

POCKET SUPERHET BLUEPRINT INSIDE!

PRACTICAL 1/6

NOVEMBER
1960

WIRELESS

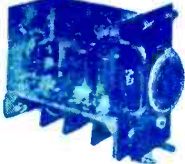
FREE for this pocket
BLUEPRINT **TRANSISTOR**
RADIO



PLUS
PRIVILEGE
PRICE OFFER

SPECIALLY DESIGNED
LIGHTWEIGHT CASE AND DIAL

R.F. UNIT CONVERTORS



Undoubtedly the most useful Govt. surplus units ever released. The R.F. units will extend the frequency range of your receiver to enable you to receive amateur, TV and V.H.F. stations.

R.F.24
Frequency 20-30 Mc/s. switched complete with 3 valves and circuit. **22/6**
P. & P. 3/6

R.F.25
Frequency 40-50 Mc/s. switched complete with 3 valves and circuit. **8/6**
P. & P. 3/6

R.F.27
Frequency 65-85 Mc/s. slow motion illuminated tuning, complete with 3 valves and circuit. **29/6**
P. & P. 3/6

HI-FI HEADPHONES

These miniature Hi-Fi phones use high quality permanent magnetic speakers with regulated voice coil. The soft rubber ear moulds give correct spacing for optimum acoustic load. Each unit has a built-in miniature Hi-Fi transformer to ensure the finest music and voice reproduction. Supplied free is a small transformer unit which steps impedance up to 4000 ohms. Only 15/-. P. & P. 2/6.

MICROPHONES. BRAND NEW. Throat magnetic 4/6; Throat carbon 3/6; No. 8 carbon with switch 6/6; No. 7 moving coil 7/6. Tannoy power mikes only 5/-. Crystal mike 22/6.

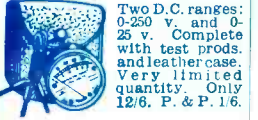
HOOVER ROTARY TRANSFORMERS
12 v. input, 500 v. output at 65 mA. or 6v input, 250 v. output at 75 mA.

Only **10/6** EACH
P. & P. 2/-.
POCKET MULTI-METER BRAND NEW. 2,500 o.p.v. Multi range 0/00/100/1,200 v. A.C., d.t.t.o.D.C. 0-1K, 0-1 megohm; 400 Micro-A., 12 mA., 300 mA.—0 to +64 db 5 ranges; 3in. x 4 1/4in. x 1 1/2in. Large clear dial. Leads supplied. Our Price 70/-. P. & P. 2/6.

COMPLETE HEADPHONE ASSEMBLY. A must for every constructor and "Hi-Fi" consists of moving coil padded headphones and "press to talk" microphone. 10/-. P. & P. 3/6.

PRECISION 1% RESISTORS Manufactured by Electrothermal, we offer the following values: 100K, 400K, 500K, all ±1% 1 watt, 1/9 each; 20/- per dozen.

POCKET VOLT TEST METER
Two D.C. ranges: 0-250 and 0-25 v. Complete with test prods. and leather case. Very limited quantity. Only 12/6. P. & P. 1/6.



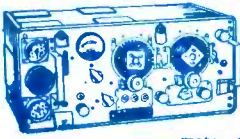
NEW!

SUPER MINIATURE EARPHONE FOR TRANSISTOR CIRCUITS

Here is a really sensitive dynamic earphone of exceptional fine quality. This lightweight miniature earpiece is convenient and comfortable to wear. The practically invisible cord is connected to the earphone. Provides clear reproduction of music as well as speech. Fully Guaranteed and supplied complete with transparent ear insert, 3 feet cord, sub-miniature plug and socket. Model CR.5 Crystal Earpiece, high imp. .. 8/- P. & P. Model MR.4 Magnetic Earpiece, low imp. .. 7/- 1/-



WIRELESS SET No. 19 MK. II



Incorporates "A" Set -TX/RX covering 2-8 Mc/s (37.5-150 metres). "B" Set-VHF TX/RX covering 230-240 Mc/s. (1.2-1.3 metres) and intercom amplifier. Complete with 15 valves, 500 microamp check and tuning. meter, circuit and instruction book. In used condition. 65/-. Carr. 10/-.

PORTABLE

TRANS/RECEIVER No. 18

A self-contained Trans/Receiver for Telephone and C.W. Range approx. 10 miles. Freq.: 6-9 Mc/s. (30-33.3 metres). Valve line-up: 3 ARP-12, 2 AR-8, 1 ATP4. Complete with aerial, H.T. and L.T. meter and all accessories. Weight 20 lbs. Size 8 x 10 x 17in. Only 80/-. Carr. 10/-.



TWO TRANSISTOR POCKET RADIO with Miniature Speaker

Anyone can build it!



This powerful pocket radio gives reception over the entire broadcast band. Complete with all parts, including 2 transistors, exclusive ferrite rod, miniature speaker tuning condenser, plastic case, wiring diagram, and step by step instructions. Size 4 1/2 x 3 ins. ONLY 27/6. P. & P. 1/6. Battery 1/- extra.

SPARE VALVE KIT

Here's a gift for all 38 and 18 Set owners! Case contains 4 ARP12 & 1 ATP4 valves. Only 40/-. P. & P. 2/6.



U.S.A. WHIP AERIALS. 12ft. 12/6, P. & P. 2/6. 1 m METER, 2in. round, 17/6. P. & P. 1/6. **CRYSTAL DIODES** 6/- per doz. P. & P. 1/-.

ACCUMULATOR

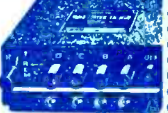
3 volts, 16 A.H. (unspillable). Ideal for 6 and 12 volts supply, etc. Brand new. Original cartons. Size 4in. x 7in. x 2in., 5/6 each. P. & P. 1/6. 3 for 15/-. P. & P. 3/6. 6 for 27/6. P. & P. 5/-.



PRINTED CIRCUIT KIT. Easily and quickly you can make miniature professional printed circuits. Complete with illustrated manual. 19/6. P. & P. 1/6.

CONTROL BOX - B.C. 602

Complete push-button control box. 4 position and on/off with dual coloured indicators for instant channel check. In black crackle case 4 1/2in. x 3 1/2in. x 1 1/2in. Bargain price, 5/- each. P. & P. 1/6. Two for 8/-. P. & P. 2/6.



VARIABLE TRANSFORMERS

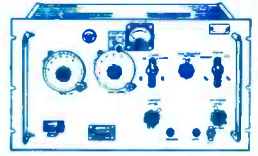
Input voltage 230 v. continuously variable output from 0-280 v. Supplied complete. Model B.5 Current rating 5 amps. £18.5.0 Model B.10 Current rating 10 amps. £18.5.0 Model B.20. Current rating 20 amps. £32.10.0 ALL FULLY GUARANTEED.



POLICE - AIRCRAFT - HAM RECEIVER 1392

15 VALVE SUPERHET. Frequency 95-150 Mc/s (2 to 3 metres). Valve line up: 1st and 2nd R.F. Amp. VR.136 (EF.54), 1st Local Oscillator VR.55 (SF.61), 2 Oscillator Multipliers VR.136 (EF.54), 3 I.F. Amp. VR.53 (EF.39), A.G.C. 6G7, Output 8J5, Muting VR.92 (EA.50), Noise Limiter VR.92 (EA.50), B.F.O. 6J7, Mixer VR.136 (EF.54), De Mod. 6G7. Slow motion tuning, normally crystal controlled, or tuneable over 95-150 Mc/s. Power supply required: 240-250 volts at 80 mA., 6.3 volts at 4 amps. Size 19 x 10in. Standard Rack Mounting.

PRICE COMPLETE
ONLY
£65.0
Carriage 15/-



Callers: 87 TOTTENHAM COURT ROAD, LONDON, W.1
Mail Orders: (DEPT. P), 32a COPTIC STREET, LONDON, W.C.1
Telephone: MUSum 9607

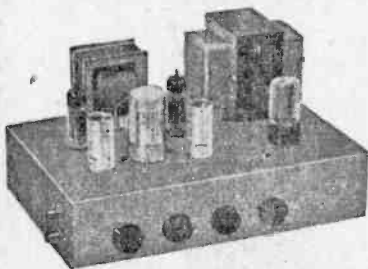
R.S.C. HI-FI TAPE RECORDER KIT

REALISM AT INCREDIBLY LOW COST, CAN BE ASSEMBLED IN HALF AN HOUR
The Recorder incorporates the Latest Collaro Studio Tape Transcriber. The Linear LT45X High Quality Tape Amplifier listed £12.10, High Flux P.M. Speaker listed 30/-, empty Tape Spool, a Reel of Best Quality Tape listed 22/6, and a Handsome Portable carrying Cabinet finished in Two-tone covering, size 18 x 13 x 9 1/2 in. high, listed £4.10.0, and circuit. Total cost if purchased individually approximately £40. Performance equal to units in the £60-£80 class. S.A.E. for leaflet.

HIGH FIDELITY 12-14 WATT AMPLIFIER TYPE A11

PUSH-PULL ULTRA LINEAR OUTPUT "BUILT-IN" TONE CONTROL PRE-AMP STAGES

Two input sockets with associated controls allow mixing of "mike" and gram, as in A10. High sensitivity, includes 5 valves, ECC83, ECC83, EL84, EL84, 5Y3. High Quality sectionally wound output transformer specially designed for Ultra Linear operation, and reliable small condensers of current manufacture. **INDIVIDUAL CONTROLS FOR BASS AND TREBLE** "Lift" and "Cut." Frequency response - 3 D.B. 30-30,000 c/c/s. Six negative feedback loops. Hum level 60 D.B. down. **ONLY 23 millivolts INPUT** required for **FULL OUTPUT**. Suitable for use with all makes and types of pick-ups and microphones. Comparable with the very best designs. For **STANDARD or LONG PLAYING RECORDS** For **MUSICAL INSTRUMENTS** such as **STRING BASS, GUITARS, etc.** **OUTPUT SOCKET** with plug provides 300 v. 30 mA and 6.3 v. 1.5 a. For supply of a **RADIO FEEDER UNIT**. Size approx. 12-9-7in. For A.C. mains 200-250 v. 50 c.p.s. Output for 3 and 15 ohms speakers. Kit is complete to last nut. Chassis if fully punched. Full instructions and point-to-point wiring diagrams supplied. **Only 8 Gns.** Carr. 10/-



If required louvered metal cover with 2 carrying handles can be supplied for 18/0. **TERMS ON ASSEMBLED UNITS. DEPOSIT 24/3, and 3 monthly payments of 24/3.** Send S.A.E. for illustrated leaflet detailing Ready-to-assemble Cabinets, Speakers, Microphones, etc., with cash and credit terms.

R.S.C. STEREO/TEN HIGH QUALITY AMPLIFIER

A complete set of parts for the construction of a stereophonic amplifier giving 5 watts high quality output on each channel (total 10 watts). Sensitivity is 50 millivolts, suitable for all crystal stereo heads. Ganged Bass and Treble Controls give equal variation of "lift" and "cut." Provision is made for use as straight (monaural) 10 watt amplifier. Valve line-up ECC83, ECC83, EL84, EL84, E281. Outputs for 2-3 ohm speakers. Point-to-point wiring diagrams and instructions supplied. Send S.A.E. for leaflet. **8 Gns.** Carr. 10/-

R.S.C. BATTERY CHARGING EQUIPMENT

ASSEMBLED CHARGERS
6 v. 1 amp. 19/9
6 v. or 12 v. 1 amp. 29/9
6 v. 2 amps. 29/9
6 v. or 12 v. 2 amps. 38/9
6 v. or 12 v. 3 amps. with ammeter. 59/9
Above ready for use. With mains and output leads. Carr. 3/6.

HEAVY DUTY CHARGER KIT
8 1/2 v. 6 amps. variable output. Consisting of Mains Transformer 0-200-230-250 v.; F.W. (Bridge) Selenium Rectifier; Ammeter, Multi-Position Switch with Knob; Panels, Plugs, Fuses, Fuseholder and circuit. 59/9. Carr. 4/8.



Assembled 6 v. or 12 v. 4 amps.
Fitted Ammeter and variable charge rate selector. Also selector plug for 6 v. or 12 v. charger. Louvred steel case with stoved blue hammer finish. **Fused 69/9** use with Carr. 5/- mains and output leads. Terms: Deposit 13/3 and 5 monthly payments 13/3.

ASSEMBLED CHARGER
6 v. or 12 v. 2 amps.
Fitted Ammeter and selector plug for 6 v. or 12 v. Louvred metal case finished attractive blue hammer finish. Ready for use with mains and output leads. Double Fused. **Only 49/9** Carr. 3/6

BATTERY CHARGER KITS
Consisting of Mains Transformer, F.W. Bridge, Metal Rectifier, well ventilated steel case. Fuses. Fuse-holders. Grommets, panels and circuit. Carr. 3/6 extra.
6 v. or 12 v. 1 amp. 24/9
As above, with Ammeter. 32/9
6 v. or 12 v. 2 amps. 25/9
6 v. or 12 v. 2 amps. including attractive sleeve of Ammeter. 42/9
6 v. or 12 v. 4 amps. 53/9
6 v. or 12 v. 4 amps. with Ammeter and variable charge rate selector. 59/9.
CHARGER AMMETERS.
0-1.5 a., 0-3 a., 0-4 a., 0-7 a., 0-25 a., 0-60 a. 8/9.

R.S.C. MAINS TRANSFORMERS

Interleaved and Impregnated. Primaries 200-230-250 v. 50 c/s. screened **TOP SIKROUDED DROP THROUGH**
250-0-250 v. 70 mA. 6.3 v. 2 a. 5 v. 2 a. 17/9
350-0-350 v. 80 mA. 6.3 v. 2 a. 5 v. 2 a. 18/9
250-0-250 v. 100 mA. 6.3 v. 2 a. 6.3 v. 1 a. 13/9
250-0-250 v. 100 mA. 6.3 v. 3.5 a. C.T. 25/9
250-0-250 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 25/9
300-0-300 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 25/9
350-0-350 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 25/9
350-0-350 v. 100 mA. 6.3 v. 4 a. 4 a. C.T. 0-4 v. 3 a. 25/9
350-0-350 v. 150 mA. 6.3 v. 4 a. 5 v. 3 a. 29/9
FULLY SIKROUDED UPRIGHT
250-250 v. 60 mA. 6.3 v. 2 a. 5 v. 2 a. 17/11
Midjet type 21-3-31n. 17/11
250-0-250 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 26/9
300-0-300 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 26/9
350-0-350 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 26/9
300-0-300 v. 130 mA. 6.3 v. 4 a. 5 v. 3 a. 26/9
for Mullard 510 Amplifier 35/9
350-0-350 v. 150 mA. 6.3 v. 4 a. 5 v. 3 a. 35/9
425-0-425 v. 200 mA. 6.3 v. 4 a. C.T. 6.3 v. 4 a. C.T. 5 v. 3 a. 49/9

FILAMENT TRANSFORMERS
All with 200-250 v. 50 c/s. primaries 6.3 v. 1.5 a. 5/9; 6.3 v. 2 a. 7/8; 0-4-6.3 v. 2 a. 7/8; 12 v. 1 a. 7/11; 6.3 v. 3 a. 8/11; 6.3 v. 6 a. 17/6; 12 v. 1.5 a. twice, 17/6.
OUTPUT TRANSFORMERS
Midjet Battery Pentode 66:1 for 834, etc. 3/8
Small Pentode 5,000 Ω to 3 Ω 3/8
Small Pentode 78,000 Ω to 3 Ω 3/8
Standard Pentode 5,000 Ω to 3 Ω 5/6
Standard Pentode 78,000 Ω to 3 Ω 5/6
10,000 Ω to 3 Ω 5/6
Push-Pull 10-12 watts 6V6 to 3n or 15 Ω 18/9
Push-Pull 10-12 watts to match 6V6 to 3-5-8 or 15n 19/9
Push-Pull EL84 to 3 or 15 Ω 18/9
Push-Pull 15-18 watts 6L6, KT66 22/8
Push-Pull for Mullard 510 Ultra Linear 29/9
Push-Pull 30 watts sectionally wound 6L6, KT66, etc. to 3 to 15 Ω 47/8

ELIMINATOR TRANSFORMERS
Primaries 200-250 v. 50 c/s.
120 v. 40 mA. 5-0-5 v. 15/9
90 v. 15 mA. 4-0-4 v. 500 mA. 8/9
SMOOTHING CHOKES
150 mA. 7-10 H 250 ohms. 11/9
100 mA. 10 H 200 ohms. 8/9
80 mA. 10 H 350 ohms. 5/9
60 mA. 10 H 400 ohms. 4/11
CHARGER TRANSFORMERS
All with 200-230-250 v. 50 c/s Primaries:
0-9-15 v. 1 a. 11/9; 0-9-15 v. 2 a. 14/9; 0-9-15 v. 3 a. 16/9; 0-9-15 v. 5 a. 19/9; 0-9-15 v. 6 a. 23/9.
AUTO (Step up/Step down) TRANS.
0-110-120-230/250 v. 50-80 watts. 13/9;
0-110-120-200/230/250 v. 150 watts 27/9.
MICROPHONE TRANSFORMERS
120:1 high grade, clamped, 8/9; 120:1 Potted, Mu-metal screened, 9/9.



25 1/2 GNS.
Carr. 7/6

H.P. TERMS. Deposit £5.76 and 12 monthly payments of 2 gns. Cash price if settled in 3 months.

TELEVISION RECEIVERS. 250 v. 200 mA. small size. Only 6/9 each. **RE-ENTRANT SPEAKERS.** Tanno, 8 watt. 7.5 ohms. Only 22/6 each. **Parneco Horn Type.** 10 watt. 15 and 200 ohm matching, 58/6. R.C.A. 20 watt. 15 ohms or 200 ohms. 6 gns.

PLESSEY 3-SPEED AUTO-CHANGERS
Brand new. Turnover sapphire styl. Many exclusive features. For 200-250 v. A.C. mains. Very limited number. at **Only 25/19.6.**

THE SKYFOUR T.R.F. RECEIVER. A design of a 3-valve Long and Medium wave 200-250 v. A.C. Mains receiver with selenium rectifier. High gain H.F. stage and low distortion detector. Power pentode output. Valve line-up 6K7, 6F61, 6V6G. Selectivity and quality excellent. Simple to construct. Point-to-Point wiring diagrams, instructions and parts list. 1/9. maximum building costs £4.19.6. Inc. attractive Walnut veneered wood cabinet 12 x 6 1/2 x 5 1/2 in.

H.C. SUPPLY KIT. 12 v. 1 a. consisting of a partially drilled metal case, mains trans., F.W. Bridge Rectifier, 2 fuseholders and fuses. Change Direction switch, variable Speed regulator and circuit. For 200-250 v. A.C. mains. Suitable for Electric Trains. Limited number available at **35/9.**

R.S.C. A12 STEREO-PHONIC AMPLIFIER KIT

A complete set of parts to construct a Stereo amplifier with an undistorted output total 3 watts. For A.C. mains input of 200-250 v. Outputs for matched 2-3 ohm speakers. Sensitivity 133 m.v. Ganged Vol. and Tone Controls. Preset balance control. Full instructions and point-to-point wiring diagrams supplied. Only good quality Carr. and pkg. 5-components and latest high grade valves used. Exceptionally realistic reproduction can be obtained at ample volume for the home, as can be demonstrated in typical surroundings at our County Arcade premises. A really sensational offer

4 Gns.

STEREO EQUIPMENT OFFER. Comprising A12 Kit, 2 matched 8in. L/Speakers, £6.19.6 and Acos T10 Stereo head Carr. 7/7 with sapphire stylus suitable most pick-ups.

PICK-UP ARMS complete with Hi-Fi turnover crystal head, Acos GP54. Limited number brand new, perfect, at approx. half price. Only 29/11.

ACOS CRYSTAL MICROPHONES. M1c40 stand or desk. Listed 45/-, only 27/9. 39-1 Stick types, listed 9 gns. Only 39/6.

R.S.C. 30 WATT ULTRA LINEAR HIGH FIDELITY AMPLIFIER A10

A highly sensitive Push-Pull high output unit with self-contained Pre-amp. Tone Control Stages. Certified performance figures compare equally with most expensive amplifiers available. Hum level 70 db. down. Frequency response -3 db. 30-33,000 c/s. A specially designed sectionally wound ultra linear output transformer is used with 807 output valves. All components are chosen for reliability. Over 100 types are used. EF85, EF86, ECC83, 807, 807, GZ33. Separate Bass and Treble Controls are provided. Minimum input required for full output is only 12 millivolts so that ANY KIND OF MICROPHONE OR PICK-UP IS SUITABLE. The unit is designed for CLUBS, SCHOOLS, THEATRES, DANCE HALLS or OUTDOOR FUNCTIONS, etc. For use with Electronic ORGAN, GUITAR, STRING BASS, etc. For standard or long-playing records, OUTPUT SOCKET PROVIDES L.T. and H.T. for a RADIO FEEDER UNIT. An extra input with associated vol. control is provided so that two separate inputs such as Gram and 'Mike' can be mixed. Amplifier operates on 200-250 v. 50 c/s. A.C. Mains and has output for 3 or 15 ohm speakers. Complete kit of 300 wiring diagrams and instructions. If required cover for A8 can be supplied for 18/9. The amplifier can be supplied, factory built with 12 months' guarantee, for £13.19.6. TERMS: DEPOSIT 31/9 and 9 monthly payments of 31/9.

FULL RANGE OF LINEAR AMPLIFIERS ALWAYS IN STOCK.

R.S.C. BATTERY TO MAINS CONVERSION UNITS

Type BM1. An all-dry battery eliminator. Size 5 1/2 x 7 1/2 x 4 1/2 approx. Completely replaces battery supplying 1.4 v. and 90 v. where A.C. mains 200-250 v. 50 c/s is available. Suitable for all battery portable receivers requiring 1.4 v. and 90 v. This includes latest low consumption types.



Type BM2. Size 8 x 5 1/2 x 2 1/2 in. Supplies 120 v. 90 v. and 60 v., 40 mA. and 2 v. 0.4 a. to a fully smoothed. Thereby completely replacing both H.T. batteries and L.T. accumulators when connected to A.C. mains supply 200-250 v. 50 c/s. SUITABLE FOR ALL CHANGERS with Stereo/Monaural pick-ups.

VERS normally using 2 v. accumulator. Complete kit of parts with diagrams and instructions. 49/9, or ready for use, 59/6.

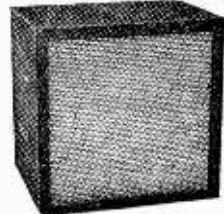
R.S.C. 3-4 WATT A7 HIGH-GAIN AMPLIFIER

For 200/250 v. 50 c/s. Mains input. Appearance and Specification with exception of output wattage as A5 amplifier. Complete Kit with diagrams. £3.15.0. Carr. 3/6.

COLLARO JUNIOR 4-speed single player units and Hi-Fi crystal pick-up with turnover head, £3.19.6.

E.S.R. (U.A.S.) 4-SPEED AUTO-CHANGERS with Stereo/Monaural pick-up head, £7.19.6. Carr. 5/-. TERMS: C.W.O. or C.O.D. No. C.O.D. under #1. Post 1/8 extra under #2. 2/9 extra under #6. S.A.E. with all enquiries.

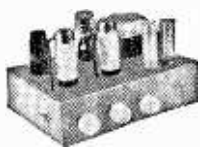
12in. 10 WATT HIGH QUALITY LOUD- SPEAKER IN POLISHED WALNUT FINISHED CABINET



Gauss 12,000 lines. Speech coil 3 ohms or 15 ohms. Only £4.19.6 Carr. 5/-.

Terms: Deposit 17/9 and 9 monthly payments of 17/9. Only £7.19.6. Carr. 8/6.

R.S.C. 4.5 WATT A5 HIGH-GAIN AMPLIFIER



A highly-sensitive 4-valve quality amplifier for the home, small club, etc. Only 50 millivolts input is required for full output so that it is suitable for use with the latest high fidelity pick-up heads, in addition to all other types of pick-ups and practically all 'mikes'. Separate Bass and Treble Controls are provided. These give full long-playing record equalisation. Hum level negligible being 70db. down. 15db. of Negative feedback is used. H.T. or 300 v. 25 mA. and L.T. of 6.3 v. 1.5 a. is available for the supply of a Radio Feeder Unit, or Tape-Deck pre-amplifier. For A.C. mains input of 200-250 v. 50 c/s. Output for 2-3 ohm speaker. Chassis is not alive. Kit is complete in every detail and includes fully punched chassis with instructions. Exceptional value at only £4.15.0. or assembled ready for use 25/- extra, plus 3/6 carr.; or Deposit 22/6 and 5 monthly payments of 22/6 for assembled unit.

R.S.C. PORTABLE GUITAR AMPLIFIERS

Junior 5 watts High Quality output. Separate Bass and 'Treble Cut' and 'Boost' controls. Sensitivity 15 m.v. Twin inputs. High Flux 8in. Loudspeaker 'built-in'. Handsome, strongly made Cabinet (size approx. 14 x 14 x 7in.) finished in satin walnut, and fitted carrying handle. H.P. Terms. Deposit £1 and 9 monthly payments of £1.

£8-19-6

Carr. 7/6

Senior 10 watts High Fidelity output. Separate Bass and Treble 'Cut' and 'Boost' controls. Twin separately controlled high gain inputs so that two instruments such as Guitar and String Bass can be used at the same time. Two loudspeakers are incorporated, a high Flux 12in. for Bass notes and a 7 x 4 in. elliptical for Treble. Cabinet is well made and finished satin walnut. Size approx. 18 x 18 x 12in. H.P. Terms. Deposit 34/9 and 9 monthly payments of 34/9. Carr. 10/-

15 gns.

SPECIAL TRANSISTOR OFFER. T51 Brimar. Brand new. Perfect. 3 for 10/9

AM FM RADIOGRAM CHASSIS for 200-250 v. A.C. mains only. 3 wavebands. V.H.F. Medium and Long. Built in Ferrite rod aerial. Attractive glass dial size 16in. long by 4in. high. Valve line up EF85, ECH81, ECC85, EABC80, EL84, EZ80. High quality output of up to 4 watts. Overall size 16in. x 4in. x 5in. Only £12.19.6. Carriage 10/-.

PLESSEY DUAL CONCENTRIC 12in. 15 ohms HIGH FIDELITY SPEAKER (12,000 lines) with built-in tweeter (completely separate elliptical speaker with choke, condensers, etc.) providing extraordinarily realistic reproduction when used with our A8 or similar amplifier. Rates 10 wats. Price only 25.17.6.

HI-FI CRYSTAL PICK-UP HEADS. Turnover type with sapphire stylus. HGP59. Standard replacement for Garrard and B.S.R. B.S.R. Ful-fi. Garrard GC2. 19/9. B.S.R. Stereo/Monaural 39/11.

F.M. SPEAKERS. 2-3 ohm. 2in. Perdio 21/9. 5in. 17/9. 6in. 16/9. 8in. 19/9. 8 x 5in. 25/9. 10in. 26/9. 10in. 12in. 29/11. 10in. W.B. 'Stentorian' 3 or 15 ohms type HF1012 10 wats. hi-fidelity type. Recommended for use with our A8 Amplifier. £4.10.6. 12in. Plessey 3 ohms 10 wats (12,000 lines). 59/6.

TWEETERS. Plessey 30 19/9. 15n 25/9.

GL3A MINIATURE 2-3 WATT GRAM AMPLIFIER. For use with any single or auto-change unit. Output for 2-3 ohm speaker. For 200-250 v. 50 c.p.s. A.C. mains. Over-all size 11 1/2 x 2 1/2 x 2 1/2 in. Controls: Vol. and Tone with switch. Guaranteed 12 months. Only 59/6.

SUPERHET FEEDER UNIT. Design of a high quality Radio Tuner Unit (specially suitable for use with any of our Amplifiers). Delayed A.V.C. employed. The V.Ch. Sw. incorporates Gram position. Controls are Tuning, W.Ch. and Vol. only 250 v. 15 mA. H.T. and L.T. of 6.3 v. 1 amp. required from amplifier. Size of unit approx. 9-6-7 in. high. Simple alignment procedure. Point-to-Point wiring diagrams, instructions and priced parts list with illustrations. 2/6. Total building cost £4.15.0. For descriptive leaflet send S.A.E.

COLLARO CONQUEST 4-SPEED AUTO-CHANGER with high fidelity Studio pick-up. Latest model. For 200-250 v. 50 c.p.s. A.C. mains. Our price £6.19.6. Carr. 5/6.

R.S.C. BRADFORD, MANCHESTER (Leeds) Ltd.

and LEEDS

Mail Orders to 29-31 Moorfield Road, Leeds 12. Callers to 5 and 7 County Arcade, Briggate, Leeds 1. and 8-10 Brown Street (Market Street), Manchester 2, or 56 Morley Street (next to Majestic Ballroom), Bradford.

BENTLEY ACOUSTIC CORPORATION LTD.

38 CHALCOT ROAD, CHALK FARM, LONDON, N.W.1.

Telephone: PRIMROSE 909J

EXPRESS POSTAL SERVICE. ALL ORDERS DESPATCHED SAME DAY AS RECEIVED. FOR ONLY 2/6 EXTRA TELEPHONE FOR THAT URGENT ORDER TO BE DESPATCHED IMMEDIATELY BY OUR SPECIAL C. O.D. SERVICE

OA2	17/6	6CH4	9/1	7R7	12/6	25Z5	9/6	D1	3/1	ECH42	9/7	HL2	7/6	PL38	26/6	U329	14/1	X79	21/3
OB2	17/6	6D3	19/11	757	9/6	25Z6U	10/10	D15	10/6	ECH81	9/7	HL41DD	19/3	PL81	10/6	U336	16/7	X81	46/5
OZ4	5/1	6D6	6/6	7V7	8/6	275V	19/11	D63	5/6	ECH83	13/11			PL82	7/6	U403	16/7	X101	33/2
IA3	3/1	6E5	12/6	7Y4	7/6	28D7	7/7	D77	4/6	ECL80	9/7	HL42DD		PL83	9/7	U404	8/6	X109	17/3
1A5	6/1	6F1	26/6	7Z4	18/7	30C1	8/10	DAC32	10/6	ECL82	10/6			PL84	12/8	U801	29/10	XID(1.5)	6/6
1A7GT	12/1	6F6G	7/1	8D2	3/6	30F5	7/7	DAF91	6/6	ECL83	19/3	HN309	24/7	PL820	12/6	U4020	16/7	XFG1	18/1
1C5	12/6	6F6GTM	8/1	8D3	4/6	30FL1	10/10	DAF96	8/6	EF9	23/3	HVR2	20/1	PM2B	18/6	U4BC80	9/7	XFY12	9/6
1D5	9/1	6F11	17/3	9RW6	15/3	30L1	8/10	DD41	13/11	EF22	14/1	HVR2A	6/1	PM12	6/6	U4AF42	9/6	XFY34	17/6
1D6	10/6	6F12	4/6	9D2	4/1	30L15	11/6	DF33	10/6	EF36	4/1	KF35	8/6	PM12M	6/6	UB41	12/1	XH(1.5)	6/6
1G6	17/6	6F13	11/6	10C1	13/1	30P12	7/6	DF66	15/1	EF37A	8/1	KL35	8/6	PM24M	21/3	UBC41	8/6	XSG(1.5)	6/6
1HSGT	10/6	6F14	26/6	10C2	26/6	30P16	7/6	DF70	15/1	EF39	5/6	KL32	24/7	PX4	10/6	UBC81	11/4	Y63	7/6
1L4	4/6	6F15	15/3	10D2	12/1	30PL1	11/6	DF91	4/6	EF40	15/1	KT2	5/1	PX25	59/8	UBF80	9/6	Z63	7/6
1LD5	5/1	6F16	9/6	10F1	26/6	30PL13	12/6	DF96	8/6	EF41	9/1	KT33C	10/1	PY31	16/7	UBF89	9/6	Z66	17/6
1LN5	5/1	6F17	12/6	10F9	11/6	33A/158M		DF97	9/1	EF42	10/6	KT36	29/10	PY32	11/6	UBL21	23/3	Z77	4/6
1NSGT	10/6	6F23	10/6	10LD3				DH63	6/6	EF50(A)	7/1	KT41	12/6	PY80	7/6	UC88A	14/7		
1RS	6/6	6F32	10/6	10LD11				DH76	5/1	EF50(E)	5/1	KT44	12/6	PY81	8/6	UC88S	9/1		
1S4	9/1	6F33	7/6		15/11	35L6GT	21/3	DH77	7/1	EF54	5/1	KT61	12/6	PY82	7/6	UCF80	16/7		
1S5	6/1	6G6	6/6		15/11	35W4	7/6	DH81	46/5	EF53	10/6	KT66	15/1	PY83	8/6	UCH21	23/3		
1T4	4/6	6H5GT	3/1	10P14	19/3	35Z3	10/6	DH10	28/6	EF80	7/1	KT65	15/1	PZ30		UCH81	9/6	OA70	4/1
1U5	6/1	6J6G	5/1	11D3	24/7	35Z4GT	6/6	DH107	13/11	EF85	7/1	KT81	46/5	QP21		UCL82	11/6	OA79	4/1
2A7	10/6	6J5GTG	5/6	12A6	5/1	35Z5GT	9/1	DK32	12/1	EF86	10/6	KT83	22/6	QP25	14/6	Q150/15		OA81	4/1
2P	26/6	6J5GTG	6/1	12AC6	15/3	42	23/3	DK40	21/3	EF89	9/1	KTW61	6/6	QS15	10/6	UF41	9/1	OA86	6/1
2X2	4/6	6J6	5/6	12AD6	17/3	43	10/1	DK91	6/6	EF91	4/6	KTW62	7/6			UF42	9/1	OA91	5/1
3A4	6/1	6J7G	6/1	12AE6	13/11	50C5	10/1	DK92	9/1	EF92	4/6	KTW63	6/6	R12	9/6	UF43	12/6	OA95	5/1
3A5	10/6	6J7GT	10/6	12AH7	8/1	50CD6G		DK96	8/6	EF97	13/3	KTZ41	8/1	R18	14/1	UF80	10/6	OA99	5/1
3B7	12/6	6K7G	5/1	12AH8	12/6			DL33	9/6	EF98	13/3	KTZ63	7/6	R19	19/11	UF85	9/1	OA99	5/1
3D6	5/1	6K7GT	6/1	12AT6	7/6	50L6GT	9/6	DL66	17/6	EF183	18/7	L63	6/1	RK34	7/6	UF86	17/11	OA210	25/1
3Q4	7/6	6K8GT	10/6	12AT7	6/1	53KU	19/11	DL68	15/1	EK32	8/6	MH4(C)	7/1	S130	15/1	UF89	9/1	OA211	40/1
3QSQT	9/6	6K8G	6/6	12AU6	23/3	72	4/6	DL82	46/5	EL32	5/1	MHL4	7/6	SD6	12/6	UL41	9/1	OC16	54/1
3S4	7/6	6K25	19/11	12AU7	6/6	75	24/7	DL92	7/1	EL33	12/6	MHLD6	12/6	SP4(7)	14/6	UL44	26/6	OC19	54/1
3V4	7/6	6L1	23/3	12AV6	12/8	77	8/1	DL94	7/6	EL34	15/1	ML4	8/6	SP41	3/6	UL46	14/6	OC26	44/1
5FR4G	17/6	6L6G	8/1	12AX7	7/6	78	6/6	DL96	8/6	EL38	26/6	M54B	23/3	SP42	12/6	UL84	8/6	OC28	60/1
5LJG	6/6	6L6M	9/6	12BA6	8/1	80	9/1	DM70	7/6	EL41	9/1	MU12/14	8/1	SP61	3/6	UM4	17/3	OC35	48/1
5V4G	10/6	6L7GT	7/6	12BE6	9/1	83	15/1	EA50	2/1	EL42	10/6	N37	19/11	SU25	26/6	UM80	15/3	OC45	23/1
5Y3GT	6/6	6L18	13/1	12BH7	21/3	85A2	15/1	EABC80	9/1	EL81	12/6	N78	19/11	SU61	9/1	UR1C	9/1	OC65	22/6
5Z3	12/6	6L19	23/3	12E1	20/3	150B2	15/1	EAC91	4/6	EL84	7/6	N108	19/11	T41	23/3	UU6	19/11	OC66	25/1
5Z4G	9/1	6LD3	8/6	12J5GT	4/6	161	10/6	EAF42	9/1	EL85	13/11	N303	20/7	TDD4	12/6	UU7	16/7	OC70	14/1
5Z4GT	10/6	6LD20	15/11	12J7GT	9/6	185BT	33/2	EB34	2/6	EL91	10/6	N339	15/1	TH4B	15/1	UU8	26/6	OC71	14/1
6A7	10/6	6N7	8/1	12K5	17/11	185BTA	33/2	EB41	8/6	EL95	10/6	P61	3/6	TH41	26/6	UU9	7/6	OC72	17/1
6A8G	9/1	6P25	12/6	12K7GT	5/6	304	10/6	EB91	4/1	EM34	9/6	PABC80	23/3	TH233	33/2	UY1N	18/7	OC73	20/1
6A8T	8/1	6P28	26/6	12K8GT	14/1	305	10/6	EB33	23/3	EM71	23/3		13/11	TH2321	20/1	UY21	13/11	OC75	15/1
6A8B	9/1	6Q7G	6/6	12Q7GT	5/1	807	7/6	EBC33	5/1	EM80	9/1	PCC84	8/1	TP22	20/1	UY21	7/6	OC76	15/1
6AC7	4/1	6Q7GT	11/6	12SA7	8/6	956	3/1	EBC41	8/6	EM81	9/1	PCC85	9/6	TP25	15/1	UY85	15/1	OC77	21/1
6AG5	5/6	6R7G	10/1	12SC7	8/6	1821	16/7	EBC81	8/1	EM94	10/6	PCC88	18/1	TP2620	33/2	VP54B	15/1	OC78	17/1
6AK5	8/1	6SA7GT	8/6	12SG7	7/1	5763	12/6	EBF80	9/1	EN31	37/6	PCC89	11/6	TY86F	13/3	VM2(7)	12/6	OC79	14/1
6AL5	4/1	6SC7	7/6	12SH7	8/6	7475	7/6	EBF83	13/11	EY51	9/1	PCF80	8/1	U12/14	8/6	VP4	15/1	OC87D	17/1
6AM6	4/6	6SG7GT	8/1	12SJT	8/6	9005	5/6	EBF89	9/6	EY83	16/7	PCF82	10/6	U16	10/6	VP2B	14/6	OC81	18/1
6AQS	7/6	6SH7GT	8/1	12SQ7	6/1	AC/PEN		EBL21	23/3	EY84	14/1	PCF86	15/1	U18/20	8/6	VP4B	23/3	OC170	35/1
6AT6	7/1	6S17GT	8/1	12SQT	11/6	5-pin 23/3		EBL31	23/3	EY86	9/1	PCL82	10/6	U22	8/1	VP13C	7/1	OC200	54/1
6A95	10/6	6SK7GT	6/6	12SR7	8/6	7-pin 15/1		EC52	5/6	EZ35	6/1	PCL83	11/6	U24	29/10	VP23	6/6	OC203	58/1
6AV6	12/8	6S17GT	6/6	12SY7	10/6	AC2PEN/		EC54	6/1	EZ40	6/1	PCL84	12/6	U25	17/11	VP41	6/1	TJ1	40/1
6B8G	4/6	6SN7GT	5/6	14S7	27/10	DD	12/6	EC70	12/6	EZ41	7/1	PEN4A	12/6	U26	10/1	VR105	8/1	TJ3	45/1
6BBGT	6/6	6S2GT	9/1	18	23/3	AC6PEN	7/6	EC92	13/3	EZ80	7/1	PEN84	26/6	U31	9/6	VR150	7/6	TP1	40/1
6BA6	7/6	6S57GT	8/1	19AQ5	10/6	ATP4	5/1	ECC32	5/6	EZ81	7/1	PEN4DD		U33	26/6	VT61A	5/1	TP2	40/1
6BE6	6/1	6U4GT	12/6	19BG6G				ECC33	8/6	FC2A	24/7			U35	26/6	VT501	5/1	TP3	40/1
6BG6G	23/3	6U5GT	7/6		23/3	AZ1	18/7	ECC34	24/7	FC4	15/1	PEN25	26/6	U37	26/6	W61M	26/6	TS2	12/6
6BH6	8/1	6U7G	8/6	19H1	10/1	AZ31	10/1	ECC35	8/6	FC13	26/6	PEN40DD		U43	9/1	W76	5/6	TS3	15/1
6BJ6	6/1	6V6G	7/1	20D1	15/3	AZ41	13/11	ECC40	23/3	FC13C	26/6			U45	9/1	W81M	6/1	TS4	24/1
6BQ7A	15/1	6V6GTG	8/1	20F2	26/6	B36	15/1	ECC81	6/1	FW4/500		PEN44	26/6	U50	6/6	W107	18/7	XA101	23/1
6BR7	15/1	6X4	5/1	20L1	26/6	BL63	7/6	ECC82	6/6			PEN45	19/6	U52	6/6	W729	18/7	XA102	26/1
6BS7	25/1	6X5GT	6/1	20P1	26/6	C1	12/6	ECC83	7/6	FW4/800		PEN45DD		U54	19/11	X24M	24/7	XA103	15/1
6BV6	8/6	6/30L2	10/1	20P3	23/3	CIC	12/6	ECC84	9/1					U76	6/1	X31	26/6	XA104	18/1
6BW7	7/1	7A7	12/6	20P4	26/6	CBL1	26/6	ECC85	8/6	GZ30	10/1	PEN46	7/6	U78	5/1	X41	12/6	XB102	10/1
6BX6	7/1	7B6	21/3	20P5	23/3	CBL31	23/3	ECC88	18/6	GZ32	10/1	PEN383	23/3	U107	16/7	X61(C)	12/6	XB103	14/1
6C4	5/1	7B7	8/6	25A6GT	10/6	CCH35	23/3	ECC91	5/6	GZ34	12/6	PEN453DD		U191	16/7	X61M	26/6	XB103	14/1
6C5G	6/6	7C5	8/1	25L6GT	10/6	CK506	6/6	ECF80	10/6	H63	12/6			U321	10/1	X63	9/1	XB104	10/1
6C6	6/6	7C6	8/1	25U4GT	16/7	CL33	19/3	ECF82	10/6	HABC80		PEN/DD		U251	14/1	X65	12/6	XCI01	16/1
6C19	13/6	7D6	10/6	25Y5	10/1	CV63	10/6	ECH3	26/6		13/6	4020	33/2	U281	19/11	X66	12/6		
6C9	9/1	7D8	23/3	25Y5G	10/1	CY1	18/7	ECH21	23/3	HL23DD		PL33	19/3	U282	22/7	X76M	14/1		
6CD6G	36/6	7H7	8/1																



Servicing electronic computer for Comet simulator

Make your hobby your career...

In today's R.A.F.
you can work on some
of the most sensitive
electronic equipment
ever made

The man in this photograph is an instrument fitter at work. At least, it's called work, but to him it has the fascination of a hobby—a paid hobby at that. Still, he's an enthusiast; anything to do with electronics and he's not happy until he's ferreted out all the secrets. And there are plenty of secrets in the R.A.F. In fact, you don't really know what advanced equipment is until you've handled some of the R.A.F. stuff.

If you have the flair that makes the born electronics man, the R.A.F. offers you a satisfying career. For that matter, the R.A.F. can offer you a satisfying career wherever your natural bent lies. As a tradesman in the R.A.F. you will get a skilled training that is yours for life. You get paid well, you live well—and you may travel anywhere in the world. There's no doubt about it,—the R.A.F. gives you a secure career—and an adventurous one.

TODAY'S TOP JOB IS THE R.A.F.

The
 Royal 
 Air Force 

Fill in this coupon and you will be sent, without obligation, a free copy of "The Man on the Ground" a fully illustrated booklet giving complete details of all R.A.F. trades.

NAME _____

ADDRESS _____

DATE OF BIRTH..... _____

Send the completed coupon to:
 Central Recruiting Office (PW 116a),
 Victory House, Kingsway, London, W.C.2.

HARVERSON SURPLUS CO. LTD.

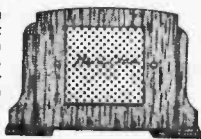
MONAURAL AMPLIFIER



This amplifier as illustrated, made by a leading manufacturer. Mullard valves—ECC83, EL84 x EL84, EZ80. Bass Treble and Volume on remote panel. Elegant Knobs. OUR PRICE one month only £4.16.6 plus P. & P. 3/6.

EXTENSION SPEAKER

An attractive cabinet 8 x 6 x 2in. fitted with 3 ohm 5in. speaker complete with lead, a few only. 19/6 P. & P. 2/6.



STEREOPHONIC AMPLIFIER £5.10.0

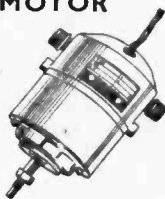
Complete with 2 Loudspeakers

Plus 4/6 P. & P.

This is a compact amplifier embodying the latest features and giving a high standard of reproduction, with ample volume. Supplied complete with valves (ECL82, ECL82, EZ80), panel, knobs, etc., and two specially selected 3Ω matched loudspeakers. We only have a few, and we will never be able to repeat this offer at such a low price! Don't risk disappointment! Order now!

1/6 H.P. MOTOR

140 Watt (Approx. 1/6 H.P.). Series wound, 220/250 volt 50 cycle motor. Off load 14,000 rev/min. on load 8,500 rev/min. Ideal small saw, sewing machine, etc. 30/- post free. P. & P. 3/-



TRANSISTOR

TRANSISTOR by leading manufacturer. First Grade Equivalent OC44. For one month only, the first 100 customers 8/6 post free. 6 for 50/-

RECTIFIERS FOR BATTERY CHARGERS

12 v. 1 amp.	4/3	12 v. 4 amp.	12/6
12 v. 2 amp.	7/-	12 v. 5 amp.	14/6
12 v. 3 amp.	10/-		P. & P. 6d.

CONDENSER/RESISTOR PARCEL

50 mixed P.F. Condensers and 50 mixed Resistors. An assortment of useful values. All popular sizes—all new—a must for the serviceman and constructor. ONLY 10/- P. & P. 1/-.

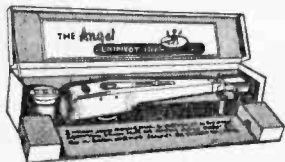
YOU ARE INVITED!

Spend a day browsing around our premises at **83 HIGH ST., MERTON, S.W.19** (one minute South Wimbledon Tube).

We have a wealth of components, valves, chassis, tape decks, autochangers, amplifiers, F.M. tuners, record players, tape recorders, cabinets, and a whole host of other things we just don't have the space to describe. Please come and look for yourself. We will be pleased to see you, and there's no obligation to buy.

BARGAINS IN GRAM & TAPE EQUIPMENT

THE WORLD FAMOUS E.M.I. ANGEL TRANSCRIPTION P.U. (Model 17A)



A Pick-up for the connoisseur originally priced at £17.10.0. The last remaining few offered at **£4.10.0** Plus P. & P. 5/-.

PICK-UP CARTRIDGE BARGAINS

STUDIO P...	...	17/6
ACOS HIGH G...	...	17/6
E.U. POWER POINT	...	12/6
RONETTE	...	18/6
G.C.Z.	...	16/6
	P. & P. 1/-	

RECORD CHANGERS

GARRARD	RC 98 Mk. 4H.	4-speed autochange	£16.10. 0
	RC 120/D Mk.2	"	£9. 0. 0
	RC 120 Mk.4D	"	£9. 0. 0
	RC 120 Mk.4H	"	£9. 0. 0
	RC 121 Mk.1	"	£11.0. 6
	RC 121 Mk.4H	"	£11.0. 6
	RC 121/40 Mk.2	"	£11.0. 6

COLLARO	RC 54	4-speed autochanger	£6.19. 6
	RC 594	"	£7.19. 6
	Conquest	"	£6.12. 6
	Challenger	"	£7.19. 6

B.S.R.	Monarch UA8	4 speed autochange	£6.19. 6
	TUB	4-speed single player less pick up	£2.10. 0

NOTE: Any of the above with Stereo Cartridge and Fittings, 16/- extra. Carriage and ins. on each of above 5/- extra.

TAPE DECKS

LATEST B.S.R. MONARDECK (single speed) 3½in. per sec., simple control, uses 5½in. spools.....£9.19.6 plus 5/6 carriage and insurance (tapes extra).
 COLLARO STUDIO DECK piano key controls, pause control, space for additional head, uses 7in. spools, with counter.....£14 plus 6/- carriage and insurance (tapes extra).

WE HAVE A LARGE RANGE OF READY-BUILT RECORD PLAYERS AND TAPE RECORDERS (BOTH STEREO AND MONAURAL) AT BARGAIN PRICES

83 HIGH STREET, MERTON, S.W.19

CHErroywood
3985/6/7

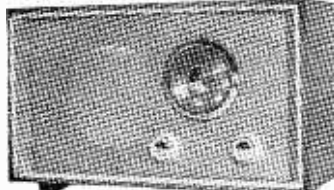
MIDGET GRAM AMPLIFIER READY-BUILT with Speaker



A 2½ watt gram amplifier, fitted with bass, treble, and vol./on-off controls. Supplied complete with 6 x 4in. 3 Ω speaker, valves (UY85, UF89, UL84), knobs, etc., all mounted on an attractive baffle board, size 10½ x 7½ins.

OUR PRICE ONLY **49/-** P. & P. 3/-

HARVERSON T.R.F. EASY FOUR KIT



All parts and theoretical wiring diagram only.
OUR PRICE **£4.0.0.** Plus P. & P. 3/6.



HARVERSON SUPERHET 4 KIT

A medium and long wave superhet, incorporating two i.f. stages, modern 69 valves (UCH81, UBF89, UCL83, U785), built-in ferrite rod aerial. All you need supplied, from theoretical wiring diagram to the nut and bolt (main components ready mounted), including an attractive contemporary styled cream plastic cabinet with gold trimmings. Size 11½ x 4½ x 6½in. PRICE **£6.12.6.** Post 3/6

AM/FM RADIOGRAM CHASSIS

★ By famous manufacturer. ★ 220/250 volts A.C. ★ Coverage 1000-1900 m, 200-500 m, 88-98 Mc/s. ★ Tuned by 5 "Piano Keys"—Off, LW, MW, FM and Gram. ★ Sockets for P.U., Ae, E, Extn. Spkr. and Dipole. ★ Tuning and tone controls fitted. ★ Valves, ECH81, EF89, EABC80, EL84, ECC85 and EZ80. ★ Only at ridiculous price of **12 gns.** plus 8/6 P. & P.

TAPE RECORDER

★ **CONTEMPORARY** Red and White Tygan Cabinet. Size 13½ x 14½ x 9½ inches.
★ **B.S.R. DECK.**
★ **MAGIC EYE** tuning.
★ **INPUTS** for RADIO and MIKE.
★ **VOLUME** and **TONE** Controls.
This instrument has to be seen and heard to be believed. Complete with **ACOS Xtal Mike.** ONLY **18 gns.** P. & P. 8/6

GUARANTEED VALVES		★ NEW AND BOXED		★ PROMPT DISPATCH		★ POST 6d. per Valve extra	
ACHLDD	EB41 8/8	EF91 5/6	ELL32 8/-	PLS1 11/9	U76 7/6	VU111 2/3	5Z4M 9/9
	9/3	EBF80 9/-	EF91(BVA) 1/2	4/6	PLS2 8/-	U191 10/6	W21 11/9
AC/P	7/-	EBP89 9/-	8/6	KT24 4/6	PLS3 11/-	U339 11/9	W76 7/-
AC/P4	7/-	EBL21 22/-	EL32 4/3	KT32 9/3	PK25 11/9	U403 15/6	W77 8/-
AC/PEN	11/2	EBL31 22/-	EL33 13/-	KT33C 8/-	PK30 7/-	U404 19/6	W29 9/9
DD	25/0	EC31 7/-	EL38 24/6	KT36 28/-	PY81 8/-	U801 22/-	X22 16/9
AC6PEN/59/3	ECC81 7/6	EL41 9/6	KT55 10/3	8/6	PY82 6/6	UABC80 9/6	X41C 16/9
ACVP1/59/3	ECC82 7/6	EL42 9/6	KT61 9/6	8/6	PY83 8/-	UAF42 8/9	X101M 11/8
ATP4	3/3	ECC83 8/6	EL81 15/6	KT63 7/6	PZ30 18/6	UBG41 8/6	V33 8/6
AZ1	9/8	ECC84 9/8	EL84 8/6	KT66 15/-	PEN4DD	UPF80 8/9	Z21 9/9
AZ31	11/2	ECC85 9/-	EM84 8/9	KT88 21/-		UCC84 10/0	Z309 7/-
B8	14/-	ECF80 11/3	EM80 9/3	KTW61 6/6	PEN4VA	UCC85 10/6	Z359 7/-
CB131	22/9	ECF82 12/3	EM81 9/3	KTW63 7/-		UCF80 15/6	IA3 3/-
COH35	22/9	ECH21 22/-	EY51 9/3	KTZ41 3/3	PEN25	UCH42 9/9	IA5GT 15/6
CL4	11/9	ECH42 9/-	EY86 9/3	ML41 6/6	PEN46	UCH81 9/9	IA7GT 11/9
CL33	18/-	ECC81 8/6	EZ40 7/-	ML4 8/6	PEN38322A	UCL82 15/6	IC2 11/-
CY31	15/9	ECU80 9/8	EZ41 7/-	MS4B 18/-	PEN220A	UCL83 11/6	IC5GT 11/9
CV73	9/9	ECL82 9/9	EZ80 6/6	MS4/5 7/6		UCF41 8/6	ID5 11/9
C96A	8/-	EP22 8/-	EZ81 6/6	MS4/7 7/6	PEN45D	UCF85 8/6	ID6 11/9
DAF96	8/6	EF36 4/6	EZ90 7/-	MVS/PEN 25/-		UCF89 8/6	HS6GT 10/-
DF6	8/6	EF37A 14/6	EL148 1/9		PEN44	UL41 9/6	IL4 6/-
DH63	11/6	EF39 5/8	EL148 1/9	MX40 16/8	PEN44	UL41 9/6	IL4 6/-
DH101	11/6	EP40 13/6	FW4/500 9/3	N37 18/6	QP21 4/6	UL48 15/6	IN3 9/9
DK98	8/6	EP41 9/8	GTIC 25/8	N78 18/6	R16 25/-	UL54 8/6	IS5 7/-
DL96	8/6	EP42 10/8	GZ32 11/-	N39 22/-	SP41 2/9	U06 18/4	IS4 9/9
DL145	9/8	EF80 3/9	H30 4/6	OZ4 5/-	SP45 2/9	U08 25/-	IS5 6/-
DM70	7/-	EF308YL	H83 9/3	P61 3/3	SP61 9/9	UY1N 11/9	IT4 5/6
DN41	16/6		HL22DD 8/-	PC84 8/6	SP47 9/9	UY21 11/9	IC26 2/3
EA30	1/8	EF84 5/8	HL22 8/-	PCF80 9/-	T41 22/-	UY41 7/-	2P 25/-
EABC90	8/6	EF85 9/8	HL41 3/3	PCF82 11/9	TDD13C 7/-	UY85 6/6	2X2 4/-
EB42	9/8	EF86 7/-	HN309 23/-	PCL82 11/8	TR233 17/6	VP13C 3/3	3A4 6/6
EB34	1/8	EF85 7/-	K40N 8/6	PCL83 13/6	TP22 7/6	VP23 8/6	3A8GT 5/6
EB41	8/-	EF86 11/8	KF35 8/-	PL38 16/6	TP25 25/-	VP41 8/-	3D6 4/6
EB33	6/3	EF89 8/-	KK32 20/6	PL36 14/6	U10 9/9	VP133 14/-	3Q4 7/6
					U14 8/-	VR22RPM	3Q5GT 9/9
					U18 8/-	2A) 2/9	384 7/-
					U16 11/9	VR105/30	3V4 8/-
					U17 11/9		4D1 2/9
					U22 7/6	VR118 3/9	3R4GY 9/-
					U25 13/6	VR150/30	504G 8/3
					U98 11/9		5V4 10/9
					U37 25/-	UV120A 3/3	5Y3G 7/6
					U45 14/-	VU39(MU)	5Y3GT 7/6
					U50 7/6		12/14 8/6
							6Z4G 8/6
							6K7M 6/6

SPEAKER FRET

Super quality heavily woven fret. 54 inches wide. Usual price 50/- per yard. P. & P. 1/1.
OUR PRICE, 19/6 per yard

CYLDON 12 CHANNEL TURRET TUNERS

New purchase offered at still lower price. i.f. 33-38 Mc/s. Complete with PC84 and PCF80 valves and 8 sets of Coils for 5 Band I channels and 8, 9, 10 Band III. New and unused. Value over £7.
OUR PRICE, Post paid **32/6**

MINIATURE AMPLIFIER



Miniature amplifier, size 3½ x 2½ x 4½ins. Ideal for record player, etc. Controls, volume/on-off, bass and treble. Supplied ready built, less valves (UY85, UF89, UL84), and mains transformer, at the give away price of **14/-** P. & P. 2/6

MIDGET I.F. TRANS & COILS

A pair of midget 465 kc/s I.F. transformers, plus LW and MW coils.
OUR PRICE 10/- per set. P. & P. 1/9.
Set of I.F. transformers for transistor superhet. 9/-.

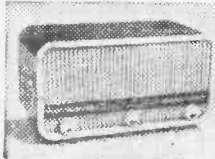
COSSOR C.R.T. SNIP

108K 10-inch. New and boxed, 15/-, plus 6/- P. & P.
75K 10-inch. New and boxed, 15/-, plus 6/- P. & P.

ION TRAP MAGNETS

To suit the above, 2/9 each. P. & P. 3d.

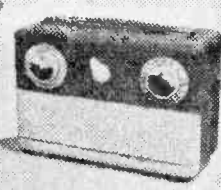
LONDON'S NEW WALK-AROUND "Service with a smile" SHOP!
ALSO 24 HOURS MAIL-ORDER DESPATCH SERVICE



Only £5.10.0
 Build this beautiful "Symphony" radio for only 25. 10. 0. Sturdy, exceptionally well finished cabinet with horizontal dial. Covers all medium and long waves. Good selectivity and very good quality reproduction. For A.C. mains 200/250 volts. All high quality parts, gold insert knobs, etc. No knowledge needed—our **SIMPLE CONSTRUCTION ENVELOPE** makes it as easy as A. B. C. All our parts tested. **CAN BE BUILT FOR ONLY £5.10.0** including construction envelope and everything down to the last nut and bolt. Post and packing 1/- extra. C.O.D. 2/6 extra. (Parts sold separately. Components price list 1/-.)

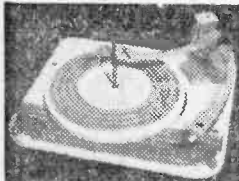
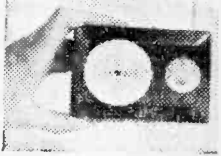
Only £10.19.6

Build this 7-transistor "Malorca" superhet portable with Car Radio aerial attachment. A very high quality design giving exceptionally good tone. Push-pull output. **Can be built for only £10.19.6** including **SIMPLE CONSTRUCTION ENVELOPE**, makes construction as easy as A. B. C. Everything down to the last nut and bolt. Post and packing 3/6 extra. C.O.D. 2/6 extra. (Parts sold separately. Components price list 1/-.)



Only 35/-

The "Coronet" 2-transistor radio is very sensitive—ideal for Office, Bedroom, Holidays, etc. Fits in the palm of your hand. Months and months listening off a 9g battery. **Can be built for only 35/-**, including everything down to the last nut and bolt and our **SIMPLE CONSTRUCTION ENVELOPE** makes it easy as A. B. C. Post and packing 2/- extra. (C.O.D. 2/6 extra.) (Parts sold separately. Components price list 1/-.)



Only £8.17.6 **BRAND NEW!** the latest 4-speed Autochanger, B.S.R. UA14, as illustrated, few only. **Our Price £8.17.6.** P. & P. 3/6. **BRAND NEW!** the B.S.R. 4-speed Autochanger, UA9, few only left. **Our Price £6.19.6.** P. & P. 3/6. **BRAND NEW!** the COLLARO Junior 4-speed record player. **Our Price 75/-.** P. & P. 3/6. **BRAND NEW!** COLLARO "Conquest" 4-speed Autochanger. **Our Price £7.15.6.** P. & P. 3/6.



ONLY 97/6
 The famous "Coby" **TEST-METER**. We recommend these multi-range meters as being accurate and well made. Ranges cover A.C. D.C. and resistances. New in box with test prods and instructional booklet. **Our Price 97/6.** P. & P. 2/6.

ROBERTS ELECTRONICS OF LONDON (Dept. PW3)
 COME AND LOOK AROUND—NO OBLIGATION. WE ALSO OPERATE 24 HOURS MAIL-ORDER SERVICE.

398 HARROW ROAD, LONDON, W.9.
 Telephone CUNningham 0323
 Open 9.30 a.m. until 6 p.m. including Saturdays.
 (We don't close for lunch)

CIRCUITS FOR AUDIO AMPLIFIERS
 -a book every enthusiast will want!

This new Mullard publication is a practical manual for every audio enthusiast. In addition to describing twelve of the most popular Mullard circuits, it has introductory chapters on many of the theoretical and practical aspects of high quality sound reproduction. Whether you are interested in disc or tape, monaural or stereo, you will find that "Circuits for Audio Amplifiers" gives just the sort of information you need. This informative book costs only 8/6. The demand for it is high, so get your copy now from your local radio dealer.

Mullard



MULLARD LIMITED · MULLARD HOUSE · TORRINGTON PLACE

LONDON W.C.1
 MVM423A

EASY AS A.B.C. TO BUILD

The new, exciting De Luxe "Gold Star" Pocket Radio in beautiful moulded plastic case—This model is a highly sensitive, self-contained set covering all medium waves. Uses modern miniature "button-base" valve and specially designed high efficiency coil. Exceptionally easy to build from our step-by-step plans—the case is supplied ready drilled! Size of radio only 4 1/4 in. x 2 1/4 in. x 1 1/4 in. —and batteries fit inside. We can supply all parts including case, detachable aerial, instruction book, wire, screws, etc., for only 37/6, plus 2/6 Post and Packing. C.O.D. 2/- extra. (Parts sold separately, priced parts list 1/6.)

37/6



2/- extra. (Parts sold separately, priced parts list 1/6.)



AT LAST— WRIST RADIO!
29/6

Our engineers have designed a novel Wrist-Watch Radio using latest Transistor Techniques. Size only 1 1/4 in. x 1 in. x 1/4 in.!! —"Feather-weight"—yet gives clear, crisp, personal-phone reception over all medium waves. Tiny battery inside lasts months—costs 5d. No snags. Anyone can build it in an hour or two using our pictorial step-by-step simple plans. All parts supplied (including case and strap) for only 29/6 (add 2/6 Post, etc.). C.O.D. 2/- extra. (All parts sold separately, priced parts list 1/6.) Send Now!

Can Be Built for 47/6. Build this exceptionally sensitive high efficiency personal phone radio. Uses unique assembly system and can be built by anyone without any radio knowledge whatever in 45 minutes. Handsome black-crackle steel case with specially made black and gold dial with stations printed. Size of radio only 6 1/4 in. x 5 in. x 3 in. Covers all medium and long waves. H.T. consumption only 1 to 1.5 mA. Ideal for Bedroom, Garden, Holiday, etc. **BUILD THE "SKY-ROMA" NOW!** Total building cost—everything down to the last nut and bolt, 47/6 (Postage, etc., 2/-)—with full set of clear, easy-to-follow plans. (Parts sold separately. Priced parts list and plans 1/6.) C.O.D. 2/- extra.



47/6



THE SENSATIONAL POCKET RADIO!
29/6

The sensational "Silver-tone" model! A highly compact self-contained miniature "button-base" valve pocket radio at absolute "rockbottom" building cost! Covers all the medium waves with the very latest circuitry bringing in stations from all over Europe—with-out fuss. Easy as A.B.C. to assemble, using our step-by-step instruction manual. Size only 4 1/4 in. x 2 1/4 in. x 1 1/4 in.—a fascinating little pocket radio. We can supply all the parts including beautiful two-tone case, detachable aerial, instruction book, screws, wire, etc., for only 29/6 (plus 2/- Post and Packing). C.O.D. 2/- extra. (Parts sold separately, priced parts list 1/6.)



THIS TRANSISTOR SET Can Be Built For Only 29/6. The "Sky-Scout" Pocket two-stage transistor set, size only 1 in. x 3 1/4 in. x 4 1/4 in. Covers all medium waves and works entirely off tiny "penlight" battery which costs 6d. and fits inside case. All parts tested before despatch. Can be built for 29/6, plus 2/- Post and Packing. **INCLUDING CASE, TRANSISTOR, STEP-BY-STEP PLANS FOR ABSOLUTE BEGINNERS, nuts, bolts, etc.** (C.O.D. 2/- extra.) Parts sold separately, priced parts list and plans 1/6. **VERY SIMPLE TO BUILD.**

29/6



MATCHBOX SIZE RADIO!
17/6

This amazing "Tiny-Tim" model—no larger than a match box—costs nothing to run—ever! No batteries! No Valves! No complete electricity! Will never run down or burn out. Uses the latest TRANSISTOR TYPE GERMANIUM DIODE, receives local stations anywhere—without extra aerial. Clear, Crisp Tone. No snags, anyone can build it within an hour using our step-by-step instruction book, etc., for only 17/6, plus 2/- Post and Packing (C.O.D. 2/- extra). (Parts sold separately, priced parts list 1/6.)

17/6



Anyone can build this precision Pocket Radio in an hour or two. No knowledge whatever needed. Our simple pictorial plans take you step-by-step!

39/6

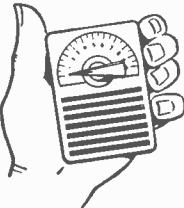
Remarkably sensitive—covers all medium waves, inc. Luxembourg, Home, Light. Size only 2 1/2 in. x 3 in. x 5/8 in.—Not a Toy! But a Real, Personal-phone, Valve Radio with Detachable Aerial! IDEAL FOR BEDROOM, GARDEN, etc. We supply ALL parts necessary, together with plans, etc., for the special price of 39/6, plus 2/6 post and packing. (C.O.D. 2/- extra.) **BUILD YOURS NOW!** (All parts sold separately, priced parts list 1/6.) Send Today! Money refunded if parts returned intact within 7 days.

Choice of beautiful walnut veneered cabinet or ivory bakelite. This is the




107/6

lowest possible price consistent with high quality. No radio knowledge whatever needed can be built by anyone in 2-3 hours, using our very simple, easy-to-follow diagrams. The terrific new circuit of the "Ocean-Hopper" covers all medium and long waves, has razor-edge selectivity and exceptionally good tone. Price also includes ready drilled and punched chassis, set of simple-to-follow plans—in fact everything! Parts tested before despatch. Uses standard octal base valves. (Low running costs—approximately 18 watts.) Size 12 in. x 8 in x 5 in. Build this long-range powerful midget NOW. **TOTAL BUILDING COST INCLUDING PLANS, ETC., 107/6.** (Post and Packing 3/6.) Parts sold separately. Priced parts list and plans 1/6. C.O.D. 2/- extra.



45/-

TWO-TRANSISTOR POCKET SET. Can Be Built for 45/-. **BUILD THE "SKY-ROMA" NOW!** **VEST-POCKET TWO-TRANSISTOR RADIO** which gives a superb performance and is highly sensitive. Weight under 7 ozs.—yet it is a **THREE-STAGE** receiver covering all medium waves, working entirely off a "penlight" battery. Every part tested before despatch! **SPECIAL STEP-BY-STEP PLANS FOR ABSOLUTE BEGINNERS.** Total building cost including case, transistors, etc.—**ONLY 45/-** with plans. Postage, etc., 2/- (C.O.D. 2/- extra.) (Parts sold separately. Priced parts list and plans 1/6.) **RUSH YOUR ORDER TODAY!**



CONCORD ELECTRONICS

210, Church Road, Hove, Sussex

Dept. FW24

Orders receive prompt attention. Cheques accepted. Cash on delivery 2/- extra. Please print name and address in block letters. Suppliers to Schools, Universities, Government and Research Establishments. Complete range of components and valves stocked. Regret no C.O.D. abroad. DEMONSTRATIONS DAILY AT WORKS.

A.C./D.C. Multimeter Kit

Ranges: D.C. volts 0-5, 0-50, 0-100, 0-500, 0-1,000. A.C. volts 0-5, 0-50, 0-100, 0-500, 0-1,000. D.C. milliamps 0-5, 0-100, 0-500. Ohms 0-50,000 with internal batteries. 0-500,000 with external batteries. Measures A.C./D.C. volts, D.C. current and ohms. All the essential parts including metal case, 2in. moving coil meter, selected resistors, wire for shunts, range selector switches, calibrated scale and full instructions, price 19/6. plus 2/6 post and insurance.



Versatile Wire

Single-strand 18-gauge wire with 27% covering which makes it rustproof. Extra strong, will stand tremendous strain. Ideal for gardening, clothes lines, indoor aerials, etc., etc. Also being steel alloy and having a resistance of approximately 1 ohm per yard this can be used for electrical work, soil heating, wrapping round water pipes, etc. New on drum containing 3,000ft. Price 8/6, plus 3/6 carr.



Welding Transformer

Output 2/3 volts by high and low switch. Continuous rating 250 amps. Intermittent (or spot) welding exceeds 2,000 amps. Unused, slightly soiled, but perfect working order. £3.10.0 plus 3/6 carriage.



TV Workshop Aids

- E.I.T. SEALER.** Apply with soldering iron. Stops corona discharge, etc. 2/6 per stick.
- POLYTHENE TAPE.** 2in. x 10 thou. for E.H.T. insulation up to 25 kv. 5/- per 20ft. roll.
- SPONGE STRIP.** 1in. x 1in. For sealing or cushioning. 9d. per foot.
- ANTI-STATIC SCREEN CLEANER.** For TV tubes and screens. Perspex or glass. Delays accumulation of dust. 3/- per tube.
- CELLULOSE CEMENT.** Specially prepared for radio gluing of metal, glass, ceramic, wood, fabrics. 4/6 per tin.

1960 ALL Mains Amplifier



Undoubtedly finest value obtainable in amplifiers—powerful three valve circuit ideal for dances, parties, etc. Complete with valves, mains, transformers, volume and tone controls, but less chassis, speaker and cabinet. Price only 29/6, plus 2/6 post and ins. Data free with parts or available separately 1/6.

TRANSISTOR LOUDSPEAKER RADIOS

Results guaranteed. Nothing can be more disappointing than to find that despite care in making up, your little radio just will not work. This is unlikely to happen with our set, but if it does, you may send it in for service, we guarantee good results.



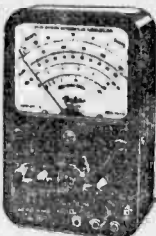
TWO MODELS

Pocket 3 for strong signal areas, uses two transistors and one diode, price 27/6.
Pocket 4 uses three transistors and one diode and has refinements for receiving weak stations, price 42/6. Every set complete to last out and bolt, with proper case, tuning condenser, and miniature loudspeaker. Our sets do not need external aerials, also they may be built in stages to car radio output. Post and insurance 2/6.

PHILIPS TRANSCRIPTION UNIT

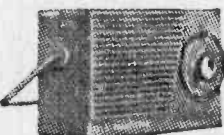
Phillips AG 2009 Record Player, 4 speed. Ideal for the enthusiast. Pick-up arm wired for stereo, fine adjustment on all four speeds. Continuously variable pick-up weight (2.12gms.), supplied with Philips Hi-Fi crystal type AG3019 for micro-groove and 78 r.p.m. Frequency response 30-15,000 c/s. Picked-up lifting and lowering device. Individually balanced heavy turntable. Muting switch. Can be used with any amplifier or radio set. Complete with monaural pick-up £10.10.0, or 2 gns. deposit and 20 fortnightly payments of 10/-. Available also with stereo head, diamond or sapphire stylus. Prices on request.

The Taylor Meter Model 127A



A pocket size meter but with a big scale and a sensitivity of 20,000 Ohms per volt D.C., therefore an ideal unit for television servicing—robustly made and complete with leads and prods—20 ranges as follows:
D.C. current 50 micro-amps. to 1 Amp.
D.C. voltages—0-1,000 volt in seven ranges (25 KV. with external probe, optional extra.
Volts A.C.—0-2,500 in six ranges.
Ohms—0-20 meg. Ohm in three ranges (self-controlled) deposit and 23 fortnightly payments of 10/-. Non-callers add 5/- carriage and insurance.

Self-contained, 3in. movement, Price £10 or 10/-



Transistor Set Cabinet

Very modern cream cabinet, size 5 1/2 x 3 x 1 1/2 in. with chrome handle tuning knob and scale. Price 7/6, plus 1/6 postage and packing.

Another Battery Charger Bargain

Components would Cost More
Car Battery Charger—ready made high output battery charger in stove enamelled sheet steel louvered case. Rated at 12 v. 5 amps, and variable rate selector for trickle charging, also a meter to show charging rate. Suitable for 230/250 A.C. mains, Special snip price of 65/-, plus 3/6 post and ins.



Connecting Wire

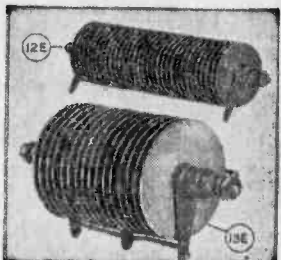


P.V.C. covered in 100ft. coils—2/6 a coil or four coils different colours. 10/- post free.

Yaxley Switches

- 1 Pole 3 Way..... 1/6
- 1 Pole 5 Way..... 2/-
- 1 Pole 11 Way..... 2/6
- 1 Pole 12 Way..... 3/-
- 2 Pole 2 Way..... 2/6
- 2 Pole 4 Way..... 2/-
- 2 Pole 6 Way..... 2/6
- 2 Pole 8 Way..... 3/6
- 2 Pole 12 Way..... 4/6
- 3 Pole 3 Way..... 1/6
- 3 Pole 6 Way..... 3/6
- 4 Pole 4 Way..... 3/-
- 6 Position Shorting..... 2/-
- 6 Pole 3 Way..... 2/6
- 6 Pole 5 Way..... 3/6
- 8 Pole 2 Way..... 2/-
- 9 Pole 3 Way..... 2/6
- 12 Pole 2 Way..... 2/-

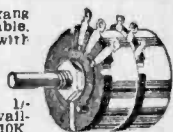
Rectifier Bargains



Selenium rectifier type 12, 500 v. i. A. half-wave, easily rebuilt into full wave or multiple type, contains 30 35 mm. discs. Price 8/6, plus 1/6 post. Type 13, 36 volt 9 amp, easily rebuilt into six full wave charger rectifiers suitable for 6 or 12 volt batteries 8 amps, contains 24 84 mm. discs. Real bargain at 19/6, plus 1/6 post.

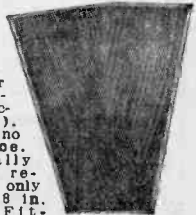
Morganite Potentiometers

Single and 2-gang types available, standard size with long length spindle, all new and boxed.
Single types, 1/- each, values available: 5K, 10K, 25K, 50K, 100K, 250K, 1 meg., 2 meg. 2-gang type 3/- each, values available: 5K ± 5K, 100K ± 100K, 1 meg. ± 1 meg., 2 meg. ± 2 meg.



Hi-Fi Snip Infinite Wall Baffle

Nicely veneered and polished, corner fitting (attaches to picture rail). Takes up no floor space. Gives really fantastic results with only low-price 8 in. speaker fitting for tweeter. Only 45/- each, carriage and insurance 3/6.



Crystal Mike by Acos



Model 39/1. This is ideal for tape or general amplifiers, complete with screened lead 39/6. plus 1/- post.

Chassis Assembly



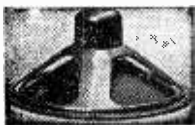
Superhet Chassis, 3-waveband, coloured scale, scale pan, etc. Scale size 14 1/2 in. x 3 1/2 in. Chassis size 15 in. x 15 in. Mullard £3.10.0, ditto unbranded, x 2 in. Price 9/6, plus 1/6 post.

UNIQUE OPPORTUNITY TO BUILD FINE TRANSISTOR SET

Constructor's parcel consisting of cabinet approx. size 4 1/2 x 1 1/2 in. with handle and embellishment as illustrated, turning dial, tuning condensers and easy to follow constructional data. Price 22/6 plus 2/6 post and insurance. You can build a pocket transistor set as currently being sold at 17/6. We can supply all necessary parts at highly competitive prices. Alternatively build your own circuit. Circuit diagram and constructional data supplied separately. 1/6.



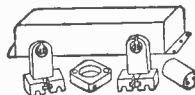
Speaker Bargain



12 in. Hi-fidelity loudspeaker. High flux. Permanent magnet type with standard 3 ohm speech coil. Will handle up to 12 watts. Brand new by famous maker. Price 32/6, plus 3/6 post and insurance.

"Dim and Full" Switch

Particularly useful for controlling photo-flood lamps which have only a short life at full brilliance. This toggle switch has three positions: the first position puts two lamps in series at half brilliance for setting up, the second position is off and the third position full brilliance for the operation shots. Also useful for controlling night lights, heaters, etc. etc. Price 3/9 each, post 9d. Circuit diagram included.

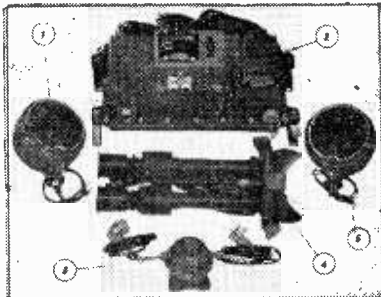


Fluorescent Light Bargain

Kit of parts comprising: choke, two lamp holders, starter holder and starter, 40 watt, 19/8, 80 watt, 23/6. Plus 2/- post and insurance.

Components for Transistor Sets

Sub-miniature Electrolytics. 1 mid 18v., 2.5 mid 6v., 4 mid 6v., 8 mid 6v., 5 mid 12v., 10 mid 6v., 25 mid 6v., 30 mid 3v., 50 mid 3v., 200 mid. All 1/8 each.
 Transistor Ferrite Rod Aerial with medium and long wave coils with circuit. Price 7/6.
 Oscillator Coil and set of 3 I.F. transformers for transistor set with circuit. Price 23/6.
 Midret 3 in. P.M. Loud-speaker for transistor set. 3 ohm or 80 ohm coil. Price 18/6.
 Midget 208 pF + 176 pF two-gang Tuning Condenser with trimmers, 1 spindle drilled and tapped. Price 9/- plus 1/- post.
 Push-pull Output Transformers, for transistors OC78, etc. Sub-miniature. Price 8/6, plus 1/- post.
 Push-pull Input Transformer to match the above. Output Transformer, 8/6.
 0.0005 mfd Single Tuning Condenser. Solid dielectric in spindle for transistor or crystal set. 3/9; ditto with spindle tapped 6 BA. 4-.
 Transistors tested. Set of six for Superhet includes matched pair, Mullard £3.10.0, ditto unbranded 45/-; suitable as mixers, 9/6 each. Suitable as I.F. amplifiers, 8/6; suitable for R.F. and Regen circuits, 6/6; matched pairs for Push-pull Output, 18/- per pair. High gain for single ended output, 7/6. Ordinary white spot, 3/9; red spot, 3/6.
 Resistors, miniature quarter watt type for transistor sets. All popular values, 5d. each.
 Miniature ceramic condensers 6d. each.



TABBY EQUIPMENT COMPLETE

Complete equipment for seeing in the dark, as fitted to Army vehicles for night driving, etc. Complete working equipment comprises: 2 Infra Red Radiators, adjustable binoculars, powerpack for 6 or 12 volts, control units and inter-connection cables. Original cost probably around £100. Unused and in perfect order—£6.19.6 or 10/- deposit and 15 fortnightly payments of 10/-.



R1155 for Spares

These are less valves but otherwise reasonably complete—ideal for spares—prices £2 to £4 depending on condition—carriage 7/6.

CABINET SNIP

Extremely well-made portable amplifier case finished in two-tone and very modern in appearance. Large enough for stereo outfit with tape deck or auto-changer. Snip price 56/9, plus 3/6 carriage and insurance.



SPECIAL THIS MONTH

Twin Twisted Lighting Flex—equivalent 14/36, rubber insulated, cotton covered, 12/6 per 100 yard coil.

Moving Coil Meters

0-500 microamp 2 in. flush 17/6
 250-0-250 microamp 2 1/2 in. surface 27/6
 750 microamp 2 1/2 in. surface 17/6
 5-0-5 milliamp 2 1/2 in. flush 17/6
 0-30 milliamp 2 1/2 in. flush 17/6
 0-100 milliamp 2 1/2 in. flush 15/-
 0-300 milliamp 2 1/2 in. flush 15/-
 0-500 milliamp 2 1/2 in. flush 15/-

Unbreakable Mains Lead type of lead fitted to electric razors makes fine lead for test meters and any other devices where subject to continuous bending. Twin figure eight construction, soft cream p.v.c. covered. Normally costs 2/- per yard. Three 6ft. leads for 2/-.

Filament Transformer, 6.3 v., 11 amp. 6/6.

0.3 Amp Dropper—tappings marked 200/220/250, 3/6.

Auto-Transformers, totally enclosed primary 200-250, secondary 110-120v., 150 w., normally 27/6. Price 17/6.

Output Transformer—standard pentode—4/6, multi ratio, 6/6.

Bi-metal Strip with heavy duty contact—ideal for thermostat, fire, lamp, etc., 2/6.

Neon Lamp—midget wire ended, ideal mains tester, etc., 2/-, ex Govt., 1/6.

5 amp. 12 v. full-wave Charger Rectifier, normal Price 17/6. Price 10/-, plus 1/6 post and ins.

Install those extra points. 3.029 twin flat T.R.S. cable. Big purchase enables us to sell this at 45/- per 100 yds., carriage 8/6.

Head Phones, DLR5. Ideal crystal sets, etc., 8/6, plus 2/- post.

Goodmans Multi Ratio Output Transformer, 6 watt, 8 ratios, from 12-1 to 72-1. Centre tapped for push/pull, 7/6—plus 1/6.
 Ditto, unbranded, 6/6, post 1/-.

Cold Cathode Valve CV41R. Voltage regulator or trigger switch—unused but ex-equipment, 2/6 each.

Tag Panels, ideal for constructors, experimental circuits, etc., 3 of each of 12 different types, 5/-, post 1/6.

Belling Lee 2BA fully insulated terminals for mounting through metal panels, 1/6 each.

Terminal Heads, insulated 4BA, 2/ doz. 0-1 mfd. 350 v. Small tubular metal cased condensers made by Dubilier, 2/6 doz.

50 Assorted Resistors, Well mixed and useful values 1/2 and 1 watt, 5/- for 50. Ditto, but 1 watt, 6/6 for 50.

Mains Transformer, Standard 230 v. input 250-0-250 at 80 mA., 6.3 v. at 5 A., 12/6, post 1/6.

Toggle Switch, Standard metal body, type with round dolly, fixing ring and on/off indicating plate, 1/3 or 12/- doz.

Metal Rectifier, 250 v. 60-80 milliamps, ideal for mains set or instrument or to replace that expensive valve, 4/6.

Screened Cable, Rubber covered flexible with metal braiding, ideal for microphone or gramophone extensions, 4d. per yd., 30/- per 100 yds.

ELECTRONIC PRECISION EQUIPMENT LTD.

★ Orders received by post are despatched from our warehouse, Dept. 7, 66 Grove Road, Eastbourne, and to save time, please post your order to this address. Please include enough for postage. Callers, however, should use one of the following addresses:

Electronics (M.P.) Ltd.,
 520 High Street North,
 Manor Park, E.12
 Phone: Ilford 1011
 Half day Thursday

Electronics (Ruislip) Ltd.,
 42-46 Windmill Hill,
 Ruislip, Mddx.
 Phone: RU1SLIP 5780
 Half day Wednesday

Electronics (Croydon) Ltd.,
 266 London Road,
 Croydon.
 Phone: CRO 8558
 Half day Wednesday

Electronics (Finsbury Park) Ltd.,
 29 Stroud Green Rd.,
 Finsbury Park, N.4.
 Phone: ARCHWAY 1049
 Half day Thursday



Stern's "fidelity" TAPE RECORDERS

BEFORE YOU BUY — YOU SHOULD HEAR THESE

RECORDERS. THEY ARE COMPARABLE TO THE MUCH HIGHER-PRICED MODELS

There are no better value for money Tape Recorders on the market—if you can't call and hear them, send S.A.E. for fully descriptive leaflets.

MODEL CR3/S incorporates the New COLLARO "STUDIO" TWIN TRACK 3-speed Deck H.P. Terms: Deposit £7.18.0 and 12 months of £39.10.0 £2.17.11

MODEL CR3/T incorporates the very popular 3-speed COLLARO Mk. IV "TRANSCRIPTOR" Deck which has both upper and lower tape tracks. H.P. Terms: Deposit £9.10.0 and 12 months of £39.8.8 £47.10.0

MODEL TR3/Mk. VI incorporates the New TRUVOX Mk. VI TWIN TRACK 2-speed Tape Deck H.P. Terms: Deposit £9.18.0 and 12 months of £3.12.7 £49.10.0

All prices quoted provide for the COMPLETE RECORDER including CRYSTAL MICROPHONE and 1,200 ft. Spool of Tape.

Each Model incorporates the highly successful HF/TR3 Amplifier (described opposite) thus ensuring truly "Hi-Fi" record and playback facilities.

TAPE AMPLIFIERS and PRE-AMPLIFIERS PRESENTED FROM MULLARD DESIGNS

MODEL HF/G2A-D

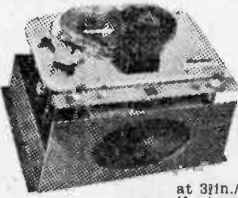
A complete self-contained Tape Recorder chassis incorporating Loudspeaker and comprising the Model HF/G2A Amplifier connected to the Garrard Tape Deck. Operates at 3 1/2 in./sec. speed and supplied fully tested and ready for immediate operation, designed for easy fixing into a portable case or cabinet only four fixing screws being required.

PRICE £25.0.0 (Including a 4 in. spool of Long Play Tape). Terms, Dep. £5.0.0, 12 months £1.18.8.

Alternatively we offer Complete Kit of Parts to build the HF/G2A Amplifier with the ASSEMBLED AND TESTED GARRARD TAPE DECK for **£22.0.0** Terms, Deposit £4.8.0, 12 months £1.12.3.

The model HF/G2A is available separately for

- (a) COMPLETE KIT OF PARTS £11.0.0
- (b) ASSEMBLED £12.15.0



MODEL HF/G2P-D

THE IDEAL "LINK" TO ADD FULL TAPE RECORDING FACILITIES TO HIGH QUALITY HOME INSTALLATIONS. RADIOGRAMS, etc. Comprises the HF/G2P Tape Pre-amplifier fitted to the Garrard Tape Deck, operates at 3 1/2 in./sec. speed, connects into the tape input channel or pick-up sockets of existing Amplifier or Radio Chassis. COMPLETE WORKING UNIT, containing 4 in. spool of Long Play Tape.

PRICE £23.15.0 Terms, Dep. £4.15.0, 12 months £1.14.10.

Alternatively we offer Complete Kit of Parts to build the HF/G2P Pre-amplifier with the ASSEMBLED AND TESTED GARRARD DECK for **£20.15.0** Terms, Dep. £4.2.0, 12 months £1.10.5.



Model HF/G2A-D Contains the Model HF/G2A-D Unit (described opposite). A small robust recorder with outstanding performance. Truly portable, weighs only 22 lbs. Twin Track operates on 3 1/2 in./sec. speed.

PRICE £29.15.0 H.P. Terms, Deposit £6.0.0, and 12 months at £2.3.7.

The Pre-amplifier Model HF/G2P is available separately for

- (a) Complete Kit of Parts £29.10.0
- (b) Assembled £11.5.0

MODEL HF/TR3 TAPE AMPLIFIER

(Mullard Type "A" design) A very high quality Amplifier incorporating 3-speed treble equalisation, using the latest FEROXUCUBE POT CORE INDUCTOR, FOR COLLARO-TRUVOX-BRENELL-WEARITE or MOTEK Tape Decks, has GILSEN Output Transformer. Includes separate Power Supply Unit.



KIT OF PARTS £12.15.0 OR **ASSEMBLED £16.10.0** H.P. Deposit £3.6.6 and 12 months at £1.4.2.

FOR THE HOME CONSTRUCTOR SPECIAL 'COMBINED ORDER' PRICES

- (a) The COLLARO "STUDIO" TAPE DECK and our Mullard Type "C" PREAMPLIFIER and Power Unit Assembled and Tested. **£29.10.0**
- (b) H.P. Deposit £5.18.0, and 12 months £2.3.3.
- (b) As above but TYPE "C" PREAMPLIFIER supplied as complete KIT OF PARTS **£26.10.0**
- (c) The COLLARO Mk. IV TAPE DECK and the MULLARD TYPE "C" PREAMPLIFIER and Power Unit assembled, tested. **£35.0.0**
- (d) H.P. Deposit £7, and 12 months £2.11.4
- (d) As (c) but Type "C" as COMPLETE KIT OF PARTS **£32.0.0**
- (e) The TRUVOX Mk. VI DECK and the assembled Type "C" Preamplifier and Power Unit. H.P. Deposit £8.0.0, and 12 months £2.18.8. **£40.0.0**
- (f) As above but Type "C" as complete KIT OF PARTS **£36.10.0**
- (g) The BRENELL Mk. V DECK and the assembled Type "C" PREAMPLIFIER and POWER UNIT H.P. Deposit £9.4.0, and 12 months £3.7.6. **£46.0.0**
- (h) As (g) but Type "C" as complete KIT OF PARTS assembled and tested. **£43.0.0**
- (i) THE WEARITE 4A DECK with TYPE "C" assembled and tested. H.P. Deposit £11.4.0, and 12 months £4.2.1. **£56.0.0**

ALL THE ABOVE CAN BE SUPPLIED IN A PORTABLE CASE FOR £5.10.0 extra, THUS FORMING A COMPLETE PORTABLE PRE-AMPLIFIER.

FULLY DESCRIPTIVE LEAFLETS ON ALL OF ABOVE ARE AVAILABLE BUT PLEASE ENCLOSE S.A.E. AND STATE WHICH LEAFLET IS REQUIRED.

MULLARD TYPE "C" TAPE PREAMPLIFIER—ERASE UNIT

The "Hi-Fi" link to add full tape recording facilities to High Fidelity home installations. Incorporates FEROXUCUBE POT CORE PUSH PULL OSCILLATOR and 3-speed treble equalisation by FEROXUCUBE POT CORE INDUCTOR, FOR WEARITE-COLLARO-TRUVOX-BRENELL or MOTEK TAPE DECKS. Includes separate power Supply Unit.



KIT OF PARTS £14.0.0 H.P. £4.8.0 Deposit and 12 months £1.4.11. **£17.0.0** (Excluding power unit £11.15.0 and £14.10.0 respectively).

- (a) COMPLETE KIT to build the HF/TR3 Amplifier, together with the COLLARO "STUDIO" DECK, ASSEMBLED AND TESTED. **£25.10.0**
- (b) As above but with HF/TR3 supplied ASSEMBLED and TESTED. H.P. Deposit £5.16.0, and 12 months £2.2.6. **£29.0.0**
- (c) COMPLETE KIT to build the HF/TR3, together with the Mk. IV COLLARO "TRANSCRIPTOR" TAPE DECK. **£30.15.0**
- (d) As above if we are required to wire up Deck Switch Banks.)
- (d) As above but HF/TR3 supplied ASSEMBLED and TESTED. H.P. Deposit £7.0.0, and 12 months £2.10.5. **£34.10.0**
- (e) extra if we are required to wire up Deck Switch Banks.)
- (e) COMPLETE KIT to build the HF/TR3, together with the NEW TRUVOX Mk. VI TAPE DECK. **£36.0.0**
- (f) As above but HF/TR3 supplied ASSEMBLED and TESTED. H.P. Deposit £7.18.0, and 12 months £2.17.11. **£39.10.0**
- (g) COMPLETE KIT to build the HF/TR3 AMPLIFIER with the BRENELL Mk. V TAPE DECK. **£41.10.0**
- (h) As above but HF/TR3 supplied ASSEMBLED and TESTED. H.P. Deposit £9.0.0, and 12 months £3.8.0. **£45.0.0**
- (i) THE WEARITE 4A DECK with assembled and tested HF/TR3 Amplifier including WEARITE Head Lift Transformer. H.P. Deposit £11.0.0, and 12 months £4.0.8. **£55.0.0**

Carriage and Insurance on each above is 10/- extra. ATTRACTIVE PORTABLE CASE is available to accommodate the TRUVOX or COLLARO TAPE DECKS and we offer it, together with ROLA ACCELERATION 10 x 8 in. LOUDSPEAKER—ACOS CRYSTAL MICROPHONE—and 1,200 ft. SPOOL E.M.I. TAPE—ALL FOR £9.10.0. Carriage and Insurance 5/- extra.

STERN RADIO LTD.

STERN'S MULLARD DESIGNS

Designed by MULLARD—presented by STERN'S strictly to specification

COMPLETE KIT OF PARTS—

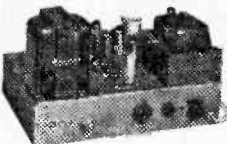
MULLARD "5-10" MAIN AMPLIFIER

For use with the MULLARD 2-valve pre-amplifier with which undistorted power output of up to 10 watts is obtained. We supply SPECIFIED COMPONENTS AND NEW MULLARD VALVES, including PARMKO MAINS TRANSFORMER and choice of the latest Ultra-Linear PARMKO or the PARTRIDGE Output Transformer. PRICE COMPLETE KIT (PARMEKO Output Trans.)

Alternatively we supply ASSEMBLED £10.00

ASSEMBLED AND TESTED £11.10

ABOVE INCORPORATING PARTRIDGE OUTPUT TRANSFORMER, £1.60 EXTRA



MULLARD'S PRE-AMPLIFIER TONE CONTROL UNIT

Employing two EF86 valves, and designed to operate with the MULLARD MAIN AMPLIFIERS, but also perfectly suitable for other makes.

PRICE COMPLETE KIT OF PARTS £6.60

ASSEMBLED AND TESTED £8.00

Supplied strictly to MULLARD'S SPECIFICATION and incorporating:

- Equalisation for the latest R.I.A.A. characteristics.
- Input for Crystal Pick-ups, and variable reluctance magnetic types.
- Input (a) Direct from High Imp. Tape Head. (b) From a Tape Amplifier or Pre-amplifier.
- Sensitive Microphone Channel. ● Wide range BASS and TREBLE Controls.



COMPLETE MULLARD "5-10" AMPLIFIER

The popular and very successful complete "5-10" incorporating Control Unit providing up to 10 watts high quality reproduction. Only Specified Components and new MULLARD VALVES are supplied including PARMKO MAINS TRANSFORMERS and choice of the latest PARMKO or PARTRIDGE ULTRA-Linear Output Transformers.

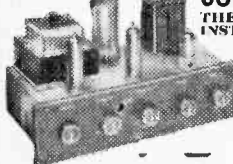
KIT OF PARTS £11.10

OR ASSEMBLED £13.10

and TESTED £15.10

OR PURCHASE (Assembled Amp. only). DEPOSIT £2.14.0.12 months at 19.10.

ABOVE INCORPORATING PARTRIDGE OUTPUT TRANS. £1.60 extra.



COMPLETE MULLARD "3-3"

THE IDEAL AMPLIFIER FOR A SMALL HIGH QUALITY INSTALLATION PROVIDING EXCELLENT REPRODUCTION OF UP TO 3 WATTS OUTPUT. COMPLETE KIT OF PARTS £7.10.0

OR ASSEMBLED £8.19.6

and TESTED £9.19.6
 (plus 6/6 carriage and insurance) H.P. Terms: Deposit £2.0.0 and 8 Months at £1.0.0. Complete to MULLARD'S SPECIFICATION including Mullard valves and a PARMKO OUTPUT TRANSFORMER.

STEREO "3-3" MAIN AMPLIFIER

Comprises two MULLARD 3-3 Main Amplifiers on one chassis. Operates with MULLARD STEREO PRE-AMPLIFIER. Output power 6 watts. Inputs for Crystal Pick-up and Radio Tuner.

KIT OF PARTS £10.0.0

OR ASSEMBLED £11.15.0

COMPLETE STEREO AMPLIFIER

Meets the many requests for a low priced but good quality Stereophonic Amplifier. Output power is 4 watts and suitable for Crystal Pick-ups.

KIT OF PARTS £8.10.0

OR ASSEMBLED £10.10.0

!! RECORD PLAYERS !!

- THE LATEST MODELS ARE IN STOCK, MANY AT REDUCED PRICES
- SEND S.A.E. FOR ILLUSTRATED LEAFLET
- B.S.R. MONARCH UA8 4-speed mixer Autochanger with Crystal Pick-up. £6.19.6
- THE NEW COLLARO MODEL RP594 4-speed Single Record Player, Studio Carriage. £9.18.9
- THE COLLARO "CONQUEST" 4-speed Autochanger Studio Pick-up. £7.10.0
- THE COLLARO 4-speed Single Record Player, Studio Pick-up. £6.9.6
- THE NEW B.S.R. Model UA12 in Stock. A4 "SPED" MIXER AUTOCHANGER. £8.7.6
- UA12 also available incorporating the B.S.R. STEREO Pick-up, plays L.P. and 78 Records. £10.10.0
- GARRARD MODEL TA/MK.11 4-speed Player fitted high output Crystal Pick-up. £8.10.0
- GARRARD MODEL RC/210. Autochanger 4-speeds. High output. Crystal Pick-up. £10.10.0

Carriage and Insurance on each above, 5/- extra. H.P. TERMS AVAILABLE ON EQUIPMENT OVER £9. DESCRIPTIVE LEAFLETS AVAILABLE FOR ALL EQUIPMENT. PLEASE SEND S.A.E.

PRICE REDUCTIONS

- (a) The KIT OF PARTS to build both the "5-10" Main Amplifier and the 2-valve PRE-AMP CONTROL UNIT. £15.15.0
- (b) The "5-10" and the 2-stage PRE-AMP both ASSEMBLED and TESTED H.P. Dep. £3.16.0 and 12 months of £1.7.8. £18.18.0
- (c) The KIT OF PARTS to build the DUAL-CHANNEL "3-3" AMPLIFIER and the DUAL-CHANNEL PRE-AMPLIFIER CONTROL UNIT. £21.10.0
- (d) The DUAL-CHANNEL "3-3" AMPLIFIER and the DUAL-CHANNEL PRE-AMPLIFIER CONTROL UNIT BOTH ASSEMBLED and TESTED. £25.0.0
- H.P. Terms: Deposit £5 and 12 months of £1.16.8.
- (e) THE KIT OF PARTS to build one "5-10" MAIN CHANNEL and the DUAL-CHANNEL PRE-AMP CONTROL UNIT. £21.10.0
- (f) ONE "5-10" AMPLIFIER and the DUAL-CHANNEL PRE-AMPLIFIER both ASSEMBLED and TESTED. £25.0.0
- H.P. Terms: Deposit £5, 12 months of £1.16.8.
- (g) KIT OF PARTS to build Two "5-10" MAIN AMPLIFIERS (incorporating Parmeko Output Transformers) and the DUAL-CHANNEL PRE-AMPLIFIER CONTROL UNIT. £31.0.0
- (h) TWO "5-10" AMPLIFIERS and the DUAL-CHANNEL PRE-AMPLIFIER CONTROL UNIT BOTH ASSEMBLED & TESTED. £36.0.0
- H.P. Terms: Deposit £7.4.0. 12 months of £1.12.0.
- Carriage and Insurance 7/6 extra. Prices quoted are subject to £1.6.0 extra for Partridge Transformer.

STEREO PRE-AMPLIFIER

This model incorporates two Mullard 2-valve Pre-Amplifiers combined into a single unit and is designed to be used for both STEREOPHONIC or MONAURAL operation. It is designed primarily to operate with our range of MULLARD MAIN AMPLIFIERS but will also operate equally well with any make of Amplifiers requiring an input of 250 mV. COMPLETE KIT OF PARTS £12.10.0



ASSEMBLED AND TESTED £15.0.0
 H.P. £3 Dep. and 12 mths. at £1.2.0

MULLARD FOUR CHANNEL MIXER UNIT

Self powered with Cathode follower output. Incorporates Two inputs for MICROPHONES. One for CRYSTAL PICK UP and a fourth for RADIO or TAPE



Complete Kit of Parts £8.8.0
 Assembled and Tested £10.0.0

TERMS: Deposit £2 and 12 months at 15/-.

Mk.11 "Fidelity" FM TUNING UNIT

An attractively presented unit incorporating MULLARD PERMEABILITY TUNING HEART and corresponding Mullard valve line up. FOR THE CONSTRUCTOR £10.10.0 ASSEMBLED £14.5.0

A SPECIAL CASH OFFER !!

This very attractive PORTABLE AMPLIFIER CASE together with a good quality GRAM AMPLIFIER and a matched P.M. SPEAKER. For ONLY £8.7.6 (Plus 7/6 Carr. & Ins.)



The Amplifier consists of a 2-stage design incorporating 3 modern B.V.A. valves and has separate BASS and TREBLE CONTROLS. The Portable Case will also accommodate almost any make of Autochanger and is attractively finished in Mushroom Grey Rexine. WE ALSO SUPPLY SEPARATELY— £4.2.6
 (a) The 2-stage (plus Rectifier) AMPLIFIER £3.17.6
 (b) The PORTABLE CARRYING CASE
 (c) 6in. P.M. SPEAKER 18/9 Carriage and Insurance 4/- extra.

Dept. P.W. 109 FLEET ST., LONDON, E.C.4
 Telephone: FLEET STREET 5812/3/4

RETURN-OF-POST

We offer a really efficient Mail Order Service on all items stocked. All cash orders are dealt with on the day of receipt. Hire purchase orders are subject to slight delay but this is kept to the absolute minimum.

JASON FM TUNER KITS

Three Jason F.M. Tuner kits with variable tuning are now available to the home constructor. Brief details are given here and our illustrated list is available free.

MOST IMPORTANT. We take great pains to see that every item needed is included in our kits and also that all items are entirely suitable in every way. This should be borne in mind when comparing prices.

Hire Purchase Terms are available on any kit.

INSTRUCTION MANUALS. All our kits include the instruction manual, but this can be supplied separately if required. Data Publications booklet describing FMT1, 2, and 3, 2/10; J.T.V.2, 3/10; Mercury 2, 3/10. All post free.

STANDARD TUNERS

FMT1. Supplied complete with a chassis-panel assembly fitted with a gold hammer finished panel and glass dial. Four EF91 valves are used and an external power supply is required. Complete kit **£6.19.6.** Power Pack Kit **£2.12.6.**

FMT2. This is a new version of the FMT1 and is supplied with a complete cabinet-chassis assembly which can be mounted in a cabinet or stood on a shelf. The circuit employs four EF80 valves and the power supply can be built into the cabinet if desired. Complete kit less power supply **£9.9.6.** Kit with power supply **£10.9.6.**

FRINGE TUNER

FMT3. This is a fringe tuner using the same cabinet assembly as the FMT2 described above. The tuner is fitted with variable AFC and uses five EF80 and one ECC81 valves. Kit less power supply **£10.9.6.** Kit with power supply **£12.7.6.**

F.M./TV SWITCHED TUNERS

Kits for two new Jason F.M./TV Sound switched tuners are now available. Both incorporate the latest "Fireball" Turret Tuner which gives switch positions for the three BBC Programmes as well as BBC and ITA TV Sound. A.P.C. is fitted to ensure freedom from drift.

JTV2. This tuner is complete with power supply in a cabinet which can be used either for shelf or cabinet mounting. Complete kit **£15.17.6.**

MERCURY 2. This is similar to the JTV2 but has no provision for a power supply. It is mounted on a small chassis with printed front panel and is intended for cabinet fixing. Complete kit **£11.7.6.**

IMPORTANT. When ordering JTV2 and Mercury 2 kits it is essential to give the TV channels and F.M. stations required on the tuner.

GRAMOPHONE EQUIPMENT

ALL LATEST MODELS Hire Purchase
Cash Price Deposit Mthly/Pmts.

RECORD CHANGERS

COLLARO Conquest (Studio O PU) ..	£7.19. 6	£1.12. 0	6 of	£1.4. 7
GARRARD RC216 (GC8 PU) ..	£9.19. 6	£1.19. 6	12 of	15/-
B.S.R. UA14 Monarch (TC8 PU) ..	£7.15. 0	£1.10. 0	6 of	£1.4. 2
B.S.R. UA8 Monarch (TC8 PU) ..	£7. 5. 0	£1. 9. 0	6 of	£1.2. 8
B.S.R. UA14 Monarch (TC8S Stereo/LP/78) ..	£9.18. 0	£1.18. 0	12 of	15/-

SINGLE RECORD PLAYERS

GARRARD TA (GC8 PU) ..	£8.10. 0	£1.14. 0	12 of	13/-
B.S.R. TU9 (TC8 PU) ..	£4.10. 0	£1. 5. 0	3 of	£1.5. 0
COLLARO RP594 (O, P or T PU) ..	£9.18. 9	£1.18. 9	12 of	15/-
E.M.I. (Acos Stereo/Mono PU) ..	£6.15. 0	£1. 7. 0	12 of	10/8

TRANSCRIPTION UNITS

COLLARO 4T/200 (TX88 PU) ..	£18.13. 0	£3.15. 0	12 of	£1.7. 4
COLLARO 4TR/200 Motor only ..	£13.18. 3	£2.15. 3	12 of	£1.0. 5
GARRARD 4HF (GC8 PU) ..	£18. 9. 9	£3.15. 9	12 of	£1.7. 0

Many of the above can be supplied for stereo working. See our Gramophone Equipment List for details.

NEW ILLUSTRATED LISTS

NOW READY!

Illustrated lists are available on **LOUD-SPEAKERS, TAPE DECKS, TEST GEAR, RECORDING TAPES, GRAMOPHONE EQUIPMENT.** Any will be sent free on request.

BLANK CHASSIS

The very latest blank chassis for the home constructor. Packed flat for easy and safe posting. These are made in bright tin-plate and have the top plate and four side channels packed flat complete with nuts and bolts for assembly. The top plate is completely flat for easy drilling before assembly. Earth connections can be made directly by soldering. Available in the following sizes: 7 x 5 x 2in., 4.9, post 1.3; 10 x 5 x 2in., 5.3, post 1.4; 10 x 7 x 2in., 6.7, post 1.6; 14 x 5 x 2in., 7/8, post 1.6; 14 x 10 x 2in., 8/9, post 1/8.

CATHODE-RAY TUBES

BRAND NEW STOCK. NOT REBUILDS.
12 MONTHS' GUARANTEE

We can supply all BVA branded tubes at the new reduced prices. This includes Brimar, Cossor, Emisco, Emitron, Ferranti, G.E.C., Mazda and Mullard. Full list of all available types sent on request.

STEREO COMPONENTS

Morganite ganged potentiometers as specified for the Mullard circuits. Lot/Anti-Log, 500k, 1 meg., 2 meg. Log/Log, 250k, 1 meg., 2 meg. Lin/Lin, 500k, 1 meg. All 10/6 each.
Denco Chassis for the Mullard circuits. All drilled with printed front panels.
Three Valve Stereo Amplifier, 22-. Seven watt Stereo Amplifier, 24.6. Stereo Pre-Amplifier, 24.6.
Pick-up cartridges. B.S.R. TC8S £9.4.11. Ronette DC284, £3.19.6. Both are turn-over types for Stereo, LP and 78 records.

LATEST TEST METERS

	Cash Price	Deposit	Hire Purchase	Mthly/Pmts.
AVO Model 8 ..	£23.10. 0	£4.14. 0	12 of	£1.14. 6
AVO Model 8 with leather carrying case ..	£27. 8. 0	£5. 8. 0	12 of	£2. 0. 4
AVO Model 7 ..	£19.10. 0	£3.18. 0	12 of	£1. 8. 8
AVO Model 7 with leather carrying case ..	£23. 8. 0	£4.12. 0	12 of	£1.14. 6
AVO Multiminor ..	£23.10. 0	£1.18. 0	12 of	14/4
AVO Multiminor with leather carrying case ..	£11. 9. 0	£2. 5. 0	12 of	17/-
TAYLOR Model 127A ..	£10. 0. 0	£2. 0. 0	12 of	15/-
CABY A-10 ..	£4.17. 6	£1. 7. 6	3 of	£1. 6. 8
CABY B-20 ..	£6.10. 0	£2. 0. 0	3 of	£1.13. 4

Full details of any of the above supplied free on request.

TAPE DECKS

	Cash Price	Deposit	Hire Purchase	Mthly/Pmts.
B.S.R. TD2 ..	£28.19. 6	£1.19. 6	12 of	15/-
COLLARO STUDIO ..	£15.10. 0	£3. 2. 0	12 of	£1. 2. 0

All carriage free.
All components in stock for the Mullard Tape "C" Pre-Amplifier Kit. Fully detailed list available.

TRANSISTORS

ALL BRAND NEW STOCK—NOT SURPLUS
MULLARD—Audio OC79, OC71, 14—each; OC72 Audio Output Matched pair, 34—; RF, OC44, 26—; OC45, 24—.
MAZDA—XB102, XB104, Audio, 10— each; XC101 Audio Output, Matched pair, 34—; RF, XA101, 23—; XA102, 26—; XA103, 15—; XA104, 18—.

WATTS RADIO (MAIL ORDER) LTD

54 CHURCH STREET, WEYBRIDGE, SURREY.

Telephone: Weybridge 4556

PLEASE NOTE: POSTAL BUSINESS ONLY FROM THIS ADDRESS

SERVICE

RECORDING TAPE

DOUBLE PLAY

R.A.S.F. 300ft (3"), 14/-; 600ft (4"), 25/-; 1200ft (5"), 45/-; 1800ft (5 1/2"), 58/-; 2400ft (7"), 77/8.

EMITAPE 100, 400ft (3"), 17/-; 1200ft (5"), 45/-; 2400ft (7"), 80/-.

SCOTCH ROY 200, 400ft (3"), 17/-; 1200ft (5"), 45/-; 2400ft (7"), 80/-.

TELEFUNKEN, 1200ft (5") in plastic container, 40/-; 1800ft (5 1/2") in plastic container, 50/-; 2400ft (7"), 75/-.

LONG PLAY

BASE, 210ft (3"), 9/-; 850ft (5"), 28/-; 1200ft (5 1/2"), 35/-; 1800ft (7"), 50/-.

EMITAPE 99, 99/3 250ft (3"), 9/8; 99/3N 250ft (3 1/2"), 9/8; 99/9 850ft (5"), 28/-; 99/12 1200ft (5 1/2"), 35/-; 99/18 1800ft (7"), 50/-; 99/9, 99/12 and 99/18 available in Emitape, 2/8 extra.

SCOTCH BRAND 150, 300ft (3 1/2"), 9/8; 900ft (5"), 28/-; 1275ft (5 1/2"), 35/-; 1800ft (7"), 50/-.

TAPE ACCESSORIES

BIB Tape Splicer, 18/6. Post 9d.

WEARITE De-fluxer, 50/-. Post 1/3.

Full tape list including special offers of standard tapes available free.

LOUDSPEAKERS

	Cash Price	Hire Deposit	Purchase Mthly/Pmts.
GOODMAN'S			
Axiom 110, 10"	£5. 0. 0	£1.10. 0	3 of £1. 8. 8
Axiom 112, 10"	£8.10. 0	£1.14. 0	6 of £1. 8. 0
Axiote, 8"	£8.12. 1	£1. 7. 1	6 of £1. 0.10
Axiom 300, 12"	£11. 5. 9	£2. 5. 9	12 of 16/8
Axiom 400, 12"	£16. 1. 0	£3. 4. 0	12 of £1. 3. 7
Audiom 60 Bass, 12" ..	£9.12. 9	£1.18. 9	12 of 14/8
Trebax Tweeter	£6. 4. 0	£1. 5. 0	6 of 10/10
CX5000 Cross-over unit	£1.18. 0	—	—
WHITELEY			
HF1018, 10"	£7.12. 3	£1.11. 3	6 of £1. 3. 6
HF1012, 10"	£4.15. 0	£1.10. 0	3 of £1. 5. 0
HF816, 8"	£6.10. 6	£1. 6. 6	6 of £1. 0. 8
T816, 8"	£8. 3. 9	£1. 3. 9	6 of £1. 0. 0
T10 Tweeter	£4. 4. 0	£1. 4. 0	3 of £1. 3. 4
T359 Tweeter	£1.13. 3	—	—
CX3000 Cross-over unit	£1.10. 0	—	—
CX1500 Cross-over unit	£1.18. 3	—	—

OUTPUT TRANSFORMERS

GILSON
W0696A, W0696B, 50/6, post 2/-; W0710, W0710/8K, 55/6, post 2/-; W0892, 62/3; W0767, 27/-; post 1/6.

PARTRIDGE
P3667, 52/6, post 2/-; P.4014, 98/6; P4131, 60/-; P3591A, 99/-; P5202, P5203, 95/-.

P. ARMEKO, P2641, 27/-; post 1/6.

ELSTONE, OT3, 25/-, post 1/6; OT/ML, 45/-, post 2/-.

ELLISON, OPT84, 20 watt P-P Multi-ratio, 30/-, post 2/-.

AMPLIFIER KITS

We have full stocks of all components for the Mullard 510, Mullard 2 and 3 valve Pre-Amplifiers, GEC 912 Plus. Fully detailed list on any of these sent upon request. Instruction Manuals. Mullard. All Mullard Audio Circuits in "Circuits for Audio Amplifiers", 9/5. GEC 912. 4/6. All post free.

HIRE PURCHASE TERMS

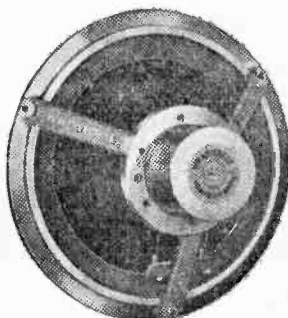
are available on any item. Repayments may be spread over 3, 6 or 12 months. Details as follows: Three months: Deposit 6/- in the £. Service charge 5 per cent but minimum charge of 10/-. Six and Twelve months: Deposit 4/- in the £. Service charge 10 per cent but minimum charge 20/-.

TERMS OF BUSINESS

Cash with order or C.O.D. We charge C.O.D. orders as follows. Up to £3, minimum 2/8. Over £3 and under £5, 1/8. Over £5 and under £10, 1/8. Over £10, no charge. Postage extra on CASH orders under £3.

HIGH QUALITY SPEAKERS with foam surrounds by Wharfedale

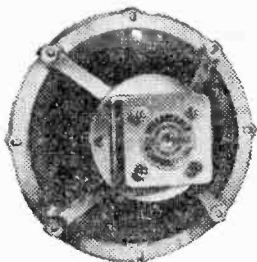
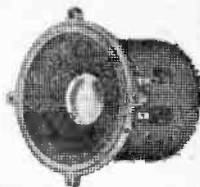
THREE MORE FROM THE LARGE RANGE
OF MODELS IN PRODUCTION



GOLDEN/FSB
Bass Resonance 30/38
c/s. Flux Density 14,500
gauss. Total Flux
60,000 maxwells.
Price (inc. P.T.) 166/7

SUPER 3

Flux Density 14,500
gauss. Total Flux
60,000 maxwells.
Price (inc. P.T.) 133/3



8in. BRONZE/FS/AL
Bass Resonance 45/55
c/s. Flux Density 10,000
gauss. Total Flux
39,500 maxwells.
Price (inc. P.T.) 86/7

FOAM SUSPENSION

is used on all the above units. Its resilience reduces the incidence of distortion at low frequencies, and the softness improves dissipation of middle and high frequency vibrations at the edge of the cone, resulting in all-round improvement in the smoothness of response.

Illustrated, descriptive leaflet and cabinet construction sheet free on request.

Wharfedale

WIRELESS WORKS LTD
IDLE BRADFORD YORKS

Telegrams: 'Wharfedale', Idle, Bradford.
Telephone: Idle 1235/6

**REPLACEMENT, REBUILT TV TUBES
GUN, ETC., 12 MONTHS GUARANTEE**



Terms available over 20 weeks Carr. and ns. 15/6

21" TUBE £8.10.0
17" TUBE £7.10.0 **£2** ALLOWED ON OLD TUBE

12" 14" 15" TUBES £5.10.0 **£1** ALLOWED ON OLD TUBE

DUKE & CO. (LONDON) LTD.

621/3 Romford Rd., Manor Park, E.12 ILF 6001/3
Liverpool St. Stn. to Manor Park Stn. only 10 mins.

PLESSEY TV CHASSIS FOR SPARES only 9/6

56 Resistances, 54 Condensers, 13 Valve Holders, 4 Transformers, Chokes 250mA. Metal rectifiers 300 volts at 250mA. Fuse panel. Focus magnets. Plugs, Sockets. Carr. 7/6.

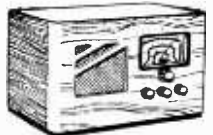
SENSATIONAL OFFER! LOOK!

17" TV's Complete 19 gns.

Terms: £7 deposit and 20 weekly payments of 15/- Carr. and Ins. 25/- (TV/BBC. Beautifully styled polished cabinets. These are table models with option of contemporary legs fitted (2 gns. extra). 17in. rectangular tube guaranteed for 12 months. Valves and chassis guaranteed for 3 months (chassis salvaged but reconditioned). Where possible personal collection is advised.

HOME RADIO 79/6

A.C. Five valve octal superhet. 3 waveband receiver. P.U. In attractive wooden cabinet. 9½ x 18½ x 11½in. Ins. & Carr. 4/6.



RECORD PLAYER CABINET R.P.2



ONLY 59/6

Made by famous manufacturer. In polka dot cloth with clipped lid and carrying handle. Size 16 x 14 x 8½in. deep. Carr. & Ins. 4/6.

EXTENSION SPEAKERS 19/9



Bin. P.M. Speaker fitted into polished cabinet. Standard matching to any receiver (2.5 ohms) Complete. Switch and flex included. P. & P. 3/9.

Contemporary EXTENSION SPEAKERS 19/9

Covered in smart two tone leatherette colour scheme. Beautifully made. Including Bin. P.M. speaker. P. & P. 3/9.

SPEAKER SALE!

- BARGAIN SPEAKER 5/9**
Bin. P.M. Repaired cone defect not affecting reproduction quality.
- Bin. P.M. SPEAKER 6/9**
As above but with output transformer.
- Bin. P.M. SPEAKER ... 9/9**
Highest quality. Fitted output transformer.
- ELLIPTICAL SPEAKERS 15/9**
8 x 3in. and 7 x 4in. Brand new. Also 9 x 4in. at 19/9.
Post and packing on each, 2/9

TAPE RECORDER CABINET! and COMPLETE TAPE RECORDER!



DE-LUXE MODEL

ONLY 29/9

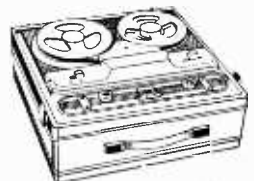
Beautifully made Tape Recorder Cabinet. Size 13 x 10½ x 7in. Covered in two-tone coloured rexine cloth. Stylish design. Carrying handle and detachable lid Easily adapted to Record Player Cabinet. P. & P. 4/6.

LIST PRICE 29 gns.

Now only 18 Gns.

Famous Manufacturer. Unrepeatable Value

Huge purchase allows us to offer at this amazing price. Beautifully styled rexine covered cabinets. Colours: Red, Grey, Black. Storage space for 4 tapes, mike and lead. Incorporating latest B.S.R.: Deck. LOOK AT THESE EXPENSIVE FEATURES. Record playback switch and rewind with interlocking device to prevent accidental erasure. Tone and volume controls. Superimpose and electronic eye. Ample power output 3.5 watts. Small overall size 14½ x 14½ x 7½in. Lightweight, 21 lbs. Playing time 1½ hours. 5½in. standard tape. Terms: Carr. and Ins. 12/6. Microphone 27/6 extra. Tapes 19/9.



TAPE RECORDER AMPLIFIER

Compact, well designed 5-valve amplifier. Output 3.5 watts. Valve line up—ECC83. **£7.19.6**
Double triode first audio amplifiers. ECL82 Triode pentode further audio amplifier and output valve. 6BW6 Bias and erase oscillator. EM84 record level, indicator. EZ80 H.T. rectifier. Input for mike, radio and gram. Controls: record playback volume and on/off playback tone. Dia. 8½ x 3 x 4½in. Ins. and carr. 4/6. Terms. Knobs 2/6 per set. Beautiful perspex dial plate, 3/6. Completed with sockets for mike. Radio and superimpose switch.

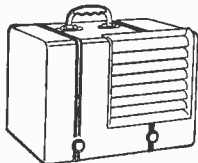
RECTIFIERS 2/9

250 volt, 100mA. Full or half valve. Salvage, guaranteed. P. & P. 1/3.
CHASSIS 1/-
6 or 8 valve, latest type. Midget valve design. 12½ x 7½ x 2½in. P. & P. 1/9.

SOUND/VISION STRIP 2/9

I.F.'s 10.5/14 Mc/s and 16/19.5 Mc/s. 8 valve holders. P. & P. 2/6.

**THE "NEW LOOK" GRAM AMPLIFIER
STEREO, MICROPHONE, GUITAR, RECORDS**



ideal for stereo attachment. Well styled cabinet in Brown/Ivory with carrying handle. Contains 8in. high flux speaker. For use A.C. or D.C. mains. 3 valves, 10F1, 10P14 and U404. Maximum output 4.5 watts. Size 14 x 11 x 6½in. Wonderful for HOME, HALL, AMATEUR THEATRICALS. Two units can give a world of amusement and special stereo effects. Ideal for works and offices as Loud Hailer, for Election Speaker and Public Address. Ready for immediate use. 12 months' guarantee Post and packing 5/6. Terms: Deposit 30/-, plus P. & P., and 10 weekly payments of 8/-. MONEY BACK IF NOT DELIGHTED. Extras: Mike, 27/6; Record Changer, £6.19.6; Extra Loud Speaker in contemporary cabinet, 19/9.

The decision is yours. To be a success in your chosen career; to qualify for the highest paid job . . . to control a profitable business of your own. ICS home-study courses put your plans on a practical basis; teach you theory and practice; give you the knowledge and experience to take you, at your own pace, to the top.

Choose the RIGHT course :

RADIO & TELEVISION ENGINEERING
INDUSTRIAL TELEVISION

RADIO & TELEVISION SERVICING
RADIO SERVICE AND SALES

VHF/FM ENGINEERING : ELECTRONIC
COMPUTERS & PROGRAMMING

ICS provides thorough coaching for professional examinations:

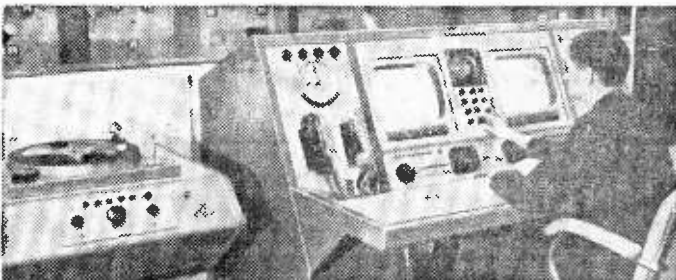
Brit. I.R.E., City and Guilds Telecommunication Technicians, C. & G. Radio & TV Servicing (R.T.E.B.); C. & G. Radio Amateurs.

Technical Training in Radio, Television and Electronics Engineering with

LEARN AS YOU BUILD

Practical Radio Courses

Gain a sound up-to-professional-standards knowledge of Radio and Television as you build **YOUR OWN** 4-valve T.R.F. and 5-valve superhet radio receiver, Signal Generator and High-quality Multi-meter. At the end of the course you have three pieces of permanent and practical equipment and a fund of personal knowledge and skill. ICS Practical Radio courses open a new world to the keen Radio amateur.



THERE ARE ICS COURSES TO MEET YOUR NEEDS AT EVERY STAGE OF YOUR CAREER. FILL IN AND POST THIS COUPON TODAY.

You will receive the FREE 60 page ICS Prospectus listing examinations and ICS technical courses in radio, television and electronics PLUS details of over 150 specialised subjects.

Other ICS courses include: MECHANICAL, MOTOR, FIRE, ELECTRICAL & CHEMICAL ENGINEERING, FARMING, GARDENING, ARCHITECTURE & WOODWORKING, SELLING & MANAGEMENT, ART, PHOTOGRAPHY, etc., etc.

PLEASE STATE ON COUPON SUBJECT YOU ARE INTERESTED IN . . .

INTERNATIONAL CORRESPONDENCE SCHOOLS
(DEPT. 172), INTERTEXT HOUSE, PARKGATE RD., LONDON, SW11
PLEASE SEND FREE BOOK ON.....
NAME
ADDRESS
.....
OCCUPATION..... AGE.....
11.60

FURTHER HUGE PURCHASES DIRECT FROM SOURCE

13 CHANNEL TV's

TABLE MODELS. FAMOUS MAKERS. Complete with all valves and tubes. Unequalled in value. They are untested and not guaranteed to be in working order.

AMAZINGLY POPULAR-IDEAL SECOND SETS

12" - £3.19. (p. & p. 12/6)

14" - £6.19. (p. & p. 15/6)

17" - £9.19. (p. & p. 17/6)

12' 5 CHANNEL TV's 45/- (p. & p. 12/6)

14' 5 CHANNEL TV's 85/- (p. & p. 12/6)

Record Players

- COLLARO CONQUEST 4-speed 4/546... £5 19 0
EMI 1-speed Stereo... £2 19 0
BEE (AUI) AUTOCHANGERS... £7 19 0
B.S.R. (UAS) AUTOCHANGERS... £6 19 0
GARRARD RC120 MK1... £9 7 6

4-SPD. RECORD PLAYERS

Latest B.S.R. 7U9 Turntable, together with light-weight Starr Galaxy dust sapphire crystal turnover pick-up head. Truly amazing value £3.10.0

GALAXY PICKUPS, as above, only 19/6.

External/Internal ITV Converters with power pack

Hammered finish. Very compact. Gain and Trimmin. controls. Lists at £17. OUR PRICE 39/-

TRANSISTORS

REDFOT Now only 3/6. WHITE SPOT 4/6

DIODES General purpose, famous make, 9d. 8/- doz. GEX44 type, 3/8.

TUBES DIRECT FROM OUR FACTORY

Due to the increasing demand for our wide range of C.R.T.S. and our efficient handling methods we offer unbeatable value.

REGUNNED TUBES have new Guns, Getters, Aquadac Coatings, Bases, etc. TOP QUALITY GUARANTEED

Table with columns for tube types (e.g., 6M6, 6X4, 6X5, 6X6, 6X8, 6X9, 6X10, 6X11, 6X12, 6X13, 6X14, 6X15, 6X16, 6X17, 6X18, 6X19, 6X20, 6X21, 6X22, 6X23, 6X24, 6X25, 6X26, 6X27, 6X28, 6X29, 6X30, 6X31, 6X32, 6X33, 6X34, 6X35, 6X36, 6X37, 6X38, 6X39, 6X40, 6X41, 6X42, 6X43, 6X44, 6X45, 6X46, 6X47, 6X48, 6X49, 6X50, 6X51, 6X52, 6X53, 6X54, 6X55, 6X56, 6X57, 6X58, 6X59, 6X60, 6X61, 6X62, 6X63, 6X64, 6X65, 6X66, 6X67, 6X68, 6X69, 6X70, 6X71, 6X72, 6X73, 6X74, 6X75, 6X76, 6X77, 6X78, 6X79, 6X80, 6X81, 6X82, 6X83, 6X84, 6X85, 6X86, 6X87, 6X88, 6X89, 6X90, 6X91, 6X92, 6X93, 6X94, 6X95, 6X96, 6X97, 6X98, 6X99, 6X100) and prices for 6 months, 12 months, and 18 months regunned.

SPECIAL OFFERS

UAB Stereo Changers

B.S.R. famous Monarch autochangers. fitted with quality stereo cartridge. £6.19.0

MAINS AMPLIFIERS

3 valve (10F3, 10P14, U9), 3 watt, 4 in. loud-speaker, in two tone cases with controls. Ideal for record players, P.A. work, etc. 49/-

Loudspeakers

TOP MAKES—MANUFACTURER FRESH
2 1/2 in., 18/-; 3 in., 18/-; 3 1/2 in., 15/-; 5 in., 18/-; 6 in., 18/-; 8 in., 18/-; 10 in., 22/6; 12 in., 25/6; 7 x 4 in. elliptical, 18/-; 9 x 6 in. elliptical, 22/6; 10 x 6 in. elliptical, 22/6; 8 in. Stentorian 15 ohms HF101, 70/-; 10 in. Stentorian 37-5-15 ohms HF102, 99/9; 12 in. Close Field, 27/6. STOP PRESS—3 x 1 1/2 in. Hi-Fi speakers, 49/-.

PM SPEAKERS Surplus 3 ohm

Tested, top makes, performance guaranteed. 6 1/2 in. 9/- 5 in. 11/- 7 X 1 1/2 in. 13/-

RECTIFIERS

For Chargers, selenium, full wave, 12 volt, 3-4 amper, 9/6; (Carb 17), 25V, 70, 80, 2A, 5/-; RM1/ 6/6; 6M2, 8/-; RM3, 9/-; RM4, 15/6; RM5, 21/-; 14A8, 17/-; 14A9, 22/-; 14A10, 25/-; 16RC1-16-1, 7/8; 18RA1-18-1, 7/8; 18RD2-2-8-1, 14/-; 14RA1-2-8-9, 17/-; 14RA1-2-8-3, 20/-.

100 RESISTORS 6/6

100 CONDENSERS 10/-

Miniature Ceramic and Silver Mica Condensers. 3 pF to 10,000 pF. LIST VALUE OVER 25.

PL81 SOLED 4/6 EY51 SHORT ENDS 4/6

4 Transistor Amplifiers

ONE WATT—From a single 6V, all-dry battery. Latest GET15 Satisfactor Transistors. In PUSH-PULL Two-transistor. High Gain pre-amplifier stages. Output 3 ohms. £3.19.0

1 Watt Transistor Stage

Pair of GET15 1 watt Power Transistors (listed 50/-). Push-Pull INPUT AND OUTPUT TRANSFORMERS. 4 Transistor Amplifier circuit. 45/-

★ VALVES BY RETURN OF POST ★

10% DISCOUNT TO PURCHASERS of any SIX VALVES marked to black type (15% in dozen). Post: 1 valve, 6d., 2-11, 1/-.

NEW LOW PRICES GUARANTEED 3 MONTHS

FREE TRANSIT INSURANCE. All valves are new or of fully guaranteed ex-Government or ex-equipment origin. Satisfaction or Money Back Guarantee on goods if returned unused within 14 days.

Large table listing various vacuum tube types (e.g., 6Z4, 6A5, 6AR5, 6AV6, 6B4, 6BE6, 6BE7, 6BE8, 6BE9, 6BE9A, 6BE9B, 6BE9C, 6BE9D, 6BE9E, 6BE9F, 6BE9G, 6BE9H, 6BE9I, 6BE9J, 6BE9K, 6BE9L, 6BE9M, 6BE9N, 6BE9O, 6BE9P, 6BE9Q, 6BE9R, 6BE9S, 6BE9T, 6BE9U, 6BE9V, 6BE9W, 6BE9X, 6BE9Y, 6BE9Z, 6BE9AA, 6BE9AB, 6BE9AC, 6BE9AD, 6BE9AE, 6BE9AF, 6BE9AG, 6BE9AH, 6BE9AI, 6BE9AJ, 6BE9AK, 6BE9AL, 6BE9AM, 6BE9AN, 6BE9AO, 6BE9AP, 6BE9AQ, 6BE9AR, 6BE9AS, 6BE9AT, 6BE9AU, 6BE9AV, 6BE9AW, 6BE9AX, 6BE9AY, 6BE9AZ, 6BE9BA, 6BE9BB, 6BE9BC, 6BE9BD, 6BE9BE, 6BE9BF, 6BE9BG, 6BE9BH, 6BE9BI, 6BE9BJ, 6BE9BK, 6BE9BL, 6BE9BM, 6BE9BN, 6BE9BO, 6BE9BP, 6BE9BQ, 6BE9BR, 6BE9BS, 6BE9BT, 6BE9BU, 6BE9BV, 6BE9BW, 6BE9BX, 6BE9BY, 6BE9BZ, 6BE9CA, 6BE9CB, 6BE9CC, 6BE9CD, 6BE9CE, 6BE9CF, 6BE9CG, 6BE9CH, 6BE9CI, 6BE9CJ, 6BE9CK, 6BE9CL, 6BE9CM, 6BE9CN, 6BE9CO, 6BE9CP, 6BE9CQ, 6BE9CR, 6BE9CS, 6BE9CT, 6BE9CU, 6BE9CV, 6BE9CW, 6BE9CX, 6BE9CY, 6BE9CZ, 6BE9DA, 6BE9DB, 6BE9DC, 6BE9DD, 6BE9DE, 6BE9DF, 6BE9DG, 6BE9DH, 6BE9DI, 6BE9DJ, 6BE9DK, 6BE9DL, 6BE9DM, 6BE9DN, 6BE9DO, 6BE9DP, 6BE9DQ, 6BE9DR, 6BE9DS, 6BE9DT, 6BE9DU, 6BE9DV, 6BE9DW, 6BE9DX, 6BE9DY, 6BE9DZ, 6BE9EA, 6BE9EB, 6BE9EC, 6BE9ED, 6BE9EE, 6BE9EF, 6BE9EG, 6BE9EH, 6BE9EI, 6BE9EJ, 6BE9EK, 6BE9EL, 6BE9EM, 6BE9EN, 6BE9EO, 6BE9EP, 6BE9EQ, 6BE9ER, 6BE9ES, 6BE9ET, 6BE9EU, 6BE9EV, 6BE9EW, 6BE9EX, 6BE9EY, 6BE9EZ, 6BE9FA, 6BE9FB, 6BE9FC, 6BE9FD, 6BE9FE, 6BE9FF, 6BE9FG, 6BE9FH, 6BE9FI, 6BE9FJ, 6BE9FK, 6BE9FL, 6BE9FM, 6BE9FN, 6BE9FO, 6BE9FP, 6BE9FQ, 6BE9FR, 6BE9FS, 6BE9FT, 6BE9FU, 6BE9FV, 6BE9FW, 6BE9FX, 6BE9FY, 6BE9FZ, 6BE9GA, 6BE9GB, 6BE9GC, 6BE9GD, 6BE9GE, 6BE9GF, 6BE9GG, 6BE9GH, 6BE9GI, 6BE9GJ, 6BE9GK, 6BE9GL, 6BE9GM, 6BE9GN, 6BE9GO, 6BE9GP, 6BE9GQ, 6BE9GR, 6BE9GS, 6BE9GT, 6BE9GU, 6BE9GV, 6BE9GW, 6BE9GX, 6BE9GY, 6BE9GZ, 6BE9HA, 6BE9HB, 6BE9HC, 6BE9HD, 6BE9HE, 6BE9HF, 6BE9HG, 6BE9HH, 6BE9HI, 6BE9HJ, 6BE9HK, 6BE9HL, 6BE9HM, 6BE9HN, 6BE9HO, 6BE9HP, 6BE9HQ, 6BE9HR, 6BE9HS, 6BE9HT, 6BE9HU, 6BE9HV, 6BE9HW, 6BE9HX, 6BE9HY, 6BE9HZ, 6BE9IA, 6BE9IB, 6BE9IC, 6BE9ID, 6BE9IE, 6BE9IF, 6BE9IG, 6BE9IH, 6BE9II, 6BE9IJ, 6BE9IK, 6BE9IL, 6BE9IM, 6BE9IN, 6BE9IO, 6BE9IP, 6BE9IQ, 6BE9IR, 6BE9IS, 6BE9IT, 6BE9IU, 6BE9IV, 6BE9IW, 6BE9IX, 6BE9IY, 6BE9IZ, 6BE9JA, 6BE9JB, 6BE9JC, 6BE9JD, 6BE9JE, 6BE9JF, 6BE9JG, 6BE9JH, 6BE9JI, 6BE9JJ, 6BE9JK, 6BE9JL, 6BE9JM, 6BE9JN, 6BE9JO, 6BE9JP, 6BE9JQ, 6BE9JR, 6BE9JS, 6BE9JT, 6BE9JU, 6BE9JV, 6BE9JW, 6BE9JX, 6BE9JY, 6BE9JZ, 6BE9KA, 6BE9KB, 6BE9KC, 6BE9KD, 6BE9KE, 6BE9KF, 6BE9KG, 6BE9KH, 6BE9KI, 6BE9KJ, 6BE9KK, 6BE9KL, 6BE9KM, 6BE9KN, 6BE9KO, 6BE9KP, 6BE9KQ, 6BE9KR, 6BE9KS, 6BE9KT, 6BE9KU, 6BE9KV, 6BE9KW, 6BE9KX, 6BE9KY, 6BE9KZ, 6BE9LA, 6BE9LB, 6BE9LC, 6BE9LD, 6BE9LE, 6BE9LF, 6BE9LG, 6BE9LH, 6BE9LI, 6BE9LJ, 6BE9LK, 6BE9LM, 6BE9LN, 6BE9LO, 6BE9LP, 6BE9LQ, 6BE9LR, 6BE9LS, 6BE9LT, 6BE9LU, 6BE9LV, 6BE9LW, 6BE9LX, 6BE9LY, 6BE9LZ, 6BE9MA, 6BE9MB, 6BE9MC, 6BE9MD, 6BE9ME, 6BE9MF, 6BE9MG, 6BE9MH, 6BE9MI, 6BE9MJ, 6BE9MK, 6BE9ML, 6BE9MN, 6BE9MO, 6BE9MP, 6BE9MQ, 6BE9MR, 6BE9MS, 6BE9MT, 6BE9MU, 6BE9MV, 6BE9MW, 6BE9MX, 6BE9MY, 6BE9MZ, 6BE9NA, 6BE9NB, 6BE9NC, 6BE9ND, 6BE9NE, 6BE9NF, 6BE9NG, 6BE9NH, 6BE9NI, 6BE9NJ, 6BE9NK, 6BE9NL, 6BE9NM, 6BE9NN, 6BE9NO, 6BE9NP, 6BE9NQ, 6BE9NR, 6BE9NS, 6BE9NT, 6BE9NU, 6BE9NV, 6BE9NW, 6BE9NX, 6BE9NY, 6BE9NZ, 6BE9OA, 6BE9OB, 6BE9OC, 6BE9OD, 6BE9OE, 6BE9OF, 6BE9OG, 6BE9OH, 6BE9OI, 6BE9OJ, 6BE9OK, 6BE9OL, 6BE9OM, 6BE9ON, 6BE9OO, 6BE9OP, 6BE9OQ, 6BE9OR, 6BE9OS, 6BE9OT, 6BE9OU, 6BE9OV, 6BE9OW, 6BE9OX, 6BE9OY, 6BE9OZ, 6BE9PA, 6BE9PB, 6BE9PC, 6BE9PD, 6BE9PE, 6BE9PF, 6BE9PG, 6BE9PH, 6BE9PI, 6BE9PJ, 6BE9PK, 6BE9PL, 6BE9PM, 6BE9PN, 6BE9PO, 6BE9PP, 6BE9PQ, 6BE9PR, 6BE9PS, 6BE9PT, 6BE9PU, 6BE9PV, 6BE9PW, 6BE9PX, 6BE9PY, 6BE9PZ, 6BE9QA, 6BE9QB, 6BE9QC, 6BE9QD, 6BE9QE, 6BE9QF, 6BE9QG, 6BE9QH, 6BE9QI, 6BE9QJ, 6BE9QK, 6BE9QL, 6BE9QM, 6BE9QN, 6BE9QO, 6BE9QP, 6BE9QQ, 6BE9QR, 6BE9QS, 6BE9QT, 6BE9QU, 6BE9QV, 6BE9QW, 6BE9QX, 6BE9QY, 6BE9QZ, 6BE9RA, 6BE9RB, 6BE9RC, 6BE9RD, 6BE9RE, 6BE9RF, 6BE9RG, 6BE9RH, 6BE9RI, 6BE9RJ, 6BE9RK, 6BE9RL, 6BE9RM, 6BE9RN, 6BE9RO, 6BE9RP, 6BE9RQ, 6BE9RR, 6BE9RS, 6BE9RT, 6BE9RU, 6BE9RV, 6BE9RW, 6BE9RX, 6BE9RY, 6BE9RZ, 6BE9SA, 6BE9SB, 6BE9SC, 6BE9SD, 6BE9SE, 6BE9SF, 6BE9SG, 6BE9SH, 6BE9SI, 6BE9SJ, 6BE9SK, 6BE9SL, 6BE9SM, 6BE9SN, 6BE9SO, 6BE9SP, 6BE9SQ, 6BE9SR, 6BE9SS, 6BE9ST, 6BE9SU, 6BE9SV, 6BE9SW, 6BE9SX, 6BE9SY, 6BE9SZ, 6BE9TA, 6BE9TB, 6BE9TC, 6BE9TD, 6BE9TE, 6BE9TF, 6BE9TG, 6BE9TH, 6BE9TI, 6BE9TJ, 6BE9TK, 6BE9TL, 6BE9TM, 6BE9TN, 6BE9TO, 6BE9TP, 6BE9TQ, 6BE9TR, 6BE9TS, 6BE9TT, 6BE9TU, 6BE9TV, 6BE9TW, 6BE9TX, 6BE9TY, 6BE9TZ, 6BE9UA, 6BE9UB, 6BE9UC, 6BE9UD, 6BE9UE, 6BE9UF, 6BE9UG, 6BE9UH, 6BE9UI, 6BE9UJ, 6BE9UK, 6BE9UL, 6BE9UM, 6BE9UN, 6BE9UO, 6BE9UP, 6BE9UQ, 6BE9UR, 6BE9US, 6BE9UT, 6BE9UU, 6BE9UV, 6BE9UW, 6BE9UX, 6BE9UY, 6BE9UZ, 6BE9VA, 6BE9VB, 6BE9VC, 6BE9VD, 6BE9VE, 6BE9VF, 6BE9VG, 6BE9VH, 6BE9VI, 6BE9VJ, 6BE9VK, 6BE9VL, 6BE9VM, 6BE9VN, 6BE9VO, 6BE9VP, 6BE9VQ, 6BE9VR, 6BE9VS, 6BE9VT, 6BE9VU, 6BE9VV, 6BE9VW, 6BE9VX, 6BE9VY, 6BE9VZ, 6BE9WA, 6BE9WB, 6BE9WC, 6BE9WD, 6BE9WE, 6BE9WF, 6BE9WG, 6BE9WH, 6BE9WI, 6BE9WJ, 6BE9WK, 6BE9WL, 6BE9WM, 6BE9WN, 6BE9WO, 6BE9WP, 6BE9WQ, 6BE9WR, 6BE9WS, 6BE9WT, 6BE9WU, 6BE9WV, 6BE9WW, 6BE9WX, 6BE9WY, 6BE9WZ, 6BE9XA, 6BE9XB, 6BE9XC, 6BE9XD, 6BE9XE, 6BE9XF, 6BE9XG, 6BE9XH, 6BE9XI, 6BE9XJ, 6BE9XK, 6BE9XL, 6BE9XM, 6BE9XN, 6BE9XO, 6BE9XP, 6BE9XQ, 6BE9XR, 6BE9XS, 6BE9XT, 6BE9XU, 6BE9XV, 6BE9XW, 6BE9XX, 6BE9XY, 6BE9XZ, 6BE9YA, 6BE9YB, 6BE9YC, 6BE9YD, 6BE9YE, 6BE9YF, 6BE9YG, 6BE9YH, 6BE9YI, 6BE9YJ, 6BE9YK, 6BE9YL, 6BE9YM, 6BE9YN, 6BE9YO, 6BE9YP, 6BE9YQ, 6BE9YR, 6BE9YS, 6BE9YT, 6BE9YU, 6BE9YV, 6BE9YW, 6BE9YX, 6BE9YY, 6BE9YZ, 6BE9ZA, 6BE9ZB, 6BE9ZC, 6BE9ZD, 6BE9ZE, 6BE9ZF, 6BE9ZG, 6BE9ZH, 6BE9ZI, 6BE9ZJ, 6BE9ZK, 6BE9ZL, 6BE9ZM, 6BE9ZN, 6BE9ZO, 6BE9ZP, 6BE9ZQ, 6BE9ZR, 6BE9ZS, 6BE9ZT, 6BE9ZU, 6BE9ZV, 6BE9ZW, 6BE9ZX, 6BE9ZY, 6BE9ZZ)

Post: 2 lbs. 1/6, 4 lbs. 2/-, 7 lbs. 2/9, 15 lbs. 3/6, etc. No C.O.D. ALL ITEMS 5% + POST FREE IN DOZENS. (Callers always welcome). LIST OF 1000 SNIPS 6d P.O. BOX 21 (W)

TECHNICAL TRADING CO. 350-352 FRATTON ROAD, PORTSMOUTH.

Easy-to-build kit-sets of



highest quality at lower cost

HI-FI F.M. TUNER

Tuning range 89-108 Mc/s. For your convenience this is available in two units sold separately as follows: Tuner Unit (FMT-4U) with 10.7 Mc/s I.F. output (£3.2.0, inc. P.T.). I.F. Amplifier (FMA-4U) complete with cabinet and valves (£10.10.6).
Total **£13.12.6**



F.M. TUNER

HI-FI 16W STEREO AMPLIFIER Model S-88

10mV. basic sensitivity (2 mV. available, £1 extra). Ganged controls. Stereo/Monaural gram. radio and tape recorder input. Push-button selection. Two-tone grey metal cabinet. **£25.5.6**



S.33

6-TRANSISTOR PORTABLE Model UXR-1

Pre-aligned I.F. transformers, printed circuit, 7 x 4in. high-flux speaker. Real hide case. **£14.18.6**



S-88

DUAL-WAVE TRANSISTOR RADIO UJR-1

This sensitive headphone set is a fine introduction to electronics for any youngster. **£2.16.6**



DX-40

RES.-CAP. BRIDGE Model C-3U

Measures capacity 10pF to 1,000µF resistance 100Ω to 5 MΩ and power factor. 5-450 v. test voltages. With safety switch. **£7.19.6**

AUDIO SIGNAL GENERATOR Model AG-9U

10 c/s to 100 kc/s. switch selected. Distortion less than 0.1% 10 v. sine wave output metered in volts and dB's. **£19.3.0**



UXR-1

VALVE VOLTMETER Model V-7A

Measures volts to 1,500 (D.C. and R.M.S.) and 4,000 pk. to pk. Res 0.1Ω to 1,000 MΩ. D.C. input impd. 11MΩ. Complete with test prods, leads and standardising battery. **£13.0.0**



OS-1

Portable 2¾ in. SERVICE 'SCOPE Model OS-1

Compact portable 'scope ideal for servicing and general work. Y amplifier sensitivity 10 mV/cm; response ± 3 dB 10 c/s-2.5 Mc/s. Time base 15 c/s-150 kc/s. Printed circuit. Case 7½ x 4½ x 1½in. long. Wt. only 10½ lb. **£18.19.6**



SSU-1

5 in. OSCILLOSCOPE Model O-12U

Has wide-band amplifiers, essential for TV servicing, F.M. alignment, etc. Vertical freq. response 3 c/s. to over 5 Mc/s. without extra switching. T/B covers 10 c/s to 500 kc/s. in 5' ranges. **£34.15.0**



NEW MODELS include:

Grid Dip Meter, GD-1U, **£9.19.6**

Transistorised Grid Dip Meter, **£9.18.6**

Tape Amplifier—

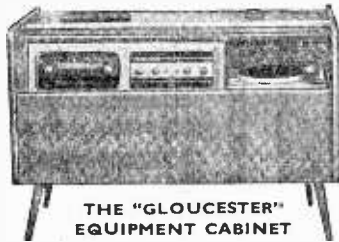
Mono (TA-1M) **£16.14.0**

Stereo (TA-1S) **£22.4.0**

and

'PACKAGED DEALS' of HI-FI

Equipment including TAPE DECKS (Collaro or Truvox), RECORD PLAYERS (Collaro or Connoisseur and DECCA ffs PICK-UPS. Write in to see how these deals save you further money.



THE "GLOUCESTER" EQUIPMENT CABINET

6-W STEREO AMPLIFIER Model S-33

3 watts per channel, 0.3% distortion at 2.5 w/chnl. 20dB N.F.B. Inputs for Radio (or Tape) and Gram., Stereo or Monaural, ganged controls, Sensitivity 100 mV. **£11.8.0**

TRANSCRIPTION RECORD PLAYER RP-1U

4-speed A.C. motor. Ronette Stereo/Mono pick-up. Complete with plinth. **£12.10.0**

HI-FI SPEAKER SYSTEM Model SSU-1

Ducted-port bass reflex cabinet "in the white". Twin speakers. With legs **£11.12.6**. **£10.5.6**

"HAM" TRANSMITTER Model DX-40U

from 80-10 m. Power input 75 w. C.V.V., 60 w. peak C.C. phone. Output 40 w. to aerial. Compact and self-contained. Prov. for V.F.O. **£29.10.0**

AMATEUR TRANSMITTER Model DX-100U

Covers all amateur bands from 160-10 metres. Self-contained including Power Supply Modulator and V.F.O. **£78.10.0**

"GLOUCESTER" EQUIPMENT CABINET

46½ x 30 x 21in. deep. Mk.I houses Record Player, Stereo Amplifier, F.M. Tuner, records, etc. Mk.II will house a Tape Deck in addition. Left in the white for finish to personal taste.

Mk. I ... **£15.18.6** Mk. II ... **£17.8.6**

"COTSWOLD" HI-FI SPEAKER SYSTEM KIT

Acoustically designed enclosure "in the white", 26 x 23 x 15½in., housing a 12in. bass speaker with 2in. speech coil, elliptical middle speaker and pressure unit to cover the full frequency range of 30-20,000 c/s. Complete with speakers, cross-over unit level control, etc. **£19.18.6**

COMPLETE MATCHED STEREO OUTFIT

Includes record player, amplifier and twin speaker systems (pedestal speaker legs optional **£42.10.0** £4.14.0 extra).

"CHEPSTOW" EQUIPMENT CABINET

Ideal cabinet for small rooms or armchair operation. Houses Record Player, F.M. Tuner and Stereo Amplifier. **£10.10.0**

SINGLE CHANNEL AMPLIFIER, MA-12

10-12 watt Hi-Fi amplifier. Extremely low distortion and wide frequency range. **£9.19.6**

STEREO CONTROL UNIT, USC-1

Luxury model with press-button inputs to suit any pick-up or tuner and most tape-heads. Output 1.3 v. R.M.S. per channel. Printed circuit construction. **£17.19.6**

STEREO HEAD BOOSTER, USP-1

Ideal for boosting tape-head output and low output pick-ups (e.g. Decca ffs). **£5.19.6**

VAR. FREQ. OSCILLATOR VF-1U

From 160-10 m. Ideal for our DX-40U and similar transmitters. Price less valves **£8.19.6**. **£10.12.0**

Prices include free delivery UK
Deferred Terms
available on orders over **£10**

Please send me FREE CATALOGUE (Yes/No).....

Full details of model(s).....

NAME

ADDRESS

PW11

DAYSTROM LTD.

DEPT. P.W.10, GLOUCESTER, ENGLAND

A member of the Daystrom Group, manufacturers of the WORLD'S LARGEST-SELLING ELECTRONIC KITS



RADIO & TV TABLES

"NEWSTEAD" (as illustrated). This contemporary "Slimline" TV Table is finished in highly polished walnut veneer. Measures 19" x 13" x 20" high.

Price £3.7.6 (inc. P.T.)
"CHATS WORTH". Finished in highly polished walnut veneer. Measures 19" x 14" x 21" high.

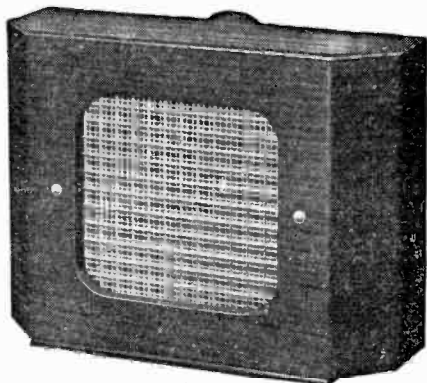
Price £4.0.0 (inc. P.T.)
"WELBECK". (as illustrated) measures 20" x 20" x 20" and is fitted with self-adjusting gliders.

Price £3.15.0 (inc. P.T.)
"SHERWOOD" will accommodate the largest television receivers, measures 23" high x 25" wide x 22" deep.

Price £5.5.0 (inc. P.T.)
"SENIOR", of ample dimensions (18" x 24" x 25" high).
Price £4.18.9 (inc. P.T.)
All are supplied packed flat ready for instant assembly and with the exception of the Welbeck and the Chatsworth have easy running 2" castors.



*The symbol
of extra
High Quality*



Stentorian EXTENSION SPEAKERS

These well designed speakers demonstrate the traditional Whiteley quality at really competitive prices. This range of extension speakers has finger-tip volume control, is superbly finished in polished walnut veneer and provides excellent reproduction.

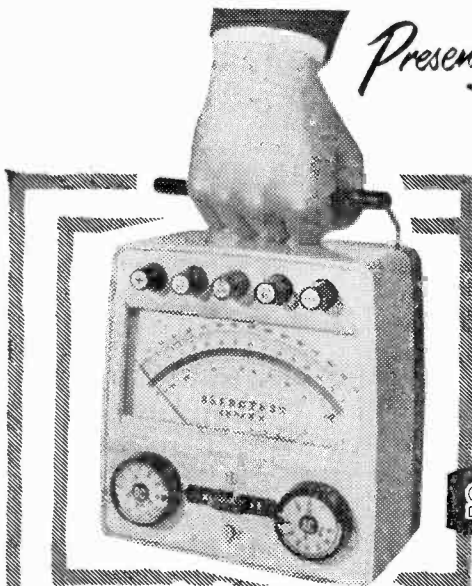
WHITELEY ELECTRICAL RADIO CO. LTD.
MANSFIELD . NOTTS

WITH THE
EXCLUSIVE
FINGER-TIP
VOLUME
CONTROLS

'BUDE' 60/-
'BEDFORD' 72/-
'BRISTOL' 86/6

Prices include P.T.

Presenting THE MOST ADVANCED
MULTI-RANGE TEST METERS
EVER DESIGNED...



Send for leaflet No. S.K.50/6002/PW

Accurate readings can be taken with the instrument in any position. The resistors, rectifier, transformer, movement, switches and automatic cut-out are mounted on a robust printed circuit board, enclosed in a strong attractive, two-tone dustproof case, with a unique carrying handle.

SEI SELECTEST
SUPER K & SUPER 50

SALFORD ELECTRICAL INSTRUMENTS LTD.

PEEL WORKS, SILK STREET, SALFORD 3, LANCs. Tel: Blackfriars 6688
London Sales Office: Magnec House, Kingsway, W.C.2. Tel: Temple Bar 4668
A Subsidiary of THE GENERAL ELECTRIC CO. LTD. OF ENGLAND

Practical Wireless

VOL. XXXVI, No. 645, NOVEMBER, 1960

Editorial and Advertisement
Offices:

PRACTICAL WIRELESS

George Newnes, Ltd., Tower House,
Southampton Street, W.C.2.

© George Newnes Ltd., 1960

Phone: Temple Bar 4363.
Telegrams: Newnes, Rand, London.
Registered at the G.P.O. for trans-
mission by Canadian Magazine Post.

SUBSCRIPTION RATES

including postage for one year

Inland - - - - £1.3.0 per annum
Abroad - - - - £1.1.6 per annum
Canada - - - - 19s. per annum

Contents

	Page
Editorial	581
Round the World of Wireless	582
Radio Construction for the Beginner—2	584
Camera Case Transistor Portable	587
Selecting Output Trans- formers	591
Six-Valve Top-Band Tx	595
Converting to Stereo	598
On Your Wavelength	603
Midget T.R.F. Receiver	604
Pocket Superhet	608
Low Drift V.H.F. Receiver	612
Inexpensive P.A. Equipment	617
Comprehensive Guitar Ampli- fier	622
Trade News	629
Club News	633
S.W. Listeners' Log—3	634
Letters to the Editor	637

The Editor will be pleased to consider articles of a practical nature. Such articles should be written on one side of the paper only, and should contain the name and address of the sender. Whilst the Editor does not hold himself responsible for manuscripts, every effort will be made to return them if a stamped and addressed envelope is enclosed. All correspondence intended for the Editor should be addressed: The Editor PRACTICAL WIRELESS, George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2. Owing to the rapid progress in the designs of wireless apparatus and to our efforts to keep our readers in touch with the latest developments, we give no warranty that apparatus described in our columns is not the subject of letters patent.

Copyright in all drawings, photographs and articles published in PRACTICAL WIRELESS is specifically reserved throughout the countries signatory to the Berne Convention and the U.S.A. Reproductions or imitations of any of these are therefore expressly forbidden. PRACTICAL WIRELESS incorporates "Amateur Wireless."

OUR FREE BLUEPRINT

LAST month we announced the P.W. "Pocket Superhet" and on page 608 of this issue we present the first article on the receiver. The article is illustrated with large, clear, half-tone pictures which will be of great use when the receiver is being constructed. The free blueprint of the set contains large, clear diagrams—of the circuit, and above- and below-chassis wiring—and a list of parts required to build the receiver.

The circuit of the Pocket Superhet is designed to cover both medium and long waves; this provision, while introducing wavechange switching is essential for those readers living outside the reception areas of the medium wave Light Programme transmitters. The circuit used is for the most part conventional except that the coupling to the base of the first-transistor is by means of a coupling winding and tapping on the L.W. coil, thus avoiding the additional switching often used. The input, or mixer, stage is followed by two I.F. stages to achieve high sensitivity. A crystal diode is employed as the detector which feeds the driver stage. The output circuit is of the push-pull type and gives more than sufficient output for most purposes. An efficient AGC circuit is included in the design so that the large sensitivity is only used for weak stations.

The performance of the set is excellent and is comparable with many commercial designs. A prototype was exhibited at the Radio Show and was admired by many readers who visited our stand. The attractive plastic cabinet in which the receiver was housed gave rise to many favourable comments. It ensures that the completed set has a truly professional appearance. On page 638 of this issue, you will find details of a special gift offer. For only 6s. 6d. you will be able to purchase a case complete with a dial and a chrome-plated handle.

In this month's article, the principal constructional details are given, and with the aid of the blueprint, even those comparatively new to radio construction should find little difficulty in building the receiver. In the second article, next month, the procedure for testing the set will be described and complete information will be given on how to align the R.F. and I.F. sections.

We are sure that this design will prove very successful; therefore be sure to order next month's issue well in advance, for the demand for the second part of the article will be great. The demand for the plastic cases will also be great; be sure to order yours quickly.

A FILM SHOW

ANOTHER film show has been arranged in collaboration with Mullard Ltd. It will be held at Caxton Hall, Westminster, and readers are invited to send for their free tickets which are now available from these offices. The films will be shown on Friday, January 13th, 1961, and the programme will begin at 7.30 p.m. When applying for tickets, enclose a stamped addressed envelope (at least 3½ ins. x 6 ins.). Mark your envelope "Caxton Hall" in the top left-hand corner.

Our next issue, dated December will be published on November 4th

Round the World of Wireless

POTENTIAL AND CURRENT NEWS

Broadcast Receiving Licences

THE following statement shows the approximate number of Broadcast Receiving Licences in force at the end of July, in respect of wireless receiving stations situated within the various Postal Regions of England, Wales, Scotland and Northern Ireland.

Region	Total
London Postal	769,776
Home Counties	725,181
Midland	535,071
North Eastern	586,732
North Western	487,057
South Western	432,344
Wales and Border Counties	260,578
Total England and Wales	3,806,739
Scotland	443,855
Northern Ireland	130,900
Grand Total	4,380,594

Thailand Communications

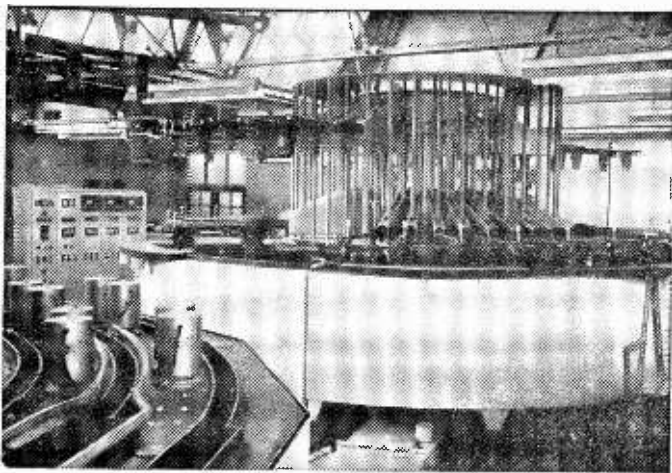
TWO guests were received by Associated Electrical Industries during September, both from Thailand. They were Lt. Gen. Phachirn Nimibutr and Mr. Chamroon Vajrabhaye. Anticipating swift growth of Thai telecommunication systems, they chose to examine the research and manufacturing resources of Great Britain. Telephone exchange installations were inspected between visits to A.E.I. laboratories.

Thailand's public telephone systems are rapidly expanding, especially around the capital city, Bangkok. Already a £500,000 contract has been awarded to A.E.I. which will bring into operation another 10,500 telephone lines.

Picturesque Bangkok, and ten other Thai towns, will soon be able to boast of automatic telephone exchanges of a modern design that will clash boldly with the ancient temples of Siam.

URSI Meeting

REPRESENTATIVES from Russia and America joined with delegates and observers from 27 countries at a general meeting of the International Scientific Radio Union (URSI) held recently in London. The press and television organisations were admitted to allow the public to hear about some of the discussions on radio studies into space research, which was the subject of the meeting.



The illustration above shows the interior of the new factory at Borehamwood of Printed Circuits Ltd. This is a result of a programme of complete reorganisation started eighteen months ago.

New Automatic Factory at Borehamwood

EIGHTEEN months ago a programme of complete reorganisation of Printed Circuits Ltd. began. Included in this programme was the building of what is now one of the largest and most modern factories of its type in the world. Automatically printed circuits, industrial nameplates and instrument panels will be produced on two etching and anodising machines which are of a completely revolutionary design.

Two years of research and development have gone into making this method of production unique. So new is this process that human handling has been eliminated throughout the whole operation. This factory has been completed in association with Millet Levens Ltd., of Borehamwood.

Radio Hobbies Exhibition

FOR the amateur radio enthusiast, a noteworthy event of the autumn will be the International Radio Hobbies Exhibition at the Royal Horticultural Society's Old Hall, Westminster. Home-constructed equipment of all descriptions will be on show and will be demonstrated.

As usual the Radio Society of Great Britain, which sponsors

this annual event, will award prizes for outstanding examples of completely amateur equipment.

Most of the commercial exhibits will be kits and components for the home constructor, rather than already assembled apparatus. The Radio Clubs of the Armed Forces will show the latest communications equipment issued to them as well as equipment built by themselves. Technical books and journals will be on sale.

The show, which takes place from November 23rd to 26th, will be open from 11 a.m. until 9 p.m. daily.

Indian Pipeline Project

FOR Murphy Radio Ltd. a £1,000,000 contract with Oil India Private Ltd. has recently been secured. An extensive V.H.F. radio network is to be formed in North Eastern India. Starting at a point 100 miles south of the Nepal border, a radiophone link system will follow the route of the oil company's pipeline over 700 miles of terrain which was previously considered impossible and uneconomical to transverse with such means of communication. At intervals of about 30 miles along the eastward-bound net-

work, Murphy radio stations will be installed to give a total of 36 communication channels along the pipeline route. These radio stations will be close to pumping houses so that oil-flow statistics as well as speech may be relayed easily along any one of these channels.

Parametric Amplifier

RECENTLY developed by Marconi's for use with their range of 50cm radar is a parametric amplifier. A fully coherent pump frequency is incorporated and the tube itself and its solenoid are manufactured by the English Electric Valve Co. (also of Chelmsford), Marconi associates within the English Electric Group of Companies.

Aircraft Test Bed for Electric Equipment

A MIRAGE IV jet aircraft carried a Marconi Döppler navigator at twice the speed of sound recently, while testing this piece of equipment. The Générale Aéronautique Marcel Dassault, who have recently ordered this type of navigating equipment, were testing its accuracy under conditions likely to be experienced in their aircraft.

Student's Visit to Sweden

FOR 27-year-old post-graduate student John Beal, B.Sc., next month sees the beginning of an educational visit to Sweden. Sponsored by the journals, "British Communications and Electronics", "British Power Engineering" and "Nuclear Engineering", he will visit various Swedish research establishments.

Travelling Wave Tube

A CONTRACT worth 2 million dollars for the supply of Travelling Wave Tubes to The Radio Corporation of America has been awarded to Mullard Ltd. These tubes are intended for use in a new multi-channel radio communication system.

A travelling wave tube is a special type of electronic valve providing useful wide-band amplification at frequencies well beyond those at which conventional valves can function successfully. Mullard have extensive experience in the development of these and other special types of electronic tubes for communications systems.

The tubes to be supplied to R.C.A. were, in fact, developed by Mullard Research Labora-

tories and will be manufactured at the Company's Transmitting and Microwave Valve Plant at Waddon, Surrey. First shipments are expected to be made in May 1961.

£250,000 Contract for Solartron Oscilloscopes

CONTRACTS totalling £250,000 for the supply of Solartron Oscilloscopes to the Admiralty and Ministry of Aviation have been awarded to Solartron Laboratory Instruments, Ltd., a subsidiary of the Solartron Electronic Group Ltd., Farnborough. The oscilloscopes are the Solartron Double-Beam Oscilloscope Type CD. 711S.2, the Precision Measuring Oscilloscope Type CD. 643S.2, and the General Purpose Oscilloscope Type CD. 5235.2.

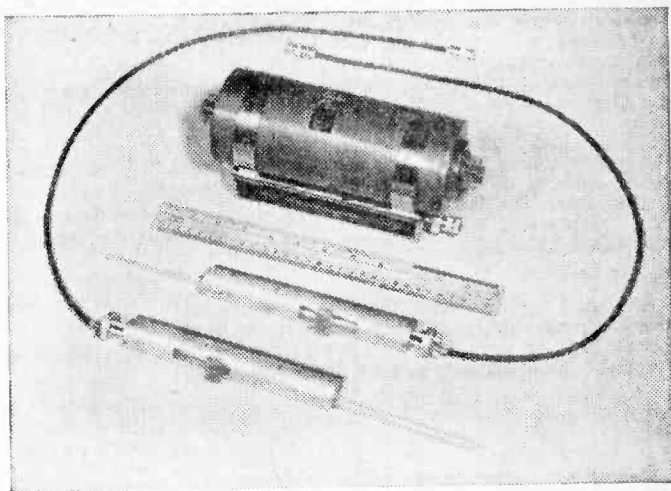
in recent years. Over 300 firms displayed their products at the 1960 exhibition, occupying 500,000sq. ft of space within the hall and extending into the forecourt to provide a spacious outdoor demonstration area.

Record numbers of visitors came to the 1960 show and placed orders amounting to millions of pounds. Overseas visitors, 45 per cent greater in number than on any previous occasions, came from 77 different countries.

First Electronic Newspaper

A BEACONSFIELD man, 44-year-old Mr Cyril Gee, of Hogback Wood Road, recently made newspaper history.

He is the managing editor of Europe's first newspaper devoted



A parametric amplifier for use with their range of 50cm radar has been developed by Marconi's. The above illustration shows the parametric amplifier tube and solenoid with associated baluns (balance-to-unbalance transformers) and coaxial lines.

Mechanical Handling Exhibition

THE next Mechanical Handling Exhibition — the world's largest display of all classes of industrial labour-saving and ancillary equipment—is to be held at Earls Court, London, England, from 8 to 18 May, 1962.

It will be the eighth in the series of this biennial exhibition which started in 1948. Its growth, both in influence and attendance, reflects the spectacular development of industrial mechanisation

to electronics—one of the world's fastest-growing industries.

Titled "Electronics Weekly", the new 24-page newspaper was launched by Heywood and Company at a Savoy Hotel, London, reception on September 6.

Mr. Gee is well-known as founder-editor of "British Communications and Electronics".

His new venture, "Electronics Weekly", will cover the scientific, technical, commercial, economic, financial and statistical aspects of electronics.

Radio Construction for the Beginner

No. 2—A SIMPLE CRYSTAL RECEIVER

By D. B. Kidd

EVERY beginner should try to acquire, as soon as possible, a knowledge of the symbols used in the theoretical drawings of circuits. These are conventional signs which have evolved from pictures of the components, and save time and trouble in electrical diagrams and illustrations.

Electrical Notation

All the symbols which should be memorised first by the beginner appear in Fig. 1(a) and this diagram should be carefully compared with Fig. 1(b), which is a practical form of the same circuit. This illustration shows the proposed layout of the parts as described in the first instalment of this article. It need not be followed too precisely; in fact, the receiver, like most circuits, will work in any sort of physical arrangement, provided the electrical connections are a true likeness of the original.

Fig. 1(b) does not show an actual aerial or earth, but this receiver, whose only source of power is the minute amount of current set up in the circuit by the transmitter many miles away, will only function with a good aerial and earth.

The Aerial

A "good aerial" need only be a length of strong copper wire, preferably insulated, as long and as high as possible. The great majority of "crystal" receivers use a wire from the house

tied to a foot or two of non-conducting material (nylon fishing line is perfect, but waxed string will do), and this in turn tied to the support. Where the wire passes into the house, a short length of

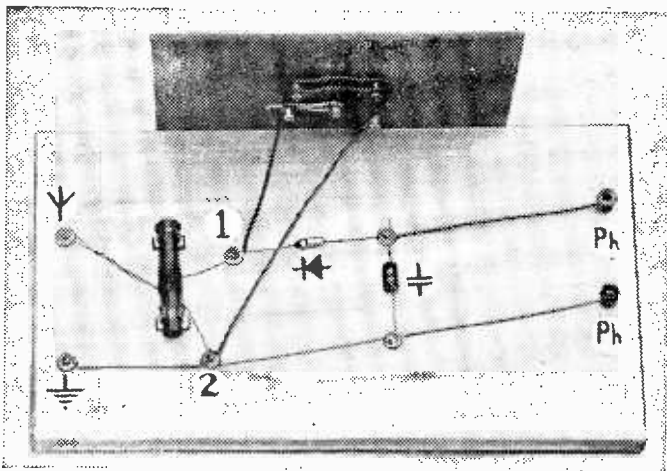


Fig. 1(b).—Practical layout of the circuit in Fig. 1(a), with the symbols corresponding to the parts indicated.

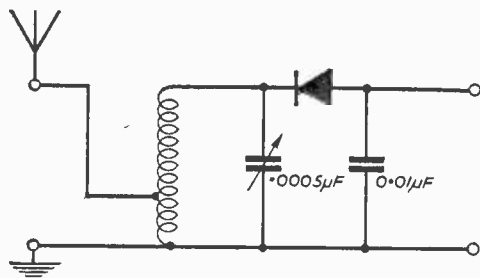


Fig. 1(a).—Circuit of the simple crystal receiver.

window to some high object (a pole, a tree or the top of another building). It is important that the wire should not make electrical contact with anything between its far end and the point where it is coupled to the receiver. With modern plastic-covered wire, this warning may be safely ignored, but if bare wire is used for the aerial, the following simple precautions should be taken.

The far end of the wire should not be tied directly to its support. Instead, it should be

plastic sleeving should be slipped over it at any point of contact with walls, window frames, sills, etc.

The Earth Line

The earth line consists of a length of stout copper wire leading, as directly as possible, from the receiver to the ground. It should be anchored there by soldering (or bolting tightly with a brass nut and bolt) to a fair-sized metal object. A copper rod or tube is ideal, but a large tin-can, filled with soil and buried completely works very well.

Beginners who cannot arrange an earth line of this sort need not despair. A stout copper wire led to the nearest cold water pipe will nearly always give a good earth connection, provided the bared end of the wire is tightly bound or clamped to clean metal. Any paint or corrosion can easily be removed with a file or coarse sandpaper from an inch or so of the pipe and contact may then be made satisfactorily. Provided the earth line is a good one, indoor aerials will sometimes work.

Assuming the reader has solved these problems and has also acquired a pair of high impedance headphones, the parts listed in the last instalment may now be mounted on the board.

Mounting the Tuning Condenser

The variable or "tuning" condenser should be fixed to the panel by boring a hole, $\frac{1}{4}$ in. in diameter, in the centre of it. The threaded bear-

ing should then be passed through the panel and secured by the nut provided. A knob is fitted tightly to the spindle. If the reader is using an old air-spaced condenser, he will have to make his own arrangements for fixing it somewhere on the board. The air-spaced type are generally considered superior in performance and for the beginner they have the added advantage of showing the opening and closing effect of the vanes. This is almost impossible to observe in the solid dielectric type.

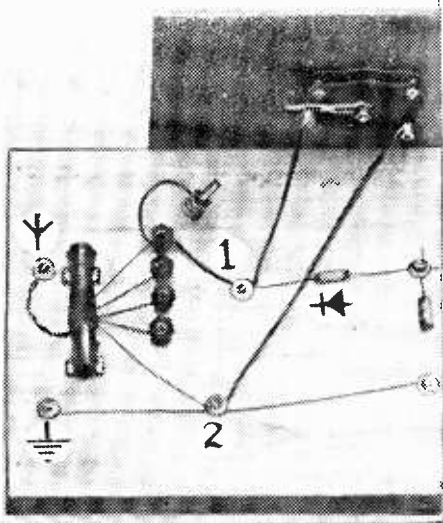


Fig. 2(a).—A modified circuit with tappings on the coil.

For this receiver, six brass woodscrews and washers will be required in the construction. They should be set out as shown in Fig. 1(b), after the washers have been burnished on both faces with the "flour" grade glasspaper. Lengths of connecting wire are now measured as required and the last half-inch or so bared and curled clockwise round the screws beneath the washers. Provided the washer has been well burnished, this method of wiring results in a contact resistance of only a fraction of an ohm. If more than one wire is clamped at the same point the pressure is less and the resistance rises somewhat, but is still very small. If a screw fails to grip easily, a new place should be found for it immediately, as low pressures lead to hidden resistances and poor contacts.

The tuning condenser used is provided with two small nuts to secure the ends of the wires. These should be tightened very firmly, using a pair of pliers if necessary.

The two terminals on the right of Fig. 1(b) are small hexagonal sockets, obtainable from a well-known chain store. They will fit tightly into two $\frac{1}{8}$ in. holes drilled in the board. As $\frac{1}{8}$ in. is perhaps an awkward size of drill, the reader may care to use a $\frac{1}{16}$ in. drill, then enlarge the hole slightly. The bared end of each connecting wire is passed through the slot in the threaded brass

tube and the plastic portion screwed down on to it. These sockets will accommodate any small wander plug, and if the headphones are not so equipped, a couple of these will have to be procured and fitted.

The position of the various components should be clear enough from Fig. 1(b), the smaller ones being labelled as an additional help. It does not matter which way round the crystal diode is mounted in this circuit, though in some circuits it is critical.

Winding the Coil

All that remains to be done now is to wind the coil and fasten the aerial and earth leads to the two screws on the extreme left of the board. In order to save coil wire and space, and to guarantee a fair performance, the coil is wound on a ferrite core which may be any scrap of ferrite rod at least $1\frac{1}{2}$ in. in length.

All the coils mentioned in this series will be "pile wound"; that is to say, the turns will be restricted to a small length of the core, in this case the middle half-inch of the piece of ferrite. A small piece of $\frac{1}{4}$ in. wide adhesive cellophane tape is wrapped round the middle of the ferrite and will act as a guide in winding the coil and none of the turns should be allowed to stray outside this band. Leaving six inches or so free to connect with, the coil wire is now wound on to the guide band, the first turn being trapped by the succeeding turns as soon as possible. After 15 turns, wound with an even tension, have been completed, a loop about three inches long should be twisted in the wire near the core, then winding recommenced. This loop is to form the aerial "tapping" as shown in Figs. 1(b) and 1(a). A further 45 turns (60 turns in all) are wound in the same way, then the coil wire is cut, leaving about 6 in. to spare. The windings are secured with another band of Sellotape wrapped on very tightly.

The enamel must now be removed from the ends of the three wires. This is best carried out by drawing the ends gently through a small piece of the "flour grade" glasspaper, folded with the rough surface inwards. When the ends of the three wires appear bright from all points of view they can be connected, the beginning of the coil going to the screw labelled (2) in the illustration, the end of the coil to (1) and the "tapping" loop to the aerial screw (top left).

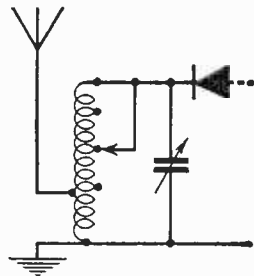


Fig. 2(b).—The theoretical circuit corresponding to Fig. 2(a).

The Completed Set

When the aerial and earth leads have been connected, and the ends of the ferrite rod secured in the two small tool-clips previously listed, the receiver is complete. On plugging in the headphones and turning the tuning knob medium-wave stations should be heard.

The reader is now in a position to carry out a few experiments with the receiver. First, the total

number of turns can be altered. The number of turns chosen, namely 60, is adequate for coverage of the medium waveband using a piece of ferrite $1\frac{1}{2}$ in. long. As the length of the ferrite rod increases, so the number of turns needed becomes less, falling to about 45 turns by the time an 8 in. length is reached. By increasing the number of turns the average wavelength which can be received will lengthen roughly in proportion to the number of turns. An application of this rule is as follows:—

The centre of the medium waveband is about 280m and the middle of the long waveband is about 1,376m, that is, about five times as large. So if 60 turns gives a correct medium waveband covering, then $5 \times 60 = 300$ turns will be about correct for a long waveband coil.

A Multi-Band Receiver

A multi-band receiver can easily be constructed by making a number of tapplings on the coil, then "shorting out" those which are not wanted for tuning. Fig. 2(b) shows this in diagram form and Fig. 2(a) as a practical layout.

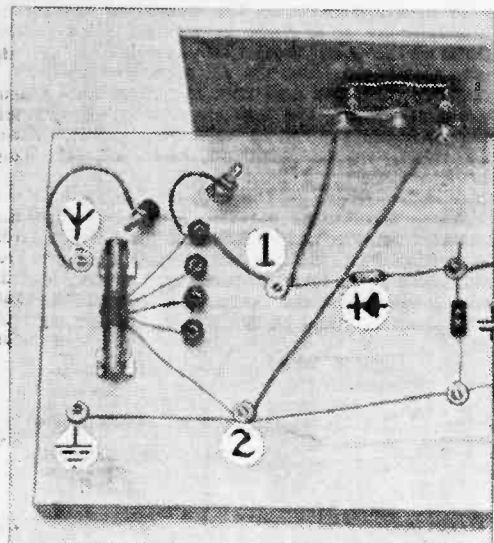


Fig. 3(a).—The modified receiver with tapplings for both diodes and the aerial.

Four extra sockets are arranged as shown, the beginning of the coil going to screw (2) as before and the 15th turn to the aerial in the form of a looped "tapping" as previously described. Other tapplings go to the lower three sockets and the end of the coil to the uppermost socket of the row. This socket has a length of wire with a "free" plug attached, and is also joined by a wire to screw (1) as labelled. Different wavebands are selected by plugging into one of the four sockets.

As tuning condensers of the ordinary sort tune over a range of roughly 3 : 1 in wavelength, the tapplings are best arranged by multiplying successively by this number. For instance, if the first tapping chosen is 20 turns, then the second socket up should be connected to a 60-turn tapping (20×3), the third up to a tapping at 180 turns

(60×3), and the uppermost socket to the end of the coil at 540 turns (180×3).

Beginners can gain valuable experience by listening carefully on a number of wavebands in this way, especially after dark. A paper disc stuck on the panel behind the pointer knob can be used to mark the points at which various stations were heard. These can be inked in four colours, corresponding to four differently coloured sockets.

The aerial tapping has been given as 15 turns from the earth end (beginning of the coil), but this tapping is best determined by experiment. The choice of an aerial tapping will decide the loudness at which the station is heard (i.e., the receiver's sensitivity) and the ability of the set to separate stations (i.e., its selectivity). For such an experiment, a row of sockets is arranged as before, connected to various tapplings on the coil. Into these sockets a "free" plug, on a length of wire from the aerial screw, is inserted. There is no reason why one single row of sockets should not be used for both plugs, and Figs. 3(a) and 3(b) show just such an arrangement, the tapplings being shared by both the waveband plug and the aerial plug. Owing to the special form of these wander plugs, both may occupy the same socket at any moment, one plug fitting into the other, three deep.

In conclusion, the writer would like to point out that these experiments should be regarded as starting points. The next instalment will describe the construction of a one-transistor, dual-waveband receiver, using the same mechanical contact techniques.

(To be continued)

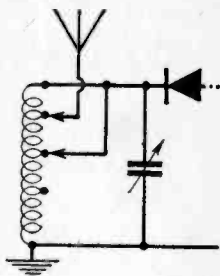


Fig. 3(b).—Theoretical circuit corresponding to Fig. 3(a).

SEND A "PRACTICAL" CHRISTMAS GIFT

You're holding the ideal Christmas gift in your hands now. Yes, PRACTICAL WIRELESS. Why not send a year's subscription for this invaluable magazine to friends who are radio enthusiasts? It's a present you know they'll appreciate. And each new issue will be a renewal of your best wishes . . . month in, month out, right up until Christmas 1961!

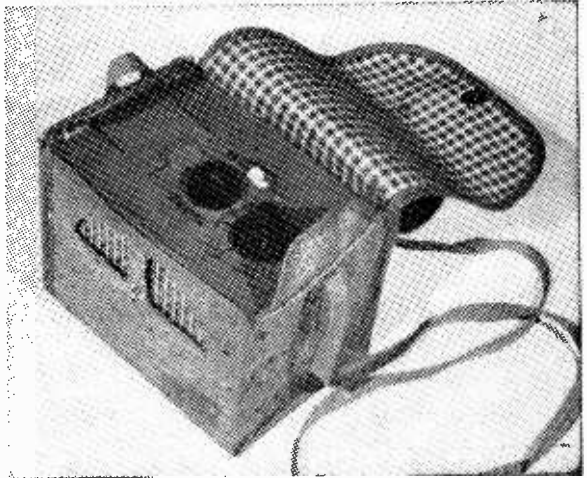
Simply send your friends' names and addresses, together with your own and remittance* to cover each subscription to the Subscription Manager (G.1.), "Practical Wireless", Tower House, Southampton Street, London, W.C.2. We will dispatch first copies to arrive in time for Christmas, and send an attractive Christmas Greetings Card in your name to announce each gift.

* RATES (INCLUDING POSTAGE) FOR ONE YEAR (12 ISSUES):—U.K. £1.3.0, OVERSEAS £1.1.6, CANADA £0.19.0, U.S.A. \$3.00.

CAMERA CASE PORTABLE

A SMALL, SENSITIVE SIX-TRANSISTOR SUPERHET

By F. N. Hart



The completed receiver.

IN order to accommodate a larger loudspeaker than those usually found in pocket transistor radios (and thereby obtain better quality reception), this set was designed to fit into a camera case made by a well-known British firm. It is 5in. wide x 4½in. deep x 3½in. front to back. It is made of an attractive plastic and has a shoulder strap. The inside of the case has to be reinforced (except for the front) with cardboard stuck on with a contact adhesive.

Preparing the Case

Two pieces of the case are cut out, above the press stud, to form an opening, so as not to impede the sound. The edges are then folded in and stuck with the adhesive.

The loudspeaker baffle is of ¾in. three-ply. It is cut to the shape of speaker, leaving a "cross" of the wood in the middle so as to withstand pressure from the press button when the lid is closed. These apertures are covered with a piece

of thin "baffle" covering material to match the case. Drill and cut the baffle as in Fig. 3.

The top panel is of thin bakelite, fixed partly by an angle bracket to the chassis, and partly held by the tuning condenser, which is already drilled to take screws, both in front and in the bottom.

The Chassis

The chassis is made of bakelite drilled so that threaded brass rods can hold the speaker rigidly 2½in. from the chassis at the bottom. The top panel and chassis can be joined as soon as the components are assembled on them, but the loudspeaker and baffle should be left until all the wiring is completed except for the two leads from the output transformer.

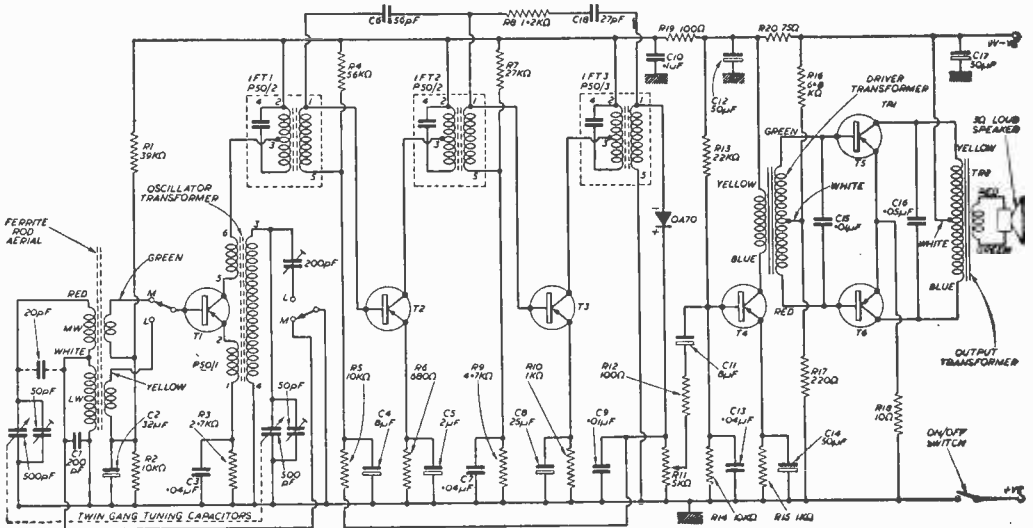


Fig. 1.—The circuit diagram.

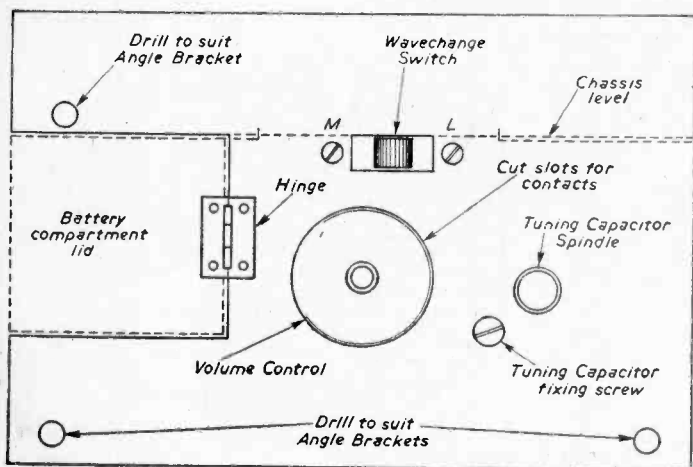


Fig. 2.—The top panel of the receiver.

The top panel (Fig. 2) is now cut and drilled, leaving a square space to the left, for the lid of the battery compartment. This is $1\frac{1}{2}$ in. square, and if the piece is cut out with a fine saw, it may be used as the lid, being held by a small brass hinge. The chassis and lid are drilled to take very small screws or rivets. The slot and screw-hole for the slider switch must now be drilled, counter-sinking all the screws on the panel so that they are hidden. At this point the panel may be covered with a coloured adhesive material.

Drill the slots to take the four lugs of the volume control switch, which are mounted by bending them over outwards from the centre. Make the hole for tuning condenser spindle.

Mounting the Components

Now drill the chassis and cut a space in the front to allow room for the wave-change switch which is mounted on the top panel. Also cut the apertures for the six transistor holders and stick them in place with a quick drying adhesive. The oscillator and I.F. coils are the first to be put on the chassis, and then the tuning condenser is mounted taking care to see that the fixing hole in the front coincides with that on the panel.

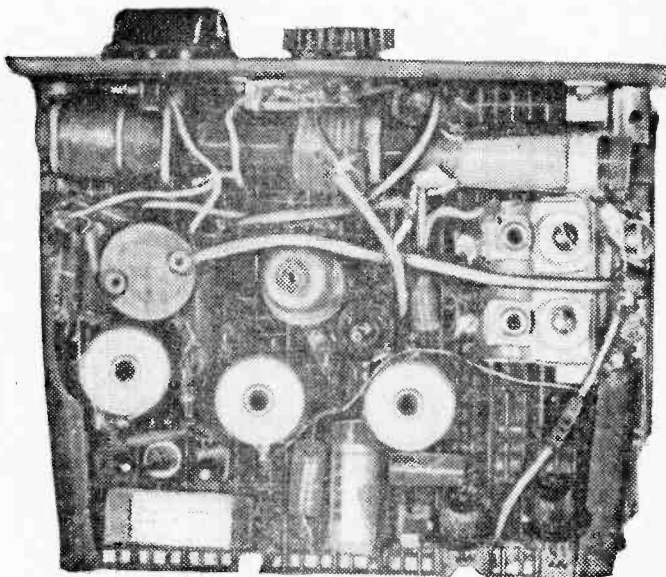
It is advisable, from time to time during assembly, to attach the top panel to the chassis to see that components do not foul one another, and that holes coincide with their respective brackets, etc.

After seeing that the aerial will fit into its place on the holder, put it on one side until later. This holder is made from a piece of coil former or composition tube. It is packed with a grommet or a piece of rubber. The tube is held to the chassis by a small wood screw.

The I.F. cans each have two holding lugs which are passed through the chassis and bent over, forming soldering lugs. The earth bus-bar can be soldered to them as early as possible to secure them.

The oscillator coil, having no "can", must be an accurate fit and is only held in place by its soldering pins, but it can be secured by a small dab of adhesive, taking care not to get any on the pins and so impede soldering. These components are actually intended for printed circuits, but provide no difficulty when soldering. After the coils and transistor holders are attached, the trimmer gang can be screwed in place: one of the screws bearing a soldering tag. The padder condenser is left until the first and second I.F. transistor holders are completely wired, but it is supported in place by an angle bracket, held by a screw through a spacing bush of insulating material. For this reason it is as well to remember its position when soldering the holders. For safety it is a good idea to put a dab of nail varnish or paint on the collector side of these holders to ensure that the transistors are not inserted the wrong way round.

Solder the earth position connections to the cans and the tuning condenser soldering lug on to its fixing screw and to the trimmer gang. It is most important that a very good earth is maintained. In fact to ensure stability, not only is a bus-bar from the can lugs on the back needed, to which all the earth ends of condensers and resistors are



Above chassis wiring.

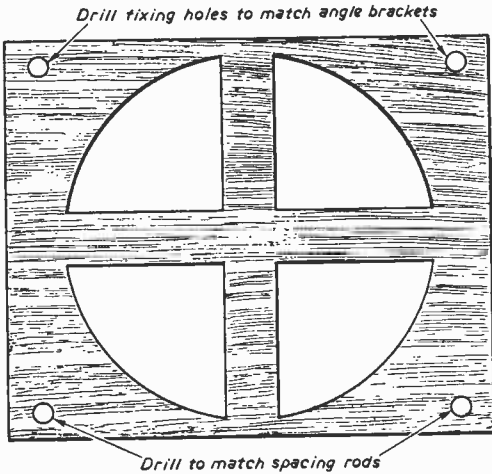


Fig. 3.—The loudspeaker panel.

fixed, but another earth line must be soldered to each can on the top side of the chassis.

The leads from C2, C3, C7, C8, C13, C14, pass through the chassis, and R3 and R9 are mounted vertically to save space. R18 has one lead passing through to join the emitters of transistors T5 and T6, the other end going to the trimmer earth lug. R6 is mounted on top of its blocking condenser C5 (2μF). The remaining resistors and condensers are mounted and soldered on the inside.

When the battery compartment (Fig. 5) is firmly stuck, the I.F. transformers can be mounted. They have at each end, a lug which should be pushed through slits cut in the cardboard and bent over. A four tag soldering bar should be stuck on to the bottom or secured with a short screw, taking care it does not protrude inside and interfere with easy insertion of the battery.

Solder the positive and negative wires first, as they should go flush against the chassis to leave room for leads to resistors and condensers, and solder the earth ends of these components. In the model, the earth ends of C4, C9, and C10 are soldered direct on to the bottom of the tuning condenser, but care must be taken to ensure a clean joint by scraping it well. Leads can be anchored where necessary by passing them through twice and soldering, when using the loudspeaker fret as chassis.

From time to time, when soldering, make sure that the loudspeaker on the baffle does not foul anything. As a precaution against any shorting, cover the metal part of the magnet case with Sellotape. Now mount and solder the padder.

COMPONENTS LIST

- Ferrite Rod 4in. Long. M. W. Coil FRM2 (Teletron).
- L. W. Coil TL (Teletron).
- 2-gang tuning condenser (365pF).
- 2 Trimmer condensers (60 + 60pF).
- 1 Padder condenser (200pF).
- 1 Oscillator Coil P50/2.
- 2 I.F. Coils P50/2 (Weymouth).
- 1 3rd I.F. Coil P50/3.
- 1 Driver Transformer D131 (Ardente).
- 1 Output Class B Transformer D132 (Ardente).
- 1 Slider Switch D.P.-D.T. and holding screws.
- Battery 9V PP6 Clips.
- Resistors and condensers as in circuit.
- Transistors.
- 1 Ediswan XA104.
- 2 Mullard OC45.
- 1 Red Spot XB104.
- 2 Matched XB104 or 2 matched OC72 Mullard.
- 1 Diode OA70 Mullard.
- 1 sub-miniature volume control (5k) with switch (hearing aid type).
- Top panel mounting.
- 3½in. 3Ω loudspeaker (Elac).
- Kodak camera case No. 912.
- 1 tuning knob.
- 22 s.w.g. wire, sleeving 4 colours.
- Paxolin: 4½ x 3½ x ¼in. (for panel).
- Paxolin: 4½ x 3½ x ⅜in. (for chassis).
- 4 small single-hole brackets: ½in. wide and ½in. each arm.
- 1 piece ⅜in. three-ply 4½ x 3½in. for baffle.
- Small brass hinge for battery compartment lid.
- 4 rivets or small screws for the hinge.
- Adhesive plastic sheet.
- Thin L.S. covering material (4½ x 3½in.).
- 2 brass threaded rods with brass nuts (8) 2½in. long.
- Sundry small screws and nuts.
- 1 coil former or composition tube to fit ferrite rod at centre.
- 6 transistor holders.
- 1 small 4-tag soldering strip and 2 or 3 separate tags.
- Sellotape.

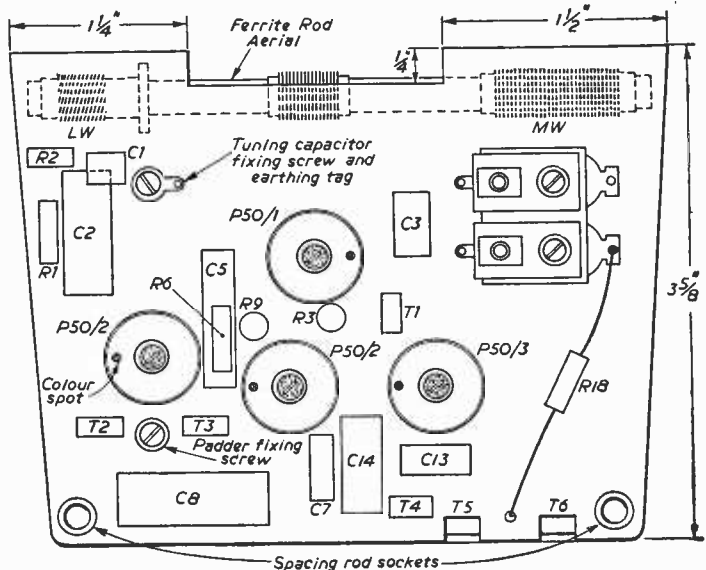


Fig. 4.—Above chassis layout.

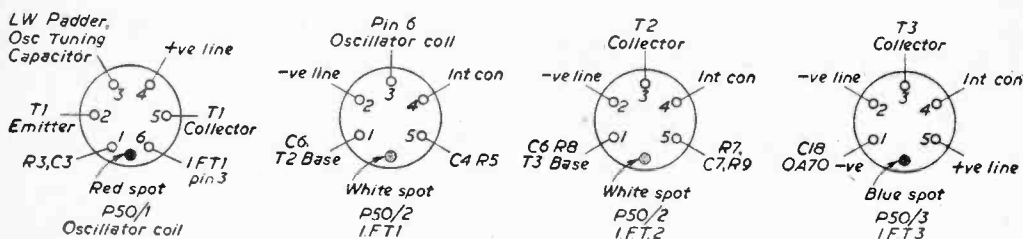


Fig 6.—Coil connections.

Resistors R4, R5, R7, R13, R19, and the positive end of the diode, are the last to be mounted and soldered. Insert the ferrite rod into the holder. Slip on the coils and solder the leads.

Solder on the battery leads, making sure that they are long enough to allow for the battery to be inserted after the clips have been put on. The surplus is tucked in under the lid.

Testing

When the set is ready for testing, see that the loudspeaker and baffle fit neatly into position. Then remove the spacing rods leaving only the left-hand, front, angle-bracket, fixing screws holding the baffle to the panel. Now provided that enough lead is left loose from the output transformer after soldering, the loudspeaker can be moved freely.

Insert transistors into their holders, and ensure that the battery switch is off and the wave change switch on the medium wave. Now switch on.

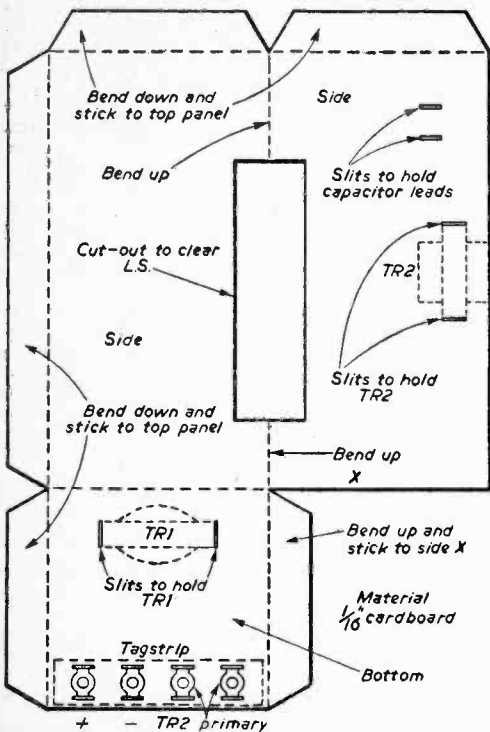
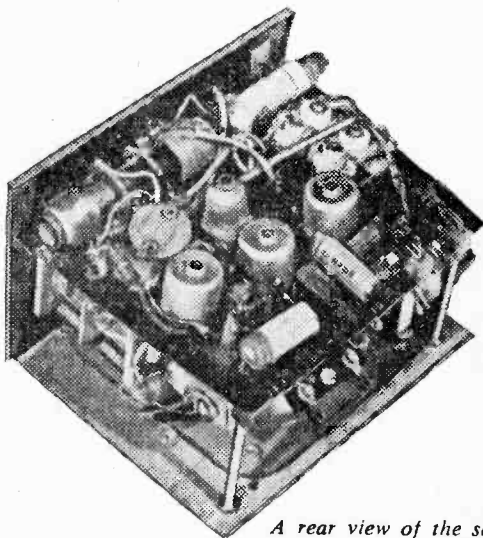


Fig. 5.—The battery compartment.

The coils are pre-set by the makers and should only need a slight adjustment when a station is heard. Turn the set, when the signal is powerful, to the position of weakest reception, thus preventing automatic gain control masking effects of adjustment.

Normal trimming practice is used, moving the aerial coil to the strongest position on the lower frequencies, and adjusting the trimmers for the highest.



A rear view of the set.

If there is any instability when the intermediate frequencies are in harmony, the neutralising chain C6, R8, C18 needs variation. The coil makers specify a resistance about 2.7k between base of T2 and C6, but this was found to be unnecessary. Variation of the values of these resistors should clear up the instability. In the model, however, an extra heavy earth lead from the trimmer to the tuning condenser was needed.

Long Wave Adjustment

The long-wave adjustment is easy, but if near a powerful medium wave transmitter, there may be some break through, on to the long wave band, and care should be taken that this is not being used for adjustment purposes.

When testing is finished, switch off and remove the battery. Fasten the loudspeaker baffle to the remainder of the set and carefully insert into the case. Replace the battery and the set is ready for use.

Selecting Output Transformers

CALCULATING THE TURNS RATIO

By J. Gray

FOR proper results, the output transformer used to couple the speaker to a receiver or amplifier should be of the correct type. Choosing a transformer for this purpose need not present any difficulty when the method of finding its ratio is known, as it is on this point that an error is most likely to be made.

Most loudspeakers have an impedance of only a few ohms, while the optimum load (or best anode impedance for a valve) is usually several thousand ohms. To obtain an impedance match from valve to speaker, a step-down transformer is therefore required. The primary, or large winding, is connected from anode to high tension positive, as in Fig. 1, and the secondary is wired to the speaker.

The transformer ratio can be found by dividing the optimum load of the valve by the speaker speech coil impedance, and finding the square root. That is:

$$\text{Ratio} = \sqrt{\left(\frac{\text{Optimum Load}}{\text{Speaker Impedance}} \right)} : 1$$

As an example, assume the optimum load for the output valve is 5,000Ω, and the ratio to match a 2Ω speaker is to be found.

$$\sqrt{\left(\frac{5,000}{2} \right)} : 1 = \sqrt{(2,500)} : 1 = 50 : 1$$

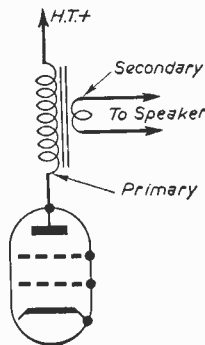
The required ratio is thus 50:1.

The optimum loads to be used with various output valves are listed by the valve manufacturer. Speaker manufacturers also give the impedance of their speakers, and the correct transformer ratio can thus be worked out.

For all ordinary purposes, the ratio is not highly critical, and good results will be obtained with a transformer having a ratio fairly near that actually needed. But a very great departure from the correct ratio should be avoided, because the quality of reproduction will begin to fall.

The optimum load depends to some extent on the anode voltage, and is usually given for a typical

Fig. 1.—Single output valve with speaker transformer.



voltage. To avoid the need for calculation, Table I (overleaf) may be used. This shows popular battery and mains output valves, the anode voltages at which they would most likely be used, and the optimum load and transformer ratio for 2 to 3Ω speakers and 15Ω speakers. It is thus only necessary to look up the ratio required for the valves listed in the table.

It will be observed that a possible cause of mismatching can arise if a 2/3Ω speaker is used instead of a 15Ω model. Very many speakers are of approximately 2/3Ω impedance, but numerous models of other impedance are also made. It is thus wise to ascertain the speaker speech coil impedance, especially with miniature speakers, large "quality" units, or any other type of reproducer where the more usual 2/3Ω impedance may not be used.

Push-Pull Circuits

When two valves are used in a push-pull circuit, a centre tapped transformer is required, as shown

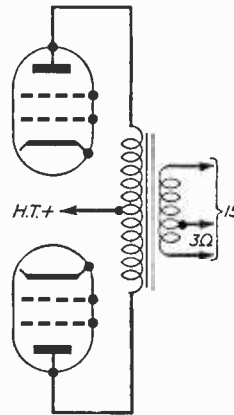


Fig. 2.—Push-pull output and optional speaker tapplings.

in Fig. 2. The optimum load impedance for the complete stage may then be given as from anode to anode. For example, if each valve, used alone, had an optimum load of 5,000Ω, the anode-to-anode impedance, with the valves working in the same way but together in push-pull, would be 10,000Ω. The total ratio of the transformer would thus be twice that of the circuit in Fig. 1, so that each valve would have the same load, with only one-half of the primary.

With valves in push-pull, the actual load depends on operating conditions. It is thus

wise to take the figure from the maker's data, and to choose the transformer to suit.

Some transformers have various tapplings, so that a number of ratios can be selected. If so, choose the tags from the maker's instructions, or use those found to give best quality and volume. There may also be optional secondary connections, as shown in Fig. 2. In this case, those used should suit the speaker impedance.

Current Carrying Capacity

With battery valves, an anode current of some 10mA or so may not be exceeded, and the transformer primary may be wound with fine wire, especially with midget components. Such transformers are not suitable for mains valves, where the anode current will often be some 30 to 60mA, in average receivers and amplifiers. For mains valves, it is thus necessary to use a larger transformer, so that the primary can carry the current which must pass. Such transformers are listed as "mains output valve" transformers; or the actual current carrying capacity of the primary may be given. For average equipment, a transformer able to carry 60mA will be large enough.

TABLE I.
OUTPUT TRANSFORMER RATIOS.

Valve.	Anode Voltage. (V)	Optimum Load (Ω).	Ratio. $2/3\Omega$ speaker.	15Ω speaker.
3V4	90	10,000	64:1	25:1
3S4, 1S4	67½	5,000	45:1	18:1
		90	8,000	58:1
6AQ5, 6BW6, 6V6, 7C5, 9BW6, 19AQ5	250	5,000	45:1	18:1
		7,000	54:1	21:1
		2,500	32:1	13:1
6L6	250	4,200	42:1	17:1
12A6	350	8,000	58:1	23:1
25A6G	180	4,000	40:1	16:1
25L6	135	3,000	35:1	14:1
35L6	200	4,500	43:1	17:1
	200			

With high-power amplifiers, or any equipment using very large output valves, currents of 100mA or more may be encountered. It is then necessary to use a larger transformer to suit.

Transformer Quality

With ordinary receivers and amplifiers of popular type, the relatively inexpensive transformers will be satisfactory. But with special equipment, such as "quality" amplifiers, a particular transformer may be specified. If so, it should be used if possible, because the more expensive type of transformer may have sectional windings, balanced construction, or other features intended to avoid phase shift or other limitations of small transformers. For the same reason, where a particular ratio or component is specified in a circuit employing negative feedback, this should be followed. If not, phase shift may result in some frequencies not being at 180deg in the negative feedback loop, or the drop in effective output impedance, resulting from the feedback, may not be taken into account.

Flight Deck Communications System

A FLIGHT deck communications system designed to permit voice communication between a flight deck control centre of an aircraft-carrier and flight deck crews has been developed by the Telecommunications Division of The Plessey Company Ltd. on behalf of and in conjunction with the Admiralty. Normally, direct voice communication on the flight deck is impossible due to aircraft noise and to ear protectors that are worn by crew members.

This system enables the controller to transmit orders over a broadcast channel at audio frequencies. The signals are fed into a magnetic coupling loop encircling the flight deck of the aircraft carrier. Crew members carry a receiver that picks up the audio signals, amplifies and feeds them to an earphone built in the ear-protector.

Key members of the flight-deck crews are able to talk back to the control centre by means of a V.H.F. radio transmitter which is carried clipped to the receiver.

Fully transistorised, the miniature portable equipment is battery operated and protected by a nylon cover.

The ratios in Table I therefore apply to valves used in ordinary circuits of straightforward type, and with the valves wired for operation in the normal way—that is, as tetrodes or pentodes. If the valves are triode connected for any reason (screen grid and anode employed together as anode) then the optimum load will be reduced. A transformer of lower ratio would then be necessary.

Transformer Connections

It is worth noting that the resistance reading which would be obtained with a D.C. meter does not show what the transformer impedance is. For example, a 5,000 Ω transformer may have a D.C. resistance of only a few hundred ohms, depending on the gauge of wire with which it is wound. In the same way a $2/3\Omega$ secondary may have a D.C. resistance of only a fraction of an ohm.

D.C. readings will, however, allow primary and secondary to be correctly identified, if necessary. In the case of a surplus or unmarked transformer, such readings will also allow the relative positions of taps or a centre-tap to be located.

Audio Broadcast Channel

The audio signal for the broadcast channel is selected from one of three input points: a local microphone, a remote microphone, or the talk-back channel.

After amplification by a microphone pre-amplifier, the audio signals are mixed with a signal which is used for AGC and the combined signal is fed to the power amplifier.

The receiver pick-up coil consists of a potted ferrite inductor which receives the combined audio-frequency and AGC signals from the broadcast loop.

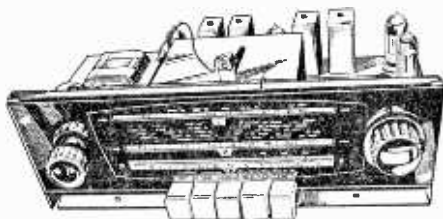
After amplification the audio signal is separated in a low-pass filter and applied to the output stage which drives the headset.

Talk Back Channel

Talk back from the crew to control is effected by means of a V.H.F. radio link. Key members of the crew each carry a transistorised transmitter which is mechanically joined to the broadcast channel receiver.

The microphone input is amplified by two common emitter stages and fed via an emitter-follower to modulate the output of the transmitter.

BRAND NEW AM/FM (V.H.F.) RADIOGRAM CHASSIS AT £13.6.8 (P. & P. 10/-)



Some dusty (but working) chassis at £10 (carr. 10/-). Tapped input 220-225 v. and 228-250 v. A.C. ONLY. Chassis size 15 x 6 1/2 x 5 1/2 in. high. New manufacture. 12 mths. guarantee. Dial 1 1/2 x 4 in. in black and yellow Pick-up. Extension Speaker. Ae. E., and Dipole sockets. Five "piano" push buttons—OFF L.W., M.W., F.M. and Gram. Aligned and tested. With all valves and O.P. Transformer. Tone Control Fitted. Covers 1,000—1,900 Mc.; 200-500 M.; 30-39 Mcs. Valves EZ90 rect., ECH81, EF89, EAB39, EL34, ECC85. Speaker and Cabinet to fit chassis (table model) 47/6. 10 x 6 in. ELLIPTICAL SPEAKER, 20/-, to purchasers of this chassis. TERMS:—(Chassis) £4.16.8 down - 10/- carr. and 6 Monthly Payments of 30/-, or with Cabinet and Speaker £5.9.2 down and 7 Monthly Payments £1.12.2.

COSSOR/EMI 10in. TV tube type 108K. Brand new and boxed. ONLY 30/- (carr. 3/6).

BATTERY ELIMINATOR. Converts your Battery Set to Mains. For 4 Low Consumption Valves (96 range). 90 v. 15 mA. and 1.4 v. 125 mA. 42 6 (2/6 post). 200-250 v. A.C. Size 5 1/2 x 3 1/2 x 2 in. Also for 250 mA. 1.4 v. and 90 v. 15 mA at same price. Specify which, or give Valve line-up.

50 SILVERED MICA AND CERAMIC CONDENSERS, 10-50 RESISTORS, 5/-, ALL DIFFERENT VALUES. 31 TUBULAR CONDENSERS (7 values 0.001 to 0.1 mf), 4/6.

BATTERY OPERATED TRANSISTOR RECORD PLAYER KIT

£5.19.6 (3/6 P. & P.)

Coscor printed circuit 4-transistor amplifier; Garrard 45 r.p.m. battery player type BA1; speed control; Cabinet size 11 x 9 x 5 in.; less than 8 1/2 lb. inc. batteries. Requires two Ever Ready AD28 batteries. State colour—red/cream or blue/cream.



"READY TO USE" ITA CONVERTER

Separate gain controls. Valves PCF80 and PC84. Switch position ITA (1)—ITA (2)—BBC. Bakelite moulded cabinet 6 1/2 x 4 x 6 in. £5.5.0. P. & P. 3/-



LISTEN WITHOUT INTERFERENCE

Fully built V.H.F./F.M. Set for £8.8.0 (3/- post). Covers 88-98 Mc/sec. Wired, aligned and tested. Mullard permeability tuner and 4 valves (ECC85, ECL82 and two EF91), with mains transformer. Cheap room dipole. 10/-, 300 ohm twin feeder. 6d. yd. All with 12 months' guarantee.

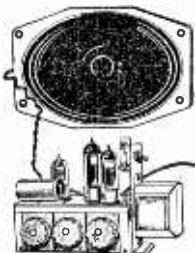


GRAMOPHONE AMPLIFIER with 5in. SPEAKER.



On Fabric-covered Baffle 12 1/2 x 5 in. Mains and Output Transformers, EZ40 Rectifier, and EL41 Valve. Tone and Volume Controls. On/Off switch. Plenty of Volume. Fully Guaranteed. Two Knobs supplied. Ready to play. Useful for Stereo.

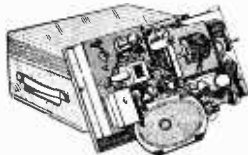
ONLY 57/-, post 3/-



3-VALVE AMPLIFIER (INC. RECT.). Capable of giving 6 watts. Mains and output transformers. Valves ECC81, EL34, and EZ80. Controls volume, bass and treble. On/Off switch. Fully guaranteed. Chassis size 6 1/2 x 3 x 2 1/2 in. 6 1/2 in. round or 7 x 4 in. elliptical speaker, state which. Not suitable for microphone input.

67/- (3/- p. & p.)

TAPE RECORDER ASSEMBLED TO B.S.R. MONARDECK



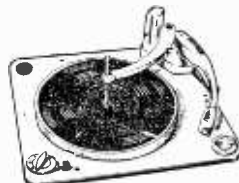
A QUALITY ARTICLE. Valves EZ80, ECC83, ECL82, DM70. Acos Crystal "mike". 850lt. Tape and extra spools. 3In./sec. Mike and Radio inputs: Vol. on/off tone. Ext. L.S. and Monitor. Fast forward and reverse. Cannot be accidentally erased. Magic Eye indicator. 7 x 4 in. Speaker. Four separate chassis assembled to base of the Monardeck to fit into cabinet of 14 x 11 x 7 in.

PRICE for Recorder and Deck Assembly, as above (without Cabinet), £16.10.0 (10/- p. & p.). Cabinet £3 (5/- carriage). Enquiries invited for any of the parts.

AUTOMATIC RECORD CHANGERS COLLARO CONQUEST with manual play also. 4-speed. A.C. mains 200-250 v., see illus.

£7.10.0 (5/- P. & P.)

B.S.R. UAS 4-speed auto-changer, £8.10.0 (5/- carr.) or with Stereo Head, £8.12.6 (5/- carr.). All with Crystal Turnover Head.



ALL ITEMS GUARANTEED 12 MONTHS—B.V.A. VALVES

3 MONTHS Send 6d. (stamps will do) for our illustrated catalogue of the above items and others. All New Goods. Delivered by return. Terms:—One-third down and balance plus 7/6 in four equal monthly payments. Postage with down payment (C.O.D. 2/- extra).

SEE SPECIAL TERMS FOR A.M./F.M. CHASSIS AND TAPE RECORDER. Posted Orders to Camberley Please.

See additional advertisement on page 620

GLADSTONE RADIO

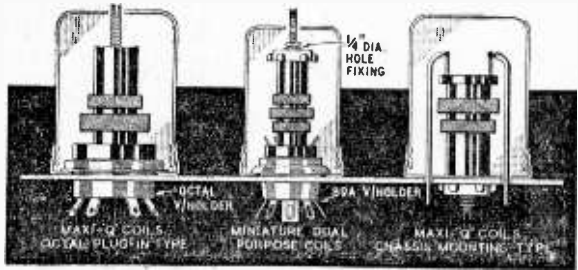
58A HIGH STREET, CAMBERLEY, SURREY. Tel. 22791

Also at 3 Church Road, Lawrence Hill, Bristol 5 and 247 New Road, Portsmouth, Hants. Camberley closed Saturdays. Bristol and Portsmouth closed Wed., afternoons.

MAXI-Q
REGD.

"WE COULD BLIND YOU WITH SCIENCE"
on the technical superiority of our coils but
are sure you would prefer us just to say
"WE GUARANTEE THEM"!

Coverage from 3.8 to 2,000 metres in 7 ranges—
Each coil is packed in an aluminium container
which may be used as a screening can for the
coil itself—Brass threaded adjustable iron
cores—Colour coded moulded polystyrene
formers—Chassis/Plug-in Technical Bulletin
DTB.1 1/6—Dual Purpose Technical Bulletin,
DTB.4 1/6—Colour Code Identified Coils:
BLUE Signal Grid Coil with Aerial Coupling
winding—YELLOW Signal Grid Coil with
intervalve coupling winding—GREEN Grid Coil
with reaction and coupling windings—RED
Superhet Oscillator for I.F. of 465 Kc/s—WHITE
Superhet Oscillator for 1.6 Mc/s. Prices range
from 4/1 to 4/9 each. Five Colour Glass Scale,
Back Plate, Pointer, Pulleys and Cord for use
with 315pF tuning condensers. Coverage (1)
150-400 Kc/s; (2) 530-1600 Kc/s; (3) 1.5-4 Mc/s;
(4) 4-12 Mc/s; (5) 10-30 Mc/s; Price 15/-.



GENERAL CATALOGUE covering full range of components send 1/4d. in stamps or P.O. PLEASE SEND S.A.E. WITH ALL ENQUIRIES.

DENCO (CLACTON) LTD. (Dept. P.W.), 357/9 Old Road, Clacton-on-Sea, Essex

be TRANSISTOR-WISE! be POCKET-WISE!



"RECO" MIDDY THREE

(Medium and Long Waves.) Variable regen. control. Vari Q Ferrite Rod Aerial. Complete Kit with EDISWAN TRANSISTOR, and easy-build plans and miniature speaker 49/6, with "Sonotone" dynamic earpiece 55/-, post 1/6. Battery 1/-.

"RECO" PUSH-PULL FOUR TRANSISTOR KIT

(Medium and Long Waves with two S/W Coils FREE upon request.) Case size as PP5. New improved circuit. 3in. High Grade Moving Coil Speaker. Bias sensitivity volume control. Ferrite Rod Aerial. Gleaming Pale Blue Polystyrene Case with contrasting Speaker Grille in Red. Complete Kit with 4 1st grade EDISWAN TRANSISTORS and 3 volt battery, £4.19.6, p.p. 2/6.



"RECO" PUSH-PULL FIVE TRANSISTOR KIT

(Size 6½ x 4½ x 1½in.) Medium, Long Waves and Trawler Band. Indoors or outdoors this brilliant radio brings Home and Continental Stations to your finger-tips. High Grade 3in. Moving Coil Speaker. Regenerative receiver with EDISWAN TRANSISTORS, XC101's (350Mw) Push-pull Output Stage. High Gain Ferrite Rod Aerial. Gleaming Pale Blue Polystyrene Case with Contrasting Speaker Grille in Red. Complete Kit with easy-build diagrams, etc., £1.19.6, p.p. 2/6. A customer in Dorset writes—"Makes fine car radio."

"RECO" SUPER TRANSIGEN FOUR

Medium and Long Waves. Four first grade EDISWAN TRANSISTORS, XA104, XB113, XC101, XC101. High gain Ferrite rod aerial. 3in. High Flux Moving Coil speaker. Performance as Transigen Three but with extra stage for speaker output. Case as PP5. Complete kit, with 4½ volt battery, £4.19.6. Post, etc., 2/6.

"RECO" TRANSIGEN THREE TRANSISTOR KIT

(Case as PP5.) (Medium, Long Waves and Trawler Band.)

Fitted Super High Gain Ferrite Rod Aerial. R.F. Stage, EDISWAN TRANSISTORS. On test: tuned in Home, Light, Third, Radio Luxemburg, A.F.N. and many others at good listening level. The Prototype was tested at approximately 50 miles from nearest transmitter. Complete Kit, with super dynamic miniature earpiece, 69/6, p.p. 2/6. If reception conditions warrant, a small speaker may be fitted under red speaker grille.



"RECO" SENSITONE THREE

(5 stage reflex) Medium and Long Wave

Uses latest Ediswan Transistors for sensitivity and selectivity. Improved R.F. stage for greatly increased gain. Inbuilt ferrite rod aerial. Fitted volume/sensitivity control. Appearance as Transigen-3. Easy-build practical wiring diagrams. Fitted with a full toned 3in. moving coil speaker. Complete kit, 89/6, post, etc., 2/6.

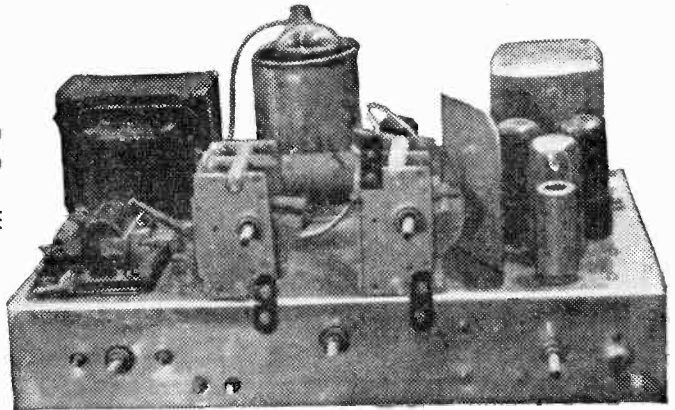
AFTER SALES SERVICE ● **THE ABOVE SIX CIRCUITS AND PRICE LISTS 2/6**
RADIO EXCHANGE CO. 27 HARPUR ST., BEDFORD. Telephone 2367
Name, address BLOCK letters please Closed 1 p.m. Saturdays.

Six-Valve Top-Band Tx

THE CONSTRUCTION OF THE
TRANSMITTER

By R. Dowling

(Continued from page 490 of the
October issue)



The completed transmitter.

WHEN building the transmitter, it is first necessary to mark-out the chassis. In this connection, Fig. 4 shows the relative positions of the various large components. No attempt has been made to show the position of small holes, etc., for two reasons: first, the constructor may not be using components of exactly the same size as the ones used by the writer, and, secondly, the precise positioning of most of the smaller components is not very critical.

As mentioned last month, it is suggested that

the power supply section be built first. Little difficulty should be encountered in making it function satisfactorily.

Modulator

The writer next tackled the modulator section. Again, this is not a "difficult" circuit to build. The thing to remember when building up a multi-valve circuit of this sort is to adopt a systematic approach, and to tick off on the circuit diagram each component as it is wired in. Let us therefore consider the wiring-up of each valve in detail.

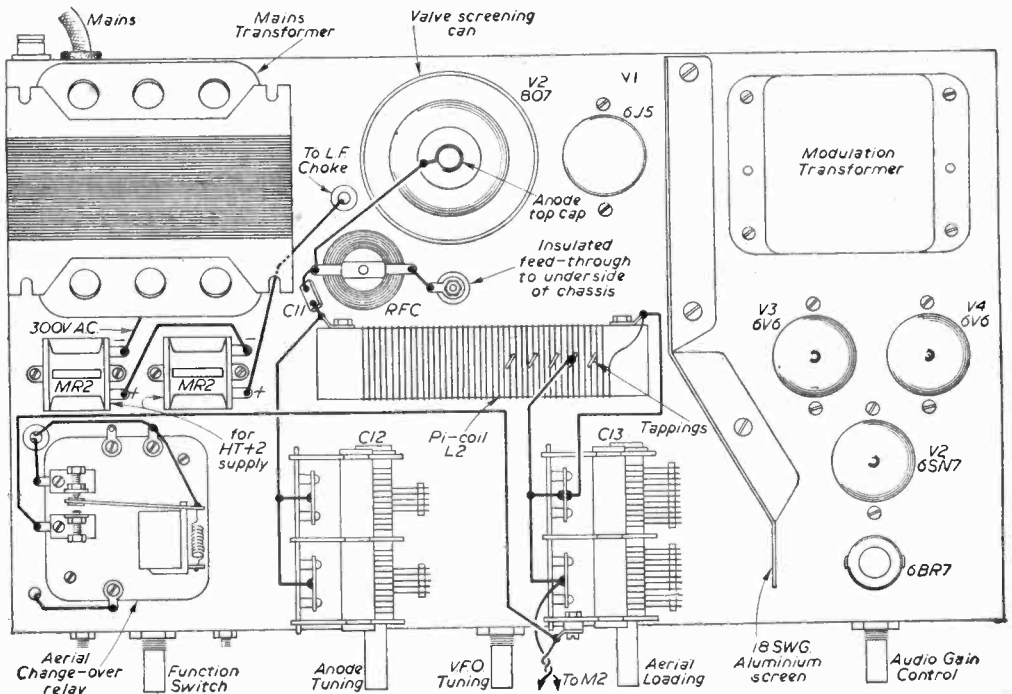


Fig. 4.—The above-chassis layout. (The microphone socket is adjacent to the A.F. gain control.)

The pre-amplifier (6BR7). All leads to the control grid of this valve must be as short as possible. The lead from the microphone socket to the control grid of this valve must be as short as possible and it must be screened, the screening being earthed at both ends. The wiring to the screen-grid, suppressor-grid and cathode is less critical, but even so there is no point in making the leads longer than necessary. The heater leads should be of twisted flex, and neither lead should be earthed at the valve. Finally, the anode wiring must again be kept very short and the lead to the audio gain control VR1 screened at both ends.

The Phase-splitter (6SN7). The phase-splitter is a low-gain stage; its purpose is not one of amplification but of converting the single-phase output of the 6BR7 into two phases 180deg apart which feed the push-pull 6V6's. Accordingly, the tendency of this valve to pick up hum is not nearly so great as that of the valve preceding it. Leads should nevertheless be no longer than necessary, especially to the two grids.

The Output valves (6V6's). Here again, the wiring is not specially critical; if it is carried out in accordance with the layout of Fig. 5 then no trouble should be experienced.

A very satisfactory method of assessing the performance of the modulator when completed is by means of a pair of high impedance headphones connected across the secondary of the modulation transformer. The match is obviously not going to be perfect (most high impedance headphones

having an impedance of about 2,000Ω), but even so one can obtain a good impression of the general performance of the modulator in such respects as hum level, microphony, etc. It might be mentioned in passing that in the case of the actual modulator built up by the writer very little hum was apparent in headphones even with the gain turned up fully.

Finally, then we come to the R.F. section. Again, if a systematic approach is adopted the likelihood of wiring errors is considerably minimised.

The V.F.O. (6J5). Begin with the wiring of the grid-cathode section, which forms the actual

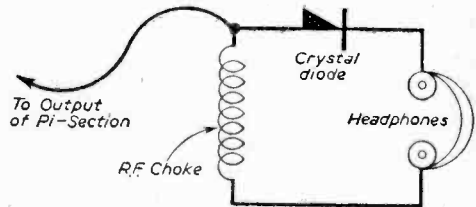


Fig. 6.—A simple modulation monitor.

oscillatory path in the Clapp oscillator. Heavy gauge wire must be used here; 18s.w.g. should be regarded as the minimum. Each length of wire should be only as long as absolutely necessary and should be quite rigid; only if precautions such as these are taken will satisfactory stability be

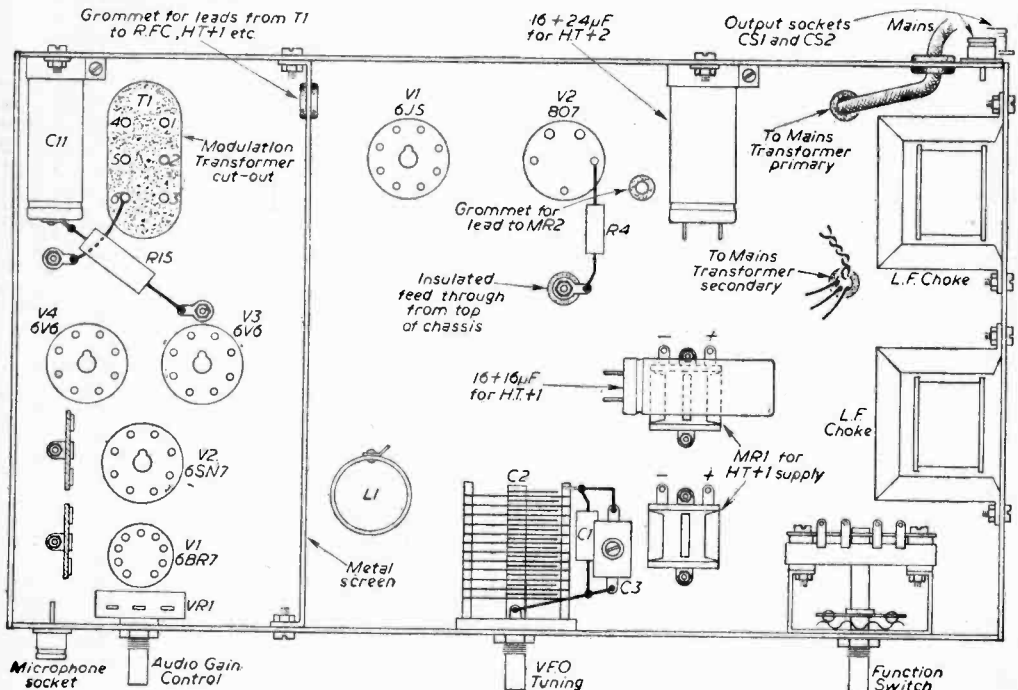


Fig. 5—Positions of components on the underside of the chassis.

obtained from the V.F.O. It will be seen from Fig. 5 that the V.F.O. coil and condenser are mounted some distance from the rest of the V.F.O.; the reason for this is two-fold: first, in order that the condenser might be brought out conveniently to the front of the transmitter, and, secondly, that the tuned circuit is thereby removed to some extent from heat-producing parts of the circuit.

The Power Amplifier (807). The output of the V.F.O. is conveyed to the control grid of the P.A. by means of C8 (100pF). The cathode wiring of the 807 consists of the lead to the function switch S1, and the lead from the function switch to the 50mA meter M1. The leads to the meter should be of twisted flex.

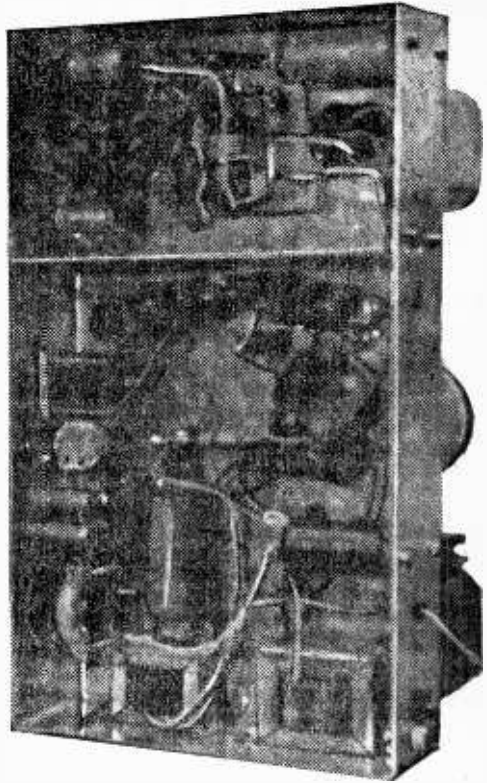
The anode and the screen-grid of the 807 are connected to the secondary of the modulation transformer: the anode via an R.F. choke and the screen-grid via a 22k resistor. The output of the 807 is then taken through a 1000pF capacitor C11 to the π -section output. The coil L2 should not be bolted directly against the chassis, since this will impair the Q; in the original transmitter the coil was raised from the chassis by means of two small "feet" at either end.

Operating Details

The main function control is the four-pole three-way switch S1; the three positions are labelled "net," "receive" and "transmit." In the "net" position the P.A. and the modulator are both switched off, so that it is possible to detect the note of the V.F.O. in the receiver. In this way, one can move frequency within the band without causing any interference to other stations because no carrier is being radiated.

Preliminary adjustment of the transmitter is best carried out with a dummy aerial connected across the output to earth. This can take the form of an 80 Ω non-inductive resistor of 10W rating.

It is first of all necessary to adjust the V.F.O. until it is operating within the correct frequency range; this is carried out as follows. Begin by setting the station receiver B.F.O. If the V.F.O. trimmer is now adjusted using an insulated tool it will be found possible to tune in the note of the oscillator. Once the approximate position of the trimmer has been determined in this way, it should be



Underchassis wiring of the transmitter.

carefully readjusted until the band is comfortably covered by the swing of the main V.F.O. condenser.

Next, one can attempt to load the transmitter into the dummy aerial. First of all, switch the function switch to "transmit" and set both the π -section variable condensers to maximum capacity. If the anode tuning condenser C12 is now rotated a point will be found where the anode current of the 807 suddenly dips. At the same moment the current in the aerial will be seen to increase sharply. Let us suppose that the anode current dips down to 10mA, and the anode voltage is 300V. Now,

$$P = EI$$

$$\therefore \text{Power input} = 300 \times (10/1,000) = 3W.$$

However the G.P.O. allows a maximum input power of 10W on this band; thus we can use the above expression to calculate the value of anode (or, more strictly speaking, cathode) current as measured by M1:

$$P = EI$$

$$\therefore 10 = [300 \times \text{anode current (mA)}] / 1,000.$$

$$\therefore \text{anode current (mA)} = 33\text{mA} = (10/300) \times 1,000\text{mA}.$$

The problem is, therefore, to increase the value of the anode current at dip from 10mA, say, up to about 33mA. This is achieved quite simply by means of the aerial loading condenser, C13. Previously, we have kept this at maximum capa-

(Continued on page 634)

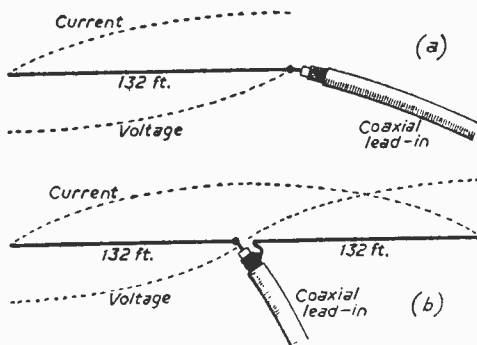
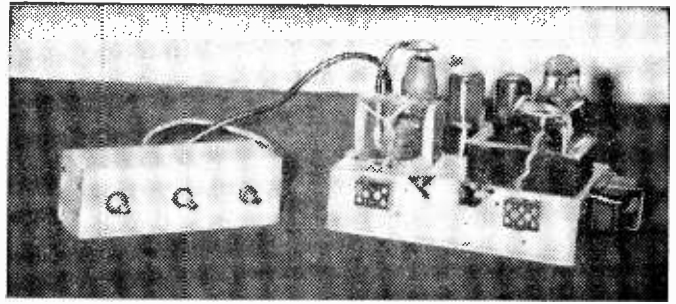


Fig. 7.—The end-fed quarter-wave (a) and the centre-fed dipole (b) aerials are very suitable if space is available.

Converting to Stereo

ADDING THE SECOND CHANNEL

By D. W. Easterling



The control unit and main amplifier.

THE equipment to be described was designed to provide at reasonable cost a second sound channel for an existing fairly expensive monaural hi-fi assembly. The original system consisted of a good quality crystal pick-up, feeding a comprehensive pre-amplifier/tone corrector unit, and main amplifier. For the reproduction of stereophonic recordings it was necessary to change the original monaural pick-up head for a suitable stereo type, and arrange the connections so that one signal (left) was fed through the original amplifier and loudspeaker chain, while the other signal (right) fed an additional second amplifier and loudspeaker system.

Circuitry

Although there is no reason why the stereo head, and system in general, cannot be used for playing monaural microgroove records, the original head, together with its associated pre-amplifier was a comprehensive affair containing steep-cut filters, etc., suitable for all types of record, including the

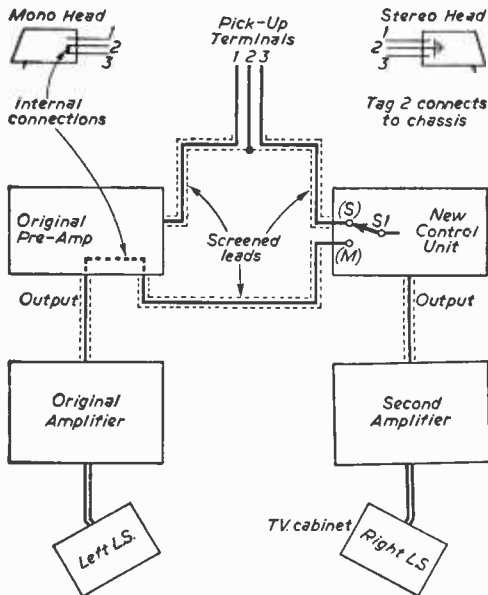


Fig. 1.—Block diagram of the arrangement of the amplifiers.

early 78's; consequently it was desirable that both amplifier and loudspeaker chains might be fed together from the original head and pre-amplifier when required.

In the case of the record player concerned (Philips Type AG2009), stereo and monaural heads are plug-in types, and freely interchangeable. Referring to Fig. 1 it will be seen that when the stereo head is in use, the "left" signal feeds, via terminal (1), to the original amplifier chain; while the "right" signal feeds, via terminal (3), to the new control unit, and amplifier chain. Without any switch changing, the above system is also suitable for monaural microgroove records.

When it is desired to use the comprehensive facilities of the original head and pre-amplifier, for the simultaneous reproduction of monaural records through both channels, switch S1 in the new control unit is moved to position (m); thus deriving its input from the output of the original pre-amplifier. Both channels are now fully controlled by the original pre-amplifier, but in addition, the new channel is still controlled by the new control unit to facilitate tone and volume balance between each channel. It should be noted that when the monaural head is used, the input to terminal (3) becomes dead due to the internal shorting strip in the head.

Amplifier Design

As crystal pick-ups usually have a greater output than magnetic types, an amplifier having only moderate gain may be employed.

It was found that in the interests of stability, low hum level, and ease of mounting in the cabinet, the control unit should be separate from the main amplifier. Details of the main amplifier are given first.

From Fig. 2 it will be seen that the amplifier circuit consists of a push-pull output stage driven by a single pentode voltage amplifier. Class A push-pull output enables a fairly small, and therefore a cheap output transformer to be used, while still maintaining a low value of distortion. Unlike most push-pull arrangements associated with sound reproducing equipment, it requires no special phase splitting valve stage or transformer.

Operation

The input signal is fed to the grid of valve V1, where it is amplified and passed via C3 to the grid of the first push-pull valve (V2). The output of V2 is developed across one half of the output

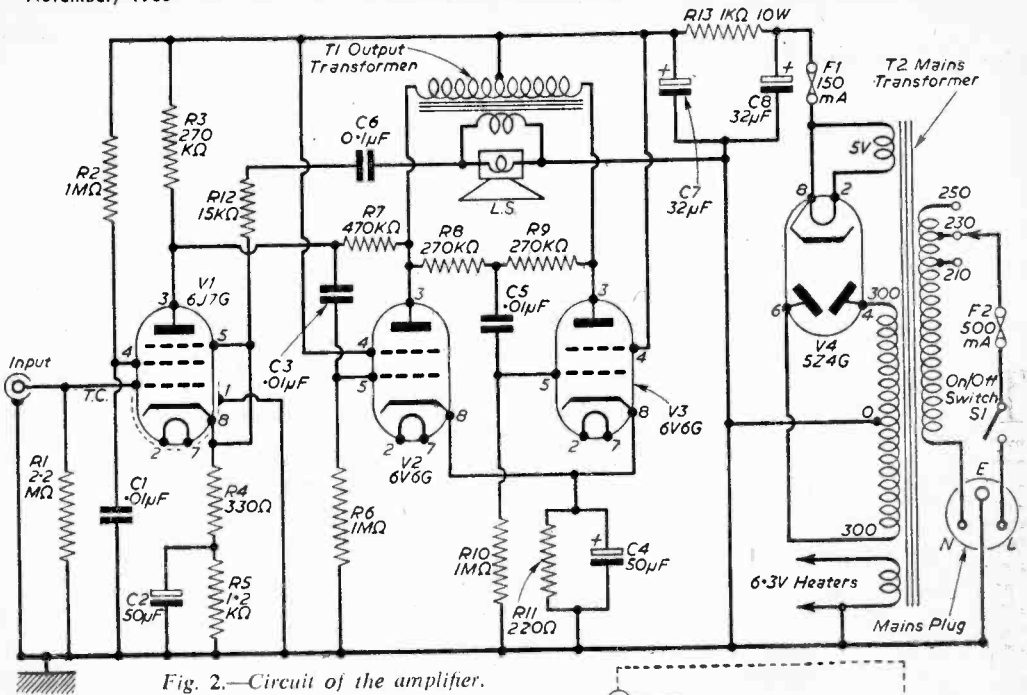


Fig. 2.—Circuit of the amplifier.

transformer in the usual way; but a second output is taken via R8 and C5 to the grid of V3; thus the phase reversal across V2 ensures that V3 is fed by a signal of the correct phase for push-pull operation. The output of V3 is developed across the second half of the output transformer primary; and again, a second output is taken via R9, back to the junction of R8/C5. The values of R8 and R9 are similar, and as the output signals of V2 and V3 are anti-phase, there is a tendency to cancel out. Complete cancellation cannot occur because any drop in the signal applied to V3 will

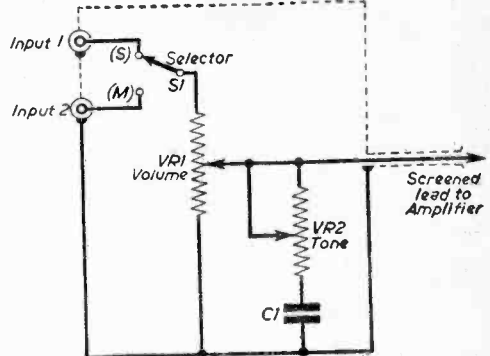


Fig. 3.—Control unit circuit. (VR1 and VR2 are 2M log pots; C1 is 0.01μF.)

unbalance the output circuit, causing a greater signal to be fed to its input. The circuit is, therefore, balanced, and the output signals of V2 and V3 will always be the same.

One advantage of the circuit just described is that a fair measure of negative feedback is automatically achieved. Further negative feedback is provided across V2 by resistor R7, and by the main loop from the secondary of T1, via C6 and R12, to the cathode of V1.

The power section of the circuit is conventional,

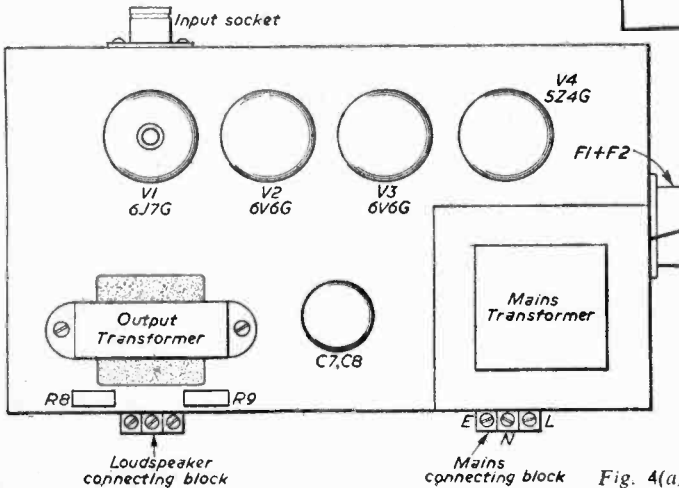


Fig. 4(a).—Above-chassis layout.

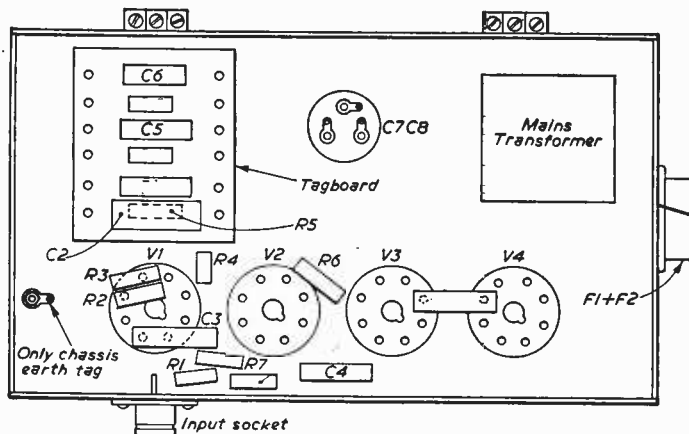


Fig. 4(b).—Underchassis layout.

consisting of a full wave rectifier system with resistor-capacitor smoothing. If the obtainable H.T. voltage is greater than 300, an additional resistor between F1 and R13 can be used with advantage. The mains transformer, besides providing a tapped H.T. supply to the rectifier, also supplies current for the amplifier valve heaters, and rectifier filament.

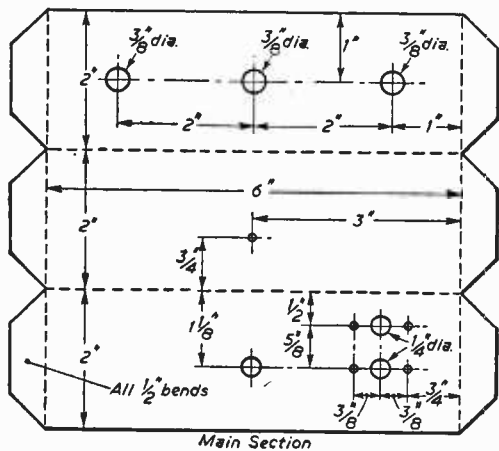


Fig. 5(a).—Drilling details of the control unit.

The control unit circuit, shown in Fig. 3, is simple, and contains three controls: selector S1, a single-pole changeover switch; VR1, volume control; and VR2, in conjunction with C1, acting as a simple "top cut" tone control. All are mounted in a metal box, and connected to the main amplifier by screened lead.

Construction

The main amplifier is mounted on a "U"-shaped chassis, the original dimensions being 8in. x 4 1/2in. x 2in. deep. The component layout is shown in

Figs. 4(a) and (b), but detailed dimensions are not given as these will vary according to the components used. Where the layout is varied, consideration should be given to keeping leads as short as possible. Incidentally, the mains switch (S1 in Fig. 2) was not fitted in the prototype, as this function is already provided in the original pre-amplifier.

Wiring is fairly straightforward, and should present no difficulties provided sufficient tags are available. The tagboard shown in Fig. 4(b) is very useful in this respect. For the prevention of hum it is best if the wiring is earthed to the chassis at only one point: near the input socket. It is also best if the leads carrying A.C. (such as heater and transformer wiring)

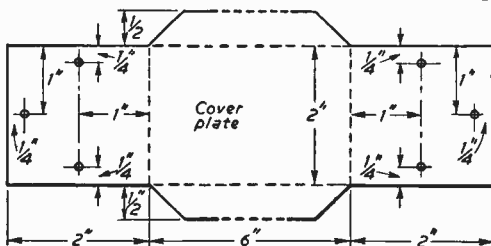


Fig. 5(b).—Control unit cover plate.

are twisted together. Earth and C6 connections to T1 secondary should give minimum gain, and can be left until the first test run.

The metal box containing the control unit is made in two parts from thin aluminium sheet, or tinplate. Templates for each section are illustrated in Figs. 5(a) and (b). The main section holds the controls.

(Continued on page 614)

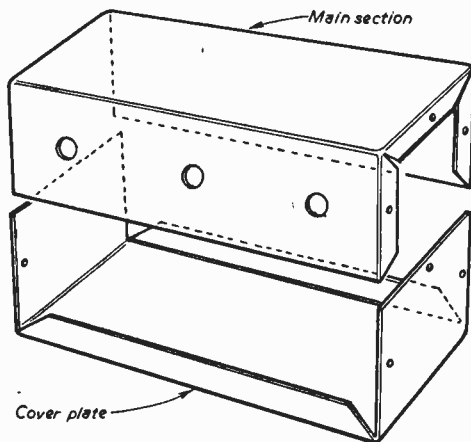


Fig. 6.—Assembly of the control unit box.



PORTABLE TRANSISTOR Record Player BARGAIN OFFER

- ★ 6v. operation (2E/R Type 800 Batts.)
- ★ 4 Latest G.E.C. Transistors
- ★ 1 watt Push Pull Output
- ★ Garrard Fidelity Gram. Unit



Size: 11 x 8 1/2 x 5 in.
Colour: 2 Tone Red/White with Polka Dot relief. Alternative Blue/Fawn with Polka Dot relief.

CABINET incl. Motor Board and 7 x 4 in. Speaker. £1.19.6. Carr. 2/6.
GARRARD BA1 Gram. Unit, 45 r.p.m., £2.19.6. Carr. 2/6.

RECORD PLAYER BARGAINS

All brand new latest 4-speed Models—fully guaranteed.

SINGLE PLAYERS—B.S.R. (TU9) with PUL-FI, P.U. 90/-, Collaro Junior with latest GP 57-12 Xial. 90/-, Garrard TA Mk.2 with GCS Head, £7.19.6; Garrard 4HF Transcription Unit, £13, carr. 3/6.

AUTO CHANGERS—B.S.R. (UAS), £6.19.6; UAS Stereo, £7.19.6; UA14, £7.19.6; Collaro Conquest, £7.19.6; Garrard RC121/4D Mk.2, 91 gms., carr. 4/6.

GARRARD ROM10 4-speed Autochanger Model with latest features and GCS Plug-in Head only 10 gms., carr. 4/6. This model just released.
R.M.I. 4-speed Single Player with Auto Stop-Start Dual Turnover Cartridge for Stereo and Monoaural L.P. and 78—Bargain Buy at £6.19.6, carr. 3/6.

RECORD PLAYER CABINETS

Contemporary styled, rexine covered cabinet, in two-tone fawn and brown, or mottled red with white polka dot. Size 18 1/2 x 13 1/2 x 8 1/2 in., fitted with all accessories, including baffle board and anodised metal fret. Space available for all modern amplifiers and autochangers, as above, etc. Uncut record player mounting board 14 x 12 in. supplied. Cabinet Price £23.0. Carr. and Ins. 8/6.



2 VALVE, 2 WATT AMPLIFIER

Two stage ECL82 with vol. and neg. feedback. Tone controls A.C. 200/250 v. with double-wound Mains controls. Complete with knobs, etc., ready wired to fit above cabinet, £2.17.6. P. & P. 1/6. 5in. Speaker and matching tone, 25/- P. & P. 1/6.

RECORDING TAPE BARGAINS

EMI 1st grade. Brand New sealed boxes.	Standard	Long Play
5in., 175ft. .. 7/-	250ft. .. 9/-	
5in., 600ft. .. 19/-	850ft. .. 25/-	
5 1/2in., 850ft. .. 25/-	1,200ft. .. 31/6	
7in., 1,200ft. .. 31/6	1,800ft. .. 45/-	

SPARE REELS: Emtape, new, boxed: 5in. 3/-, 5in. 3/8, 5 1/2in. 4/-, 7in. 4/6.

SPECIAL PURCHASE: Famous manufacturers, 1st grade tape, in sealed white boxes.
Standard Long Play
5in., 600ft. .. 15/- 850ft. .. 19/6
5 1/2in., 850ft. .. 18/6 1,300ft. .. 22/6
7in., 1,200ft. .. 21/- 1,800ft. .. 32/6
Plastic Tape Reels special offer. Manufacturers' surplus. 5in. 2/6, 5in. 3/-, 5 1/2in. 3/8, 7in. 3/6.

CRT. HTR. ISOLATION TRANSFORMERS

New Improved types, low capacity, small size and tag terminated, A.C. 200/250 v. Secondaries N11, +25%, +50% BOOST, for 2 v., 4 v., 6.3 v., 12.6 v. and 15 v. tubes. EA Type 12/6 each. P. & P. 1/6.

Complete RECORD PLAYER KIT

3 UNITS Bargain Price

£7.19.6 Carr. 4/-

Send for full details now

REDUCED PRICES	VALUES	ALL GUARANTEED
1T4 5/6	ECH42 10/8	EZ80 7/6
1R5, 153 7/6	ECL80 10/6	EZ81 7/6
384, 3V4 7/6	ECL82 10/6	6U4 9/-
5Z4 9/6	EF90 9/-	PCU34 9/6
6AP6 9/6	EF96 13/6	PCF80 9/6
6F96 9/6	EF91 5/-	PCL33 12/6
6K96 9/6	EL11 9/6	PL81 13/6
6L96 9/6	EL34 8/6	PL82 9/6
EABC80 8/6	EY35 10/6	P123 10/6
ECP50 9/6	EY38 10/-	U35 12/6

TRANSISTORS - BVA 1st GRADE

REDUCED PRICES			
Mazda	Mullard	GEC	
XA101 14/6	OC70 9/6	GET114 9/6	
XA102 16/6	OC71 12/6	GET15 12/6	
XA103 18/-	OC72 18/-		
XA104 19/-	OC41 25/6	Newmarket	
X1102 10/-	OC45 21/-	"Goldtop"	
XG101 10/6	OC16 49/6	V16/10P 15/-	

Germanium Diodes, OA70 2/9, GEX34 4/-, GD4 3/6

RE-GUNNED TV TUBES

New Reduced Prices
New Heater, Cathode and Gun Assembly fitted to all tubes. Reconditioned virtually as new. Now 12 months' guarantee to highest standards—as used by our own Service Dept.
12in. £5, 14in. £5.10.0, 17in. £6.
Mullard and Mazda types ex-stock Carr. and Ins. 10/-
10/- Part Exchange allowance on your old tube.

7 VALVE AM/FM RADIOGRAM CHASSIS

Valve Line-up: ECC85, ECH81, EF89, EABC80, EL84, EM81, EZ80.

Three Waveband and Switched Gram position. Med 200-500 m., Long 1,000-2,000 m., VHF/FM 88-95 Mc/s. Philips Continental Tuning insert with permeability tuning on FM and combined AM/FM IF transformers, 480 Kc/s and 10.7 Mc/s. Dust core tuning air coils. Latest circuitry including AVC and Neg. Feedback. Three watt output. Sensitivity and reproduction are of a very high standard. Chassis size 13 1/2 x 6 1/2 in. Height 7 1/2 in. Edge illuminated glass dial 1 1/2 x 3 1/2 in. Vertical pointer. Horizontal station names. Gold on brown background. A.C. 200/250 v. operation.

Aligned and tested ready for use. £13.10.0. Carr. & ins. 5/-

Complete with 4 Knobs—walnut or ivory to choice. Indoor FM aerial, 3/6 extra.
Three ohm P.M. speaker only required. Recommended quality speakers.
As previously announced, fresh supplies are now being received, but we regret some slight delay may be experienced in fulfilling orders for this popular item.



ONLY A FEW ITEMS ARE LISTED FROM OUR COMPREHENSIVE STOCK
WRITE NOW FOR FULL BARGAIN LISTS, 3d.

RADIO COMPONENT SPECIALISTS

70 Brigstock Road, Thornton Heath, Surrey

Terms: C.W.O. or C.O.D. post and packing up to 1/6. 7d.; 1 lb. 1/1; 3lb. 1/6; 5lb. 2/-; 10 lb. 2/9



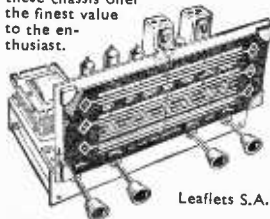
Phone: THO 2188. Hours 9 a.m.—6 p.m. 1 p.m. Wed. Open all day Saturday. By Thornton Heath Station.

KINGSMERE SUPPLIES LIMITED

Insured Post 1/-, over £2 Free. (Export extra.) MAIL ORDER HOUSE
Single valves, post 6d.

TERMS: Remit with Order or C.O.D.
Cash refund guarantee!

Built to the highest specifications, these chassis offer the finest value to the enthusiasts.



Leaflets S.A.E.

ALL BRITISH RADIOGRAM CHASSIS. 3 WAVEBANDS 5 MULLARD VALVES
E8B1, EF89, EBC81, EL84, EZ80
Brand new and guar. A.C. 200/250 v. Short - Medium - Long, Gram. P.U. High Q dust core coils. Latest circuit technique. AVC and neg. feedback. 4 x watts. Chassis size 13 1/2 x 6 x 7 1/2 in. Aligned and calibrated ready for use. Quality at Low Cost. Chassis isolated. H.P. Dep. £5 and five monthly of £1.

OUR PRICE £9.90



The Brilliantly Successful

Maranch

BRAND NEW AND BOXED
with Template
OUR PRICE POST FREE
£6.15.0

4 SPEED MODEL UA8

GARRARD 4-SPEED HIGH FIDELITY UNITS
Autochanger 121 Mk.11 £9.19.6 }
Single Player TA Mk.11 8 gns. } Price inc. plug-in. normal
Transcription 4 HF 17 gns. } Stereo hds. £2 ex.

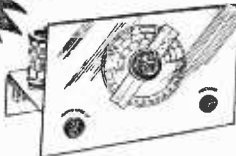
Matched Speakers, 5in., 6 1/2in., 8in., 17/6 ea. 10in. 25/-

BRAND NEW		VALVES		Matched Pairs 1/- extra		PLASTIC RECORDING TAPE							
0Z4	6/-	6BA6	7/6	6SJ7M	6/6	DF96	8/6	EL41	9/6	PCL82	11/6	7in. reel, 1,800ft. 32/6	7in. reel, 1,200ft 21/-
IR5	7/6	6BE6	7/6	6SN7GT	6/6	DK96	8/6	EL84	8/6	PY80	7/6	5 1/2in. reel, 1,200ft. 22/6	5 1/2in. reel, 850ft. 17/6
IS5	7/-	6C4	5/-	6U5G	7/6	DL96	8/6	EM81	9/6	PY81	9/6	5in. reel, 850ft. 19/6	5in. reel, 600ft. 15/-
IT4	6/-	6D6	6/-	6V6G	6/6	EABC80	8/6	EY51	9/6	PY82	7/6	3in. reel, 225ft. 7/6	
2X2	3/6	6F6G	7/6	6X5G	6/-	EB91	5/6	EY86	10/-	PY83	9/6	Spare Plastic reels all sizes	3/-
3Q5	9/-	6G6	5/6	12A7	8/-	EBC41	8/6	EZ40	7/6	QP25	7/6	"Instant" Bulk Tape Eraser and Head De-	
3S4	7/6	6H6	3/6	12AU7	7/6	EBF80	10/-	EZ80	7/-	R3	9/-	fluxer, 200/250 v. A.C., 27/6. Leaflet, S.A.E.	
3V4	7/6	6J5	5/6	12AX7	7/6	ECC84	9/6	E1148	1/6	SP81	3/6		
SU4	7/6	6J6	5/6	12K7GT	6/6	ECH40	10/6	HABC80		UF41	9/-		
5Y3G	7/6	6J7G	6/6	12Q7GT	6/6	ECL80	10/6		12/6	UL41	9/6	SETS OF VALVES	
5Z4G	9/6	6K6GT	6/6	25Y5G	9/6	ECL82	10/6	HVR2A	6/-	UY41	7/6	24/6	IRS, IT4, IS5, 3S4 or 3V4.
6AC7	5/-	6K7G	5/-	35L6	9/6	EF39	5/6	KT33C	10/-	UJ22	8/-	29/6	DK96, DF96, DAF96, DL96.
6AG5	5/-	6K7M	7/6	35Z4	7/6	EF41	9/6	MU14	9/-	VP23	6/6	39/6	6K8, 6K7, 6Q7, 6V6, 5Z4 or 6X5.
6AL5	5/6	6K8G	7/6	807	5/6	EF80	7/6	P61	3/6	U76	6/6	39/6	ECH42, EF41, EBC41, EL41, EZ40.
6AM6	5/6	6N7M	6/6	954	1/6	EF91	5/-	PC84	9/6	VR105/30	9/-	39/6	ECH81, EF89, EBC81, EL84, EZ80.
6AT6	7/6	6Q7G	7/6	956	2/6	EF92	5/-	PCF80	9/6			39/6	12K8, 12K7, 12Q7, 35L6, 35Z4.
6BB8G	5/-	6SA7M	6/-	DAF96	8/6	EL32	5/-					39/6	UCH42, UF41, UBC41, UL41, UY41, UCH81, UF89, UBC81, UL84, UY85.

25 FOAMCOURT WAY, FERRING, WORTHING, SUSSEX

CONSTRUCTORS CORNER

Construction price includes valve and one coil covering 40-100 m.
● Can be converted to 2v. or 3v.
● Receives speech and music clearly from all over the world.
Send 2/- for diagram and price list.



Explore the world on short-wave radio (10-100m)
FOR ONLY 35/-

SENSATIONAL RESULTS WITH 2 TRANSISTORS

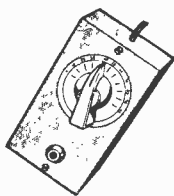
- ★ No aerial or earth.
- ★ Dial tuning with mini .0005.
- ★ Drilled chassis, colour coded components, simple layout for beginners.
- ★ Special small case fits shirt pocket.
- ★ Soldering iron and pliers are only tools needed.



Finest results ever obtained with 2 transistors and diode layout. The ideal radio to carry with you everywhere.
PARTS, PRICE LIST & EASY LAYOUT PLANS, 2/-. Total building cost, including transistors, wire, etc. **62/6**

YOU CAN NOW BUILD THE R.C.S. TAPE TUNER

Will operate on all types of Recorder. Size 3 1/2 x 1 1/2 x 1 in. High impedance output, variable med. wave tuning, Triple wound Super-Hi-Q coil. Easily constructed from full instruction data and Layout Diagrams. Chassis and components colour coded.



All parts to Build. Post 1/6.

30/-

CRYSTAL RECEIVER

Covers M/W Band

All components including case for **12/6**

Ideal for the beginner

BUILD THIS AMAZING RADIO

POWERFUL! PERSONAL PORTABLE

- ★ Sturdy metal case.
 - ★ No holes to drill.
 - ★ Detachable rod aerial
 - ★ All batteries self contained
 - ★ Can be built in 1 hour
 - ★ Covers medium waves
 - ★ Loud clear tone.
 - ★ Selective tuning.
 - ★ All parts are sold separately.
- This delightful set is designed to give you a completely personal portable radio. Bronze-finished case. Ideal for the beach, the bedroom, the office—in fact anywhere.
Send 2/- for wiring diagram and component price list.

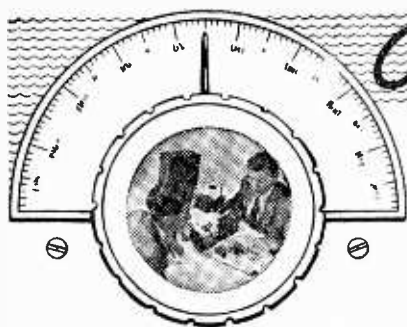


FOR ONLY 35/-

Post and packing: Under 10/- add 9d.; under 40/- add 1/6; over POST FREE

Trade Enquiries Welcomed

R.C.S. PRODUCTS (RADIO) LTD. 11 OLIVER RD., LONDON E.17 Mail Order Only



On Your Wavelength

BY THERMION

V.H.F. Reception

WHEN the BBC first introduced its V.H.F. service, it was emphasised that the service was intended purely for local reception and that medium waves would still have to be used when long distance reception of other than local BBC programmes was required. However, it seems that the V.H.F. transmitters are more effective than was prophesied for I am continually hearing of instances of long distance reception of F.M. The other day, in fact, I was visiting friends in the Midlands and although about 120 miles from the transmitter, reception of Wrotham was possible without any complicated circuitry. The results obtained were very satisfactory and, of course, the fidelity of the programmes was far better than those transmitted from the local station. As many readers will know, the cables to the Wrotham transmitter are specially designed to reduce the loss in quality which normally occurs when long land-lines are used. The cables are said to give extremely good results up to about 10kc/s—a higher figure than is possible on the land-lines from, say, London to Manchester. Although it is hoped eventually to improve the land-lines linking the BBC in London to the other BBC centres, it will probably be some time before the standard compares with the results from Wrotham.

Considering that so much was claimed when V.H.F. first started, it often seems to me that the service falls short of the standard required. I admit that it has proved a reliable service where previously none existed or where there was overwhelming foreign interference; in many areas, V.H.F. gives results which could only be obtained by such a method of transmission, but now the service has become well established, it is surely time to improve the fidelity of the broadcasts, so that all programmes compare with the technical standard of a long-playing gramophone record. At present, so far as I can tell, the only transmissions which approach this standard are those from Wrotham, and then only when they are of local origin.

From my own point of view therefore, if I had to live away from Wrotham, I should certainly investigate the possibility of building a radio capable of receiving transmissions from this station. Provided that a very efficient aerial is employed, reception should be possible in many areas remote from the official service area.

Our "Pocket Superhet"

By the time you read this, you will probably have examined your free copy of the blueprint of the P.W.

"Pocket Superhet" which has been given away free with each copy of this issue. Midget transistorised receivers are currently very popular and it was their growing popularity that prompted the design of this pocket-sized set. I have followed the development of the set from its inception and can vouch for its excellent performance. One of the features which I found particularly attractive was the plastic cabinet which adds to the "finish" of the completed receiver. This cabinet is the subject of a special gift offer and by using the coupon on page 638 of this issue, readers may obtain it for only 6s. 6d. If this cabinet is employed, no criticism will be made that the final result looks unprofessional. With the free blueprint, the construction of the receiver is made very easy and I am sure that many readers who would otherwise not attempt the construction will be able to proceed with confidence.

Our "Olympic" TV Receiver

Many of you will no doubt know already that in the October issue of our companion journal *Practical Television* the first article appears on the construction of a television set. This design has taken several months to prepare and is definitely well worth building. The circuit contains several unusual features but to my mind, one of the most sensible of them is the careful attention to stability in the tuned circuits and timebases. This means that no adjustment is necessary to either "hold" control or to the Band III oscillator circuit—in fact, there is no "fine tuning" control. The October issue of *Practical Television* also contains a free blueprint of the wiring of the "Olympic".

FRIDAY, JANUARY 13th, 1961

A FILM SHOW

(in collaboration with Mullard Ltd.)

CAXTON HALL, WESTMINSTER

at 7-30 p.m.

Send for your free tickets now marking your envelope "Caxton Hall" in the top, left-hand corner and enclosing a stamped addressed envelope (at least 3½ in. x 6 in.) for the tickets.

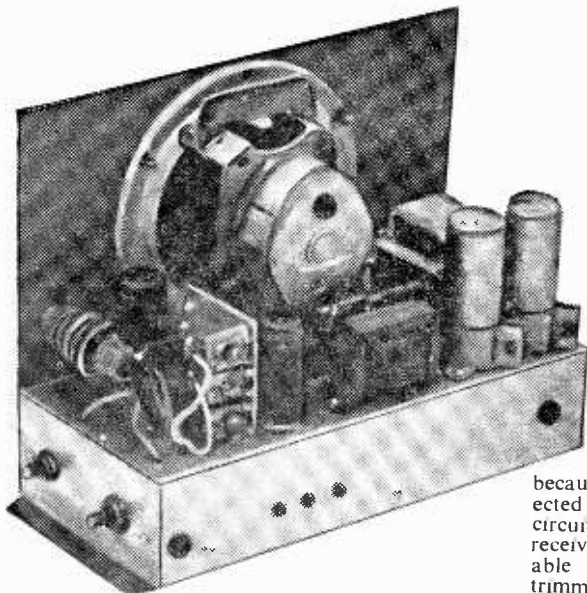
The films to be shown will be announced later, but, as in previous years, the programme will be arranged to appeal to all who are interested in radio.

The demand for tickets will be great; order yours NOW.

A Midget T.R.F. Receiver

SWITCHED TUNING
FOR THE BEGINNER

By J. Smith



Circuit

The circuit is given in Fig. 1. Switched tuning to receive three transmissions is employed, so saving the cost of a ganged capacitor tuning drive and scale; it also enables the best use to be made of the selectivity of the two tuned circuits because tracking errors are avoided and the selected transmissions can be tuned "spot on" in each circuit. The selectivity obtainable is good enough to receive satisfactorily any transmission of reasonable strength, even after dark. Postage stamp trimmers of 50pF capacity are used for tuning, with fixed capacitors as required in parallel.

R.F. Stage

The R.F. amplifier. V1 is a high gain vari- μ pentode, EF92, and the gain of the stage is controlled by variation of the cathode bias in the usual way. Variable resistor VR is so connected that the aerial coil, L1 is short-circuited when the control is at minimum, so enabling the volume to be reduced to zero. The mains switch is incorporated in this control.

ALTHOUGH simple and economical in design and construction, this is a serviceable and efficient set for domestic use. The valves employed are of the modern, all glass, type but are available at present at less than 5s. each. Despite its small size, there is room in the chassis for components of standard size and the constructor will be able to make use of such parts as he has available, provided only that they are suitable electronically.

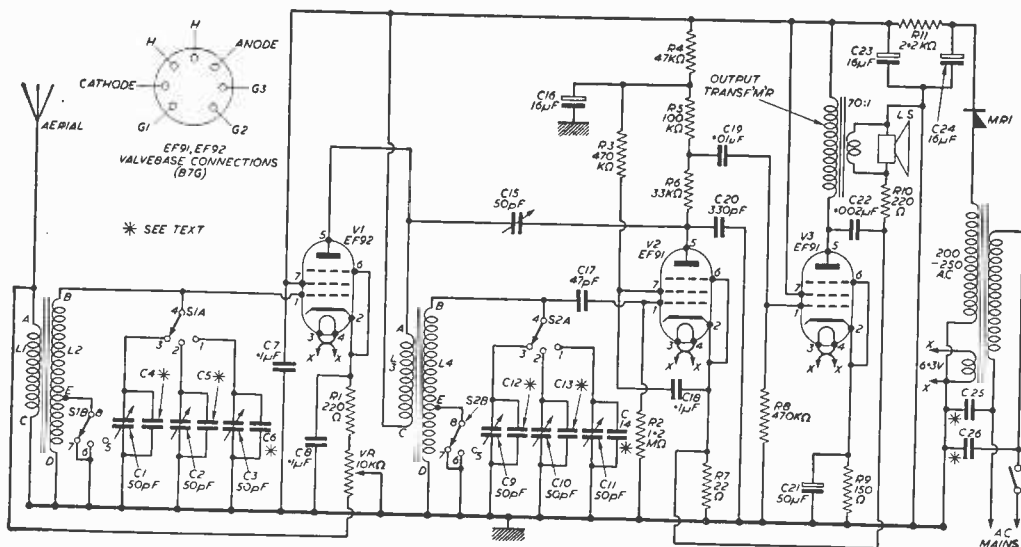


Fig. 1.—The circuit diagram.

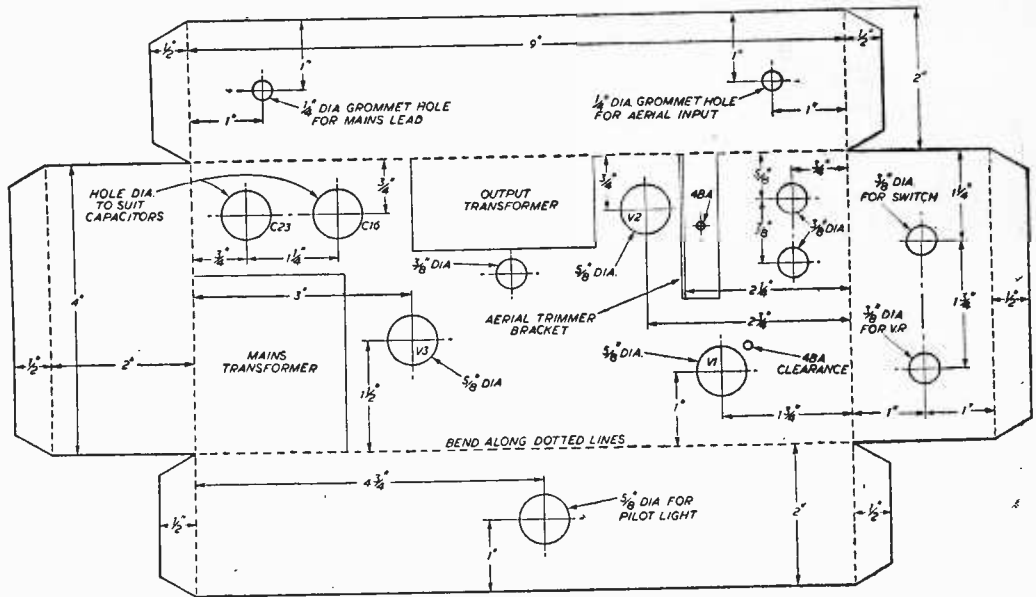


Fig. 2(a).—Plan of the chassis.

Detector

A high gain R.F. pentode, EF91, is used as a leaky grid detector and in the interests of quality, the grid leak and capacitor are 1.2M and 47pF respectively. The grid leak damps the tuned circuit somewhat but the resultant loss of selectivity is recovered by reaction, applied via the postage stamp trimmer C15. The capacitor C20 provides a path to earth for R.F. currents in the anode circuit and R6 encourages them to take this route. The load resistor is R5, while R4 and C16 provide decoupling and additional smoothing.

Note that the screen of V2 is decoupled to cathode to avoid the degeneration through the feedback resistor, R7, which would occur if the screen were decoupled to earth.

Output Stage

The signal from V2 is transferred via C19 to the grid of V3 which is also an EF91. Although it is properly an R.F. amplifier, it functions well in this position and having only a modest current requirement of some 12mA, it enables the power supply to be reduced in both bulk and cost. Of course, it cannot be expected to produce a large undistorted output but there is adequate volume for ordinary listening. For the usual 3Ω speaker the

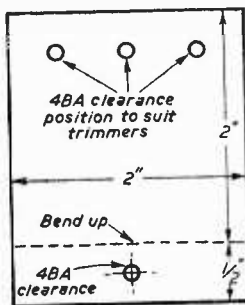


Fig. 2(b).—Aerial trimmer bracket.

output transformer should have a ratio of 70 or 80:1 and a reasonably high primary inductance. The cathode bias resistor is 150Ω and it is essential that C21 should not be less than 50μF if it is to have any worthwhile by-passing effect on such a low resistance.

Negative Feedback

It will be seen that there are two negative feedback paths. One from the anode of V3, via C22, is at R.F. and provides heavy feedback to the cathode of V2. The EF91 is a very efficient amplifier of R.F. and this arrangement is necessary so that any R.F. signals reaching its grid from V2 anode are reduced so as to be insignificant. The second feedback path from the secondary of the output transformer to V2 cathode, is at A.F.. It reduces the residual hum and improves the quality of reproduction; it also avoids having to include in V3 anode circuit the resistance/capacity network commonly used with pentode output valves to restrict output at the higher frequencies.

Power Supply

The power requirement is 200/250V at 20mA and 6.3V at 1A, which can be supplied quite easily by a small mains transformer of the type used in television converters, etc. A contact-cooled rectifier is used and smoothing is provided by R11 in conjunction with C23 and C24. The value of R11 must be such that the H.T. line voltage is not less than 170 and it may need to be adjusted according to the output obtainable from the transformer. If R11 is reduced below 1.5k, it will probably be desirable to increase the capacity of C23 or C24 or both to maintain good smoothing.

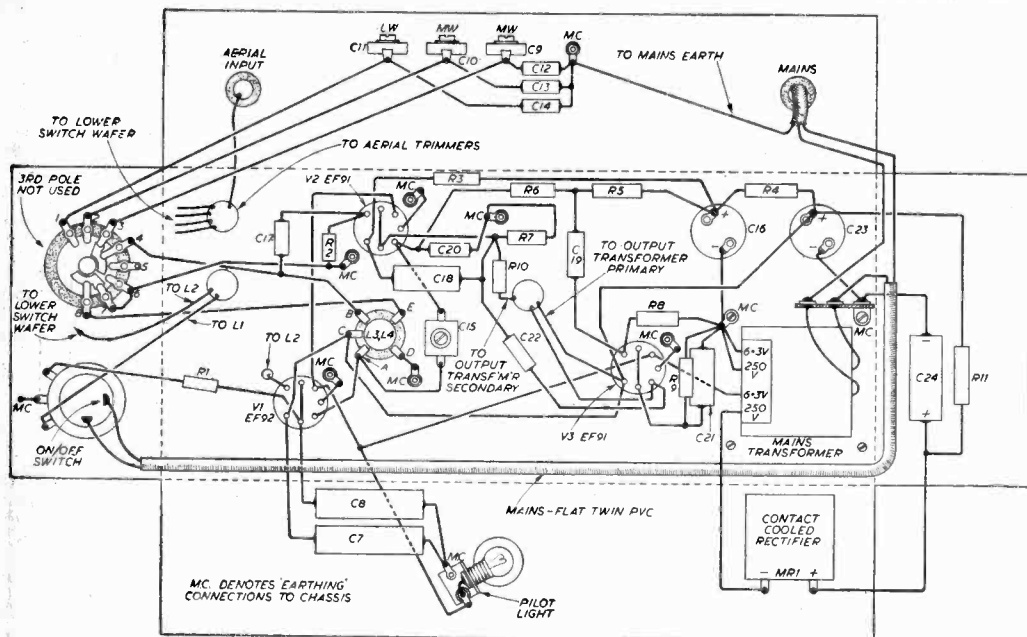


Fig. 3.—The underchassis wiring.

each may safely be doubled. As a guide, the prototype uses a transformer with a nominal 200V secondary and on a 240V supply, R11 is 2.3k (2-4.7k resistors in parallel). The power consumption of the set on 240V mains is less than 20W.

Operation

The aerial required will depend to some extent on local reception conditions but about 20ft of

wire will usually be ample for good reception and a good signal/noise ratio. The tuning of the R.F. grid circuit is affected by the aerial capacity in the usual way and the trimmers should be adjusted finally with the set connected to the aerial with which it is to be used. An earth is not necessary but electrical interference will be greatly reduced if the chassis is connected to mains earth at a three-pin outlet via a three-core flexible mains lead. In good reception areas, the set will give good results as a portable with about 4ft of wire as an aerial. In this case, the full range of control of VR will probably not be required and some increase in sensitivity and selectivity may be obtained by omitting the connection between the bottom of VR and the top of L1.

Components

The coils may be any dual-range T.R.F. pair and if the detector coil has a reaction winding, this may be used if desired instead of the arrangement shown in Fig. 1. The Q of the coils is not very important as the set relies for its sensitivity on the high gain of the valves. The tuning switch is a 2-bank, 3-pole, 3-way Yaxley type and it must be modified slightly by fitting a screen between the two wafers. The screen should be of light aluminium, 1½ in. square, having a ½ in. hole in the centre for the switch spindle and two 4B.A. clearance holes to suit the switch bolts. Remove the outer wafer from the switch, fit the screen and then one or two washers on each bolt to provide a clearance between the screen and the outer wafer, which should then be replaced. All the resistors can be ¼W except R11 (1W) and because the H.T. comes on through the metal

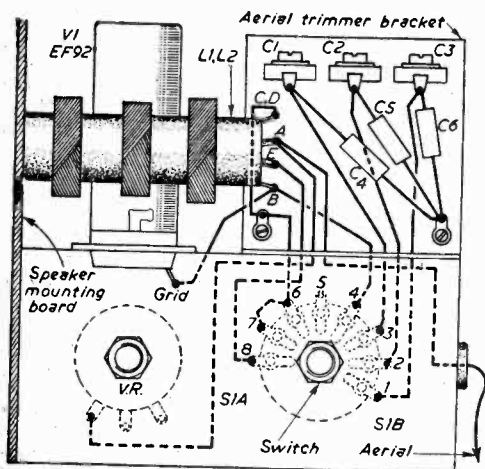


Fig. 4.—End elevation showing the R.F. grid wiring.

rectifier before the valves are warmed up and ready to receive it, all the capacitors, except C21, must be rated for not less than 350V working.

Construction

The receiver is easily and conveniently constructed on a chassis of 18s.w.g. aluminium, 9in. x 4in. x 2in., a plan of which is given in Fig. 2(a). The cut-outs and fixing holes for the mains and output transformers and for the coils, are not shown in the plan as they will depend on the components used in each case. The layout is not at all important except that, to ensure stability, all the wiring and components in V1 grid circuit must be above the chassis and those in V2 grid circuit, below. Note that the lead from V1 grid passes through the chassis immediately it leaves the grid.

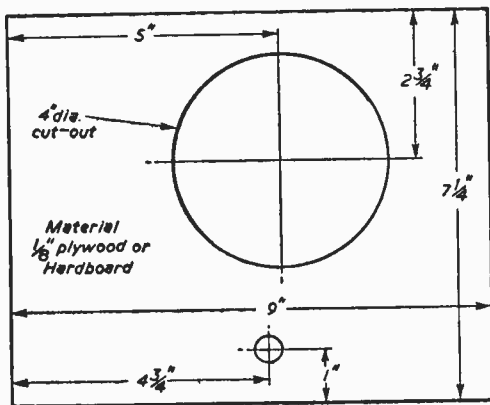


Fig. 5.—The speaker mounting board.

The wiring is shown in detail in Figs. 3 and 4. In these drawings, the wiring and components have been opened out for clarity so that some of the connections appear much longer than they really are; in construction, they should be made no longer than necessary. Tinned copper wire of 22s.w.g. is suitable for wiring and lengths of more than an inch or so should be covered with sleeving. A convenient order of assembly is, first to fit the valve holders, then transformer, smoothing capacitors and speaker in that order. The chassis can then be stood firmly upside down on the bench for wiring up. The 5in. speaker is fitted integral with the chassis as shown in the illustration, as this simplifies the construction of the cabinet. A piece of 1/8in. ply or hardboard, 9in. x 7 1/4in. is required as a mounting board, with cut-outs for speaker and pilot light as shown in Fig. 5. This is bolted to the front of the chassis at three points and unless the speaker is a light one, it must be supported by a stay or bracket at the rear so that it is quite firm. The capacitors, C4, 5, 6, 12, 13 and 14 may not all be required. They should be omitted when wiring up, the trimmers only being fitted.

Switch Wiring

The wiring of the two wafers is identical. When the switch is fitted in the chassis, its connections

are not very accessible and it is well to solder some lengths of wire to the appropriate tags beforehand. Identification of the connections afterwards will be facilitated if wire or sleeving of several different colours is used.

Testing

When the wiring is complete and before switching on, a check should be made with a meter between the "hot" end of R11 and the chassis to see that there are no shorts in the H.T. circuits. The set can then be switched on, the H.T. line voltage checked and the value of R11 adjusted if necessary. If with C15 at minimum, there is A.F. instability, the connections to the output transformer primary should be reversed so that the feedback becomes negative.

MIDGET T.R.F. RECEIVER COMPONENTS LIST

Resistors (1/4W)

- R1 220Ω
- R2 1.2M
- R3 470k
- R4 47k
- R5 100k
- R6 33k
- R7 22Ω
- R8 470k
- R9 150Ω
- R10 220Ω

Resistors (1W)

- R11 2.2k

Variable Resistor

- VR 10k with switch.

Capacitors

- C1, 2, 3, 9, 10, 11 and 15. 50pF (max.) trimmers.
- C4, 5, 6, 12, 13, 14—values as required (see text next month).
- C7 0.1μF.
- C8 0.1μF.
- C16 16μF, 350V electrolytic.
- C17 47pF.
- C18 0.1μF.
- C19 0.01μF.
- C20 330pF.
- C21 50μF, 25V electrolytic.
- C22 0.002μF.
- C23 16μF, 350V electrolytic.
- C24 16μF, 350V electrolytic.

Coils

- Any T.R.F. dual range pair.

Valves

- V1 EF92, B7G base and screen.
- V2 EF91, B7G base and screen.
- V3 EF91, B7G base.

Switch

- Yaxley type, 2-bank, 3-pole, 3-way.

(Note:—Capacitors C25 and C26 may be included if their presence reduces interference; their working voltage should be 350 A.C.)

(To be continued)

Practical Wireless

POCKET SUPERHET

CONSTRUCTIONAL DETAILS OF OUR FREE BLUEPRINT RECEIVER

THE outside dimensions of this receiver are approximately 5½ in. x 3½ in. x 1½ in., so that it is of small size but not so extremely cramped that construction is abnormally difficult. A superhet circuit is used, tuning both long and medium waves, with a self-contained ferrite rod aerial, with this type of circuit quite a reasonable selection of stations can be received. Running costs are small, current consumption being about 7mA with no signal, or at low volume, and rising to about 15mA or so when receiving an average programme at normal volume.

Operation

The circuit is shown in the blueprint, and brief details of its working may be of use to constructors who are not familiar with this type of receiver. The rod aerial has two tuned windings, the long wave section being shorted out, for medium wave reception. Coupling to the first transistor base is by means of a coupling winding and tapping on the L.W. coil, and this avoids the additional switching often used in this part of the circuit, when separate coupling windings are provided. The aerial windings are tuned by the 208pF section of the gang condenser.

A single oscillator coil is used with the first transistor, a 180pF fixed condenser being brought across the tuned section, for L.W. reception. By this means the single oscillator coil allows both M.W. and L.W. tuning.

The output from the first transistor, which operates as frequency changer, is amplified by two intermediate frequency stages. This provides a good measure of sensitivity. These two stages are neutralised by means of the two resistors and condensers wired to the I.F. transformers and base circuits.

Detector

A crystal diode acts as detector, the audio output being developed across the 10k potentiometer, which serves as volume control. Part of the rectified voltage is fed back as bias to the first I.F. stage, to provide a degree of automatic volume control.

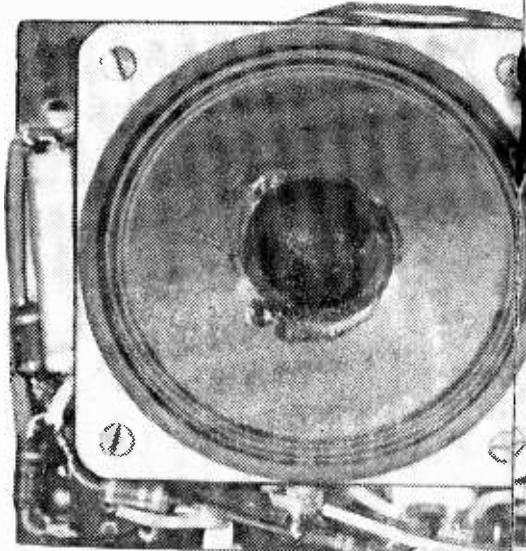
The audio signal obtained from the slider of the volume control is applied to the first audio frequency transistor, which acts as driver for a pair of transistors in push-pull. This type of output stage is most economical in current drain, for the power obtained, and will give adequate output for the loudspeaker.

Most of the other resistors are associated with circuits which provide suitable emitter and base voltages for the transistors, and the values shown should be followed. The small capacity condensers, used in frequency changer and I.F. stages, are also fairly critical, and should not be modified. The larger condensers, however (that is, of 0.04μF

and larger), are used for by-pass purposes, and this means that the values are not critical. The values given are the lowest capacities that it is wise to employ. As a result, the actual condensers are small. But this does not mean that larger capacities may not be used, either because they are to hand, or can be more readily obtained. Provided they are of small size, 0.05μF or 0.1μF condensers will be satisfactory.

Chassis Drilling

The chassis is 1½ in. thick or similar paxolin. 3 in. x 5½ in. A piece about 2½ in. x 1½ in. is cut out, to accommodate the speaker magnet in the position shown in the blueprint. A small piece, about 1½ in. x ½ in., is required to carry the output transformer. The paxolin can be cut easily with a metal saw or any other saw with small teeth. It should be checked that the speaker will fit easily, and the paxolin may be filed a little to clear the cone surround, if this is necessary. The four corner holes of the speaker are then used as a guide to marking 6B.A. clearance holes on the paxolin. The tuning condenser should now be positioned, and a clearance hole drilled for the spindle and ball-bearing projection. Short bolts in the tapped front plate of the condenser secure it to the paxolin. Drilling positions for these bolts may most easily be marked by pressing a piece of paper upon the front



The compact layout of the receiver

plate of the condenser, and using the indentations formed as drilling positions.

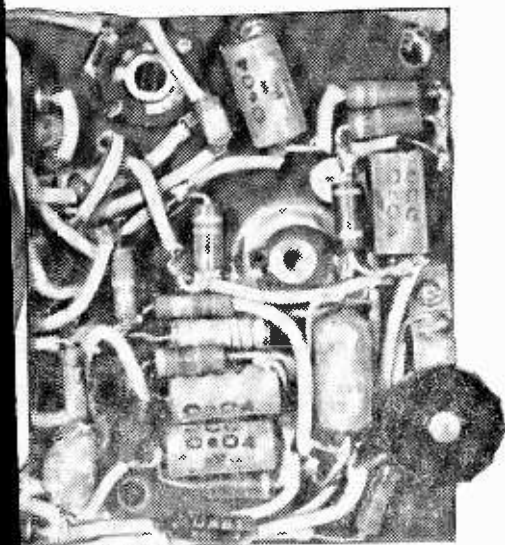
Mounting the Volume Control

The volume control is mounted on a $\frac{1}{2}$ in. long 8B.A. countersunk headed bolt, so that it comes centrally in the aperture in the case. The aperture may need widening slightly, with a fine file. The volume control may also fit better if a slight indentation is cut in the case, to receive the bolt head. This must, of course, be very shallow, to avoid penetrating the front of the case.

The volume control is spaced from the chassis by using extra nuts on the 8B.A. bolt, as shown. The height of the control is adjusted, by this means, until it fits correctly in the aperture in the case. To prevent the body of the control rotating, a small projection passes through a hole in the metal strip, and this strip is bolted to the chassis by a short 8B.A. bolt. The bolts and metal strip, electrically common to the centre of the control, form the slider connection, so the nuts must not touch the battery leads or tags, or other metal parts.

Volume control connections are clearly shown. The strip is filed to clear the small tags, and thin flexible leads should be soldered to these before finally mounting the control. These leads may be coloured for identification—red for battery positive, green for 0.01 μ F condenser connection, and a bare wire for the condenser frame (or earth) circuit.

The chassis, with tuning condenser, volume control and speaker, should now be placed in the case. A 6B.A. clearance hole, for the wavechange switch operating level, must now be drilled through paxolin chassis and the front of the case. The drill should be kept vertical, so that the two holes will coincide. The hole is $1\frac{1}{4}$ in. from the end of the chassis, and just sufficiently far from the edge of the wavechange switch wafer to clear the case.



er may be clearly seen here.

The Wavechange Switch

The wavechange switch operating spindle consists of a 6B.A. bolt, $\frac{1}{4}$ in. long, with half its length filed flat so that it will pass inside the rotating section of the switch wafer. A nut should be placed on the bolt before filing, so that the threads can be cleared by removing the nut. A small operating lever, cut from brass, is drilled to take the bolt, and soldered to the bolt head. A 6B.A. washer is then put on the bolt, and this is threaded through the case. A further washer is added, and two half nuts, locked together. The lever must be small, and so positioned that it does not touch the tuning dial.

The switch can be set into three positions, but only two are required. To avoid a switch position which would give no reception, but leave the battery on, two tags are wired together. As a result, turning the switch lever fully one way or the other gives L.W. or M.W. reception, as required.

When it is found that the tuning condenser, volume control, wavechange switch and speaker fits correctly, the chassis is removed from the case. The speaker, gang condenser, switch wafer, and volume control should also be set aside, so that they are not damaged while drilling the other holes.

Oscillator Coil and I.F. Transformers

The positions for the oscillator coil and I.F. transformers will be seen in the chassis diagrams on the blueprint. The oscillator coil has six pins, and six clearance holes are drilled for these. A red dot is placed between pins 1 and 6. Small holes are also needed for the can tags. After drilling for each transformer, and the oscillator coil, these parts should be set aside until the remaining drilling is finished. Each I.F. transformer has five pins, the space coming between pins 1 and 5. Pins 4 are not used, but must not touch other leads, etc. A blue spot distinguishes the third I.F. transformer from the others, which are marked with white spots.

The driver transformer has two projecting lugs. One passes through a slot made by drilling small holes close together, and the other clips round the edge of the chassis. The output transformer is mounted on its strip by passing its lugs through holes. Notches need filing in this strip, to clear the speech coil tags of the speaker.

Components and Wiring

The tuning condenser is bolted in place, a tag under one bolt head forming the "frame" connection. The oscillator coil and I.F. transformers are inserted, and the tags of the screening cans bent out to hold them. One tag on each can is cut short. The others are left projecting slightly, and are all wired together, and to the earth line. The speaker is not fixed until other wiring is finished.

Note: All the diagrams — circuit, wiring, etc. — associated with this receiver appear on the blueprint given away with this issue. Continual reference to the blueprint is essential when constructing the receiver and reading the text.

Soldering

A soldering iron with a small bit is necessary for wiring up. The ends of many condensers and resistors have to be cut very short, and the iron should not be applied to any joint longer than is required to obtain a good connection. The transistors are only added as wiring progresses, and particular care is needed when soldering these, as prolonged heating may cause damage. Each transistor can have $\frac{1}{2}$ in. lengths of insulated sleeving threaded on collector and emitter leads before the leads are passed through the chassis. The base leads can be left bare here, but must be insulated on the other side of the chassis. No attempt is made to cut the leads from the transistors as short as possible. They should, in fact, be left fairly long, even where this means that the connection will form a loop. Exceptional care in soldering is not then required, but the iron should not be kept in contact with any transistor lead longer than three or four seconds. A good joint can usually be made in less than this. The same care is wise when connecting the OA81 diode. Long heating of condensers, resistors, transformer and coil pins should also be avoided.

Rear of Chassis

The aerial is best left until other wiring has been carried out, and details are given later. The rod is to be mounted on the rear side of the chassis, however. This is done by taking two rubber grommets which are a push fit on the rod, and cutting two slots in pieces of paxolin $\frac{1}{2}$ in. x 1 in. to fit. Two small brackets are bolted to the paxolin pieces, and to the chassis. The rubber grommets, with the rod, may then be pushed into the slots.

Two tags of the twin 60pF trimmer are soldered to one bracket, as shown in the blueprint, this point going to the earth line. One trimmer is wired to the rear fixed plates tag of the gang condenser, as

shown, the 250pF fixed condenser also being soldered to this tag. The other trimmer is taken to the wavechange switch, and "switch" tags of the rod windings, as also shown.

The 470 Ω resistor is soldered directly across the 32 μ F condenser, and the condenser leads pass straight down through small holes. With all the electrolytic condensers, the polarity shown must be observed. Where no other markings are given on the actual components, the plain end of the can is negative, and the lead at the ridged end of the can is positive.

It will be seen that some of the transistor connections pass directly to the driver and output transformer. These leads should be covered throughout their length with insulated sleeving. With the output transistors, both emitter leads pass together through a single hole, to the 5 Ω resistor.

The Front of the Chassis

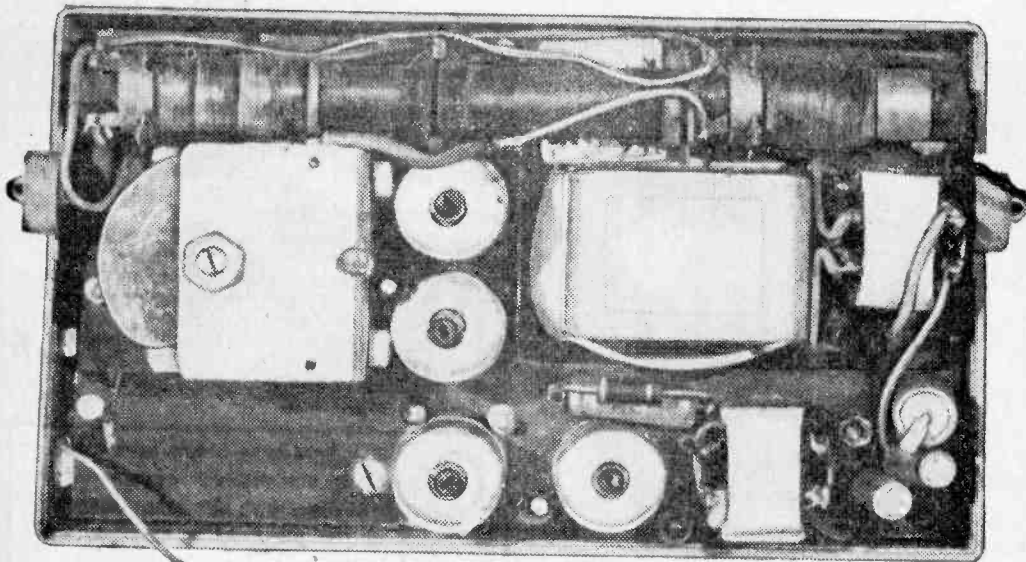
Most of the small components are on the front side of the chassis. A little extra space has been left between components in the wiring diagram so that connections can be followed more easily.

Soldered joints to the oscillator coil and I.F. transformer pins should be made fairly quickly, so that heat will not loosen internal connections. The three fixed condensers, which appear in the circuit in parallel with the I.F. transformer primary windings, are included in the cans, ready connected.

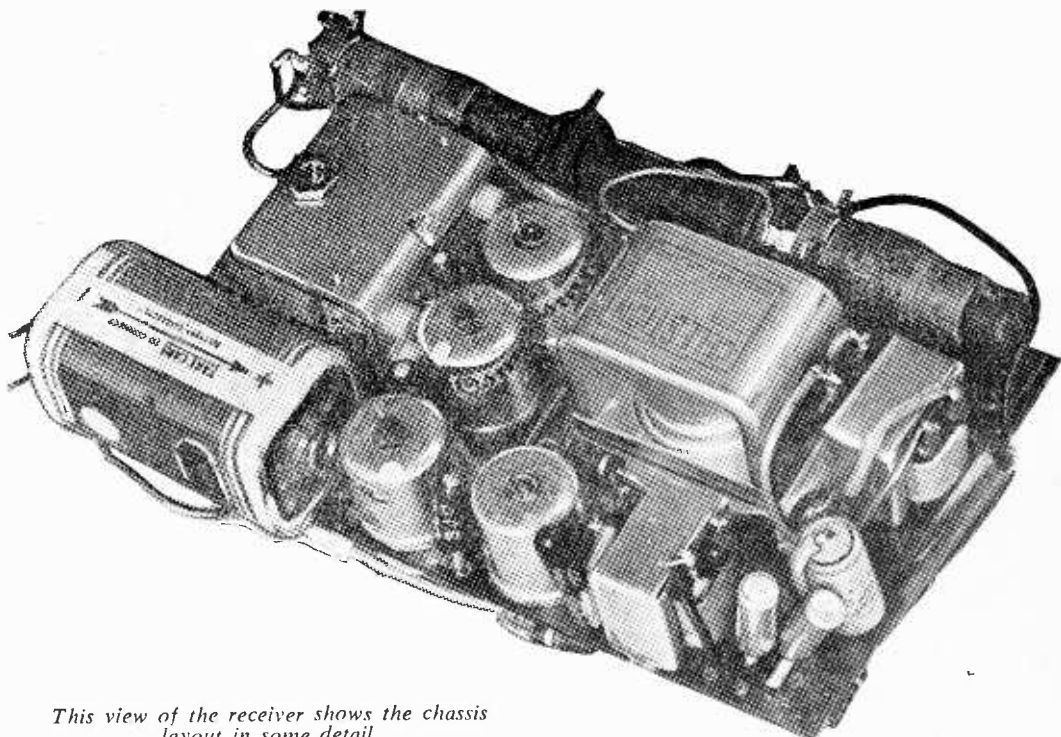
A fairly thin gauge wire, with small diameter sleeving, will be most convenient for connections. About 1yd of 26s.w.g. tinned copper wire, and 1yd of 1mm sleeving, will easily be sufficient for the receiver.

Wiring

It is wise to wire one stage at a time, inserting the transistor as the stage is completed. If the



Plan view of the chassis in its case.



This view of the receiver shows the chassis layout in some detail.

transistors are located as shown, emitter, base and collector leads will emerge at the front of the chassis in the positions shown in the blueprint. It may also be helpful to use coloured sleeving to identify these leads. It is essential that the emitter, base and collector leads do not touch each other, or other connections, and that they are correctly wired.

A check should be kept of resistor values, as they are wired in, because a mistake may cause lack of results, or distortion, and prove difficult to remedy later.

Volume connections should be taken from the blueprint in the manner already described. As the control also contains an on/off switch, incorrect wiring here will prevent the set working.

Leads and parts must be kept clear of the four holes used to mount the speaker, and also the holes used to secure the chassis in the receiver case. All other parts are kept flat, near the chassis, as there is only about 9mm clearance between chassis and case.

Wavechange Switch

The wavechange switch wafer is mounted by passing small pieces of 18s.w.g. tinned copper wire through the two holes in it, and through matching holes in the chassis. A small loop of tinned wire is made round these 18s.w.g. wire pins, and a touch of solder used to hold each in place.

The single tag of the switch goes to the earth line at the other side of the switch, one tag goes to the 180pF condenser. The other two tags this

side are joined, and wired to the 60pF trimmer, and switch tags of the aerial.

The aerial is shown out of position in the blueprint, so that leads to it can be seen. With the medium wave section, the tags marked "B" and "Tap" go to the small winding of enamelled wire. This winding is connected to the tapping on the long wave section. This tapping is only a few turns from the earthed end of the L.W. section, so care is necessary to wire the L.W. winding correctly. The beginning of the M.W. tuned section is connected to the front fixed plates tag of the gang condenser, the end of this winding goes to the wavechange switch, trimmer, and "S" tag of the L.W. section. Bend the condenser tags flat after wiring to them.

The Aerial

The aerial connections are best made with thin flex, so that the positions of the windings on the rod can be modified when aligning the receiver. When testing and aligning the set, before inserting it in its case, a small strip of paxolin can be used to manipulate the wavechange switch rotor. When the set is inserted in its case, the wavechange switch lever must be turned so that the flats on 6B.A bolt match the position of the rotor, or the chassis will not fit in the case.

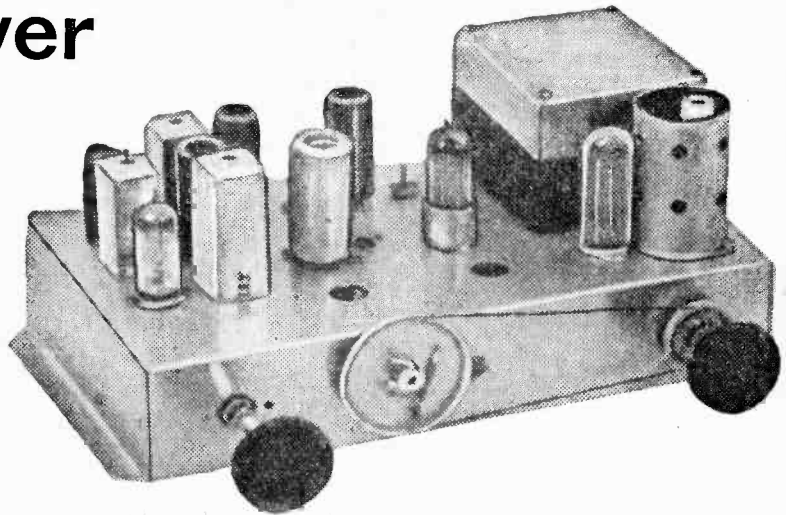
NEXT MONTH :
Testing and aligning the receiver

Low Drift V.H.F. Receiver

MAKING A SUITABLE CABINET

By E. H. Berny

(Continued from page 518 of the October issue)



A CABINET of functional design and pleasing appearance in which to house the receiver together with a speaker up to 8in. diameter may be made from $\frac{3}{4}$ in. 5-ply wood having an oak, walnut or similar hardwood facing. Old television cabinets are a good source of supply. No complicated joinery is required and only simple tools are needed.

First, cut two pieces of wood each 13in. x 7 $\frac{1}{2}$ in. for the top and bottom. In the bottom make six 1in. holes for ventilation as in Fig. 12. Next cut two pieces each 11in. x 7 $\frac{1}{2}$ in. for the sides. Rebates, $\frac{1}{4}$ in. deep, must be formed at the top and bottom of each side on the unfaced surface as follows. Draw a line parallel with and slightly more than $\frac{1}{4}$ in. from the edge of the wood and fasten along it with a couple of panel pins, a wooden straight-edge

to act as a guide for the saw. Make a cut $\frac{1}{4}$ in. deep along the line with a tenon saw, taking care to keep the tool at right angles to the surface and close up against the straight-edge. Remove the unwanted wood with a chisel and finish off with No. 2 glasspaper. When all the rebates have been formed, assemble temporarily the top, bottom and sides, using three or four 1in. panel pins driven half way home at each corner. Square up the assembly and secure it temporarily with a strip of wood fastened diagonally across the back so that it looks like Fig. 14.

The Front

To mark out the front of the cabinet, place the assembly front down on the unfaced surface of a piece of plywood and mark round both the inside and outside. Cut the front very slightly larger than the outside rectangle so marked, so as to leave a little to spare for sanding down. The inside rectangle is the line along which a $\frac{1}{4}$ in. deep rebate must be formed all round the edge by the method already described and when this has been done, the front should be a good push fit into the assembled portion of the cabinet. If, as may happen, it is a little slack, there is no need to worry as the strength of the cabinet will not be greatly affected. The holes and cutouts should now be made. The speaker aperture is best cut by first making 1in. holes in the four positions shown in Fig. 13. It is then a simple matter to remove the unwanted wood

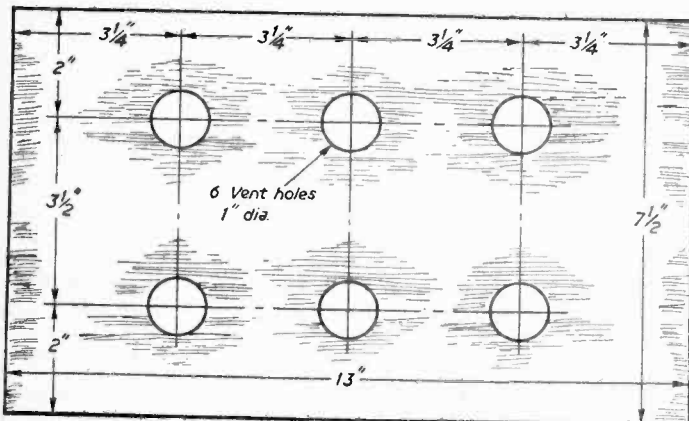


Fig. 12.—The bottom of the cabinet.

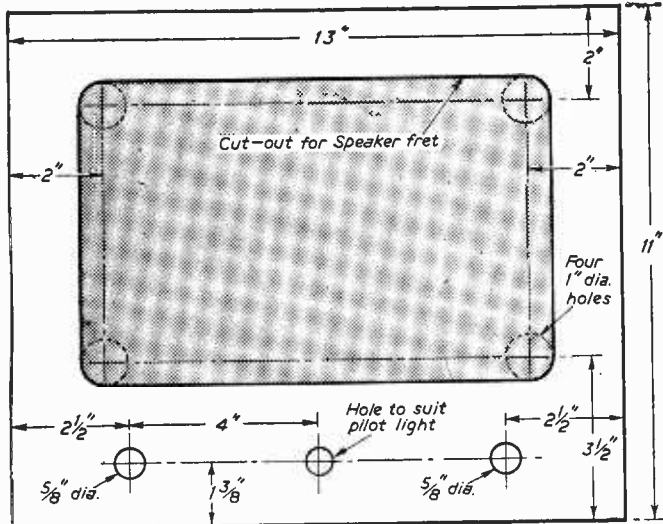


Fig. 13.—The front of the cabinet.

with a pad saw or a coarse hacksaw blade held in a pad handle. Work from the faced surface of the wood so that the saw will not tear the facing. Finish off the edge of the aperture with glasspaper and give it a coat of matt black paint.

Assembly

Dismantle the assembly, apply a coat of casein glue to all mating surfaces and re-assemble, driving the panel pins right home. Glue alone will be sufficient to secure the front but the joint will have to be kept under pressure by means of weights till the glue is dry. The success of the whole operation up to this point depends chiefly on the accuracy with which the wood is cut and the rebates formed. This is not difficult but requires a little time and care which will be well rewarded. It is important of course, to use a good glue.

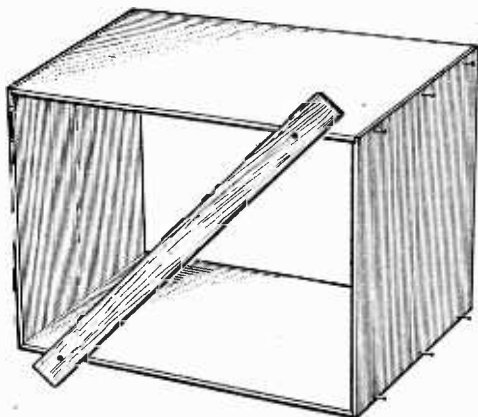


Fig. 14.—The temporary assembly of the top, bottom and sides of the cabinet.

Finishing

Allow 24 hours for the glue to harden thoroughly, then punch in the panel pins so that the heads are below the surface; fill in the holes and any other blemishes with plastic wood of the same colour as that in which it is desired finally to polish the cabinet. When the filler is hard, give a good rub down with No. 2 glasspaper, removing surplus filler and any projections at the corners. Finish off with No. 0 glasspaper. The final result depends greatly on the preparation at this stage, so make sure no scratches or other blemishes remain. Wood dye of appropriate colour may now be rubbed in with a rag wad.

Polishing

The best result is obtained by French polishing which, contrary to popular belief, is not at all difficult if done with one of the several polishes prepared and sold for amateur use. The constructor should follow carefully the instructions supplied with the polish. Alternatively, a very reasonable finish can be obtained by the application of clear varnish. Three or four coats will be required with a light rub down with No. 0 glasspaper between each. About 48 hours should be allowed for each coat to dry before rubbing down and the varnish should be applied and allowed to dry in a dust-free atmosphere.

Four 3/4 in. rubber buffers should be fitted to the bottom of the cabinet to permit under-chassis ventilation and to prevent damage to any polished surface on which the receiver may stand.

Heat Deflector

It is desirable to fit a heat deflecting screen above R30 so that the rising current of air is carried away to the top rear of the cabinet. This prevents the top of the cabinet from warming up and improves

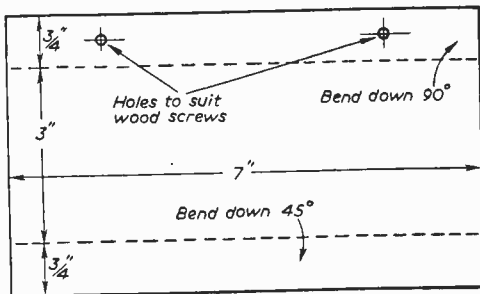


Fig. 15(a).—The heat deflector.

the interior ventilation. It may be made quite simply from a piece of 16 or 18s.w.g. aluminium to the measurements given in Fig 15(a) and secured to the side of the cabinet with two small wood screws. Fig. 15(b) shows how it should be arranged.

Fitting the Receiver

Glue a piece of Tygan or similar material over the speaker aperture. Cut a piece of $\frac{1}{8}$ in. plywood or hardboard to size and make a 7 in. aperture for the speaker as in Fig. 16. Secure the speaker over the aperture with two 4B.A. countersunk bolts, nuts to the rear, in the positions shown. The assembly should now be mounted in the top of the cabinet so that wood screws in the two remaining securing holes of the speaker will pass through the $\frac{1}{8}$ in. ply into the cabinet front. The ply should then be further secured to the cabinet by a small wood screw at each corner. Fit in the bottom of the cabinet a piece of perforated zinc about 12 in. x 7 in. to cover the ventilation holes. Slide the receiver into position and mark on the bottom of the cabinet by measurement the positions of the chassis flanges. Make holes through the bottom to receive 4B.A. bolts or self-tapping screws of about the same diameter; two at the main transformer end and one at the other will suffice. Make corresponding holes in the chassis flanges. Solder temporarily a short length of insulated wire to the negative end of C26, and fit the receiver. Do not fit the securing bolts yet.

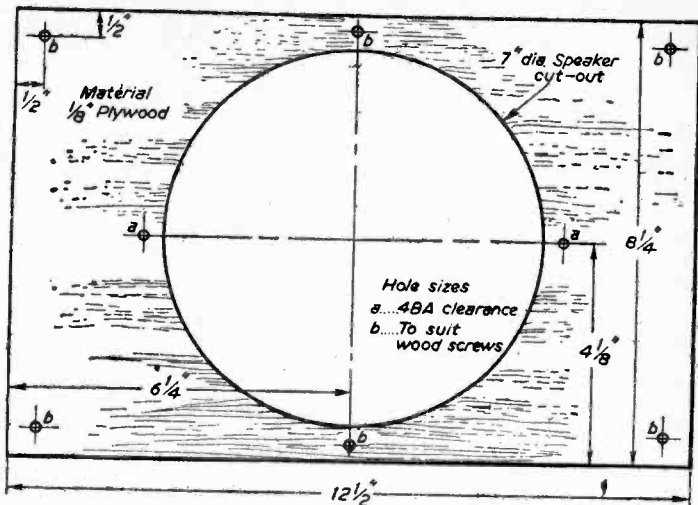


Fig. 16.—The speaker mounting board.

CONVERTING TO STEREO

(Continued from page 600)

Capacitor C1 is mounted between VR2 and an earthing tag secured by a 6B.A. nut and bolt. If tinplate is used, a directly soldered connection may be made. The remainder of the wiring is simple, and is completed by taking the screened lead for connection to the amplifier through the hole provided.

The cover plate is secured to the main section by six 6B.A. self-tapping screws, three on each end. Holes (bored with a number 43 drill) should be made, and the screws fitted, one at a time; so that the holes in each section properly match.

Correct inter-connection of the various units can be taken from Fig. 1. In addition, the new amplifier has to be supplied from the mains. The original amplifier has a mains outlet connecting to the gramophone motor; this supply being switched by a pre-amplifier control. The outlet is also now used to supply the second amplifier.

One last word of warning: While it is permissible to use the stereo head for playing monaural micro-groove records, on no account use the mono head for stereo records, otherwise they will be seriously damaged.

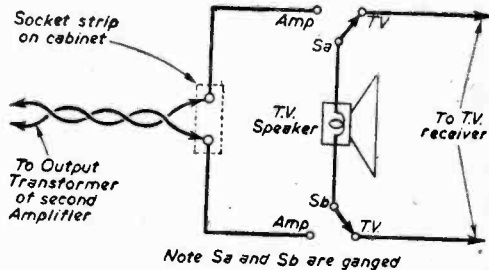


Fig. 7.—Using the loudspeaker of a TV receiver for the second channel.

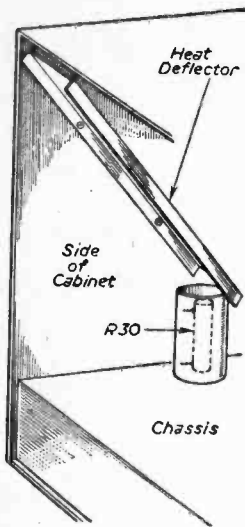


Fig. 15(b).—Fitting the heat deflector.

Remove the chassis from the cabinet, detach the temporary connection from C26, replace the chassis and insert the securing bolts.

Cabinet Back

As the chassis is "dead" and there are no exposed voltages, the cabinet need not have a back. If one is needed, it may be of $\frac{1}{8}$ in. ply or hardboard and can be secured to $\frac{1}{8}$ in. wooden fillets glued inside the cabinet. Holes should be made for ventilation at both top and bottom.

Calibration

Fit the tuning knob, which should be about 1 $\frac{1}{2}$ in. in diameter, connect an aerial and switch on. After 15 minutes, connect a meter or tuning indicator to C26, tune in each station in turn and make a mark on the tuning knob at top dead centre for each. The knob can then be taken to an engraver for permanent marking.

★ **JUST OUT - NEW 10th EDITION** ★

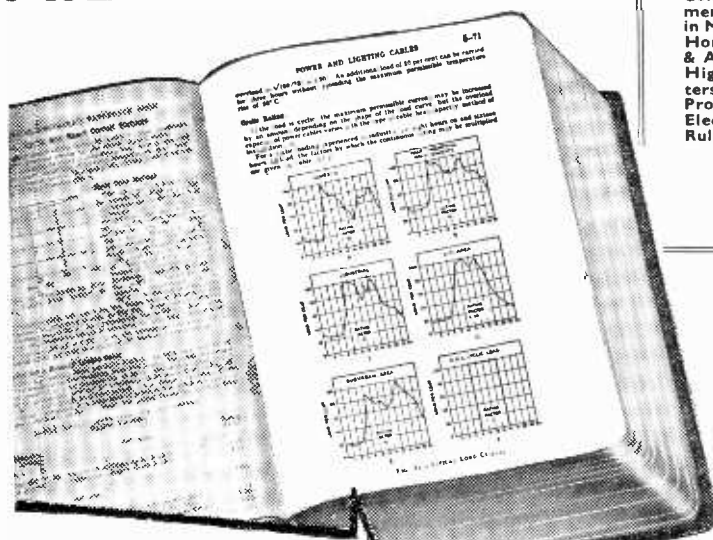
NEWNES

Electrical Engineer's Reference Book

The ELECTRICAL ENGINEER'S REFERENCE BOOK is your standard reference—a comprehensive and factual work on modern theory, practice and equipment, and on the latest developments in all branches. In the last few years Edition after Edition has quickly sold out—now comes the latest 10th Edition with up-to-the-minute information and new features which keep pace with the industry's progressive outlook and effort. The work is arranged in 33 self-contained sections and written by 65 specialist contributors. Consulting Editor is M. G. SAY, Ph.D., M.Sc., M.I.E.E., with long experience in contracting, machinery manufacture and design.

IT'S YOURS—WITHOUT OBLIGATION

FREE FOR A WEEK



33 Fact-filled Sections

Theory & Calculations . Power Station Practice . Electrical Materials Transformers . Cables & Wires Power Supply Networks . Switchgear & Protective Gear . Electric Motors . Electric Motor Control Rectifiers & Convertors . Wiring & Installation . Illumination & Lamps Electrical Measurements . Power Factor Correction . Heating, Ventilating & Air Conditioning . Welding Batteries & Electrochemical Processes Electric Traction . Marine Applications of Electricity . Electronic Engineering . Electric Lifting & Conveying . Electromagnetic Equipment . Automatic Control . Electricity in Mines . Electricity in Agriculture & Horticulture . Electricity in Aircraft & Automobiles . Electric Furnaces & High-Frequency Heating . Computers . Miscellaneous Applications Progress . Education & Training Electrical Literature . Electricity Rules, Regulations & Supply Data Full Index

INDISPENSABLE IN DAY-TO-DAY WORK

2,232 PAGES

Modern Standard Practice and developments in all branches.

2,096 DIAGRAMS

Data tables and technical drawings prepared by expert draughtsmen.

Nearly **300 PHOTOS**

Gathered together with the co-operation of leading firms in the vast electrical industry.

Strongly bound in hard-wearing blue moraqueette. Weighs 3½ lb.

DON'T MISS THIS SPECIAL OFFER

This rich store of Electrical knowledge provides wanted information at your finger-tips—*theory, calculations, data, equipment, design, construction, etc.* Judge for yourself by free examination and without obligation to purchase!

Post Coupon To-day

GEO. NEWNES LTD., 15-17 Long Acre, London, W.C.2

Please send me Newnes ELECTRICAL ENGINEER'S REFERENCE BOOK without obligation to purchase. I will either return the work within eight days or I will send the first payment of 5/- eight days after delivery, then ten monthly subscriptions of 10/-, until the sum of 105/- has been paid. Cash price within eight days is 100/-.

Name _____

Address _____

Occupation _____

Your Signature _____
(Or Parent signs if you are under 21)

Tick (✓) where applicable

HouseOWNER	<input type="checkbox"/>
Householder	<input type="checkbox"/>
Living with Parents	<input type="checkbox"/>
Lodging Address	<input type="checkbox"/>

EE18

Inexpensive P.A. Equipment

COMPLETE CONSTRUCTIONAL INFORMATION

By V. E. Holley

(Continued from page 537, October issue)

THE mixer circuit uses very little power and a small mains transformer of the type used in television converters is suitable, and as the H.T. requirement is only two or three milliamps, a contact-cooled rectifier and simple smoothing are adequate.

The constructor should not be tempted to employ a double triode instead of the two pentodes. The inputs are at high impedance and if a high- μ valve is used, there will be high frequency attenuation owing to the Miller effect while a low- μ valve will not have sufficient gain.

Construction

The unit is conveniently constructed on a small chassis of 16s.w.g. aluminium to the measurements

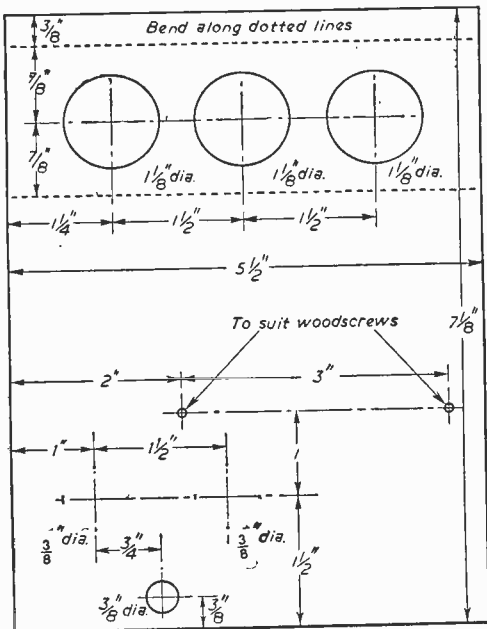
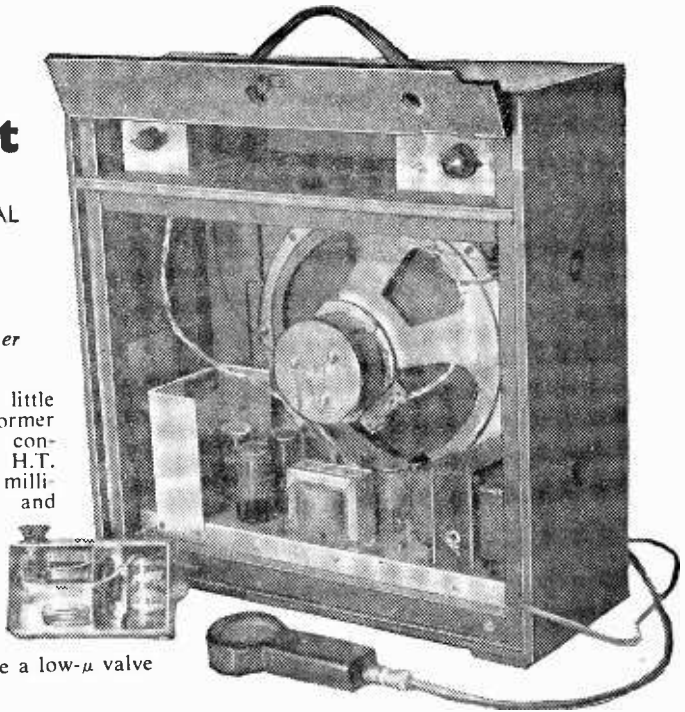


Fig. 12.—Plan of the chassis of the mixer unit.



The completed equipment in its case.

given in Fig. 12. the two volume controls and the panel lamp being arranged to protrude through the motor board in the front right hand corner. The mains transformer is mounted separately some distance away to minimise hum pick-up. Care must be taken with the heater wiring for the same reason and pin 2 on each valve base should be earthed. It is inevitable that some hum will be introduced by the heaters but as it will be heard only at near maximum gain, which will never be required, it does not merit any further attention. Complete elimination can in any case only be obtained by operating the heaters from a source of D.C. which is a troublesome and unnecessary complication. The layout is shown in Fig. 13.

Pick-up

High fidelity is not necessary for the reproduction of dance music and any inexpensive single player of the popular type will be suitable. Acceptable quality must nevertheless be maintained and the response of the pick-up must be examined to see what correction is necessary to compensate for recording loss. If the pick-up is of a superior type having a level response and no internal compensation, the circuit of Fig. 14 may be used. With the component values as shown, it provides full compensation at the rate of 6dB/octave below about 250c/s. There will of course be a serious loss of output at middle and high frequencies, but this is easily put right by a turn of the volume control.

Most crystal pick-ups of the popular type have a rising output below about 400c/s which provides some compensation. In such cases it will generally be satisfactory to add compensation at the rate of 3dB/octave, which may be done with the same

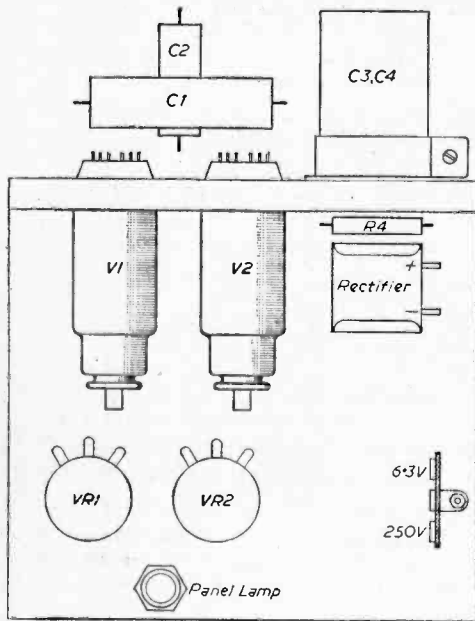


Fig. 13.—Layout of the mixer unit.

circuit using component values $R1=0.32M$, $R2=0.15M$ and $C=0.005\mu F$. If the response of the pick-up is unknown, the best arrangement must be found by trial and error, and in this connection the aim should be to make the load at middle and high frequencies approximately that recommended by the manufacturers. The reactance of C being negligible, the required figure is given by the formula

$$R1 + \left[\frac{R2 \times R3}{R2 + R3} \right]$$

Housing the Player

If the constructor already has a portable record player it will be a simple matter to install the mixer unit within the case, the only requirement being that there should be a minimum clearance of 2in. between the motor board and the bottom of the case. Not much heat will be generated but it is desirable to provide ventilation holes through the case and the motor board, those in the latter being positioned underneath the turntable out of sight.

If no portable player is available, a satisfactory turntable and pick-up can be obtained from surplus sources, and a case of professional appearance in which to house it can be made at the cost of a few shillings. No complicated joinery is required.

Making a Case

Suitable material for the motor board is $\frac{1}{8}$ in. 5-ply; for the sides of the case $\frac{1}{4}$ in. will serve,

and for the top and bottom $\frac{1}{4}$ in. is suitable. Unless the player is of unusual size or shape, the dimensions to be given may be followed exactly.

First prepare the motor board, 15in. x 13in. and cut out the holes required for the motor, pick-up, controls, etc. The motor should be mounted on the side of the board remote from the mixer unit in such a position that the centre of the turntable is located at the point "X" in Fig. 15. The position of the pick-up relative to point "X" will depend on the manufacturer's instructions, which should be followed exactly to ensure proper tracking.

Prepare next the front and back, each 15in. x 5 $\frac{1}{2}$ in., and the two sides, which, if $\frac{1}{4}$ in. wood is being used, will each be 13 $\frac{1}{2}$ in. x 5 $\frac{1}{2}$ in. It is now advisable to make a trial assembly of the front, back and sides around the motor board to check the fit, securing them temporarily to each other and to the motor board with $\frac{1}{8}$ in. panel pins, driven half-way home. The motor board should be positioned so that its lower surface is 2 $\frac{1}{2}$ in. from the bottom of the assembly. When any misfits have been rectified, a good resin glue should be applied to all mating surfaces and the pieces re-assembled, driving the panel pins right home. When the glue is dry, a stiffener, 13in. x 2 $\frac{1}{2}$ in. x $\frac{1}{2}$ in., having a couple of 1in. holes in it for ventilation and the passage of cables, should be pinned and glued below the motor board as shown in Fig. 15. This will increase the strength of the case considerably and will reduce vibration from the motor.

Making the Lid

Next prepare the top of the case from $\frac{1}{8}$ in. ply and fit it permanently in position with glue and panel pins. The bottom should also be fitted now; it must be removable and should be secured with small brass screws to a $\frac{1}{4}$ in. square wood

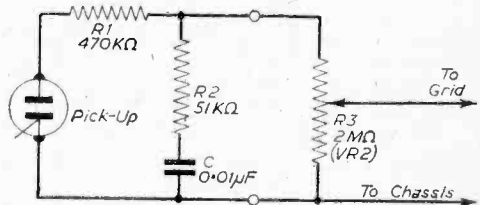


Fig. 14.—Compensation circuit for the pick-up.

fillet glued around the inside of the case, $\frac{1}{8}$ in. from the bottom edge.

When all has been assembled, draw a line round the case 2 $\frac{1}{2}$ in. from the top, and with a sharp tenon saw cut the case into two pieces along this line. The result is a box with a lid which is an exact fit. This operation requires some care, and if the constructor is not confident of his skill with the saw, he should fit temporarily on each side of the line of cut a strip of plywood with a straight edge, leaving just enough room between the strips for the saw to enter. If the saw is then used horizontally and at right angles to the surface, a clean accurate cut will be made. Strips of wood about 1in. wide and $\frac{1}{4}$ in. in thickness should now be glued round the inside of the case above the motor board so as to project into the lid, thus locating it firmly when closed.

"POST HASTE" — "POST FREE"

JASON F.M. TUNER KITS

We are the Authorised Jason Dealer and the whole kit is as supplied by them. You can therefore safely return to Jason for alignment without them rejecting it for non-standard components.

We can also align for the standard charge.

- FMT1 is the standard variable tuner for cabinet mounting, unpowered. Supplied complete with four EF91 valves £6.16. 0
 Hire purchase Deposit £1.8.6 and 6 monthly instruction book, 2/6 extra. £1. 1. 4
- FMT1 Power pack with ready drilled chassis kit ... £2. 1. 9
- FMT2 is a new tuner in a green modern case, which can be used for shelf or cabinet mounting and has space for power supplies if required. Supplied complete with four EF80 valves ... £7. 6. 6
 Hire purchase Deposit £1.10.6 and 6 monthly instruction book, 2/6 extra. £1. 2. 8
- FMT2 With power. Complete kit £9. 2. 0
 Hire purchase Deposit £1.18.0 and 6 monthly instruction book, 2/6 extra. £1. 7. 4
- FMT3 is the Fringe version and should be used when further than 70 miles from transmitter. Supplied complete with 6 valves £9. 3. 6
 Hire purchase Deposit £1.17.6 and 6 monthly instruction book, 2/6 extra. £1. 7. 8
- FMT3 With power. Complete kit £10.19. 0
 Hire purchase Deposit £2.5.0 and 8 monthly instruction book, 2/6 extra. £1. 4. 3

NEW JASON SWITCHED TUNERS

The JTV/2 and Mercury 2 are both of the pre-set station type with the addition of BBC and ITA sound. They use the latest "Fireball" turret and the A.F.C. ensures freedom from drift. The Mercury 2 is for cabinet mounting with external power supplies. The JTV/2 has the same tuning heart, with power supplies mounted in a case. This again can be used for shelf or cabinet mounting. The JTV/2 cannot be supplied less power.

- JTV/2 Complete with valves and book £14.14. 9
 Hire purchase Deposit £3.4.9 and 12 monthly instruction book for switched tuners, 3/6. £1. 1. 1
- Mercury 2 Complete with valves and book £10.16. 6
 Hire purchase Deposit £2.4.6 and 8 monthly instruction book for switched tuners, 3/6. £2. 1. 9

IMPORTANT

Required channels must be specified. All Jason kits can be supplied less valves. To find the cash price, less valves, deduct 7/6 per valve.

A more detailed price list can be sent upon request. ALL JASON TUNERS ARE ON DEMONSTRATION

GRAMOPHONE EQUIPMENT

- B.S.R. Monarch TC8H, cartridge £6.15. 0
 Hire purchase Deposit £1.7.0 and 6 monthly instruction book for switched tuners, 3/6. £1. 1. 4
- Collaro Conquest "O" cartridge £7.15. 0
 Hire purchase Deposit £1.11.0 and 6 monthly instruction book for switched tuners, 3/6. £1. 4. 0
- Garrard TA Mk.2 GC8 cartridge £8.10. 0
 Hire purchase Deposit £1.14.0 and 6 monthly instruction book for switched tuners, 3/6. £1. 6. 0
- Garrard 4HF, GC8, cartridge £18. 9. 9
 Hire purchase Deposit £3.19.9 and 12 monthly instruction book for switched tuners, 3/6. £1. 6. 7
- Phillips AG2009, AG3016, cartridge £10.10. 0
 Hire purchase Deposit £2.2.0 and 8 monthly instruction book for switched tuners, 3/6. £1. 3. 6
- Connoisseur 2-speed Transcription unit £16.13. 1
 Hire purchase Deposit £3.13.1 and 12 monthly instruction book for switched tuners, 3/6. £1. 3. 10
- Garrard TPA12, Pick-up arm, less cartridge £4. 9. 6
- Garrard GCS10, Stereo cartridge £1.12.10
- Garrard GC8, Mono cartridge 19/7
- Collaro "R", Stereo turn over cartridge £3.19. 6
- Acos 71/5, Stereo cartridge with diamond £2.12.10
- B.S.R. Mono turn over cartridge £1. 9. 9
- Garrard SPG3, new stylus gauge, 0-12 grammes ... 19/6

For further information please write for manufacturers' list.

TAPE EQUIPMENT

- Collaro Studio Deck. 3 speed, 3 motors, 7in. spools. Pause control space for third head, piano keys, counter. OUR PRICE £14. 0. 0
 List price £17.10.0. Hire purchase Deposit £3.0.0 and 12 monthly instruction book for switched tuners, 3/6. £1. 0. 2
- Tape Amplifier for Studio Deck. Completely assembled by famous maker. NOT A KIT. Full wiring plans to connect to deck. Magic Eye, Radio and Mic inputs, Mixing and Super-imposing ex L/S socket. Low level input tone control. Can be used as amplifier. EF86, ECC83, 2—EL84, EM84, EZ80, OA81. 3 watts output. CASH PRICE £10.10. 0
 Hire purchase Deposit £2.2.0 and 8 monthly instruction book for switched tuners, 3/6. £1. 3. 6
- Tape Recorder Case to house the above Deck and Amplifier. Two tone colour £5. 5. 0
 EMI speaker, 10 x 5in., to fit case £1. 5. 0
 1200ft. Brand Five Tape, 25/; Crystal Mic, 40 mic, £1. 7. 0
 1 set of knobs and plates for amplifier, 12/6;
 Screened input plugs, 4/6 each.
- The above Recorder complete to PERSONAL SHOPPERS ONLY for £35. 0. 0
 Hire purchase Deposit £7.0.0 and 12 monthly instruction book for switched tuners, 3/6. £2. 11. 4
- This machine is a first-class job and normally sells at £41. 0. 0

SEND FOR MAKER'S ILLUSTRATED LEAFLET

- B.S.R. Monardeck TDI 3½ i/s. One motor, 5½in. spools. OUR PRICE £9.15. 0
 List price £12.12.0. Hire purchase Deposit £1.19.0 and 6 monthly instruction book for switched tuners, 3/6. £1. 9. 4
- Collaro Tape Heads, Record/Playback and Erase ... 37/6 pair

TRANSISTORS

ALL MANUFACTURED BY MULLARD			
	List Price	OUR PRICE	
OC44 Mixer ...	26/-	12/-	+ Red Spot
OC45 I.F. ...	23/-	12/-	+ A.F. 5/-
OC71 Audio ...	14/-	8/6	+
OC72 Audio ...	17/-	8/6	+
OC78D Driver...	17/-	10/-	+ White spot
OC78 Audio ...	17/-	10/-	+ R.F. 6/-

TEST METERS

- CABY A10 D.C. volt (Sensitivity 2000 ohms per volt), 10v, 50v, 250v, 500v, 1000v.
 A.C. volt (Sensitivity 2000 ohms per volt), 10v, 50v, 250v, 500v, 1000 volt.
 Resistance ohms 10K, 1 meg. ohm.
 D.C. current, 0.5mA, 25mA, 250mA.
 Will also measure decibels. Size 5 x 3½ x 2in.
 PRICE £4.17.6
- CABY B20 D.C. volt (Sensitivity 10,000 ohms per volt). 0.5v, 2.5 volt.
 D.C. volt (Sensitivity 4000 ohms per volt), 10v, 50v, 250v 1000 volt.
 Resistance ohms 2K, 20K, 2 meg. 20 meg ohm.
 D.C. current, 100 micro/A, 2.5mA, 25mA, 250mA.
 Will also measure decibels. Size 6 x 4 x 2½in.
 PRICE £6.10.0

**WE PAY ALL POSTAGE AND INSURANCE
 ALL ORDERS DEALT WITH SAME DAY
 MONEY WILL BE REFUNDED IF REQUESTED**

SURBITON PARK RADIO, 48 Surbiton Road, Kingston upon Thames, Surrey

(Established over 30 years)

Telephone: KIN 5549

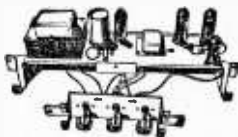
HOURS: 9 a.m. to 6 p.m. 1 p.m. Wednesday.

OPEN ALL DAY SATURDAY—WE DO NOT CLOSE FOR LUNCH

Gladstone Radio

PUSH-PULL AMPLIFIER £4.17.6 (3/6 P. & P.)

Brand new by famous manufacturer. 200-240 A.C. mains. Bass, treble and vol. controls on flying panel. Valves EZ80, ECC83 and 2-EL84 giving full 8 w. Chassis 12 x 3½ x 3½ in. With o.p. trans. for 2-3 ohm speaker. Suitable for Crystal Mike Input.



TWO-TONE BROWN RECORD PLAYER CABINET (With Motor Board for Autochanger) and Gramophone Amplifier to fit Cabinet for £55.0 (5/- carr.). Size 17 x 15 x 8½ in. Brand New.

NEW ELECTROLYTIC CONDENSERS: All 1½ in. dia. Can. 30 + 30 mF 350 v., 3/6; 16 + 32/450 v., 4/-; 60 + 50 + 60/275 v., 3/6; 140 + 60/350 v., 5/6; 100 + 200/275 v., 5/-; Post 9d. or 3 post free.



COMPLETE TAPE RECORDER FOR ONLY £19.19.0

B.S.R. deck. Two-tone leatherette case, Acos crystal mike, 850ft. tape, extra spool. On/Off Tone and Vol. 7 x 4in. Speaker. 1½ hrs. playing time. Single speed 3½ in./sec., fast forward and reverse, mike and radio inputs, ext. speaker socket; cannot be accidentally erased, 13½ x 12 x 8in. Weight 20 lbs. 12 months guarantee. Carr. 7/6 extra. Terms: £6 down and 6 monthly payments of 50/-.

RADIOGRAM CHASSIS £8.10.0
by famous manufacturer

Chassis 16½ x 6½ x 7in. high. Dial in red, gold and brown. 18 x 4in. 1000-2000M; 200-550M and 6-18 Mc/s. 4 knobs in front. Ferrite rod aerial; Tone control; Ext. L.S.; P.U.; Ae and E sockets. Gram. mains socket 200-225 v. and 226-250 v. A.C. Valves ECH81, EBF80, ECC83; two EL84 in push-pull. GZ30 rect. Fine value for money at £8.10.0 (7/6 carr.).

A cheaper Radiogram Chassis for £6.10.9 (7/6 carr.). Chassis 16½ x 5½ x 6in. high. Dial in gold and brown 15½ x 4½ in. 4 knobs two at each end. Tone; ext. L.S.; P.U.; Ae; Earth. Valves EZ40, ECH42, EF41, EL41, EBC41. Also by the manufacturer of above chassis.

COMPLETE V.H.F./A.M. RADIO FOR £12.12.



Brand new set in superb walnut cabinet (size 19 x 8½ x 14in. high). Covering 80-100 Mc/s. 16.49 M; 200-500 M, and 1,200-2,000 M. Mains trans. 200-250 v. Ferrite rod aerial for A.M. Controls. volume on/off, tuning, w/change. Gram. and ext. speaker position provided. Fully guaranteed. Post and packing 10/- extra. Terms: £3.12.0 down (inc. carr.) and 5 monthly payments of £2. Indoor V.H.F. aerial 10/- extra cash. Valves 12AT7, 12AH8, 6BJ6, EABC80, 6BW6.

FOR ADDRESSES SEE THE OTHER ADVERTISEMENT FOR GLADSTONE RADIO ON PAGE 393

IT'S SENSATIONAL!
THE BUDDY SUPER IV TRANSISTOR
DO-IT-YOURSELF RADIO KIT



- 4 Transistors
 - 5" Speaker
 - Pre-cut wood cabinet
 - Drilled chassis
 - Ferrite rod aerial
 - Packaged & labelled components
 - Easy build instructions
 - 1st grade components
- A TRULY GREAT LITTLE SET FOR THE BEDROOM, THE KITCHEN OR DEN. ONLY **£6.12.6**

Post and packing 2/6 extra

THE B. B. RADIO CO.
151, Chapel Street, LEIGH, LANCs.

VHF RECEIVER R1391D. Covers 95-158 Mc/s (2-3 metres). In very good condition, complete with all 15 valves, circuit diagram, and air tested. Power supply required HT250 v. at 80 mA LT 6.3 v. at 4 A (P.U. Type 234A was used) 79/6 plus 10/6 carr.

MINIATURE 378 I.F. STRIPS.—For F.M. tuner described in P.W. With 3 of EF91, 2 of EF92 and EB91. A fresh release enables us to offer these once again. BRAND NEW with circuit and full P.W. Reprint, 35/-, OR less valves. 12/6. Post either 2/6.

DEAF AID—MEDRESCO TYPE (3 min. batt. valves). Complete with min. xtal earphone, earplugs and leather case. Brand New 35/- or with batteries £28 post free.

R-1155-B, with latest drive, first-class condition, £9.19.8. Mains Power Pack, £6.10.0. Data book, 1/3 post paid. Moving COIL PHONES. Finest quality Canadian, with Chamolts ear-muffs and leather-covered headband. With lead and jack plug. Noise excluding, supremely comfortable, 19/6. post 1/6.

GIANT COMPONENT PARCEL. Contains 100 + and 1 watt resistors, 50 Hi Zlab resistors, wire-wound resistors, carbon and W/W pots, 100 capacitors (mica, paper, Sprague, bias variable, etc.), valveholders, tag strips, metal rectifiers, sleeving, etc. All components are unused. GUARANTEED VALUE, 25/- plus 2/6 post.

CR100 COMMUNICATION RECEIVERS. Covers 80 Kcs—30 Mc/s in 6 bands. 11 valves, 2 R.F. and 3 I.F. stages. Crystal gate. B.F.O. etc. Ready for 200-250 v. A.C. mains 2½ watts output for 3 ohms speaker. SUPERB CONDITION AND OUTSTANDING PERFORMANCE for ONLY £21. S.A.E. for illustrated details.

AVOMETRIC MODEL 'D' 34 range testmeter. D.C. volts 0-1,500 v. (10 ranges). A.C. volts to 1,500 v. (8 ranges). D.C. current to 30 A (8 ranges). A.C. current to 15 A (8 ranges). Ohms 0-1k-0-10k. A robust instrument with 5in. mirror scale and cut out. With battery and leads. Guar. £8.19.6. Post 3/6.

G.E.C. SELECTEST. 34 range testmeter. D.C. volts to 1,500 v. (10 ranges). A.C. volts to 1,500 v. (8 ranges). D.C. current to 30 A (8 ranges). A.C. current to 15A (8 ranges). Ohms 0-1kΩ, 0-10kΩ. A robust instrument with 5in. mirror scale and cut out. Complete with battery leads. Fully tested, £7.10.0. Post 3/6.

RCA AH-88 SPEAKERS. 3½ 8in. P.M. speaker in heavy gauge black cracked steel cabinet 11 x 10 x 8in. with rubber feet. A SUPER QUALITY unit. BRAND NEW, for ONLY 45/- Post 3/6.

CHARLES BRITAIN (RADIO) LTD.

11 Upper Saint Martin's Lane, London, W.C.2

TEmpLe Bar 0545

Shop Hours 9-6 p.m. (9-1 p.m. Thursday). Open All Day Saturday

REPANCO HIGH GAIN COILS

Dual Range Crystal Set Coil, Type DRX1.....	2/6			
Dual Range Coil with Reaction, Type DRX2.....	4/-			
Matched Pair Dual Range T.R.F. Coils, Type DRM3, pair.....	8/-			
Pair Dual Range Superhet Coils, Type SH4, pair.....	8/-			
Miniature Iron Dust Cores Coils, Type "R".....				
Range	Aerial	H.F.	Occ.	
500-2,000m.	RA1	RHF1	ROL	
100-550m.	RA2	RHF2	RO2	each....
70-230m.	RA3	RHF3	RO3	
15-50m.	RA4	RHF4	RO4	
Ferrite Rod Aerial, Dual Range Type FRI.....	12/0			
Miniature I.F. Transformers, Type MBE (465 Kcs), pair.....	12/6			
Standard I.F. Transformers, Type TCG (465 Kcs), pair.....	18/6			

Send S.A.E. for latest Repanco Component Catalogue.

RADIO EXPERIMENTAL PRODUCTS LTD.

38 Meech Park St., COVENTRY.

Tel.: 62572

External Connections

External access must be provided for the microphone input, the output to the amplifier and the mains connection, and it is an advantage if the case has a power socket from which the supply for the amplifier can be taken. As with the main amplifier these fittings should be flush with the outside surface of the case. Flush mounting coaxial sockets are used for the input and output, the former being sited as close as possible to VR1. For the mains connection, the plug half of a 2-pin 5A flex connector is screwed to the underside of the motor board in such a position that the pins project into a hole cut in the rear of the case; this hole should be of such shape and size to admit the socket half of the same connector. The same kind of fitting can be used for the mains supply to the amplifier, but in this case the socket portion is secured to the motor board, projecting into a similar hole to a position flush with the outside surface.

The leads from the pick-up are taken first to a small metal box under the motor board, in which is installed R1, R2 and C of the compensation circuit (Fig. 14). The compensated signal is then taken through the motor board by a short screened lead terminating in a coaxial plug. The plug fits into the adjacent socket and the signal is then returned to the under side of the motor board and carried to VR2. A second microphone channel is thus obtainable when required by removing the plug and connecting a mike cable in its place. A switch is provided to cut out the gramophone motor when this arrangement is in use. The wiring of all the switches and fittings under the motor board is shown in Fig. 15.

Finishing

Fittings on the outer surface of the case should now be removed and the heads of the panel pins punched below the surface. A small wire nail with the point sawn off makes a good punch. Fill all blemishes with plastic wood and when it is hard, give the case and lid a good rub down with No. 2 glass paper. The final finish can be obtained if desired by the application of wood dye and clear varnish, but a much more professional appearance will be achieved if the case is covered with material obtainable from a well-known chain store under the name of "leathercloth" in a variety of colours. About 1½ yd will be required. It should be secured to the case with resin glue, a thin coating being applied to both surfaces and the cloth then stretched tightly into position.

When the covering is dry, the input and output sockets can be replaced and a pair of surface mounting hinges fitted to attach the lid. A stay

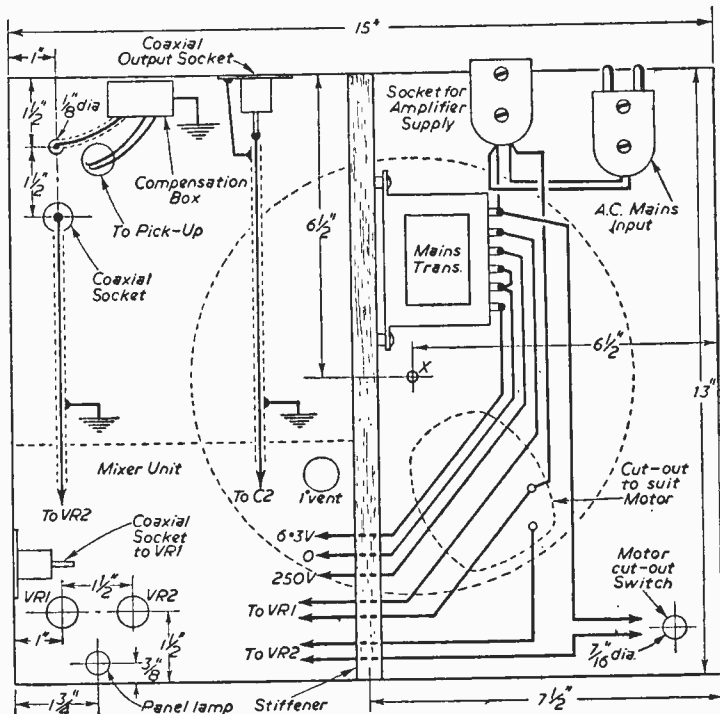


Fig. 15.—Layout of the record player motor board.

is also required inside and a pair of clip fasteners at the front to secure the lid when closed. The corners of the case should be trimmed off and metal corner pieces fitted; eight will be needed. Two ½ in. ventilation holes should be made in the bottom, one beneath the motor and one under the valves, using a sharp centre bit so as to make a clean cut through the leather cloth. A carrying handle should be fitted to the front in such a position that the attachment screws pass into the edge of the motor board, so ensuring firm attachment and good balance. Finally, eight ¼ in. rubber buffers should be fitted, four on the bottom and four at the back so that the player may stand upon them horizontally and vertically.

Operation

If the power supply for the main amplifier is taken from the socket on the player, the whole equipment will be under the control of the gramophone operator. The maximum overall gain is considerably more than can be used and the excess should be removed first by the application of maximum negative feedback and then by means of the volume control on the main amplifier. In this condition the equipment will have a silent background, and it will be found possible to obtain the maximum designed output on either channel by operation of the controls on the player and without introducing hum or other undesirable effects. The two inputs can be mixed in controllable proportions and it is possible for instance to make announcements without entirely interrupting dance music and to fade gradually from one input to the other.

Comprehensive Guitar Amplifier

A COMPLETE UNIT WITH TREMOLO, ETC.

By B. L. Phillips

(Continued from page 511 of the October issue)

THE potentiometer mentioned last month in the feedback circuit of V1 varies the input to the buffer and is called the Vibrato or Tremolo Depth Control. The anode of this buffer is direct-coupled to the screen grid of the pentode EF86, whilst the guitar input is conventionally coupled to the grid. A very high value of cathode resistor is used on the EF86 to bias it towards cut-off, as in this condition the oscillator can easily modulate the guitar input.

output is fed through a high-pass filter which removes the oscillator output whilst allowing the modulated output to be fed to the pre-amplifiers. The pentode stage has only a little gain, and the input to this is approximately the same as the other inputs although some increases in volume may be noticeable when using the vibrato input. The volume control is placed after the filter with the other input controls. Wiring in the oscillator, buffer and mixer stage is not critical at

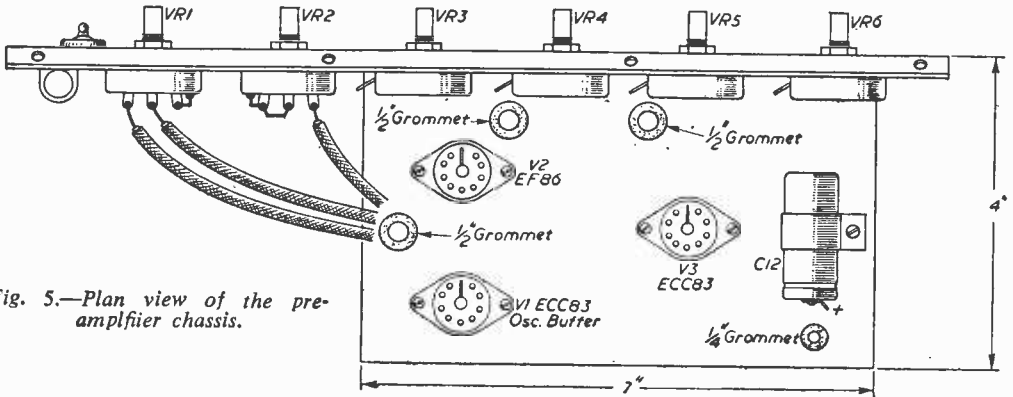


Fig. 5.—Plan view of the pre-amplifier chassis.

Thus, at the anode of the EF86, we have the modulated guitar output, plus the oscillator itself. If this were amplified, then the oscillator would appear in the output as an annoying "thump"! So the

all, but it is recommended that screened lead be used where indicated to avoid hum pick-up. The leads to the volume controls should be screened, (Continued on page 625)

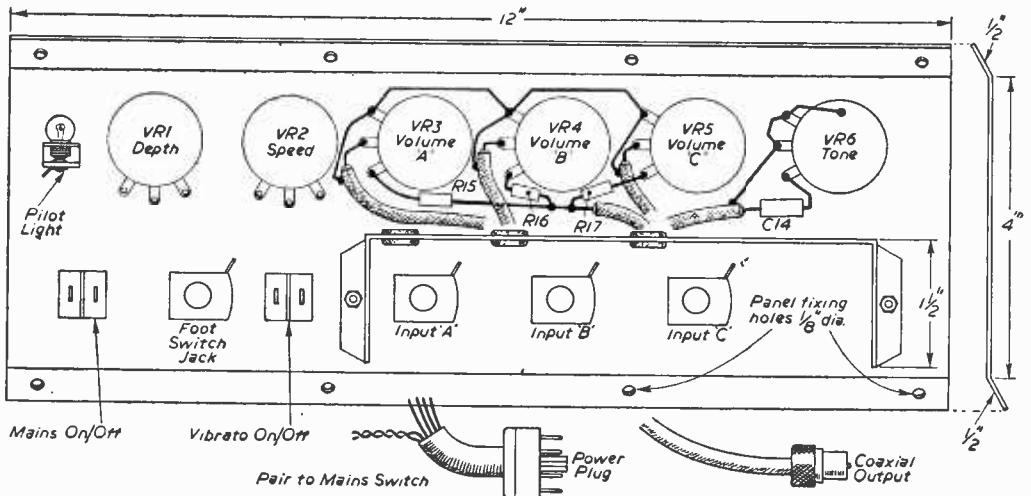


Fig. 6.—Rear view of the pre-amplifier panel (the top of the panel is bent inwards, the bottom outwards, for mounting to the cabinet).

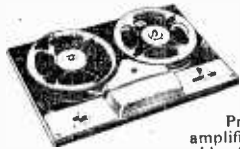
HOME RADIO OF MITCHAM

(Dept. P), 187 London Road, Mitcham, Surrey.
MIT. 3282

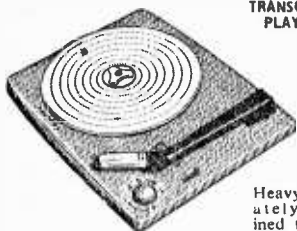
Shop hours 9 a.m. to 6-30 p.m. Wed. 9 a.m. to 1 p.m.

MAKE YOUR OWN HI-FI TAPE RECORDER

Complete portable tape recorder in neat cabinet, using latest B.S.R. TD2 tape deck. Printed circuit amplifier for easy assembly. All parts available separately. Total cost only £21.0.0. Constructional data and price list price 2/6, post 6d.



TRANSCRIPTION PLAYER UNIT AG2009



This Philips 4-speed player unit is today's best value.

Heavy accurately machined turntable with generous

bearings for steady running and freedom from wow. Adjustable pick-up weight and device for lowering and raising arm from record. Hi-Fi plug-in crystal pick-up head for standard and L.P. records. Price £10.10.0, plus 2/- post. Additional plug-in head for stereo 30/-.

W.B. STENTORIAN SPEAKERS

Still the most popular high fidelity loudspeakers for the enthusiast. The HF1012 is a 10in. unit with die-cast chassis, 12,000 gauss magnet. Level response from 30 to 14,000 cycles, will handle 10 watts, and has universal speech coil for 3, 7 $\frac{1}{2}$ and 15 ohms. Price £4.15.0, post 2/-.



VOLUME CONTROL BARGAIN

Special offer of 12 new assorted volume controls, switched, wire-wound, pre-set and standard less switch. Really wonderful value. Of particular interest to the constructor. Send NOW while available. Only 6/- post paid.

HERE IT IS—EVERYTHING ON ONE CHASSIS

Sensitive AM Tuner with Ferrite Aerial. High quality FM Tuner with AFC, high fidelity 16 watt monaural amplifier, high fidelity stereo amplifier with 8 watts push-pull each channel, independent treble and bass boost controls, facilities for tape, modern streamlined appearance and all on one precision made unit. Leaflet on request. Price 42 pns. (or H.P. terms).

ARMSTRONG STEREO 12 MK II



SOLON INSTRUMENT IRON

The best for all types of radio work from amplifiers to transistor sets, is the Henley SOLON instrument iron. 25 watts with detachable $\frac{1}{4}$ in. bit and slim neat construction. State voltage required. Price 24/-, post 9d.



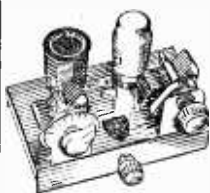
HEADPHONES

We are recognised as the best suppliers of high quality headphones. The famous "Royal" lightweight high resistance phones are ideal for crystal sets, short wavers, etc. Price 15/-, post 1/- . Also available S. G. Brown type "F", price 37/6, and Ericsons professional type £2.15.0. Add 1/- post.



BOOKS HI-FI YEAR BOOK 1960 gives full specifications and details of every item of quality equipment and hosts of useful information. Price 10/6, post 1/- . Wireless World Valve Data Book 5/-, post 9d Short Wave Sets for the Beginner 6/-, post 6d. Guide to Amateur Radio, 3/6, post 6d.

NEVER MIND THE WEATHER—TOUR THE WORLD ON SHORT WAVES FROM YOUR ARMCHAIR



Music from Brazil, News from America, Sport from Australia, and the hundreds of amateurs talking to each other round the world. Learn morse code and listen in to shipping, etc. You will make a host of new friends and never have a dull moment with the "GLOBE-KING" one-valve short wave set at your side. This scientifically designed set gives real long-distance reception at minimum cost. Only top grade components and new patented matched coils. Kit for set including three coils covering 10 to 100 metres. PRICE £3.19.6, post 1/- . Send s.a.c. for leaflet.

"CIRCUITS FOR AUDIO AMPLIFIERS"

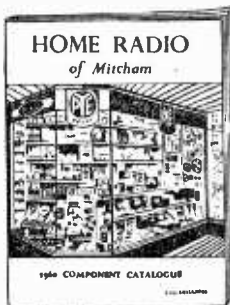
This new book by Mullard covers all aspects of Hi-Fi audio design and includes constructional data on 12 different designs for pre-amplifiers, amplifiers, stereo amplifiers, mixers, tape amplifiers, tape pre-amplifiers, etc. Book 8/6, post 1/- . We stock all the components for these designs, including punched chassis, special switches, Bulgin components, etc. Price lists 6d.



JASON TUNER KITS

Crystal clear Hi-Fi reception with the FMT2 V.H.F. Tuner. The best and most popular tuner kit on the market. Full constructional data and price lists price 3/6, plus 6d. post. Self-powered and with neat case for shelf or cabinet mounting. Kit Price £9.8.0.

Super 128 page CATALOGUE



PRICE 2/- Post 5d.

The MERCURY 2 Tuner gives you

the three BBC FM programmes plus BBC and ITV television sound channels at the turn of a switch. Latest type turret-tuner ready wired and tested makes it easy to assemble and build. Constructional data and price list 3/6, post 6d. Kit price £11.11.0.



HEATHKIT OSCILLOSCOPE

We are proud to announce that we stock the famous HEATHKIT amplifiers, tuners and test gear. This is the OS-1 Service Oscilloscope. An ideal light, compact and portable scope for the engineer. Price £18.19.6, carriage paid. Also all other kits in stock or for early delivery. Send us your order on enquiry.



COILS & COILPACKS

REPANCO 3 wave-band Superhet Coilpack. Price completely wired and with full circuits, 34/4, post 1/- . Also full range of high efficiency coils for all circuits, individually boxed and with circuits in each. DRX1 dual range crystal coil 2/6, DRR2 dual range with reaction 4/- . Special "R" type matched individual coils for Aerial, H.F., and oscillator. Long, Medium and Short wave ranges. Price 3/3 each coil. Add 6d. post to order. Leaflet on request.





**"MINITEST"
Model 127A**

20,000 o.p.v. POCKET SIZE!

Performance equal to a high priced instrument

OUTSTANDING FEATURES:

- ★ Sensitivity 20,000 o.p.v. D.C. 1,000 o.p.v. A.C.
- ★ 20 Ranges.
- ★ D.C. Current 50µA, to 1 Amp.
- ★ D.C. Volts 0.3 v. to 1,000 v. (25 kV by probe).
- ★ A.C. Volts 10 v. to 1,000 v.
- ★ 3 Resistance Ranges from 0-20 megohms (self-contained).
- ★ Meter 40µA 3½" arc.
- ★ Accuracy D.C. 3%, A.C. 4%.
- ★ Dimensions 5½" x 3½" x 1½".

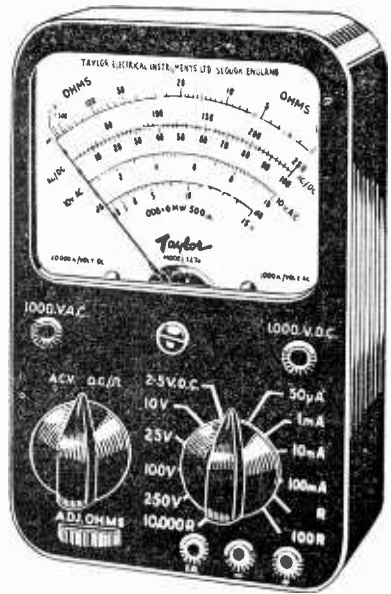
PRICE: £10.0.0

Credit Sale Terms available

9 monthly instalments of

£1.44

Complete with Instruction Manual and Interchangeable test prods and clips. High quality leather case, if required, £2.18.0.
H.V. Probe for 25 kV ... £4.0.9



Write for
fullest
details to:

TAYLOR ELECTRICAL INSTRUMENTS LIMITED
Montrose Avenue, Slough, Bucks. Tel: Slough 21381 Cables: Taylins Slough
Member of the METAL INDUSTRIES GROUP OF COMPANIES

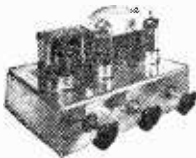
Premier RADIO

23 TOTTENHAM COURT ROAD, LONDON W.1
and at 309 EDGWARE ROAD, LONDON W.2

TEL.: MUSEUM 3451/2
TEL.: PADDINGTON 6963

"THE MID-FI"

A NEW DESIGN
4½ WATT AMPLIFIER KIT
MAY BE BUILT FOR 95/- plus 3/- p. & p.



A new circuit for the home constructor requiring a good quality medium powered Amplifier for reproduction of Records of F.M. Broadcasts. For use with Loudspeakers of 3 or 15 ohms impedance. Technical Specifications: separate bass and treble controls. Valve line-up EF86, EL84, EZ80. Voltage adjustment for A.C. mains from 200-250 volt. Negative feedback. Size 7 x 5 x 2in., overall height 5in. Silver hammered finish Chassis. Instruction Book 1/-.

THE EASY-SIX

6-Transistor Battery Portable
MAY BE BUILT FOR 99.15.0 plus 3/- p. & p.



Ever-Ready PP7 Battery extra 3/3

STAR FEATURES ★ Six Mullard Transistors ★ Internal Ferrite Rod

★ Aerial ★ Provision for Car Radio Aerials ★ 5in. Loudspeaker
★ Printed Circuit, with component positions indicated ★
★ Pre-assembled Dial Assembly ★ 500 milliwatts push pull output.
★ Full medium and long waveband coverage ★ Attractive two-tone Blue/Cream Vynide covered Cabinet, dimensions 8½ x 6½ x 3in. Weight, 3 lb. with battery. Inst. book 1/6.

DRAMATIC PRICE REDUCTIONS

Avantic SPA11. 10 watts (per channel) combined Stereophonic Amplifier and Pre-amplifier. Dimensions 14½ x 8½ x 4in. Original Price 28 gns. OUR PRICE 19 gns. 7/6 p. & p.
Avantic PL621. 20 watt monaural amplifier, frequency response 10 c/s-30 kc/s ± 1dB. L.S. impedance 4, 8 or 16 ohms. Dimensions 14 x 8½ x 4½in.
Original Price 29 gns. OUR PRICE 19 gns. 7/6 p. & p.
Avantic SP21. Stereophonic Pre-Amp. Control Unit designed for use with the DL7-35 Power Amplifier. Power requirements 6.3 v. at 1.3A. A.C., 350 v. at 5mA D.C. Dimensions 14½ x 9 x 4in. Original Price £28.10.0. OUR PRICE £16.19.6, 7/6 p. & p.
Avantic DL7-35. Power Amplifier, power output 54 watts peak. Valve line up: GZ34 2 ± EL34 ECC83, EF86. L.S. impedance. 4, 8 or 16 ohms switch selected. Dimensions 14½ x 9 x 8½in. Original Price 30 gns. OUR PRICE £16.19.6, 12/6 p. & p.

**SPECIAL BARGAIN OFFER
THE PERFECT STEREO SYSTEM:**

Two DL7-35 power amplifiers; 47 gns. P. & P. 25/-
one SP21 Stereo Control Unit.

2-BAND RECEIVER

MAY BE BUILT FOR £5.10.0 plus 3/- packing and postage. This receiver uses the latest type circuitry and supplied complete with easy to follow point-to-point wiring diagrams, suitable for use on A.C. mains 200/250 v. When constructed the Receiver is housed in an attractive walnut finish Bakelite Cabinet or if required Wooden Walnut Cabinet. Overall dimensions 12 x 6½ x 5½in. Instruction Books available separately. PRICE 1/-.

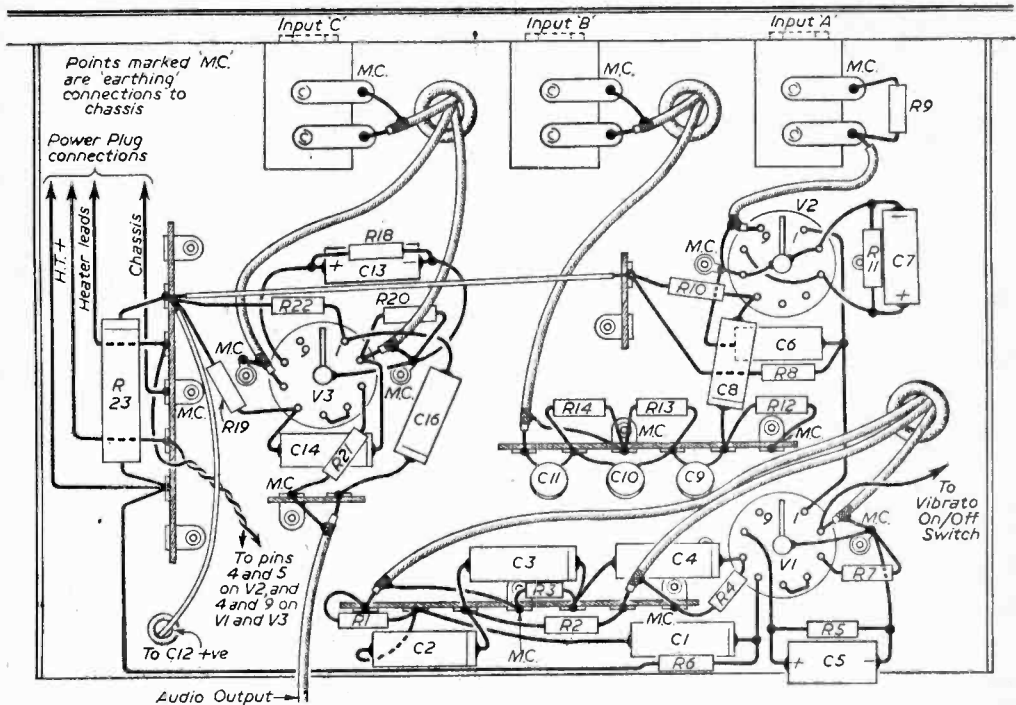


Fig. 7.—Underchassis wiring of the pre-amp.

(Continued from page 622)

and only one earth wire run from each control and jack.

To enable the vibrato to be switched on and off, a switch is employed to earth the buffer grid. This is in series with a closed circuit jack, so that an external foot switch can be used, if desired, from this jack on a screened coaxial lead. If this is used the switch on the amplifier is closed, putting the grid through to the foot switch. The "depth" control enables either deep, medium, or low vibrato effects to be employed, and the "speed" control gives a range of roughly 4 to 10c/s vibrato speed. The speed range may be altered by altering the 470k resistor in series with the speed control to say 250k, when it will be faster.

Construction

Figs. 5 and 6 show the general layout of the pre-amplifier chassis. The main panel should not be less than 12in. x 5in. and of 16s.w.g. aluminium or steel, and bent as shown in Fig. 6. The panel will have an inclination of 45deg so both top and bottom edges should be at as near to 45deg with the panel face as possible. Four 1/4in. holes are drilled in each bent side for the cabinet mounting screws. The six volume control mounting holes should be spaced out equally to occupy the whole panel area. The three input jacks are mounted directly under the sub-chassis. Connections between controls and jacks may be open wire, but short lengths of screened cable are preferred. The three

100k stoppers may be connected together above the sub-chassis, and a single screened lead fed from their junction to the grid of the ECC83.

The sub-chassis supporting the valves and associated circuits is made from 16 s.w.g. metal, bent with two edges down 1 1/4in. of the front edges of the chassis being bent out to bolt to the panel. If the pilot light is fitted, a small hole made in the panel with a strip of red celluloid across it is required as the "jewel". The lamp socket must be insulated from the panel, as the heater chain is only grounded at the main power-chassis end to reduce hum. A small piece of ebonite or paxolin will suffice. Bolting the lamp holder to this with a well countersunk bolt, and then bolting the insulated support to the panel.

Heater leads must be well twisted and kept away from the signal circuits as far as can be arranged. Fig. 7 gives a more detailed idea of how the pre-amplifier chassis is wired, and shows the majority of the connections.

Cabinet

In Fig. 8 is shown the cabinet used for the prototype, which was constructed out of 5-ply, screwed together. It can be covered in plastic material or rexine. The speaker fret material can be expanded metal or a heavy cloth, a narrow strip of wood screwed across the speaker opening gives added protection. It was found in the prototype that the pre-amplifier chassis could not be inserted in the cabinet with the valves in place, the glass pips just fouling the cabinet top. The valves can be easily

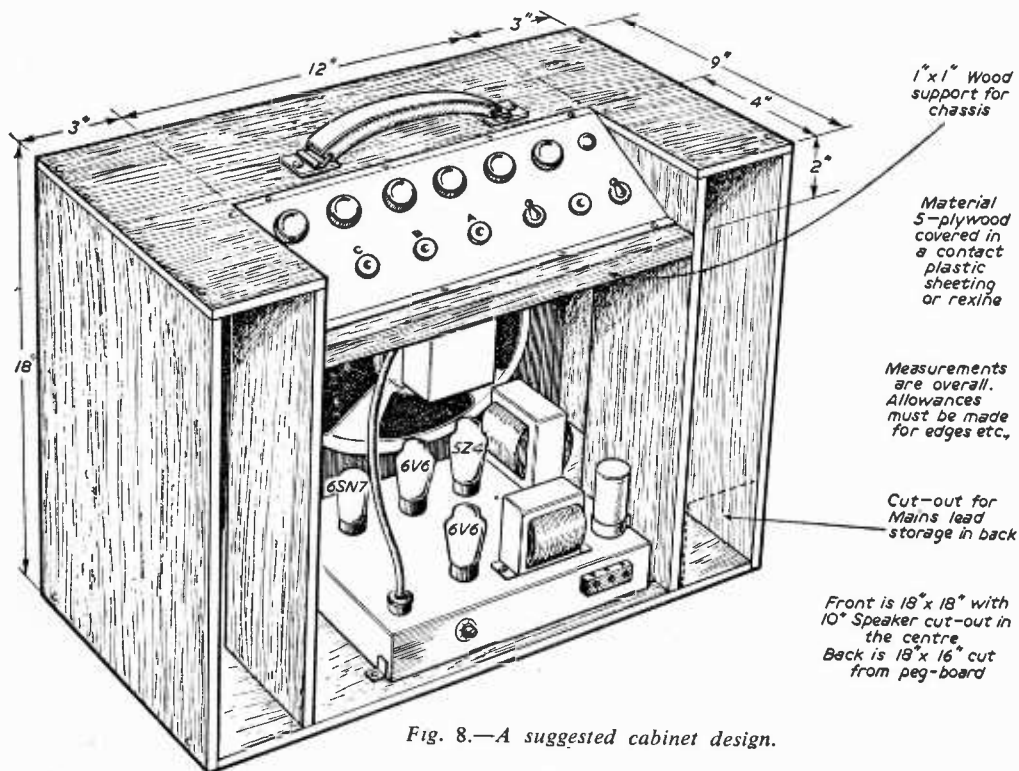


Fig. 8.—A suggested cabinet design.

put into place after the chassis has been placed in the cabinet opening by leaving it protruding slightly at the front so the bases can be seen looking down on it from above. The valves are then pushed home by putting them up from below. The chassis front may be painted a dove grey and the notations for the controls written on with Indian ink. Then give the face a coat of clear varnish.

Final Tests

With the equipment switched on, turn each volume control to zero with the vibrato switched off, and turn the tone control for maximum treble. Little hum, but some "hiss" should be heard from

the speaker. Adjust the negative feedback control until this noise level is such that it can be heard only 3-4ft from the set. If an electric guitar is available it may be connected to each input in turn and checked for volume. The vibrato may be switched on and this checked for depth and speed. Microphony may be evident with some valves in the pre-amplifier, and if this is found, then the offending valve (most likely the ECC83 amplifier) must be changed. New valves in good condition do not show this trouble. The equipment will handle high outputs without overloading, and, say, two guitars on chords and one melody are reproduced extremely clearly with few intermodulation troubles.

AUTOMATIC CONTROL OF MACHINE TOOLS

A NEW type of German milling machine, fitted with a British tape-control system, which anticipates errors and stops the machine before they would have been made, thus eliminating the scrapping of valuable workpieces, was shown publicly for the first time at the German Machine Tool Fair at Hanover from September 11th to 20th.

The machine—a Droop and Rein FS80 vertical mill—is controlled by the "Emicon" system, designed and manufactured by E.M.I. Electronics Ltd. This system incorporates a new angle safety unit, which foresees any programme error or irregularity in the tape and brings the safety circuits into operation before the cutter arrives at that point.

The big advantage of E.M.I.'s new system is that

the machine is stopped before the fault has affected the workpiece. Immediately the irregularity has been investigated and if necessary corrected, cutting can continue.

Other Features

The "Emicon" system fitted to this machine also provides several other facilities. It gives contour control in any two axes and very fine step control in the third dimension. It also provides zero shift in all axes, which facilitates accurate positioning of the workpiece, considerably reducing the setting-up time.

Another outstanding feature is that the input programme can be corrected for the actual size of the cutter in use, even after a regrinding operation during the course of cutting a workpiece.

COSSOR 17" TELEVISIONS & RADIOS

at half original price ! ! ! ! !

PAY US A VISIT FOR

SUPER SALE BARGAINS



BUILD IT YOURSELF!
THE FAMOUS COSSOR
 (Traveller's Friend) Transistorised
£7.19.6 **POCKET**
RECEIVER
 P. & P. 2/-
 In leatherette case

This set can be built for £7.19.6. Size 6 x 3½ x 1½in. Weight 17 ozs. This set covers medium waveband 190/500 metres intermediate frequency. 470 kc/s using 4 transistors (Ediswan) and 2 diodes on a printed circuit board, plus a 2½in. moving coil speaker. Instruction book with point to point wiring diagram. 2/6 each. Batteries, PP4 (Ever Ready) 2/- each.

COSSOR BATTERY PORTABLE SPECIAL

£6.19.6

P. & P. 3/6



A printed circuit. 5in. speakers are features of this battery portable. An internal ferrite rod aerial for L and M Bands. A polythene wrapper provided to protect receiver. Width 10in., height 6½in., depth 5½in.

**MICROPHONES - LOUDSPEAKERS
 TRANSFORMERS - ALL COMPONENTS**

In fact we have the lot. Send for details and prices.

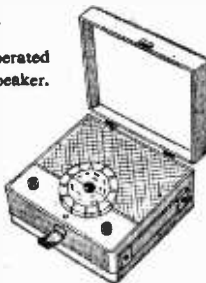
COSSOR BATTERY PORTABLE

£7.19.6 P. & P. 3/6

This extremely sensitive battery operated set has a printed circuit and 5in. speaker. A frame aerial fitted in the lid gives high quality listening on L and M Bands.

CARTRIDGES

- Collaro Studio O .. 18/-
- Collaro Studio P .. 18/-
- B.S.R. .. 18/-



CONVERT THAT TV TO ITV **37/6**

with our COSSOR TURRET TUNER ZB2 P. & P. 2/-
 2-valve cascade R.F. amp, using one 7AN7 valve. One freq. Changer 8A8. Output from converter, sound 10.1 mc/s, vision 13.6 mc/s. Fitted with aerial panel, fine tuning control. Brand new in carton with full instructions and circuit. Suitable for use in sets made by: Coscor, Argosy, Baird, Decca, Murphy, Peto-Scott, Philips, Philco, Regentone, R.G.D. and Stella. Both Birmingham and London channels available.

"SUPER-THREE"

Transistor Pocket Radio

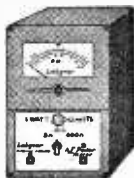


Printed circuit technique using 2 Surface Barrier type transistors one A.F. Trans and one Diode. Ferrite aerial, fully tunable on LW and MW. Uses 2 U16 1½ volt batteries. And easily assembled by the beginner. **Kit of Parts Complete 39/6** P. & P. 1/6

LABGEAR OUTPUT METER

£2.19.6 Complete Kit P. & P. 2/-

At last a Meter at the right price for the home constructor. An accurate Audio Power Output Meter. Two ranges 25mW to 1W and 1W to 10W. Accuracy 5% matched for 3, 15, 600 ohms with inst. and tech. data. New 3in. 0-1mA meter.



NOT GOVERNMENT SURPLUS

COSSOR RECORD PLAYER KIT

We can now supply the following **COMPLETE KIT £5.9.6** parts to build this P. & P. 5/- unit:
 (1) Player Case.
 (2) Garrard Motor B.A.I.
 (3) Amplifier 4 transistor.
 (4) Speaker.
 (5) Knobs. Plugs. etc.
 Suitable for 7in. 45 r.p.m.s.

17in. TUBE BARGAIN

Type CME/1702 90° by Mazda. Not surplus. Heater (amps) 0.3, Heater (volts) 12.6 (Seconds).

SPECIAL PRICE

£3.19.6

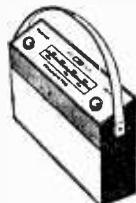
P. & P. 10/-

FERGUSON VHF/FM TUNER

This F.M. adaptor is completely self-contained and can be fitted to any A.C. mains radiogram or radio with P.U. sockets. Valves 2-EF80's, ECF80. Input 200-250v. A.C. range 80-98 Mc/s. **Greatly Reduced £13** P. & P. 2/-

YOUR EXISTING RADIOGRAM OR RECORD PLAYER CHANGED TO STEREO BY OUR STEREO ADAPTOR

Tech. Data 2 valves EF80 and EL84. Switch control for Stereo and Mono. Dual volume and tone control. Output 3 ohms, suitable for use with Acos GC/71, GP/73 and Garrard GC/10. Complete with wiring diagram. **£2.19.6** P. & P. 2/6



6-TRANSISTOR RADIO KIT

£9.15.0

P. & P. 1/6

6 transistor printed circuit, ferrite aerial, 5in. speaker, push-pull output, with 3 I.F. stages, and driver stage. Range MW 180-550 metres, LW 1,200-2,000 metres. Wooden case attractively covered in Blue and Grey washable vinyl.

WIRECOMP ELECTRONICS

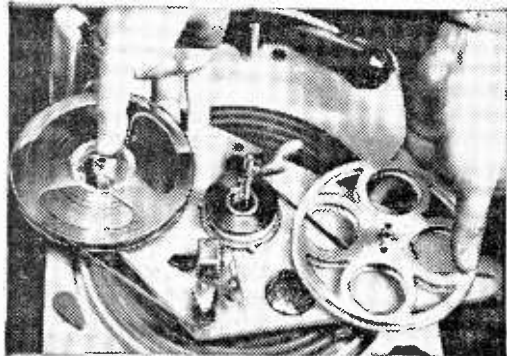
378 HARROW ROAD, LONDON, W.9 TEL.: CUNNINGHAM 9530

Hours of business: 9 a.m. to 6 p.m. Open all day Saturday? Opposite Paddington General Hospital. Buses 18B & 36 pass the door.

New! A TRULY REMARKABLE
BRITISH INVENTION!

Gramdeck

GRAMOPHONE TAPE RECORDER



Turns any gramophone into a superb TAPE RECORDER! and back into a record-player in a moment!

- ★ Plays at 7½ per sec. or 3 other speeds.
- ★ Records direct from radio or microphone.
- ★ Erase and fast rewind.

11 Gns.

YOURS FOR 13/- DOWN AND 18 FORTNIGHTLY SUMS OF 13/-. Ready to record, complete with Control Unit and 600 ft of Twintrack tape. Special moving coil microphone extra.

EASY TERMS

Gramdeck is an ingenious invention that instantly turns your gramophone into a tape-recorder and back into a gramophone at will! You simply slip it on to your turntable and you are ready to record direct-from-radio or microphone... the voices of your family... radio programmes... your favourite music—and you can instantly play it back through your own gramophone or radio with *Lifelike Fidelity*. Made by the people who make radar instruments for Viscounts and Britannias, the amazing Gramdeck now brings full tape-recording facilities to every gramophone owner at little extra cost.

As easy as putting on a Record

"Real hi-fi results." "Better than many so-called hi-fi recorders..." These are typical comments of famous technical journals. Gramdeck enables any gramophone owner to add superbly good tape-recording facilities to existing equipment, at a fraction of the usual cost. Full details, photos, specifications, Easy Terms, etc., are given in the Gramdeck Book. Send for your FREE copy today.

FREE BOOK—POST NOW!

Please send me the Gramdeck Book—FREE and without obligation.

NAME _____

ADDRESS _____

Gramdeck

GRAMOPHONE TAPE RECORDER

(Dept. PA813), 29-31 WRIGHT LANE, LONDON, W.8

GRAMDECK TURNS A TURNTABLE INTO A TAPE-RECORDER

SPECIAL FOR THE "HAMS" RADIO STATION

Illustrated

½ inch detachable bit
soldering instrument
List No. 70

Combined Protective Unit
with Wiper/Abrasion Pad
and Solder Reel
List No. 700

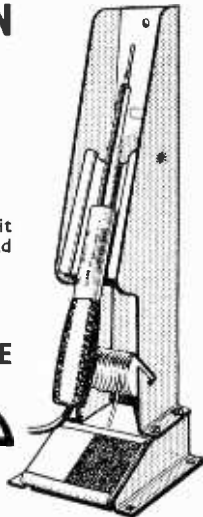
Apply **SALES & SERVICE**

ADCOLA

(Regd. Trade Mark)

**GAUDEN ROAD
CLAPHAM HIGH ST.
LONDON, S.W.4**

Telephones:
MACaulay 4272 - 3101



British & Foreign
Patents, Registered
Designs, etc.

Telegrams:

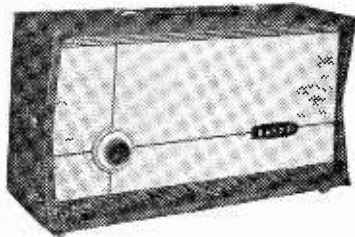
"SOLOINT, LONDON"

Baird

**4-WATT HIGH QUALITY
AMPLIFIERS**

in handsome Portable Cabinet measuring 15 x 9 x 6 in. (depth). Built-in power supply—Complete, ready to operate. Separate Tone and Volume Control.

2 VALVES
EZ80 and
ECL82 7x4in.
ELLIPTICAL
speaker—
ideal for
converting
record
players and
radiograms
to stereo—
take
advantage
of this offer!



NORMAL PRICE 9 Gns.

- TERMS - CASH WITH ORDER
- 7-Day Money Back Guarantee

89/6

BEAVER RADIO

60 WHITECHAPEL, LIVERPOOL, 1.

Trade News

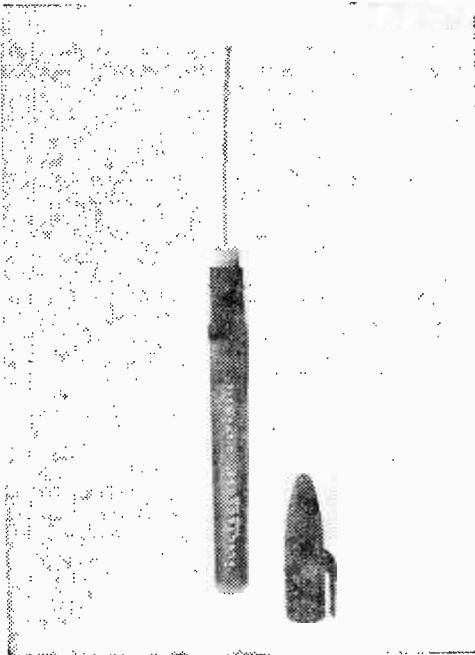
NEW PRODUCTS AND DEVELOPMENTS

SAFARI PORTABLE RADIOGRAM

THIS lightweight radiogram is powered by three 9V batteries which make it completely portable. The Safari is a nine transistor model with a long and medium waveband radio section incorporated. It will accommodate all sizes of records on a four-speed auto-stop record player with a turnover cartridge and sapphire styli for 78 r.p.m. and long playing records. A combined volume and tone control, wavechange switch, radio/off/gram switch and tuning control are located on the front panel. The cabinet is covered with imitation leather and is available in two colours—red and natural and tan and natural. The price is 37 guineas and this model may be obtained from *Dynatron Radio Ltd., Maidenhead, Berks*

ELECTROLUBE POCKET DISPENSER

A POCKET size "Pen" type dispenser which enables low resistance lubricant to be economically applied to otherwise inaccessible places has been introduced by *Electrolube Ltd.* A sharp pull on the fountain-pen type cap automatically releases a thin 3in. nylon "Snorkel" tube which

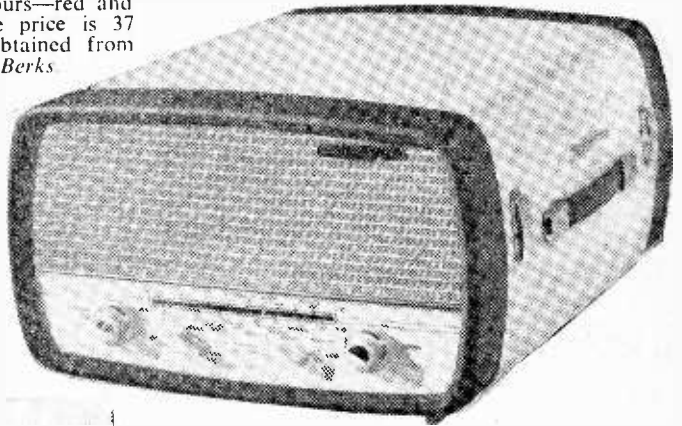


The Electrolube "Pen" type pocket dispenser.

permits direct application of controlled drops when the reservoir body is squeezed or flexed. The amount of pressure on the nylon reservoir body controls the amount of lubricant used. The handy pocket dispenser is made by *Electrolube Ltd., Oxford Avenue, Trading Estate, Slough.*

CAPACITOR PRECISION DECADE BOX

A LOW-PRICED capacitor precision decade box, Model DC-1U-F, has been introduced by *Beulah Electronics.* This instrument provides



The Safari Portable Radiogram.

capacity values from 100pF to 0.11 μ F steps so that exact capacitor values are available for determination of capacitor values in compensating networks, filters, etc. Precision 1 per cent silver-mica capacitors are employed for high accuracy. Switches are ceramic wafer types for minimum loss and feature smooth action. The price is £9 net. *Beulah Electronics, 138, Lewisham Way, New Cross, London, S.E.14.*

REFLECTOGRAPH TAPE RECORDER

THIS tape recorder, Model A, has separate record and playback amplifiers providing continuous monitoring from the tape with provision for instant comparison between input signal and recorded signal. The recorder will take spools up to 8 $\frac{1}{2}$ in. Further information on this model may be obtained from *Multimusic Ltd., Maylands Avenue, Hemel Hempstead, Herts.*

PUSH BUTTON CAR RADIO

PUSH button station selection and wavechange is the main feature of a new car radio introduced by *Philips.* Model 493VT uses four valves plus transistor output stage and tone control is continuously variable. All connections are on flexible leads and an adjustable aerial trimmer is mounted externally in the aerial lead. Model 493VT retails at 28 guineas and is manufactured

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

PAM STEREOPHONIC RADIOGRAM

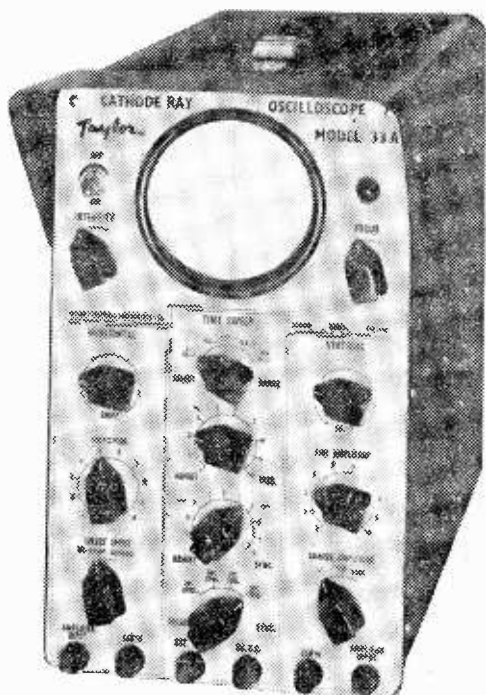
ONE of the new models from Pam (Radio & Television) Ltd. is the RG.630 stereophonic radiogram. This has a three waveband VHF radio and four-speed stereo/mono record player complete in one cabinet. Two wide range loudspeakers are fitted on the swing doors which may be closed when not listening to stereo. Model 630 measures 21½ in. high plus 11 in. legs, 33 in. wide and 15½ in. deep with ample record storage space. The makers are Pam (Radio & Television) Ltd., 295, Regent Street, London W.1.

NEW OSCILLOSCOPE

MODEL 33a is a new oscilloscope recently released by Taylor Electrical Instruments Ltd. This instrument has a hard time base having good synchronisation characteristics covering the wide range of frequencies from 2c/s to 100kc/s and can be operated either free running or triggered. Horizontal and vertical amplifiers with push-pull output are provided, the latter being of high gain with a frequency range extending from a few cycles per second to 60Mc/s. Further information on the oscilloscope, including the price, may be obtained from Taylor Electrical Instruments Ltd., Montrose Avenue, Slough.

TWO NEW "STELLAPHONES"

TWO new tape recorders have been added to the range of "Stellaphone" recorders. They are the ST.455 and the ST.454 selling at 59 guineas and 37 guineas respectively. Both these models have four-track operation. Model ST.455 is a three-speed recorder housed in a portable cabinet



The Taylor oscilloscope—Model 33a.

with a detachable lid. Model ST.454 is a single speed instrument with push-button operation. Details of these tape recorders may be obtained from Stella Radio & Television Co. Ltd., Astra House, 121-123, Shaftesbury Avenue, London, W.C.2.

SHURE TAPE HEADS

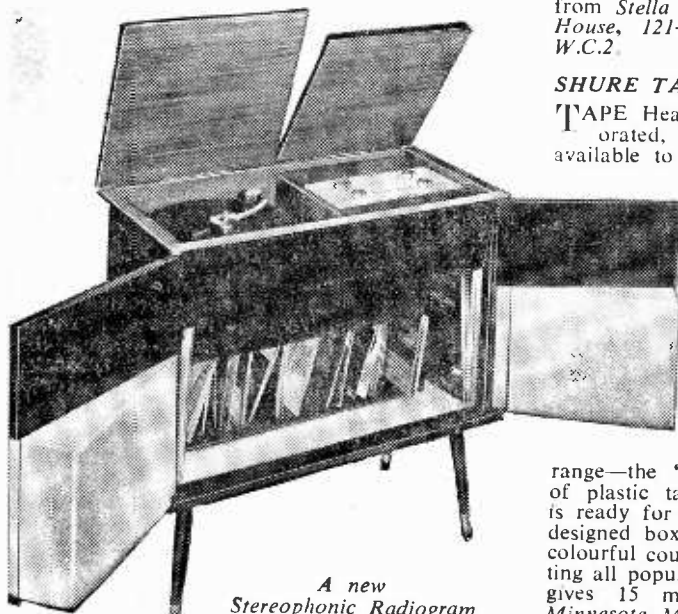
TAPE Heads made by Shure Brothers Incorporated, Evanston, Illinois, U.S.A. are now available to manufacturers in the U.K.

The range includes the new 4-track Stereo Tape Head Model TR54A and Stereo Erase Head Model TE28A.

Full details and specifications can be obtained from the sole U.K. representative of Shure Brothers—Mr. J. W. Maunder—at 95, Hayes Lane, Beckenham, Kent.

"ONE-FIVE SPECIAL"

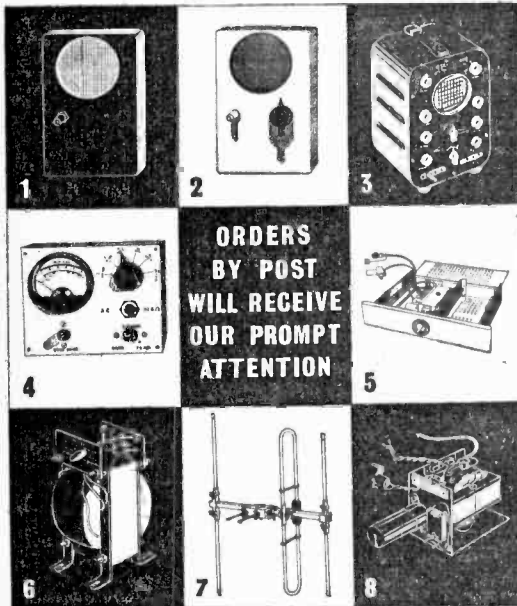
THE makers of "Scotch" Brand Magnetic tapes have added their latest addition to the range—the "One-five Special". With 150 feet of plastic tape on a 3 in. reel, the "Special" is ready for instant mailing in its own specially designed box, and is available to Retailers in a colourful counter display containing 12 reels. Fitting all popular recorders, the "One-five Special" gives 15 minutes playing time at 3½ in./sec. Minnesota Mining and Manufacturing Co. Ltd., 3M House, Wigmore Street, London, W.1.



A new
Stereophonic Radiogram
from Pam—Model RG.630.

CHECK with these

BARGAINS



ORDERS BY POST WILL RECEIVE OUR PROMPT ATTENTION

- 1-2-TRANSISTOR POCKET RADIO** with MINIATURE SPEAKER, PRINTED CIRCUIT and FERRITE ROD. Size 3½ x 4½ x 1½ in. Tunable over medium and long waves. Set of parts including ivory coloured case, 2 transistors and all necessary components (less batteries—available anywhere at 10d.). 22/6, P. & P. 1/6. Wiring diagram 1/6, free with kit.
- 3-TRANSISTOR POCKET RADIO** with MINIATURE SPEAKER. Plus Germanium Diode and Printed Circuit. Size 3½ x 4 x 1½ in. Ferrite Rod Aerial. Two Surface Barrier Transistors and one Audio. Tunable over medium and long waves. To build yourself 39/6, P. & P. 1/6. Circuit diagram 1/6, free with kit. All parts of items 1 and 2 sold separately.
- DOUBLE BEAM "SCOPE"** for D.C. and A.C. APPLICATIONS. A high gain, extremely stable differential Y-amplifier (30 mV/C.M.). Provide ample sensitivity with A.C. or D.C. inputs. Especially suitable for measurements of transistor operating conditions where maintenance of D.C. levels is of paramount importance. Push-pull X amplifier; Fly-back suppression; Internal Time-base Scan Waveform available for external use; pulse output available for checking TV line O/P Transformers, etc. Provision for external 1-1/2" and CRT Brightness Modulation. A.C. mains 200/250 v. £19.19.0 P. & P. 7/6 or 50/- deposit plus P. & P. 7/6 and 12 monthly payments of 33/4. FULL 12 MONTHS GUARANTEE INCLUDING VALVES and TUBE.
- A.C./D.C. POCKET MULTI-METER KIT.** 2½ in. moving coil meter, scale calibrated in A.C./D.C. volts, ohms and milliamperes. Voltage range A.C./D.C. 0-50, 0-100, 0-250, 0-500. Milliamperes 0-10, 0-100. Ohms range 0-10,000. Front panel, range switch, wirewound pot (for ohms zero setting), toggle switch, resistor and rectifier. 19/6, P. & P. 1/6. Wiring diagram 1/-, free with kit.
- CHANNEL TUNER.** Will tune to all Band I and Band III stations. Complete with P.C.C.84 and P.C.F.50 valves (in series) I.F. 16-19 or 33-28. Can be modified as an aerial converter (instructions supplied). 32/6, plus 3/6 P. & P. HEATER TRANSFORMER to suit above, 200-250 v., 8/-, plus 1/6 P. & P.
- MAINS TRANSFORMERS.** All with tapped primaries, 200-250 volts, 0-160, 180, 200 v., 60 mA, 6.3 v., 2 amps, 10/6, 250-0-250 80 mA, 6.3 v., 2 amp, 6.3 v., 1 amp, 10/6, 350-0-350 v., 70 mA, 6.3 v., 1 amp, 8.3 v., 2 amp, 10/6, 250-250 v., 70 mA, 6.3 v., 2 amp, 10/6, P. & P. 3/-.
- WOLSEY 3-ELEMENT FOLDED DIPOLE.** I.T.V. Aerials less mounting bracket for external use, complete with 12 yds. of coaxial cable, 15/-; 4-element, 17/6. P. & P. 3/6.
- BUILT POWER SUPPLY UNIT.** A.C. Mains 200-250 v. D.C. Output 250 v. at 75 mA. Also 6.3 v., 2 amp; heater winding. 21/-, P. & P. 3/6.
- SIGNAL GENERATORS.** Cash £4.19.6 or 25/- deposit and 4 monthly payments of 21/6, P. & P. 5/-. Coverage 120 kc/s to 84 Mc/s. Case 10 x 6½ x 4½ in. Size of scale 6½ x 3½ in. 2 valves and rectifier. A.C. mains 200-250 v. Internal modulation of 400 c.p.s. to a depth of 30 per cent, modulated or unmodulated R.F. output continuously variable 100 millivolts. C.W. and mod. switch variable A.F. output. Magic eye as output indicator. Accuracy ± 2 per cent.

- SIGNAL GENERATORS.** Cash £4.19.6 or 25/- deposit and 4 monthly payments of 21/6, P. & P. 5/-. Coverage 120 kc/s to 84 Mc/s. Case 10 x 6½ x 4½ in. Size of scale 6½ x 3½ in. 2 valves and rectifier. A.C. mains 200-250 v. Internal modulation of 400 c.p.s. to a depth of 30 per cent, modulated or unmodulated R.F. output continuously variable 100 millivolts. C.W. and mod. switch variable A.F. output and moving coil output meter. Accuracy ± 2 per cent.
- BATTERY RECORD PLAYER AND AMPLIFIER.** Comprising 45 r.p.m. "Starr" motor, "Acos" crystal pick-up, 3 transistor push-pull amplifier, complete with transistors. Output 500 milliwatts, 49/6, P. & P. 3/6.
- 3-WATT PUSH-PULL AMPLIFIER COMPLETE WITH CRYSTAL MIKE AND 5in. LOUDSPEAKER.** A.C. mains 200-250 v. Size 10½ x 8½ x 2½ in. 6 valves, 11 P. pent., 2 triodes, 2 output pens and rectifier. For use with all makes and type of pick-up and mike. Negative feed back. Two inputs, mike and gram, and controls for same. Separate controls for Bass and Treble lift. Response flat from 40 cycles to 15 kc/s. ± 2 db; 4 db down to 20 kc/s. Output 3 watts at 5 per cent total distortion. Noise level 40 db down all band. Output transformer tapped for 3 and 15 ohms speech coils. For use with std. or L.P. records, musica instruments such as guitars, etc. £4.19.6, P. & P. 7/6 or 20/- deposit plus P. & P. 7/6 and 4 monthly payments of 23/-.
- E.S.R. MONARCH UAS WITH FUL-FI HEAD.** 4-speed, plays 10 records, 12in., 10in. or 7in. at 16, 33, 45 or 78 r.p.m. Intermixes 7in., 10in. and 12in. records of the same speed. Has manual play position: colour brown. Dimensions: 12½ x 10½ in. Space required above base-board 4½ in., below base-board 2½ in. Fitted with Push-FI turnover crystal head. £6.19.6 P. & P. 5/-. With Stereo Head. £7.19.6, P. & P. 5/-.
- TRANSISTOR TESTER.** For both P.N.P. and N.P.N. transistors incorporating moving coil meter. In metal case, size 4½ x 3½ x 1½ in. Scale marked in gain and leakage. 19/6, P. & P. 2/6.
- PUSH-PULL OUTPUT STAGE** inclusive of transistors with output and output transformer to match 8 ohms speech coil, suitable for use with the POCKET RADIO. Kit of parts, including transistors. 19/6, P. & P. 1/6. Wiring diagram 1/6, free with kit.
- PORTABLE AMPLIFIER.** On printed circuit for A.C. Mains 200/250 v. Size 4 x 3 in. with tone and volume control. Valves: ECL82 and E280. 39/6, P. & P. 2/6.



SATISFACTION GUARANTEED OR MONEY REFUNDED

RADIO & T.V. COMPONENTS (Acton) LTD.

23A HIGH STREET, ACTON, LONDON, W.3
ALL ENQUIRIES S.A.E.
GOODS NOT DISPATCHED OUTSIDE U.K.

LASKY'S RADIO

"VANCOUVER" 3-TRANSISTOR POCKET RADIO

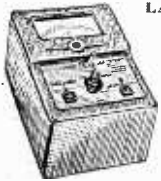
Plus germanium diode on printed circuit, size 3½ x 4 x 1½ in., incorporating ferrite rod aerial. Tuneable over med. and long waves. Extremely simple to build. Can be built for 39/6. Post 1/6. Circuit diagram 1/6 (free with parcel).



LABGEAR A.F. POWER METER KIT

Two ranges: 25 milliwatts to 1 watt; 1 watt to 10 watts. Accuracy 5% and matched for 3, 15 and 600 ohms. Ideal for constructors, hi-fi enthusiasts, engineers.

COMPLETE KIT with full step-by-step instructions, circuit, data, 59/6. Post 1/6.



STEREO ADAPTOR (or SINGLE-END AMPLIFIER)

Converts any radiogram to give stereophonic reproduction. 2-valve amplifier using EF80X and EL84 metal rectifier (full-wave bridge). Mains voltage 195-250, 50/60 c.p.s. Ganged volume control and ganged tone control.

LASKY'S PRICE. Complete with printed circuit, circuit diagram, full service data and two new valves. 59/6 Post 3/6.

SPECIAL COMBINED OFFER
The above, plus Acos 73-la Stereo Cartridge and 6 or 8 in. Speaker. 95/- Post 5/-.

BUILD THE "EASY SIX" TRANSISTOR PORTABLE. Medium and Long wave, for Only 49.15.0 p. & p. 1/6. Instructions and circuit diagram 1/6 (free with parcel).

LASKY'S CAR RADIO 12 v. operation, transistor output, medium and long waves. Can be built complete with speaker for £11.19.6. Post 3/6. Booklet 2/6.



(rounded if you order).

LASKY'S 100-date COMPONENTS CATALOGUE, will save you pounds. Price 2/-, post 6d. Our latest 12-page Bargain Bulletin included free (separately, price 6d.).

3-SPEED TRANSISTOR RECORD PLAYER

CAN BE
BUILT
FOR
£9.19.6

Carr. 7/6



6 v. operation.

For all L.P. and standard records. All components available separately.

AMPLIFIER. 300 milliwatts push-pull output, using two OC71 and two OC72 transistors. Fully assembled, 79/6. Knobs, 3/6 extra.

LOUDSPEAKER. 30 ohms 7 x 4 in. elliptical, matched to Amplifier, 25/-.

3-SPEED TURNTABLE. 6 v., with rubber mat and speed adjustment, complete with t.o. crystal cartridge and two sapphire styli. 79/6.

CARRYING CASE, as illustrated, handsome two-tone finish. 17 in. deep, 14 in. wide, 5 1/2 in. high. Well made and finished. 49/6. Batteries extra.

207 EDGWARE ROAD, W.2 Near Praed Street PAD 3271/2
Both addresses open all day Saturday.

42 TOTTENHAM COURT ROAD, W.1. MUS 2605

All Mail Orders to Lasky's Radio Dept. PW, 207 Edgware Road, London W.2.

The least expensive way to high fidelity is an *Armstrong* chassis

JUBILEE Mk 2 (illustrated) 29 gns.

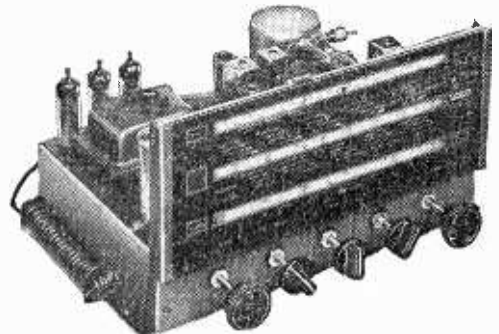
The new and improved version of the famous Jubilee chassis. VHF, with automatic frequency control, and medium and long bands. Separate tone controls. Tape record and playback inputs. The improved amplifier provides 8 watts push-pull output.

STEREO 44 27 gns.

A stereo and mono chassis providing 8 watts output and covering the full VHF and medium bands. Stereo and mono inputs for pick-ups, tape record and playback. Separate tone controls and dual volume control for ease of balancing.

AF 208 22 gns.

An AM/FM chassis, of 5 watts output, covering the VHF and medium bands. Although an economically priced chassis this has the same superior finish and components as our more expensive models.



A large part of the cost of a radiogram relates to the cabinet (and purchase tax). Use an existing cabinet and replace the old unit with an Armstrong chassis or fit a chassis into a new cabinet or convenient bookshelves. In this way your expenditure goes wholly into the quality of reproduction.

The name ARMSTRONG is the registered trade mark of
ARMSTRONG WIRELESS & TELEVISION Co. Ltd.
WARTLERS ROAD, LONDON N.7. Tel.: NOR 3213

Post this coupon or write for free catalogue or call at our Showroom for full demonstration and professional advice on your installation. Open 9—5.30 weekdays, 9—5 Sats.

NAME _____

ADDRESS _____

PNC

Club News

REPORTS OF CURRENT ACTIVITIES

AMATEUR RADIO CLUB OF NOTTINGHAM

Hon. Sec.: E. C. Weatherall, 16 Aveberry Close, Clifton, Nottingham.

September 22nd saw the opening of a course of R.A.E. instruction for newcomers. The course is under the direction of A. Davis, G3LXL, and classes will continue to be held throughout the winter.

Future Events:

October 4th—Open Night.

October 25th—"The Panoramic Adaptor" by G3JWQ.

AMATEUR RADIO MOBILE SOCIETY

Hon. Sec.: N. Fitch, 79 Murchison Road, London, E.10.

"Uncle Tom's party", an annual club event, took place this year at Bishop's Stortford, Hertfordshire, on August 28th.

Future Event:

November 12th—Gala buffet and ball.

CALCOT RADIO SOCIETY

Hon. Sec.: F. D. Mitchenall, 12 Glenwood Drive, Tilehurst, Reading.

During October two lectures were given for club members in St. Birinus' Church Hall. One was on transistor portable receivers, by S. Woodward; and the other on transistor circuitry, by J. A. B. Dunn.

Future Event:

November 25th—A lecture and demonstration on recording TV pictures on tapes will be given at St. Birinus' Church Hall, Calcot. Reading.

DERBY AND DISTRICT AMATEUR RADIO SOCIETY

Derby and District College of Art, Green Lane, Derby.

Hon. Sec.: F. C. Ward, 5 Uplands Avenue Littleover, Derby.

The estimated number of visitors who attended this year's Mobile Rally was 1,000, some 500 less than last year and it is thought that the unsettled weather was responsible for the reduced attendance.

At the time of closing the transmitters at 2.45 p.m. G3ERD/A on 160m had contacted 41 mobiles and G3EEO/A on 2m had worked seventeen.

A car park check at 3.15 p.m. provided a count of 215 cars, 65 of which had been equipped for mobile operation. The visitors log was closed at 3.30 p.m. and showed a total of 461 which included 163 call signs among which was ON4GK Theodore Nissen from Antwerp who, incidentally was the lucky recipient of the major raffle prize, an Electric Washing Machine.

The Mobile Competition was of a novelty nature being based on an elimination competition. The winner was F. James, G6NW, from Hayes, who carried off the other Washing Machine. The runner up was P. Hill, G3NPU, of Eastbourne.

The main programme commenced at 2 p.m. but the Children's Sports were somewhat curtailed due to a shower of rain. The flying display was also postponed to 5.15 p.m. A new feature was a display of unarmed combat by members of the Derby Olympus Judo Club, this created quite an attraction.

The main hall was packed to capacity for the start of the Monster Junk Sale at 3.45 p.m. Business was brisk for the next 45 minutes whilst the Chairman, Tom Darn, G3FGY, auctioned the oddest variety of articles to the amusement of the crowd of well over 600.

Raffle prizes were presented at 5 p.m. by the President's wife, Mrs. A. G. G. Melville, after which a 60-minute Cartoon Film Show was screened for the juniors while parents refreshed themselves in the School Refectory where refreshments were in the hands of the Treasurer, Harry Shaw, assisted by members' families and friends.

Quite a lot of new friendships were made but some of the old faces were missing. Suggestions and criticisms will be welcomed by the Chairman of the Organising Committee, G3FGY.

EXETER AMATEUR SOCIETY

Hon. Sec.: J. Duff, 70 Cranford Avenue, Littleham Cross, Exmouth, Devon.

New members are invited to attend club meetings in the recently acquired clubroom at the Exeter Y.M.C.A. The club meets on the second Thursday of each month.

LIVERPOOL AND DISTRICT AMATEUR RADIO SOCIETY

Hon. Sec.: H. James, G3MCN, 448 East Prescott Road, Knotty Ash, Liverpool 14.

During October the Society held its Annual General Meeting.

Future Events:

October 11th—G3MCN "Vacation in Holland." Illustrated by colour slides.

October 18th—Open night.

October 25th—G3H11 talk on "TV Studio Work".

MITCHAM AND DISTRICT RADIO SOCIETY

Hon. Sec.: M. Pharaoh, G3LCH, 1 Madeira Road, Mitcham.

A lecture, by G3JJG, on Third Method Single Side-band for the Amateur, was held on September 9th; and a lecture and demonstration on 23cm equipment was given by G3FP on the 23rd of the same month.

Future Events:

October 7th—Lecture on Colour Television by the BBC.

November 18th—Talk by Collins Radio Co.

PLYMOUTH RADIO CLUB

Hon. Sec.: R. Hooper, 2 Chestnut Road, Peverell, Plymouth, Devon.

The clubroom is again open for the Tuesday evening meetings. The aerial at the clubroom has been resited and it is hoped that more interesting contacts will result during the coming winter.

Future Event:

October 18th—Junk Sale.

STOKE-ON-TRENT AMATEUR RADIO SOCIETY

Hon. Sec.: V. J. Reynolds, G3COY, 90 Prince's Road, Hartshill.

Stoke-on-Trent, Staffordshire.

The Stoke-on-Trent A.R.S. has, in recent months, been on the air from several exhibitions and rallies. 1960 is the city's jubilee year, and for the period of the celebrations the special call-sign GB3SOT has been used in place of the more familiar call of the society (G3GBU).

The society's most recent event was "The Rally of Boats". This was in co-operation with the local boat club who staged their national boat rally. Several craft were fitted for FM operation.

WELLINGBOROUGH RADIO CLUB

Hon. Sec.: P. E. B. Butler, 88 Wellingborough Road, Rushden.

Northamptonshire.

During the summer recent the club TX has been completely overhauled and G3KSC rebuilt the modulator.

Future Event:

November 3rd—Film night on British Railways.

WEST MIDDLESEX TAPE RECORDING CLUB

Hon. Sec.: H. E. Saunders, 20 Nightingale Road, Hampton, Middlesex.

The meeting at St. George's Hall, Southall, on Thursday, August 25th, was taken up with playing back the unedited tapes of the visit to Whipnade Zoo, and it was decided to play them again at Hampton on September 8th, with a view to consolidating all three efforts to make a feature tape in due course. Also, a further tape from Fred Gazelev concerning his scheme for the Blind, was played, and a recording made of the subsequent discussion.

The meeting felt that Fred could best be helped by individual offers of help such as dubbing, reading and technical assistance, as such help was liable to be required at short notice which rather ruled it out as a Club activity.

The next meeting was at the Railway Hotel, Station Road, Hampton, at 7.30 p.m. on Thursday, September 8th, to listen to the Whipnade tapes and make rude comments thereon, and the second meeting of the month was at the St. George's Hall, Lancaster Road, Southall, at 8 p.m. on Thursday, September 22nd. Stanley Mace also presented a tape entitled "The Bird-Watcher's Dilemma".

We seem to be standardised for a while in our meeting place. There will be two meetings per month until further notice. On the second Thursday of the month at the Railway Hotel, Station Road, Hampton, and on the fourth Thursday of the month at St. George's Hall, Lancaster Road, Southall. The Hampton meetings start at 7.30 p.m., and the Southall meetings start at 8 p.m., and refreshments are provided.

We are attempting to obtain some specially written playlets or sketches suitable for recording, from a local author who has won several prizes for his material, and it is hoped to arrange future recording sessions for putting these on to tape.

Future Events:

October 13th—At the Railway Hotel, Station Road, Hampton, Bruce Bargavel will be singing, with a pianist, and Members are invited to bring along their equipment to do some live recording of voice and piano.

October 27th—A visit from a leading tape-recorder manufacturer, for a demonstration.

November 10th—Members are invited to bring along their home-made equipment and gadgets for the approbation of their fellows.

Short-wave Listeners' Log—3

SHORT wave enthusiasts who can read Morse will usually find many interesting signals on any active band. In order to produce an audible tone from C.W. transmissions, the receiver beat frequency oscillator has to be operating. Receivers of other types than "communications" may not be fitted with a B.F.O. In this case a unit can be made by making a simple one-valve oscillator. Any small triode or H.F. pentode will serve. Current is drawn from the receiver, and the coil tunes to about the intermediate frequency of the receiver. The oscillator is coupled to the detector diode by a small capacity such as an insulated loop round the diode connection.

Setting a B.F.O.

When initially setting a B.F.O., tune in a signal with it switched off. The B.F.O. frequency is adjustable with a small condenser (e.g. 25pF) and the audio tone produced will be the difference between receiver I.F. and B.F.O. frequency (e.g., for a 465kc/s I.F. tuning the B.F.O. to 466kc/s or 464kc/s would give 1kc/s, or 1000cs. audio output).

With communications receivers having a crystal filter or single-signal circuit, the B.F.O. should be adjusted to the high frequency side of the I.F., so that the heterodyne image can fall in the crystal rejection notch. With simple T.R.F. receivers, C.W. Morse can be heard by bringing the detector into oscillation and tuning slightly to one side of the transmitter frequency.

If little proficiency in code reading has been gained, it is as well to choose the amateur bands, selecting slow, clear signals free from chirps and tails, and clearly keyed. The 80m band will often

provide stable, clear local C.W. signals. On this band most messages heard will be in English.

Amateur and Commercial Stations

When some speed in reading has been obtained, various commercial and similar stations may be selected. When 12w.p.m. can be copied, it will be found that occasional snatches at 16, 20, or even more words per minute can be taken down. At this stage it may be found that a stable, cleanly keyed 16w.p.m. commercial transmitter is easier to read than 10 or 12w.p.m. from a chirpy, poorly-keyed amateur station. Unfortunately, many commercial signals will be in cipher, though some are in plain English.

The various stations previously listed generally continue to be well received at the times given. In many cases the English transmissions that are beamed towards this country are of excellent signal strength.

The New Amateur Band

Attention to the fairly new 15m amateur band is worth while for long range Dx. This band covers 21.0Mc/s to 21.45Mc/s and in favourable conditions has a long skip distance. Very good reception has been obtained from the far east, west, and Africa.

When conditions are good, U.S.A. amateurs can sound almost like "locals" on the 15m and 20m bands. Many long distance commercial stations also employ frequencies in the neighbourhood of 19m to 20m, 16.75m to 17m, and 13.8m to 14m, and excellent reception of these is quite usual.

Six-Valve Top-Band Tx

(Continued from page 597)

city; if we now slightly reduce its capacity, it will be found that the dip which occurs on rotation of the anode tuning condenser is less pronounced. It may be found, for example, that instead of the dip down to 10mA which we had originally, the dip is now only to 15mA (corresponding to a power input of 4½W). It will also be found that the aerial current indicated by M2 is now considerably greater. All we need do, therefore, to load up to 10W is gradually to reduce the value of the aerial tuning condenser until the dip produced by the anode tuning condenser is about 33mA.

While we have the dummy aerial connected up it is interesting to determine the approximate efficiency of the P.A. stage. Let us suppose that the transmitter has been loaded up to 10W, and that the aerial current meter M2 reads 250mA (i.e. ¼A). Now,

$$P = I^2 R$$

$$\text{Power dissipated in } 80\Omega \text{ dummy load} = (1/4)^2 \times 80W \\ = (80/16)W \\ = 5W$$

$$\text{Efficiency} = [\text{Output power}/\text{Input power} \times 100]\% \\ = (5/10) \times 100 \text{ per cent} \\ = 50 \text{ per cent.}$$

It is also well worthwhile at this stage to monitor the transmission. This can be carried out in a variety of ways; the one the writer prefers is shown in Fig. 6. It is, in effect, an extremely simple crystal set which can be connected to the output of the transmitter. If the modulation seems satisfactory one can then proceed to remove the dummy aerial and plug in the aerial itself.

Conclusion

As stated earlier in the article, the actual length of the aerial is not very critical from the point of view of loading up the transmitter. Those without very much garden space will find that a 66ft wire, erected as high as possible, will give good results. If space is available, a quarter-wave end-fed aerial is very satisfactory; it may be fed with 80Ω coax without introducing too great a mismatch. The aerial used by the writer is half-wave and end-fed, about 35ft high at the highest point. In the space of about six months, over 30 counties of the British Isles have been contacted on phone.

C.R.T. ISOLATION TRANSFORMERS
 TYPE A OPTIONAL 25% and 50% BOOST.
 2 V. OF 4 V. OR 8.3 V. OR 10.8 V. OR
 13.5 V. MAINS INPUT. 12/6

TYPE A2 HIGH QUALITY LOW CAPACITANCE
 10/15 mF. OPTIONAL BOOST 5% 51%
 75% MAINS INPUT. 16/6

TYPE B MAINS INPUT. MULTI OUTPUT 2.
 4, 8.3, 7.3, 10 and 13 VOLTS. BOOST 25%
 AND 50%. LOW CAPACITY. 21/-

TRIMMERS. Ceramic. 30, 50, 75 pF. 9d., 100 pF. 15p.
 150 pF. 1/3. 250 pF. 1/6. 500 pF. 750 pF. 1/9.

RESISTORS. Preferred values. 10 ohms to 10 meg.
 4 w., 4d., 1 w., 4d.; 1 w., 6d., 1 w., 8d.; 2 w., 1/1.
HIGH STABILITY. 4 w., 1%, 2/-. Preferred values.
 10 Ω to 10 meg. Ditto 5% 100 Ω to 5 meg. 9d.

5 watt } WIRE-WOUND RESISTORS 1/8
 10 watt } 25 ohms-10,000 ohms 1/6
 15 watt } 2/-

PLASTIC RECORDING TAPE

Long Play 7in. reel, 1,700ft	32/6	Spare
5in. reel, 1,200ft	22/6	Plastic
5in. reel, 550ft	17/6	Reels
5in. reel, 225ft	7/6	3/- ea.
Standard 7in. reel, 1,200ft	27/-	Metal
5in. reel, 850ft	17/6	Reels
5in. reel, 600ft	15/-	2/- ea.

"Instant" Bulk Tape Eraser and Head De-
 fluxer 200/250 v. A.C. 27/6. Leaflet, S.A.E.

O.P. TRANSFORMERS. Heavy Duty 50 mA. 4/6.
 Miniature, 384, etc., 4/6. Multitap push-pull 7/6.
 Push-Pull 10 w., 16/6. 20 w. 8K or 8K, 30/6.

L.F. CHOKES 15/10 H. 60/65 mA. 5/-, 10 mA. 14/-
 55 mA. 10/6; 10 H. 120 mA. 12/6 10 H. 150 mA. 14/-

MAINS TRANSFORMERS: 900/250 v. A.C.
 STANDARD. 250-0-250 80 mA. 6.3 v. 3.5 a.
 tapped 4v. 1a. resistors 6.3 v. 1 a. 5v. 22/6
 2 a. or 2 v. 2 a. ditto 550-0-550... 10/6

MINIATURE. 200 v. 20 mA. 6.3 v. 1 a. 10/6
 MIDGET 220 v. 45 mA. 6.3 v. 2 a. 16/6
 SMALL. 220-0-220, 65 mA. 6.3 v. 3.5 a. 17/6
 STD. 250-0-250, 65 mA. 6.3 v. 3.5 a. 17/6
 HEATER TRANS. 6.3 v. 14 amp. 7/6
 Ditto tapped sec. 2, 4, 6, 3 v. 14 amp. 8/6
 Ditto, sec. 6.3 v. 3 amp. 10/6

ALADDIN FORMERS and core. 7in., 8d.; 7in., 10d.
 0.3in. FORMERS 5937/8 and Cans TV12. 7in. sq. x
 2 1/2in. and 7in. sq. x 1 1/2in. 2/- ea., with cores.

COLON Midget 10in. 200/10v. or 220/40v. 25w. 24/-
 REMPLY Instrument 10in. 220/40v. 25 w. 17/6.

MAINS DROPPERS. 3in. x 1 1/2in. Adj. Sliders
 0.3 amp., 1600 ohms. 4/3. 0.2 amp., 1000 ohms. 4/3.
 LINE CORD. 9.3 amp., 60 ohms per ft. (0.2 amp.), 100
 ohms per ft. 2-watt. 8d. (0.1 v. 3-watt). 7d. per ft.

LOUDSPEAKER P.M. 3. 300-Ω. 17/6
 8in. Piesey 18/6. 6in. x 4in. Rola. 18/-. 6in. Rola.
 18/6. 4 in. x 2in., 10/- x 6in., 27/6. 10in. Rola. 30/-
 4in. Tweeter 25/-. 12in. R.A. 30/- x 9 in. 25/-
 STENTORIAN HF1012. 10in. 3 to 15 ohm 10 w. 95/-
 12in. BAKER FOAM SUSPENSION. 15 ohms. 28.
 CRYSTAL DIODE. G.E.C. 4in. GEX34. 4/-
 HIGH RESISTANCE PHONES. 4,000 ohms. 15/- pr.
 MIKE TRANS. 50-1. 3/8 ea.: 100:1. Potated. 10/6.
 SWITCH CLEARER. 7 1/2in. 3/6. 10in. 4/6
 TWIN GANG TUNING CONDENSERS. 365 pF.
 miniature lin. x 1 1/4in. x 1 1/4in. 10/-, 0.0005 standard
 with trimmers, 9/-; less trimmers, 8/-; midget, 7/6.
 SINGLE. 50 pF. 2/6; 80 pF. 100 pF. 160 pF. 7/-
 Solid dielectric 100, 300, 500 pF 3/6.
 SPEAKER FRET. GOLD CLOTH. 7 1/2in. x 2 1/2in., 5/-
 2 1/2in. x 3 1/2in., 10/-. Tysan. 4ft 6in. wide. 10/- ft.
 2ft 3in. wide. 5/- ft. Samples S.A.E.

New and Boxed VALVES 90-day Guarantee.

1R5	7/6	6K8G	7/6	EABC80	8/6	EY88	10/-
1R5	7/6	6L6G	10/6	E91	8/-	HAB080	9/6
1T4	8/-	6N7M	8/6	EBC38	8/6		12/6
2X2	8/6	6Q7G	7/6	EBFC41	8/6	EV82A	6/8
384	7/6	68A7	8/-	EBF80	10/-	MU14	9/-
5V3	7/6	68J7M	6/6	ECC84	9/6	PCCR84	9/6
5U4	7/6	68N7	6/6	ECC80	9/6	PCP80	9/6
5Y3	7/6	6V8G	6/6	ECH42	10/6	PC182	11/6
5Z4	9/6	6X4	7/6	ECL82	10/6	PE828	6/6
6AM6	5/-	6X5	6/6	EF39	5/6	PI82	10/6
6BR5	5/6	12A77	8/-	EF41	9/6	PY80	7/6
6BR6	7/6	12A7	8/-	EF50	5/6	PY81	7/6
6BR6	9/6	12A7 X	8/-	EF80	8/-	PY82	7/6
6BW6	9/6	12B16	8/6	EF81	5/-	SP61	3/6
6D5	6/-	12C12	6/6	EF92	5/6	UCH41	9/6
6F6G	9/6	12Q7	6/6	EHL32	5/6	UCH42	9/6
6H6	3/6	35L6	9/6	EL41	9/6	UP41	9/6
6J5	5/6	35Z4	7/6	EL84	8/6	UL41	9/6
6J7	6/6	80	9/6	EM81	9/6	UV41	9/-
6J6	6/6	80	9/6	EM80	7/6	UV22	8/-
6K8CT	6/6	934	1/6	EZ80	7/6	VR105	8/6
6K74	5/-	EA50	1/6	FY51	9/6	VR130	9/6

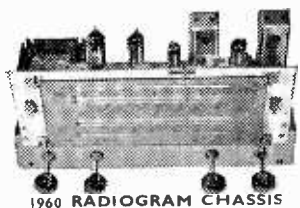
"REGENT" 4 VALVE



"96"
RANGE
VALVES
 KIT PRICE
£6. 6. 0.
 Carr 4/-

PRINTED CIRCUIT BATTERY PORTABLE KIT

Medium and long wave. Powerful output. 6in. High Flux Speaker. T.C.C. Printed circuit and condensers. Components of finest quality clearly identified with assembly instructions. Osmer Ferrite Aerial and Coils. Rexine covered attache case cabinet. Size 12 in. x 8in. x 4in. Batteries used B126 (L5512) and AD35 (L5040), 10/- extra. Instructions 9d. (free with kit). Mains Unit ready made for above 39/6. Sold separately



THREE WAVEBANDS FIVE VALVES
 S.W. 16 m. -50 m. LATEST MULLARD
 M.W. 200 m. -550 m. ECH81 EFR81
 L.W. 800 m. -2,000 m. 21L4 E78K1
 12-month guarantee. 21L4 E78K1
 A.C. 200/250 v. 4-watt Switch; Short-Medium-
 Long-Gram. A.V.C. and Negative feedback
 5 watts. Chassis 1 1/2 x 5 1/2 x 2 1/2in. Glass dial
 horizontal or vertical winding size 10in. x 4 1/2in.
 Anodized and calibrated. Isolated Chassis.
£9.10.0 Carr. & Ins. 4/6.

PERMANENT DEL. £5.50 and five months of 81.
MATCHED SPEAKERS FOR ABOVE CHASSIS:
 3in., 17/6. 10in., 25/-. 12in., 30/-

COLLAR CONQUEST
HIGH-SPEED AUTOCHANGER
4-SPEEDS-10 RECORDS
 Studio Pick-up
OUR PRICE £7.19.6 post free
 Or with cabinet, speaker and amplifier
£11.19.6 Carr. 5/6

BSR MONARCH JAS
 The Famous Autochanger. 4 speeds.
£6.15.0 post free

ALUMINIUM CHASSIS. 18 a.w.g. undrilled.
 With 4 sides, riveted corners and lattice fixing
 holes. 2 1/2in. sides, 7 x 4in., 4/6; 9 x 7in., 5/8;
 11 x 7in., 6/8; 13 x 9in., 8/6; 14 x 11in., 10/6;
 15 x 14in., 12/6; 15 x 16 x 3in., 16/6.

HI-GAIN BAND 3 LTA. PRE-AMP KIT.
 Cascode circuit with valve EOC84. Price 29/6.
 With Power Pack 49/6. Plans only 6d.
 Band 1 BBC version same price.

GARRARD RECORD PLAYERS
AUDIO PERFECTION

Designed to play 16, 35, 45, 78 r.p.m. Records
 7in., 10in., 12in. Lightweight. Xtal pick-up.
 GCR pipe-in-head. Stereo Wired.
Single Play TA Mk II £8.8.0.
Transcription 4 HF £18.
Auto Changer R.C. 210 £10.10.0.
 (Stereo heads £2 extra). Leaflets, S.A.E.

Volume Controls 80 OHM COAX
 50k ohms. Guaranteed 1 year. Midget
 5k ohms to 2 Meg. 0.001 ohm/rev. 1/4in.
 No. sw. D.P.S.W. 1/2in. 1/2in. 1/2in.
 Linear or Log Tracks. 4/6
 Air Spaced.

Postage 1d. per valve
 4/6 per 100 valves
 Stranded core
 Losses cut 50%
6d. yd.
 Prime Quality 1/- yd.

COAX PLUGS. 1/- LEAD SOCKET .. 2/-
PANEL SOCKETS 1/- OUTLET BOXES .. 4/6
BALANCED TWIN FEEDER yd. 6s. 80 or 300 ohms
DITTO SCREENED per yd. 1/6. 80 ohms only
WIRE-WOUND POTS. W.P.T. Pre-set Min.
 1V Type. All values 25 ohms to 25 K. 3/- ea.
 30 K 50 K 4/-. (Carbon 30 K. to 2 meg., 8/-)
WIRE-WOUND 4 WATT POTS. Long Spindle
 Values. 100 ohms to 50 K. 6/6; 100 K. 7/6
CONDENSERS. New Stock. 0.001 mfd. 7 kv. T.C.C. 5/6. Ditto, 50 kv. 2/1T. Pre-set Min.
 Tubular. 500 v. 0.001 to 0.05 mfd., 9d. 0.1, 1/-;
 0.25, 1/6; 0.5/550 v., 1/8; 0.1 mfd., 2,000 volts. 3/6.
CERAMIC CONDS. 500 v., 0.3 pF. to 0.01 mfd., 9d.
 1V Type. 500 pF. to 2,000 pF. 1/3. Close tolerance
 (±1 pF.) 1.5 pF. to 47 pF., 1/6. Ditto 1 1/2 50 pF.
 to 815 pF. 1/6; 1,000 pF. to 5,000 pF., 2/-

I.F. TRANSFORMERS 7/6 pair.

465 Kcs Sing Tuning Miniature Can. 2 1/2in. x
 1 in. x 1 in. High Q and good band width.
 By Post. Batteries to Data sheet supplied.
 Wearite M800 L.F. 465 Kcs. 12/6 per pair.
 Weymouth Sid. L.F. 465 Kcs. 12/6 per pair.

NEW ELECTROLYTICS. FAMOUS MAKES

TUBULAR	TUBULAR	CAN TYPES
1/850v. 2/-	50/350v. 5/8	8/500v. 3/-
2/350v. 2/3	100/25v. 3/6	15/500v. 4/-
4/450v. 2/3	250/25v. 3/-	32/350v. 4/6
8/450v. 2/3	500/12v. 3/6	100/270v. 5/6
8/500v. 2/3	8+8/450v. 3/6	250/350v. 5/6
16/450v. 3/-	8+8/500v. 4/-	32+32/350v. 5/6
16/500v. 4/-	8+16/450v. 3/6	32+32/450v. 6/-
32/450v. 3/6	8+16/500v. 5/6	50+50/450v. 7/6
25/25v. 1/9	16+16/450v. 4/3	61+16/270v. 7/6
50/25v. 2/-	16+16/500v. 5/6	61+16/350v. 11/6
50/50v. 2/-	32+32/350v. 4/6	100+200/270v. 12/6

SELENIUM RECTIFIER. 800 v., 75 mA., 7/6.
CONTACT COILED. 250 v., 50 mA., 7/6. 60 mA., 8/6
 80 mA. 9/6. 200 mA. 21/-; 300 mA. 27/6.
COILS Wearite P" type. 3/- each. Osmer Midget
 O" type adj. dust core from 4/- All ranges
TELETRON. L. & M. T.R.P. with reaction, 8/6.
FERRITE ROD AERIALS. 10in. 12/6. 12in. 14/6
 T.R.F. COILS 4HF 7/- pair. H.F. CHOKES, 2/6
FERRITE ROD 4in. x 1/2in. 2/6.

JASON I.M. TUNER COIL SET 28/- H.F.
 coil aerial coil. Oscillator coil, two I.F. trans.
 10.7 Mc/s. Ratio Detector and heater choke.
 Circuit book usins 10r 6AM6. 2/6.
COMPLETE JASON F.M. KIT FMT1 58/6.
 With set of 4 Valves. £6.5.0. Details S.A.E.

FULL WAVE BRIDGE SELENIUM RECTIFIERS
 2, 5 or 12 v. 1 1/2 amp., 8/6; 2 a., 11/8; 1 a., 1/76
CHARGER TRANSFORMERS. Tapped input 300
 250 v. for charging at 2, 5 or 12 v., 1 1/2 amps., 15/6
 2 amps., 17/6. 500 v. input. 22/6. Circuit included.
VALVE and TV TUBE equivalent books, 9/6
TOGGLE SWITCHES. S.P. 2A. D.P. 3/6. D.P.T. 4/6
WAVECHANGING SWITCHES
 1 p. 4-wave v. wate long spindle 2/6
 2 p. 2-wave, or 3 p. 2-way short spindle 2/6
 3 p. 4-way, or 4 p. 2-way, 4 p. 8-way long spindle 3/-
 3 p. 4-way, or 1 p. 12-way long spindle 3/6
VALVEHOLDERS. Pax. Int. Oct., 4d. EF50, EA50
 6d. B12A, CRT, 1/8. Eng. and Amer. 4, 5, 6, and
 7 pin. 1/-, 8/6. EQUIVALENT HAZARD and Int. Oct. 6d.
 B7G, B7A, B7C, B7D, 80, R7G with can., 1/6
 B9A with can., 1/8. CERAMIC KF50, B7A, B7C
 Int. Oct., 1/-, 8/Can. 17/6. B9A 1/-

CRYSTAL MIKE INSERT by ACO, precision
 engineered. 4 size 7in. x 3 1/2in., 6/6.

RADIO COMPONENT SPECIALISTS **OUR ONLY ADDRESS**
 337 WHITEHORSE RD.,
 WEST CROYDON
 THO 1665. Buses 133 or 68

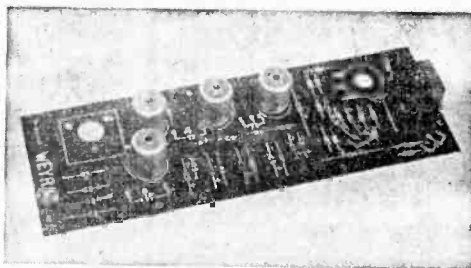
Postal service 1/-, over 2 free.

(Export Extra.) C.O.D. 1/6. (Wed. 1 p.m.)

WEYRAD

COILS AND TRANSFORMERS FOR A 2-WAVE TRANSISTOR SUPERHET WITH PRINTED CIRCUIT AND FERRITE ROD AERIAL

- LONG AND MEDIUM WAVE AERIAL—RA2W
On 6 in. rod, $\frac{7}{8}$ in. diameter, connections to 6-Tag Ring, 208 pF tuning 12/6
- OSCILLATOR COIL P50/IAC
Medium wave in screening can. For 176 pF tuning condenser 5/4
- 1st AND 2nd I.F. TRANSFORMERS—P50/2CC
470 Kc/s operation with 250 pF tuning in cans. $\frac{1}{4}$ in. diameter by $\frac{3}{4}$ in. high 5/7
- 3rd I.F. TRANSFORMER—P50/3CC
Last stage transformer to feed diode detector. Size as P50/2 6/-
- DRIVER TRANSFORMER—LFDT2
Upright mounting with six connecting tags— $1\frac{1}{8}$ in. x $\frac{7}{8}$ in. x $1\frac{3}{4}$ in. 9/6



PRINTED CIRCUIT—PCA1

Size $2\frac{3}{4}$ in. x $8\frac{1}{4}$ in. Ready drilled and printed with component positions 9/8

THESE COMPONENTS ARE APPROVED BY TRANSISTOR MAKERS AND PERFORMANCE IS GUARANTEED.

Constructor's Booklet with full details, 2/-.

WEYMOUTH RADIO MANUFACTURING CO., LTD.
CRESCENT STREET, WEYMOUTH, DORSET

TELEVISION SPARES

ALL MAKES AND MODELS

We can supply new or secondhand, perfect condition spares, for Radio and Television—

Line output transformers, Scanning Coils, etc.,

—CHEAPEST PRICES ANYWHERE—

OUR VALUES STOCKS INCLUDE:—

AZ31 8/-	EP42 9/-	PCL82 7/-	UBC41 6/6	6F1 5/-
B36 8/-	EP50 2/6	PCL83 11/-	UCH42 6/6	6F12 3/-
DH77 6/-	EP91 3/6	PL36 11/-	UCH81 7/-	6F13 6/-
EBG41 6/6	EL39 14/6	PL38 14/-	UF41 7/6	6L1 11/6
EP80 8/-	EL41 6/6	PL81 8/6	UF42 6/-	6L18 9/-
ECC81 5/-	EL42 8/-	PL82 7/-	UL41 7/-	6L19 11/-
ECC82 5/6	EL84 6/-	PL83 7/-	UL46 7/-	6L19 11/-
ECC84 7/-	EY518E 6/-	PY32 10/-	UY41 6/6	6V6 5/-
ECP80 8/6	EY86 7/6	PY80 7/-	U22 6/-	10C2 12/6
ECH33 5/-	EZ40 6/-	PY81 8/-	U801 22/-	10F1 5/6
ECH42 7/-	EZ41 7/-	PY82 6/-	U8 14/6	10P14 8/-
ECH81 8/6	GZ32 8/-	PY83 7/-	Z 2/6	20F2 9/-
ECL80 7/-	KT330 9/-	SP41 2/-	5U4 5/-	20L1 12/6
EP37 8/-	KT36 21/-	SP61 2/-	5V4 8/-	20P1 10/6
EP39 4/6	PC34 7/-	T41 7/-	5Y3 6/-	
EP41 7/-	POF80 7/-	UAP43 7/-	6Z4 7/-	

IF YOU DO NOT SEE WHAT YOU REQUIRE SEND S.A.E. FOR IMMEDIATE QUOTE, GUARANTEED RETURN POST SERVICE.

FOR THAT URGENT SPARE—

Phone: CHerrybury 3955
from 9 a.m., until 12 midnight.

Terms. C.W.O. or C.O.D.

G. AND D. TELEVISION,

131a KINGSTON ROAD,
LONDON, S.W.19

For Safety's Sake
use
AVO Prodclips



Pat. No. 748811

...with Trigger-Action Spring-Loaded Clips

PRESS TRIGGER TO OPEN

RELEASE TO GRIP

Safety first every time with these patented spring-loaded AVO Prodclips.

Cleverly designed for use as insulated prods, they are invaluable for reacting and holding test points which are difficult of access.

Suitable for use with AvoMeter, Multiminor and Avo Electronic Test Meter Leads.

Post Free
15/-
per pair.

AVO LTD • AVOCET HOUSE,
92-96 VAUXHALL BRIDGE ROAD, LONDON, S.W.1.
VICtoria 3404 (12 lines)

A MEMBER OF THE METAL INDUSTRIES GROUP OF COMPANIES

Letters to the Editor

The Editor does not necessarily agree with the opinions expressed by his correspondents

Whilst we are always pleased to assist readers with their technical difficulties, we regret that we are unable to supply diagrams or provide instructions for modifying commercial or surplus equipment. We cannot supply alternative details for receivers described in these pages. **WE CANNOT UNDERTAKE TO ANSWER QUERIES OVER THE TELEPHONE.** If a postal reply is required a stamped and addressed envelope must be enclosed with the coupon from page iii of cover.

HI-FI SYSTEMS

SIR,—I would like to second Mr. A. Jennings's letter (P.W. July), and hope that you will be able to include some early articles on installing a Hi-Fi system from scratch.—E. TUNER (Birmingham).

MANUAL WANTED

SIR,—I would like to know if any of your readers has a circuit diagram and/or manuals for the Ex WD. Tx/Rx W.S. 22?—A. PINNINGTON (Wirral, Cheshire).

INFORMATION REQUIRED

SIR,—I wish to fit an "S" meter to a communications receiver. If anyone can supply information about this, I would be very grateful.—R. MCA. (Northern Ireland).

BOOKS WANTED

SIR,—My letter appeared in the August edition of this magazine asking for information about the Hallicrafters S-20R receiver. I received a number of replies to this letter, and I thank everyone who sent me information.

One such person is an Indian living near Madras, a young man who although holding a Diploma in Radio Servicing and Maintenance, is unable to get a job, owing to the small number of jobs available in India in comparison to the great number of qualified people. While waiting for such a job, he spends his time trying to learn more about his subject by reading books and by corresponding with people of any age who are interested in Radio or Electronics of any kind.

Would anyone who would like to write to this person, or who would like to send some books or odd bits of radio "spares", please write to me enclosing s.a.e.—R. LESTER (Highgate).

CONVERTING TO MAINS

SIR,—With the end of summer many constructors will no doubt be desirous of converting their battery-portable receivers into mains versions for winter at-home listening. I should certainly like to do this with mine but I am not certain of the procedure. Could any of your magazine readers or perhaps a contributor to your magazine help here?—J. ROBINSON (Buckinghamshire).

TRANSISTORS

SIR,—The point I wish to press is this. Recently we have been entertained by Transistors v Valves. This seems to be a most pointless argument. I have waited in vain for 12 months for a valve enthusiast to answer one question—why use valves? Most letters on the subject have proved pointless. People who compare amplified crystal sets to valve radios only betray their own ignorance while to those who say "a valve can heat up to great temperatures," I say why do you want hot valves? I don't. In the last year I have handled 40 transistors and only damaged one electrically and three mechanically and I have made almost every error in the book.—D. RICHARDSON (Edinburgh).

ONE VALVER

SIR,—I was glancing through some of my past issues of the P.W. when I noticed a letter from W. H. M. Godwin, of Kenya, referring to a 1L4 triode one valver and its peculiarities in receiving far-off stations.

I too have a one valver battery set for use with headphones which brings in LW and MW stations exceptionally clearly. The valve used is a 3S4 beam tetrode and only requires a small aerial as an earth upsets reception of Luxembourg.

You might think that this letter is a waste of time, but the oddity of my set is the battery it uses. The L.T. for the valve is a 2V accumulator, the H.T. for the valve is, or should be, 90V, but the circuit was designed for 22½V. I find it works off a 1.5V pen cell for H.T. with equal volume as that of a crystal set.

My receiver brings in Luxembourg, Home and Light programmes, etc., with clarity with a 1.5V H.T. It also runs off a 2V H.T. from the same supply as the valve heater.

I find that it sounds rather odd to be able to say "My valves run off a 2V L.T. and 2V H.T."—K. HAMLEY (Northants).

TAPE CLUB

SIR,—I am interested in forming a Tape Club at Dartford and would like to hear from interested readers.

As a reader from No. 1, I have been very interested in Valves v Transistors article; I think that at the moment neither has a majority of people favouring one or the other but in the next two to three years I am sure the transistor will take first place in about 90 per cent. of all equipment.—E. H. FOREMAN (Dartford).

CROSS-OVER NETWORKS

SIR,—I was very interested by the comment of Mr. James in the October issue on the subject of cross-over networks.

I disagree that these devices are either compli-

cated or expensive, and if Mr James cares to visit his local library he will find a host of information on the subject. Recently I tried an apparently similar circuit using an 8 μ F condenser and the results were good, but were greatly enhanced by the addition of a small home-made choke.

Mr James will find that the loudspeakers have a great deal to do with cross-over, and a good bass speaker 8in. in diameter or larger will make almost any cross-over sound much better, because good bass cannot be obtained with a smaller speaker.

Finally, the table of cross-over frequencies concerning different networks and speaker impedances can also be found at the library. —J. A. BAKER (Doncaster).

INTERFERENCE

SIR,—In your October issue Mr. Parsons commented on the interference on or near 208m medium wave. I entirely agree and have great difficulty in pin-pointing this popular station.

In my opinion, and I am sure many people will agree, there should be a radio conference every five or seven years. Any new medium or long wave stations that want to come on the air should make arrangements at one of these conferences, and register them.

Soon we will have so many stations on medium wave that we will not be able to decipher any of them unless our receivers are made a great deal

better than they are now.—N. D. ROFE (Bawnboy, Eire).

STEREOPHONIC SOUND

SIR,—In regard to Mr F. Barrington's letter, printed in the October issue may I say how misinformed he is about stereo records.

The majority of the latest mono extended play and long play records are also released in stereo thereby letting stereo enthusiasts take full advantage of their equipment.

I have just completed a 3W stereophonic amplifier and find it gives excellent results. Also the acoustics of the room, in which the units are situated, did not impair with sound reproductions so much as to make me wish I had not constructed this piece of equipment.

From Mr. Barrington's letter I understand that he prefers modern records. Who wants these records in stereo anyway? The majority sound bad enough already, what would reproduction sound like in stereo!

If he wanted a good quality amplifier for these records he should not have used stereo but should have built a mono one instead. After all there has been a great number of well-designed circuits in PRACTICAL WIRELESS for gram amplifiers and I feel that Mr. Barrington should have thought about all aspects of stereo before he started.—M. L. How (Palmer's Green).

Exclusive Bargain Offer—Only 6/6

How to order your "Practical Wireless"

POCKET TRANSISTOR SUPERHET CASE

(INCLUDING CHROME-PLATED HANDLE, TRANSFERS AND DIAL)

1. Fill in the coupon below in ink.
2. Make out a postal order for 6/6 (which covers postage, packing and insurance) crossed and made payable to **PRACTICAL WIRELESS**. NO STAMPS CAN BE ACCEPTED.
3. Send the postal order and the completed coupon to: **PRACTICAL WIRELESS**, Pocket Superhet Case Offer, 136 Long Acre, London W.C.2.

CUT ALONG THE DOTTED LINE

PRACTICAL WIRELESS POCKET SUPERHET CASE OFFER

Please send me a _____ Cream } Case. (Put a tick against the colour you prefer).
 _____ Red }
 _____ Blue }
 I enclose P.O. value 6/6.

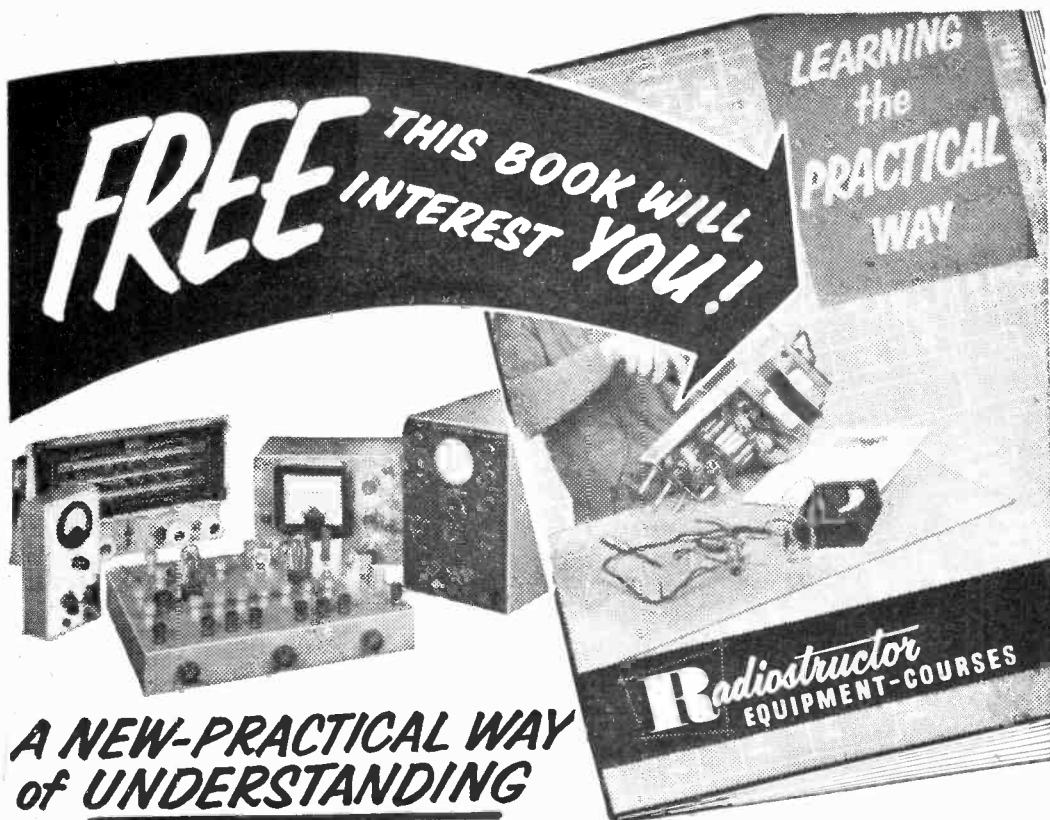
NAME _____

(Block letters)

ADDRESS _____

(Block letters)

If undelivered, please return to 136 Long Acre, London W.C.2.



**A NEW-PRACTICAL WAY
of UNDERSTANDING**

Radio • Television • Electronics

Including: Transistors; VHF/FM; Hi-Fi equipment; Computers; Servo-mechs; Test Instruments; Photo-electrics; Nucleonics, etc.

FOR ... Your Career ... Your Own Business ... An Absorbing Hobby

Radiostructor—an organisation specialising in electronic training systems offers a new self-instructional method using specially designed equipment on a "do-it-yourself" basis.

You learn by building actual equipment with the big kits of components which we send you. You advance by simple steps, performing a whole series of interesting and instructive experiments—with no complicated mathematics! Instructional manuals employ the latest techniques for showing the full story of electronics in a practical and interesting way—in fact—you really have fun whilst learning! Post the coupon below, now, for full details.—

RADIOSTRUCTOR
LEADS THE WORLD
IN ELECTRONICS TRAINING

POST NOW

To RADIOSTRUCTOR (Dept. G82)
READING, BERKS.

Please send brochure, without obligation, to:

★ Name _____

Address _____

11 / 60

★ **BLOCK CAPITALS PLEASE**
(We do not employ representatives)

RECEIVERS & COMPONENTS

GUARANTEED VALVES from 6d. Lists 3d. **HAMILTON RADIO (W)**, 13, Western Road, St. Leonards, Sussex.

AM/FM STEREO CHASSIS £20

2.5W Transistor Hi-Fi chassis 10cps to 150kc/s. Transformerless. £10.

Parts and equipment made to order.

BEL, Marlborough Yard, London, N.19
Arc 5078

EX-GOV. VALVES, IT4 3/-, IL4 1/6, 89 6/-, OZ4 4/-, ECC81 4/-, 6SN7GT 5/-, 12A6 3/-, 12AH7 3/-, 1R5 3/-, 1S5 3/-, 6L6G 5/-, C.W.O. send for full list. **WOODWARD, 16, Aubrey Road, Sherwood, Nottingham.**

TUBES 18 Months' Guarantee MAZDA & MULLARD TYPES

12in. and 14in. 55.10.0
17in. £6.0
Min. 53/00 28.0.0 (return and tube £1 rebate)
Other Types—List Available.
PERMS C.W.O. Postage and Insurance 10/-
WILFORD RADIO SERVICE
Dept. P.W. 44 MAYFIELD GR., MEADOWS,
NOTTINGHAM

VALVES, 1.500 EL 32's. Best offer over 1/- seconds. Carriage extra. **NORMAN H FIELD, 1, Lodge Road, Hockley, Birmingham 18.**

MULLARD TUBES, reclaimed, 6 months' guarantee. 9in., 30", 12-14in., 59/6, 17in., 79/6. All pictures tested. **FITTED FREE.** Picture shown to callers. Other makes, types, cheap. Salvaged spares for modern and obsolete sets. Prices from: **Lot 17/6, POT 7/6, Osc. Tr. 6/-, Mains tr. 10/-, Valves, 1.000 types in stock.** EP91, EB91, 6J5, 2/6. EP80, 10F1, EP42, 3/6. Save money. Send a S.A.E. with enquiries or for free list. **"ST. JOHN'S RADIO" 156, John's Hill, S.W.11 (BAT938).**

KINGSLAND

ELECTRONIC COMPONENTS

Stupendous Offers

Insulated Radio Pliers, Screwdriver, Bench Vice, 4 Ass'd. 3ft. Screened Leads, 10/-, p. & p. 1/9.

Set of 4-Piece Two-way Screwdrivers in case. All Metal Plane. Junior Hacksaw, 10/6, p. & p. 1/9.

BARGAIN PACK. Pair Throat Microphones, 150 Assorted Screws, 2ft. 2in. Screened Lead with socket, one 5 Henry 200 mA Choke, 3 Electrolytic Condensers, 6 Knobs, 3 Toggle Switches, 6 Octave Valve Bases, 1 Waveband Switch, 6 Coax. Plugs, 6 Assorted Coils, Cartridge Fuses, 6 Potentiometers, 6 W.W. Multimeters, Festoon Lamp and Holder, Coil of Wire, 15/6, p. & p. 3/6.

New 115 v. Relays, 15 amp., 7/6, p. & p. 2/6. Instrument Rectifier with Circuits, 5/6, 6 v. or 12 v. Vibrators, 2/6 each, p. & p. 1/-, 9 Assorted Droppers, 5/-, p. & p. 1/8. Loaded Chassis, 7/6 and 5/-, p. & p. 4/6. Mike and Pick-up Transformers. Ideal for Baby Alarms, 4/6, p. & p. 1/-.

100 Assorted Resistances or Condensers or 30-50, 5/-, p. & p. 1/6.
New headphones, low impedance, ideal for crystal sets, etc., 5/6, p. & p. 1/6.
6 Assorted Potentiometers, 5/-, p. & p. 1/6.

182 KINGSLAND RD., SHOREDITCH, E.2. Tel.: SHO 6512. Sorry, U.K. only.

RATES: 5/6 per line or part thereof, average five words to line, minimum 2 lines. Box No. 1/- extra. Advertisements must be prepaid and addressed to Advertisement Manager, "Practical Wireless," Tower House, Southampton St., London W.C.2.

"WEYRAD" TRANSISTOR RECEIVER

COMPLETE KIT—LONG & MEDIUM WAVE AND PUSH-PULL O.P. £8.17.6
CONSTRUCTORS BOOKLET 2/- send S.A.E. for Shopping List.

WESTHAM RADIO SUPPLIES) Rear of 176, Abbotbury Road, WEYMOUTH, DORSET

RESISTORS.—100 new, wire ended, assorted, all types. 7/6 box, post free. **COOK'S OF BEDFORD, 29, St. Mary's Street, Bedford.**

SPEAKER REPAIRS. Cones/Fields fitted. Clock Coils Wound. L.S. REPAIRS, Pluckley, Ashford, Kent.

VOLTMETERS!!! AMMETERS!!! BARGAINS!!!

UNUSED, BOXED, GUARANTEED. EX. M.O.S. POST FREE.
AMMETERS. 2in. Dial. Moving coil, with shunt, 5 milliamperes full movement, scaled 0-20, 5/6. 8in. dial, moving iron, 50 cycles A.C., scaled 0-50, 43/-, 8in. dial, 50 cycles A.C., scaled 0-30, 22/-. **VOLTMETERS.** 2in. dial. Moving coil, 10,000 ohms resistance, D.C., scaled 0-50, 8/6.

SPEED ELECTRICS, Dept. PWL, Church Street, Basford, Nottingham. Tel. 75716

GET LUXEMBOURG clearly at last! Our attachment fits any radio. Complete and easy to fit, 3/11 each, post and packing 6d. **EDDY'S 116 Alfreton Road, Nottingham.**

LOUDSPEAKERS 7in. x 4in. and 6 1/2in. 7/6, post 1/6. 8in. 10/-, post 2/- Valves, Transistor Components and Kits. List available. S.A.E.: H.R. MAIL ORDER, 16, Regent Parade, Harrogate

Siemens Relays SPDT, 10,000 ohms, 1 mA, 15/- (1/6), 40in. American Whip Aerials with loading coil, effectively increasing height to 12ft, 25/- (5/-) Precision Infinitely Variable Speed Gearboxes, 0 to 9900 r.p.m. driven by 1/4 hp. 230 v. A.C. motor, 28 ohm output 24 v. input uses 1-128/7 and 2-4/6, 7 x 3 ohms, 12/6 (less valves) (2/6). Kurman Relays 81/DT 7000 ohms 3 amp contacts, 12/8 (1/6). Metal Rectifiers 34 v. 12a. 20/- (3/6). 5ft P.O. Racks, angle iron sides 19in. wide, 65/- (10/-). B.C.610 Whip Aerials, 3 sections, 9ft. in canvas holdall, 35/- (5/-). Heavy Insulated Bracket Mounts for above 26/- (5/-). BC-650 Transmitter Receivers crystal controlled 14 valves (less crystals and valves) 35/- (10/-). BC-650 Power Supply Units, vibrator type for attachment to Tx, Rx or 12 v. input (see vibrator), 25/- (10/-). BC-650 Battery Box for attaching to Tx Rx or man pack use, 7/6 (5/-). 50 watt Power Amplifiers rack mounting, 280 v. A.C. input (1-1/4 1/4 2-PK 25, 1-VU-39) with v/c and meter, less valves 35/- (32/-). AVO Portable Genser Counters for Beta or Gamma Ray detection, new less batteries £12.10.0, (16/-). Laboratory Mains Filter Units remove mains borne interference, 10/- (2/6).

40 PAGE LIST OF OVER 1000 ITEMS IN STOCK AVAILABLE—KEEP ONE BY YOU

American Operators Tables, black cracks, 36 x 22 x 3 1/2in. jack boxes and switches under, ideal for many uses, 65/- (10/-). Germanium Diodes, GEX 35, 45, 55 or 68, all 2/8 each (paid). Elliott 0/1mA moving coil meters, 2000 o.p.v. 2 1/2in. A.I.A. Power Units, 1200 v. 200mA smoothed from 200-250v. A.C., 1 cwt, 48 (2/6). Amount in brackets is carriage England and Wales.

We have large quantities of "Bits and Pieces" that we cannot list—please let us have your enquiries, we can probably help—everyone answered.

P. HARRIS, ORGANFORD, DORSET

RECEIVERS & COMPONENTS

(continued)

POWER IN PACKETS—Owing to a stupendous "buy" we offer the following at greatly reduced prices. W. 1649, V. Meter/Oscillator with atten. and inst. book, 22/6 each, 426a (6Xtal) control units (all handy Xtals for model control) 22/6 each. Similar with 1 VXR 14/6 all new. Crated CV 1397 VCR tubes 6/6, 90 x 1 1/4 H.D. H's 10/6, 90 x 7 1/4 7/6, 1 1/4 heavy duty 2/3 each. Assorted files 16/6 doz. C.W. 1 set interval timers 10/-, We regret NO "18" set Hts. in stock. All items above are IN. CLUSIVE of p. and p. All orders dealt with in strict rotation so hurry before stocks run out. **DIGGINS, 129/133, Radnor Street, Hulme, Man. 15.**

LEADER RADIO

REFANCO MINI-7

The amazing new transistor set for the home constructor. Seven transistors, superhet circuit, fully tuneable over long and medium wave. Equal to any manufactured set. Kit complete with instruction data (excluding batteries) £10.10.0

THE TELETRON TAPETAKE

(Transistorised tuner)

Converts your tape recorder into a high quality Radio Receiver. Recording of Radio Programmes directly or tape. High sensitivity. £5.9.0, excluding PP4 battery. Carr. 2/6.

AUTO CHANGERS

B.S.R. U8 £6.15.0
COLLARO CONQUEST £7.15.0
Carr. 2/6.

RESISTORS

New, 4 w-3 w. 50-4-100-7/6, post 1/-, Welwyn 10 w/w w 5 K precision on ceramic formers, 1/2 each, post 6d.

PLESSEY O.P. TRANSFORMERS
Standard matching for 3-5 ohms speaker. Only 2/9, post 1/-. S.A.E. with enquiries. **73 VISTA WAY, KENTON, HARROW MIDDIX.** Phone: Wor 4512

TRANSISTOR BARGAINS — Brand new Mullard OC44 12/6, OC45 10/6, OC70 7/6, OC72 type 6/6, OC71 type 5/6, OC44/45 type 9/6, brand new 3 section chrome Car Aerials 17/6 and 1/6 post. Miniature Transistor type Speaker as used in kits 4/11 each. **D. B. CARTER (ELECTRONICS), 347, Ladypool Rd., Sparkbrook, B'ham, 12.**

ANNAKIN

WE OFFER THE BEST BARGAINS!

Transmitter No. 81. Chassis only, less valves and xtal. No. Gen. 4-valveholders, 9-RF chokes, 31-resistors, 30-condensers, 5-gang condenser, 5-coils, etc., etc. Only 5/- each, 2/- post.

Quartz Xtals. 4860 Mcs, British, 3/6 each, post 6d.

Valves, EL91, EP91, 3/-; IL4, IT4, 4/-; CV93 with 200 Mc/s. oct on panel, 3/-, post 6d.

Relays, U.S.A. 100 ohm 12 v. 1-CO, 1-B, 3/6 each, post 1/6. 80 ohm 12v. 1-M, small, 3/6, post 6d.

V.H.F. Recr. BC-624. With valves, 32/6 each, carr. 5/-, Less xtals. Wonderful value!

V.H.F. Tranx. BC-625. With valves, 32/6 each, carr. 5/-, Less xtals. Well worth 5/-.

Modulation Transformers. For P.P.-12A6 to 6Z2. Ratio 2-1. Double wound. Prim. Imped. 22K. Sec. Imped. 3.5K. Only 7/6 ea., post 1/6.

Microphone Trans. Ratio 45-1, 5/- ea., p. 1/6. Push-pull Input Trans. Ratio 1-2, 5/- ea., post 1/6.

AF Transformers, 1-200 ohm 1/-, post 11d. Periscope Primas, 3/- pair, post 1/6.

Chokes, 10H, 60mA, 1K, 2/-, post 1/9.

Selenium Rects. 500v., 30mA, 2/-, post 9d.

Carbon Mikes, 3/- ea., post 1/6.

Low Res. Phones. Single, 2/-, post 1/3. All valves offered are genuine Ex-Govt. Mail Order (Mainland) only. C.W.O. only. Stamped addressed envelope for lists please!

25 ASHFIELD PLACE, OLEY, YORKS.

RECEIVERS & COMPONENTS
(continued)

TO BE CLEARED
— NEW STOCK —

100 Condensers 5pF to 0.1mFd, Rotary Switches, Radio Jack, Knobs, 4 Preset Pots wire wound and carbon, Valve holders.

ALL FOR 7/6, plus 2/6 p.p.

SOUND VISION

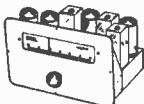
Anchor Street, Chelmsford

VALVES 1/- each (tested O.K.) Radio and TV. List. stamp. 85. Charninster Avenue, Bournemouth.

“HEATHKITS” can now be seen in London and purchased on easy terms. Free brochure. **DIRECT TV REPLACEMENTS LTD.**, Dept. PW/7/10. 138, Lewisham Way, S.E.14. Tideway 6686.

RECLAIMED VALVES, tested and perfect. Huge stocks: all one price. 5/- plus 6d postage each. Delivery by return. **LEWIS**, 46, Woodford Ave., Ilford, Essex.

ALMOST A GIFT



Build this highly successful FM Tuner Kit. Complete K it, less valves. Detailed instructions and wiring diagram, layout, etc.

SETS OF FM COILS £3.15.0

IP's Ratio Det. Aer. and Osc. £1.0.0 Transistors, Valves, Components. All at remarkably low prices. S.A.E. for Lists.

To:—

R.C.R.

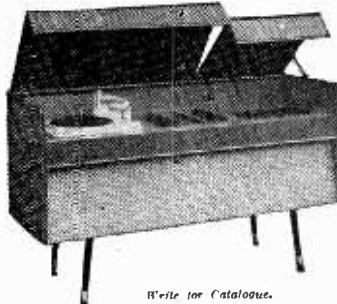
89 DERLEY ROAD
SOUTHALL, MIDD.X.

FOR SALE

ANOTHER NEW low-priced Tape Bargain! 1,800ft latest polyester on 7in. reel. 32/6 p.p. 1/6. Also outstanding bargains in all other sizes 3in. to 8 1/2in. S.A.E. for list. (includes American Audio Tape, BASF etc.)

Over 30 mint condition secondhand Tape Recorders and all new Recorders and Hi-Fi Equipment on NO INTEREST H.P. Terms. E. C. **KINGSLEY AND CO.** (Dept. P.W.) 132, Tottenham Court Road (near Warren St.), London W.1. EUS6500.

KITS, built complete. Details: 6, Hooker Rd., Heartsease, Norwich, Nfk.



Write for Catalogue.

GP76 FOR STEREO OR MONAURAL 46in. wide record storage. Control Panel 15 x 18in. Deck 17 x 16in. Tripart grille. Cash Price £22.10.0 or £3.7.6, dep. and 14 payments of 24/5 monthly. Delivery 12/6. In Walnut and Mahogany

FOR SALE
(continued)

**BLANK CHASSIS
MADE TO ORDER
SAME DAY SERVICE**

Metalwork Dept.
H. L. SMITH & CO. LTD.
287-289 Edgware Road, London W.2
PAD. 5891-7595

2,000 COMPONENT BOXES each with 10 adjustable compartments 2in. x 1 1/2in. x 1 1/2in. and press on lid. Ideal for nuts, screws, etc. 3/11 ea. 6 for £1, post free. **JERVIS**, 16, Manor Road, Brampton, Chesterfield.

ALL AT 9d.			
ID6	18	EB34	VR35
3D6	78	EF37	SP41
4D1	210VPT	EF36	SP61
6B7	1203A	EF50	T41
6B8	2050	GTIC	TT11
8D2	7193	KT24	VR21
9D2	2C22	ARPI8	VR35
11D3	AR6	KTZ41	VT61A
12BE6	ARPI8	LP220	VW48
12Y4	DI	NGT2	
15DA	EA50	PM220	

ALL AT 2/9			
6C4	7Y4	EF92	P61
6F1	UU6	VP41	PEN45
6F12	10F1	EL32	U22
6F13	DF66	EF33	VP133
6F14	EB4C1	KT33C	
6F15	EF42	KT81	
6J5	EF91	KTW61	

ALL AT 7/9			
5U4	6V6	EB33	TH233
5Y3	6X5	ECC81	U24
6K8	12A7	ECH35	W76
6P28	12K7	EL38	DH76
65L7	12Q7	KT36	
65N7	EABC80	PZ30	

Post on 1, 9d.; Post on 6, 1/6; Post on 12, 2/6

P.P. COMPONENTS LTD.
219, ILFORD LANE, ILFORD, ESSEX
Stamp for NEW Catalogue. Mail Order Only

AMERICAN MAGAZINES. — Year's subscription “High Fidelity,” 50/-; “Electronics World,” 43/-; “Audio,” 35/-; Specimens, 5/- each. Full catalogue free. **WILLEN LTD.** (Dept. 40), 9, Drapers Gdns., London, E.C.2.

CABINETS, ENCLOSURES and EQUIPMENT by STAMFORD

	Cash	Hire	Pchase
		Dpct.	18mths.
SPEAKERS			
Aziette ..	£6.12.1	26/5	6/4
WB/HF1012 ..	£4.15.0	19/-	4/9
Golden 10in. ..	£8. 6.7	33/4	8/-
Axiom 800 ..	£11. 5.9	45/2	10/10
MOTORS			
Garrard 210 ..	£12.13.5	50/9	12/2
Garrard 4 H.F. ..	£18. 9.9	74/-	17/8
Garrard TA Mk.II ..	£8.10.0	34/-	8/2
Collaro RP504 ..	£9.18.9	40/-	9/-
CHASSIS			
Armstrong 55 ..	£38.12.0	134/5	32/2
Armstrong Stereo MK.II ..	£44. 2.0	178/5	42/2
TUNERS			
Dulcote FMT/2 ..	£24.13.4	98/8	23/7
Rogers Junior ..	£24.10.3	98/1	23/5
Armstrong ST3 ..	£28. 7.0	118/5	27/1

A. L. STAMFORD Dept. F29
84/86/88 WEYMOUTH TERRACE
HACKNEY ROAD, LONDON, E.2.

FOR SALE
(continued)

100 BAYS of brand new adjustable steel shelving, 72in. high x 34in. wide x 12in. deep. stove enamelled, dark green, sent un assembled, six-shelf bay, £3/15/-. Sample delivered free. quantity discounts. **N. C. BROWN LTD.**, Eagle Steelworks, Heywood, Lancs. Tel.: 69018.

WORLD'S SMALLEST LOUDSPEAKER!
This incredibly small High Fidelity miniature elliptical Loudspeaker is now available in limited supplies by a world famous maker. It is designed for Transistor application. Sent with full technical data. Fully Guaranteed.

25/- WESTERN ELECTRIC
1 Bridgegate
London, N.21

Inc. tax and postage.

WANTED

WANTED Service Sheets. No quantity too large. Highest prices paid. **SULTAN RADIO**, 29, Church Road, Tunbridge Wells, Kent.

WANTED VALVES

All types for prompt cash. Must be new. State quantity.

WILLIAM CARVIS LTD.
103 North Street, Leeds 7

A PROMPT CASH OFFER for your surplus Brand New Valves, Speakers, Components. Test Instruments, etc. R.H.S., 155, Swan Arcade, Bradford 1.

BEST price paid by return for new Valves and equipment. **STAN WILLETTS**, 43, Spon Lane, West Bromwich, Staffs. Tel.: WES 2392.

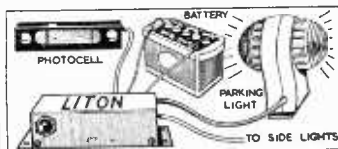
MISCELLANEOUS

— YOU READ MUSIC? —

Then how about making yourself an electronic organ? Constructional data available—full circuits, drawings and notes. It has 5 octaves, 2 manuals and pedals with 24 stops—use 41 valves. With its variable attack you can play Classics and Swings

Write NOW for free booklet and further details to C. & S., 20 Maude Street, Darlington, Durham.

“LITON” AUTOMATIC PARKING LIGHT SWITCH



Controlled by a photocell, will turn your light on at dusk, off at sunrise automatically. Easy to build and fit. Kit of Parts, 52/6. Built and Tested 57/6. Mains **PHOTOELECTRIC GARAGE DOOR OPENER, BURGLAR ALARM**, etc. Kit: £4.12.6. Built: £5.10.0. Batter Model: Kit: 65/-. Built: 72/6. Photocells only 7/6, 12/6, and 25/-. Circuit and details of any project. 6d. stamp please. **“ST. JOHN'S RADIO,”** 126 St. John's Hill, LONDON, S.W.11. BATersca 9836

(continued on next page)

SITUATIONS VACANT

CENTRAL ELECTRICITY GENERATING BOARD
Eastern Division

BRADWELL (NUCLEAR) GENERATING STATION (ESSEX)

Maintenance Craftsmen (Instruments) Required

For routine and breakdown maintenance in respect of the following:

Mechanical and Electrical Measuring Instruments.

Electronic Instruments including Radio and Television.

Telecommunication type equipment.

Rate of pay: 5/11 per hour for a 42 hour week of 5 days.

Superannuable post, Sick Pay Scheme and Welfare facilities.

Housing accommodation may be available.

Application should be made on Form A.E.6/M, which may be obtained from any office of the Generating Board, or from the Station Superintendent, Bradwell Generating Station, Southminster, Essex, to which address complete applications should be sent.

CITY AND GUILDS (Electrical, etc.), on "No pass—no fee" terms. Over 95% successes. For details of Electrical Engineering, Applied Electronics, Automation, etc., send for our 148-page handbook, free and post free. B.I.E.T. (Dept. 242A), 29, Wright's Lane, (London, W.8).

SITUATIONS VACANT

(continued)

A.M.I.Mech.E., A.M.Brit.I.R.E., City and Guilds, G.C.E., etc. brings high pay and security. "No pass—no pay" terms. Over 95% successes. For details of exams and courses in all branches of Engineering, Building, Electronics, etc., write for 148-page handbook, free B.I.E.T. (Dept. 242B), London, W. 8.

RADIO AND TV SERVICING, all aspects from basic principles. Guaranteed coaching for City and Guilds, R.T.E.B. Cert., Brit.I.R.E., etc. Study at home under highly qualified tutors. No books to buy. Write for FREE Prospectus, stating subjects to:—I.C.S., Intertext House, Parkgate Rd., (Dept. 541A), London, S.W.11.

TV AND RADIO, A.M.Brit.I.R.E., City and Guilds, R.T.E.B. Cert., etc. on "No pass—no fee" terms. Over 95% successes. For details of Exams and Courses (including practical apparatus) in all branches of Radio, TV and Electronics, write for 148-page handbook, free. B.I.E.T. (Dept. 242C), 29, Wright's Lane, London, W.8.

EDUCATIONAL

"HOW AND WHY" of Radio and Electronics made easy by a new, non-maths, Practical Way. Postal instruction based on hosts of experiments and equipment building carried out at home. New Courses bring enjoyment as well as knowledge of this fascinating subject. FREE brochure from: Dept. P.W. 12, RADIOSTRUCTOR, 40, Russell Street, Reading, Berks.

EDUCATIONAL

(continued)

LEARN RADIO AND ELECTRONICS the new practical way! Hosts of absorbing experiments carried out at home under expert guidance to teach you Radio in a new, enjoyable and interesting way. Construction, servicing and fault finding on equipment made easy for the first time! No previous experience needed. No mathematics used. Free brochure from: Dept. 11 P.W., RADIO-STRUCTOR, 40, Russell St., Reading, Berks.

NEW!

LEARN RADIO & TV SERVICING and ELECTRONICS

and how to make and build your own equipment—using an exciting new practical apparatus course. Ideal for starting your own business or as a fascinating hobby.

FREE Brochure, without obligation, RADIOSTRUCTOR Dept. G77 READING, BERKS.
Britain's leading radio training organisation

WIRELESS. See the world as a Radio Officer in the Merchant Navy; short training period; low fees; scholarships, etc., available. Boarding and Day students. Stamp for prospectus. **WIRELESS COLLEGE,** Colwyn Bay.

(continued on next page)

IBM UNITED KINGDOM LIMITED
CUSTOMER ENGINEERING

Due to continued expansion, International Business Machines, the largest company of its kind in the world, requires approximately 185 additional Customer Engineers to be responsible for the installation, maintenance and efficient working of IBM's whole range of Data Processing equipment, including computers, calculators and electro-mechanical accounting machines. Applications are invited to fill the following vacancies:

- 1. COMPUTER ENGINEER** Applicants (age 21-30) should be of H.N.C. (Electronics) standard or have a sound background in general electronics, with emphasis on pulse circuitry. A knowledge of computer or calculator techniques would be an advantage but is not essential. Computer Engineers selected for the IBM 700 series machines must be prepared to spend a training period of 5/6 months in France, or the United States. For the IBM 650 and RAMAC systems, training given in the United Kingdom or Germany. Excellent starting salaries are offered based on qualifications and experience.
- 2. ACCOUNTING MACHINE AND CALCULATOR ENGINEER** Applicants (age 21-30) should have the ability to handle complex electro-mechanical machines and have a sound background in electronics obtained by study for a National or City and Guilds certificate or through practical experience in industry or the Armed Forces. Starting salaries are between £600 and £750 per annum. Salary increases are awarded solely on ability and performance. Promotion prospects to computers or to supervisory/managerial appointments are excellent.
- 3. JUNIOR ENGINEER** Applications are invited from men aged approximately 18-21 who have G.C.E. at Advanced Level in Pure and Applied Mathematics and Physics or who are studying for a National, City and Guilds or similar qualification. Junior Engineers are trained initially on a limited number of IBM machines and should very quickly reach the grade of full Customer Engineer. A starting salary will be given which is commensurate with the very high standard of man we require. This is probably the best opportunity of its kind open to technically-minded young men.

Preliminary interviews will be conducted at the IBM offices which are located throughout the United Kingdom. Applications should be made in writing to the

**Personnel Manager, IBM United Kingdom Limited,
101 Wigmore Street, London, W.1, or any IBM Branch**

Quoting Reference CE/60/146

EDUCATIONAL
(continued)

TRAINING IN RADIO AND TELEVISION SERVICING. Next full-time One Year course commences on 3rd January. Recognised by R.T.E.B. for new Radio and Television Servicing Certificate examinations. Details from:—**THE PEMBRIDGE COLLEGE OF ELECTRONICS**, 34a, Hereford Road, London, W.2.

FREE FROM THE I.P.R.E. Syllabus of famous radio and TV courses. Membership Conditions booklet. 1/-. Sample copy The Prac. Radio Engineer. 2/- post free. Secretary, 20, Fairfield Road, London. N.8.

**Radio
Television
& Electronics**

Learn at home with the World's largest home study organisation. Brit.I.R.E.; City & Guilds; R.T.E.B., etc. Also Practical Courses with equipment. No books to buy.

Write for FREE prospectus stating subject to

I.C.S.

Intertext House, Parkgate Road, (Dept. 541), London S.W.11

RADIO AND TELEVISION SERVICING. Home-study courses with special schemes of practical work are available from the Pembridge College. (1) Introductory course for beginners. (2) More advanced course covering new R.T.E.B. Intermediate Certificate. (3) Advanced course covering new R.T.E.B. Final Certificate. (In preparation). Details from:—**THE PEMBRIDGE COLLEGE OF ELECTRONICS**, 34a, Hereford Road, London, W.2.

SERVICE SHEETS

SERVICE SHEETS, TV 4/- ea. Radio 3/- ea. List 1/-. All orders dispatched on day received. Also Manuals for sale and hire. Mail orders only. **SULTAN RADIO**, 29, Church Road, Tunbridge Wells, Kent.

SERVICE SHEETS.—We have the largest stock of Radio and TV Sheets in the country for sale at 4/- ea. Why tolerate delay in obtaining your supplies when we will dispatch by return? 1960 Radio and Television Service Sheet List Now Ready. 1/-. Also Manuals for sale and hire. List 9p. S.A.E. please. Mail orders only. **S.P. DISTRIBUTORS**, 11, Old Bond Street, London, W.1.

FAULTFINDER FILES. showing common faults that each receiver is prone to and other useful servicing information. 2/- ea. List 9d., plus postage. **S.P. DISTRIBUTORS**, 11, Old Bond Street, London, W.1.

38 SET WALKIE TALKIE
CIRCUIT INFORMATION

Alignment Procedure. Typical faults in Ex. W.D. Sets. Component location diagrams. Circuit diagram. Complete Circuit description. Instructions for use, etc. P.O. 5/-. Address in block capitals, please.
CAMPBELL
Laundry Lane, Hungerford, Berks.

SERVICE SHEETS
(continued)

SERVICE SHEETS. Largest stock Radio and Television Sheets north London. 4/- each with S.A.E. State make and model. No. Circuit Diagrams only 2/6. Also Manuals for sale and hire. Radios over 20 years our speciality. All enquiries S.A.E. please. **WYNDSOR TELEVISION**, St. Albans Road, Barnet, Herts.

SERVICE SHEETS, Radio, TV 5,000 models. Lists 1/-. S.A.E. enquiries. **TELRAY**, 11, Maudland Bk., Preston.

SERVICE SHEETS

RADIO and Television
Over 100,000. S.A.E. for List.
Large stock of obsolete Radio and Television Valves.
JOHN GILBERT RADIO
20 Extension
Shepherd's Bush Market, London W.12
SHE 3052

SERVICE SHEETS for sale, all types from 1/- with free fault-finding guide. 125 Radio/TV sheets covering 370 popular models 12/6. **HAMILTON RADIO** (W), 13, Western Road, St. Leonards, Sussex.

BOOKS & PUBLICATIONS

FIND TV SET TROUBLES IN MINUTES from that great book "The Principles of TV Receiver Servicing." 10/6 all book houses and radio wholesalers. If not in stock from Secretary, I.P.R.E., 20 Fairfield Road, London, N.8.

SOUND RECORDINGS

TAPE/DISC/TAPE transfer. 1,800ft. American LP tape. 35/- p.f. **UNIMIXER** Mixing Units for quality. **SOUND NEWS**, 10, Clifford St., London, W.1.

HANDICRAFTS

JEWELLERY SIMPLY MADE. Catalogue Free. Brooches, Ear-clips, Rings, Marcasite. **WEBBS HANDICRAFTS**, 46, Burnway, Hornchurch, Essex.

TRANSISTORS

Red Spots. 3/-; White Spots, 3/9; Yell/GR, 4/6; Ediswan XB104, 8/6; XA103 (4 Mc/s), 10/1; XA104 (6/8 Mc/s), 12/-; Mullard OC70, 14/-; OC71, 14/-; OC72, 17/-; OC44, 26/-; OC45, 23/-; OC170 (70 Mc/s), 35/-; Newmarket V15/10P (10 watt power), 15/-; Diodes, 1/- and 2/6; Mullard Diode, 4/-; Electrolytics (sub. min. 15 v.) 2, 4, 8, 50, 100 uf, 3/- ea.; Ardent Trans. D239, 8/6; D240, 8/6; D131, 12/6; D132, 12/6; T1079, 12/-; D167, 12/-; Headphones L.R., 8/6; H.R., 17/6; Resistors 10% tol., 6d.; 5% tol., 1/-; Desk Mike, 31/6; Balance inserts (use as earpiece of speaker), 2/6; M.C. Earpiece (use Min. Speaker), 5/-; Westalite Contact Rectifier 250 v., 60 mA, 7/6; Transformer 250-0-250 v., 6 v. and 5 v., 15/-; 6 v., Vibrator Pack, 120 v., 60 mA, out, 12/6; Garrard Portable Record Player, cabinet, battery turntable 45 r.p.m. and pick-up; takes transistor amplifier, £3, 10.0, plus carr., 3/3. Real bargain. Limited quantity.

TERMS.—Cash with order. Post extra, excess refunded. Morco Reflex Rx, best 2-transistor Receiver. Send 8d. stamps for notes.

MORCO EXPERIMENTAL SUPPLIES
8 & 10 Granville Street, Sheffield 2
Tel.: 27461

Eddy's (NOTTM.) Ltd.

172 Alfreton Road, Nottingham

TRANSISTORS. Red Spot 3/9, White Spot 4/3, post 6d.

NIFE ACCUMULATORS. Size 3 x 2 1/2 x 1/2 in. 7 amp hrs. Weight 13 ozs., 1.25 v. 1/11 ea. p. & p. 1/6 one only, add 9d. per cell.

VIBRATORS. 12 volt, 4 pin, 4/11, post 1/-.

NEON MAINSTESTERS SCREW-DRIVERS. 3/11, post 9d.

RECTIFIERS, RM1 4/9, RM2 6/6, RM3 7/6, RM4 15/-, RM5 19/6, post 1/-.

DIMMER SWITCHES. Ideal for Train Speed regulators, 1/11, post 9d.

JACK PLUGS. Standard 1/11, post 6d.

DYNAMOTORS. 200 v. D.C. to 12 v. D.C. Ideal for Train Sets, etc. 19/11, post and packing 2/6.

MORSE TAPPERS. Plated Contacts Adjustable Gaps Heavy Duty, 3/6, post 9d.

CONDENSERS. Tubular Wire End (not ex govt.) 8 mid, 450 v., 1/9; 8-8 450 v., 2/6; 16 mid, 450 v., 2/9; 16-8 450 v., 4/-; 16-16 450 v., 3/9; 32 mid, 450 v. 3/9; 32-32 350 v., 4/-, post 1/-.

LUXEMBOURG EXPANDING AERIALS. Complete and easy to fit. No technical knowledge required. Greatly improves reception, 3/11, post 6d.

CRYSTAL SETS. Complete 2-wave bands. Good quality, 19/11. Transistor model, 9/11 extra, p. & p. 2/-.

HEADPHONES. High Res. to suit above crystal set. Good quality, 12/11, p. & p. 2/-.

ACOS MIKES. Mic-40, as supplied with most modern tape recorders with folding rest and 8ft lead, 25/-, p. & p. 2/-.

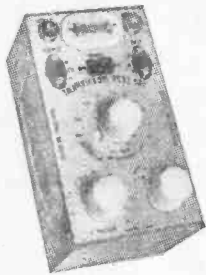
SPEAKER, GOLD GRILLE, 6 1/2 x 4 in., 1/-, post 6d.

New or Surplus VALVES—
Guaranteed and Tested by Return Post.

1D5	7/6	35Z4G	5/3	EF89	7/-
1R5	5/6	CL33	12/6	EF91	3/6
1S5	4/9	DAF91	4/9	EL41	7/3
1T4	3/11	DAF96	6/11	EL42	9/3
354	5/11	DF91	3/11	EL84	6/6
3V4	6/9	DF96	6/11	EL91	4/6
5Z4G	7/6	DK91	5/6	EY51	7/11
6A7	10/-	DK92	8/-	EY86	7/9
6AG5	4/-	DK96	6/11	EZ40	6/3
6B8G	2/11	DL96	6/11	EZ80	6/-
6BA6	5/11	EB41	6/11	EZ81	6/9
6BE6	5/11	EB91	3/6	GTIC	6/11
6B615	5/11	EBF80	8/-	PCC84	7/3
6C4	4/3	ECC81	5/3	PCF80	7/6
6C6	3/3	ECC82	5/11	PCL82	7/-
6C9	9/3	ECC83	6/6	PEN36C	8/6
6I7G	5/6	ECC84	8/3	PL36	10/9
6K7G	1/11	ECC85	7/11	PL81	8/9
6K8G	5/3	ECC89	9/-	PL82	7/9
6S7M	4/9	ECC89	9/-	PL83	7/9
6SN7GT	4/3	ECL80	7/6	PY80	7/-
6U4G	10/6	ECL82	10/-	PY81	6/3
6V6G	4/11	ECH42	8/-	PY82	6/6
6V6GT	6/-	ECH81	8/-	PY83	7/3
6X5G	5/-	EF36	3/-	UBC41	7/3
6Q7G	5/9	EF40	13/3	UF42	6/3
12K7	5/3	EF41	7/9	UCH42	7/9
12Q7	5/3	EF42	7/6	UL41	7/3
25A6	8/-	EF50	1/9	UY1N	10/11
25L6GT	8/11	EF80	5/9	UY41	6/-
35L6GT	8/11	EF86	9/9	U25	12/6

Any parcel insured against damage in transit for only 6d. extra per order. All uninsured parcels at customers risk. Post and Packing 6d. per valve extra. C.W.O. or C.O.D. only. C.O.D. charge 3/- extra. S.A.E. with enquiries.

Direct TV Replacements Research has produced this revolutionary instrument for you...



the **D900**

a new, compact, dynamic

TRANSISTOR TESTER/POWER SUPPLY

- ⊙ Makes possible dynamic transistor testing *in situ*.
- ⊙ Tests **CURRENT GAIN (A.C.) ALPHA GAIN**
- ⊙ Tests **CURRENT GAIN (under D.C. conditions) BETA GAIN**
- ⊙ Measures leakage Currents between Collector/Base and Collector/Emitter at any voltage between 0-25v.

Tests transistors while in circuit. Has its own self-contained power supply providing smoothed D.C. 0-25v. Size 3 1/2 x 3 x 2 1/2 in. Price £10. Order or send for full details TODAY.

A Beulah Electronics Product distributed by



Britain's largest stockists of TV Components.
Dept. PW/11/60, 138 Lewisham Way, New Cross, S.E.14
TIDeway: 6666.
Day and Night Automatic Telephone Service: TIDeway 6668.

East Surrey Radio
128, STATION ROAD, REDHILL, SURREY
MAIL ORDER ONLY

Aluminium, 18g. 3/6 sq. ft., 9 x 12, 12 x 12, 9 x 18, 12 x 18, 18 x 18. Aerials, TV, FM, Radio, 20% off list. Coax. 6/4. v.l., brown, white; coax plugs, 1/4. sockets, 1/3. Crystal coils M.L., 3/8. Crystal kit, less cab. 11/6. Diodes, 1/6. Enamelled w. and cotton wires, 2 and 4 oz. reels, price list 1/-; Eliminator for A.D. sets, 3 1/2 x 2 1/2, 55/-. Ferrite rods, 4in., 2/-; 8in., 2/9; slab, 5 1/2in., 3/3. Ferrite aerials, M.W., 6/9; M.L., 10/9; Twin "00", 8/8; 000s, vac., 3/-. Droppers, 0.15, 0.2, 0.3, 5/- ea. Midget, 0.2, 0.3, 6/6. L/Sprs., 2, 18/-; 3, 19/6; 5, 19/-; 6, 21/-; 8, 22/6; 10, 23/6; 12, 3 or 15 ohms, heavy duty 15watt, 23.5, 6/-; B.A. nuts and bolts, 1/- pkt. Motors, Mighty Midget, 3-4v., 10/8; geared, 13/-. Panel mounting sig. lamp holders, red, green, amber, 2/- ea. Presets, most values, 2/3. Tag strip, 28 tag, 1.8. Toggles spst., 2/4; spdt., 2/10; dpst., 3/4; dpt., 4/-; c/o. sp., 3/4; dp., 3/10; rotary w.c. most types 3/11. Rectifiers, rml, 5/9; rm2, 6/3; rm3, 7/9; contact coated, 18rd1161, 7/3; 18rd151, 5/-; 18rd2281, 13/9; 16rc1161, 8/3; 16rd2281, 10/1; 16rc2181, 9/3; w.x6, 3/-; w., 1/9. Ion traps, 3/6. Transistors, white, 6/-; Y.G., 6/-; gold, 16/-; red, 5/-. Mics, carbon, 4/6; Crystal, 28/6; Bal. arm L/S, low res., 6/-. Transistor set, white cabinet, diode, two transistors, M.L., 44/6. Morse keys, 3/-. Morse transmitters, 9/9. Buzzers, 3/6; Phones, 10/-, 14/6. Panel neons, 3/9. Neon tester screwdriver, 3/6. Soldering irons, wood handle, 2/9; Solon, Pifco, liteloid, 22/6 ea. Test meters, Pifco, 32/-; Taylor, £10 and £3.10.0.0. Gaby, 24.17.6. 25.10.0. Speaker grill, gold, 5/6. All, 4/6 sq. ft. Player amplifiers, 2v. printed circuit, 53; Decca, with 6in. 1/5, 25; Stereophonic, 4 watt, 29.10.0; Tripletone, 26.18.0. Resistors, Hy stab, 9d.; carbon, 1w. 4d.; 1w. 8d.; 2w. 1/-; Condensers all types; Jack plugs, 2/6; Jacks, 2/3. Miniature jacks, 2/9; L.M., 22/8. Double Richards shavers, 23.10.0. Crystal sets, roomers, 22.18.9. Service sheets, Radio, 2/6; Tele, 3/6. Transistor transformers and condensers, lowest prices. Recording tapes, 3in. 225ft., long play, 7/-; 5in. std. 600ft., 16/6; 5in. l.p., 900 ft., 18/6; 7in. std. 1,200 ft., 23/6; 7in. l.p., 1,800 ft., 30/6. Mullard ball tubes, 6d. Insulating tape, 6d. Egg insulators, 6d. Line cord, all types. Mains Xformers, output up to 90 boost. Valves, list 1/-. Teleton, Repanco, Osmor Coils and products.

S.A.E. all enquiries. CASH WITH ORDER
Postage and packing: Over 25 free; up to 1 lb., 1/-; 1 lb., 1/6; 2 lb., 2/-; 3 lb., 2/6; 8 lb., 4/-; 15 lb., 5/-.

FREE TO AMBITIOUS ENGINEERS
— THE LATEST EDITION OF ENGINEERING OPPORTUNITIES

Have you sent for your copy?
ENGINEERING OPPORTUNITIES is a highly informative 156-page guide to the best paid engineering posts. It tells you how you can quickly prepare at home for a recognised engineering qualification and outlines a wonderful range of modern Home Study Courses in all branches of Engineering. This unique book also gives full details of the Practical Radio & Electronics Courses, administered by our Specialist Electronics Training Division—the B.I.E.T. School of Electronics, explains the benefits of our Employment Dept. and shows you how to qualify for five years promotion in one year.

We definitely Guarantee
"NO PASS — NO FEE"

Whatever your age or experience, you cannot afford to miss reading this famous book. If you are earning less than £20 a week, send for your copy of "ENGINEERING OPPORTUNITIES" today—FREE.

WHICH IS YOUR PET SUBJECT?

- Mechanical Eng.,
- Electrical Eng.,
- Civil Engineering,
- Radio Engineering,
- Automobile Eng.,
- Aeronautical Eng.,
- Production Eng.,
- Building, Plastics,
- Draughtsmanship,
- Television, etc.

GET SOME LETTERS AFTER YOUR NAME!

- A.M.I.Mech.E.
- A.M.I.E.E.
- A.M.I.Prod.E.
- A.M.I.M.I.
- I.O.B.
- A.F.R.Ae.S.
- B.Sc.
- A.M.Brit.I.R.E.
- City & Guilds
- Gen. Cert. of Education
- Etc., etc.

PRACTICAL EQUIPMENT

Basic Practical and Theoretical Courses for beginners in Radio, T.V. Electronics, Etc., A.M.Brit.I.R.E. City & Guilds Radio Amateurs' Exam. R.T.E.B. Certificate P.M.G. Certificate Practical Radio Radio & Television Servicing Practical Electronics Electronics Engineering Automation

INCLUDING TOOLS!

The specialist Electronics Division of B.I.E.T. (Incorporating E.M.I. Institutes) NOW offers you a real laboratory training at home with practical equipment. Ask for details.

B.I.E.T. SCHOOL OF ELECTRONICS



POST COUPON NOW!

Please send me your FREE 156-page "ENGINEERING OPPORTUNITIES" (Write if you prefer not to cut page)

NAME

ADDRESS

SUBJECT OR EXAM THAT INTERESTS ME (SE/21)

BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY (Incorporating E.M.I. Institutes)
(Dept. SE/21), 29 Wright's Lane, London, W.8

THE B.I.E.T. IS THE LEADING ORGANISATION OF ITS KIND IN THE WORLD

Brand new, individually checked and guaranteed VALVES

AC/DD 2/6	DL72 7/6	ESU208 8/-	PENDD/1360 9/6	VR78 4/-	6AC7 4/3	6SC7GT 6/-	3524GT 7/-	1626 4/6
AC/P 4/6	DL96 8/-	EY51 8/3	PL81 11/-	VR99 8/-	6AG5 4/6	6SG7 5/-	39/44 6/-	1629 4/6
AC/PI 2/6	E1323 25/-	EY91 3/6	PL82 8/-	VR105/307/6 8/-	6AG7 8/-	6SH 5/-	53A 3/-	7193 1/9
ACSPENDD 4/-	E1524 6/6	EZ40 7/-	PL83 9/-	VS110 4/-	6AJ7 4/3	6SJ7 6/9	58 6/-	6475 5/-
AC6/PEN/5 4/-	EAC91 4/6	EZ80 7/6	PM4DX 3/-	VT25 3/-	6AK5 6/9	6SJ7G 6/6	59 6/-	8010AR 22/6
AC/SP3 4/6	EB34 1/6	H30 5/-	PT25H 7/6	VU111 3/6	6AK6 7/6	6SK7 5/6	71A 4/6	8013A 10/-
AL60 6/-	EB91 3/7	H63 3/6	PY82 8/-	VU120 3/-	6AK7 8/-	6SL7GT 6/9	77 6/-	8020 6/-
AR8 5/-	EBC33 6/-	KBC32 5/-	QP21 6/-	VU120 3/-	6AM5 5/-	6SN7GT 4/6	78 6/-	9001 5/-
ARDD5 2/-	EC52 3/-	KF35 5/-	QP25 5/3	VU133A 3/-	6AM6 6/3	6SQ7 6/6	80 6/3	9003 5/6
ARP3 3/-	ECC32 4/-	KT2 4/-	QOV60-40 6/6	Y31 7/-	6BB 5/6	6SR7 6/6	82 8/-	9004 4/-
ARPA 3/6	ECC81 6/6	KT31 8/-	QOV60-45 45/-	Y66 8/-	6BBG 2/6	6S7 5/-	83V 12/-	9006 4/-
ARP2 2/9	ECC82 6/9	KT33C 7/-	Q575/20 6/9	Z31 6/-	6C4 4/-	6F5 5/-	84 12/6	
ARP24 3/6	ECC83 7/-	KT44 7/-	Q595/10 6/9	Z31 6/-	6C5 4/-	6V6G 5/6	85A1 12/-	
ARP21 5/6	ECC84 7/9	KT63 6/-	QS108/45 6/9	IA3 3/6	6C6G 4/6	6V6GT 6/-	89 6/-	
ARP34 4/6	ECC91 4/-	KT241 9/-	QS150/15 6/9	IA5GT 5/-	6C8G 5/-	6X4 5/6	210LF 3/-	
ATP4 2/9	ECL80 9/6	KTW62 7/6		IC5GT 7/6	6E5 5/-	6X5GT 6/6	210VPT 2/6	
ATP7 5/6	EF22 7/3	KTW63 6/6	R10 12/6	ID8GT 6/-	6F6 7/-	6X4 5/6	7 pin 7/6	
AUI 5/-	EF32 5/-	L30 4/-	REL21 25/-	IE7GT 7/6	6F5G 5/6	8D2 2/6	217C 17/6	
AU4 5/-	EF36 3/6	MH4 3/6	RL37 3/6	IR5 6/9	6F8G 6/6	9D2 3/-	446A 14/-	
AVV3 4/-	EF39 4/6	ML4 4/-	RK34 2/6	IS5 6/6	6F12 4/6	10A 8/6	705A 17/6	
BL63 6/-	EF50 2/6	ML6 6/-	SP2 4/-	IT4 4/-	6H6GT 1/9	12A6 5/-	715B 97/6	
BT45 40/-	EF52 5/3	MPT42 5/3	SP43 7/6	IT4 4/-	6HA7 4/3	12A7 7/6	717A 8/6	
BT98 40/-	EF54 3/6	MS/PEN 6/6	SP13C 4/6	IT4 4/-	6H6M 2/9	12AT7 6/6	723A/B 4/6	
D41 3/3	EF55 4/-	N34 6/-	SP210 4/-	IT4 4/-	6IA7 4/3	12AU7 6/9	801 3/-	
D42 4/-	EF70 6/9	NR15A 3/-	SP41 2/6	IT4 4/-	6I5 3/6	12AX7 7/6	803 22/6	
D77 4/3	EF80 6/9	NT37 3/-	STV280/40 2/-	IT4 4/-	6I5G 3/3	12CB 7/6	805 30/6	
DA30 12/6	EF85 6/10	OD33A 10/-	SU2150A/4/9 3/29	IT4 4/-	6I6 4/3	12E1 22/6	807AMER 5/3	
DAF86 8/-	EF86 9/-	OD3 5/-	T41 19/-	(829B) 60/-	6I7 7/6	12H6 2/-	807BR 3/9	
DETS 15/-	EF89 8/9	P61 2/6	TP25 15/-	3Q5GT 9/-	6K6GT 6/6	12J5GT 3/6	808 8/-	
DET19 2/6	EF91 4/10	PCC84 8/-	TT11 3/-	3V4 7/3	6K8G 6/6	12K8GT 9/-	813 67/6	
DET20 2/6	EF92 5/-	PCC85 8/-	U17 5/-	4A1 4/6	6L5G 6/-	12S7 4/9	816 30/6	
DF70 9/-	EL32 3/9	PCF80 8/-	U18 6/6	4D1 2/6	6L6 9/-	12S17 6/9	829A 30/-	
DF72 7/6	EL35 9/-	PEN25 4/6	U27 8/-	5V4 7/-	6L6G 6/6	12SK7 5/-	843 7/6	
DF96 8/-	EL41 8/3	PEN45 5/6	U52 5/-	5V4 7/-	6L34 4/6	12SL7 7/6	861 15/-	
DH76 4/9	EL84 8/3	PEN46 5/6	UL84 8/6	5Y3GT 6/9	6N7G 6/6	12SR7 6/-	866A 10/-	
DK96 8/-	EL91 7/6	PEN65 6/6	UL85 7/-	5Z3 8/6	6N7GT 7/6	15D2 6/-	872A 35/-	
DL71 8/-	EM4 4/-	PEN220A 3/-	V248A 4/-	5Z4G 8/-	6O7G 6/3	15E 8/-	930 8/-	
			VZD33B 8/-	6A6 5/-	6R7G 7/6	15R 7/6	954 2/-	
			VP23 3/6	6AB7 5/-	6R7GT 8/-	30 5/-	956 2/-	
					6SA7 6/-	35T 30/-	1619 5/-	
					6SC7G 5/6	35Z4 5/-	1625 6/-	

Cathode Ray Tubes

3BP1	25/-
5BP1	35/-
5CP1	42/6
5FP7	45/-
VCRX258 (with scanning coil)	45/-

Photo Tubes

GL16	12/6
------	------

Special Valves

2J31	45/-
3A/1481	45/-
3J/170/E	£35
3J/192/E	£37.10
723AB	45/-
726A	27/6
ACT25	40/-
CV691	60/-
KR3	45/-
VX710	15/-
WL47A15	15/-

AND MANY OTHERS IN STOCK, INCLUDING CATHODE RAY TUBES AND SPECIAL VALVES. All U.K. Orders below 10/-. P. & P. 1/-; over 10/-, 1/6. Orders over £2 P. & P. free. C.O.D. 2/- extra. Overseas Postage extra at cost.

T.C.S. Receivers. Made by Collins of U.S.A. In fully guaranteed working condition. 1.5-12 mcs. Line up: 12S47 (1), 12S27 (1), 12A6 (2), 12SK7 (3). Power requirements 12 v. L.T., 225 v. H.T. £11.10.0. Carriage 12/6.

Specially Built Power Pack for the above. 230 v. A.C. mains, including 6X5GT valve, £3.15.0. Carriage 5/-.

Transmitter/Receiver No. 22. 2 mc. to 8 mc. Built almost exactly as No. 19 set but much more economical in battery consumption. Complete in fully working condition with power pack for 12 v., Headgear and Microphone assembly and Key. £9.19.6. Carriage 15/-.

Brand new original spare parts for AR88 Receivers. Please write your requirements.

Low Resistance Headphones, brand new, type CLR, 5/-, Balanced Armature, 7/6. P. & P. 1/-.

Telephone Handset, Standard G.P.O. type, new, 12/-, P. & P. 1/6.

S.C.R. 522 Receivers (BC624) 100-156 Mc/s., including all valves, 25/-, P. & P. 5/-.

H.T. Chokes made by Bendix Radio (U.S.A.), 3 Henrys 0.600A D.C. 25 ohms D.C. resistance 18,000 v. R.M.S. 60 cycle test £1.12.6. P. & P. 6/-. Ditto 10 Henrys 250 A. D.C. 90 ohms resistance 1,500 v. R.M.S. 60 cycle test 16/6. P. & P. 3/6.

Throat Microphones T 30 (U.S.A.), 3/6. P. & P. 1/6.

Carbon inset Microphone. G.P.O. Type 2/6. P. & P. 1/-.

Transmitter Cabinet with door at back. 7 7/8 in. high, 29 in. wide, rack fitting type, £17.10.0. Carriage £1.

Variometers for W/S No. 19. Fully tested and working, 12/6. P. & P. 2/6.

NEW PRODUCT OF TAYLOR

Model 127A Pocket size meter. Sensitivity 2 0, 0 0 0 o.p.v. D.C. 1,000 o.p.v. A.C. 2 0 ranges. D.C. current 50µA to 1 amp. D.C. volts 0.3 v. — 1,000 v. (2.5 kv by probe). A.C. volts 1 0 v. — 1,000 v. 3 resistance ranges from 0-20 megohms (self contained). Meter 0.20µA 3 1/2 in. arc. Accuracy D.C. 3% A.C. 4%, ohms 5%. Dimensions 5 1/2 in. x 3 1/2 in. x 1 1/2 in. weight 14 ozs. Price £10 complete with instruction manual, test plots and clips. Leather case £1.12.0 extra.

Filament Transformers. Primary 0-190-210-230-250 v. 50 C. Sec. 1 2.5 v. C.T. at 10 amps.; 2 2.5 v. C.T. at 10 amps.; 3 10.5 v. C.T. at 11 amps., 4,000 v. insulation. Price £2.19.0. P. & P. 5/-. Primary 0-190-210-230-250 v., 50 C. Sec. 1 10 v. C.T. at 4.5 amps., 4,000 v. insulation C.T. at 4.5 amps., 4,000 v. insulation £1.16.0. P. & P. 5/-. Primary 230 v. 50/60 c. 67 v. amp. Sec. 1 6.3 v. 1-6 amps.; 2 6.3 v. C.T. 3 amps.; 3 6.3 v. C.T. 3 amps.; 4 6.3 v. C.T. 3 amps. £1.12.0. P. & P. 5/-.

P. C. RADIO LTD.
170 GOLDHAWK RD., W.12
Shepherds Bush 4946

Ferranti Transformer. Oil cooled, 20/19.5 K.V.A., 3 phase, 50 cycles, Primary 360/380/400/420/440 v. Secondary 2,700/2,900/3,100/3,300/3,500 v., 2.1 amp. Voltage regulation by simple switches on primary and secondary. Weight 1,150 lbs. Price £125.0.0. Carriage at cost.

Driver Transformers. Primary 500 ohms imp. Sec. to match two 805 in push-pull. £17.6. P. & P. 5/-.

Rotary Transformer. 171 W 12 v. input, 1,600 v. 100 mA output, 30/-, P. & P. 7/6.

Insulation Test Meter. Testing voltage adjustable up to 6,000 v. D.C. Mains supply 180/250 v. In wooden case £25. Carriage 10/-.

Vibrator Unit. 12 v./160 v. 35 mA. Exceedingly well filtered and smoothed, excellent for car radios. New including 6X5G valve and vibrator, 17/6. P. & P. 5/-.

Moving Coil Round Hand Microphone. No. 13. 2 1/2 in. dia. with press switch, 12/6. P. & P. 1/-.

Complete Set of Strong Aerial Rods (American). Screw-in type MP49, 50, 41, 52, 53, total length 15ft. 10in., top diameter 0.615in., bottom diameter 0.185in., together with matched aerial base. MP37 with ceramic insulator, ideal for car or roof insulator, £2.10.0, post free.

HRO Mains power pack, input 115/250 v. A.C.; output 250 v. 0.75 mA and 6.3 v. 3.5 amps. £3, inc. carr.

Avominors. Leather case. With leads, fully tested and guaranteed. With batteries.

2,000 volt, D.C. £2.19.6. P. & P. 2/6.

Output Transformer in screening can give 9 different ratios 10 : 1 up to 120 : 1 for battery receivers or any high resistance pentodes used as output valves, 6/6. P. & P. 1/6.

Electronics (FLEET ST) Ltd

Dept. B

152/3 Fleet St., London, E.C.4. Tel. FLE 2833
Business Hours: Weekdays, 9-6. Saturdays, 9-1.

ASTOUNDING OFFER

AVANTIC BEAM-ECHO EQUIPMENT

DL7-35 POWER AMPLIFIER

Accepted as one of the finest amplifiers produced. Power output 54 watts peak. Distortion 0.05% d. at 20V sine wave output. Inter mod distortion 0.7% at 20V output. Freq. response 5 c/s to 30 kc/s. load impedance 4 ohm, 8 ohm, 16 ohm. Switch selected. Hum level—85 DB at 20V output. Makers' price 30 gns.

OUR PRICE £16.19.6 P. & P. 12/6

SPECIAL OFFER FOR STEREO ENTHUSIASTS

Two Avantic DL7-35 power amplifiers as above and the Avantic SP21 stereo pre-amp control unit as below, the 3 items—

OUR PRICE NOW 47 gns.

Carriage and packing 30/-. The last of this wonderful offer.

SP21 STEREO PRE-AMP

Twin channel pre-amp, designed for DL7-35 amplifier, ideal for mono or stereo, stereo balance control, 6 inputs each channel. Tuner tape p/up. Freq. response 40 c/s to 15 kc/s ± 1DB, bass and treble control, loudness control and numerous refinements. Makers' price £28.10.0.

OUR PRICE £16.19.6

A NEW TRANSISTOR PORTABLE RECEIVER

Build this mighty six transistor superhet battery portable. Circuit description: 6 Mullard transistors, OC44, 2—OC45, 1—OC81D, 2 matched OC81, 1—X1 diode, printed circuit, internal ferrite aerial, 5in. loudspeaker assembled. Dial assembly, medium and long wave coverage, 500 mW output, attractive blue/cream two tone cabinet, size 8½ x 6 x 3in. Weight approx. 3 lb. Detailed point to point and theoretical diagram, including all components for easy construction.

Only **£9.15.0** plus 3/- post and packing.

E/ready PF7 battery, 3/3. Instructions and circuit, 1/6 post free.

LIMITED NUMBER



F.M. Tuner by the Ferguson Company. An attractive and compact unit in gold finish hammered metal case 10in. wide, 7½in. deep, 2½in. high. Neat escutcheon and tuning dial. Has own power supply. Uses two EF80, one ECF80.

2 Germanium diodes and metal rectifier. Coverage 87.6—98 Mc/s. (continuously). Will feed into any amplifier or radio.

AT THE AMAZING PRICE OF **£12.19.6**

2/6 Post and Packing.

BRAND NEW T.V. TUBES, CHEAPER THAN REBUILDS

All brand new in famous maker's cartons. (1) 17in. rectangular aluminumized 6.3 HRTS. 0.3A current; max. anode voltage 16 kV. Usual price £17.5.0. **OUR PRICE £7.19.6.** Crating and carr. 15/-. (2) 14in. rectangular Tube, 6.3 heaters; 0.3 amp. current; max. anode 14kV; ion trap; external conducting coating; B12A base, £7.9.6. Crating and carriage 12/6. (3) Ferranti T12/549 12in. magnetic white fluorescence; 4 v. heater; max. anode 10 kV. As used in many TV receivers. Original price £17.15.0. **OUR PRICE £2.19.6.** Crating and carr. 12/6. (4) Ferranti 9in. Tube, round white fluorescence, 4 v. heater, max. anode voltage 7 kV. **OUR PRICE £2.5.0.** Crating and carr. 11/6.



NEW, GUARANTEED, PERFECT RED 3/- SPOT TRANSISTORS

WHITE SPOT. 4/8. GREEN/YELLOW. 5/8.
GET3. 8/-; OCTO. 9/-; OC45. 16/8; TSI. 4/-; TS3. 12/8.

CRYSTAL DIODES, 1/-, Mullard OA81, 4/-;
OA70, 4/-.
BRIMAR GD4 (GEX34), 4/-.

MULLARD: OC16, 54/-; OC44, 26/-; OC71, 14/-; OC72, 17/-;
2/OC72 (matched pair), 34/-; OC170 (Short Wave), 50/-; OCP71
(Photo Electric), 50/-.

EDISWAN: XA101, 23/-; XA102, 26/-; XA103, 15/-; XA104, 18/-;
XB104, 10/-; XC101, 16/-; 2/XC101 (matched pair), 32/-; XA131, 35/-;
2/XC131 (matched pair), 34/-.

TRANSISTOR HOLDERS, 1/3. ARDENTE sub min., 1/9.

FERRITE ROD: 3 x 5/16in. 1/6.

CONDENSERS: Miniature, 0.01/150 v., 11d.; 0.1 mfd./100 v., 1/2;
0.005/200 v., 10d.; Standard size 0.01/1,000 v., 8d.; 0.1/500 v., 10d.;
Wire ended, 16 mfd./450 v., 2/4; 16-16/450 v., 4/-; 8-8/450 v., 2/9;
8-16/450 v., 2/9; 50 mfd./50 v., 1/8; 25 mfd./25 v., 1/8; 100 mfd./6 v.,
2/3. Miniature, 25 mfd., 2/6; 50 mfd., 2/3; 5 mfd., 2/3; 2 mfd., 1/6.
SUB MINIATURE: 32 mfd., 25 mfd., 16 mfd., 8 mfd., 2 mfd. All
3/8; 100 mfd., 2/9.

TUNING CONDENSERS: Solid, dielectric, 500pF (0.0005 mfd.).

4.- 300 pF, 2/9; 100 pF, 3/-. Miniature, 500 pF, 5/-.

RESISTORS: All values 10% 1 w. 6d.; 1 watt, 9d.

BEGINNERS I VALVE: Circuit and plans, 11d. Kit, 35/-.

COILS: Repanco DRR2, 4/-; DRX1, 2/6; Telatron HAX, 3/-.

All complete with circuits.

H.R. HEADPHONES (for Crystal Transistor or Valve Sets):

Diploma, 17/6; IVALER, 14/-.

TAPE—SUPERIOR QUALITY: Standard PVC Base, 60ft. on

5in. spool, famous make, 17/6.

CONNECTING WIRE: Six assorted colours, 1 yard of each

colour, 1/9; 2 yards of each colour, 2/9; 10 yards of each colour,

10/6.

OAKFIELD RADIO THE TRANSISTOR PEOPLE

Mail Order Only

121 Macclesfield Road, Hazel Grove,
Stockport, Cheshire

GZAK: This Month's Bargains

AMERICAN "SIGNAL" MORSE KEYS

Type M100 with switch. This excellent, lightweight,
fast key is currently priced in U.S.A. at \$6.85 (£2 10s.)
and is offered at only 12/6, p. & p. 1/6.

AERIAL EQUIPMENT

TWIN FEEDER. 300 ohm twin ribbon feeder, similar K25,
6d. per yard. K35B Telcon (round) 1/6 per yard. Post on above
feeder and cable 1/6 any length.

COPPER WIRE. 14 G., H/D 140ft. 17/-; 70ft. 8/6. P. & 2/-.
Other lengths pro rata. Stranded 7/25, 140ft. 10/-; 70ft. 5/-
P. & P. 2/-.

RIBBED GLASS. 3in. aerial insulators, 1/6 each P. & P. 1/6.

CERAMIC FEEDER SPREADERS. 6in. type F.S. 10d. each

or 9/- dozen. P. & P. 2/-.

CERAMIC "T" PIECES. Type A.T. for centre of dipoles,

1/6 each. P. & P. 1/-.

2 METRE BEAM 5 ELEMENT W.S. YAGI. Complete in

box with 1 x 2½in. mast head bracket. PRICE 49/-, P. & P. 3/6.

SUPER AERIAL CABLE. 75 ohm, 300 watts, very low

loss, 1/8 per yard, P. & P. 1/6. 50 ohm, 300 watt coax, very low

loss, 1/6 yd. or 20 yds. 27/6, P. & P. 1/9.

HEADPHONES H.R. TYPE, 4,000 ohms., very sensitive.

ONLY 12/6 pr. P. & P. 1/6. C.L.R. Type (low res.), 8/6.

P. & P. 1/6.

ABSORPTION WAVEMETERS. 3,000 to 35,000 Mc/s. in 3

switched bands, marked on scale. Complete with indicator

bulb. A MUST for any Ham shack. ONLY 17/6, post free.

ROTARY CONVERTERS. 6 v. input, 250 v., 125 mA

output. ONLY 17/6. P. & P. 3/-. 12 v. 490 v. 65 mA, 17/6.

P. & P. 3/- Also 12 v. D.C. MINIATURE, output, 360 v., 30 mA

cont. or 310 v. 70 mA intermittent rating. 12/6 each or 22/- for

2. P. & P. 2/-.

CHAS. H. YOUNG LTD.

THE COMPONENT SPECIALISTS

Dept "B", 110 Dale End, Birmingham 4, (CEN 1635)
(No C.O.D. under £1 please) (By return Service)



FOR VALVES - TUBES AND COMPONENTS - BY RETURN POST SERVICE

AC/P 7/6	ECC84 10/-	EL84 9/-	P61 3/6	U404 11/4	W101 8/-	6AG5 5/6	6L19 13/6	12BE6 9/-
AC6PEN 6/6	ECC85 9/6	EL91 4/-	PABC80	UABC80	W729 10/6	6AK5 5/-	6N7GT 7/6	12C8 7/-
ATP4 3/6	ECF80 12/-	EM34 9/6	13/11	10/-	W61 6/-	6AL5 4/6	6Q7G 7/6	12H6 3/6
AZ1 10/-	ECF82 13/-	EM80 9/6	PCC84 8/6	UAF42 9/6	W61(M) 5/-	6AM5 7/6	6Q7GT 9/6	12J5GT 3/6
AZ31 10/-	ECH42 9/6	EM81 10/6	PCC85 11/6	UB41 9/-	X22 12/6	6AM6 4/6	6SA7GT 8/-	12J7GT 10/6
AZ41 13/11	ECH81 9/-	EY51 9/6	PCF80 8/9	UBC41 8/6	X41M 12/6	6QA5 7/6	6S7G 7/6	12K7GT 6/6
B36 10/-	ECH83 13/11	EY81 9/6	PCF82 11/6	UBC81 11/4	X101M 8/-	6AT6 8/6	6SH7 4/6	12K8GT13/6
CL4 12/6	ECL80 9/6	EY86 10/-	PCL82 11/6	UBF80 9/6	Y63 7/6	6AU6 10/6	6S17 8/6	12K8M 13/6
CV73 4/-	ECL82 10/6	EZ40 7/6	PCL83 13/6	UBF89 13/3	Z21 (4 pin)	6BB8 4/6	6S7K 6/-	12Q7GT 6/6
C36A 6/6	ECF22 8/6	EZ41 7/6	PCL84 13/6	UC92 13/3	Z309 8/6	6BA6 7/6	6SL7GT 8/-	12S7G 7/6
D42 4/6	EF36 4/-	EZ80 7/6	PL36 14/6	UCC84	Z359 7/6	6BE6 7/6	6SN7GT 7/6	12SH7 6/-
DAF96 8/-	EF37A 15/-	EZ81 7/-	PL81 11/-	10/11	I A3 3/6	6BH6 9/-	6SQ7 9/3	12S17 6/-
DF96 8/-	EF39 5/9	EZ90 7/6	PL82 8/6	UCC85 9/6	I A3 3/6	6B16 9/-	6U4GT 12/-	12SK7 6/-
DH63 7/6	EF40 13/6	E1148 2/-	PL83 9/6	UCH42 9/6	I A7GT 12/6	6BR7 12/6	6U5G 8/6	12SL7 8/-
DH101 8/-	85A2 10/-	FW4/500	PL84 12/7	UCX81 10/6	IC2 11/6	6BW6 9/6	6U7G 8/6	12SN7GT
DK96 8/-	EF41 9/9	GZ32 10/-	PX25 12/6	UCL82 11/6	IC5GT 12/6	6BW7 7/6	6V6G 6/-	10/-
DL63 9/-	EF42 11/-	H30 5/-	PY80 7/6	UCL83 13/6	ID5 9/6	6C4 4/6	6V6GT 7/9	15D2 7/9
DL82 10/6	EF50 4/-	H63 10/-	PY81 8/6	UF41 9/-	ID6 10/6	6CSGT 6/6	6X4 7/6	19AQS 9/9
DL96 8/-	EF50SYL 7/-	H63 10/-	PY82 7/6	UF80 13/11	IHSGT 9/-	6C6 5/6	6X5G 7/-	25A6G 10/6
DM70 7/6	EF54 6/-	HL23DD 8/6	PY83 8/6	UF89 9/-	IL4 6/6	6C31 7/6	6X5GT 7/6	25L6GT 10/6
DN41 12/6	EF55 10/-	KT22 5/-	REN4VA10/6	UF85 9/-	IL5 8/-	6D6 5/6	6/30L2 12/6	25Z4 10/6
EAS0 1/6	EF80 7/-	KT24 5/-	REN45 6/-	UL41 10/-	IN5 10/6	6CH6 8/6	7B6 10/6	25Z5 8/6
EABC80 9/6	EF85 7/-	KT32 4/-	PEN45 10/-	UL84 9/-	IR5 7/6	6FG 7/6	7B7 8/6	25Z6 10/-
EAF34 9/6	EF86 12/6	KT32 4/-	PEN46 7/-	UL84 9/-	IS4 10/6	6FGM 7/6	7B8 6/6	30C1 10/6
EB24 2/-	EF89 8/9	KT33C 8/6	PEN420A 4/-	UY1N 12/6	IS5 6/6	6FI 14/-	7C5 8/6	30F5 10/6
EB41 8/6	EF91 5/9	KT61 13/6	PEN44 12/6	UY41 7/6	IT4 5/6	6F13 14/-	7C6 8/6	30FL1 10/6
EB91 4/-	EF9(BVA)	KT63 7/6	PM12M 8/-	UY85 7/-	2C26 1/6	6F15 14/-	7D6 13/6	30P4 15/-
EB91 4/-	EF9(BVA)	KT74 6/6	PM12M 8/-	VP13C 3/6	3A5 12/6	6F33 7/6	7H7 8/6	30P12 12/6
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VP13 15/-	3A8GT 6/-	6H6 2/6	7Q7 9/-	20P16 9/6
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR22(PM2A) 3/-	3D6 5/-	6H6GT 2/6	7S7 9/6	30PL1 12/6
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR22 3/-	3Q4 7/6	6I5G 3/6	7Y4 8/6	35L6GT 10/-
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR22 6/6	3Q5GT 9/6	6I5GT 5/6	8D2 2/9	25Y5 9/9
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VP23 6/6	3S4 7/6	6I5M 6/6	9D2 3/6	35W4 7/6
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VP41 8/6	3V4 8/-	6I6 5/6	10D2 12/-	35Z4GT 8/-
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR105/30 8/-	4D1 3/-	6I7G 6/6	10F1 12/6	42 8/-
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR116 4/-	5R4GY 9/6	6K7G 4/6	10LD11 12/-	35Z5GT 9/-
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR150/30 7/6	5U4G 6/6	6K7M 6/9	10P13 15/-	50C5 11/6
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR150/30 7/6	5V4 11/6	6K8G 6/6	12A6 5/-	10L6GT 8/6
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR150/30 7/6	5Y3G 8/-	6K6GT 7/9	12A8H 12/-	75 10/6
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR150/30 7/6	5Y3GT 7/6	6K7GT 5/-	12AT6 9/-	77 6/-
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR150/30 7/6	5Z4G 9/-	6K8GT 10/-	12AT7 7/6	78 7/6
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR150/30 7/6	5Z4M 10/-	6L6G 8/-	12AU6 8/-	80 8/6
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR150/30 7/6	6A7 10/-	6L6M 9/6	12AU7 8/-	142BT 3/6
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR150/30 7/6	6A8G 9/-	6L7G 7/6	12AX7 8/-	210DDT 4/6
EB91 4/-	EF9(BVA)	KT76 6/6	PM12M 8/-	VR150/30 7/6	6A7 10/-	6L7G 7/6	12BA6 9/-	210VPT 3/6

AUTOMATIC RECORD CHANGER UNITS

B.S.R. "Monarch"
UA8, 4-speed unit with B.S.R. Ful-Fi cartridge, £6.19.6.

B.S.R. "Monarch"
UA8, as above but fitted with B.S.R. Ful-Fi STEREO cartridge, £7.19.6.

B.S.R. "Monarch"
UA12, 4-speed unit in green and cream £8.19.6.

B.S.R. "Monarch"
UA14, 4-speed unit in two tone green. £8.19.6.

Collaro "Conquest",
4-speed fully mixing changer complete with studio "0" cartridge, £7.19.6.

Garrard RC120 4D
Mk.2, 4-speed unit with manual control to enable records to be played singly fitted GC2 cartridge, £8.19.6.

Garrard RC121 4D,
4-speed unit with plug in

pick-up head. £10.19.6.

SINGLE RECORD PLAYERS

Collaro Junior, 4-speed turntable and pick-up complete with crystal cartridge and sapphire styli, 75/-.

E.M.I. Single Player
4-speeds with automatic stop. Fitted with Acos STEREO turn-over cartridge, £6.19.6.

SUNDY SPECIALS
Semi air spaced 2-gang condenser, 6d. yd. 2-gang condenser AFM/FM type 3/9 each. High resistance Headphones, 4,000 ohms, 13/6 pair. 2 mid paper block condensers for X over, 9d. each. 1,200ft. reels of recording tape 21/- each. Acos GP54 pick-up arm with cartridge, 2/6 each. Weller 100 watt soldering gun, 75/-.

Line cord 3-way, 0.3 amp or 0.2 amp, 1/9 yd. JB "00" 2 gang condenser for Transistor kit: 9/6

each. Rola C25 2 1/2 in. louds peaker. 26/8 each. Solon 625 instrument iron, 25 watts. 24/- each.

REPANCO TT9 miniature interstage Transformer, 12/6. **REPANCO TT10** miniature push-pull output Transformers 12/6. XT6 1st and 2nd. IFT in Transistor Receiver 10/-.

XT7 3rd IFT 10/-.

LATEST B.S.R. "MONARDEC K" SINGLE SPEED
3 1/2 i.p.s. taker 5 1/2 in. spools. Simple controls, £9.19.6. Tapes extra. Carriage and Insurance 5/6.

REPANCO ONE VALVE BATTERY RECEIVER
Includes metal chassis, headphones, battery, valve and all other parts. An ideal set for the beginner. Can be easily modified at a later date for output and speaker.

Price 45/- each. Envelope with full details 9d.

COLLARO MK IV TAPE TRANSCRIBER
Four heads. Twin track operation. Pause control. Tape measuring and calibration device. Two motors. Fast rewind. 7" tape spool. Three speeds: 3 1/2, 7 1/2 and 15" per second. Finish cream polystyrene cover plate with maroon control. Delivery from stock, £17.19.6.

SINGLE CABLES
All P.V.C. covered in various colours—Red, Black, Blue, Yellow, etc. 7/18, 1/066, 1/044, 23/0076, 14/0076 etc. all 1/3d. per yard. Special price for quantities.

HEADPHONES—MICROPHONES
CLR Low resistance type 120 ms. . . . 7/6 pair.

High Resistance Phones, 4,000 ohms. . . 13/6 pair. Throat Microphones . . . 3/- set. American T30 type Throat Microphones . . . 3/- pair

TELEVISION TUBES REGUNDED 12 MONTHS' GUARANTEE
MW31/74, £5.10.0; CRM-152B, £6; MW36/24, £5.10.0; CRM141, £5.10.0; CRM123, £5.10.0; MW43/69, £6; CR1.171, £6. Carriage and insurance 10/- extra. Allowance on old tube if returned.

CATALOGUE
Our 1961 catalogue is now available, please send 1/- in stamps for your copy. Trade catalogue also available, please attach your business letter heading.



**103 LEEDS TERRACE
WINTOUN STREET
LEEDS 7**

TERMS: Cash with order or C.O.D. Postage and Packing charges extra; as follows: Orders value 10/- add 1/-; 20/- add 1/6; 40/- add 2/-; £5 add 3/- unless otherwise stated. Minimum C.O.D. fee and postage 3/-.

For full terms of business see inside cover of our catalogue. Personal Shoppers 9 a.m. to 5 p.m. Mon. to Friday; Saturday 10 a.m. to 1 p.m.

SELENIUM RECTIFIERS

F. W. BRIDGE	H.T. Types H.W.
7/12 v. 1 a... 3/11	150 v. 40 m.a. ... 3/9
6/12 v. 2 a... 6/11	250 v. 50 m.a. ... 3/11
6/12 v. 3 a... 9/9	250 v. 60 m.a. ... 4/11
6/12 v. 4 a... 12/3	250 v. 80 m.a. ... 5/11
6/12 v. 6 a... 15/3	250 v. 250 m.a. ... 12/9
6/12 v. 10 a... 25/9	CONTACT COOLED
6/12 v. 15 a... 35/9	250 v. 80 m.a. H.W.
24v. 2a... 14/9	6/11 250 v. 75 m.a.
	F.W. (Bridge) 8/11

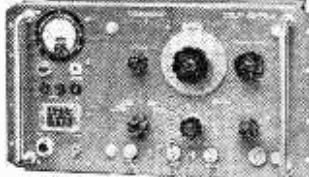
B.S.R. MONARDECK TAPEDECKS. Speed 3 1/2 in. per sec. High quality recording heads, 9 gns. Carr. 5/-. Suitable polished veneered walnut carrying case for above 39/6. (Space for amplifier.)

EX-GOVT. CASES. Size 14-1 1/4 in. high Well ventilated, black crackle finished, undrilled cover. IDEAL FOR BATTERY CHARGER OR INSTRUMENT CASE OR COVER COULD BE USED FOR AMPLIFIER. Only 9/9, plus 2/- postage.

HI-FI 10 WATT AMPLIFIERS. Slightly store soiled but guaranteed unused and in perfect order. Fitted Mullard valves. Dual inputs for "mike" and gram., etc. Bass and Treble Controls. High sensitivity and quality. For 230-250 v. A.C. Carriage 7/6. **6 gns.**

COLLARO STUDIO TAPE Transcriptors. limited number **15 gns.** Carr. 5/-. 3 motors incorporated. Virtually no Wow or Rumble. Position for extra Record/Playback head for stereo. Accurate digital rev. counter, 3 speeds. **Linear LT45—Tape Amplifier,** suitable for above. Switched negative feedback equalisation for different speeds. Superb quality at up to 4.5 watts. For **12 gns.** 200-230-250 v. A.C. mains.

SIGNAL GENERATORS



Type C.T.53 by Wayne Kerr. Complete with charts. **SUITABLE FOR ALIGNING V.H.F. RADIO or TV RECEIVERS.** 3.9 to 300 megacycles. Output 1 micro-volt to 10 millivolts. Vernier Tuned, 6 Band Coil. Turret Potted "C" Core Transformers. Seven BTG Valves. Stabilised H.T. All voltage supplies including mains R.F. filtered. External mod. by sine wave from 50 c.p.s. to 10 Kcs. or Pulses down to 1 Hz sec. Worth approx. £100. Only 17 gns. Carr. 10/- or on H.P. terms.

MICRO-AMMETERS. 2in. diam. 250-0-250 micro-amps. 15/9. 3in. diam. 0-50 micro-amps. 39/6. 3 1/2 in. diam. 0-500 micro-amps. 59/6.

RELAYS. Carpenters' Type. Polarised. 2 times 9,500 turns at 1,685 ohms. 19/6. Miniature Moving Coil Differential Type. Single pole 2-way, or centre stable. Two coils each 350 ohms. Minimum operating current 140 micro-amps, nominal 400 micro-amps maximum 8 milli-amps. Two way contact current 100 mA at 50 v. A.C. or D.C. Size 1 1/2 x 1 1/2 in. approx. 19/6. Miniature Type G.E.C. 670 Sealed, wire ends, 4 covers, platinum M1085. 18/9.

SPECIAL OFFER EX-GOVERNMENT SELENIUM RECTIFIERS. 24 v. 15 amp. with large square cooling fins. 29/11 each.

EX. GOVT. SMOOTHING CHOKES. 200 mA. 3-5 H., 50 ohms. Parmeko 8/9; 100 mA. 5 H., 100 ohms 3/11; 150 mA., 10 H., 50 ohms 9/9; 80 mA., 20 H., 900 ohms 5/9; 120 mA., 12 H., 100 ohms 8/9; 50 mA., 50 H., 1,000 ohms 6/9; 100 mA., 10 H., 100 ohms 6/9; 80 mA. 5-10 H., 250 ohms 2/11.

EX. GOVT. MAINS TRANSFORMERS

Primaries 200-250 v. 50 c.p.s. A.C. 250 v. 60 mA. 6.3 v. 2 a. ... 10/11
270-0-275 v. 100 mA. 6.3 v. 7 a. 5 v. 3 a. 21/9
300-0-300 v. 60 mA. 6.3 v. 2 a. ... 12/11
300-0-300 v. 100 mA. 6.3 v. 2 a. 5 v. 2 a. 18/9
350-0-350 v. 160 mA. 6.3 v. 5 a. 5v. 3a. 27/9
0-10-20-25 v. 24a. (Govt. rating) ... 79/6
Carriage 15/-

2 VOLT ACCUMULATORS

Varleys small size 4 x 3 1/2 x 1 1/2 in. 2 v. 14 A.H., brand new, 6/9 ea., 3 for 15/6.

FIELD TELEPHONES

With bell. Require only small battery. Suitable for office, factory, warehouse, or outside intercommunication. 59/6 each.



R.S.C. BRADFORD MANCHESTER (LEEDS) LTD. and LEEDS

TERMS: C.W.O. or C.O.D. No. C.O.D. under £1 Post 1/9 extra under £2. 2/9 extra under £5 Open 9 to 6. Wed. until 1 p.m. Trade supplied. S.A.E. with all enquiries. Mail Orders to 29-31 Moorfield Road, Leeds 12. Callers to 5 and 7 County (Mecca) Arcade, Briggate, Leeds 1. and 8-10 Brown Street (Market Street), Manchester 2, or 56 Morley Street (next to Majestic Ballroom), Bradford.

Get these



CIRCUITS & WIRING DIAGRAMS

T.R.F. Circuits
Battery Circuits
Portable Circuits
Sheet Circuits
Mains Circuits
Filter Circuits

The selection of circuits continually changing and being added.

Send Postage 1/- (6 stamps)

OSMOR COILS are regularly used and recommended by designers writing in "Practical Wireless," "Wireless World" and "Radio Constructor." Why not follow the experts?

"Q Coils" All ranges
Potted Coils
F.M. COILS
TAPE COILS Speaker Cross-over Coils
ROD AERIALS
Coils and I.F.s for Transistor Circuits
SUB-MINIATURE COILS
Midget I.F. Trans. With ferrite cores

418 Brighton Road, South Croydon. Telephone: CRO 5148/9



SOUTHERN RADIO'S WIRELESS BARGAINS

ATTACHMENTS for "18" Transreceivers. ALL BRAND NEW HEADPHONES, 15/6; HAND MICROPHONE, 12/6; AERIALS, 5/-; SET OF 6 VALVES 30/-.
CONDENSERS. 100 Assorted. Mica Tubular, etc., NEW, 15/-.
CONTACTOR TIME SWITCHES. 2 impulses per sec., in case ... 11/6
REMOTE CONTACTOR. For use with above. ... 7/6
LUFBRA HOLE CUTTERS. Adjustable 1/2" to 3/4". For Metal, Plastic, etc. ... 7/-
MAGNETS. Strong Bar Type. 2" x 1/2". 1/6 each.
MORSE TAPPERS. Midget Type, 2/9. Standard, 3/6. Heavy Type on Base, 5/6. ALL BRAND NEW.
PACKARD-BELL AMPLIFIERS. Complete BRAND NEW with Valves, Relay, etc., etc., 17/6 each.
QUARTZ CRYSTALS. Types F.T.241 and F.T.243, 2-pin, 1/4 Spacing. Frequencies between 5,675 Kc/s. and 8,650 Kc/s. (F.T. 243) 20 Mc/s. and 38.8 Mc/s. (F.T.241), 54th Harmonic, 4/- each. ALL BRAND NEW TWELVE ASSORTED CRYSTALS, 45/-, Holders for both types, 1/- each. Customers ordering 12 crystals can be supplied with lists of frequencies available for their choice.
QUARTZ CRYSTAL CASES (F.T. 241/243)...10/6 per dozen.
RECORDING BLANKS. New "Emidisc", ready for use. 13" 6/- each. Or 15" complete in metal case £4.
RESISTANCE BOXES. 100 Assorted useful values. New wire end, 12/6
SPECIAL OFFER. 12 ASSORTED METERS. Slightly damaged, Mainly broken cases (perfect movements). Including 3 Brand New Aircraft instruments, 12 for 45/-.
STAR IDENTIFIERS. Type I-A-N Covers both Hemispheres, 5/6
TRANSPARENT MAP CASES. Plastic. 14" x 10 1/2". Ideal for Maps, Display, etc. ... 5/6
TRANSCEIVERS. Type "38" complete with 5 valves, etc. New condition, untested by us, but serviceable, no guarantee, 22/6 each.
ATTACHMENTS for Type "38" Transreceivers. ALL BRAND NEW. PHONES, 15/6; THROAT MICROPHONES, 4/6; JUNCTION BOXES, 2/6; AERIALS, No. 1, 2/6; No. 2, 5/-; WEBBING, 4/-; HAVERSACKS, 5/-; VALVES, A.R.P.12, 4/6; A.T.P.4, 3/6. Set of FIVE VALVES, 19/- the set.

POST OR CARRIAGE EXTRA, FULL LIST OF RADIO BOOKS, ETC., 3d

SOUTHERN RADIO SUPPLY LTD.
11 LITTLE NEWPORT ST., LONDON W.C.2. GER. 6653

The greatest All-Transistor circuit of our time

BUY AS YOU BUILD the "MIRACLE" Super Six Plus

ANY PART SOLD SEPARATELY

Makes up to a portable transistor superhet embodying all the latest design developments including a self-oscillating mixer, two double-tuned IF stages, audio amplifier and a matched push-pull output stage. Also two germanium diodes are incorporated, additional to the six Mazda transistors, one as detector and the other to assist the AGC as a variable damping element.

12 Good Reasons why the Miracle has no equal

- ★ Printed Board engraved with component locations
- ★ Special provision for use as a CAR RADIO
- ★ Double-tuned IF transformers
- ★ 6 First Grade Mazda transistors plus 2 Mazda hi-efficiency diodes
- ★ Hi-flux 5in. (12000 lines) 25-ohm loudspeaker
- ★ Full coverage Medium and Long wavebands
- ★ 3½in. tuning dial with 5:1 slow motion
- ★ Long life dry battery. 150/200 hours.
- ★ Internal high-Q Ferrite Aerial
- ★ Push-pull matched output stage 400-milli-watts
- ★ 3½in. x 7½in. x 10in. attractive two-tone case—total weight approx. 4 lb.
- ★ Comprehensive Manual supplied—so easy to build

Our inclusive price for all components, cabinet and battery, complete in every detail:

£11.10.0

Plus 3/6, Regd. p.p.

INSTRUCTION MANUAL and CIRCUIT BOOK containing itemised list of all component prices, 3/6 post free. Any part sold separately.

ACCLAIMED BY OVER 10,000 PEOPLE THE FINEST TRANSISTOR KIT OBTAINABLE

STEREO AMPLIFIER—BARGAIN OFFER

Line up ECC83-ECL82-ECL82, including valves, gilt escutcheons, and knobs, circuits and full specifications. **£5.10.0** POST FREE Cannot be repeated.

Ask to see a working model in the shop — You will be amazed!

RADIO CLEARANCE LTD., 27, TOTTENHAM COURT ROAD, LONDON, W.1.

Telephone Museum 9188

A.R.R.L. RADIO AMATEURS HANDBOOK 1960

- New edition. 32/6. Postage 1/9
- Multiband Transistor Reference Manual, 12/6, postage 1/9
- Using an Oscilloscope by Easterling, 6/6, postage 6d.
- Correcting TV Picture Faults. New edition by Cura, 4/-, postage 6d.
- Better Shortwave Reception by Orr, 25/-, postage 1/-
- Beam Antenna Handbook by Orr, 22/-, postage 1/-
- Principles of Transistor Circuits by Amos, 21/-, postage 1/-
- World Radio Handbook by Johansen, 15/6, postage 1/-
- Introduction to C.R. Oscilloscope, 2nd ed. by Harley Carter, 15/-, postage 1/-
- The Grundig Book by Purves, 12/6, postage 1/-
- Transistor Projects by Gernsback, 23/-, postage 1/-

UNIVERSAL BOOK CO.

12 Little Newport Street, London, W.C.2 (adjoining Lisie Street)

High Stab. Resistors 1W 1%. Special offer 13 each during October only. 100 ohms, 5K, 9, 10K, 15, 20, 30, 70, 100K, 150, 225, 270, 450, 500, 900K, 1.5M, 2M, 6.8M.

Precision Wirewound Resistors. 1 Watt 1 ohm to 1K, 1%, 2.9, 0.2%, 4.3; to 5K 1%, 3.3, 0.2%, 4.9; to 20K, 1%, 4; to 100K, 1%, 4.3. Your value wound to order. 1µF 2%, 3/6, 0.1µF 2%, 2/9; 0.01µF 2%, 1000pF 2%, 100pF 2%, 1/- each.

Wirewound Pots 1K, 10K, 50K, all spindled 2/6. Free Circuits for 100µA, 1 and 1mA meters. Stamp only.

Switches Full size water. 1p. 11w. 3/11; 2p. 11w. 6/3; 4p. 11w. 11/-.

14F Paper Block 600V. 1/6, 400V 1/-; 0.1µF 600V. Sprague 8/- doz; 0.02 µF 350V. TCC CP33N 3/- doz; 25 pF air-sp. trimmer 2/6 doz; min. mains neons, holder, resistor 2/-.

Transistors. Red Spot 3/6. White 4/6. GEX 4 diodes 1/6. Croc clips 6d. PVC 14/0078 connecting wire 1/8 doz. yds.; wander plugs 4d.; suitable plain sockets 4d.; ins. sockets 7d.; List available. S.A.E. enquiries please.

PLANET INSTRUMENT CO.

25 DOMINION AVENUE, LEEDS 7

VALVES SAME DAY SERVICE NEW! TESTED! GUARANTEED!

SETS 1R5, 1S5, 1T4, 384, 3V4, DAF91, DF91, DK91, DL92, DL94 .. any 4 for 18/8
DAF96, DF96, DK96, DL96 4 for 27/8
6K7G, 6K8G, 6Q7G, 6V6G, 6X5G, or 5Y3G 5 for 27/-

1A7GT 12/-	6LD20 8/-	30L1 7/9	ECC82 6/6	EZ81 7/-	U25 13/-
ID5 8/-	6P25 8/-	30PL1 10/-	ECC83 7/-	FW4/500 8/-	U26 10/0
1H5GT 10/-	6Q7G 6/9	36L6GT 9/6	ECC84 8/9	GZ32 9/6	U50 6/9
1N5GT 10/-	6Q7GT 9/6	3Z4GT 6/6	ECC85 8/3	KT33C 7/-	U62 5/3
1R5 1/6	6S17GT 6/3	3Z5GT 8/6	ECP80 9/6	KT41 11/6	U76 6/-
1S5 5/3	6SN7GT 4/9	6L6GT 8/9	ECP82 6/6	KT44 9/-	U78 6/-
1T4 4/-	6U4GT 11/-	AZ31 9/6	ECH21 13/6	KT61 10/-	UACB80 7/9
3A5 9/-	6V6G 5/-	B30 8/9	ECH35 8/9	KT88 8/6	UAF42 9/6
3A5 9/-	6V6GT 6/6	CL33 13/-	ECH42 8/9	KT71 8/6	UFC41 7/9
3Q4 7/6	6X4 5/-	DAC32 10/-	ECH81 9/-	ML11 7/6	UF80 9/6
354 6/-	6X5GT 5/6	DAF91 5/3	ECL40 7/3	MX40 9/6	UF89 8/-
3V4 7/-	7B7 7/6	DAF96 7/6	ECL82 10/-	N18 7/6	UBL21 13/6
5U4G 5/3	7C5 7/6	DCC90 9/-	EP39 4/6	PCC84 7/9	UC92 12/6
5Y3GT 5/6	7C6 7/6	DF33 10/-	EF41 8/6	PCC39 12/-	UC94 12/6
5Y3GT 6/9	7H7 7/9	DF91 4/-	EF42 9/6	PCF80 7/3	UC95 7/6
824G 7/9	7S7 9/8	DF96 7/6	EP80 8/6	PCF82 8/-	UCF80 14/-
8AL5 3/6	7Y4 7/-	DH76 5/6	EF85 6/6	PCL82 8/-	UCH21 13/6
6AM6 3/6	10C1 14/6	DH77 7/3	EF96 10/-	PCL83 11/-	UCH42 8/-
6AQ5 6/-	10C2 17/6	DK32 12/-	EF99 7/6	PCL84 8/-	UCH81 8/-
6A7E 7/3	10P13 14/6	DK91 9/-	EF91 3/6	PEN44 11/-	UC182 10/9
6BA8 6/-	12A18 10/-	DK92 8/6	EP42 4/6	PEN36C 8/6	UC183 14/-
6BS6 6/9	12A17 7/6	DK96 7/6	EL33 10/-	PEN45 7/6	UF41 8/9
6BH6 5/9	12A07 6/6	DL33 9/-	EL41 8/6	PEN46 5/6	UF85 8/6
6BJ6 5/9	12A7 7/-	DL35 10/-	EL42 9/6	PL35 11/6	UF89 7/-
6BR7 9/9	12K7GT 5/6	DL92 6/-	EL41 12/-	PL38 20/-	UL41 5/6
6BW6 8/-	12K8GT 11/6	DL94 7/-	EL84 7/6	PL81 9/6	UL84 7/6
6BW7 6/6	12Q7GT 5/6	DL96 7/6	EM34 8/6	PL82 7/6	UR1C 9/6
6CD6G 22/6	12Z3 7/6	EAB380 7/6	EM80 9/-	PL33 7/6	UY21 11/3
6F1 14/6	1487 16/9	EAF42 8/-	EM81 9/-	PL84 10/-	UY41 6/6
6P6G 6/6	20F2 17/6	EB91 3/9	EM84 10/-	PY32 11/-	UY35 6/6
6F13 12/6	20L1 17/6	EBC33 5/-	EY51 7/6	PY30 7/6	VP19 10/9
6F14 17/6	25AG 8/-	EBC41 8/6	EY81 9/-	PY81 6/3	VP4B 9/6
6K7G 2/6	25L6GT 9/-	EBF80 8/-	EY84 13/-	PY82 7/-	VP41 5/6
6K7GT 5/-	25Z4G 7/6	EBF96 8/9	EY86 7/9	PY83 7/9	W77 4/6
6K8G 6/9	25Z6GT 9/6	ECL21 13/6	EY90 6/9	PZ30 17/-	W78 4/6
8L1 15/-	30C1 7/3	ECS2 11/-	FZ41 7/6	R19 13/6	X76M 11/3
8L18 12/3	39FL1 9/-	ECC81 5/9	EZ80 8/3	T41 9/6	Z77 3/8

READERS RADIO

24 COLBERG PLACE, STAMFORD HILL LONDON, N.16 STA. 4587

Post 6d. per valve extra.
Any Parcel insured Against Damage in Transit 6d. extra.
Any C.O.D. Parcel 2/6 extra.

TECHNICAL TRAINING in radio television and electronics

Whether you plan to have your own business, to become an electronics engineer, to take up a career in industry, or to brush-up your knowledge and study new developments, transistors, etc., an I.C.S. Course will help you to success. You learn at home in your own time, under expert tuition. Moderate fees include all books.

EXAMINATION COURSES FOR:—

C. & G. Radio and TV Servicing Certificate
(R.T.E.B.)

C. & G. Radio Amateurs' Exam.
(Amateurs' Transmitting Licence)

British Institution of Radio Engineers, etc.

LEARN AS YOU BUILD

Practical Radio Servicing Course

A basic course in radio, electronic and electrical theory backed by thorough practical training. You build radio receivers, signal generator and multimeter.



Post this Coupon TODAY! for FREE book on careers in Radio, and full details of other I.C.S. Courses.

INTERNATIONAL CORRESPONDENCE SCHOOLS

(Dept. 171J), Intertext House, Parkgate Road, London S.W.11.

Please send book on.....

Name..... Age.....
(Block Letters please)

Address.....

Occupation..... 10-60

INTERNATIONAL CORRESPONDENCE SCHOOLS



Solve that Circuit trouble!
PIFCO Radiometer

Not only circuit tests but everything electrical with this handy compact meter. Tests H.T. & L.T. Valves, components, electrical appliances and car lighting systems, etc. May be used on A.C. & D.C. mains.

See the Radiometer at your dealer or write for illustrated leaflet to:—

only **32/6** complete

PIFCO LTD.

WATLING STREET · MANCHESTER · 4

EXPRESS ELECTRONICS

ROSEDENE LABORATORIES
KINGSWOOD WAY, SELSDON, SURREY
VALVES NEW, TESTED AND GUARANTEED
REDUCED PRICES

1C1 7/8	6BW6 7/8	16A5 9/-	ERP80 8/8	N19 7/8
1C3 8/-	6BW7 7/-	25A6G 8/8	ECC81 5/-	N37 10/8
1F1 8/-	6C10 9/-	26L6GT 6/9	ECC82 7/8	PC84 9/-
1F3 7/8	6D2 3/8	26Z4G 9/-	ECC83 7/8	PCF80 9/-
1FD1 8/-	6F12 3/-	30C1 8/-	ECC84 8/8	PCF82 7/8
1FD9 7/8	6H6GT 7/-	30L1 8/-	ECP80 8/8	PCL82 8/-
1L4 6/9	6J7GT 7/8	35L6GT 9/-	ECP82 8/8	PCL84 7/8
1P1 8/-	6K7G 5/8	35W4 8/8	ECH42 9/-	PLS1 9/-
1P10 7/8	6K8G 5/-	38Z4GT 8/-	ECH81 10/-	PLS2 7/-
1P11 7/8	6Q7G 7/8	5763 7/8	ECL80 8/8	PY81 8/8
1R5 5/8	6Q7GT 8/8	80 8/-	ECL82 9/8	PY82 7/8
1S5 5/8	6S1GT 6/-	DAF91 7/8	EP41 9/-	PY93 7/8
1T4 7/8	6S1GT 4/8	DAF96 8/-	EP80 8/8	R19 11/8
1U5 8/-	6V6G 7/8	DF91 7/8	EP86 9/-	U52 7/8
3Q4 9/-	6X4 7/-	DF96 8/-	EP91 3/-	U76 7/8
3S4 7/8	6X3G 5/-	DH76 7/8	EP92 5/8	U78 7/-
3V4 7/8	6X5GT 6/-	DH77 7/8	EL41 9/8	UBC41 8/8
5U4G 7/8	7B7 7/8	DH142 8/8	EL84 8/8	UCH42 9/8
5Y3GT 7/8	7C5 7/8	DH150 10/-	EM34 7/-	UF41 8/8
5Z4G 9/8	7S7 8/8	DK91 7/8	EY51 7/8	UL41 8/8
6AK5 8/8	8D3 3/-	DK92 7/8	EY81 10/-	UY41 7/8
6AL5 3/8	12AH8 10/8	DK96 8/-	EZ40 7/8	W76 8/9
6AM6 3/-	12AT7 5/-	DL92 7/8	EP80 6/-	W142 8/8
6AT6 7/8	12AU7 7/8	DL94 7/8	EZ81 8/-	X17 7/8
6BA6 7/-	12AX7 7/8	DL96 8/-	KT33C 9/8	X142 9/-
6BE6 7/-	12BH7 10/8	EABC80 8/8	KT66 11/8	X150 9/-
6BR7 8/9	12K8GT11/-	EB91 3/8	X17 7/8	Z77 3/-
6BS7 10/8	12Q7GT 7/8	EBG41 10/-	N18 8/-	ZD17 7/8

VOLUME CONTROLS MIDGET SIZE LONG SPINDLES, D.P. switch. 5/8. 8.P., 3/3. Less switch, 2/8. Values 10K to 2M. Pre set 2/6.

MATCHED PAIRS

EL84 21/-, 6V6G 17/-, 6BW6 18/- per pair. Push Pull O.P. Transformers for above 3-15 Ω 14/8. 12" P.M. Speakers 3 Ω 24/8. Baker's "Selhurst" 12" 15 Ω 13W, 90/- P. & P. 2/8. 12" Stereo Model 27.7.0.

SETS OF VALVES

DK91, DF91, DAF91, DL92 or DL94.....	19/6
DK96, DF96, DAF96, DL96.....	27/8
1C3, 1F1, 1FD1, 1P1.....	27/8
1R5, 1T4, 1S5, 3S4, or 3V4.....	19/8

Postage and packing 6d. Over £1 post free. C.O.D. 2/6.

MORE BARGAINS FROM OUR EXTENSIVE STOCK

POTENTIOMETERS		SWITCHES	
6 ohm, small Colvern w/w.	1/6 ea.	2M miniature slides	6d. ea.
60 ohm, Plessey carbon, linear	1/3 ea.	2M miniature Deaf Aid	1/3 ea.
100 ohm, Burco w/w.	3/6 ea.	SWITCHES	
270 ohm, Colvern w/w.	2/6 ea.	(Yaxley) 2p. 2w. Type A	2/6 ea.
400 ohm, 4 watt w/w.	1/6 ea.	2p. 2w. Type B	1/6 ea.
400 ohm, small Colvern w/w.	1/6 ea.	2p. 4w.	2/9 ea.
2K w/w. for CR.100	2/6 ea.	3p. 4w.	1/6 ea.
2.5K Colvern large precision w/w.	4/6 ea.	3p. 3w. with on/off switch	1/9 ea.
3K American w/w. with switch	2/6 ea.	4p. 3w.	1/9 ea.
3K Burco w/w. instrument	1/6 ea.	D.P. c/o., intercom.	1/6 ea.
3K + 50 ohm Colvern tandem	3/- ea.	(Ceramic) 2 bank 2p. 3w.	2/6 ea.
5K transistor preset	6d. ea.	2 bank 2p. 2w.	2/6 ea.
10K Colvern w/w.	1/3 ea.	(Key) ex. equipment	9d. ea.
10K + 10K American, ganged type J	2/6 ea.	2-way, new	1/9 ea.
10K + 10K Morganite, ganged carbon	2/- ea.	(Micro) Press to make or press to break	2/6 ea.
20K Colvern w/w.	1/6 ea.	Sensitive press to make	2/6 ea.
50K Colvern w/w.	1/9 ea.	Press to make with reset	2/6 ea.
50K + 50K Colvern ganged w/w.	3/- ea.	Press to make roller type	2/6 ea.
75K Colvern precision, new and boxed	4/6 ea.	B. & L. miniature protective: O.2A. and O.4A. with cut-out on overload	1/6 ea.
200K Instrument, new and boxed	6/6 ea.	Meters 500 microamp, 2in. round	12/6 ea.
500K carbon	1/6 ea.	I.F. Transformers, 10Mc/s, new	6d. ea.
Battery charger Croc' clips	1/- ea.	Hand Mic., Canadian No. 3	3/6 ea.
Clarostat mains droppers 250-110V.	2/6 ea.	Morse Keys, Canadian	1/- ea.
Small inspection lamps with on/off switch, lead and plug for dashboard	2/6 ea.	Ring Generators	3/6 ea.
Junction box, GPO 4-way, brand new	1/- ea.	Mic' transformers	1/- ea.
Meters 0-1mA, 2 inch, square, new... ..	18/6 ea.	American Jack Sockets	1/- ea.
GPO Jack plugs	1/9 ea.	5A. mains plugs and sockets	1/- ea.
Bulgin Jack plugs	1/6 ea.	EF50 (silver)	1/- ea.
VALVES	9001	6H6	EF50 (red)
954	1/3 ea.	EF50 (red)	1/3 ea.
			KTW61
			KTW62

POSTAGE & PACKING on all the above, 6d. each.

super **RADIOTECH** *limited*
38 MONMOUTH ST., UPPER ST. MARTIN'S LANE, LONDON, W.C.2

12in. SPEAKER AND 5in. TWEETER by leading manufacturer, 75/-. This is less than half list price, 3 ohm.
CUT PRICE TOOLS, 5in. side cutters, 5/6. 5in. plated and nose tapered pliers, 5/6. 7in. flat-nosed tapered pliers, 8/6. Pocket neon testers with retractable screwdriver, 5/-. 7in. combination pliers, 6/-. 8in. Steel Block Planes 1 1/2in. blade, 10/6. **FULL SIZE H/S TWIST DRILLS**, Set 7, 1/18 to 1/4in. in Wallet, 6/-. Smaller size sets, 4/-. Set 13, 9/6. Set 17, 1/18 to 1/4, 15/6.
TRANSFORMERS, 230/50 v. 1 a. and 250/28-32 v. 4 a., 32/6 each.
STUDIO 0 CARTRIDGES, 21/-.
PANOLIN PANELS, 12 x 6 x 1/4in., 3/8. **PANOLIN TUBING**, 1 1/2 x 3/16 x 72in., 17/6.
OUR FAMOUS TRANSFORMERS, Input 200/250, Output tapped 3 to 30 v. 2 a. or 5. 11. 17 v. 5 a. Each 24/6.
F.W. METAL RECTIFIERS, 12/6 volt, 1 a., 7/6; 3 a., 13/-; 4 a., 17/6; 6 a., 27/6; 24 v. 2 a., 23/6.
TOGGLE SWITCHES DPDT, 3/6.
MICRO SWITCHES, Make & Break 5/6.
MAINS TRANSFORMER & RECTIFIER, Output 12 v. 1 a. D.C., 19/6; 30 v. 2 a., 33/6.
NICKEL NIFE BATTERIES, 1.2 v. 2.5 a. Size 3 x 2 1/2 x 1 1/2 in., 6/-. or 3 for 16-, 4 for 21/-, practically everlasting.
EX. WD. MORSE KEYS, 3/8, 6/- and 8/6.
RELAYS, We hold large stocks. Any contact combination and operating coil voltage supplied from 3-.
KEY SWITCHES from 3/-.
AMERICAN MADE P.V.C. TAPE, Finest quality 800ft. reels 19/6.
12 v. MINIATURE RELAYS, 1 1/2 x 1 1/2 x 1 1/2 in. wgt. 14oz. S.P.C.O. 9/3. S.P.C.O. and 3 make 10/6.

All items new, guaranteed and post free except where stated.
Lists sent on request. Post orders only to
RADIO & ELECTRICAL MART
BOX 9, G.P.O., TUNBRIDGE WELLS, KENT.

CABINETS & HI-FI EQUIPMENT
We can supply any Cabinet to your own specification



"Bureau" £16.16.0

This is only one example taken from our extensive range of stock cabinets. Write for our NEW 24 page fully illustrated catalogue on: **THE LARGEST RANGE OF CABINETS IN THE COUNTRY**. Equipment is also our speciality and we now offer, in a novel book form: **A NEW EQUIPMENT COMPARATOR** illustrating our range of radio chassis, speakers, tape decks, single players and autochangers. **SEND TODAY for a copy of these two books, which are absolutely FREE.**

LEWIS radio
100 (PW1160) Chase Side Southgate, N.14
Pal 3733

MULLARD
REFERENCE MANUAL OF TRANSISTOR CIRCUITS
Over 300 Pages. Illustrated. 12/6. Postage 4/-

TRANSISTOR PROJECTS, Gurnsback Lib; 23/-. Postage 1/-.
TELE-COMMUNICATIONS PRINCIPLES IN M.K.S. Units by R. N. Renton, 45/-. Postage 2/-.
HANDBOOK OF LINE COMMUNICATION Vol. I. HMSO. 30/-. Postage 2/-.
BASIC ELECTRONICS 6 parts. 66/- per set. Postage 1/6.
WORLD RADIO HANDBOOK 1960. 15/6. Postage 1/-.
SUMMER - SUPPLEMENT TO WRH. 1960. 5/3. Postage 3d.
TAPE RECORDING & HI-FI YEAR-BOOK 1960-61 ed. 6/-. Postage 9d.
RADIO VALVE DATA Compiled by "WVW" 6th ed. 5/-. Postage 9d.
NEW 1960 CATALOGUE 1/-.

THE MODERN BOOK CO.
BRITAIN'S LARGEST STOCKISTS of British and American Technical Books
19-21 PRAED STREET, LONDON, W.2
★ Phone: PADington 4185
★ Open 6 days 9-6 p.m.

UNIVERSAL AVOMETER MODEL D

Just released by the Air Ministry, these famous AC/DC Test Meters are a "snip" for anyone requiring a First Grade General Purpose Instrument. Normal Avometer size, 7 1/2 in. x 6 1/2 in. x 3 1/2 in., with carrying strap, indication being given on a 5 in. Mirror Scale. Thoroughly overhauled and complete with batteries and instructions. Provides 34 ranges of current, voltage and resistance, as follows:

D.C. Voltage	A.C. Voltage	D.C. Current	A.C. Current
150 mv.	7.5 v.	15 ma.	15 ma.
300 mv.	15 v.	30 ma.	150 ma.
1.5 v.	75 v.	150 ma.	750 ma.
3 v.	150 v.	300 ma.	1.5 amps.
15 v.	300 v.	1.5 amps.	7.5 amps.
30 v.	600 v.	3 amps.	15 amps.
150 v.	750 v.	15 amps.	
300 v.	1,500 v.	30 amps.	Resistance
750 v.			1,000 ohms.
1,500 v.			10,000 ohms.

ONLY 28.19.6. (Carriage 3/6)

COMMUNICATIONS RECEIVER R1155. The famous Bomber Command receiver known the world over to be supreme in its class. Covers 5 wave ranges 1.9 to 7.5 Mc/s, 7.5 to 3 Mc/s, 1,500 to 600 kc/s, 500 to 230 kc/s, and 203 to 75 kc/s, and is easily and simply adapted for normal mains use, full details being supplied. All sets thoroughly tested and in perfect working order before dispatch, and on demonstration to callers. Fitted latest type super slow-motion tuning assembly. Have had some use but are in excellent condition. **ONLY 49.19.6. A.C. M-AI-N-S POWER PACK OUTPUT STAGE,** for the above in black crackle case to match receiver, enabling it to be operated immediately, by just plugging in, without any modification, with built-in 6 in. speaker. **26 10.0. DEDUCT 10/- IF PURCHASING RECEIVER AND POWER PACK TOGETHER.** Send S.A.E. for illustrated leaflet, or 1/3 for 10-page booklet which gives technical information, circuits, etc., and is supplied free with each receiver. Add carriage 10/6 for Receiver, 5/- for Power Unit.

V.H.F. RECEIVER TYPE R.1392. A superb 15 valve superhet receiver covering 85-150 Mc/s (2-3 metres), being fully tuneable over that range, with provision for Crystal Control. Has 2 stages of R.F., 3 of I.F., B.F.O. AGC, etc. Fitted with 2 1/2 square meter for Oscillator and Audio Signal checking. Size 19 in. x 10 in. x 10 in. Used, but in very good order, thoroughly air tested before despatch. Power supply required, 240-250 volts at 80 mA, and 6.3 volts at 4 amps. Complete with valves and circuit diagram. **ONLY 79/6 (carriage etc., 10/6).**

POCKET VOLTMETERS. Read 0-15 volts and 0-300 volts A.C. or D.C. BRAND NEW and UNUSED. **ONLY 18/6.**

CANADIAN MOVING COIL PHONES. Low resistance, fitted noise excluding chamois ear muffs, and leather covered head band. Lead terminates to jack plug. Supremely comfortable. BRAND NEW. **ONLY 19/6 (post 1/6).**

INTERCOM TELEPHONE SET. Two pairs of Brand New Headphones connected to Breast Microphones, with leads, etc. in fitted carrying cases. Supplied with 4V battery, 10 yards twin wire, and full instructions for connecting to make super intercom. **ONLY 27/6 (post 3/6).** Extra Wire 3d. per yard.

RCA 8 in. P.M. SPEAKER. In heavy black crackle metal case. Can be used as normal 3 ohms extension. Size 11 1/2 in. x 10 1/2 in. x 6 in. NEW IN MAKER'S CARTONS. **ONLY 45/- (post 3/6).**

AMERICAN HALLICRAFTERS 6 VOLT VIBRATOR PACK. Output 300 volts D.C. at 170 mA. Designed to run Communications Receivers from 6 volt car battery. In grey metal case, size 6 in. H. x 6 1/2 in. W. x 7 in. D. Complete with 2 valves 6X5, and instructions, in maker's cartons. BRAND NEW and UNUSED. **ONLY 29/6 (carr. 3/6).**

POWER UNIT TYPE 3. Primary 200/250 volts A.C. 50 cycles. Outputs of 250 volts 100 mA, and 6.3 volts 4 amps. Fitted double smoothing, and 2 meters to read H.T. Current and Voltage. For normal rack mounting (or bench use) having grey front panel, size 19 in. x 7 in. BRAND NEW. **ONLY 79/6 (carriage 7/6).**

10/- CONSTRUCTION PARCEL. 10 yards each of 6 colours wiring wire, solder, 24 each assorted Resistors and Condensers.

RESISTORS. 100 assorted values. NEW. 10/-.

CONDENSERS. 100 assorted mica and silvermica. NEW 12/6.

SPRAGUE CONDENSERS. Metal cased, wire ends. New 0.01 mfd. 1,000 volt, and 0.1 mfd. 500 volt. 7/6 per dozen. Special quotes for quantities.

MINIATURE MOTORS. Ideal for models. Will operate on 3-9 v. D.C. Size 1 1/4 x 1 x 1 1/4 in. plus 1/4 in. spindle. BRAND NEW only 7/6.

HARRIS ELECTRONICS

(LONDON) LTD.

138 Gray's Inn Road, London, W.C.1.

(Phone TErminus 7937)

Please include carriage costs on All items. Open until 1 p.m. Saturdays. We are 2 mins. from High Holborn (Chancery Lane Station) and 5 mins. by bus from King's Cross.

SOLDERING EQUIPMENT

by



PRECISION SOLDERING for the ELECTRONICS INDUSTRY

- Comprehensive range
- Robust & Reliable
- Light weight
- Rapid heating
- Bit sizes 3/32 in. to 3/8 in.
- 'Permatit' or Copper bits
- All voltage ranges 6/7v. to 230/250v.
- Prices from 19/6



Illustrated is the 25w. 3/16 in. replaceable bit model with safety shield.

ADAMIN—the new range of precision micro-soldering instruments—have you had details?

British and Foreign Patents. Registered designs. Suppliers to H.M. and Foreign Governments. Agents throughout the world.

Brochure No. S 10 sent free on request. Sole proprietors and manufacturers:

LIGHT SOLDERING DEVELOPMENTS Ltd.
28 Sydenham Road, Croydon, Surrey
Phone: CR0ydon 8589 Grams: Litesold Croydon

REPANCO TWINETTE

A NEW REMARKABLE TWO TRANSISTOR PORTABLE RADIO FOR THE HOME CONSTRUCTOR

- ★ LOUDSPEAKER, 7 x 4 in. ELLIPTICAL
- ★ TWIN FERRITE SLAB AERIALS
- ★ LONG AND MEDIUM WAVES
- ★ PROVISION FOR EXTERNAL AERIAL
- ★ SIZE 7 x 5 x 3 in.
- ★ LOW BATTERY CONSUMPTION

Send now for Easy Wiring Plans and Component Price List, 1/6 (post free).

★ OTHER

REPANCO EASY-TO BUILD RECEIVERS

Receiver	Envelope
The R.E.P. One-valve Radio	9d.
The Hiwayman, A 4-valve Portable Radio	1/6
F.M. Tuner Unit, 5 Valves plus Tuning Indicator	1/6
Three Dee, 3-transistor Radio... ..	9d.
Mini-3, Mk. II, 3-transistor Pocket Radio	1/3
Mini-7, Mk. II, 7-transistor Pocket Receiver	1/6
Transeven, 7-transistor Portable Receiver	1/6
Major-7 7-transistor Portable Receiver	1/6
Transistor Car Radio Receiver	2/-
Transistor Amplifier and Feeder Unit Circuits	1/6

Please add towards postage.

For details of our Components send 6d. in stamps for our ★ 1960 Catalogue.

Mail order and Trade:
RADIO EXPERIMENTAL PRODUCTS LTD.
33 Much Park St.
COVENTRY
Tel.: 27114

Wholesale Inquiries and Export:
REPANCO LTD.
O'Brien's Buildings
203-269 Foleshill Rd.
COVENTRY
Tel.: 24224

FIRST-CLASS RADIO COURSES . . .

GET A CERTIFICATE!

QUALIFY AT HOME—IN SPARE TIME

After brief, intensely interesting study—undertaken at home in your spare time—**YOU** can secure your professional qualification. Prepare for **YOUR** share in the post-war boom in Radio. Let us show you how!

FREE GUIDE

The New Free Guide contains 132 pages of information of the greatest importance to those seeking such success-compelling qualifications as **A.M.Brit.I.R.E., City and Guilds Final Radio, P.M.G. Radio Amateurs, Exams., Gen. Cert. of Educ., London B.Sc. (Eng.), A. M. I. P. E., A.M.I.Mech.E., Draughtsmanship** (all branches) etc., together with particulars of our remarkable Guarantee of

SUCCESS OR NO FEE

Write now for your copy of this invaluable publication. It may well prove to be the turning point in your career.

FOUNDED 1885—OVER

150,000 SUCCESSES—

NATIONAL INSTITUTE OF ENGINEERING

(Dept. 461), 148 HOLBORN, LONDON E.C.1

S. Africa: P.O. Box 8417, Jo'burg.
Australia: P.O. Box 4570, Melbourne

H.A.C. SHORT-WAVE EQUIPMENT

AND

SHORT-WAVE KITS

Famous for over 25 years for S.W. Receivers and Kits of Quality.

H.A.C. were the original suppliers of SHORT-WAVE RECEIVER KITS for the amateur constructor. Over 10,000 satisfied customers—including Technical Colleges, Hospitals, Public Schools, Hams, etc.

Improved designs with Denco coils: **One-valve Kit, Model "C."** Price 25/-; **Two-valve Kit, Model "E."** Price 50/-. New Addition: **Model "K."** Super sensitive "All Dry" Receiver. Special incl. price, Complete Kit, 77/-.

All kits complete with all components, accessories and full instructions. Before ordering call and inspect a demonstration receiver, or send for descriptive catalogue and order form.

POST THIS COUPON NOW!

"H.A.C." SHORT-WAVE PRODUCTS
(Dept. T1D, 11 Old Bond Street, London W1)

Please send me FREE and without obligation your 1960 literature.

NAME _____

ADDRESS _____

BOOKS for CONSTRUCTOR

A NEW PRACTICAL WAY OF UNDERSTANDING

BASIC ELECTRICITY, 5 parts, 55/-.
BASIC ELECTRONICS, 6 parts, 86/-.

THE PICTURE BOOK WAY
The Complete Set sent on payment of first instalment.

LEARN WHILE YOU PAY

Write for FREE Illustrated Prospectus *etc* into details of instalment plan! As advertised by THE TECHNICAL PRESS

RADIO TUNERS by H. A. Hartley, F.M.A.M. and Stereo Tuners. Illus. 64 pages, 5/6 post free.

PUBLIC ADDRESS SYSTEMS by R. Edgar. Chapters include Sound Reproduction, Acoustic Feedback, Microphones, Choice of Amplifiers, Impedance Matching, etc. Illus. 36 pages, 2/10, post free.

COIL DESIGN AND CONSTRUCTION MANUAL. How to make your own RF and AF Coils, Chokes and Transformers. Fully illus. 5/6, post free.

TRANSISTOR CIRCUITS No. 1. Gregory. 2/10, post free. 32 pages, 8 circuits, 24 plans and illustrations. Full constructional details, suitable for beginners and advanced.

TRANSISTOR CIRCUITS No. 2. Sinclair. 2/10, post free. 18 new projects including Transistors, FM Tuners, 1 watt Hi-Fi amplifier, several pocket radios and sub-miniature Transmitters.

TRANSISTOR CIRCUITS No. 3. Sinclair. 2/10, post free. 11 projects using prefabricated circuit units, complete commercial receiver included.

PRACTICAL TRANSISTOR RECEIVERS. Sinclair. 5/6, post free. 56 pages, 36 plans and illustrations. Over 50 different receivers described and illustrated.

HIGH FIDELITY TAPE RECORDER. Sinclair. 2/10, post free. 24 pages, 15 illustrations. This book describes the construction of an elegant and high performance tape recorder with a frequency response of from 30 c/s to 12,000 c/s.

BOYS' BOOK OF CRYSTAL SETS AND SIMPLE CIRCUITS. 2/10, post free. 36 pages, 28 illustrations and plans. The know how on constructing 12 different sets without any previous knowledge.

BEGINNERS' GUIDE TO RADIO. Camm. Advanced orders taken for the New and Revised Edition. 8/-, post free.

SEND STAMP FOR LISTS

FREE with your order—MULLARD VALVE DATA BOOK, 1961 edition.

SELRAY BOOK CO.

60 HAYES HILL, HAYES BROMLEY, KENT

BBC - ITV - F.M. AERIALS



B.B.C. (BAND 1). Telescopic loft, 19/6. External, S/D, 26/3.

I.T.V. (BAND 3). 3 Element loft array, 24/-, 5 Element, 32/6. Wall mounting, 3 Element, 33/9. 5 Element, 41/3.

COMBINED B.B.C. + I.T.V. Loft 1+3 Element, 41/3. 1+5 Element, 48/9. Wall mounting, 1+3 Element, 36/3. 1+5 Element, 63/8. Chimney and mast mounting units also available.

F.M. (BAND 2). Loft "H", 28/-, 3 Element loft, 52/6. S/D loft, 19/6. External S/D, 26/3. State channel when ordering. C.W.O. or C.O.D. P.P. 2/6. Coaxial cable, 8d. yd. Coaxial plugs 1/3. Send 6d. stamps for illustrated lists.

K.V.A. ELECTRONICS (Dept. P.W.)
3B, Godstone Road, Kenley, Surrey.



SEMICONDUCTORS

AUDIO AMPLIFIER AND RADIO

APPLICATION REPORTS

250 mW

Class B push-pull using GET114 transistors operating from a 6V supply (SAR 5).

Class B push-pull transformerless output stage using GET114 transistors operating from a 9V supply (SAR 6).

500 mW

Class B push-pull using GET114 transistors operating from a 6V supply (SAR 7).

Class B push-pull transformerless output stage using GET114 transistors operating from a 9V supply (SAR 8).

1W

Class B push-pull using GET114 or GET115 transistors operating from a 6V supply (SAR 10).

Class B push-pull transformerless output stage using GET114 or GET115 transistors operating from a 12V supply (SAR 2).

2W

Class B push-pull using GET116 transistors operating from a 12V supply (SAR 11).

3W

Class B push-pull transformerless output stage using GET115 transistors operating from a 12V supply (SAR 12).

RADIO RECEIVER

6-transistor superhet operating from a 9V supply (SAR 13)

For copies of any of these Semiconductor Application Reports (SAR's) or for information on the wide range of G.E.C. transistors please write to:

THE GENERAL ELECTRIC COMPANY LIMITED

Semiconductor Division
School Street, Hazel Grove,
Stockport, Cheshire.

THE PEMBRIDGE COLLEGE OF ELECTRONICS *offers training in* RADIO TELEVISION AND ELECTRONICS

ATTENDING COURSE

Full-time One Year Course in Radio and Television. College course in basic principles for prospective servicing engineers.

Next course commences 3rd January, 1961.

This course is recognised by the Radio Trades Examination Board (R.T.E.B.) for the new Servicing Certificate examinations.

HOME-STUDY COURSES

A. Radio and Television Servicing

- (1) Introductory course.
- (2) Basic course covering R.T.E.B. Intermediate Radio and Television Servicing Certificate examination.

B. Courses in Radio, Telecommunications and Mathematics up to City and Guilds Telecommunication Technicians' Final Certificate.

C. Constructional kits.

For details, write to:

The Principal, P.10.
**THE PEMBRIDGE COLLEGE
OF ELECTRONICS**
34a Hereford Road, London, W.2.

PC12

BENSON'S

BETTER BARGAINS

MORSE KEY with buzzer, on board, wired to 4½ v. battery, 8/6 (p.p. 1/6). **TELE "P"** intercom, sets, good condition, pair 65/-, post free G.L.B. **METERS** (100/4) with two centre-zero movements, 000 and 400 µA, 8/6. **RELAYS** 6/12 v., 2 heavy make contacts, on base, 3/6; or superior, bigger type, 7/6. **TRANSFORMERS**. Open, upright, input 200/250 v. Outputs:—250-0-250 v., 150 mA, 3 v. 3 A. and 6.3 v. 5 A., 25/-; input 110/230 v. Outputs:—6 v., 2 A. twice shrouded, 10/6. Potted, "C" core: Input 230 v. Outputs:—6.3 v., 0.3 A. (1A. actual) twice, 8/6; outputs: 510-0-510 v. 273 mA, 375-0-375 v., 83 mA, 5 v. 3 A., 6.3 v. 7 times (17 A.), 45/-. **CONDENSERS**, block, paper: 3 mfd. 250 Vw., 4/-; 500 Vw 8/-; 4 mfd. 2 kWV, 7/6; 600 Vw. 3/6. Switch fuse splitter, D.P. 15 A. 15/-. Panel fuseholders, 1/3; Panel Lampholders (indicators) 1/6. **MONITOR** 58 triggered oscilloscope, comprising Indicator 548 and Power Unit 675, 230 v. A.C. Input, with cables and circuit. Cathode probe unit extra, 17/6. 28.10.0 (Rali 15/-). **HEADPHONES**, CL 7/6. 02100 Noise limited, acoustics with valve 3/6. **NEW M.C. METERS**, 3 1/2 in. round dust 50µA, 70/-; 200 µA centre zero, 50/-; 1 mA, Centre zero, 45/-; 1 mA, 55/-; 2 1/2 in. 1 mA, 22/6; 2 in. 300 mA, each 9/6. 2 1/2 in. M.T. 20 v. A.C., 8/6; 300 v. A.C. 7/6. 15/-.

VIBRATORS, Malory G634C 12 v. 4-600, 7/6; 6 v. 3-pin reversible, 7/6. **R1155B**, good condition, tested with handbook, 2S (Rali 10/-).

DRIVES: slow-motion Admiralty 2001, new, scaled 0-100, 5/6. **R1155 S.M.** "N" type, new, scaled 0-100, 5/6. **D.C.** to 250 v. 40 mA, 10/6. **VIREAPAK**, 6 v. D.C. to 250 v. 40 mA, 21/- (p.p. 3/6). **DYNAMOTORS** (post 3/6). 12 v. to 230 v. 40 mA, 11/6. 6 v. to 250 v. 60 mA, 11/6. **CHOKES**, LF 10 H. 200 mA, 9/6; 100H, 60 mA, 8/6; 9H, 100 mA, 5/6; 10H, 250 mA, 12/6; Potted 10H, 100 mA, 7/6; "C", 5H, 400 v. 10/6. **R.F.F.27** good cond., 18/- (p.p. 3/6).

LIST AND ENQUIRIES "A.E. viaeae. Terms, C.W.O. Postage extra. (min. despatch. Orders and post: W. A. BENSON (P.W.) 138 Rathbone Road, Liverpool 15. S.F.P. 6853. Collect: SUPERADIO (Whitechapel) Ltd., 118 Whitechapel, Liverpool 1. ROP 1130.

"GLOBE-KING"

WORLD-FAMOUS KITS AND RECEIVERS for the Radio Amateur and S.W. Listener. Catalogue Free, enclose stamp for Postage. Kits from 79/6 at your dealers, or direct from

JOHNSONS (RADIO)
ST. MARTINS GATE, WORCESTER

A 3d. stamp will bring you a copy of our latest
**RADIO & TELEVISION
COMPONENT Catalogue**
JAMES H. MARTIN & CO.
INSTHWATE, NEWBY BRIDGE
ULVERSTON, LANCs.

**Morse Code operating . . .
. . . as a PROFESSION**

45 years of teaching Morse Code is proof of the efficiency of the Candler system.
Send 3d. stamp for Payment Plans and full details of all Courses.

CANDLER SYSTEM CO., Dept. 510
52b Abingdon Road, London, W.8
Candler System Co., Denver, Colorado, U.S.A.

DO IT YOURSELF

Build your own electronic keyboard and play everything! Send for free leaflet. Guitar, cello, flute and trumpet are all easy. Write now

**C. & S., 20 Maude Street,
Darlington, Co. Durham**

NEW VALVES!

Guaranteed Set Tested
24 HOUR SERVICE

1R5, 1S5, 1T4, 354, 3V4, DAF91, DF91, DK91, DL92, DL94, SET of 4, 18/6.
DAF96, DF96, DK96, DL96, SET of 4, 20/6.

1D3	7/6	DL33	8/6	PCF82	7/6
1R5	5/6	DL35	8/6	PCL82	7/6
1S5	4/6	DL92	5/11	PCL83	10/6
1T4	3/1	DL34	6/9	PCL84	7/6
354	5/11	DL96	6/11	PL38	10/9
3V4	6/9	EB41	7/6	PL38	10/6
5U4G	4/9	EBF90	8/-	PL31	8/9
5Y3GT	5/9	EBL21	12/6	PL82	7/-
5Z4G	7/6	ECC81	5/3	PL83	7/-
6K7G	2/-	ECC82	8/-	PL84	8/6
6K8G	5/3	ECC83	6/6	PY32	10/3
6Q7G	5/9	ECC84	8/3	PY80	7/-
6SL7GT	8/-	ECC85	8/-	PY81	5/9
6SN7GT	4/6	ECC90	8/-	PY82	6/3
6V6G	4/9	ECP82	9/-	PY83	7/3
6V6GT	6/3	ECH21	12/6	U25	12/6
6X5GT	5/-	ECH42	8/-	U26	10/-
12K7GT	5/3	ECL80	7/-	UABC80	7/6
12K8GT	11/-	EP41	7/9	UAF42	8/6
12Q7GT	5/3	EF80	5/-	UB41	7/3
35L6GT	9/-	EF65	6/-	UBP80	8/6
35Z4GT	8/-	EF68	9/9	UCH85	7/-
AZ31	8/9	EF99	7/9	UCX21	12/6
B36	8/3	EL41	7/3	UCH42	7/9
CL43	12/6	EL84	8/6	UF89	6/6
DAC32	9/6	EY51	7/3	UCL82	10/6
DAF91	4/9	EY86	7/9	UCL83	13/6
DAF96	6/11	EZ40	6/3	UF41	7/9
DF33	9/6	EZ41	7/-	UF85	8/-
DF91	3/11	EZ80	6/-	UF89	6/6
DF96	6/11	EZ81	6/9	UL41	7/3
DH77	6/-	GZ32	8/9	UL84	7/-
DK32	11/3	MU14	7/9	UV31	11/-
DK91	5/6	PCC84	7/3	UV41	8/-
DK92	8/-	PCC89	11/6	UY85	6/3
DK96	6/11	PCF80	6/9	VP4B	8/3

Postage 6d. per valve extra. Any Parcel insured Against Damage in Transit 6d. extra. Any C.O.D. Parcel 2/6 extra. Office address, no calls.

GERALD BERNARD
90 GARR MANOR AVENUE
LEEDS 17

LOOK! IT'S TRUE

3 3 TRANSISTORS POST FREE 3/3

Red Spot Transistors, 3/3 each, 6 for 18/6 or 36/- doz. White Spot Transistors 4/- each, 6 for 22/6 or 42/6 doz. Yellow/Green Transistors 4/6 each; Red/Yellow Transistors 6/9; OC45 Transistors 11/6; Transistor Holders 1/5 each, 13/9 doz. Germanium Diodes 1/- each, 3 for 2/6, 8/- doz. GEX 34 or Mullard OA70, OA79 and OA81 all 4/- each. Vari-Loopstick M.W. Coil with Transistor Circuit 4/6. Interstage Transformers 5:1, with Transistor Circuit, 7/6 each.

Repenco Coils etc., with Circuits. DRX1 M & L Crystal Set Coil, 2/6 each. DRR2 Dual Range Coil, 4/- each. TT4 Output Transformer 8/6. TT5 Push-Pull Interstage Transformer 8/6. TT14 Interstage Transformer 4.5:1, 12/6. Miniature Transistor Transformers by Radiospares. T/T1 Driver 1:1 C.T., 11/3 each. T/T2 Output 6.6:1 C.T., Prim., 9/9 each. T/T3 Driver 3.6:1 +1 Split Sec., 12/9 each. T/T4 Output Single OCT2 etc. to 3 ohm 9.2:1, 8/3 each. Miniature Electrolytics. 15 volt in 21uF, 51uF, 8uF, 25uF, 50uF or 100uF, all 3/- each.

ALL SENT POST FREE BY
PETHERICK'S RADIO SUPPLIES
22 High Street, BIDEFORD, N. Devon

RES/CAP. BRIDGE 38/- p. & p. 2/-
Checks all types of resistors, condensers 6 RANGES.
Built in 1 hour. Direct reading
READY CALIBRATED
Stamp for details of this and other kits.
RADIO MAIL (Dept. EP)
Raleigh Mews, Raleigh Street, Nottingham

THE PUNCH YOU NEED!

HOLE PUNCHES

One Minute Type		
3/8" diameter	...	4/9 ea.
1/2" " "	...	5/6 "
Screw-up Type		
1 1/8" diameter	...	6/- ea.
" " B7G	...	6/6 "
" " B8A, B9A	...	7/- "
" " " "	...	7/3 "
" " " "	...	7/6 "
Postage and packing 1/-		
1 1/8" diameter	...	8/- ea.
1 1/4" " " Int. Octal	...	8/9 "
1 1/2" " " " "	...	10/- "
1 3/8" " " " "	...	11/3 "
1 1/2" " " B9G	...	12/6 "
2 3/2" " " Meter	...	18/- "
Post and packing 1/9		

Owing to increased costs, all hole punches will go up as from 1st January, 1961. Buy now while stocks last.

Oliver & Randall Ltd.
Dept. P.W.
40, Perry Hill, London S.E.6
Tel.: FOrest Hill 8242

LYONS RADIO LTD.

Telephone: SHEpherds Bush 1729
3 Goldhawk Road
Shepherds Bush, London W.12

EARPHONE INTERCOM. Single earphones which also serve as microphones. Two connected together make an amazing/ly simple but efficient means of two-way communication. Self energising, no batteries required. Dozens of uses in the Home, Office, Factory etc. and provide hours of fun for the youngsters. Ideal gift. Supplied ready for use connected with 36ft. flex (longer lengths at 3d. extra per yard). PRICE ONLY 9/6. post 1/6.

VALVE BARGAINS. All tested before despatch and guaranteed. VR101 (MHL/D6), 9/6; VR102, 5/-; 7E6, 7N7, 7F7, 20D7, all at 5/6 each; 12K8, 10/6; 25L6, 8/6; EF50, 6SH7 at 2/6 each; 6C4, 3/6; 6AM5, 5/-; 90C, 12/6. Post 6d. each, over 6 post free. **MAGNETRON** type 725A, 15/-. Other types of Magnetrons and Industrial Tubes in stock; enquiries invited.

CRYSTAL MICROPHONES. Fitted with long screened lead, for desk or hand use. Specially made for good quality tape recorders and P.A. work. Brand new, imported. PRICE ONLY 22/6. post 1/6.

INVERTERS. Known as Motor Generator type 7. Air Min. net 5U3228, input 23/24V. D.C. Output 80v, 1600 cycles, 240VA. Carbon pile V/R and filter unit incorporated. In good condition. PRICE ONLY 45/-, carriage 5/-.

HIGH STABILITY RESISTORS. Plus or minus 10 per cent. 1/2 watt rating, miniature size up to 1 meg., std. size above. Resist. value clearly printed on body of resistor. Eliminate that fumbling through the spares box for the resistor that can't be found just when it's needed—get our "Experimenter's Kit"—One each of the 70 preferred values from 10 ohms to 10 megohms. PRICE ONLY 25/- or Two each of the range, 45/-, Any preferred value to your choice, 5/- dozen.

PADGETTS RADIO STORE

40 MEADOW LANE, LEEDS 11
Tel.: CLeckheaton 2866

New VC R97 Tube, 5/-, carriage 5/-.
New — Metal Screens, 2/-, post 2/-.
Special Valve Offer. 12 EF50 Valves. Removed from new sets. 6/6. post free.
P.M. Speakers in perfect condition, as new. Removed from TV sets. Roia, Celestion, Goodmans, E.C.T. 7 x 4, 6 x 4, 10/-, Small Philips 10/-, 6in. Round 6/6. Post on Speakers, 2/6 each.
New TV Co-Axial Cable. Multi-strand. Best make, 6d. per Yard, 50 yards 20/-, 100 yards 37/6. All post free.

Valves Removed from TV Sets. All tested and are as good as new, 3 months' guarantee. Here are just a few. Send 3d. for up to date list.

EF80 2/6, ECL80 5/-, 6SL7 2/9, 6SN7 2/9, PY81 5/-, PL81 5/-, 10F1 3/-, 20D1 5/-, 10P13 5/-, 10C2 3/-, 20P4 5/-, 165BT 8/6.

Transmitter Type 1154, Model M. Complete with all valves and meters. Clean condition. 18/-, carriage 12/-.

Tube Unit Type 116. Complete with VCR97 tube, 7 EF50 Valves ECT. Sets in very good condition. 25/-, carriage 7/6.

Receiver Type 3645. The up to date 1355. Same valve and coil line up, less 5U4 and 6X5, 12/- carriage 7/6. Sets in very good condition.

Special Offer. BBC and ITV 12in. good working order. Perfect tubes, not boosted TV sets. Bush, Pye, Ecko, Cossor, Ferguson, Ultra. £4.10.0. carriage 17/6. Tube in separate case.

New I.F. Strip complete with valves. 3—CV4015, 1—CV137, 1—CV4026, 1—CV4014. 12/- post free.

DID YOU KNOW

COYNE'S NEW TROUBLE-SHOOTING SERIES TAKE HEADACHES OUT OF ALL SERVICING PROBLEMS?



Pin-Point
10 troubles in 10 minutes

Find the exact sound or picture trouble in ANY TV set from 700 possibilities! 300 pages; 300 diagrams, check charts, 31/6. Postage 1/-.

Pin-Point
Transistor troubles in 12 minutes



Trouble-shoot every type of circuit in ALL transistorized equipment! 525 pages; hundreds of illustrations; 120 check charts, 47/6. postage 1/4.

Simple Check Chart System Saves Time

These amazing practical handbooks with **ENTIRELY NEW METHOD** show you how to find the trouble in ANY TV, or transistor circuit. **FAST** Index tells you where to look; famous Check-Charts help you to pin-point the exact trouble in minutes! These on-the-job books quickly pay for themselves in profitable new business and valuable time saved!

SEND NO MONEY

Just mail coupon for free trial. After 7 days send only low price or return books and pay nothing! If you keep both books send only £1 after 7 days and £1 a month until 75/- plus 1/- postage is paid. If ordering one book, pay one half after seven days and the other half in 30 days.

FREE TRIAL OFFER Mail Coupon Now!

Mail Order Division, SIM-TECH BOOK COMPANY, Gater's Mill, West-End, Southampton, Hants.

- Rush 2-book PIN-POINT Series for 7-day FREE TRIAL per offer.
- I do not require both books, please send me the following book as per offer.
- TRANSISTORS, 47/6, plus postage.
- TV TROUBLES, 31/6, plus postage.

Name

Address

City..... County.....

Check here if enclosing full price: we pay postage. Same 7-day money-back guarantee.



CRYSTAL MICROPHONES

- (1) ACOS 39-1 STICK MICROPHONE WITH STAND AND SCREENED LEAD, 39/6, P. & P. 1/6
- (2) ACOS 40 DESK MICROPHONE WITH FOLDAWAY STAND AND SCREENED LEAD, 19/6, P. & P. 1/6.
- (3) ACOS45 (ILLUSTRATED) NEW STYLE HAND MICROPHONE WITH SCREENED LEAD. VERY SENSITIVE, 29/6, P. & P. 1/6.

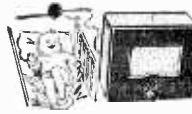
TRANSISTORS—PRICES DOWN AGAIN

XB102, 7/6; XA104, 15/-; XA103, 12/6; XC101, 12/6; XC101 PAIRS, 25/-; XA102, 17/6; XA101, 15/-; XB103, 10/-; SB078, 7/6; SB305, 10/-; SB231, 15/-; SB231R, 22/6; XC131 PAIRS, 34/-; XC141 (REPLACES OC16), 30/-; OC44, 19/6; OC45, 18/6; OC71, 10/-; OC72 PAIRS 30/-; OC76, 15/-; V15/10P, 15/-.

BRAND NEW—FULLY GUARANTEED

NEW FREE DATA LIST AND EQUIVALENTS ON REQUEST

ALL TRANSISTOR BABY ALARM The "Baby Sitter"



- ★ 100% Safe—Guaranteed
- ★ Fully Portable
- ★ No Mains—Battery Operated
- ★ Can be used over Any Distance
- ★ Battery life 3 to 4 months

USE IT AT HOME, TAKE IT ANYWHERE
Every Sound can be heard on large 5-inch Speaker

COMPLETELY ASSEMBLED WITH BATTERY AND MICROPHONE **£5.10.0** P.P. 2/6

— BE WITH YOUR CHILDREN ALL THE TIME —
(Illustrated leaflet free on request)

SUB-MINIATURE MICROPHONES

MATCH INTO TRANSISTOR INPUT NO TRANSFORMER

- (1) $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$ in., 15/- (illustrated).
- (2) $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{4}$ in., 17/6.
- (3) $\frac{3}{8}$ in. diameter $\times \frac{1}{2}$ in., 15/-.



ALL IDEAL FOR MICROPHONES FOR AMPLIFIERS, TRANSMITTERS, ETC.
BRAND NEW AND GUARANTEED

SPEAKERS

For Valve and Transistor Circuits

- 2 $\frac{1}{2}$ in. 3 ohm $\frac{1}{2}$ in. deep ... 17/6 P.P. 1/-
- 2 $\frac{1}{2}$ in. 3 ohm ELAC ... 18/6 P.P. 1/-
- 2 in. 250 ohm (replaces personal phone) ... 17/6 P.P. 1/-
- 3 in. 3 ohm ELAC ... 18/6 P.P. 1/-
- 3 in. 25 ohm ELAC ... 22/6 P.P. 1/-
- 4 $\frac{1}{2}$ x 1 $\frac{1}{2}$ in. 3 ohm TSC ... 24/6 P.P. 1/-
- 5 in. 3 ohm RA ... 15/- P.P. 1/-
- 5 in. 25 ohm ELAC ... 24/- P.P. 1/-
- 7 x 4 in. 35 ohm RA ... 27/6 P.P. 1/-

MANY OTHER SIZES AND MAKES IN STOCK

SPECIAL OFFER

SET OF 6 EDISWAN TRANSISTORS AND TWO DIODES

ONLY **57/6**
P.P. 1/-

XA102
2-XA101
XB103
2-XC101
2-DIODES

Supplied in Matched Sets for High Sensitivity

FULLY GUARANTEED

★ SPECIAL OFFER ★
MULLARD OC78D and 2-OC78, 400 mW Push-Pull Output and Driver.

ONLY **37/6** P.P. 9d.
GUARANTEED

VALVE REDUCTIONS

(WHEN PURCHASED IN SETS)

- TP25, VP23, HL23/DD, PEN25 (or QP25) 25/-
 - 1A7GT, 1N5GT, 1H5GT, 1C5GT (or 3Q5GT) ... 35/-
 - X66, KTW61, DH63, KT63, U50 ... 30/-
 - 6K8G, 6K7G, 6Q7G, 5Z4G, 6V6G 32/6
 - 1R5, 1S5, 1T4, 1S4 (or 3S4 or 3V4) ... 25/-
 - DK96, DF96, DAF96, DL96 ... 35/-
 - 6K8G, 6K7G, 6Q7G, 25L6GT, 25Z5 (or 25Z6G) ... 35/-
 - 12K8GT, 12K7GT, 12Q7GT, 35Z4GT, 35L6GT (or 50LGT) ... 40/-
 - 12SA7GT, 12SK7GT, 12SQ7GT, 35Z4GT, 35L6GT (or 50L6GT) ... 32/6
- P.P. 1/- per set of valves

VALVES

TRANSMITTING, RADIO AND TV VALVES, TUBES, AND INDUSTRIAL TYPES.
FREE LIST ON REQUEST.



TRANSISTORS

NOW FROM 3/6 EACH.
NEW FREE LIST OF TRANSISTORS AND COMPONENTS ON REQUEST

TRADE ENQUIRIES INVITED ON ALL ITEMS



Quartz Crystals

FOR TX, RADIO CONTROL, OSCILLATORS, ETC.
FREE LIST ON REQUEST.



HENRY'S (RADIO) LTD.

5 HARROW ROAD, EDGWARE ROAD, PADDINGTON, LONDON, W.2
Opposite Edgware Road Tube Station, PADDINGTON 1008/9. OPEN MONDAY to SAT. 9-6. THURS. 1 o'clock

SEE BACK PAGE

Practical Wireless

BLUEPRINT

SERVICE

ALL OF these blueprints are drawn full-size and although the issues containing descriptions of these sets are now out of print, an asterisk in the list below denotes that constructional details are available free with the blueprint.

The index letters which precede the Blueprint Number indicate the periodical in which the description appeared. Thus PW refers to PRACTICAL WIRELESS; AW to *Amateur Wireless* and WM to *Wireless Magazine*.

Send (preferably) a postal order to cover the cost of the Blueprint (stamps over 6d. unacceptable) to

PRACTICAL WIRELESS, Blueprint Dept., George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2.

SPECIAL NOTE

THE following blueprints include some pre-war designs and are kept in circulation for those constructors who wish to make use of old components which they may have in their spares box. The majority of the components for these receivers are no longer stocked by retailers.

Title	Number	Price
CRYSTAL SETS		
Junior Crystal Set	PW94*	2/-
Dual-wave Crystal Diode	PW95*	2/6

STRAIGHT SETS		
Battery Operated		
Modern One-valver	PW96*	2/6
All-dry Three	PW97*	3/6
Modern Two-valver	PW98*	3/6

SUPERHETS		
Mains Operated		
A.C. Band-pass Three	PW99*	4/-
A.C. Coronet-4	PW100*	4/-
A.C./D.C. Coronet	PW101*	4/-

MISCELLANEOUS		
The PW 3-speed Autogram	—*	8/-
The PW Monophonic Electronic Organ	—	8/-

TELEVISION		
The PT Band III converter	—*	1/6

Title	Number	Price
A.C. Fury Four	PW20*	2/6
Experimenter's Short Wave	PW30a*	2/6
Midget Short Wave Two	PW38a*	2/6
Band-Spread Three (Battery)	PW68*	2/6
Crystal Receiver	PW71*	2/-
Signet Two (Battery)	PW76*	2/6
Simple S.W. One-valver	PW88*	2/6
Pyramid One-valver	PW93*	2/6

BBC Special One-valver	AW387*	2/6
Short-Wave Two	AW429*	2/6
Short-Wave World Beater	AW436*	3/6

Standard Four Valve S.W.	WM383*	3/6
Enthusiast's Power Amplifier	WM387*	3/6
Standard Four Valve	WM391*	3/6
Listener's 5-Watt Amplifier	WM392*	3/6

QUERY COUPON

This coupon is available until 4th November, 1960, and must accompany all queries in accordance with the notice on our "Open to Discussion" page.

PRACTICAL WIRELESS, NOVEMBER, 1960.

Continental "6"

COMBINED PORTABLE/CAR RADIO
EQUALLY SENSITIVE ON
MEDIUM AND LONG WAVE BANDS

SPECIFICATION

- 425mW Push-Pull Output
- 6 "Top-Grade" Ediswan Transistors
- New Type Printed Circuit with all Components Marked
- Full Medium and Long Wave Tuning
- High "Q" Internal Ferrite Aerial
- Car Radio Adaptation and AVC
- Slow Motion Fingertip Tuning
- "Hi-Fi" Quality Speaker
- Size 9½ x 7½ x 3½ in. Weight 4½ lb.

ALL COMPONENTS AVAILABLE SEPARATELY

Wherever you are

"First Class in every way"



ALL THE CONTINENTAL AND LOCAL STATIONS AT YOUR FINGERTIPS

CALL FOR DEMONSTRATION

- ★ STEP BY STEP FULLY ILLUSTRATED INSTRUCTIONS
- ★ ALL COMPONENTS GUARANTEED

Total Cost of all Components
£11.10.0 P.P. 3/6
 including Cabinet, Battery Transistors, Car Radio, AVC and all necessary items.

- ★ SIMPLE TO CONSTRUCT
 - ★ NO TECHNICAL KNOWLEDGE REQUIRED
 - ★ WORTH DOUBLE WHEN BUILT
 - ★ EXCELLENT RESULTS ANY WHERE
- DESCRIPTIVE LEAFLET FREE ON REQUEST

NOW! EVEN BETTER !! EASY-TO-BUILD PERSONAL POCKET RADIOS

★ RANGER—2 ★ (Supersedes the Major 2)

— MEDIUM WAVE AND TOP BAND —
 — PERSONAL POCKET RADIO —
 (120 metres to 500 metres coverage)
 ● LUXEMBOURG GUARANTEED ●
 (where normally receivable)

- ★ Full Station Separation
- ★ NO EXTERNAL AERIAL OR EARTH REQUIRED
- ★ Size 4½ x 3 x 1½ in.
- ★ 9 Months' Battery Life
- ★ Weight only 4½ ozs.

Total cost of all items with battery, transistors and personal earphone, etc. **65/-** P.P. 1/6

All components sold separately and Fully Guaranteed.

—EASY TO BUILD, SIMPLE TO USE—UNBREAKABLE PLASTIC CABINET—FINGER-TIP CONTROL

— Building Instructions and Prices FREE On Request —

★ RANGER—3 ★ (Supersedes the Major—3)

FULL TUNING OF MEDIUM WAVEBAND AND AMATEUR TOP BAND
 (120 metres to 500 metres or 600 kc/s to 2.5 Mc/s coverage)

● LUXEMBOURG GUARANTEED ●
 (where normally receivable)

- ★ Full Station Separation
- ★ 6 Months' Battery Life
- ★ Fingertip Control
- ★ Fitted Volume Control
- ★ No External Aerial or Earth
- ★ Unbreakable Plastic Cabinet
- ★ Size 4½ x 3 x 1½ in. Weight 4½ ozs.

TOTAL COST with Personal Earphone, Battery, Transistors, etc. **79/6** P.P. 1/6
 All parts sold separately.

Full Instructions and Prices FREE On Request

—Continental and local stations—GUARANTEED!!

(ALL COMPONENTS FOR MAJOR—2 AND MAJOR—3 STILL AVAILABLE FROM STOCK)



PERSONAL EARPHONES

ALL MAGNETIC & GUARANTEED

- ★ Single Personal Earphone, medium impedance, as used on Ranger-2 and 3 etc. Complete with lead & eartip. 12/6, P.P. 6d.
- ★ Single Personal Earphone, low impedance, fitted with lead and sub-miniature Jack Plug.....19/6, P.P. 6d.
- ★ Medium Impedance Earphone, with lead fitted and Jack Plug19/6, P.P. 6d.
- ★ Very High Impedance version for Perdio, etc..... 22/6, P.P. 6d.
- ★ Jack Sockets, 4/-; with Circuit Breaker Switch, 5/-.



CRYSTAL MICROPHONE INSERTS

Fully Guaranteed

- ★ ACOS 43-1, 2½ in. round ... 12/6, P.P. 6d.
- ★ ACOS 14-9, 1½ in. round ... 7/6, P.P. 6d.
- ★ ACOS, ½ in. x ¾ in. ... 7/6, P.P. 6d.
- ★ ¾ in. square (ex-units) ... 3/6, P.P. 6d.

Practical Transistor Circuits

No. 2

GADGETS RECEIVERS AMPLIFIERS TEST UNITS TRANSMITTERS All transistor

Now contains 40 Easy to build Transistor Circuits for the home constructor with diagrams and prices. **3/6** POST FREE

Telescopic Chrome Aerials

- ★ 7-Sections, 3ft 6in. open; 6in. closed. Ideal for Portable Receivers. Walkie-talkies, Radio Control, etc. With Clips 12/6. P.P. 1/-
- ★ 64in. version with clips 17/6. P.P. 1/-



"STEREO 3-D"

New high-gain circuit with full tone, balance and volume controls. Can be used with all types of records as well as stereo.

- ★ 2 WATTS PEAK PER CHANNEL
 - ★ ECC83: 2-ECL82 VALVES
 - ★ MAINS 110-250V A.C.
- Complete with speaker sockets, calibrated dials, etc. **£5.7.6.** P.P. 2/-

- ★ ★ COLLARO 4-SPEED STEREO AUTO-CHANGER, ideal for use with above amplifier..... £7.10.0. P.P. 3/6.
- ★ ★ 9 x 6in. large magnet Elac speaker, for use with STEREO 3-D. 37/- pair. P.P. 1/6

SPECIAL OFFER

Matched set of 3 Mullard Driver and Output Transistors, OC78D and 2—OC78. Giving 400mW, very high quality. 37/6, P.P. 9d.

PLEASE



HENRY'S (RADIO) LTD.

5 HARROW ROAD, EDGWARE ROAD PADDINGTON, LONDON W.2
 Opposite Edgware Road Tube Station. PADddington 1008/9 OPEN MON. to SAT. 9-6, THURSDAY 1 o'clock (Open all day Saturday).