466/0192

PLEASE NOTE THIS IS OUR ONLY ADDRESS. OPEN ALL DAY SATURDAY

CLASSIFIED ADVERTISEMENTS — continued

For Sale (continued)

Tape and gram equipment repairs/mods.—Harding Electronics, 120A Mora Road, Cricklewood, N.W.2.

Easysplice Tape Splicer makes accurate splicing easy, guaranteed, 5s. 6d.—Easysplice, 30 Lawrence Road, Ealing.

Dimos Ltd., announce an outstanding new type of amplifier. This is the most versatile unit ever offered to the tape enthusiast, mono or stereo, magic eye or meter up to 7 mono channels etc. Specifically suitable for the Planet Decks. Send for full details to 8 Corwell Lane, Hillingdon, Middx.

Ferroglyph 5A/N, 422 and 424, Revox E36, etc., always in stock.—City and Essex Tape Recorder Centres. (see page 540).

Hear the fascinating Tape of Stanley Tamworth, the man who made God his legal business partner. Hire 5s., Catalogue 1s.—Evangelical Enterprises, 53a London Road, Leicester.

Minifon Miniature (pocket) portable wire recorder 2½ hours continuous recording, £25.—64 Wellington Road, Nantwich, Cheshire.

Fi-Cord 1A, complete, perfect. Exchange for Grundig TK1 or cash.—Gauntlett, Glebe House, Rotton Row, Lewes, Sussex.

Brenell MK5 "M" 60 gns.; Stuzzi Magnette 35 gns.—Barker, 13 St. Andrews Road, Croydon. CR0ydon 7711, after 6.30 p.m.

Stellaphon Tape Recorder (ST455) with microphone and D.P. Tape under manufacturer's guarantee, £50.—Kibble, 232 Westrow Drive, Barking, Essex. Phone: RIPpleway 1749.

Recorder need Repairing? Then let City and Essex Tape Recorder Centre do it for you expertly and economically (see page 540).

TAPE EXCHANGES

Put your Tape Recorder to its most exciting use! S.A.E. for particulars—"Worldwide Tapetalk," 35 The Gardens, Harrow.

TAPE TO DISC

Tape to Disc Recordings. Finest professional quality, 10 in. L.P. 35s. (32 min.); 12 in. L.P. 40s. (45 min.); 7 in. E.P. 17s. 6d. 48-hour Postal Service. S.a.e. for leaflet to: Deroysound Service, 52 Hest Bank Lane, Hest Bank, Lancaster.

Tape to Disc service, editing, and dubbing, all speeds. Studio available for musical groups. Outside recordings our speciality. Ilford Sound Recording Service, 63 Aintree Crescent, Barkingside, Ilford, Essex. Telephone: CRE 8947 and GRA 5107.

WANTED

Copy of Vol. 2 March 1960 Tape Recorder required. Good price paid for clean copy.—Tape Recorder, 99 Mortimer Street, London, W.1.

Soundbox wanted for Edison Phonograph. Good price paid for correct type. Send details to Box 302.

Reverberation or Echo Unit wanted. Preferably without the use of an endless tape loop. Spring systems or plate echo required. State input and output impedance and price. Box No. 303.

PERMANENT BINDING

We can undertake the permanent binding of all volumes of The Tape Recorder. Send your copies to us, the price is 36s. which includes index and postage. They are individually hand stitched and covered in black buckram, gold block on spine. Other colours and leather bindings are also available, details on application.

THE INDEX TO VOLUME 3 TAPE RECORDER IS NOW AVAILABLE PRICE 2/6 (Post free)
99 Mortimer Street · London · W.1

Now... you can order direct from Hi-Fi News

AUDIO



Read the original magazine about high fidelity every month. Use convenient order form.

Hi-Fi News
99 Mortimer Street
London, W.1., England

I enclose 35/ for a 1 year subscription to AUDIO which is to be mailed post-free from the U. S. (Please print or type name and address)

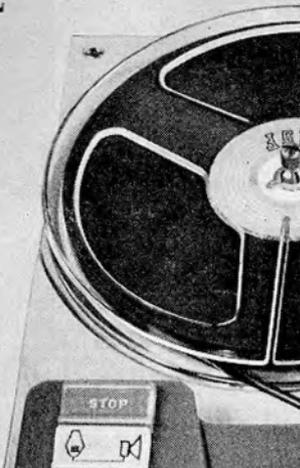
Name _____

Address _____

ADVERTISERS' INDEX

	Page
A.K.G.	536
Armstrong Wireless & T.V. Co. Ltd.	546
B.A.S.F. Chemicals Ltd.	560
Brenell Engineering Co. Ltd.	544
A. Brown & Sons Ltd.	554
C.B.S. Tapes	536
Chelsea Record Centre	554
City & Essex Tape Recorder Centres	540
De Villiers (Electronic World) Ltd.	544
Elstone Electronics Ltd.	532
E.M.I. Tape Ltd.	524
Ferrania Magnetic Recording Tape	543
Film Industries Ltd.	548
Francis of Streatham	557
Gevaert Ltd.	518
Grampian Reproducers Ltd.	557
Heathkit	552
Howard Tape Recorders	542
J. J. Francis (Wood Green) Ltd.	546
Kingswood Supplies	553
Lustraphone Ltd.	548
Mallory Batteries Ltd.	530
M.S.S. Recording Co. Ltd.	526
Nusound Recording Co.	543-545-554
Rapid Recording Service	543
Reps Tape Recorders Ltd.	550
Selfround Ltd.	548
Simon Equipment Ltd.	522
Studio 99	555
The Garrard Engineering & Manufacturing Co. Ltd.	523
The Recorder Co.	532
Tellux Ltd.	519
Truvox Ltd.	559
Valradio Ltd.	554
N. Walker	543
Wellington Acoustic Laboratories	543
World Record Club	520-521

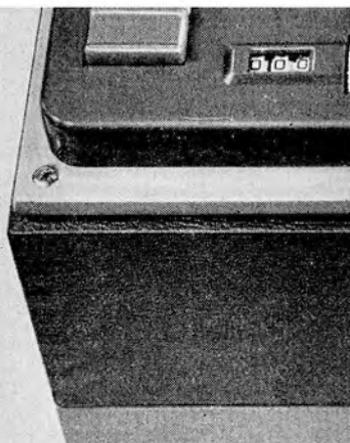
PD 82 twin-track
£42



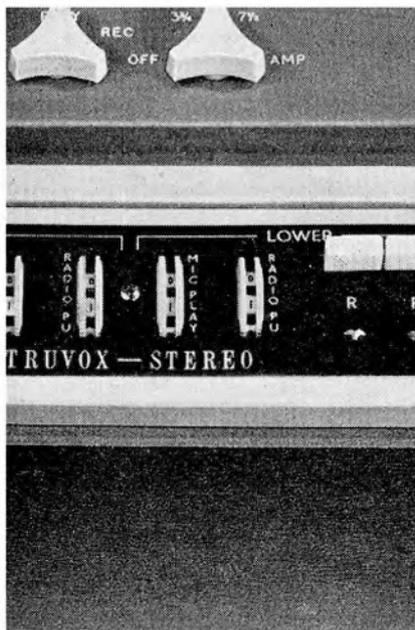
PD 86 Stereo
quarter-track £63



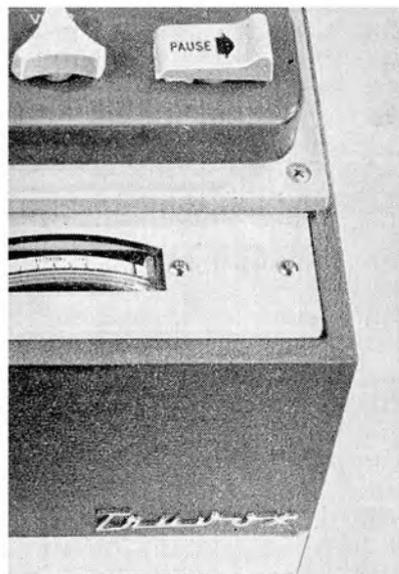
PD 83 Professional
twin-track
£48 10 0



PD 84 four-track
£46



PD 87 Stereo
half-track £63



PD 85 Professional
four-track
£52 10 0

six variations on a Hi-Fi theme

'SERIES 80' TAPE UNITS BY TRUVOX ■ The heart of this series is the Truvox 80 tape deck—fast becoming recognised as a classic of modern audio engineering. Smooth, silent and certain in operation. Crisply precise and alert to the touch. Ruggedly built for a long, tough and active life. And as reliable as Big Ben. ■ Truvox tape units offer—in all six variations—a fine array of features. A hysteresis capstan motor by Papst provides three speeds (7½, 3½ and 1½ ips) constant to within ± 1%, and changeable while running, with two independent motors to ensure a 60-second

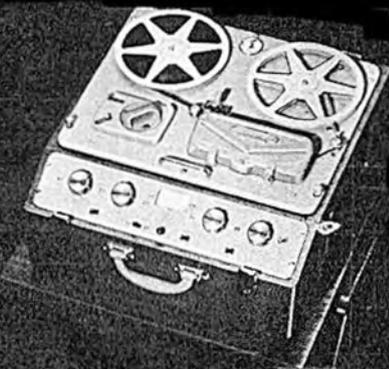
fast rewind for a full 7" reel. The braking is positive and efficient and the autostop operates both at the tape end or in case of tape breakage (no foil required!). All versions are self-powered and housed in an attractive wooden plinth ready for easy connection to existing hi-fi installations. (No matching problems!) ■ Inspect the Series 80 at your Truvox Dealer. When you see, hear and handle these fine instruments for yourself you'll recognise, too, what we mean by the Truvox Touch—the extra, *subjective* factor, beyond the specification, that is engineered into every Truvox tape recorder.

Send now for leaflets showing *all* the tape recording equipment with The Truvox Touch:—
TRUVOX LTD. Neasden Lane, London, N.W.10
TR

THE TRUVOX TOUCH

starts where the specification leaves off

The Incomparable **Ferrograph**



for
the man
who
demands
HARMONY
IN THE
HOME

Post this coupon today for full details

NAME

ADDRESS

T2.

THE FERROGRAPH COMPANY LTD

84 BLACKFRIARS ROAD LONDON S.E.1. Tel: WATERloo 1981

New, Bigger Showrooms Mean an even Wider Choice from the Mail Order Service run by **TAPE SPECIALISTS FOR TAPE ENTHUSIASTS**

A friendly welcome awaits you at our bright new showroom extension. Here you will find a lavish array of equipment at every price level . . . make your choice for immediate delivery or if you cannot visit us, the fast and friendly R.E.W. Mail Order Service makes it easy for you to enjoy the professional results only possible with an advanced Tape Recorder. Get in touch with us now. We have thousands of satisfied customers and a reputation for generous part exchange, reliability and specialist service.

MACHINE OF THE MONTH



**PAMPHONIC
REFLECTOGRAPH Type A 105 gns**
A new machine with redesigned amplifier giving improved frequency response at all speeds, on record and playback..

2 speeds: 3 $\frac{3}{4}$ and 7 $\frac{1}{2}$ i.p.s.
Separate playback amplifier V.U.
M. Meter Semi-prof.
No interest terms, £11.5.0, deposit
and 12 monthly p'ments of £8.5.0.
Also available on H.P. Terms, 18-
24 months to pay.

Bargain Basement!

We have an unrivalled stock of leading makes of new and used machines at unbeatable bargain prices—(30%-60% reductions on original prices! Make a point of asking for our Special Bargain List.

* **CASH FOR YOUR TAPE RECORDER**
or HI - FI.
Highest cash offers for good equipment . . .
get in touch today!

300 MACHINES ON DISPLAY!

Call, see, hear and choose the Tape Recorder you've always wanted from one of the biggest ranges anywhere. Just about every model—for off-the-shelf delivery—in-

5AN 85 gns, Brenell Mk. 5/2 69 gns, Brenell Mk. V "M" 88 gns, Revox Stereo 110

Type "A" 105 gns, Grundig TK46 99 gns, and hundreds of others.

You're guaranteed maximum satisfaction with the R.E.W.

"PLUS FIVE" SERVICE

- Generous part exchange allowances.
- No interest terms—lowest deposits.
- Off-the Shelf delivery from the biggest range under one roof.
- Free servicing and free delivery.
- Optional personal insurance.

NO INTEREST TERMS!

Take your pick from our wide range and have any machine you want for 10% deposit, balance twelve months and no interest charged. (18-24 months H.P. terms also available).

Home demonstrations in the London area gladly arranged. By return enquiry service. Agents for all makes.



R·E·W
(Earlsfield) Ltd.
Mail Order Department
264/266 (TR) Upper Tooting Road,
London, S.W.17.
Telephone: BALhnm 7710

PRECISION SOUND —THE STORY



The BASF Tape Manual is the standard guide for those embarking upon the complexities of precision sound recording. The colourful, 76-page booklet covers the whole subject from the elementary principles to the intricacies of editing your own tapes. Whether expert or beginner, there is always something to learn about the fascinating art of precision recording. Send today for the BASF Tape Manual by filling in the coupon below.

PRECISION SOUND —THE STORAGE

Each recording you make is unique; but there are those cherished few which are quite irreplaceable. Keep them safe from dust and damage in BASF Library Boxes—tough, hard-wearing Polystyrol plastic containers which house three tapes (or 8 mm. films) in swivel-open cassettes for 3", 4", 4½", 5", 5½" and 7" spools. BASF LIBRARY BOXES—the modern, inexpensive way of storing, tabulating and protecting your tapes.



—SYMBOL OF
AUTHENTIC SOUND

BASF CHEMICALS LIMITED,
5a GILLESPIE ROAD, LONDON, N.5. TEL: CANONBURY 2011

To: **BASF CHEMICALS LIMITED**, 5a Gillespie Rd., London, N.5.
Please send me a copy of the **BASF Tape Manual**.
I enclose Postal Order No. Value 1/6d.

NAME

ADDRESS

T.R.