

JUNE
1961

Practical 1/6 WIRELESS

**A Transistorised
Alignment Aid**



Ways to Learn Morse
Bass Reflex Enclosure
10 Watt One-valve Tx

LOUDSPEAKER ONE-VALVER



Stentorian

for sound reproduction

This range of Stentorian loudspeakers, incorporating the patented cambric cone, was developed to provide reproduction that takes full advantage of the television and V.H.F. sound transmissions and high fidelity recordings now available. The cone of the loudspeaker is made from uncured cambric and bonded pulp, the whole being completely cured together and made into one composite cone.



MODEL H.F. 1016

10" Unit H.F. 1016. 16,000 gauss. Instantaneous matching at 3, 7.5 and 15 ohms. Handling capacity 10 watts. Frequency response 30 c.p.s. to 15,000 c.p.s. Bass resonance, 35 c.p.s.

Price £7.12.3 (inc. P.T.)

* Incorporates a universal impedance speech coil.

Type	Flux Density	Price	Type	Flux Density	Price
8" H.F.816*	16,000 gauss	£6.10.6	T.816	16,000 gauss	£6.3.9
8" H.F.812*	12,000 gauss	£3.19.6	T.12 tweeter	16,000 gauss	£12.12.0
8" H.F.810	10,000 gauss	£2.19.0	T.10 tweeter	14,000 gauss	£4.4.0
6" H.F.610	10,000 gauss	£2.9.0 steel £2.11.0 diecast	T.359 tweeter	9,000 gauss	£1.13.3

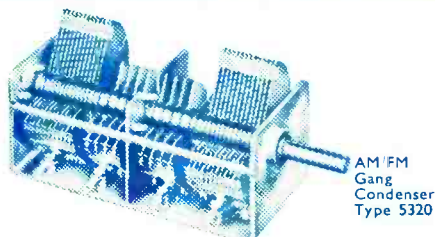
WHITELEY ELECTRICAL RADIO CO. LTD. MANSFIELD, NOTTS
 Telephone: MANSFIELD 1762-5 London Office: 109 Kingsway, London, W.C.2
 WA3

JACKSON

the big name in PRECISION components

Precision built radio components are an important contribution to the radio and communications industry.

Be sure of the best and buy Jackson Precision Built Components.



AM/FM Gang Condenser Type 5320

JACKSON BROS. (LONDON) LTD.
 KINGSWAY-WADDON, SURREY

Phone: Croydon 2754-5 Grams: Walfico, Souphone, London

SPECIAL FOR THE "HAMS" RADIO STATION

Illustrated

$\frac{1}{8}$ inch detachable bit soldering instrument
 List No. 70

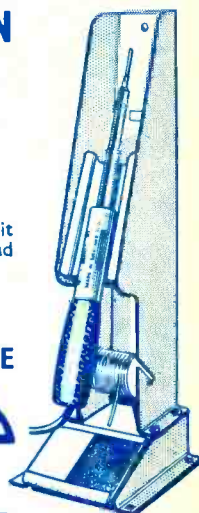
Combined Protective Unit with Wiper/Abrasion Pad and Solder Reel
 List No. 700

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 "SOLJOINT, LONDON"

Tel: Mitcham 6201

Open Daily to Callers

R S T

All Valves Brand New
and Fully Guaranteed

211 STREATHAM ROAD, MITCHAM, SURREY

Special 24 Hour Express Mail Order Service

0Z4	5/9	6CH6	12/-	10C2	27/10	32	13/6	CCH35	21/-	ECL83	12/6	H23DD		PENA4	17/6	U282	22/-
IA5	6/-	6E5GT	10/-	10F1	26/2	35A5	15/-	CL4	12/6	EF9	21/-	CL4	12/6	PENB4	17/6	U301	22/6
IA7	14/6	6F1	15/6	10F3	17/6	35L6GT	10/6	CL33	18/6	EF22	17/6	HL1	12/6	PEN4DD		U329	17/6
ID5	14/-	6F6	6/9	10F9	12/6	35W4	8/-	CY1	15/9	EF36	7/6	HL41DD			22/6	U339	19/-
ID6	10/-	6F7	15/-	10LD3	12/6	35Z4	7/6	CY31	15/9	EF37	8/6		13/6	PL33	18/6	U403	11/6
IH5	10/6	6F12	4/9	10LD11	15/-	35Z5	9/6	D41	12/6	EF37A	8/6	HL42DD		PL38	23/9	U404	10/-
IL4	6/-	6F13	17/6	10P13	21/-	40SUA	15/-	D42	12/6	EF39	4/-		13/6	PL81	14/9	U401	29/-
ILNS	4/6	6F14	17/6	10P14	20/-	41STH	23/6	D63	3/6	EF40	15/-	HY90	8/-	PL82	8/-	U4020	15/6
INS	10/6	6F15	14/9	11D3	17/6	42	15/-	D77	5/6	EF41	9/3	IW4/350	10/-	PL83	10/6	U4BC80	8/6
IR5	9/-	6F17	12/-	11D5	17/6	43	15/-	D152	6/-	EF42	10/6	IW4/500	10/-	PL820	21/6	UAF42	9/6
IS4	8/6	6F33	5/6	12A6	6/6	50C5	15/-	DAC32	10/6	EF50(E)	3/6	KBC32	9/6	PM2A	12/6	UB41	9/6
IS5	9/-	6H6	2/6	12A83	10/-	50CD6G		DAF91	7/6	EF50(A)	4/-	KF35	8/6	PM2HL	14/-	UBC41	9/6
IT4	4/-	6J5GT	4/6	12A76	9/-			DF33	10/6	EF80	6/-	KL32	10/6	PM22A	13/6	UBF80	9/6
IU5	10/-	6J6	7/6	12A77	8/-	50L6GT	9/-	DF91	4/-	EF85	6/6	KLL32	11/6	PM24M	21/6	UBF89	8/6
2D21	8/6	6J7GT	9/6	12A78	9/-	61BT	17/6	DF92	7/-	EF86	11/-	KL35	9/6	PM202	16/-	UCC85	10/-
2X2	5/-	6K7GT	3/-	12A79	9/6	615PT	17/6	DF96	9/6	EF89	9/6	KT2	7/6	PY31	16/6	UCH42	9/-
3D6	14/6	6K8GT	10/6	12BA6	9/6	62BT	17/6	DF97	9/6	EF91	4/9	KT32	10/-	PY32	15/6	UCH81	9/-
3Q4	8/-	6K25	19/6	12BE6	9/6	75	12/6	DH63	10/6	EF92	5/9	KT33C	10/-	PY80	8/6	UCL82	12/6
3Q5	10/6	6L1	15/6	12E1	17/6	77	12/6	DH76	7/6	EF93	7/6	KT36	28/6	PY81	7/6	UCL83	13/6
3V4	8/-	6L18	12/6	12K7GT	8/6	80	10/6	DH77	8/3	EF95	15/-	KT41	22/6	PY82	8/6	UF41	9/-
3S4	9/-	6L19	21/-	12K8GT	12/6	85A2	12/6	DH719	7/6	EL31	12/6	KT44	13/6	PY83	8/6	UF42	11/6
5R4GY	9/-	6L34	10/-	12Q7GT	8/6	150B2	12/6	DK91	9/-	EL32	5/6	KT55	22/6	PZ30	18/6	UF80	9/-
5U4G	4/6	6/30L2	10/-	12SC7	8/6	150B3	15/-	DK92	9/6	EL33	12/6	KT61	18/6	Q225	14/6	UF85	9/6
5V4	8/-	6LD3	9/6	12SG7	8/6	185B2	32/-	DK96	10/-	EL35	12/6	KT63	8/6	Q230	17/6	UF89	8/6
5Y3GT	8/6	6LD20	15/6	12SH7	4/-	303	7/6	DL36	12/6	EL37	18/6	KT66	17/6	QP21	12/6	UL1	9/-
SZ3	10/-	6M1	10/6	12SK7	8/6	304	7/6	DL33	9/-	EL38	23/9	KT71	9/6	R10	21/6	UL44	24/6
SZ4G	10/-	6M2	10/6	12SQ7	11/6	305	7/6	DL35	12/6	EL41	10/6	KT74	12/6	R19	19/6	UL46	21/6
6A7	18/6	6P1	17/6	12SN7	17/6	329	7/6	DL92	8/6	EL42	10/6	KT76	12/6	SD6	8/6	UL84	9/6
6A8	10/-	6P2	19/6	12Z3	15/-	807	7/6	DL94	9/6	EL81	14/9	KT101	25/6	SP4	14/6	UU6	20/11
6AB8	9/-	6P25	19/6	13D3	12/6	955	4/-	DL96	9/6	EL84	7/6	KTW63	7/6	SP41	3/6	UU7	15/-
6AB8	9/6	6P28	26/-	14H7	12/6	5763	17/6	EAS0	2/-	EL85	10/6	KTZ41	8/-	SP42	12/6	UU8	26/-
6AK5	8/-	6Q7GT	10/6	14R7	12/6	9002	7/6	EAC80	7/6	EL90	8/6	KTZ63	10/-	SP61	3/6	UY21	15/6
6AK8	7/6	6S1GT	7/6	14S7	21/-	9003	7/6	EAC91	7/6	EL91	5/6	L63	4/9	T41	22/6	UY41	7/6
6AL5	6/-	6S7	7/6	15A2	17/6	AC4/PEN		EAF42	10/-	EM80	10/-	LN309	15/-	TDD4	17/6	UY85	7/6
6AM5	5/-	6S7	7/6	15D2	23/9	9007	7/6	EB41	7/6	EM81	10/-	LZ319	12/6	VP28	17/6	VP28	17/6
6AM6	4/-	6S7	7/6	19AQ5	10/6	AC5/PEN		EB91	5/-	EY51	8/6	MH4	8/6	VP48	17/6	VP48	17/6
6AN5	7/6	6SL7GT	6/6	19BG6G		22/6		EB91	5/-	EY81	10/6	MHD4	17/6	VP48	17/6	VP48	17/6
6AQ5	8/3	6SN7GT	5/6	24/4		AC6	21/-	EBF80	9/6	EY84	10/6	MHL	10/-	TH41	23/9	VP48	17/6
6AQ8	9/3	6U4GT	11/6	20D1	12/6	ACTP	32/-	EBF89	9/-	EY86	9/6	MKT4	5/7	TP22	17/6	VP48	17/6
6AT6	8/3	6U5	7/6	20D2	23/-	ACHL	12/6	EBL21	23/-	EY91	9/-	MS48	17/6	TP25	17/6	VP48	17/6
6AU6	10/-	6U7	7/6	20E2	26/6	AC/PEN		EC90	9/6	EZ35	7/6	MS49	17/6	U14	15/9	VP48	17/6
6B7	10/-	6V6G	5/-	20L1	26/6	17/6		EC91	9/6	EZ40	7/6	MU14	9/-	U16	10/6	VP48	17/6
6B8	4/-	6V6GT	8/-	20P1	26/-	ACTH1	34/9	EC91	9/6	EZ80	7/6	MX40	17/6	U18/20	10/6	VP48	17/6
6BA6	7/6	6X4	5/-	20P3	23/-	ACV2	17/6	EC91	9/6	EZ81	7/6	N18	8/-	U21	14/6	VP48	17/6
6BE6	7/6	6X5GT	5/-	20P5	22/6	ACVP1	17/6	EC91	9/6	EZ81	7/6	N19	8/-	U22	14/6	VP48	17/6
6BG6G	21/-	7B7	8/-	25L6GT	9/6	ACVP2	17/6	EC91	9/6	FC2	21/-	N37	18/6	U24	29/6	VP48	17/6
6B16	7/6	7C5	8/-	25Y5	10/-	AC2/PEN		EC91	9/6	FC13	17/6	N78	17/6	U25	14/6	VP48	17/6
6BW6	8/6	7C6	8/-	25Z4	9/6	AC2	21/-	EC91	9/6	FC13C	21/-	N108	18/-	U26	14/6	VP48	17/6
6BX6	6/-	7D5	15/-	25Z5	9/6	PENDD21/-		EC91	9/6	FW4,500	10/-	N142	9/6	U27	14/6	VP48	17/6
6B7	7/6	7D6	15/-	25Z6	10/6	AZ1	15/6	EC91	9/6	FW4,800	10/-	N147	18/6	U28	14/6	VP48	17/6
6C4	6/6	7H7	8/-	27SU	17/6	AZ31	10/6	EC91	9/6	FW4,800	10/-	N150	10/6	U29	14/6	VP48	17/6
6C5GT	8/-	7K7	10/6	30	13/6	B36	21/-	EC91	9/6	GZ30	10/6	N153	11/6	U30	8/6	VP48	17/6
6C6	6/6	7Q7	11/6	30C1	12/6	B65	8/6	EC91	9/6	GZ32	11/6	N309	11/6	U31	9/6	VP48	17/6
6C9	12/6	7R7	12/6	30F5	11/6	B152	8/6	EC91	9/6	GZ34	13/6	N329	10/6	U32	9/6	VP48	17/6
6C10	12/6	7S7	10/6	30FL1	10/6	B309	9/6	EC91	9/6	H30	5/6	N727	7/6	U33	21/6	VP48	17/6
6CD6G	27/6	7Y4	7/6	30L1	11/6	B329	9/6	EC91	9/6	H63	9/6	P2	10/6	U34	29/6	VP48	17/6
6D1	8/-	8D3	4/-	30P4	22/6	B339	9/6	EC91	9/6	HBC90	9/6	PCC84	9/6	U35	21/6	VP48	17/6
6D2	5/-	9BW6	14/9	30P2	11/6	B719	9/6	EC91	9/6	HL92	6/6	PCF80	10/6	U36	21/6	VP48	17/6
6D3	15/-	10C1	18/-	30P16	10/-	CBL1	17/6	EC91	9/6	HL133DD	10/-	PCF82	9/6	U37	21/6	VP48	17/6
				30PL1	15/-	CBL31	21/-	ECL80	9/-	HL23	12/6	PCL82	11/6	U38	21/6	VP48	17/6
												PCL83	12/6	U281	20/-		

METAL RECTIFIERS

RM1	6/-	18RA 1-1-8-1	4/6	16RE 2-1-8-1	8/6
RM2	8/-	18RA 1-1-16-1	6/6	18RA 1-2-8-1	11/-
RM3	9/-	16RA 1-1-16-1	8/6	14A86	17/-
RM4	16/6	14RA 1-2-8-2	18/-	14A97	23/6
RM5	22/-	14RA 1-2-8-2	21/-	14A100	24/-

SPECIAL OFFER

IT4 4/-, 6K8 8/-, 6K7G 3/-, 6V6G 5/-,
EF39 4/-, EF80 6/-, EF91 4/9, 6X5G 5/-,
6X4 4/6, 5U4G 4/6.

TERMS OF BUSINESS C.W.O. or C.O.D.
2/9 PACKING CHARGE ON ALL C.O.D.
ORDERS. POSTAGE 3d. PER VALVE

OBSOLETE VALVES A SPECIALITY.
QUOTATIONS GIVEN ON ANY TYPE
NOT LISTED



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 COLLARO "STUDIO" TWIN TRACK 3-speed Deck, operating at 1 $\frac{1}{2}$, 3 $\frac{1}{2}$ and 7 $\frac{1}{2}$ speeds..... **£39.10.0**
H.P. Terms: Deposit £7.18.0 and 12 months of £2.17.11.

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 below) thus ensuring truly "Hi-Fi" record and playback facilities.

MODEL TR3/Mk.VI incorporates the New TRUVOX Mk. VI TWIN TRACK 2-speed Tape Deck operating at 3 $\frac{1}{2}$ and 7 $\frac{1}{2}$ speeds..... **£49.10.0**
H.P. Terms: Deposit £9.18.0 and 12 months of £3.12.7.

TAPE AMPLIFIERS and PRE-AMPLIFIERS PRESENTED FROM MULLARD DESIGNS

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



MULLARD TYPE "C" TAPE PRE-AMPLIFIER—ERASE UNIT



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

KIT OF PARTS £13.13.0 OR **ASSEMBLED £17.0.0**
H.P. Deposit £3.8.0 and 12 months at £1.4.11.

FOR THE HOME CONSTRUCTOR SPECIAL 'COMBINED ORDER' PRICES

- (a) The COLLARO "STUDIO" TAPE DECK and our Mullard Type "C" PRE-AMPLIFIER and POWER Unit Assembled and Tested..... **£29.10.0**
H.P. Deposit £5.18.0 and 12 months £2.3.3.
- (b) As above but TYPE "C" PRE-AMPLIFIER supplied as complete KIT OF PARTS..... **£26.10.0**
- (c) The TRUVOX Mk. VI DECK and the assembled Type "C" Pre-amplifier and Power Unit..... **£40.0.0**
H.P. Deposit £3.0.0, and 12 months £2.18.8.
- (d) As above but Type "C" as complete KIT OF PARTS..... **£36.10.0**
- (e) The BRENELL Mk. V DECK and the assembled Type "C" PRE-AMPLIFIER and POWER UNIT..... **£46.0.0**
H.P. Deposit £9.4.0, and 12 months £3.7.8.
- (f) As (e) but Type "C" as complete KIT OF PARTS..... **£43.0.0**
- (g) THE WEARITE 4A DECK with TYPE "C" assembled and tested..... **£56.0.0**
H.P. Deposit £11.4.0, and 12 months £4.9.1.

(Carriage and Insurance on above quotes 10/- extra).
EACH OF THE ABOVE CAN BE SUPPLIED IN A PORTABLE CASE FOR £5.10.0 EXTRA, THUS FORMING A COMPLETE PORTABLE PREAMPLIFIER. FULL DETAILS ON REQUEST.

KIT OF PARTS £14.0.0 H.P. £3.8.0 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..... **£26.0.0**
- (b) As above but with HF/TR3 supplied ASSEMBLED and TESTED..... **£29.10.0**
H.P. Deposit £5.18.0 and 12 months £2.3.3.
- (c) COMPLETE KIT to build the HF/TR3, together with the NEW TRUVOX Mk. VI TAPE DECK..... **£36.10.0**
- (d) As above but HF/TR3 supplied ASSEMBLED and TESTED..... **£40.0.0**
H.P. Deposit £3.0.0, and 12 months £2.18.8.
- (e) COMPLETE KIT to build the HF/TR3 AMPLIFIER with the BRENELL Mk. V TAPE DECK..... **£42.0.0**
- (f) As above but HF/TR3 supplied ASSEMBLED and TESTED..... **£45.10.0**
H.P. Deposit £9.2.0 and 12 months £3.6.9.
- (g) THE WEARITE 4A DECK with assembled and tested HF/TR3 Amplifier including WEARITE Head Lift Transformer..... **£55.0.0**
H.P. Deposit £11.0.0, and 12 months £4.0.8.

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/CELESTION 10 x 6in. LOUDSPEAKER—ACOS CRYSTAL MICROPHONE and 1,200ft. SPOOL E.M.I. TAPE—ALL FOR £9.0.0. Carriage and Insurance 5/- extra.

SPECIAL OFFER OF TAPE

spools. New, boxed and guaranteed.
225ft. on 3in. Spool..... **5/9**
900ft. on 5in. Spool..... **18/6**

P.V.C. base on latest type plastic
1200ft on 5 $\frac{1}{2}$ in. Spool..... **21/-**
1200ft on 7in. Spool..... **21/-**
1800ft on 7in. Spool..... **32/6**

TAPE ACCESSORY KITS

- (a) E.M.I. includes 3 reels leader tape, splicer, jointing tape and stop foil..... **37/6**
- (b) SCOTCHBOY, includes 3 reels leader tape, splicer, and jointing tape..... **29/6**

A LARGE PURCHASE OF BRAND NEW AND FULLY GUARANTEED

TRUVOX and GARRARD TAPE EQUIPMENT

ENABLES THESE OUTSTANDING PRICE REDUCTIONS

The "MODEL HF/G2R" PORTABLE TAPE RECORDER (Original Price £33.0.0)

FOR ONLY 22 gns.

H.P. Dep. £4.14.0. 12 months £1.13.9. (Carr. & Ins. 10/- extra). Incorporates THE LATEST GARRARD "MAGAZINE" TAPE DECK and a HIGH QUALITY AMPLIFIER which is entirely based on the very successful MULLARD TYPE "A"

DESIGN and specifically developed to operate the GARRARD DECK. Price INCLUDES SUPPLY OF THE GARRARD TAPE MAGAZINE and 4in. SPOOL OF DOUBLE PLAY TAPE. Comprises a Twin Track Recorder operating at 3 $\frac{1}{2}$ in/sec. speed and providing up to 1 hour 10 mins. playing time. Truly "Portable", weighs only 22 lbs. Outstanding features are excellent performance and simplicity of operation.

The "MODEL TK/MkIV" PORTABLE TAPE RECORDER (Original Price £49 10.0)

FOR ONLY £36.10.0 Price includes a 7' spool of EMI tape!

H.P. Dep. £7.8.0, 12 months £2.13.6 (Carr. and Ins. 10/- extra).

Incorporates the Truvox MkIV Tape Deck, Rola/Celestion 5 x 5 in. Loudspeaker and the Truvox Type "K" Amplifier specifically developed by Truvox Ltd to correctly operate their MkIV Tape Deck. As a result we are able to present a highly perfected tape recorder providing sound reproduction which truly justifies the title "High Fidelity".

At Twin Track Two Speed model operating at 3 $\frac{1}{2}$ and 7 $\frac{1}{2}$ in/sec. speeds and incorporating Magic Eye Indicator, Safety Button. (Prevents accidental erasure). Ext. Speaker output, tone and volume controls.



MAGAZINE and 4in. SPOOL OF DOUBLE PLAY TAPE. Comprises a Twin Track Recorder operating at 3 $\frac{1}{2}$ in/sec. speed and providing up to 1 hour 10 mins. playing time. Truly "Portable", weighs only 22 lbs. Outstanding features are excellent performance and simplicity of operation.

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



STERN RADIO LTD.

STERN'S MULLARD DESIGNS

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

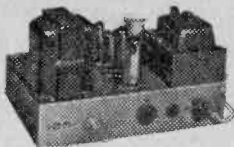
COMPLETE KIT OF PARTS—

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 PARMEKO MAINS TRANSFORMER and choice of the latest Ultra-Linear PARMEKO or the PARTRIDGE Output Transformer. PRICE COMPLETE KIT (PARMEKO Output £10.00 Trans.)

Alternatively we supply ASSEMBLED AND TESTED. **£11.10.0**

ABOVE INCORPORATING PARTRIDGE OUTPUT TRANSFORMER. £1.6.0*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 **£6.6.0** ASSEMBLED AND TESTED **£8.0.0**

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.

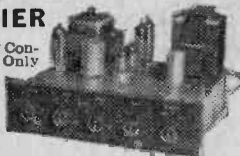


COMPLETE MULLARD "5-10" AMPLIFIER

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 PARMEKO MAINS TRANSFORMERS and choice of the latest PARMEKO or PARTRIDGE ULTRA-Linear Output Transformers.

PRICE COMPLETE KIT OF PARTS **£11.10.0** OR ASSEMBLED AND TESTED **£13.10.0**

HIRER PURCHASE (Assembled and Tested) £2.14.0 12 months at 15/10. ABOVE INCORPORATING PARTRIDGE OUTPUT TRANS. £1.6.0 extra.



COMPLETE MULLARD "3-3"

THE IDEAL AMPLIFIER FOR A SMALL HIGH QUALITY INSTALLATION PROVIDING EXCELLENT REPRODUCTION OF UP TO 3 WATTS OUTPUT

PRICE COMPLETE KIT OF PARTS **£7.10.0** OR ASSEMBLED AND TESTED **£8.19.6**

(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 PARMEKO OUTPUT TRANSFORMER.

THE "ADD-A-DECK"

Incorporating GARRARD "MAGAZINE" TAPE and the MATCHED MODEL HF/G2P PRE-AMPLIFIER

Supplied on ONE CHASSIS (as illustrated) **18 Gns.**

FOR USE (Carr. & Ins. 10/- extra).

Price includes Garrard Magazine and a 4in. Spool Double Play Tape H.P. Deposit £3.16.0 and 12 months at £1.7.8. Provides complete tape recording facilities and designed to operate through the pick-up sockets of the standard type of RADIO RECEIVER, or an AMPLIFIER, from which really first class reproduction is obtained. It consists of a Twin Track Deck connected to the Pre-amplifier and operates at 3 1/2 in/sec. speed providing up to 1 hr. 10 mins. playing time*



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 RP354 4-speed Single Record Player. Studio Cartridge. **£9.18.9**

The NEW COLLARO MODEL C40 4-speed Autochanger unit with Studio "O" Pick-up. **£7.19.6**

The E.M.I. 4-speed Single Record Player with crystal Pick-up. **£6.9.6**

B.S.R. MODELS UA12 and UA14. Each a 4-speed mixer autochanger with Crystal Pick-up. **£7.19.6**

Both available incorporating the B.S.R. STEREO Pick-up, plays L.P. and 78 Records. **£10.10.0**

GARRARD MODEL TA/Mk11 4-speed Player fitted high output Crystal Pick-up. **£8.10.0**

GARRARD MODEL HC7000. Autochanger 4-speeds. High output. Crystal Pick-up. **£8.19.6**

Carriage and Insurance on each above. 5/- extra.

Dept. P.W. 109 FLEET ST., LONDON, E.C.4

Telephone: FLEET STREET 5812/3/4

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**

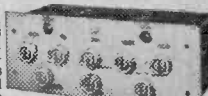
(h) TWO "5-10" AMPLIFIERS and the DUAL-CHANNEL PRE-AMPLIFIER CONTROL UNIT BOTH ASSEMBLED & TESTED. **£36.0.0**

H.P. Terms: Deposit £7.4.0. 12 months £2.12.0.

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 enabling it to be used for both STEREO-Phonic or MONAURAL operation. It is designed primarily to operate with our STEREO MAIN AMPLIFIERS but will also operate



range of MULLARD MAIN AMPLIFIERS requiring an input of 250 mivolts.

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/-

MODEL LL one microphone input matched for moving coil or Ribbon Mike. £1.17.0 extra.

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— (a) The 2-stage (plus Rectifier) AMPLIFIER **£4.2.6**

(b) THE PORTABLE CARRYING CASE **£3.17.6**

(c) 6in. P.M. SPEAKER 18/9 Carriage and Insurance 4/- extra.

BENTLEY ACOUSTIC CORPORATION LTD.

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

Telephone: PRIMROSE 9090

EXPRESS POSTAL SERVICE! ALL ORDERS DESPATCHED SAME DAY AS RECEIVED. TELEPHONE AND TELEGRAM ORDERS FOR CASH ON DELIVERY SERVICE ACCEPTED UP TO 3.30 P.M.

OA2	17/6	6F11	17/3	10F1	26/6	35Z3	10/6	DK91	6/6	EF54	5/-	KLL32	24/7	PM24M	17/3	U4020	16/7	XFY12	9/6
OB2	17/6	6F12	4/6	10F9	11/6	35Z4GT	6/6	DK92	9/-	EF73	10/6	KT2	5/7	PM84	21/3	UABC80	9/1	XFY34	17/6
OZ4	5/-	6F13	11/6	10LD3	8/6	35Z5GT	9/-	DK96	8/6	EF80	6/-	KT33C	10/-	PX4	10/6	UAF42	9/6	XH(1.5)	6/6
1A5	6/-	6F15	15/3	10LD11	4/3	43	10/-	DL33	9/6	EF85	6/-	KT36	29/10	PY31	16/7	UB41	12/-	XSG(1.5)	6/6
1A7GT	12/-	6F23	10/6		15/11	50C5	10/-	DL66	17/6	EF86	10/6	KT41	23/3	PY32	12/6	UBC41	8/6	Y63	7/6
1C5	12/6	6F32	10/6	10P13	15/-	50C6DG		DL68	15/-	EF89	9/-	KT44	12/6	PY80	7/6	UBC81	11/4	Z63	7/6
ID6	10/6	6F33	7/6	10P14	19/3			DL72	15/-	EF91	4/6	KT61	12/6	PY81	8/6	UBF80	9/1	Z66	17/6
IG6	17/6	6G6	6/6	12A6	5/-	50L6GT	9/6	DL92	7/6	EF92	4/6	KT63	7/6	PY82	7/6	UBF89	9/1	Z77	4/6
1HSGT	10/6	6H6	3/-	12AC6	15/3	53KU	19/11	DL94	7/6	EF97	13/3	KT66	15/-	PY83	8/6	UCC21	23/3	Z719	6/-
IL4	3/6	6I5	5/-	12AD6	17/3	77	8/-	DL96	8/6	EF98	13/3	KT88	24/-	PY88	13/3	UCC84	14/7		
ILD5	5/-	6I6	5/6	12AE6	13/11	78	6/6	DM70	7/6	EF183	18/7	KTW61	6/6	PZ30	19/11	UCC85	9/1		
ILN5	5/-	6J7G	6/-	12AT7	8/-	80	9/-	EOF	20/-	EF184	18/7	KTW62	6/6	QP21	7/6	UCF80	16/7		
1NSGT	10/6	6J7GT	10/6	12AH8	12/6	83	15/-	EB3F	37/6	EK32	8/6	KTW63	6/6	QP25	14/6	UCH21	23/3	CGIC	7/6
1RS	6/6	6K7G	5/6	12AT6	7/6	85A2	25/-	EA50	2/-	EL32	5/-	KTZ41	8/-	QS150/15		UCH42	9/6	CG4E	7/6
154	9/-	6K7GT	6/-	12AT7	6/-	150B2	15/-	EA76	9/6	EL33	12/6	KTZ63	7/6		10/6	UCH81	9/6	CG7E	7/6
155	9/-	6K8GT	10/6	12AU6	23/3	161	10/6	EABC80	9/-	EL34	15/-	L63	6/-	R12	7/6	UCL82	11/6	CG7E	7/6
1T4	3/6	6K8G	6/6	12AV7	6/6	185BT	33/2	EAC91	4/6	EL38	26/6	LH152	9/-	R18	14/6	UCL83	19/3	CG10E	7/6
1U5	6/-	6K25	19/11	12AU6	12/8	304	10/6	EAF42	9/-	EL41	9/-	MH4	7/6	R19	19/11	UF41	9/1	CG12E	7/6
2P	26/6	6L1	23/3	12AX7	7/6	305	10/6	EB34	2/6	EL42	10/6	MHL20	12/6	RG1/240A		UF42	12/6	GD3, 4, 5	
3A4	6/-	6L6M	9/6	12BE6	8/-	807	7/6	EB41	8/6	EL81	16/7	ML4	8/6		45/-	UF80	10/6	6, 8	4/-
3A5	10/6	6L7GT	7/6	12BH7	21/3	1821	16/7	EB3C	23/3	EL84	7/6	MU12/14	8/-	S130	22/6	UF86	17/11	OA73	4/-
3B7	12/6	6L1B	13/-	12E1	30/-	4033L	12/6	EBC33	5/-	EL85	13/11	N37	23/3	SP4(7)	14/6	UF89	9/1	OA79	4/-
3D6	5/-	6L19	23/3	12J5GT	4/6	5763	12/6	EBC41	8/6	EL86	17/3	N78	19/11	SP41	3/6	UL41	9/1	OA81	4/-
3Q4	7/6	6LD3	8/6	12J7GT	9/6	7193	5/6	EBC81	8/6	EL91	5/-	N108	23/3	SP42	12/6	UL44	26/6	OA86	6/-
3Q5GT	9/6	6LD20	15/11	12K5	17/11	7475	7/6	EBF80	9/-	EL95	10/6	N308	20/7	SP61	3/6	UL46	14/6	OA91	5/-
3S4	7/6	6N7	8/-	12K7GT	5/6	9002	5/6	EBF83	13/11	EL820	18/7	N339	15/3	SU25	26/6	UL84	8/6	OA95	5/-
3V4	7/6	6P25	12/6	12K8GT	14/-	AC/PEN		EBF89	9/-	EL822	25/-	P61	3/6	SU61	9/-	UM4	17/3	OA210	25/-
5A4GY	17/6	6P26	19/11	12Q7GT	5/6	5-pin	23/3	EBL21	23/3	EM34	9/6	PABC80	T41	9/-	UN34	17/3	OA211	40/-	
5U4G	6/6	6P28	26/6	12SA7	8/6	7-pin	15/-	EBL31	23/3	EM71	23/3		13/11	DDD4	12/6	UM80	15/3	OC16	54/-
5V4G	10/6	6Q7G	6/6	12SC7	8/6	AC2/PEN		EC52	5/6	EM80	9/-	PCC84	8/-	TH41	26/6	URIC	18/7	OC19	54/-
5Y3	6/6	6Q7GT	11/-	12SG7	7/-	DD	12/6	EC54	6/-	EM81	9/-	PCC85	8/-	TH233	33/2	UU6	19/11	OC23	87/-
5Z3	12/6	6R7G	10/-	12SH7	8/6	AC6/PEN	7/6	EC70	12/6	EM84	10/6	PCC88	18/-	TH2321	20/-	UO7	16/7	OC26	44/-
5Z4G	9/-	6SA7GT	8/6	12S17	8/6	AC.T.P.	33/2	EC92	13/3	EM85	17/3	PCC89	11/6	TP22	15/-	UO8	26/6	OC28	25/-
6A7	10/6	6S7C	7/6	12SK7	6/-	ATP4	5/-	EC93	5/6	EN31	37/-	PCF80	8/-	TP25	15/-	UO9	7/6	OC35	48/-
6A8	9/-	6S7GT	8/-	12SQ7	11/6	AZ1	18/7	EC93	8/6	EY51	9/-	PCF82	10/6	TP2620	33/2	UY1N	18/7	OC44	26/-
6AC7	4/-	6SH7GT	8/-	12SR7	8/6	AZ31	10/-	ECC34	24/7	EY83	16/7	PCF84	16/7	TY86F	13/3	UY21	13/11	OC45	23/-
6AG5	5/6	6S7GT	8/-	12Y4	10/6	AZ41	13/11	ECC35	8/6	EY84	14/-	PCF86	15/-	U12/14	8/6	UY41	7/6	OC65	22/6
6AK5	8/-	6SK7GT	8/-	1A57	27/10	B36	15/-	ECC40	23/3	EY86	9/-	PCL82	10/-	U16	10/6	UY85	7/6	OC66	25/-
6AL5	4/-	6SL7GT	6/6	19AQ5	10/6	BL63	7/6	ECC81	6/-	EZ35	6/-	PCL83	10/6	U18/20	8/6	VMP4G	15/-	OC70	14/-
6AM6	4/6	6SN7GT	5/6	19H1	10/6	C1	12/6	ECC82	6/6	EZ40	7/-	PCL84	12/6	U19	36/-	VM54B	15/-	OC71	14/-
6AQ5	7/6	6SQ7GT	9/-	20D1	15/3	C1C	12/6	ECC83	7/6	EZ41	7/-	PCL95	16/7	U22	8/-	VP2	12/6	OC72	17/-
6AT6	7/6	6S7GT	8/-	20F2	26/6	CBL1	26/6	ECC84	9/-	EZ90	7/-	PEN44	23/3	U24	29/10	VP4	15/-	OC73	20/-
6AU6	10/6	6U4GT	12/6	20L1	26/6	CBL31	23/3	ECC85	8/6	EZ81	7/-	PEN48	26/6	U25	17/11	VP2B	14/6	OC75	15/-
6AV6	12/6	6U5G	7/6	20P1	26/6	CCH35	23/3	ECC88	18/-	FC4	15/-	PEN4DD	U26	10/-	VP4B	23/3	OC77	21/-	
6B8	5/-	6U7G	8/6	20P3	23/3	CK506	6/6	ECC91	5/6	FW4/500	8/6	26/6	U31	9/6	VP13C	7/6	OC78	17/-	
6BA6	7/6	6V6G	7/-	20P4	26/6	CL33	19/3	ECF80	10/6	FW4/800	8/6	PEN25	4/6	U33	26/6	VP23	6/6	OC81	18/-
6BE6	6/-	6V6GTG	8/-	20P5	23/3	CV63	10/6	ECF82	10/6	GU50	27/6	PEN40DD	U35	26/6	VP41	6/6	OC170	35/-	
6BG6G	23/3	6X4	5/-	25A6G	10/6	CY1	18/7	ECF86	19/11	GZ30	9/-		25/-	U37	26/6	VR105	8/6	OC200	54/-
6BH6	8/-	6X5GT	6/-	25L6GT	10/6	CY31	16/7	ECH3	26/6	GZ32	10/-	PEN44	26/6	U43	9/-	VR150	7/6	OC203	58/-
6BJ6	6/-	6/30L2	10/-	25Y5G	10/6	D1	3/-	ECH21	23/3	GZ33	19/11	PEN45	19/6	U45	9/-	VT61A	5/-	TJ1	40/-
6BO7A	15/-	7A7	12/6	25Z4G	9/6	D15	10/6	ECH35	6/6	GZ34	14/-	PEN45DD	U50	6/6	VT501	5/-	TJ2	45/-	
6BR7	23/3	7B6	21/3	25Z5	9/6	D63	5/-	ECH42	9/-	GZ37	19/11		26/6	U52	6/6	W76	5/6	TJ3	50/-
6B57	25/-	7B7	8/6	25Z6G	10/6	D77	4/-	ECH81	9/-	H63	12/6	PEN46	7/6	U54	19/11	WB81M	6/-	TP1	40/-
6E6W	8/6	7C5	8/-	27S5U	19/11	DAC32	10/6	ECH83	13/11	HABC80		PEN383	23/3	U76	6/-	W107	18/7	TP2	40/-
6BW7	6/-	7C6	8/-	28D7	7/-	DAF91	6/-	ECL80	9/-		13/6	PEN453DD	U78	5/-	W729	19/11	TS1	10/-	
6BX6	6/-	7H7	8/-	30C1	8/-	DAF96	6/6	ECL82	10/6	HL2	7/6	33/2	U107	16/7	X24M	24/7	TS2	12/6	
6C4	5/-	7R7	12/6	30F5	6/-	DD41	13/11	ECL83	19/3	HL23	15/3	PEN/DD	U191	16/7	X41	15/3	TS3	15/-	
6C5	6/6	7S7	9/6	30FL1	10/-	DET25	7/6	EF9	23/3	HL23DD	7/6	4020	33/2	U201	16/7	X61(C)	12/6	TS4	24/-
6C6	6/6	7V7	8/6	30L1	8/-	DF33	10/6	EF22	14/-	HL41DD		PL33	19/3	U251	14/6	X63	9/6	V30/10P	28/6
6C9	13/6	7Y4	7/6	30L15	11/6	DF66	15/-	EF36	4/-		19/3	PL36	12/-	U281	19/11	X65	12/6	XA101	23/-
6C10	9/-	8D2	3/6	30P4	12/-	DF91	3/6	EF37A	8/-	HL42DD		PL38	26/6	U282	22/7	X66	12/6	XA102	26/-
6CDS6	36/6	8D3	4/6	30P12	7/6	DF96	8/6	EF39	5/6		19/3	PL81	10/6	U301	23/3	X76A1	14/-	XA103	15/-
6C6H	9/-	9BV6	15/3	30PL1	10/6	DF97	9/-	EF40	15/-	HN309	24/7	PL82	7/6	U329	14/6	X78	23/3	XA104	18/-
6D6	6/6	9D2	4/-	30PL13	12/6	EH63	6/6	EF41	9/-	HVR2	20/-	PL83	9/6	U339	16/7	X79	23/3	XB102	10/-
6E5	12/6	10C1	13/11	35A6	21/3	DF76	7/6	EF42	10/6	HV72A	6/-	PL8	12/8	U403	16/7	X109	17/3	XB103	14/-
6F1	26/6	10C2	26/6	35L6GT	9/6	DH77	7/6	EF50(A)	7/6	KF35	8/6	PL820	18/7	U404	8/6	XD(1.5)	6/6	XB104	10/-
6F6G	7/6	10D2	12/-	35W4	7/6	DK32	12/-	EF50(E)	5/-	KL35	8/6	PM2B	12/6	U801	29/10	XFG1	18/-	XC101	16/-

Transistors and diodes

RADIO BOOKS. MULLARD AMPLIFIER 9/6d. MULLARD TRANSISTOR MANUAL 13/6d. BRIMAR VALVE MANUAL 7/- ALL POST FREE.

VOLUME CONTROLS

All with Long Spindle and Double-pole Switch, 4/6 each.	DRM1B 13/-	RM-1	5/3	14A86	17/6	14B130	35/-	14RA 1-2-8-1	21/-	1BRA 1-1-16-1	6/6
10 K 25 K 50 K 100 K	DRM2B 15/6	RM-2	7/6	14A97	25/-	14B261	11/6	(FC31)		(FC116)	
	DRM3B 15/6	RM-3	7/9	14A100	27/-	14RA 1-2-8-2	17/6	16RD 2-2-8-1	12/-	1BRA 1-2-8-1	11/-
	LW7	21/-	RM								

Easy-to-build kit-sets of



highest quality at lower cost

AMATEUR TRANSMITTER Model DX-100U
Covers all amateur bands from 160-10 metres. Self-contained including Power Supply Modulator V.F.O. £81.10.0

AMATEUR 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. £32.10.0

VAR. FREQ. OSCILLATOR VF-1U
From 160-10 m. Ideal for our DX-40U and similar transmitters. Price less valves £8.19.6 £11.2.0

R.F. SIGNAL GENERATOR Model RF-1U
Up to 100 Mc/s. fundamental and 200 Mc/s. on harmonics and up to 100mV. output on all bands. £11.18.0

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. £19.19.6

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

Portable 2 3/4 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 7 1/2 x 4 1/2 x 12 1/2 in. long. Wt. only 10 1/2 lb. £19.10.0

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. £36.10.0

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. £8.6.6

SINGLE CHANNEL AMPLIFIER, MA-12
10-12 watt Hi-Fi amplifier. Extremely low distortion and wide frequency range. £10.19.6

HI-FI EQUIPMENT CABINETS
Range of cabinets available with at least one to suit your particular needs. From small to large, housing Tape Deck, Record Player and full equipment. In the white for finishing to personal taste.
From £11.5.6 to £17.18.6

GRID DIP METER Model GD-1U
Coverage from 2 Mc/s. to 250 Mc/s. Complete set of plug-in coils provided. £10.9.6

TAPE RECORDING/PLAYBACK AMPLIFIER Model TA-1
Monaural (TA-1M) £18.2.6. Conversion unit to Stereo £6.10.0. Stereo (TA-1S). £23.6.0

'PACKAGED DEALS' of Hi-Fi Equipment including TAPE DECKS RECORD PLAYERS and DECCA ffs PICK-UPS.

Write in to see how these deals save you further money:



F.M. TUNER



S.33



S.88



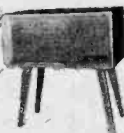
DX-40



UXR-1



OS-1



SSU-1



THE "GLOUCESTER" EQUIPMENT CABINET

THE "MOHICAN" GENERAL COVERAGE RECEIVER, Model GC-1U
Fully transistorised, including 4 piezo-electric trans-filters. The very latest and an excellent portable or Fixed Station receiver for the Ham and short-wave listener. £38.15.0

SHORT-WAVE TRANSISTOR PORTABLE Model RSW-1
Extending aerial, leather case, four bands (2 short-wave bands Trawler and Medium). £21.18.6

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

DUAL-WAVE TRANSISTOR RADIO UJR-1
This sensitive headphone set is a fine introduction to electronics for any youngster. £2.16.6

HI-FI F.M. TUNER
Tuning range 88-108 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 (£32.0 inc. P.T.). I.F. Amplifier (FMA-4U) complete with cabinet and valves (£11.11.0). £14.13.0

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. £26.12.6

6W STEREO AMPLIFIER Model S-33
3 watts per channel, 0.3% distortion at 2.5 w/chn 20dB N.F.B. Inputs for Radio (or Tape) and Gram. Stereo or Monaural, ganged controls. Sensitivity 100 mV. £12.8.6

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 £11.16.6. £10.15.6

"COTSWOLD" HI-FI SPEAKER SYSTEM KIT
Acoustically designed enclosure "in the white" 26 x 23 x 15 1/2 in., 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. £21.19.0

COMPLETE MATCHED STEREO OUTFIT
includes record player, amplifier and twin speaker systems (pedestal speaker legs optional £4.14.0 extra). £43.19.0

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. £18.18.6

STEREO HEAD BOOSTER USP-1
Ideal for boosting tape-head output and low output pick-ups (e.g. Decca ffs). £6.17.6

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

PW6

DAYSTROM LTD.

DEPT. P.W.6, GLOUCESTER, ENGLAND

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

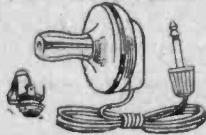
Solderless Transistor 3

Any boy from eight years onwards will easily make this pocket size transistor set. No soldering is involved and in fact the set can be made up virtually without tools. It is nevertheless a workmanlike job which, when completed, will receive Luxembourg and local stations entirely without aerial or earth. Uses two transistors and diode in reflex circuit. Other features include optional medium and long waves and loud speaker.

The parcel contains everything necessary to complete as follows:—
 Packet of Solderless terminals.
 Packet of Condensers.
 Packet of Resistors.
 Packet of Transistors.
 Connecting wire.
 Proper plastic transistor set case with printed scale and tuner. Hearing aid type headphone.
 Plug and socket with on/off switch, and full comprehensive easy to follow instructions. Price 37/6 plus 2/6 post and insurance.



Miniature Earphones

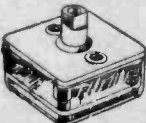


For Transistor Circuits or Deaf Aid. Very lightweight and easy to wear. Cord almost invisible, good quality production of music and voice. Complete with miniature plug and socket, ready to use—correct impedance OK for red spot and similar transistors. Crystal and Magnetic, 9/-. Post and Insurance 1/-.

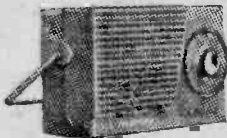
Miniature Plug and Socket

as used with the above can be supplied separately. Price 3/6.

Smallest Possible 2-gang



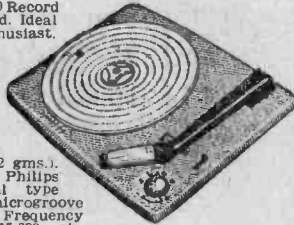
With built in trimmers, polystyrene case, size only 0.8 x 1 x 7/16in., price 17/6. Smallest IP and oscillator to match, 21/-. P.P. input and P.P. output transformers, 12/6. Circuit diagram free with any of above.



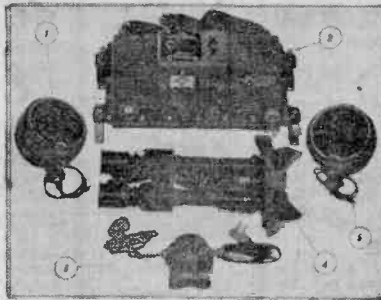
Transistor Set Cabinet
 Very modern cream cabinet, size 5 1/2 x 3 x 1 1/2 in. with chrome handle, tuning knob and scale. Price 7/6, plus 1/6 postage and packing.

PHILIPS TRANSCRIPTION UNIT

Philips AG 200 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 (2.12 gms.).



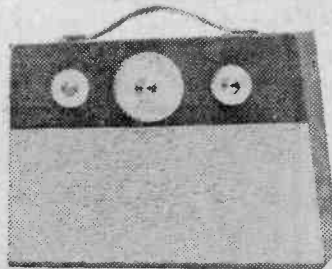
Supplied with Philips Hi-Fi crystal type AC3019 for microgroove and 78 r.p.m. Frequency response 30-15,000 c/s. Pick-up lifting and lowering device. Individually balanced heavy turntable. Muting switch. Can be used with any amplifier or radio set. Complete with monaural pick-up £10.10.0, or 2xns. deposit and 20 fortnightly payments of 10/-. Available also with stereo head diamond or sapphire stylus. Prices on request.



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, power pack 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/-.

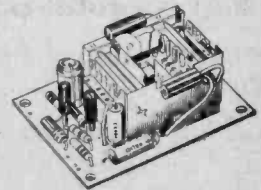
THE REAL COMPANION CAR RADIO PORTABLE



There's nothing to compare with this, so don't buy your portable until you have heard this one—call at any branch for demonstration—you will be well satisfied—why not earn spare time cash making them up for your friends?

NOTE THESE FEATURES
 ★ 400/500 mw. Output Push-Pull. ★ 6 First Grade Transistors. ★ Latest Type Superhet Circuit. ★ Medium and Long Wave. ★ Internal Ferrite aerial Itz wound. ★ High "Q" coils. ★ Latest type printed circuit with components plan. ★ Slow motion tuning. ★ Car aerial attachment. ★ Two-tone cabinet. ★ High flux elliptical speaker. ★ Size 11 x 8 x 3in. approximately. ★ Easy to follow instructions. ★ 12 months' guarantee all components. ★ No technical knowledge required. ★ Service available at moderate charges.

ORDER IN CONFIDENCE
 Money returned in full if parcel not up to expectation and returned un assembled. Price complete, less battery 29/19/8. Battery 3/6 plus carr. and insurance 7/6.



Transistor Amplifiers

2 x CX71's direct coupled cascade drive to 2 precision matched OC74's in Class B push-pull provide up to 1 W. undistorted output from 5 mV. in at 15 K-ohm Frequency response, 60-16,000 c/s ± dB. Overall size 3 x 2.2 x 1.2in. 92/6. Post and Ins. 2/6. 750 M/WATT AMPLIFIER. Similar specification. £2.2.6.

Yaxley Switches

1 Pole 3 Way	1/6
1 Pole 5 Way	2/-
1 Pole 8 Way	2/6
1 Pole 12 Way	3/-
2 Pole 2 Way	2/6
2 Pole 4 Way	3/-
2 Pole 6 Way	2/6
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 3 Way	3/6
8 Pole 2 Way	2/-
9 Pole 3 Way	2/6
12 Pole 2 Way	2/-

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 priced 8in. speaker. Fitting for tweeter. Only 45/- each, carriage and insurance 3/6.

Building A Scope?



3in. oscilloscope tube. American made type No. 3FP7. 6.3 v. 0.6 amp. heater, electrostatic deflection, brand new and guaranteed. With circuit diagram of scope. 15/- each, plus 1/6 post and insurance.

Connecting Wire



P.V.C. covered in 100ft. coils—2/9 a coil or four coils different colours, 10/- post free.

Miniature Microphone

American made. Dynamic type, real bargain at 2/6, plus 6d. postage.



POCKET LOUDSPEAKER TRANSISTOR RADIO

Available Again at 42/6

Read these Testimonials

Dr. A. Hilton, Leigh, Lancs.
"I received 'Pocket 4' on Christmas Day. I made it up on Boxing Day and I am very pleased with the results. It brings in local stations and many foreign stations including Luxemburg at good strength. I am 13 years old."

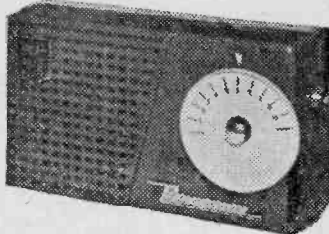
Mr. J. Bell, Wolverhampton.
"I am writing to express my satisfaction at the standard of Your kit for your Pocket 4 Transistor set and also to state that it has come up to my expectations in regard to performance."

Mr. R. Bell, Newcastle-on-Tyne.
"I have built your Pocket 5 Transistor set. I am very pleased with it."

Mr. F. Jackson, Ickenham, Middx.
"I have built the Pocket 4 and am more than pleased with the results."

Mr. G. Bamford, Ravenskate.
"I find this set even better than you claim it to be and most certainly up to your usual standard of quality. I feel that nobody could fail to build it and get results. Even the first-time-ever novice, as your circuit diagrams and instructions are so clear and precise."

Mr. A. J. Simmonds, Wellng, Kent.
"I purchased from you a week ago the Pocket 4 Transistor Kit, I put it together last night in 1 1/2 hours, on switching on the set I was right on Radio Luxemburg. I must say thank you because not only has the set a very attractive appearance, it also behaves fantastically."



AVAILABLE WITH FIRST GRADE TRANSISTORS AND FOR LONG AND MEDIUM WAVES

Circuit comprises 2 HF transistors reflexed to equal 4 stages. Permanent germanium diode and high gain AF output stage, fitted with miniature speaker, proper tuning condenser, volume control and in case with handle as illustrated (less monogram), completely portable. No aerial or earth required. Pocket 4 uses 3 transistors and 1 diode, price 52/6, plus 2/6 post and insurance. Pocket 5 uses 4 transistors and 1 diode and has feedback control, price 67/6, plus 2/6 post and insurance.

GOOD RESULTS EVERYWHERE

Nothing can be more disappointing than to find that despite care in making up, your radio just will not work or needs a long high aerial and water pipe earth. We can prove good results in all areas and we guarantee all components for 12 months. Read just a few of the hundreds of testimonials we have received from constructors who have made these sets. Send in confidence. Money refunded if not up to your expectations. Plans free with parts, or separately 1/6. More details S.A.E.

Also again available with S.E. transistors as last year 42/6 and 52/6, plus 2/6 post and packing M.V.

AGENTS WANTED to build these sets. Excellent commission. S.A.E. for more details.

Transistors for R.F., F.M., T.V. and U.H.F.

Frequencies quoted are approx. cut-off.

SB 978 15-20 Mc/s	8/6
SB 305 20-30 Mc/s	9/-
SB 231R 40-50 Mc/s	15/-
AMERICAN 2N127 100-150 Mc/s	15/-
AMERICAN 2N174 100-150 Mc/s	12/6
AMERICAN 1B32 100-1300 Mc/s	25/-
AMERICAN 1B33 100-1300 Mc/s	25/-

THIS MONTH'S SNIP



Budgetiger Amplifier complete with microphone, long lead and transistor amplifier in bakelite cabinet. Can also be used as baby alarm. Full details S.A.E. Price: £4.15.0. Post and insurance 2/6.

THE POCKET 5 Q.P.P.

This pocket receiver has a remarkable performance comparable in fact with portables being sold at £12 and over. It uses the 3in. moving coil speaker to give really good quality tone and the circuit is reflex R.F. with push-pull output. It completely tunes the medium and long wave bands. Price for all parts and pocket sized cabinet £4.15.0. Post and insurance 2/6.

SUB MINIATURE COMPONENTS FOR TRANSISTOR SETS

- ★ Push-pull o.p.t. and driver 17/9 pair (500 milliwatt). 12/8 pair (300 milliwatt).
- ★ Push-pull driver with Sep. Secondaries for transformerless output 6/6.
- ★ 3 IF transformers and oscillator and circuit 23/6.
- ★ Ferrite aerial with coils for medium and long wave with circuit for pocket sets 7/6. Ditto for standard size set 10/6.
- ★ Two gang tuning condenser to suit above I.F.S. and rod aerial—11/6. fast and slow; 9/6, ordinary.
- ★ Printed circuit for above with construction data superhet pocket size 8/6. Standard size 7/6.
- ★ Smallest possible electrolytics 1/8 each. 1 mid., 2 mid., 3 mid., 10 mid., 20 mid., 30 mid., 50 mid., 100 mid., 200 mid.
- ★ Smallest watt resistors 5d. each all popular values.
- ★ Miniature 0.1 mid. 1/-, 0.05, 0.01 8d. values up to 0.005 6d. each.
- ★ Miniature slide switch 2/6.
- ★ Transistor holder 1/6 each.
- ★ Edgewise Volume controls, 2K., 5K., 10K., 20K., all 2/6 each.
- ★ Ditto, with switches 8/- each.
- ★ Set of 8 transistors for superhet in original packets guaranteed Mullard OC4, OC35, OC71 matched pair OC72 £3.10.0 the set.
- ★ Superhet 6 all first grade includes matched pair 45/- and 35/-.

- ★ Oscillator and 2 IF—new American High gain 35/-.
- ★ Red Spots 3/6.
- ★ White Spots 3/9.
- ★ Surface barrier (super white spot) 6/6.
- ★ Surface barriers 15 M/cs 9/6.
- ★ Diodes 1/-. Sub-miniature 2/6.
- ★ 3in. Speakers 3 ohm 18/6.
- ★ 3in. Speakers 80 ohm 18/6.
- ★ 2 1/2in. Speakers 3 ohm 19/6.
- ★ Elliptical Speaker, 7" x 4", 3 ohm or 35 ohm 19/6.

"Dim and Full" Switch

Particularly useful for controlling flood lamps which have only a short life at full brilliance. This 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. Ditto but without the off position i.e. d.p.d.t., 10 amp 2/9.

Speaker Bargain



12in. 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.

P.W. ROADFARER
Come to us for all the parts—or send for list.

TRANSISTORISED STETHOSCOPE

Trace signal right through: Radio, T.V., Tape amplifier, Hi-Fi, etc.—simplest way to fault-find—carry it like a fountain pen—all parts including transistor barrel crystal, everything except battery, 12/6 plus 1/6, extra included or separately 1/6. Or complete with dead aid type earphone, 20/-.



ELECTRONIC PRECISION EQUIPMENT LTD.

post orders are dealt with from Eastbourne, so for prompt attention please post your orders to 66 Grove Road, Eastbourne, marked Department 7. Callers may use any one of the Companies below.

266 London Road, Croydon. Phone: CRO 8558 Half day Wednesday

29 Stroud Green Rd., Finchley Park, N.4. Phone: ARChway 1049 Half day Thursday

530 High Street North, Manor Park, E.12. Phone: ILFord 1011 Half day Thursday

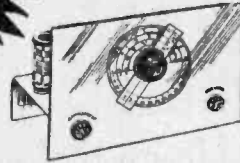
42-46 Windmill Hill, Ruislip, Middx. Phone: RUislip 5780 Half day Wednesday

246 High Street, Harlesden, N.W.10. Phone: ELGar 4444 Half day Thursday

CONSTRUCTORS CORNER

ENSURE SUCCESS WITH R.C.S.

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/-

AN IDEAL PRESENT!

EASY TO BUILD TWO STAGE TRANSISTOR SET
 The set that looks like a Radio Set

- Attractive Case
- Mini .0005 Tuner
- High Q Litz Coil
- Works for months off No. 8 Battery
- Simple to construct in 15 min.

You can't go wrong. We guarantee good results.
Total Building Costs. P.P. 1/6 25/-

Components Price List. Layout Plans 1/6 free with order.



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 **12/6**
 for
 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 components 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

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 £25 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.C.E.
- A.M.I.Prod.E.
- A.M.I.M.I.
- A.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

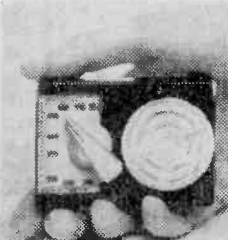
THE B.I.E.T. IS THE LEADING ORGANISATION OF ITS KIND IN THE WORLD

SENSATIONAL NEW 1961 DESIGNS—BY CONCORD

LOW PRICES ★ PICTORIAL STEP-BY-STEP PLANS ★ EASY AS A.B.C.

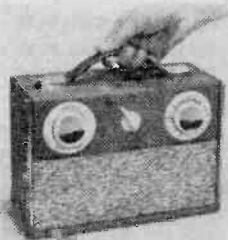
THE NEW "LISBON" TRANSISTOR SET

Build the miniature, highly sensitive "LISBON" design. This is a pocket 2-stage transistor set not much larger than a matchbox. Excellent clear reception covering all medium waves and working for months and months off a tiny 11 or 3 volt battery costing only 3/6. A very simple set to build and an excellent introduction to transistor circuitry. Everything can be supplied down to the last nut and bolt including **SIMPLE AS A.B.C. PICTORIAL STEP-BY-STEP PLANS FOR ONLY 19/6**, plus post and packing 1/6 (C.O.D. 2/- extra). Parts sold separately, priced parts list 1/-.



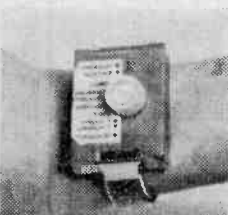
"MAJORCA" 7 TRANSISTOR RADIO

Build this **7-TRANSISTOR £10.19.6** "MAJORCA" superb portable with Car Radio aerial attachment. An exceptional high quality design giving remarkable tone with push-pull output. Can be built for **ONLY £10.19.6**, including everything down to the last nut and bolt and **SIMPLE AS A.B.C. PICTORIAL STEP-BY-STEP PLANS**. Post and packing 3/6 (C.O.D. 3/- extra). Parts sold separately.



OUR NOVEL WRIST RADIO

Our engineers have designed this novel Wrist Radio using latest transistor techniques. Size only 1 1/2 x 1 x 1/2 in. "Featherweight" yet gives clear, crisp reception over all medium waves. Tiny battery lasts months and months costing only 4d. No snags—anyone can build it in an hour or two using our **SIMPLE AS A.B.C. PICTORIAL STEP-BY-STEP PLANS**. All parts can be supplied including case and strap **FOR ONLY 22/6**, plus post and packing 1/6 (C.O.D. 2/- extra). Parts sold separately, priced parts list 1/-.



THE NEW "FLORIDA" VALVE RADIO

This sensational "FLORIDA" model is one of our most sensitive valve radios. It is highly compact, self-contained, miniature push button base, valve socket radio at absolutely rock bottom building cost. Covers all medium waves with very latest circuitry bringing in stations from all over Europe without fuss. **8/2c only 4/-** x **2/-** x 1 1/2 in. A fascinating pocket radio. We can supply all the parts including beautiful 2-tone case and **SIMPLE AS A.B.C. PICTORIAL STEP-BY-STEP PLANS**, screws, wire, etc. Can be built for the exceptionally **LOW PRICE OF 27/6**, plus post and packing 1/6 (C.O.D. 2/- extra). Parts sold separately, priced parts list 1/-.



OUR NEW 4 STAGE "MINUETTE"

Build this newly-designed "MINUETTE" 4-STAGE transistor set in very strong ready drilled **ULTRA-MODERN CASE**, size only 6 x 3 1/2 x 1 1/2 in. Uses three transistors and diode and **SELF-CONTAINED LOUD SPEAKER**. Very sensitive, ideal for office, bedroom, holidays, etc. Months and months of listening off an 9d. battery. Can be built **FOR ONLY 39/6**, including **PROPER CASE**, miniature speaker, etc. **SIMPLE AS A.B.C. PICTORIAL STEP-BY-STEP PLANS**, etc., plus post and packing 1/6 (C.O.D. 2/- extra). Parts sold separately, priced parts list 1/-.

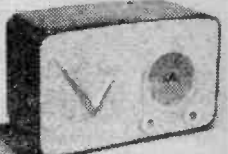
39/6



THE NEW "MONTE-CARLO" RADIO

One of our new, exciting designs, the "MONTE CARLO" is a powerful, all mins, miniature table radio with the latest trimmings, gold insert knobs, special unmarkable plastic veneer, etc. The amazing circuit covers all medium and long waves with good selectivity, fantastic tone and output. Includes ready drilled and punched chassis, standard octal base valves, etc. All the parts can be supplied including **SIMPLE AS A.B.C. PICTORIAL STEP-BY-STEP PLANS**. Everything down to the last nut and bolt **FOR ONLY £5.15.0**, plus post and packing 3/6 (C.O.D. 2/- extra). Parts sold separately, priced parts list 1/-.

£5.15.0



THE NEW 3-STAGE "RIO"

Our fabulous new 3-STAGE MINIATURE **LOUDSPEAKER DESIGN** THE "RIO" covers all medium waves including Home, Light, etc. Very reliable and lightweight. Works for months and months off an 9d. battery. Can be assembled in an hour or two. All parts can be supplied including miniature speaker and everything down to the last nut and bolt with **SIMPLE AS A.B.C. PICTORIAL STEP-BY-STEP PLANS FOR ONLY 29/6**, plus post and packing 1/6 (C.O.D. 2/- extra). Parts sold separately, priced parts list 1/-.



29/6

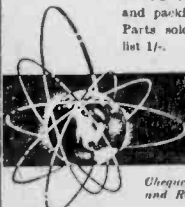
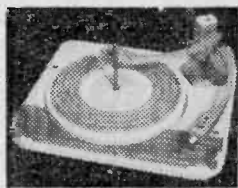
BRAND NEW RECORD CHANGERS

ONLY £8.15.0 BRAND NEW! the latest 4-speed Autochanger, B.S.R. UA4, as illustrated, few only **OUR PRICE £8.15.0 P.P. 3/6**

BRAND NEW! the B.S.R. 4-speed Autochanger, UA8, few only left. **OUR PRICE £8.15.0 P. & P. 3/6**

BRAND NEW! the COLLARO Junior 4-speed record player. **OUR PRICE 7s/- P. & P. 3/6**

BRAND NEW! COLLARO "Obagust", 4-speed Autochanger. **OUR PRICE £7.15.0 P. & P. 3/6**



CONCORD ELECTRONICS

210, Church Road, Hove, Sussex

Dept. PW31

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

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 Transistor. The Linear LT45X High Quality Tape Amplifier listed £12.12. 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 with latest attractive two-tone polychrome finish, size 18 x 13 x 9 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.



25¹/₂
GNS.

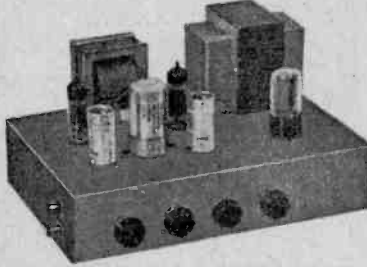
Carr. 17/6

H.P. TERMS. Deposit £57.6 and 12 monthly payments of 2 gns. Cash price if settled in 3 months.

HIGH FIDELITY 12-14 WATT AMPLIFIER TYPE A11

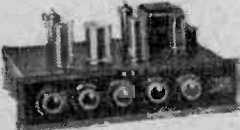
PUSH-PULL ULTRA LINEAR OUTPUT "BUILT-IN" TONE CONTROL PRE-AMP STAGES

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 ohm speakers. Kit is complete to last nut. Chassis is fully punched. Full instructions and point-to-point wiring diagrams supplied. Only **8 Gns.** Carr. 10/- (Or factory built 51/6 extra).



If required louvered metal cover with 2 carrying handles can be supplied for 18/9. **TERMS ON ASSEMBLED UNITS. DEPOSIT 24/3, and 9 monthly payments of 25/-.** 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 stereo-phonograph 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, E231. Outputs for 2-3 ohm speakers. Point-to-Point wiring diagrams and instructions supplied. Send S.A.E. for leaflet. **8 Gns.** Carr. 10/- Full constructional details and price list 2/6.

R.S.C. BATTERY CHARGING EQUIPMENT

HEAVY DUTY CHARGER KIT 6/12 v. 6 amps. variable output. Consisting of Mains Transformer, 0-200-230-250 v.; F.W. (Bridge) Selenium Rectifier; Ammeter, Variable Charge Rate Selector, Panels, Plugs, Fuses, Fuseholder and circuit. 58/9. Carr. 4/6.

DEAF AID EARPIECES. Low Impedance with lead. 8/9. High Impedance Crystal 8/9.

MICROPHONE INSERTS. Crystal type. 6/9.



Assembled 6 v. or 12 v. 4 amps.

Fitted Ammeter and variable charge rate selector. Also selector plug for 6 v. or 12 v. charging. Louvered steel case with stoved blue hammer finished. Fused and ready for use with Carr. 5/- mains and output leads. 7 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. Louvered metal case finished attractive hammer blue. Ready for use With mains and output leads. Double Fused. Only **49/9** Carr. 3/9.

BATTERY CHARGER KITS Consisting of Mains Transformer, F.W. Bridge, Selenium 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. 2 amps. 25/9
6 v. or 12 v. 2 amps. 31/6
6 v. or 12 v. 2 amps. including 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 (FULLY GUARANTEED)

Interleaved and Impregnated. Primaries 200-230-250 v. 50 c/s. Screened TOP SHROUDED DROP THROUGH
250-0-250 v. 70 mA. 6.3 v. 2 a. 5 v. 2 a. 17/9
350-0-350 v. 100 mA. 6.3 v. 2 a. 5 v. 3 a. 19/9
250-0-250 v. 100 mA. 6.3 v. 2 a. 6.3 v. 1 a. 19/9
250-0-250 v. 100 mA. 6.3 v. 3.5 a. C.T. 19/9
350-0-350 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 25/9
for Mullard 50 Amplifier .. 29/9
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 v. 4 a. C.T. 25/9
0-4.5 v. 3 a. 25/9
350-0-350 v. 150 mA. 6.3 v. 4 a. 5 v. 3 a. 28/9
FULLY SHROUDED UPRIGHT
250-250 v. 60 mA. 6.3 v. 2 a. 5 v. 2 a. 17/11
Midget type 21-3-3in. 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. 28/9
350-0-350 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 35/9
425-0-425 v. 250 mA. 6.3 v. 4 a. C.T. 49/9
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. 7/9; 0-4-6.3 v. 2 a. 7/9;
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
Midget Battery Pentode 66:1 for 384, etc. 3/9
Small Pentode, 5000Ω to 3Ω .. 3/9
Small Pentode 778,000Ω to 3Ω .. 3/9
Standard Pentode 5,000Ω to 3Ω .. 5/6
Standard Pentode 778,000Ω to 3Ω .. 5/6
10,000Ω to 3Ω .. 5/6
Push-Pull 10-12 watts 6V6 to 3Ω or 15Ω .. 18/9
Push-Pull 10-12 watts to match 6V6 to 3-5-8 or 15Ω .. 18/9
Push-Pull EL84 to 3Ω or 15Ω .. 18/9
Push-Pull 15-15 watts 6L6, KT66 .. 22/9
Push-Pull for Mullard 510 Ultra Linear .. 29/9
Push-Pull 20 watts, sectionally wound 6L6, KT66 etc., to 3 to 15Ω .. 47/9

ELIMINATOR TRANSFORMERS
Primaries 200-250 v. 50 c/s.
120 v. 40 mA. 5-0-5 v. 1 a. 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. 11 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; 0-9-15 v. 8 a. 28/9.

AUTO (Step up/Step down) TRANS.
0-110/120-230/250 v. 50-80 watts. 13/9;
0-110/120-230/250 v. 150 watts. 27/9.

MICROPHONE TRANSFORMERS
120:1 high grade, clamped, 6/9; 120:1 Potted. Mu-metal screened, 9/9.

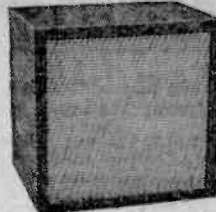
R.S.C. (Manchester) LIVERPOOL, LEEDS, BRADFORD, MANCHESTER

R.S.C. A12 STEREOPHONIC AMPLIFIER KIT

A complete set of parts to construct a Stereo amplifier with an understored output total 6 watts. For A.C. mains input of 200-250 v. Outputs for matched 2-3 ohm speakers. Sensitivity 130 m.v. Ganged Vol. and Tone Controls. Preset balance control. Full instructions and point-to-point wiring diagrams supplied. Only good quality 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 A.C. premises. A really sensational offer.

4 Gns.

12in. 10 WATT HIGH QUALITY



SPEAKER IN POLISHED WALNUT FINISHED CABINET

Gauss 12,000 lines. Sens. coil 3 ohms or 15 ohms. Only £4.19.6 Carr. 5/- Terms: Deposit 11/3

STEREO EQUIPMENT OFFER.
Comprising A12 Kit, 2 matched 8in. L/Speakers, and Acos T70 Stereo head suitable most pick-ups. **£6.19.6 Carr. 7/6**

PICK-UP ARMS complete with Hi-Fi turnover crystal head. Acos GF54. Limited number brand new, perfect at approx. half price. Only 35/9.

ACOS CRYSTAL MICROPHONES. MC140 stand or desk. Listed 45/- Only 27/9. 39-1 Stick type. Listed 5 gns. Only 39/6.

LINEAR L45 MINIATURE 4/5 WATT QUALITY AMPLIFIER. Suitable for use with any record playing unit, and most microphones. Negative feedback 12db. Separate Bass and Treble Controls. For A.C. mains input of 200-250 v. 50 c/s. Output for 2-3 ohm speaker. Three miniature Mullard valves used. Size of unit only 7-5-5 1/2 in. high. Guaranteed for 12 months. Only £5.19.6. Send S.A.E. for illustrated leaflet. Terms: Deposit 22/6 and 5 monthly payments of 22/6.

and 6 monthly payments of 11/3.
12in. 20 WATT HI-FI LOU-SPEAKERS IN CABINETS. Size 18 x 18 x 10in. Finish as above. Terms: Deposit 7/9 and 4 monthly payments of 17/9. Only £7.19.6. Carr. 8/6

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 8 stages. Certified performance figures compare equally with most expensive amplifiers available. Hum level 70 db. down. Frequency response—3 db. to 30,000 c/s. specially designed sectionally wound ultra linear output transformer is used with 807 output valves. All components are chosen for reliability. Six valves are used EF86, EF96, ECC83, 6X7, 6X5, 6X4. Separate Bass and Treble Controls are provided. Minimum input required for full output is only 12 millivolts or 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 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 and 15 ohm speakers. Complete kit of parts with fully punched chassis and point-to-point wiring diagrams and instructions. If required cover as for A11 can be supplied for 18/9. The amplifier can be supplied factory drilled with EL34 output valves and 12 months' guarantee, for 14 Gns.

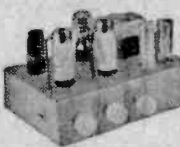
TERMS: DEPOSIT 33/9 and 9 monthly payments of 33/9.

FULL RANGE OF LINEAR AMPLIFIERS ALWAYS IN STOCK.

COLLARO JUNIOR 4-speed single play units and Hi-Fi crystal pick-up with turn-over head, £2.19.6.

B.S.R. UA8 4-SPEED AUTO-CHANGERS with Hi-Fi turnover pick-up head, £6.19.6. Carr. 5/-.

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 equalization. Hum level is negligible being 70db. down. 15db. of Negative feedback is used. H.F. or 300 V. and L.F. 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 handles) with the banner finish and point-to-point wiring diagrams and 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 7 1/2 in.) finished in attractive and durable polycrome. and fitted carry yin & handle. H.P. Terms. **£8.19.6** Deposit £1 and 9 monthly payments 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 as Junior model. Size approx. 18 x 18 x 18in. H.P. Terms. Deposit 34/9 and 9 monthly payments of 34/9. **15 Gns.** Both models for 200-250 v. Carr. 10/- A.C. mains. Above model fitted Linear Tremolo Unit 5 gns. extra. Or Deposit 11/6 and 9 monthly payments 11/6.

R.S.C. BASS REFLEX CABINETS, JUNIOR MODEL. Specially designed for W.B. HF1012 Speaker, but suitable for any good quality 10in. speaker. Acoustically lined and ported. Polished walnut veneer finish. Size 16 x 12 x 10in. Handsome appearance. Ensure superb reproduction for only £3.19.6.

STANDARD MODEL. As above but for 12in. speakers. Size 20 x 15 x 13in. Especially recommended for Plessey Dual Concentric Speaker. £5.19.6. Suitable legs with brass ferrules. 25/- per set of 4. **PLESSEY DUAL CONCENTRIC 12in. 15 ohms HIGH FIDELITY SPEAKER** (12,000 lines) with built-in tweeter (completely separately enclosed speaker with choke, condensers, etc.) providing extraordinarily realistic reproduction when used with our All or similar amplifier. Rated 10 watts. Price only £5.19.6.

P.M. SPEAKERS 2-3 ohm. 2in. Perdio 21/9. 5in. 12/9. 6in. 14/9. 8in. 19/9. 8 x 5in. 25/9. 10in. 26/9. 10 x 6in. 29/9. 12in. 29/11. 10in. W.B. "Stentorian" 3 or 15 ohms type HF1012 10 watts, hi-fidelity type. Recommended for use with our All Amplifier. £4.10.9. 12in. R.A. 3 ohms 10 watts (12,000 lines). 59/6.

TWEETERS, Plessey 30 19/9, 15 25/9. HI-FI CRYSTAL PICK-UP HEADS. (Turnover type with sapphire stylus.) Acos. Standard replacement for Garrard and B.S.R. B.S.R. Ful-f. Garrard GC2, 19/9. B.S.R. Stereo-Monaural 39/11.

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. A.C. mains. Size 1 1/2 x 2 1/2 x 2 1/2 in. Controls: Vol. and Tone with switch. Only 59/6.

SUPERHIT FEEDER UNIT. Design of a high quality Radio Tuner Unit (specially suitable for use with any our Amplifiers). Decimetric A.C. Controls are Tuning, W.Ch. and Vol. Only 250 v. 15 m.A. H.T. and L.T. of 6.3 v. 1 amp. required from amplifier. Size of unit approx. 9-6-7in. high. Simple alignment procedure. Point-to-point wiring diagrams, instructions and priced parts list with illustration, 2/6. Total building cost £4.15.0. For leaflet send S.A.E.

R.S.C. BATTERY TO MAINS CONVERSION UNITS

Type BM1. An all-dry battery eliminator. Size 5 1/2 x 6 1/2 x 4 1/2 in. 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 v.p. low consumption type. Complete kit with diagrams, 39/9. or ready to use, 46/9.



Type BM2. Size 8 x 5 1/2 x 2 1/2 in. Supplies 120 v. 90 v. and 60 v., 40 m.A. and 2 v. 0.4 a. to 1 amp. fully smoothed. Thereby completely replacing both H.T. batteries and L.T. 2 v. accumulators, when connected to A.C. mains supply 200-250 v. 50 c/s. **SUITS FOR ALL BATTERY RECEIVERS.**

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

LINEAR TAPE PRE-AMPLIFIER. Type LP1. Switched Negative feedback equalisation. Positions for Record 1 in. 3in., 7in. and 10in. Playback, FM4 Recording Level indicator. Designed primarily as the link between a Collaro Tape Transcriber and a high fidelity amplifier, but suitable for almost any Tape Deck. Only 9 gns. S.A.E. for leaflet.

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. Weds. until 1 p.m. Trade supplied. S.A.E. with all enquiries.

R.S.C.
(Manchester) Ltd.

Mail Orders to 29-31 Moorfield Road, Leeds 12.
Personal shoppers to any of branches below—
73 Dale Street, Liverpool 2
5-7 County (Mecca) Arcade, Briggate, Leeds 1

8-10 Brown St. (Market St.), Manchester 2
56 Morley Street (Above Alhambra Theatre), Bradford

Electronics (FLEET ST.) Ltd

Dept. B

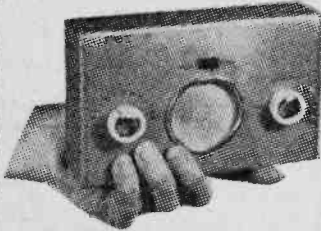
152-153 Fleet St., London, E.C.4. Tel. Flc 2833

Business Hours: Weekdays, 9-6, Saturdays 9-1

Stockists for

AMPLIFIERS, V.H.F. TUNERS, HI-FI SPEAKERS BY ALL THE LEADING MANUFACTURERS

The Transistor Set you "THE FLEET SIX" have been waiting for!



The Transistor Set you have been waiting for, the "Fleet 6," a wondrous of a transistor set that really gets the stations. New design 6 transistor superhet pocket receiver, using 6 guaranteed first grade transistors plus sensitive diode, push pull

output medium and long wave bands, new type printed circuit, high Q internal ferrite rod aerial, 2 1/2 in. high flux speaker, provision for car aerial, overall size 6 1/2 x 4 1/2 x 1 1/2. Simple to follow instructions. All components guaranteed, service after sales. This is equal to many manufactured sets at double the price. All components including cabinet, transistors, speaker, circuit, etc., only £8/19/6 complete, post and pkg. 2/6. PP4 Battery 2/- extra. Due to overwhelming demand from last month's advert, we have been able to reduce this receiver from £9/19/6. All components sold separately. Send S.A.E. for details. Circuit and Instructions 2/6 post free.

SUPER SIX Table Model



The "Super 6" Table Model Transistor Receiver using six latest top grade transistors, printed circuit, medium and long wave bands, 500 M/W push pull output, 7 x 4 High Flux Speaker, high Q ferrite rod aerial, calibrated direct drive, beautifully polished cabinet, gilt trimmed, size 18in. x 7 1/2in. x 5 1/2in. Using Long-life power pack battery. All necessary components including easy to follow instructions and theoretical circuit, £9/15/0 complete, post and pkg. 4/6. Battery extra. All components sold separately. Send S.A.E. for details. Circuit and instructions 2/6.

ANOTHER FAMOUS MANUFACTURER'S BARGAIN

COSORR 4 VALVE SUPERHET PORTABLE

Long and Medium wave bands, 5in. speaker, built-in frame aerial using Ever-Ready B126 90 volt H.T. and AD35 1 1/2 volt Batteries. Attractive 2-tone finish, dimensions 9in. x 8 1/2in. x 4 1/2in.

Original Price 15 gns.

Our Price £8/19/6. P. & P. 3/-.

Batts. 10/- extra.

Suitable mains unit to fit in place of batteries. Original Price 63/- Our Price 39/6 P. & P. 2/-.

AERIALS

BAND I BAND II BAND III

Combined Arrays I and III

- 1+3 Element Loft Mounting .. 38/3
- 1+5 Element Loft Mounting .. 46/9
- 1+3 Element Wall Mounting .. 45/3
- 1+5 Element Wall Mounting .. 51/-
- 1+3 Element Chimney M'ting .. 67/10
- 1+5 Element Chimney M'ting .. 66/9

Band I

- Single Dipole Wall Mounting .. 24/7
- Single Dipole Chimney M'tins .. 40/2
- X Aerial Chimney Mounting .. 62/3
- H Aerial Chimney Mounting .. 67/7

Band III

- 3 Element Yagi Wall Mounting 33/-
- 6 Element Yagi Wall Mounting 43/-
- 9 Element Yagi Wall Mounting 56/-
- Chimney Lashing Mounting add 10/-
- Double 6 Array, only with clamp 83/-

Band II

- Single Dipole Wall Mounting .. 20/5
- Single Dipole Chimney M'ting .. 29/9
- H Array Chimney Mounting .. 52/4



REPAIR KITS

- Band III Folded Dipole With Insulator, Complete .. 9/3
- Band I Insulator with two 1/2 inch Dipoles for 1 or 4 inch Booms, Complete .. 10/5
- 6 inch Lashing Kit, 12/11. 7 1/2 inch Lashing Kit .. 14/8
- 6 inch Wall Bracket With U Bolts .. 7/10
- 1-1: 1-1 inch Clamps, 3/10. 1-2 inch Clamps Universal .. 5/4
- Bracket Repair Kit, J Bolts; U Bolts; 20ft Lashing Wire; Thimbles; Corner Plates .. 6/-
- Insulators: All Types .. (Enquire)
- Co-Ax. Semi Air Spaced, 7d. yd. .. Plus, 1/2
- Send 6d. for Lists. Please state Channel when ordering. Cash with Order. Post and Packing 3/- extra.

SATISFACTION OR MONEY BACK GUARANTEED

WALKER & SQUIRES

PINNOX STREET, TUNSTALL, STOKE-ON-TRENT

Phone: Stoke-on-Trent 88767

EXPRESS ELECTRONICS

ROSEDENE LABORATORIES

KINGSWOOD WAY, SELSDON, SURREY

NEW TESTED AND GUARANTEED FOR THREE MONTHS

VALVES	NEW TESTED AND GUARANTEED FOR THREE MONTHS					
1C1	7/6 6A78	6/- 8D3	4/- DH78	7/6 EF41	9/- PCL84	7/-
1C3	8/- 8BA8	7/- 12A8H	10/- DH77	6/- EF80	8/6 PL81	12/6
1F1	8/- 6BE6	7/- 12AT7	6/- DH142	3/6 EF86	9/- PL82	7/-
1F2	7/6 6B17	8/9 12AU7	5/- DH150	10/- EF81	4/- PY81	8/6
1FD1	8/- 6B47	10/8 12AX7	7/8 DK91	7/6 EF92	5/6 PY82	7/6
1FD9	7/6 6B98	7/6 12BH7	10/6 DK92	7/6 EL41	9/6 PY83	7/6
1L4	8/6 6BW7	7/- 12CKG11	7/- DK96	8/- EL84	7/- R19	11/8
1P1	8/- 6C10	9/- 12Q7GT	7/6 DL92	7/6 EM34	7/- U26	9/6
1P10	7/6 6D2	4/- 16A5	8/- DL94	7/6 EY51	7/6 U52	7/6
1P11	7/6 6F12	4/- 25A6G	8/6 DL96	8/- EY81	10/- U76	7/6
1R5	6/- 6HG7	2/- 25L6GT	8/6 EB91	4/- EZ40	7/6 U78	7/-
1R6	6/- 6JGT	7/6 35Z4G	9/- EBC41	10/- EZ80	5/6 UBC41	8/6
1T4	7/6 6K7G	5/6 60C1	6/9 EBF90	8/6 EZ81	8/- UCH42	9/6
1U5	6/- 6K8G	6/- 50L1	7/- ECK81	9/- KT33C	9/6 UF41	8/6
3Q4	8/- 6J7GT	8/6 35L6GT	9/- ECC82	5/- KT86	11/6 UL41	8/6
3B4	7/6 6SL7GT	6/- 35W4	8/6 ECC83	7/6 N17	7/6 UY41	8/6
5U4G	7/6 6V9G	7/6 35Z4GT	8/- ECC84	7/8 N18	8/- W76	6/6
5Y3GT	4/6 6X4	7/- 5763	7/6 ECF80	8/6 N19	7/6 W142	8/6
5Z4G	9/6 6X9G	5/- 80	6/- ECF82	8/9 N37	10/8 X17	7/6
6AK6	6/6 7B7	7/6 DAF96	8/- ECH42	9/- PCC84	6/9 X142	9/-
6AL5	4/- 7C3	7/6 DF91	7/6 ECH81	10/- PCF90	6/9 X150	9/-
6AM6	4/- 7S7	8/6 DF96	8/- ECL82	8/6 PCF82	7/- ZD17	4/6

VOLUME CONTROLS MIDGET SIZE LONG SPINDLES. D.P. switch 4/- Less switch 8/6. Valves 10K to 2M. B9A, B7G v. Holders, 9d., Screens 9d., Contact Cooled Rectifiers 250v. 60mA, 6/6, 85mA, 8/6.

MATCHED PAIRS

EL84 17/-, 6V9G 17/-, 6B6G 18/- per pair. Push Pull O.P. Transformers for above 3-15.0 14/6. P. & P. 1/6. 12in. P.M. Speakers 3Ω 24/6. Baker's "Belhurst" 12in. 15Ω 15W. 90/- P. & P. 2/6. 12in. Stereo Model £7.7.0.

SETS OF VALVES

DK91, DF91, DAF91, DL92 or DL94 .. 19/8 ECH42, EF41, EBC41, DK96, DF96, DAF96, DL96 .. 27/8 EL41, EZ40 .. 37/6 1C3, 1F1, 1FD1, 1P1 .. 27/6 UCH42, UF41, UBC41, 1R5, 1T4, 1R6, 3B4, or 3V4 .. 19/6 UL41, UY41 .. 35/- Postage and packing 6d. Over £1 post free. C.O.D. 2/6.

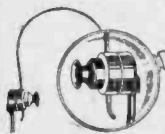


FULL SCALE RANGES:
D.C. VOLTAGE: 0-6-30-120-600-1200 v. (10,000 o.p.v.)
A.C. VOLTAGE: 0-6-30-120-600-1200 v. (10,000 o.p.v.)
D.C. CURRENT: 0-120 uA. 0-12-300 mA.
RESISTANCE: 0-20K. 0-2 Meg. (150 ohm. 15K at centre scale).
CAPACITANCE: 0.005 to 0.15 uF. (at A.C. 5 v.)
DECIBELS: -20 to +63db. (600 ohm. 1mV. 0dbm = 0.775 v.)
ACCURACY: D.C. Voltage and Current $\pm 2\%$ f.s. A.C. Voltage $\pm 4\%$ f.s. Resistance $\pm 3\%$ of total scale length.

NEW! 10,000 O.P.V.
MULTI-TESTER ON BOTH AC & DC

MODEL EP-10K OUTPERFORMS INSTRUMENTS MANY TIMES ITS SIZE AND PRICE!
UNBELIEVABLE BARGAIN!
 A revolutionary new Multi-Tester. A complete wired and tested instrument (not a kit) incorporating extra large 3 in. meter face and unique slide range switch. Can be conveniently carried in the pocket and features unusually sensitive 10,000 ohm. per volt AC-DC meter. 1 per cent precision resistors, and largest meter ever placed on an instrument this size. Single, easy to use range selector switch, can be appreciated by the novice and engineer alike. Complete with colour coded test leads and battery.
Size: 4 1/2 x 3 1/2 in. Model EP-10K ONLY £5-19-6 P. & P. 3/6.

LIGHT-WEIGHT HEADPHONE

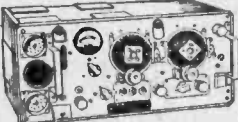


These H.S. 30 phones are the smallest size ever made by the U.S. Air Force. 2500 Imp. using soft

rubber miniature ear moulds for maximum music and voice reproduction of the finest quality. Supplied free is a small transformer unit with cord and plug which steps impedance up to 4,000 Ohms. ONLY 12/6. P. & P. 2/6. Standard High Resistance Phones. 12/6. P. & P. 2/6.

R.C.A. COMMUNICATION RECEIVER AR-88 D. Range: 540 kc/s-32Mc/s in 6 bands. Undoubtedly the finest communication receiver ever produced for service and laboratory use. Now Relda's exclusive purchase enables you to obtain this Rolls-Royce of communication receivers at the lowest price ever offered. Fully guaranteed. FEW ONLY AT £39.10.0. carr. 50/-.

WIRELESS SET No. 19



Incorporates TX/RX covering 2-8 Mc/s (37.5-150 metres), and intercom. amplifier. 500 microamp check and tuning meter. circuit and instruction book. ONLY 85/-. Carr. 10/-.

BOOST YOUR 19 SET!

No. 19 Set High powered amplifier offered for the first time! Can be used easily with all 19 set models previously released. Contains its own generator and two or four 807's giving 50 or 100 watts output. Identical size to 19 set and a must for all owners. Price 65/-. carr. 10/-.

AERIAL VARIOMETERS

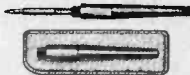


These magnificent instruments will enable you to receive maximum signal strength on all S.W. receivers. Precision calibrated control. 12/6. P. & P. 2/6.

U.S.A. WHIP AERIALS. 12ft
 Now only 8/-. P. & P. 2/-.

PORTABLE SOLDERING IRONS

MODEL SP-1. 30 watt Portable Hand Soldering Iron. The latest - smallest - coolest 30 watt iron available. Especially suited for precision wiring. Highly stable heat characteristics assure long life and safety in use. Features a removable handle that may be used to cover the tip and barrel to permit the iron to be carried safely even while hot. Supplied complete with vinyl base-lead and plug. Only 18/9. P. & P. 1/3.



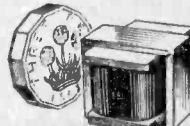
SLIM CRYSTAL MICROPHONE



MODEL 100-C. A unique design offering tremendous value. Has detachable 7 ft. shielded cable and muting switch. Smooth wide range response 60-10,000 CPS. Sensitivity: 52 db. High impedance. Satin chrome finish metal case. Only 32/6. P. & P. 2/6.

SUB-MINIATURE TRANSFORMERS

Here is outstanding value in transistor transformers consisting of one Driver Transformer and one Output Transformer. Ideal pair for miniature transistor portables, etc.
Driver Model LT4: Primary: 20k. Secondary: 1k. Centre Tapped. Ratio: 5:1.
Output Model LT700: Primary: 1.2K. Centre Tapped. Output: 3.2 ohms. Ratio: 2:1. Complete with detailed instructions. Only 9/6 per pair. P. & P. 1/6.



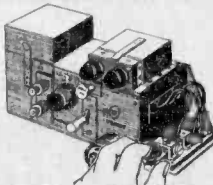
TELEPHONE PICK-UP COILS

MODEL FC-8 Induction Pick-up coils enabling conversations to be picked up without tapping of wires or special telephone circuits. No electrical connections! Simply place telephone on the pick-up platform and connect lead to the input of any medium gain amplifier or direct to any tape, disc, or wire recorder. The coil is electrostatically shielded to minimise hum pick-up. Brand new complete with 5ft. shielded cable. FC-8 only. 16/- plus 1/6 P. & P.



MORSE CODE SET WITH HEADPHONES

Complete morse code set. Includes headphones, morse key, buzzer, pitch control, internal battery. Magnificent appearance and housed in portable wooden case with carrying strap. Supplied complete and ready for immediate use. ONLY 19/6. Carr. 4/6.



MINIATURE EARPHONE



A really sensitive dynamic earphone of exceptionally fine quality. Provides clear reproduction of music as well as speech. Fully Guaranteed and complete with transparent ear insert, 3 feet cord, sub-miniature plug and socket. CR-5 High Imp. crystal 8/- Each. MR-4 Low Imp. magnetic 8/- Post 1/-

PORTABLE TRANS/REC. No. 18



A self-contained Trans/Receiver for Telephone and C.W. Range approx 10 metres. Freq 6-9 Mc/s. (50-33.8 metres). Valve line-up: 3 ARF, 12.2 Af, 5.1 ATP4. Complete with aerial, H.T. and L.T. meter and all accessories. Weight 20 lbs. Size 8 x 10 x 7 in. ONL £80/- Carr. 10/-.

HC-21 HETERODYNE CRYSTAL CONTROLLED FREQUENCY METERS
 Freq. range: 125 Kc/s to 20 Mc/s. Calibration: Individual Calibration Books and numerous Crystal Check Points. Accuracy: 0.01% or 25 cycles. Power supplies: 6 v. and 135 v. batteries. Size 14 x 10 1/2 x 9 1/2 in. Weight 43 lbs. Offered for the first time at the ridiculous price of only £25. Carriage Paid.

11-1/2" HEADPHONES

Uses high-quality permanent magnetic speaker with regular voice coil. The banded chamois ear-cuffs give correct spacing for optimum comfort and low load, giving finest music and voice reproduction. Each unit has a built-in Hi-Fi 500 tones total 1000 n. ONLY 25/-. Carr. 2/6.



MINIATURE DUBBLER CONDENSER SPECIAL!

Minimum lots of one dozen from these assorted values: .002; .04; .01; .005; .001; All at 100 volts A.C. and 300 volts D.C. Recent Manufacture. ONLY 5/- per dozen. P. & P. 6d. per dozen. (Please state values required.)

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



SIGNAL GENERATOR

Model SWO-300 150 kc/s-300 Mc/s. Frequency Range: 150 kc/s-150 Mc/s on fundamentals (8 bands). 300 Mc/s on harmonics. Calibration Accuracy within ± 1 per cent. Modulation Internal and external. Attenuation: To -40db. Output: Facilities for high and low. Power Supply: Internal 230 v. A.C. Size: 7 x 10 x 5 in. Complete with test leads and instruction manual. Fully guaranteed. ONLY £14.19.8 Carriage 5/6.

MAIL ORDERS TO

(DEPT. P.), 32a COPTIC STREET, LONDON, W.C.1



CALLERS WELCOME AT

87 TOTTENHAM COURT ROAD, LONDON, W.1 MUS 9606

FREE THIS BOOK WILL INTEREST YOU!

LEARNING the PRACTICAL WAY

Radiostructor
EQUIPMENT-COURSES

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 _____

6/61

★ **BLOCK CAPITALS PLEASE**
(We do not employ representatives)

Practical Wireless

VOL. XXXVII No. 652 JUNE, 1961

Editorial and Advertisement
Offices:

PRACTICAL WIRELESS

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

© George Newnes Ltd., 1961

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	113
Round the World of Wireless	114
A 10 Watt One Valve Trans- mitter	116
The P.W. Signal Generator	120
An Introduction to Stereo	122
An All Band 75W Transmitter Adding Communication	127
Features	131
On Your Wavelength	135
The P.W. "Roadfarer"	136
Comprehensive Power Supply Unit	138
Transistorised Alignment Aid	140
Hi-Fi Pre-amp and Equaliser	144
Loudspeaker One-valver	149
Trade News	157
Letters to the Editor	161
A Bass Reflex Enclosure	162
Short Wave Section—Ways to Learn Morse	165
Club News	170

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".

MODERN SOUND REPRODUCTION

IN a recent lecture, a well-known personality was heard to say that it was his opinion that modern sound reproduction was little better than that of twenty years ago. This statement was reported in the national press and must give lay readers, in particular, the impression that when they buy, for instance, a new radio or gramophone, they are buying equipment which is virtually the same as the one which they are discarding. Radio enthusiasts, and readers of *Practical Wireless* especially, know that modern electronic equipment for the home—whether for radio or for gramophone records—is far removed from that on sale in, say, 1930. However, it must be admitted that certain aspects of sound reproduction appear to change very little over the years—the design of loudspeaker enclosures is one particular instance; in fact, one of the earliest horns is still worthy of attention today. The main advantage of modern loudspeaker enclosures is their small size compared with their predecessors; the quality of the sound reproduced may not be better than that of the best older designs, but when sizes are compared, then the modern enclosure stands supreme. Early loudspeakers, too, do not bear comparison with contemporary models—unless the listener prefers a frequency range which is restricted at both extremes.

Not only have loudspeakers and enclosures improved, but also the sources of the reproduced signal. Gramophone records have been given an increased frequency range and, much more important, a greatly increased playing time; interference has been removed from radio by the use of new frequency bands—VHF—and at the same time, fidelity has been improved—the list is endless.

There is no justification whatever for the statement that modern sound reproduction differs little from that of the early days of radio and gramophone records; any true belief in such a statement must stem from a nostalgic longing for the days of large, ugly, equipment and restricted frequency ranges with their associated resonances, rather than an impartial examination of the facts.

INDEXES

INDEXES to Volume 35 of *Practical Wireless* and Volume 10 of *Practical Television* are now available and will be found of great help for easy, quick, reference to articles and information; many cross-references have been included to facilitate their use. Both indexes may be purchased at 1s. 3d., each including postage, from the Publishing Department, George Newnes Limited, Tower House, Southampton Street, London W.C.2.

Our next issue, dated July, will be published on June 7th.

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 February 1961, in respect of wireless receiving stations situated within the various Postal Regions of England, Wales, Scotland and Northern Ireland. The numbers include Licences issued to blind persons without payment.

Region	Total
London Postal	697,246
Home Counties	657,662
Midland	477,279
North Eastern	524,914
North Western	450,971
South Western	393,952
Wales and Border Counties	233,133
Total England and Wales	3,435,157
Scotland	387,517
Northern Ireland	118,185
Grant Total	3,940,859

Radio Guided Tours for the Science Museum

VISITORS to the Science Museum in Kensington are now able to hire small radio receivers in some of the galleries which will give them a guided tour and a commentary on the exhibits.

For some months, the Ministry of Works, the Museum authorities and Multitone Electric Company Ltd., the designers and makers of the equipment, have been experimenting with a system in which tape-recorded commentaries are transmitted over a limited area, where they can be received by small hand-held sets.

So successful have these tests been that the Ministry has equipped three galleries at the Museum with the system and it came into regular operation on Monday, 13th March. It is the first time that such a system of radio guided tours has been installed in a national museum. Visitors borrowing the receivers are asked to pay a hire charge of 1s. plus a returnable deposit.

In each of the three galleries operating the system a loop aerial transmits the commentary relating to that particular gallery. The visitor tunes into this by setting a switch on his hand-held receiver.



Radio-guided tours have been introduced at the Science Museum in Kensington. It is the first time that such a system has been in operation at a national museum in this country.

The receiver is enclosed in a grey plastic moulding about 20in. long and about 2in. in diameter, and weighing only 7oz. The receiving equipment, operated by a small torch battery, is at one end, and a circular loudspeaker, about 1½in. across, is at the other.

When the receiver is held to the ear, a recorded talk or discussion can be heard, a typical example being a guide directing a party round the museum and describing the various exhibits.

The visitor listening in merely has to follow the instructions contained in the commentary while making his tour. They take him from display to display.

Each commentary lasts about twenty minutes. Once the system is switched on at the control point it works automatically, the tape recorders in various key parts of the museum playing their commentaries, re-winding their tapes for the next transmission without any attention.

Ballistic Missile Early Warning System

SIR ALEXANDER GIBB AND PARTNERS, consulting engineers, have engaged Belling and Lee Limited on behalf of the Air Ministry, to assist in the design and imple-

mentation of R.F. shielding and interference suppression on the ballistic missile early warning system project at Fylingdales Moor. This installation is to form part of the United States chain of early warning stations, with a range of 3,000 miles, capable of detecting high-trajectory missiles approaching over north polar routes.

The purpose of the shielding is two-fold; to protect operating personnel from the extremely high R.F. radiated power which will be used, and to ensure interference free conditions of working for all the varied electronic equipment, including the computers, etc., to be housed there.

British Equipment for German Airfields

AMONG orders announced at the Leipzig Fair by the Government of the German Democratic Republic was one for £40,000 which was awarded to Pye Telecommunications Limited of Cambridge.

The equipment to be supplied includes an Instrument Landing System (I.L.S.) for Dresden International Airport and the latest VHF ground-to-air communications equipment for Schoenefeldt airfield and the East German area.

The Pye I.L.S. gives highly accurate guidance to an aircraft on approach to landing by the use of a directional localiser and stabilised glide path. It has already been supplied to airfields in Geneva, Hong Kong, Canada, Nairobi, Belgian Congo, Persian Gulf, Russia, Hungary, Yugoslavia and Britain.

BOAC Comet Fleet to have Döppler Navigator

THE British Overseas Airways Corporation, after an intensive evaluation, has elected to equip its fleet of 19 Comets with the Marconi Döppler Navigator type AD2300A.

This important step forward in civil aviation navigation means that Comet captains will now have instrumentation to provide them with instantaneous and continuous information on ground speed, angle of drift and distance flown. The equipment is completely self-contained in the aircraft and requires no ground stations for its operation.

The AD2300A is a basic Döppler sensor operating on a frequency-modulated continuous wave system and consists of several sub-units.

Radar Equipment on Television

MARCONI'S traffic radar—the portable electronic device which measures the speed of passing vehicles — was recently demonstrated on the BBC television programme "Tonight". The device, known as "Peta", is now in use by the police forces of fifteen counties in Great Britain.

The team of Marconi engineers demonstrated a modified version of Peta which can differentiate between men and women walking in the radar beam. The "Tonight" film unit showed this device in action, using a vehicle, men and women and a dog to illustrate the different signals given out by the instrument when different moving objects are picked up.

When a loudspeaker is connected to the radar set the object is picked up as a whistle, and the faster it moves the higher pitched the whistle.

Arc Furnace Transformers for Electric Melting Projects

THE Transformer Division of Associated Electrical Industries Ltd. has received an order from Birlec-Efco (Melting) Ltd.,

Westgate, Aldridge, Staffordshire, covering two 35-MVA arc-furnace transformers to be installed at the Tinsley Park Works of English Steel Corporation Ltd., Sheffield.

The transformers will be designed and manufactured at the AEI Rugby Works. Each will supply power to a Birleco arc furnace of one hundred tons capacity, with a 22ft diameter shell, rotatable about its vertical axis through an angle of 30° on either side of its mean position. The shell bottom will be of non-magnetic steel in order to permit the use of a stirrer of the electromagnetic type. The transformers will operate on a 33kV, 3 phase, 50 cycle supply, and will transform this voltage down to a range of furnace voltages, these voltages being variable on load by means of AEI resistor-transition tap changers under the control of the furnace operator.

The maximum rated current of each of the furnaces will be approximately 40,130A.

Oscillators for Long Distance Navigation System

USED as "clocks" in navigational experiments now being carried out by the Royal Aircraft Establishment at Farnborough, quartz oscillators, designed by the Marconi

Company, have shown remarkable stability and accuracy.

Experiments on a recent flight of over 4,000 miles by Comet were made possible by the new oscillator which was designed specifically for airborne purposes.

During recent flight tests, when the Comet was guided by the low frequency signals of the Rugby radio transmitter, operated by the Post Office, the Marconi oscillator was shown to be stable over long flying hours to better than one part in a thousand million. Therefore, as "clocks", the oscillators introduce navigational errors no greater than about two nautical miles in a flight of 3,000 miles.

Crucial tests are now on hand to establish to what extent this navigational accuracy is degraded by radio propagation uncertainties over various routes, at various times and seasons.

The design of the new oscillator follows on research the Marconi Company has been conducting since 1946 into low frequency signals as a medium for long distance navigation. Research on stable oscillators indicated that a "clock" could be made sufficiently accurate to assess the system if it were possible to design the equipment for airborne use.



Marconi's traffic radar, known as Peta, was recently demonstrated to viewers of "Tonight".

A 10 Watt One Valve Transmitter

ANOTHER UNIT FOR THE NEW HAM

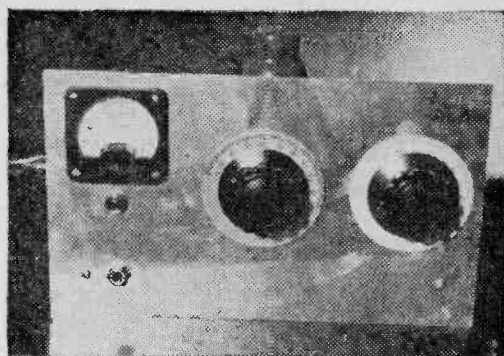
By J. Ross

(This transmitter must not be used without a transmitting licence.)

THIS transmitter is particularly intended as a stand-by while rebuilding or modifying larger equipment, or as a first transmitter for newly licensed operators who are seeking something straightforward with which to get on the air. It is singularly free from snags, and not critical as regards operating voltage. With a 6L6, considerably more than 10W input is possible, if desired. It is also feasible to use the receiver power pack to supply the transmitter, or to use a small separate power pack.

Circuit

The circuit is shown in Fig. 1, and will operate satisfactorily with valves other than that mentioned. Regeneration is purposely omitted, because satisfactory output is obtainable without this, and because incorrect adjustment could then



possibly cause oscillation at other than crystal frequency.

A conventional π -output circuit is used, and this allows simple end-fed aerials to be matched. The transmitter may also be coupled to a dipole, and permits easy adjustment of loading.

Cathode keying is used, a meter also being included here. Safety bias, to protect the valve from destructive anode currents if oscillation should cease, is obtained from the 220 Ω resistor. The H.T. supply line may receive 200V up to 400V, or more, according to the valve and input required.

Panel and Chassis

Fig. 2 shows the panel layout, a metal panel about 10in. x 6in. being convenient, with a chassis about 9in. x 7in. and 2in. deep. Exact dimensions are of little importance.

The loading condenser is a 2-gang receiver type, of about 500pF capacity each section. These are usually mounted by feet or tapped holes, and will be secured to the chassis. The height at which the spindle comes may then be marked on the panel, and a clearance hole may be drilled. The 150pF condenser, which is secured to the panel by means of a nut, can then be fitted at the same height.

Fairly large knobs with numbered dials will be most convenient for tuning up. No reduction drives are required.

Meter, key jack, and heater stand-by indicator lamp fitting are positioned as in Fig. 2. Extra bolts hold the panel to the front runner. An enclosed box-type chassis will give maximum rigidity.

Chassis

The chassis is shown in Fig. 3, and clearance holes are required for crystal, valve, and coil holders. Eddystone plug-in coils, with holder, were used

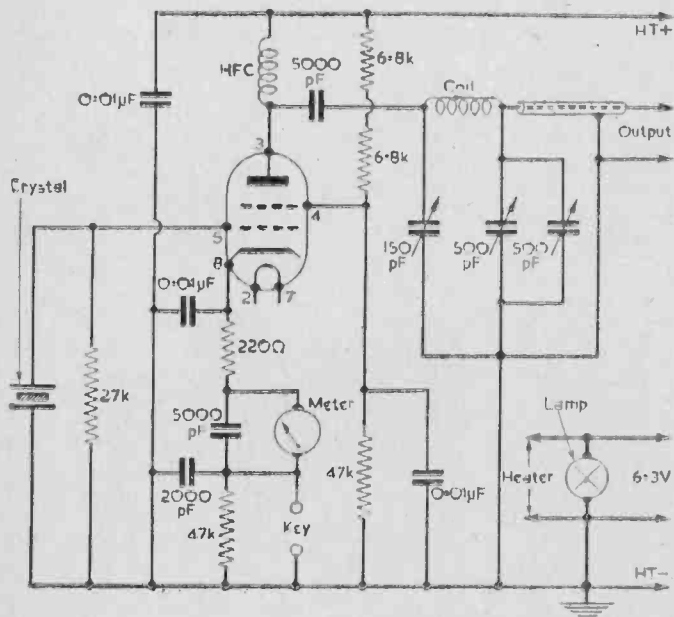


Fig. 1.—The C.W. transmitter circuit. (The valve is a 6V6 or 6L6—see text.)

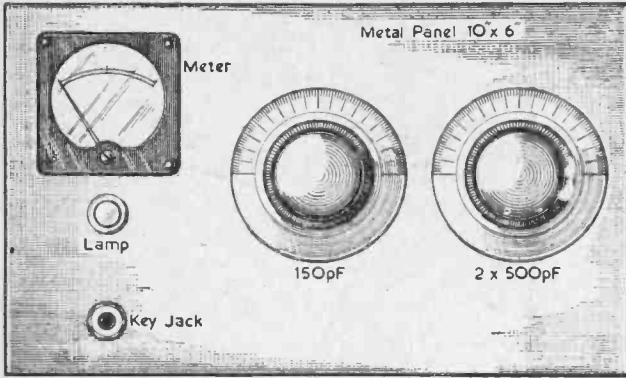
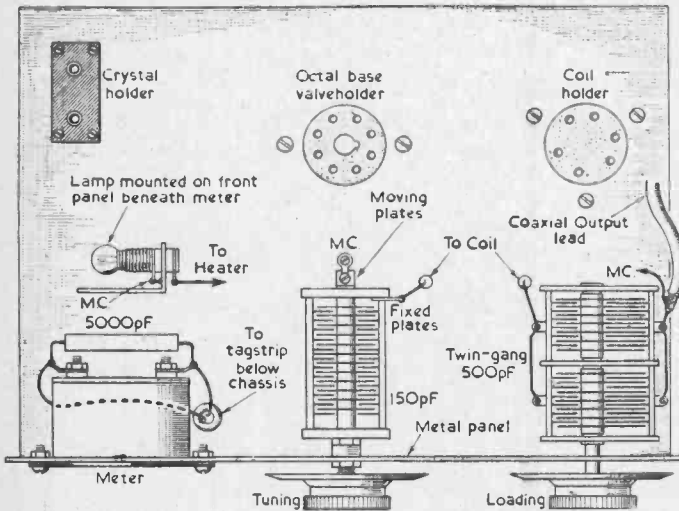


Fig. 2 (above).—The front-panel layout of controls.

Fig. 3 (below).—The above-chassis component layout.



convenient. The instrument actually used was surplus, scaled 0-300, but with a full scale deflection of 100mA. Meters of more sensitive type can be shunted to obtain a suitable range.

Wiring

All resistors are 1W. A 12k or 15k 2W resistor may be used instead of the two 6.8k 1W resistors. For maximum input with relatively small H.T. voltages, these resistors may be reduced in value, or even omitted.

Connections should be short and direct. The capacity of bypass condensers is not particularly important. The 5000pF π -network coupling condenser should be a mica component with a working rating of 1000V to 2000V. The H.F. choke is any small transmitting type of about 1.5mH upwards.

Power Supplies

The receiver power pack will provide some 60mA to 80mA, at 250V to 350V, according to design. As the transmitter has only one valve, adequate power can be obtained with such a supply. For example, if the transmitter draws 50mA at 250V this represents a power input of 12½W.

A typical receiver power supply circuit is shown in Fig. 5, with a 2-way switch added to give send/receive operation. This switch ensures that receiver and transmitter will not both be drawing current together, thereby overloading the power pack.

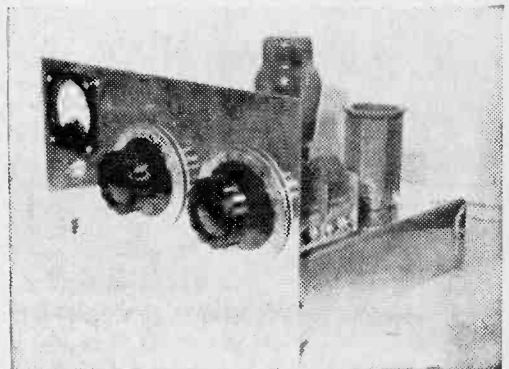
The 6L6 will require 0.9A at 6.3V for the heater, plus 0.3A or 0.15A for the lamp. This is usually too much additional load for the receiver. A small 1A 6.3V heater transformer

in order to permit easy changing, but a fixed coil is equally satisfactory if operation is to be upon a single band.

The 2-gang condenser is earthed directly to the chassis. A short lead passes from the moving plates tag of the 150pF tuning condenser, to a tag bolted on the chassis. As a coaxial output will often be convenient, a few feet of coaxial cable may be soldered directly to the 2-gang condenser, as shown in Fig. 3. This cable can then go to the aerial coupler, aerial, or aerial changeover relay or switch. If a coaxial connector is preferred, fit the socket at the back of the chassis, as in Fig. 4, and wire the coil to this, as shown. An aerial or coaxial lead may then be plugged in here.

Leads from the meter and lamp fitting pass through a rubber grommet. A 6.3V, 0.3A, or 0.15A bulb will be satisfactory. Its purpose is to show that the valve heater is on, for stand-by.

The 6L6 cathode current will run up to about 80mA, so a 100mA or similar meter will be



The completed transmitter

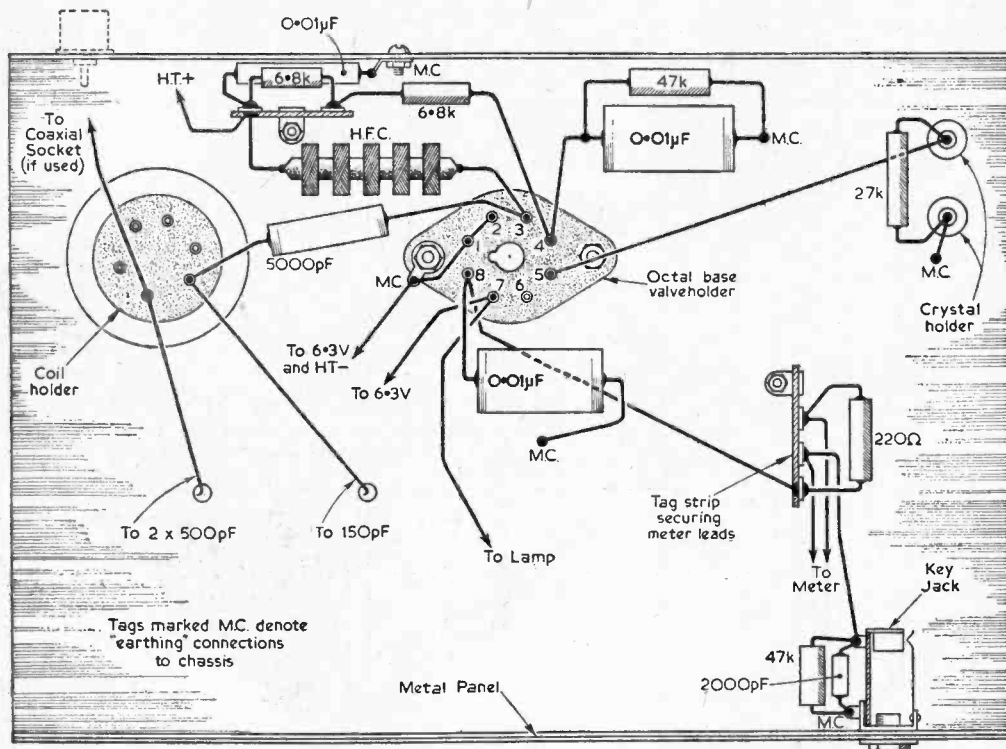
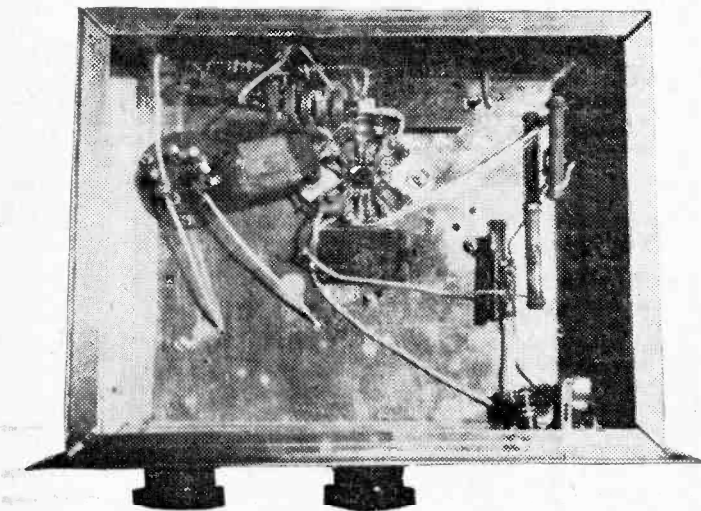


Fig. 4.—The under-chassis wiring diagram (shown below as it was on the prototype).



may thus be used. The receiver and transmitter heaters are left on continuously, in the usual way.

If a smaller valve, such as a 6V6, is employed, this will only require 0.45A for the heater (again plus signal lamp current). It may then be practicable to take the 6.3V supply from the receiver,

especially if one or more dial lamps can be removed, or replaced by low consumption bulbs. With a 6V6, cathode current should not exceed about 45mA to 50mA. With the 6L6, it may run up to about 80mA to 85mA maximum.

If a separate power pack is to be constructed, the circuit can be shown as in Fig. 5. A 5V4 or similar rectifier will be satisfactory, and will require a 5V 2A heater winding. The transformer H.T. secondary may be from 250/0/250V to 375/0/375V. A 60mA to 100mA choke may be used, with 8μF or 16μF smoothing condensers. A 6.3V secondary delivering 1½A will be adequate.

With a separate power pack, the transmitter is virtually switched by the key, so no further switching is required.

This does have the advantage of permitting rapid break-in operating, which is not possible when a send/receive switch has to be manipulated.

Coils and Crystals

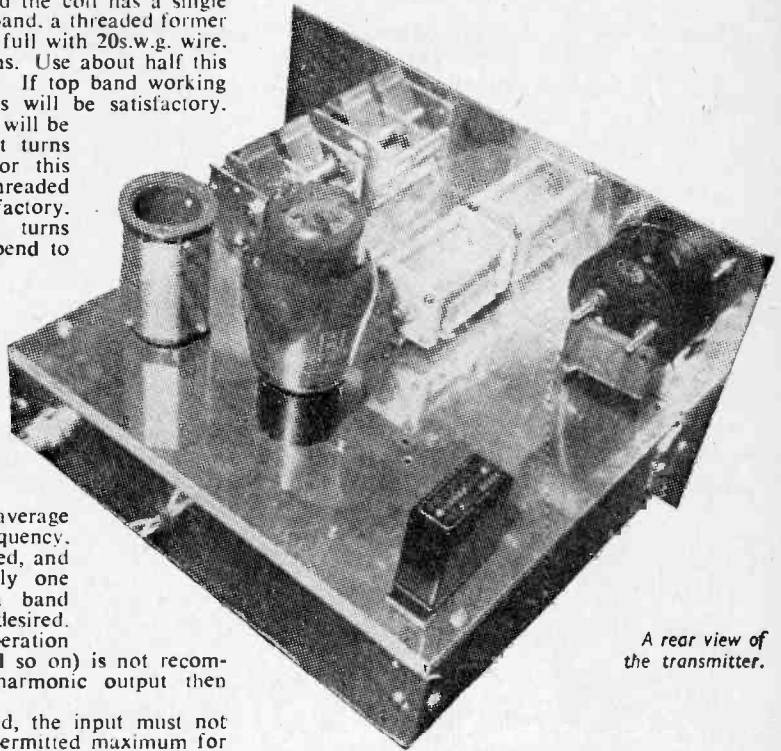
Standard plug-in coil formers are convenient.

Only two pins are used, and the coil has a single winding. For the 3.5Mc/s band, a threaded former of this type may be wound full with 20s.w.g. wire. This will give about 30 turns. Use about half this number of turns for 7Mc/s. If top band working is required, about 55 turns will be satisfactory. Insulated wire, close-wound will be necessary, so that sufficient turns can be accommodated. For this type of winding the unthreaded formers will be most satisfactory.

The actual number of turns which can be used will depend to some extent on the loading required, and aerial, but may readily be adjusted if necessary. If the 150pF condenser is fully closed without reaching the required loading, at resonance, the coil needs more turns.

Ordinary fundamental crystals are used, and need not be of expensive type, provided they have average efficiency. To change frequency, the crystal is simply removed, and another one inserted. Only one coil is required for each band upon which operation is desired. Doubling (for 7Mc/s operation with a 3.5Mc/s crystal, and so on) is not recommended because of the harmonic output then likely.

If the 160m band is used, the input must not exceed 10W, which is the permitted maximum for



A rear view of the transmitter.

these frequencies. A larger input may be used on the other bands, if desired.

Tuning and Loading

An initial test can be made with an "artificial aerial" consisting of a clear 25W 200/250V domestic lamp, in holder. The holder is connected to the coaxial output socket, or to the length of coaxial lead soldered to the gang condenser.

With crystal and coil for the same band inserted, and the 2-gang condenser fully closed, heater and H.T. voltages may be applied. The key can be closed or shorted temporarily.

(Continued on page 169)

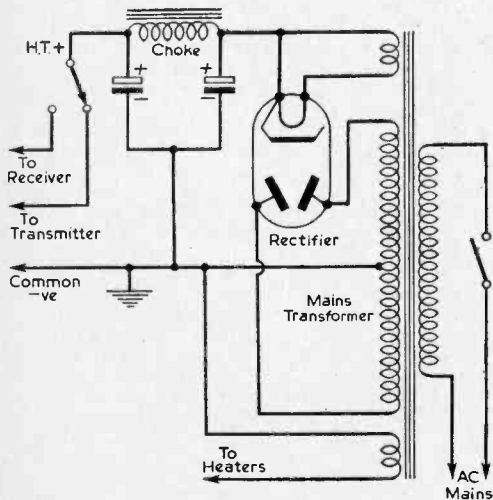


Fig. 5 (above).—The circuit of the receive/transmit switch for the receiver powerpack.

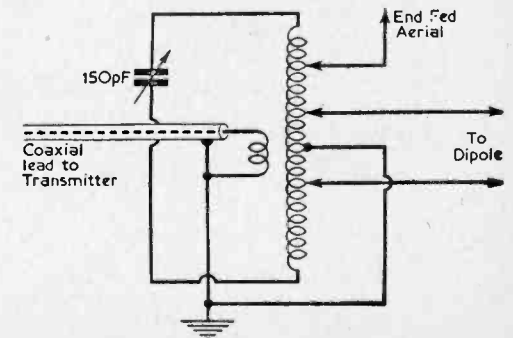


Fig. 6 (right).—The circuit and connections for the aerial coupler.

THE P.W. SIGNAL

COMPLETING CHASSIS No. 2

(Continued from page 47 of the May issue)

By E. V. King

LAST month, the R.F. generator and modulator sections were tested with the first coil only in position. The remaining wiring should have been carried out as described on page 47 of the May issue, and it now remains to test the other three coils.

Testing L2

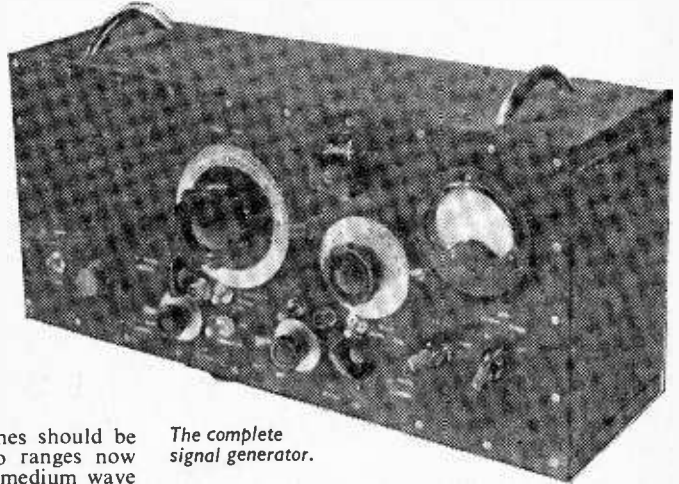
Connect up to the receiver with S8/9 switched to the L2 position and the set switched to the medium wave band. (Use PHF2 coil with the crystal set.) Heterodynes should be very frequent and strong. The two ranges now fitted will cover all of the long and medium wave broadcasting bands.

Incidentally, if the range L1 is used near a superhet, heterodynes will occur at the frequency of the I.F. transformers, probably 465kc/s in most receivers.

Testing L3

Check that oscillation is occurring by shorting at the test point as before. The receiver may still be switched to the medium wave band for the time being, or to any band between 3 and 5Mc/s if the receiver has one. This is approximately the 75m band. Many heterodynes, somewhat weaker than received with L1 and L2, should be heard, the gap between the first audible, high

The complete signal generator.



pitched whistle and the zero pitch position will be much smaller. It will be easier to tune the generator if a large knob is fitted on the tuning condenser VC1. Should the valve not oscillate, try a substitute valve (all valves in this unit except the rectifier are the same) or, only as a last resort with second-hand valves, decrease R26 gradually, keeping it as high in value as possible with the valve oscillating at all settings of VC1. If R26 is reduced unduly the waveform will suffer.

Testing L4

Test with the meter and short at the test point as before. The anode current should still drop by 0.02mA to 0.05mA at all positions of variable condenser.

If the receiver used will tune to 20, 30, or 40m, so much the better; if not, use the medium wave band. Hundreds of small heterodynes should be heard, thus showing that the oscillator is working on this band. If there is any trouble over oscillation on this band it will be due to faulty wiring, poor emission of the valve, or incorrect component values. Try substitution with the valves first, as some will oscillate on high frequencies better

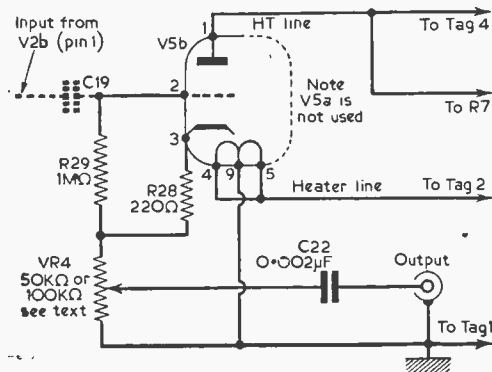
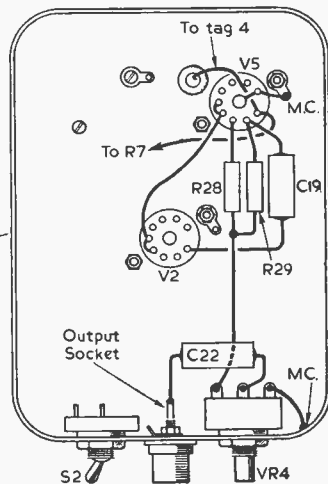


Fig. 14 (above).—The circuit of the cathode follower stage.
Fig. 15 (right).—The wiring of the cathode follower stage.

When carrying out the wiring in Fig. 15, check that the heater pins of V5 have been connected—as described on page 1106 of the April issue.



GENERATOR

than others. As a last resort make R26 lower in value as described for L3.

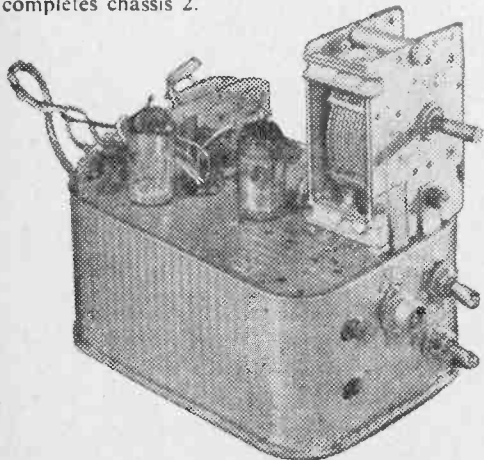
Squegging Test

This is best carried out when a buffer stage has been added, but it is interesting and instructive to carry out the test at this stage. Connect a good, sensitive pair of phones to the output socket or via a small amplifier to boost the signal. The unmodulated output of the generator should give no hissing noises at any setting of VC1 on any range. Slight hum may, however, be present. The hissing sound is caused by an additional audio vibration superimposed on the H.F. output. This is known as "squegging" and if it is present it may be due to incorrect component values, especially R27 and C20, which should be checked, possibly by substitution (the values given will not cause squegging).

The beginner can make the unit "squeg" (instead of hissing, a rough audio note can be obtained) by replacing R27 temporarily by a higher value (say 100k or 500k) and C20 by a higher capacity (say 500 pF or even 0.001 μ F). Squegging will occur more readily at certain settings of VC1. For most purposes a squegging oscillator is useless, so revert to the proper values of R27 and C20 afterwards.

The Cathode Follower Stage

At the moment the oscillator is working but the output is not controllable, and the external circuit conditions will have some slight effect on the frequency. An isolating stage, with an output control, is to be fitted. The circuit is shown in Fig. 14. This is added to the circuit of Fig. 7 and completes chassis 2.



The R.F. generator chassis with the tuning capacitor in position.



A view of the crystal receiver used for testing.

Point to Point Wiring Details

Remove C19 from the output socket and connect to pin 2 of V5 (see Fig. 15). Connect R29 to pin 2 as well and leave the other end unused temporarily. Connect R28 to pin 3 and its other end to the spare end of R29 just connected. Join the junction of these two resistors to one side of VR4, the position of which is shown in Fig. 15. Connect the other side of this control to earth and the centre tag to the output socket via C22. If the output control works the wrong way round reverse the outside connections.

Reference to Figs. 5 and 6 (April issue) will show that R7 has already been wired in the audio modulator section to tag 4 (for power unit). It is now wired instead to pin 1 of V5 and from there a wire is taken to tag 4, i.e. tag 4 supplies H.T. for V5h and then for V2b, and note that V2a receives its H.T. from another source: tag 3.

Testing the Cathode Follower Stage

Switch the range switch to any convenient position and connect a receiver as in Fig. 13. Switch on both power unit and R.F. section, but leave the modulation switched off. Heterodyne whistles should be audible provided VR4 is not fully "off". Now switch on the modulation and tune for maximum noise. Turn down VR4 and the noise should gradually diminish almost to zero; if it does not do so, VR4 is faulty.

The H.T. current of this stage, shown by fitting a milliammeter in the lead from VR4 to earth, is approximately 4.0mA.

Complete calibration will be carried out later when the units are shielded and in a cabinet.

(To be continued)

ADDITIONAL COMPONENTS LIST

- | | |
|---------------------------------------|---|
| C19 | Check that this is 50pF |
| C22 | 0.002 μ F mica |
| R29 | 1M $\frac{1}{4}$ W |
| R28 | 220 Ω $\frac{1}{4}$ W |
| VR4 | 50 or 100k linear potentiometer (small size, i.e., 1in. diameter) |
| V5 | ECC81 |
| Section (a) of the valve is not used. | |

An Introduction to Stereo

CONSTRUCTING THE PRE-AMPLIFIER AND MAIN AMPLIFIERS

By N. A. Walter

(Continued from page 54 of the May issue)

WHEN considering the power output per channel, it will be found that stereo has the effect of apparently louder volume for a given power output. In the largest room likely to be found in a normal house, 3W per channel will be found more than adequate.

To keep cost and hence the valve complement to a minimum, single ended amplifiers are essential, and since we need only 3W per channel,

to the main amplifier by a single-core screened cable, terminated in a single-pole jack plug. This jack plug is inserted into a single-pole jack socket (JK3) on the main amplifier chassis.

The first valve is an EF86, a low noise, low microphony, pentode (somewhat similar in its electrical characteristics to the older 6J7). The EF86 is used under starvation conditions, with anode and screen voltages much lower than is

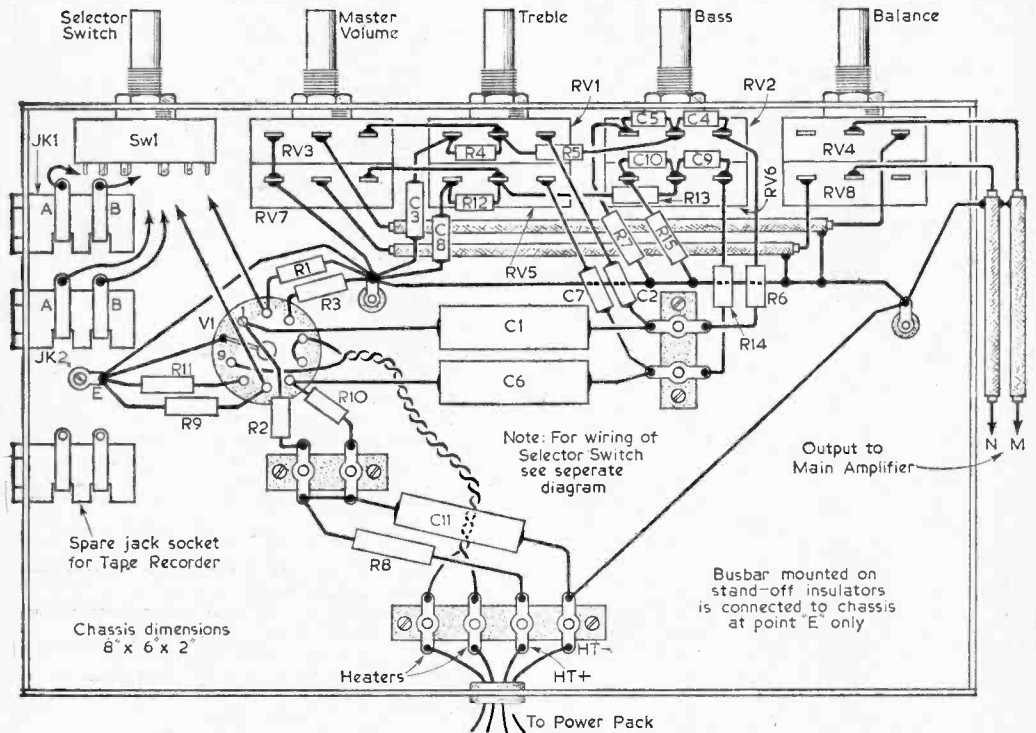


Fig. 3a (above).—The wiring of the pre-amplifier. (JK1, JK2 and the spare jack should be positioned as close to SW1 as possible).

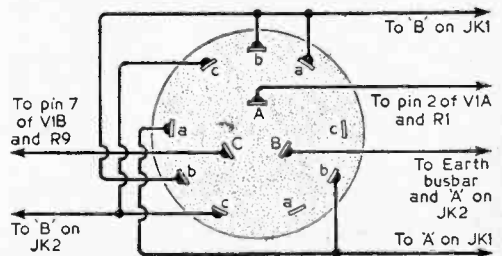
by using heavy negative feedback, distortion can be kept to a minimum.

Fortunately a design already exists in the Mullard 3-3 amplifier, which is very small, inexpensive to build and excellent in operation. A simplified version of the Mullard 3-3 is used and a full circuit diagram of one amplifier is shown in Fig. 6. The Mullard publication, "Mullard Circuits for Audio Amplifiers" will be found helpful.

The Circuit (Fig. 6)

Considering only one channel (the right hand channel), the output from the pre-amplifier is fed

Fig. 3b (below).—The wiring of the switch SW1.



usual. The total current consumption is low and a 1M high stability resistor is used as an anode load. It is important to use a high stability resistor here to prevent noise. The circuit configuration results in very high gain, and the valve is direct-coupled to a high slope output valve, an EL84. Such high gain is achieved that approximately 26dB of feedback can be used, and is taken from the secondary of the output

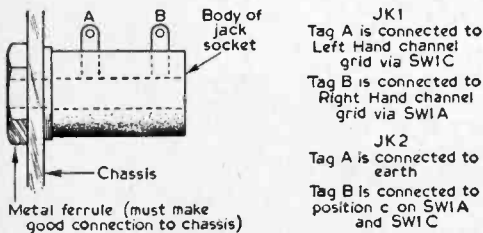
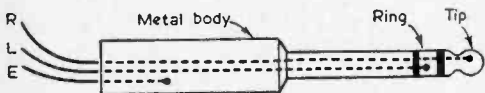


Fig. 4 (above).—The wiring of the input sockets, JK1 and JK2.

Fig. 5 (below).—The connections to the input jack plugs.



- Pick-Up Jack (JK1)
 R = Lead from R.H. channel of Pick-Up (Red)
 L = Lead from L.H. channel of Pick-Up (Yellow)
 E = Screening
- Radio Jack (JK2)
 R = Audio high lead
 L = Audio low lead (often Earth)
 E = Screening (connected to chassis)

transformer and fed back into the cathode of the EF86. The overall result is 3W output at less than 1per cent total distortion, and a good damping factor for the loudspeaker.

It should be noted that the anode of the EF86 is directly coupled to the grid of the EL84 via R5 and the screen voltage for the EF86 is obtained from the cathode of the EL84. In this way a high degree of stability of electrode voltage is obtained.

Feedback is supplied by R11 and C5 in shunt and no variable controls are needed on the modified chassis, since these are taken care of in the pre-amplifier and tone control unit.

The secondary of the output transformer is taken to colour-coded sockets on the chassis, and a 1k resistor is shunted across the output. This is to prevent instability and possible damage to the output transformer if the loudspeaker should be inadvertently disconnected.

The same wiring precautions should be adopted as detailed

COMPONENTS LIST

- R1 10M 1/4W
- R2 10k 1/4W
- R3 1M 1/2W high stability
- R4 390k 1/4W
- R5 1k 1/4W
- R6 22k 1/4W
- R7 150Ω 1/2W
- R8 3.9k 1/2W
- R9 560Ω 3W w.w. wound
- R10 1k 1/4W
- R11 6.8k 1/4W
- Rx 120Ω for 3Ω loudspeaker
82Ω for 15Ω loudspeaker
- C1 0.25μF 350VW
- C2 8μF 450VW
- C3 50μF 50VW
- C4 50μF 50VW
- C5 390pF 350VW
- C6 0.02μF 350VW
- V2 EF86
- V3 EL84
- T1 Output transformer:
 Colne 03077
 Parmeko P2641
 Wynall W1452
 Gilson W.O.767
 Partridge P4073
- Valve holders:
 V2 B9A skirted, nylon loaded
 V3 B9A moulded type
- JK3 Single pole input jack socket
- Loudspeaker output socket
- Aluminium chassis 8in. x 6in. x 2in.
 (both amplifiers are built on one chassis)

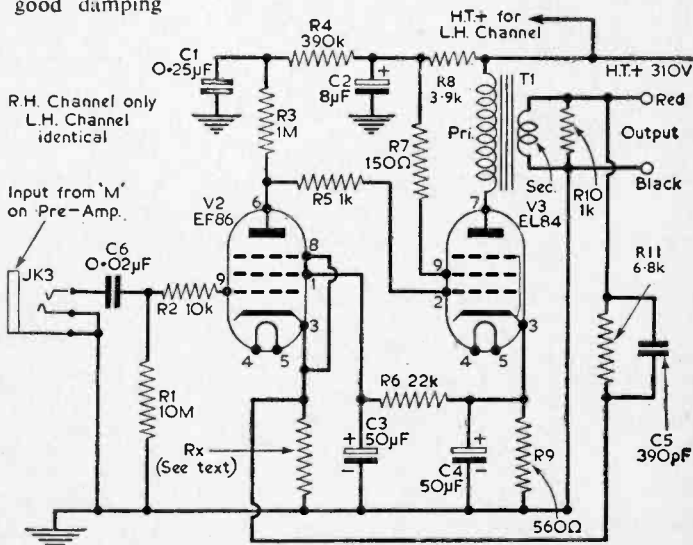


Fig. 6.—The circuit of one of the main amplifiers—the other is identical.

under the pre-amplifier and tone control unit. Both main amplifiers may be built on a single 8in. x 6in. x 2in. chassis, and it is advisable to mount the output transformers at 90° to each other to minimise coupling.

Output Transformer

The component list should be closely followed, and the only component which needs special mention is the output transformer. This is quite straightforward and has an 8H primary inductance and secondary to match 3 or 15Ω speakers. It should be noted that resistor Rx should be altered depending upon which output impedance is used (see components list).

The Loudspeaker System

Several full length articles could be written on this subject, and most people have their own idea of what is the best arrangement. It is useless to build an amplifier with low distortion and then

use it on ordinary small speakers built into a small radiogram cabinet.

(To be continued)

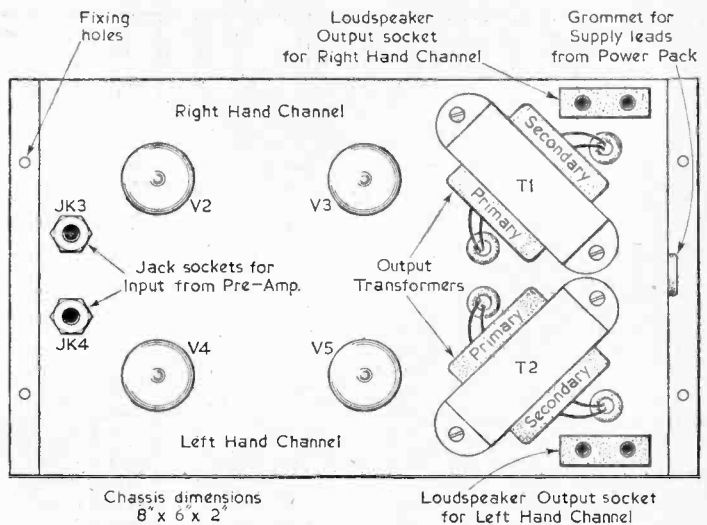


Fig. 7.—The above-chassis layout of the main amplifiers.

Busbar connected to chassis at point 'E' only

LEFT HAND CHANNEL

L.H.C. Speaker Output Sockets

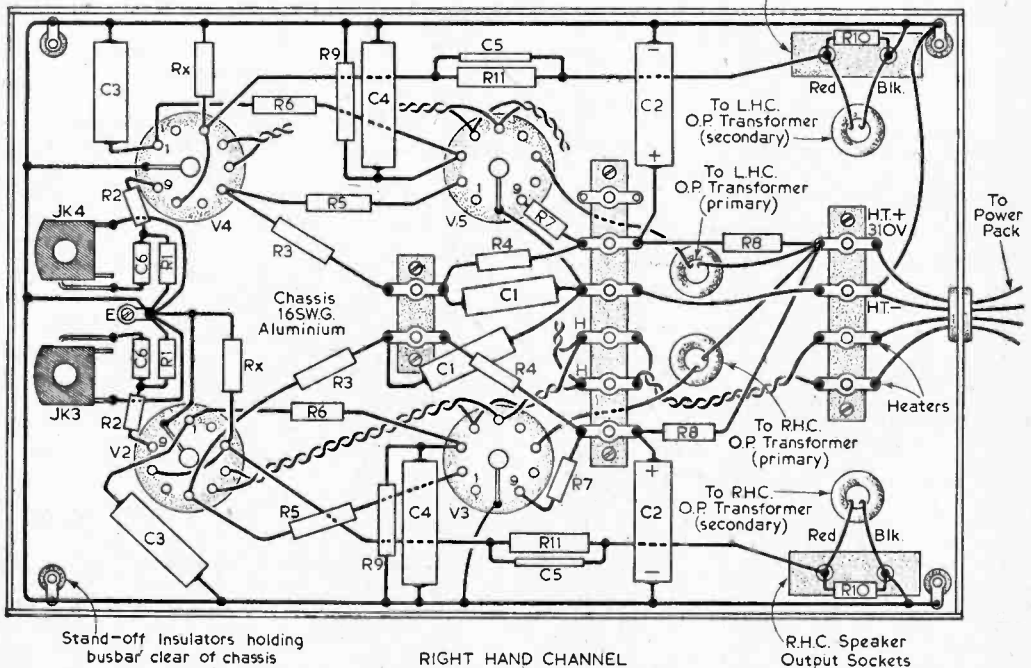


Fig. 8.—The underchassis wiring of the main amplifiers; note that resistors and condensers in the left-hand channel have the same numbers and values as those in the right-hand channel. All electrolytic condensers must be wired with the correct polarity—check with Fig. 6, the circuit diagram.

HARVERSON SURPLUS CO. LTD.

83 HIGH STREET, MERTON, S.W.19. CHerrywood 3985/6

GRAM AND TAPE EQUIPMENT BARGAINS

MONAURAL AMPLIFIER KIT

This comprises a complete kit of parts (including UCL82 valve) to build a quality 3W amplifier, size 7 x 3½ x 6½in. Efficient Circuit with volume and tone controls. Everything supplied including mains and O.P. transformers, metal rect., knobs, etc. and comprehensive instructions.
ONLY 39/6 Post and packing 4/6 extra.
 5in. loudspeaker (3Ω) to suit, 14/6 extra. All parts sold separately.

A.M. RADIOGRAM CHASSIS

A modern chassis by a famous maker. Size 1½ x 7 x 6½in. high, incorporating fully delayed AVC and neg-feed back. Valves ECH81, EF89, EBC81, EL84, EZ81. Attractive brown and gold dial with matching knobs. Controls—w/change (L.M.S. and gram), tone, tuning, and vol. on/off. Complete with O.P. trans, valves, knobs, etc. **£9.19.6** plus 4/6 P. & P.

F.M. TUNER HEAD

Made by famous manufacturer. 88-100 Mc/s. Non-drift. Uses ECC85 valve. (PRICE **14/6** plus 1/6 P. & P. ECC85 valve 8/6 extra.

RECORD CHANGERS

Write for our new super list of Tape Decks and Changers.

B.S.R.
 Monarch UA8 4-spd./a/changer **£6.19. 6**
 TU8 4-spd. single player less P.U. **£2.10. 0**
 UA14 Stereo Changer **£9. 5. 0**
 NOTE: Any of our Mono Players 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 **£7. 5. 0**
 plus 5/6 carr. and ins. (tapes extra).
TRUVOX MARK III TAPE DECK. New and Boxed **£10. 6. 6**
 Plus 6/- carr. and ins. (tapes extra).

MIDGET I.F. TRANS & COILS

A Pair of midget 465 kc/s I.F. transformers, plus LW and MW coils. PRICE 10/- per set. P. & P. 1/9.
 Set of I.F. transformers for transistor superhet. 12/6. P. & P. 1/9.

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. P. & P. 1/-.
ONLY 10/-

1/6 H.P. MOTOR

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

HI/FI STEREO/MONAURAL AMPLIFIER

A 5 valve HI/FI amplifier with switched stereo/monaural operation. Output 3 watts per channel, provision for bass and treble speakers on each. Volume and tone controls fitted both channels. All housed in stylish blue/gray metal case, with gold finished knobs plus 4/6 P. & P. **£9.19.6**

READY BUILT AMPLIFIER

A 3-valve amplifier (ex-relay unit). Comprising 10F3 RF amp, 10P14 Audio amp (3W) and U404 rect. Inputs for AC/DC mains, 6 preset channels and crystal P.U. Complete in attractive brown and cream bakelite case, with 8in. 15Ω speaker fitted. Ideal gram, guitar, amplifier, etc. **ONLY 21/-** Plus 6/6 P. & P.

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 5/- P. & P.

E.M.I 4-SPEED RECORD TURNTABLE AND PICK-UP

Heavy 8½in. metal turntable. Low flutter motor, 200/250 v. shaded motor with tap at 80 v. for amplifier valve filament if required. Turnover LP/78 head. **89/6 COMPLETE** Plus 4/6 P. & P.

E.M.I 4-SPEED STEREO PLAYER

To suit our stereo amps. **£6.12.6** Plus 5/- carr.

SWITCHED ATTENUATOR

Audio to V.H.F. in four steps of 20 dB ± 0.02 dB up to 300 Mc/s. Cost £5.10.0. **OUR PRICE £2.19.6** Plus 1/- P. & P.

SUPER STEREO KIT

A kit of ready-built units only requiring interconnection. Comprising two midget 3W amplifiers, push button switch, transformer, control unit (bass, treble and vol.), power pack, one speaker (second speaker 14/6 extra), indicator light, valves (ECL82, EZ80 range), and comprehensive instructions. **59/6** plus 6/6 P. & P.

SUPERHET CHASSIS

Modern AC/DC chassis with printed cct. and ferrite rod aerial. Although not completely built, the main components are mounted—L. & M. wave coverage. 4 valves (UBF89, UCL83, UCH81, UY85). Everything supplied including dial knobs, etc., and simple instructions. **£4.19.6** plus 3/6 P. & P.

F.M. TUNER KIT

At last a quality F.M. Tuner Kit at a price you can afford. Just look at these fine features, which are usually associated with equipment at twice the price!

- ★ F.M. Tuning Head by famous maker.
- ★ Guaranteed Non-drift.
- ★ Permeability Tuning.
- ★ Frequency coverage 88-100 Mc/s.
- ★ OA81 Balanced Diode Output.
- ★ Two I.F. Stages and Discriminator.
- ★ E.M.84 Magic Eye.
- ★ Self powered, using a good quality mains transformer and valve rectifier.
- ★ Valves used ECC85, two RF80's, EM84 (Magic Eye) and EZ80 (rectifier).
- ★ Fully drilled chassis.
- ★ Everything supplied, down to the last nut and bolt.
- ★ Size of completed tuner 8 x 6 x 5½in.

All parts sold separately. **£4.19.6** Plus 8/6 P.P. & ins.
 Circuit diagram and illustrations. 1/6 post free.

STEREOPHONIC AMPLIFIER

Complete with 2 Speakers
 A compact amplifier embodying the latest features, giving good reproduction and ample volume. Complete with valves (ECL82, ECL82, EZ80), panel, knobs, etc., and two 3½ matched speakers.

£5.10.0 Plus 4/6 P. & P.

TRANSISTOR BARGAINS

ALL FIRST GRADE

OC71	8/-
OC72	12/-
OC72 Matched Pair	25/-
OC45 Green Spot	15/-
OC45 Blue Spot	15/-
OC44	15/6
OA41 Diode	3/6

Postage on all above 6d.

SPECIAL OFFER

DON'T MISS THIS
MULLARD O.C.76 10/6
MATCHED PAIR £1.0.0
 Post and packing 6d.

G.E.C. FIRST GRADE TRANSISTORS

Set comprising one 874 mixer, two 873 I.F.'s, one GET114 driver, two GET113 matched output and one diode.
£1.18.6 post 1/-

FOR FULL DETAILS AND ILLUSTRATIONS OF THE ITEMS ON THIS PAGE, ALSO OUR BARGAIN VALUE LIST, SEE MAY ISSUE, PAGES 3, 4, 5 and 6.

COMPACT HI-FI

by *Armstrong*

STEREO 55 (illustrated) **32 GNS.**

TUNER-AMPLIFIER CHASSIS

An outstanding new Armstrong chassis combining AM and FM Tuners, a Stereo Control Unit and two High Fidelity 5 watt Amplifiers in one compact unit. In all its functions the Stereo 55 is designed for mono as well as stereo use so that up to 10 watts output is always available.

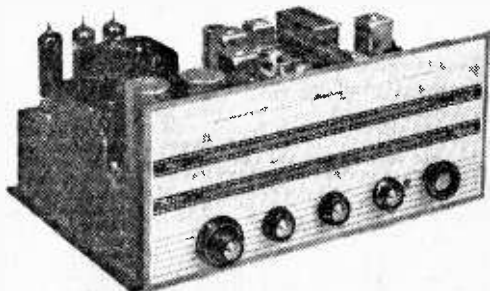
Full VHF and medium bands. ● Inputs for tape recording and playback. ● Alternative pick-up inputs. ● Booster unit available for low output pick-ups. ● Input for possible future stereo radio. ● Separate bass and treble controls and dual volume control for ease of balancing. ● Free instruction booklet with every model.

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 including Saturdays.

NAME _____

ADDRESS _____

PJS



STEREO 12 Mk. 2 **42 GNS.**

A new and improved version of the famous Stereo-Twelve. A total of 16 watts output is available from the two 8 watts push-pull amplifiers. VHF, with automatic frequency control, and medium and long bands. Inputs for recording and playback and for stereo radio if required in the future. Booster unit available for low output pick-ups, both mono and stereo.

The name *ARMSTRONG* is the registered trade mark of **ARMSTRONG WIRELESS & TELEVISION Co. Ltd.** WALTERS ROAD, LONDON N.7. Tel.: NOR 3213

OUTSTANDING new books on electronics

Principles of Semiconductors

Introduction to the properties and applications of semiconducting materials.

M. G. Scroggie, B.Sc., M.I.E.E. A straightforward introduction to this increasingly important subject. 21s. net by post 21s. 11d. 156pp. inc. 115 diagrams, plus 12pp. plates.

Principles of Transistor Circuits 2ND EDITION

Introduction to the design of amplifiers, receivers and other circuits.

S. W. Amos, B.Sc. (Hons.), A.M.I.E.E. A completely revised and enlarged edition of a recent popular book. 21s. net by post 22s. 210pp. 125 illustrations.

Radio Valve Data 7TH EDITION

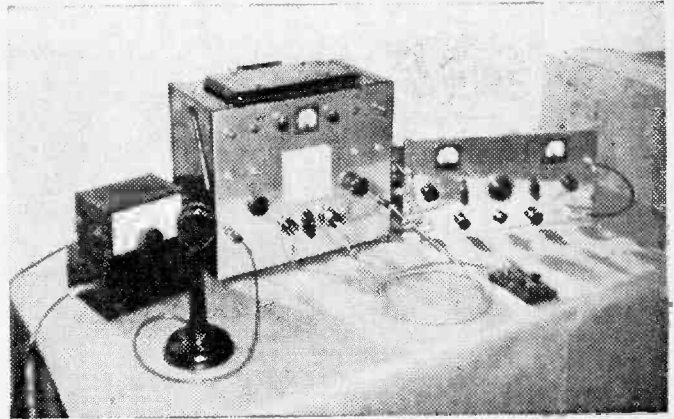
Characteristics of 4,800 valves, transistors, rectifiers and cathode ray tubes.

Compiled by "*Wireless World*". A completely revised and reindexed edition. 6s. net by post 6s. 10d. About 160pp.

from leading booksellers

ILIFFE Books Ltd. DORSET HOUSE, STAMFORD ST., LONDON, S.E.1

AN ALL BAND 75 W



TRANSMITTER

THE R.F. SECTION

(Continued from page 81 of the May issue)

By G. Favour

THE R.F. unit is built with 16s.w.g. aluminium for which drilling diagrams are given in Figs. 8, 9 and 10. The screening partitions (Fig. 10) are fixed to the chassis by small aluminium brackets and screws. Since the only tools used in the construction were a hand-drill, hacksaw, file, screwdriver and pliers, the lack of a workshop need not deter

potential constructors. The larger holes were cut out by marking the required extremities, drilling a number of overlapping $\frac{1}{8}$ in. holes, and finishing off with a file having a curved cross-section. Great care should be exercised in all drilling, since a slip of the drill can ruin the appearance of the front panel. Aluminium is very soft, and may be scratched even by the fingernails. All drilling should take place before the chassis is bent. The indicator lamp on the front panel was removed from a 19 set control box, and contains a 6V 60mA

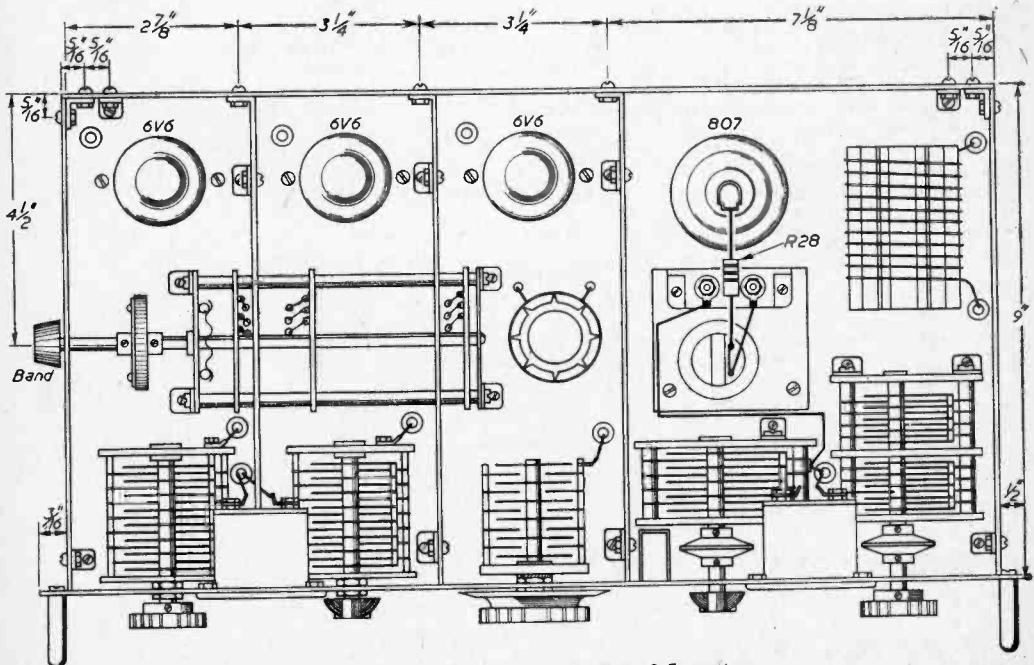


Fig. 8.—The above-chassis layout of the R.F. section.

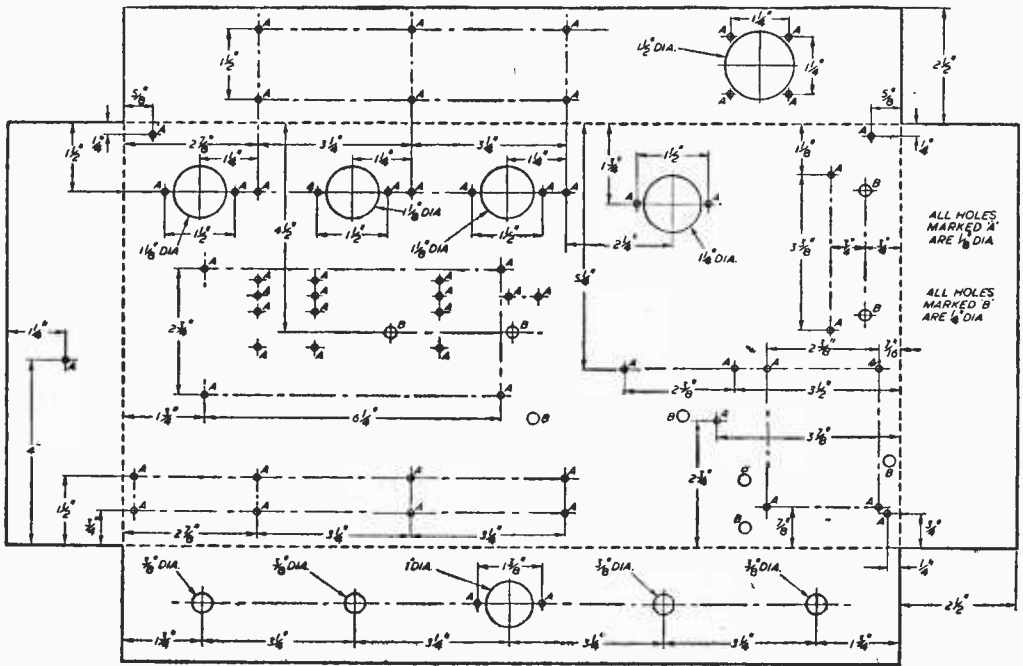


Fig. 9.—Chassis drilling diagram for the R.F. section.

bulb. The panel handles were removed from R.F. 24 and 25 units.

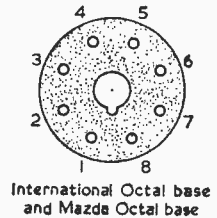
Circuit

The input from the V.F.O. is by airspaced coaxial cable through a Pye elbow and socket. A short piece of similar cable goes from the input socket to a point adjacent to V5 valveholder. Since the input is at high impedance, this cable causes some mismatch, but this is not important if the length is made about four feet. V5 is a 6V6

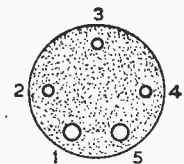
operating as a driver stage on 80m and as a doubler on the remainder of the bands. While this valve is possibly not the best for the position, and a 6AG7 might perform better, it has proved perfectly satisfactory in this, and many other transmitters, and is very cheap on the surplus market. The cathode of this valve is keyed on CW. The anode circuit is tuned by the parallel combination of L1 and VCI. VCI is a broadcast type ceramic insulated 500pF type, obtained from a 1930 radio. This large capacity is necessary, since it is required

VALVE BASE CONNECTIONS

Valve Holder	6V6 I.O.	5P6I M.O.	5R4GY I.O.	807 UX5	6F8 I.O.
Pin 1	Metal shell	Heater	—	Heater	Metal shell
Pin 2	Heater	Cathode	Heater	Screen grid	Heater
Pin 3	Anode	Anode	—	Control grid	Anode 1
Pin 4	Screen grid	Screen	Anode 1	Cathode	Cathode 1
Pin 5	Control grid	Suppressor grid	—	Heater	Control grid 2
Pin 6	Beam plates	Metal shell	Anode 2	—	Anode 2
Pin 7	Heater	—	—	—	Heater
Pin 8	Cathode	Heater	Heater	—	Cathode 2
Top cap	—	Control grid	—	Anode	Control grid 1



International Octal base and Mazda Octal base



UX5 base

COMPONENTS FOR THE R.F. SECTION
 (see Fig. 1, page 66, May issue)

R14 270 Ω 2W	R22 47k $\frac{1}{2}$ W
R15 47k $\frac{1}{2}$ W	R23 33k $\frac{1}{2}$ W
R16 33k $\frac{1}{2}$ W	R24 270 Ω 2W
R17 47 Ω $\frac{1}{2}$ W	R25 24k 5W (see text)
R18 47k $\frac{1}{2}$ W	R26 33k $\frac{1}{2}$ W
R19 270 Ω 2W	R27 100 Ω $\frac{1}{2}$ W
R20 47 Ω $\frac{1}{2}$ W	R28 47 Ω $\frac{1}{2}$ W
R21 47 Ω $\frac{1}{2}$ W	

(Note the values of R14 and R15 which differ from those of R14 and R15 in the power unit and modulator)

C16 0.01 μ F paper	C30 200pF mica
C17 0.001 μ F mica	C31 300pF mica
C18 0.1 μ F paper	C32 0.1 μ F paper
C19 0.001 μ F mica	C33 0.001 μ F mica
C20 0.001 μ F mica	C34 0.01 μ F ceramic
C21 0.1 μ F paper	C35 0.01 μ F ceramic
C22 0.1 μ F paper	C36 100pF mica
C23 0.1 μ F paper	C37 0.01 μ F ceramic
C24 0.1 μ F paper	C38 0.01 μ F ceramic
C25 0.001 μ F mica	C39 0.01 μ F mica
C26 0.001 μ F mica	C40 0.1 μ F paper 1kVW
C27 0.001 μ F mica	C41 0.004 μ F (see text)
C28 0.1 μ F paper	C42 100pF mica
C29 0.1 μ F paper	C43 500pF mica

(Note: All paper condensers are 350VW)

V5 6V6	V7 6V6
V6 6V6	V8 807
M2 100mA (ex T1154)	
M3 100mA (ex T1154)	
L1 (see text)	
L2 Denco—Yellow or Blue Range 5	
L3 Denco—Yellow or Blue Range 5	
L4 Plug-in—see text	
VC1 500pF	VC5 500 + 500pF
VC2 500pF	VC6 50pF } (air-spaced
VC3 100pF	VC7 50pF } trimmers)
VC4 150pF	
S2 1.5 Ω w.w. (see text)	
SW1 (see text)	
SW2 1-pole, 3-way	
SW3 2-pole, 3-way	
Three ceramic I.O. or M.O. valveholders	
One B.5A. (807) valveholder	
Two 5:1 epicyclic drives	
One length of air-spaced coaxial cable	
Two Pye sockets with matching elbows	
One 8- or 10-pin plug and matching socket	
Ten suitable knobs	
Handles for R.F. unit	
One $\frac{1}{2}$ in. long, $\frac{1}{8}$ in. diameter spindle	
16s.w.g. aluminium	

to tune two bands. L1 is the H.F. oscillator coil from the 1154, with the taps removed.

Band-Switch

The band-switch is the ex1154 range-switch, with one of the banks removed leaving three 1-pole 3-way switch sections. The spacing of these is also slightly altered to fit between the above-chassis screens. A ceramic switch would be better, but the paxolin type is quite satisfactory.

The second stage doubles the frequency from 40 to 20m or triples to 15m, and is essentially the same as the first stage except for the tuned circuit. L2 (Denco yellow or blue chassis mounting range 5 type) has its larger winding tuned by VC2 (500pF) in series with C30 (200pF). This reduces the effective capacity to about 40pF. A small air-spaced trimmer VC7 is soldered across L2, and by the adjustment of both this and the core, both bands should be covered easily. This should be done initially in conjunction with an absorption wavemeter, since it is possible to choose incorrect harmonics. When operation is on 80m, L2 is short-circuited.

The third doubler stage is also identical with the exception of the tuning. L3 is identical with L2, but the effective tuning capacity is smaller. The trimmer VC6 should be at almost minimum capacity, and the core out further. This stage is only in operation on 10m.

The T1154 Mag Feed 100mA meter is switched by SW2 to read the anode current in the doubler stages. A sharp dip should be obtained; fairly deep when the fundamental is being amplified, but only a flicker when third harmonic output is used. The grid current meter gives a more exact tuning indication. The 0.004 μ F mica condenser across the meter should not be removed.

Decoupling

The H.T. and heater wiring should be decoupled by 0.01 μ F disc ceramic condensers when passing from stage to stage. It possible, all R.F. chokes in the circuit should have different inductances in order to prevent tuned anode—tuned grid oscillation occurring. The highest inductance (larger) type should be used in the first stage anode, with slightly smaller sizes for the other stages. If parasitic oscillations are found to be taking place in the doubler stages (indicated by 807 grid current flowing even when the V.F.O. is disconnected), the provided screening cans should be fixed over L2 and L3, and 47 Ω $\frac{1}{2}$ W resistors connected in each anode lead.

The output from these stages is passed to the control grid of the 807 P.A.. The grid leak R25 (24k ex 1154) is decoupled from R.F. by RFC4, C34 and C35, and its earthy end is taken through the connecting cable to the grid current meter. The P.A. is driven into class C, automatic bias being developed by rectification between grid and cathode. The insulated anode cap is connected through a 47 Ω anti-parasitic resistor to the ex 1154 unit comprising R.F.C. 4 and C41. An ex 1154 half screening can is fixed around the 807 to prevent the output reaching the grid. The anode current meter M₃ is identical with M₂, and is obtainable for 3/6d. from an advertiser. The shunt S₂ increases the FSD current to 150mA, and is made of a short length of nichrome wire. The resistance per foot or metre is usually stated on the reel of wire, and, by a simple calculation, the length required to make a resistance of 1.5 Ω can be determined.

The anode tuning condenser (ex 1154) is about 150pF. A fixed mica condenser is switched in by one section of the ceramic switch SW3 in order to

cover the L.F. end of 80m. The output loading condenser is a double-gang 500pF broadcast type, with epicyclic drive.

The output π coil is changed for each band of operation. It is supported on stand-off insulators. If suitable ceramic types are not available, the switch supports on the 1154 200kc/s loading coil may be used, if suitable terminals are fixed on the top.

On 80m, L4 is the 1154 L.F. tank coil with tappings removed. This is a high Q semi-airspaced silver plated type.

On 40m, the 1154 H.F. tank coil is used. All tappings must be removed.

Coils

On 20m, the coil is a home-made airspaced type: six turns 12s.w.g. wire, 2in. outside diameter, length 1in.

On 15m, L4 is also home-made: three turns 12s.w.g., 2in. outside diameter, length $\frac{1}{2}$ in.

On 10m, four turns $\frac{3}{8}$ in. dia. copper tubing, $1\frac{1}{4}$ in. outside diameter, 1in. long.

The three home-made coils are silver-plated to increase the efficiency, since high frequency currents flow on the surface, rather than in the centre of conductors. Since silver nitrate is expensive, only a very small quantity is used. A little of the liquid is soaked up with a small paint-brush. The positive terminal of a 1 $\frac{1}{2}$ V cell is connected to the metal part of the brush, and the negative to the coil, which should be perfectly clean and free from grease. By slow, gentle brushing, a thin permanent film of metallic silver is deposited.

The output to the aerial is through another Pye elbow and socket to coaxial cable.

Connectors

These are very simply constructed using either multi-strand cable, or a number of strands of ordinary single wire wrapped around one another. The four way VFO lead is about four feet long, terminated by old Mazda octal valve bases, with pin 1 connected to pin 1, etc. The eight way R.F. section lead is about five feet long, terminated on the power unit end by an international octal base, and the other end by any suitable 8 to 10 way plug. All the valve bases are filled with pitch or asphalt to improve the appearance and prevent electric shocks and short circuits.

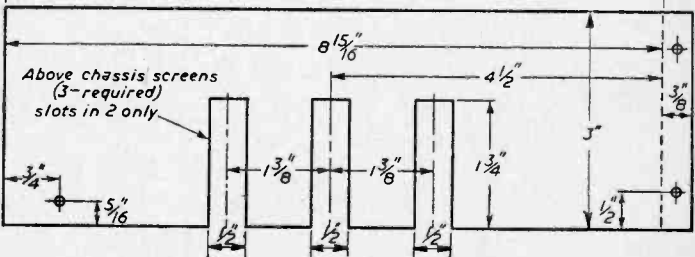
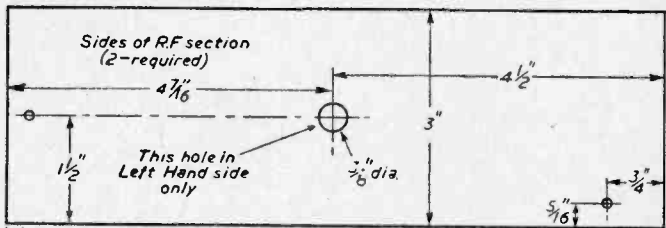
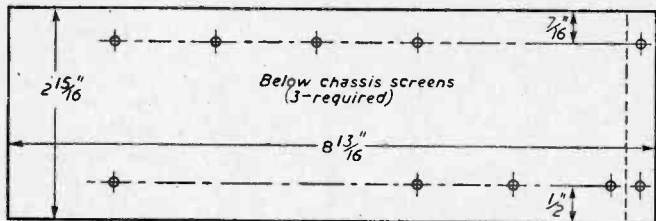
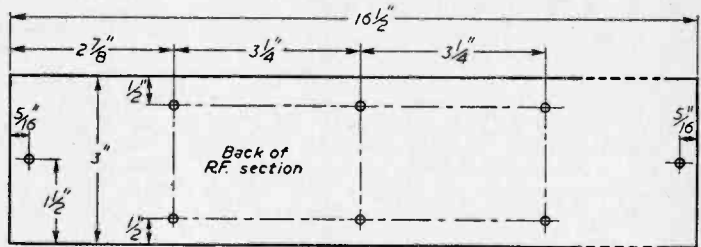
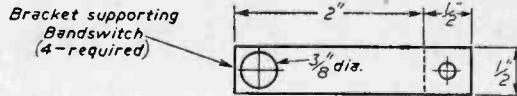


Fig. 10.—The screen and brackets for the R.F. section.

Operation

This is quite standard, and requires no special skill. The three units are connected together, mains switch turned on, and put to receive position. The low H.T. switch is turned on, when the receiver should work normally. It is tuned to an amateur band (80m best for first testing) the "listen-through" control set at zero, the meter

(Continued on page 146)

ADDING COMMUNICATIONS FEATURES

By F. G. Rayer

IMPROVING THE OPERATION OF HOME CONSTRUCTED AND COMMERCIALY MADE RECEIVERS

A "COMMUNICATIONS" receiver is a superhet of advanced design, with features which permit better or more comprehensive operation. Many of these circuit improvements can be added to a superhet of ordinary type, to achieve more satisfactory reception especially under difficult conditions. Such additions can greatly improve results, and the extra components can often be accommodated on the chassis fairly easily. The features to be described can be very suitable indeed for a home-constructed receiver having a fairly large chassis, but some may be added to commercially-made sets, and to receivers of compact design.

additional I.F. stage, SSB (signal side band) carrier injection, and other circuits which may be employed in a communications receiver, but which will usually be absent from a general purpose superhet.

Some, at least, of these features can be added to almost any receiver, and will give improved results, greater ease of operating, and other advantages.

A Typical Receiver

Fig. 1 shows a typical receiver circuit of popular type, such as might be originally used. Coils for

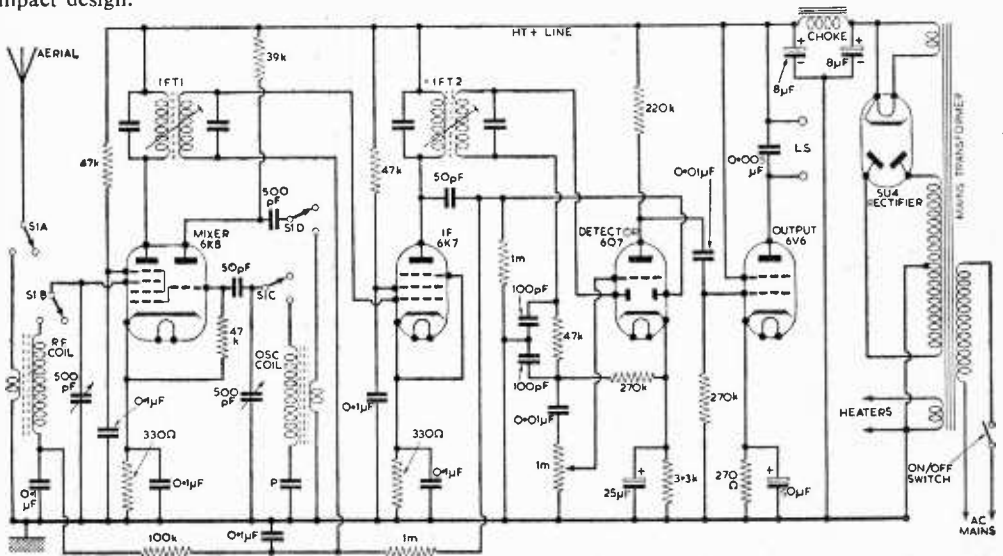


Fig. 1.—A typical circuit of a mains superhet receiver.

There is, of course, no need whatever to add all the items described. For example, a BFO may not be desired, if there is no need for the reception of C.W. signals. Some of the other features, such as provision for single-side band reception, or the use of bandspreading or "Q" multiplier circuits, are not employed in many popular communications receivers, though they will be found in expensive receivers of very advanced design.

Additions to be covered include beat-frequency oscillators for C.W. reception, crystal markers for exact dial calibration, the use of regeneration and "Q" multipliers in F.C. and I.F. stages, bandspreading and the addition of other wave ranges, noise limiters and tuning and signal strength indicators, function switching, suppressing interference and improving AVC action, using a crystal filter or

one waveband only are included, though two or more bands will generally be available. Component values and valves may differ from those indicated, but this will not usually be of any importance. There is, of course, no need whatever that the original receiver should resemble that in Fig. 1, which is merely an indication of the general type of circuit to which additions can be made.

If a radio frequency stage is present, this will be of advantage. In larger receivers, there may also be an additional I.F. amplifier. Other circuit details may also be different.

If a receiver is to be constructed, and the additions mentioned are to be made later, the circuit in Fig. 1 will be a good starting point, for easily obtainable octal valves. If preferred, miniature valves can be used instead.

Fig. 2.—The circuit of a triode beat frequency oscillator.

Quite a number of useful additions can also be made to battery operated receivers, except for those of miniature type, where parts are difficult to reach, and where there may be no space for additional components.

Beat Frequency Oscillator

A BFO is always provided in a communications receiver, so that C.W. (Morse) may be copied. If C.W. reception is not required, the BFO may be used to locate crystal marker harmonics, when a frequency crystal is provided for dial calibration. In some circumstances the BFO can also provide the required local carrier, for reinsertion in single-sideband voice signals, which would otherwise be unintelligible.

Fig. 2 shows a suitable BFO circuit. This will operate with any small triode, or one section of a twin-triode may be used, when the other section will be employed for other purposes. This may be convenient when an additional stage of A.F. amplification is to be provided to boost weak signals.

Fig. 3.—A B.F.O. circuit with variable output.

Most receivers have 465kc/s as the intermediate frequency. The BFO then needs to tune from about 464kc/s to 466kc/s. If the BFO is adjusted to 464kc/s or 466kc/s, and a C.W. signal at 465kc/s is available at the detector, these frequencies beat to produce a 1kc/s (1,000 cycle) audio tone. The BFO switch is opened for ordinary reception.

A winding from a disused I.F. transformer may be used for the BFO coil. As it may be difficult to tap the winding, the same effect can be achieved by winding on a few extra turns. Three or four turns will usually be sufficient. They are close to the original winding, and in the same direction. The end of the original coil and beginning of the extra winding then form the cathode tap, the end of the new winding being taken to chassis.

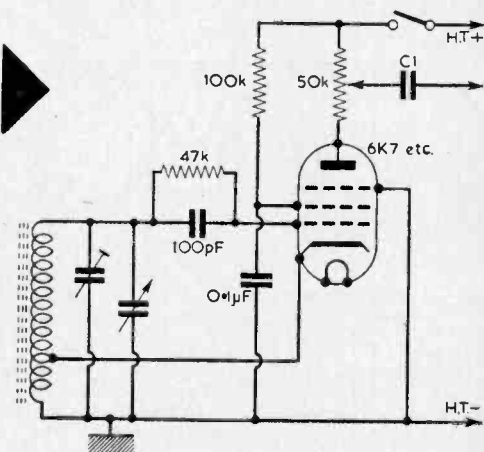
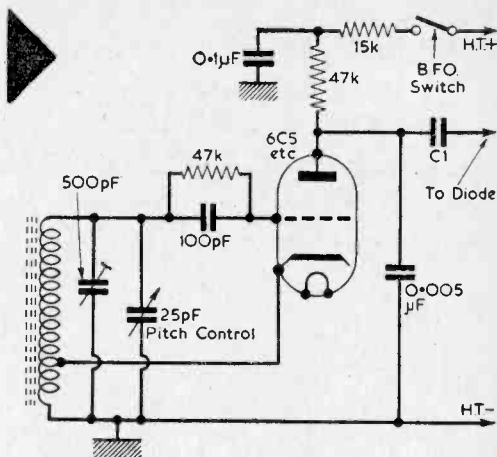
The 500pF or similar trimmer is adjusted until the BFO tunes to about 465kc/s with the 25pF or similar pitch control condenser half closed. No extra trimmer will be needed if the I.F. coil is fitted with a fixed condenser, and has an adjustable core.

The capacitor C1 should be very low in capacity, and can be made from a loop of insulated wire taken round the appropriate connecting point. The BFO is coupled to the detector diode, which will generally be one electrode in a double diode triode. The 0.1μF condenser and 15k resistor in Fig. 2 need not be added unless troublesome back-coupling to earlier stages arises.

Variable Output BFO

A BFO with variable output is shown in Fig. 3. C1 can again be very small, but the actual signal applied to the diode depends largely on the setting of the 50k potentiometer. Any type of H.F. pentode may be used.

A variable control of this kind is useful if the BFO is to be employed for the reception of SSB signals. An appropriate carrier strength can then be obtained from the BFO.



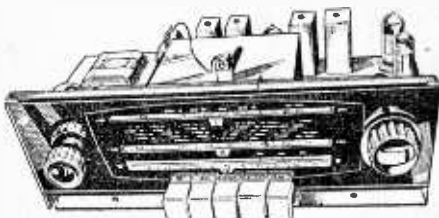
Construction and Adjustment

The BFO stage is best constructed in a small screened box, or the coil and valve may be screened. It should be located near the detector, to avoid a long connection from C1. If stray coupling arises with earlier stages in the receiver, whistles may be heard at multiples of 465kc/s on the tuning dial. If this is suspected, the trouble may easily be identified, as it will cease when the BFO is switched off. If so, screening should be improved, and the H.T. feed may be bypassed, as in Fig. 2. C1 may need reducing in value, and can best be in the BFO screening can.

The heater is wired in parallel with other heaters, and is normally left on. A fairly weak C.W. signal should be tuned in, and the trimmer or BFO coil core is adjusted until the BFO can be tuned through the intermediate frequency by means of the 25pF condenser. This component should have a panel control, and it can be operated by an extension shaft.

(To be continued)

BRAND NEW AM/FM (V.H.F.) RADIOGRAM CHASSIS AT £14 (Carriage paid)



tapped input 200-225 v. and 226-250 v. A.C. ONLY. Chassis size 15 x 6 1/2 x 5 1/2 in. New manufacture, 12 mths. guarantee. Dial 1 1/4 x 4 in. in black and gold. Pick-up. Extension Speaker. Ac. E. hd Dipole Sockets. Five "piano" push buttons—OFF L.W., M.W., F.M. and Gram. Aligned and tested. With all valves and O.F. Transformer. Tone Control Fitted. Covers 1,000—1,900 M.; 200-500 M.: 88-98 Mc/s. Valves E230 rect., ECH81, EF89, EABC80, EL84, ECC85. Speaker and Cabinet to fit chassis (table model). 47/6 (post 3/6). 10 x 6 in. ELLIPTICAL SPEAKER. 20/-, to purchasers of this chassis. **TERMS:**—(Chassis) £5.10.0 down and 6 Monthly Payments of 30/-, or with Cabinet and Speaker £5.17.0 down and 7 Monthly Payments 32/-.

THE "CABY" TEST METERS

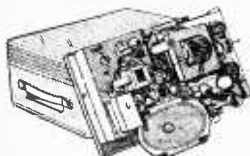
Pricing include Test Prods, Batteries, Instruction Book. Also measure dB. Accuracy: A.C., 3 per cent. D.C., 2 per cent.

A-10 **£4.17.6** B-20 **£6.10.0**

A.10—2K ohms/v. on A.C. and D.C. volts (10, 50, 250, 500 and 1000 v); 10K and 1M Ohms; 1 mA, 25 mA and 250 mA. D.C. Size: 5 1/2 x 3 1/4 x 1 1/2 in. Weight 17 oz.
B.20—10K ohms/v. on 0.5 v. and 2.5 v.; 4K ohms/v. on 10, 50, 250, 500 and 1000 v.; A.C. and D.C. Resistance, 2K, 200K, 2 M and 20M ohms; D.C. current, 100 microA, 2.5 mA, 25 mA, 250 mA. Size: 5 1/2 x 3 1/4 x 2 1/2 in. Weight, 24 oz.



TAPE RECORDER FOR ONLY £17.17.0 (10/- carriage)



QUALITY ARTICLE. Valves E230, ECC83, ECL82, DM70. Acos Crystal "mike". 850ft. Tape and extra spool. 3 1/2 in. 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. 6 x 4 in. Speaker. Cabinet 14 x 11 1/2 in. Supplied completely built and in cabinet.

B.S.R. "MONARDECK" TAPE DECK SINGLE SPEED. Our price only £7.2.6 (5/6 carr.). 850 ft. first grade tape 5 1/2 in. plastic spool, 16/-, post 1/-.

ELECTROLYTICS, ALL 275 v. 100-200mF 5/-; 100-400mF 7/6; 100-400-32mF 8/6; 200-200-200mF 9/-; 32-32mF 3/-; 60-250mF 5/-. Please add Postage 5d. for 1; 1/6 for 3; 8 post free.

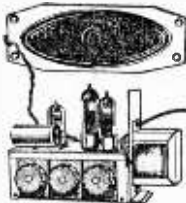
NEW WAXED TUBULARS, 350 v. or above. 0.001, 0.002, 0.005, 0.01, 0.02, 0.05, 0.1, 0.25, 0.5 mF. Total 21 for 4/6, post 9d.

TWO-TONE BROWN RECORD PLAYER CABINET (with Motor Board for Autochanger) and Gramophone Amplifier to fit Cabinet for £5.5.0 (5/- carr.). Size 17 x 15 x 9 1/2 in. Brand New. BSR UA8 autochanger to fit. £6.10.0 (extra carriage 2/6).

COLLARO STUDIO TAPE TRANSCRIBER, 3 MOTORS, 3 SPEED. Push Button Controls. £12 (10/- carr.).

3-VALVE AMPLIFIER (INC RECT.). 4 watts. Valves ECC83, EL84, and E230. Controls, volume, bass and treble. On/off switch. (Chassis size 6 1/2 x 3 x 2 1/2 in.) 6 1/2 in. round or 7 x 4 in. elliptical speaker. Not suitable for microphone input. A.C. only.

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



LISTEN WITHOUT INTERFERENCE

Fully built V.H.F./F.M. Set for £8.12.0 (carr. pd.). Covers 88-95 Mc/sec. Wired, aligned and tested. Mullard permeability tuner and 4 valves (ECC85, ECL82 and two EF91), + 2 diodes. Cheap room dipole. 10/-, 300 ohm twin feeder. 6d. yd.

SELF-POWERED VHF TUNER CHASSIS.

Covering 88-95 Mc/s Mullard permeability Tuner, Dims. 10 1/2 x 4 1/2 x 5 in. high. ECC85, EF91 EF91 and 2 diodes. Metal Rectifier. Mains transformer. Fully wired and tested. Only £7.14.0 (carr. pd.). Room dipole 10/-, 300 ohm twin feeder 6d. yd. Tuner without power pack £6.14.0 (carr. pd.).



STEREO AMPLIFIER £4.15.0

(3/- p. & p.) Brand new. 200-250 A.C. Tone and volume controls each channel. E230; ECC83; and 2-EL84; giving 2 x 4W. Size 12 x 3 1/2 x 3 1/2 ins. O.F. Trans. for 2-3" speaker. Separate on-off switch to allow balancing to remain set. Monaural push/pull amplifier giving 8W same price.



SAVE 10/-. Swiss made Univ Shaver operating from 1.5 v. battery, usual price 59/8. Our price, 49/8. Long Life battery. 2/- Not a toy, but a shaver. (carr. pd.).

NEW VALVES (add 9d. post for 1; 1/3 for 2 or 3; 1/6 for 4 or more) 2/- ea., EF50, HL4, Barretter 306, VU120, AR8; 2/6 ea., 6AL7, 6B7, 6V54, VP41, HL41DD, P41, HL42DD, DD41; 4/- ea., VR66, ME41, HL133DD, AC/P4, 6K7, 6AT6, 6AU6, 6F33, EF91, EB91, EAC91, ECC91, U78/6X4, W77, TH41, LD5, TH321, U08, 50C5, 12S/7; 5/- ea., 7193, VP4B, N78, AC2HL, EC31, 354V, 2P, MH41, AC/P, 7/6 ea., PF321, PA22, AC4/P, X79, V503, VP1322, FX4, AC2/P, PENDING, FC4, KT55, ECC34, DA30, PP5/400.

BATTERY ELIMINATOR. For 4 Low Consumption Valves (66 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 1/2 in. Also for 250 mA, 1.4 v. and 90 v. 15 mA at same price.

AUTOMATIC RECORD CHANGERS, ALL 4-SPEED WITH TURN-OVER CRYSTAL CARTRIDGE (carr. 5/- extra) B.S.R. UA8, £8-10.0; UA8 stereo, £7.5.0; latest UA14, £7.10.0.

COMPLETE V.H.F./A.M. RADIO FOR £13.10.0 (carr. pd.)



Brand new set, in superb walnut cabinet (size 19 x 8 1/2 x 14 1/2 in. high). Covering 80-100 Mc/s, 16-49 M., 200-500 M. and 1,200-2,000 M. Mains trans. 200-250 v. with 3 tapplings. Ferrite rod aerial for A.M. Controls: volume on/off, tone tuning, w/ change. Gram and ext. speaker position provided. Valves 12AT7, 12AH3, 6B36, EABC80, 6BW6 and metal rectifier. Fully guaranteed. Post and packing 10/- extra. Today's Value, £20.

Send 6d. (stamps will do) for 20 p. illustrated catalogue. 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.**

Posted Orders to Camberley Please

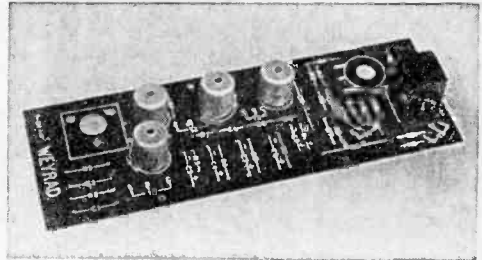
ALL ITEMS GUARANTEED 12 MONTHS—B.V.A. VALVES 3 MONTHS

GLADSTONE RADIO 58A HIGH STREET, CAMBERLEY, SURREY Tel. 22791
Also at 247 New Road, Portsmouth, Hants, and 56 Stokes Croft, Bristol 1
Camberley closed Saturdays Portsmouth and Bristol closed Wednesdays

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, $\frac{7}{16}$ in. diameter, connections to 6-Tag Ring, 208 pF tuning 12/6
- OSCILLATOR COIL P50/IAC
Medium wave in screening can. For 176pF tuning condenser 5/4
- 1st AND 2nd I.F. TRANSFORMERS—P50/2CC
470 Kc/s operation with 250 pF tuning in cans. $\frac{1}{16}$ in. diameter by $\frac{3}{4}$ in. high 5/7
(2 REQUIRED)
- 3rd I.F. TRANSFORMERS—P50/3CC
Last stage transformer to feed diode detector. Size at P50/2 6/-
- DRIVER TRANSFORMER—LFDT2
Upright mounting with six connecting tags— $1\frac{1}{16}$ in. x $\frac{7}{8}$ in. x $1\frac{3}{4}$ in. 9/6



PRINTED CIRCUIT—PCAI
Size $2\frac{3}{4}$ in. x $8\frac{1}{4}$ in. Ready drilled and printed with component positions 9/6

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

RECORD PLAYER CABINET

"PETITE"
29/9

Portable cabinet in smart two-tone colours

Size:—
12 x 10 $\frac{1}{2}$ x 6 in.

Light and easy to carry.

Insurance and carriage 4/6.



SPEAKER SALE



EXTENSION 19/9. 8in. P.M. Speaker fitted into polished cabinet. Complete. Switch and flex included. P. & P. 3/9.

TO CLEAR 8/9 EACH

Manufacturers' salvage. 5, 6, 8 and 7 x 4in. other sizes available. Money back guarantee. P. & P. 2/9.

B.S.R. "MONARDECK" £6.10.0
3 $\frac{1}{2}$ l.p.s., 5 $\frac{1}{2}$ in. spools. Complete with R/playback and erase heads. Simple control for R/playback and fast rewind with safety switch. Size: 13 x 9 $\frac{1}{2}$ x 2 $\frac{1}{2}$ in. P. & P. 4/6.

14in. T.V. TUBES
35/-

Salvage purchase of guaranteed replacement 14in. Tubes. Carr. 5/-.

LOOK!

COMPLETE KIT
16 $\frac{1}{2}$ Gns.



(Sold separately)
Cabinet 49/6
B.S.R. Deck £6.10.0
Amplifier £7.19.6
Loudspeaker 15/9

Also: Mike 27/6. Tape 19/9. Spools 2/9. Jack Plugs 1/9

Amplifier Accessories: Dial. incl. sockets and superimpose switch, 3/6 each. Knobs, 2/6.

Kit	Amplifier	POSTAGE	Deck	Loudspeaker
12/6	4/6	4/6	4/6	2/9

Credit Terms Available on Complete Kit

COMPLETELY ASSEMBLED Only 18 Gns.

incl.: MICROPHONE AND TAPE

Ins., Carr. 13/6.

Credit Terms Available

Hours—
9 a.m.—6 p.m.
Half Day Thursday

Send for
LATEST FREE
CATALOGUE

DUKE & CO. (London) LTD.

621/3 ROMFORD ROAD, MANOR PARK, E.12
ILF 6001/3

5/9 each

5U4, 6Q7, 6V6, 6X5, 12AU7, 12AT7, 12K7, 12K8, 12Q7, 20P1, EBC33, EBF80, ECC31, ECC81, ECC82, ECC84, ECF80, ECL50, EL33, EL38, EL41, PCC84, PCF80, PL38, PY81, PY32, PZ30, PL81, PL82, U76, W76.

1 valve, 7d. POSTAGE 6 valves, 1/6. 12 valves, 2/6

RECORD PLAYER CABINET 99/6

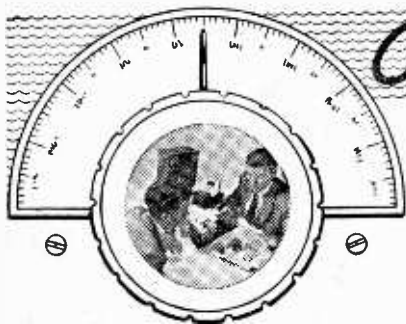


Portable Show Model in two-tone colours. Suitable for Stereo with Extension Speaker secured in lid. Size: 18 x 14 x 8 $\frac{1}{2}$ in. Ins. & Carr. 5/6.

V ALVES SALVAGE GUARANTEED.

9d. each 7/8 doz.
2D21, 4D1, 6AL5, 6C8, 6C9, 8D1, 8D2, 6H6, 6J5, 6J7, 6LD20, 6SC7, 6SG7, 7B, 6SH7, 6SK7, 8D2, 9D2, AR6, AR10, T41, EB91, EF36, EF39, EF50, SP41, SP61, HLAIDD, T41, TT11, VT501, VT510.
2/9 each 30/- doz.
6A8, 6AM6, 6C4, 6D6, 6F12, 6F13, 6F14, 18, 6F15, 6K7, 6K25, 6L18, 6P28, 6SL7, 6SN7, 6SQ7, 6U4, 6Z4, 7B7, 7Q7, 10F1, 12SH7, 12SK7, 25A3, 25Z5, 3D3, 35Z4, 42, 43, CL33, ECC34, ECC41, EF90, EF91, EF92, EL32, EY51, TH41, U22, U24, U801, VP41, EF39.

60/- doz.



On Your Wavelength

BY THERMION

had been thrown out in disgust—in spite of the fact that several of those involved in its design were active transmitters.

Miniature Apparatus

One hears much today about miniaturisation, but until one sees a really miniature set the full meaning of the word is not realised. I recently had the opportunity of seeing a piece of apparatus in which the components were almost microscopic. The transistors were of a type which may now be seen incorporated in the type of hearing aid which is enclosed in the frame of a pair of spectacles or in a complete unit which is inserted inside the ear. The tiny volume controls appear to be so small that it is a wonder that the coating does not scrape off when the arm is rotated, and electrolytic condensers have been reduced to almost the thickness of the metal normally used on a printed circuit! I wonder if any reader has been able to get hold of some of these small components and made up a workable set round them? Unfortunately most of them—even in some cases the transistors themselves—are controlled by the manufacturer and supplied to Government sources only.

Unusual Transistor Application

Whilst on the subject of transistors I recently heard of a most novel application of these interesting little components. We have all heard how they are taking the place of valves in many pieces of test equipment and in America a complete electronic organ has been built—without the employment of a single valve, no mean feat when one remembers that there are 60 notes to each keyboard and each is a separate oscillator, duplicated in the case of a two-manual instrument. There must also be the necessary amplifiers, but I do not know what power was developed by this organ, although I know that they have transistors over there which are not yet available in this country.

The novel application to which I referred in my earlier paragraph was for an instrument for St. Dunstan's, and consisted of a "responder". This comprised a tuned transistor amplifier with a microphone input. The instrument was made sensitive to a high audio-frequency signal, and the blind person carries a whistle which is tuned to that frequency. If the whistle is blown, a relay in the output circuit of the instrument is actuated and rings a bell for a pre-determined period. From the direction of the sound emitted by the bell the blind person can gauge his or her position relative to the responder. The range of this instrument is stated to be about 60yd on a still day, so that it can be used in a fairly large garden. This instrument has been developed by the Transistor Division of the Standard Telephones and Cables company and is, I understand, at present undergoing field trials in South Africa.

Difficult Requests

I AM receiving an increasing number of letters from readers and old friends, thanking me for some of my recent notes—especially those on transistor sets—and many of these correspondents ask me to let them have circuits of either receivers or test gear. Whilst I am at all times only too willing to help those who are unable to find circuits, etc., which meet their special requirements I must unfortunately turn down requests of this type. It is not that I do not have the time or am unwilling to prepare circuits, but this type of request is one which I know the editorial staff continually encounter and it is not possible to fulfil it. First of all, it is a fairly simple matter to draw out a theoretical circuit of either a simple type of set or a simple piece of test equipment. Obviously such things as a multi-valve communications receiver, or a complete oscilloscope are in a different category. But what happens when one has drawn such a circuit? It may prove useless to the reader. Old hands will know that when one is designing a new set the *first* step is to prepare a circuit which follows the lines or principles involved. The next step is to make up a rough layout—which most conveniently takes the form of the "bread-board" arrangement, and this is then tried out. Often one finds that there are many changes which have to be made in component values, and sometimes even in the valves, in order to obtain either a stable or an efficient working arrangement. Static and dynamic characteristics can vary widely in some cases, and therefore the supply of a circuit to an individual request is likely to be worthless. It is the layout and the working conditions which are most important, and unless it is possible to supply a tried and tested arrangement, requests of this type regretfully have to be refused.

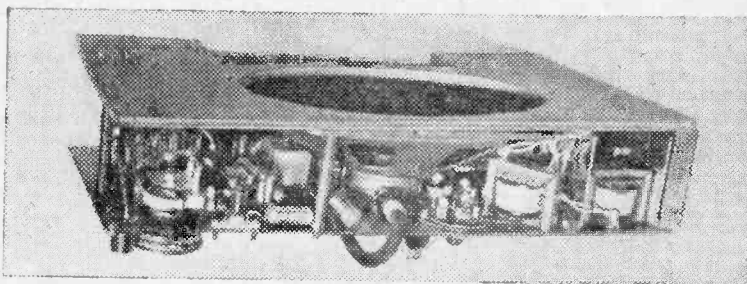
Whilst talking about the bread-board layout and the experimental work involved in developing a set, I remember on one occasion I was visiting a very well known Radio club to give a talk on a certain subject and was drawn into an argument about a set which the club were trying to build. They had been at work on it for weeks and everything had been checked and double checked, even to the extent of sending the circuit to the valve manufacturers (who at that time were very helpful in vetting circuits using their products) and according to everybody it should work. But it wouldn't. At least, not in the manner anticipated. I heard later that it never did come to fruition and

The P.W. "Roadfarer"

GENERAL ASSEMBLY AND ALIGNMENT DETAILS

(Continued from page 49
of the May issue)

THE power unit should have been constructed as described last month, and it now remains to connect the mains cable. The terminations are clearly shown on the board and these connections should now be made. The mains selector plug should now be connected with a short piece of insulated wire to one side of the fuse holder tag. This connection is shown in Fig. 3, last month. The other side of the fuse holder should be connected to the printed board as shown. Next solder two 3in. lengths of insulated wire to the battery clips and then solder each lead to the appropriate hole in the board. Using 8in. lengths of insulated connecting wire, and in accordance with the printing on the board, the two slide switches should be connected.



The P.W. "Roadfarer".

General Assembly

The dial plate assembly, drive pulleys, cord-drive and drums should now be assembled. The loud-speaker should be mounted on to the baffle board and secured loosely with two 4B.A. screws. Using mounting pillars, the printed board should be assembled on to the baffle but first ensure that the edge control has been fitted on to the spindle of the volume control potentiometer. The board is fitted to the baffle using 4B.A. bolts and mounting pillars. The outer mounting pillars are 2in. in length and slightly shorter pillars are used where they are mounted over the speaker. Whilst assembling the board, the aerial socket for the F.M. section should be fitted. The coupling coil, L8 may be soldered to the aerial socket, and a short length of tinned copper wire connected from the capacitor tag to a 4B.A. solder tag which should be incorporated in the aerial socket fixing.

The cord for the drive may now be threaded and the tension spring fitted. The assembled receiver may be fitted into the case and this is carried out by first positioning the edge controls below the appropriate slots and sliding the set upwards into the case. The assembly is secured by four wood screws which are inserted from the front of the case and screw into the wooden baffle holding it firmly against the front of the case. The speaker grille may be "clicked" into position on the front of the case. Finally fit the telescopic aerial and connect the coupling capacitor C33. The two slide switches should then be fixed into the top of the case and the receiver is now ready for alignment.

Medium Wave Alignment

Set the A.M./F.M. switch to "A.M." and set the battery/

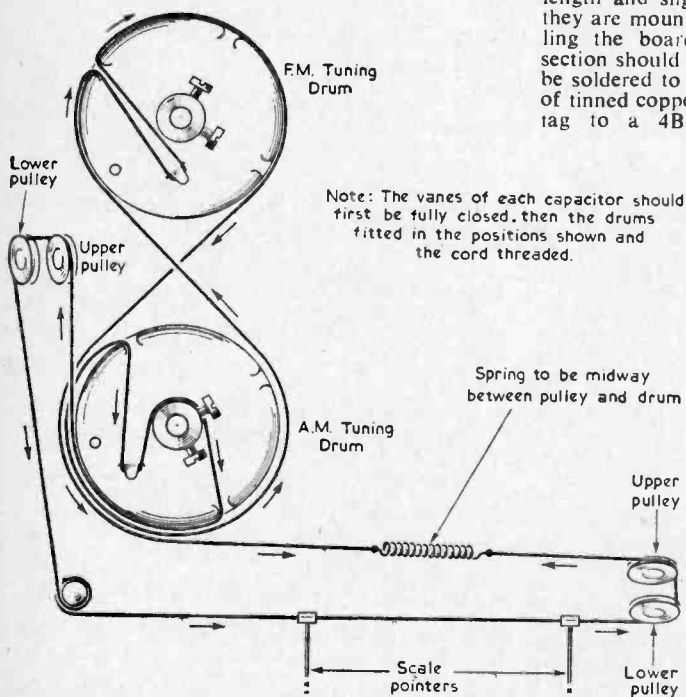


Fig. 4.—Details of the cord drive system.

mains switch to "Battery". Turn the volume control to maximum. Adjust C9 for minimum capacity (fully unscrewed). Adjust C3 and C4 to maximum capacity and then unscrew the adjusting screws two turns. Move LC1 to the extreme end of the rod. Tune to the L.F. end of the band (tuning capacitor fully closed) and inject a modulated signal of 340kc/s into the base of TR1, via a 100pF capacitor. Adjust the AE rod winding LA1 and the core of L1 for maximum signal. Tune to the H.F. end of the band (tuning capacitor fully open) and inject a modulated signal of 1.64Mc/s. Adjust trimmers C3 and C4 for a maximum signal. Repeat this operation several times until no further improvement can be obtained. The input signal should be progressively reduced and adjustments made with a minimum input level.

Tune to the H.F. end of the band and inject a 1.64Mc/s signal into the base of TR1 via a 100pF capacitor in series with a 100kΩ resistor. Increase the capacity of trimmer C9 until an increase in signal level occurs. Then readjust C3 and C4 for maximum signal. Return to C9 and increase capacity *slowly*, readjusting C3 and C4 for maximum signal and also adjusting the level of the injected signal, keeping it at a level which gives a low output from the speaker.

Repeat the operation until the point is reached where any further increase in the capacity of C9 results in instability and oscillation. If insufficient adjustment is available on C9 the reaction winding LF1 may be pushed further on to the rod.

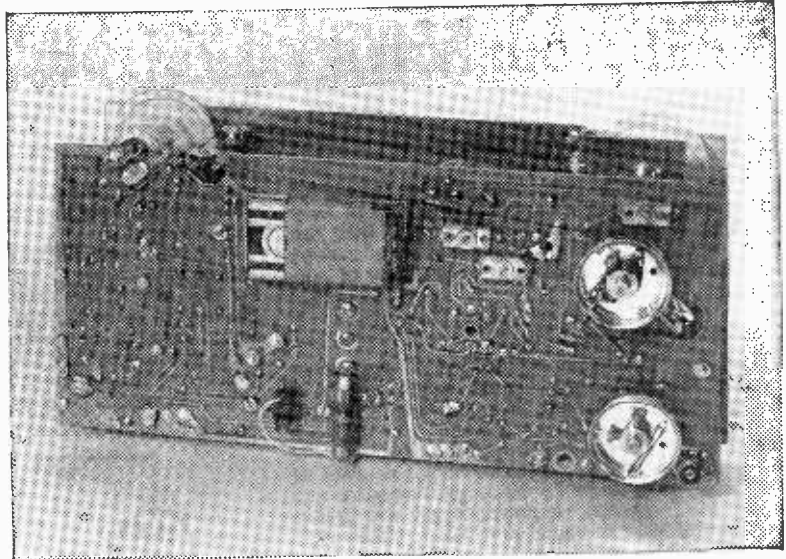
Now tune slowly over the band and should instability occur at any point adjust the core of L2 until the oscillations cease.

Final adjustments are best made using the signals from actual stations on the band. The adjustment should be carried out using a new battery. As the battery ages, it is possible to compensate by adjusting C9 to give increased signal level.

F.M. Alignment

Switch the A.M./F.M. switch to "F.M."; and the battery/mains switch to "Battery"; set the volume control to half rotation. Fully extend the telescopic aerial. Adjust the core of L4 until a loud rushing noise is heard. Tuning over the band, signals from the Home or Light Programmes should be heard. The rushing noise should disappear as the station is tuned in.

If a signal generator is available, the output terminal needs only to be connected to a short length of wire to give radiation sufficient for the



Rear view of the "Roadfarer".

tuner. Using either a programme, or the signal generator, the tuner may be calibrated by adjusting the spacing of the turns on the coil L3.

Each station will be found to tune in clearly twice, i.e. either side of the carrier frequency. L4 should be adjusted to give maximum signal.

In areas of lower signal strength, an additional F.M. dipole may be used and should be connected using about 4ft of coaxial cable. Long lengths of cable or outdoor aerials *must not be used* because of the possibility of interference with other receivers by radiation from the oscillatory circuit of the 2N502.

The F.M. tuner is *not* intended to operate in fringe areas without an F.M. pre-amp which may be used with an external aerial.

When using the receiver in conjunction with the mains, if no method is available of measuring the supply voltage, plug the mains selector into the 225V position. If instability on A.M. results, then plug into the 250V position. *Always disconnect the set from the mains supply before handling the voltage selector.*

JOIN THE PRACTICAL GROUP

PRACTICAL TELEVISION .. 1/6

Every Month.

PRACTICAL MECHANICS .. 1/3

Every Month.

Devoted to Mechanics, Science and Invention.

PRACTICAL MOTORIST .. 1/6

Every Month.

PRACTICAL HOUSEHOLDER 1/3

Every Month.

Comprehensive Power Supply Unit

A VALUABLE EXPERIMENTAL CIRCUIT

By W. Morle

JHIS article is concerned with a feature of construction that can be applied, at a cost of only a shilling or two, to most power units, with the object of improving their adaptability, and making them usable without alteration for a variety of purposes.

A Number of Designs

There are a number of designs of equipment intended for home construction which require a separate power supply unit, including tape amplifiers, pre-amplifiers, F.M. tuners and so on. For the main part, it would be possible to devise a power supply unit that would satisfy the requirements of most or all of these units so far as the necessary current and voltage are concerned. A power supply unit giving, say, 250 and 300V at about 60 to 80mA would serve for most of these units, especially if there were some provision for minor changes of voltage when the different units were used.

The advantages of a common design of power unit will be readily appreciated: if a fault develops or is suspected in one unit, it can be checked at once by substituting the unit from another piece of equipment.

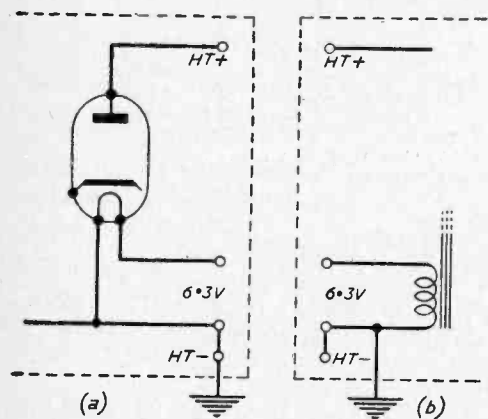


Fig. 1.—If an F.M. tuner, for example, with one side of its heater circuit connected to earth or chassis—represented by diagram (a)—is connected to a power-pack, the power-pack must be wired as in diagram (b).

When a new piece of equipment is made, it is not necessary to complete the power unit for it before testing it. Again, when a new piece of equipment is being designed, involving experiments, it is very convenient to have available a power supply that can be borrowed temporarily from existing equipment.

At first sight, it might appear a simple matter to devise a power unit that could be used in this way, but closer examination shows that there are consider-

able difficulties in doing so. In the first place, the smoothing required may differ: an amplifier might require the highest available voltage, with minimum smoothing, whilst a pre-amplifier would require a lower voltage with the maximum smoothing available. This problem is not insuperable, and various solutions come to mind.

A much more difficult point arises with heater connections, owing to the fact that some designs call for one side of the transformer winding supplying the heaters to be earthed, whilst others call for the centre-point to be earthed. In the latter case, the earth connection may be required to be made in the power unit itself through a low value potentiometer, so that the centre point can be adjusted.

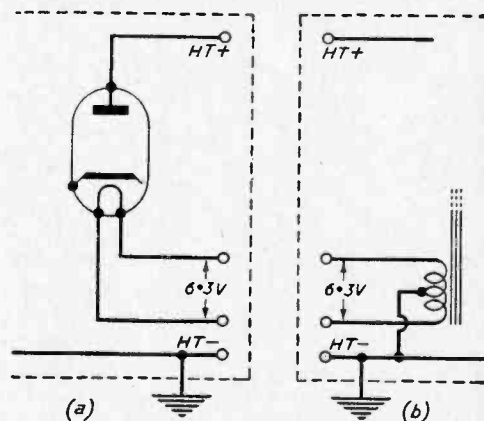


Fig. 2.—If a unit such as a tape amplifier, for example, has a heater circuit which is not earthed—represented by diagram (a)—the centre tap of the heater winding in the power-pack must be earthed as in diagram (b).

This last difficulty can be illustrated with two items of equipment that have been made in large numbers by home constructors; an F.M. tuner and a tape amplifier. In one design of the former, the heaters are earthed on one side, in the manner shown in the circuit detail of Fig. 1(a). Three wires extend between the tuner and its power unit, the heater arrangement of which has to be as in Fig. 1(b). On the other hand, the heaters of the tape amplifier are not earthed in the amplifier itself, and require the centre-tap of the heater winding to be earthed in the power unit, as shown in Figs. 2(a) and (b). The amplifier takes its power supply through a four-pin plug and socket, and it is not an easy matter to modify it in this respect.

If equipment of the type shown in Fig. 1(a) were used with a power unit connected as shown in Fig. 2(b), or vice versa, it will be seen that in either case the heater winding will be short-circuited as soon as the two chassis are connected together. The short circuit is shown in Fig. 3 by the dotted line. In passing, it is to be observed that the earth connection in the power unit of Fig. 2(b) cannot be omitted in an attempt to solve the difficulty, as such a practice is conducive to hum.

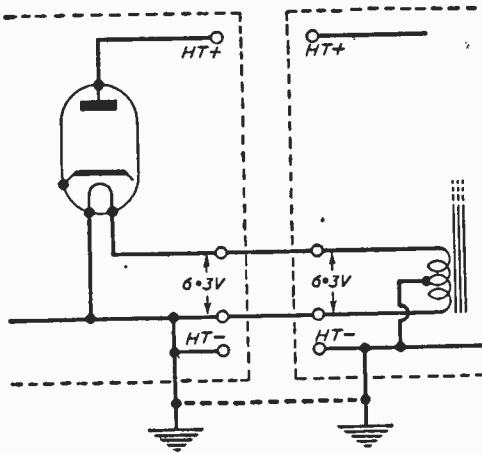


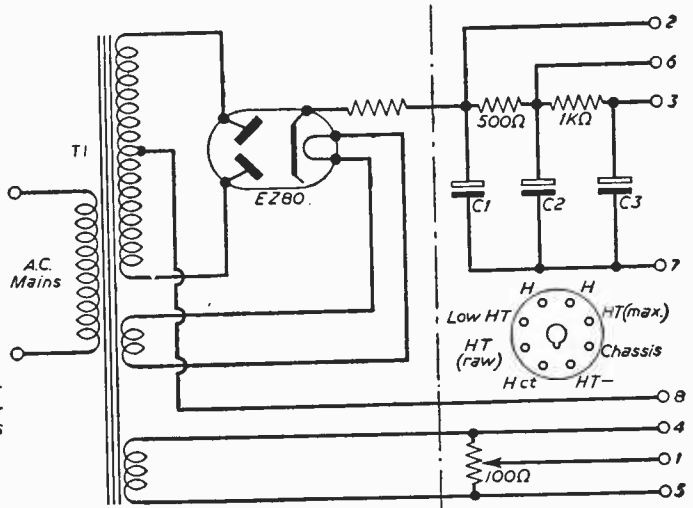
Fig. 3 (above).—If a unit having one side of its heater circuit earthed were connected to a power-pack having a heater winding with an earthed centre tap, as shown above, then part of the heater winding would be short-circuited.

tions to the power unit are therefore made when the plug is inserted. In the interests of economy, an octal valveholder is used as the socket; the plug can be a cable-mounting octal plug or an old octal valve base pressed into this service. Additionally, the plug can be used to select different output voltages, so that when the plug of a particular piece of equipment is inserted into the socket of the unit, the correct voltage will automatically be supplied to the equipment without further adjustment.

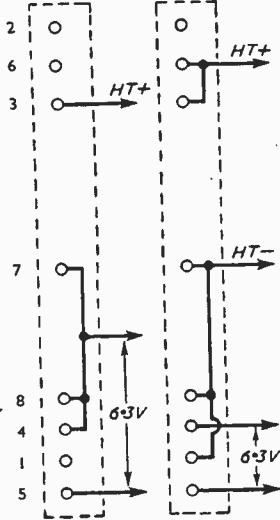
Power Supply Circuit

The circuit of a power supply unit designed on these lines is shown in Fig. 4. The unit consists for the most part of a conventional full-wave rectifier arrangement and that part of the circuit which lies to the left of the dotted line can be replaced by any equivalent circuit within the resources or needs of the constructor. The transformer T1, used in the unit described, had secondary windings giving 290.0-290V, 6.3V for the rectifier and 6.3V for the

Fig. 4 (right).—The circuit of the power supply unit. (Details of the socket connections are included.)



Below: Fig. 5 (left) and Fig. 6 (right).—Alternative arrangements of the connecting plug. (The pin connections correspond to those in Fig. 4.)



Plug and Socket Connection

In the power supply unit which is now to be described, a solution to this problem is offered which consists of using a plug and socket connection at the power supply unit; no connection is made in the unit itself between the heater winding and the chassis of the unit, the necessary connections being made in the plug. The plug forms part of the equipment supplied with power, and the appropriate connect-

heaters. The primary winding can be embellished with voltage taps, switches, fuses and plugs and sockets as desired. The rectifier valve is an EZ80.

Smoothing

Smoothing is effected by two resistors of 500 and 1000Ω respectively, in conjunction with a three-section electrolytic capacitor C1, C2, C3, 350VW. The 500Ω resistor can be replaced by a smoothing inductance in the usual way.

We now come to the less conventional parts of the circuit. Various connections to the circuit are brought out to eight terminals, numbered 1 to 8 using the convention usually adopted with octal plugs and sockets; with the socket viewed from the under-side, the contacts are numbered clockwise starting from the location projection on the key. Connections are brought out from the top of C1, C2 and C3, from the centre tap of the H.T. winding, from the common can of C1, etc.—which is also connected to the chassis—from the ends of the heater

(Continued on page 146)

Transistorised alignment

THE circuit of this signal generator consists of two separate units—an R.F. oscillator and an L.F. oscillator. The L.F. oscillator may be used separately, or, the two units may be used together, the L.F. oscillator then serving to modulate the R.F. oscillator. For simplicity, both oscillators utilise a tuned collector circuit and the minimum of components is used throughout. A transistor is used in both units, making possible a small, portable, instrument which works from a miniature torch battery. Because both units are oscillators, the gain of the transistors is of little importance and little advantage is obtained by using preferred types—surplus transistors will serve just as well.

L.F. Oscillator (TR2)

The L.F. oscillator comprises a grounded emitter A.F. transistor with a tuned collector circuit and a feedback winding connected in its base/emitter circuit. The output is taken from its emitter load, a 1k resistor, which is shared by the R.F. oscillator.

The output level of this oscillator is made variable by connecting a 5k potentiometer—fitted with a switch—across the 1k emitter resistor; the switch serves as the battery on/off control. For simplicity, the output impedance of the signal

generator has not been made constant for all output levels—but this omission should not cause inconvenience for most applications.

R.F. Oscillator (TR1)

The circuit of the R.F. oscillator is very similar to that of the L.F. oscillator except that the L.F. transformer is replaced by two R.F. trans-

formers—one for medium-wave and one for long-wave frequencies—with the necessary switching to connect the appropriate transformer into the circuit. A 500pF (0.0005μF) variable capacitor is used to tune to the required frequency.

Modulation of the R.F. oscillator is achieved by injecting the L.F. signal into the emitter circuit of the R.F. oscillator—both oscillators sharing a common emitter resistance. An additional output, for higher level signals, is available, and this output is taken from the collector of the R.F. oscillator

transistor via a 0.01μF isolating capacitor. The R.F. oscillator may be rendered inoperative by the wave-change switch; the signal generator may thus be used for A.F. signals only. Both of the R.F. transformers have tunable cores enabling the required bandwidth of oscillations to be covered.

Construction

Both oscillators are constructed on two pieces of 1/16 in. paxolin with the exception of the tuning capacitor, the potentiometer, and the wave-change switch. The complete circuit is mounted on the inside of the front panel of the instrument, as shown in the illustration on page 142. The instrument case is made entirely from hardboard. The end pieces are veneered and then French polished. The remaining surfaces are covered with adhesive-backed plastic material. Alternatively, the end pieces of the cabinet may be cut from 1/4 in. hardwood and polished.

The supply battery—three U16 cells connected in series—is mounted on the hinged back of the instrument case and held in position by a case formed

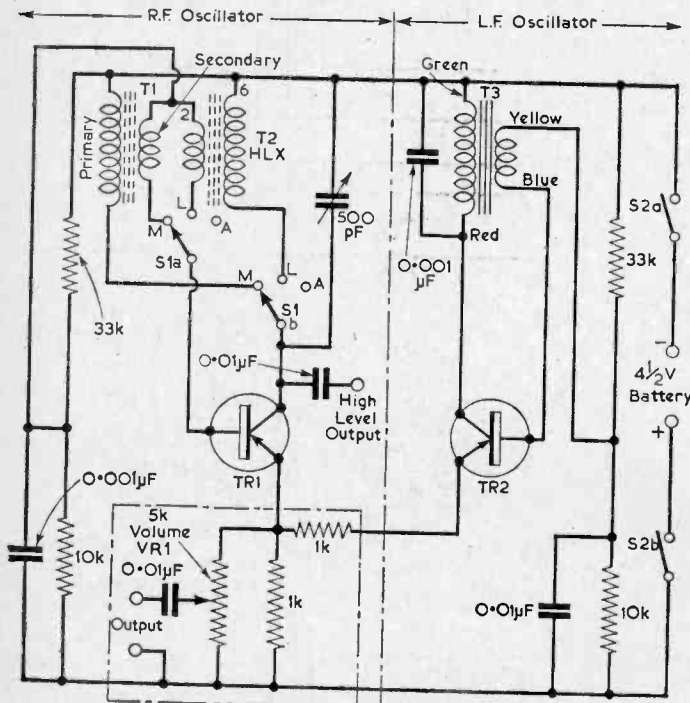


Fig. 1.—The circuit diagram.



A TWO-TRANSISTOR CIRCUIT FOR MEDIUM AND LONG WAVES

By D. Saull

by wrapping thin card-board round the cells and cementing in position. Details of the cabinet construction are shown in Figs. 3 and 4.

When making the cabinet, all the components should be fitted into position before the front panel is cemented to the sides and to the top and bottom, and then removed for completion of the cabinet. This ensures that all the components will fit and that screw holes, etc., are in the correct position, making final assembly easier.

Where the front panel meets the top and the bottom of the cabinet, because of the inclined angle of the front panel, a gap occurs between the meeting surfaces. This gap may be filled with plastic wood which, when dry, may be sanded into a gentle curve.

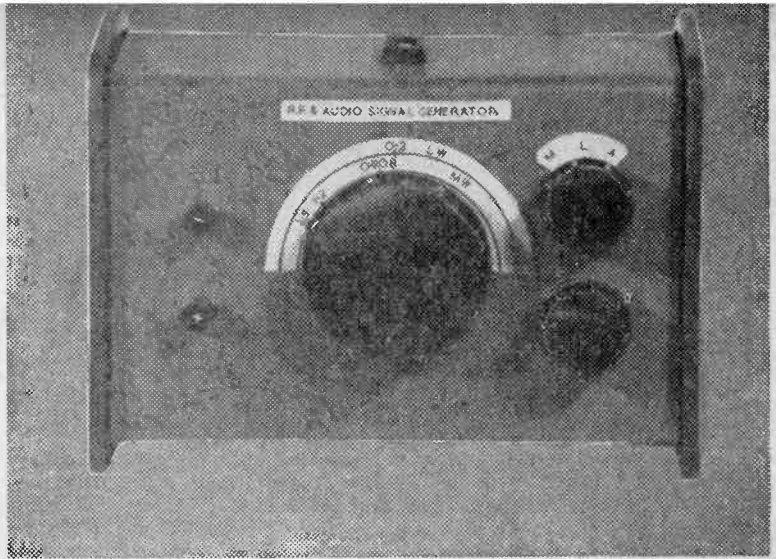
The back of the cabinet is hinged by means of a strip of cloth cemented to the edge of the base and the back of the cabinet.

Impact adhesive (e.g., Evostick, Dunlop 708, etc.) is used throughout the construction, and the corners of the cabinet are reinforced with strip wood.

Wiring and Assembly of Components

The tuning capacitor should be inserted into the cabinet first and two leads connected to it. The volume control should be wired before inserting into position, and the output terminals connected into circuit. Fig. 5 illustrates the initial wiring. Then insert the R.F. and the L.F. oscillator panels and complete the wiring.

Should, on completion, either oscillator fail to function, then reverse the connections of the feedback winding on the relevant coil.



Front view of the unit.

Calibrating the Signal Generator

The calibration of the instrument—a simple process—is carried out as follows:—

- (1) turn the supply switch to "on";
- (2) connect two leads from the signal generator to the aerial and earth sockets of an ordinary domestic receiver;
- (3) turn the wave-change switches on the domestic receiver and the signal generator to the medium-wave position and tune the domestic receiver to the Home programme;
- (4) adjust the frequency tuning control on the

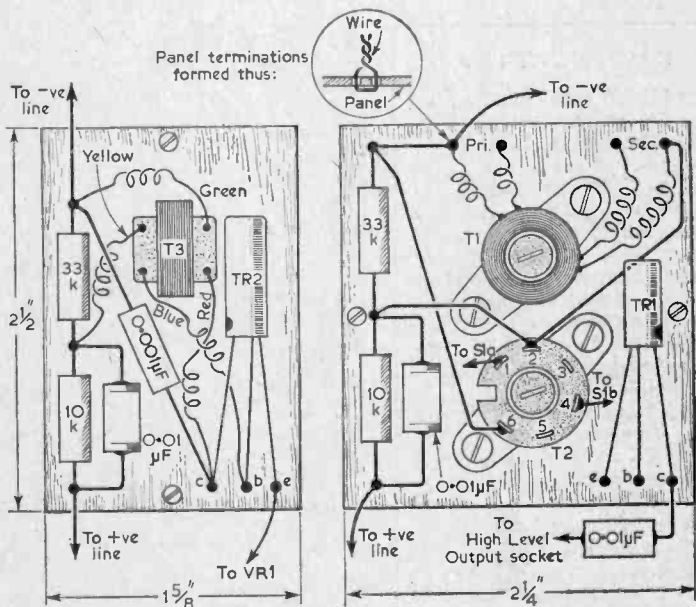


Fig. 2.—The wiring of the L.F. and R.F. oscillators.

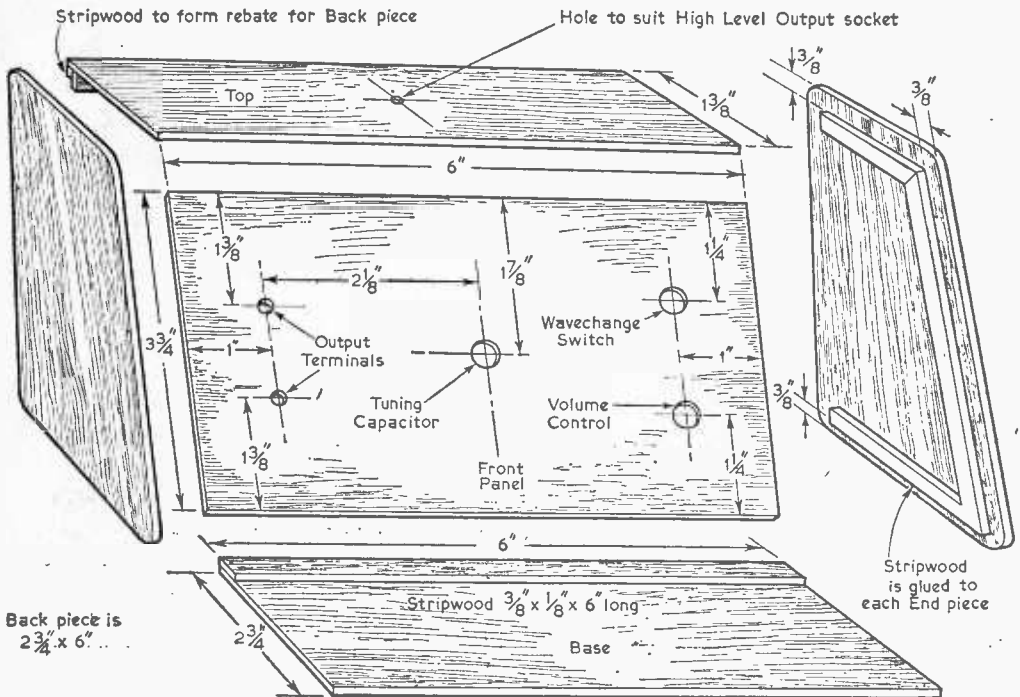


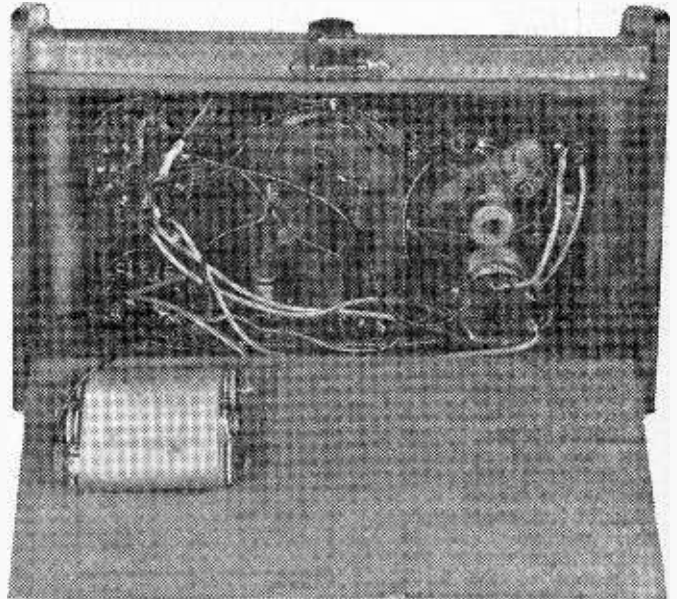
Fig. 3.—The construction of the cabinet.

signal generator until a 1kc/s audio tone is heard superimposed on the broadcast programme from the domestic receiver and mark the setting—wave-

length or frequency (note: the output of the signal generator is insufficient to cause interference to other listeners by radiation). Finally, steps (3)

COMPONENTS LIST

Two $33k \frac{1}{2}W$ resistors
 Two $10k \frac{1}{2}W$ resistors
 Two $1k \frac{1}{2}W$ resistors
 Three $0.01 \mu F$ capacitors
 Two $0.001 \mu F$ capacitors
 Miniature pot.— $5k$ with double-pole switch
 $500pF$ mica dielectric tuning capacitor
 $4\frac{1}{2}:1$ miniature interstage transformer (Ardente)
 4-pole, 3-way wafer switch (two of the poles are not used)
 Three U16 batteries
 One $\frac{3}{8}$ in. diameter polystyrene coil former with slug
 One HLX coil (Teletron)
 Two small terminals
 One small socket
 One large tuning knob (about 2in. in diameter)
 Two knobs, $\frac{3}{4}$ in. in diameter
 TR1: White spot transistor
 TR2: White or red spot transistor



Internal wiring of the unit.

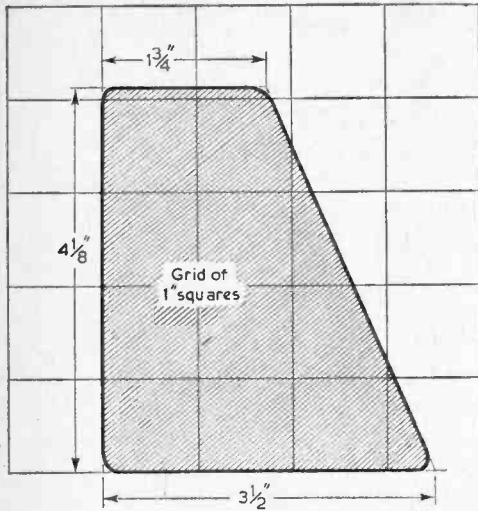


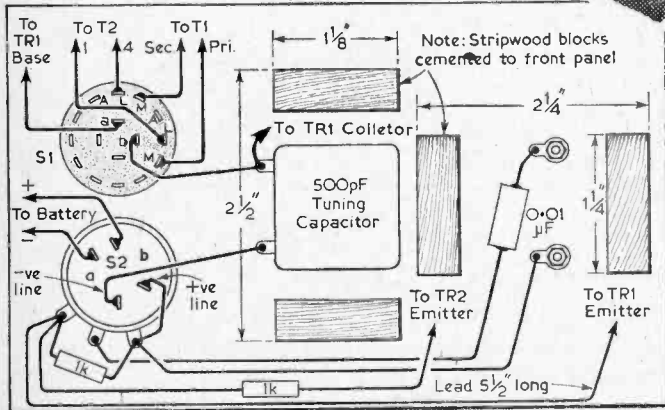
Fig. 4.—The dimensions of the sides of the cabinet.

and (4) should be repeated for the Light programme on the medium and long wavebands. Other intermediate calibration points can be inserted on the scale based upon the calibration of the domestic receiver tuning dial, but three highly accurate calibration points will have been obtained at the broadcast signal frequencies.

(Note: Local broadcasting transmitter frequencies and wavelengths can be found in the local edition of *Radio Times*.)

Signal Generator Frequency Scale

The frequency scale is made from a piece of white cardboard; the markings are made in black ink. If care is taken, a professional appearance may be obtained. Figures and letters may be in free-hand style—or by U.N.O. stencil.



The scale is covered with transparent material and cemented to the front panel of the instrument.

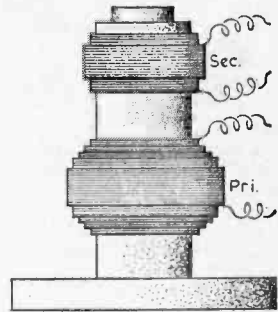
When connecting the signal generator to a receiver for calibrating or for checking a receiver's performance, the following observations may be found useful:—

- (1) The greatest signal is available when two connections are made between the signal generator and the receiver, one lead being connected to the receiver chassis and the other to

(Continued on page 154)

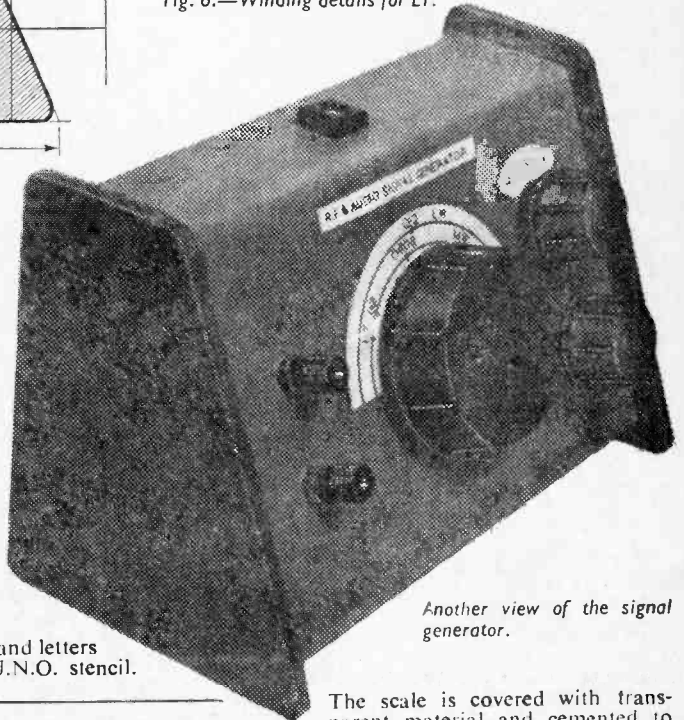
Fig. 5 (left)—The wiring to be completed before the oscillator panels are mounted.

- Secondary
 - 1st. layer — 14 turns
 - 2nd. " — 6 "
- Primary
 - 1st. layer — 30 turns
 - 2nd. " — 25 "
 - 3rd. " — 20 "
 - 4th. " — 18 "
 - 5th. " — 10 "



Use 32SWG. D.S.C. or D.C.C. wire

Fig. 6.—Winding details for LI.



Another view of the signal generator.

HI-FI Pre-amp and Equaliser

A COMPREHENSIVE CIRCUIT

By J. Haskell

THE circuit described comprises the latest techniques in hi-fi pre-amplification. It is suitable for use with any amplifier.

Equaliser

The circuit in Fig. 1 is focused around V1 which can be either one section of the double triode ECC83 or any high gain, double-diode-triode, such as the EBC41 or 6AT6.

The circuit of V1 comprises equalisation for radio and records, as well as additional amplification for an amplifier with an input impedance of 1M requiring 500mV input. Equalisation for radio is on position 1 of SW1, RIAA position 2, U.S. Col. LP's position 3, and 78's position 4. A negative feedback resistance/capacity network in the anode/grid circuit of V1 provides the necessary frequency correction. RL is not the load resistor of the pick-up, as it is in parallel with

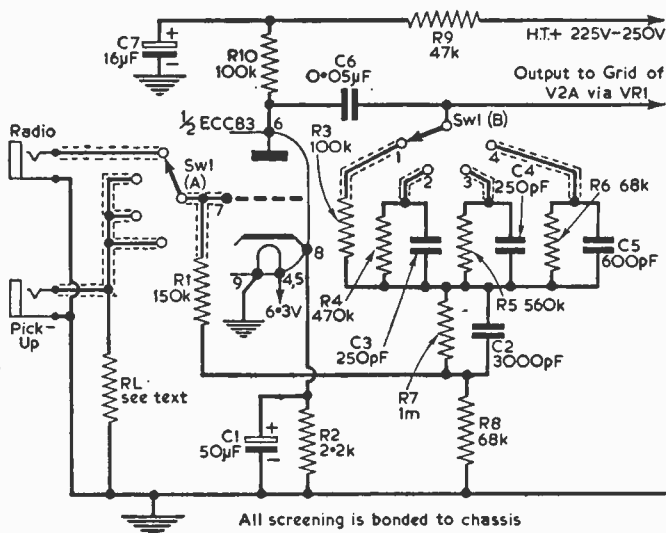


Fig. 1.—The equaliser circuit.

(R1 + R8) and its value should, therefore, be calculated bearing this fact in mind. Adequate decoupling by C7 serves to keep hum and distortion at low level.

Tone Control System

In Fig. 2, the second stage incorporates a well-known tone control circuit with independent cut and boost in both treble and bass frequencies, as referred to a frequency of 1,000c/s.

An interesting change was the omission of C15, as a result of which a degree of current feedback was applied to V2, keeping hum and distortion at a minimum. C15 could, however, be inserted if extended high frequency response is required and where the extra gain is useful. The potentiometer VR2 is centre-tapped, giving treble boost and cut at the extreme ends of its travel; this also applies to VR3.

Construction

As many constructors design their own layout, a few points must be stressed: 1, all control-grid wires are to be screened; 2, the tone control casings should be earthed; 3, owing to the high gain, screening might be required, though it was not used in the prototype; 4, all heater wires should be twisted tightly and positioned close to the chassis, as far away from the grid leads as possible.

The author found construction on group boards gave a neat appearance and facilitated servicing. It should be remembered that the layout of components can make or mar the capabilities of

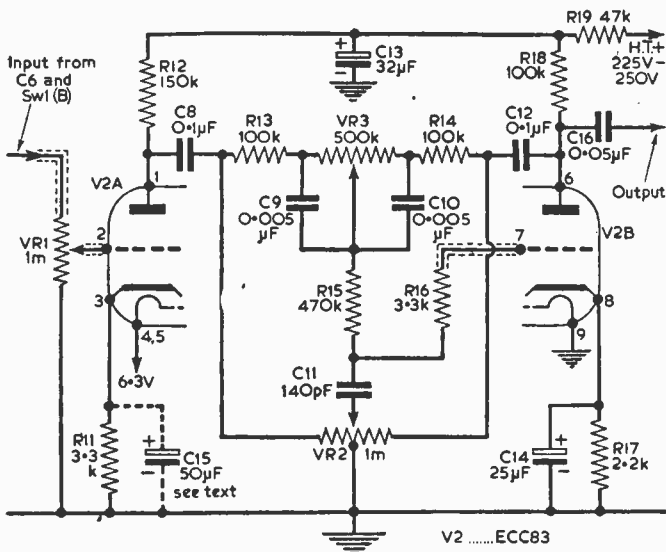


Fig. 2.—The tone and volume control circuit.

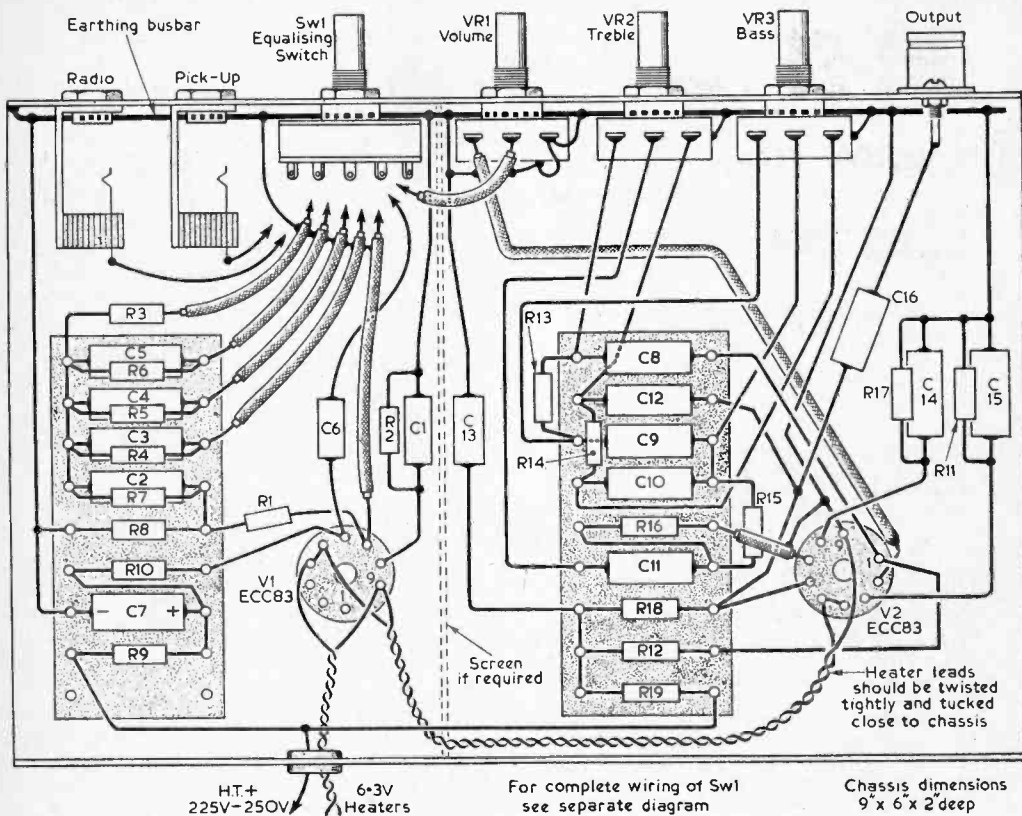


Fig. 3.—The under-chassis layout.

the pre-amp. The lead going to R11 should be kept close to chassis since the absence of C15 (if, in fact, it is omitted) may cause induced hum. All earthing must be made to a bus-bar, earthed as

close to the input sockets as possible, and there only. Best results would be obtained if C11, C3, C4, C5, R4, R5, R6 were of close tolerance, i.e. 5per cent.

COMPONENTS LIST

Resistors

(All resistors are 1/4 or 1/2 W)

R1	150k	R11	3.3k
R2	2.2k	R12	150k
R3	100k	R13	100k
R4	470k	R14	100k
R5	560k	R15	470k
R6	68k	R16	3.3k
R7	1M	R17	2.2k
R8	68k	R18	100k
R9	47k	R19	47k
R10	100k		

Capacitors

C1	50 μF 50VW	C4	250pF
C2	3000pF	C5	600pF
C3	250pF	C6	0.05 μF

C7	16 μF 450VW	C14	25 μF 450VW
C8	0.1 μF	C15	50 μF 50VW
C9	0.005 μF	C16	0.05 μF
C10	0.005 μF	VR1	1M
C11	140pF	VR2	1M centre-tapped
C12	0.1 μF	VR3	500k
C13	32 μF 450VW	SW1	4-pole, 4-way rotary switch
			2 B9A holders if using two ECC83's

Miscellaneous

One piece of aluminium 10in. x 9in. for the chassis (which is made as the constructor wishes). Connecting wires, shielded wire, etc.

Valves

Two ECC83's (or one ECC83 and one double-diode-triode)

Component layout

For constructors wishing to follow the prototype, the layout of components on the group boards is shown in Fig. 3.

For constructors with a modest income, the author advises that the tone control circuit be made first, and if used with the popular crystal cartridges, which have a fair degree of record equalisation owing to their response curves, quite good results will be obtained. If, however, the best results are desired, both units should be constructed together.

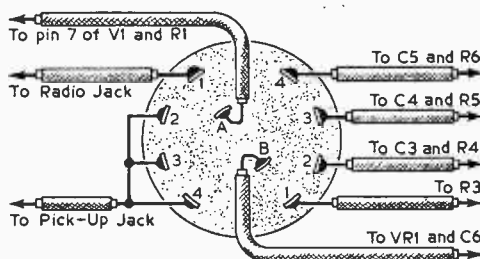


Fig. 4.—The wiring of SW1—the equalising switch.

COMPREHENSIVE POWER SUPPLY UNIT

(Continued from page 139)

winding and from the centre-tap of this last winding. The centre-tap can be a direct tap on the winding, if one is provided; if it is not it can be an artificial one formed by two resistors connected in series, of about 20 to 100Ω each, across the winding. In the circuit described, which was intended to be used with equipment where hum had to be kept to a minimum, a potentiometer (100Ω) is used. Any value between about 50 to 200Ω would be suitable.

Plug Wiring

In Fig. 5 is shown the way in which a plug would be wired to supply a piece of equipment such as the F.M. tuner mentioned earlier, with one side of the heaters earthed, and a single H.T. connection, as in Fig. 1(a). As before, the numbers refer to the standard octal contacts. In the plug (Fig. 5), the H.T. connection is made to contact 3, the heater connections to contacts 4 and 5 and contacts 7, 8 and 4 are joined for the common earth and H.T. negative.

The reason for bringing out the separate connection to the centre-tap of the main H.T. winding may not be apparent at first but it has the important practical advantage that, should the unit be operated with the mains supply switched on, but with no plug in position in the output socket, no damage to the electrolytic capacitors will ensue. Otherwise, if there were no current being drawn from the unit, the voltage on the capacitors would rise to approximately the peak voltage of the H.T.; with 290V, this would be about 400V, which is in excess of the voltage ratings of the capacitors. The indirectly heated EZ80 prevents excessive voltage on the capacitors when switching on in normal use.

A further arrangement of the connecting plug is shown in Fig. 6, intended for use with the tape amplifier. In this case the H.T. connection is made to contacts 6 and 3 which are shorted in the plug. The effect of this is to give a higher output voltage, and to short out the 1k resistor and connect capacitors C2 and C3 in parallel, to make best use of them for smoothing. Contacts 7 and 8 are joined together in the plug as before, and the centre-tap contact 1 is also connected to them. For convenience, a view of the socket base, from the underside, is shown in Fig. 4.

In both the uses of the unit described, only a single H.T. + connection has been made to the associated equipment, but if desired connections can be made to both terminals 6 and 3 provided that the total current drawn from the unit does not exceed the permissible maximum. ■

All-Band 75W Transmitter

(Continued from page 130)

switch set to "grid current," the "phone/CW" switch to "phone," the bandswitch set to 80m and the appropriate tank coil plugged in. The "net" switch is depressed, the receiver R.F. gain reduced, the BFO turned on, and the V.F.O. tuned for a medium frequency beat note. The "net" switch is turned off, and the receiver R.F. gain control reset for normal reception. The transmit/receive switch is depressed, and VCI tuned around three quarters capacity for a dip in anode current and a jump in the grid current reading from zero to a high value. The tuning of the VFO output stage is adjusted for maximum grid current. VCI is adjusted until the grid current reads about two thirds of FSD. The high H.T. switch is depressed and the P.A. anode tuning quickly adjusted for a sharp deep dip. The loading condenser should be moved to maximum capacity during this adjustment. The loading condenser is now adjusted for a rise in anode current, the tuning condenser adjusted for a dip, and so on, until a reading of about 100mA is obtained at the dip position. It is quite possible to load up to almost 150mA, when an input of 112W is being taken, but this may damage the valve. The "listen-through" control is slowly advanced until the beat note is again heard loudly. The receiver B.F.O. is turned off, a suitable microphone plugged in, and headphones used for reception. The modulator gain control should be advanced until good clear modulation is heard, on speaking. At this point, the P.A. anode current meter will give slight upward kicks. You may now have a QSO: switching back to "receive" carries out all the switching necessary to return to normal reception. By simple modifications, press-button microphone, or voice controlled switching can be used. Normally, when operating on 'phone, the "listen-through" control is turned down sufficiently to prevent audio feedback. On CW, monitoring of the output is possible using this control.

Operation on the other bands is just as simple, but it should be remembered that around 5mA of grid current is required for efficient output. Excess drive will reduce the output. ■

AMAZING NEW TRANSISTOR RADIO KIT

"SONIC SIXTY"

6 Mullard Transistors. 1 Diode. Internal Ferrite Rod Aerial. 7 x 4in. high quality Speaker. 500 mW push-pull output. MW and LW. Calibrated Direct Drive Assembly. Modern high polish Walnut Cabinet 17 x 7½ x 5in.

COMPLETE KIT
READY TO BUILD **£9.15.0** P. & P. 4/6

ALL PARTS SOLD SEPARATELY



BUILD IT YOURSELF!

"THE COMPANION"
(Our improved version of the Traveller's Friend)

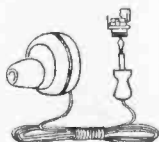


£8.19.6 POCKET RECEIVER
P. & P. 3/6
in leatherette case

This amazing set can be built complete for £8.19.6. Size 6½ x 4½ x 1½in. just right for the pocket. Uses 6 guaranteed first grade transistors, covering Long and Medium wavebands, latest printed circuit. High Q internal ferrite rod aerial, with socket for car aerial. Complete with step by step instructions. All parts sold separately. Battery PP.4 (Ever Ready 2/- each).

MINIATURE EARPHONE FOR TRANSISTOR RADIOS

Light weight plastic earpiece, can be worn without discomfort, provides excellent reproduction of music and speech. Fully guaranteed complete with 3 ft. of fine flex, plug and socket. Crystal earpiece as illustrated 10/-
Magnetic " " " " P. & P. 1/-



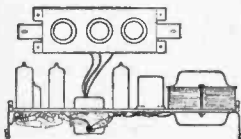
DECCA AMPLIFIER

Ideal for any record player. Tone and volume controls ECL82. Mains. Size 8½ x 3½ x 3in. Ready Built For Use. **59/6**
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 3ohms, suitable for use with Acos GC/71, GP/73 and Garrard GC/10. Complete with wiring diagram. **£2.19.6**
P. & P. 2/6

8 WATT AMPLIFIER



This superb 8 watt amplifier made by well-known manufacturer, ready for your Hi-Fi cabinet. Spec.: 2 EL84, 12AX7 and EZ81. Push-pull output. Separate Bass and Treble controls on panel with extended lead.

Special Bargain while stocks last **£4.15.0** P. & P. 3/6

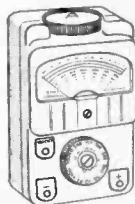
BATTERY ELIMINATOR

Convert your Battery Set to Mains with a COSSOR BATTERY ELIMINATOR.

MU2. For operation on 200/250 v. 50 c/s A.C. mains. Output: L.T., 1.5 v. 125 mA; H.T., 90 v. 10 mA. **42/6**
P. & P. 2/6



NEW POCKET MULTIMETER



A must for all home constructors. Basic movement 300µA. Sensitivity 1,000/V. A.C. and D.C. Ranges 10-50-250-500-1,000V. D.C. and A.C. 1-100-500mA. D.C. 2K/200K ohms. Accuracy: 3% FSD and D.C. 5% F.S.D. and A.C. 10% on Resistance scale. Dimensions 5½ x 3½ x 2½in. Complete with test leads, prods and 1.5V cell. **59/6**

59/6
P. & P. 2/-

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



OUR LATEST RECORD PLAYER KIT



£8.9.6 COMPLETE KIT OF PARTS
P. & P. 3/6

A.C. Supply 200-250 v. Attractive cabinet covered in Red plastic, size 14 x 12½ x 6½in. with gilt fittings. Uses Collaro Junior single play 4-speed motor. Acos GP67-32 cartridge and ready assembled amplifier with UL41 valve, 7 x 2in. speaker.

RECORDING TAPE OFFER

FAMOUS MAKE P.V.C. BASE ON PLASTIC SPOOL
STANDARD LONG PLAY
600ft on 5in. spool 15/- 900ft on 5in. spool 18/6
850ft on 5½in. spool 16/6 1200ft on 5½in. spool 21/-
1200ft on 7in. spool 21/- 1800ft on 7in. spool 32/6
P. & P. 1/-

LOUDSPEAKERS

5in. 14/6; 6½in. 16/-; 8in. 16/6; 6 x 4in. 14/6; 7 x 4in. 15/-; 8 x 5in. 23/-; 10in. 30/-; 10 x 6in. 25/-; 12in. 32/6. All above 3 ohms impedance. P. & P. 2/6.
12in. 15 ohms. Hi-Fi Celestion £4.19.6.

SEND S.A.E. FOR FREE PRICE LIST
OR PAY US A PERSONAL CALL

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 and 36 pass the door.

LASKY'S RADIO

TRANSISTOR RECORD PLAYER

CAN BE
BUILT
FOR

£9.19.6

Carr. free



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 3/8 extra.

LOUDSPEAKER. 30 ohms. 7 x 4in. elliptical, matched to Amplifier, 25/-.

3-SPEED TURNTABLE. 6 v., complete with L.C. crystal cartridge and two sapphire styli. 79/6.

CARRYING CASE, smart two-tone finish, 17 x 14 x 5 1/2 in. High. 49/6. Batteries extra.



SUPERB 6-TRANSISTOR S/HET TRANSPORTABLE

CAN BE BUILT **£9.15.0**
COMPLETE FOR plus 4/6 p.&p.

Printed circuit construction, all components of highest quality. Uses 6 Mullard matched transistors, 1 diode, two OC81 valves in push-pull, giving 1 watt undistorted output. I.F. 470 Kc/s. Medium and long wavebands. Ferrite rod internal aerial, high flux 7 x 4in. Loudspeaker. Cabinet with first quality walnut veneer finish and gold embellishments. Size: 18 x 8 1/2 x 5 1/2 in. deep. Circuit diagram and full data supplied. Every component available separately.



LASKY'S CAR RADIO 12 v. operation.

Transistor output. Medium and long waves. Small size will fit any car. Build and install now for Summer pleasure. Can be built complete with Speaker for **£9.19.6** Instruction booklet 2/6 (refunded if you order) plus 3/6 p. & p.

207 EDGWARE ROAD, LONDON, W.2.

PADdinton 327112

42 TOTTENHAM COURT ROAD, W.1.

MUSEum 2605

BOTH OPEN ALL DAY SAT. Early Closing Thurs. Mail Orders to Dept. P.W., Edgware Road.

THE "SHERWIN 6" TRANSISTOR POCKET SUPERHET

Very latest printed circuit, using 6 matched top grade S.T.C. transistors and germanium diode. Push-pull output feeding 3in. P.M. speaker. Full coverage of medium and long waves. Internal ferrite aerial; provision for car aerial. Housed in leatherette-covered case. 6 1/2 x 4 1/2 x 1 1/2 in. Full point-to-point instructions supplied.

CAN BE BUILT FOR **£8.19.6**

All components available separately. Circuit and instructions, 2/6. (Refunded if you order).

THE "KINEMATIX" STEREO BALANCE METER UNIT

No more guessing! Perfect balance in seconds. Brand new U.S.A. import supplied with full operating instructions. Suitable for use with all hi-fi stereophonic amplifiers. Enables you to recreate the stereo effect in any particular area of the room. Smart polished wood Cabinet. 6 1/2 x 3 1/2 x 4 in. LIST £7.7.0

LASKY'S PRICE 67/6 Post 2/6

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 5th September 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.

For details, write to:

The Principal, P.10
**THE PEMBRIDGE COLLEGE
OF ELECTRONICS**
34a Hereford Road, London, W.2

THIS receiver is of small size, but neither miniature components nor a very compact layout have been adopted. Construction is thus very easy indeed, and the completed receiver is inserted as a single unit into its cabinet. The circuit is shown in Fig. 1, and uses an ECC83 or 12AX7 double triode. This valve has a heater which may be operated from a 6.3V or 12.6V transformer. In the wiring plan the heater is wired for 6.3V operation. If a 12.6V transformer is to hand, heater circuit connections are made to pins 4 and 5 on the holder, and pin 9 is not used.

Loudspeaker One-valver

A BEGINNER'S MAINS CIRCUIT

By K. Severn

The Function of the Components

The set covers long and medium waves. C1 is an isolating condenser, and is screwed on the inside of the cabinet, so that a length of thin flex may be attached to it, to use as a "throw out" aerial. If a short aerial will always be used, a 500pF mica condenser will be satisfactory here. If a longer or better aerial can be provided, results can be improved by using a much smaller capacity, such as 50pF. Alternatively, a small pre-set condenser may be joined in series with C1, and adjusted for best results. The value is in no way critical, but selectivity is improved if C1 (or the pre-set) is of fairly low capacity.

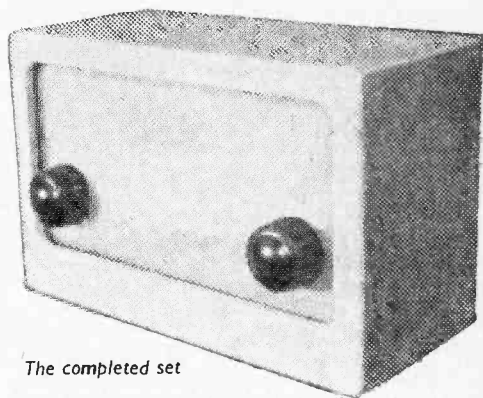
C2 is for tuning, and in the interests of small size a 384pF air-spaced condenser is fitted. The usual 500pF air-spaced condenser is too large to be accommodated, unless panel and chassis dimensions are slightly increased. A 500pF solid-dielectric condenser may be used, but is less efficient.

As the valve has a high gain, some negative feedback is introduced by the 1M resistor between anodes. The anode current is small, and permits a personal portable type of output transformer to be used. (These are intended for 3S4 and similar all-dry output valves.)

H.T. is obtained from a small contact-cooled rectifier, with series resistors for smoothing, and to keep the voltage down to a suitable figure. The mains switch is a lead-through type, as used for lamps, etc., and included in the flex to the receiver.

Chassis and Panel

The chassis is 7in. x 3in., with 1/2in. runners, and can be made from a piece of aluminium 8in. x 3 1/2in. The front-ends of the side runners are bent over, forming brackets which are bolted to the panel (Fig. 3). The panel is of 3-ply, and is 7in. x 4 1/2in., with holes for variable



The completed set

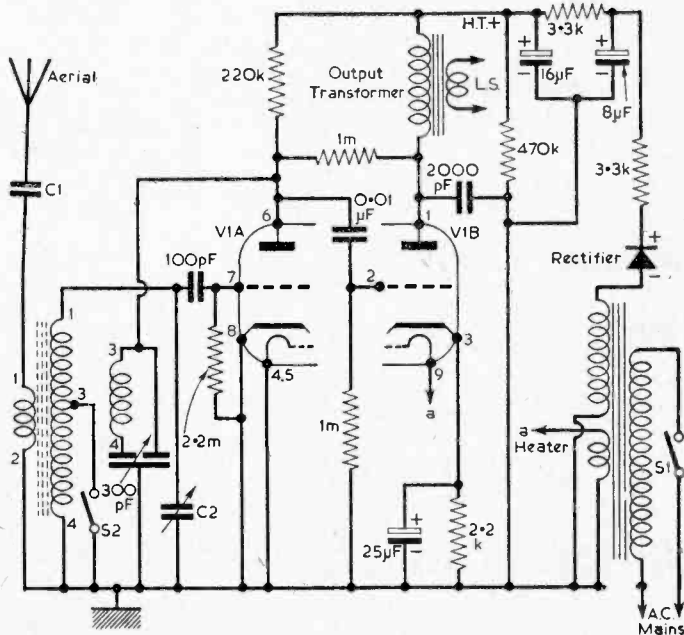


Fig. 1.—The circuit diagram.

condensers and speaker, as shown in Fig. 4. It is covered with silk or similar material after construction is finished.

Fig. 2 shows components and wiring above the chassis. The heater consumption is only 0.3A at 6.3V so the smallest type of mains transformer will suffice. That actually fitted was a "converter" transformer. The H.T. winding should give about 200V at 20mA but transformers giving 150-180V will be suitable also.

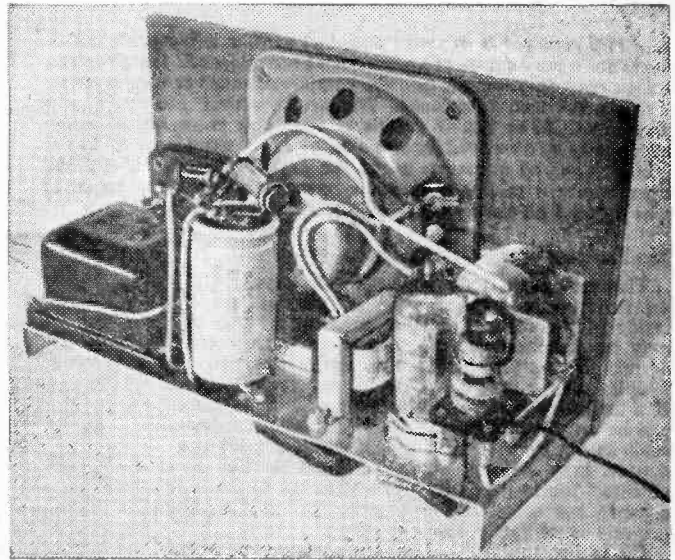
The smoothing condenser has a tag soldered to its common negative lug so that it can be bolted to the chassis. The frame of the tuning condenser C2 is also connected to the chassis. To obtain the 384pF capacity with the small condenser listed, both sets of fixed plates are wired in parallel, as in Fig. 2.

The reaction condenser is a differential type, and thus has two sets of fixed plates. These are marked F1 and F2 in Fig. 2. The moving plates tag is joined to the chassis.

Transformer Wiring

Leads from the speaker transformer secondary pass to the speaker unit speech coil tags, as in Fig. 2. Primary leads from the transformer pass through the chassis, to the H.T. positive line, and pin 1 on the valveholder. The rectifier is bolted to the chassis, under the speaker. The total H.T. consumption is only a few milliamps, so a very small rectifier is satisfactory. It must, however, be intended for a 250V A.C. input.

Connect a length of twin flex to the mains transformer primary. Take one side of the



Rear view of the receiver.

circuit to the neutral pin of the mains plug—which is marked "N" in Fig. 2. Wire the on/off switch mentioned in the "L" conductor of the flex, at a convenient distance from the receiver. Take this lead to the "L" pin, or internal fuse, on the mains plug.

Components and wiring under the chassis are shown in Fig. 3. The insulated tag forms a connecting point for H.T. positive. The 470k resistor from here to the chassis serves to discharge the large condenser.

(Continued on page 153)

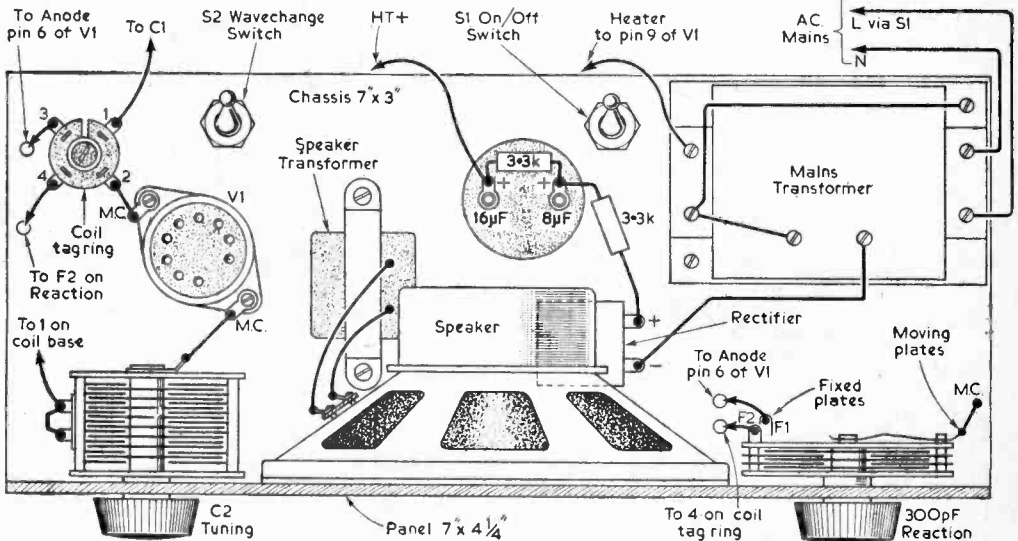


Fig. 2.—Layout, and dimensions, of the chassis and front panel.

CLYNE RADIO LTD. THE COMPONENT SPECIALISTS

18 TOTTENHAM COURT ROAD, W.1
162 HOLLOWAY ROAD, LONDON, N.1
9 CAMBERWELL CHURCH STREET, S.E.5

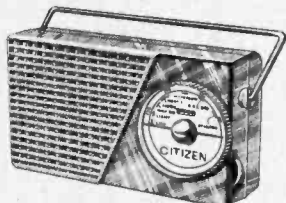
MUSEum 5929/0095
NORth 6295/6/7
RODney 2875

All post orders and correspondence to 162 HOLLOWAY ROAD, LONDON, N.7

NEW! "THE CITIZEN"

Introducing our new Super-Sensitive 5-Stage (4 transistor plus diode) pocket transistor receiver—for full medium wave reception—with the following outstanding features:

Only
95/-
Plus
2/6
P.&P*



★ Completely self-contained—No external aerial or earth required. ★ Genuine 2in. High Flux P.M. Speaker. ★ Push-pull output—250 milliwatts. ★ Genuine Edesman transistors. ★ Socket provided for personal listening. ★ Socket provided for connection to Car Aerial. ★ Volume Control with on/off switch—Condenser tuning. ★ Easy assembly on colour coded pre-tagged circuit board. ★ Attractive red polystyrene cabinet measures 5 1/2 x 3 x 1 1/2 in. chrome handle, attractive dial. All required components including full instructions, solder, etc. and battery at special inclusive price of only 95/- (Yes, Ninety Five Shillings Only!) Plus 2/6 P. & P. Nothing more to spend. Suitable crystal deal-aid type miniature earpiece fitted with miniature jack plug at 7/8 extra only! If req. All parts available separately—Itemised list and full assembly instructions, sent for 1/8 post free. Hear this amazing little receiver working, at any of our branches.

I VALVE SHORT-WAVE RADIO

World-wide coverage at most reasonable cost.

Covers 40-100 metres with the coil supplied. Can be extended to cover 10-100 metres. Provision is also made for the addition of two extra valve stages. Employs the famous Acorn-type 954 valve. All necessary components can be supplied complete with full assembly instructions at ONLY 95/- plus 2/- p. & p. Send 2/- for point-to-point wiring diagram and price list.

Printed Circuit Car Radio (for Home Construction)

We are proud to be able to offer this New type Car Radio employing up-to-the-minute circuitry special 12 volt valves and transistorised output stage. The highest degree of sensitivity is assured by the incorporation of Permeability Tuning and a tuned R.F. Stage. Covers, Medium and Long Wavebands. NO VIBRATOR PACK IS REQUIRED. This is a really compact receiver that will fit any car. Comprehensive assembly instructions are provided with all necessary components, including valves and transistor at a Special New Low Inclusive Price of Only £11.19.6 plus 3/6 P. & P. Instruction booklet with itemised price list, full description, dimensions, etc., available separately at 3/6 post free.



"PAGEROV" 2-TRANSISTOR POCKET PORTABLE

Completely portable—No external Aerial or Earth Req'd.

An amazing little receiver with built in aerial and small enough to be held in the palm of the hand. Medium wave reception at wonderful volume. No fiddly tuning! condenser tuning.



Supplied with drilled chassis and colour coded components. Easily assembled with the aid of the easy-to-follow assembly instructions provided. Total cost of all necessary components, including transistors, wiring wire and even solder, ONLY 32/6, plus 1/8 P. & P. Battery 3/- extra. Ardent type deal-aid earpiece complete with cord and plugs 12/6 extra. Parts price list and Easy Lay-out Plans 1/8 post free. Demonstrated at all our branches.

NEW BRANCH! NOW OPEN

AT
9, CAMBERWELL CHURCH STREET
S.E.5

Telephone: RODney 2875

Situated 25 yards only from Camberwell Green.
OPEN ALL DAY SATURDAY
We regret that owing to City roadwidening scheme our branch at Cheapside is now closed for building reconstruction.

RADIO JACK

Covers local medium wave stations variably tuned. Compact self contained unit requiring only connection to aerial (no power supplies req'd) for 1st class reception when used in conjunction with your tape recorder or high gain amplifier. All necessary parts available at a special inclusive price of ONLY 19/6, P. & P. 1/8.

THE P.W. "ROADFARER"

As described in current "Practical Wireless"
Now available the "Osrom" version at special inclusive price of **£16.19.6** Plus 2/6 P. & P.

A completely self-contained transistor portable with many novel features. For Battery or mains operation. Medium, Long and V.H.F. bands. Full details and individually priced parts list on request.

OPEN: Tottenham Court Rd., 9 a.m. to 6 p.m. Mon. to Fri., Sat. 1 p.m. Holloway Rd. and Camberwell, 9 a.m. to 6 p.m. daily. Thurs. 1 p.m. Sat. 5.30 p.m. Our Advantageous H.P. and Credit Sale Terms are available on any single item over £5. Your enquiries invited. Please print your name and address.

THE "WAVEMASTER" 7-TRANSISTOR LUXURY PORTABLE

400 Milliwatt Output

To build yourself Medium and Long Waves—Push-Pull Superhet A.V.C. Perfect Car Radio reception. Size 10in. x 6 1/2 in. x 4 1/2 in. at base tapering to 4in. at top.

Very attractive two-tone grey Vyndie covered cabinet with black and gold printed escutcheon plate, cream and gold knobs, handle and cabinet fittings. ★ Weight—complete with long-life 7A volt battery—41lb. ★ Mazda high-grade transistors throughout. ★ High-Flux 7in. x 4in. Elliptical Speaker. ★ Slow motion tuning. ★ Co-axial socket at rear for direct connection to Car Radio Aerial. ★ Improved reception by use of seven-section plated telescopic aerial disappearing into Cabinet when closed. 34in. above Cabinet when fully extended. Construction simplified by Bakelite chassis board with the following components already mounted: L.F. Transformers (3) Oscillator Coil, Trimmer Bank, Output Transformer, Interstage Transformer, Aerial Brackets and Earth Bar. SPECIAL INCLUSIVE PRICE for all required components, full assembly instructions—Nothing more to buy—£10.18.6 plus 3/6 P. & P. Alignment service available. Full assembly instructions and individually priced parts list, all of which are available separately, 2/6, post free.

OUTSTANDING METER IMPORT!

20,000 ohms per volt!

MODEL 200H. Volt-ohm-Milliammeter

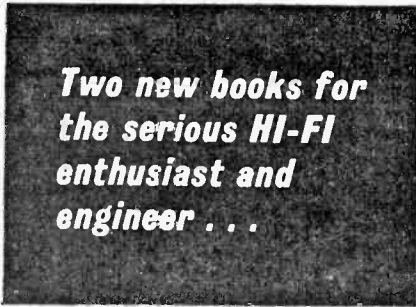


Ranges: A.C. Voltage: 10, 50, 100-500, and 1000 volts (10,000 ohms per volt). D.C. Voltage: 5-25, 50, 250, 500, and 2.5k (20,000 ohms per volt). D.C. Current: 0-50 microamps. 0-2.5 ma, 0-250 ma. Resistance: 0-6k, 0-6 meg. (300 oh and 30k at centre scale). Capacitance: 10 pf to 100 mfd. 0-1 mfd to 1 mfd. Decibels: -20 to +22 db.

A fully guaranteed pocket size meter, (actual size: 4 1/2" x 3 1/2" x 1 1/2") knife edge pointer, top quality supplied complete with test leads and full operating instructions at £6.19.6 ONLY. Plus 2/6 P. & P. Optional extra, attractive carrying case 13/6 only. (Bona-fide trade enquiries invited) Leaflet available.

"PRACTICAL WIRELESS" CIRCUITS

All required Components for the complete Osrom Version of the Pocket Superhet described in "Practical Wireless" now available at special new low inclusive price of £8.19.6 complete, including Printed Circuit and Osrom booklet. All items available separately send for list. Enquiries invited for all other "P.W." circuit specified components.



Two new books for the serious Hi-Fi enthusiast and engineer...

INTRODUCTION TO HI-FI

Just Published!

Clement Brown



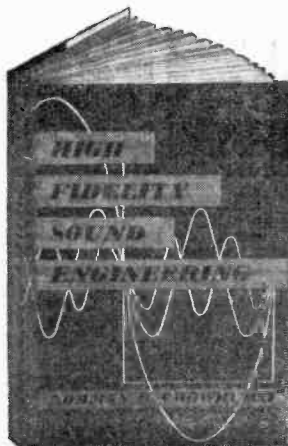
A clear introduction to what we can and cannot do in the world of hi-fi, what is and is not important, which items of equipment can be bought cheaply, and for which this would be false economy. 85 illustrations.

21s. net

From all booksellers or in case of difficulty use the order form below. A fully descriptive leaflet is available from the publishers.

HIGH FIDELITY SOUND ENGINEERING

Norman H. Crowhurst
50s. net



ORDER HERE

To George Newnes Ltd. Tower House, Southampton St., London, W.C.2.

Please supply _____ copy/copies
Introduction to Hi-Fi (21s. net, 22s. by post)
And _____ copy/copies High Fidelity Sound Engineering (50s. net, 51s. 6d. by post) (Please cross out items which do not apply)

Name _____
Address _____

I enclose remittance of _____

PW/6.61

NEWNES

RETURN-OF-POST SERVICE

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.

LATEST TEST METERS

	Cash Price	Deposit	Hire Purchase Mthly/Pmts
AVO Model 8	£24. 0/0	£4.16.0	12 of £1.15. 2
AVO Model 8 with leather carrying case	£27.18.0	£5.12.0	12 of £2. 0/11
AVO Model 7	£21. 0/0	£4. 4/0	12 of £1.10.10
AVO Model 7 with leather carrying case	£24.18.0	£5. 0/0	12 of £1.18. 6
AVO Multimeter with leather carrying case	£9.10.0	£1.18.0	12 of 14/4
TAYLOR Model 127A	£11. 9/0	£2. 5/0	12 of 17/-
CARY A-10	£10. 0/0	£2. 0/0	12 of 15/-
CARY B-20	£4.17.8	£1. 7/8	3 of £1. 6/ 8
	£6.10.0	£2. 0/0	6 of £1.13. 4

GRAMOPHONE EQUIPMENT

ALL LATEST MODELS ALL POST FREE	Cash Price	Deposit	Hire Purchase Mthly/Pmts
RECORD CHANGERS			
GARRARD RC210 (GC8 PU)	£9.19.6	£1.19.6	12 of 15/-
B.S.R. UA14 (TC8 PU)	£7.15.0	£1.11.0	12 of 12/-
B.S.R. UA8 (TC8 PU)	£7. 5/0	£1. 9/0	12 of 11/4
B.S.R. UA14 Monarch (TC8 Stereo/LP78)	£8.18.0	£1.18.0	12 of 13/6
SINGLE RECORD PLAYERS			
GARRARD TA (GC8PU)	£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
E.M.L. (Acos Stereo/Mono PU)	£6.15.0	£1. 7/0	12 of 10/8

TRANSCRIPTION UNITS
GARRARD JHF (GC8 PU) £18. 9/8 £3.15.9 12 of £17.0
PHILIPS AG3200 £10.10.0 £2. 2/0 12 of 15/8
Many of the above can be supplied for stereo working. See our Gramophone Equipment List for details.

TAPE DECKS

All carriage free	Cash Price	Deposit	Hire Purchase Mthly/Pmts
B.S.R. TD2	£8.19.6	£1.16.6	12 of 13/7
COLLARO STUDIO	£12.19.6	£2.12.6	12 of 19/-

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

"BRAND FIVE" RECORDING TAPE

Long Play: 900ft (5"), 18/6; 1200ft (5"), 23/6; 1800ft (7"), 35/-
Double Play: 1200ft (5"), 37/6; 2400ft (7"), 60/- (All Post Free!)

JASON FM TUNER KITS

Standard Tuners: FMT1, £6.19.6; Power Pack, £2.12.6; FMT2, less power supply, £3.9.6; with power supply, £10.9.6. Fringe Tuners: FMT3, less power supply, £10.9.6; with power supply, £12.7.6. FM/TV Switched Tuners: JTV2, £15.17.6; Mercury 2, £11.7.6. (Important. When ordering JTV2 and Mercury 2 Kits it is essential to give TV Channel required). Hire Purchase terms available. Instruction manuals available separately if required. Data Booklets for FMT1, FMT2 and FMT3, 2/10. JTV2, 3/10. Mercury 2, 3/10. All post free.

STEREO COMPONENTS

Morganite ganged potentiometers as specified for the Mullard circuits. Log/Anti-Log, 500k, 1 meg, 2 meg, Log/Log, 50k, 250k, 1 meg, 2 meg, Lin/Lin, 500k, 1 meg, All 10/8 each. Denco Chassis and other components for Mullard circuits available. Send for list.

LOUDSPEAKERS

GOODMANS: Axiom 110 10in, £5.0.0; Axiom 112 10in, £8.10.0; Axiote 8in, £6.12.1; Axiom 300 12in, £11.5.9; Axiom 400 12in, £16.1.0; Audion 60 Bass, 12in, £9.12.9; Trebax Tweeter £6.4.0; CX3000 Cross-over unit £1.19.0.
WHITELEY: HF 1016 10in, £7.12.3; HF1012 10in, £4.15.0; HF816 8in, £6.10.8; TS16 8in, £6.3.9; T10 Tweeter £4.4.0; T359 Tweeter £1.13.3; CX3000 Cross-over unit £1.10.0; CX1500 Cross-over unit £1.18.3. H.P. Terms available.

AMPLIFIER KITS

We have full stocks of all components for the Mullard 610, Mullard 3-3, Mullard 2 and 3 Valve Pre-amplifiers, GEC 912 Plus. Fully detailed list on any of these sent upon request. Instruction Manuals: All Mullard Audio Circuits in "Circuits for Audio Amplifiers" 9/5. GEC 912, 4/6. All post free. Illustrated lists are available on LOUDSPEAKERS, TAPE DECKS, TEST GEAR, RECORDING TAPES, GRAMOPHONE EQUIPMENT, AMPLIFIER KITS, MULLARD CATHODE RAY TUBES. Any will be sent free upon request.

TERMS OF BUSINESS

Cash with order or C.O.D. We charge C.O.D. orders as follows. Up to £3, minimum of 2/8. Over £3 and under £5, 1/6. Over £5 and under £10, 1/8. Over £10, no charge. Postage extra on CASH orders under £3 except where stated. Postage extra on Overseas orders irrespective of price.

WATTS RADIO (MAIL ORDER) LTD.

54 CHURCH STREET, WEYBRIDGE, SURREY
Telephone: Weybridge 4556

Please note: Postal business only from this address.
Please note: Closed for Annual Holidays AUG. 11-26th.

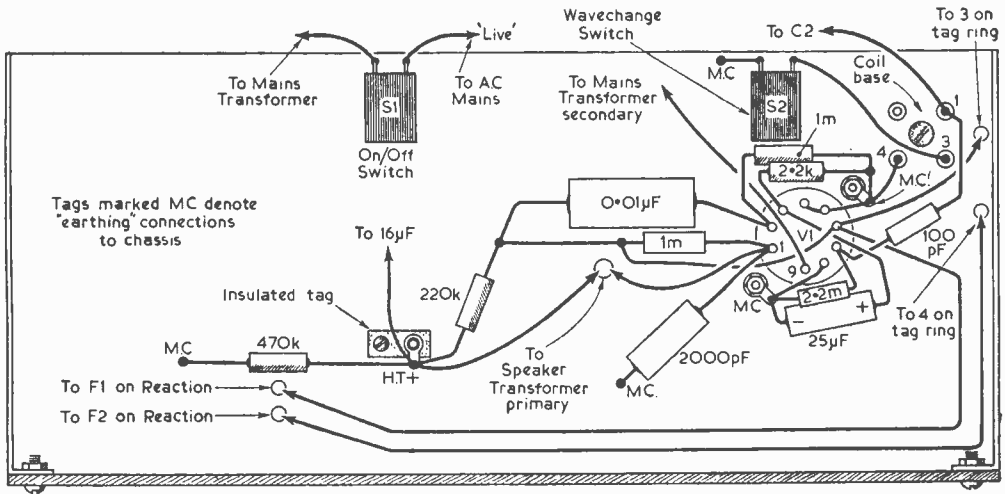


Fig. 3.—Wiring and components under the chassis (S1 and S2 may be mounted on the side of the cabinet if desired.)

(Continued from page 150)

Anode and grid leads should be kept short and direct, and run near to the chassis. A 0.01µF mica condenser is recommended for coupling between stages, as any leakage will upset working.

Coil Connections

The coil listed has a square base with numbered tags, and a circular tag ring, with slot. Connections to the square end of the coil are shown in Fig. 3. The coil is supported by a very short, stout lead from tag 4 to a soldering tag, which is bolted to the chassis. Tag 1 goes to the 100pF fixed condenser and the fixed plates of the tuning condenser C2. A short length of thin flex is taken from tag 3 to the wavechange switch, which is returned to chassis. This switch may be mounted on the side of the cabinet.

The tag ring end of the coil is shown in Fig. 2. Tag 1 goes to C1, for the aerial connection. Tag 2 is connected to the chassis. Tag 3 goes to anode (pin 6 on the valveholder) while tag 4 is connected

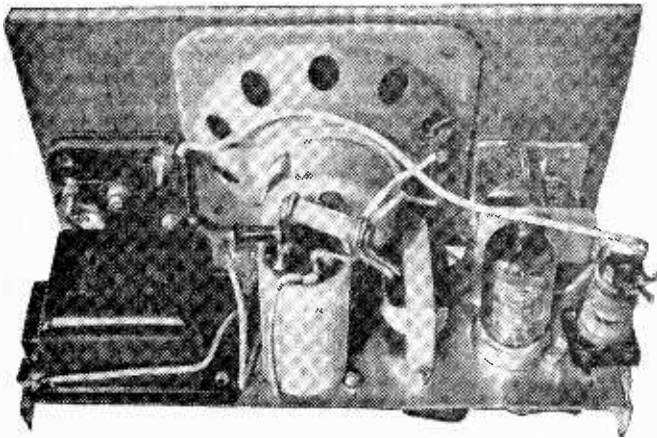
COMPONENTS LIST

- ECC83 or 12AX7 valve, B9A holder
- Jackson Bros. 208 + 176pF tuning condenser
- 300pF differential reaction condenser
- Osmor QR11D coil
- Insulated toggle switch
- Lead-through mains switch
- Condensers: 8 + 16µF 350VW 25µF (small), 100pF, 500pF, 2000pF, 0.01µF mica
- Resistors: 2.2M, two 1M, 470k, 220k, two 3.3k, 2.2k
- 250 V, rectifier
- Two 1½ in. diameter knobs
- Converter type mains transformer: primary to suit mains; secondaries: 180-200V 20mA; 6-3V 0.6-2A
- 3½ in. permanent magnet speaker with transformer

to F2 on the 300pF reaction condenser. If it should be found that reaction is unsatisfactory, reverse the leads going to tags 3 and 4.

Panel and Cabinet

The loudspeaker is attached by means of wood screws, taking care these are not long enough to penetrate the front of the panel. A quick-drying adhesive is then applied round the perimeter of the panel, and a piece of silk or similar material is prepared by cutting clearance holes for the variable condensers. This material is then placed on the panel, and kept taut with a few drawing pins at the edges, until the adhesive has dried. Any surplus material can then be cut away.



Another view of the receiver.

Constructional details of the cabinet are shown in Fig. 5. Take care to leave a little clearance so that the receiver can be inserted from behind. The parts are held together with glue and panel pins. When the glue has hardened, all edges and corners can be smoothed with a glasspaper block.

The finish given to the cabinet is a matter of choice. The author's receiver was given a coat of quick-drying cream enamel. If there are defects in the joints or the wood has open grain, fill with one of the packet fillers sold for such purposes, allow to dry and smooth off with glasspaper.

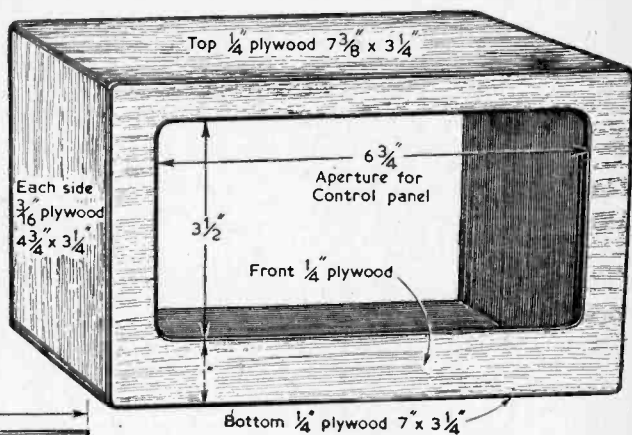


Fig. 5.—Details of the cabinet.

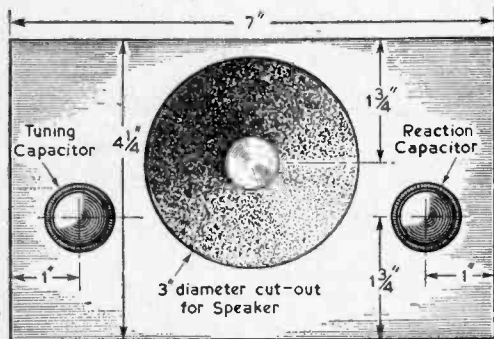


Fig. 4.—The front panel.

If varnishing is preferred, two coats are best. The first should be allowed to dry, and should then be lightly sanded before applying the second coat.

The actual wavebands tuned will depend somewhat on the position of the coil core, so this should be altered, if necessary, to obtain the required coverage. Reaction should be carefully adjusted to build up the volume of weak stations. This control should not, however, be turned fully clockwise, as this will only cause oscillation and poor reception. ■

TRANSISTORISED ALIGNMENT AID

(Continued from page 143)

the point of injection into the receiver circuit. It will be found that the output signal is strongest at the higher frequency end of the M.W. band and falls progressively with decrease in frequency, necessitating turning up the volume control on the signal generator. If a connection is made to the chassis of a receiver, care should be taken if the latter is of the D.C. variety and has a live chassis.

If too great a signal is available, it will be found that removing the connection to the receiver chassis will decrease the signal applied to the receiver. Overloading the receiver will give a distorted output note—when correctly adjusted a good clear note is heard from the speaker of the receiver.

(2) Because the signal generator is of simple design, it has at its output terminals harmonics of the fundamental signal. It may be possible to tune to the signal at two positions of the receiver tuning dial. The signal generator output and the gain of the receiver should always be adjusted to give an audio output from the receiver under test of sufficient strength just to be comfortably heard. The fundamental signal amplitude is always greater than its harmonics.

(3) The signal generator output impedance is

of a low order, thus making it ideal for injecting into low-impedance circuits—i.e., the aerial coil of a receiver, the base of a transistor, etc. However, if the output is applied direct across a tuned circuit in a receiver it will damp the tuned circuit and render it almost inoperative. The output from the signal generator when taken from the collector of the R.F. oscillator transistor has a higher source impedance and is more suitable for such purposes. (A separate terminal is available for this facility on the signal generator.)

(4) When wishing to check a receiver with a ferrite rod aerial (such as a modern portable superhet), a lead taken from the socket connected to the collector of the transistor in the R.F. oscillator circuit of the signal generator positioned over the top of the receiver will give ample test signal.

(5) The battery consumption of the instrument is only 1½mA, permitting long periods of operation without frequent battery replacement.

The signal generator will provide a useful source for test signals, and although, by very reason of its simplicity, it has limitations, with a little practice and time to become familiar with its characteristics, it should prove both useful and effective to the user. ■

PORTABLE RADIO OR CAR RADIO

PUSH-PULL SIX

(6 Ediswan Transistors plus 2 Diodes)

MEDIUM, LONG WAVE AND TRAWLER BAND EXTENDING TO 80 METRES WITHOUT COIL CHANGING



styrene case with duo-diffusion grilles in red. Uses 9 volt battery. Sockets for car aerial.

Build for **£6.19.6** Size 6½ x 4½ x 1½in.

"Agreeably surprised with Trawler Band reception. Luxembourg as loud as local. Your easy build diagrams helped a lot... my first at emp't."—H.S., Penzance Cornwall (poor reception area).

ALL PARTS SOLD SEPARATELY

NEW PUSH-PULL FIVE

(MW/LW and TRAWLER BAND)
(5 Ediswan Transistors)



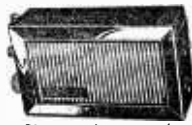
Now greatly improved Sensitive FERRITE ROD AERIAL. Pale blue polystyrene case with speaker grilles in red. Volume/sensitivity control. Noiseless compression tuning condenser. Miniature push-pull transformers. 350 Mw XC101's in push-pull. Sensitivity R.F. stage for station selection.

Total building cost **£5.7.6** P.P. 2/6.
ALL PARTS SOLD SEPARATELY

PUSH-PULL POCKET SIX

MEDIUM AND LONG WAVES AND 400 TO 750 METRES WITHOUT COIL CHANGING.

Sensitivity of a superhet, tonal quality of a TRF. Volume control. Tuning condenser. Latest type switches. Handsome two-tone pocket case. Ferrite rod aerial. 3in. quality speaker. Easy build diagrams. 6 Transistors (including Ediswan and Semiconductors) plus 2 diodes.

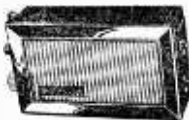


All parts **£5.19.6** P.P. 2/6
ALL PARTS SOLD SEPARATELY

TRANSONA-4

(4 Ediswan Transistors)

Miniature speaker. FERRITE ROD AERIAL. MW/LW and Trawler Band coverage down to 80 metres. On test tuned in over 30 stations. This sensational new radio is simple to build with our easy-build plans. Handsome pocket case.



May be built for **65/-** P.P. 2/6.

NEW! EASY BUILD THREE RADIO

(3 Ediswan Transistors plus 2 Diodes)

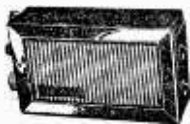
Easy to build, easy to operate. This transistor radio operates over the M.W. and L.W. extending down to 80 metres without coil changing. Ferrite rod aerial, volume/sensitivity control. Sonotone high fidelity miniature earpiece.



May be built for **49/6** P.P. 2/6.

NEW! POCKET RADIO

(5 Ediswan Transistors and 2 Diodes)



MEDIUM, LONG WAVE AND TRAWLER BAND TO 80 METRES. Designed round super sensitive ferrite rod aerial and 3in. speaker. Home and Continental stations at your finger tips. Attractive 2-tone pocket size case in gleaming polystyrene. No aerial. No earth required. Over 30 stations listed test receiver. Easy-build plans for beginners. Powered by 9 volt battery.

This amazing receiver may be built for **£4.19.6** P.P. 2/6.

ALL PARTS SOLD SEPARATELY

First-grade Miniature Push-pull Transformers.....pair. 11/-
Ferrite Rod Aerial, M/L wave (7in.).....8/6
Ferrite Rod Aerial, M/W (4in.).....5/-
Transformers: 300 ohms primary, 5 ohms secondary.
Brand new, boxed.....3/6

SIX EDISWAN TRANSISTORS AND TWO DIODES

XA102, 2—XA104, XB113, 2—XC101 (matched pairs).

ONLY **57/6** THE SET

Sensitive balanced Armature Headphones. Boxed, brand newpair. 9/-
Sensitive 2½in. Speakers. Only ½in. deep, 3 ohm.....16/6

DATA SHEETS AND PARTS PRICE LIST FOR THE ABOVE 1/3 EACH
ALL PARTS SOLD SEPARATELY
AFTER SALES SERVICE

RADIO EXCHANGE COMPANY

27 HARPUR STREET, BEDFORD

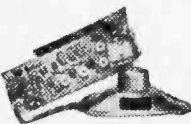
PHONE 2367

(Opposite Co-op)

CLOSE 1 p.m. SAT.

"6 plus 1" TRANSISTOR RADIO KIT — UNBEATABLE VALUE —

Mrs. Current Production Offer—A fortunate bulk purchase enables us to offer one of the season's most outstanding bargains in Portable Transistor Radio Kits. This kit is a modern, sensitive quality circuit Receiver Unit with all the latest features. Six latest Transistors and 1 Diode, Printed Circuit, Med. and Long Waves, Ferrite Aerial, Car Radio Input, 1w Push-Pull output into 3 ohm Speaker, Calibrated Dial and Slow Motion Tuning, etc. Size: approx. 7 x 2 1/2 in.



Kit, including printed circuit and all components £5. 5.0 p. & p. 2/6
Set of 6 Transistors and 1 Diode £2. 5.0 p. & p. rd.
Complete Kit—Bargain offer—only £6.19.6 p. & p. 2/6
3 ohm Speaker only required—7 x 2 1/2 in. Elliptical 18/6.
Send for leaflet (3d. stamp) and judge for yourself!

RECORDING TAPE—Special Offer

American COLUMBIA (C.B.S.) 1st Grade P.V.C. TAPE. Fitted leader and auto stop. Brand New and Boxed.

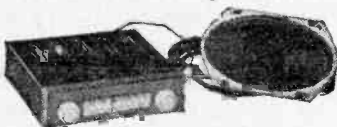
Standard	Long Play
5in., 400ft. 15/-	900ft. 19/6
5 1/2in., 900ft. 16/6	1,200ft. 22/6
7in., 1,200ft. 21/-	1,800ft. 32/-

DOUBLE PLAY and OTHER SIZES AVAILABLE AT
SPECIALLY REDUCED PRICES
Plastic Tape Reels .. 3in. 2/6. 5in. 3/-, 6 1/2in. 3/3. 7in. 3/6

2 WAVEBAND CAR RADIO KIT 12v. operation Medium and Long Waves

Recommended Buy

Modern development of the famous Brimar Hybrid vibratorless car radio circuit. Five latest type Brimar low voltage valves and power transistor.



R.F. stage and permeability pre-aligned Cydon Tuner Unit provide extremely good sensitivity and signal noise ratio. Printed circuit for easy construction and 7 x 4 in. elliptical speaker for fidelity output. Self-contained in neat metal cabinet 8 x 7 x 2 1/2 in., with attractive calibrated dial. Speaker and power transistor stage mounted separately approx. 8 x 5 x 3 in. Instruction booklet and parts list available. 2/6 post free

Complete Kit
Reduced Bargain
Price
£11.19.6
P. & P. 3/6.

JASON FM TUNER UNIT KITS (87-105 Mc/s) Standard Model (FMT1)—as previously extensively advertised. Complete Kit—5 gns. P.P. 2/6. Set of 4 spec. valves now only 20/-.
Tuner Coil Set, IFS and Ratio Detector, etc., 26/-.
Model FMT2—attractively presented shelf mounting unit in enclosed metal cabinet with built-in power supply. Complete Kit £7. P. & P. 3/6. Set of 5 spec. valves, 37/6.
Latest Model—JTV2—Switched Band 1-2-3 AM/FM Unit with A.F.C. Kit £12.19.8. P. & P. 2/6.
New Jason Comprehensive FM Handbook 2/6, post free. 48-hr. Alignment Service, 7/6. P. & P. 2/6.

TAPE RECORDER

Manufacturers' brand new, current production offer. Latest 5-valve circuit based on Mullard's famous design. Magic eye level indicator. Volume and tone controls. T.C.C. printed circuit already wired. Only power pack and controls to assembly and wire. Valves EF83, ROC83, EL84, RM84 and EZ80. A sensitive quality recorder at Special Unit Prices.



COMPLETE AMPLIFIER KIT

B.S.R. Kit .. 95/- Collaro Kit .. £0.5.0
B.S.R. Tape Deck .. £3.10.0 Collaro Tape Deck .. £12.10.0
Set of 5 valves 45/-

Send Stamp for detailed Unit Bargain Prices. Illustrated Circuit Handbook 2/6 post free.

TRANSISTORS—BVA 1st grade—8x Mrs. Mazda
XA102, 18/8; XA101, 14/6; XC101, 10/8; OC70, 9/8;
XB102, 10/-; XA103, 15/-; OAB1, 3/8; OA70, 2/8.
Hours 9 a.m.—6 p.m., 1 p.m. Wednesday.

RADIO COMPONENT SPECIALISTS

70 BRIGSTOCK ROAD, THORNTON HEATH, SURREY

Est. 1946

Telephone THO 2188

Terms C.W.O. or C.O.D. Post and Packing up to 1lb, 7d.,
1lb, 1/1, 3lb, 1/6, 5lb, 2/-, 10lb, 2/9.

SOLDERING EQUIPMENT

by



PRECISION SOLDERING for the ELECTRONICS INDUSTRY

Comprehensive range - Robust & Reliable
- Light weight - Rapid heating - Bit sizes
3/32in. to 3/8in. - 'Permagit' or Copper
bits - All voltage ranges 6/7v. to 230/
250v. - Prices from 19/6.

- Also
- Plastic Cable Strippers
 - Miniature Solder Pots
 - Heat Guards
 - Long Life Bits

Illustrated is the 25w. 3/16in. replaceable bit model with safety shield.

ADAMIN—the new range of precision micro-soldering instruments—
Have you had details?

Brochure No. S10 sent free on request.

Sole proprietors and manufacturers:

LIGHT SOLDERING DEVELOPMENTS LTD.

28 Sydenham Road, Croydon, Surrey

Phone: CROYdon 8589 Grams: Litesold Croydon

New from REPANCO

1—THE "JOURNEYMAN". A SIX TRANSISTOR PORTABLE RECEIVER

- ★ MEDIUM AND LONG WAVEBANDS
- ★ POSITION FOR CAR RADIO AERIAL
- ★ PRINTED CIRCUIT WITH COMPONENT NUMBERS MARKED
- ★ PUSH-PULL OUTPUT
- ★ FERRITE SLAB AERIAL

Step by step instructions. 1/6, post 3d.

2—COMPONENT PACK No. 3

CONTAINS REPANCO COMPONENTS FOR THE "JOURNEYMAN". FS30, 5 1/2in. Ferrite Slab Aerial, two XT26's 1st and 2nd IFT's XT27 3rd IFT, XO28 osc. coil, all pre-aligned, TT29, single ended push-pull driver transformer, printed circuit and aerial fixing brackets. £2.15.6.

3—MINI-4. A REMARKABLE FOUR TRANSISTOR SUPER-HET POCKET RECEIVER

- ★ MEDIUM AND LONG WAVEBANDS
- ★ SIZE OF CASE 5 1/2 x 3 1/2 x 1 1/2 in.
- ★ AUTOMATIC GAIN CONTROL
- ★ 2 1/2 in. LOUDSPEAKER
- ★ 3RD IFT REFLEXED AS AUDIO DRIVER

Easy Wiring Plans and Step-by-Step Instructions. 1/6, post 3d.

4—COMPONENT PACK No. 2

CONTAINS REPANCO COMPONENTS FOR THE MINI-4. FS39, Ferrite slab aerial, two XT26's, 1st and 2nd IFT's, XT27 3rd IFT, XO28 osc. coil, all pre-aligned, TT5 transformer group board, switch and speaker pillars. £2.7.6.

5—SHORT WAVE TRANSISTOR COILS

All coil litz wire, enclosed in high frequency Ferrite pots and tuned with Ferrite cores. Can size 1/2 in. sq. x 1 1/2 in. Send S.A.E. for Full Details. 10/- each.

Mail Order and Trade:

RADIO EXPERIMENTAL

PRODUCTS LTD.

33 Much Park Street;

COVENTRY

Tel.: 27114

Wholesale Inquiries and Export:

COVENTRY

O'Brien's Buildings,

203-269 Foleshill Rd.,

COVENTRY

Tel.: 24224



Trade News

NEW PRODUCTS AND DEVELOPMENTS

LOW DRIFT AMPLIFIERS

THREE new amplifiers are available from Honeywell Controls Ltd., each having low noise, low drift and high common mode rejection characteristics.

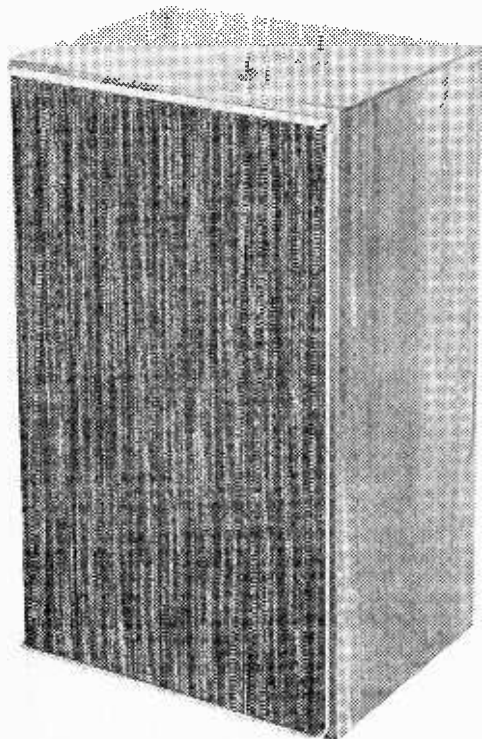
The Accu Data III D.C. amplifier is chopper-stabilised and designed primarily for use with strain gauges and thermocouples.

The other two units are preamplifiers for use with direct-recording or self-balancing potentiometer recorders.

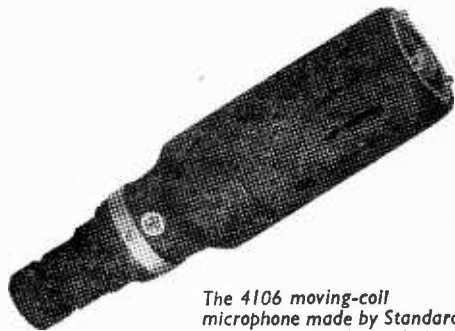
The 2HLA-8 preamplifier is designed to accept D.C. inputs as low as $20\mu\text{V}$ and give full scale deflection on a 12in. strip chart recorder with a response time of $\frac{1}{2}$ sec.

The model 2HLA1-4a is a general purpose differential input D.C. amplifier for laboratory or process use.

Both units are built to high industrial standards. Their mechanical features include input and output connections at the front and rear, and they may be bench or panel mounted. All three amplifiers are produced by *Honeywell Controls Ltd., Greenford, Middlesex.*



The "Sandwich" full range loudspeaker, made by H. J. Leak and Co., Ltd.



The 4106 moving-coil microphone made by Standard Telephones and Cables Ltd.

NEW MICROPHONES AT THE AUDIO FAIR

TWO new microphones, made by Standard Telephones and Cables Ltd., were on show at this year's Audio Festival and Fair, recently held in London.

The 4106 is a moving-coil, studio grade microphone, and has a frequency range of 30c/s to 12kc/s. It is approximately 4.6in. in length and has a diameter of 1.6in.

The other microphone, the 4108, is a condenser type and is also intended for studio use. It has a frequency response of 30c/s to 15kc/s and a transistor and valve head amplifier and a separate power unit.

Both of these new microphones are manufactured by *Standard Telephones and Cables Ltd., Connaught House, Aldwych, London, W.C.2.*

LOW DISTORTION LOUDSPEAKER SYSTEM

AN exhibitor at the Audio Festival and Fair was H. J. Leak and Co. Ltd., who demonstrated their "Sandwich" full-range loudspeaker. Contained in a cabinet only 26in. x 15in. x 12in., it provides a very low distortion moving-coil loudspeaker system. Its construction damps panel resonances and permits the loudspeaker to reproduce full clean bass. A 3in. and a 13in. loudspeaker and a half-section cross-over network, complete the system which gives high quality reproduction, over the whole frequency range of the input signal from records, radio, tape or microphone. The loudspeaker costs £39 18s. 0d. and is produced by *H. J. Leak & Co. Ltd., Brunel Road, Westway Factory Estate London, W.3.*

CAR RADIO AERIALS

THREE new car radio aerials have been added to the Antiferrence range. All of them are one-hole fixing and designed for roof mounting.

The "Monte-Carlo" aerial is fixed at 45° to the base which incorporates an anti-damage spring. It comes complete with an 80in. screened lead and plug.

The "Goodwood" has a two section telescopic collector rod, extending from 21in. to 38in.

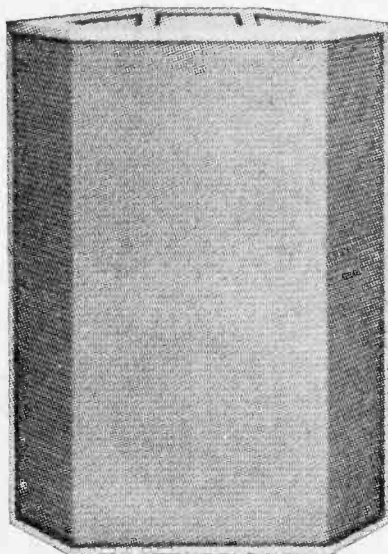
The "Silverstone" aerial also has a two section telescopic collector rod. The angle of the rod is adjustable through 90° with self-locating action and is fitted with an anti-damage spring.

The prices of the "Monte-Carlo," "Goodwood" and "Silverstone" are respectively, 29s. 6d., 37s. 6d., 42s. They are all finished in chrome plate and are made by *Antiference Ltd., Television and Radio Aerial Division, Bicester Road, Aylesbury, Buckinghamshire.*

FREE-STANDING SPEAKER ASSEMBLY

THE main feature of Wharfedale's exhibit at the Audio Festival and Fair was the new Airedale loudspeaker. Basically this consists of a three-speaker system in a free standing enclosure. The main panels of the Airedale cabinet are filled with sand to minimise panel resonance. The crossover frequencies are 400c/s and 5kc/s.

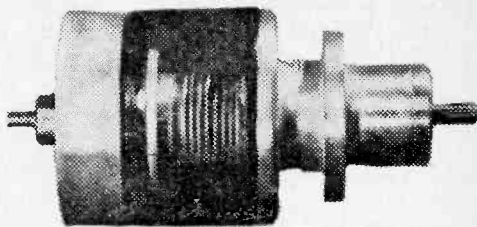
Finished in walnut, oak or mahogany veneers, the Airedale measures 38in. x 28in. x 14in. The price of this loudspeaker is £65, and it is made by *Wharfedale Wireless Works Ltd., Idle, Bradford, Yorkshire.*



The Wharfedale "Airedale" free-standing speaker assembly.

HIGH VACUUM VARIABLE CAPACITORS

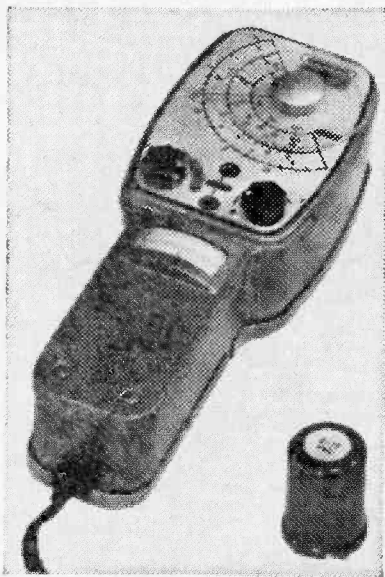
A RANGE of high vacuum variable capacitors has been made available by the English Electric Valve Company. Five units comprise the range, three with capacitances of 5-30, 8-50, 16-80pF and two with capacitances of 5.5-206pF. The peak R.F. voltage is 15kV for the first three and 8 and 10kV for the other two. *English Electric Valve Co. Ltd., Chelmsford.*



A U50/15 high vacuum variable capacitor manufactured by the English Electric Valve Company Limited, Chelmsford, Essex.

GRID-DIP RESONANCE METER

A NEW instrument by Grundig may be used for detecting the resonant frequencies of all kinds of tuned circuits and also frequencies of working oscillators. It may also be used as an A.M. test oscillator and as a simple receiver. The circuit consists basically of an R.F. oscillator, the frequency of which is determined by interchangeable coils and by setting of a tuning condenser. A meter indicates the oscillator grid current.



The Grundig grid-dip resonance meter.

The unit—type 701—covers from 1.7Mc/s to 250Mc/s in six ranges. The frequency is by direct reading from the tuning scale and is within a tolerance of +1.5per cent. (*Wolsey Electronics Limited, Cray Avenue, St. Mary Cray, Orpington, Kent.*)

We regret that in "Trade News" in the May issue, an illustration was given an incorrect caption; the photograph at the top of page 62 was in fact of the "Studio de Luxe" model of Sound Tape Recorders (Electronics) Limited, and not of their "Sound Master" model.

SIMTECH

BOOK SERVICE

NOW YOU CAN GET TOP U.K. & U.S.A.

BOOKS ON FREE TRIAL, EASY PAYMENT PLAN!

Yes it's true! Now for the first time ever! You can select from a whole new range of books by famous authors!

These books will show you the way to a better understanding of Electronics, Hi-Fi, Radio, Television theory and repair. A library built from the books listed will save hours of valuable time in locating faults or constructing electronic equipment—making them a source of pleasure and profit for years to come! No man who takes his hobby or profession seriously can afford to be without at least some of these well known and highly respected publications—and now it is so easy to acquire them all through the SIM-TECH BOOK SERVICE! Look over the list of books and select the first three books you would like to examine. Circle the book numbers on the coupon. Additional books you would like to see may be entered on a separate piece of paper and these will be sent on to you after completion of the first transaction.



FREE TRIAL OFFER!

No. 1. APPLICATION OF RADIO AND TELEVISION PRINCIPLES. Coyne.

Mainly for the beginner. Covers Frequencies, Inductive Reactance, Resonance and Tuning Coils, Electronic Tubes and Valves, Electrons, Amplifiers, Rectifiers, Oscillators, Modulators, Circuits, Couplings, Transformers etc. 300 pages. Vinyl cloth covers. 26/-

No. 2. RADIO-TELEVISION AND F.M. RECEIVERS. Coyne.

Rectifiers, Power Supplies, Antennas, Super-Heterodyne Receivers, Car radios, Public Address Systems, High Frequency, Short Wave, F.M./V.H.F. Receivers, etc. 400 pages. Vinyl cloth covers. 26/-

No. 3. RADIO AND TELEVISION CIRCUITS. Coyne.

Amplifiers, Power Tubes, Phase Inverters, Transformers, Decoupling and Shielding, Tuning and Tracking Tests, Testing Methods, Distortion and Noise, Contact Rectifiers—Detector, Photo-tubes—Special Uses. 335 pages. Vinyl Cloth covers. 26/-

No. 4. LATEST INSTRUMENTS FOR SERVICING RADIO AND TELEVISION. Coyne.

Indicating meters, Operating and Care of Meters, Measurements, Analyzers and Multi-meters, Electronic Voltmeters, Signal Generators, Oscillators, Testing Methods, 350 pages. Vinyl cloth covers. 26/-

No. 5. PRACTICAL TELEVISION SERVICING AND TROUBLE SHOOTING MANUAL. Coyne.

A How-to-do-it approach to Tuners, Alignment Methods, Video I-F Amplifiers, Traps, Video Detectors and Amplifier, Picture Tubes, Power Supplies, Test Patterns, Antennas, Colour TV and V.H.F. 34/-

No. 6. COYNE TELEVISION SERVICING CYCLOPEDIA. Coyne.

Latest data on TV, Colour TV and Transistors. Quick and Concise Answers to TV Problems in alphabetical order, cross indexed, fully illustrated. Covers hundreds of facts on servicing. Over 800 pages. Vinyl cloth covers. 47/6.

No. 7

Pin-Point

TV Troubles in 10 minutes

Find the exact sound or picture trouble in ANY TV set from 700 possibilities! Latest edition now has 332 pages of solid TV servicing information; 300 diagrams, check charts. 31/6. Postage 1/-.



SPECIAL OFFER

Circle Book No. 7 on coupon, send only 16/3 after 7 days, and 16/3 in 30 days, making a total of 32/6 including postage.

No. 8

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 1/6. Circle Book No. 8 on coupon.



No. 9. TRANSISTOR CIRCUIT HANDBOOK. Louis E. Garner.

Practical—Technical Reference Book covering Modern Transistor Applications. Covers Control Circuits, Amplifiers, Receivers, Test Instruments, Special Purpose Circuits, Wiring Techniques, etc. Fully illustrated—more than 200 Circuit Diagrams. 410 pages. Vinyl cloth covers. 39/6.

No. 10. TELEVISION RECEIVER SERVICING. Vol. 1. by E. A. W. Spreadbury. 1961 Edition.

Time Base Circuits, including the Cathode Ray Tube. How to check the Waveform at the Input and Output of Each Section—Faults—Blank Screen—Obtaining a Raster, Applying a Signal, Synchronization, Interace Quality etc. 382 pages. 25/-

No. 11. PRINCIPLES OF TRANSISTOR CIRCUITS. S. W. Amos.

Introduction to the Design of Amplifiers, Receivers and other Circuits, how to determine input resistance, etc; gain, optimum Load, Power Output, values of Coupling Capacitors and Transformer Winding Inductances. Details of Photo-sensitive Devices and Transistor Relaxation Oscillators. 21/-

No. 12. RADIO DESIGNER'S HANDBOOK. Fourth Edition. F. Langford-Smith.

A Comprehensive reference book, the work of 10 Authors and 25 Collaborating Engineers, containing a vast amount of data in a readily accessible form. This book is intended especially for those interested in the design and application of radio receivers and audio amplifiers. 149 pages. 55/-

No. 13. TELEVISION EXPLAINED. Miller & Spreadbury.

In simple terms and non-mathematical language gives a step-by-step survey of modern television receivers and aerial systems, including A.T.C. and Flywheel synchronising. 184 pages. 12/6.

No. 14. RADIO CIRCUITS. Miller & Spreadbury.

Introduction to Superheterodyne Receiver Circuits, includes transistor and F.M. Receivers, Battery Receivers, Car Radios, Mathematics and obscure theoretical details are entirely omitted. 172 pages. 15/-

No. 15. WIRELESS SERVICING MANUAL. W. T. Cocking. 9th Edition.

Over 110,000 copies of this publication already sold. This is a standard work recognised as a reliable and comprehensive guide for amateur and professional alike. Essential testing apparatus is described, and logical methods of reducing and remedying faults are explained. 265 pages. 17/6.

No. 16. PRINCIPLES OF FREQUENCY MODULATION. B. S. Camies.

Basic Principles of F.M. Theory of F.M. Receivers, Interference, Generation of F.M. Waves, Detection of F.M. F.M. Receivers, R-F Amplifier, Mixer, Oscillator, F.M. Tuner, Aerial. 145 pages. 21/-

No. 17. ELECTRONIC COMPUTERS. Principles and Applications. T. E. Ivall. 2nd Edition.

Circuitry and Construction of Digital and Analogue Computers. Latest Applications in Industry, Commerce and Science outlined. A non-mathematical introduction to computers, designed to appeal to technicians, engineers and students who have some knowledge of electronic engineering. 260 pages. 32 plates. 25/-

No. 18. REFERENCE MANUAL OF TRANSISTOR CIRCUITS. Mailard.

Features 60 circuits you can build, 241 diagrams. 308 pages. 12/6. Just mail coupon for free trial. After 7 days send only low price or return books and pay nothing. If you keep more than one book send £1 after 7 days and £1 each month until completed (maximum three books). To buy one book send one half in 7 days, one half in 30 days.

SEND NO MONEY—POST COUPON NOW FOR SPECIAL OFFER.

To SIM-TECH BOOK COMPANY
Mail Order Division, DEPT. FW9, Gaters Mill, West-End, Southampton.
Hants.

Rush the books circled below for 7-day FREE TRIAL as per offer.

1	3	5	7	9	11	13	15	17
2	4	6	8	10	12	14	16	18

Name.....
Address.....
City..... County.....

Tick here if enclosed full price. Same 7-day money back guarantee. Postage £2 or less, 1/3; £3 or more, 2/-.



This splendid AVO Instrument has been developed to meet a definite demand for a sturdy pocket-size multi-range test meter at a modest price, suitable for use on modern electronic apparatus as well as for radio and television receivers, motor vehicles, and all kinds of domestic appliances and workshop equipment.

Readings are obtainable quickly and easily on a very open scale, and range selection is by means of a robust, clearly marked rotary switch of the characteristic Avo Meter type. Measurements of A.C. and D.C. Voltage, D.C. Current and Resistance are made by means of only two connection sockets.

Designed and Manufactured by

AVO LTD AVOCET HOUSE - 92-96 VAUXHALL BRIDGE RD. - LONDON - S.W.1



A member of the Metal Industries Group of Companies

MM2

Just Right for your pocket!

THE MULTIMINOR

19 Ranges

D.C. Voltage: 0-1,000V in 7 ranges

A.C. Voltage: 0-1,000V in 5 ranges

D.C. Current: 0-1A in 5 ranges

Resistance: 0-20,000 Ω. 0-2M Ω.

Pocket Size: 5½ x 3½ x 1½ inches.

Weight: 1 lb. approx.

List Price **£9 : 10s.**

Complete with Test Leads and Clips.

Leather Case if required 39/-.

Sensitivity:

10,000 ohms per volt on D.C. voltage ranges. 1,000 ohms per volt on A.C. voltage ranges

Accuracy:

On D.C. 3% of full scale value.

On A.C. 4% of full scale value.

To meet special requirements, instruments can be supplied to a higher degree of accuracy for a small additional charge.

Telephone: VICTORIA 3404 (12 lines)

HOME RADIO OF MITCHAM

(Dept. P), 187 London Road, Mitcham, Surrey. MIT 3282
Shops hours 9 a.m. to 6.30 p.m. Wed. 9 a.m. to 1 p.m.

SUPER CATALOGUE!
128 PAGES—HUNDREDS OF PICTURES

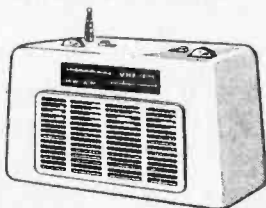


GET YOURS TO-DAY
PRICE 2/- PLUS 9d. Post

WE ARE ACTUAL STOCKISTS OF HEATHKITS

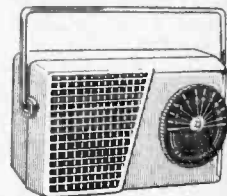
SPECIAL CONDENSER
60+40+40 450 volts 12/6
MANY USES

P.W. "ROADFARER"



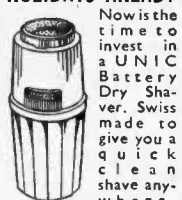
ALL PARTS IN STOCK FOR THIS UNIQUE SET S.A.E. for Price List

P.W. POCKET PORTABLE



PRINTED CIRCUIT VERSION
Price List on Request

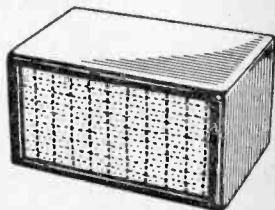
HOLIDAYS AHEAD!



Now is the time to invest in a **UNIC Battery Dry Shaver**. Swiss made to give you a quick clean shave anywhere, when, where. Ideal for the car, camping, holidays abroad, etc. Uses single U2 cell. Price £2.19.6 complete. Leaflet on request.

T.S.L. "HIGH Q" REPRODUCER

This will amaze you. A giant in performance but a midget in size. Crisp clear natural reproduction. Genuine Hi-Fidelity with minimum size. Ideal for the modern home where space is at a premium. Perfect in pairs for Stereo. Power handling up to 10 watts peak. Size only 12 x 6½ x 7½ in. Price £5.19.3 post paid.



Leaflet on request

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.

TRANSISTOR USE

SIR,—In reply to Mr. G. May's letter in the April edition of PRACTICAL WIRELESS, I would like to make a few points clear.

A junction transistor, as with any other transistor, can be used with its collector-emitter leads reversed, but as the transistor is not symmetrical (it has a larger collector contact) there is a loss in gain.

Reversing the battery connections, and hence the base bias causing the base-contact current to be greatly increased, will probably destroy the transistor. But if the resistance in the base is high enough to prevent a heavy current flowing, the transistor will not be destroyed.—P. W. ROACH (Hove, Sussex).

SIR,—With reference to G. May's query on transistors (P.W. April), the collector-base junction of a transistor behaves, when battery polarity is correct, as a rectifier connected in its reverse direction and passes only a small leakage current. When the battery polarity is reversed, the junction behaves as a rectifier with a forward voltage applied so that its resistance is very low, and current high enough to destroy the transistor flows in the circuit (usually the collector load resistor limits the current to a safe value).

The base-emitter junction behaves anyway as a rectifier with a forward voltage applied and thus an incorrect bias does no harm to the transistor. The dangerous condition is if the bias resistor is short circuited and an excess of current flows.

There is no fundamental difference between the base-emitter and base-collector junctions. The transistor may be connected so that the electrode coded as emitter functions as collector and vice versa, but in practice amplification usually suffers owing to the fact that there are slight differences in the two electrodes to allow for dissipation in the collector.—A. W. LAWFORD (Reading).

BBC TELEVISION RECEPTION

SIR,—I wonder if any readers could explain why I can receive BBC television on 3.5Mc/s?

I often hear this station whilst listening on the 80m amateur band. Could it be that a signal is being emitted from my own television receiver?—G. SHUCKSMITH (Barton-on-Humber).

TRANSISTOR SET RECEPTION

SIR,—I thoroughly endorse all that Mr. A. S. Fielding (April issue) says about receiving stations on transistor portables. I have made four such receivers and have been disappointed with all of them. Loudspeaker reception is possible using an aerial and earth, but who wants that; it must be portable or it ceases to be useful. I think that designers of portables should state in which part of the country they have been used with success.

I have built the nine valve receiver in the June 1957 issue of PRACTICAL WIRELESS*, and spend many happy hours listening to stations all over the world. May I add that, although I am 71 years of age, I still enjoy constructing any new circuits I find.—J. JAMES (Winslow, Buckinghamshire).

[*Now out of print.—Ed.]

SIR,—Mr. Fielding (PRACTICAL WIRELESS, April) does not seem to understand that the distortion appearing on the Luxembourg signal is inherent in any receiver, since the signal arriving at the aerial suffers distortion on its passage through the ionosphere. AVC does not help this problem, but only increases the distortion, as it is only present at low signal strength. A vertical aerial, responsive only to a signal coming via the ionosphere, will give a more steady output.—P. GOODHART (Oxford).

FRENCH TELEVISION RECEPTION

SIR,—While tuned in to 355m on January 1st, between 7.59p.m. and 8.03p.m., I picked up the sound of the French Television Service. I thought at the time that it was a news bulletin as it was preceded by the French National Anthem. I have since been assured by a French pen-friend that the particular programme was one in which viewers sent in political questions.

I wonder if any other readers have heard foreign TV programmes on their receivers?—D. G. FORSYTH (Fife, Scotland).

THE YOUNGEST CONSTRUCTOR

SIR,—I am aged 8. I have made a short-wave set. All it is is a crystal set with a short-wave coil it has 12 turns on a ferrite-rod, the ferrite-rod is 2 inches long. The crystal is a Mullard OA79. The condenser is an ordinary tuning condenser. The aerial is 12 yards long, 14 feet high. I got Russia and France and Germany.—Jonathan Shirley (Bucks).

[We would like to hear a lot more from young enthusiasts.—Ed.]

A BASS REFLEX ENCLOSURE

DIMENSIONS OF SUITABLE CABINETS

By J. B. Francey

INEXPENSIVE equipment for stereophonic sound production has opened up an interesting field of investigation to the home constructor. It is not always appreciated, however, that a substantially high level of fidelity can be obtained with conventional equipment when this is used under proper conditions. Nor, indeed, it is always appreciated that the value of stereo systems can be completely lost through an ineffectual and asymmetrical positioning of the twin speakers in a room.

After a consideration of various possibilities, it was decided to construct an experimental "bass reflex" speaker enclosure using an old receiver cabinet. This system has had considerable commercial application in America, and many cabinets with internal and external refinements may be obtained from our own audio equipment stockists at a cost of about five pounds. Since the present quest was of the nature of a "salvage operation", however, an attempt was made to apply the principle to a home-constructed cabinet. The effort proved well worth while.

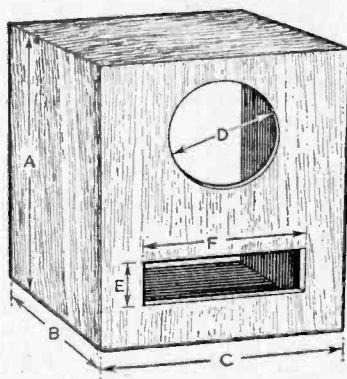
Reflex Enclosure

Most radio constructors will be aware that an effective baffle suppresses the back waves of a speaker to prevent these being mixed "out of phase", with the waves from the front of the speaker cone. The indiscriminate joining of waves from two sources would not only nullify part of the speakers' output by cancellation, but would also set up harmonic distortions in the total sound produced. A large or "infinite" baffle will effectively prevent this mixing, but only by rejecting the back waves from the speaker which may, in a small system, form quite a large proportion of the available sound. Since output of the higher sound register is comparatively easy to obtain, the main defect is the rejection of the more valuable bass register of frequencies which cannot be replaced at normal levels, that is, domestic levels of amplification. A really critical hearing of many baffle systems, moreover, will reveal an absence of tonal variation, or colour, in the lower register of sound, even though boom effects tend to make the condition not too obvious.

With the reflex enclosure system, the waves from the back of the speaker cone, which would normally be lost to sound production by suppression, are emitted from a port of rectangular shape which is cut in the baffle below the circular speaker cut-out. A very high proportion of these waves are emitted in proper phase. For this reason the overall efficiency of a reflex enclosure is high, since sound in its desired form is emitted at two sources from one speaker.

It should be noted, however, that phase reversal is not aimed at for the whole register of

frequencies. For this reason, the enclosure and port dimensions are somewhat critical for best results, and if some form of sliding shutter for the port is included in the arrangement, to enable the area of port discharge to be varied initially, the effort would be well worthwhile. Actually, one particular frequency is discharged from the port out of phase, and its reaction is used in opposition to the natural resonance of the speaker.



Material
Stout plywood
or blockboard
panels, screwed
and glued.
Inside joints
with 1" battens.
Inside top and
side panels
lined with felt
underlay

Speaker Diameter	Cabinet o/a sizes			Cut-out sizes		
	A	B	C	D	E	F
8"	23"	10"	18"	6½"	3"	9½"
10"	28½"	12½"	22"	8½"	4"	12½"
12"	34"	14¾"	26"	10½"	5¼"	16½"

Fig. 1.—A suitable cabinet, with sets of dimensions for different loudspeaker sizes.

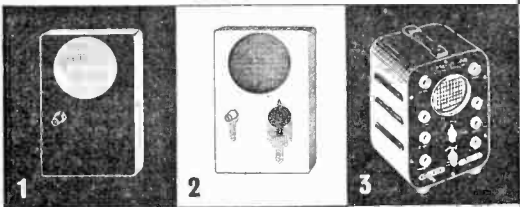
Construction

Readers will be aware that really professional directions on cabinet construction have been published in PRACTICAL WIRELESS from time to time, and for that reason it is not intended to do more than provide a materials and dimensions guide for this particular application. The illustration shows sizes of cabinet and associated cut-outs for three standard speakers, and in the search for accuracy reference was made to figures which were published some five years ago in America.

A stout blockboard or ¾in. thick plywood should be used for the panels, and wood battens should be used to reinforce the joints. It will be found to be an advantage to line the inside face of the top and the side panels with a felt underlay material as is used with carpets, or with off-cuts of foam rubber which can be obtained from some stores. Where glue is used, ample time should be allowed for this to set so that the continuous bonding of the substance is not impaired. The back panel should, of course, be made removable.

CHECK with these

BARGAINS



1. 3-TRANSISTOR POCKET RADIO with MINIATURE SPEAKER, FERRITE ROD, PRINTED CIRCUIT and GERMANIUM DIODE. The only 3 transistor radio available at the price. Build it in 1 evening! Tunable over M/L waves. Complete with easy-to-follow instructions and all components (less batteries obtainable anywhere 10d.). 22/6, P. & P. 1/6. (All parts available separately.)

2. 3-TRANSISTOR SUPER POCKET RADIO with MINIATURE SPEAKER, Plus Germanium Diode and Printed Circuit. Size 3 1/4 x 4 x 3/4 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.

3. OSCILLOSCOPE for D.C. and A.C. APPLICATIONS. A high gain, extremely stable differential V-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 A 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/P and CMT Brightness Modulation. A.C. mains 200/250 v. £15.15.0, P. & P. 7/6 or 30/- deposit plus P. & P. 7/6 and 12 monthly payments of 26/6.

4

ORDERS BY POST WILL RECEIVE OUR PROMPT ATTENTION

5

4. FULL 12 MONTHS' GUARANTEE INCLUDING VALVES and TUBE. A.C./D.C. POCKET MULTI-METER KIT. 2nd. 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.

5. CHANNEL TUNER. Will tune to all Band I and Band III stations. Complete with P.C.C.84 and P.C.F.80 valves (in series) I.F. 16-19 or 33-38. Can be modified as an aerial converter (instructions supplied). 32/8, plus 3/6 P. & P. HEATER TRANSFORMER to suit above, 200-250 v., 6/-, plus 1/6 P. & P.

6. MAINS TRANSFORMERS. All with tapped primaries, 200-250 volts, 0-160, 180, 200 v., 40 mA., 4.3 v. 2 amps, 10/8. 350-0-350 v., 70 mA., 6.3 v. 1 amp, 6.3 v. 2 amp, 10/8. 250-250 v. 70 mA., 6.3 v. 2 amp, 10/8, P. & P. 3/-.

7. WOLSEY 3-ELEMENT FOLDED DIPOLE. I.T.V. Aerial less mounting bracket for external use, complete with 12 yds. of coaxial cable. 15/-, P. & P. 3/6.

8. SIGNAL GENERATORS. Cash £6.19.6 or 25/- deposit and 6 monthly payments of 21/6, P. & P. 6/-. Coverage 100 kc/s to 100 Mc/s on fundamentals and 100 Mc/s to 200 Mc/s on harmonics. Case 10 x 6 1/2 x 5 1/4 in. Three miniature valves and Metal 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.

6

EASY TERMS AVAILABLE EXCEPTING AUTO-CHANGES

7

10. 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 6 1/2 x 4 1/4 in. Size of scale 6 1/2 x 3 1/2 in. 2 valves and rectifier. A.C. mains 250-250 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.

11. BATTERY RECORD PLAYER AND AMPLIFIER. 45 r.p.m. "Star" motor "Acos" crystal pick-up, 3 transistor push-pull amplifier complete with transistors. Output 600 milliwatts, 49/6, P. & P. 3/6.

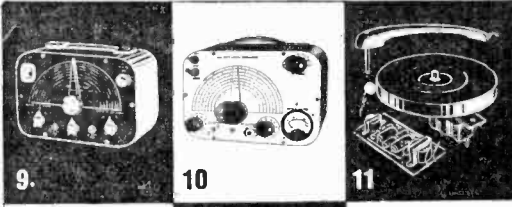
12. 9-WATT PUSH-PULL 5 VALVE AMPLIFIER. A.C. mains 200-250 v. Size 10 1/2 x 6 1/2 x 2 1/2 in. 5 valves. For use with all makes and type of pick-up and mike. Negative feed back. Two inputs, mike and gram, and controls for same. Separate controls for Bass and Treble lift. Response flat from 40 cycles to 15 kc/s. ± 2 db; 4 db down to 20 kc/s. Output 8 watts at 5 per cent total distortion. Noise level 40 db down all thru. Output transformer tapped for 3 and 16 ohms speech coils. For use with Std. or L.P. records, musical instruments such as guitars, etc. Suitable for small halls. £3.19.6, P. & P. 1/6. Crystal mike to suit 15/-, P. & P. 1/6. 8in. P.M. Speaker to suit 12/6, P. & P. 1/6.

13. B.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. Intervues 7in., 10in. and 12in. records of the same speed. Has manual play position, colour, brown. Dimensions: 12 1/2 x 10 1/2 in. Space required above baseboard 4 1/2 in., below baseboard 2 1/2 in. Fitted with Pul-Fi turnover crystal head. £6.19.6, P. & P. 5/-. With Stereo Head £7.19.6, P. & P. 5/-.

14. TRANSISTOR TESTER. For both P.N.P. and N.P.N. transistors incorporating moving coil meter. In metal case size 4 1/2 x 3 1/2 x 1 1/2 in. Scale marked in gain and leakage. 19/6, P. & P. 2/6.

15. PUSH-PULL OUTPUT STAGE inclusive of transistors with input and output transformers to match 3 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.

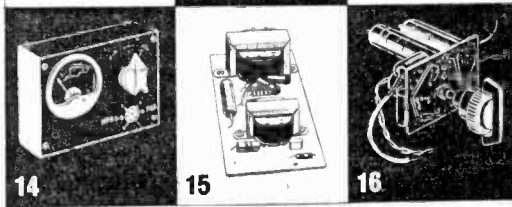
16. PORTABLE AMPLIFIER. On printed circuit for A.C. Mains 200/250 v. Size 4 x 3 in. with tone and volume control. Valves: ECL82 and EZ80. 39/6, P. & P. 2/6.



12

SATISFACTION GUARANTEED OR MONEY REFUNDED

13



RADIO & T.V. COMPONENTS (Acton) LTD.

23B HIGH STREET, ACTON, LONDON, W.3.

ALL ENQUIRIES S.A.E. GOODS NOT DISPATCHED OUTSIDE U.K.

THE LINEAR L1/10

A 10-WATT HIGH FIDELITY ULTRA LINEAR AMPLIFIER WITH INTEGRAL PRE-AMP

Full advantage has been taken of latest component miniaturisation developments to produce a 10-watt Hi-Fi push-pull amplifier incorporating tone control preamplifier stages within the measurements of 9 x 7 x 5ins.

In addition two high impedance input sockets are provided for microphone and gram., etc. With selector switch and vol. control, five B.V.A. valves are employed ECC83, ECC83, EL84, EL84, EZ81, H.T. and L.T. power supply point is included for a radio tuner.

FREQUENCY RESPONSE

± 1 d.b., 30-20,000 c.p.s.

MAXIMUM POWER OUTPUT

in excess of 14 watts.

SENSITIVITY

L.P. 220 m.v. for 10 watts. 78 r.p.m. 220 m.v. for 10 watts. Radio/Microphone 40 m.v. for 10 watts.

TREBLE LIFT CONTROL

+ 10 d.b. to -22 d.b. at 12,000 c.p.s.

BASS CONTROL

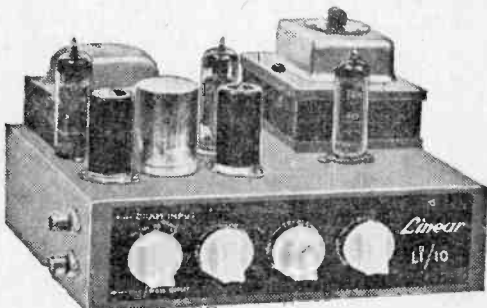
+ 14 d.b. to -10 d.b. at 50 c.p.s.

HUM LEVEL

Referred to maximum output and including integral pre-amp.—70 d.b.

NEGATIVE FEEDBACK

21 d.b. in main loop.



HARMONIC DISTORTION Less than 0.1% measured at 8 watts at 1000 c.p.s. Weight 10 lbs. Power consumption 90 watts. For 200-230-250 v. 50 c.p.s. A.C. mains. Outputs for 3-and 15-ohm speakers. Chassis finish stoved Gold hammer.

HIGHEST QUALITY Retail Price

MAXIMUM RELIABILITY AT A PRICE YOU CAN AFFORD **13 GNS.**

Send S.A.E. for descriptive literature

TRADE ENQUIRIES to

LINEAR PRODUCTS LTD.

ELECTRON WORKS, ARMLEY, LEEDS.

Also Available—THE L.45.A compact High Quality 4.5 watt amplifier. Size approx. 7.5-5 1/2 in. high. Sensitivity is 28 millivolts so that the input socket can be used for either microphone or gram., tape, radio tuner etc. B.V.A. valves used are ECC83 EL84, EZ80. Controls are: Vol. Treble and Bass with mains switch. The Tone controls provide full compensation for long playing records. Output matching for 3 ohm loudspeaker. Retail price £5.19.6.

THE LT45 TAPE DECK AMPLIFIER. A complete unit (power pack and oscillator incorporated) ready for connection to A.C. mains. 3 ohm loudspeaker and practically any make of deck. Negative feedback equalisation adjustment by multi-position switch for 1 1/2, 3 1/2 and 7 1/2 in. per second. Retail price 12 gns.

DIATONIC 10-14 WATT. High Fidelity amplifier with integral pre-amplifier. Retail 12 gns.

CONCHORD 30 WATT. Hi-Fi amplifier with two separately controlled inputs. Retail 16 gns.

L50 50 WATT AMPLIFIER. Size approximately 14 x 10 x 8 in. Sensitivity 25 mV. Output for 3 and 15 Ω speakers. Retail price 22 gns.

L5/5 STEREO AMPLIFIER 5 + 5 watt 12 gns.

FUNDAMENTALS OF RADIO RECEIVER SERVICING

By E. M. Squire

3rd Edition

A concise introductory guide to the practical operation of a radio receiver, presented in such a way that new radio receiver engineers, testers, and dealers may be able to obtain a working knowledge of receivers and servicing equipment in the shortest possible time. In this new third edition particular attention has been paid to F.M. receivers, transistor receivers and printed circuits, and in addition the whole text has been carefully revised and brought up-to-date. 15/- net.

From all Booksellers

PITMAN

Parker St., Kingsway, London W.C.2

REPANCO

HIGH GAIN COILS AND TRANSFORMERS for THE HOME CONSTRUCTOR

Send 6d. stamp for comprehensive List of REPANCO COMPONENTS and Easy-to-Build Receivers.

RADIO EXPERIMENTAL PRODUCTS LTD

33 Much Park Street, Coventry

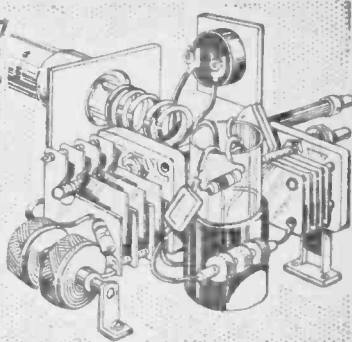
Tel. 27114

VALVES SALVAGE GUARANTEED

9d. each 7/6 dozen. Post on 1 valve. 9d.: 6, 1/6: 12, 2/6.											
1D6	6D2	6SJ7	15D2	BTH210H	EF34	KT36	TDD13C				
2D21	6H6	6SK7	78	BW48	EF36	P41	TT11				
4D1	6J5	8D2	185BT	C2C	EF37	P61	VR21				
6AL5	6J7	9D2	210VPT	CV66	EF39	PM202	VR35				
6BG6	6LD20	10C2	7133	D1	EF50	E19					
6C8	6SC7	10F3	ACP4	DDT	HL41DD	SP41					
6C9	6SG7	11D3	ARR	EA50	LD210	SP61					
6D1	6SH7	12Y4	AR10	EB91	LP2	T41					
2/9 each 30/- dozen. Post on 1 valve. 9d.: 6, 1/6: 12, 2/6.											
1LC6	6F13	6P28	7S7	25A6	8D3	EBG41	EY51				
6A8	6F14	6SL7	10D1	25L6	APV4	EBL21	(sh/ends)				
6AK8	6F15	6SN7	10P13	25Z5	APP4	ECC34	KT81				
6AM6	6K7	6SQ7	12BE6	25RE	E86	ECC31	KTW81				
6B7	6K25	6U4	12SH7	35Z4	CL33	EF39	N142				
6C4	6L7	6U4	12SJ7	42	CY1	EF41	PEN45				
6D5	6L18	7A7	12SK7	43	CY31	EP80	PEN46				
6F1	6LD	7B7	12H7	50CD6	DH76	EP91	7H41				
6F3	6N7	7C5	14H7	50L6	DH77	EP92	TH233				
6F12	6P25	7Q7	18	874	EABC80	EL32	U22				

P.P. COMPONENTS LTD. 219 Iford Lane, Iford, Essex. 100's more. Stamp for FREE Catalogue.

SHORT-WAVE SECTION



WAYS TO LEARN MORSE

By "Amateur Transmitter"

THE writer first learnt Morse over twenty years ago, and in the interval since then has noted several "methods" which help to speed up progress, or avoid boredom. Some of these methods can be used alone, while others require a second person. It seems wise to obtain variety in the manner of learning, so as to avoid a set habit which in time becomes almost essential.

GPO Test

It is assumed that the code has already been memorised, and that the aim is to pass the GPO 12 w.p.m. amateur transmitting test. To give

A valve oscillator, using any R.F. or A.F. screen-grid pentode, or triode, is shown in Fig. 2. Almost any transformer of about 1:3 or 1:5 ratio will work. If no oscillation is obtained, reverse connections to one winding. The pitch of the note may be reduced by wiring a condenser across one winding. Alternatively, the pitch may be raised by adding a resistor at "X". Changing the H.T. voltage, or phones, or wiring the latter in parallel with the primary, will also change the note obtained.

A good, clear note around 1000c/s is usual, but it is as well to gain practice in reading with equal ease when there is some change in frequency.

Letter and Word Speed

Speed in reading depends on the immediate recognition of the complete "sound" of a letter. (Later, complete words will be read in this way.) It is thus as well to get accustomed to the 12 w.p.m. sound of letters as early as possible.

In Fig. 3, "and" is shown with drawn-out letters, such as might represent sending at 6 w.p.m. If this is speeded up to 12 w.p.m., the sound of the letters will be different. Fig. 3 also shows letters sent at a speed which would allow 12 w.p.m., but with extra spacing, so that the actual speed is only 6 w.p.m. With this form of sending, individual letters will sound the same as if they were part of a 12 w.p.m. text. Accordingly, no change in

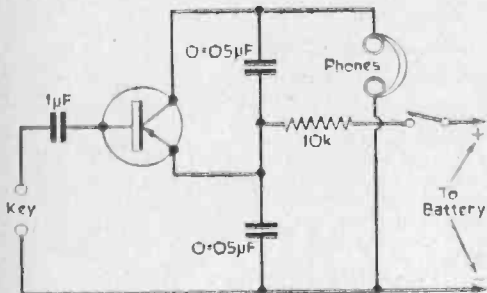


Fig. 1.—The circuit of a transistorised practice oscillator.

reliable reading during the actual test, it is a good plan to achieve 14 or 16 w.p.m., rather than rely on a minimum speed. The various punctuation and procedure signals can be ignored for the time being, as the test is in plain language and figures only, and other signals can be dealt with later. The plain language speed required is 12 w.p.m., or 60 letters per minute.

To practise sending alone, or sending and reading with another person, or sending with a tape recorder, an oscillator is necessary. One of the simplest transistor circuits is shown in Fig. 1. Any audio transistor is suitable, with a small dry battery. High impedance phones are recommended. The note depends greatly on the phone windings, but can be changed by substituting other condensers for the 0.05µF components or changing the transistor or battery voltage.

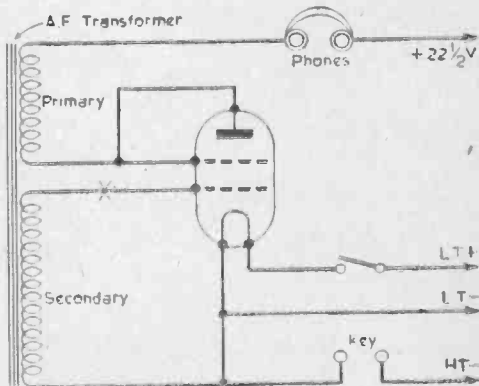


Fig. 2.—An oscillator circuit which uses a valve.

recognition becomes necessary, as increased speed is achieved by reducing the gap between letters, the letters themselves remaining unchanged.

For initial practice in sending and reading, some time spent on rather slow letters will do no harm. But an actual *letter* speed of about 12 w.p.m. should be adopted as soon as possible, the *word* speed being kept down to a suitable figure by increasing spacing.

Reciprocal Practice

When two persons can practise together, one sends while the other writes down the text as he reads it. Great care should always be taken to form letters correctly, and not to rush the sending speed so that accuracy suffers.

One key will suffice, but two pairs of 'phones, or a loudspeaker, will be required. Short periods of practice, such as twenty minutes on each of a few evenings a week, will give better progress than trying to put in an hour or two of practice only once a week.

Straightforward text should be sent, and occasional random letter groups, to avoid guessing. Learning facility depends on the person, but in actual fact the process can become very interesting, especially when modified by the methods suggested later, or by copying radio messages.

A "learning plateau" or inability to increase speed is often encountered. If so, all practice can be dropped for a week or so. It will then probably be found that speed has increased during this interval.

Speed may sometimes be increased by having a copy of the text being sent, and reading this while listening to the code. Afterwards, the text should be copied without the printed or written copy. Occasionally running through the alphabet at greater than usual speed also helps rapid reading.

Using a Tape Recorder

If a person has to practise alone, and a tape recorder is available, this will be extremely useful. Set up the equipment to make a recording of the oscillator. This can most easily be done by placing the recorder microphone against the oscillator phones.

As it is easily possible to keep sending speed ahead of reading speed, code can be recorded on the tape at the required speed for reading practice.

As memory will come into action and allow much guessing, random letters will have to be employed. One way of obtaining these, and still making it possible to compare the copied code with the original, is to prepare a few squares like those in Fig. 4. These each have 64 letters, and thus represent about 12 w.p.m., when each is sent in one minute. Lines may be read in either direction, and up and down, as well as diagonally, to ensure that sequences are not remembered. Occasional words may be interspersed at any point.

Some letters are much easier to read, and the required speed can most rapidly be achieved with them. But no letter should be wholly omitted. In addition, practice with the difficult letters from time to time will give added accuracy.

Smaller squares, for lower speeds, can easily be prepared. If care is taken to avoid repeating a square in the same form too often, one recording may be used many times for reading practice.

Reading from Radio

A TRF receiver or short wave superhet with B.F.O., will provide many code signals. Initially it may be almost impossible to read any characters at all. But when a reading speed of several words per minute has been achieved, occasional intervals spent in reading transmitted code will become very helpful indeed.

Try to select a slow transmission, and write down any letter as it is recognised. Some simple letters, such as O and H, will soon be read easily.

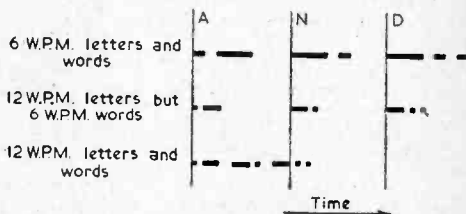


Fig. 3.—Fast letter speed with slow word speed.

It will be found that other letters can be added from time to time, until the copy becomes more and more complete.

If the message proves to be unintelligible, when written down, this need not cause concern. The text may be in code, or a foreign language, or employ abbreviations.

If possible, other forms of practice should be interspersed with reading off the radio, to obtain an improvement in recognising those letters which are not being read in the transmitted text.

High Speed Easy Reading

A useful gain in reading speed can be achieved by choosing those letters which can be read easily, and copying these at the required 60 per minute, or faster. This requires a tape recorder, or, for preference, a second person.

For an absolute beginner, only one letter may be read at this speed. But other letters can soon be added. Easy letters include T, M and O (-, --, and ---) and E, I, S and H (:, ::, :::, and). Others can soon be added.

To use this method, the sender confines himself to such letters as the reader can copy at the chosen speed, but adds a new letter when the existing letters are being copied reliably. For example, EEEEEIEEEEEI until this is read, then, say, EIEITIEETITIEITTI until this is read, and so on. The reader will then be copying the chosen speed all the time, though the number of letters will only constitute a part of the alphabet.

From time to time a change should be made by copying difficult letters, or random letters, or actual words. Some of the easy letters already being read easily and quickly can also be temporarily dropped.

Clearing Difficulties

After some time a number of habitual errors, such as inverting (e.g. reading Y for Q), may become apparent. If so, these should be cleared up as soon as possible, since the mistake is only being made more permanent by allowing it to

(Continued on page 169)

C.R.T. BOOSTER TRANSFORMERS
TYPE A. OPTIONAL 25% and 50% BOOST.
 2 V. OR 4 V. OR 6.3 V. OR 10.8 V. OR 13.3 V. MAINS INPUT. 12/6
TYPE A2. HIGH QUALITY. LOW CAPACITY.
 10/15 P. OPTIONAL BOOST 25%. 50%. 75%. MAINS INPUT.
TYPE H. MAINS INPUT. MULTI OUTPUT 2.
 4, 6.3, 7.3, 10 and 13 VOLTS. BOOST 25% AND 50%. LOW CAPACITY. 21/-
 Full instructions supplied

TRIMMERS. Ceramic, 30, 50, 70 pF. 8d.; 100 pF. 16p. 1/8; 250 pF. 1/6; 500 pF. 75p. 1/8.
 RESISTORS. Preferred values, 10 ohms to 10 meg. 1 w., 4d.; 1/2 w., 3d.; 1 w., 6d.; 1 1/2 w., 8d.; 2 w., 1/-.
HIGH STABILITY 1/2 w., 1%; 2 w., 2%. Preferred values, 100 to 10 meg. Ditto, 5%, 100 to 5 meg. 9d.
 10 watt 1/3
 15 watt 1/6
 25 ohms-10,000 ohms 2/-
WIRE-WOUND RESISTORS 1/3
 10 watt 1/6
 15 watt 2/-
 12.5K to 50K 10 w

AMERICAN "BRAND FIVE" PLASTIC RECORDING TAPE
 Long Play 7in. reel, 1,800ft. 35/- Spare
 5 1/2in. reel, 1,200 ft. 23/6 Plastic
 5in. reel, 900 ft. 18/6 Reels
 Double Play 7in. reel, 2,400ft. 43 Metal
 Standard 7in. reel, 1,200ft. 25/- 7 Reels
 5in. reel, 600 ft. 16/- 2/- ea.
 "Instant" Bulk Tape Eraser and Head De-
 duxer. 200/250 v. A.C. 27/6. Leadet, S.A.E.

O.P. TRANSFORMERS. Heavy Duty 50 mA, 4/6.
 Miniature, 384, etc., 5/8. Multiratio push-pull, 7/6.
 Push-Pull 10 w. 15/8, 10 to 20 w. 5K 30/-
SOLIN MIDGET Iron 200/10v. or 220/40v. 25w., 24/-.
L.F. CHOKES 15/10 H., 60/65 mA, 6.3 v. 3.5 A. 14 H.
 85 mA, 10/8; 10 H., 29/6; 12/8; 10 H., 150 mA 14/-

MAINS TRANSFORMERS: 200/250 v. A.C.
STANDARD, 250-0-250, 60 mA, 6.3 v. 3.5 A.
 Tapped 4 v., 4a. Rectifier 6.3 v. 1 a. 5 v. 2 a., or 4 v. 2 a. ditto, 350-0-350 ... 22/6
MINIATURE, 200 v. 20 mA, 6.3 v. 1 a. 10/6
MIDGET, 230 v. 45 mA, 6.3 v. 2 a. 17/6
SMALL, 230-0-230, 50 mA, 6.3 v. 3.5 A. 15/6
STD, 250-0-250, 65 mA, 6.3 v. 3.5 A. ... 17/6
HEATER TRANS. 6.3 v. 1 1/4 7/6 3A 10/6
 Ditto 1.4, 2, 3, 4, 5, 6.3 v. 1 1/4 ... 8/6
 Ditto Tapped, 3 to 30 v., 2A ... 22/6

ALADDIN FORMERS and core, 1in., 8d.; 1in., 10d.
 0.3in. FORMERS 5937/8 and Cans TV/3. 1in. sq. x 2 1/2in. 2/-; 1 1/2in. 2/-; 1in. 2/-; 1 1/2in. 2/-; 1in. 2/-.
SOLIN Midget Iron 200/10v. or 220/40v. 25w., 24/-.
MAINS DROPPER. 300v. x 1in. Ad. Sliders. 0.3 amp., 1000 ohms, 4/3. 0.2 amp., 1000 ohms, 4/3.
LINE CORD. 0.3 amp., 60 ohms per ft., 0.2 amp., 100 ohms per ft., 2-way, 6d. per ft., 3-way, 7d. per ft.
LOUDSPEAKER P.M. 3 OHM. 5in. Roar, 17/6; 8in. Piecey, 18/6; 7in. x 4in. Piecey, 18/6; 6in. Roar, 18/6; 10 x 6in. 27/6; 10in. Roar, 30/-; 4in. Tweeter, 25/-; 12in. S.L.A. 30/-; 8in. 25/-.
STENTORIAN HP102. 10m. 3 to 15 ohm 10 w., 95/-
12in. BAKER 15 watt 3 ohms or 15 ohms, 90/-
12in. BAKER FOAM SUSPENSION, 15 ohms, 28/-
CRYSTAL DIODE G.E.C. 2/-; GEX34, 4/-
HIGH RESISTANCE PHONES 4,000 ohms, 15/-; 100 ohms, 10/-
LOW RESISTANCE PHONES LBA5, 7/6 pr.
MIX TRANS. 50-1, 3/9 ea.; 100-1, Potted, 10/6
SWITCH CLEANER. Fluid squirt spout. 4/3 tin.
TWIN GANG TUNING CONDENSERS. 365 pF. miniature 1in. x 1 1/2in. x 1 1/2in. 10/-; 0.0005 Standard with trimmers, 9/-; less trimmers, 8/-; midget, 7/8.
SINGLE. 50 pF. 2/8; 80 pF. 100 pF. 160 pF. 5/8. Solid dielectric 100, 300, 500, pF 3/8.
SPEAKER FRET GOLD CLOTH. 17in. x 25in., 5/-; 25in. x 35in., 10/-; Tykan, 4in. 5in. wide, 10/-; 3in. 3in. wide, 5/- ft. Brown or Red or Green.

New and Boxed VALVES 90-day Guarantee.
 1R5 7/6 6K9G 7/6 EABC80 8/8 EY86 10/-
 1R5 7/6 6L6G 10/6 EB90 8/8 HABC80 10/-
 1R4 6/- 6V7M 6/8 EBC33 8/8 12/6
 2X3 3/6 6Q7G 7/6 EBC41 8/8 HVR2A 6/8
 6A4 7/6 6S7M 6/8 EBF80 10/- MU14 9/-
 3V4 7/6 6SN7 6/8 EDC34 9/8 PCF80 9/8
 3V7 7/6 6V6G 6/8 ECF80 9/8 PCF80 9/8
 3Y3 7/6 6X4 7/6 ECH42 10/6 PCL32 11/6
 8Z4 9/6 6X5 6/8 ECL82 10/6 PL82 10/6
 6AM6 5/- 12AT7 8/- EF41 9/8 PY80 7/8
 888 6/8 12AU7 8/- EF50 5/8 EF51 9/8
 888E 6/8 12AX7 8/- EP80 8/- PY82 7/6
 888E 6/8 12BE6 8/8 EF91 5/- SP81 3/6
 6D6 6/- 12K7 6/8 EP93 5/8 UB41 9/8
 6P6G 7/6 12Q7 6/8 EL32 6/- UB42 9/8
 6BE 3/6 35L6 9/8 EL41 9/8 UB41 9/8
 618 5/6 35Z4 7/- EL54 8/8 UL41 9/8
 618 5/6 80 9/8 EM81 9/8 UY41 8/8
 637G 6/8 907 5/6 EZ40 7/8 U22 8/8
 6K6GT 6/8 954 1/8 EZ80 7/8 VR105 8/8
 6K7G 5/- EA50 1/8 EY61 9/8 VR150 8/8

"REGENT" 4 VALVE

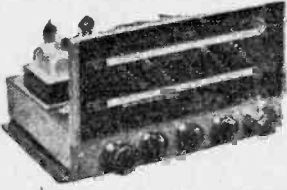


"96" RANGE VALVES KIT PRICE £6. 6. 0.
 Carr. 4/-

PRINTED CIRCUIT BATTERY PORTABLE KIT

Medium and long wave. Powerful 7 x 4in. high Flux Speaker. T.C.C. Printed Circuit and condensers. Components of finest quality clearly identified with assembly instructions. Osmor Ferrite Aerial Coils. Rexine covered attaché case cabinet. 81z 12in. x 6in. x 4in. Batteries used B126 (L5512) and AD35 (L5404) 10/- extra. Instructions 9d. (free with kit). Mains Unit ready made for above 39/6. Sold separately.

ARMSTRONG AF 208 AM/FM RADIOGRAM CHASSIS



★ Full VHF Band (87-108 Mc/s) and Medium Band, 187-570M. ★ 7 Valves ★ 5 Watts Output ★ 15dB Negative Feedback ★ Separate wide range Bass and Treble Controls ★ 2 Compensated Pick-up Inputs ★ Frequency Response 30-22,000 c.p.s. ± 2dB ★ Tape Record and Playback Facilities ★ Continental Reception of Good Programme Value ★ 7 1/2 and 15 ohm speakers. 12 Month guarantee ★ Installation and Service Manual Supplied.

Price **22 Guinea** Carr. Free



Maranch 680
 World's Best Equipped Autochanger

4 Speed Autochangers, B.R.R., U.A.S. £15.0
 4 Speed Autochangers, U.A.S. Stereo £7.10
 Garrard 209, Acco 73 Head ... £10.10
 Garrard Model 210, G.C.S. Head ... £10.10
 4 speed Single Players, E.M1 ... £8.18
 Garrard TA Mk. 11 G.C.S. Head ... £8.0
 Garrard 4 HF Transcription G.C.S. £12.18
 Garrard Stereo Heads ... £2.0

Volume Controls 80 ohm COAX

100 spindle. Midget 5K ohms to 2 1/2 M. Semi-air spaced 1in. 8w. D.P.S.w. Stranded core. 6d./yd. 3/- Fringe Quality 4/6 Air Spaced. 1/-yd.

COAX PLUG ... 1/- **LEAD SOCKET** ... 2/-
PANEL SOCKETS 1/2 **OUTLET BOXES** 4/8
BALANCED TWIN FEEDER yd. 6d. 80 or 300 ohms
DITTO SCREENED per yd. 1/8. 80 ohms ohm.
WIRE-WOUND POTS, 3 WATT. Pre-set Min. TV Type. All valves 10 ohms to 25 K., 8/-; ca. 30 K., 50 K., 4/-; (Carbon 30 K., 60 to 3 ucs., 3/-)
WIRE-WOUND 4 WATT POTS. Long Spindle. Values, 30 ohms to 50 K., 8/8; 100 K., 7/8.

ALUMINIUM CHASSIS. 18 s.w.g. undrilled. With 4 sides, riveted corners and lattice framing. holes, 2 1/2in. sides, 7 x 4in., 4/6; 9 x 7in., 5/8; 11 x 7in., 6/8; 13 x 9in., 8/8; 14 x 11in., 10/6; 15 x 14in., 12/6; 18 x 16 x 3in., 16/6.

HI-GAIN BAND 3 L.T.A. PRE-AMP KIT. Gascode circuit with valve ECC84, or PC954. Printed 29/6. With Power Pack, 48/6. Plans only 6d. Band I BBC version, same prices.

CONDENSERS. 1000 pF. 7 kv. T.C.C. 5/8; 5000 pF. 20 kv., 9/8, 0.1 mfd. 7 kv., 9/6; Tubular 500 v. 0.0001 to 0.05 mfd., 9d. 0.1 mfd., 0.25, 1/8; 0.5/500 v., 1/8; 0.1/350 v., 9d.; 0.1/1000 v. 1/8; 0.01/2,000 v., 1/8; 0.1 mfd., 2,000 volt. 3/6; **CERAMIC CONDS.** 500 v., 0.3 pF. to 0.01 mfd., 8d. **SILVER MICA CONDENSERS.** 10% 5 pF to 500 pF. 1/-; 600 pF to 3,000 pF. 1/3. Close tolerance (± 1 pF) 2 pF to 47 pF, 1/8. Ditto 1% 50 pF to 815 pF, 1/8; 1,000 pF to 5,000 pF, 2/-.

I.F. TRANSFORMERS 7 1/2 pair 485 Kcs Slug Tuning Miniature Can 1 1/2in. x 4in. square. High and good bandwidth. By Eye Radio. Data sheet supplied. Weymouth 3 1/2 x 1 1/2in. sq. I.F. 485 Kcs, 10/6 pair

NEW ELECTROLYTIC. FAMOUS MAKES

TUBULAR	TUBULAR	CAN TYPES
1/350v. 2/-	50/350v. 5/8	8/600v. 9/-
2/350v. 2/3	100/250v. 2/-	32/350v. 4/-
4/450v. 2/3	250/250v. 2/6	100/370v. 6/-
8/500v. 2/3	500/125v. 3/-	2/500/370v. 4/-
16/450v. 3/-	8+16/450v. 3/8	32+32/360v. 5/-
16/500v. 4/-	8+16/500v. 5/8	32+32/450v. 6/-
32/450v. 3/8	16+16/450v. 4/8	50+50/350v. 7/-
50/250v. 1/8	18+18/600v. 6/-	64+120/350v. 11/6
80/50v. 2/-	32+32/350v. 4/8	100+200/275v. 12/6

SELENIUM RECTIFIER. 300 v. 85 mA., 7/6.
CONTACT COOLED. 250 v. 50 mA. 7/8; 60 mA. 8/6; 85 mA. 9/8; 200 mA. 21/-; FC31, 300 mA. 27/6.
COILS Wreite. "T" type 3/- each. Osmor Midget coils 9/6. (dust cap add. from 4/-). All ranges.
TELETRON. L & M.T.R.F. with reaction, 3/6.
FERRITE ROD AERIALS. M.W. 8/8; M & L 12/6.
T.R.F. COILS. A/H.F. 7/- pair. H.F. CHOKES. 2/8.
FERRITE ROD. 5in. x 1/2in. dia., 2/8.

JASON P.M. TUNER COIL SET. 29/- H.F. coil, aerial coil. Oscillator coil, two I.F. trans. 10.7 Mc/s. Ratio Detector and heater choke. Circuit book using four 6AM6. 2/8. COMPLETE I.F. M. KIT FM1. with set of 4 valves. £6.5.0. Details N.A.E.

FULL WAVE BRIDGE SELENIUM RECTIFIERS. 3 8 or 12v. 1 1/2 amp. 8/8; 2 a. 11/8; 4 a. 17/6
CHARGER TRANSFORMERS. Tapped input 200/250 v. for charging at 2, 6 or 12 v., 1 1/2 amps. 18/6; 2 amps., 17/8; 4 amps., 22/6. Circuit included.
VALVE AND TV TUBE equivalent books, 9/6.
VALVE DATA. Vol. 1, 2, 3 or 4, 5/-, each.
TOGGLE SWITCHES. 8 p. 2/-, D.P. 3/6, D.F.D.T. 4/-
WAVECHANGE SWITCHES
 5 p. 4-wave 2 water long spindle ... 6/6
 3 p. 2-way, or 3 p. 2-way short spindle ... 2/8
 3 p. 2-way, 4 p. 2-way, 4 1/2-way long spindle ... 3/6
 3 p. 4-way, or 1 p. 12-way long spindle ... 3/6
VALVE HOLDERS. Pax Int. Oct. 4d. EP50, EA50, 6d. B12A, CRT 1/3. Eng. and Amer. 4, 5, 6, and B7G, B9A, B8G, B9A, 8d. B7G with can., 1/6. B9A with can., 1/6. CERAMIC EP50, BG7, B9A. Int. Oct. 1/-, S/Caus. BG7, B9A, 1/-.

NEW MULLARD TRANSISTORS
 Audio OC71 ... 12/6 RF OC44 ... 15/6
 OC72 ... 12/6 OC45 ... 12/8
 Sub Miniature Electrolytics, 15 volt. 1, 2, 4, 5, 8, 25, 50, 100 mfd. 3/- each.
 "P.W." Pocket 6 Transistor Kit. All parts, Printed Circuit and Cabinet ... £9.15.0

RADIO COMPONENT SPECIALISTS

OUR ONLY ADDRESS
337 WHITEHORSE RD., WEST CROYDON
 THO 1665. Buses 133 or 68

Postal Service 1/2, over £2 free. C.O.D. 1/6. (Export Extra. No C.O.D.) (Wed. 1 p.m.)

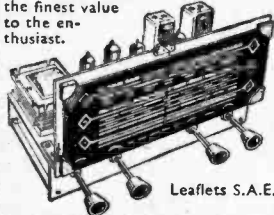
KINGSMERE SUPPLIES LIMITED

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

MAIL ORDER HOUSE

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

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



Leaflets S.A.E.

ALL BRITISH RADIOGRAM CHASSIS, 3 WAVEBANDS 5 MULLARD VALVES ECH81, EF89, EBC81, EL84, EZ80

Brand new and guar. A.C. 200/250V. Short - Medium - Long Gram. P.U. High Q dust core coils. Latest circuit technique. AVC and neg. feedback. 4 watts. Chassis size 13 1/2 x 6 x 7in. Aligned and calibrated ready for use. Quality at Low Cost. Chassis isolated. H.P. Dep. £5 and five monthly of £1.

OUR PRICE **£9.9.0**



BRAND NEW AND BOXED
with Template
4 SPEED
MODEL UA8

£6.15.0

STANDARD OR STEREO PICK-UP

GARRARD 4-SPEED HIGH FIDELITY UNITS

Autochanger RC210 £9.19.6
Single Player TA Mk.11 £7.19.6
Transcription 4HF £16.19.6

Price inc. plug-in normal heads. Stereo hds. £2 ex.

Matched Speakers, 5in., 6 1/2in., 8in., 17 1/2 ea. 10in. 25/-, 12in. 30/-.

BRAND NEW

VALVES

OZ4	6/-	6BA6	7/-	6S17M	6/-	DF96	8/-
IR5	6/-	6BE6	7/-	6SN7GT	6/6	DK96	8/-
IS5	6/-	6C4	5/-	6U5G	7/6	DL96	8/-
IT4	5/-	6D6	6/-	6V6G	5/-	EABCB80	8/-
2X2	2/6	6F6G	7/-	6X5G	6/-	EB91	4/-
3Q5	9/-	6G6	5/-	12A7	6/-	EBC41	8/-
354	7/6	6H6	3/6	12AU7	6/-	EBF80	10/-
3V4	7/6	6J5	5/6	12AX7	6/-	ECC84	8/-
5U4	6/-	6J7G	6/6	12X7GT	6/6	ECH42	10/-
5Y3G	6/-	6K6GT	5/-	25Y5G	9/6	ECL80	10/-
5Z4G	9/6	6K7G	5/-	35L6	9/6	ECL32	10/-
6AC7	3/6	6K8G	6/-	807	5/-	EF80	7/-
6AG5	5/-	6N7M	7/6	35Z4	6/6	EF41	9/-
6AL5	4/-	6G7	6/-	954	1/6	EF91	4/-
6AM6	4/-	6G7G	7/6	956	2/6	EF92	5/-
6AT6	7/6	6SA7M	6/-	DAF96	8/-	EL32	4/-
6BB8	5/-						

Matched Pairs 1/- extra

PCL82	8/-	EL41	9/-
PY80	7/6	EL84	8/6
PY81	8/6	EM81	9/6
PY82	7/-	EY51	7/6
PY83	9/-	EY86	7/-
QP25	7/-	EZ40	7/-
R3	7/6	EZ80	7/-
SP61	3/6	E1148	1/-
UF41	8/6	HABCB80	
UL41	8/6		
UY41	7/-	HVR2A	6/-
U22	8/-	KT33C	10/-
VP23	6/6	MU14	7/6
U76	6/6	P61	3/6
VR105/30	8/-	PCC84	8/-
	9/-	PCF80	7/6

American Magnetic Recording Tape FERRODYNAMICS "BRAND FIVE"

5in. 600ft.	16/-	MYLAR DUPONT
5in. 900ft.	18/6	Super High Fidelity
5 1/2in. 1,200ft.	23/6	Double Play
7in. 1,200ft.	25/-	5in. 1,200ft. ... 37/6
7in. 1,800ft.	35/-	7in. 2,400ft. ... 60/-

Illustrated leaflet S.A.E.

Spare Reels, 3in. 1 1/6; 4, 5, 5 1/2in. 2/-; 7in. 2/6.

"Instant" Bulk Tape Eraser and Head De-fluxer, 200/250 v. A.C., 27/6. Leaflet, S.A.E.

SETS OF VALVES

19/6	IR5, IT4, IS5, 354 or 3V4.
27/6	DK96, DF96, DAF96, DL96.
27/6	6K6, 6K7, 6Q7, 6V6, 5Z4 or 6X5.
37/6	ECH42, EF41, EBC41, EL41, EZ40.
39/6	ECH81, EF89, EBC81, EL84, EZ80.
35/-	12K8, 12K7, 12Q7, 35L6, 35Z4.

25 FOAMCOURT WAY, FERRING, WORTHING, SUSSEX



COIL PACKS

CP.3/370 pF and CP.3/500 pF. These 3 waveband Coil Packs are available for use with either 370 pF or 500 pF tuning condensers. The coverages are: Long Wave 800-2,000 metres. Med. Wave 200-250 metres, Short Wave 16-50 metres. Designed for use with "MAXI-Q" glass scale type S2. Retail price of each unit: 32/- plus 10/8 P.T.—total 42/8.

CP.3/G. As above but with Gram. position, suitable for use with 500 pF tuning condenser: 39/- plus 13/- P.T.—total 52/-.

CP.3/F. This Coil Pack is for use with a 500 pF tuning condenser and covers the standard, Long, Med. and Short wavebands with the addition of the band 50/160 metres. This covers the Trawler band, Aeronautical and the 80 and 160 metre Amateur bands: 49/- plus 16 1/4 P.T.—total 65 1/4.

CP.3F/G. As CP.3/F but with Gram. position: 57/- plus 19/- P.T.—total 76/-.

CP.4/L and CP.4/M. These compact 4-station Coil Packs are available for either 1 Long Wave and 3 Medium Wave Stations (CP.4/L) or 4 Medium Wave Stations (CP.4/M). They are fully wired and require only four connections for use with any standard frequency changer valve. 25/- plus 8 1/4 P.T.—total 33 1/4.

CP.4L/G and CP.4M/G. As CP.4/L and CP.4/M but with provision for Gram. position. 31/- plus 10 1/4 P.T.—total 41 1/4.

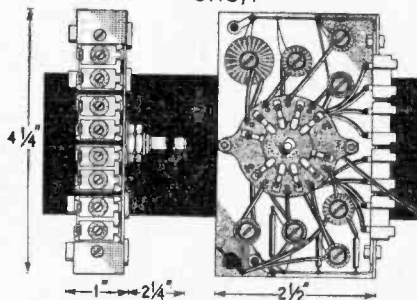
See Technical Bulletin DTB.9 for details of all Coil Packs, 1/6.

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

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

STOP PRESS: TDO.3 Tape Oscillator Coil for Mullard 3 watt Tape Amplifier, 7/6 each.

CP.3/F



(Continued from page 166)

continue. Occasional periods confined to difficult letters, or those wrongly read, will be very helpful.

Exclusive use should not be made of random letters, or squares like those in Fig. 4. In addition, ordinary words should be used. Otherwise it may well be found that squares like those in Fig. 4 can be read at 12 w.p.m., even when wholly unfamiliar, yet at the same time straightforward text at 12 w.p.m. cannot be copied. (This arises because

O	J	K	E	T	A	H	S
W	Y	M	T	F	T	B	O
P	S	H	R	Z	O	I	G
I	O	A	X	I	X	U	M
H	W	K	E	W	I	G	N
A	M	N	C	T	U	D	H
S	E	U	B	Q	K	A	D
R	N	T	L	E	J	V	O

Y	T	G	B	H	C	P	Q
I	N	D	R	G	Y	Y	G
P	X	V	B	J	S	V	G
W	M	C	V	L	B	C	X
F	D	D	A	O	F	Y	K
O	F	L	O	P	X	O	L
P	W	U	Y	J	C	E	Z
B	Z	N	R	Z	N	R	J

Fig. 4.—Easy and difficult letter squares.

with straightforward text the mind becomes aware of a word forming, and this diverts attention from the code signals being read.)

An occasional rest from letter reading can be usefully employed by concentrating on figures. Blocks of figures like the letters in Fig. 4 can be prepared. The Post Office test requires 50 figures in 1½ minutes. These are in ten groups of five figures. Usually, learning to send and read figures up to this speed will prove quite easy.

When reading text or figures, always leave the required break between words or figure groups.

Also observe the breaks in sending. When sending errors are made, correct them in the proper manner (8 dots) as would be required in the test. Such points will then become automatic, and cause no difficulty or anxiety.

When possible, reading practice should be undertaken before sending practice. Sending may then be modelled on receiving. But if a person is learning alone, or two help each other, sending will be necessary almost from the beginning. In this case, accuracy is the essential point, as speed in sending will soon come quite easily.

When some speed has been gained, it will be found that short, frequent words, or repeated combinations of letters, such as "ed", "qu", "ll", etc., are recognised as a unit. As this happens it will be found of immense help, and at this stage practically all the reading required can be straight off the radio.

Testing

If a second, skilled operator is available, it is a good plan to carry out a simulated "test" occasionally, and also have him point out sending errors. The sending test is 36 words in 3 minutes, with not more than 4 erasures, and no uncorrected errors, plus 10 groups of 5 figures in 1½ minutes, with up to 2 erasures, and no uncorrected errors. The reading test is 36 words in 3 minutes, with up to 4 errors, plus 10 groups of 5 figures in 1½ minutes, with up to 2 errors. In duration, 3 dots equal a dash; the space between dots and dashes in a letter is equal to 1 dot; the space between letters is equal to 1 dash; and 5 dots space should be left between words. Writing in longhand (not block letters) will prove best for the higher speeds.

A 10 WATT ONE VALVE TRANSMITTER

(Continued from page 119)

When the 150pF condenser is rotated, a sharp dip in cathode current should be found, and the household lamp should light. Loading will probably be inadequate, and is increased by slightly opening the 2-gang condenser, and re-tuning the 150pF condenser for the cathode current dip. The current will now be higher, and the lamp will have increased in brilliance. Loading is progressively increased, by opening the 2-gang condenser, and re-tuning with the 150pF condenser, until the required cathode current rating has been reached.

It will be found that if loading is too heavy, the valve will not commence oscillating cleanly, when keyed. Best results in this direction will also be achieved with the 150pF condenser very slightly off resonance. However, adjustments are in no way critical, especially when the transmitter is not run up to the maximum possible input.

Aerial

A single wire, end-fed, aerial may be loaded by connecting it directly to the centre of the coaxial socket or lead. With the aerial connected, the transmitter is loaded in the same way as described for the lamp.

The end impedance of such an aerial will depend on its length, and can become very high when it

approaches a ¼-wave (¼λ) for the band in use. In these circumstances, the transmitter may be insufficiently loaded, even with the 2-gang condenser reduced to minimum capacity. If this arises, and the aerial length is not to be changed, an aerial coupler should be added. This can consist of a coil and condenser tunable to the band used. A centre tap on the coil is taken to earth. A loop consisting of a few turns of insulated wire is then used to couple to the transmitter, as shown in Fig. 6. The aerial is tapped along the coil until satisfactory loading is obtained.

Dipole

If a dipole is available, the same aerial coupler can be employed. It should be connected as in Fig. 6, but the two leads of the dipole feeder are tapped at equal distances from the centre tap, as shown. When first putting the transmitter into use, listen to its signal on a receiver, to assure that it keys and starts cleanly. If not, excessively heavy loading, for the H.T. voltage available, is probably the cause. With large H.T. voltages, operating the transmitter with no load, or inadequately loaded, may cause heavy crystal currents. This can be watched by inserting a 60mA type bulb in series with the crystal. With any average aerial and supply voltage, operation will be very easy indeed.

Club News

REPORTS OF CURRENT ACTIVITIES

AMATEUR RADIO MOBILE SOCIETY

Hon. Sec.: G3FPK, 79 Murchison Road, London E.10.

On March 24th, Norman Fitch gave a lecture on "Mobile Operation and its Problems", at the London meeting of the R.S.G.B. The "S.X. Mystery Rally" was held at High Beech, in Essex, on March 28th, and operation was on 10 and 160m.

Future Event:

May 18th—A meeting to discuss the proposed Midlands Section of A.R.M.S.

CHESTER AND DISTRICT RADIO SOCIETY

Hon. Sec.: H. Morris.

Press Sec.: A. Bagley. Oak Lea, Long Lane, Saughall, Chester.

At the Annual General Meeting on January 10th, H. Morris was re-elected Hon. Sec.; D. Wardle, Chairman; D. Richers, Vice-chairman; and J. Butler, Treasurer. The Annual Dinner was April 15th. On April 25th G30PT gave a lecture on Detector Circuits.

Future Events:

May 9th—Top Band Net Night.

May 16th—Commercial v Home Built Equipment.

CITY OF BELFAST Y.M.C.A. RADIO CLUB

Hon. Sec.: W. A. R. Bell, 78 Orangefield Avenue, Bloomfield, Belfast 5.

The transmitter rooms are available for the use of members on club nights—Wednesdays and Saturdays from 20.00hrs. The club exhibited a live station in Ulster TV's "Hobbies and Holidays" Exhibition at Balmoral, Belfast.

CLIFTON AMATEUR RADIO SOCIETY

Hon. Sec.: C. H. Bullivant, G3DIC, 25 St. Fillas Road, London S.E.6.

During February, Dave Deacon (G3BCM) explained some of the International Radio Regulations which apply to amateur stations and also demonstrated his miniature amateur bands receiver. On April 21st, C. Hatfull (G3H21) gave the annual D/F lecture.

DERBY AND DISTRICT AMATEUR RADIO SOCIETY

Hon. Sec.: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.

At the Annual General Meeting T. Darn was elected Chairman, F. C. Ward was elected Hon. Sec., S. Swindell is the Vice-chairman, and H. Shaw the treasurer. On April 19th, Tom Douglas gave a lecture entitled "Two Metres", and on April 22nd the Founder Members' Dinner was held at the Derbyshire Yeoman.

Future Events:

May 7th—144 Mc/s Field Day.

June 3/4th—National Field Day.

FLINTSHIRE RADIO SOCIETY

Hon. Sec.: J. Lawrence, "Perranporth", 9 East Avenue, Bryn Newydd, Prestatyn.

"Introduction to Transistors" was the title of a lecture given by J. Lawrence on March 27th, and on April 24th G. Ralph told of his "Trip to Woomera".

Future Event:

May 29th—Final arrangements for the National Field Day.

HALIFAX AND DISTRICT AMATEUR RADIO SOCIETY

Hon. Sec.: A. Robinson, G3MDV, Candy Cabin, Ogdon, Halifax.

On March 7th members discussed the National Field Day arrangements.

Future Events:

June 6th—A talk about Model Aircraft.

June 20th—An informal evening.

LIVERPOOL AND DISTRICT AMATEUR RADIO SOCIETY, G3AHD

Hon. Sec.: H. James, G3MCN, 448 East Prescott Road, Knotty Ash, Liverpool 14.

On April 4th members enjoyed a film show, and on April 18th, G3IQO gave a lecture about D.F. equipment. G3LIS lectured on TVI Precautions on May 2nd.

Future Events:

May 16th—D.F. Contest.

May 23rd—"Single Side Band" by G3JPJ.

LLANELLY AND DISTRICT AMATEUR RADIO CLUB

Sec.: H. J. Hughes, 4 Pen-y-morfa, New Dock, Llanelly, Wales.

The club meets on Thursdays for lectures on radio technology and on Tuesdays for Morse training, and work benches are available for the building and stripping of equipment. On both evenings licensed operators are present to instruct amateurs on lining up and operating the club transmitter.

MANCHESTER AND DISTRICT RADIO SOCIETY (G3HOX)

Chairman: A. D. Camp, G3MYR, George 6th Club, North Road, Manchester 10.

Meetings are held every Wednesday evening from 7 to 7.30 p.m. until 10.30 p.m.

On being reorganised last October, new premises were obtained at The George VI Club in Manchester and the new Committee includes two Short Wave Listener members (adult and junior) to enable the Committee to keep in mind all sections of the club membership when making any decisions.

The call-sign G3HOX has been re-issued to the club and instruction in "operating procedure" is available to those members interested in becoming licensed. The Committee has introduced Morse instruction and practice classes, a technical class, lectures on A.M. S.S.B. transmitter construction, frequency control etc., in an endeavour to help SWL members to become licensed operators.

MITCHAM AND DISTRICT RADIO SOCIETY

Hon. Sec.: M. Pharaoh, G3LCH, 1 Madeira Road, Mitcham.

G4ZU gave a talk on the "Birdcage" aerial on March 24th, and on Friday, 7th April, National Field Day arrangements were discussed.

Future Event:

May 21st—National Field Day dummy run.

PADDINGTON AND DISTRICT AMATEUR RADIO SOCIETY

Hon. Sec.: N. A. Lambert, Beauchamp Lodge Settlement, 2 Warwick Crescent, London W.2.

An extensive programme has been laid on for the summer months, which includes C.W. training by W1BHZ, and a series of talks on "Interpretation of Circuits" by G3JEA and "Practical Construction" by G3KNL, and many other subjects.

PETERBOROUGH AND DISTRICT AMATEUR RADIO SOCIETY

Hon. Sec.: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.

At the Peterborough Technical College on June 2nd, the evening will be spent listening to a lecture on Aerials. A Mobile Rally is to be held at Hunstanton on May 28th.

Talk-in stations will operate on Two Metres (160m and 80m).

PLYMOUTH RADIO CLUB

Hon. Sec.: R. Hooper, 2 Chestnut Road, Peverell, Plymouth, Devon.

On May 10th it is proposed to show some slides to accompany a tape-recording called "Round the Local Hams".

READING AMATEUR RADIO CLUB

Hon. Sec.: R. G. Nash, G3EJA, "Peacehaven", 9 Holybrook Road, Reading.

On April 29th Mr. Kirkpatrick and Mr. Horsnell discussed the Transmitter Licensing Regulations.

Future Event:

May 27th—A. M. Mills, G3NMF, will be informing the members of the results of his experiments on "Aerials in restricted places for 160m and 80m".

SLADE RADIO SOCIETY

Church House, High Street, Erdington, Birmingham 23.

The first Harcourt Trophy Test was held on April 23rd.

Future Event:

June 11th—Harcourt Trophy Test.

STOKE-ON-TRENT AMATEUR RADIO SOCIETY

Hon. Sec.: V. J. Reynolds, G3COY, 90 Princes Road, Hartshill, Stoke-on-Trent.

The North Midlands Mobile Rally was held on April 30th. V. J. Reynolds has been appointed to the posts of ASR and TR R.S.G.B. for Stoke-on-Trent. The Annual General Meeting was held on April 6th.

SUTTON COLDFIELD RADIO SOCIETY

Hon. Sec.: L. Hall, 24 Calthorpe Road, Walsall, Staffordshire.

H. Symes gave a talk on "SSB for Beginners" on April 27th.

Future Events:

May 25th—A Film Show at T. Parton's QTH.

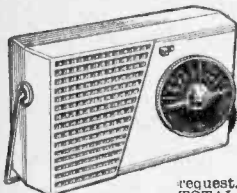
June 8th—"Transistors".

WANSTEAD AND WOODFORD RADIO SOCIETY

K. Smith, G3JIX, 82 Gransille Road, Walthamstow, London E.17.

The Junior section had a successful outing to the Science Museum recently. Future events include a possible field day with a transmitter and a D.F. competition. Coming lectures include "Superheterodyne Reception"; "Transistor Action" and "The use of powers and logarithms in calculations".

"P.W." 6 TRANSISTOR PERSONAL RECEIVER



Designed by the technical staff of *Practical Wireless*: easy to build, using printed circuit, and 1st Grade Matched Transistors and Diode. Full Medium and Long Wave coverage to internal speaker. All parts sold separately (new components only) enabling you to buy as required, and full detailed price list will be sent on request. Constructional details 1/6. **TOTAL COST INCLUDING BATTERY AND CABINET £8.19.6.**

request.

Constructional details 1/6. TOTAL COST INCLUDING BATTERY AND CABINET £8.19.6.

TRAWLER BAND RECEIVER RH155. The late version of the famous Bomber Command receiver known the world over to be supreme in its class. Covers 5 wave ranges 18.0 to 7.5 Mc/s. 7.5 to 3 Mc/s. 3.0 to 1.5 Mc/s. 1.500 to 600 kc/s, 500 to 200 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 £12.19.6.**

A.C. MAINS POWER PACK OUTPUT STAGE. for the above in black crackle case to match receiver, enabling it to be operated immediately, but just plugging in, without any modification. With built-in 8in. speaker. **£6.10.0. 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.

"P.W." ROADFARER

All components available, detailed list sent on request, for this super transistorised AM/FM Portable.

UNIVERSAL VOLT-OHM-MILLIAMMETER

A last a first grade multi-tester within the reach of everyone's pocket, and a necessity to all interested in Radio and TV. Reads A.C. and D.C. Volts up to 1,000 in 5 ranges, 20, 1,000 ohms per volt, D.C. current (3 ranges) to 500 mA. Resistance readings to 200 K ohms in 2 ranges. Basic movement 300µA sensitivity. Easily read open scale, beautifully made and fully guaranteed. Limited number available under import quota. Complete with leads, prods, and internal battery.



ONLY 59/6

H.R.O. SENIOR COMMUNICATIONS RECEIVERS. Complete with all 9 coils, giving coverage of 50 kc/s-30 Mc/s. Checked and in perfect working order. Rack mounting type **18 gns.**, Standard Table Model **21 gns.** (Carr. etc. 22/- either type.)

H.R.O. MAINS POWER UNITS. A.C. input 115/230 v. output D.C. (fully smoothed) 230 v. 75 mA. and 8.3 v. 3.5 A. Complete in black crackle case. **ONLY 59/6.**

POCKET VOLTMETERS. Read 0-15 volts and 0-300 volts A.C. or D.C. BRAND NEW and UNUSED. **ONLY 15/6.**

A.C. 220 FREQUENCY METERS. The famous American crystal controlled, portable frequency measuring standard. Coverage 125 kc/s-20 Mc/s. Complete with original numbered calibration book. Perfect order. Illustrated details on request. **ONLY 21/6.**

INTERCOM TELEPHONE SET. Two pairs of Brand New Headphones connected to Breast Microphones, with leads, etc. in fitted carrying cases. Supplied with 41 volt battery, 10 yards twin wire, and full instructions for connecting to make super Intercom. **ONLY 27/6** (post 2/6). Extra Wire 3d. per yard.

A.C. 220 500 KHz MICROPHONE. With screened lead and stand. **39/6**, plus 1/6 p. & p.

CRYSTAL DESK MICROPHONE. With screened lead and built-in stand. **18/6**, plus 1/6 p. & p.

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.

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.)

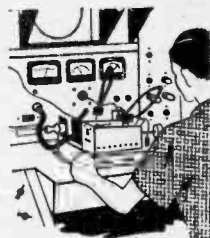
C. & G. Radio Amateurs' Exam.
(Amateurs' Transmitting Licence)

British Institution of Radio Engineers, etc.
C. & G. Telecom. Technician's Cert.

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. 171), Intertext House, Parkgate Road, London S.W.11.

Please send book on _____

Name _____ Age _____
(Block Letters Please)

Address _____

Occupation _____ 6.61

INTERNATIONAL CORRESPONDENCE SCHOOLS

RECEIVERS & COMPONENTS

SPRAGUE & MICAMOLD Condensers: metal cased, wired ends .01 mfd 1.000V D.C., and .1 mfd 350V D.C. respectively, 5/- per dozen including postage and packing. 49 Hudson Road, Southsea, Hants.

"DERLO RADIO" built transistor equip! "Minimobile" top band (206-150 meters). "Transmitter" with mic 95/6, batt. p.p. 5/6. "Radios" MW/LW from 58/6. C.W.O. 41 Newfield, Sandbach, Ches.

Guaranteed Perfect—Set Tested. 1930-1960

SPARES—VALVES—TUBES

NEW, EX-EQUIPMENT or SURPLUS STOCK. Compare our prices.

TUBES 6m. Guarantee. FITTED FREE.

9-10-12in., 30/-; 14in., 40/-; 17in., 50/-

V. VALVES, 1000 types stocked. Examples:

6K25	4/6	B36	4/6	PL81	4/6
10C1	4/6	EB91	2/-	PL92	4/6
10C2	4/6	ECL80	4/6	PL93	4/6
10P1	3/-	EF80	2/-	PY31	4/6
10P13	4/6	EF91	2/-	PY80	4/6
10P14	4/6	EL33	4/6	PY81	4/6
20D1	3/6	EL38	4/6	PZ82	4/6
20P2	4/6	EY81	4/6	PZ83	4/6
20P1	4/6	KT36	4/6	U24	7/6
20P3	7/6	N37	4/6	U281	7/6
27S5	10/-	PL33	4/6	U301	10/-
18B2T	12/6	PL38	10/-	U801	12/6

Free-ward, 3 pin valves, 5/-, postage 6d. each
Other types equally cheap. RM4, RMS, 5/-
NEW TRANSISTORS. Red Spot, 2/-;
OC4, OC45, OC72, OC76, 10/-; OC38, 20/-;
SPEAKERS: 6 & 7 x 4in., 5/-; Opt. Tr., 2/6.
LOT from E.I. FOT. Def. Coils Ose. Tr. cheap
Send S.A.E. with enquiries or for full list.
"ST JOHN'S RADIO", 156 St. John's Hill,
London S.W.11. Phone: BAT 9838

TRANSISTORS BRAND NEW. Mullard OC81D 2 OC81MAT 30/-. Newmarket set of 6 + 1 diode 45/-; Red spot 3/6, White spot 4/-, Green/Yellow 4/-, Yellow/Red 6/-. Diodes general 10d., GEX34 3/3, OA81 3/3, Miniature cap 2/3 ea. Rectifiers RM5 32/6, SMs 43/6. All postage paid by CHAPPELLE RADIO, 107 Neasden Lane, N.W.10.

SPEAKERS — ELAC 5in., 3 ohm: 12 £5; 50 £17. C. HEYWOOD, The Croft, Ladybrook Rd., Bramhall, Ches.

KINGSLAND ELECTRONIC COMPONENTS Stupendous Offers

1958 ELECTRONIC COMPONENTS
50 Assorted Resistances and Condensers, 6 Miniature Valve Holders, two Tag Strips, 40 Separate Contacts each 3/9, p. & p. 1/9. Chassis 14 x 8 x 1in. 12 Miniature Valves 1x 1in. with Valve holders, approx. 90 resistances and capacitors, 2 and 1 watt, 6 Germanium diodes, two tag strips, 100 contacts each, 5/-, p. & p. 2/3.

120 Resistances 1 and 1/2 watt, 35 metalmitre and T.C.C. small Condensers, 9 Miniature Valve Holders, 3 Tag Strips, 100 contacts each and other useful pieces, 8/6, p. & p. 2/3.

BARGAIN PACK. Fair Throat Microphones, 3ft. 2in. Screened Lead with socket, one 5 Henry 200 mA Choke, 3 Electrolytic Condensers, Vibrator, 3 Toggle Switches, 8 Octal Valve Bases, 1 Waveband Switch, 6 Coax. Plugs, 6 Assorted Coils, 6 Cartridge Fuses, 6 Potentiometers, 6 W.W. Multipliers, two Variable Condensers Coil of Wire, 15/6, p. & p. 3/8.

Instrument Rectifier with Circuits, 5/6, 6 v. or 12 v. Vibrators, 2/6 each, p. & p. 1/6, 6 Assorted Dropers, 5/-, p. & p. 1/6, Mike and Pick-up Transformers. Ideal for Baby Alarms, 4/6, p. & p. 1/-, 100 Assorted Resistances or Condensers or 50-50, 6/-, p. & p. 1/9.

6 Assorted Potentiometers, 5/-, p. & p. 1/9, 182 KINGSLAND RD., SHOREDITCH, E.2. Tel: SHO 6372. Sorry U.K. only.

RATES: 6/6 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.

In Scotland RENVUE for Better Value

COMPLETELY REPROCESSED TUBE (NEW GUN, RESCREENED, ALUMINISED)

12.6v and 6.5v, 0.3 amp., 17 and 15in. Types	£6.10.0
12.6v and 6.5v, 0.3 amp., 14in. Types	£6. 0.0
12v, 15in. Types	£7. 0.0
2v, 12 and 15in. Types	£6. 0.0

Electrostatic 90 degree and 110 degree tubes 10/- extra. Carr. paid.

10/- ALLOWED ON OLD TUBE Terms arranged.

FERGUSON
14in. BBC and STV Consoles . . . £12.10.0
14in. BBC and STV Receivers . . . £10.10.0
17in. BBC and STV Receivers . . . £19. 0.0

COMPLETELY OVERHAULLED AND FITTED WITH COMPLETELY REBUILT TUBE with one Year's Guarantee

£5 Deposit. Terms on Balance.

Renfrew Electronics Ltd. Anderson Drive Renfrew : Scotland Tel.: Renfrew 2642

6in. Dia. (yes—six inch) Millimeters 0/1 fl. round Ernest Turner 78/- (3/6), 2 in. Dia. Voltmeters 0/500 fl. round Weston 1000 ohms per volt, 4/78 (2/6). Special Valves 4250A 25-10.0; QY3125 25-10.0; 4212 24. Simpson Model 443 Voltmeters 24 in. meter in case 25-10.0 (5/-). Metal Rectifiers 24 v. 12A 20/- (3/6).

40 PAGE LIST OF OVER 1,000 ITEMS IN STOCK AVAILABLE—KEEP ONE BY YOU.

Wide Band Aerial Amplifiers, ten separate outlets from one aerial rack mounting 29.10.0 (7/6). Variable gearboxes, precision job 0/6000 r.p.m. variable throughout range driven by 1 h.p. 230 v. A.C. motor 26 (35/- includes £1 returnable box). 3 Foot P.O. Racks 19in. wide drilled and tapped 65/- (10/-). Elliott 0/4 volt moving coil Voltmeters 2000 ohms per volt, 24in. dia. ideal as basic meter 25/- (2/6). Mains Filter Units, laboratory precision type totally enclosed, 24 amps. 10/- (2/6). Sigma 10,000 ohms SPDT Relays 12/6 (1/6). Metal Rectifiers 24 v. 12A 20/- (3/6). AVO Greiner Converters 25.10.0 (5/-). Bendix 6ft enclosed Transmitter Cabinets, 19in. wide 25 (20/-). P.O. Racks 19in. wide, 3ft high 22 (10/-). Metal Rectifiers 12 v. 1 amp 5/- (1/6). 30 Foot Super Lightweight Aluminium Tripod self supporting 14in. dia. Masts, complete, 7 lbs. weight 10.10.0 (30/-).

"We have large quantities of "bits and pieces" we cannot list—and invite your enquiries—we can probably help—every one answered."

Amounts in brackets are carriage England and Wales.
P. HARRIS, ORGFANFORD, DORSET

RECEIVERS & COMPONENTS

(continued)

NEW AM/FM STEREO

- INPUTS FOR TAPE, 78's. etc.
- MW—LW—VHF
- PUSH-PULL OUTPUTS—16W
- SEPARATE TONE AND VOLUME
- INTEGRAL PREAMPLIFIER

BEL, Marlborough Yard, London N.19 Arc 5078

TELEVISION TUBES Rebuilt, 1 year warranty. Mostly 75/- exchange, 3 Park Ave., New Barnet. BAR 3185 now!

"HEATHKITS" can now be seen in London and purchased on easy terms. Free brochure. DIRECT TV REPLACEMENTS LTD., Dept PW 7/5, 138, Lewisham Way, S.E.14. Tideway 6668.

"WEYRAD" TRANSISTOR RECEIVER

LONG & MEDIUM WAVE. P.P. OP. ALL COMPONENTS AVAILABLE. TOTAL COST £8.17.6. CONSTRUCTOR'S BOOKLET 2/-.

TRANSISTOR AM FEEDER UNIT, SUPERHET AVAILABLE NOW. Size 4 x 3 x 1in. TOTAL COST OF COMPONENTS £5.10.0. CONSTRUCTOR'S BOOKLET, 1/8. Send S.A.E. for Shopping Lists. 35 (10M) ALLAN SPEAKERS, 27/1, JACKSON "GOO" GANG (with Trimmers), 10/6.

WESTHAM RADIO SUPPLIES
Rear of 175 Abbotbury Road WEYMOUTH, DORSET

GUARANTEED VALVES from 1/-, Radio TV components. Transistor set Kits from 10/-, S.W. Kit 22/6. Lists 3d. HAMILTON RADIO (SW), 13 Western Rd., St. Leonards, Sussex.

ANNAKIN

For the "PW" Signal Generator:—Our Famous No. 1900 A.F. Transmitter. A well made job. New, boxed. Now only 1/- ea. 11d. post. 6/- doz., 2/9 post.

Trans. R. Chassis only. Less valves, xtals. Approx. 82 useful parts. No Gen., 5/- ea. post 2/-. A really wonderful snip!

C.F.O. unit. Variable Tuned Oscillator output 48 Mc/s. Complete with 6F33 valve. Cast all case. A "Must" at 7/6 ea., post 2/-. Periscope Prisms. Slightly soiled silvering, but still a bargain at 1/- pr., post 2/-.

30 mc. I.F.T. Midset, with can, 2 slugs. In. d. Former OK for rewinding for T.V. F.M., etc. New 3d., 6d. post. 2/6 doz., 1/- post, 24/- gross, 3/6 post.

Silver Mica Condens. 430 pF, 1/- doz., 6d. P. 10/- gross, 1/6 post.

Belling Lee Type. 7 way sockets, 3d. ea., 6d. post, 2/6 doz., 1/6 post.

Block Condensers. G.E. Pyranol. 0.375 mFd, twice, 400 v. wks., 3d. ea., 9d. Post. 2/6 doz., 2/- Post. New!

Disc Magnets, 2/- doz., Post 6d.

Aiken Keys, No. 8, 1/- doz., Post 6d.

Box of 4 Motor Brushes, 1/- doz., boxes, 9d. post, 10/- gross boxes, 2/6 post. Useful for small motors.

Frost Warning Thermostats. Last few 8d. ea., post 6d.

Amplifier No. 165 with 5 valves. 21 ea., post 3/-.

All goods Postage Extra. Orders with insufficient postage not accepted. Mail Order Only. No C.O.D. No Export. Send stamped addressed envelope for Lists. 25 ASHFIELD PLACE, OTLEY, YORKS.

RECEIVERS & COMPONENTS
(continued)

RECLAIMED VALVES, tested and perfect: huge stocks; all one price. 5/- plus 6d. postage each. Delivery by return. LEWIS, 46 Woodford Ave., Hford. Essex.

STOCK SALE, Lists 2d. Mail only. 98 Greenway Avenue, E.17.

COMPONENTS, VALVES, Tubes, etc. Write or phone for free list. ARION TELEVISION, 4 Maxted Rd., Peckham. S.E.15. (New X 7152.)

SPEAKER REPAIRS, Cones/Fields fitted. Clock Coils Wound. L. S. REPAIRS, Pluckley, Ashford, Kent.

CONSTRUCTORS BARGAINS

200 Condensers, 5pF to 0.1 mfd., 5/-, 4 Volume Controls, 1/-, 50 Resistors (1 to 1 watt mixed), 2/-, P. & P. 1/-.

TRANSISTORS

Red Spot. 3/-; White, 3/9; Yellow (6 volt), 2/3; Yellow/Green, 3/9; Red/Yellow, 5/-; STG/TS1 (OC71), 4/3; TS17 (OC72), 6/- each.

MAZDA

XA101, 102, 103, 104, 9/- each. XB102, 103, 104, 8/- each. XC101, 10/-, Single Transistors P. & P. 3d.

NEWMARKET

NKT152A (OC44), 10/-, 153A (OC45), 8/6, 252A (OC71), 5/6, 253A (OC74), 6/9 each. Postage 6d.

MULLARD

OC16 (30 watt), 35/-, OC170 (up to 100 Mc/s.), 30/-, OC81D, 15/-, OC81, 36/- pair.

BARGAIN SETS

6 Mazda plus 1 Diode for Superhet, 52/6, 6 Newmarket plus 1 Diode for Superhet, 43/-, P. & P. 6d.

Condensers, Sub-Miniature, 1, 2, 4, 5, 8, 10, 16, 30 and 50 mfd., at 2/3 each. P. & P. 3d.

SPEAKERS

2 1/2 in. E.M.I. 3 ohm, 17/11, 15 and 35 ohm, 25/-, Elliptical 7 x 4, 35 ohm, 25/-, P. & P. 1/6, 8 in., 15/-, 10 in., 20/-, 12 in., 45/-.

CRYSTAL SETS, with chassis, dial, knobs, etc., all parts 12/6, P. & P. 1/-.

CRYSTAL EARPIECE, with lead and plug. High or low impedance, 9/8 each. **Headphones for Crystal Sets**, 15/- (light-weight).

Sub-Miniature Jack Plugs and Sockets, 3/6 pair. P. & P. 1/-.

PRINTED CIRCUITS

P.W. Pocket Superhet, 9/-, Weyrad, 9/-, Mullard, 3/3 Amplifier with drawings, 5/6, Mullard, 5/10 Amplifier with drawing, 11/9, Mullard 5/20 Amplifier with drawings, 11/9, Mullard 5/10 Stereo Board, 25/6, All other parts available. P. & P. 1/-.

METERS

"Caby" A-10, £4.10, 6 B.20, £6.5.0, P. & P. 2/3, 24 500 mA, 10/- each.

VALVES

Post Free (many types for the "Ham") 6K7G, 2/6; 6F6, 6/6; 6CH6, 9/-; KT66, 10/-; KTW63, 6/-; N43, 2/6; ECC83, 5/-; PX4, 10/-; RT33C, 5/6; 25Z5, 9/6; 25Z6, 10/-; FEN4, 10/6; American 41, 5/-; 43, 5/-; 57, 6/-; 58, 6/6; 75, 6/6 (1 dozen or more 20 per cent off). Aerials, Tubes, Transformers, Coils, Microphones.

Stockists for: Jason, Armstrong, Linear, Leak, Denco, Repanco, Osamor, etc., plus many bargain lines for the caller.

SOUND VISION ANCHOR STREET CHELMSFORD - ESSEX

RECEIVERS & COMPONENTS
(continued)

BROADWAY ELECTRONICS

92 MITCHAM ROAD,
TOOTING BROADWAY,
S.W.17.

Telephone: BALham 3984

C.B.S. BRAND (COLUMBIA) AMERICAN TAPE (P.V.C. RECORDING TAPE). Attractively boxed with space for titles, etc. Tape fitted Leader and Autostop. 1800ft. 1 7/8 in. L.P. 32/6; 1200ft. 5/8 in. L.P. 25/-; 900ft. 5/8 in. L.P. £1. Post free.

B.T.H. EX-RELAY AMPLIFIERS, A.C./D.C. MAINS 210/250v. Contains 8in. 15 ohm speaker. Three valves—10F1, 10P14 and U404. Cabinet size 14 x 11 x 6 1/2 in. Attractive two-toned cabinet with ivory knobs. 30/-, plus 5/6 Carriage and packing.

B.S.R. U48 MONARCH, 4-speed Auto-changer wired for Stereo. £6.12.6, plus 5/- Post and Packing.

SPECIAL OFFER: White Boxed Tape, Acetate Base, 5 1/2 in. 850ft., 14/6; 5 1/2 in. EMI Type Spools, 2/9.

Add 1/- Post and Packing.

DK96, DAF96, DF96, DL96, 6/6 each.

RESISTORS—100 new, wire ended, assorted, all types, 7/6 box, post free. **COOK'S OF BEDFORD**, 29 St Mary's Street, Bedford.

POST-FREE BARGAINS

VALVES

6V6GT 4/-, 6L6G 5/6, 5U4G 4/6, 807 5/-, 6H6GT 1/6, 6AC7 3/6, EF50 (B) 1/6, EF50 (A) 2/-, EF36 3/-, 6SN7GT 3/6.

SCOPE TUBES

3BP1 with base, mask and mu-metal screen, as new, 17/6. VCR517C 8/-, 5FP7A 6/6.

POTTED TRANSFORMERS (Oil Filled)

All primaries 180-250 v. 50 c/s, 450-0-450 v., 100 mA, 490 v. 50 mA, 3 x 5 v. 2 a., 22/6, 436-0-436 v., 170 mA, 6.3 v. 20 a., 5 v. 6 a., 32/-, 2 kv. 2.5 mA, 4.12 v. 2 a., 2 v., 2 a., 27/-.

POTTED CHOKES (Oil Filled)

15 H., 60mA, 8/-, 9 H, 125mA, 8/-, 4 H, 110mA, 6/6, 4 H, 250mA, 9/-.

MICROPHONE TRANSFORMERS

Only 1 1/2 x 1 1/2 x 1 1/2 in. Two matched primaries each giving 100 : 1. Can be wired in series to give 50 : 1, 1/3 each, 6/- for 6, 10/- a doz.

DENBY'S ELECTRONICS

"HILLSIDE", COLDSHAW,
HAWORTH, KEIGHLEY, Yorks.

FOR SALE

100 BAYS Brand New Adjustable Steel Shelving, 72in. high x 34in. wide x 12in. deep; stove enamelled dark green, sent unassembled. Six shelf bay £3 15s. Sample delivered free. Quality discounts. N. C. BROWN LTD, Eagle Steelworks, Heywood, Lancs. Tel: 69918.

INDEPENDENT 200/240 volt electricity supply for only £8. American Dynamotor Unit, runs Television, Electric Drills and all Universal AC/DC Mains Equipment from 12 volt car battery. Cost £40. Our price £8. — S.A.E. full details, Scientific Products, P., Cleveleys, Lancs.

CLEARANCE LINES

(Limited quantities). Unused in Makers' cartons. Carriage 5/-.

ARMSTRONG STEREO 44	..	£28.19.6
B.S.R. CHANGER U14 MONO	..	£7.10.0
" " STEREO	..	£7.19.8
GARRARD " 210 MONO	..	£9.19.8
" " STEREO	..	£10.19.6
" " TA Mk II MONO	..	£7.19.6
" " STEREO	..	£8.19.6

Credit or H.P. Terms.
A. L. STAMFORD LTD. (Dept. E 29)
84/86 Weymouth Terrace, London, E.2.

WANTED

NEW VALVES bought, state price. A. D. A. MANUFACTURING CO., 172 Alfreton Road, Nottingham.

WANTED, Service Sheets. No quantity too large. Highest prices paid. **SULTAN RADIO**, 29, Church Road, Tunbridge Wells, Kent.

NEW VALVES WANTED
Any type, any quantity
CASH PAID
R.S.T. 211, Streatham Road,
Mitcham, Surrey.
Telephone: MITcham 6201.

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 WILLETS**, 43, Spion Lane, West Bromwich. Staffs. Tel: WES 2392.

WANTED VALVES
All types for prompt cash. Must be new. State quantity.
WILLIAM CARVIS LTD.
103 North Street, Leeds 7

SOUND RECORDINGS

RECORDING TAPE, save up to 30% send for list; also 50 second-hand recorders in stock.—E. C. KINGSLEY AND CO., 132 Tottenham Court Road, London W.1. EUS 6500.

(continued on next page)

SERVICE SHEETS

SERVICE SHEETS. Radio, TV, 5,000 models. Lists 1/-. S.A.E. enquiries. TELRAY, 11, Maudland Bk., Preston.

SERVICE SHEETS. We have the largest stock of Radio and TV Service Sheets in the country for sale at 4/- ea. Why tolerate delay in obtaining your supplies when we will dispatch by return? Service Sheet List 1/-. Also Manufacturer's Manuals for sale and hire. 1961 List now available 1/-. S.A.E. please. Mail orders only to S.P. DISTRIBUTORS, 44, Old Bond Street, London, W.1.

38 SET WALKIE TALKIE
CIRCUIT INFORMATION

Alignment Procedure. Typical faults in Ex W.D. Sets. Components 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; also Current and Obsolete Valves for sale. JOHN GILBERT RADIO, 20, Extension, Shepherd's Bush, Market, London, W.12. (Phone: SHE 3052.)

SERVICE SHEETS. TV 4/- ea. Radio 3/- ea. List 1/-. All orders dispatched on day received. Also Manuals for sale and hire. SULTAN RADIO, 29, Church Road, Tunbridge Wells, Kent.

SERVICE SHEETS (1930-1961) from 1/- with Free Fault Finding Guide. Catalogue 6,000 models. 1/-. 125 Radio/TV Sheets covering 370 popular models 20/-. S.A.E. enquiries, HAMILTON RADIO, Western Road, St. Leonards, Sussex.

MISCELLANEOUS

YOU READ MUSIC?

Then how about making yourself an electric organ? Constructional data available—full circuits, drawings and notes. It has 5 octaves, 2 manuals and pedals with 24 stops—uses 41 valves. With its variable attack you can play Classics and Swing.

Write NOW for free leaflet and further details to C. & S., 20 Maude Street, Darlington, Durham.

BOOKS & PUBLICATIONS

FIND TV SET TROUBLES IN MINUTES from the 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.

EDUCATIONAL

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.

City and County of Bristol
Education Committee

BRISTOL TECHNICAL COLLEGE

Principal: E. Poole.
B.Sc. (Eng.), M.I.Mech.E., M.I.Prod.E.
Bristol School of Marine Radio and Radar
(Formerly of A.S.T. Hamble)

Courses available for 1st and 2nd Class P.M.G. Certificates for Marine Radio Officers; M.O.T. Radar Maintenance Certificate: Six weeks Pre-Sea Training for qualified Radio Officers; (From September, 1961)—Two-year course for Air Radio Maintenance Engineers Licences, Categories 'A' and 'B'.

For further details apply to the Registrar, Bristol Technical College, Ashley Down, Bristol, 7.

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.

"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 employment as well as knowledge of this fascinating subject. FREE brochure from: Dept. P.W. 12, RADIOSTRUCTOR, 40, Russell Street, Reading, Berks.

EDUCATIONAL (continued)

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.

(Dept. 541), Intertext House, Parkgate Road, London, S.W.11

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.

★ LEARN ★
RADIO & T/V
SERVICING
for your OWN
BUSINESS/HOBBY

● by a new exciting no-maths system, using practical equipment recently introduced to this country.

FREE Brochure from:—

RADIOSTRUCTOR

DEPT. G77, READING, BERKS. 6/61

SITUATIONS VACANT

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. 242G), 29, Wright's Lane, London, W.8.

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.

A.M.I.Mech. EA, 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.

(continued on next page)

DIAMOND

STYLI



FOR DIAMONDS

Manufacturer's offer to users—send us your old stylus arm and we will retip with finest Transcription quality Diamond. To ensure best reproduction every Diamond is inspected for finish and radius with 500 magnification.

FOR £1.00 ONLY

Or we will supply complete with any stylus arm for £1 5s. 0d. Tax Paid and will despatch within 48 hours of receipt, post free.

All Diamonds are Guaranteed for One Year

(Sapphires also supplied 4/6 Tax Paid)

Mail Orders to:—Dasco, Frith Park, Tadworth, Surrey.

SITUATIONS VACANT

*(continued)***RADIO ENGINEERS**

Experienced Radio Engineers required for the installation, inspection and maintenance of car radios.

RADIO ASSEMBLERS

Female radio assemblers required, with soldering experience.

These posts offer well paid and permanent employment.

Applications, in writing, should be made to:

The Staff Manager
S. SMITH & SONS (England) LTD.
Cricklewood, London, N.W.2

Or apply in person during working hours to:

SMITHS' RADIOMOBILE LTD.
Goodwood Works
North Circular Road
London, N.W.2
(near Staples Corner)

THE REED PAPER GROUP

have a vacancy for an

**ELECTRONICS
TECHNICIAN**

to work at

AYLESFORD PAPER MILLS

Candidates should be between 25 and 30 years of age and have either O.N.C. Electronics, City and Guilds Telecommunications (Intermediate) or an equivalent qualification.

Preference will be given to those applicants with experience in the installation, testing and servicing of electrical/electronic equipment.

Experience of industrial instruments for counting, flow and temperature measurement, etc., would be considered an advantage.

Conditions of service are excellent and include a non-contributory Pension Scheme.

Applications, in writing, stating age, experience and qualifications, should be addressed to:

ASSISTANT PERSONNEL MANAGER,
Aylesford Paper Mills,
Larkfield, Nr. Maidstone, Kent.

Please quote ref: ET/APM

LEO**Training as Computer Technicians**

Applications are invited from young men for maintenance of large scale computer installations. The work involves the maintenance and fault diagnosis of the electro mechanical equipments. Applicants should have a good basic engineering knowledge together with some practical experience of electro mechanical equipments and preferably of electronic circuits. Comprehensive training will be given in all aspects of the work. There are excellent prospects for advancement, since the Company is expanding very rapidly.

Details of experience, qualifications, age and present salary should be sent to PERSONNEL MANAGER, **LEO COMPUTERS LIMITED**, Hartree House, 151A Queensway, London, W.2.

MINISTRY OF AVIATION**E.I.D.****ELECTRONIC
INSPECTORS**

required for

RADIO, RADAR, COMPONENTS & ELECTRICAL
ANCILLARIES AT BROMLEY & WOOLWICH
and elsewhere in London and Home Counties.

Varied and interesting work with opportunities for gaining valuable experience and further training.

Excellent promotion prospects.

PAY 266/- to 281/- (with prospects of further progression to **306/-**) for a 5-day week. Skilled men apply, stating experience, to:

ELECTRICAL INSPECTION DIRECTORATE

AO/L

Aquila, Golf Road, Bromley, Kent.

SELENIUM RECTIFIERS

F.W. BRIDGE H.T. Types H.W.
 6/12v. 1 a. .3/11 150 v. 40 m.a. . . 3/9
 6/12v. 2 a. .6/11 250 v. 50 m.a. . . 3/11
 6/12v. 3 a. .9/9 250 v. 80 m.a. . . 4/11
 6/12v. 4 a. .12/3 250 v. 80 m.a. . . 5/11
 6/12v. 6 a. .15/3 250 v. 250 m.a. . . 11/9
 6/12v. 10 a. .25/9 **CONTACTCOOLED**
 6/12v. 15 a. .35/9 250 v. 80 m.a. H.W.
 24 v. 2 a. .14/9 6/11, 250 v. 50 m.a.
 F.W. (Bridge) 8/11

B.S.R. MONARDECK TAPEDECKS.

Speed 31n. per sec. High quality recording heads. 7 gms. Carr. 5/-.
 Suitable polished veneered walnut carrying case for above 39/6. (Space for amplifier.)

EX-GOVT. CASES. Size 14-10 1/2 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.

LINEAR TREMOLO/PRE-AMP UNIT

Type TPU1, with 3 controls, volume, amplitude and frequency. Inputs for guitar and microphone. Requires power supply of 250 v. 10 m.a. and 6.3 v. 1 a., available from any R.S.C. or LINEAR amplifier. The unit is merely connected to normal input socket of hi-fi amplifier or guitar amplifier. Only £4.19.9.

MICRO-AMMETERS. 3/16 in. diam. 0-50 micro-amps, 33/9.

**R.S.C. LIVERPOOL
 (Manchester) BRADFORD
 Ltd. MANCHESTER
 and LEEDS**

HI-FI 10 WATT AMPLIFIERS

Brand new. Manufacturer's discontinued line. Fitted Mullard valves. Dual inputs for "mike" and gram. etc. Bass and Treble Controls. High sensitivity and quality. For 230-250v. A.C. **£6.19.6**
 Carriage 7/6.

POCKET PORTABLE 3 TRANSISTOR RADIO DESIGN.

Handsome plastic cabinet. "Built-in" ferrite rod aerial, and Miniature loudspeaker unit. Regenerative circuit using 2 Brimar R.F. transistors, 1 output transistor and crystal diode. Point-to-point wiring diagrams and instructions 11d. Total cost of all necessary parts only 49/9.

PRACTICAL WIRELESS SUPER SIX POCKET PORTABLE RADIO DESIGN

Diagrams etc., 1/9 or all parts including printed circuit and first grade transistors **£9.18.6**.

MULTI-METERS. Ferranti Universal A.C./D.C., 59/6.

CABY A10. Basic Meter sensitivity 155 micro-amps, A.C. and D.C. ranges £4.17.6.

CABY B30. Sensitivity up to 10,000 ohms per volt, A.C. and D.C. £9.10.0.
 Miniature Type G.E.C. 670 Sealed, wire ends, 4 covers, platinum M1056. 12/9.

RELAYS. Carpenters' Type, Polarised 2 times 9,500 turns at 1,665 ohms, 13/9.
 Miniature Type G.E.C. 670 Sealed, wire ends, 4 covers, platinum M1056. 12/9.

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. Weds. until 1 p.m. Trade supplied. S.A.E. with all enquiries.

Mail Orders to 29-31 Moorfield Road, Leeds 12.
 Personal Shoppers to: 5 and 7 County (Mecca) Arcade, Briggate, Leeds 1.
 8-10 Brown Street (Market Street), Manchester 2.
 56 Morley Street (next to Majestic Ballroom), Bradford.
 73 Dale Street, Liverpool 2.

SPECIAL OFFER EX-GOVERNMENT SELENIUM RECTIFIERS.

12v. 15 amp. with large square cooling fins. 19/9 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.,
 10 H., 1000 ohms 6/9; 100 mA., 10 H., 100
 ohms 6/9; 60 mA., 5-10 H., 250 ohms 2/11.

EX. GOVT. MAINS TRANSFORMERS

Primaries 200-250 v. 50 c.p.s. A.C.
 250v. 60 m.a. 6.3v. 2a. 10/11
 270-0-275v. 100 m.a. 6.3v. 7a. 5v. 3a. . . 21/9
 300-0-300v. 60 m.a. 6.3v. 2a. 12/11
 300-0-300v. 100 m.a. 6.3v. 2a. 5v. 2a. . . 18/9
 350-0-350v. 160 m.a. 6.3v. 5a. 5v. 3a. . . 21/9
 5v. 10a. Parmeko 11/9
 4-4v. C.T. 6-8 amps, Parmeko 7/9
 400-0-400v. 200 m.a. 17/9
 0-35-40-45-50v., 300 m.a. 6.3v. 3a. . . 17/9
 450-0-450v. 100 m.a. 6.3v. 1.5a. 4v. 3.5a.
 5v. 2.5a. 22/9

2 VOLT ACCUMULATORS
 Varley's 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.



VALVES SAME DAY SERVICE
NEW! TESTED! GUARANTEED!

SETS IR5, IS6, IT4, 384, 3V4, DAF91, DF91, DK91, DL92, DL94 .. Set 4 for 19/6
 DAF96, DF96, DK96, DL96 4 for 27/8
 6K7G, 6K8G, 6Q7G, 6V6G, 6X5G, or 5Y3G 5 for 24/6

1A7GT 11/6	8LD20 8/-	2S26GT 9/6	EC92 11/-	EZ40 6/9	PY83 7/9
1D5 8/-	8P1 13/6	30L15 11/-	ECC40 17/6	EZ41 7/-	PZ30 17/-
1HG2T 10/6	8P25 9/-	35A5 9/6	ECC81 5/-	EZ30 6/3	7P1 9/8
1NSGT 10/-	8Q7G 9/-	35L8GT 9/-	ECC82 9/-	EZ31 7/-	U2 7/3
1R5 5/6	6Q7GT 9/6	3S24GT 6/9	ECC83 7/-	FW4/500 8/-	U25 13/6
1S4 8/6	6SL7GT 6/3	3S26GT 8/6	ECC84 8/9	GZ30 8/6	U26 10/6
1S5 5/3	6SN7GT 4/9	50L6GT 8/9	ECC85 8/9	GZ32 9/6	U50 6/-
1T4 3/6	6U4GT 11/-	AC/TH 16/9	ECP80 8/6	HC80 7/-	U52 4/8
1U5 5/9	6V6G 5/-	AZ31 9/6	ECP82 8/6	KT3C 7/-	U78 4/9
3A5 9/9	6V6GT 6/6	B36 8/6	ECH21 13/6	KT41 11/6	UBC80 7/9
3Q4 7/-	6X4 4/9	CL33 12/3	ECH35 6/3	KT44 6/6	UBA42 9/-
354 6/-	6X5GT 5/-	DA32 10/-	ECH42 8/9	KT61 10/-	UBC41 7/9
3V4 7/-	7B5 9/-	DAF91 5/3	ECH81 8/-	KT63 6/6	UBF80 8/9
5U4G 4/6	7B7 7/6	DAF96 7/6	ECL90 7/6	MU4 7/6	UBF99 8/-
5V4G 8/-	7C5 7/8	DCC90 9/-	ECL82 9/6	MX40 9/6	UC52 12/6
5Y3GT 8/-	7C6 7/6	DF33 10/-	EP39 4/6	N18 7/-	UCC84 12/9
5Z4G 7/9	7H7 7/8	DF91 3/6	EP40 12/6	N37 10/6	UC85 7/6
6AL5 3/6	7S7 7/-	DF96 7/6	EF41 8/3	PC65 10/-	UCF80 14/-
6AM6 3/6	7Y4 3/6	DH76 4/6	EP42 9/6	PC84 7/6	UCH80 13/6
6AQ5 6/6	80C1 11/6	DH77 6/9	EP80 5/6	PCC89 11/-	UCH42 8/-
6AT8 6/9	10C2 17/6	DK32 11/6	EP85 5/6	PCF80 7/9	UCH81 8/-
6BA6 8/6	10P13 14/8	EK91 5/8	EP86 9/9	PCF82 8/-	UCL62 10/9
6BB3 5/9	12A7G 7/-	EK92 7/6	EF88 7/-	PCF86 14/-	UCL63 13/3
6BH6 5/9	12A7U 5/-	EF91 3/6	EF91 3/6	PCL82 9/-	UF41 8/9
6BJ6 5/9	12AU6 8/6	EP92 4/6	EF92 4/6	PCL83 11/6	UF85 8/6
6BW6 8/-	12AU7 6/3	EP183 14/-	EL13 14/-	PCL94 7/6	UF89 7/-
6C9 8/9	12AX7 7/-	EL34 7/-	EL34 7/-	PEN44 11/-	UL41 8/-
6CD6G 2/9	12X6GT 5/9	EL42 8/6	EL42 8/6	PEN86C 8/-	UL84 7/6
6F1 12/6	12K8GT 11/6	EL43 9/-	EL84 7/-	PL81 11/8	URIC 5/-
6F8G 6/6	12Q7GT 4/9	EAB30 7/-	EM34 8/9	P151 9/6	UY21 11/3
6F13 11/-	12Z3 7/6	EAF42 8/6	EM34 8/9	PL82 7/-	UY41 6/6
6F14 16/6	14S7 18/6	EB9 3/9	EM80 8/6	PL83 7/6	UY85 6/6
6K7G 2/6	20P2 17/6	EB33 5/-	EM81 8/6	UL84 7/6	VP4 9/6
6K7GT 5/-	20L1 17/6	EB41 8/-	EM84 10/-	YP32 11/-	VP41 5/-
6K8G 6/3	25A8G 8/-	EB80 8/-	EY51 7/6	YP80 7/6	W76 5/3
6K8GT 9/3	25L8GT 7/9	EBP89 8/9	EY84 10/-	YP81 6/9	W77 4/6
6L18 10/3	25Z4G 7/6	EEL21 13/6	EY86 7/9	YP82 6/9	Z77 3/6

BOOKS FOR THE CONSTRUCTOR

NEW PICTORIAL APPROACH TO LEARNING

BASIC ELECTRICITY, 5 parts.
BASIC ELECTRONICS, 6 parts.
 The Complete Set sent on payment of first instalment.

LEARN WHILE YOU PLAY
 Write for FREE Illustrated Prospectus giving details of instalment plan!

BOYS' BOOK OF CRYSTAL SETS AND SIMPLE CIRCUITS. 3/-.

TRANSISTOR CIRCUITS Nos. 1, 2, 3, 4. 3/- each.

ELECTRONIC NOVELTIES. 5/6.

ELECTRONIC GADGETS. 4/6.

SERVICING TRANSISTOR RECEIVERS 6/6.

Postage included in above prices. SEND STAMP FOR LISTS.

SELRAY BOOK CO.

60 HAYES HILL, HAYES, BROMLEY, KENT.

"GLOBE-KING"

WORLD-FAMOUS KITS AND RECEIVERS
 Designed and marketed specially for the newcomer and beginner, the "Globe-King" kits continue to enjoy world-wide popularity. Unsolicited testimonials include many from Transmitting Amateurs and Professional Operators praising performance and efficiency of this miniature equipment. The single-valve kit costs only 79s. 6d. complete down to the last screw. First-class components throughout, three coils, three low-loss S.W. variables includes band-spreading, Siemens-Edward Mazda valve, etc., Unit-assembly and construction, "Easy-Build" Diagrammatic Instructions enclosed with each Kit. Send now for Catalogue—it's free, but please enclose stamp for postage.

JOHNSONS (Radio), ST. MARTINS GATE, WORCESTER

READERS RADIO
 24 COLBERG PLACE, STAMFORD HILL,
 LONDON, N.16. STA. 4587

Just out!
the **NEW**



**100 WATT
SOLDERING IRON**

costs only **29/-**
including post & packing

- Perfectly balanced
- Flat copper bit shaped for any application
- New stainless steel side plates eliminate corrosion
- Strong robust element with large surface ensures good heat transfer and long life
- Improved shock resisting moulded handle.



All elements flash tested at 1000 volts to earth to ensure **RELIABILITY, QUALITY AND SAFETY**

A really professional, high wattage iron at an economical price.

Suitable for operation at 12 v., 50 v., 100/110 v., 200/220 v., and 230/250 v.
Please state voltage required when ordering.
Send for leaflet or order direct from:

Standard Telephones and Cables Limited
Industrial Supplies Division
Stanelco Process Heating, Footscray, Sidcup, Kent
Footscray 3333

MULTIMETERS. 1000Ω/volt. A.C. and D.C. volts. 0-10, 50, 250, 500, & 1000. D.C. current 0-10, 100mA. Resistance 0-2kΩ and 0-200kΩ Bakelite case, complete with test leads. BRAND NEW 59/6.

BC 221. The most accurate precision portable heterodyne frequency meter 125Kc/s to 20Mc/s. Complete with original individual calibration book. Guaranteed perfect 21/6.

CRYSTAL CALIBRATOR No. 10. Good condition, tested, with instruction manual, ONLY 59/6 or AS NEW with three spare valves, leads, etc. £4.10.0. P. & P. 5/6.

CANADIAN RECEIVER No. 52. 1.75-18 Mc/s (19-170 m.) in three wavebands. R.F. Mixer, Sep. Osc., 2 I.F.'s, Det./A.V.C., 1st Audio, Output, B.F.O. (10 valves), plus a 9-valve dual Crystal Calibrator. Controls: R.F. Gain, L.F. Gain, Crash Limiter, C.W. Filter, Variable Selectivity, slow and fast tuning and Osc. Vernier Tuning, Man or A.V.C. B.F.O. pitch control. Internal 3in. speaker and valve check meter. Power supply required 180 v. H.T., 12 v. L.T. Data and Circuit supplied. An excellent receiver. £8.19.6, carr. 15/6. Power Supply Unit, 59/6, carr. 5/6.

GRAM. MOTORS. Garrard AC6. 78 r.p.m. NEW 19/6, post 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 £2 post free.

R-1155-B, with latest drive, first class condition, £9.19.6.
Mains Power Pack, £6.10.0. Data Book, 1/3 post paid.
Moving Coil Phones. Finest quality Canadian, with Chamois earmuffs and leather-covered headband. With lead and jack plug. Noise excluding, supremely comfortable. 19/6, post 1/6.

GIANT COMPONENT PARCEL. Contains 100 1 and 1 watt resistors, 50 HI Stab resistors, W/W 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, £5/-, plus 2/6 post.**

T.C.C. VISCONOL CONDENSERS, 8 mid., 900 v., D.C. wkg. at 71°C. CP 152V. 3 x 11 x 5in. high BRAND NEW. Boxed, 8/6 each.
IRO COMMUNICATION RECEIVERS, complete with 9 coils. From 18 ens. S.A.E. for full particulars.

CALLERS CLEARANCE CORNER. We have a large amount of miscellaneous stock, either slightly imperfect or too few to advertise which we are offering at "Knock-out" prices.

CHARLES BRITAIN (RADIO) LTD.

11 Upper Saint Martins Lane, W.C.2

TEmple Bar 0545

Shop Hours 9-6 p.m. (9-1 p.m. Thursday).
Open all day Saturday.

IN THE HOME, IN THE CAR,
BY THE SEA, IN FIELDS AFAR

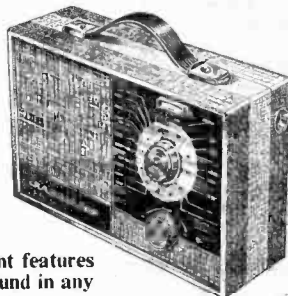
THE CONTESSA

IS VOTED BEST OF ALL

A really remarkable

**2 BAND 6 TRANSISTOR
SUPERHET KIT**

(As displayed at the Radio Hobbies Exhibition)



The CONTESSA is the professional looking set with the professional performance.

Study these brilliant features which cannot be found in any other kit

- Waveband Coverage of 530 k/cs to 1620 k/cs and 160 k/cs to 270 k/cs.
- Assured reception of at least a dozen stations in daylight!
- Large clearly-calibrated station-named dial.
- Internal high-gain Ferrox Aerial.
- 5:1 ratio slow motion tuning.
- Fitted with the latest 12000 line high-flux loudspeaker.
- Power of 410 milliwatts from the single-ended push-pull final stage.
- Specially designed aerial matching coil for use in a CAR.
- Only first grade fully guaranteed Mazda matched transistors and diodes are used.
- Double tuned IF transformers for maximum gain and knife-edged selectivity.
- Fully drilled printed circuit panel marked with component numbers.
- The two colour case measures 10 x 7½ x 3½in. and weighs approx. 4 lb.
- Battery lasts 4 months with normal usage.
- Book supplied with detailed assembly instructions, diagrams and circuitry.
- Anyone can build this set—everything supplied just a soldering iron required.

Inclusive price for all associated components, cabinet and battery, complete in every detail, **£11.10**

Plus 3/6 Regd. P.P.

Or our **BUY AS YOU BUILD SCHEME** any parts sold separately. Send for comprehensive descriptive manual and parts list, 3/6 post free.

See and hear a working model at:—

RADIO CLEARANCE LTD.

27 Tottenham Court Road, London W.1

Telephone: Museum 9188

**"PRACTICAL WIRELESS"
POCKET SHEET**
TRANSISTORISED-PRINTED BOARD

"PRACTICAL WIRELESS"

Roadfarer

TRANSISTORISED-PRINTED BOARD

A.M./F.M.

INCLUDING
SPECIALIST-DESIGNED CABINET

A-Z CONSTRUCTIONAL BOOKLETS 1/6 each
including "BLOWN-UP" DIAGRAM

Price List from your usual Dealer or Direct from

OSMOR RADIO PRODUCTS LTD.

418 BRIGHTON ROAD, S. CROYDON
CRO 5148

*"There Is No Virtue
Without Courage—
No Reward Without
Labour"*

Not simply a school motto but at B.N.R.S. a creed and a way of life. We owe to it all we have and are. If you are prepared to make it your motto and live up to it, we can help you to get to the top. It will take time, it will take effort, it will take courage, and on top of all this you will actually be charged fees.

If we haven't succeeded in putting you off, write for details, today, to:

Mr. J. SYKES

(M.I.E.E., M. Brit. I.R.E., M.I.N.)

Principal :

BRITISH NATIONAL RADIO SCHOOL
Red Lion Court, Stalbridge, Dorset

Britain's premier Radio Correspondence School
specialising in City and Guilds examinations.

**CABINETS &
HI-FI EQUIPMENT**

We can supply any Cabinet
to your own specification



"Grosvenor" £19.19.0

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 (P.61) Chase Side
Southgate, London, N.14. Pal 3733

**LOOK FREE
POSTAGE**

TRANSISTORS, WHITE SPOTS 3/- each.
RED SPOTS 3/- each, 3 for only 8/6.
YELLOW/GREEN 3/6 each, 3 for 10/-.
RED/YELLOWS 5/9 each, 3 for 16/6.
**ALL COMPONENTS for ROAD-
FARER and P.W. Pocket Transistor**
Superhet. Send S.A.E. for Price List.
DIODES 1/- each, 3 for 2/6, 7/6 dozen.
TRANSISTOR HOLDERS 1/3 each, 3
for 3/6.

Miniature SLIDER SWITCHES DP/DT 2/9
CRYSTAL EARPIECES with Lead 8/6.
Low Imp EARPIECES with Lead 8/6.
LIGHTWEIGHT HEADPHONES 4000
Ohms 15/9. OA70, OA79, or OA81
DIODES 4/- each.

VARI-LOOP STICK M.W. COILS 4/6.
DRX1 Crystal Set Coil M. & L., 2/6.
DRR2 Dual Range Coil 4/- each.

REACTION CONDENSERS 0.0001 3/-,
0.0003 3/9, 0.0005 4/-.

MINIATURE 0.0005 REACTION CON-
DENSERS 4/-.
TELESCOPIC AERIALS 7 Section.
Chrome, 11/6.

CRYSTAL MICROPHONE INSERTS
6/-, Acos 7/6.

ALL SENT POST FREE IN U.K. by
**PETHERICK'S RADIO
SUPPLIES**
22 High Street, Bideford, N. Devon

ONE-FINGER PIANISTS

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 7th EDITION

**RADIO VALVE
DATA**

Characteristics of 4,800 valves & trans-
istors, rectifiers & cathode ray tubes.
Compiled by staff of "VW".

6/-, Postage 10d.

**THE RADIO AMATEUR'S HAND-
BOOK**, by A.R.R.L. 1961 ed., 32/6.
Postage 2/-.

**PRINCIPLES OF TRANSISTOR
CIRCUITS**, by S. W. Amos. 21/-.
Postage 1/-.

**PIN POINT TRANSISTOR
TROUBLES IN 12 MINUTES**, a
Coyne Pub: 47/6. Postage 1/-.

WORLD RADIO TV HANDBOOK
1961. 16/6. Postage 1/-.

**PIN POINT TV TROUBLES IN 10
MINUTES**, a Coyne Pub: 31/6.
Postage 1/-.

**BASIC SYNCHROS & SERVO-
MECHANISMS** in 2 parts, 16/-
each. Postage 1/-.

**MULLARD CIRCUITS FOR
AUDIO AMPLIFIERS**, 8/6. Post-
age 9d.

COMPLETE CATALOGUE 1/-.

THE MODERN BOOK CO.

BRITAIN'S LARGEST STOCKISTS
of British and American Technical Books

**19-21 PRAED STREET
LONDON, W.2**

Phone: PADDINGTON 4185
Open 6 days 9-6 p.m.

Premier RADIO

23 TOTTENHAM COURT ROAD, LONDON W.1
and at 309 EDGWARE ROAD, LONDON W.2

TEL: MUSEUM 3451/2
TEL: PADDINGTON 6963

6-TRANSISTOR POCKET SUPERHET

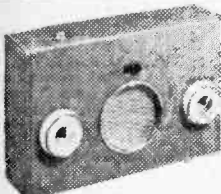
May be **£8.19.6** Plus 2/6
Built for P. & P.
PP3 Battery extra at 2/6.

This receiver uses the most up-to-date printed circuit method and construction is simplicity itself with the aid of the point-to-point instructions supplied, using 6 Transistors and one Diode and internal Ferrite Rod Aerial, with provision for Car Radio Aerial. Full medium and long waveband coverage and when constructed the Receiver is housed in an attractive leatherette Case, size 6½in. x 4½in. x 1½in.

The **"Petite"** PORTABLE
MAY BE BUILT FOR

£7.0.0 Plus 3/-
p. & p.

BATTERIES EXTRA.
H.T. 10/- (Type B126) or
equivalent L.T. 1/6 (Type
AD35) or equivalent.
★ Size only 8in. x 8in. x 4½in.
★ Instruction book 1/6.



The SUPER 60 6-Transistor Battery Receiver May be Built for **£9.15.0**

Plus 4/6 P. & P.
Ever-Ready P.P10
Battery Extra 11/-

STAR FEATURES:—

- ★ Six 1st grade Mullard Transistors and one Diode.
- ★ Internal Ferrite Rod Aerial.
- ★ 7in. x 4in. Elliptical Speaker.
- ★ Printed Circuit.
- ★ 500 mW Push-Pull Output.

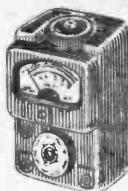
The Receiver is housed in an attractive contemporary mahogany finished cabinet trimmed with gilt, supported by gilt stands. The receiver will operate for months on one 9-volt long-life battery. Instruction Book separately at 2/6 p.p.



- ★ Full medium and long waveband coverage.
- ★ Calibrated Direct Drive Dial Drive Assembly.
- ★ Full point-to-point instructions supplied.
- ★ Dimensions 18in. x 7½in. x 5½in.

OUTSTANDING BARGAIN OFFER The Kapura Model UI Multi- timer for only **59/6**

Complete with Test Leads P. & P. 2/6
A truly efficient Meter for the enthusiast; sensitivity 1000 ohms per volt A.C. and D.C. ranges (A.C./D.C.) 0-10-50-250-500-1000v. D.C. current 0-100-500 mA. 0-1mA (at D.C. 0-10v) resistance 1-2000 ohms (centre—24 ohms). 100-200K (centre—2400 ohms). Size 5 x 3 x 2½in. Brand new in manufacturer's original boxes.



GRAB: This month's bargains

Screened Microphone Cable, 1st. Grade, 9d. yd. or 6/- per doz. yds. 12-Core Screened Cable, 2/- yd. 10-Core (5 Pairs) Screened Cable, 1/8 yd. All plus 1/6 P. & P. B.1. 8 mFd 1,200 v. D.C. Wkg. Capacitors. 12/6 each. P. & P. 2/-.

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. & P. 2/-. Other lengths *pro rata*.
RIBBED GLASS. 3in. aerial insulators, 1/9 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.
ABSORPTION WAVEMETERS. 3.00 to 35.00 Mc/s. in 3 switched bands, 3.5, 7, 14, 21 and 28 Mc/s. Ham Bands marked on scale. Complete with indicator bulb. A MUST for any Ham shack. 22/6, post free.
VARIABLE CONDENSERS. All brass with ceramic end plates and ball race bearings. 50 pF, 5/9. 100 pF, 6/6. 160 pF, 7/6. 240 pF, 8/6, and 300 pF, 9/6. All fitted with rear extension for ganging. P. & P. 1/-. Also Flexible Couplers 1/- each.

CHAS. H. YOUNG LTD.

THE COMPONENT SPECIALISTS

Dept. "P", 110 Dale End, Birmingham 4. (CEN 1635)
(No C.O.D. under £1 please). (By return service)

FOR BARGAINS

M.S. RADIOPOST CO.

MAIL ORDER SPECIALISTS

Please quote Dept. M.O.P.W.

Rear of 19 Harpenden Road, Wanstead Park, London, E.12
Wanstead 1534

MINIATURE DYNAMIC SPEAKERS

A must for all Build-it-yourself-Hams. As supplied with all current transistor Kits. Can also be adapted for home phones or Intercom. 2in. diameter. Resistance 70 ohms. ONLY 5/-.



SENSITIVE RELAY. Miniature type 250 ohms. D.P.D.T. 12 v. D.C. Overall size 1 x 1½ x 1in. Adjustable armature tension spring. Will operate on less than 1 mA. Suitable all model radio control. Brand new. 15/6 each.

CARBON HAND MICROPHONES.

Brand new and in original cartons. Built-in on/off switch, bakelite construction, with lead and plug. Only 6/6 each.

MINIATURE MODEL MOTOR

(Not Ex-Govt.). Removed from Transistor Tape Recorders and in perfect condition. 3 to 12 volts. Dual spindle fully reversible, protected bearings. Approximately 3/4000 r.p.m. Size: 2½in. long x 1in. wide. Spindle: ½in. x 1/32in.



Only 9/6 each

MINIATURE AMERICAN LEAD ACID ACCUMULATORS. 36 volts 20 mA. 4 x 1½ x 3in. 3/6 each.
12 VOLT VIBRATORS. 4 pin non-synchronous. Mid. by Mallory in cartons of 20. 21/- per 20.

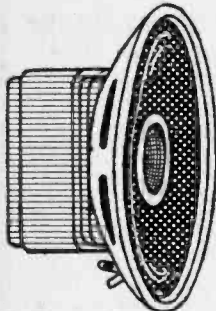
HYSTERESIS BLOWER MOTOR

Manufactured by SMITH'S Aircraft Instrs. Type: HM14. 115 volts 400 cycles. Removed from New Automatic Pilot equipment but in perfect condition. Only 80/- ea. 8in. WHIP AERIALS. 8 x 1ft. sections. For model radio control. etc. 2/6 com.



TERMS: C.W.O. or 7 days approved accounts. All our goods are guaranteed new or in working order. Money refunded in full if not absolutely satisfied. Orders despatched same day. NO POSTAL OR PACKING CHARGES. C.O.D. 2/- extra. Carriage extra Eire and N. Ireland and countries outside U.K.

For the TRANSISTOR AGE



MICRO MINIATURE SPEAKER TYPE LP45F

- Max. loading—200mW
- Frequency response 200-7000 c/s.
- 10 ohms. imp. at 800 c/s.
- Ferrite magnet 9,500 gauss.
- 1.75in. dia. x 0.75in.

25/-

(inc. P/tax)

From Radio Stockists Everywhere

A super sensitive miniature speaker (face diam. 1 3/4 in.) with 9,500 gauss flux density, better than ever quality from smaller than ever equipment!

Operates from as little as 30-50mW peak value from class "A" outputs; will accept 200mW from class "B" p/p outputs.

TSL

TECHNICAL SUPPLIERS LTD.
Hudson House, 63 Goldhawk Rd.
LONDON, W.12

SOUTHERN RADIO'S WIRELESS BARGAINS

PORTABLE TEST METERS. (As featured in March issue, pages 1005 to 1010) 0-5000 ohms; 0-60 mA; 0-1.5 v., 0-3 v. 12/6 each.

METERS. 30-0-30 and 3-0-3 volts, with leads. 15/-

ATTACHMENTS FOR "38" TRANSMITTER-RECEIVER: Headphones 15/6; Throat Microphones, 4/6; Junction Boxes, 2/6; Aerials, No. 1, 2/9, No. 2, 5/3; Webbing, 1/-; Haversacks, 5/6; Valves—A.R.P.12, 4/6. A.T.P.4, 3/6. Set of five valves, 19/-. Postage on each item 1/6 extra (except valves).

TRANSMITTER-RECEIVERS: TYPE "18", MARK III. Brand New, complete with 6 valves, etc. £4.10.0, carriage paid.

ATTACHMENTS FOR "18" TRANSMITTER-RECEIVER. Headphones, 15/6; Microphone 4s, 12/6; Aerials, 5/-; Morse Key, 6/6; Valves—A.R.P.12, 4/6, A.T.P.4, 3/6, A.R.8, 7/6; Set of six valves, 25/-. Postage extra (except valves) 1/6 each item.

QUARTZ CRYSTALS. Types F.T.241/F.T.243 2-pin 1/2 spacing. F.T.241 20 to 38.9 Mc/s (54th and 72nd Harmonic). F.T.243 5700 to 8650 kc/s (Fundamental), 4/6 each. Lists of available frequencies on request. Crystal Holders for F.T.241/243, 1/3. F.T.241/243 Crystals. New but not guaranteed (ideal for using the case or regrading). 12/6 per dozen, post paid.

RECORDING BLANKS. New 13in., 6/- each or 15 complete in Tin. £4.

BOMBIGHT COMPUTERS. Ex-R.A.F. Wealth of gears, motors, blowers, etc. Ideal for experimenters. £3.12.6, carr. paid.

CONDENSERS. 100 Asstd. Useful values, new wire-ends, 12/6 per 100.

MORSE PRACTICE SETS. Key with Buzzer on Base, with battery, 12/6, postage 2/-.

LUBRIFA HOLE CUTTERS. Adjustable. 3" to 3 1/2". 7/3.

STAR IDENTIFIERS. 1-AN. Covers both hemispheres, 5/6.

VISUAL INDICATORS (10 Q4). Type 3 with 2 meter movements, 2 neons. New, 12/-.

MAGNETS. Strong Bar, 2" x 1/2". 1/6 each.

COMMAND RECEIVERS B.C. 454 3-6 Mc/s. B.C. 455 6-9 Mc/s. Complete with 6 valves, new condition, 47/6 each.

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

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 SUCCESSSES—

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.

PADGETTS RADIO STORE

40 MEADOW LANE, LEEDS 11

Phone: Cleckheaton 2866

Special Offer. 62A tube unit, complete with all valves, in new condition, less tuning dial. 22/6, carriage 8/6.

Tube Unit. Type 116A. Complete unit with all valves and VCR97 tube, as new, 15/-, carriage 7/6.

Complete 12in. TV Chassis. Less valves, four for 10/-, carriage 5/-.

Brand New. P.C.R. Vibrator Paek. Complete with spare vibrator. 12 volts in 200 volts at 100mA output, 15/-, carriage 5/-.

P.M. Speakers. Removed from TV sets. Guaranteed perfect. 6in. and 7 x 4in. 5/- each, post 2/-.

NEW VALVES, Ex-units. All post free

6K7	2/-	EF91	1/9	DLS10	1/-
6K8	3/6	EB91	1/9	KT63	4/-
6X5	4/-	EL91	1/9	U12	5/-
6C4	1/6	954	1/6	5U4	4/6
VR91	1/6	9001	9d.	134	2/-
VR91 red	2/-				

Valves removed from TV sets. All tested on a new Mullard Valve Tester, are 100% as new. They carry a 3 months' unconditional guarantee. All valves Post Free.

EF90	2/6	6P25	5/-	10P14	5/-
ECL80	5/-	6F1	5/-	10F1	5/-
ECC82	5/-	6P61	1/6	10C2	3/-
EL38	5/-	6G6	2/6	20D1	5/-
EF50	1/3	6Y8	2/-	20L1	5/-
EY51	5/-	6SS7	2/-	20P3	5/-
EBF90	5/-	FY81	5/-	U25	5/-
6SN7	2/9	PL81	5/-	20P4	5/-
6F13	5/-	PL82	5/-	U261	5/-
6P14	5/-	PY80	5/-	U329	5/-
6P15	5/-	PL33	5/-	U801	8/8
6LD20	5/-	PK23	5/-	KT36	5/-
6K25	5/-	PL39	5/-	L63	3/-
6AL5	5/-	10P13	5/-	N37	5/-
6P28	5/-				

Many more types in stock

Reconditioned 12in. TV sets. Bush TV24A and TV24C. 5 channels, 65/-; 13 channels, £4.10.0, carriage and ins. on the sets, 17/-.

Tubes are not boosted and sets work well.

TV Tubes. Returned, 12 months' guarantee, 12. 14 and 17in. all at £3.15.0 each, carriage and insurance 7/6.

Red Spot Transistors, 3/-; White Spots, 3/-; Yell./Gr., 3/6; Ediswan XA102, 10/-; XA104, 9/-; XA103, 9/-; XA101, 9/-; XB103, 8/6; XB104, 7/6; XC101, 9/-;

Special bargain set for P.W. Superhet 6 Transistors (1-XA102, 2-XA101, 1-XB103, 2-XC101), plus Diode, 47/6; Newmarket V15/10 P, 15/-; Diodes, 1/-; 2/6; 4/- Transistor holders, 1/-; Ardente Trans. D239, 8/6; D240, 8/6; D.131, 10/-; D.132, 10/-; Sub. Min. Electrolytics (15v) 2, 4, 8, 10, 25, 50, 100 mfd., 3/-; 23 mfd., 2/9; P.W. Superhet, complete kit, Reduced £9/0/0. M.C. Earpiece (used as speaker), 5/-; Balance Inserts (as earpiece or speaker), 3/6. Silicon Rectifier bargain 70 p.i.v. 1/2 amp., 3/3; Westalite Contact Rectifier 250 v., 60 mA, 7/6; Transformer 250-0-250 v., 6v. and 5v., 15/-; Packard Bell Amplifiers, new 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

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. MP)
Raleigh Mews, Raleigh Street, Nottingham

OUR COMPREHENSIVE SERVICE INCLUDES:

12 CHANNEL TURRET TUNERS, 10, 16, 38 Mc/s, 40/-; VALVES, PCF80 and PCC84, 7/3 each. Cabinets, Glasses, Masks, Condensers, Resistors, Ion Traps, Speakers.

RECLAIMED C.R. TUBES

(Not boosted or reactivated)
9in. and 12in., 35/-; 14in., 50/-; 17in., 60/-
All picture tested, taken from stripped TVs.

REGUNNED C.R. TUBES

(12 month guarantee)
12in., 80/-; 14in., 90/-; 17in., 100/-
VT7, CTM4 52/8 35/- 55/- 35/-

EXAMPLE OF TRANSFORMER LIST
L.O.P.T. SCAN COILS
FERGUSON: (New) (Used) (New) (Used)
103T, 105T 69/9 35/- 60/- 35/-
992/4/6/8 .. 69/9 35/- 60/- 35/-

PYE:
V4, VT4, V7 52/8 35/- 55/- 35/-
VT7, CTM4 52/8 35/- 55/- 35/-
These are only examples of stocks, we have many thousands more, and would be pleased to quote for any component you may require.

We pride ourselves that we can obtain and supply any TV spare.

OUR GIGANTIC STOCKS INCLUDE:
LINE OUTPUT, FRAME OUTPUT, SOUND OUTPUT, LINE AND FRAME BLOCKING OSC. TRANS. AND SCAN COILS. FOR ANY MAKE OR MODEL TELEVISION.

SOME OF OUR VALVES

AZ31	8/6	PCL82	10/9	SP41	2/3
B36	5/6	PCL83	11/3	SP61	2/3
B77	3/-	PCL84	9/6	Z77	5/-
DH77	4/6	PL33	8/6	Z77	5/-
DK91	5/9	PL36	10/9	5U4	5/-
DK92	3/-	PL38	14/6	5V4	9/-
DK96	7/6	PL41	8/6	5Y3	10/6
DL82	5/9	PL82	6/9	5Z4	3/-
DL94	6/9	PL83	7/-	6AL5	3/-
DL96	7/6	PY31	7/-	6AM6	3/-
EB91	3/-	PY32	10/-	6CD6	27/6
EB933	5/-	PY80	6/6	6D2	3/-
EBF80	9/6	PY81	8/-	6F1	5/-
ECC81	5/3	PY82	6/6	6F12	3/-
ECC82	5/9	PZ30	10/-	6F13	7/-
ECC84	8/-	U22	9/6	6F14	9/6
ECCF80	8/-	U24	10/-	6F15	9/6
ECH85	9/-	U25	8/-	6L1	12/8
ECH81	6/-	U26	12/-	6V6	5/-
ECL80	6/9	U31	9/6	6V6	5/-
EF39	5/-	U50	3/8	10F1	4/6
EF50	3/9	U52	7/-	10C1	10/-
EF90	4/8	U181	9/-	10C2	13/-
EF91	3/-	U281	9/-	10P13	9/-
EF92	5/-	U282	20/-	10P14	9/-
EL33	8/6	U301	20/-	12AT7	5/8
EL38	14/6	U301	22/6	12AU7	5/9
EL84	7/84	U1A42	8/-	20D1	9/6
EY51	6/-	UBC41	7/9	20F2	9/-
EY51SE	7/9	UCH42	7/-	20L1	12/8
EY86	7/6	UF41	8/8	20P1	10/8
EZ40	6/6	UF42	3/9	20P3	12/-
KT33C	8/-	UL41	7/3	20P4	16/8
KT36	8/6	UL46	7/3	27SU	14/-
KT56	15/-	UL44	11/6	30C1	7/-
PCC84	7/-	UY41	6/8	30L1	7/-
PCF80	9/6	U08	14/6	30P4	10/9
PCF80	7/-	U09	6/6	185BT	14/-

These are only examples of our valves: if you do not see what you require send stamped addressed envelope for special quotation.

For the Finest, Fastest Service in the country, contact—

D. & B. TELEVISION
131a KINGSTON ROAD
SOUTH WIMBLEDON
LONDON S.W.19

Phone: Cherrywood 3555

And that's not all—
WE ARE OPEN FROM 10 a.m. UNTIL MIDNIGHT

For any information or problems you have, call on us or phone, we are always pleased to help.

TERMS: S.A.E. all enquiries. C.W.O. or C.O.D. 3/- extra.
Postage on Valve 6d. each, C.R.T.s 12/6 inc. insurance.

SATISFACTION ASSURED
RETURN POST SERVICE

Still available—a comprehensive, practical "basic" course in TV transmission and reception . . .

A BEGINNER'S GUIDE TO TELEVISION

by F. J. CANN. Covers:—
Persistence of Vision and Scanning . Cathode-ray Tube . The Timebase . Receiving and Transmitting Systems . The Aerial . Tracing the signals through the Receiver. Video Section . The Television Camera . The tuning Signal Test Card C, and tracing faults . Colour . The N.T.S.C. System—Tricolour Tubes explained . Telecine—Video Tape Recording . Stereoscopic Television . Technical Terms . Index.

With 61 illustrations

ONLY 7s. 6d. FROM ALL BOOKSELLERS

. . . or in case of difficulty send 8s. 6d. to GEORGE NEWNES LTD., Tower House, Southampton St., London, W.C.2.

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. TH), 44 Old Bond Street, London W.1

Please send me FREE and without obligation your 1961 literature.

NAME

ADDRESS

EDDY'S (NOTTM.) LTD.

172 Alfreton Road, Nottingham

BUILD YOUR OWN CAR RADIO!



7 Transistors Long and Medium Waves. Two watts output. RF stage and automatic gain control. (6 or 12 volts, please state). Supplied with full instructions at Size: 7 1/2 x 7 1/2 x 2 1/2 in. Speaker 17/11 extra (7 x 4 ellipt.) if required. Postage and packing 5/- extra per kit. **10 1/2 Gns.**

POCKET RADIO. 2 Transistor with Miniature speaker. Complete with all parts wiring diagram and full instructions 27/6. Batteries 1/-, P. & P. 2/6.

P.W. 6 TRANSISTOR Medium and long wave pocket superhet. 6 matched transistors and Diode 150 M.W. Push pull output. Easy to follow printed circuit with all components marked. High "Q" internal ferrite Aerial. Quality 2 1/2 in. speaker size 5 1/2 x 3 x 1 1/2 in. No technical knowledge required. No extras to buy. Total cost of all items 28/19/6, P. & P. 2/6.

THROAT MIKES. 1/- each, Post 6d. also super quality throat mike 2/- ea. Post 9d. could be used for electrifying musical instruments, etc.

AMPLIFIERS 12 volt 4 pin, 4/11. Post 1/-.
CRYSTAL SETS. Complete 2 wave bands high gain. Good quality 19/11, also with transistor amplifier, extra 9/11, P. & P. 2/6.
HEADPHONES. High resistance to suit above crystal sets. Good quality 13/11 pair, P. & P. 1/6.

All above are new and guaranteed.

Guaranteed New or Surplus valves by return post

AC2/PENDD	7/6	PCC84	7/3	6BA6	5/11
C1C	7/6	PCF80	7/3	6BE6	5/11
DAF91	4/9	PCL82	7/6	6B16	5/11
DAF96	6/11	PCL83	12/6	6BB8	2/11
DF91	3/11	PCL84	12/6	6C4	3/6
DF96	6/11	PEN4A	12/6	6F3	6/6
DL96	6/11	PEN36C	8/6	6J5G	2/9
DK96	6/11	PL81	9/-	6K7G	1/11
EAF42	8/6	PL82	7/-	6K7GT	3/9
EB41	6/11	PL83	7/-	6K8G	5/3
EB91	3/6	PY81	6/6	6Q7G	5/9
EBC41	7/6	PY82	6/9	6SA7M	5/9
ECC81	5/3	PY83	7/3	6SG7M	4/9
ECC82	5/11	TDD4	7/6	6SL7GT	6/6
ECC83	6/6	UB41	7/11	6SN7GT	4/3
ECC84	8/3	UBC41	7/3	6U4GT	10/6
ECC85	7/11	UCH42	7/6	6V6G	4/9
ECH42	7/9	UL41	7/3	6V6GT	6/-
ECL80	7/-	UL84	7/6	6X4	5/9
ECL82	10/-	UY41	6/3	6X5GT	5/11
EF41	7/6	UY85	6/3	10F1	6/11
EF42	7/6	YF23	6/6	12A6	5/3
EF80	5/-	1A7GT	11/6	12AT6	7/6
EF85	5/11	1CSGT	9/9	12AT7	5/3
EF86	9/6	1D5	7/6	12K7	5/3
EF91	3/6	1H5GT	9/6	12K7	5/3
EL41	7/3	1N5GT	9/9	12Q7	5/3
EL42	9/6	1L4	3/6	25L6GT	7/6
EL84	6/6	1R5	5/6	25Z4G	7/6
EL91	4/6	1S5	4/9	30F5	8/6
EY51	7/11	1T4	3/11	35W4	6/9
EY86	7/9	3V4	6/9	35L6GT	8/11
EZ80	6/-	5Y3GT	5/9	35Z4	5/3
EZ81	6/9	5Z4G	7/6	80	7/-
KT33C	6/6	5U4G	4/1	95A	1/6
MU14	7/-	6A6S	4/1	95B	2/6
				95C	3/6

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.

★ **POST HASTE** ★

JASON F.M. TUNER KITS

We are the authorised Jason dealer and the whole kit is as supplied by them.

- FMT1** Standard variable tuner, complete with valves £6.17.6
- Hire purchase deposit £1/7/6 and 6 monthly... £1. 1.8
- FMT1** Power pack ready drilled chassis, complete... £2.12.6
- FMT2** Shelf mounting, less power supplies, complete £7.17.6
- Hire purchase deposit £1.11.6 at 6 monthly... £1. 4.4
- FMT2** As above, but with power supplies, complete £9.15.0
- Hire purchase deposit £1.19.0 and 6 monthly £1. 9.4
- FMT3** Fringe model, less power supplies, complete £9.12.6
- Hire purchase deposit £1.18.6 and 6 monthly £1. 9.0
- FMT3** As above, with power supplies, complete £12. 0.0
- Hire purchase deposit £2.8.0 and 8 monthly... £1. 6.6
- Mercury 2** Switched tuner with A.F.C. TV sound... £10.15.0
- Hire purchase deposit £2.3.0 and 8 monthly... £1. 4.0
- JTV/2** As above, but shelf mounting and powered... £14.15.0
- Hire purchase deposit £2.15.0 and 12 monthly £1. 2.0

The Instruction Book is included in all kits.

REQUIRED CHANNELS MUST BE SPECIFIED FOR SWITCHED TUNERS

Instruction Book for FMT1, FMT2, and FMT3, 2/6 Mercury 2 and JTV/2, 3/6.

A more detailed list can be sent upon request.

ALL JASON TUNERS ARE ON DEMONSTRATION
ALL THE ABOVE TUNERS ARE ALWAYS IN STOCK

★ **POST FREE** ★

TRANSISTORS

- OC44 Mixer ... 12/-
- OC71 Audio ... 8/6
- OC45 I.F. ... 12/-
- OC72 Audio ... 8/6

All Brand New Mullard and Not Sub-Standard.

Matched pairs of OC71 and OC72 can be supplied at no extra cost.

"PRACTICAL WIRELESS"

POCKET SUPERHET

Osmor printed circuit version. Osmor Rod Aerial, 10/-, I.F.T.s and Osc. Coils 22/6. Osmor Driver, 11/6. Osmor Output, 10/6. Set Mullard Transistors, 61/6. J.B. Gang, 11/-, Trimmers, 2/8 pr. Set Condenser, 15/-, Resistors, 6/6. Ardenne Vol. Control, 10/6. Ardenne W/C, 3/6. Speaker, 19/10. OA81 diode, 4/-, Hardware 4/6. Printed Circuit, 9/-, Case and Knob, 7/6. PP4 Battery, 2/-, Leaflet illustrated, giving full instructions and constructional details, 1/9.

All the above components, if purchased at one time £9.19.6

WEYRAD P50 Coils and transformers for a dual wave transistor Superhet, with printed circuit and ferrite rod aerial. Long and medium wave aerial RA2W, Osc. coil P50/1AC, 1st and 2nd I.F. Transformers P50/2CC, 3rd I.F. transformer P50/3CC, Driver transformer LFD72, Printed circuit PCA1. Constructors' Booklet 2/3. The above WEYRAD set with book £2.16.0.

COLLARO STUDIO DECK. List price £17.10.0, OUR PRICE £12.19.6. Hire purchase deposit £2.19.6 and 8 monthly 27/6.

WE PAY ALL POSTAGE AND INSURANCE
ALL ORDERS DESPATCHED SAME DAY
MONEY WILL BE REFUNDED IF REQUESTED

SURBITON PARK RADIO

(Established over 30 years)

48 SURBITON ROAD,

KINGSTON UPON THAMES, SURREY

Telephone: KIN 5549

Hours: 9 a.m. to 6 p.m. 1 p.m. Wed.

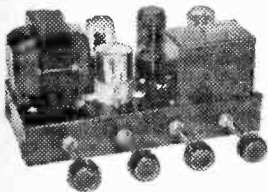
We do not close for lunch

Open all day Saturday

BARGAIN OFFER

DE-LUXE 4 WATT GRAM AMPLIFIERS
LIST PRICE £9-7-6

OFFERED AT



£4-0-0

Guaranteed for 12 months

This Amplifier is a high quality unit by a well known manufacturer. It has independent boost and cut on treble, middle, and bass. The response curve can be varied to compensate for non-linearity in pick-up or speaker. The hum level is virtually non-existent and voltage negative feedback gives a very low distortion level. The Amplifier is finished in stove enamel, with fully shrouded transformers and modern knobs with gold rings. Valves 6SN7, 6X8, 6X5. Size 9 x 4 1/2 x 4 1/2. Mains 200-250 volts A.C. fully isolated.

C.W.O. or C.O.D. P. & P. 3/6

A.G. SUPPLIES
241A THE BROADWAY, S.W.19

3-TRANSISTOR POCKET RADIO

With Miniature Loudspeaker

Absolutely NO Soldering Required



UNIQUE DESIGN

Superb appearance. Simple instructions. Built in an evening. No drilling.

No soldering. Complete in every detail. Receives entire broadcast band. Aerial required in certain areas. Pocket size 4 1/2 x 2 1/2 in.

ALL PARTS SOLD SEPARATELY

42/6 Battery 1/- extra P. & P. 2/-

SAVOY ELECTRONICS LTD.
15 Maiden Lane, Strand, London WC2 (Back of Adelphi Theatre)

A Knockout TRANSISTOR Bargain! One O.C.44, two O.C.45s, one O.C.81d and two O.C.81s with Diode at the amazing price of 50/-, X.A.101s and 102s at 6/- each, 3 v. green spot audio transistors 3/- each. Coils: 1st, 2nd I.F.s. 4/-, 3rd I.F. and Osc. coil 4/3. All the components in the P.W. Pocket Superhet I.F. chassis, Nov. issue, job for £2.7.0 (Ediswan transistors), Mullard Coil units for winding your own coils, 2/6 each, S.A.E. for list.

RONNO'S
32 Heathfield Gardens, Chiswick, W.4

NEW VALVES!

Guaranteed Set Tested 24 HOUR SERVICE

- 1R5 1S5, 1T4, 384, 3V4, DAF91, DF91, DK91, DL92, DL94, SET of 4, 18/6.
- DAF96, DF96, DK96, DL96, SET of 4 26/-
- 1R5 7/- DL92 5/11 PCF90 7/8
- 1R5 5/- DL94 6/9 PCF82 7/8
- 1S5 4/6 DL96 6/9 PCL82 8/3
- 1T4 3/3 EB91 3/- PCL83 11/-
- 384 5/11 EBC41 7/6 PCL84 7/6
- 3V4 6/9 EBF90 7/9 PL36 10/9
- 5U4 4/3 EBL21 12/6 PL81 8/-
- 5Y3GT 5/8 ECC40 17/- PL82 7/-
- 5Z4G 7/3 ECC81 4/9 PL83 7/6
- 6AM6 2/9 ECC82 5/9 PL84 9/6
- 6K7G 1/9 ECC83 6/3 PY32 10/3
- 6R8G 4/9 ECC84 8/- PY80 7/-
- 6Q7G 5/6 ECC85 7/9 PY81 6/8
- 6V8G 4/9 ECF80 8/3 PY82 8/3
- 6V8GT 6/6 ECF82 8/3 PY83 7/3
- 6X3GT 4/9 ECH21 12/6 UC25 10/3
- 12K7GT 4/9 ECH42 7/9 UAF80 7/6
- 12K8GT 11/- ECL80 7/3 UAF42 8/6
- 12Q7GT 4/6 EF40 12/3 UBC41 7/-
- 35LGT 8/6 EF41 7/6 UBF80 9/6
- 35ZGT 5/9 EF80 4/9 UCB85 13/-
- AZ81 8/9 EF85 5/- UCH21 12/6
- CL33 11/9 EF86 9/6 UCH42 7/6
- DAC32 9/6 EF89 6/9 UCH81 8/-
- DAF91 4/6 EF91 2/9 UCL82 10/-
- DAF96 6/9 EL41 7/- UCL83 13/-
- DF83 9/6 EL84 6/3 UF41 7/9
- DF91 3/3 EY51 7/3 UF85 8/-
- DF96 6/9 EY86 7/6 UF89 6/6
- DH77 6/7 EY40 6/- PL41 7/-
- DK22 11/- EZ41 6/9 UL84 7/-
- DK81 5/- EZ80 5/9 UY21 11/-
- DK92 7/3 EZ81 6/6 UY41 5/6
- DK96 6/9 MU14 7/- UY85 6/3
- DL33 8/6 FCC94 7/3 VP48 8/6
- DL36 9/6 PCC89 10/- Z77 2/9

Postage 6d. per valve extra. Any Parcel Insured Against Damage in Transit 6d. extra. Any C.O.D. Parcel 3/- extra. Office address, no callers.

GERALD BERNARD
(Note new address - formerly of Leeds)
25 NEWBURY ROAD
HIGHAMS PARK, LONDON, E.4

6 MULLARD TRANSISTORS AND DIODE

- 1—OC44 ONLY
 - 2—OC45 **50/-**
 - 1—OC71
 - 2—OC72 PER SET
- and
1—OAB1
or with 2—OAB1, 52/6.

Special offer of 1st grade transistors.

SUNDRIES

- ★ 1000 ohm Personal Phone with Leads and Jack Plug and Socket, suitable for most Commercial Transistor Radios. 17/6.
- ★ 9.065 Mc/s 3rd Overtone Crystal for all 27 Mc/s Model Control Transmitters. 12/6.
- ★ 7 section chromed Telescopic Aerials, 42in., 12/6; 64in., 17/6.
- ★ ACOS Crystal Mic Inserts. 2in., 12/6; 1 1/2in., 7/6; 1 1/4 x 3/4in., 7/6.
- ★ Mercury Batteries, 1.3 v. 500mAh. 3d. x 3/4in. 1/3 ea. P.P. 3d.
- ★ Siemens High Speed Sealed Miniature Relay, 1700—1700 ohms. 15/- ea.
- ★ 4.7 volt 1 watt Zener Diode. 19/6 ea.

ALL COMPONENTS IN STOCK for "WEYRAD"

6-Transistor Superhet. Booklet 1/3 post free. Leaflet on request.

6-TRANSISTOR RADIO



Fidelity "CORONET"

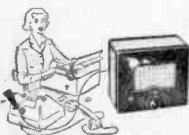
MEDIUM AND LONG WAVE POCKET RADIO

- Size 2 1/2 x 4 1/2 x 1 1/2 in.
- Quality Push-Pull Speaker Output.
- Guaranteed for 12 Months.
- Phone and Tape Socket.

ALL BRITISH DESIGN AND CONSTRUCTION



9 1/2 gns Reg. Post 2/6. (INCL. BATTERY)



ALL TRANSISTOR TIME SAVER OFFICE OR HOME TELEPHONE PICK-UP AMPLIFIER

★ No more "Holding On", wasting time waiting for your call to come through. When it does the amplifier can be switched off if required. No connections, just Selloctape the pick-up coil to back of phone as above.

- 5-inch speaker; 3 months battery life. Now with 400mW output.

BUILT, TESTED, READY TO USE

£5.10.0 P.P. 2/6

MULTI RANGE TEST METERS

Model A-10 (500 Micro-amp. movement) D.C. (2k per volt) 0/10/50/250/500/1,000 V.A.C. (2k per volt) 0/10/50/250/500/1,000 D.C. current 0/0.5/25/250mA. Resistance: 0/10K/1 Meg. Size 5 1/2 x 3 1/2 x 1 1/2 in. Weight 17 oz. inclusive of test prods, instruction book and batteries. £4.17.6. P.P. 1/6.

Model B-20 (100 Micro-amp. movement) D.C. (10,000 ohms per volt) 0/0.5/2.5 volts D.C. (4,000 ohms per volt) 0/10/50/250/500/1,000V A.C. (4,000 ohms per volt) 0/10/50/250/1,000V D.C. Current: 0/0.1/2.5/25/250mA. Size 5 1/2 x 3 1/2 x 2 1/2 in. Weight 24 oz. inclusive of test prods, instruction book and batteries. ... £6.10.0. P.P. 1/6



● FULLY GUARANTEED—EASY TO USE ●

CRYSTAL MICROPHONES

ACOS 39-1 Stick Microphone with screened cable and Stand (list 5 gns.), 39/6, P.P. 1/6.

ACOS 40 Desk Microphone with screened cable and built-in stand (list 50/-) 19/6 P.P. 1/6.

ACOS 45 Hand Microphone with screened lead, very sensitive, 29/6, P.P. 1/6.

MC43 Stick Microphone with muting switch and screened cable 42/6, P.P. 1/6.

Brand New—Fully Guaranteed

ULTRA MINIATURE TRANSISTOR COMPONENTS

- Set of OSC. and 3 IF's. Size 7/8 x 7/8 x 1/2 inch. 21/-.
- 1 1/2 inch Square Poly. 2-gang Tuner with Trimmers. 17/6.
- Driver and Output Transformer, (matched to 8/10 ohms). 12/6 pr.
- 2 1/2 inch 10 ohm Speaker. 17/6.
- Ferrite Aerial Slab. To match 3/6.

TRANSISTORS From 3/6 each

SEND FOR NEW FREE LIST WITH DATA AND USES

FULLY GUARANTEED

We can supply a Transistor for every need!

RANGER-2

PERSONAL POCKET RADIO.



● Two Transistor Two Diode version of "Ranger-3". See back page. Similar in performance.

All Parts 59/6 P.P. 1/6.

● PICTORIAL PLANS AND DETAILS FREE ON REQUEST

LET US HAVE YOUR ENQUIRIES FOR ALL TYPES OF COMPONENTS

TRANSISTOR FM TUNER

Fully tunable with A.F.C., A.G.C., Incorporating 5 Transistors and Printed Circuit Pre-assembled units.

- 85 to 108 Mc/s. All Parts

- Slow motion tuning illuminated dial. 18 gns.

- Hammer finish case. P.P. 3/-
- Output may be fed to valve or transistor equipment. Performance better than many valve types.

Fully Illustrated Book 2/6.

2 WATT POWER AMPLIFIER

- Designed to boost up the output of Portable Transistor Radios when used in a Car. Works from 6 or 12 volt (state which) Car Battery—uses power transistor. All Parts 49/6, P.P. 2/-.

Henry's Radio Ltd

5 HARROW ROAD • LONDON W.2

Opposite Edgware Road Tube Station
OPEN MON. to SAT. 9-6, THURS. 1 o'clock
Telephone PADDDINGTON 1008/9

SEE BACK PAGE

OUR SPECIALITIES
Transistors, Valves, Components at Competitive Prices.

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	PW83*	2/6
Pyramid One-valver	PW93*	2/6
<hr/>		
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 7th June, 1961, and must accompany all queries in accordance with the notice on our "Letters to the Editor" page.

PRACTICAL WIRELESS, JUNE, 1961.



Size 4½ x 3 x 1½ in.

ALL COMPONENTS
79/16 P.P. 1/6
NO EXTRAS TO BUY
Everything Supplied.

● AFTER SALES SERVICE, GUARANTEED SUCCESS ●

27 Mc/s. MODEL CONTROL RECEIVERS

● "SUPERTONE 1-C"

New design 3-transistor transformer coupled receiver for 27 Mc/s model control. Uses OC169/OC71/OC72 transistors. Overall size 2½ x 2 x 1½ in. Range about ½ mile. Easy to build.

● OUTPUT to MIN. RELAY.
4½-VOLT OPERATED: RELAY 24/
"SUPERTONE 3-C". 69/16 P.P. 1/6.
3-CHANNEL VERSION.

★ GUARANTEED RESULTS—
DIAGRAM FREE ★



Total Cost of Parts
69/16 P.P. 1/6
RELAY 24/.

Now, with new more powerful circuit design.

★ BABY SITTER ★

ALL TRANSISTOR BABY OR
INVALID ALARM

Battery operated, push-pull, 250mW output. Low impedance microphone enables unit to be used up to 200 yards. Output on 5in. speaker.

● GUARANTEED for 6 MONTHS and 100% SAFE.

● Microphone is placed within 6 ft. of Baby; twin flex is taken to amplifier unit and placed in any room required.
COMPLETELY BUILT AND TESTED

£5.10.0 P.P. 2/6.

● Used All Night, Every Night, Battery Life 3 to 4 months

750mW TRANSISTOR AMPLIFIER

OVER 1 WATT PEAK OUTPUT

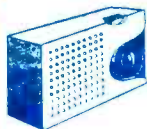
● Uses OC71, OC81D and, 2—OC81 matched transistors on Printed Circuit. Size 4 x 2½ ins. 3 ohms output. Very sensitive.

★ BUILT AND TESTED
79/16
P.P. 1/.

Ideal for Record Player, Intercomm, T.R.F. or Superhet Tuners, etc.

9 volt supply, 3 ohm output.

REPANCO MINI-4



- 4-Mullard Transistor
- 5-stage medium and long-wave superhet. OC44/2-OC45/OC72
- 2½-inch SPEAKER.
- Easy to build and use.
- Moulded Case Size: 5½ x 3½ x 1½ ins.

ALL PARTS **£6.19.6** P.P. 1/6.

● NEW EASY DIAGRAMS, 1/6 plus post. PARTS LIST FREE ON REQUEST

★ VALVES ★

WE STOCK OVER 800 TYPES OF VALVES AND TUBES AT REALLY COMPETITIVE PRICES. ● FREE LIST ON REQUEST ●

PLEASE



TURN
PAGE

Henry's Radio Ltd 5 HARROW RD., LONDON, W2

Opposite Edgware Road Tube Station. PADDINGTON 1008/9. Open Monday to Sat. 9-6, Thurs. 1 o'clock

★ Let us have your Enquiries for Components, Miniature and Standard ★
NOT ALL OUR UNITS ARE ADVERTISED ABOVE, SEND FOR DETAILS OF OUR RANGE

★ 'PW' ROADFARER ★

(as described in April edition of *Practical Wireless*)



A.M. and F.M.
7-transistor mains/battery portable in attractive moulded case. Slow motion tuning; telescopic aerial; 7 x 4 in. speaker; Ferrite aerial, etc.

● Full tuning medium wave and VHF F.M. for clear reception of all programmes anywhere in the country.

- 500mW push-pull output with Mains or Battery supply built in.
- PRINTED CIRCUIT—SEVEN TRANSISTORS.
- FULLY ILLUSTRATED BUILDING INSTRUCTIONS

All Parts as Specified
£17 P.P. 3/6

All components sold separately. List on request.

★ 'PW' 6-TRANSISTOR ★

MEDIUM AND LONG WAVE
SUPERHET

(as described November P.W.)

● A sensitive superhet with 150mW push-pull output on 2½ in. speaker. Uses 6 first grade Mullard transistors and printed circuit. Moulded cabinet. Red, Blue or Cream.

● All parts sold separately. Send for list. Illustrated Building Plans, 1/6 plus post.



Size 5½ x 3 x 1½ in.

ALL PARTS REQUIRED **£8.19.6**

★ NO EXTRAS TO BUY—EVERYTHING SUPPLIED ★

3-TRANSISTOR and DIODE PERSONAL POCKET RADIO ★ SUPER 3 ★

A simple to build local station radio with personal earphone output. Built-in Ferrite Aerial and Battery lasting 9 months.



QUALITY OUTPUT ON
PERSONAL EARPHONE

ALL PARTS
37/6 P.P. 1/6

● NO EXTRAS TO BUY
Size 4½ x 3 x 1½ in.

★ IDEAL for BEGINNERS

COMBINED PORTABLE AND CAR RADIO



● CONTESSA ●

6 TRANSISTOR MEDIUM AND
LONG WAVE SUPERHET

TERRIFIC SENSITIVITY
UNBEATABLE IN PERFORMANCE
AND APPEARANCE
SPECIFICATION

- 425mW Push-Pull Output
- 6 "Top-Grade" Ediswan Transistors
- New Type Printed Circuit with all Components marked
- Full Medium & Long Wave Tuning
- High "Q" Internal Ferrite Aerial
- Car Radio Adaption and AVC
- Slow Motion Fingertip Tuning with Station Names
- "Hi-Fi" Quality Speaker
- Attractive Rexine Covered Cabinet

TOTAL COST OF ALL PARTS

£11.10.0 P.P. 3/6

● NO EXTRAS TO BUY ●

Call for demonstration. No technical knowledge necessary. All parts sold separately. Only the best in components used throughout. New descriptive Leaflet and Prices on request.