British
RADIO AND
TELEVISION
Incorporating "The British Radio Maker and Exporter"

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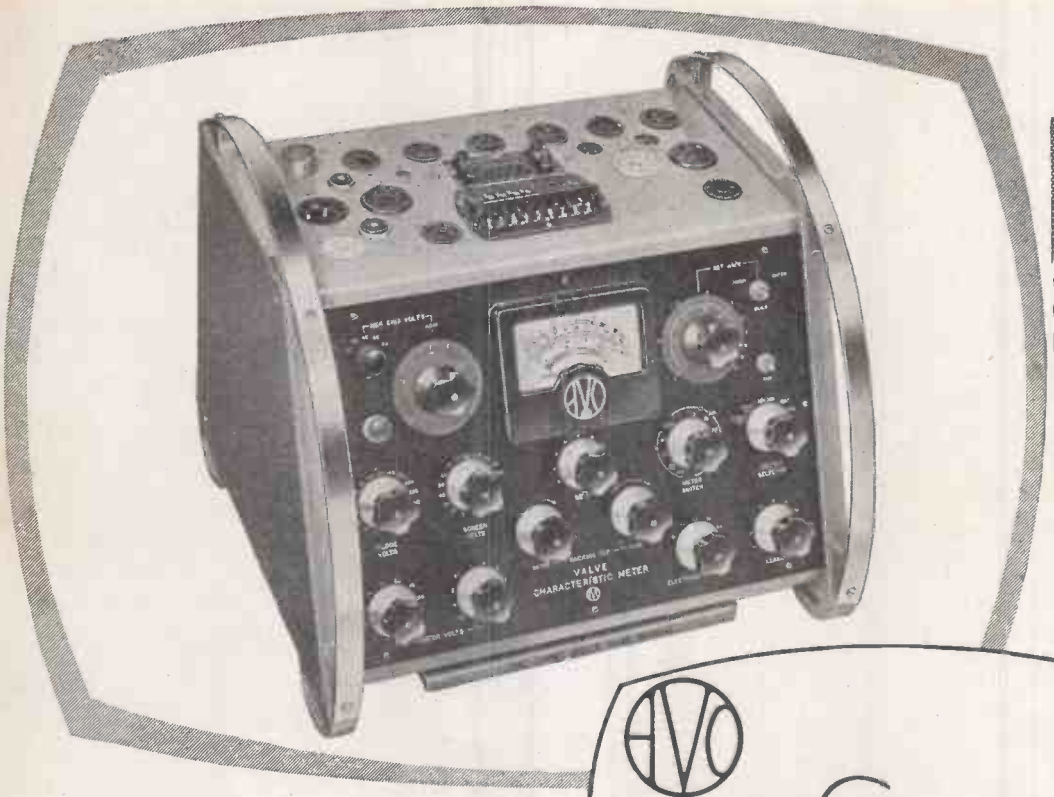


WE SHALL BE AT THE
RADIO SHOW
EARLS COURT
Aug 24-Sept 3

Stand No.
116

AVO VALVE Characteristic METER Mk III

The AVO Valve Characteristic Meter Mark III offers the Radio Engineer far more than is generally implied by the words "a valve tester".

This compact and most comprehensive Meter sets a new high standard for instruments of its type. It will quickly test any standard receiving or small transmitting valve on any of its normal characteristics under conditions corresponding to a wide range of D.C. electrode voltages.

A new method of measuring mutual conductance ensures that the instrument can deal adequately with modern valves of high slope and short grid-base such as are commonly used in T.V. receivers.

PROVIDES all necessary data to enable Ia/Va, Ia/Vg, Ia/Vs, etc., curves to be drawn.

MEASURES mutual conductance up to 30mA/V.

DETERMINES inter-electrode insulation with heater both hot and cold.

GIVES direct measurement of "gas" current.

TESTS rectifying and signal diodes under reservoir load conditions.

COVERS all normal heater voltages up to 117V.

CIRCUIT improvements provide accurate setting and discrimination of grid voltage over the full range to 100V negative.

List Price
£75

A comprehensive Instruction Book and detailed Valve Data Manual are provided.

A relay protects the instrument against damage through overloading the H.T. circuits and also affords a high measure of protection to the valve under test.

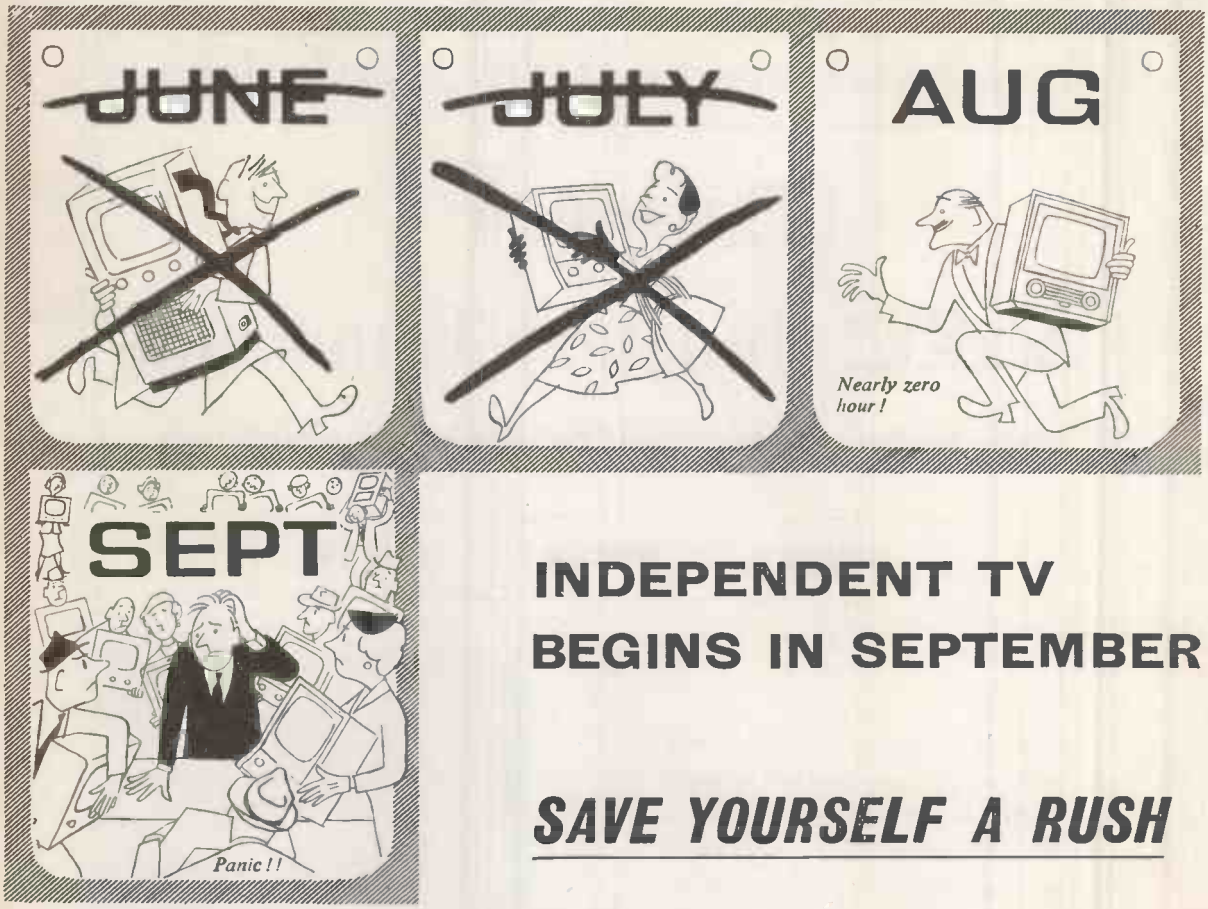
The instrument is fitted with a hinged fold-over lid which protects the valve holders when not in use.

Regd. Trade Mark

THE AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO. LTD.

AVOCET HOUSE · 92-96 VAUXHALL BRIDGE ROAD · LONDON · S.W.1. *Telephone: VICtoria 3404 (9 lines)*

V.C.4.



INDEPENDENT TV BEGINS IN SEPTEMBER

SAVE YOURSELF A RUSH

Urge your TV customers to convert now!

NO-ONE WANTS to turn down business, but you may find yourself in that situation when Independent TV begins—unless you urge your customers to convert *now!*

We are doing our bit with a big advertising campaign which is now running. Big spaces in London evening and suburban newspapers, posters in the Underground, leaflets for your counter, and windowbills—all these are telling your customers about the forthcoming programmes: most of the biggest names in the entertainment world will be appearing regularly on the new station. We are telling viewers, too, to come to *you* with their enquiries.

But *you* know what people are like for putting things off! So warn your customers that they may miss the first months of the new programmes *unless they take steps now!*

The new station will bring you plenty of new business—make sure *now* that you can cope with it!

ASSOCIATED BROADCASTING COMPANY LTD · ASSOCIATED-REDIFFUSION LTD · THE LONDON PROGRAMME COMPANIES

NOW—the McCARTHY 7-Valve Bureau Radiogram at only 56 gns.

The radiogram you've been waiting for! McCarthy's Masterpiece! A beautiful walnut veneered cabinet with generous, easily accessible record space, houses this magnificent radiogram, with the superb tone.

TWO TYPES AVAILABLE

1 PP 7 with short, medium and long wave-bands and push-pull output.

2 FM 7 for F.M. areas; complete A.M. reception on short, medium and long wave-bands and F.M. reception over the whole of band II. Single ended output.

200-250 v. A.C.

At 56 guineas, this will be the Radiogram of the year! Make sure of *your* stocks to meet the demand.

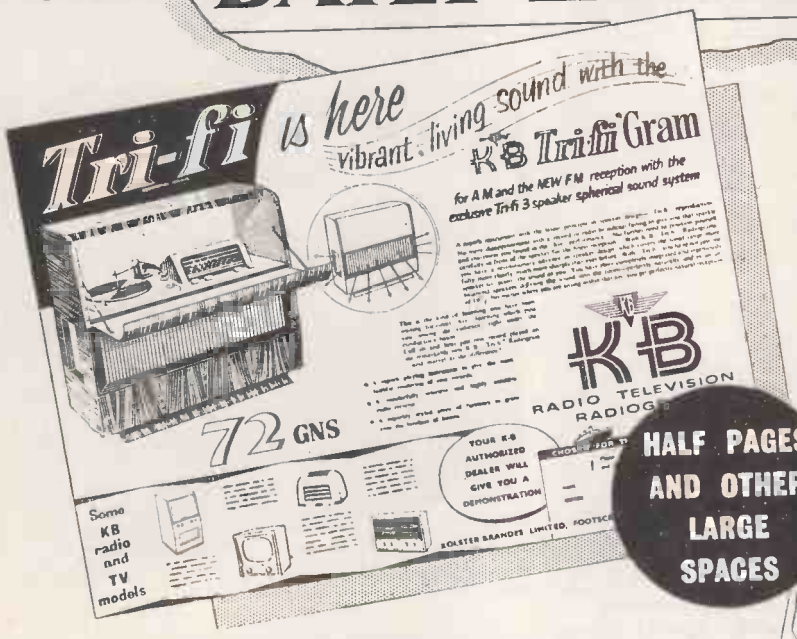
- **N.W. ENGLAND.** Ernest Hathaway & Co. Ltd., "Sartor House," 37 Derby Street, Manchester, 8. Hardman & Co. Ltd., P.O. Box No. 23, Hardale House, Baillie Street, Rochdale. S. Hathaway & Co. (Liverpool) Ltd., 1/3 Pall Mall, Liverpool, 3.
- **N.E. ENGLAND.** Robert Hardman Ltd., 3 Queen Square, Leeds, 2.
- **NOTTS.** Robert Hardman Ltd., 3 Queen Square, Leeds, 2. Mansfield Factors (Electrical Supplies) Ltd., 50 Stockwell Gate, Mansfield.
- **LINCS.** Mansfield Factors (Electrical Supplies) Ltd., 50 Stockwell Gate, Mansfield.
- **MIDLANDS.** S. Hathaway & Co. (Midlands) Ltd., 50 High Street, Henley-in-Arden. R. A. Poole (London) Ltd., Cox Street, Coventry. R. A. Poole (London) Ltd., 40-42 St. James Street, Cheltenham. E. A. Wood. Ltd., 100 Aston Road, Birmingham, 6. E. A. Wood, Ltd., "Eltic House," 61 Belgrave Gate, Leicester.
- **KENT.** H. E. Kettle Ltd., Knightrider Street, Maidstone.
- **SURREY AND SUSSEX.** John Street Manufacturers Ltd., 88 Springbank Road, Hither Green, London, S.E.13.
- **S. & W. ENGLAND.** Robshaw Brothers Ltd., 105 Commercial Road, Bournemouth.
- **REMAINDER OF ENGLAND.** Radio & Electrical Mantel Co. Ltd., Felgate House, Studland Street, Hammersmith, London, W.6
- **WALES.** Electrical Wholesalers (Shropshire) Ltd., Alexandra Road, Wellington, Shropshire.
- **CHANNEL ISLANDS.** Robshaw Brothers Ltd., 105 Commercial Road, Bournemouth.
- **SCOTLAND.** Bryterlite Electrical Co. (Glasgow) Ltd., 39-43 Robertson Street, Glasgow, C.2.
- **N. IRELAND.** Bryterlite Electrical Co. (Belfast) Ltd., 11 College Square North, Belfast.

10

McCarthy radio

Manufactured by FELGATE RADIO LTD., FELGATE HOUSE, STUDLAND STREET, HAMMERSMITH, LONDON, W.6.

ANOTHER EXTENSIVE KB ADVERTISING CAMPAIGN TELLS 11½ MILLION READERS of the DAILY EXPRESS



about the new KB Tri-fi Gram

HALF PAGES AND OTHER LARGE SPACES

Perhaps you are getting rather tired of being told to watch out for this, and that, advertising campaign? Well, here, for a change, is one you won't have to watch out for—it will be so dominating you'll scarcely be able to miss it!

In early September comes the greatest weight of advertising, with half-page spaces in the *Daily Express*, *Daily Herald* and *Daily Mirror*. These and large spaces in other important papers throughout the country will give 30 million readers the K-B news.

As you see, this year our main story is "Tri-fi," K-B's outstanding new development in radio reception and gramophone reproduction. Every advertisement will carry a bold, clear invitation to "call in and hear just one record on the remarkable new K-B "Tri-fi" Radiogram." K-B Dealers should be ready to cash in on the profitable enquiries which are bound to come their way.

KOLSTER-BRANDES LTD., FOOTSCRAY, SIDCUP, KENT.

AN EMI ASSOCIATE

British RADIO AND TELEVISION

Incorporating "The British Radio Maker and Exporter"

Vol. X, No. 4 AUGUST, 1955

Editorial and Advertising Offices :

92 Fleet Street, London, E.C.4

Telephone : CENtral 4100

EDITOR: David McIlwain
TECHNICAL EDITOR: W. Norman Stevens
ADVERTISEMENT MANAGER: Robert C. Cornwall

Published on or about the 1st of each month and available by subscription only to bona-fide members of the radio and television trade and industry. Annual subscription to any part of the world £1 post paid.

In this issue:

Tele-opinion

The Importance of being a Dealer

MOST radio and television dealers will have realised by now that they are more than mere purveyors of gadgets and gimmicks designed to entertain the public. They are, in fact, an essential part of the mechanism of television expansion and development. They are responsible for the overall extent and efficiency of the national receiving screen, and on their efforts and enterprise ultimately depends the size of the viewing audience.

If this wasn't all too apparent before, it certainly is now. The reason is not far to seek. For the first time in the history of British broadcasting the success of a service is going to depend entirely on the size of the viewing audience.

The commercial TV set-up is such that the revenue for financing programmes must come from advertisers who buy time on the air, and the advertisers will only want to buy time if they are assured of an audience. Consequently the I.T.A. programme contractors are keenly aware of the important part the dealer is playing, and must continue to play, in getting the new service off to a good start.

The programme companies have not been slow to make contact with dealers and seek their full co-operation. The recent meeting (reported elsewhere on this page) shows how this policy has been translated into practical terms.

In addition, I.T.A. publicity material distributed to the public via retailers, and press advertising underlining the need for prompt conversions, are all healthy signs of the strong liaison that exists between the I.T.A., the programme contractors and the retail trade.

For the same reasons, though less directly, potential advertisers in the new medium will support wholeheartedly this new conception of broadcaster-dealer co-operation. Audience has become an economic factor in entertainment, and the key man in acquiring audience availability is the retailer.

Contact Man

In other ways too, the dealer is consolidating his status. The Radio Industry Council, representative body of the industry as a whole, continually stress the importance of the dealer in the success of the National Radio Show, and are always willing to assist dealers in making the most of show publicity. The dealer, as contact man with the public, can be very influential in stimulating local interest in the Radio Show—a stimulus which inevitably results in increased turnover at the one and only point of sale—the dealer's shop counter.

Being a dealer always was important, but perhaps never so important as now, when he becomes, in effect, a vital part of the machinery of commercial television. The benefits will operate both ways. The more conversions completed and new sets installed now, the better for commercial TV. And the better commercial TV is when it starts, the more conversions and new sets will be sold in the months to come.

Testing Time

The necessity to provide adequate test transmission periods to assist radio dealers in making Band III conversions cannot be overstressed. In spite of intensive advertising by the industry and the I.T.A. programme contractors, a large percentage of the viewing public will inevitably leave the matter of conversion until the last minute—or even until after the start of the new service, when they have had reports from their friends about the commercial programme. That is ordinary human inertia.

It will create a big problem for retailers during the coming autumn and winter when the continuing demand for set and aerial conversions is likely to saturate available labour. The pressure will, however, be eased considerably if adequate high-power test transmissions are radiated throughout the day on Band III during the gaps between programmes.

This will save time in making repeat calls to adjust and trim sets and aerials that were adapted and installed during a blank no-transmission period.

The I.T.A. should do everything within their power to ensure that dealers get full co-operation in their efforts to meet the rush for conversions by maintaining a test signal during the normal working day. Transmitter maintenance is necessary—but there's always the night!

DEALERS MEET I.T.A. PROGRAMME COMPANIES

ABOUT 150 dealers attended a meeting held on June 30 at the Conway Hall, London, arranged by the London Commercial Television Programme Contractors, represented by Paul Adorian, Roland Gillett, and Frank Coven (Associated-Rediffusion, Ltd.), and Harry Allen Towers (Associated Broadcasting Co., Ltd.).

Two important announcements were made. First, as reported elsewhere in in this issue, Associated-Rediffuson, with the co-operation of the R.T.R.A., are to make available £500,000 credit to facilitate the financing of receiver and aerial conversion. Second, a new test card (illustrated above) has been introduced on the Belling-Lee low-power transmission from Croydon. The card bears a message urging the public to have their sets converted without delay, and alternates with the old test card during the transmission periods.

During the course of the meeting, in which dealers were invited to ask questions, the need for high-power test transmissions from the Croydon station at the earliest possible moment was stressed. It was pointed out that although the I.T.A. were prepared to meet any expenses incurred in arranging for a high-powered signal to be put out immediately, it had proved impossible to obtain adequate transmission equipment or aerial facilities.

The types of test transmission which the I.T.A. may be expected to put out were discussed, and it was stated that they will probably take the form of a test card with recorded music, and perhaps some film. Due to the fact that no stand-by equipment will be available initially, test transmission hours may be restricted to some extent by the need for maintenance of transmission equipment. When duplicate equipment becomes available, the I.T.A. may transmit test signals during the whole of the working day between programmes.

Meanwhile high-power tests will start at the beginning of September.

ROUND-UP OF THE MONTH'S NEWS AND VIEWS

B.B.C. Colour TV tests this month

EXPERIMENTAL colour transmissions will be radiated by the B.B.C. from Alexandra Palace during August. A number of different systems will be tested in order to gather information on important points such as transmission, compatibility, pattern interference, etc. The industry will be collaborating in these tests with a view to determining the requirements of colour receiver design.

The B.B.C. state that the tests will be made after the normal evening transmissions have ended, and will last for several days.

Band III Credit Plan

ASSOCIATED-REDIFFUSION, as stated at the recent meeting with dealers in London, have agreed to make a credit of £500,000 available to retailers to facilitate conversion of TV sets and aerials for the reception of commercial programmes.

It is understood that the terms will be offered via the R.T.R.A. as part of their existing finance scheme, and are expected to take the form of a credit sale agreement up to nine months with a reasonable interest charge.

The £500,000 credit will cover the conversion of some 40,000 sets initially, but as repayments are made they will finance further conversions.

Grundig open London Showroom

A NEW modern showroom at 39-41 New Oxford Street, London, W.1, was officially opened by Grundig (Great Britain), Ltd., last month. The showroom, which makes a special feature of contemporary lighting and decor styles, exhibits the complete range of Grundig tape recorders, the *Stenorette* office dictating machine, the new Grundig f.m. receiver, and several prototypes.

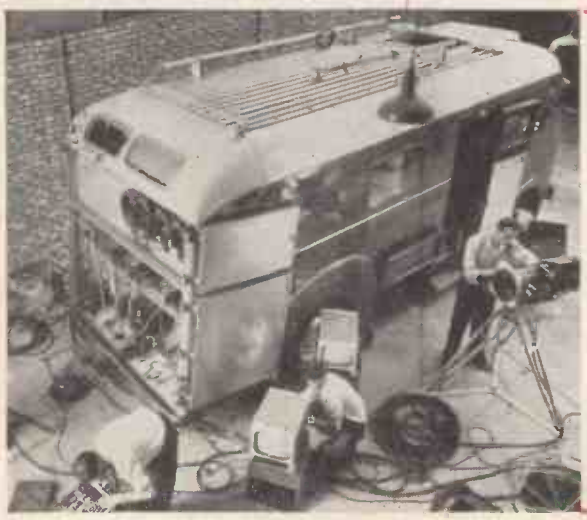
On the opening day an industrial TV camera was used on closed circuit to feed pictures of passers-by to a monitor receiver in the window. Another device enabled people outside to record their voices and hear them played back.

The showroom is open to the public, potential customers being referred to their nearest Grundig dealer. Dealers and wholesalers are particularly welcomed.

The upper floors of the building have been occupied for some time by Grundig executives and office personnel.

R.T.R.A. CHANGE HQ

HEADQUARTERS of the R.T.R.A. are now located at new and larger premises at 15-17 Goodge Street, London, W.1. Telephone LANgham 6941. The change of address to more commodious premises has been necessitated by the continuing growth of membership and the extended services offered to its members by the association.



PYE SUPPLY CTV O.B. UNIT

The first Pye outside broadcast vehicle to be delivered to one of the I.T.A. programme contractors is here seen undergoing acceptance tests at the Pye factory in Cambridge, shortly before it was delivered to Associated-Rediffusion during the last week in June.

Monopolies Commission Group Appointed

IN accordance with the provisions of the Monopolies and Restrictive Practices Commission Act, 1953, the chairman of the commission has appointed the following group to consider and report on the commission reference concerning the supply of electronic valves and cathode-ray tubes: Sir David Cairns, Q.C. (chairman); Professor G. C. Allen; J. Archdale; W. G. Cullen; C. N. Gallie; C. H. P. Gifford, O.B.E.; Professor A. L. Goodhart, K.B.E., Q.C.; Gordon Stott, Q.C.; C. E. Wrangham, C.B.E.

It was announced on December 8, 1954, that this subject had been referred to the commission by the Board of Trade. Written and oral evidence is now being taken from manufacturers, wholesalers, retailers and others interested in the trade. Any inquiries, and any offers to give evidence to the Commission, should be addressed to the Monopolies and Restrictive Practices Commission at 8 Cornwall Terrace, Regents Park, London, N.W.1.

Cossor Instruments, Ltd.

A. C. COSSOR, LTD., announce the formation of Cossor Instruments, Ltd. The new company will design and develop new instruments to meet the demands of research and industry and is equipped to promote and deal with the application of electronics to industries which heretofore have not used the new science.

The chairman is Lord Burghley, supported on the board by J. S. Clark, H. Chisholm, H. T. Shepherd, and L. A. Woodhead (general manager).

The new company is located at Cossor House, Highbury Grove, London, N.5.

Southern Radio Branch

SOUTHERN Radio and Electrical Supplies, of Redlynch, Salisbury, Wilts, have opened a new branch at Market Place, Fordingbridge, Hants (telephone: Fordingbridge 3103) for the sale of radio and television components, receivers, and domestic electrical appliances.

NEW STANLEY ADDRESS

FOLLOWING the fire at their Haslemere Works (reported in *B.R.T.* last month), Stanley Sound and Vision Products, Ltd., announce that their new address is: The Green, Pirbright, Surrey.

FOR ALL IN THE TRADE AND THE INDUSTRY

Telesurance and Band III

SOME of the problems facing television insurance companies and maintenance contractors have been outlined by R. T. Sharpe, managing director of Telesurance, Ltd., whose company specialises in TV insurance and maintenance throughout the British Isles.

The essence of the problem is that insurance companies operate on a statistical basis. When a radical change of circumstances occurs the insurance company must investigate thoroughly the possible effects of the innovation on its policies. New statistics, when they have been compiled over a period of time, must be carefully studied.

Mr. Sharpe said: "*It is our job at Telesurance working within narrow margins to watch the cost of TV repairs, and from our charts and statistics forecast the over-all trend. For example, we keep one set of graphs showing the rate of failure of cathode-ray tubes month by month. By watching the trend of the curve we are able to budget ahead.*

"*Our organisation is especially designed and equipped to collect statistics which we gather rom all over the country.*

"*Commercial Television will present difficulties to all concerned with television maintenance, particularly where "schemes" are involved. Further problems will arise from the introduction of larger tubes which will add considerably to the cost of repairs and increase in value the hazards of claims.*

"*With longer viewing hours, additional Band III equipment and more expensive TV bills, maintenance will become an even greater issue in the matter of goodwill relations between retailer and customer and with the advent of Band III we efipect an increase in service calls necessitated by the susceptibility to interference of this wavelength, "ghosts." etc., etc.*

"*Since it is difficult at this stage to assess our additional commitments due to the conversion of receivers to Band III, we have decided to wait and see what experience dictates. If necessary, we are prepared to dip into our substantial capital reserves to tide us over the initial exploratory period.*

"*In the meantime, we are making no additional premium charges to our policyholders providing that the sets are converted by our appointed Agents at the owner's expense and in accordance with the recommendations of the manufacturer.*

"*Special leaflets have been issued to our Agents explaining the position to the public.*"

hi-fi on tour

GOODMANS MOBILE DEM UNIT

SINCE January Goodman's Industries, Ltd., have been visiting gramophone and music societies all over the country to demonstrate high-fidelity loudspeakers. During the run of the Northern Radio Show fifteen similar programmes were given at the Free Trade Hall, Manchester, and the company propose to give further demonstrations during the National Radio Show at Earls Court, during which the new Axiom 80 loudspeaker will be publicly demonstrated for the first time in this country.

The Goodmans demonstration team has been sent on tour at no cost at all to the societies visited, and the equipment used was transported in a vehicle (illustrated) specially obtained and equipped for this purpose. It is proposed to continue these demonstrations until the end of the year, and gramophone or music societies who would like a visit from the demonstration team are invited to apply to the company.

The company are also willing to give advice to hi-fi-minded wholesalers and retailers who wish to make alterations or modifications to their premises to enable them to demonstrate high-fidelity sound reproduction to their clients.

GEC TV Expansion

TO meet the increased demand for their domestic television and radio products, The General Electric Co., Ltd., is transferring the production of domestic radio receivers from its Spon Street Works to another factory in Coventry, and is devoting to television production the whole of the manufacturing space previously occupied by domestic radio production.

The new and enlarged facilities for television production include flow line assembly tracks which embody "soak" testing facilities during the various manufacturing stages.

These changes will increase potential output by more than 50 per cent.

RURAL TV

DESIGNED to boost sales of their television receivers in rural areas, a campaign has been started by Pye in the form of a leaflet and newsletter distributed to their dealers stressing the fact that perfect TV is possible without electrical mains if a small generating plant is used. A Lister generator is particularly mentioned. The newsletter suggests ways in which Pye dealers can contact farmers and others living in rural areas who might be interested in running a TV set from their electrical generating plant.

More Ferguson Cabinets

THORN ELECTRICAL INDUSTRIES, LTD., have purchased the ordinary share capital of H. Herrmann, Ltd. H. J. Russell has resigned from the board and Alfred Deutsch and R. E. Davis, of Thorn Electrical, have been elected thereto.

The Herrmann group will continue to manufacture radio and television cabinets and furniture and the purchase will give additional cabinet capacity to Thorn Electrical for the expanding requirements of their Ferguson Division.

TV Times will give CTV programmes

A WEEKLY paper carrying programme details of the I.T.A. programme contractors, to be known as the *TV Times*, will be published as from September 20. It will contain the full day-to-day programmes for ten days, beginning with the opening transmission on September 22.

In addition to programmes, *TV Times* will contain news and features covering every aspect of television. Publishing day after the first number will be Friday, and the price will be 4d. Temporary editorial and circulation offices are at Gough House, Gough Square, London, E.C.4.

NEWS ROUND-UP CONTINUED

Telerection Price Changes

TELERECTION of Cheltenham announce certain price revisions in their aerial range due to the increased cost of raw materials. The company state that up to date they have absorbed these increases themselves, but are now forced to raise the prices of two ranges. New prices are: 3FD/A, 32s. 6d.; 4FD/A, 43s. 6d.; 6FD/A, 51s. 6d.; 3FD/MA, 44s. 6d.; 4FD/MA, 55s.; 6FD/MA, 72s. Their 6-element stacked array, type 6FDX2, is reduced from £14 10s. to £12 10s.

The new prices come into effect on August 1.

OTHER PRICE CHANGES

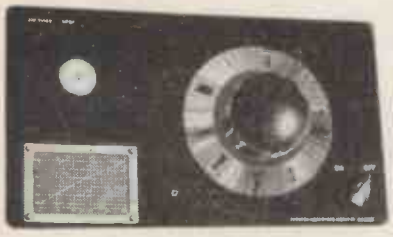
TRUVOX, LTD., announce that the list price of their tape recording amplifier, type "C," has been increased to 17 gns. This has been made necessary by continual increases in the cost of components and the recent labour award.

BECAUSE of higher production costs the retail price of Philips a.m.-f.m. radio receiver, Model 643A, has been increased from 42 gns. to 48 gns. tax paid.

PRICE of the Ultra Twin de luxe radio has been increased to 21 gns. tax paid because of increased cost of materials. The Standard Twin (Ultra Model R786) will continue at its present price of 17 gns.

McELROY-ADAMS F.M. TUNER

THE McElroy Adams Manufacturing Group, Ltd., 46 Greyhound Road, London, W.6, have introduced a high-quality f.m. tuner unit designed for maximum stability and fidelity with its



own power supply. The unit uses six valves and two stabiliser valves in the power unit, and covers the frequency band 85-100 Mc/s. Price is £36 10s.5d., tax paid.

This seven-colour poster now being distributed to Mullard dealers was designed by David Judd and printed by Petty & Sons, Leeds. It was produced for Mullard, Ltd., by Arks Publicity, Ltd.

Permanoid in Midlands

PERMANOID, LTD., have opened a Midlands branch to cover the Birmingham and Midlands area. The new premises will carry comprehensive stocks of all types of Permanoid cables together with Arrell television aerials.

Address of the new branch, which is under the management of D. J. Blashill, is: 558 Wolverhampton Road East, Fighting Cocks, Wolverhampton, Staffs. Telephone: Wolverhampton 38367.

REV-LETTE DISCONTINUED

CHAMPION Electric Corporation announce that their Model 806 *Rev-lette* record player without amplifier and speaker (listed at 9½ gns.) has been withdrawn from the Champion range and production discontinued.

AERIAL ERECTORS LTD.

NEW address of Aerial Erectors, Ltd., is 16 Chase Hill, Enfield, Middlesex.

Technical Gen for Grundig Men

A NEW Technical Bulletin has been issued by Grundig (Gt. Britain), Ltd., and distributed to all Grundig dealers. The bulletin contains technical information on Grundig products, details of tackling servicing and maintenance problems, and ideas and suggestions submitted by readers.

The bulletin will be published at intervals as notes for inclusion become available and is part of the technical service Grundig offer to their dealers.

NEW ARGOSY FACTORY

ARGOSY Radiovision, Ltd., have moved into a spacious new factory in Abbey Road, Barking, Essex, a few hundred yards from their existing works in Hertford Road.

Objects of the move are to enlarge cabinet production (which will now occupy the whole of the Hertford Road works), and to provide in the new premises the necessary space to deal with the steadily increasing demand for Argosy autoradiograms, table radio receivers and television receivers. The company also plan to make radio cabinets for certain other radio manufacturers.

The Argosy policy of supplying their products to recognised radio wholesalers only is being continued.

Pye at Gravesano Congress

TWO senior Pye engineers, together with two members of the Nixa Record Co., Ltd., attended the Second International Congress of the International Foundation for Music and Electroacoustical Research held at Gravesano, near Lugano, Switzerland, last month.

Every evening during the conference recitals of *Nixa* records were held on Pye hi-fi equipment.

Birmingham Sound Reproducers, Ltd., are now offering an attractive window display cut-out for the Monarch automatic record changer. The display in red, grey and black is available free upon request. Picture shows the display unit with the autochanger in position.

The latest in Radio and TV Receivers and Accessories

MURPHY F-M TABLE RADIO

Murphy Radio, Ltd., Welwyn Garden City, Herts.

MODEL A362 is the first low-priced Murphy receiver to cover the new v.h.f. f.m. band. Medium and long-wave ranges are also provided. The circuit uses five valves plus rectifier with a ratio detector for f.m. reception.

A built-in f.m. dipole which also acts as a plate aerial on a.m. caters for strong signal reception. A bass lift circuit takes care of quality on a.m., and quality on the f.m. band is better because of improved h.f. response. Output is via a 5in. p.m. loudspeaker.

The cabinet is moulded in maroon with the facia stove-enamelled in beige-gold. The maroon control knobs have decorative gold centres. Price of Model A362 is £22 tax paid.

BROADCASTER GRAMETTE

J. and A. Margolin, Ltd., 112–116 Old Street, London, E.C.1.

ILLUSTRATED is the latest addition to the Margolin range of record reproducers, known as the Broadcaster *Gramette*. This is a portable 3-speed reproducer with built-in amplifier housed in a neat case finished in two-tone Rexine of modern styling, with non-corrosive bronze fittings throughout.

Margolin's new Broadcaster Gramette

Two views of the Ravenette television record cabinet designed as a TV table combined with record storage cabinet.

The gram unit, which has a 3-speed motor, will play all sizes of records, and has a turnover crystal pick-up head with dual stylus (Cosmocord GP59). The chassis-built a.c. amplifier has independent tone and volume controls. A cushion buffer is provided for securing pick-up head in transit.

Price of the *Gramette* is 12 gns. (tax pd.).

RSL1 RIBBON LOUDSPEAKER

Thermionic Products, Ltd., Hythe, Southampton.

THE RSL1 ribbon loudspeaker, manufactured by Kelly Acoustics, Ltd., 295 Regents Park Road, London, N.3. and distributed by Thermionic Products, Ltd., was introduced recently at trade exhibitions and is claimed to represent a radical advance in the development of high-frequency reproducing units.

The diaphragm consists only of a special duralumin foil 0.0003in. thick operating in an intense magnetic field. The alternating voice current flowing through the foil results in a magnetic field being generated which interreacts with the permanent field and the magnetic force resulting from this reaction is applied uniformly over the whole ribbon.

Therefore, unlike conventional moving-coil type tweeters where the force is applied only at the point of contact between the voice coil and the diaphragm the whole of the moving system vibrates with equal force and in phase, contributing to a remarkably smooth response free from resonance.

The ribbon is coupled to the air by a specially designed catenoidal horn which gives high coupling efficiency at frequencies from 3-20 kc/s and attenuates considerably all frequencies below about 1,000 c/s. The unit is supplied complete with its own matching transformer for 15 ohm lines. As with all tweeters the unit must be fed from either a high pass filter with a cut off frequency between 1,500-3,000 c/s., or from a specially designed high frequency transformer, again with a response only in excess of 3 kc/s. Low frequency signals below 3,000 c/s. must not be applied to the tweeter or damage will result.

Frequency response 3–20 kc/s; power handling capacity 10W; impedance 15 ohms; dimensions: 8½in. × 5½in. × 4½in.; weight 8lb. Price £12 12s.

TV RECORD CABINET

Alfred Hart and Co. Ltd., 249 Upper Street, Highbury Corner, Islington.

THE *Ravenette* television record cabinet (illustrated) is designed to support a table television receiver, provide storage space for gramophone records, and at the same time serve as a handsome item of furniture for the home.

Dimensions are 20in. × 18in. × 21in. The front, top and sides are in veneered walnut. The record cabinet doors are ¾in. thick, and the inner surfaces are finished in mahogany veneer.

Retail selling price of the *Ravenette* is £6 17s. 6d.

STRAD TABLE TV RECEIVERS

R.M. Electric, Ltd., Team Valley, Gateshead, 11.

THE *Strad* Model 35TV is a 14in. table receiver with built-in turret-tuner for 13-channel reception on Bands I and III. It employs 18 valves in a superhet chassis for operation on a.c. mains only, 185-250V, 50 c/s. The cabinet, which is finished in walnut veneers, measures 19in. × 18in. × 18in. The loudspeaker is located at the front of the cabinet and is covered by "Tygan" washable plastic fabric.

Front controls, on either side of the loudspeaker, are volume/on-off and contrast. Controls at rear left side of cabinet are frame hold, line hold. Preset controls at rear of chassis include

(continued on page 287)

BRAND NEW *Continued*

frame height, linearity, vision interference suppression, and brilliance.

Sound output under normal reception conditions is 3½W from the 6in.×4in. elliptical speaker. The sensitivity of the receiver is such that it should be satisfactory in nearly all secondary reception areas. Automatic contrast control is featured. Price not yet announced.

PYE CANTATA LOUDSPEAKER

Pye, Ltd., Radio Works, Cambridge.

A NEW addition to the Pye range of hi-fi is the *Cantata* loudspeaker system, a corner speaker of pleasing design having a frequency range (in cabinet) of 30–13,000 c/s. The speaker has a voice-coil impedance of 15 ohms at 400 c/s and a power handling capacity of 12 watts. Dimensions are: height 37in.; length of side 18½in.; length across front 26in.; depth 17in. Price of the *Cantata* corner speaker is 35 gns.

ADD-ON RECORD HOUSING UNITS

Record Housing, Brook Road, London, N.22.

A RECORD storage cabinet of unit construction (illustrated) is now being produced by the company. The units, which are of modern design with sliding doors, have a capacity of 100 records each. Any number of units can be joined together to form a composite whole, the sections being secured to their neighbours by a simple locking device. The installation can be adapted to fit any corner, recess or wall.

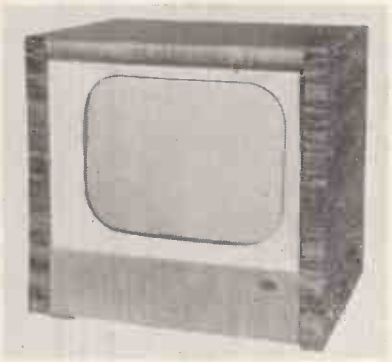
Each unit measures 14in.×14in.×14in. and is finished in medium-striped walnut, mahogany, or oak. Price per unit is £2 19s. 6d. (no tax). A plinth costs 7s. 6d. extra.

Record storage cabinet comprising six add-on units

NEW G.E.C. TABLE TV

The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2.

A NEW 14in. all-programme table television receiver has been added to the G.E.C. range. It incorporates a similar basic circuit to the BT1746, which was introduced last year and is being retained, but offers an alternative modern presentation with the loudspeaker mounted immediately below the screen. The front panel covering the loudspeaker is of woven plastics material which provides contrast between the veneered wood housing and the tube surround.



G.E.C. Model BT1252 14 in., table TV receiver

The tuning unit covers all 13 channels in Band I and III, without extras, and enables the user to select at the turn of a switch, any one programme preset from Bands I and any two programmes preset from Band III.

Setting-up is facilitated by the introduction of a single ganged tuning control for Band I, accessible through a hole in the side control panel. In addition, aerial variations can be compensated for by fine adjustment of the individual aerial and r.f. circuits which are accessible from the underside of the receiver. The user controls comprise the programme selector switch, concentric with the fine tuning knob; the picture contrast control; and the sound volume control, combined with the on/off switch.

The cathode-ray tube has an integral neutral filter and the wide angle flat screen gives a high level of picture brilliance and contrast even in strong ambient lighting conditions with a picture size of $11^{5}/_{16}$in. by $8^{9}/_{16}$in. An automatic vision gain control system operating on the mean picture level and combined with an independent automatic volume control system, ensures that the picture and sound remain constant in fading signal conditions and also compensates for variations in programme brightness.

The new receiver, known as the BT1252, will operate from 200–250V, 50 c/s a.c. mains supplies or 200–250V d.c. mains supplies. It is 16½in. high, 16½in. wide and 12½in. deep plus 6in. back projection. The list price is £51 1s. 1d. plus £17 3s. 11d. purchase tax.

BELLING LEE BAND III AERIALS

Belling & Lee, Ltd, Great Cambridge Road, Enfield, Middlesex.

THE company announce that as an emergency step they are releasing four more varieties of their Band III Channel 9 aerials. They are for mounting on the sides of existing Band I aerial masts as follows:

L903/8 and 9/S1½—a 3-element high front-to-back ratio (not high-gain) aerial for side mounting on 1½in. diam. Band I masts (£1 14s. list); L903/8 and 9/S2—the same as 9/S1½ but for 2in. diam. masts (£1 14s. list); L904/8 and 9/S1½—a 6-element high-gain and high-front-to-back ratio aerial for side mounting on 1½in. diam. Band I masts (£2 10s. 6d. list); L904/8 and 9/S2—the same as 9/S1½ but for 2in. diam. masts (£2 10s. 6d. list).

These aerial types are released to assist erectors to get more Band III aerials up in less time as the opening of the I.T.A. station draws near.

BATTERY-MAINS RADIOGRAM

Winter Trading Co. Ltd., 6 Harrow Road, London, W.2.

THE company are now making available to the trade the new mains-battery radiogram (illustrated) manufactured by Braun of Frankfurt.

(continued on page 289)

Braun mains-battery portable radiogram

for good looks

'Deep picture' TV from this compact table model with 13 channel programme selector, 15 valves plus germanium crystal and metal rectifier. Vision and noise suppression, automatic gain control vision and sound. Walnut veneered cabinet, 200-250 v. AC/DC.

A.1800 17" *screen Price: 78 gns. including p. tax.*

A.1497 14" *screen Price: 67 gns.* „ „

...and good listening

Stone grey plastic cabinet with red handle and gold finished trims. 4 valves plus metal rectifier. Mains/Battery Portable. Built-in "magnecor" aerial. 5" p.m. speaker. Standard L.T. and H.T. Batteries, or AC/DC mains 200-250 volts.

A.3634 *Price: 18 gns. including p. tax. (Batteries extra)*

PHILCO *takes the laurels*

All Philco sets for Britain are made in Philco's own factory at Chigwell, Essex.

BRAND NEW *Continued*

The instrument, which is of modern compact design, embodies a 4-valve superhet radio with built-in mains unit for use on 110–240V a.c. mains. The gram unit is designed for 45 r.p.m. records, fitted with speed regulator. Storage space in the lid will hold six spare records.

Battery consumption is extremely low, and the following Ever Ready batteries are suitable: l.t.—two U2 cells; h.t.—one B1931 (90V); motor—three U11 cells. The instrument is housed in a two-tone grey plastic cabinet, with push-buttons and control knobs in red. Weight, including batteries, is 9½lb.

Price of this instrument is 35 gns. tax paid.

NEW RADIOSPARES PRODUCTS

Radiospares, Ltd., 4–8 Maple Street, London, W.1.

MANY new products are listed in the July issue of the Radiospares catalogue which is available to bona-fide members of the trade on application to the company. A new addition to the range of "exact replacement" volume controls is the type V90, designed for *Radiomobile* car radios (control units) Nos.: 200XA, 201, 202, 203, 220XE and 221XE. The unit (illustrated) is fitted with a special ⅛in. spindle, is of the 0.5mΩ d.p. type, and costs 5s. 3d.

Radiospares exact replacement volume control for Radiomobile car radio

Another new addition is a 75kΩ standard volume control with d.p. switch; this is an exact replacement value for brightness controls for Ekco Models TC178, T196, T205/6, T217, etc. Price 4s. 6d.

Change-over switches are now available designed for simple waveband-radiogram switching, etc. Two types are s.p. (2s. 6d.) and d.p. (2s. 9d.). Miniature crocodile clips are introduced to solve the problem of making test connections to the pins of miniature valves, etc. Measurements are 11/16in. × ⅜in. × ⅛in. Price 3s. 9d. per dozen.

Other interesting additions to the Radiospares range include miniature group panels (for mounting miniaturised components) at 6½d. for 6-way and 1s. 7d. for 18-way units; fibre washers for insulating canned condensers and other components; and extensions to the ranges of metal tubular electrolytics, "Hygrade" silver mica capacitors, miniature and midget resistors, and 5-watt and surge resistors.

PHILIPS MOTORADIO

Philips Electrical, Ltd., Century House, Shaftesbury Avenue, London, W.C.2.

A NEW Philips car radio—the *MotoRadio* (Model 344V)—will be available early this month at a retail price of 21 gns. (tax paid). Particular attention has been paid to the matter of compact shape and dimensions, and the finished product consists of a complete unit which can easily be fitted into the space provided for radio in most British cars.

A number of other advantages are claimed including 12-volt operation, easily adjustable to 6-volt without changing the vibrator or dial bulb and without the use of a soldering iron; built-in power supply; a separate loudspeaker, of extreme sensitivity, to allow alternative mountings; and a chassis which is easily accessible for servicing.

The *MotoRadio* is suitable for use with all types of car aerials. Due to built-in filters, only normal suppression is necessary. Consumption is low and the receiver is permeability-tuned.

It is housed in a metal casing finished in grey hammer lacquer with a silver-coloured front escutcheon, and weighs 6lb. 11oz. (excluding loudspeaker).

In addition to extensive practical tests applied by the manufacturers, a series of exhaustive trials have also been carried out by a number of well-known car manufacturers. Particular reference is made in their reports to "freedom from ignition interference," "low level of background noise," "quality of output" and "ease of installation of this very small and single unit set, with its separate speaker."

Specifications include: wavebands (l.w.) 1070–2010m., (m.w.) 186–584m.; 5in. high-sensitivity speaker with universal housing; consumption 12V 2A or 6V 3.9A; i.f. 470 kc/s.; valves ECH42, EF41, EAF42, EL42, and vibrator.

NEW MULTICORE SOLDER PACK

Multicore Solder, Ltd., Multicore Works, Maylands Avenue, Hemel Hempstead, Herts.

MULTICORE SOLDERS LTD., have supplemented their 6d. and 5s. retail lines with a new 2s. 6d. pack containing 20ft. of high-quality 60/40 alloy on a reel. This 18 s.w.g. 5-core solder, wound conveniently on a reel, is packed in individual cartons and in colourful counter displays of one dozen.

The new Multicore solder pack in special display carton

The company claim that with the increased interest in the construction of f.m. tuners and amplifiers by amateurs, a ready market will be found for this pack which is now being generally distributed. In addition to this, the new 2s. 6d. Home Constructors' Pack will satisfy the need for a larger and more economical supply for home soldering purposes.

Full discounts will be given to the Trade, *i.e.*, Nett trade price 20s. per dozen packs.

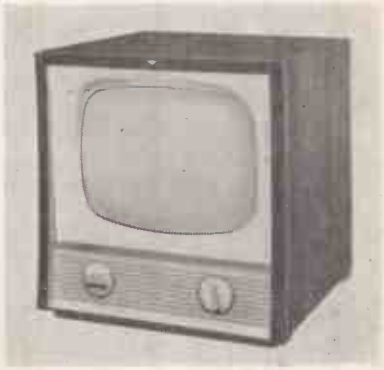
NEW K-B TV MODELS

Kolster-Brandes, Ltd., Footscray, Sidcup, Kent.

TWO new table television receivers (illustrated) have been released by the company. Model MV30 is a 14in. set featuring "contromatic" gain circuit but without flywheel sync. It has a similar chassis to Model LVT30. The cabinet is of contemporary design finished in walnut. Price 66 gns. tax paid.

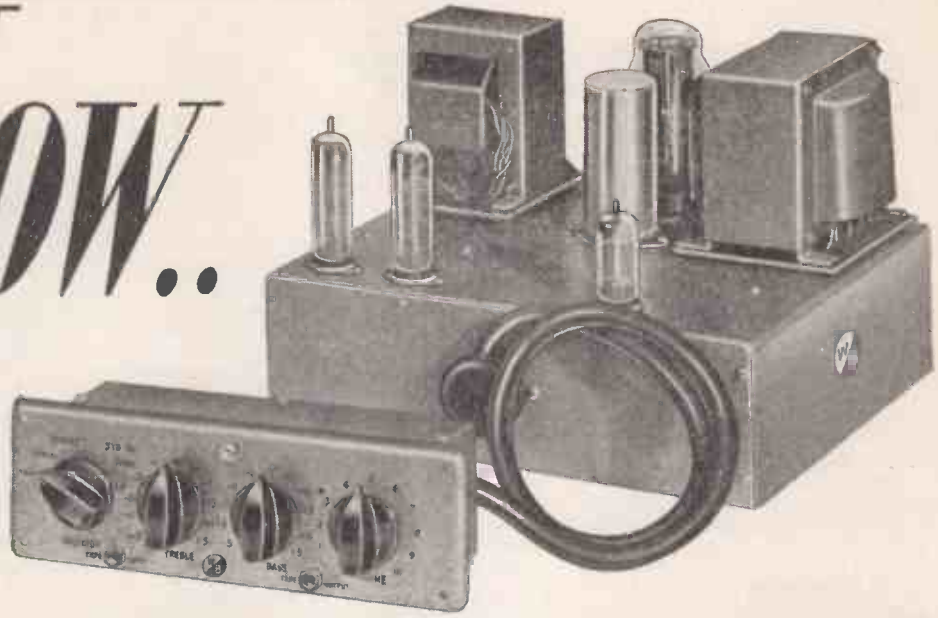
Model MV50 is a 17in. version housed in a walnut cabinet similar in design to that of the MV30, with the same circuit features. Price 78 gns. tax paid.

(Continued page on 291)



K-B Model MV30 14in. table TV set

Now..



the WB12 HIGH FIDELITY AMPLIFIER

Another Whiteley Winner!

already acclaimed by Percy Wilson, F. J. Camm, John Gilbert and many other leading authorities.

Thirty years' manufacturing experience of sound reproduction equipment is embodied in the development of this amplifier — the technical details will satisfy the most critical user. Employing the most recently developed valves, it has a low noise input circuit, feeding the double triode phase splitter, and a push-pull output stage, ultra-linear connected, using a specially designed Whiteley Output Transformer. 25 db negative feed back is applied over the main amplifier. Switched pick-up matching is incorporated in an extremely flexible, compact and easily mounted pre-amplifier tone control unit. Both units are attractively styled and finished in hammered gold.

This equipment, when used in conjunction with Stentorian Speakers, provides most outstanding reproduction.

★ Extensively advertised in Gramophone, Gramophone Record Review, Wireless World, Electronic Engineering and Practical Wireless

SPECIFICATION

MAIN AMPLIFIER

Power Output	12 watts
Distortion	400 c/s 0.2% 1,000 c/s 0.12%
Frequency Response	+.15 db 20-20,000 c/s
Negative Feedback	25 db
Hum and Noise	—80 db relative to 10W
Output Tappings	3-4 ohms and 15 ohms

VALVES

GZ.32 2 X EL.84 2 X ECC.83
Power Supply for feeder available 6.3V, 1.5A, 50 mA at 300V

CONTROL UNIT

Input Sensitivity for 10W 50mV
Hum and Noise relative to 10W —72 db
Bass Control Continuously variable from +11 db to —11 db at 30c/s
Treble Control Continuously variable from +10 db to —10 db at 10Kc/s
Switched Input for Radio Feeder, Pickup and Tape

Price £25 complete

WHITELEY ELECTRICAL RADIO CO. LTD · MANSFIELD · NOTTS

BRAND NEW *Continued*

SIMON PORTABLE TAPE RECORDER

Simon Sound Service, Ltd., Recorder House, 48–50 George Street, London, W.1

THIS new tape recorder, Model SP/2, is designed to give high quality performance plus a wide range of facilities. Recording is twin track at two speeds (7½ and 3¾in./sec.). Frequency response at 7½in./sec. is 50–12,000 c/s, and at 3¾in./sec. 50–7,000 c/s. Output power is 10 watts.

The recorder is designed for operation on a.c. mains 110–120 and 200–250 volts, 50 c/s. Power consumption is 100 watts.

Simon SP/2 portable tape recorder.

A 10in. high-flux p.m. loudspeaker is incorporated. Input facilities are: microphone—1 megohm unbalanced, sensitivity 1.5mV; radio—½ megohm unbalanced, sensitivity 0.15V.

Three induction motors are used for drive, fed from the primary of the power transformer in the amplifier unit, making the motor supply voltage independent of mains voltage. Tape movement is controlled by a single "Monomaster" control. An autostop device automatically switches off the spool motors at end of run. Speed change is effected by a simple two-position key when tape is moving or stationary.

A combined record-replay amplifier is employed, offering an additional facility in its use as an independent, high-quality p.a. amplifier. The speaker provides also for the monitoring of the incoming signal when recording and incorporates its own gain control.

Separate bass and treble controls, operative on playback and p.a. only, are provided; 16db of negative feedback is applied across the last three stages and the output transformer. Bias and erase voltages are derived from a self-excited electron-coupled oscillator, the frequency being 55 kc/s. A separate preset control enables the bias voltage to be set to an optimum value.

The modulation indicator has high and low sensitivity shadows so that low and peak modulation levels can easily be followed. The signal fed to the indicator is rectified so that a clean-cut shadow is obtained. This indicator is switched on, as a safeguard, only during recording.

A wide range of microphones can be supplied, including crystal, dynamic and ribbon types. Remote control and telephone attachments are available, the latter providing a simple means of recording a two-way telephone conversation.

Price of Model SP/2 is 85 gns.

NEW INCREMENTAL INDUCTANCE BRIDGE

Salford Electrical Instruments, Ltd., Peel Works, Salford, 3.

THE company have introduced a new incremental inductance bridge for the measurement of incremental inductance and equivalent series resistance. It incorporates features such as continuous frequency coverage and an unusually wide inductance and resistance range, and will be of particular interest to the manufacturers of telecommunications and similar components since it can be used for testing such equipment as output transformers and filter chokes.

The new unit is a reversed Owen bridge which has provision for passing direct current through the inductor under test. It enables the incremental inductance and the associated dynamic series resistance of an inductor to be determined under known conditions of a.c. and d.c. excitation.

The instrument incorporates a 45–1,500 c/s variable oscillator, but can be used from 20 c/s to 5 kc/s with an external source of 7,000 ohms output impedance. It covers an inductance range from 0.1 mH to 1,000 H in six switched ranges, the accuracy of direct measurement being about 1 per cent.

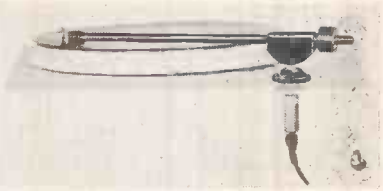
The new Masteradio 13-channel tuner unit recently introduced for use with their TE and TD series of television models. Details were given in the June issue on page 205.

The resistance range covered by the bridge extends from 10 milliohms to 1 megohm, and the inductance and series resistance can be read directly off the instrument, independent of frequency and with a common range multiplier. Very high and very low Q inductors can be measured, and, since the inductance dial is calibrated from zero, the bridge can be used for measuring the a.c. resistance of non-linear devices, such as lamps, thermistors and rectifiers with d.c. bias. The instrument can, in addition, be used for resonance measurements of frequency and dynamic resistance.

IMPROVED LEAK DYNAMIC PICKUP

H. J. Leak and Co. Ltd., Brunel Road, London, W.3.

AN improved model of the Leak dynamic pick-up was exhibited at the B.S.R.A. exhibition in London recently. This pick-up has a diamond stylus, and is of the dynamic moving coil type with an impedance of 6 ohms at 1,000 c/s. Frequency response is 40 c/s to 20,000 c/s. The height of the pick-up is adjustable, enabling it to be used with any make of turntable.



The improved Leak dynamic pickup.

Prices are: *Pick-up arm* £3 14s. 3d.; *Long arm for 16in. records* £4 7s. 9d.; *Head for long-playing records with diamond stylus* £7 15s. 3d.; *Head for 78 r.p.m. records with diamond stylus* £7 15s. 3d.; *Mumetal-cased transformer* £1 15s. (Prices include purchase tax where applicable).

NEW G.E.C. H.F. TRANSISTOR

The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2

A NEW high-frequency germanium point contact transistor known as type EW51 has been developed by G.E.C. Ltd. Its main value is in pulse circuits (*e.g.* amplifying, forming and shaping of pulses) and it is therefore of considerable importance in the field of digital computers. Used as a pulse amplifier its speed of response is such that, if the rise time of the input waveform is 0.05 microsecond, the rise time of the output waveform is less than 0.15 microsecond (usually less than 0.10 microsecond).

If the input waveform does not cause the transistor to "bottom" (a condition of high collector current, low collector voltage, in which further increase in the amplitude of the input signal does not increase the amplitude

(*Continued on page 292*)

Continued

of the output signal) the fall time of the output waveform will be approximately equal to the rise time. If bottoming occurs the fall time will be increased because of the " hole storage " effect; the actual increase will depend on the degree of bottoming and the duration of the pulse.

In a typical case the current gain factor (alpha) falls to 0.7 of its low frequency value at a frequency of 4 Mc/s. This means that it can be used in high frequency amplifier circuits when a low noise factor is not the main requirement (a typical noise factor value, measured at a frequency of 1 Mc/s, is 20db). The low values of the inter-electrode capacitances (1–2pF) is also an important feature.

To obtain this performance the spacing between the metal whiskers at their points of contact on the germanium surface is extremely small (approximately 0.001in.). This has been achieved by paying particular attention to the mechanical construction of the transistor; as a result it can withstand considerable mechanical shock and vibration and can also be stored at temperatures of up to 70 degrees C without change in characteristics.

The transistor is hermetically sealed in a metal container, measuring $\frac{3}{16}$in. in diameter and $\frac{1}{2}$in. in length. It has successfully withstood a test in which it was cycled daily for 84 days to an elevated temperature in a very humid atmosphere.

It has a number of interesting electrical features. Thus it " bottoms " at a collector voltage of the order of 1 volt; this is advantageous in circuits operated from a low d.c. supply voltage. The " off " collector current (*i.e.*, the current that flows at a given collector voltage when the emitter current is zero), although slightly higher than in some types of point contact transistors, is almost independent of temperature over the allowed range of operating ambient temperature. Increasing the ambient temperature from 20 degrees C to 50 degrees C causes the " off " collector current to increase by only about 10 per cent.

COPYING MAGNETIC SOUND TRACKS

E. K. Cole, Ltd., Southend-on-Sea, Essex.

BY arrangement with Rudman Darlington (Electronics) Ltd., the British Victor Division of E. K. Cole Ltd. is now able to supply the " Reflectograph " tape recorder fully matched for use as an accessory to Victor/Ekco-" Sound " magnetic projectors.

The " Reflectograph " is specially suitable for use with magnetic sound tracks on 16 mm. film because of its variable speed control, and now that it has been matched with the Ekco-' Sound ' equipment it is possible to transfer commentaries from the film to the tape recorder and back again in synchronisation to another copy of the same film.

When a number of copies of the same magnetic sound film are required the sound track would normally be stored on tape and transferred to film when needed.

When dubbing an original commentary the " Reflectograph," with its " neutral " running position, is invaluable for adding sound effects because the drive can be switched in at full speed, thereby avoiding the initial " wow." Split-second timing, can, therefore, be easily achieved.

The " Reflectograph," which retails at £87, is a high quality instrument and can be demonstrated, in conjunction with the Victor/Ekco-" Sound " equipment, on request to E. K. Cole Ltd., British Victor Division, 5 Vigo Street, London, W.1. (Tel.: Regent 7030).

IMPROVED MULLARD PRECISION OSCILLATOR

Mullard, Ltd., Century House, Shaftesbury Avenue, London, W.C.1.

A NEW version of the Mullard precision oscillator, a high stability variable frequency oscillator, is now available. Improvements have been made in mechanical stability, and resetting accuracy. A fine tuning scale has been incorporated, and also a new temperature control system.

The oscillator, which covers the frequency range 2–5 Mc/s in two bands, has a frequency stability over 24-hour periods of 30 parts in a million (0.003 per cent). Its principal application is as a drive for shortwave transmitters requiring accurate frequency control to meet " Atlantic City " standards without resort to crystals. It is a compact equipment, and three oscillators can be accommodated on a standard 19in. panel.

A Compact Console

with an impressive performance

This is the 327RG—a new addition to the Ferguson value-for-money range of radiograms. And what a fine Ferguson it is! A handsome, compact, 3-wave 3-speed console with an impressive performance on radio and records. The price?

FERGUSON MODEL **327RG**

49GNS TAX PAID

for operation on A.C. mains only

5-valve 3-waveband superhet. 3-speed auto-changer with turnover crystal head for standard or L.P. records. External speaker sockets with muting switch for internal 8" P.M. moving coil speaker. Handsome console cabinet of figured walnut veneers lined with a contrasting light wood.

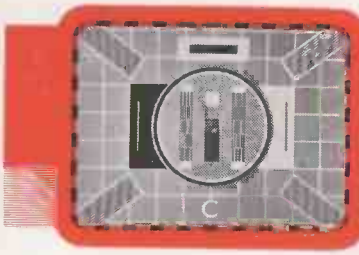
...fine sets these **FERGUSON'S**

Visit us at STAND No. 14 NATIONAL RADIO SHOW Aug. 23-Sept. 3

Thorn

THORN ELECTRICAL INDUSTRIES LTD., 233 SHAFTESBURY AVENUE, LONDON, WC2

Issued with British Radio and Television, August, 1955



James Huxley's

SERVICE DEPARTMENT

No. 8

THIS TECHNICAL SECTION IS INDEPENDENTLY STAPLED SO THAT IT CAN BE REMOVED AS A COMPLETE UNIT FOR EASY FILING

. . . as good as an extra Service Engineer ?

Well, not quite! But the Mullard High Speed Valve Tester saves so much time that each Service Engineer is twice the man he was. Check these features for yourself:—

- ★ Tests any normal receiving valve.
- ★ Test card automatically sets the instrument.
- ★ Valves tested to factory service limits.
- ★ Can be operated by unskilled staff.
- ★ C.R.T. indicator.
- ★ Always ready for immediate use.

Already over 2,000 dealers up and down the country have installed Mullard High Speed Valve Testers to increase their efficiency and to give better service to the public. *Write for full details to-day.*

Mullard

HIGH SPEED VALVE TESTER

MULLARD LTD., CENTURY HOUSE, SHAFTESBURY AVENUE, LONDON, W.C.2

TECHNICAL GEN for SERVICING MEN

Edited by James Huxley

HELP YOURSELF

to all the technical gen in this feature, which is your feature, presenting details of faults encountered by engineers in current radio and television sets, and explaining how those faults were diagnosed and overcome. The aim of this feature is to guide

AND HELP

all in the radio and TV trade.

If you have come across any unusual fault in a set recently, write and tell James Huxley, "British Radio and Television," 92 Fleet Street, London, E.C.4. All published contributions are paid for, and your contribution may help

OTHER ENGINEERS

Philips 1726U

Unusual Tube Fault On one of the above models, peak whites were modulating the frame causing a bunching of scanning lines in white portions of the picture. This bunching was mobile and followed any white objects up and down the screen. The fault condition was not apparent with the contrast and brightness controls adjusted slightly below normal settings, but as soon as either of these controls were advanced the fault appeared and was very severe at any setting above the critical point.

After a good deal of testing and changing components it seemed that the fault could only be due to a faulty tube. Consequently, the c.r.t. was changed and the trouble was cured. No leakage could be measured between electrodes on the old tube. In over three years of servicing I have never encountered any fault which looked as technically impossible as this one.—A.A., Leeds, 13.

McMichael 151AC

Fuse Bulb Trouble The symptoms were that the fuse bulb would occasionally blow. On test the bulb would first light up brightly, then dim down and the set would work normally. As the bulb would only blow immediately after switching on, the electrolytics were suspected and changed but the fault persisted. Tapping the valves in turn led to the discovery of an intermittent flash-over in the 5V4G rectifier valve but replacement did not cure the bulb trouble.

Since the cause of the trouble was excessive current, the cathode bias of each valve was checked and the fault finally traced to one of the N78's which intermittently developed a s·c and the excessive current drain must have affected the rectifier valve and damaged it.—J. H., Ballymoney, Co. Antrim.

Ferranti 14T4

Excessive Gain During the past fortnight, three of the above Ferranti receivers have been seen with the same symptoms, but all had different faults. In each case the trouble was excessive gain, causing the video amplifier valve to glow up brightly, contrast and sensitivity controls making little or no difference.

The first set was quite straightforward and the trouble was a 0.1μF capacitor (C82) across the contrast potentiometer going open-circuit. The second was cured by slight adjustment of the oscillator coil (L109) on Band I preset turret. The third was a little more difficult to trace as the trouble was intermittent. It was found to be an electrode leakage in the PCF80 valve (V2 on Band III turret unit) again upsetting the oscillator.—W.M., South Ruislip.

Write to James Huxley

on Service Department matters, and pass on all the hints and tips and dodges that you have found useful in dealing with day-to-day service problems. Articles on all subjects of technical service interest are welcomed. All published contributions are paid for.

Vidor CN396

Faulty Volume Control The fault on this set was very low volume on mains and batteries. Valves were changed with no improvement and voltages all seemed o.k. The a.f. stages seemed lively enough, so the detector stage came under suspicion. On checking resistor values the diode load (a 1MΩ volume control) was found to have a value of approximately 15kΩ. Replacement restored volume to normal. —B.A., Oxford.

Baird P167

Weak Line Drive A fault with rather baffing symptoms has several times been encountered on this model. Picture is weak and out of focus, but sound is satisfactory. Investigation shows that e.h.t. is low—both d.c. on the c.r.t. final anode and a.c. on the anode of the e.h.t. rectifier being abnormal. The fault appears to be

(Continued on page 301)

The Editor does not necessarily endorse the views expressed by contributors to this feature

TECHNICAL GEN

Continued

insufficient drive from the line oscillator or a low emission output valve, but the unusual thing is that the e.h.t. rectifier heater is lighting quite normally and is not dull as would be expected. Furthermore, it is possible to draw off a larger arc from the anode of the line output valve than from the e.h.t. terminal.

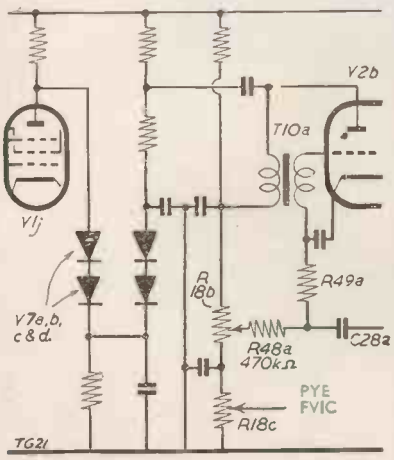
The trouble is usually traced to the lead from the e.h.t. overwind of the line output transformer to the rectifier anode terminal. This has a habit of parting inside the systoflex sleeving and a low-value e.h.t. is maintained by corona discharge between the broken ends. Repairing the lead brings everyr thing back to normal but this is rathea tricky job as the wire is part of the winding.—V.D.C., Bristol, 5.

Pye FVIC

Frame Sync Inter. This set came in for frame-hold trouble having been to two other dealers without the fault being located. The frame would lock but periodically slip would occur requiring the readjustment of the frame-hold. All components were checked without any apparent fault although R48A, 0.47 MΩ connected to frame-hold control was replaced. M1 rectifiers were replaced by M3's as recommended by the manufacturer, but without success.

Meters were then reconnected at V2B stage to check the voltages at the anode, screen and cathode as well as the h.t. rail. When the fault occurred it was noticed that the voltages flickered and were more pronounced at the anode. I suspected the blocking oscillator transformer T10A.

Removing the outer covering to expose the top layer of the h.t. winding I found this had gone "green." After cleaning the wire and rewinding the top layer no further trouble was experienced. The transformer was later replaced.



When transformers fail I always try and dismantle them to find out why they had failed and there are too many failing to-day because of contamination during winding causing corrosion later. —C.S.T., London, N.22.

Marconiphone T37DA

Drive Cord Slip I have been experiencing drive cord slip on several Marconiphone T37DA models. Examination revealed that the cord was crossing and locking on the tuning spindle and this happened when the pointer was in a certain position. There is only one drive pulley on the dial back plate and the one that should be directly beneath the tuning spindle has been omitted. To me this seems bad mechanical practice.

If an extra pulley is fitted (there is a hole already drilled in the back plate) together with a slightly longer cord, no further slipping will be experienced. —R.C., Derby.

Bush TV24A

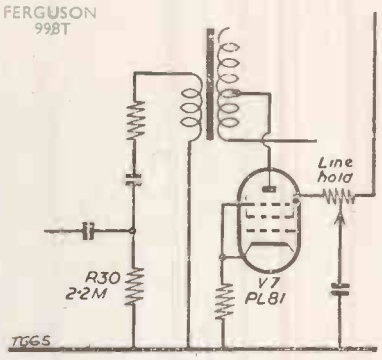
Loud-speaker Fault This fault was distortion on certain notes only, and the symptoms were those for grit or dust in the gap. When the speaker was removed for examination, however, it was found that the cone could be moved quite freely without any sign of rubbing or fouling, but on a signal the symptoms became apparent.

It was found on further examination (with speaker removed and signal applied) that the trouble was on the pigtail connection between the speaker chassis and the anchoring point halfway up the cone flare. This connection is in the form of a fabric core with a copper braid woven round the fabric. The copper braid had fractured at the point where the solder ended but it was still held in its position by the fabric core; thus as the cone vibrated the pigtail connection was broken if the vibrations were fairly heavy, giving the symptoms of a fouled gap.—C.A., Rillington.

Ferguson 998T

Common Line Fault A number of these models have been dealt with recently, each having the same fault: Very poor line-hold when brightness control was advanced to the correct level, and a bright vertical bar appears down the centre of the screen.

The fault is due to R30, a 2.2MΩ resistor in the sync input circuit to the line oscillator valve V7. It goes high—



to about 4MΩ. In replacing this component it is advisable to use a resistor of solid carbon 1 watt type.—M.A.H., Exeter.

Ekco T217

Sound Instability The receiver was undergoing a bench test after repair and as the contrast control was advanced the sound immediately became unstable—a fault not previously evident. The repair was carefully checked, but everything was in order. The sound circuits were investigated, decoupling checked, but no cause for the trouble could be found.

It was then noticed that by moving the sound i.f. grid decoupling capacitor (C19) stability was restored and it was found subsequently that the physical position of the component is important. While the original repair was being carried out it must have been displaced. V.D.C., Bristol, 5.

Grundig 500 and 700L

Drive Belt Trouble Varying symptoms such as tape not winding on to the right-hand spool, variations in speed of recording and tape spilling, etc., are very often caused by the main drive belt becoming slack or losing its pliability. It is very easily removed and as it is of thermoplastic material, warming it gently before a fire will quickly restore the belt to its former condition.—K.G.T., Southport.

H.M.V. 1825A

Erratic Frame Hold Symptoms were intermittent frame slip and the frame required frequent correction over a viewing period of a few hours, the hold control locking position becoming very critical. Adjustment of the height control caused the frame to slip.

The valves were satisfactory and the frame oscillator could be adjusted to either side of the frame frequency. It was suspected that the frame sync

(*Continued on page 303*)

pulses were of insufficient amplitude or distorted at the anode of the blocking oscillator V15. Valve voltages were checked and proved o.k. as was the metal rectifier W3. It was then decided to check the constants of the pulse shaping and integrating circuit and on removing C49 (330pF) and submitting it to a megger test it showed a variable reading of 10–800kΩ. Replacement gave normal operation.—J.W., Perth.

Philco 1717

Tube Too Bright

The fault was too much brilliance and even with the control set at minimum and the tube grid earthed there was still a little too much screen illumination. The picture itself, however, was very good. On carrying out normal tests it was found that the c.r.t. cathode voltage was below normal. Furthermore, the video load resistor (R25, 6.8kΩ) was seen to be open-circuit.

It seemed strange that the picture itself was so good. The noise limiter diode and associated circuit must have formed a load for the video amplifier but although this is not uncommon with the video load o/c, the picture quality usually suffers badly.—A.A., Leeds, 13.

Ekco T161/162

Resistor Overheating

A common fault on these models is slight jumping of the frame time-base and it will usually be found that the frame hold control will be at its maximum travel to effect a lock. The fault is usually due to R59 (2.7MΩ) changing value—it has been known to rise to 4.5MΩ—and replacement will cure the trouble. It has been found, however, that if the replacement is a half-watt type as originally fitted, the trouble is likely to reappear. Recent replacements with 1 watt resistors have proved satisfactory—J.K.G., Exeter.

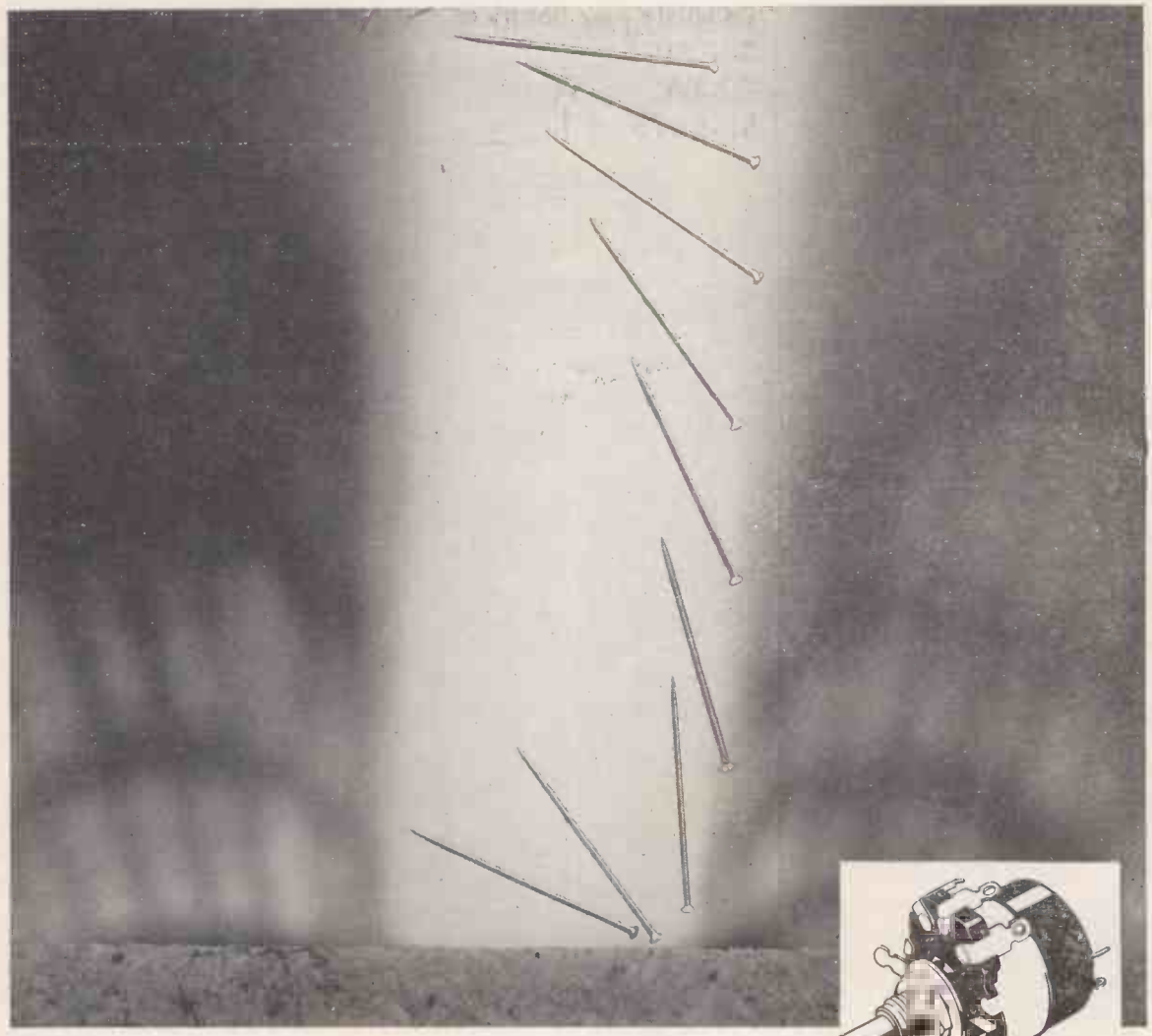
G.E.C. BT1746

Puzzling Barretter Fault

On a visit to service one of the above models, the fault was no sound or vision and the immediate suspects were o/c switch and o/c barretter. Both items were tested for continuity but were found normal. All the valves and the c.r.t. showed that they were also o.k.

Then taking a firm grip of the mains plug we commenced tracing from the

(Continued on page 305)



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lead itself and found continuity up to one side of the barretter but on the other side—open-circuit! The barretter was unscrewed and tested for continuity again, but it showed normal again.

It was the boy apprentice who realised that when the barretter was held upside down it read normal, but when screwed into position the right way up the break occurred!—C.G.B., Tonypandy.

Murphy V204

Stop and Start

A very elusive fault that was recently encountered on one of the above models took the form of the intermittent collapse of the line scan and e.h.t. for a second or so, after which the receiver would work perfectly for a week or two. This trouble was particularly annoying in that it could not be traced in the normal way but had to be found by substitution.

The culprit eventually turned out to be the line drive trimmer (C46, 150-750pF) which is mounted above chassis alongside the 6L1 line oscillator valve. The trimmer was intermittently developing a short circuit and then healing itself.—R.V.A., Birkenhead.

Pye V4 Series

Poor Line Hold

Quite a few of these receivers have come in suffering from poor line-hold. Sometimes the line will lock satisfactorily but later drift out of lock. On other receivers the verticals present a generally ragged appearance. Owing to the complex a.p.c. system used, trouble shooting in the line circuits can be something of a headache!

Checking with an oscilloscope, however, it has been found that the amplitude of the line sync pulses is barely sufficient to lock the time-base. A remedy which has proved satisfactory in many such cases has been to increase the value of the sync feed capacitor (C93 on service manual) from 100 to 250pF. Sets modified in this way have been in service for some months with no recurrence of the trouble.—V.D.C., Bristol. 5.

Ferguson Halolight Console

Faulty Grid Resistor

Once every three seconds a "plop" was heard in the speaker and the height and width of the picture would decrease about quarter-inch all round.

The h.t. fell about 15 volts. The component at fault was the 660kΩ grid return resistor (R67) of one of the pentode sections of the ECL80 push-pull output valves.—J.G.D., Glasgow, C.4.

R.G.D. 6017T

Fuse That Refused

The customer complained that his set had gone completely dead, but being extremely busy at the time I sent two apprentices to the job, armed with an array of test gear and spares. They returned to report that despite carrying out every possible test, there was no indication at all why there should be lack of h.t., e.h.t., heater volts, etc. Therefore I made a personal call and soon found the trouble—it was the 500mA fuse.

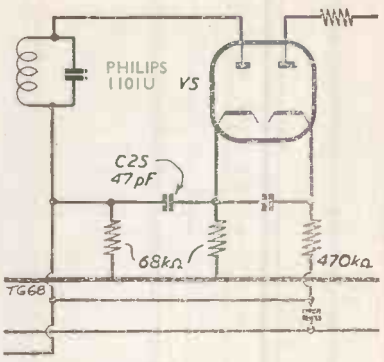
WHEN SENDING IN REPORTS TO JAMES HUXLEY FOR TECHNICAL GEN . . . please write (or type) on one side of the paper only, leaving space between the lines for editorial use and add a rough sketch where possible.

What had caused the puzzle to the apprentices was that although the glass fuse tested o.k. when removed, it open-circuited when replaced in the holder.—A.A., Bo'ness.

Philips 1101U

Weak Sound Signal

On this model the trouble was weak sound. Substitution of all the sound channel valves was carried out without any improvement and voltage tests showed no obvious discrepancies. After this, attention was directed to the sound detector stage and in checking over the components it was found that the 47pF filter capacitor C25 had developed a leak of around 30kΩ—R.R., Mansfield, Notts.



CLEANING VOLUME CONTROLS

Concerning the trouble with a volume control after the application of switch cleaner experienced by "E.A.T." (April "B.R.T.") on a Pye V4 receiver, the makers of these volume controls state that under no circumstances should switch cleaner be used for such purposes as it is likely to dissolve the carbon track.

If it should become necessary to clean the tracks in these controls, ordinary commercial parafin is the best cleaning agent to use as it washes the track and leaves behind sufficient oil to lubricate the track without damaging its surface. I have used this method on numerous sets and always found it completely satisfactory over long periods.—W.J.C., Warwick.

Etronic ECV157

Critical Replacement

Owner complained of poor frame-hold and picture cramped at lower portion. Valves V9,V13 and V14 were found to be satisfactory and T5 appeared to be o.k. All valve readings in the frame time-base were as specified in the service manual.

It was then discovered that on touching the 0.02μF capacitor C9, the frame collapsed to a thin horizontal line. Replacement restored a full frame scan but the frame-hold was still erratic. Another 0.02μF capacitor was tried but no improvement resulted, but on trying a third replacement the frame-hold became perfect.

As a matter of interest three further capacitors were tried but out of the total six substitutes only one would provide satisfactory frame-hold. All these capacitors were tested on the bridge and showed normal.—R.R., Sheffield.

Ultra V815

Frame Non-linearity

After a few weeks it was found that several of these sets developed cramping at the bottom of the picture. Assuming that the valves are satisfactory, then either or both of the two 0.5μF 350V paper tubular capacitors clamped near the 6K25 holder are leaky and usually the cause of the trouble. One is a charge-discharge capacitor for the frame oscillator and the other feeds the frame amplifier. In this circuit both must be of high efficiency and certain types do not seem to function satisfactorily. In one isolated case, cramping at the top has been due to the 100Ω —watt anode stopper of the 6K25 going up to 20kΩ.—F.A.S. Northants.

in the field

practical hints on efficient outside service

by H. W. HELLYER
A.I.P.R.E.

A CERTAIN sales manager, who should have known better, once said:

" Outside engineer . . . that's not a job, it's a joke! "

He may have been prejudiced, but I feel sure that most employers will agree that in a well-run business the man in the field shares honours with the boffin at the bench. A good outside engineer can be the making of a small establishment and the mainstay of a large one.

The growing complication of television receivers has increased his responsibility, and future developments appear likely to make his position even more responsible.

What should his duties be and how should he best set about them?

Reading Symptoms

His most important attribute is the ability to diagnose a fault. Many precious hours can be saved by an intelligent reading of symptoms. A few minutes spent manipulating the controls of a television receiver and inspecting the screen can tell the capable service man a good deal.

If the repair can be done on the spot with a minimum of fuss and bother, so much the better, but the extent of the repairs an outside service man will carry out depends largely upon the policy dictated by his employer.

Some employers assert that anything more serious than adjustment or a simple valve change should not be attempted on site. The customer, they say, does not like to have his set dissected on the kitchen table!

In my experience, however, the opposite holds true. The average customer is fascinated by the complicated " innards " of his receiver and can often be persuaded to " hold the light," especially when he — or, more often, she — knows that removal of the set to workshops may mean missing Wilfred Pickles!

Whether or not to pick up the set for bench repair must rest with the outside engineer.

Many things will influence his decision: the number of other calls on his book, available " signal " time, the customer's attitude, and the possibility of success. Experiments that fail are bad for business and prestige.

Tools and Spares

The scope of his work will determine an outside engineer's equipment. A comprehensive range of valves should be carried, with duplicates of the more frequent offenders. Nothing is more annoying than having to leave a job undone for the lack of a common valve replacement. Quite a large range can be packed in a small space and stowed neatly in the van.

Tools, small components, a soldering iron and a reliable meter are other requirements. These can be carried in a suitable tool-box, divided into compartments, remembering that the meter should be padded against mechanical shock. Small tools can be carried in some form of case or canvas roll to assist in packing and quick selection.

A special compartment can be fitted out to take the soldering iron. Any of the small quick-heating types may be used and the addition of a small, tubular, metal container for heat dissipation will enable it to be packed away as soon as the job has been completed.

A little care and thought in the construction of a tool-box will pay enormous dividends. It impresses the customer much more favourably to see tools and equipment neatly packed and easily selected rather than a harassed engineer rummaging in a bottomless box!

Public Relations

This brings us to " public relations." An outside engineer is the firm's representative. Courtesy costs nothing but reaps a rich reward. During the greater part of his working day the " man in the field " will be dealing with women and his tact and personal touch can be very important.

He must remember, too, that the customer's TV or radio set is " the most important one in the world." Disparaging remarks and careless handling can only lead to trouble! A little extra attention with that highly-polished cabinet — even a little fussiness — will make a good impression.

He will learn to avoid making promises it may not be possible to keep. That suspected " minor fault " often turns out to be a troublesome "special" component which may have to be sent for. Intermittent faults, however trivial, often require protracted " soak-testing." This should be explained to the customer, who will usually understand.

Television Installations

Installation of TV receivers is one part of an outside engineer's job too often treated with contempt. It is not sufficient to plant the set, in a customer's house, switch on, get a picture and go! A little extra trouble at the outset can save service calls later. The picture should be adjusted carefully, the controls demonstrated and the customer instructed in their use.

" Ghosting " is a severe problem in some areas, but can often be minimised by experiment. The service man who instals a receiver and does nothing to improve a " ghosty " or " grainy " picture is not being honest. Even if the customer does not complain of poor picture quality when the set is first installed, someone will be sure to point it out to him after the novelty has worn off.

No outside engineer who is worth his salt will consider installation beneath him. He is, after all, the one who must face the dissatisfied customer when service calls come in!

A separate record should be kept by the outside service engineer of his calls and the customer's complaints. It is a small thing that is often overlooked, and is worth the extra trouble involved. It boosts a customer's morale when the engineer remembers details of a previous visit. Such a system, too, can be useful for pin-pointing prevalent faults and provides a handy cross-reference with workshop records.

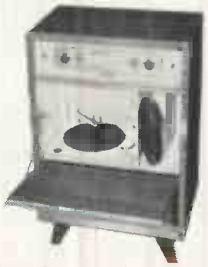
Another point is worthy of note: the outside engineer spends much of his time running about in a van which bears the firm's name. How he behaves as a driver reflects directly upon the business.

Summing Up

To sum up: his qualifications need not be those of a first-class engineer, but he should be more than a willing tyro with a wet finger! Diagnosis is his principal attribute. He must be tactful, courteous and capable of carrying out on-the-spot repairs without fuss.

It is certainly no job for a joker!

valnut veneered "bureau" type console cabinet.



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Servicing Audio Equipment

PART THREE — TAPE RECORDERS

With the sales of tape recorders booming, this article, the third of the series on *Servicing Audio Equipment*, will be of special importance. The author discusses the basic principles of tape recorders and offers practical advice on servicing problems and maintenance which will pave the way for efficient and speedy repair work in what can be a very fruitful field.

By R. E. B. Hickman

IN practically every issue of this journal there is an announcement of some further development in magnetic tape recording; it may be a new type of tape, or a new model of recorder, or perhaps a new system of recording such as that used for the H.M.V. stereosonic tape records. As a result of this continuous increase in the popularity and the spread of tape recording it is essential that service engineers should be alive to the new problems they are likely to encounter in this very fruitful field.

Let us first of all then consider very briefly the basic elements of a magnetic tape recorder.

Magnetic Recording Method

It is not difficult to understand the broad principles of the theory of magnetic recording, although a detailed treatment of the subject may not be necessary for the service engineer.

The audio signal to be recorded, which for the purpose of illustration we will assume to be a human voice, is converted into an electrical voltage by a microphone. This voltage is amplified and applied to the coils of the recording head. A magnetic tape, which consists of a paper or plastic base material coated or impregnated with a mixture of iron oxides, is then passed at a uniform speed over the pole pieces of the recording head. The varying current passing through the head coils produces a variable magnetic field at the recording gap and this in turn impresses a varying magnetic pattern on the tape. An essential part of the recording process is the use of a high frequency bias. Without this feature it is impossible to achieve a wide frequency response, a low distortion factor or a satisfactory signal-to-noise ratio. (See Fig. 1.)

To reproduce or play-back a magnetised tape it is passed over the reproduce head at the same speed at which it was recorded. The varying magnetisation of the tape induces a proportionally variable flux in the core of the head. The corresponding voltage changes in the coil of the head are then amplified and passed to a loudspeaker. With correct design of the complete equipment the output signal will be a most faithful reproduction of the original sound.

In order to ensure that the tape as it approaches the recording head is in a magnetically neutral state, it is normal practice to pass the tape over an erasing head which effectively removes any previously recorded signal.

Basically then, a magnetic tape recorder consists of the following elements: (a) a recording head; (b) a recording amplifier; (c) a reproducing head; (d) a reproducing amplifier; (e) an erasing head; (f) a high frequency oscillator for supplying bias voltage and erasing voltage; and (g) a transport system for the tape.

It will be obvious that there are many variations of the way in which a tape recorder can be assembled, and the service engineer will soon become familiar with combined record/reproduce amplifiers, combined record/reproduce heads, combined record/erase heads, one, two or three motor transport systems, etc.

Servicing Problems

It is convenient to regard a tape recorder as being divided into two main sections: (*a*) the electronic section, consisting of the recording and reproducing amplifier or amplifiers, the oscillator circuit, and the switching facilities and (b) the electro-mechanical section, consisting of the recording, playback and erasing heads, and the tape transport system, etc. The section (b) is often referred to as the tape deck and is often sold separately for assembly by the owner into a complete unit.

The Tape Deck

The essential design feature of all tape decks is to ensure that the passage of the tape over the magnetic heads takes place at an absolutely constant speed free from all audible traces of wow or flutter. To achieve this demands a high degree of precision in manufacture and careful attention to the design features of such components as the driving capstan, the guide rollers and the braking system.

The popular arrangements at present appear to be the single motor deck, as exemplified by the well known Grundig range of recorders, or the three motor units, as used by Wright & Weaire, Ltd., in the "Ferrograph" recorder and also by the Sound Master tape recorder.

When only one motor is used there will also be various driving belts and probably mechanical or magnetic clutches so arranged as to drive the take-up and the feed spools. Recorders of this type have certain similarities, at least from the servicing point of view, to automatic record changers and should not present any great difficulties to the service engineer.

When faulty mechanical performance occurs it is generally possible to simulate, by manual operation, all the operations normally carried out by the motors, so that the point where correct operation breaks down can be determined.

Whether the tape deck uses one motor or more than one, it should be realised that the essential feature is to turn the capstan roller at a constant speed, whilst at the same time driving the two spools at speeds appropriate to the diameter of the tape being wound at any particular moment.

Wow or Flutter

Inconstancy in the tape transport speed will manifest itself as "wow" or "flutter" and it is these irregular changes of speed which can give rise to objectionable audible distortions in the reproduced sound.

The normal drive motors used are either good quality induction or, preferably, synchronous motors. These motors are generally quite sturdy and able to stand up to a fair degree of rough usage. Excessive vibration or rough handling, however, may damage the bearings or even distort the rotor shaft. Either of these faults would give rise to wow. The maker's instruction book will give instructions on how to remove the motor and will also advise

whether it is possible to remove the rotor shaft for straightening (in any case not a job to be light-heartedly undertaken!)

Another prolific source of wow is the capstan roller. This, or possibly its associated pinch roller, normally has a rubber tyre and if this tyre should become distorted it will transmit an uneven motion to the tape. Distortion of the rubber roller may be due to excessive contact pressure or to leaving the rollers in contact during periods of non-operation of the recorder.

The recommended pressure of the pressure roller against the capstan varies somewhat according to the precise details of design but is generally of the order 2–3 lbs. This can be checked by fixing a small spring balance to a piece of tape and measuring the pull necessary to just move the tape when it is trapped between capstan and pinch roller. Adjustment of the various pressure devices should be made until the maker's recommended pressure is achieved.

To prevent flats forming on the rubber tyre the pressure rollers or pads should always be disengaged when the recorder is not in use. It is important also to ensure that during fast forward spooling or rewinding there is at least 1/16in. clearance between the pressure rollers and the tape.

Wow Frequency as Clue to Source

It is often possible to get valuable clues as to the probable source of the wow from an approximate determination of the wow frequency. For instance in one well known make of recorder the pinch roller rotates at 2 r.p.s., the flywheel rotates at 8 r.p.s., while the motor revolves at 23 r.p.s. Hence any wows of 2, 8 or 23 c.p.s. are almost certainly associated with some distortion of the respective parts mentioned. A study of the manufacturer's literature for information of this nature may save considerable time in tracking down a troublesome wow.

The Grundig TK819—a well known recorder using a single-motor deck.

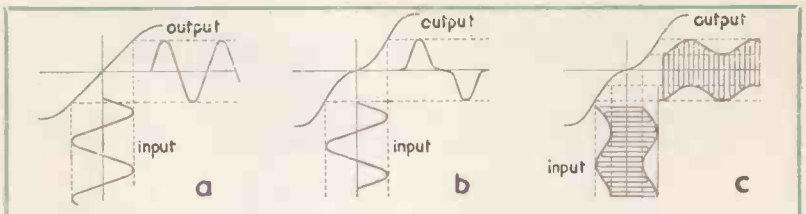


Fig. 1. H.F. BIAS is necessary to prevent the distortion which would be caused by non-linear transfer characteristic—i.e., the magnetism induced in the tape is not a true image of the audio signal causing the magnetic field in the recording head. Diagram "a" shows a typical linear characteristic (e.g., the Ia/Vg curve of a valve) and diagram "b" shows the non-linear characteristic of a typical magnetic recording system, with the resulting distortion of output signal. By mixing the input signal with a high-frequency oscillation, as shown at "c," the waveform of the input signal is artificially broadened so that the audio signal actually operates on the linear portions of the magnetic transfer characteristic. Thus, the magnetism induced in the tape can be made a faithful image of the audio waveform in the recording head. H.f. bias is only required in recording and not on playback.

Cleaning

The capstan surface should always be kept highly polished and considerable care should be taken when cleaning it. A liquid abrasive applied on a soft cloth is normally adequate but if the deposit of foreign material is very bad a fine emery cloth or "blue-back" may be used with discretion. For cleaning the pressure roller and tape-guides fine emery cloth or glass-paper may be used with safety.

To clean the magnetic heads a piece of cotton material soaked in methylated spirits will normally prove adequate. On no account should any harsh abrasives be used on the heads or damage will be caused. Carbon tetrachloride is recommended by some manufacturers, but before using any such chemical it is advisable to consult the appropriate instruction book, since some heads are potted in plastic materials which may dissolve in these liquids.

Incorrect Operating Speeds

In addition to the cyclic speed variations known as wow, tape recorders sometimes develop other troubles in the transport system. It is unusual for the motors to run fast, but various defects may cause slow running. A fairly frequent trouble is excessive drag on the feed spool. This may be due to excessive friction on the driving clutch, especially if it is of the differential type in which the weight of the unused tape governs the speed of feed.

The maker's instructions should be studied to determine the correct value of operating tension. Electromagnetic clutches of the Grundig type require careful adjustment but providing the instructions given in the service manual are followed no trouble should be experienced in setting up.

Lack of lubrication on the clutch mechanism may also contribute to slow running.

In those recorders where the tape has to pass through a series of pressure guides or rollers, jamming or excessive pressure of the guides will also cause slow operation.

Some recorders incorporate relays in their motor circuits and it is possible that faulty operation of the armature or distortion of one or more of the spring blades may result in a lower voltage being applied to the motor so causing incorrect operating speed.

Checking Operating Speed

It is a simple matter to check a recorder for correct tape speed and many service shops keep a special tape for this purpose. At 7½in. per second, for instance, 37ft. 6in. of tape should pass over the heads in one minute; at 3¾in. per second 18ft. 9in. and proportionally for other speeds or times. An old piece of recording tape may be calibrated by measuring off the one minute lengths using splicing tape as the markers. Different speeds may be indicated by different coloured splicing tapes. The test tape should preferably be one of the non-stretching types. When this test tape is played back the replay time for a particular section should not be different from the correct time by more than one second in one minute. It should be noted here that over a full reel speed constancy should be very much better than this—a common figure quoted in recorder specifications for long-term speed constancy is 0.5 per cent, *i.e.*, one second in three minutes 20 seconds.

Fast Rewind or Wind-on

Most recorders achieve high speed operation for fast winding by either applying a higher voltage to the motors than during normal operation, or by parallel field connection of the motors. If high speed operation cannot be obtained it may be due to a faulty switch connection or alternatively one field coil may have gone open-circuit.

Incorrect Take-up

Another fairly common fault which is likely to occur in operation is sloppy take-up of the tape. On first switching on the machine a small loop of tape is often pushed out ahead of the capstan before the take-up spool reaches correct operating speed. This loop should disappear within one second. If it does not, it is an indication of excessive friction in the spool bearing, or of insufficient tension in the driving clutch, or of a rubbing brakeshoe. All of these potential sources of trouble should be inspected and adjusted as necessary.

Magnetic Heads

Let us now turn our consideration to the magnetic heads. It has been seen that three functions have to be performed, namely, recording, reproducing and erasing. Although ideally three separate heads should be used, it is possible to obtain a very satisfactory compromise by the use of combination heads. Present-day practice appears to be either to use three heads or two heads. In the latter case the preferred arrangement seems to be a combined record/reproduce head and a separate erase head.

A most desirable feature of a magnetic head, especially a recording or reproducing head, is that the gap should be correctly aligned with respect to the magnetic tape. It is a well recognised fact that on machines with a combined record/reproduce head considerable misalignment of the gap can be present without the user being aware of it, so long as he continues to record and reproduce only on the one machine. This is because although the gap is out of alignment it is equally so both during recording and playback and hence a measure of self compensation occurs. If, however, the owner of such a unit attempts to play back a tape which has been recorded on a machine with a properly aligned head considerable distortion and loss of high frequency response will be apparent. Hence the importance of head alignment. (Fig. 2).

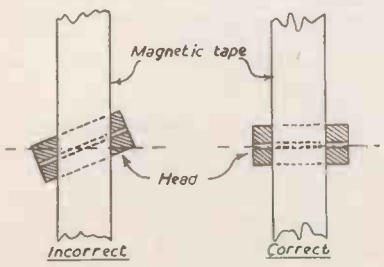
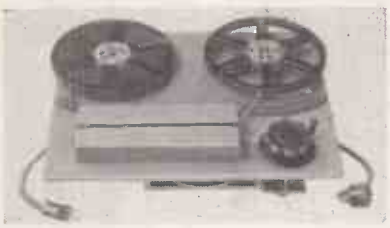


Fig. 2. Incorrect and correct alignment of the recording head.

Head Alignment

The correct positioning of the head assembly or assemblies is very critical, but correct setting is not difficult, if the manufacturer's instructions are followed carefully. The adjustment should be made using a standard test tape which may be obtained from various of the recorder manufacturers, or alternatively, a length of tape may be recorded with a high frequency constant tone, say 6,000c/s to 7,500c/s, on a machine known to have an accurately aligned recording head. This standard tape should then be reproduced on the machine which is being tested. The playback head is then adjusted to give maximum output voltage as recorded on a valve voltmeter, which may be connected to the output socket of the recorder. The alignment of the head consists essentially of adjusting the position and orientation of the gap so that the gap is in close contact with the tape and is also in the correct direction relative to the tape.



A tape mechanism using a three-motor driving system, made by M.S.S.

This involves both horizontal and vertical adjustment of the head. Since this is necessarily a precise and critical operation the maker's instructions should be followed carefully, and for the same reason it is a waste of time to try to make the adjustments by listening to the changes in sound output level.

The adjustment described above is all that is necessary if the machine is of the combined record-reproduce head type. A word of caution here perhaps—make sure that the test tape is recorded on a machine which is known to have an accurately aligned recording head, *i.e*,. a recorder with an impeccable high frequency response. If there is any doubt about the availability of such an instrument, don't waste time—use a manufacturer's test tape.

Separate Head Alignment

Where separate heads are used for recording and reproducing the procedure just described can be applied to the playback head, whilst the recording head may be dealt with as follows. Inject a constant amplitude high frequency signal (which may be 6,000 to 7,500c/s as mentioned previously), in to the recorder set to the " Record " position and record this tone on a clean tape. The recording head should then be aligned, in a similar manner to that already described for the playback head, until maximum output is shown on the recording level indicator. With a constant input of this nature a " magic-eye" indicator can give quite an accurate result, and, of course, a valve-voltmeter type of recording level indicator is even more precise.

A machine aligned in this manner can then be relied upon to reproduce faithfully tapes recorded on any other well aligned instrument.

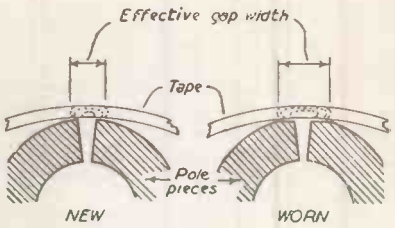


Fig. 3. Showing the increase in effective gap width due to wear on the pole pieces.

Head Wear

Since the active magnetic agent in the tape is a metallic one and since this metallic surface is passed over the heads at speed and under some pressure it will be obvious that there will be not inconsiderable wear on the pole pieces of the recording and reproducing heads. In time this will result in an increase of the effective gap width with a consequent decrease in high frequency response of the system. (Fig. 3). A secondary effect of recording head wear results in a decrease in recording efficiency. This is caused by an erasing action which itself is due to an increase in the effective bias flux. Since erasure is more effective the higher the frequency of the signal, this secondary effect will also tend to decrease high frequency response. To mitigate these effects the recording and reproducing heads should be kept scrupulously clean. As wear takes place the bias current may be progressively reduced. Since not all recorders incorporate a bias control a process of trial and error may be necessary to find the value of bias voltage required to restore the desired HF response.

Erase Heads

Nothing has been said in this discussion about erasing heads. Normally,

however, the action of an erasing head is much less critical than that of either a recording or playback head. It is unusual for an erasing head to require any adjustment. Incomplete erasure is more likely to be due to some fault in the oscillator circuit feeding the head. The erase voltage should be checked periodically to see that it is as specified in the service manual.

In some of the cheaper, and also in some of the smaller battery-operated recorders, permanent magnet erasing heads are used. Such a head may not be completely effective in removing a heavily modulated signal and it may be necessary to run the tape over the head twice to obtain a completely clean tape.

The importance of complete erasure cannot be stressed too highly. The result of partial erasure is a very serious rise in the background noise and involves a sacrifice of one of the priciple advantages of tape recording—namely, the very high signal-to-noise ratio which can be achieved.

A useful accessory for the service man (and indeed for the serious user of tape) is a bulk eraser. This consists of a coil which generates a high density 50 c/s. field and on which a reel of tape can be placed. The reel is slowly rotated and then withdrawn from the field when all recorded signals will have been completely wiped off.

The Amplifier Assembly

Let us now consider the purely electronic section of the magnetic tape recorder, namely, the amplifier assembly. Although a large amount of the circuitry used is standard a.f. practice (and as such is covered by the preceding article in this series) there are important sections and aspects of a magnetic recorder amplifier assembly which find no counterpart in the normal run of amplifiers.

H.F. Oscillator

The most important of these is the so-called "bias oscillator." Although this term is widely used it is not a very accurate one, since not only does the oscillator not provide bias in the normally accepted sense of the word, but in addition it also supplies the voltage required by the erasing head. A preferred term is "H.F. Oscillator."

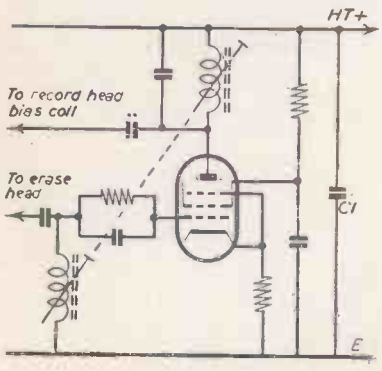


Fig. 4. A typical h.f. oscillator circuit.

For optimum operating efficiency the frequency of the oscillator should not be less than five times, and not more than ten times, the maximum frequency it is desired to record. Various commercially available recorders use frequencies in the range 35–70 kc/s. The power requirement for recording bias is low, but for satisfactory erasing several watts may be used, so that the h.f. oscillator valve may conveniently be a small a.f. output valve. Popular types in this service are 6V6 or 6AQ5. A typical oscillator circuit is shown in the figure 4 (Grundig TK819).

Faults in the h.f. oscillator usually show up as inability to make a good fully modulated recording, or as severe distortion on reproduction, even when played through an instrument of known good performance, or as inability to erase a previous recording, even with repeated passages over the erase head. None the less, the faults which can develop in the oscillator circuit are generally quite simple. A check of the h.f. voltage in the anode or grid circuit of the oscillator valve should be made. If no voltage is recorded it is probable that the oscillator coil has open-circuited, or the valve has failed. The h.f. voltage appearing as bias at the recording heads can be checked and a reference to the maker's literature where this figure is invariably quoted will check whether the correct output is being achieved. If the output is low the cause may be a low emission oscillator valve, low h.t. voltage or incorrect bias (normal audio bias this time!) on the oscillator valve.

It is important that the waveform of the h.f. oscillator should be a pure sine wave as otherwise noise may be introduced into the recorded signal. The waveform of the oscillator can be checked on the c.r. oscilloscope which is generally available in a service shop nowadays. The most common cause of poor waveform is possibly a faulty valve and by simple substitution a valve giving a pure sine wave output can be selected.

Another important feature of the oscillator circuit is a capacitor (C, in Fig. 4) across the h.t. line. The purpose of this is to allow the oscillations to gradually leak away when h.t. is cut off after erasing. A sudden cut off the erasing voltage may leave the head in a magnetised condition with consequent high background noise when next a recording is made.

The Philips *Recordergram*, a compact unit in the "popular" price range.

Hum

Since the signals involved in magnetic tape recording are all very low level, the recording and replay amplifiers incorporated in a magnetic recorder are high gain units and hence special precautions are necessary to avoid undue hum. Most recorders use special low noise valves in their early stages, and may also employ "hum-dinging" potentiometers in the filament supply wiring. The position of the a.c. heater wiring may be quite critical and it should as a general rule be kept close to the chassis and away from other wiring in the circuit.

The heads themselves are very sensitive to hum pick-up, and special precautions are invariably taken to screen them from electromagnetic pick-up of stray a.c. fields. The drive motor (or motors) may be a prolific source of excessive hum. This may be induced directly into the heads, or it may be induced into the metallic parts of the tape transport system and re-radiated to the heads. Make sure that the shields around the heads are in position and are making good contact with the metal chassis. With the recorder set to the "play-back" condition and the volume control set to maximum check carefully if there is any difference in the hum level with one or more motors running or switched off. If the hum level increases greatly when the motor is on, check first of all that the a.c. wiring to it does not run near the heads. It may be possible to reduce hum quite substantially by moving the mains wiring. In some recorders it is possible to slightly alter the orientation of the motor relative to the head and so reduce hum and pick-up. As a last resort a screen may be interposed between the motor and the head.

When the hum is being re-radiated

it is most likely to be from the capstan assembly on those recorders where this assembly is not made of non-magnetic material.

Some commercial recorders incorporate a small hum bucking coil in series with head so that hum noise may be cancelled out by suitable adjustment of the position of this auxiliary coil.

Recording Level Indicator

In order to produce high quality recordings it is essential that the correct recording level should be used. By this is meant the maximum signal which can be applied without producing an undesirable amount of distortion.

The simple types of recording level indicator such as the flashing neon tube and the magic eye can, in the hands of a skilled operator, enable consistent and well modulated tapes to be produced, but for accurate high grade records it is desirable to have an indicator of the valve voltmeter type. Fig. 5.

Setting-up Procedure

If a distortion meter is available it is a relatively simple matter to set-up a valve voltmeter recording level indicator so that consistent results in recording can be maintained.

Set the recorder to "Record," turn the volume control to about half-way and check with an a.c. voltmeter that the bias voltage is in accordance with the manufacturer's specification. Now connect the a.c. voltmeter to the output of the recording amplifier (it may be necessary to consult the service manual to find the correct point for this connection). Inject a signal (say 400 c/s) from an audio oscillator and adjust its value until the full rated output of the amplifier is achieved. Now adjust the setting of the indicator meter until the needle reads something over half full scale—say a reading of 7 on a meter calibrated 0 to 10. Record a short length of tape at this level. Next adjust the amplifier volume control to obtain a meter reading of say 6 and then 8, and record short lengths at these levels also. Rewind the tape and play back into the distortion meter. Measure the distortion level of each length of track. Note the conditions which produce a distortion level of 5 per cent. If necessary, further adjustments to the gain control should be tried (maintaining constant input from the oscillator) until a condition of 5 per cent distortion is produced. This condition is then the correct operating condition. If, however, the level meter reads more than 8 or less than 6, the test conditions should be repeated and the meter reading adjusted by the indicator control until a figure of 7 is obtained. Any recordings made thereafter on which peaks send the meter up to a reading of 7 can be accepted as fully modulated.

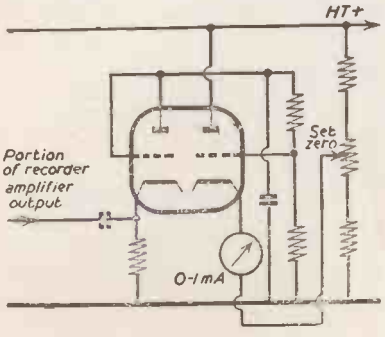


Fig. 5. A typical indicator for recording level.

OPERATIONAL FAULTS

In addition to faults caused by breakdown or deterioration of components there are a number of troubles which can arise in magnetic recording due to a lack of proper understanding on the part of the user. While not strictly speaking part of the serviceman's duties he should be prepared to offer advice on such points. Due to the great variety of recorders now available it would be impossible to compile a comprehensive list of such faults but the following may help:

Fault	*Possible Cause*
1. Weak reproduction	(a) Tape threaded wrong way (b) Incorrect recording level. (c) Input plug left in
2. Distorted reproduction	(a) Incorrect recording level (b) Tape incorrectly threaded (c) Sound source too near to microphone
3. Excessive hum on play-back	(a) Interference from heavy a.c. fields (b) Microphone cable not shielded and earthed. (c) Mains plug reversed
4. Reproduction "boomy" after recording from radio	(a) Tone control on radio incorrectly set
5. Rumbling noises after recording by microphone	(a) Microphone on same table as recorder
6. Wow on particular reel	(a) Bent or distorted reel
7. Wow after particular recording session	(a) Recorder disturbed or not mounted level during recording
8. Loud howls on reproduction	(a) Microphone still plugged in.

Magnetic Tape

There are many ¼in. tapes available from various manufacturers and all are suitable for the home recorder. The most popular package is the 7in. dia. reel holding some 1,200ft. of standard thickness tape. Running at 7½in. per sec. this reel will give approximately 32 minutes playing time per track or over an hour's recording for both tracks. Also gaining in popularity is the 5in. dia. reel holding some 600ft. and giving the same playing times mentioned above on a machine running at 3¾in. per sec. With the improvements in design and manufacture of heads and the advances which have been made of recent years it seems likely that the playing speed for tapes will be progressively reduced with corresponding reductions in cost per unit of playing time. A number of recorders now employ automatic tripping devices for reversing the direction of tape travel at the end of a reel so that the full two tracks may be recorded or played back without manually removing the reels These tapes have metallic strips on their ends to actuate the necessary relays.

In normal usage modern magnetic tape is practically indestructible and so long as it is kept away from the vicinity of strong magnetic fields there appears to be no reason why a magnetic record should not be preserved indefinitely.

Some of the bases used for magnetic tapes are susceptible to damage by excessive heat or humidity and hence, should not be stored in placed where such conditions are likely.

Occasionally, due to some fault in the manufacturing process, it may be found that a tape begins to curl after a few playings. Such a tape should be rejected as it will be impossible to obtain satisfactory results with it. Plastic reels are very common nowadays and are very reliable and not easy to damage. Some of the aluminium reels formerly in common use, however, were easily deformed and gave rise to serious operational difficulties. A bent reel should be discarded immediately.

Conclusion

Properly conducted there is no reason why servicing of magnetic recorders should not develop into a useful source of revenue for the service shop. There is no doubt that the use of magnetic recorders and reproducers will continue to develop and expand. Already special high quality instruments are being introduced to play the tape records which are destined to become increasingly popular in the near future. Magnetic dictating machines and continuous loop advertising machines are also rapidly gaining ground. Now is the time to get into this field and to become familiar with what will be a general utility instrument in the not too distant future.

A USEFUL SIDELINE FOR THE SERVICE-MINDED DEALER IS

TESTING AND SERVICING ELECTRONIC PHOTO-FLASH EQUIPMENT

says A. E. MASZEWSKI

EVERY radio service department can make quite a good extra profit on servicing electronic flash equipment, or "speedlight's" as they are sometimes called. Photographers and photographic dealers are using them more and more every day and should they develop a fault or cease to operate, they usually return them for service to the manufacturer, at a disadvantage of being left for a week or two without a useful tool of the trade. Many photographic dealers do not realise that a radio service engineer can invariably repair these units more quickly and probably more cheaply.

Once the principles of operation of this equipment are understood (and they are relatively simple) nearly every repair could be undertaken in any radio workshop, with ordinary radio test equipment and standard radio components.

The object of using speedlights is to obtain a very bright light for a very short duration of time, exactly at the moment when the shutter in the camera is actually open for the purpose of taking a photograph. Thus the flash received from speedlight should be synchronised to the camera. We will see later the methods used for this purpose.

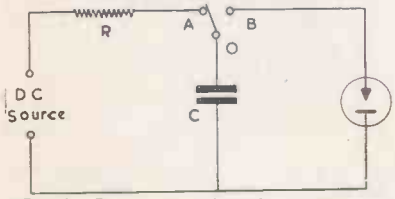


Fig. 1—Basic principles of operation.

Fundamentals

As the light produced is proportional to the current flowing through any electric light source, we will require a source of e.m.f., which can give an output of very high current for a short duration of time. The ideal source of such e.m.f. is a condenser charged to a d.c. potential.

For example, let us consider Fig. 1. Supposing a condenser of high capacity is connected across a d.c. source, through a switch OA. It will charge very rapidly if a series resistance R and internal resistance of the source are small.

Now let us break OA and contact OB. If the voltage across the condenser is higher than the firing voltage of the gas-filled tube, gas inside the tube will ionise, and the tube will offer very low impedance across the charged capacitor. Thus the condenser discharges very rapidly, causing a very short pulse of high current to pass through the tube.

The amount of light given will be proportional to the voltage across and the capacity of the condenser, according to formula $W = \frac{1}{2}CV^2$ (where C is in microfarads, and V in kilovolts, W being in watt-seconds). If CV is constant for different tubes, the amount of light given will depend entirely on the internal impedance of tube; the lower the impedance, the higher light output and shorter pulse.

The circuit of Fig. 1, also not practical, is the basic circuit of all electronic photo-flashing apparatus. Every speedlight, from the smallest battery operated, to the largest mains operated for studio work, can be divided into six clearly defined sections: (1) source of energy, (2) charging device, (3) storage capacitor, (4) indicating device, (5) flash tube, (6) triggering and sync. device.

Source of Energy

The source of energy for any type of speedlamp is governed by the purpose for which speedlights are designed. Large studio models using two, three or more tubes, will always be operated from the a.c. main, while small portable equipment will use dry batteries or an accumulator. Dry batteries have the advantage of simplicity and lightness, while an accumulator proves more economical.

Charging Devices

Very small portable equipment using compact h.t. batteries (*see* Fig. 2) with output up to 50 joules do not use special charging devices. The output from the batteries (when switched on) is connected direct across the condenser. Other types use conventional radio-type transformer - rectifier arrangements, usually (but not always) employing voltage-doubling circuits. If the unit is battery or accumulator operated it employs a vibrator, sometimes self-rectifying (Fig. 3). If mains operated it uses a conventional mains transformer (Fig. 5).

For small portable units metal rectifiers are often used (or cold cathode rectifiers), while mains units use conventional filament type rectifiers either half-wave or full-wave, with or without voltage doubling.

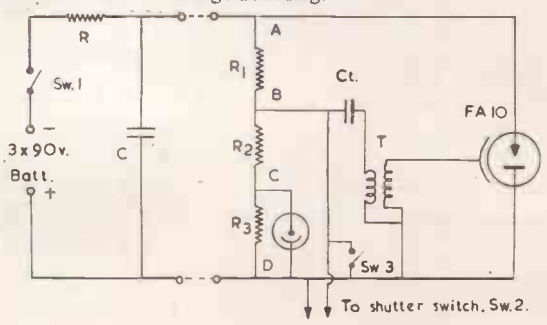


Fig. 2—Circuit of a battery-operated 50-joule portable photo-flash unit.

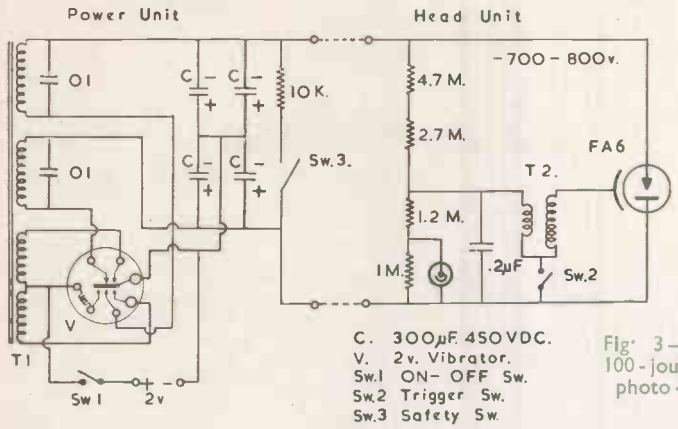


Fig. 3—Circuit of 100-joule portable photo-flash unit.

Almost all types of speedlight apparatus in this country are positively earthed. When tracing the faults in power supplies remember: The voltages employed are very high (often over 1,000 volts) and due to the high tank condenser could be lethal. Before attempting any repairs always discharge the tank condenser through a 5 or 10 watt resistor of value 1 to 5 kilohms, until the tank condenser is fully discharged.

The failures in this part of the circuit are usually conventional, *e.g.*, faulty vibrator, condenser, transformer or a rectifier. Such faults are easy to diagnose and repair.

Storage Capacitor

As the energy required for the flash is proportional to the capacity of the tank condenser, the capacity used is high. In some early types of speedlights high voltage paper condensers were used. In portable units 12 to 32μF 2.5 kV are most popular; in large studio equipment several such condensers are connected in parallel, giving sometimes several hundred μF. Modern small portable units employ electrolytic condensers with capacities ranging from 500 to several thousand μF.

Indicating Device

To show the user that the tank condenser is fully charged and the apparatus is ready for firing, indicator devices are frequently employed, the most popular, cheapest and perhaps the most reliable being a neon indicator bulb. The bulb is connected in the potential dividing circuit across the tank capacitor, and is fired after the voltage across them reaches the required value. The bottom end of potential divider is sometimes made adjustable by a miniature potentiometer, so that it can be adjusted to required level. The small, cheap units use standard fixed resistors.

Large studio units (and some of portable units) may use moving coil meters as indicators, with no difference in the circuit employed, the only advantage being direct reading of instantaneous value of the voltage across the condenser.

Flash Tubes

Many types of flash tube are available on the market at the moment, produced by almost every radio valve manufacturer. They are designed to operate from voltages as low as 150 volts, or as high as 3,000 volts, the flash duration varying from a 100 to 500 microseconds.

There are two basic types of flash tubes, each requiring its own triggering device. The "self-ignition" type will operate whenever any potential across the electrodes exceeds its critical value. This type is much less popular and almost obsolete now, due to complicated triggering devices, usually requiring a relay with heavy contact switching (*see* Fig. 7).

The other, most popular type ("closed helix tube") has a self-ignition voltage considerably in excess of its applied potential and fires only when an additional "trigger" electrode receives a pulse of much higher voltage. This triggering pulse ionises the gas contained in the flashtube, and reduces its internal resistance to a few ohms, allowing the tank capacitor to discharge its energy very rapidly.

Triggering and Synchronising

From the point of view of simplicity we will consider first the triggering devices used in small portable units with "closed helix" tubes. Referring to Fig. 2—on closing SW1 (on-off switch) the tank condenser is rapidly charged through series—limiting resistor R. At the same time the current is flowing in high-resistance network R1, R2, R3. The voltage across BD is rising logarithmically, charging condenser Ct.

After approximately five seconds the voltage across R3 rises to such a value that neon indicator will be fired, and then will glow steadily. The unit is now ready to be flashed. The trigger transformer "T" has a very high ratio of turns. If we now close the switch SW2, the condenser Ct will rapidly discharge through primary of trigger transformer, giving a sharp pulse of very high voltage across its secondary.

This voltage applied to triggering electrode of the tube will ionise the gas, and the tank condenser will now rapidly discharge through flash tube. If SW2 is synchronised to the camera shutter (it is mounted inside the camera for that purpose), the flash will be synchronised with the camera. For open flash there may be another switch SW3 mounted in the unit.

This type of synchronisation, also very widely used in modern portable equipment, has one very serious disadvantage. As the contacts on camera shutter are very light, and a discharge of Ct give very considerable current, it will ruin the shutter contacts in a very short time.

To overcome this disadvantage either a relay or a small thyratron tube can be employed, to complete the circuit. In small portable equipment usually cold cathode thyratron is used, while in studio models, conventional heated thyratrons are used (Fig. 5). When cold cathode thyratrons are used the operating voltages are quite critical, and if not of correct value can be quite deceptive when servicing.

When relay-operated triggering is used, because of the time delay factor of the relay, the shutter contacts should

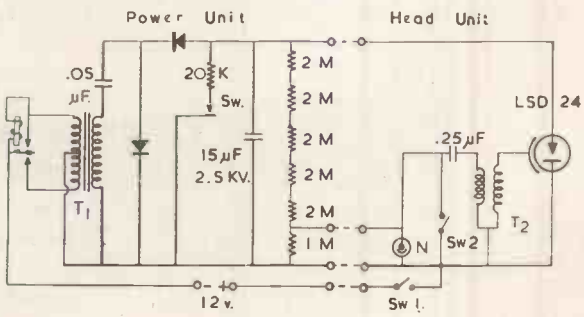


Fig. 4—Circuit of a 100-joule battery operated photo-flash unit.

close 5 to 50 milliseconds before the shutter leaves are fully open. For relay operated synchronisation see Fig. 6.

Some Servicing Hints

Besides the usual defects found in any equipment using tubes, condensers, transformers and resistors, there are certain additional causes of failure, which are not met within radio service work. An aged battery, while delivering almost full-rated voltage, may be the cause of much trouble. Always check the battery voltages under load (when an accumulator is used a quick test is to plug-in the battery charger; if this improves the performance, a new accumulator will cure the trouble).

Cold-cathode thyratrons, rectifiers and flashtubes themselves are best checked by substitution, especially if working is erratic. These components are rather expensive to stock, but fortunately failure of these parts is not so common.

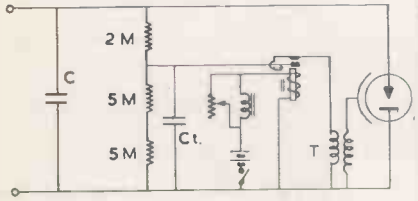


Fig. 6—Diagram of a relay-triggered system.

If the equipment is not firing at all' and indicator device is not showing the charge, it is usually due to something in the supply circuit. Such faults are quite easy to locate. Listen for vibrator noise, check for voltages (remember—positive earth). If the voltage is present (unless it is too low) the triggering circuit should be suspected, and the tube checked by substitution.

As in radio service work, the most difficult repairs are to the equipment working intermittently. Again first check the tube, then all the soldering joints in triggering circuit. To check the triggering circuit remove the tube and attach a lead to triggering electrode pin, and keep the other end about ½in. from the chassis, with a sharp point towards

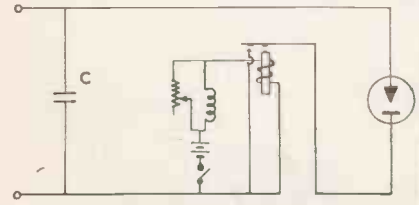


Fig. 7—Trigger system for a self-ignition tube.

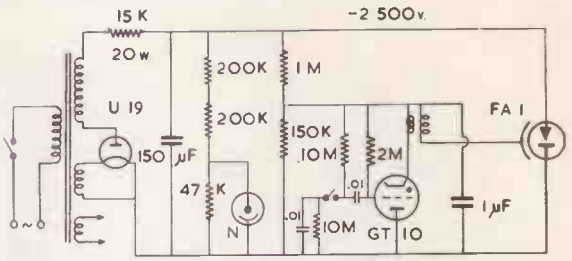


Fig. 5 Circuit of an a.c. mains operated studio-type electronic flash unit.

the common earth. If triggering circuit is in order, a spark should jump across when pressing switch.

Sometimes operation may be noisy (cracks can be heard when flashed), and this is usually due to a bad contact or connection in the high voltage line.

The circuits shown are chosen to represent typical equipment in current use. It is worth while when servicing equipment of this type to draw a circuit diagram (for future reference). Always check carefully the cables connecting flash head with power unit, as breakages can be commonplace.

After a few repairs confidence will be obtained and electronic photoflash servicing will prove a profitable sideline.

RADIO AND TELEVISION DIGEST

★ Topicalities from Everywhere ★

Picture shows a consignment of Ekcovision receivers being flown from Southend-on-Sea airport to Jersey by E. K. Cole, Ltd., to fulfil a promise that the sets would be delivered in time for TV transmission. The aircraft is Ekco's own Anson.

Reconstruction work is well under way to make the Wood Green Empire, London, the most up-to-date TV theatre in Britain. It will have a vast stage of 6,000 sq. ft. and house £80,000 worth of camera equipment. The theatre will be used by Associated Broadcasting for commercial TV productions.

One TV station in U.S.A. employs a glamour girl to give weather reports. She dresses according to the temperature, wearing less in warm weather and more in cool weather. Viewing figures are reported to be highest when the temperature soars.

To make life more pleasant for thirteen men manning a 180ft. coal drilling tower standing on the sea bed in the Firth of Forth, Ferguson radio and television receivers have been installed. The tower, of tubular steel, has galley, messroom and 25 bedrooms, and is being used to gather information about coal seams in the estuary.

When Peter Thorneycroft, president of the Board of Trade, opened the Business Efficiency Exhibition at Olympia recently, his opening speech was recorded on the new *Minifon* P55 recorder (seen strapped to the rostrum) so that a verbatim transcript could be available in the Exhibition Press Room shortly afterwards. The *Minifon* with its complete range of accessories was prominently featured along with the Emidicta dictation system on the stand of E.M.I. Sales and Service, Ltd.

The Mullard "Disappearing Gold Ball" was featured at an exhibition last month organised by the Crime Prevention Department of the Liverpool City Police. The device, which comprises an electronically controlled ball which withdraws into a hole when a hand is put near it, served to illustrate the part electronics can play in burglar alarms and similar security measures.

Take Your Pick, **the Michael Miles Radio Luxembourg quiz programme, has been bought by Associated-Rediffusion, Ltd., for commercial TV.**

A new type of high-power storm detection radar has recently been put into production by Marconi's Wireless Telegraph Co., Ltd. One of the first customers for this equipment is the meteorological department of Rhodesia and Nyasaland.

India's first electronic brain, manufactured by the British Tabulating Machine Co., Ltd., has now been installed at the Indian Statistical Institute, Calcutta.

"Presented to Manchester City F.C. by R.G.D. in appreciation of their wonderful fighting spirit and grand football. Wembley, 1955." This is the inscription on the lid of a radiogram presented to the Manchester City Football Team when they appeared on the R.G.D. stand at the Northern Radio Show shortly after the 1955 Cup Final at Wembley.

Belgium is to build what is claimed to be the highest TV tower in the world. It will be constructed of concrete and will be more than 2,000ft. tall—more than twice as high as the Eiffel Tower.

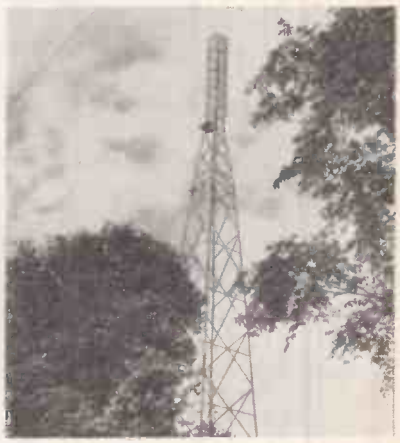
An order worth more than £125,000 has been placed by the government of Burma with Standard Telephones and Cables, Ltd., to equip a new overseas radio-telephone and telegraph centre. The order includes single-sideband transmitters and receivers, radio-telegraph receivers, teleprinters, terminal equipment and beam aerials.

TV Advertising, Ltd., have signed a two-year contract with Halas and Batchelor, Ltd., for exclusive handling of the latter company's cartoon films for commercial television advertising. Halas and Batchelor recently produced the first full-length British colour cartoon film—George Orwell's *Animal Farm*. Their first cartoon commercial will be seen on Friday, September 23 in a TV advertisement for a petrol company.

Planning permission has been given for the erection of a television station on East Lomond, a hill above Falkland, Fife. Four buildings and a 100ft. mast are to be installed.

Heat-wave tactics adopted by American radio station WRCA in New York last month included broadcasting the sounds of waterfalls, gurgling brooks, the clinking of ice in a glass, and the crunch of walking on snow whenever the temperature reached ninety. Object was to make listeners feel cooler.

Edwards High Vacuum, Ltd., have formed a subsidiary company in Italy to supply vacuum equipment to the electronics industry. A recent order was for cathode-ray tube pumping units for use in the growing Italian television industry.



The Marconi mast and aerial, erection of which is completed, at the Croydon I.T.A. TV transmitting site. The aerial is a twin 4-stack Band III vertically polarised array. Meanwhile installation of the sound transmitter is complete, and the installation of the vision transmitter is going according to schedule.

To mark his retirement after 33 years' service in the same division of the Plessey Co., Ltd., William Young, foreman in charge of radio and television assembly shops, was presented on behalf of his colleagues with a number of valuable gifts including a gold watch and silver tea set by Michael Clark, a director of the company, at a pleasant little ceremony in the Ilford plant recently.

HENRY O. THOMAS, sales manager of Regentone Radio and Television, Ltd., has been admitted to the Institute of Export Managers as an Associate Member. He is already a member of the Sales Managers' Association. Mr. Thomas, an ex-R.A.F. officer, joined Regentone in 1951 as an assistant to the sales manager, and became sales manager himself two years later.

The following head office and regional appointments are announced by the television and radio division of Philips Electrical, Ltd.

J. T. MOORE, who joined Philips more than 25 years ago and was formerly assistant sales manager to the division, is appointed product manager for TV and radio.

F. GOULD is appointed manager of the distribution and sales office. He joined Philips in 1938 and, as well as serving on the radio side, has worked in the accounts and personnel departments. In addition to his new duties, he will continue to look after Philips TV and radio interests in Northern Ireland.

F. D. PERKINS, latterly TV and radio representative in the Eastern Counties, is appointed assistant product manager for car radio.

Messrs. Moore and Gould will be directly responsible to A. L. Sutherland, commercial manager. Mr. Perkins will be directly responsible to A. F. D. Knight, product manager for car radio.

In the North-West Region, K. **RUSHTON** takes over as TV and radio manager under the regional manager, N. D. Margerison. Mr. Rushton has been with the Company since 1927. Until recently, he was attached to the Bristol Branch where he represented Philips TV and Radio in Hampshire, Wiltshire, Gloucestershire, Isle of Wight and parts of Dorset and Somerset.

F. SHERIDAN is appointed TV and radio manager in the North-East Region. He is well known to northern dealers, having been a TV and radio representative in the Newcastle and Leeds areas. He will be directly responsible to the regional manager, C. Horner.

British Insulated Callender's Cables, Ltd., announce that **H. H. DAKER,** B.Sc., A.M.I.E.E., C.P.A., has been appointed Patents Officer in succession to the late Mr. R. L. Cleaver.

H. H. HATTON has been appointed assistant manager of the Liverpool Branch of The General Electric Co., Ltd. Mr. Hatton joined G.E.C. in 1933 as a Student Apprentice at the company's Witton Engineering Works. In 1946 he was appointed to the Industrial Sales Department, and in 1950, became manager of Industrial Sales Department at Liverpool branch.

M. R. CARLISLE is now representative of R.M. Electric, Ltd., for the counties of Warwickshire, Worcestershire, Shropshire, Northamptonshire, Leicestershire, Nottinghamshire and Derbyshire. He will be calling wholesalers in this territory in the near future.

MICHAEL CLARK, director of the electronics and equipment group of The Plessey Co., Ltd., left Britain recently for a visit to the United States to observe new developments there in the field of electronics and communications.

The following sales appointments are announced by Sidney Davies, "His Master's Voice" radio and television sales manager.

S. E. JENNINGS has been appointed area manager for Scotland and North-East England. Mr. Jennings has been associated with companies now in the E.M.I. group since 1923, when he joined the Columbia Graphophone Co., Ltd., from Pathé-Freres. Since 1945 he has been "His Master's Voice" Sales Supervisor for the Manchester District, North-East England and the Eastern areas of Scotland, covered by the resident sales representative, R. P. Longhurst

Left, S. E. Jennings, and right, P. H. Evans, take up new H.M.V. appointments.

As part of the I.E.E. Measurement Section's summer visit, a party of 100 members and their ladies spent the morning touring the E.M.I. factories at Hayes, Middlesex, after which they were entertained to lunch by the company. Pictured above are (left) B. E. G. Mittell (managing director of E.M.I. Studios, Ltd.) exchanging notes with M. Whitehead (chairman of the I.E.E. Measurement Section).

P. H. EVANS has been appointed area manager of North-West England and North Wales. Mr. Evans has served with companies of the E.M.I. group since joining the Columbia Graphophone Co., Ltd., from the Edison Bell Company in 1932, and since 1945 has been "His Master's Voice" sales supervisor for North-West England and North Wales.

The Radio Wholesalers' Federation announce that the following officers have been elected by the Council to hold office for the ensuing year. *President*: R. G. Alger (Alger's Wholesale Supplies, Ltd., Newport); *Vice-President*: J. Mitchelhill (J. Beaumont and Son, Ltd., Newcastle-on-Tyne); *Hon. Treasurer*: W. N. Hart (Kerry's Gt. Britain, Ltd., London).

The Council of the Federation is made up as follows Dr. C. K. Black (Michael Black, Ltd., Glasgow), R. Collins (Albion Electric Stores, Ltd., Leeds), S. C. Coulson (Wireless Electric, Ltd., Bristol), A. J. Dew (Past President), J. Diamond (Past President), J. C. N. Eastick (J. J. Eastick & Sons, Ltd., London), C. O. O. Herzog (Past President), E. J. Morris (Smith Bros. (Caer Conan) Wholesale, Ltd., Doncaster), F. D. Newcombe (Past President), J. Robertson, M.B.E., J.P. (Past President), L. Scop, J.P. (Eirco (Wholesale), Ltd., Belfast), E. Smith (Past President), F. K. Smith (Past President), S. Walker (Thompson, Diamond & Butcher, Ltd., London), G. H. Wells (Electrical Components, Ltd., Birmingham), G. Whiteford (James Whiteford & Co., Glasgow), A. S. Wild (Gothic Electrical Supplies, Ltd., Birmingham), A. V. Wood (E. A. Wood, Ltd., Birmingham).

C. G. F. PRITCHETT, M.I.E.E., A.C.G.I., has taken over the position of chief engineer to Chloride Batteries, Ltd., Exide Works, Clifton Junction, Swinton, Manchester, in succession to the late C. P. Lockton. Mr. Pritchett, who has been engaged in the battery industry since 1925, became a director of Chloride Batteries, Ltd., in May, 1952.

(*continued on page 328*)

People in the Picture

— *continued* —

R. J. PATTINSON, of Wireless Instruments (Leeds), Ltd., has recently become managing director of Residential Hotels (Harrogate), Ltd. This company has taken over the Grand Hotel, Harrogate, and Mr. Pattinson states that he is particularly looking forward to welcoming delegates to conferences or trade shows, and tired "commercials" who wish to have bed and breakfast at the Grand. He has arranged that special attention and advantageous terms shall be given to all members of the radio and electrical trades. The Grand is a five-star luxury hotel with more than 50 private suites and capable of accommodating 600 to 800 guests in the dining room.

The following changes are taking place in representation of Radio Division of The Edison Swan Electric Co., Ltd. **R. T. GREENWOOD,** who is very well known to the radio trade in the Lancashire area, is coming to London where he will mainly be concerned with contacting wholesalers in the London area. From August 15 he can be contacted at 155 Charing Cross Road, London, W.C.2.

S. WEBSTER, who has been in Birmingham and the Midland area for some time, is taking Mr. Greenwood's place in Lancashire, and he will now be based on Ediswan's Manchester and Liverpool offices.

E. W. TAYLOR, who opened the Ediswan Midlands Cathode-ray Tube Service Depot and has been in charge of its operation for several years, is taking Mr. Webster's place as Radio Division representative in the Mdiland area. He can be contacted at the Ediswan Birmingham Office. For the time being Mr. Taylor will also continue to supervise the operation of the Service Depot.

L. W. ORCHARD has been elected a director of the Ever Ready Co. (Great Britain), Ltd. Mr. Orchard is manager of the Ever Ready Trust Co., Ltd., and is also a director of Clayton Dewandre Co., Ltd., and Ship Carbon Co. of Great Britain, Ltd.

New sales manager in Currys organisation is **H. J. POTTERTON,** who has been publicity manager of the company for the past six years. **B. P. DENCER** is taking over publicity matters.

The Ministry of Supply announce that **Dr. R. COCKBURN, C.B., O.B.E.,** has been appointed Deputy Controller of Electronics in succession to Rear-Admiral G. Burghard, C.B., D.S.O. (Retired), whose tour of duty has expired. Dr. Cockburn, who is 44 years of age, has been Principal Director of Scientific Research, Guided Weapons and Electronics, since March 1, 1954. Before that he was Scientific Adviser to the Air Ministry.

Appointed senior commercial executive to the Solartron Electronic Group, Ltd., Thames Ditton, Surrey, is **E. CATTANES, B.Sc., M.Brit.I.R.E.** He will be responsible for developing the European export market for Solartron electronic instruments and will open the company's new Paris office later in the year.

E. CARPENTER, technical sales and survey engineer of the Electro-Acoustic Division of Philips Electrical, Ltd., recently completed 25 years' service with the company. Presentation were made on behalf of the company and Mr. Carpenter's friends and colleagues at a celebration luncheon held in London.

Following the recent appointments of **S. E. JENNINGS** and **P. H. EVANS** as area managers, two further appointments have been announced by Sidney Davies, *His Master's Voice* radio and television sales manager. These are: **R. J. J. ANDREW** as area representative for Manchester and district, North-East Cheshire and Lancashire (South of Liverpool/Salford), and **P. W. HARTLEY** as area representative for Cumberland, Westmorland and Lancashire (North of Liverpool/Salford).

Clive Rawes, B.B.C. television presentation editor, who was programme officer for the Radio Industry Council at the Radio Show last year, is acting this year as programme adviser. John Goss, to be seconded from the B.B.C. from August 2 to September 10, has been appointed programme officer.

Mr. Goss is production assistant in B.B.C. television, acting under Brian Tesler. He has been associated with several top-ranking programmes like "Ask Pickles," "Bathtime with Braden," "The Dick Bentley Show," various variety shows, and drama under Ian Atkins.

His work at Earls Court will be over-all control of the two continuous vision programmes on closed circuits and the sound programme for the public address system. He will have an assistant specially to look after the programme on the Band III circuit and will be responsible for the R.I.C. announcers, who will be appointed shortly.

J. A. SMALE, engineer-in-chief of Cable and Wireless, Ltd., has been appointed by the government of Cyprus to be first chairman of the new Cyprus Inland Telecommunications Authority. The appointment is a part-time one, and Mr. Smale will continue to serve Cable and Wireless in his present post, visiting Cyprus as necessary.

JIM MATHERS has joined the Ferguson Division or Thorn Electrical Industries, Ltd., as sales representative for the territory including Cheshire (excluding the Wirral), North Staffs, Shropshire and North Wales.

ROBERT L. GREEN, A.M.I.E.E., has joined Winston Electronics, Ltd., Park Road, Hampton Hill, Middlesex, as senior development engineer responsible for telecommunications research and development. He is particularly concerned with the compact redesigned "Winston Tellaloud" loudspeaking telephone which is now entering the production stage.

F. G. ROBB, having reached the normal retiring age, has relinquished his position as Chief of the Test Division of Marconi's Wireless Telegraph Co., Ltd. He is succeeded by **E. H. EVANS.** Mr. Robb served with Marconi's for thirty-six years. He was appointed chief of Marconi's Test Division in 1948. Mr. Evans, his successor, joined Marconi's in 1913. He has been associated with the Test Division throughout his service, and for a number of years had been chief of Receiver Test.

R. E. BURNETT, M.A. (Oxon), A.M.I.E.E., A.Inst.P., who has been assistant to the general manager for special duties, as well as manager of Education and Technical Personnel and principal of Marconi College, has now been appointed full-time assistant to the general manager. His duties as manager of Education and Technical Personnel will be undertaken by **E. R. L. LEWIS,** M.A., A.M.I.E.E., who has for some time been acting as his deputy in this sphere.

R. G. HULSE, B.Sc. (Hons), who has been deputy principal of Marconi College during the same period, has now been appointed principal of the college

Radio Show Notes

Commercial Advertising Films will be seen at the Show

THE public will probably see commercial television and advertising films for the first time on the screens at the National Radio Show. The Radio Industry Council, which earlier stated that it was considering offering facilities for showing commercial television films, has now announced the terms on which it will do so.

In a letter to advertising agents who have shown an interest in the project, the R.I.C. states that, as usual, the B.B.C. will be providing the programmes for the Band I internal exhibition network. It was originally hoped that those responsible for commercial television would provide the alternative programme. As this is not the case, the R.I.C. has itself to arrange programme material for the Band III network.

"*In arranging this alternative programme, the R.I.C. will make no attempt to simulate I.T.A. programmes,*" it is stated. "*This will be made quite clear on the TV screens carrying the Exhibition Band III programme.*"

Times of showing will be from 11 a.m. to 10 p.m. daily. Band III programmes, which will be run through three times a day, will consist mainly of documentaries, continuity and celebrity interviews, travelogues, captions and items produced in the R.I.C. exhibition studio and the point that no attempt will be made to simulate I.T.A. programmes is emphasised very strongly.

Up to 10 per cent of the time will be given to one minute, half minute or quarter minute film advertising spots. Any film featuring a firm engaged in radio manufacture will not be accepted.

A nominal rate for the whole ten days (30 showings in all, excluding Pre-view Day) has been fixed as follows: £50 per minute; £30 per half-minute; £20 per quarter minute. Agents' commission of 15 per cent will be allowed.

Space on the programme is being allotted by ballot. Films have to be 35mm. and of a type suitable for use with telecine equipment. Colour films may be acceptable.

Interested firms were asked to apply to the Secretary, Radio Industry Council, 59 Russell Square, London, W.C.1, during the week ended July 23.

This poster has been sent all over the world by the Radio Industry Council to publicise the Radio Show. The same design is also used on the cover of the overseas brochure.

R.I.C. PUBLICITY SERVICE
"British Radio Leads the World"

AN 18-page coloured, illustrated brochure, "British Radio Leads the World," has been sent to prospective visitors from overseas to the National Radio Show to be held at Earls Court, London, from August 24 to September 3, 1955, with a pre-view for overseas and other special visitors on August 23.

With Big Ben's tower (at the British House of Commons) on the front cover and with information printed in English, French and Spanish throughout, the brochure makes the point that in the period from August 23 to September 15 there are three great exhibitions, all of radio and electronic interest, in or near London, the others being the Farnborough Flying Display and Exhibition and the Engineering and Marine Exhibition.

After a reminder that the world's first television service was Britain's and that it is now available to 90 per cent of the population, some American opinions are quoted:

"*The 14-in. TV set we rented for our London room gave us a picture that for clarity and contrast is vastly better than we generally see in the U.S.*"

"*British television is technically the most advanced in Europe.*"

Photographs show striking recent developments and installations and a graph demonstrates the rise in exports of all kinds of British radio equipment from £2 million in 1938/39 to over £29 million last year, a record figure.

Latest information about the Radio Show in London is that there will be 121 exhibitors, including all the manufacturers of radio and television receivers. Radio sets will include numerous new models for v.h.f.-f.m. reception, now coming into use in Great Britain, and another feature will be multi-channel TV sets for reception of the first commercial transmissions due to begin immediately after the Show.

H.M. The Queen is patron of the Radio Show which is organised by the Radio Industry Council, 59 Russell Square, London, W.C.1.

IN NEXT MONTH'S ISSUE — SPECIAL RADIO SHOW SUPPLEMENT

You're in Show Business too—

R.I.C. TO TRADE

WITH the above title an attractive brochure has been distributed to dealers by the Radio Industry Council outlining some important trade angles on the Radio Show. In addition, 6,000 copies of the brochure are being sent to their members by the R.T.R.A. with a covering letter.

The brochure underlines the increasing trend towards greater dealer co-operation in the Show that has been evident in recent years, and affirms the well-recognised fact that the Radio Show is a sales booster—if the dealer has the initiative to cash in on Show support and publicity in the right way.

The brochure says:

To the Radio Industry as a whole (and that, of course, includes you) the annual National Radio Show is, in its own special way, the most important event of the year. The Show is, in fact, the radio industry and broadcasting "on parade." Here's where we show what manufacturers have achieved, here's where the public can see what retailers will be selling, and—very important—the kind of entertainment they will enjoy when they buy a television set.

THE MEN IN THE KNOW ALWAYS COME TO THE SHOW

It isn't only the general public (and there'll be tens of thousands of them a day who keep up that cheerful clicking of the Earls Court turnstiles). Here and there at the Show you'll see men who obviously have the "expert eye." They're at the Show to look round . . . but with a very particular purpose. They're men like yourself—Radio Dealers. They come to the Show to check up on "what's new"—it pays them to do so.

INTEREST PAYS DIVIDENDS!

The National Radio Show is the occasion for nation-wide publicity for radio and television such as any other industry must envy. It conveys to millions that there is something important and interesting in being one of the big company of listeners and viewers. The more people in the industry who take an active interest in the National Radio Show, the better for business—your business. So come to the Show; watch public reactions, listen to what people are saying about the products you'll be selling—this is your Show, and your opportunity.

SHOW THEM!

Ask yourself these three questions:—
How many of your customers have been to the National Radio Show?
Were they interested?
Are there others who would be interested if you put the idea in their heads?
Have a go and help boost radio sales by displaying the Radio Show posters and by word of mouth.

The brochure further gives details of the R.I.C. posters and window bills featuring cartooned celebrities, and invites dealers to order the display material they need, using a stamped enquiry card supplied.

One of the attractive Radio Show window bills obtainable by dealers on request from the Radio Industry Council, 59, Russell Square, London, W.C.1. A larger poster of similar design is also available.

Celebrities caricatured in Radio Show publicity

RADIO SHOW publicity this year will follow previous policy in featuring radio and television stars, but in a different way.

This year the caricaturist, Emwood, well known for his studies of stage and radio stars, has drawn a series of caricatures of Kenneth Horne, David Nixon, Vic Oliver, Gilbert Harding, Arthur Askey, Tommy Cooper, Barbara Kelly and Alma Cogan. These are grouped as the motif of the poster advertising on the Underground in double crown and quad crown spaces, on railway stations in double crown spaces and on bus sides.

The London Evening Press will be used throughout the 10 days of the Show in advertisements which will feature the high spots of the Show linked with Emwood's caricature figures.

A special drive for dealer co-operation will be supported by folders and window bills.

The advertising is in the hands of Rumble, Crowther & Nicholas, working under the direction of the Public Relations Committee of the Radio Industry Council, chairman, Walter M. York. Press arrangements area gain handled by the R.I.C's press officer, Andrew Reid, TEMple Bar 3901–2.

F.M. Servicing to be featured at Earls Court

UNDER arrangements made by the British Radio Equipment Manufacturers' Association, there will be special provision at this year's Radio Show (Earls Court, London, August 24 to September 3) to bring together retailers' service engineers and industry representatives to discuss f.m. receiver servicing in the field.

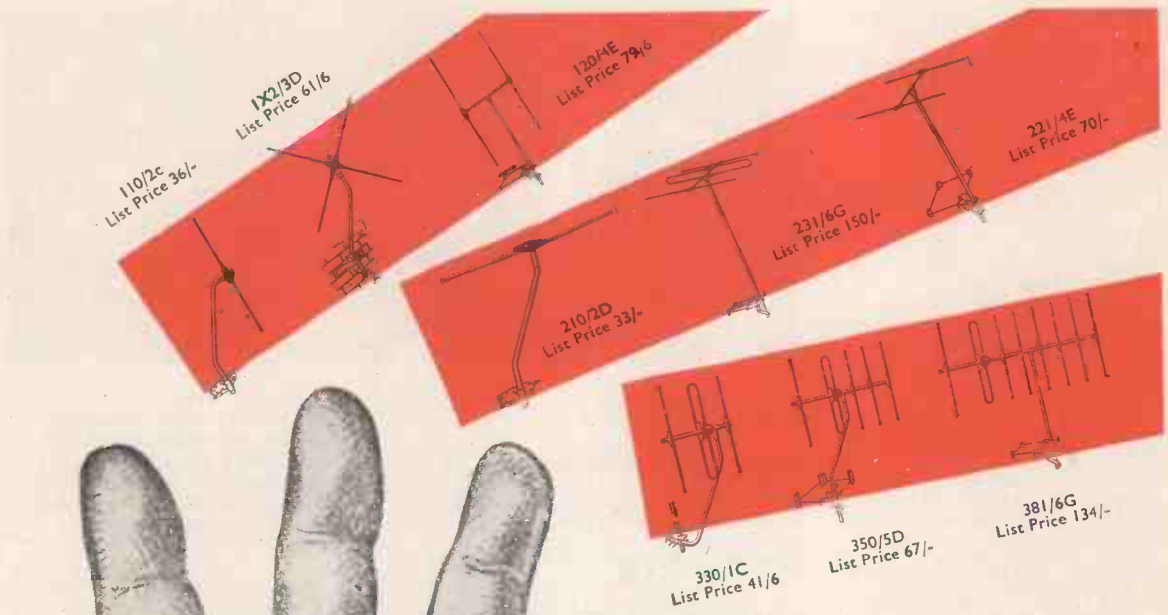
With the exception of both Saturdays, there will be a discussion meeting daily throughout the Show. Each meeting will be addressed by service managers and senior service engineers from the industry on *F.M. and the Service Engineer* and by an aerial manufacturer on *F.M. Aerial Problems*, with opportunity for questions.

Arrangements have also been made for a practical demonstration of servicing aspects of F.M., including the use of standard and specially developed test equipment, and for free discussion of individual problems between retailers' and manufacturers' service engineers.

Sessions will begin at 2.30 p.m. To ensure that the maximum attention can be given to the problems of the individual, attendance is being restricted to 50 engineers per session.

Admission will be by ticket only. Applications for tickets, stating the day for which they are required, should be sent to B.R.E.M.A. at 59 Russell Square, London, W.C.1, as early as possible.

If the demand for tickets exceeds the accommodation available at any session, every effort will be made to make additional arrangements as necessary.



Three Bands in hand . . .

★ Lower in price.

★ Rods and insulators completely pre-assembled and aligned for peak performance.

★ Seamless tubing of high grade aluminium throughout.

★ Boom and rod ends sealed to avoid aerial noise.

★ Monobloc junction units of high grade Bakelite for fully weatherproofed cable connection.

VISIT US AT THE RADIO SHOW EARLS COURT FROM AUGUST 24—SEPTEMBER 3 ON STAND 64

☆ **See the entire ANTIFERENCE range, which includes Bands 1, 2, and 3 Indoor and Outdoor Aerials and several "Addex" Units for converting Band 1 aerials to dual band reception, on OUR STAND at the RADIO SHOW**

ANTIFERENCE LIMITED

BICESTER ROAD, AYLESBURY, BUCKS. AYLESBURY 1467/8/9

DHB/2212

display topics ★ PRACTICAL POINTERS TO ECONOMIC WINDOW DISPLAYS by Victor Sutton

Displays for the Small Window

EXPERTS in the display field think that far too many windows are alike in treatment. It is true that one sees an undistinguished mass of goods in many windows, but the display specialist puts his show over with a neat and unusual set-up which catches the eye of the passer-by and causes him or her to stop and study.

Much of this trend is being noticed because the multiple stores all have a set style of display which is rigidly followed, and as the number of branches increases, so we have more mass-produced windows. Add to this the present number of retailers who just pack their windows, and one does not need much imagination to see where the small and specialised display will eventually score.

One can attract attention very freely with a small window. This is a good sales promoting space and not the orphan of the display area. It is a fact that very often the small window has landed the prize in many a window contest.

One way to make the small window attractive is to choose from three to six prominent lines (either TV or radio), and then fill in with smaller and less important items. Be sure that the window floor is clean and well covered. Some of the material made by Meadow-felt, of Kidderminster, will make an ideal fitting. There is a large range of colours and you can have the whole floor " tailor-fitted " for quite a nominal sum. This is a sound, hard-wearing pile fabric which will last for years.

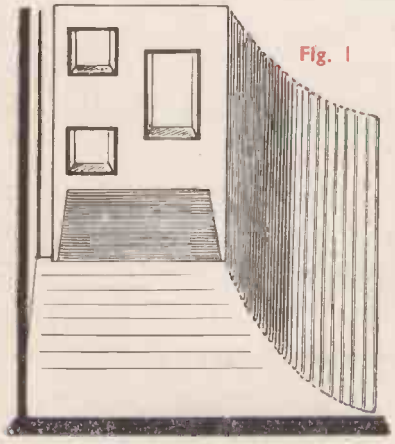


Fig. 1

Off-Side

The window in Fig. 1 is built-up in the popular off-side style—a habit which displaymen are developing in the leading stores. Some radio retailers have adopted it because that awkward corner on the right cannot be eliminated without taking the building down. Hence the use of the neat curved corrugated cardboard which is now available in rolls of 12 yards by 6ft. 6in. high.

Ranges in this material keep changing and there are now some very effective wide flutes which make it look less like packing material; there are many good pastel shades to suit all tastes.

The basic idea of the stand involves the use of three, four or more shadow boxes (which the grocer can probably supply ready made!). Size of the sets to be shown must be considered, and there is no reason why the apertures should not be different in measurement. If so, the larger one should be in the centre and the two smaller ones at top and bottom.

The framework is important. Sawn wood 2in. by 1in. is suitable and costs about 23s. 6d. per 100ft. run. To allow for the display to be positioned in the front of the window, keep the apertures at least 2ft. 6in. from the floor.

Each box is fitted securely to the framework after the holes have been cut out and lined with hardboard. Hard-board on one side is quite smooth and takes all paints and stains, but the reverse side is most effective in display because it has quite an attractive textured surface. It can be used in this way with any flat paint, especially in the fawn and dove shades. Incidentally, it lights up very well in both day and night.

The cases should be lined with display paper to suit the items being shown and bearing in mind that each unit will probably be separately lit. The arrangement of the cardboard panel can be adjusted to suit requirements, but it should be kept in position at the top.

Island Window

I have been noting quite recently how well the experts are making use of island windows (or at least the three-sided kind as shown in Fig. 2). In effect the window becomes three separate small sections and these can be used to very good advantage.

The radio trade has quite a range of merchandise that can be set out, even in one full window, into three such compact and interesting groups. It is just a matter of the arrangement of suspended battens to hold draping material.

A plan of the window should be drawn out on a sheet of paper and in pencil with the scale of 1in. to represent 1ft. By this means you will be able to measure in detail how much you can get into each sector.

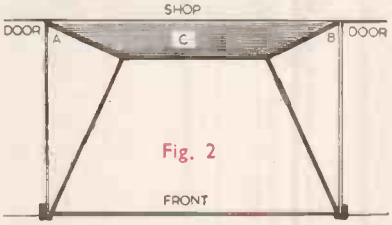


Fig. 2

The scheme is built-up with suspended battens of 2in. by 1in. prepared wood and the drape can be made with such material as *Phoenix* drape—a light, interwoven fabric of oatmeal shade which can be used as a drape or as a floor bed covering (Manufacturer: Eaton and Boyes, Phoenix Mills, Ancoats, Manchester). It is 72in. wide and costs 11s. 6d. a yard. It stands up to endless wear and should also be useful as a stand-by for other displays.

Walk-in

Assuming you have two " walk-in " sections as shown, make sure that the articles in section " A " and " B " are the eyecatchers, because it is an established fact that when people walk into a small arcade like this, they always study what is shown facing them. There is an unexplained factor in this angular type of display technique, and it is fast becoming a great feature in successful selling.

The space marked " C " is really wasted by the design arrangement, but if the window had an open back it could be used for an inside show.

Financial Review of the Industry

PART TWO —— by M. DUFFY

who is a leading financial and economic journalist with wide experience in the U.K. and U.S.A.

RADIO and Television companies which issued annual reports for the financial years ending between December of 1954 and March of 1955, further to those discussed in our last issue, mostly announced higher profit figures. Those which were lower, however, were only slightly lower.

The *Telegraph Condenser Co., Ltd's* report for the year ended December 31, 1954, gave net profit after taxation as £186,900 against a little over £198,000 for 1953. The latter figure was a new high record. Income tax for 1954, however, was shown as having absorbed £191,827, compared with £188,204, whilst profits tax for 1954 took £38,000 against £27,500 for 1953.

The chairman's address for 1954 stated that during it their Acton and Bathgate factories achieved the highest output in quantity of components ever recorded in the company's history. Owing to this unprecedented demand for their products the need for additional manufacturing space had become a matter of urgency and arrangements had consequently been made for a substantial addition to the Bathgate factory.

Other information was that the company's turnover exceeded that for the previous year and that the quantity of components sold was very substantially greater. This was attributed to a further fall in selling prices, so it was becoming increasingly difficult to maintain a reasonable margin of profit on their products. Another point was that the year had been one of intense activity throughout their sales organisation, that valuable new business had been obtained both at home and abroad and new outlets for their existing products found, also that substantial orders were being received for their printed circuits.

Ever Ready (Ireland), Ltd., is probably one of the smallest capitalised in its group as the issued and paid-up total amounts to only £80,000. Trading profit for the financial year ended March 31, 1955, was returned as some £24,800 compared with £34,400 for 1954. The latter figure was a new high record.

The reduction in profits was officially and solely attributed in the chairman's speech for 1954 to their lower prices to the general public which had been instituted at the beginning of the year. Shareholders were also told that the new addition to their factory was nearly completed, that the machinery had been delivered and that it was hoped to have the manufacture of layer type batteries (*Batrymax*) started in the near future. These batteries had previously been imported.

The Ever Ready Company (Great Britain), Ltd., issued its report about the same time and for the financial year ended February 28, 1955. Consolidated trading profit was returned at the new high level of £1,713,000 against £1,229,000. The chairman stated that the increased profits had been achieved by reason of greatly increased sales, these having reached record figures in most departments of the business, the total of the company's business at home having exceeded all previous records.

Their All-dry radio set was mentioned with the advice that the additional facilities for its manufacture, to which he had referred in his statement of last year, had been working at peak level. Further extensions to this department had been put in hand this year.

He continued with the advice that during the year considerable progress had been made by their subsidiary company in Germany which had experienced a good year's trading. There were, however, still a number of accounting and exchange difficulties which had made impossible the consolidation of the respective accounts.

New outlets for their products were noticed with the advice that they were continually seeking them, that there was no doubt that the use of electronic devices of many types had created and would create additional demands for portable forms of electricity which they manufactured. They were also equipping new electronic development laboratories to investigate all possibilities of extending the uses of their dry batteries.

The transistor was mentioned with the expression of the opinion that it was the most important recent development in the electronic industry as with its small size, and greatly increased efficiency, it removed most of the obstacles to portability in electronic devices. As the most convenient and economical source of portable electric power for many years had been dry batteries, more and more would be needed as more and more electronic devices became portable.

The Garrard Engineering and Manufacturing Co., Ltd., reported that for the financial year ended January 31, 1955, trading profit reached the new high level of some £335,400 against the region of £290,200. The chairman said that these record results had been achieved in spite of wage increases and rising costs of materials. By the installation of the latest machinery and improved methods of production they had been able to increase their turnover and so avoid increasing the price of their units.

Otherwise, capital expenditure on extensions to their factory, plant, machinery and equipment generally during the year had amounted to £202,500, while the branch they had established in Australia gave every indication of success. Sales abroad were described as having shown a substantial increase over the previous year's figures, and these sales had been maintained without detriment to the home market where sales had also increased by a similar percentage. The future was viewed with optimism in view of the orders in hand and the interest being shown in the company's products both at home and overseas.

Ultra Electric (Holdings), Ltd., published their report for the financial year ended March 31, 1955, with trading profit at the new high level of £375,400 against £269,700 for 1954. The former figure was the highest point in a steadily firming trend which has been evident since 1950. It might be noted that for the previous year of 1949 a loss was returned.

The chairman's speech for 1955 stated, first, that there had been a noticeable recession in general demand for radio and television in the spring and early summer. But in July, however, there had been a marked recovery. From that time the demand for their products had continued at a high level which they had been unable to satisfy wholly in spite of production having been at a much higher rate than in the previous year.

A further point was that home sales of Ultra radio and television receivers during the year accounted for a greater proportion of the industry's total than in any previous year, that this lead had been maintained and the sales in the current year were already substantially better than a year past. After giving the figures for the increased number of television licenses he expressed the opinion that there were good prospects of this rate of expansion continuing.

The latest receivers with the increased picture size were mentioned in conjunction with the information that they had many advantages, which resulted in the growing up of a considerable replacement market, also that this would be stimulated by the new I.T.A. programmes.

A final point was that the company was well to the fore in new fields of applied science and that orders were already resulting from these activities. As a result, combined with the expansion of the radio and television business, they were loading their manufacturing capacity to the full. Further manufacturing space was consequently an urgent necessity. They had therefore decided to erect a new factory of approximately 100,000 square feet at Gosport where employment and other conditions seemed to be favourable to such an undertaking.

(Continued on page 337)

Financial Review

—continued

Broadcast Relay Service, Ltd., issued its report about the same time, and also for the financial year ended March 31, 1955, which showed trading profit at the new high level of £2,928,000 odd against £2,431,000 for 1954. Contingencies reserve for 1955 was shown as having been allocated £1,200,000 compared with £800,000, whilst taxation absorbed £703,800 against £750,400 for 1954.

E. K. Cole, Ltd., returned a net profit, also for the financial year ended March 31, 1955, of £323,000 against £181,300 for 1954 and £134,200 for 1953. Taxation for 1955 was shown as £402,750 compared with £407,500 for 1954 and £400,600 for 1953. City comment was inclined to centre round the large amounts in current assets and liabilities, *i.e.*, some £5,279,000 against the region of £4,079,000 for the former and £2,737,000 against £2,115,000 for the latter.

The ordinary shares of the companies discussed above participated in the generally active and buoyant conditions which prevailed in the industrial department of the London Stock Exchange during the period in which their annual reports and accounts were issued.

As will be seen from the attached share price table they all finished at or around the highest levels of the year, so far. Broadcast Relay Services 5s., Garrard Engineering and Manufacturing 1s., E. K. Cole 5s., and Ultra Electric Holdings 5s. were noteworthy in that they enjoyed the largest turnovers, with fair-sized business, for both buying and selling orders, readily transactable outright.

Fairly free dealing conditions and an average-sized turnover were evident for Ever Ready (Great Britain) 5s. Dealing conditions for Telegraph Condenser 10s., however, were not so free nor was business so regularly completed.

Name	Class	1955 High	Low	Latest
Broadcast Relay Services	5/-	49/3	37/3	47/9
Cole, E. K.	5/-	25/-	18/3	23/9
Ever Ready (Great Britain)	5/-	37/6	22/3	37/6
Garrard Engineering & Manufacturing	1/-	3/3	1/10½	3/-
Telegraph Condenser	10/-	51/6	41/-	51/3
Ultra Electric (Holdings)	5/-	20/-	14/4½	19/9

New Books and Trade Literature

Questions and Answers on Radio and Television

THIS is the fifth edition of a handy little pocket book by E. Molloy, whom readers will recognise as editor of those other encyclopaedic works published by Newnes for engineers, namely, *Radio and Television Servicing Manual*, and *Radio and Television Engineers' Reference Book*. This new edition has been revised and enlarged to cover important recent advances in radio and TV techniques. The section on f.m. radio has also been augmented in view of the new v.h.f. f.m. sound broadcasting service.

The information throughout is presented in question and answer form, liberally illustrated with diagrams and circuits. The first question in the book is: *What is Electric Current*? The last question is: *Mention some of the Applications of Closed Circuit Television.* Between these two extremes a wide range of subjects related to radio and television techniques is covered in a simple non-mathematical manner.

Chapter headings inc ude: *Fundamental Principles of the Electric Circuit; Electrical Generators and Motors; Microphones and Loudspeakers; Principles of Radio Transmission and Reception; The Valve; Power Supply Units; Principles of Television.*

It is emphasised that the book is not a text-book in itself, but is intended as complementary to existing text-books on the subject.—P.P.H.

Questions and Answers on Radio and Television, by E. Molly. Published by George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Size: 6½in. × 4¼in.; 148 pages; illustrated. Price 6s.

World Radio-Television Handbook, 1955

THIS well-known publication, now in its ninth edition, is considerably enlarged, and lists, with a few minor exceptions, the great majority of the radio and television broadcasting stations currently operating throughout the world.

The information given is comprehensive, including details of publications and leading personalities associated with various broadcasting organisations in addition to complete data about frequencies and time of operation of various services. Musical quotations of interval signals are reproduced as an aid to easy identification.

The book is well illustrated with pictures and maps supplementing the data of the text, and is a useful reference book for any dealer or engineer who is often required to be knowledgeable about foreign short-wave broadcasting stations.—J.R.

World Radio-Television Handbook, 1955, *Ninth Edition*, edited and published by O. Lund Johansen, Lindorffsalle 1, Hellerup, Copenhagen, Denmark. Size: 8½in. × 6½in.; 160 pages; illustrated. Price 9s. 6d.

Operation TV

THIS is an American book which sets out to instruct the layman in the mysteries of proper television receiver adjustment, and it is, therefore, a book which could serve a useful purpose in this country too, where so much of an engineer's time is wasted in service calls to adjust new sets. Unlike so many books which attempt to teach the non-technical viewer how to use his set, this one confines itself to its terms of reference and does not concern itself with matters beyond the scope of the viewer.

The treatment is non-technical, although enough technical terms are introduced and explained to enable to the reader to understand what the various knobs on his receiver do. There is a certain amount of naive analogy used for explanatory purposes. The following quote illustrates the style adopted.

"*Whenever we think of this control by the sync. pulse, we think of a well-known humorous scene in an old-fashioned Western-movie thriller. The scene usually shows a 'tough guy' stalking into a saloon and bragging about how tough he is. Just to prove that he is tough, he picks on the most innocent-looking bystander and bellows 'Dance.' At the same time he takes out his guns and starts shooting at his victim's feet. Every time the 'tough guy' shoots, his victim jumps. The number of bullets shot and the rate at which they come towards the victim will determine how fast and how often he will jump. In this illustration, the victim represents the Horizontal-Sweep circuit in your receiver and the bullets represent the sync. pulses that trigger the victim into action, just as the sync. pulse triggers the circuit.*"

The author does, however, treat his subject with a persuasive logic in a pleasant conversational style, and there is little doubt that most owners of TV sets would benefit considerably from a course of *Operation TV*, resulting in fewer demands for dealer service because of inability to re-adjust a preset control.—P.P.H.

Operation TV, by Stephen A. Madas. Published by Vantage Press, Inc., 120 West 31st Street, New York 1, N.Y., U.S.A. Size: 8½in. × 5½in.; 82 pages. Price $2.50.

Financial News

It is pointed out that winding-up proceedings and liquidations are frequently rendered necessary for the purpose of reconstruction, extension of capital, transfer of business, etc., quite unconnected with any financial embarrassment, and the fact that companies appear in this list, therefore, must not be taken as necessarily indicating any want of solvency.

BANKRUPTCY

Morris Revere, 4 Tees Drive, Harold Hill, Essex, formerly trading as R. & G. Radiovision, 62 Stoke Newington High Street, London, N.16, radio dealer. The debtor was granted his discharge subject to a suspension of nine months by Mr. Registrar Bowyer at London Bankruptcy Court, Carey Street, W.C., recently.

Mr. W. Whitehead, Assistant Official Receiver, said that the Receiving Order was made against the debtor on March 4, 1954. His ranking liabilities amounted to some £5,475 and his assets had realised £113. A large part of the debtor's business was selling radio and television sets on hire purchase terms. During 1952 the Government imposed restrictions regarding the amount of deposit customers were to put down, and it had a serious effect on his trading.

Barry Osmond Tozer, 78 Wick Street, and 2A Essex House, Wick Street, Littlehampton, Sussex, trading as Wicks Radio., cycle and radio dealer, etc. As a result of a meeting of creditors of the above held recently at Littlehampton the debtor has executed a Deed of Assignment in favour of Mr. L. S. Findlay, C.A., of Messrs. Poppleton and Appleby, 4 Charterhouse Square, London, E.C.1, as trustee of the estate.

The debtor commenced business on his own account in February, 1954, and according to an approximate statement of affairs the liabilities amount to £2,184 3s. 9d. against assets estimated to realise £1,543 5s. 7d., leaving a deficiency of £640 18s. 2d.

DISSOLUTION OF PARTNERSHIP

Philip Augustin Daniels, Philip Thomas Daniels, Roy Daniels and William Whiting, carrying on business under the style of Daniels, Sons and Whiting, radio dealers, etc., Midhurst. All debts by Philip Augustin Daniels, Philip Thomas Daniels and Roy Daniels who will continue under the style of Daniels and Sons.

Thomas Dunlop, R. L. Burgess and D. A. Brooks, carrying on business as "Burgess & Dunlop," (Radio dealers), Winchester Street, Whitchurch, Hampshire. All debts by Messrs. Clarke & Son, solicitors, 17 Church Street, Whitchurch.

Denis Arthur Faulkner and Robert William Turnham, carryong on business under the style of Radio & Television Service Co., 14 Horsemarket, Northampton, radio and television engineers, so far as concerns Robert William Turnham who retires. All debts by Denis Arthur Faulkner who will continue.

Walter Thomas Hughes, Percy Spencer Hughes, and Edgar William Hughes, trading as A. E. Hughes & Sons, Clarence Place, Skinner Street, and Chepstow Road, Newport, Mon., radio and television dealers, etc. All debts by Walter Thomas Hughes and Percy Spencer Hughes who will continue.

Robert Henry Knox and Walter Harvey Knox, carrying on business under the style of "Knox Brothers Relay Services," Berwick-upon-Tweed, wireless relay services. All debts by Robert Henry Knox who will continue under the style of "Knox Relay Services."

INCREASE OF CAPITAL

Financings, Ltd., Kent House, 89 Regent Street, W.1. Registered capital of £5,000 increased by £5,000.

G. E. Mortley Sprague & Co., Ltd., Lyons Crescent, Tonbridge, Kent. Registered capital of £7,000 increased by £43,000.

Gloucestershire Finance Trust, Ltd., 2 Rock Street, Oldham. Registered capital of £5,000 increased by £15,000.

Gresham Facilities, Ltd., 64 Wool Exchange, Coleman Street, E.C.2. Registered capital of £1,000 increased by £4,000.

Great Yarmouth Radio Relays, Ltd., 6 Hall Quay, Gt. Yarmouth. Registered capital of £11,000 increased by £7,000.

Insulating Sleeving and Tapes, Ltd., Electron Works, Brook Street, Preston. Registered capital of £15,000 increased by £35,000.

Ivan Strudwick, Ltd., 53 High Street, Keynsham, Bristol. Registered capital of £2,000 increased by £3,000.

J. B. Finance, Ltd., 71 High Street, Southend-on-Sea. Registered capital of £100 increased by £14,900.

J. H. Dunkley & Son, Ltd., 187 Lower Clapton Road, E.5. Registered capital of £1,000 increased by £9,000.

Kenwood Electrics, Ltd., 78 Old Broad Street, E.C.2. Registered capital of £1,000 increased by £7,500.

Kenwood Manufacturing Co., Ltd., 78 Old Broad Street, E.C.2. Registered capital of £15,500 increased by £36,000.

Keystone (Southend) Finance Co., Ltd., 28 High Street, Southend-on-Sea. Registered capital of £100 increased by £3,900.

Kingsland Finance Co., Ltd., 1/2 Sandringham Mansions, Exeter Road, Bournemouth. Registered capital of £20,000 increased by £30,000.

Kolster-Brandes, Ltd., Gray Works, Sidcup, Kent. Registered capital of £250,000 increased by £150,000. Standard Telephones & Cables, Ltd., hold nearly all the issued shares.

Lapo Credit Facilities, Ltd., 183 Stoke Road, Gosport, Hants. Registered capital of £2,000 increased by £8,000.

L. M. Boys, Ltd., 1 and 1a, Dawson Street, S.E.18. Registered capital of £450 increased by £600.

Longstreets Radio, Ltd., 146 Whiteladies Road, Bristol. Registered capital of £1,000 increased by £2,500.

Luton Broadcast Relay Service, Ltd., 8 Queens Square, Luton. Registered capital of £8,500 increased by £21,500.

L. W. Cole (Distributors), Ltd., 5 Ryder Street, Birmingham, 4. Registered capital of £12,000 increased by £4,000.

NEW COMPANIES

Carnville Finance Co., Ltd. Capital £100. Objects: To carry on the business of hire purchase financiers, etc. Subscribers: Jean Herbert and Claire Moore. The first directors are to be appointed by the subscribers. Secretary: T. A. Herbert.

Castle Sports, Ltd. Capital £10,000. Objects: To carry on the business of dealers in, repairers and manufacturers of radio, television, gramophone and electrical goods, articles, accessories and components, refrigerators, washing machines and other domestic equipment, gramophone records, perambulators, cycles, etc. Directors: Ernest L. G. Loader and Alfred E. Whybrow. Solicitors: Hunt & Hunt, 13 Western Road, Romford, Essex.

C. B. McAllan (Production), Ltd. Capital £1,000. Objects: To carry on the business of mechanical, experimental, designing, constructional, consulting, chemical, electrical, radio and general engineers, etc. Directors: Dennis J. Fry and Charlotte B. E. McAllan. Secretary: C. B. E. McAllan. Registered office: 295 Regent Street, W.1.

Cecil Grainge, Ltd. Capital £2,000. Objects: To acquire the business of dealers in radio and television carried on by Cecil Grainge at 174/176 Lambeth Walk, S.E.1. Directors: Harry Goldstein, Mina Goldstein, and Cecil Grainge. Secretary: Aileen Goldstein. Registered office: Terminal House, Grosvenor Gardens, S.W.1.

C.F.T., Ltd. Capital £25,000. Objects: To finance or assist in financing hire purchase or deferred payment or similar transactions, etc.

C. G. Electrics, Ltd. Capital £500. Objects: To carry on the business of electricians, radio and electrical engineers, etc. Directors: Charles G. Robertson and Mrs. Elizabeth M. R. Robertson. Solicitors: Gerald Wilson & Bell, Guildford, Surrey.

C. Gilbert, Ltd. Capital £5,000. Objects: To acquire the business of an electrical engineer and contractors, radio and television dealer carried on by Cyril Gilbert at Long Eaton, Derbyshire, as "C. Gilbert," etc. Directors: Cyril Gilbert and Mrs. Mary Gilbert. Secretary: D. J. Lucking. Registered office: 69 High Street, Long Eaton.

Channel Electronic Industries, Ltd. Capital £5,000. Directors: Ronald F. Scarisbrick and Mrs. Hilda Scarisbrick. Secretary: R. F. Scarisbrick. Registered office: 8/12 Princess Street, Burnham-on-Sea, Som.

Charterwell Finance, Ltd. Capital £500. Objects: To carry on the business of hire purchase financiers, etc. Directors: Geo. D. Ashcroft and Edwin Grimshaw. Secretary: Edwin Grimshaw. Registered office: 30 Brown Street, Manchester, 2.

Chesterfield Finance Co., Ltd. Capital £10,000. Objects: To carry on the business of hire purchase financiers in connection with motor cars, wireless and television sets, etc. Solicitors: Jones & Middleton, Chesterfield.

Christopher Boyles, Ltd. Capital £100. Objects: To carry on the business of manufacturers, wholesalers, retailers, importers and exporters of and dealers in electrical and mechanical equipment of all kinds, consultants and advisers on electrical, mechanical and radio equipment, etc. Directors: Christopher Boyles and Mrs. Gwendoline Boyles.

City & General Finance Co., Ltd. Capital £20,000. Objects: To carry on the business of financiers for the promotion of the sale for cash, or on credit, instalment plan, and hire purchase of bicycles, tricycles, motor cycles, side-cars, motor-cars, perambulators, gramophones, wireless sets, etc. Directors: David M. Caplan, Hyman W. Cooney, Jack Ross, and Abraham Cooney. Secretary: Maurice Frankel. Solicitors: Saunders, Sobell, Greenbury, Leigh, E.C.2. Registered office: 40 Portland Place, W.1.

Clem Jackson (Redditch), Ltd. Capital £5,000. Objects: To acquire the business of dealers in motor-cycles, cycles and radio previously carried on by Clement Jackson as "C. Jackson" at 66 Evesham Street, Redditch. Directors: Clement Jackson, Mrs. Florence and A. Jackson. Secretary: Iris Williams. Registered office: 66 Evesham Street, Redditch, Worcs.

C. M. Hire Purchase, Ltd. Capital £100. Directors: John B. Gould, Alban P. B. Gould, and Patricia B. Gould. Secretary: Esther N. Bamber. Solicitor: Alban P. B. Gould, 348 St. John Street, E.C.1. Registered office: 28 Uxbridge Road, W.5.

Coalway Finance Co., Ltd. Capital £10,000. Directors: Reay V. Wood and Jas. A. Stokes. Secretary: Irene M. Thomas. Registered office: 102 Coalway Road, Wolverhampton.

Colben Radio and Engineering Co., Ltd. Capital £1,000. The first directors are to be appointed by the subscribers. Solicitors: Neish, Howell & Haldane, 47 Watling Street, E.C.4.

Coleman Finance, Ltd. Capital £1,000. Objects: To finance hire purchase agreements, etc. Leslie H. Salter is the first director. Secretary: Joan I. M. Monk. Registered office: 68 Coleman Street, E.C.2.

Compacta Ltd.—Capital £100. Objects: To carry on the business of mechanical, heating, ventilating, electrical and electronic, optical, consulting and precision engineers, etc. Directors: Mrs. Olive A. Redhead and Mrs. E. E. Redhead. Secretary: Olive A. Redhead. Registered office: 225 High Road, Ilford, Essex.

Conway Finance Company Ltd.—Capital £100. Objects: To carry on the business of financing hire purchase agreements, etc. Directors: Cyril F. Charlton, Norman B. Murrell, and Alan T. Murrell. Solicitor: W. H. Hopkins, 455 Green Lanes, N.13. Registered office: 455 Green Lanes, Palmers Green, N.13.

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CLASSIFIED ADVERTISEMENTS

Rates: 4d. per word (Minimum 18 words) per insertion. Box Numbers 6d. extra. Series rate on application. Copy and remittance should be sent to the Classified Advertisement Manager, British Radio and Television, 92 Fleet Street, E.C.4, before the 10th of each month preceding publication. Classified advertisements must be prepaid.

SITUATIONS VACANT

Engagement of persons answering these advertisements must be made through the local office of the Ministry of Labour or Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless otherwise excepted from the provisions of the Notification of Vacancies Order 1952.

DUE to continuous expansion, DERWENT TELEVISION have a number of vacancies for experienced Television Engineers and Testers, particularly those interested in Band III. The positions are interesting, progressive, well paid and permanent. Apply: Wadsworth Road, Perivale, Greenford. Tel.: PERivale 6488.

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AUCTIONS

EVERY THURSDAY AT 11 a.m.
TELEVISIONS, radios, washing-machines, fridges, heaters, etc. We can clear your surplus quickly and obtain the highest price for you. Eastern Auction Mart, Whitehorse Lane, Mile End Road. Opposite Stepney Green Station. STE 3993/3296.

FINANCE

INSTALMENT SALES, any lines, any prices. For details of Easy Payments Plan and full finance available to dealers apply Ladbrook Discount Company, Ltd., 101 Leadenhall Street, London, E.C.3.

DEALERS wishing to develop Hire Purchase and Credit Sales business apply for facilities and advice to British & F. E. Co., Ltd., 37-40 Cheapside, London, E.C.2.

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