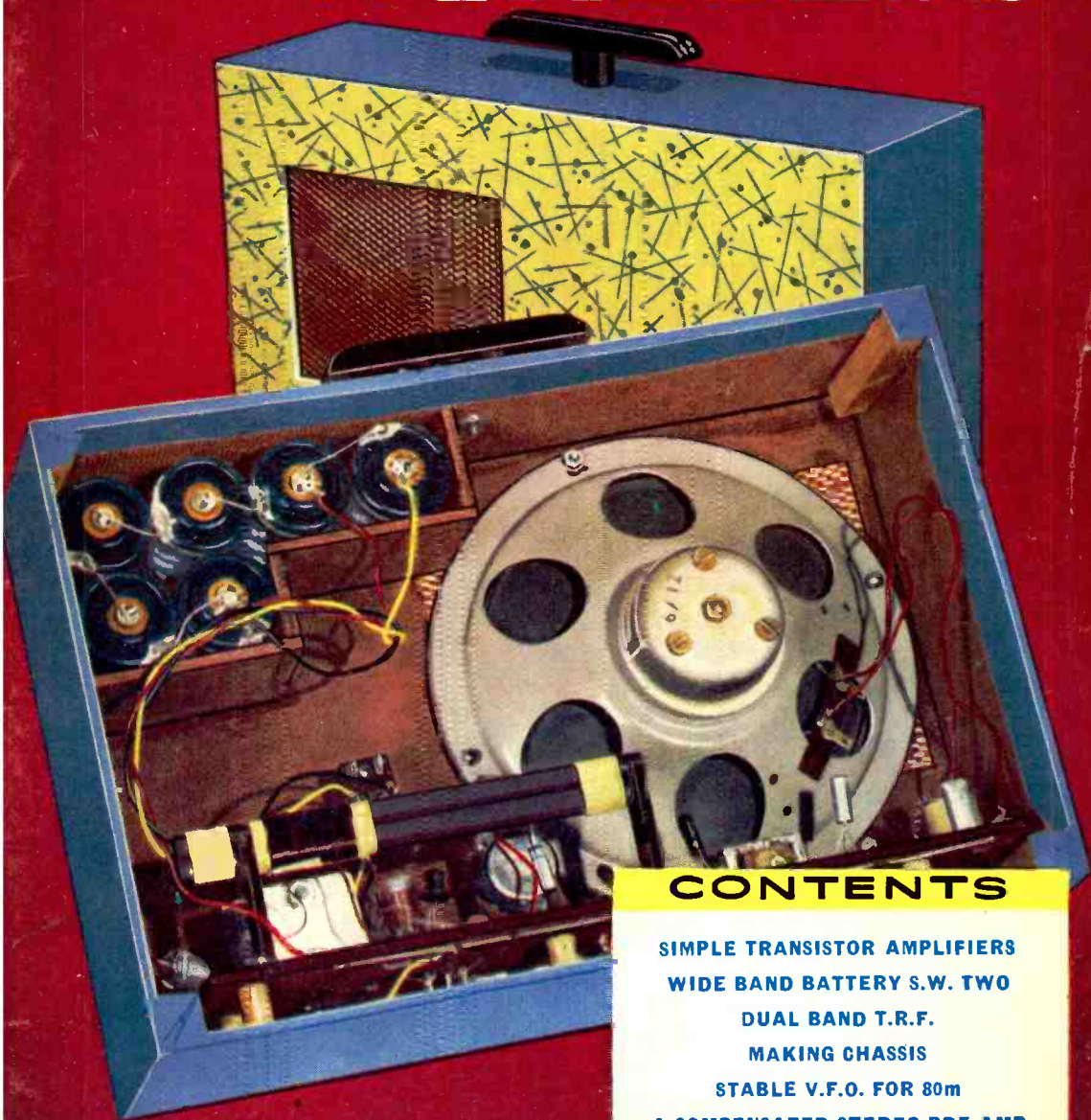


A FOUR TRANSISTOR T.R.F.

PRACTICAL ^{1/6} WIRELESS

JUNE
1960



CONTENTS

SIMPLE TRANSISTOR AMPLIFIERS

WIDE BAND BATTERY S.W. TWO

DUAL BAND T.R.F.

MAKING CHASSIS

STABLE V.F.O. FOR 80m

A COMPENSATED STEREO PRE-AMP

ETC. ETC. ETC.



RADIO & TV TABLES

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

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

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

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

Price £5.5.0 (inc. P.T.)
"SENIOR," of ample dimensions (18" x 24" x 25" high).

Price £4.18.9 (inc. P.T.)
 All are supplied packed flat ready for instant assembly and with the exception of the Welbeck and the Chatsworth have easy running 2" castors.

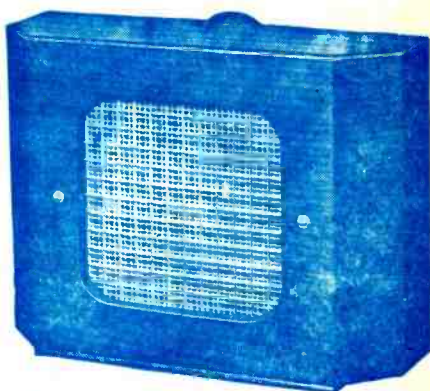


*The symbol
of extra
High Quality*

Stentorian EXTENSION SPEAKERS

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

WHITELEY ELECTRICAL RADIO CO. LTD.
MANSFIELD . NOTTS



**WITH THE
EXCLUSIVE
FINGER-TIP
VOLUME
CONTROLS**

'BUDE' 60/-

'BEDFORD' 72/-

'BRISTOL' 86/6

Prices include P.T.

ERSIN MULTICORE SOLDERS

for a first class joint every time

Ersin Multicore contains 5 cores of extra-active, non-corrosive Ersin Flux. Prevents oxidation and cleans surface oxides.

SIZE 1 CARTON

5/-

**HANDYMAN'S
CARTON**

Suitable for 200
average joints.

6d.

**HOME CONSTRUCTORS
2/6 PACK**

In addition to the well-known Home Constructors Pack (containing 19ft. of 18 s.w.g.

60/40 alloys) a similar pack is now available containing 40ft. of 22 s.w.g. 60/40 alloy especially suitable for printed circuits.



Wherever precision soldering is essential, manufacturers, engineers and handymen rely on MULTICORE. There's a MULTICORE SOLDER just made for the job you have in hand. Here are some of them.

SAVBIT TYPE 1 ALLOY

A specially formulated alloy to reduce the wear of soldering iron bits. Contains 5 cores of non-corrosive Ersin Flux and is ideal for all soldering purposes.

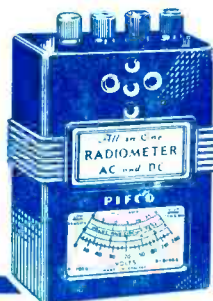
SIZE 1 CARTON 5/-

Available in three specifications.



**BIB WIRE STRIPPER
AND CUTTER**

Strips insulation without nicking wire, cuts wire cleanly, splits extruding flex. 3/6 each



**Solve
that
Circuit
trouble!**

PIFCO
Radiometer

Not only circuit tests but everything electrical can be tested with this handy compact meter. Tests H.T. & L.T., Valves, components, electrical appliances and car lighting systems, etc. May be used on A.C. & D.C. mains.

See the Radiometer at your dealer or write for illustrated leaflet to:—

PIFCO LTD.

WATLING STREET MANCHESTER 4

only
32'6
complete

MULTICORE SOLDERS LTD.,

MULTICORE WORKS, HEMEL HEMPSTEAD, HERTS. (BOXMOOR 3636)

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	HL23DD	PCL82	11/6	U251	17/6
1A5	6/-	6ESGT	10/-	10F1	26/2	35A5	10/6	CL4	12/6	ECH82	12/6	HL23DD	PCL83	12/6	U281	20/-
1A7	14/6	6F1	15/6	10F3	17/6	35L6GT	15/-	CL33	18/6	EF9	21/-	HL41	PENA4	17/6	U282	22/-
1D5	14/-	6F6	6/9	10F9	12/6	35W4	8/-	CY1	15/9	EF22	17/6	HL41DD	PENB4	17/6	U301	22/6
1D6	10/-	6F7	15/-	10LD3	12/6	35Z3	10/-	CY31	15/9	EF36	7/6		PEN4DD		U329	17/6
1H5	10/6	6F12	4/9	10LD11	15/-	35Z4	7/6	D41	12/6	EF37	8/6	HL42DD			U339	19/-
1L4	6/-	6F13	17/6	10P13	21/-	35Z5	9/6	D42	12/6	EF37A	8/6		PL33	18/6	U403	11/6
1LN5	4/6	6F14	17/6	10P14	20/-	40SUA	15/-	D63	3/6	EF39	5/-	HY90	PL38	23/9	U404	10/-
1N5	10/6	6F15	14/9	11D3	17/6	41STH	23/6	D77	5/6	EF40	15/-	IW4/350	PLB1	14/9	U801	29/-
1RS	9/-	6F17	12/-	11D5	17/6	42	15/-	D152	6/-	EF41	9/3	IW4/500	PLB2	8/-	U4020	15/6
1S4	8/6	6F33	5/6	12A6	6/6	43	15/-	DAC32	10/6	AF42	10/6	KBC32	PLB3	10/6	UABC80	8/-
1T5	9/-	6H6	4/6	12AH3	10/-	50C5	15/-	DAF91	7/6	EF50(E)	3/6	KF35	PLB20	21/-	UAF42	9/6
1U5	10/-	6J5GT	7/6	12AT6	9/-	50CD6G		DF33	10/6	EF50(A)	4/6	KL32	PM2A	12/6	UB41	9/6
2D21	8/6	6J7GT	9/6	12AT7	8/-			DF91	5/-	EF80	7/-	KL32	PM2HL	14/-	UBC41	9/6
2X2	5/-	6K7G	3/-	12AX7	9/-	50L6GT	9/-	DF92	7/-	EF85	6/6	KL35	PM22A	13/6	UBF80	9/6
3A5	12/6	6K7GT	10/6	12BA6	9/-	61ST	17/6	DF96	9/6	EF86	11/-	KT2	PM24M	21/6	UBF89	8/6
3D6	14/6	6K8GT	12/6	12B6	9/6	62BT	17/6	DF97	9/6	EF89	10/-	KT32	PM202	16/-	UCC85	10/-
3Q4	8/-	6K25	19/6	12EJ	17/6			DH63	10/-	EF91	4/9	KT33C	PM201	16/-	UCH42	9/-
3Q5	10/6	6L1	15/6	12J7GT	9/6	77	12/6	DH75	7/6	EF92	5/-	KT36	PM22	15/6	UCH81	9/-
354	8/-	6L6	7/6	12K7GT	8/6	73	12/6	DH77	8/3	EF93	7/6	KT41	PM28	8/-	UCL82	12/6
3V4	9/-	6L18	12/6	12K8GT	12/6	80	10/-	DH107	13/6	EF95	15/-	KT44	PM28	7/6	UCL83	13/6
3R4GT	9/-	6L19	21/-	12Q7GT	8/6	85A2	12/6	DH719	7/6	EL31	12/6	KT55	PM22	8/-	UF41	9/-
5U4G	7/-	6L34	10/-	12SA7	8/-	153B2	12/6	DK92	9/6	EL32	5/-	KT61	PM28	8/6	UF42	11/6
5V4	9/6	6/30L2	10/-	12SC7	8/-	153B3	15/-	DK96	10/6	EL35	18/6	KT63	PM28	18/6	UF80	9/-
5Y3GT	8/6	6LD3	9/6	12SG7	8/6	185BT	32/-	DL33	9/6	EL37	18/6	KT66	PM28	14/6	UF85	9/-
5Z3	10/-	6LD20	15/6	12SH7	8/-	303	7/6	DL35	12/6	EL38	23/9	KT71	PM28	14/6	UF89	8/-
5Z4G	10/-	6N7GT	7/6	12SJ7	8/-	304	7/6	DL92	8/6	EL41	10/6	KT76	PM28	12/6	UL41	9/-
6A7	18/6	6M1	10/6	12SK7	8/-	305	7/6	DL94	9/-	EL42	10/-	KT101	PM28	19/6	UL44	24/6
6A8	10/-	6M2	10/6	12SN7	11/6	328	7/6	DL96	9/6	EL81	14/9	KTW61	PM28	19/6	UL46	21/-
6AB3	12/6	6P1	17/6	12SN7	17/6	329	7/6	EASO	2/-	EL84	7/-	KTW62	PM28	14/6	UL84	9/6
6AJ8	9/6	6P25	19/6	12Z3	15/-	807	7/6	EABC90	7/6	EL95	10/6	KTW63	PM28	3/6	UU7	15/-
6AK5	8/-	6P28	26/-	13D3	12/6	955	4/-	EAC91	7/6	EL90	8/6	KTZ41	PM28	12/6	UU8	26/-
6AK8	7/6	6Q7GT	10/6	14H7	12/6	5763	7/6	EAF42	10/-	EL91	5/-	KTZ63	PM28	3/6	UY21	15/6
6AL5	6/-	6SA7GT	7/6	14R7	12/6	9302	7/6	EB41	7/6	EM80	10/-	L63	PM28	4/9	UY41	7/6
6AM	4/9	6SG7	7/6	14S7	21/-	9033	7/6	EB91	5/-	EM81	10/-	LN309	PM28	15/-	UY85	7/6
6AM5	5/-	6SH7	6/6	15A2	17/6			EB33	5/-	EY81	10/6	LZ319	PM28	12/6	VP28	17/6
6AN6	5/6	6S17	5/6	15D2	23/9			EB41	9/6	EY84	10/6	MH4	PM28	8/6	VP4B	17/6
6AN5	7/6	6SK7	7/6	15AQ5	10/6			EBF80	9/6	EY86	9/6	MHD4	PM28	17/6	W17	8/6
6AQ5	8/3	6SL7GT	6/6	19BG6G	24/4			EBL21	22/-	EZ35	7/6	MHL	PM28	10/-	W76	7/-
6AQ8	9/3	6SN7GT	5/6	20D1	12/6			EBL31	21/6	EZ40	7/6	MKT4 (5/7)	PM28	17/6	W77	5/-
6AT6	8/3	6UA4GT	11/6	20D2	23/-			EC91	9/6	EZ41	7/6		PM28	15/9	W81	6/-
6AU6	10/-	6U5	7/6	20F2	26/6			EC91	9/6	EZ80	7/6	MS4B	PM28	17/6	W142	9/-
6B7	10/-	6U7	7/6	20P1	26/-			EC91	9/6	EZ81	7/6	MSP4	PM28	17/6	W179	7/6
6B8	4/-	6V6G	5/-	20P3	23/-			EC91	9/6	EZ90	7/6	MU14	PM28	10/-	W727	7/6
6BA6	7/6	6V6GT	8/-	20P5	22/6			EC91	9/6	FC2	21/-	MX40	PM28	29/6	X18	11/6
6BE6	7/6	6X4	5/-	25L6GT	9/6			EC91	9/6	FC13	17/6	N18	PM28	12/6	X61M	21/-
6BG6G	21/6	6X5GT	5/-	25L5	10/-			EC91	9/6	FC13C	21/-	N19	PM28	12/6	X65	23/9
6BJ6	7/6	7B7	8/-	25L6GT	9/6			EC91	9/6	FW4,500	10/-	N78	PM28	17/6	X66	21/-
6BR7	15/-	7C5	8/-	25L5	10/-			EC91	9/6			N108	PM28	18/-	X78	21/-
6BW6	8/6	7C6	8/-	25L5	10/-			EC91	9/6			N142	PM28	9/6	X79	21/-
6BW7	6/6	7D5	15/-	25L5	10/-			EC91	9/6			N147	PM28	18/6	Y61	10/6
6BX6	7/6	7D6	15/-	25L6	10/6			EC91	9/6			N150	PM28	10/6	Y63	9/-
6BY7	7/6	7D8	15/-	25L6	10/6			EC91	9/6			N153	PM28	11/6	Z21	12/6
6C4	6/6	7H7	8/-	30C1	12/6			EC91	9/6			N309	PM28	11/6	Z63	7/6
6CSGT	8/-	7K7	10/6	30F1	11/6			EC91	9/6			N329	PM28	10/6	Z66	19/6
6C6	6/6	7Q7	11/6	30FL1	11/6			EC91	9/6			N727	PM28	7/6	Z77	4/9
6C9	12/6	7R7	12/-	30L1	11/6			EC91	9/6			N729	PM28	8/-	Z152	8/6
6C10	12/6	7S7	10/6	30P4	22/-			EC91	9/6			P2	PM28	10/6	Z719	7/6
6CD6G	21/6	7Y4	7/6	30P12	11/6			EC91	9/6			PCC84	PM28	9/6	ZD152	9/6
6D1	8/-	8D3	5/6	30P16	10/-			EC91	9/6			PCF80	PM28	10/6		
6D2	5/-	9BW6	14/9	30PL1	15/-			EC91	9/6			PCF82	PM28	11/6		
6D3	15/-	10C1	18/-					EC91	9/6							

METAL RECTIFIERS

RM1	6/-	1BRA 1-1-8-1	4/6	16RE 2-1-8-1	8/6
RM2	8/-	1BRA 1-1-16-1	6/6	18RA 1-2-8-1	11/-
RM3	9/-	16RC 1-1-16-1	88/6	1A86	17/-
RM4	16/6	14RA 1-2-8-2	18/-	1A97	23/6
RM5	22/-	14RA 1-2-8-3	21/-	1A103	24/-

CATHODE RAY TUBES

Type 43/69 £10.0.0

Type 36/44 £8.10.0

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.

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

REALISM AT INCREDIBLY LOW COST. CAN BE ASSEMBLED IN HALF AN HOUR

The Recorder incorporates the Latest Collaro Studio Tape Transcriber. The Linear LT45 High Quality Tape Amplifier listed £12.10. High Freq. P.M. Speaker listed 30/-, empty Tape Spool, a Reel of Best Quality Tape listed 22/6, and a Handsome portable carrying Cabinet finished in Two-tone covering, size 18 x 13 x 9 in. high, listed £4.10.0, and circuit. Total cost if

purchased individually approximately £40. Performance equal to units in the £80-£80 class. Send **25/-** Gns. H.P. TERMS. Deposit 5/-, 12 monthly payments 45/9. Cash price if settled in 3 mths. Carr. 17/9.

TELEVISION RECTIFIERS. 250 v. 200mA, small size, Only 6/9 ea. **RE-ENTRANT SPEAKERS.** Tannoy, 8 watt, 7.5 ohms. Only 19/6 each. Or 35/- per pair.

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 13 D.B. 30-30,000 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. 12.9-7 in. For A.C. mains 200-250 v. 60 c/s. Output for 3 and 15 ohms speakers. Kit is complete to last nut. Chassis is fully punched. Full instructions and point-to-point wiring diagrams supplied. (For factory built 45/- extra).

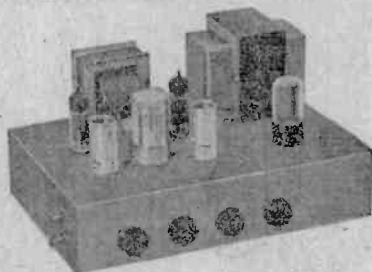
If required, louvered metal cover with 2 carrying handles can be supplied for 18/9. TERMS ON ASSEMBLED UNITS, DEPOSIT 18/9, and 12 monthly payments of 18/9. Send S.A.E. for illustrated leaflet detailing Ready-to-assemble Cabinets, Speakers, Microphones, etc., with cash and credit terms.

EX. GOVT. MAINS TRANSFORMERS

Primaries 200-250 v. 50 c.p.s. A.C.
250 v. 60 mA. 6.3 v. 2 a. 10/11
270-0-275 v. 100 mA. 6.3 v. 7 a. 5 v. 3 a. 21/9
300-0-300 v. 60 mA. 6.3 v. 2 a. 11/9
300-0-300 v. 100 mA. 6.3 v. 2 a. 5 v. 3 a. 18/9
350-0-350 v. 160 mA. 6.3 v. 5 a. 5 v. 3 a. 27/9

2 VOLT ACCUMULATORS

Varleys small size 4 x 3 x 1 1/2 in. 2 v. 14 A.H., brand new, 6/9.



Only **8 Gns.** Carr. 10/-

SELENIUM RECTIFIERS

F. W. BRIDGE	H.T. Types H.W.
6/12 v. 1 a. 3/11	150 v. 40 mA. 3/9
6/12 v. 2 a. 6/11	250 v. 50 mA. 3/11
6/12 v. 3 a. 9/9	250 v. 60 mA. 4/11
6/12 v. 4 a. 12/3	250 v. 80 mA. 5/11
6/12 v. 6 a. 15/3	250 v. 250 mA. 12/9
6/12 v. 10 a. 25/9	CONTACT COOLED
6/12 v. 15 a. 35/9	250 v. 30 mA. H.W.
24 v. 2 v. 2 a. 14/9	6/11, 250 v. 75 mA. H.W.
	F.W. (Bridge) 8/11.

HI-FI 10 WATT AMPLIFIERS

Slightly store soiled but guaranteed unused and in perfect order. Fitted Mullard valves. Dual inputs for "mike" and gram, etc. Bass and Treble Controls. High sensitivity and quality. For 200-250 v. A.C. Carriage 7/6. **£5-19-9**

R.S.C. BATTERY CHARGING EQUIPMENT

ASSEMBLED CHARGERS

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

HEAVY DUTY CHARGER KIT

6/12 v. 6 amps. variable output. Consisting of Mains Transformer 0-200-230-250 v.; F.W. (Bridge) Selenium Rectifier; Ammeter. Multi-Position Switch with Knob; Panels. Plugs, Fuses, Fuseholder, and circuit 59/9. Carr. 4/6.



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 finish. Fused 69/9 and ready for use with Carr. 5/- mains and output leads. Terms: Deposit 13/3 and 5 monthly payments 13/3.

ASSEMBLED CHARGER

6 v. or 12 v. 2 amps.

Fitted Ammeter and selector plug for 6 v. or 12 v. Louvered metal case finished attractive blue. Ready for use with mains and output leads. Double Fused Only **49/9** Carr. 3/9.

R.S.C. MAINS TRANSFORMERS (FULLY GUARANTEED)

Interleaved and Impregnated. Primaries 200-250 v. 50 c.p.s. Screened.

TOP SHROUDED DROP THROUGH

250-0-250 v. 70 mA. 6.3 v. 2 a. 5 v. 3 a. 17/9
350-0-350 v. 80 mA. 6.3 v. 2 a. 5 v. 3 a. 18/9
250-0-250 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 25/9
300-0-300 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 25/9
350-0-350 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 25/9
350-0-350 v. 100 mA. 6.3 v. 4 a. 4 a. C.T. 0-4-0 v. 3 a. 25/9
350-0-350 v. 150 mA. 6.3 v. 4 a. 5 v. 3 a. 29/9

FULLY SHROUDED UPRIGHT

250-0-250 v. 60 mA. 6.3 v. 2 a. 5 v. 2 a. Midget type 21-3-3 in. 17/9
250-0-250 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 25/9
300-0-300 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 25/9
350-0-350 v. 100 mA. 6.3 v. 4 a. 5 v. 3 a. 25/9
300-0-300 v. 130 mA. 6.3 v. 4 a. 5 v. 3 a. 1. 35/9
350-0-350 v. 150 mA. 6.3 v. 4 a. 5 v. 3 a. 35/9
425-0-425 v. 200 mA. 6.3 v. 4 a. C.T. 6.3 v. 4 a. C.T. 5 v. 3 a. Suitable Williamson Amplifier, etc. 49/9

FILAMENT TRANSFORMERS

All with 200-250 v. 50 c.p.s. primaries 6.3 v. 1.5 a. 5/9; 6.3 v. 2 a. 7/6; 0-4-0 v. 2 a. 7/9; 12 v. 1 a. 7/11; 6.3 v. 3 a. 9/11; 6.3 v. 6 a. 17/6.

OUTPUT TRANSFORMERS

Midget Battery Pentode 68L1 for 3S4, etc. 3/9
Small Pentode 5000 Ω to 3 Ω 3/9
Small Pentode 7/8,000 Ω to 3 Ω 3/9
Standard Pentode 3,000 Ω to 3 Ω 5/6
Standard Pentode 7/8,000 Ω to 3 Ω 5/6
10,000 Ω to 3 Ω 5/6
Push-Pull 10-12 watts 6V8 to 3 Ω or 15 Ω 18/9
Push-Pull 10-12 watts to match 6V8 to 3-5-8 or 15 Ω 19/9
Push-Pull EL84 to 3 or 15 Ω 19/9
Push-Pull 15-18 watts, 6L6, KT88, etc. 22/9
Push-Pull for Mullard 50 Ultra Linear 29/9
Push-Pull 20 watts, sectionally wound 6L6, KT66, etc. to 3 to 15 Ω 47/9

All for A.C. Mains 200-250 v., 50 c/s. Guaranteed 12 months

BATTERY CHARGER KITS

Consisting of Mains Transformer, F.W. Bridge, Metal Rectifier, well ventilated steel case. Fuse-holders, Grommets, panels and circuit. Carr. 8/6 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. inclusive of Ammeter. 42/9
6 v. or 12 v. 4 amps. 53/9
6 v. or 12 v. 4 amps. with Ammeter and variable charge rate selector. 59/9.
CHARGE AMMETERS
0-1.5 a., 0-3 a., 0-4 a., 0-7 a., 0-25 a., 0-60 a. 8/9.

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 H250 ohms 11/9
100 mA. 10 H 250 ohms 8/9
80 mA. 10 H 350 ohms 5/9
60 mA. 10 H 400 ohms 4/11

CHARGER TRANSFORMERS

All with 200-250 v. 50 c.p.s. Primaries:
0-9-15 v. 1 a. 12/9; 0-9-15 v. 3 a. 16/9;
0-9-15 v. 5 a. 19/6; 0-9-15 v. 6 a. 23/9.

AUTO TRANSFORMERS, 60 watt

0-110/115-220/250 v. 8/11 each.

D.C. SUPPLY KIT. 12 v. 1 a. consisting of a partially drilled metal case, mains trans., F.W. Bridge Rectifier, 2 fuseholders and fuses, Change Direction switch, variable Speed regulator and circuit. For 200-250 v. A.C. mains. Suitable for Electric Trains, etc. Limited number available at 33/9.

R.S.C. A12 STEREOPHONIC AMPLIFIER KIT

A complete set of parts to construct a Stereo amplifier with an understated 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 Carr. and pkg. 5/- components and latest high grade valves used. Exceptionally realistic reproduction can be obtained at ample volume for the home, as can be demonstrated in typical surroundings at our County Arcade premises. A really sensational offer.

STEREO EQUIPMENT OFFER.
Comprising A12 Kit, 2 matched 8in. L/Speakers, and Acos T10 Stereo head with diamond stylus suitable most pick-ups.
£6-19-6
Carr. 7/6

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

ACOS CRYSTAL MICROPHONES. Mic40 rand or desk Listed 45/-. Only 27/9. 39-1 Stick types. List price 5 gns. Brand new. 39/6.

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

A highly sensitive Push-Pull high output unit with self-contained Pre-amp. Tone Control Stages. Certified performance figures compare equally with most expensive amplifiers available. Hum level 70 db. down. Frequency response -3 db. 30-30,000 c/s. A 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, EF86, EC33, 807, 807, Q233. Separate Bass and Treble Controls are provided. Minimum input required for full output is only 12 millivolts so that ANY KIND OF MICROPHONE OR PICK-UP IS SUITABLE. The unit is designed for CLUBS, SCHOOLS, THEATRES, DANCE HALLS or OUTDOOR FUNCTIONS, etc. For use with Electronic ORGAN, GUITAR, STRING BASS, etc. For standard or long-playing records. OUTPUT SOCKET PROVIDES L.T. and H.T. for a RADIO FEEDER UNIT. An extra input with associated vol. control is provided so that two separate inputs such as Gram and 'Mike' can be mixed. Amplifier operates on 200-250 v. 50 c/s. A.C. Mains and has output for 3 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 A8 can be supplied for 18/9. The amplifier can be supplied, factory built with 12 months' guarantee, for £13.19.6. TERMS: DEPOSIT 24/9 and 12 monthly payments of 24/9.

FULL RANGE OF LINEAR AMPLIFIERS ALWAYS IN STOCK.

R.S.C. BATTERY TO MAINS CONVERSION UNITS

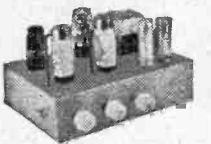
Type BM1. An all-dry battery eliminator. Size 5 1/2 x 4 x 2 1/2 in. approx. Completely replaces battery supplying 1.4 v. and 90 v. where A.C. mains 200-250 v. 50 c/s is available. Suitable for all battery portable receivers requiring 1.4 v. and 90 v. This includes latest low consumption types.

Complete kit with diagrams, 39/9, or ready to use. 48/9.

R.S.C. 1-4 WATT A7 HIGH-GAIN AMPLIFIER
For 200/250 v. 50 c/s. Mains input. Appearance and Specification, with exception of output wattage as A2 amplifier. Complete Kit with diagrams. £3.15.0. Carr. 3/6.

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

LINEAR L45 MINIATURE 4/5 WATT QUALITY AMPLIFIER. Suitable for use with any record playing unit, and most microphones. Negative feedback 12 db. 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 7-5-3 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.



mains input of 200-250 v. 50 c/s.

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. The drive full long-playing record equalisation. Hum level is negligible being 70db. down. 15 db. of negative feedback is used. H.T. of 300 v. 25 mA. and L.T. of 6.3 v. 1.5 A. is available for the supply of a Radio Feeder Unit, or Tape-Deck pre-amplifier. For A.C. alive. Kit is complete in every detail and includes fully punched chassis (with baseplate) with Blue hammer finish and point-to-point wiring diagrams and instructions. Exceptional value at only 24/15/0, 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. Loudspeakers 'built-in'. Handsome, strongly made Cabinet (size approx. 14 x 14 x 7 1/2 in.) finished in satin walnut, and fitted carry-in handle. H.P. Terms. Deposit £1 and 9 monthly payments of £1.

Senior 10 watts High Fidelity output. Separate Bass and Treble 'Cut' and 'Boost' controls. Twin separately controlled high gain inputs so that two instruments such as Guitar and String Bass can be used at the same time. Two loudspeakers are incorporated, a high Flux 12in. for Bass notes and a 7 x 4 in. elliptical for Treble. Cabinet is well made and finished satin walnut. Size approx. 18 x 18 x 18 in. H.P. Terms. Deposit 26/9 and 12 monthly payments of 26/9. Both models for 200-250 v. Carr. 10/- A.C. mains.

SPECIAL TRANSISTOR OFFER.

TS1 Brimar. Brand new. Perfect. 3 for 10/9

R.S.C. BATTERY TO MAINS CONVERSION UNITS

Type BM2. Size 8 x 5 1/2 x 2 1/2 in. Supplies 120v. 90 v. and 60 v. 40 mA. and 2 v. 0.4 A. to amp. and 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.

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

EX-GOV'T. CASES. Size 14-10-8 1/2 in. high. Well ventilated, black crackle finished, undrilled cover. IDEAL FOR BATTERY CHARGER OR INSTRUMENT CASE, OR CHARGER COULD BE USED FOR AMPLIFIER. Only 9/6. Plus 2/6 postage.

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 5. Wed. until 1 p.m. Trade accepted. S.A.E. with all enquiries. Mail Orders to 29-31 Moorfield Rd., Leeds 12. Callers to 5 and 7 County (Mecca) Arcade, Briggate, Leeds 1, and 8-10 Brown St. (Market St.), Manchester 2, or 56 Morley Street, (next to Majestic Ballroom) Bradford.

12in. 10 WATT HIGH QUALITY LOUD-SPEAKER

POLISHED WALNUT FINISHED CABINET
Gauss 12,000 lines. Speech coil 3 ohms or 15 ohms. Only 24.19.6 Carr. 5/- Terms: Deposit 12/- and 9 monthly payments of 11/-

12 in. 20 WATT HI-FI LOUD-SPEAKERS IN CABINETS. Size 18 x 18 x 8 in. Finish as above. Terms: Deposit 13/10 and 12 monthly payments of 13/10. Only 27.19.6 Carr. 8/6.

R.S.C. 45 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. The drive full long-playing record equalisation. Hum level is negligible being 70db. down. 15 db. of negative feedback is used. H.T. of 300 v. 25 mA. and L.T. of 6.3 v. 1.5 A. is available for the supply of a Radio Feeder Unit, or Tape-Deck pre-amplifier. For A.C. alive. Kit is complete in every detail and includes fully punched chassis (with baseplate) with Blue hammer finish and point-to-point wiring diagrams and instructions. Exceptional value at only 24/15/0, 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.

PLESSEY DUAL CONCENTRIC 12in. 15 ohms HIGH FIDELITY SPEAKER (12,000 lines) with built-in tweeter (completely separate elliptical speaker with choke condensers, etc.), providing extraordinarily realistic reproduction when used with our A8 or similar amplifier. Rates 10 watts. Price only 25/17/6.

HI-FI CRYSTAL PICK-UP HEADS. (Turnover type with sapphire stylus). HGP59. Standard replacement for Garrard and B.S.R. B.S.R. Ful-4, Garrard GC2. 19/9.

POWER PACK KIT. Output 250 v. 50 mA. fully smoothed and 6.3 v. 1.5 A. Consisting of Mains Transformer, Selenium Rectifier, Smoothing Choke, Double Electrolytic Condenser, Chassis 6in. x 3 1/2 in. and Circuit. Only 18/9.

P.M. SPEAKERS. 2-3 ohm. 2 1/2 in. Ferdio 21/9. 5in. 17/9. 6in. 18/9. 8in. 19/9. 8 x 6 in. 25/9. 12in. 29/9. 10 x 10 in. 29/11. 10in. 29/11. 10in. 29/11. 3 or 15 ohms type HF1012 10 watts. Hi-fidelity type. Recommended for use with our A8 Amplifier. 24.10.9. 12in. Plessey 3 ohms 10 watts (12,000 lines), 59/6.

TWEETERS. Plessey 3n 19/9, 15n 25/9.

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

SUPERHET FEEDER UNIT. Design of a high quality Radio Tuner Unit (specially suitable for use with any of our Amplifiers). Delayed A.V.C. employed. The W.Ch. Sw. incorporates Gram position. Controls are Tuning, W.Ch. and Vol. only 250 v. 15 mA. H.T. and L.T. of 6.3 v. 1 amp. required from amplifier. Size of unit approx. 9-6-7 1/2 in. high. Simple alignment procedure. Point-to-Point wiring diagrams, instructions and priced parts list with illustration. 2/6. Total building cost 24/15/- For descriptive leaflet send S.A.E.

COLLARO CONQUEST 4-SPEED AUTO-CHANGER with high fidelity Studio pick-up. Latest model. Brand new. Cartoned. For 200-250 v. 50 c.p.s. A.C. mains. Our Price 27.19.6 Carr. 8/6.

COMPLETE V.H.F./A.M. RADIO FOR £12.12.0

Brand new set, in superb walnut cabinet (size 19 x 8½ x 14 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 tapings. Ferrite rod aerial for A.N. Controls: volume on/off tone, tuning, w/change, Gram, and ext. speaker position provided. Fully guaranteed. Post and packing 5/- extra.



The famous Cossor

TRANSISTOR BATTERY PLAYER (Kit)

We can now supply the following parts to build this unit:

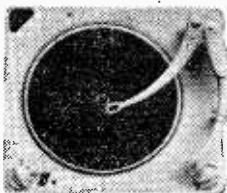
- 1) Player Case.
- 2) Garrard Motor (BA.1).
- 3) Amplifier (4 Transistor).
- 4) Speaker.
- 5) Knob, Plugs, etc.

COMPLETE
£5.9.6

p. & p. 5/-

CHANGERS

COLLARO CONQUEST	£7.19.6
B.S.R. UA8	£6.19.6
GARRARD RC.120 ..	£9. 7.6
GARRARD RC.121 ..	£10.19.6
p. & p. 3/6.	



RECTIFIERS

Westinghouse	
14A86	17/6
14A97	23/6
14A100	24/-
Contact Cooled	
14RA1282	18/6
14RA1283	22/6

Sentercel	
RM1	5/9
RM2	7/6
RM3	9/-
RM4	17/-
RM5	22/-

CARTRIDGES

Collaro Studio O ..	18/-	Collaro Studio P ..	18/-
B.S.R.	18/-		

VOLUME CONTROLS

Less switch type, long spindle, all values ..	2/10 each
Double-pole type, long spindle, all values ..	4/6 each

MAINS TRANSFORMERS

M.T.1 250/250 80 mA.	19/6
M.T.2 350/350 80 mA.	19/6
M.T.3 0/30 volts tapped.	19/6
M.T.4 150 watt Auto Transformer.	19/6
M.T.5. Battery Charger 4 amp.,	19/6
M.T.5a Battery Charger 1½ amp.,	16/6

STANDARD ELECTROLYTICS

8 µF x 450 volt ..	1/8
8 x 8 x 450 volt ..	2/4
16 mf. x 450 volt ..	2/3
16 x 16 x 450 volt ..	3/6
32 µF x 450 volt ..	3/6
32 x 32 x 450 volt ..	5/6

SPEAKERS

3½" Speaker ..	17/6
5" ..	15/-
6½" ..	16/6
8" ..	17/6
6" x 4" ..	15/-
8" x 5" ..	19/6
10" x 6" ..	25/-
12" ..	32/6

TRANSISTORS

PMP Junction Type Audio, Yellow/Green Spot. price 5/-
R.F. Transistor, Yellow/Red Spot, price 8/6
Crystal Diodes GEX00, price 1/- each! 9/- per dozen.

OUR LATEST OFFER: THE FAMOUS COSSOR (Traveller's Friend) TRANSISTORISED POCKET RECEIVER IN LEATHERETTE CASE

This set can be built for **£7.19.6**. Size 6 x 3½ x 1½ in.

Weight 17 ozs. This set covers medium waveband 190/500 metres intermediate frequency. 470 kc/s using 4 transistors (Ediswan) and 2 diodes on a printed circuit board, plus a 2½" moving coil speaker. Instruction book with point to point wiring diagram, 2/6 each. Batteries, PP4 (Ever Ready) 2/- each. P. & P. 2/-.

ALL PARTS CAN BE SOLD SEPARATELY



Garrard BA.1 Battery Player **COMPLETE £3.9.6** p. & p. 4/6.

17" TUBE BARGAIN

by well-known manufacturer

Type CME/1702 90° (seconds) with line EHT Transformer. Scanning Coil, and Frame Output Transformer.

COMPLETE
£6.19.6

p. & p. 10/-

TRANSCRIPTION TURNTABLE

Collaro 4-speed type 4T200/PX with studio transcription pick-up.

£16.19.6

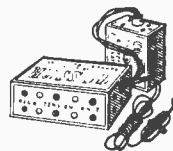
COSSOR BAND 3 CONVERTOR KIT TYPE ZB2

For television receiver model 927 and others, most channels, complete

39/6 p. & p. 2/6

8 VALVE 5 WAVE Am/Fm. Chassis by Famous Manufacturer

Covering long, medium, 2 short and VHF/FM bands. Pick-up and extension speaker sockets, dial fly-wheel tuning power pack and amplifier on separate chassis. For 200/250 v., A.C./D.C. mains. Special price **£17.19.6** p. & p. 5/-.



TAPE DECKS

- 1) B.S.R. Monardeck s.s. £9.19.6
- 2) Collaro Studio push/b. controls, 3 motors, 3 speeds. £15.15.0

p. & p. 5/-.

MICROPHONES

Acos Crystal Stick mike, type MIC39/1. Complete with cable 39/6
Type 40 Mike, hand or table mike, 25/6. P. & p. 2/-.

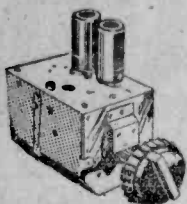
Convert your Battery Set to Mains with a **COSSOR BATTERY ELIMINATOR** MU2. For operation on 200/250 v. 50 c/s A.C. mains. Output: L.T., 1.5 v. 125 mA; H.T., 90 v. 10 mA.

OUR **37/6** p. & p. 2/6
PRICE

WIRECOMP ELECTRONICS

378 HARROW ROAD, LONDON, W.9. TEL.: CUNNINGHAM 9530
Hours of business: 9 a.m. to 6 p.m. Open all day Saturday. Opposite Paddington General Hospital. Buses 18B & 36 pass the door

12-CHANNEL TURRET TUNER



Ideal for converting an old or building into new T.V. These are brand new stock, not surplus, supplied complete with valves and coils for local Band I and Band III stations.

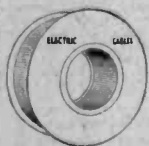
Model 1. I.F. Output 5393 Mc/s series heaters (parallel heaters, 5/- extra).
Model 2. I.F. Output 16/19 Mc/s parallel heaters (series heaters 5/- extra). With instructions and circuit diagram, 79/6. knobs 3/6 extra postage and insurance 2/6.

Chassis Assembly



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

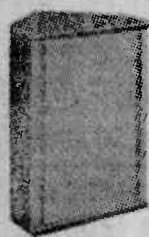
Versatile Wire



Single-strand 18-gauge with P.V.C. covering which makes it rustproof. Extra strong, will stand tremendous strain. Ideal for gardening, clothes lines, indoor aerials, etc.

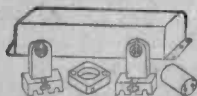
etc. Also being steel alloy and having a resistance of approximately 1 ohm per yard this can be used for electrical work, soil heating, wrapping round water pipes, etc. New on drum containing 3,000ft. Price 8/6, plus 3/6 carr.

Cabinet for Hi-Fi Speaker System

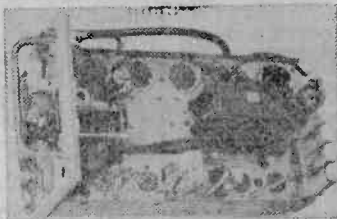


Acoustically designed bass reflex cabinet made by W.B. "STERN-TORIAN." Price £9/9/0 or 20/- deposit and 19 weekly payments of 10/-. Choice of several others available. Call or write for list. Add 5/- carr.

Fluorescent Light Bargain



Kit of Parts comprising: choke, two lamp holders, starter holder and starter, 40 watt, 18/6, 80 watt, 23/6. Plus 2/- post and insurance.



Klystron Receiver

Partly stripped but containing valuable Klystron with tuning mechanism and a host of spares including condensers (paper and mica), transformers, relay, bobbins, pot. meters, resistors, delay line, coils, coil formers, knobs, pye sockets, trimmers, valve holders, a very useful chassis and case size approx. 15 x 9 x 7 1/2 in. and hundreds of other useful sundries. Price only 19/6 plus 7/6 carriage and packing.



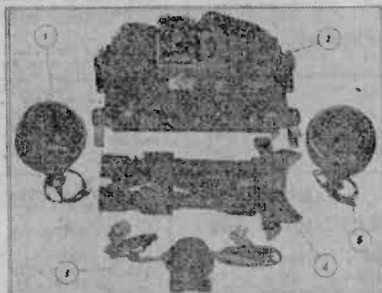
Welding Transformer

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



Breakdown Unit

Receiver Type 3085. Over 30 lbs. of useful spares including metal rectifiers, transformers, pot. meters, switches, valve holders, resistors, coils, coil formers, knobs, pye sockets, slow-motion drives, trimmers, etc. etc. Must have cost £100 each. Slightly soiled but most parts usable. 15/- plus 10/- carriage.



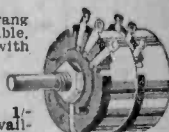
TABBY EQUIPMENT COMPLETE

Complete equipment for seeing in the dark, as fitted to Army vehicles for night driving, etc. Complete working equipment comprises: 2 Infra Red Radiators, adjustable binoculars, powerpack for 8 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/-.

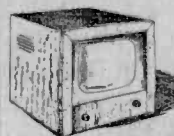
FOR ADDRESSES SEE OPPOSITE PAGE

Morganite Potentiometers

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



Now reduced to 19/6



14in. T.V. cabinet of the latest styling—beautifully veneered and polished—limited quantity. sale price

9/6 each. Carriage and packing 3/6 extra. Masks 10/- extra.

Thermostats

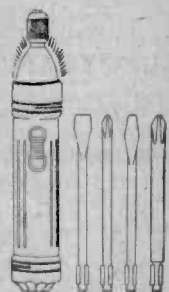


Useful for the control of appliances such as convectors, gluepots, vulcanisers, hot plates, etc. Adjustable to operate over temperature range 50-550 deg. F. fitted with heavy silver contacts, 8/6. Other types: 11 amp., 3/6; 5 amp., 9/6; 2 amp. QMB, 5/6; 15 amp. QMB, 15/- amp. encased wall mounting type, 29/6.

Transistor Snip

Equivalent of red spot—suitable all if circuits—tested before despatch. 4/6 each.

For Your Service Department



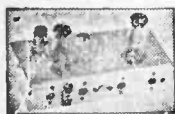
An invaluable tool for working inside a dark cabinet or cupboard. This is a screwdriver with torch and has four interchangeable bits, two for the ordinary slotted screws and two for Phillips heads. The torch section operates from 1 1/2 v. batteries in the handle and will save its cost in frayed tempers alone. Why not treat yourself to one of these now? Only 10/6, plus 1/6 post and packing.

1960 ALL Mains Amplifier



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

Band III Converters



Suitable Wales, London, Midlands, North, Scotland, etc. All the parts including 2 EF80 valves, coils, fine tuner, contrast control, condensers and resistors. (Metal case available as an extra.) Price only 19/6, plus 2/6 post and insurance. Data free with parts or available separately 1/6.

Please send two more kits, the one you sent last week is performing magnificently. We receive this sort of letter every day of the week, so if you have hesitated because you thought our kits too cheap you need hesitate no longer. Luminous Switch, double pole designed for electric blankets, neon indicators glow when appliance is switched on. 10/-.

Cabinet Snip



This fine cabinet as illustrated but less control knobs is available this month at a special snip price of 12/6, plus 3/6 post and insurance. Size is 13 1/2 x 9 x 4 in. and it is nicely covered in two tone I.C.I. fabric.

Glass Panels

Size 10 1/2 x 9 1/2—parcel of five panels.

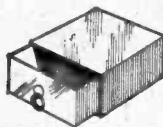
7/6

Plus 3/6 carr.



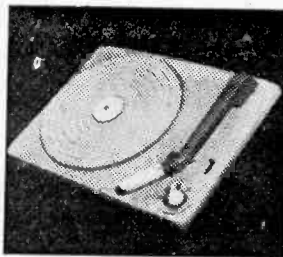
Component Storage Drawers

Stout board construction these drawers are ideal for small parts. Supplied complete with simple erection instructions—1/6 each or 12 drawers each 6 x 2 1/2 x 6 1/2 in., 13/6, post 2/-.



Philips AG2009 Transcription Unit

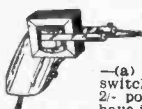
Philips AG2009 Record Player, a modestly priced 4-speed unit with many outstanding features, is ideal for the enthusiast who is assembling his own equipment or modernising an older installation. The pick-up arm is wired for stereo and the Philips stereo head is available as an optional extra.



Eddy Current Brake gives +2% fine adjustment on all four speeds. Continuously variable pick-up playing weight (2-12 gms.). Supplied with Philips Hi-Fi crystal head, type AG3019 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 fitted.

Can be used with any amplifier or radio set. Complete with monaural pick-up, £10.10.0, or £1 deposit and 21 fortnightly payments of 10/-. Available also with stereo head, diamond or sapphire stylus. Prices on request.

Making a Solder Gun



A 7-second solder gun of the type costing 23/4 was described in "Practical Mechanics". Only two essential parts are required—(a) the transformer and (b) the push switch. These we can supply at 11/6, plus 2/- post. The rest of the parts you will have in your own "junk" box. Copy of the article concerned given free with the kit.

The Taylor Meter Model 127A



A pocket size meter but with a big scale and a sensitivity of 20,000 Ohms per volt D.C., therefore an ideal unit for television servicing—robustly made and complete with leads and prods—20 ranges as follows: D.C. current 50 micro-amps. to 1 Amp. D.C. voltage 0-1,000 volt in seven ranges (25 KV. with external probe, optional extra). Volts A.C.—0-2,500 in six ranges. Ohms—0-20 Ohm in three ranges (self-contained). Self-contained. 3 1/2 in. movement. Price £10 or 10/- deposit and 21 fortnightly payments of 10/-. Non-callers add 5/- carriage and insurance.

A.C./D.C. Multimeter Kit

Ranges: D.C. volts 0-5, 0-50, 0-100, 0-500 0-1,000. A.C. volts 0-5, 0-50, 0-100, 0-500, 0-1,000 D.C. milliamps 0-5, 0-100 0-500. Ohms 0-50,000 with internal batteries. 0-500,000 with external batteries. Measures A.C./D.C. volts, D.C. current and ohms. All the essential parts including metal case, 2 1/2 in. moving coil meter, selected resistors, wire for shunts, range selector, switches, calibrated scale and full instructions price 10/6, plus 2/6 post and insurance.

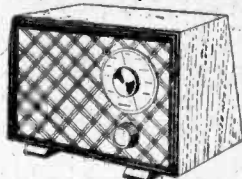


Crystal Mike by Acos



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

New Improved Circuit for the 1960 Skysearcher



This is a three valve receiver kit using modern circuitry. Ideal as a second set for the bedroom, workshop, etc. All parts including mains transformer, valves, resistors, coils, etc., but not cabinet, chassis or speaker, 29/6, plus post and ins. 3/6. Data free with parts or available separately 1/6.

Service Data

100 service sheets, covering British receivers which have been sold in big quantities and which every service engineer is ultimately bound to meet. The following makers are included: Aerodyne, Alba, Bush, Cosor, Ekco, Ever-Ready, Ferguson, Ferranti, G.E.C., H.M.V., Kolster Brandes, Lissen, McMichael, Marconi, Mullard, Murphy, Philco, Philips, Pye, Ultra. Undoubtedly a mine of information invaluable to all who earn their living from radio servicing. Price £1 for the complete folder.

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 8 in. speaker. Fit using for two or more. Only 45/- each, carriage and insurance 3/6.

ELECTRONIC PRECISION EQUIPMENT LTD.

66 GROVE ROAD, EASTBOURNE, SUSSEX

This is the correct address for post orders and for prompt attention please mark your envelope Dept. 7, also enough for postage.

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

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

Electronics (Croydon) Ltd.,
266 London Road,
Croydon.
Phone: CRO 6558
Half day Wednesday

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

EASY AS A.B.C. TO BUILD

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

37/6



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

29/6

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



47/6



The sensational "Silver-tone" model! A highly compact self-contained miniature "button-base" valve pocket radio at absolute "rockbottom" building cost! Covers all the medium waves with the very latest circuitry bringing in stations from all over Europe—without fuss. Easy as A.B.C. to assemble, using our step-by-step instruction manual. Size only 4 1/4 in. x 2 1/4 in. x 1 1/4 in.—a fascinating little pocket radio. We can supply all the parts including beautiful two-tone case, detachable aerial, instruction book, screws, wire, etc. for only 29/6 (plus 2/- post and packing). C.O.D. 2/- extra. (Parts sold separately, priced parts list 1/6.)

29/6

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

29/6



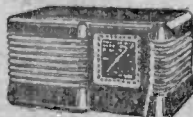
This amazing "Tiny-Tim" model—no larger than a match box—costs nothing to run—ever! No batteries! No Valves! No complete electricity! Will never run down or burn out. Uses the latest TRANSISTOR TYPE GERMANIUM DIODE, receives local stations anywhere—without extra aerial. Clear, Crisp Tone. No snags, anyone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

17/6

Anyone can build this beautiful precision Pocket Radio in an hour or two. No knowledge whatever needed. Our simple pictorial plans take you step-by-step! Remarkably sensitive—covers all medium waves, inc. Luxembourg, Home, Light. Size only 2 in. x 3 in. x 5 1/4 in.—Not a Toy! But a Real Personal-phone. Valve Radio with Detachable Aerial IDEAL FOR BEDROOM, GARDEN, etc. We supply ALL parts necessary, together with plans, etc. for the special price of 39/6, plus 2/6 post and packing. (C.O.D. 2/- extra.) BUILD YOURS NOW! (All parts sold separately, priced parts list 1/6.) Send Today! Money refunded if parts returned intact within 7 days.

39/6

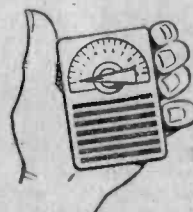
Choice of beautiful walnut veneered cabinet or ivory bakelite. This is the



107/6

lowest possible price consistent with high quality. No radio knowledge whatever needed.

built by anyone in 2-3 hours, using our very simple, easy-to-follow diagrams. The terrific new circuit of the "Ocean-Hopper" covers all medium and long waves, has razor-edge selectivity and exceptionally good tone. Price also includes ready drilled and punched chassis, set of simple-to-follow plans—in fact everything! Parts tested before despatch! Uses standard octal-base valves. (Low running costs—approximately 18 watts.) Size 12 in. x 6 in x 5 in. Build this long-range powerful midgest NOW. TOTAL BUILDING COST, INCLUDING PLANS, ETC., 107/6. (Post and Packing 2/6.) Parts sold separately. Priced parts list and plans 1/6. C.O.D. 2/- extra.



45/-

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

CONCORD ELECTRONICS

210, Church Road, Hove, Sussex

Dept. PW19

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

LOOK—ONLY £6-17-6!



BRAND NEW—NOT SURPLUS! In maker's sealed cartons. Latest UAS "Monarch" 4-speed record-player complete with High-fidelity "turnover" head. Type HGP 37—1 Capacity of 10 Records, plays 12in., 10in. and 7in. Intermixed in any order, 78, 45, 33 $\frac{1}{3}$ and 16 r.p.m. For A.C. mains 100 to 250 volts. Exclusive "magdisk" selector gives quickest and quietest change over. With full instructions and fixing plans. Limited Quantity at £6.17.6 plus 4/6 Post, Packing, etc. **WHY PAY MORE?**

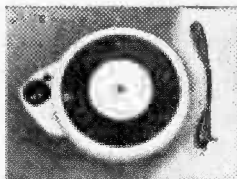
LIMITED QUANTITY "CABY" TESTMETERS! Never before such amazing value! A high grade universal tester. Large scale (3 $\frac{1}{2}$ in.), highly sensitive movement (500 Micro Amps) Measures A.C. Volts, D.C. Volts, D.C. Current, Ohms, Decibels. Inductance and Capacitance Ranges: D.C. Volts—0-10 v., 50 v., 250 v., 500 v., 1,000 v., A.C. Volts—0-10 v., 50 v., 250 v., 500 v., 1,000 v., D.C. Current—0-500 Micro-Amps, 25 Milliamps, 250 Milliamps. Resistance—0-10 K ohms and 1 Megohm. Decibels—-20 dB. to -22 dB. and -20 dB. to -30 dB. Capacitance—100 pfd. to 0.8 mfd. Inductance—10 to 1,000 Henries (also with external D.C. voltage will measure to 100,000,000 ohms). A beautiful, strongly-made instrument. Brand New, not a kit, at only 97/6, incl. test prods, instruction book and internal batteries (replacements cost only 6d. ea.). Plus 2/6 P. & P. (C.O.D. 2/- extra.)

LOOK AT THESE "CONCORD" BARGAINS

Build this MAINS "FRYING PAN" RADIO

for only 67/6!

Build this MAINS "FRYING-PAN" SPECIAL, uses highly sensitive twin-triode valve circuit and normal size speaker. Covers all Medium and Long Waves giving amazing performance and tone. Costs only 1d. for about 75 hours' use! Excellent for KITCHEN, bedroom, garden hut, etc., etc. Robust design. **NO EXPERIENCE WHATSOEVER REQUIRED—YOU CAN BUILD ANY CONCORD DESIGN AND GET PROFESSIONAL RESULTS!** For A.C. Mains 200 to 250 Volts. **LOADS OF FUN TO BUILD!—INSTRUCTIONS ANY-ONE CAN FOLLOW.** Can be built for 87/6 including valves, speaker, step-by-step plans, etc. Postage and packing 2/6 (C.O.D. 2/-). **PARTS SOLD SEPARATELY—shopping list, etc. 1/6. WILL PAY FOR ITSELF AGAIN AND AGAIN!—RUSH YOUR ORDER TODAY.**



Look—
only
77/6!

NEW in maker's sealed cartons!—limited quantity of "COLLARO" JUNIOR 4-speed record player units, exceptionally easy to fix, with lightweight pick-up, incorporating crystal turnover head and separate sapphire stylus for Standard and Long-Playing. With full instructions and fixing plans. Unbeatable price, 77/6, plus 3/6 Post, Packing, etc. C.O.D. 2/- extra. **RUSH YOUR ORDER NOW—BEFORE IT'S TOO LATE!**

CIGARETTE RADIO

Only 25/-



Amaze your friends!—this highly sensitive TRANSISTOR "CIGARETTE" receives all medium wave stations clear and crisp—holds ten cigarettes—weighs less than 3 ozs. with cigarettes! Tiny battery inside costs 3d. and lasts over three months. This brilliant little novelty personal phone radio is ideal for Bedside, News, Sports, Office. Can be built by anyone from our simple, pictorial diagrams in an hour or two. All parts supplied for 25/- (add 1/6 P. & P.). C.O.D. 2/- extra (Parts sold separately, priced parts list 1/-).



CONCORD ELECTRONICS

Dept.
2W19

210 Church Road, Hove, Sussex

FREE TO AMBITIOUS ENGINEERS

— THE LATEST EDITION OF ENGINEERING OPPORTUNITIES

Have you sent for your copy?

ENGINEERING OPPORTUNITIES is a highly informative 156-page guide to the best paid engineering posts. It tells you how you can quickly prepare at home for a recognised engineering qualification and outlines a wonderful range of modern Home Study Courses in all branches of Engineering. This unique book also gives full details of the Practical Radio & Electronics Courses, administered by our Specialist Electronics Training Division—the **B.I.E.T. School of Electronics**, explains the benefits of our Employment Dept. and shows you how to qualify for five years promotion in one year.

We definitely Guarantee

"NO PASS—NO FEE"

Whatever your age or experience, you cannot afford to miss reading this famous book. If you are earning less than £20 a week, send for your copy of "ENGINEERING OPPORTUNITIES" today—FREE.

BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY (Incorporating E.M.I. Institutes)
(Dept. SE/21), 29 Wright's Lane, London, W.8

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.
L.I.O.B.
A.F.R.A.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 Service 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)



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

TUBES

DIRECT FROM OUR FACTORY.
New low prices. New top quality guns.
ALL GUARANTEED

Carriage and Insurance 12/6	6 MONTHS REYACUMED	12 MONTHS REGUNNED	12 MONTHS NEW TYPES
CRM92, MW22-7, MW22-14, MW22-18	£2	£4	MW31 74
12KPA, 12K, C12B, CRM121, CRM121A, CRM121B, CRM122, CRM123, MW31-14C, MW31-16, MW31-18, MW31 74	£2-10	£4-10	£4-10
141K, 7201A, C14FM, CRM141, CRM142, CRM143, MW36-24, MW36-44	£3-5	£5-5	MW36 24
17ASP4, 171K, AW3621, C17FM, CRM171, CRM172, MW43-64, MW43-69	£3-15	£5-15	£7-15
7401A, AW33-90, C14BM, C17BM, CRM151, CRM152A, CRM182B, CRM153, CRM178, MW43-90, MW41-1	£4-15	£6-15	MW43 84
AW63-30, CRM212, MW53-20, MW53-30	£4-15	£6-15	£8-10

NEW 108K (EQUIV.) TUBES SPECIAL OFFER: 39/-
PLEASE NOTE: Many other types not listed available. S.A.E. enquiries

13 CHANNEL TV's

TABLE MODELS, FAMOUS MAKERS. Complete with all valves and tubes. These sets are unequalled in value for huge purchase direct from source. They are untested and are not guaranteed to be in working order. Carr. Free.

AMAZINGLY POPULAR-IDEAL SECOND SETS

12" - £3.19.

14" - £7.10.

17" - £12.10.

12" 5 CHANNEL TV'S 45/-

14" 5 CHANNEL TV'S 85/-

SPECIAL OFFERS

AMFM KIT, Gorta: Consisting of Tuning Head assembled with all L.F. Transformers, Complete FM, AM and Diode/Inductor Transformers, complete kit. Comprehensive instruction booklet included. Booklet only 2/-, Kit, with EOC55 valve, £3.13.6; Kit, less EOC55 valve, £3.5.0.

4-SPEED RECORD PLAYERS

Latest B.S.R. T10 Turntable, together with lightweight Stuart Dyal diamond sapphire crystal turnover pick-up head. £3/10/- Carr. Truly amazing value at 3/6.

1 WATT TRANSISTOR

Output Stage. Manufacturers' matched pair GET15 Transistors with push-pull input and output Transformers and Amplifier circuit.

PM SPEAKERS 3 ohms, 500m, 10m, 100m, 1000m. Only 49/- net. performance guaranteed.

8 - 30m 11/- 10m 13/-
CONNECTING WIRE
25 FT. P.V.C. insul., excellent 1/-
(50 coils, diff. colours, 4/6)

B.S.R. MONARDECK TAPE DECKS 49 10 0
COLLARO TRANSCRIPTION DECKS 215 15 0

12in. TV's 5 channel table models including speakers and line transformer. Top quality requiring only valves and tube to complete, your choice if available (carr. 4/-). (Or £3 per dozen, carr. free.) 15/-

14in. TV's 5 channel as above (carr. 4/-) 35/-

100 CONDENSERS 10/-

Assortment of miniature silver mica and ceramic condensers, 1-10,000 P.P. 1st value over 25/-

100 RESISTORS 7/6

Assortment 1-2 watt.

SINGLE RECORD PLAYERS

COLLARO 4-speed 4/040 ... 25 19 0
EMI 4-speed Stereo ... 18 0 0
OARRARD 4-speed 48P ... 17 7 6
GARRARD 4-speed TA MK11 ... 28 19 0
GARRARD 4-speed 48P ... 217 15 0

10 RECORD AUTOCHANGERS

B.S.R. (L)8 AUTOCHANGERS 28 15 0
COLLARO CONQUEST CHANGERS 26 15 0
GARRARD RC75A Senior ... 27 19 0
GARRARD RC120D MK11 ... 29 7 6
GARRARD RC121A MK11 ... 29 19 0
Carr. and Pack. 4/-

DIODES (General purpose, famous make, 9d. 8 - doz. GEM44 type, 3/9)

TRANSISTORS: RED SPOT 4/6

I.P., L.F. and Output up to 800 kc/s. (48-drazen). WHITE SPOT, R.F. and K.P. 2.5 ME. 6.6 (69/- per dozen). XA103, 15/-; XA104, 17/6; XA104, 10/-; GET15, 25/-

RECTIFIERS For Chargers, bridge, 12 volt, 3-4 amps, 9/6

(Carr. 1/-) 25 per doz. 250 v. 80 m.a., 5/-; RM1, 6/6; RM2, 8/-; RM3, 9/-; RM4, 15/6; RM5, 21/-; 14A60, 17/-; 14A67, 22/-; 14A100, 25/-; 16R01, 1-10-1, 7/6; 18R1A1-1-16-1, 7/6; 18R02-2-8-1, 14/-; 14R1A1-2-8-2, 17/-; 14R1A1-2-8-3, 20/-

CRT's EOC30 (VCR139A), 15/-; 6P7T, 9/-

EC035 (VCR139) 20/-; 6Y07T, 12/6

VALVES SOILED, GUARANTEED 3 MTHS.

EY51, PL81 AMAZING 5/-

TAPE RECORDERS (Carr. Free)

LATEST ALBA. Using the B.S.R. Monardeck 3 1/2 I.p.s. takes 5 1/2 in. spools, and is absolutely complete in attractive carrying case. 26 gu. ELIPICO tape recorder, similar to above. 26 gu. FIDELITY Super tape recorder. 29 gu.

VALVES BY RETURN OF POST

100% DISCOUNT SPECIAL OFFER TO PURCHASERS OF any SIX VALVES marked in black type (15% in dozen). Post: 1 valve, 8d.; 2-11, 1/-.

NEW LOW PRICES
GUARANTEED 3 MONTHS

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

024 5-6AAT6 7/6-KGQT 6/6 AX56T 6/6	12-KTGT 5/6 50A5 9/6 DF33 9/6	EL01 4/0 78 12-SU2160A4/UCH81 8/6
1A9GT 5-6AUA8 7/6-KGT 6/6	10-12KGT 11/6 50A6 10-12 DF01 4/6	EL08 8/6 78 12-T51 7/6 UCH82 13/6
1A7GT 11/6 6B7 9/6 6K7G 2/5 7B5 12/6	10-12KGT 11/6 50A6 10-12 DF09 7/6	EL08 9/6 78 12-T52 10/6 TH40G 12/6
10GT 9/6 6B8G 3/6 6K7GT 5/6 7B6 9/6	10-12KGT 11/6 50A6 10-12 DH63 6/6	EL08 9/6 78 12-T53 4/6 U41 8/6
1DG 9/6 6B8G 6/6 6K8G 5/6 7B7 7/6	10-12KGT 11/6 50A6 10-12 DH76 5/6	EL08 9/6 78 12-T54 8/6 U42 8/6
1DG 9/6 6B8G 6/6 6K9GT 11/6 7C3 7/6	10-12KGT 11/6 50A6 10-12 DH76 5/6	EL08 9/6 78 12-T55 8/6 U43 8/6
1H6GT 9/6 6H0G 12/6 6K25 7/6 7C6 7/6	10-12KGT 11/6 50A6 10-12 DK32 11/6	EL08 9/6 78 12-T56 8/6 U44 8/6
114 3/6 6H8H 6/6 6L1 12/6 7C7 9/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T57 12/6 U45 8/6
134 3/6 6H8H 6/6 6L2 9/6 7C8 9/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T58 12/6 U46 8/6
1LNS 4/6 6B8T 9/6 6L6G 7/6 7K7 8/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T59 12/6 U47 8/6
1NMT 9/6 6B8W 7/6 6L7 9/6 7K8 10/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T60 12/6 U48 8/6
1R4 6/6 6B8V 6/6 6L7 7/6 7K9 8/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T61 12/6 U49 8/6
1R4 8/6 6B8V 6/6 6L8 9/6 7V7 7/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T62 12/6 U50 8/6
1R5 5/6 6C4 8/6 6L19 12/6 7Y4 7/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T63 12/6 U51 8/6
174 4/6 6C5 5/6 6L19 12/6 7Y4 7/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T64 12/6 U52 8/6
2D21 4/6 6C8 4/6 6L19 12/6 7Y4 7/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T65 12/6 U53 8/6
3A4 6/6 6C9 6/6 6L19 12/6 7Y4 7/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T66 12/6 U54 8/6
3Q4 7/6 6D0G 12/6 6E7 9/6 10C2 13/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T67 12/6 U55 8/6
3Q4 8/6 6C11 9/6 6E7 9/6 10C4 14/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T68 12/6 U56 8/6
3R4 6/6 6D1 6/6 6E7 9/6 10P1 9/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T69 12/6 U57 8/6
3V5 7/6 7D2 3/6 6P28 12/6 10P2 10/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T70 12/6 U58 8/6
5B4G 9/6 6D3 12/6 6Q7G 6/6 10L14 13/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T71 12/6 U59 8/6
5B4G 5/6 6D6 4/6 6Q7GT 9/6 10L13 13/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T72 12/6 U60 8/6
5V4G 9/6 6P1 5/6 6R7G 7/6 10L12 13/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T73 12/6 U61 8/6
5V4G 6/6 6P2 5/6 6R7G 7/6 10L13 13/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T74 12/6 U62 8/6
5V3GT 9/6 6P3 7/6 6S0T 4/6 10P14 9/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T75 12/6 U63 8/6
5Z4G 9/6 6P12 3/6 6SHT 4/6 10P18 8/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T76 12/6 U64 8/6
5Z4GT 11/6 6P13 6/6 6SJT 5/6 12A6 5/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T77 12/6 U65 8/6
6A7 10/6 6P14 9/6 6K8T 6/6 12A7H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T78 12/6 U66 8/6
6A8G 9/6 6P15 9/6 6K8T 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T79 12/6 U67 8/6
6A8GT 13/6 6P16 9/6 6K8T 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T80 12/6 U68 8/6
6A8S 8/6 6P33 6/6 6S3T 4/6 12A7T 5/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T81 12/6 U69 8/6
6A7 4/6 6H8 6/6 6S3T 4/6 12A7T 5/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T82 12/6 U70 8/6
6A8S 4/6 6H8 6/6 6S3T 4/6 12A7T 5/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T83 12/6 U71 8/6
6A7 8/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T84 12/6 U72 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T85 12/6 U73 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T86 12/6 U74 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T87 12/6 U75 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T88 12/6 U76 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T89 12/6 U77 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T90 12/6 U78 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T91 12/6 U79 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T92 12/6 U80 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T93 12/6 U81 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T94 12/6 U82 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T95 12/6 U83 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T96 12/6 U84 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T97 12/6 U85 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T98 12/6 U86 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T99 12/6 U87 8/6
6A7 6/6 6J5G 2/6 6U3G 6/6 12A8H 6/6	10-12KGT 11/6 50A6 10-12 DK91 6/6	EL08 9/6 78 12-T100 12/6 U88 8/6

Post: 2 lbs. 1/6, 4 lbs. 2/-, 7 lbs. 2/9, 15 lbs. 3/6 etc. NO C.O.D. ALL ITEMS LESS 5% & POST FREE IN DOZENS.

(Callers always welcome). LIST OF 1000 SNIPS 6d.

TECHNICAL TRADING CO. P.O. BOX 21 (W)
350-352 FRATTON ROAD, PORTSMOUTH.

Stern's "fidelity" TAPE EQUIPMENT

A SELECTION OF HIGH FIDELITY PORTABLE TAPE PREAMPLIFIERS

Adds "Hi-Fi" TAPE RECORDING
TO YOUR EXISTING AUDIO
INSTALLATION

IN ALL MODELS WE INCORPORATE THE TYPE "C" PREAMPLIFIER

AND OFFER IT COMPLETE
IN CASE WITH . . .

- | | |
|--|-----------------|
| (a) The new COLLARO "STUDIO" 3 Speed Deck
H.P. Deposit £7.6.0. 12 months £2.13.6 | £36.10.0 |
| (b) The COLLARO Mk. IV "Transcriptor" 3 Speed
Deck
H.P. Deposit £8.6.0. 12 months £3.0.11. | £41.10.0 |
| (c) The New TRUVOX Mk. VI Tape Deck
H.P. Deposit £8.14.0. 12 months £3.3.10. | £43.10.0 |
| (d) The BRENNELL Mk. V 3 Speed Deck
H.P. Deposit £10.6.0. 12 months £3.15.7. | £51.10.0 |
| (e) The WEARITE MODEL 4A, Tape Deck
Deposit £12.4.0. 12 months £4.8.5. | £61.0.0 |

STERN'S MULLARD TYPE "C" TAPE PREAMPLIFIER-ERASE UNIT

INCORPORATING THE NEW FERROXCUBE POT CORE PUSH-
PULL OSCILLATOR AND 3 SPEED TREBLE EQUALISATION
by means of the latest FERROXCUBE POT CORE INDUCTOR.
PRICES INCLUDING SEPARATE SMALL POWER SUPPLY
COMPLETE KIT **£14.0.0**
OF PARTS **£17.0.0**
ASSEMBLED AND TESTED

Dep. £3.8.0 and 12 of £14.11.

ALSO AVAILABLE EXCLUDING

POWER SUPPLY UNIT

FOR £11.15.0 and £14.10.0, respectively.

WHEN ORDERING PLEASE STATE MAKE OF TAPE DECK TO
BE USED. We present this "Hi-Fi" Preamplifier strictly to
Mullard's specification incorporating ONLY NEW HIGH-GRADE
COMPONENTS and the SPECIFIED NEW MULLARD VALVES. It
comprises a COMPLETELY SELF-CONTAINED UNIT, neatly
finished in Hammered Gold with a very attractively engraved
PERSPEX FRONT PANEL.

FOR PERMANENT HIGH FIDELITY INSTALLATIONS WE ALSO OFFER (excluding case)

- | | |
|---|-----------------|
| (a) The COLLARO "STUDIO" TAPE DECK and our
Mullard Type "C" PREAMPLIFIER and Power
Unit Assembled and Tested | £32.10.0 |
| (b) H.P. Deposit £8.10.0 and 12 months £2.7.8.
As above but TYPE "C" PREAMPLIFIER sup-
plied as complete KIT OF PARTS | £29.0.0 |
| (c) The COLLARO Mk. IV TAPE DECK and the
MULLARD TYPE "C" PREAMPLIFIER &
Power Unit assembled, tested | £35.0.0 |
| (d) H.P. Deposit £8.14.0. 12 months £3.3.10.
As (c) but Type "C" as COMPLETE KIT OF
PARTS | £32.0.0 |
| (e) The TRUVOX Mk. VI DECK and the assembled
Type "C" Preamplifier and Power Unit | £40.0.0 |
| (f) H.P. Deposit £8.0.0. 12 months £2.18.3.
As above but Type "C" as complete KIT OF
PARTS | £36.10.0 |
| (g) The BRENNELL Mk. V DECK and the assembled
Type "C" PREAMPLIFIER and POWER UNIT | £46.0.0 |
| (h) H.P. Deposit £9.4.0. 12 months £3.7.6.
As (g) but Type "C" as complete KIT OF PARTS | £43.0.0 |
| (i) The WEARITE 4A DECK with TYPE "C"
assembled and tested | £56.0.0 |

H.P. Deposit £11.4.0. and 12 months £4.2.1.
(Carriage and Insurance on above quotes 10/- extra.)

PLEASE ENCLOSE S.A.E. WITH ALL CORRESPONDENCE

STERN RADIO LTD.

109 & 115 FLEET ST. LONDON, E.C.4

Telephone: FLEET STREET 5812/3/4

YOU CAN BUILD A COMPLETE TAPE RECORDER

for **£36.0.0**

H.P. TERMS Deposit £7.4.0.
12 months £2.12.10.

FOR THIS WE SUPPLY:

- ★ COMPLETE KIT OF PARTS
TO BUILD THE HF/TR3
TAPE AMPLIFIER.
- ★ THE NEW COLLARO
"STUDIO" TAPE DECK.
- ★ PORTABLE CARRYING
CASE (as illustrated)
- ★ ROLA/CELESTION 10in. x
6in. P.M. LOUDSPEAKER.
- ★ ACOS CRYSTAL MICRO-
PHONE. 1,200ft. SPOOL E.M.I. TAPE.

For those who prefer
another type of TAPE DECK
we will supply precisely as
above—but IN PLACE of the COLLARO
"STUDIO" DECK—we INCLUDE:

- | | |
|---|-----------------|
| (a) The Mk. IV COLLARO "TRANSCRIPTOR" 3 Speed
DECK
H.P. Deposit £8.0.0 and 12 months £2.18.2.
(£1 extra to wire up the Transcriptor Switch Banks.) | £39.15.0 |
| (b) The New TRUVOX Mk. VI DECK
H.P. Deposit £9.0.0 and 12 months £3.6.0.
(Carriage and Insurance on all above is 12/8 extra.) | £45.0.0 |

For Constructors with their own Cabinet WE OFFER

- | | |
|---|-----------------|
| (a) COMPLETE KIT to build the HF/TR3 Amplifier,
together with the COLLARO "STUDIO" DECK. | £28.0.0 |
| (b) As above but with HF/TR3 supplied ASSEMBLED
and TESTED | £31.10.0 |

- | | |
|---|-----------------|
| (c) H.P. Deposit £8.6.0 and 12 months £2.8.2.
COMPLETE KIT to build the HF/TR3, together
with the Mk. IV COLLARO "TRANSCRIPTOR" | £30.15.0 |
| (d) (£1 extra if we are required to wire up Deck Switch Banks.)
As above but HF/TR3 supplied ASSEMBLED and
TESTED | £34.10.0 |

- | | |
|--|-----------------|
| (e) H.P. Deposit £7.0.0 and 12 months £2.10.5.
COMPLETE KIT to build the HF/TR3, together
with the NEW TRUVOX Mk. VI TAPE DECK | £36.0.0 |
| (f) As above but HF/TR3 supplied ASSEMBLED and
TESTED | £39.10.0 |

- | | |
|---|-----------------|
| (g) H.P. Deposit £7.18.0 and 12 months £2.17.11.
COMPLETE KIT to build the HF/TR3 AMPLI-
FIER with the BRENNELL Mk. V TAPE DECK | £41.10.0 |
| (h) As above but HF/TR3 supplied ASSEMBLED and
TESTED | £45.0.0 |

H.P. Deposit £9.0.0 and 12 months £3.6.0.
Carriage and Insurance on each above is 10/- extra.

Attractive PORTABLE CASE is available to accommodate the
TRUVOX or COLLARO TAPE DECKS and we offer it, together with
ROLA/CELESTION 10 x 6in. LOUDSPEAKER—ACOS CRYSTAL
MICROPHONE—and 1,200ft. SPOOL E.M.I. TAPE—ALL FOR
£29.0.0. Carriage and Insurance 5/- extra.

WE HAVE THE NEW 2 SPEED TWIN TRACK TRUVOX Mk VI TAPE DECK IN STOCK £26.5.0

DEPOSIT: £5.5.0 and 12 MONTHS £1.18.6.

THE MODEL HF/TR3 TAPE AMPLIFIER

INCORPORATING

3-SPEED TREBLE EQUALI-
SATION by means of the
latest FERROXCUBE POT
CORE INDUCTOR.

PRICE FOR COMPLETE

KIT OF PARTS **£12.15.0**

PRICE FULLY ASSEM-
BLED & TESTED **£16.10.0**

HIRE PURCHASE. Deposit £3.6.6 and 12 monthly payments of
£1.4.2. A very high-quality Amplifier based on the very successful
TYPE "A" design completed in the MULLARD LABORATORIES.

ONLY NEW HIGH-GRADE COMPONENTS are incorporated including
MULLARD VALVES and a GILSON OUTPUT TRANSFORMER
other features are—Magic Eye Recording hand indicator—
Effective Tone Control—Monitoring and Extension Speaker
Sockets—has own Power Supply and can be used as Independent
Amplifier for direct reproduction of Gram Records or from Radio
Tuner. Overall size 11 x 9 x 6in. Can be supplied for use with
Truvox—Collaro—Lane—Brennell or Motok Decks. Please specify
which. Send S.A.E. for leaflet or 2/6 for complete Assembly Manual.

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

Alternatively we supply ASSEMBLED AND TESTED. £10.00 £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 Alternatively we supply 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"

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

KIT OF PARTS £11.10.0 OR ASSEMBLED AND TESTED £13.10.0

HIRE PURCHASE (Assembled Amp. only). DEPOSIT £2.14.0. 12 months at 19/10.

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

COMPLETE KIT £7.10.0 OR ASSEMBLED AND TESTED £8.19.6

(plus 6/6 coverage and Insurance) H.P. Terms: Deposit £2.0.0 and 8 months at £1.0.0. Complete to MULLARD'S SPECIFICATION including Mullard valves and a PARMKO OUTPUT TRANSFORMER.

STEREO "3-3" MAIN AMPLIFIER

Comprises two "2-3" MULLARD MAIN AMPLIFIERS on one chassis and is designed to operate with our DUAL CHANNEL PRE-AMPLIFIER for both STEREOPHONIC or MONAURAL operation. Its output power is 6 watts (3 watts per channel).

PRICE: COMPLETE KIT £10.0.0

OF PARTS Alternatively ASSEMBLED AND TESTED £11.15.0

H.P. Terms: Deposit £2.7.0 and 12 months at 17/4.

!! RECORD PLAYERS !!

THE LATEST MODELS ARE IN STOCK

MANY AT REDUCED PRICES

SEND S.A.E. FOR ILLUSTRATED LEAFLET

B.S.R. MONARCH UA8 4-speed mixer

Autochanger with Crystal Pick-up.

£6.19.6

The NEW COLLARO MODEL RP594 4-speed Single Record Player. Studio Cartridge.

£9.18.9

The COLLARO "CONQUEST" 4-speed Autochanger Studio

Pick-up. £7.10.0

The COLLARO 4-speed Single Record Player. Studio Pick-up.

£6.9.6

THE NEW B.S.R. Model UA12 in Stock. A4 "SPEED" MIXER AUTOCHANGER.

£8.7.6

UA12 also available incorporating the B.S.R. STEREO Pick-up, plays L.P. and 78 Records.

£10.10.0

GARRARD MODEL TA.Mk.II 4-Speed Player fitted high output Crystal Pick-up.

£8.10.0

GARRARD MODEL R210. Autochanger 4-Speeds. High output. Crystal Pick-up.

£10.0.0

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

SPECIAL PRICE REDUCTIONS

(c) The KIT OF PARTS to build both the "5-10" Main Amplifier and the 2-valve PRE-AMP CON: £15.15.0

(d) The "5-10" and the 2-stage PRE-AMP both ASSEMBLED and TESTED H.P. Dep. £9.16.0 and 12 months of £1.7.8. £18.18.0

(e) The KIT OF PARTS to build the DUAL-CHANNEL "3-3" AMPLIFIER and the DUAL-CHANNEL PRE-AMPLIFIER CON: £21.10.0

(f) The DUAL-CHANNEL "3-3" AMPLIFIER and the DUAL-CHANNEL PRE-AMPLIFIER CONTROL UNIT BOTH ASSEMBLED and TESTED H.P. Terms: Deposit £5 and 12 months of £1.6.8.

(g) The KIT OF PARTS to build one "5-10" MAIN CHANNEL PRE-AMP and the DUAL-CHANNEL PRE-AMPLIFIER CONTROL UNIT: £21.10.0

(h) ONE "5-10" AMPLIFIER and the DUAL-CHANNEL PRE-AMPLIFIER both ASSEMBLED and TESTED H.P. Terms: Deposit £5, 12 months of £1.6.8.

(i) 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

(j) TWO "5-10" AMPLIFIERS and the DUAL-CHANNEL PRE-AMPLIFIER CONTROL UNIT BOTH ASSEMBLED & TESTED H.P. Terms: Deposit £7.4.0, 12 months of £2.15.0.

Carriage and Insurance 7/8 extra. Prices quoted are subject to £1.6.0 extra for Partridge Transformer.

STEREO DUAL CHANNEL PRE-AMPLIFIER

This model incorporates two Mullard 2-valve Pre-Amplifiers combined into a Single Unit enabling it to be used for both STEREOPHONIC or MONAURAL operation. It is designed primarily to operate with our range of MULLARD MAIN AMPLIFIERS but will also operate equally well with any make of Amplifiers requiring an input of 250 mvolts.

COMPLETE KIT OF PARTS £12.10.0 ASSEMBLED AND TESTED £15.0.0

Operates equally well for MONAURAL only operation with one "5-10" Main Amplifier to which the second Main Amplifier can at anytime be added, thus very easily providing for both STEREO

or MONAURAL reproduction.

COMPLETE STEREO AMPLIFIER

A thoroughly recommended Mullard design that very effectively meets the many requests for a low-priced but good quality DUAL CHANNEL STEREOPHONIC AMPLIFIER. Output power is 4 watts from STEREO or MONAURAL gram inputs.

PRICE: COMPLETE KIT OF PARTS £8.10.0

ASSEMBLED AND TESTED £10.10.0

RADIOGRAM CHASSIS

and V.H.F. RADIO TUNING UNITS

WE HAVE THE COMPLETE RANGE OF ARMSTRONG and DULCI high quality replacement Chassis in STOCK. Descriptive leaflets are available—enclose S.A.E.

Please enclose S.A.E. for DESCRIPTIVE LEAFLETS COMPLETE ASSEMBLY MANUALS are available at 1/6 each.

STERN RADIO LTD.



Stern's "fidelity" TAPE RECORDERS

BEFORE YOU BUY
—YOU SHOULD
HEAR THESE

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

MODEL CR3/S Incorporates the New COLLARO "STUDIO" TWIN TRACK 3-Speed Deck H.P. Terms: Deposit £8.4.0 and 12 months of £3.0.2. **£41.0.0**

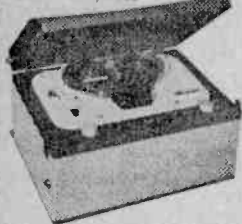
MODEL CR3/T Incorporates the very popular 3-Speed COLLARO Mk. IV "TRANSCRIPTION" Deck which has both upper and lower tape tracks. **£49.10.0** H.P. Terms: Deposit £9.18.0 and 12 months of £3.12.7.

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

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

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

Model HF/G2R



and NOW WE INTRODUCE

● MODEL HF/G2P TAPE PREAMPLIFIER

The Ideal "Link" to add High Quality Tape Recording facilities to existing Audio Installations and the

● MODEL HF/G2A TAPE AMPLIFIER

Designed to our usual High Technical Standard. Being based on the very successful Mullard Tape Designs. They incorporate MULLARD VALVES and only HIGH GRADE COMPONENTS

AS A RESULT WE PRESENT
TWO UNITS METICULOUSLY
MATCHED TO CORRECTLY
OPERATE

THE NEW GARRARD "MAGAZINE" TAPE DECK

Both Units form an entirely new "Easy to handle" presentation, each is completely self contained with Power Supply (Loudspeaker Amplifier HF/G2A only), and all INPUT and OUTPUT sockets incorporated on the chassis, which itself is constructed to allow for direct attachment to the tape deck. Thus the tape deck with the Amplifier (or Preamplifier fixed to it) form ONE COMPLETELY SELF-CONTAINED WORKING UNIT which requires only screwing into a Cabinet and Connecting to the Mains supply. As is usual with GARRARD products this Tape Deck is a Precision Engineered Unit of Excellent Quality operating two tracks at 31 in./sec. speed. It is the "Easiest to Handle" Tape Deck, having only two controls and incorporates the new Instantaneous Tape Loading Magazine which makes tape loading as simple as putting on a Record.

OVERALL PERFORMANCE IS REALLY EXCELLENT

A SPECIAL CASH ONLY OFFER !!

This very attractive PORTABLE AMPLIFIER CASE together with a good quality GRAM AMPLIFIER and a matched P.M. SPEAKER.

ALL 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 £4.2.6

Rectifier) AMPLIFIER

(c) 6" P.M. SPEAKER 18/9

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

Carriage and Insurance 4/- extra.



STERN'S MK. II "fidelity" F.M. TUNING UNIT

PRICE **£14.5.0** (Plus 5/- Carr. and Ins.)

HIRE PURCHASE: Deposit £2.17.0 and 12

Monthly Payments of £1.0.11

Incorporates the latest MULLARD PERMEABILITY TUNING HEART and the corresponding MULLARD VALVE LINE-UP. A really first-class Tuner, very attractively presented and comparable to many offered at much higher prices. Power consumption is only 1.5 amps at 6.3 volts and 25 m/a at 250 volts.

HOME CONSTRUCTORS! YOU CAN BUILD THIS TUNING UNIT FOR ONLY £10.10.0 (Plus 5/- Carr. & Ins.) Please send S.A.E. for fully descriptive leaflet, or the Assembly Manual is available for 1/6.



WE OFFER AS FOLLOWS:

(a) Model HF/G2R Portable TAPE RECORDER. **£33.0.0**

Includes spool of L.P. Tape and Crystal Microp. H.P. Terms: Deposit £5.12.0, 12 monthly payments £2.8.5

(b) Model HF/G2A-D, comp. AMPLIFIER and TAPE DECK. Inc. spool of L.P. Tape and L/S. **£27.10.0**

H.P. Terms: Deposit £5.10.0, 12 monthly payments £2.0.4

(c) ASSEMBLED AND TESTED AMPLIFIER **£15.0.0**

Model HF/G2A..... H.P. Terms: Deposit £3.0.0, 12 monthly payments £1.2.0

(d) Model HF/G2PP PORTABLE PREAMPLIFIER. Complete in Portable Case (like HF/G2R) **£30.0.0**

H.P. Terms: Deposit £6.0.0, 12 monthly payments £2.4.0

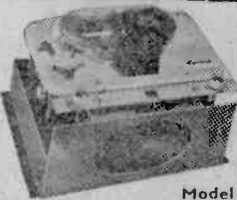
(e) Model HF/G2P-D, comp. PREAMPLIFIER and TAPE DECK. Includes spool of L.P. Tape. **£26.0.0**

H.P. Terms: Deposit £5.4.0, 12 monthly payments £1.18.2

(f) ASSEMBLED AND TESTED PREAMPLIFIER Model HF/G2P..... **£14.0.0**

H.P. Terms: Deposit £2.16.0, 12 monthly payments £1.0.6

Model HF/G2A-D



THE "ADD-A-DECK"

Incorporating the NEW B.S.R.

"MONARDECK" and Matched Preamplifier

Carriage and Insurance, 10/-

Deposit £3.12.0 **£17.17.0.**

12 mths. £1.6.2

Designed to operate

through the Pick-up

Sockets of the standard

RADIO RECEIVER

through which first-class

results are obtained. It

consists of a Twin Track

Tape Deck, incorporating

matched Preamplifier,

and operates at

31in./sec. speed.

Supplied fully tested and completely assembled on an

attractive wood plinth, and only requires connections to

the mains supply and the Pick-up Sockets, for which

purposes "floating" leads are incorporated.



"Hi-Fi" LOUDSPEAKERS

WE HAVE IN STOCK A COMPLETE RANGE BY
GOODMANS—WHARFEDALE—W.B.

Illustrated and Priced Leaflets on request.

HOME CONSTRUCTOR

A RANGE OF "EASY TO ASSEMBLE" PREFABRICATED CABINETS. Designed by the W.B. "STENTORIAN" COMPANY for "Hi-Fi" Loudspeaker systems or to accommodate high-quality equipment. The acoustically designed Bass Reflex Cabinets containing the very successful "Stentorian" Speakers give really first-class reproduction and are well recommended. Models are also available to accommodate high-quality Amplifiers, Preamplifiers, Tuning Units, Record Players, etc. All models are very easily assembled, in fact, only a screwdriver is required. Fully illustrated leaflets are available, including specifications of the STENTORIAN LOUDSPEAKERS.

109 & 115 FLEET ST., LONDON, E.C.4

Telephone: FLEET STREET 5812/3/4

PLEASE ENCLOSE S.A.E. WITH ALL ENQUIRIES.

Let I.C.S. train YOU!

COURSES ON:—

- RADIO and TELEVISION
 - SERVICING · ELECTRONICS
- EXAMINATION COURSES FOR:—

C. & G. Radio
Servicing Certificate
(R.T.E.B.)

C. & G. Radio
Amateurs' Exam.
(Amateurs' Transmitting
Licence)

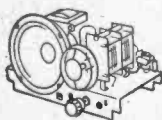
British Institution of Radio Engrs., etc.
Whether you plan to have your own business, to become an electronics engineer or to take up a career in industry, an I.C.S. Course will help you to succeed. You learn at home in your own time, under expert tuition. Moderate fees include all books.

LEARN - AS - YOU - BUILD

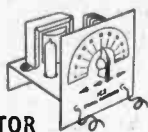
Practical Radio Course

- A basic course in radio, electronic and electrical theory backed by thorough practical training. You build a 4-valve T.R.F. and a 5-valve superhet radio receiver, signal generator and multi-tester.

Other Learn-as-you-Build radio courses are available



MULTI-TESTER
(Sensitivity 1,000
ohms per volt)



**5-VALVE
SUPERHET RECEIVER**

RF/AF SIGNAL GENERATOR

Post this Coupon TODAY! for FREE book on careers in Radio, etc., and full details of I.C.S. Courses.

INTERNATIONAL CORRESPONDENCE SCHOOLS

(Dept. 171J), Intertext House, Parkgate Road, London, S.W.11.

Please send book on.....

Name..... Age.....
(Block Letters please)

Address.....

Occupation..... 6-60

INTERNATIONAL CORRESPONDENCE SCHOOLS

SOUTHERN RADIO'S WIRELESS BARGAINS
ATTACHMENTS for "18" Transreceivers. ALL BRAND NEW. HEADPHONES, 15/6; HAND MICROPHONE, 12/6; AERIALS, 5/-; SET OF 6 VALVES, 30/-.
CONDENSERS. 103 Assorted. Mica Tubular, etc. NEW, 15/-.
CONTACTOR TIME SWITCHES. 2 impulses per sec., in case 11/6
REMOTE CONTACTOR. For use with above. 7/6
LUBBRA HOLE CUTTERS. Adjustable $\frac{1}{2}$ " to $3\frac{1}{4}$ ". For Metal, Plastic, etc. 7/-
MAGNETS. Strong Bar Type. 2" x $\frac{1}{2}$ ". 1/6 each.
MORSE TAPPERS. Midget Type. 2/9. Standard, 3/6. Heavy Type on Base, 5/6. ALL BRAND NEW.
PACKARD-BELL AMPLIFIERS. Complete BRAND NEW with Valves, Relay, etc., etc., 17/6 each.
QUARTZ CRYSTALS. Types F.T.241 and F.T.243, 2-pin, $\frac{1}{4}$ Spacing. Frequencies between 5.675 Kc/s. and 8,650 Kc/s. (F.T.243) 20 Mc/s. and 38.8 Mc/s. (F.T.241), 54th Harmonic, 4/- each. ALL BRAND NEW. TWELVE ASSORTED CRYSTALS, 45/-. Holders for both types, 1/- each. Customers ordering 12 crystals can be supplied with lists of frequencies available for their choice.
QUARTZ CRYSTAL CASES (F.T.241/243) 10/6 per dozen.
RECORDING BLANKS. New "Emidisc", ready for use. 13", 6/- each. Or 15 complete in metal case 4/-.
RESISTANCES. 100 Assorted useful values. New wire end, 12/6.
SPECIAL OFFER. 12 ASSORTED METERS. Slightly damaged. Mainly broken cases (perfect movements). Including 3 Brand New Aircraft Instruments. 12 for 45/-.
STAR IDENTIFIERS. Type I A-N Covers both Hemispheres, 5/6.
T1154 TRANSMITTERS. Complete, NEW condition. In Transit £25.0 case
TRANSPARENT MAP CASES. Plastic. 14" x 10 $\frac{1}{2}$ ". Ideal for Maps, Display, etc. 5/6
TRANSRECEIVERS. Type "38" complete with 5 valves, etc. New condition. untested by us, but serviceable, no guarantee. 22/6 each.
ATTACHMENTS for Type "38" Transreceivers. ALL BRAND NEW. PHONES, 15/6; THROAT MICROPHONES, 4/6; JUNCTION BOXES, 2/6; AERIALS, No. 1, 2/6; No. 2, 5/-; WEBBING, 4/-; HAYERSACKS, 5/-; VALVES, A.R.P.12, 4/6; A.T.P.4, 3/6. Set of FIVE VALVES, 19/- the set.
POST OR CARRIAGE EXTRA. FULL LIST OF RADIO BOOKS, ETC., 3d.
SOUTHERN RADIO SUPPLY LTD.
11 LITTLE NEWPORT ST., LONDON W.C.2. GER. 6653

REPANCO TWINETTE

A NEW REMARKABLE TWO TRANSISTOR PORTABLE RADIO FOR THE HOME CONSTRUCTOR

- ★ LOUDSPEAKER, 7 x 4in. ELLIPTICAL
- ★ TWIN FERRITE SLAB AERIALS
- ★ LONG AND MEDIUM WAVES
- ★ PROVISION FOR EXTERNAL AERIAL
- ★ SIZE 7 x 5 x 3in.
- ★ LOW BATTERY CONSUMPTION

Send now for Easy Wiring Plans and Component Price List, 1/6 (post free).

OTHER REPANCO EASY-TO-BUILD RECEIVERS

	Envelope
The R.E.P. One-valve Radio	9d.
The Hiwayman. A 4-valve Portable Radio	1/6
F.M. Tuner Unit. 5 Valves plus Tuning Indicator	1/6
Three Dee. 3-transistor Radio	9d.
Mini-3. Mk. II. 3-transistor Pocket Radio	1/3
Mini-7. Mk.II. 7-transistor Pocket Receiver	1/6
Transeven. 7-transistor Portable Receiver	1/6
Major-7. 7-transistor Portable Receiver	1/6
Transistor Car Radio Receiver	2/-
Transistor Amplifier and Feeder Unit Circuits	1/6
Please add towards postage.	

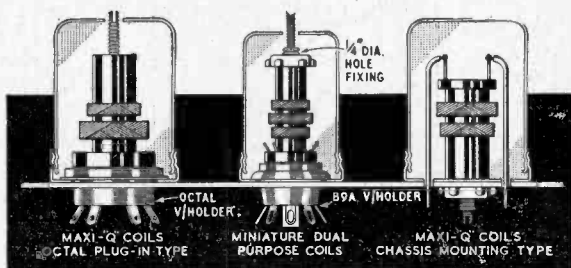
For details of our Components send 6d. in stamps for our ★ 1960 Catalogue.

Mail Order and Trade:
**RADIO EXPERIMENTAL
PRODUCTS LTD.**
33 Much Park St.,
COVENTRY
Tel.: 27114

Wholesale Inquiries and Export:
REPANCO LTD.
O'Brien's Buildings,
203-269 Foleshill Rd.,
COVENTRY
Tel.: 24224

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

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



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

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

WORKS HOLIDAY

Goods cannot be despatched from 27.7.60 to 7.8.60.

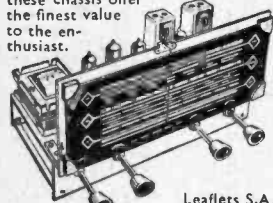
KINGSMERE SUPPLIES LIMITED

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

MAIL ORDER HOUSE

TERMS: Remit with Order or C.O.D.

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, EF87, EBC81, EL84, EZ80
 Brand new and guar. A.C. 200/250 v. Short - Medium - Long - Gram. P.U. High Q dust core coils. Latest circuit technique. AVC and neg. feedback. 4 watts. Chassis size 13 1/2 x 6 x 1in. high. 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

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



The Briffman Successor

Monarch

BRAND NEW AND BOXED

OUR PRICE

£6.19.6

MODEL UA8

GARRARD 4-SPEED HIGH FIDELITY UNITS

Autochanger 121 Mk.II 10 gns.
Single Player TA Mk.II 8 gns.
Transcription 4 HF 17 gns.

Price inc. plug-in, normal heads. Stereo hds. £2 ex.

BRAND NEW			VALVES			ALL GUARANTEED			FAMOUS MAKE		
OZ4	6/-	6BA6	7/6	6SJ7M	6/6	DF96	8/6	EL41	9/-	PCL82	11/6
IR5	7/6	6BE6	7/6	6SN7GT	6/6	DK96	8/6	EL84	8/6	PY80	7/6
IS5	7/-	6CA	5/-	6U5G	7/6	DL96	8/6	EM81	9/6	PY81	9/6
IT4	6/-	6D6	6/-	6V6G	6/6	EAB C80	8/6	EY51	9/6	PY82	7/6
2X2	3/6	6F6G	7/6	6X5G	6/-	EB91	5/6	EY86	10/-	PY83	9/6
3Q5	9/-	6G6	5/6	12AT7	8/-	EBC41	8/6	EZ40	7/6	QP25	7/6
3S4	7/6	6H6	3/6	12AU7	7/6	EBF80	10/-	EZ80	7/-	R3	9/-
3V4	7/6	6I5	5/6	12AX7	7/6	ECC84	9/6	E1148	1/6	SP61	3/6
5U4	7/6	6I6	5/6	12K7GT	6/6	ECH42	10/6	HAB C80	9/6	UF41	9/-
5Y3G	7/6	6I7G	6/6	12Q7GT	6/6	ECL80	10/6		12/6	UL41	9/6
5Z4G	9/6	6K6GT	6/6	25Y5G	9/6	ECL82	10/6	HVR2A	6/-	UY41	7/6
6AC7	5/-	6K7G	5/6	35L6	9/6	EF39	5/6	KT33C	10/-	U22	8/-
6AG5	5/6	6K7M	7/6	35Z4	7/6	EF41	9/6	MU14	9/-	VP23	6/6
6AL5	5/6	6K8G	7/6	807	5/6	EF80	7/6	P61	3/6	U76	6/6
6AM6	5/6	6N7M	6/6	954	1/6	EF91	5/-	PCC84	9/6	VR105/30	9/-
6AT6	7/6	6Q7G	7/6	956	2/6	EF92	5/6	PCF80	9/6		
6BBG	5/-	6SA7M	6/-	DAF96	8/6	EL32	5/-				

BAKERS SELHURST

QUALITY SPEAKER

12in. Stalwart, 15W ... 90/-
12in. Foam Suspension ... 120/-

25, FOAMCOURT WAY, FERRING, WORTHING, SUSSEX

TERMS — NO DEPOSIT — INTEREST FREE — 20 or 36 WEEKS TO PAY

B.S.R. MONARCH U.A.8 4-SPEED AUTO CHANGER

£6.19.6

or terms

Incorporating auto and manual control complete with turnover crystal P.U. and Sapphire stylus. A.C. Post and Ins. 5/6 or initial payment 8/11 plus Post and Ins. and 19 weekly payments of 6/11.

T.U.9 B.S.R. 4-speed single Player
Collaro Conquest 4-speed Autochanger
Collaro Conquest Stereo Autochanger
Post and Packing on each of above



£4.9.6

£6.19.6

£9.9.0

5/6

DE-LUXE TAPE RECORDER CABINET

ONLY 29/9



Beautifully made Tape Recording Cabinet. Size 13 x 10½ x 7 ins. Covered in two tone rexine Cloth. Stylish design. Carrying handle and detachable lid with lock and key. Easily adapted to Record Player Cabinet. Exceptional value at this very low price. Post and Packing 4/6.

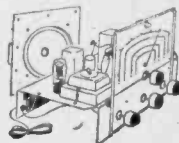
TV CHASSIS FOR SPARES ALL THIS FOR ONLY

9/6

56 Resistances including 7 variable controls. 54 condensers, including electrolytics. Coils. 7 I.F. and R.F. transformers. 13 valve holders. (8-B8A, 2-B7G and 3 octal) 4 transformers Mains-Output-Line-Frame. Chokes 250 mA. Metal Rectifiers—300 volts at 250 mA. Fuse panel, scanning coils, focus magnets. Plugs, sockets, switch, chassis screws, tag strips, etc. I.F. strip can be separated. Power pack can be used without dismantling. These chassis have been used, but were working when stored. Six page circuit and instructions showing positions of each component. Carriage 7/6.

SUPER CHASSIS 3/11 Per Week

On the initial payment of 5/1, plus carriage of 5/6, this chassis will be despatched. Balance at 3/11 for 19 weeks. 5-valve superhet chassis including 8in. P.M. speaker and valves. Four control knobs (tone, volume, tuning, W/change switch). Four wavebands with position for gram. p.u. and extension speaker. A.C. Ins. and Carr. 5/6.



Cash Price 79/6

EXTENSION SPEAKERS

19/9

In polished oak cabinet of attractive design. Complete, fitted with 8in. P.M. speaker of highest quality, switch and flex. Ready for immediate use. Ideal for bedrooms, kitchens, workshops, etc. Insurance and Carriage 3/9.



HOME RADIO A.C. OR UNIVERSAL

79/6

A.C. or Universal mains 5-valve octal superhet. 3 w/band receiver can be adapted to gram p.u. In attractive polished cabinet. Dimensions 9½ x 18½ x 11½ ins. Insurance and Carriage 4/6. Terms available.



SEND FOR A FREE CATALOGUE

Giving Full Details of Terms and Goods



£2

allowed
on old tube

Cash Price **£8.10.0**

REPLACEMENT RE-BUILT TV TUBES

Or yours for initial payment of 8/6 (plus Carr. and Ins.) and 19 weekly payments of 8/6. 12 months full guarantee. All sizes. Completely rebuilt gun assembly, new cathode, heaters, etc., giving the high standard required for long picture life, quality and value. Carr. and Ins. 15/6.

EXPRESS DESPATCH SERVICE. Please phone to confirm tube in stock. Send Telegraph Money Order, tube despatched Passenger Train same day. This service only available with remittance by Telegraph Money Order and Cash Sales—no terms.



**STEREO RECORD
PLAYER CABINET**
with extension speaker
cabinet

at the
amazing
offer of

99/6

Portable 1960 show model in two tone colours. Extension speaker cabinet secured in lid. Size 18 x 14 x 8½ ins. high. This stereophonic player complete, retails at 35 gns., in the shops today. Ins. and Carr. (with order) 5/6, or initial payment plus Ins. and Carr. of 6/1 and 19 weekly payments of 4/11.



**RECORD PLAYER
CABINET R.P.8**

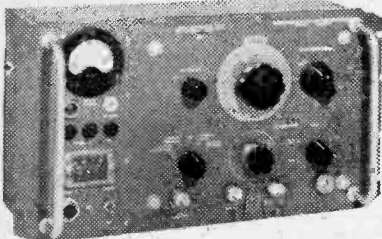
79/9 or 5/4

Initial
Payment

Balance at 3/11 a week for 19 weeks. This contemporary cabinet in two-tone grey rexine is ideal for the modern home. Added attraction is the cream plastic speaker fret. Press button lid; lock. Fittings for screw-in legs. Internal measurements 14½ x 18 x 18½ in. deep. Takes a Garrard 121 Mk. 2 or B.S.R. U.A.12: 9½ x 4½ elliptical speaker, 19/6; our Mk. 2 control portable amplifier at 79/6. Carr. and Ins., 5/6.

INSULATING TAPE 1/6 Finest quality. Large roll in sealed metal container (75 ft. x ½ in. wide). Post on 1 tin 9d. Post on 6 tins 2/-.

DUKE & CO. 621/3 ROMFORD ROAD
MANOR PARK, E.12
Tel. ILF 6001/3

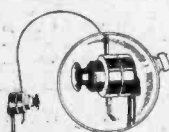


PRICE ONLY **£12.10.0**

Carr. 10/-

SIGNAL GENERATOR TYPE CT53

Manufactured to laboratory standard. Covering the complete frequency range of 8.9-300 Mc/s. In 6 bands. Complete with internal 110-250 v. A.C. Power Pack. Incorporates 110 μ V R.F. meter with variable carrier control. Five position switched attenuator giving 1 μ V to 10 MV and 10 db to 20 db. Variable Multiplier 1 to 10 and calibrated 0-20 db. Outputs: C.W., square wave and sine wave. Provisions for external sine wave or pulse. Complete with 7 valves and calibration charts. Here is your opportunity to own a Laboratory Signal Generator, covering the widest frequency range ever offered at a fraction of the original cost. We anticipate an overwhelming demand therefore send your order now to avoid disappointment.



LIGHT-WEIGHT HEAD-SETS. These H.S. 30 phones are the smallest used by the U.S. Air Force. 250 Ω 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 Ω . ONLY 15/- P. & P. 2/6.

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

U.S.A. WHIP AERIALS. 12ft. 12/6. P. & P. 2/6.

MICROPHONE BARGAIN. Acos crystal stick mike. Complete with cable. List price 5 gns. Offered at only 49/6. P. & P. 1/6. 1 m. A. METER, 2in. round, 17/6. P. & P. 1/6.

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

POCKET RADIO. The new, exciting De Luxe "Gold Star" in beautiful moulded plastic case—a highly sensitive, self-contained set covering all medium waves. Uses modern miniature valve and specially designed high efficiency coil. Exceptionally easy to build from our step-by-step plans. Size only 4 1/2 in. x 2 1/2 in. x 1 1/2 in. Batteries fit inside. Only 37/6. P. & P. 2/6.

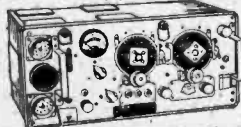
HOOPER ROTARY TRANSFORMERS



12v. input, 500 v. output at 85 mA. or 6 v. input, 250 output at 75 mA. Only

10/6

EACH P. & P. 2/-



Special Offer—Order Now! Limited number only.



PORTABLE TRANS/RECEIVER No. 13

A self-contained Trans/Receiver for Telephone and C.W. Range approx. 10 miles. Freq. 6-9 Mc/s. (50-30.3 metres). Valve line-up: 3 ARP-12, 2 AR-9, 1 ATP4. Complete with aerial. H.T. and L.T. meter and all accessories. Weight 20 lbs. Size 8 x 10 x 17 in. ONLY 80/- Carr. 10/-.

POCKET MULTIMETER BRAND NEW

2,500 o.p.v. Multi range 6/30/120/300/1,200 v. A.C., ditto D.C. 0-1 K., 0-1 megohm: 400 Micro-A. 12 mA, 300 mA. -00 to +64 db 5 ranges; 3in. x 4 1/2 in. x 1 1/2 in. Large clear dial. Leads supplied. P. & P. 2/6.

Our Price 70/-



INSTANT VALVE FILAMENT TESTER, MODEL VI-41

Pocket-size, battery operated. Gives instant check of: All radio valves; All TV valves; All TV and Radio fuses; Circuit testers; All Pilot lamps. Has built-in miniature 7- and 9-pin valve straighteners and battery test.

* International Octal, B.8. B.9. B.7 Battery and Mains types.

Beautifully styled—precision made. Supplied complete. Fully guaranteed.

ONLY 30/- P. & P. 2/6.

COMMUNICATION RECEIVER R.206

Frequency range 550 kc/s-30 Mc/s. on 6 frequency ranges. Panel Controls: two speed, backlash free, tuning control. Frequency range selector. Very fine osc. vernier tuning control. Aerial trimmer, L.F. Gain, I.F. Gain, I.F. Bandwidth switch: 0.7, 2.5 or 8 kc/s. A.V.C. switch. B.F.O. control. 900 kc/s. filter switch. Transient Interference limiter. Aerial, earth, muting, phones and line inputs. Designed for use with an external A.C. or D.C. power supply. Receiver dimensions 25 x 13 x 13 in. Supplied complete with A.C./D.C. power unit with internal speaker. Original cost over £175. Very limited quantity offered at only

£29.10.0

Carr. 50/-.

ACCUMULATORS

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



TELEPHONE SETS. Brand new, fully portable—hand generator, bell, hand set, morse key, lamps, instructions. Only 60/- a pair. Carr. 10/-.

HIGH RESISTANCE HEAD-PHONES. Brand New. 18/- P. & P. 1/6.

PRINTED CIRCUIT KIT. Easily and quickly you can make miniature professional printed circuits. Complete with illustrated manual, 18/6. P. & P. 1/6.

ARRS RECEIVER. 540 Kcs—32 Mc/s. Complete in working order. £40. Carr. 30/-.

CONVERT TO V.H.F. Within minutes you can extend the frequency of your receiver to cover V.H.F. by using our brand new V.H.F. Converter.

R.F.2: covers 40-45 Mc/s. Switched tuning. 8/6. Circuit supplied. P. & P. 3/6.

VARIABLE TRANSFORMERS, MODEL B3. input 230 volts. Output 0-260 volts, 5 amps. Brand new, only £9. Carr. 12/6.

D.M.34. America's finest little dynamotor offering 12 v. in with 220 v. out of 80 mA. With suppression and smoothing mounting base. Size 4 x 2 1/2 x 2 1/2 in. Original packing. ONLY 35/- P. & P. 3/6.

COMPLETE HEADPHONE & MICROPHONE ASSEMBLY

A must for every Constructor and "Ham". consists of moving coil, padded head phones and "dress to talk" microphone. 10/- P. & P. 3/6.



WIRELESS SET No. 19 MK. II

As described in "Practical Wireless," March page 961, April page 1027 and May. This most famous Army Trans/Receiver covers 2-8 Mc/s. (150-37 metres) in two bands and 230-240 Mc/s. V.H.F. Has an Intercom. amplifier. Designed for 12 and 24 volt operation. Uses a 6-valve superhet receiver. I.F. being 455 kc/s. and a 6-valve transmitter designed for voice and C.W. operation. Incorporates test and tuning meter for voltages, aerial loading and current tests. Panel Controls: Frequency tuning, P.A. tuning, Gain control, M.C.W., C.W. R.T. switch, Hetero., nesting, off-on, Quench, aerial—A.V.C.—L.T.—H.T.—Drive tests. Supplied complete with 15 valves and instruction book.

SET
ONLY

65/-

Carr. 10/-

Relda Radio

Callers: 87 Tottenham Court Road, London W.1
Mail Orders: (Dept. P), 32a Coptic Street, London. W.C.1
Telephone: MUSEUM 9607

FULLY ILLUSTRATED
CATALOGUE
1/3 Post Free.

PORTABLE RADIOPHONES MODEL MKII

We are proud to offer these Brand New British Army Portable Transmitter Receivers. The improved model MKII (not to be confused with earlier models) is sold exclusively by us!

NEW IMPROVED MODEL!



The Radiophones are simple and a delight to operate as all controls are mounted on the front panel of the Set and clearly marked. The fine tuning dial is fully calibrated and complete with locking position. Change over from send to receive is performed by a flick switch.

The MKII Radiophones are designed for reliable voice intercommunication operating up to 10 miles depending upon obstructions and elevation. The combined Transmitter Receiver covers the whole frequency range between 7.4-9 Mc/s. and is fully tunable on both Transmitter and Receiver. The Receiver is an extremely efficient superhet featuring ultra high amplification, automatic volume control, highly sensitive output, and noise clipping. On test this Receiver astounded us, for on a short aerial we heard 65 Short Wave Stations. One as far away as Russia.

The Transmitter is automatically tuned to the Receiver hence eliminating unnecessary controls, and affording speed and simplicity of operation. Incorporates full side tone facilities. The master oscillator is an electron coupled oscillator and can be regarded as a form of Hartley. Includes R.F. power amplifier, audio modulator, automatic P.A. Tuning. The Transmitter range, unlike the receiver, is largely dependent on prevailing obstructions and elevation but these can be compensated for by the addition of extra aerial length.

The Model MKII operates from standard dry batteries 3v. L.T. and 120v. H.T. Consumption: L.T. receive 23 amps. L.T. send 45 amps. H.T. receive 9 Ma. H.T. send 14 Ma. average battery life 30-35 operating hours. The Radiophones incorporate 5 valves: R.F. Amplifier, I.F. Amplifier, Second Detector, Output, and Power Amplifier.

All sets are supplied complete with all accessories comprising of dynamic sound powered headphones, electro magnetic supersensitive microphone, 4 ft. aerial, Junction box, battery connection details and full circuit diagram.

PRICE **60/-** PER
ONLY SET
P. & P. 4/-

OR TWO SETS FOR
£6 POST FREE

BATTERIES
20/- PER SET

DE LUXE
12ft. WHIP
AERIAL
12/6
P. & P.
2/6



Callers:
87 Tottenham Court Road, London W.1.
Mail Orders:
(Dept. P), 32a Coptic Street, London W.C.1.
Telephone: MUSEum 9407

Reldo Radio

And still... Radio Clearance Ltd. proudly presents the greatest All-Transistor Circuit of our time

BUY AS YOU BUILD the "MIRACLE" Super Six Plus

ANY PART SOLD SEPARATELY

Makes up to a portable transistor superhet embodying all the latest design developments* including a self-oscillating mixer, two double-tuned IF stages, audio amplifier and a matched push-pull output stage. Also two germanium diodes are incorporated, additional to the six Mazda transistors, one as detector and the other to assist the AGC as a variable damping element.

12 Good Reasons why the Miracle has no equal

- ★ Printed Board engraved with component locations
- ★ Special provision for use as a CAR RADIO
- ★ Double-tuned IF Transformers
- ★ 6 First Grade Mazda transistors plus 2 Mazda hi-efficiency diodes
- ★ Hi-flux 5in. (12000 lines) 25-ohm loudspeaker
- ★ Full coverage Medium and Long wavebands
- ★ 3½ in. tuning dial with 5:1 slow motion
- ★ Long life dry battery. 150/200 hours
- ★ Internal high-Q Ferrite Aerial
- ★ Push-pull matched output stage 400-milli-watts
- ★ 3½ in x 7½ in. x 10 in. attractive two-tone case—total weight approx. 4 lb.
- ★ Comprehensive Manual supplied—so easy to build

Our inclusive price for all components, cabinet and battery, complete in every detail:

£11.10.0

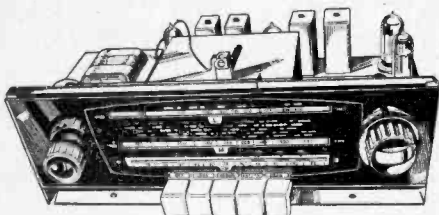
plus 3/6, Regd. p.p.

or any associated component parts supplied separately at the published prices.

INSTRUCTION MANUAL AND CIRCUIT BOOK containing itemised list of all component prices, 3/6 post free. See and hear a complete working model at

RADIO CLEARANCE LTD., 27, TOTTENHAM COURT ROAD, LONDON, W.1.
Telephone Museum 9188

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



Why buy a F.M. Tuner at the same price?

Tapped input 220-225 v. and 226-250 v. A.C. ONLY.
Chassis size 15 x 6½ x 5½ in. high. New manufacture.
Dial 14½ x 4 in. in gold and black.

Pick-up. Extension Speaker. Ae. E., and Dipole sockets. Five "plane" push buttons—OFF, L.W., M.W., F.M. and Gram. Aligned and tested. With all valves and O.P. Transformer. Tone Control Fitted.

Covers 1,000-1,900 M.; 200-500 M.; 88-98 Mc/s.

Valves EZ80 rect., ECH81, EF89, EABC80, EL84, ECC85.

Speaker and Cabinet to fit chassis (table model), 47/6.

10 x 6 in. ELLIPTICAL SPEAKER, 20/-, to purchasers of this chassis.

TERMS:—(Chassis) £14.6.8 down + 10/- carr. and 6 Monthly Payments of 30/-, or with Cabinet and Speaker £25.9.2 down and 6 Monthly Payments of 32/-.



COMPLETE RADIO FOR ONLY £10.10.0. carr. pd.

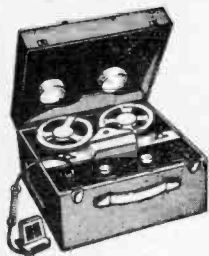
Size 19 x 13 x 7½ in. or Chassis and dial for £8 (carr. paid). Chassis Size 15 x 6½ x 5½ in.; 1,000-2,000 M.; 200-550 and 16-54 M. Mains (200-250 v. A.C.) and O.P. Trans. (3 ohm); Gram., Aer. E. Ext. L.S. Sockets; New Mullard Valves ECH42, EF41, EBC41, EL41, EZ40 and Magic Eye EM81. Dial 15 x 3 in. Fully aligned. Fantastic value for money.

6½ in. or 6 x 4 in. speaker fitted to cabinet. New Manufacture.

BATTERY ELIMINATOR. Converts your Battery Set to Mains. For 4 Low Consumption Valves (98 range). 90 v. 15 ma. and 1.4 v. 125 ma.. 42/6 (2/6 post). 200-250 v. A.C. Size 5½ x 3½ x 2 in. Also for 250 ma. 1.4 v. and 90 v. 15 ma. at same price. Specify which, or give Valve line-up.

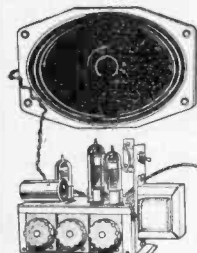
TELEREGION AERIAL. "Twenty-20" adjustable set top or table for Bands 1, 2 and 3. "Gold" finished rods and mounting. List Price 42/-, Our price 30/- (carr. paid).

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



COMPLETE TAPE RECORDER FOR ONLY £19.19.0.

B.S.R. deck. Two-tone leatherette case, Acos crystal mike. 850ft. tape, extra spool. On/Off Tone and Vol. 7 x 4 in. Speaker. 1½ hrs. playing time. Single speed 3½ in./sec., fast forward and reverse, mike and radio inputs, ext. speaker socket; cannot be accidentally erased. 13½ x 12 x 8 in. Weight 20 lbs. 12 months guarantee. Carr. 7/6 extra. Terms: £8 down and 6 monthly payments of 50/-.



3-VALVE AMPLIFIER (INC. RECT.). Capable of giving 6 watts. Mains and output transformers. Valves ECC81, EL84 and Rect. 3 Controls, volume, bass and treble. On/Off switch. Fully guaranteed. Chassis size 6½ x 3 x 2½ in. 6½ in. round or 7 x 4 in. elliptical speaker, state which. Not suitable for microphone input.

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



LISTEN WITHOUT INTERFERENCE

Fully built V.H.F./F.M. Tuner for £5.10.0 (3/- post). Covers 88-98 Mc/sec. Wired, aligned and tested. 4 Mullard valves; for use up to 40 miles from transmitter. FRINGE MODEL for above this (5 valves), £8 (p. & p. 3/-). External H.T. and L.T. supplies reqd. for both of foregoing. BUT, a complete V.H.F. set, four valves, with mains transformer, amplifier, rectifier and speaker (with above frequency coverage) can be supplied for ONLY £8.9.0 (4/- carr.). Cheap room dipole 10/-, 300 ohm twin feeder. 6d. yd. All with 12 months' guarantee.



GRAMOPHONE AMPLIFIER with 5 in. SPEAKER. On Fabric-covered Baffle 12½ x 5½ in. Mains and Output Transformers. Metal Rectifier. ECL82 Valve. Tone and Volume Controls. On/Off switch. Fully Guaranteed. Two Knobs supplied. Ready to play. Useful for Stereo

ONLY 57/-, post 3/-

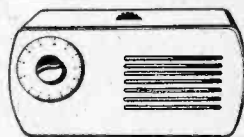
BEREC "PIONEER" RADIO IN MAKER'S CARTON. Valves DK96, DF96, DAF96. DL96. Requires Ever Ready battery B103 or battery elim. for converting to mains operation—see adjacent item. Two Short Wavebands 2.5 to 7 Mc/s and 6.5 to 17 Mc/s. Cabinet. 12 x 7½ x 6 in. ONLY £4.10.0 (2/6 p. & p.). (MW and SW £4.15.0 plus 2/6 p. & p.) In kit form with instructions and fully wired coil pack. Two Short Wavebands £4. One MW and SW £4.5.0. Plus 2/6 p. & p. Separate items supplied. Send for List.



TAKE A CHANCE. We have surplus to present manufacturing requirements tens of thousands of resistors, silvered mica, tubulars, volume controls, electrolytics, valve holders, etc. SEND US 20/- for a bargain parcel of new goods. Our good name is your guarantee. Money back if not satisfied. State preference of types of goods.

SIX TRANSISTOR SUPERJET KIT £8.19.6

Med. and L.W.; Printed Circuit; Instruction Book. Internal aerial. All items supplied separately. Write for price list. Battery, 9 v., PP4, 2/6.



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

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

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

See additional advertisement on page 152

GLADSTONE RADIO—58A HIGH STREET, CAMBERLEY, SURREY. Te. 27791

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

Practical Wireless

VOL. No. XXXVI, 640, JUNE 1969

Editorial and Advertisement
Offices:

PRACTICAL WIRELESS

George Newnes, Ltd., Tower House,

Southampton Street, Strand, W.C.2.

© George Newnes Ltd., 1960.

Phone: Temple Bar 4363.

Telegrams: Newnes, Rand, London.

Registered at the G.P.O. for trans-

mission by Canadian Magazine Post.

SUBSCRIPTION RATES

including postage for one year

Inland - - - - £1.30 per annum

Abroad - - - - £1.16 per annum

Canada - - - - 19s. per annum

Contents

	Page
Editorial ...	117
Round the World of Wireless ...	118
Dual Band T.R.F. Tuner ...	120
An Electronic Photo-Timer ...	123
Wide Band Battery S.W. Two ...	126
On Your Wavelength ...	131
Transistorised Voltmeter ...	132
A.F. Phase Shift Test Oscillator ...	135
Interstage Transistor Trans-	
formers ...	139
Making Chassis ...	141
Four Transistor T.R.F. ...	144
Model Control Transmitter	
Circuit ...	147
Some Uses of Relays ...	150
Simple Transistor Amplifiers ...	153
A Compensated Stereo Pre-	
amp ...	157
Compact 4 plus 1 ...	161
Stable V.F.O. for 80m ...	166
Trade News ...	173
News from the Clubs ...	177
Open to Discussion ...	178

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, Strand, 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."

Stereo—Rise and Fall?

ALTHOUGH the idea of stereo effects in sound reproduction has been known almost as long as the equivalent effects in sight-stereoscopy—it was only with the introduction of stereophonic, two-channel, gramophone records that the experimental facts became common knowledge to radio enthusiasts. Although doubts were expressed at its inception, stereophonic sound has proved that it will retain a steady, if not increasing, popularity. However, it is certainly true, to judge from our talks with dealers and enthusiasts and from our correspondence, that stereo does not yet enjoy the popularity or reputation which first greeted its appearance. Stereo seems to be thought of at present as a rich man's amusement, too expensive for the ordinary enthusiast. Whilst this is by no means altogether true, it may be said that the conversion of existing equipment from mono to stereo may involve the purchase of considerable extra equipment. It may also prove difficult to obtain the necessary units to form the needed second amplifying chain and, of course, the present pick-up head will have to be replaced with a stereo type—chosen from a very large and somewhat confusing range. Another loudspeaker unit will be needed too and, if the existing cabinet is an elaborate affair, the cost of duplication would not be negligible. Stereo also has a reputation of being very critical so far as the position of the listener relative to the loudspeaker is concerned. Whilst this reputation is not altogether deserved, it is certainly true that best results are obtained by listening in the theoretically correct position.

These, then, are the factors which we think account for the decline in interest in stereo and may also account for the slow progress in the development of stereophonic broadcasting. However, those hi-fi enthusiasts who can construct amplifiers should realise that in their hobby they have the means to even out the expenses incurred in conversion. Contrary to most written or spoken opinions, it is possible to obtain satisfactory results from stereo records even if the two amplifying channels are not perfectly matched. Thus, for first essays in the field of stereo, the second amplifier could quite well consist of a low output single-ended circuit which would need only a simple tone control circuit to enable the two channels to be balanced to suit the listeners' hearing and the acoustics of the room. The second loudspeaker could be a cheaper version than the one already in use. If a good cabinet is employed, the difference in the performance of the two units should not be too intrusive.

Of course, the true enthusiast will not be satisfied for long with such arrangements. However, they will prove sufficient to reduce the initial expense and enable a good stereo head to be purchased. The constructor can then improve the system by degrees and, most important, in the light of his experience; probably the final results will be better than if the amplifier chain had been duplicated at the outset.

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, 1960, 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.

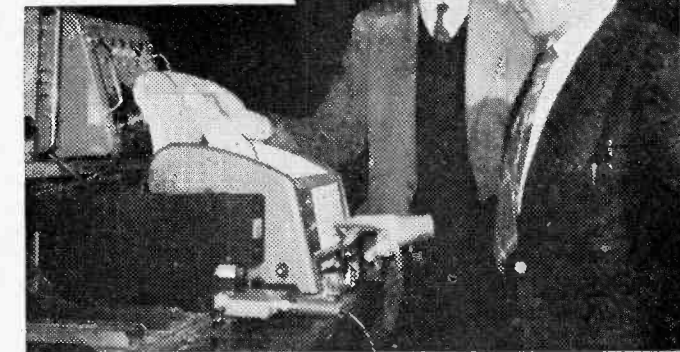
Region	Total
London Postal	798,737
Home Counties	755,859
Midlands	558,614
North Eastern	621,925
North Western	525,595
South Western	543,184
Wales and Border Counties	276,734
Total England and Wales	3,990,748
Scotland	470,129
Northern Ireland	137,014
Grand Total	4,597,891

Agreement

THE English Electric Valve Company Limited, England, and Eitel McCullough Incorporated, U.S.A., have concluded an agreement for the exchange of technical information and manufacturing know-how over a large range of klystrons, travelling wave tubes and power tubes. This agreement will enlarge the range of tubes in their respective catalogues and enable both Companies to get into production quickly on a composite range of each others products within these important fields.

Royal Radar Establishment

THE Ministry of Aviation, acting on behalf of the Royal Radar Establishment at Malvern, has placed an order with the Marconi Company for the supply and installation of a 50kW 50cm airfield control radar Type S264, together with two moving coil display units and ancillaries. The equipment, which will be sited at the R.R.E. airfield at Pershore, Worcestershire, is scheduled to go into operation in mid-1960. Several years ago one of the earliest 50cm radars, a Type II, was installed at Defford and later transferred with the establishment to Pershore and has been in con-



A transistorised airborne teleprinter receiver (Type AD308), now in production by Marconi's, has been ordered by B.O.A.C. for its fleet of Boeing 707's. The equipment is used for receiving weather information broadcast on narrow-band frequency-shift-keyed telegraphy in the frequency range 90-150kc/s. The teleprinter receiver is here shown being tested in conjunction with a printer by two testers at the company's Basildon Works.

stant use at this important airfield ever since. Pershore airfield, which is about three miles from Bredon, is surrounded by hilly terrain, with the Malvern Hills to the west. As the south-west limits of the Birmingham Air Traffic Control Zone lie only some 15 miles away, the need for good radar surveillance of the area is self evident.

Embakasi Landing System

THE Pye Instrument Landing System for bringing airliners safely to touchdown under all-weather conditions, has been selected by the East African Civil Aviation Authority for installation at the newly developed Nairobi airfield. The use of this airfield, with its 13,500ft runway for the new jet main route through Africa, makes precision radio guidance essential. The equipment has been found suitable for providing such vital service for this latest and most up-to-date of the world's airfields.

Electronics Industry Council

THE formation of an Electronics Industry Council has been announced in London by the Electronic Engineering Assoc-

iation, who with the Radio and Electronic Component Manufacturers Federation and a number of other bodies had been discussing this for some time. The new Council will be concerned with electronic instruments, sound and television transmitters, radio communication equipment, radar and radio navigational aids, computers, industrial electronic control equipment and industrial television and the electronic components used therein. Its constitution will provide for the adherence of associations or federations of manufacturers concerned wholly or partly in the manufacture in the United Kingdom of electronic components, apparatus and equipment except for those used in the broadcast radio and television receiving industry and for public telephone services.

The main function will be to deal with matters of concern to the whole industry while its constituent bodies remain autonomous in their own fields of activity.

The gross output of the industry with which the Council will be concerned is valued at about £200 million annually and is growing quickly. The exports for this

section of the industry, also expanding rapidly, in 1959 were worth approximately £50 million. One of the first tasks of the Council will be to co-ordinate statistics.

New Work for Liverpool Factory

A LIVERPOOL factory which was to have closed is now to be kept partly open. This announcement was made recently by Associated Electrical Industries Limited. The London Electric Wire Company and Smiths, now a subsidiary of A.E.I. announced last November that their Bootle factory would have to be closed because of the rationalisation of cable manufacture within the Group. This announcement was made with much regret and since then continuous efforts have been made to find another use for the factory which is in an area where alternative employment is difficult to find. It has now been found possible to use part of the factory for the manufacture of resistance wire for the Vactite Wire Company, a subsidiary of LEWCOS. Although the number of employees working on this product will at first be small, it is likely to grow. Union leaders in the district and a number of employees have been informed of the new developments.

Plessey win Radio Order

IT is announced by Plessey International Limited that they have received an order from the Canadian Government for C42 VHF radio communication equipment valued at nearly \$5,000,000. It is believed to be by far the largest single order ever received from an overseas country for British VHF radio communication equipment. The equipment will be used by the Canadian Army. This announcement follows the substantial order for similar VHF equipment for the Australian Army received by Plessey from the Australian Government last year. This communication equipment is extremely robust and is the latest multi-channel VHF radio telephone system to have been successfully tried and proved under battlefield conditions. The British, New Zealand and South African Armies have already been supplied with large quantities of identical equipment which was developed by the Electronic and Equipment Group of Plessey in close co-operation

with the S.R.D.E. (Signals Research Development Establishment) of the Ministry of Aviation. The order was negotiated by The Plessey Company of Canada Limited and delivery is expected to begin shortly.

Agreement

AN agreement has been signed in New Delhi between the Indian Government and Marconi's for co-operation in the local manufacture under licence of equipment of Marconi design.

The agreement, which provides also for technical assistance and the supply of materials and components, will form the basis for Indian manufacture of equipment in the aeronautical radio, sound and television broadcasting, communications and radar fields.

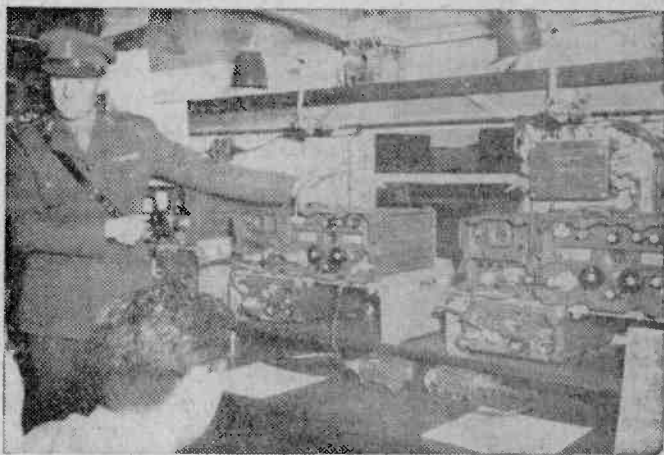
Government Policy towards Electronic Equipment Firms

SPEAKING at the annual luncheon of the Electronic

their activities in the equipment field.

"The Government's policy is to maintain in this country efficient capacity for the design, development and production of aeronautical equipment. It is not our intention to encourage airframe manufacturers to undertake work formerly done by specialist equipment manufacturers. But equally it is no part of our policy to try to prevent them from widening their range of business, provided they do so at their own risk and expense. The Government have invested large sums of public money in Laboratories and other technical facilities at the works of the specialist firms. We certainly do not propose to duplicate these facilities elsewhere at public expense.

"In development and procurement, our objective will be to obtain products of the requisite quality produced efficiently at the lowest possible cost; and our con-



The Plessey C42 equipment shown is installed in a Royal Corps of Signals demonstration vehicle. The equipment, which is the same as that going to Canada, is used to give demonstrations of VHF communication in military establishments throughout the U.K. This photograph was taken at a demonstration staged by Plessey International Limited for Commonwealth Signals officers.

Engineering Association recently, the Minister of Aviation, Mr. Duncan Sandys, said:

"I know that some of you are worried lest the recent mergers in the aircraft industry should have unfavourable consequences for the equipment manufacturers. You may have fears that the big new groups will further extend

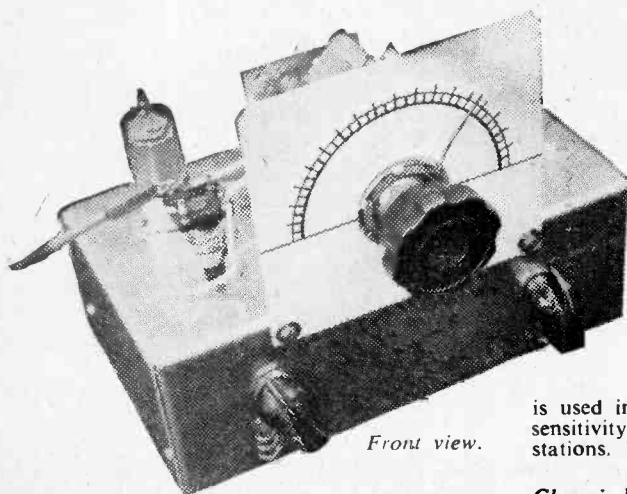
tracts will be placed with this aim in mind.

"What I have said will, I hope, reassure you that we do not intend to support unfair and uneconomic competition against our established suppliers. In so far as the competition is fair and economic, I am sure you will be well able to look after yourselves."

Dual-Band T.R.F.

A ONE VALVE PLUS CRYSTAL
DIODE CIRCUIT FOR HIGH
QUALITY

By R. Morgan



Front view.

WHEN an amplifier is fed with the signal obtained from a radio tuner this allows the equipment to be used for reception of broadcast programmes. Many amplifiers are capable of giving excellent volume, with high quality reproduction, and there are numerous musical and other programmes which are good material for listening to in this way. The tuner described here employs only one valve, so that current may be drawn from the amplifier. Current requirements are 6.3V 0.3A for the heater, and approximately 10mA at about 250V for H.T. In almost all cases this will be available from the amplifier, without any danger of overloading the power supply components.

Chassis Layout

A chassis 7in. x 4in. and 2in. deep will be convenient, with the tuning condenser placed centrally as in Fig. 2. A ball drive with a ratio of about 4:1 is fitted to the condenser. The lug on this drive must be fixed against rotation, and this is done by bolting it to a bracket secured to the chassis, as shown. The front of the drive should stand just forward of the front chassis runner, so that a pointer will clear the dial. The pointer is fixed to the part of the drive which rotates with the gang condenser spindle. If the tuner is to be placed in a cabinet with transparent scale, the dial carries no markings. If not, then it can be marked out with stations, wavelengths, or a simple 0-180deg. scale can be fitted.

If the gang condenser has trimmers, extra trimmers are not needed, but the performance will be improved if separate trimmers are fixed across each section of the coil, i.e. across the M.W. and L.W. windings. If M.W. only is used, extra trimmers are soldered to each set of fixed plates, and returned to a lead going to the chassis, as in Fig. 2. Surplus 30pF air-spaced trimmers, or mica 50pF or 60pF postage-stamp trimmers are satisfactory.

Assembly

The front runner is drilled for the 30k volume control and wavechange switch. The B7G valveholder will require a hole 1/4in. in diameter.

The dual range coils are fastened by two 6B.A. bolts and should be so positioned that both ends can be reached, because separate cores are provided for M.W. and L.W. windings.

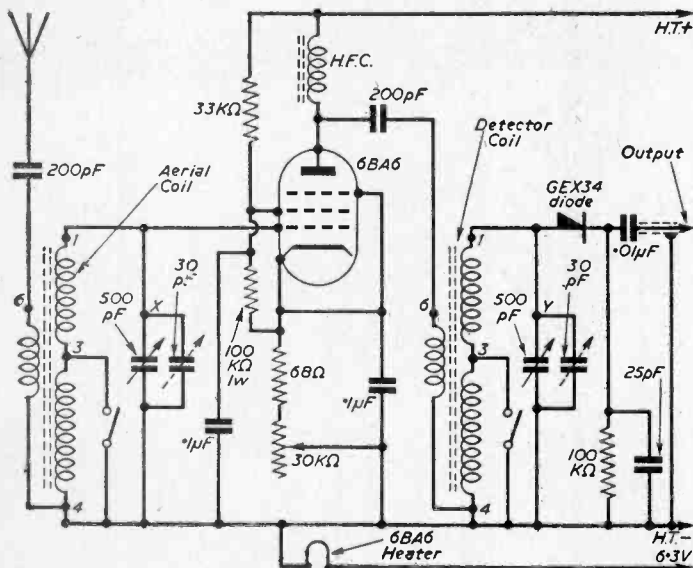


Fig. 1.—The circuit diagram.

COMPONENTS LIST

6BA6 Valve.

B7G valveholder.

Crystal diode GEX34.

Pair of QA 11D coils (Osmor).

(If a dial is to be used, where possible obtain this to match coils).

H.F. Choke (Osmor QC1).

2-pole wavechange switch.

25pF, two 200pF, 0.01μF and two 0.1μF condensers.

2-gang 500pF tuning condenser, two trimmers.

68Ω 33k and 100k ½W, and 100k 1W resistors.

30k potentiometer.

Ball Drive.

Chassis size 7in. x 4in. knobs, etc.

connection of the diode, as in Fig. 3. If the output lead to the tuner is short, it need not be screened which is an advantage, but if hum or instability arises, screening is necessary, the braiding being wired to the chassis, as shown in Fig. 3.

Power Circuit Connections

The chassis forms a common return for heater and H.T. circuits. In some amplifiers, the heater circuit is centre-tapped, either by an actual centre-tap on the mains transformer, or by means of two resistors. If so, the tuner chassis is used for H.T. negative return only. The two heater leads from the valveholder are then kept separate from the chassis, and taken to the amplifier heater circuit. There will then be four circuit connections: two for heater, and two for H.T.

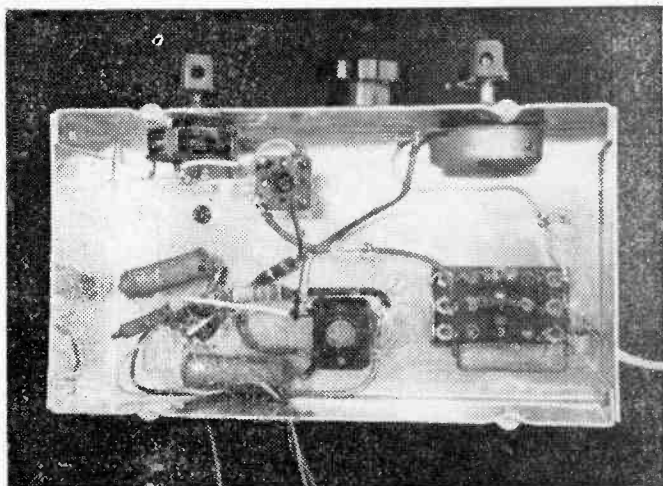
If H.T. current for the tuner cannot be drawn from a decoupled point, a resistor can be added in

Connecting Details

All connections are shown in Figs. 2 and 3, and only a few leads pass through the chassis. The lead "X" goes from the rear fixed plates to the valveholder, as shown, this point also being joined to (1) on the aerial coil. Lead "Y", from the front section of the gang condenser goes to (1) on the detector coil, shown in Fig. 3, the black end of the diode also being joined to this tag.

When the switch is set for medium wave reception, tags 3 on both coils are switched to chassis. A 3-point switch, or 2-pole 2-way switch is suitable; unrequired tags can be ignored. Various points marked "M.C." are soldered to tags bolted firmly to the chassis.

A small tagboard supports the 0.01μF and 25pF condensers, 100k resistor, and also takes the red



Underchassis view.

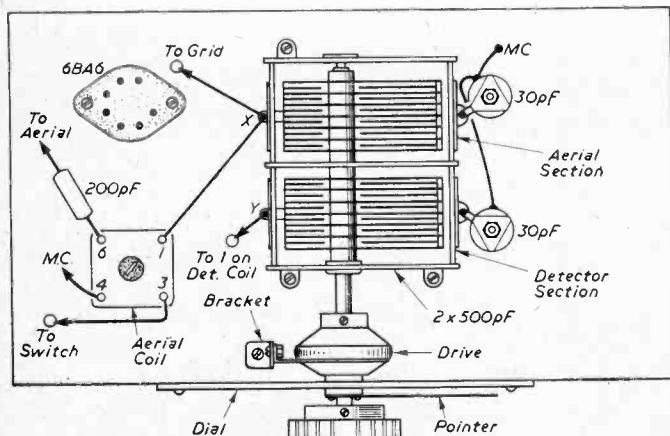


Fig. 2.—Above chassis layout and wiring.

the H.T. lead to the tuner, with a decoupling condenser from H.T. positive, at the tuner to chassis. The resistor may normally be about 5k, but can be of larger value if the amplifier has a 350V supply line about 15k then being suitable. With small or very well decoupled and smoothed amplifiers, this additional decoupling will not be required. The condenser value is unimportant, 8μF or 16μF being suitable.

The tuner is not intended for use with simple amplifiers drawing H.T. directly from the mains. It can, however, be used with these if the chassis is taken to mains neutral. Isolation from the mains is nevertheless preferable, and most amplifiers of other than very simple type will have H.T. drawn from a transformer, so that the tuner chassis will not be alive.

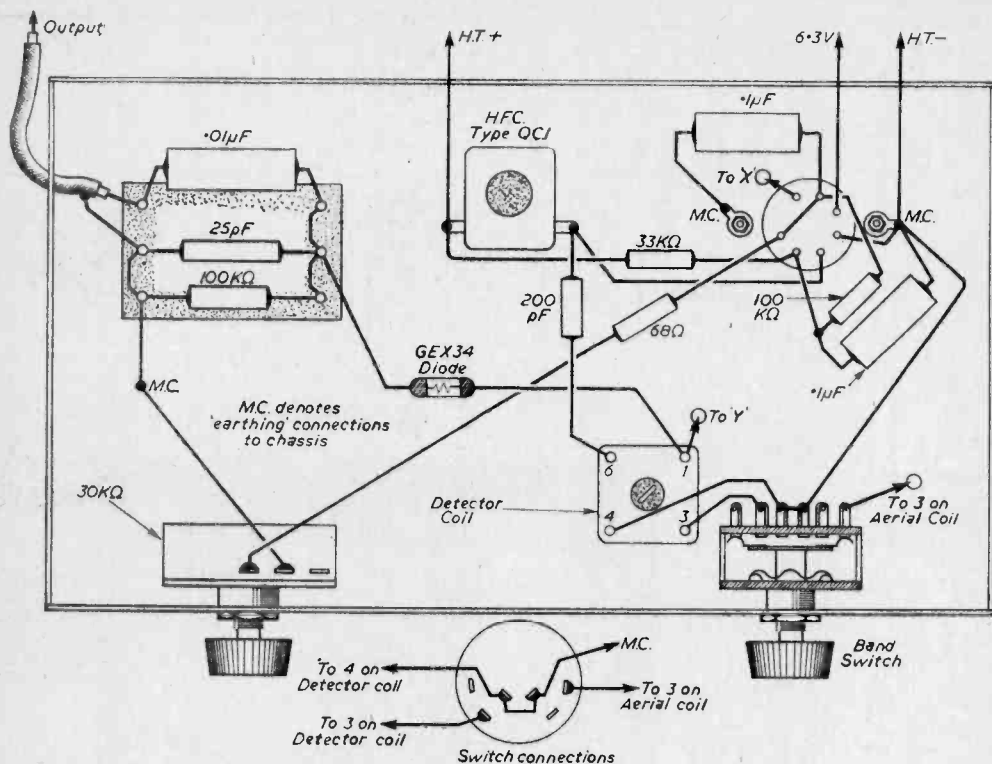


Fig. 3.—Wiring below the chassis.

Core and Trimmer Adjustment

With the switch set for M.W. reception, a station should be tuned in near the low wavelength end of the band (gang condenser nearly open) and the trimmers are adjusted with an insulated tool for best reception. A station is then tuned in near the high wavelength end of the band, and the coil cores at the tagged ends of the coils are adjusted

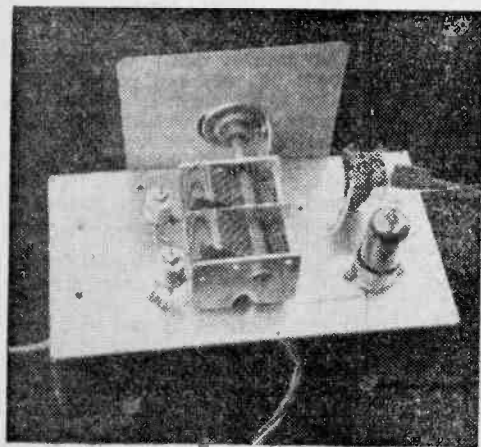
with an insulated blade, for best results. These adjustments should be repeated. Alignment will prove to be very easy with this type of circuit. The pointer positions at which stations tune in will be influenced to some extent by the settings of trimmers and cores, and sensitivity will vary accordingly, and this should be remembered if a dial marked with stations or wavelengths is fitted.

When the M.W. band has been adjusted, the L.W. cores, at the untagged ends of the coils are adjusted for best results, the trimmers being left untouched (unless separate trimmers are used for each band).

MEDICAL ELECTRONICS CONFERENCE

THE Third International Conference on Medical Electronics, organised by the Electronics and Communications Section of the Institution of Electrical Engineers in association with the International Federation for Medical Electronics is to be held at Olympia, London, 21st-27th July this year. A scientific exhibition will be associated with the conference.

Medical electronics applied during high speed flights—supply of oxygen, and measurement of human response under such abnormal conditions—is to be discussed, together with the use of electronics to accelerate escape in emergency. Another interesting factor to come under consideration is the possible use of electronics to counteract boredom and loneliness during the speed flight.

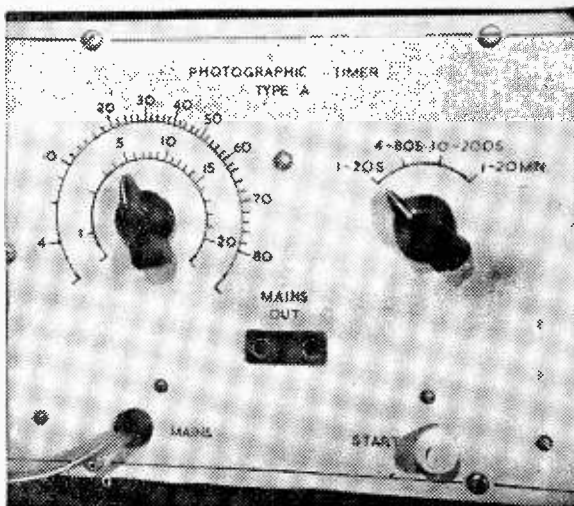


A finished tuner.

Electronic Photo Timer

ACCURATE TIMING OF
LONG INTERVALS

By H. D. Kitchen



The front panel of the finished timer.

THIS article describes the design and construction of an electronic interval timer specifically suited to the requirements of an amateur photographer. A timer is particularly useful for enlarging, the exposure being normally less than a minute. Many photographic processes, such as silk screen manufacture and other "Bichromate" processes require relatively long intervals, of anything up to 15 minutes. If a timer is to be useful for a wide variety of photographic work it is desirable, therefore, that the range of intervals covered should be from about one second to about 15 minutes. A timer covering such a range may also be used to time the development process, as it is now standard practice to develop on a time and temperature basis.

Principles

Many mechanical timers indicate the termination of the required period by means of a bell or other audible alarm. This method is, however, unsatisfactory for periods of a few seconds owing to the

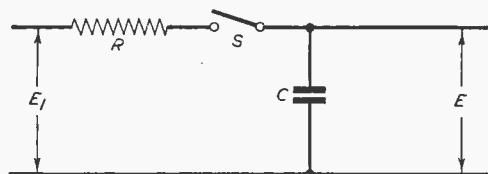


Fig. 1.—Basic R/C timing circuit.

inevitable human delay in switching off the enlarger or other apparatus when the alarm sounds. Although this error is negligible for longer periods, one often starts to do other work during a long period of timing and may be inconvenienced by being interrupted by the alarm. To avoid these difficulties it is very desirable that the timer should be capable of switching lamps off at the end of the required period. By the use of a relay this becomes a simple matter but obviously necessitates some form of electrical control.

A convenient method for determining the timing interval is to use the charging of a capacitor through a resistor. This principle is used in most electronic timers and also in the one to be described. Therefore, the theory behind the

method will be outlined first to show its limitations.

In Fig. 1 is shown a capacitor and resistor in series across a steady potential. If the voltage on the capacitor is initially zero it can be shown that the voltage on the capacitor increases, as it charges, according to the expression

$$\frac{E}{E_1} = 1 - \exp(-t/CR)$$

Time Constant

The shape of the curve according to this expression is shown in Fig. 2 and is the well-known exponential rise. The potential on the capacitor after an interval of time equal to CR is 63 per cent of E_1 . This point is used to define the "time constant" of the resistance capacitance combination. We can devise a simple timer by incorporating a change-over switch and connecting the capacitor to some form of trigger which will actuate a relay when the potential of C reaches some predetermined level. A circuit of this type employing a valve as the trigger device shown in Fig. 3. The operation of this circuit is as follows:

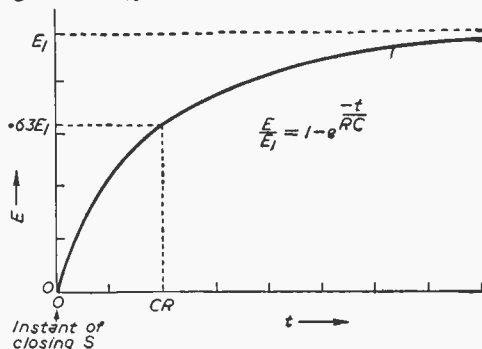


Fig. 2.—Curve showing the exponential charging of the capacitor C in Fig. 1.

Switch S is momentarily thrown into position 2, thus discharging the capacitor. As the valve cathode is held positive with respect to the grid by the "bleed" from H.T.+, the valve will now be cut off. This will de-energise the relay, the contacts of which switch on the controlled apparatus. The switch S is returned to position 1 and the timing period begins, C charging up

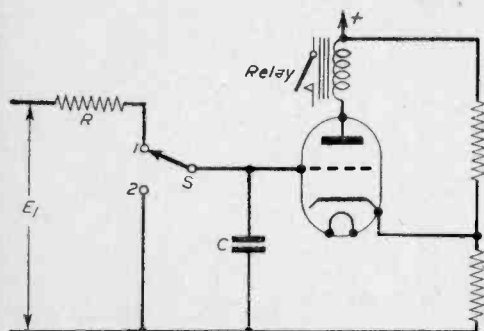
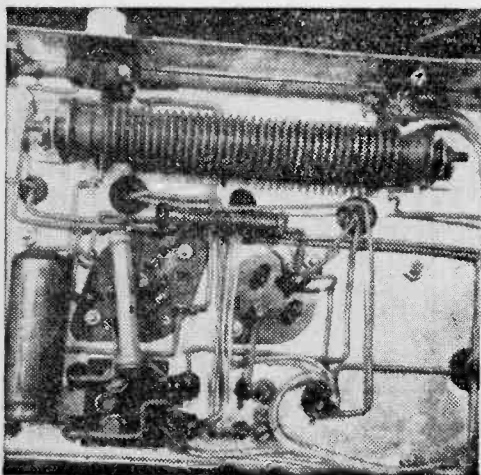


Fig. 3.—Simple interval timer using the basic circuit of Fig. 1.

through the resistor R until, at some point, the valve draws sufficient current to energise the relay and thus switch the apparatus off or on, as required. This situation will persist until the switch S is again momentarily thrown into position 2 to repeat the sequence. If we suppose that the valve draws sufficient current to actuate the relay at a grid potential of E_g , then we may show timing period on the graph of Fig. 2. This has been done and is shown in Fig. 4. Examination of this shows that we may vary the timing period in any of the three following ways:

- by varying the potential E_g at which the valve operates the relay (e.g., by variation of the cathode voltage).
- by varying the charging potential E_1 .
- by varying the time constant of the capacitor resistor combination RC.



Underchassis view.

Results

Each of these possibilities is shown in greater detail in Fig. 5. Taking first Fig. 5(a), representing case "a" above, we see that equal changes in E_g only produce equal changes in the time interval over the bottom part of the curve, where it is nearly linear. As E_g approaches E_1 the time interval changes by an increasing amount for the same change in E_g . If we increase E_g above E_1 the relay will never operate, as the valve cannot pass sufficient current. This effect means in practice that the variation of the time interval with E_g is non-linear, giving a very cramped scale with an abrupt cut-off as E_g approaches E_1 . In the cramped region the voltage E_g will be very critical for a given time interval, as only a very small change in E_g will give rise to a large variation in the interval. Thus, although we could theoretically achieve a wide range of interval by variation of E_g alone, we are limited in practice to a maximum value of about 80 per cent of E_1 , if the device is to have any degree of accuracy. When E_g is 80 per cent of E_1 , the interval obtained is 1.61CR. The scale shape of the method of Fig. 5(a) is shown in Fig. 6(a) when a linear potentiometer is used.

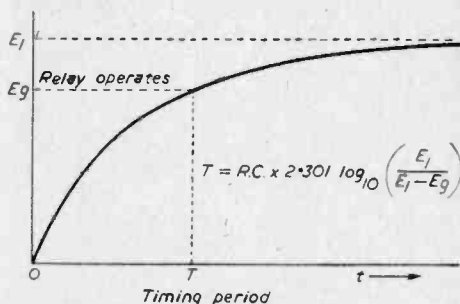


Fig. 4.—Charging curve of the timing capacitor C in Fig. 3, showing the point E_g at which the relay operates and the timing interval T.

Turning now to the second method (b) in which the charging potential E_1 is varied, we find a similar situation to that just described. This is shown in Fig. 5(b), non-linearity between the time interval and the change in E_1 being again apparent. There is a difference, however, between this case and that considered above, in that an increase in E_1 causes a decrease in the time interval. This is because increasing E_1 reduces the ratio E_g/E_1 on which the time interval depends. To achieve a reasonable degree of accuracy, E_g must not exceed about 80 per cent of E_1 , as before. That is, E_1 must not drop below about 1.25 E_g , or, expressed as a percentage, it should exceed E_g by 25 per cent. The scale shape obtained by varying E_1 is shown in Fig. 6 (b), when a linear potentiometer is used.

Varying Time Constant

The remaining method (c), variation of the time constant of the RC combination, is illustrated in Fig. 6(c). In practice variation of the time constant is obtained most conveniently by variation of R, although C could be varied with equal results, if variable capacitors of several microfarads were available. Although, therefore, impracticable when

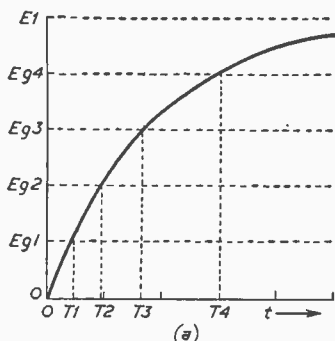


Fig. 5a.—Timing interval obtained when E_g is varied.

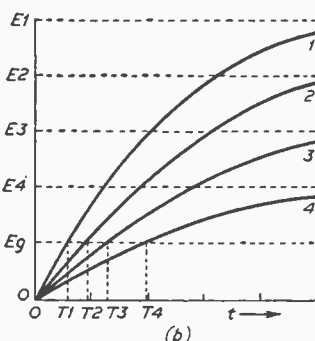


Fig. 5b.—Interval when E_1 is varied.

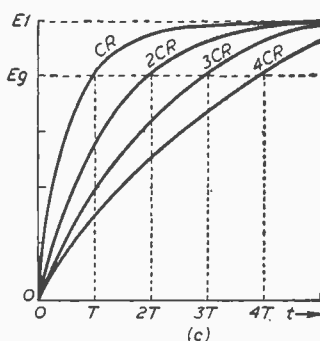
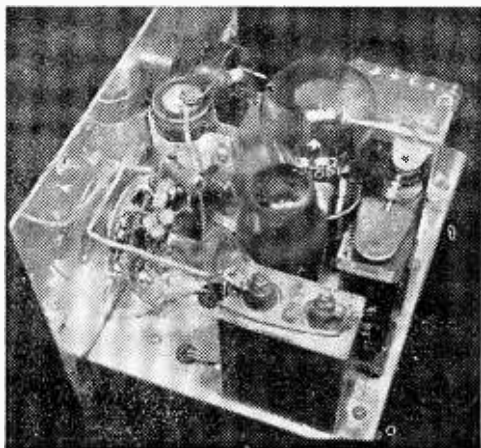


Fig. 5c.—Interval obtained when the time constant CR is varied.

continuous variation of the time interval is required, it is nevertheless possible to use variation of C if variation of the time interval in steps is permitted. The time interval is, in this case, directly proportional to the time constant of the RC combination and the resulting scale shape is



Rear view.

linear when a linear potentiometer is used, as shown in Fig. 6(c). The same remarks as before apply regarding the maximum value of E_g/E_1 and the arbitrary limit of E_g not more than 80 per cent of E_1 will imply a maximum time interval of $1.61CR$.

Of the above three basic methods for varying the timing interval, the last has been chosen in this design because of the linear scale shape. As has been mentioned above, the precision obtained in the timing interval is dependent on the ratio of E_g/E_1 , a value of 0.80 being taken as the limit. Thus, if we require a maximum time interval of 16 minutes, the time constant CR must be 10 minutes. Such a long time constant demands high values of both R and C ,

e.g., $100\mu F$ and $6M$. An electrolytic capacitor is unsuitable in conjunction with a resistor of many megohms, because of its random leakage current, and a paper type would be essential. Paper capacitors of such large capacitance are, however, very bulky and the practical limit is about $10\mu F$, which would necessitate a resistor of $60M$ for the same interval. Variable resistors of such high value are not manufactured and, even if they were, setting its value to give an interval of a few seconds in a coverage of 16 minutes would not be very accurate, to say the least. To obtain a fair degree of setting accuracy over a range of from a few seconds to about a quarter of an hour, it would be necessary to switch in different values of capacitance and give considerable difficulties with providing satisfactory insulation (remember that the variable resistor would be about $60M$). It is obvious from the foregoing that there are considerable practical difficulties with the single time constant type of timer depicted in Fig. 3, when a wide range of intervals is required.

These difficulties can be largely overcome by the use of two separate RC combinations, which are employed in the following manner. The first time constant, $C1R1$, provides a maximum period of about 30 seconds and is continuously variable, using a variable resistor of 1 or $2M$ and an electrolytic capacitor. A second RC combination is used to obtain longer delays and the complete circuit based on these principles will be given next month.

(To be continued)

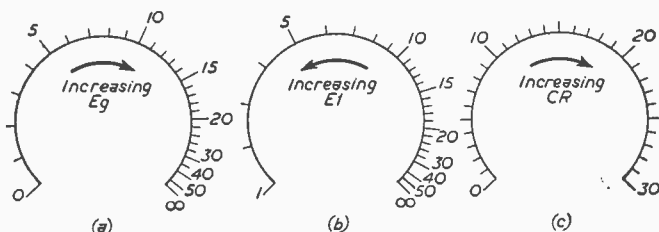
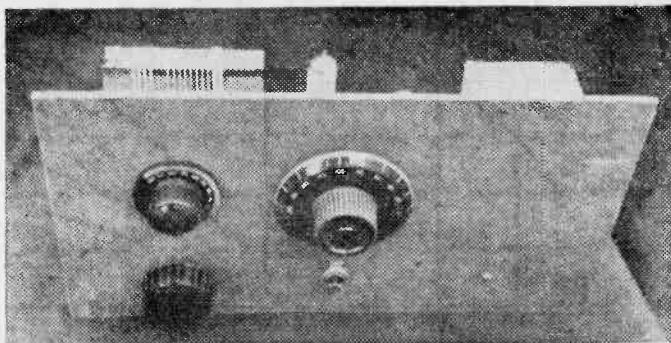


Fig. 6a.—Scale shape obtained when E_g is varied by means of a linear potentiometer. Fig. 6b.—Scale shape when E_1 is varied by means of a linear potentiometer. Fig. 6c.—Scale shape when R is varied with a linear potentiometer.

Wide-band Battery S.W. Two

A COMPREHENSIVE
CIRCUIT WITH WIDE
COVERAGE

By J. Johnstone



The completed receiver.

THIS receiver, described here, operates from a 90V H.T. battery and 1½V L.T. supply, two valves being used in an "all-dry" circuit. Alternatives to the 1S5 and 1S4 are given in the component list and may be inserted with no changes to wiring or components. It is in order to use a 3S4 instead of the 1S4, if this should be to hand or more readily available. If so, it is necessary to join tags 1 and 7 of the valveholder, using this point as filament positive. Tag 5 is then wired to chassis, being filament negative. With this slight modification, alternatives to the 3S4, which include the CV820, DL92, N17, and 1P10, may be inserted.

The circuit is shown in Fig. 1, a home-wound coil of efficient design being arranged to cover approximately 17 to 55m., so that coil changing is not required for 19, 20, 25, 31, 40 and 49m. bands. To obtain this coverage, C1 has to be of fairly large capacity, about 300pF to 400pF being most

suitable. Standard ceramic insulation single gang condensers are satisfactory. A short-wave type condenser is also perfectly satisfactory. The receiver will work just as effectively with other valves, but if the maximum capacity is less, the higher wavelengths will not be reached. Similarly, a 500pF condenser may be used, the band specified then being covered before the condenser is fully closed.

Tuning is actually carried out with the 20pF bandspread condenser, which should be fitted with a reasonably large knob and dial. This exact capacity need not be used, but a condenser of about 15pF to 25pF is most generally convenient, giving a reasonable coverage, yet not being too critical when tuning. The bandset condenser C1 must also have a scale or dial, so that settings can be returned to when necessary.

The use of two valves in a circuit of this type gives a very quiet

background, and very remote stations may be heard with phones. Really long-distance reception is, in fact, possible.

Coil Windings

The coil is wound on a 6-ribbed former 1½in. across the ribs, and notched about 8 turns per inch. A plain former, 1½in. in diameter may be used if the turns of wire are securely fixed to it. Holes are drilled to receive 6B.A. rods about 2in. long, so that the coil can be mounted as shown in Fig. 2.

The 4½-turn aerial coupling winding can be wound first. The beginning of this winding, point 1, is anchored to the 6B.A. rod. Bare, enamelled, or cotton-covered wire of 26 to 18s.w.g. may be used, and 4½ turns are wound on. The wire is then taken down through a small hole, and along inside the former to a terminal, which is used for aerial connection. This is point (2) in the diagrams.

A space of about ¼in. is then

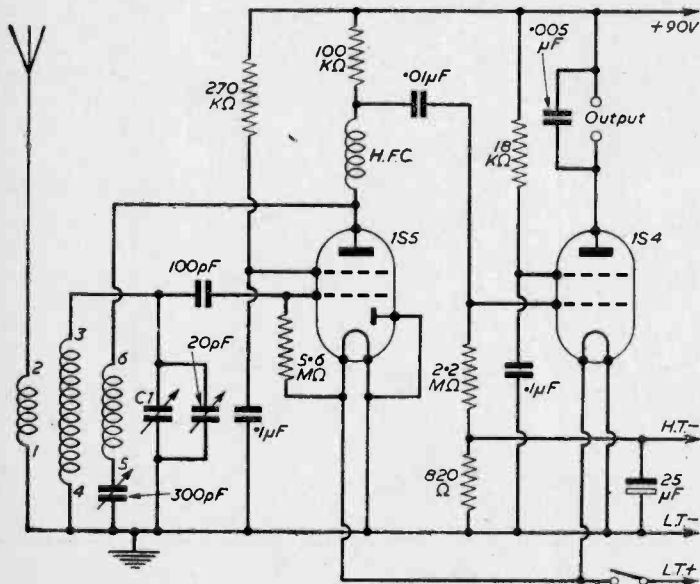


Fig. 1.—The circuit diagram.

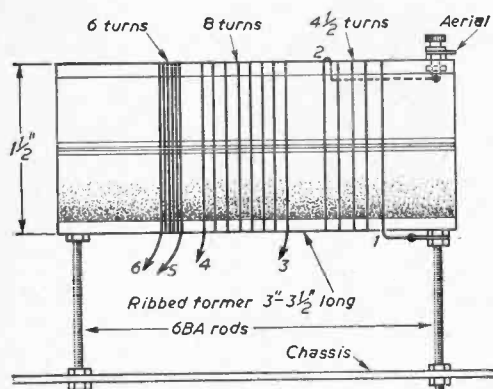


Fig. 2.—Details of the tuning coil.

left, and the 8-turn winding is put on. This can be 22 to 18s.w.g. tinned-copper or enamelled wire. Point (3) is the beginning of the winding, and goes to the fixed plates tag of C1. Point (4) is the end of the winding, and goes to the moving plates tags, and chassis. The wire ends can be anchored by passing them through small holes drilled in the former.

The reaction winding consisting of 6 turns of 26 to 22s.w.g. insulated wire, is now put on. Turns are side by side, and the coil is very near the 8-turn winding. The beginning, point (5) goes through the chassis to the fixed plates tag of the 300pF reaction condenser. The other end (6) passes to the detector anode.

Above the Chassis

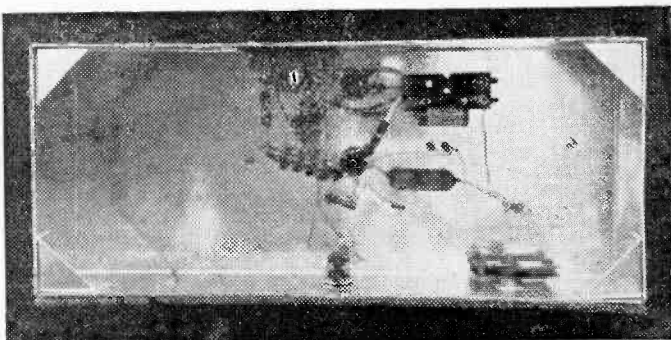
A fairly long chassis will allow the batteries to be accommodated as in Fig. 3, so that the receiver

is self-contained in this respect. Any 1 1/2V dry battery can be used for the filaments. If of the kind made for portables, take positive to the switch and negative to the chassis. Plugs to fit H.T. and L.T. batteries can be purchased from most dealers. A pair of fairly large torch battery cells, in parallel, will also do for L.T. If the card cases are removed, and a metal clip fashioned to clamp the cells to the chassis, this will provide the negative connection. The positive lead, from the switch, can then be fitted with clips, or joined to the cell caps by soldering.

Condensers

The two variable condensers are wired together as in Fig. 3; C1 is bolted to the chassis by means of angle brackets. If a panel-mounting condenser is fitted instead, join the moving plates tag to a tag bolted to the chassis.

Connections, and the approximate positions of parts below the chassis, are shown in Fig. 4. Leads



Underchassis wiring.

in the detector stage, especially to valve and coil, should be short and direct. The polarity of the 25μF condenser should be observed. Some leads pass through the chassis, as explained. Those from

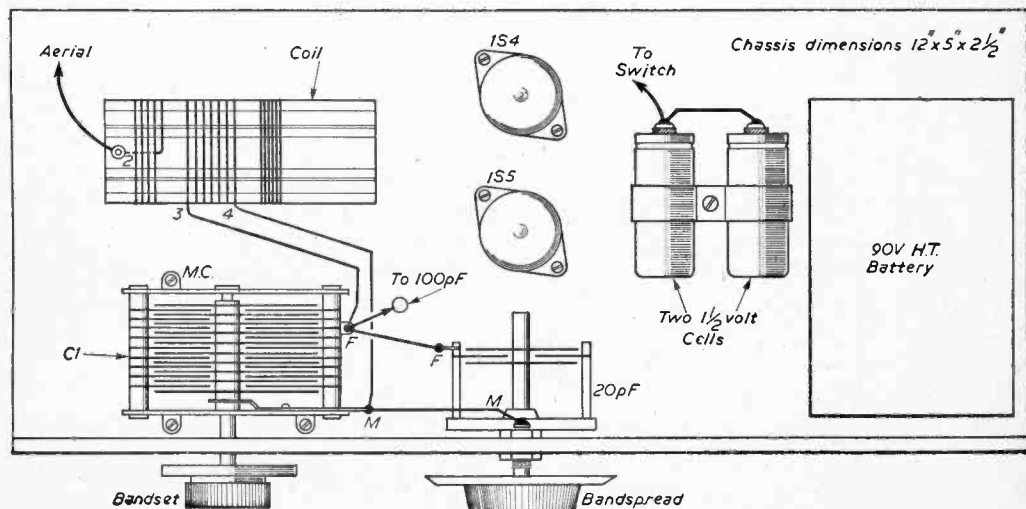


Fig. 3.—Wiring above the chassis.

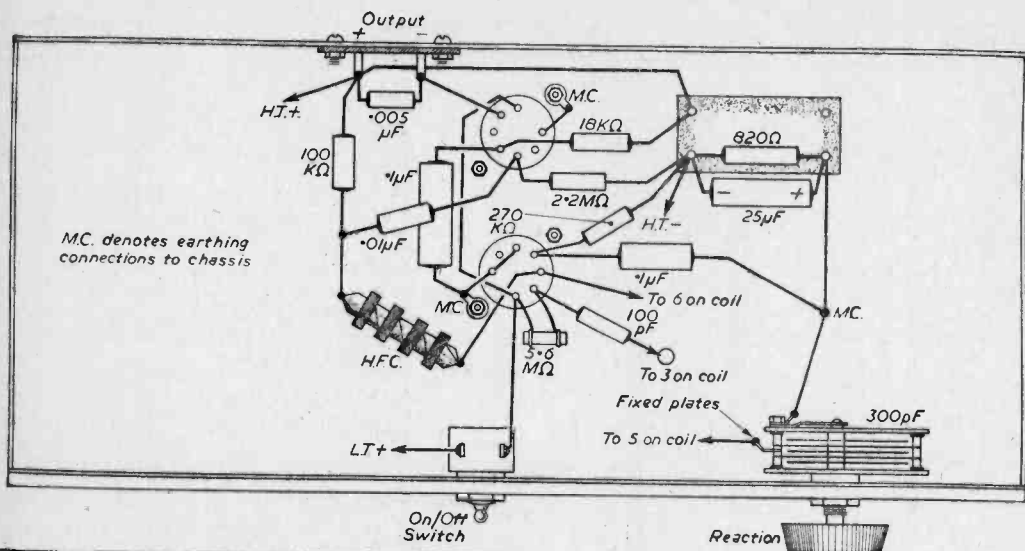


Fig. 4.—Underchassis layout and wiring.

A metal panel is helpful in removing hand capacity effects, or an insulated panel may have a thin sheet of aluminium fitted behind it for the same purpose. This is particularly helpful with short-wave type tuning condensers, but less important with a condenser with metal frame.

Using the Receiver

The valves are inserted in the positions shown in Fig. 3. If an earth is available, it is taken to the chassis. The aerial is connected to the terminal, shown in Fig. 3.

For a 2/3 ohm speaker, the transformer can have a ratio of about 60:1. Its primary is wired to the receiver, and the secondary to the speaker. A moderately large speaker (say 4in. to 6in.) of the kind intended for battery receivers will give best results. It should be fitted in a cabinet.

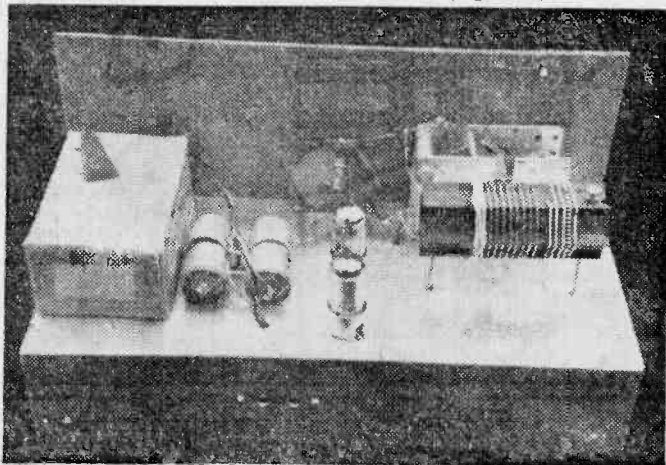
(Continued on page 154)

- Components List**
- 1S5 (or CV784, DAF91, or ZS17).
 1S4 (or CV783 or DL91).
 Two B7G valveholders.
 300pF reaction condenser with knob.
 20pF or similar variable condenser with dial and knob.
 400pF or similar variable condenser with dial and knob.
 Coil as described.
 Fixed condensers: 100pF, 0.005μF, 0.01μF preferably mica, two 0.1μF 250V or similar, 25μF 25V or similar.
 Resistors: 800Ω, 18k, 100k, 270k, 2.2M, 5.6M, all ½ or ¼W.
 S.W. H.F. Choke.
 On/off switch.
 Chassis, panel, 2-way socket strip, battery plugs, etc.

the reaction winding—(5) and (6)—can most easily be the ends of the actual winding, with insulated sleeving added where the wires pass through the chassis.

The output socket strip is bolted to the back runner, and holes large enough to clear the plugs or sockets will be necessary. Battery leads are made from thin flex, and pass up through the chassis. These leads should be fitted with appropriate plugs, or otherwise identified, as the valves will be damaged if the lead from the switch is taken to the H.T. battery in error.

Unused valveholder tags must not touch other tags, leads, or the chassis because in some cases the pins support electrodes. "M.C." shows connections soldered to tags bolted to the chassis in the usual way.



Rear view of the receiver.

Easy-to-build kit-sets of



highest quality at lower cost

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 (£10.10.6).
Total £13.12.6

HI-FI 16W. STEREO AMPLIFIER Model S-88

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

6-TRANSISTOR PORTABLE Model UXR-1

Pre-aligned I.F. transformers, printed circuit, 7 x 4in. high-flux speaker. Real hide case. £15.18.6

DUAL-WAVE TRANSISTOR RADIO UJR-1

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

RES.-CAP. BRIDGE Model C-3U

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

AUDIO SIGNAL GENERATOR Model AG-9U

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

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. 11 MΩ. Complete with test prods leads and standardising battery. £13.0.0

R.F. PROBE Model 309-CU

Extends the frequency range of our V-7A to 100 Mc/s. and enables useful voltage indication to be obtained up to 300 Mc/s. £15.6

5 in. OSCILLOSCOPE Model O-12U

Has wide-band amplifiers, essential for TV servicing, F.M. alignment, etc. Vertical freq. response 3 c/s. to over 5 Mc/s. without extra switching. T/B covers 10 c/s. to 500 kc/s. in 5 ranges. £34.15.0

NEW MODELS include:

Service 'Scope', MODEL OS-1 £18.19.6

Stereo Control Unit, MODEL USC-1 £17.19.6

Single Channel Amplifier MODEL MA-12 £9.19.6

and

'PACKAGED DEALS' of Hi-Fi

Equipment including TAPE DECKS (Collaro or Truvox), RECORD PLAYERS (Collaro or Connoisseur) and DECCA His PICK-UPS.

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



F.M. TUNER



S.88



S-88



DX-40



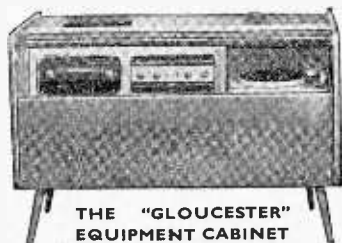
DX-100U



OS-1



UXR-1



THE "GLOUCESTER" EQUIPMENT CABINET

6-W STEREO AMPLIFIER Model S-33

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

TRANSCRIPTION RECORD PLAYER RP-1U

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

HI-FI SPEAKER SYSTEM Model SSU-1

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

"HAM" TRANSMITTER Model DX-40U

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

AMATEUR TRANSMITTER Model DX-100U

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

"GLOUCESTER" EQUIPMENT CABINET

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

Mk. I ... £15.18.6 Mk. II ... £17.8.6

"COTSWOLD" HI-FI SPEAKER SYSTEM KIT

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

COMPLETE MATCHED STEREO OUTFIT

Includes record player, amplifier and twin speaker systems (pedestal speaker legs optional, £2.14.0 extra). £42.10.0

AUDIO VALVE MILLIVOLTMETER AV-3U

1 mV. to 300 v. A.C. 10 c/s. to 400 kc/s. £13.18.6

AUDIO WATTMETER Model AW-1U

Up to 25 w. continuous, 50 w. intermittent. £13.18.6

STEREO-HEAD BOOSTER USP-1

Input 2 mV. to 20 mV. Output adjustable from 20 mV to 2 v. 40-20,000 c/s. Also suitable as high-gain monaural amplifier. £5.19.6

VAR. FREQ. OSCILLATOR VF-1U

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

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

Please send me FREE CATALOGUE (Yes/No).....
Full details of model(s).....

NAME

ADDRESS

PW6

DAYSTROM LTD.

DEPT. P.W.4, GLOUCESTER, ENGLAND

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

NEW! TAYLORMETER Model 127A

20,000 o.p.v. POCKET SIZE!

Performance equal to a high priced instrument

OUTSTANDING FEATURES:

- ★ Sensitivity 20,000 o.p.v. D.C. 1,000 o.p.v. A.C.
- ★ 20 Ranges.
- ★ D.C. Current 50μA, to 1 Amp.
- ★ D.C. Volts 0.3 v. to 1,000 v. (25 kV by probe).
- ★ A.C. Volts 10 v. to 1,000 v.
- ★ 3 Resistance Ranges from 0-20 megohms (self-contained).
- ★ Meter 40μA 3½° arc.
- ★ Accuracy D.C. 3%, A.C. 4%.
- ★ Dimensions 5¼" x 3¼" x 1¼".

Price: £10.0.0

Credit Sale Terms available.

9 monthly instalments of
£1.4.4.

Write for full details.

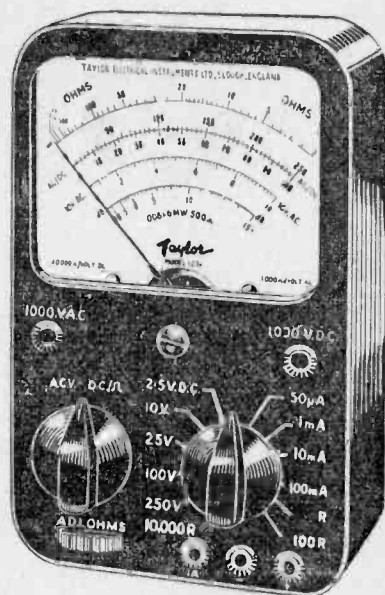
Complete with Instruction Manual and interchangeable test prods and clips. High quality leather case, if required, £2.18.0.
H.V. Probe for 25 kV ... £4.0.9



**TAYLOR ELECTRICAL
INSTRUMENTS LIMITED**
MONTROSE AVENUE,
SLOUGH, BUCKS.

Telephone: Slough 21381

Cables: Taylins, Slough



RADIOGRAM CHASSIS

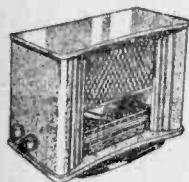
by famous manufacturer

Chassis 16½ x 6½ x 7in. high. Dial in red, gold and brown. 18 x 4in. 1000-2000M; 200-550M and 6-18Mc/s. 4 knobs in front. Ferrite rod aerial; Tone control; Ext. L.S.; P.U.; Ae and E sockets. Gram. mains socket 200-225 v. and 226-250 v. A.C. Valves ECH81, EBF80 ECC83, two EL84 in push-pull. GZ30 rect. Fine value for money at £7.10.0 (7/6 carr.).

A cheaper Radiogram Chassis for £6.10.9 (7/6 carr.). Chassis 16½ x 5½ x 6in. high. Dial in gold and brown 15½ x 4½in. 4 knobs, two at each end. Tone; ext. L.S.; P.U.; Ae; Earth. Valves EZ40, ECH42, EF41, EL41, EBC41. Also by the manufacturer of above chassis.

Coscor Battery Eliminator for 35/- (2/6 post). 90 v. at 12mA and 1.4 v. at 125mA. In two units to take the place of existing batteries.

COMPLETE V.H.F./A.M. RADIO FOR £12.12.



Brand new set, in superb walnut cabinet (size 19 x 8½ x 14½in. 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 tappings. Ferrite rod aerial for A.M. Controls: volume on/off, tone, tuning, w/change. Gram. and ext. speaker position provided. Fully guaranteed. Post and packing 10/- extra. Terms: £3.12.0 down (inc. carr.) and 5 monthly payments of £2. Indoor V.H.F. aerial 10/- extra, cash.

UNIC SHAVERS LTD.,

25 Wordsworth Road, Worthing, Sussex

SPECIAL FOR THE HAMS RADIO STATION

Illustrated

¼ inch detachable bit
soldering instrument
(List No. 70).

Also

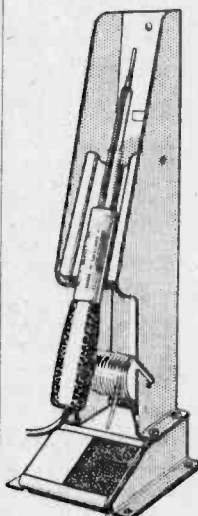
Adcola Protective Shield
complete with accessories
(List No. 700).

SALES & SERVICE

Please Apply:—

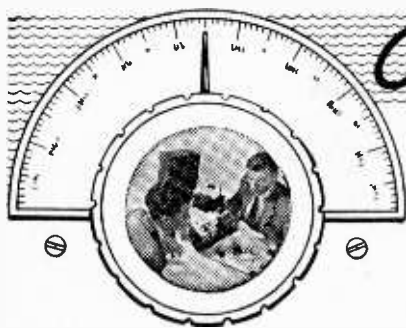
ADCOLA
(Regd. Trade Mark)

**GAUDEN ROAD
CLAPHAM HIGH ST.,
LONDON, S.W.4.**



British & Foreign
Patents. Registered
Designs, etc.

Telephones: MACaulay 4272 & 3101



On Your Wavelength

BY THERMION

Circuitry

IT is interesting to note that, of late, the popularity and use of the metal rectifier are increasing. Although these devices were very popular in the early days of radio, once reliable rectifying valves were produced, they were used in circuits only rarely. True the old metal rectifiers tended to be large and cumbersome, and their valve counterparts were much easier to accommodate, but there is now every justification for their increased use. It has always been impossible for me to understand why more amateur constructors do not make use of them, it could be that their very name conjures up visions of long, multi-finned devices reminiscent of years ago. However such types now appear only when a high current output is required; one of the best methods of effecting the cooling of an operating rectifier is the use of a flow of cool air around plates or fins. Another method of cooling is the use of a heat-sink—generally the chassis of the receiver—to which the rectifier is clamped. The heat generated is then conducted to the large surface area of the chassis which enables its dissipation to the surrounding air to proceed at a much higher rate than if the rectifier itself were air-cooled. This cooling of metal rectifiers is extremely important. Most types have an appreciable “forward” resistance and the current flowing in this resistance gives the usual I^2R losses which appear as heat. If the heat is not dissipated, then the temperature of the rectifier increases and so does the I^2R factor. The temperature will continue to rise and the rectifier may eventually burn out. If, therefore rectifiers with low forward resistance were produced, the heat generated would be less and cooling problems might be eliminated. This has proved possible now that silicon power diodes are available. These, so far as domestic circuits are concerned are little bigger than conventional germanium, signal, diodes and need no heat sink, being air-cooled. The forward resistance is extremely low; one type for TV receivers has a quoted forward voltage drop of 1.1 at a current of $\frac{1}{2}$ A! Reverse voltage ratings are such that at the moment, it is necessary to use two diodes in series for ordinary rectifying circuits in TV receivers driven direct from the mains—the peak reverse voltages must be taken into account. The reverse resistance of these diodes is extremely high and naturally is not the same for every diode. Therefore, when two are connected in series, it is often recommended that equalising resistors be connected across each of the diodes. These may each have a value of, say, 470k. This procedure ensures that

the diodes are subjected to equal reverse voltage stresses which are well within the ratings of the devices.

It is not generally known that with most types of rectifier, it is wise to employ series limiting resistors. These ensure that, when equipment is first switched on, the momentary surge of current (which may otherwise reach a very high value) necessary to polarise the electrolytic condensers in the power pack, does not exceed the rating of the rectifier.

While most constructors will not wish to employ the latest silicon power diodes in their designs they should certainly consider the use of more conventional and well established metal rectifiers; they are not museum pieces and are often used commercially, especially where high currents at low voltages are required. The use of a metal rectifier will often save space and less heat will be generated. The heater current for the valve equivalent will also be saved.

Simulators

THE role of electronics in evaluating the performance of complicated apparatus, etc., was brought home to me recently when I read about the use of an E.M.I. time delay unit for Italy's Harwell. Apparently, one of the biggest problems of the scientists who design and operate nuclear reactors is to ascertain how the coolant circuits of the reactor would behave under certain conditions, such as the sudden failure of the circulating pumps. This could cause serious damage to the reactor unless the control arrangements were adequately designed.

It is obviously impossible to study the potentially dangerous conditions on the reactor itself, but the design information can be obtained from a conventional analogue computer used as a simulator. The most difficult part of the problem is the electronic simulation of variable transport lags and E.M.I. Electronics Ltd. has recently supplied to the Centro di Studi Nucleari di Ispra, Milan—Italy's Harwell—a variable time delay unit which solves the problem more accurately than previously.

Data can be delayed by a continuously variable amount determined by the voltage applied to a “Delay Control” input, which accurately controls the speed of a loop of magnetic tape passing preset positioned record and replay heads. The total range of delay is 0.1 to 10 seconds in three pre-selected ranges.

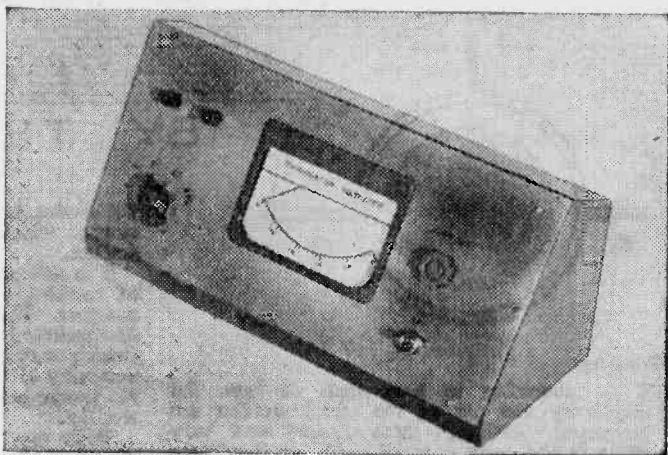
This is only one use of computers to iron out problems of design. They can be used for matters completely unconnected with electronics and they become “black boxes” which simulate accurately the characteristics of the machine, plant or system concerned. No doubt as computer design progresses, they will become more and more valuable in this field.

Transistorised Voltmeter

HIGH INPUT IMPEDANCE
FOR ACCURACY

(Continued from page 26 of the
May issue)

By D. Saull



The completed voltmeter.

THE method of assembly used in this voltmeter is simple, with components on one side of the hardboard sub-chassis and the interconnecting wiring on the reverse, as in printed circuitry. Complete wiring details are given in Figs. 7 and 8 and these show clearly the mounting of the resistors in the input attenuator circuit.

Panel and Case

The front panel is cut from a piece of hardboard, size 11in. x 5½in., with cut-outs to take the meter dial, switch, and 'set zero' control spindles. The front panel carries the on/off switch, and the input terminals, and is secured to the chassis by four lengths of 5/16in. dowel rod, screwed at either end. The dowel rods act as spacers, and their length depends upon the depth of the meter (Fig. 10).

The case is made from hardboard as shown (Fig. 11) and cemented. The front panel is screwed to the case by four ¼in. wood screws passing into strip wood blocks cemented to the inside of the case. The front panel and case is covered with a

plastic adhesive material (a piece 18in. x 27in. is ample).

The 32μF capacitor is housed between the chassis and the front panel and secured by a clip made from a 1in. strip of card bent round and cemented to the back of the front panel.

The 4½V battery is made of three U16 batteries connected in series. A strip of card is wrapped round to form a case, which is in turn cemented to the back of the chassis. The battery drain is only of the order of 1½mA and therefore the battery should seldom require replacing.

The instrument does not require any stabilising time, but may be used immediately after switching on. Likewise it should be switched off after taking the required voltage reading. Under these conditions the battery will last a very long time.

Calibration

The meter should be calibrated on the lowest range (2.5V) from an A.C. source (e.g. a 6.3V heater winding controlled by a potentiometer across it) against an A.C. meter of known accuracy.

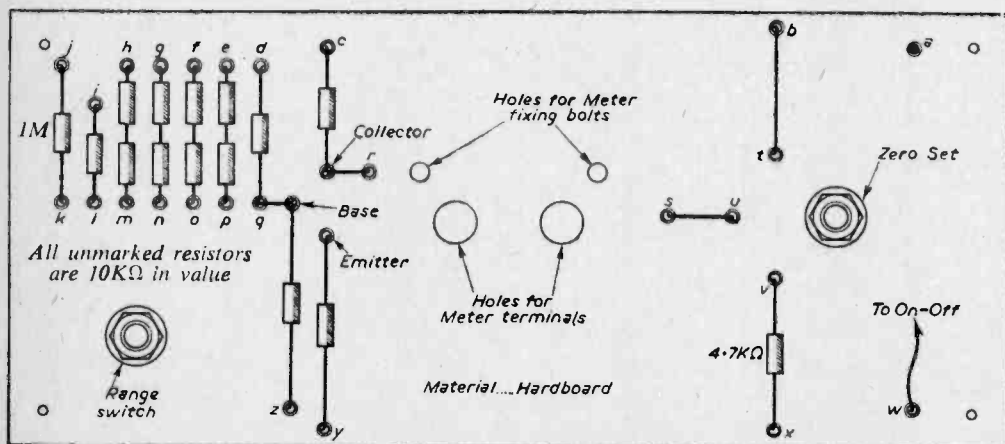


Fig. 7.—Sub-chassis wiring diagram (front side).

The positions of these screws must coincide exactly with screws marked 'B' on Front panel

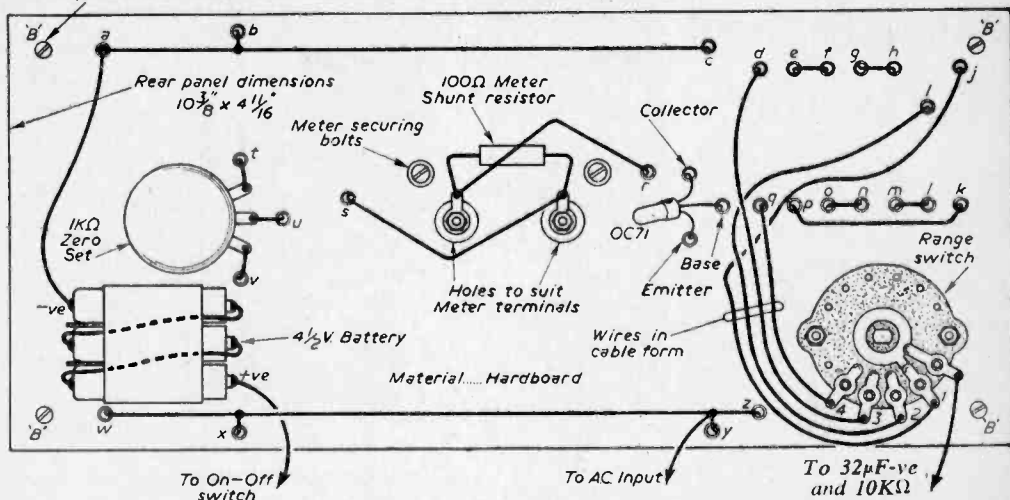


Fig. 8.—Wiring on the rear side of the sub-chassis.

Adjust the shunt resistance across the meter, decreasing its value to decrease the deflection of the meter—resistors in the 100Ω range will probably be required for a 250μA meter until half full scale deflection is obtained with 1.25V input. The characteristics of the transistor in circuit have a slight curve (Fig. 9), but if the calibration is correct at half of full scale deflection, the error will be spread over the complete length of the meter scale, and will be of a small order. An

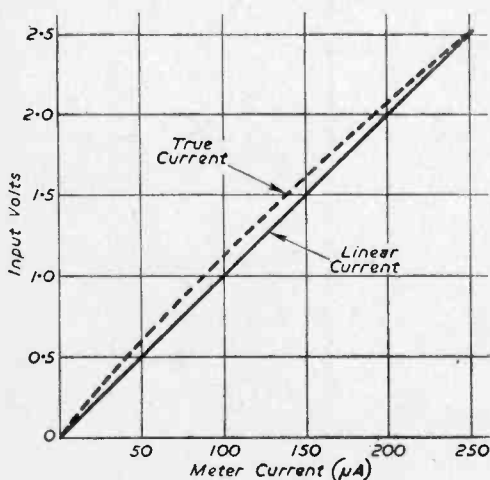
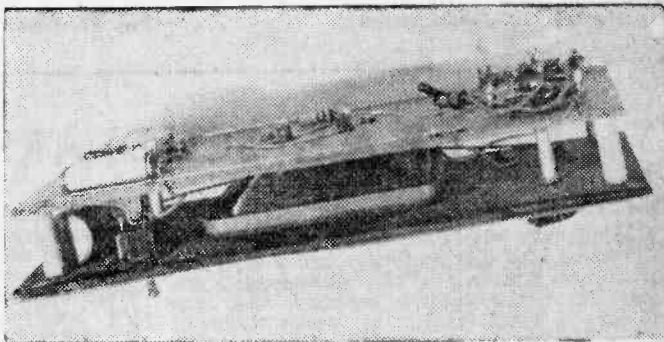


Fig. 9.—Meter characteristic curve.

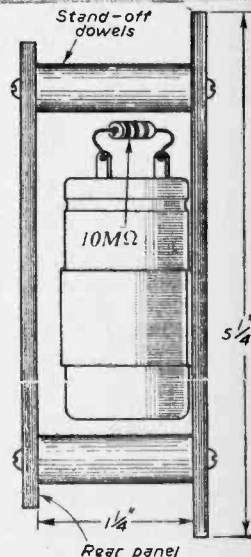


Side view of the voltmeter.

accuracy of better than 5 per cent was obtained with the prototype, except over the initial few degrees of meter deflection, and this is to be expected with all but the highest grade expensive A.C. meters.

A final word of warning, current surges are harmful to transistors and therefore care should be taken to ensure that the instrument is not connected to a voltage in excess of the range to which it is set. Also, heavy inductive circuits broken

Fig. 10.—Mounting the 32μF condenser and the sub-chassis to the front panel.



with the meter in circuit could likewise cause damage to the transistor.

With the necessary care, the instrument should find many valuable uses, and is ideal for use with the Inductance Measuring Instrument described in an earlier issue of *PRACTICAL WIRELESS* (March issue). It may be used at frequencies of 30c/s to the cut-off frequency of the transistor (about 20kc/s for the OC71).

The circuit given is flexible, and it is left to the reader to develop it further as he pleases, their being ample space in the layout for additional components.

An A.C./D.C. range switch could be introduced, shorting out the 32 μ F capacitor for D.C. readings. In this case an additional D.C. calibration would be required, as under A.C. conditions the meter reads the *average* current, whereas with D.C. the meter reads the *actual* current.

Material $\frac{1}{8}$ " Hardboard

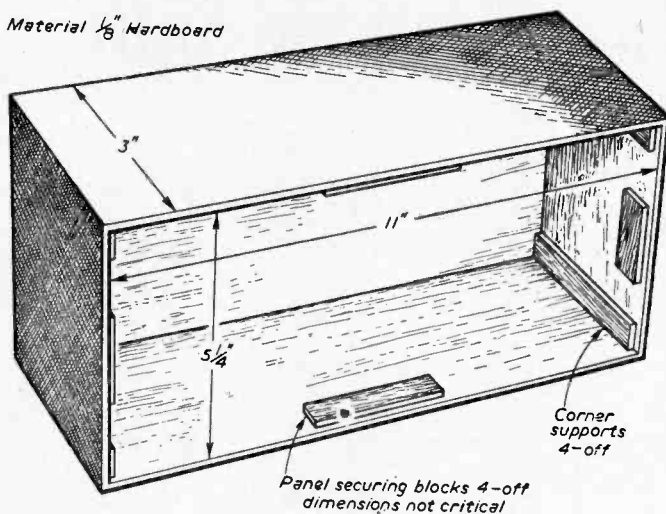


Fig. 11.—Dimensions of the case.

R.A.E. SCHOLARSHIPS

The Scheme

IN conformity with their policy of providing a reserve unit specifically for radio amateurs, 404 Signal Squadron (Press Communications), Army Emergency Reserve, announce that they will offer 12 R.A.E. scholarships to men wishing to become radio amateurs. The scheme is open to fit men between the ages of 18 and 40 who are prepared to enlist in the Squadron for a period of three years. When these men attend annual camp in September 1960, they will be given an intensive course in basic radio and electrical theory, plus a basic morse course. On returning home, they will continue their theory studies by means of a free correspondence course, and at the April 1961 camp specifically designed for R.A.E. candidates, plus more advanced morse training. This will allow them to sit the 1961 R.A.E. and take the G.P.O. morse test shortly afterwards. On completion of training men will be granted the trade of Wireless Operator. Men with good technical aptitude may be given further training to qualify as radio technicians.

Pay, Allowances, Amenities

During training all volunteers are paid at Regular Army rates, plus a Bounty of either £9 or £19 depending upon re-call liability. Uniform, food, accommodation and travel are free. Typical recruit pay rates are:—

£9 Bounty. Single man, £18; married man, £24.

£19 Bounty. Single man, £28; married man, £34.

This is for a 15 day camp. The Bounty part of the payment is Tax Free.

There is a good social life at camp, plus opportunities for sport and shooting. The Squadron has an active radio club and operates GB3AWR at camp. Volunteers who make good progress will be given permission to operate a transmitter from their homes on Service frequencies **before** obtaining the G.P.O. licence.

Obligations

The only peace-time training obligation is to attend one 15 day camp each year. There are **no** compulsory week-end or evening drills, though voluntary training nets are run. All volunteers can be called for full-time service by Royal Proclamation in a national emergency. A certain number of men volunteer for re-call without proclamation. They receive the higher rate of Annual Bounty.

How to Apply

The number of candidates for these scholarships is likely to be high, so early application is essential. Write to:—Major J. A. Bladon, G3FDU, "Madresfield", Jack Lane, Davenham, Northwich, Cheshire.

Please give details of your age, civilian job, Service experience, radio experience, morse reading speed (if any), and whether or not you hold a driving licence. You will then be sent full details of the conditions of service and your name will go forward for a scholarship award.

Men who already hold an amateur licence or who are ex Royal Signals tradesmen will find an interesting and financially rewarding spare time occupation with the Squadron.

An A.F. Phase-Shift Test Oscillator

by D. Noble and D. M. Pratt

A RELIABLE audio oscillator capable of providing a pure sinusoidal tone is an indispensable piece of equipment in the amateur workshop. Its uses are numerous, and without an audio oscillator, there are some tests which cannot

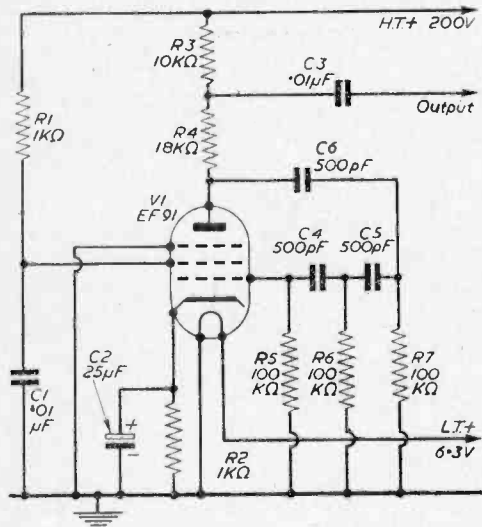


Fig. 1.—The circuit diagram.

be carried out on certain types of apparatus. This oscillator can be used to check the modulation of an amateur transmitter, and to practise Morse code as well as for many applications in audio amplifier design and testing.

The Circuit

A 'phase-shift' oscillator is employed, and this is shown in Fig. 1. The values of the capacitors C4, C5, C6 and the resistors R5, R6, R7 determine the frequency of oscillation and the values suggested in the table are calculated to give a frequency of 1000c/s.

Refinements to the circuits can include an H.T. switch, a potentiometer across the output to provide an adjustment of the output voltage, and a short-circuit type jack socket for a Morse key.



The completed oscillator.

Construction

As can be seen from the illustrations, there are two suggested forms of construction: one of conventional design, and the other employing modern printed circuit techniques. It should be mentioned, however, that the wired version uses a valve with a B9A base, whereas the printed circuit uses a EF91 valve having a B7G base. Also, in the former case, an H.T. switch, output potentiometer and socket, and key jack are provided on the unit.

There are printed circuit kits at present available from PRACTICAL WIRELESS advertisers, and it is intended here to give full constructional details of the printed circuit oscillator so that readers unfamiliar with printed circuit techniques can try their hand at this new method of construction.

The oscillator is built on a piece of copper laminate 2in. by 3in. Having cut a piece of laminate to size, the first step of construction is to cover the copper which is required to form the

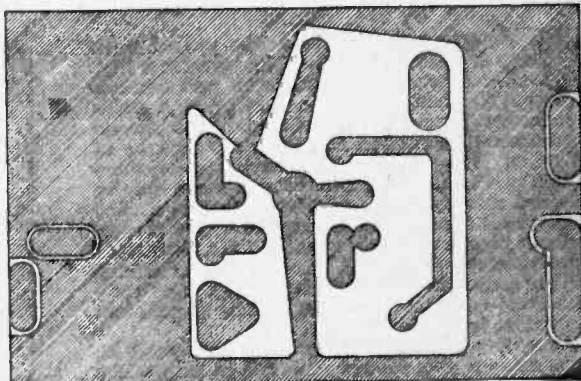


Fig. 2.—The printed wiring (full size).

'printed' wiring with acid-resistant paint. Fig. 2 shows a full scale plan of the panel after it has been painted. This is then etched in the acid, after which the paint is cleaned off with a paint thinner solution. In Fig. 3, the components are shown in position as seen from the under-side of the panel, i.e., the components are actually on the reverse side of the laminate.

Drilling

The next step is to drill the printed panel: the valveholder pins, and the points from which external connections are to be made should be drilled with a 3/32in. drill, and the spigot of the valveholder with a 5/32in. drill. Each end of the resistor and capacitor positions are drilled with a No. 55 drill. This may be done easily by placing

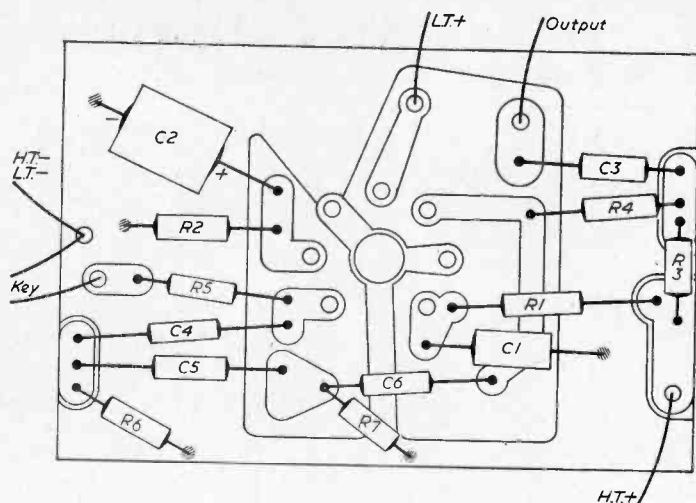


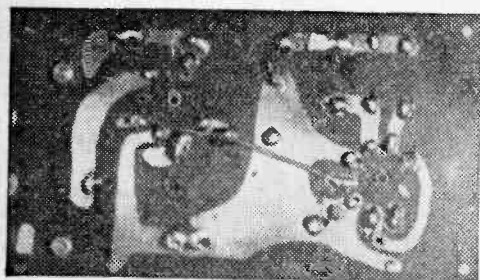
Fig. 3.—The wiring diagram.

Components

Before the drilling is carried out, it is recommended that the constructor obtains the components so that any slight changes in the component positions owing to differences in component sizes can be made. In the prototype the 500pF condensers were of very small size. They were about the same size as the resistors used, while the two 0.01 μ F condensers were a little larger. A special printed circuit B7G valve holder is required, and this may be obtained from most dealers.

It is recommended that small 3/32in. eyelets be fitted into the panel at the positions from which the external connections are to be made. These are provided to prevent the external wire leads from peeling the copper from the panel.

This oscillator unit will operate from a power-pack supplying 6.3V for the EF91 heater, and 200V H.T.



The printed wiring.

the components on the panel and marking the ends of the wires of the components with a centre punch.

SIMPLE BATTERY CHARGER

By S. G. Wood

THE charger here described has proved both cheap and efficient. As will be seen from Fig. 1, a metal rectifier is employed and the low voltage A.C. input required is supplied by a mains transformer. Fuses are inserted as shown to provide a measure of protection and these can each be of 3A rating. The ammeter A is a small one, reading from 0 to 4A. However, a serviceable meter may be obtained cheaply from a car dismantling yard. The resistance R is necessary to vary the rate of charge, and can be a heavy duty type with a resistance of approximately 15 to 20 Ω . As the rate of charge will not exceed 2A, the entire unit may conveniently be housed within a metal box so long as sufficient ventilation is provided.

As with all battery charges, polarity must be observed, and it is always advisable to remove the 'stoppers' from each cell before commencing the charge.

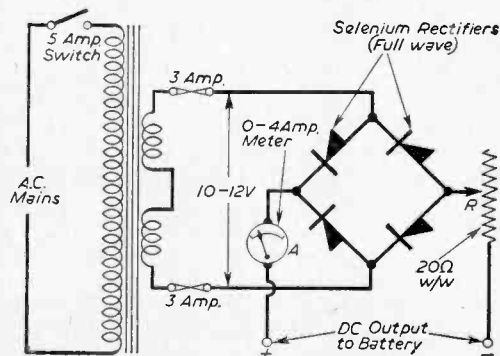
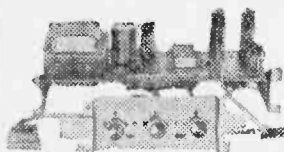


Fig. 1.—The charger circuit.

HARVERSON SURPLUS CO. LTD.

48 Beddington Lane, Croydon, Surrey. THORNTON HEATH 2577

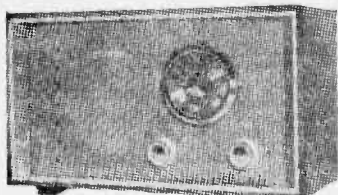


MONAURAL AMPLIFIER

This amplifier as illustrated, made by a leading manufacturer. Mullard valves—ECC83, EL84 x EL84, EZ80. Bass, Treble and Volume on remote panel. Elegant Knobs. OUR PRICE **£6.19.6** plus P. & P. 3/6.

10in. CATHODE RAY TUBE H.M.V. 3/16

Brand new. Guaranteed 12 months. Unrepeatable Bargain at only **21/-** plus 12/6 P. & P. & Ins.

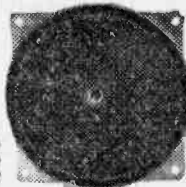


HARVERSON T.R.F. EASY FOUR KIT

All parts and theoretical wiring diagram only.

OUR PRICE **£4.12.6**
Plus P. & P. 3/6.

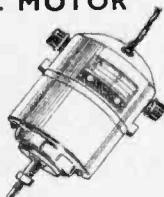
PLESSEY TWEETER



This well-known Plessey 3-ohm Tweeter at our amazing price of **10/6** Tax Paid. Plus P. & P. 1/6.

1/6 H.P. MOTOR

140 Watt (Approx. 1/6 H.P.). Series wound, 220/250 volt 50 cycle motor. Off load 14,000 rev/min. on load 8,500 rev/min. Ideal small saw, sewing machine, etc. **37/6** P. & P. 4/-.



WHY NOT VISIT US?

Our new retail premises at 83 High Street, Merton, London S.W.19 are London's biggest walk around shop. 1,000's of bargains, all enthusiasts welcome, no obligation to buy. 1 min. South Wimbledon Tube

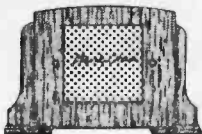
THE WORLD FAMOUS E.M.I. ANGEL TRANSCRIPTION P.U. (Model 17A)



A Pick-up for the connoisseur originally priced at **£17.10.0**. The last remaining few offered at **£5.10.0**. Plus P. & P. 5/-.

EXTENSION SPEAKER

An attractive cabinet 8 x 6 x 2in. fitted with 3 ohm 5in. speaker complete with lead, a few only. **22/6** P. & P. 2/6.



PICK-UP CARTRIDGE BARGAINS

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

Above are just a few examples from our comprehensive stock, all of which are at competitive prices. Please tell us your requirements.

TRANSISTOR

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

DO YOU WANT STEREOPHONIC SOUND?

We have much pleasure in offering you a stupendous bargain, a complete Stereophonic Amplifier, inclusive of Valves (ECL82 x ECL82), panel, knobs, etc., and even two loudspeakers. This is in fact a complete installation, ready for your cabinet. We only have a few, and this offer cannot be repeated at the amazing price of

£6

Plus 4/6 P. & P.

THIS MONTH'S OFFER

B.T.H. 1/4 h.p. Motor, 1,425 r.p.m., 240-250 v., A.C., New **£3.10.0**.
Plessey 6 x 4in. 3Ω Loudspeaker. **14/-** each.
25 amp 2 1/2in. flush mounting meters, new **7/6**.
60 Milliamp Chokes at per **5/-** each.

12 Assorted Pots. Wire wound and carbon. Switched and unswitched—all useful sizes at **18/-** the dozen. Plus P. & P. 1/-.

60 Milliamp Chokes at per **5/-** each.

AMAZING SCOOP—Cossor 10in. Tubes. 108 K. New and Boxed, **21/-** each. Plus P. & P. 12/6.
Twin Padded, Grey, Maroon Tracer Mains Lead. Usually 10d. per yard. Our price **15/-** per 100-yard coil.

IF YOU DO NOT SEE WHAT YOU WANT ON THIS PAGE WE WILL GET IT FOR YOU
Write (enclosing S.A.E. please) for our list of small parts and accessories for the Constructor. Trade willingly supplied.

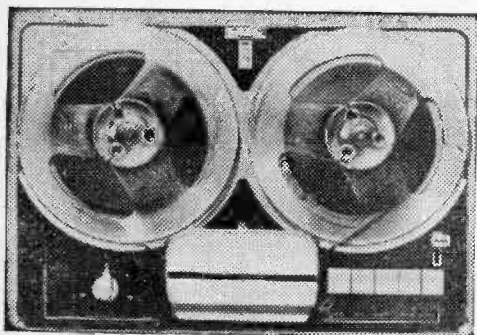
the NEW MOTEX

Patents pending

★★★★★

TAPE DECK

K10



Incorporating many new features and a greater frequency response.

Look

Now restyled in two tones of grey—you must see the new, attractive Motex K10.

★ Frequency response better than 40c/s-12,000 c/s at 7.5" per sec. with extremely low hum pick-up.

★ Enlarged drive wheel on the rev. counter ensures accurate tape positioning.

MOTEX

*makes a better
Recorder*

MODERN TECHNIQUES

Wedmore St., London, N.19. Tel: ARChway 3114

Please send for brochure of K10.



GENUINE GUARANTEED BRITISH TRANSISTORS

FAMOUS MAKES . . . LOWEST PRICES EVER

FLASH! Perfect Mullard OC70 9/-

TS1 (BRIMAR).—L.F./I.F./General purpose 800 kc/s. 4/6.
RED SPOT.—L.F./I.F./General Purpose 900 kc/s. 5/4.
WHITE SPOT.—R.F. Osc./I.F. 3.4 Mc/s. 6/6.
Green/Yellow.—Audio/Output 125 mW. 7/6.
TS3.—Special Offer, a few only, 12/6.
EDISWAN.—XA104, 18/-; XB102, 10/-; XB104, 10/-; XA103, 15/-.
EDISWAN.—Set of Seven Transistors. XA102, two XA101, XB102, XB103, two XC101. ONLY 60/6 per set.
MULLARD.—OC16, 54/-; OC44, 26/-; OC45, 23/-; OC65, 22/6; OC68, 25/-; OC70, 14/-; OC71, 14/-; OC72, 17/-; OC72 (Matched Pair), 34/-; OC170 (70 Mc/s.), 50/-; OCP71, 50/-.
ANY TYPE OF TRANSISTOR CAN BE SUPPLIED.

TRANSISTOR HOLDERS, 1/3. ARDENTE sub-miniature, 1/9.
CRYSTAL DIODES, 1/-; GEX34, 4/-; Mullard OA81, 4/-; OA70, 4/-.
FERRITE ROD.—5 x 1/4 in., 2/6; 6 x 1/4 in., 2/9; 3 x 5/16 in., 1/6.
COILS.—Repanco DRR2, 4/-; DRX1, 2/6; Teletron HAX, 3/-. All complete with circuits.
TUNG CONDENSERS.—Solid, dielectric, 500 pF (0.0005 mfd.), 4/-; 300 pF, 3/9; 100 pF, 3/-; MINIATURE 500 pF, 5/-.
TRANSISTOR CIRCUITS.—MINI 3, 1/3; Mini 7, 1/6; Major 7, 1/6; MAXI "Q", 6, 8d.; Teletron Transdyne, 11d. (Full Kit, £11.17.6); Three Dee, 11d. (Full Kit, 67/6). THE NEW 300-500 mW Amplifier and Feeder Units (6 circuits and plans), 1/6. Twinette 2-transistor Loudspeaker Portable Radio, 1/3.
BEGINNERS 1 VALVE.—Circuit and plans, 11d. Kit, 37/6.
RESISTORS.—All values 10% ± w., 8d.; 1 watt, 9d.; 1% ± w., 2/-.
CONDENSERS.—Miniature, 0.01/100 v., 10d.; 0.1 mfd./100 v., 1/2; 0.005/200 v., 10d.; Standard size 0.01/1,000 v., 8d.; 0.1/250 v., 8d.; 0.1/500 v., 10d.; 0.5/350 v., 1/10.
ELECTROLYTICS.—(Can Type) 32-32/450 v., 6/6; 100-200/275 v., 8/9; 60-250/275 v., 8/9; 64-120/350 v., 9/6; 60-100/275 v., 7/-; 24-24/350 v., 4/6; 100-100/200/275 v., 13/-; 60-50-50/350 v., 9/10; Wire ended, 16 mfd./450 v., 2/-; 25 mfd./25 v., 4/-; 8-8/450 v., 2/9; 8-16/450 v., 2/8; 50 mfd./50 v., 1/6; 25 mfd./25 v., 1/9; 100 mfd./6 v., 2/3.
Miniature, 25 mfd., 2/6; 50 mfd., 2/3; 8 mfd., 2/3; 2 mfd., 2/6.
SUB MINIATURE, 32 mfd., 25 mfd., 16 mfd., 8 mfd., 4 mfd., 2 mfd., All 3/6; 100 mfd., 2/-; 0.1 mfd., TCC, 4/-.
CONNECTING WIRE.—Six assorted colours, 1 yard of each colour 1/9; 2 yards of each colour 2/9; 10 yards each colour 10/6.
TERMS: Cash with Order (or C.O.D. on orders over £2).

OAKFIELD RADIO

THE TRANSISTOR PEOPLE

Mail Order Only

44 Oakfield Road, Stockport, Cheshire

A television course for you to study at home

*Entirely new! Practical!
Bang up to date!*

THE FAMOUS BENNETT COLLEGE OFFERS YOU THIS

An entirely new course of study based upon up-to-date techniques has now been prepared by The Bennett College.

The course is non-mathematical, and contains clear diagrams, starting from the very beginning (even including the basic principles of sound radio receivers, if desired) and covering all that you need to know!

This is what you've been looking for! A home-study course includes: production

of the signal, scanning and reproduction of picture from signal. Aerials, types and purpose. The cathode-ray tube. Time-base oscillators, and output circuits. Synchronisation. Video frequency amplifiers. The TV tuner, turret, incremental, etc. Television test gear. Television faults.

For more details, fill in the coupon below. Your studies cost little, the book you need is included in the cost.

To THE BENNETT COLLEGE (Dept. Fro4 TV Sheffield)

Please send me details of the new
TELEVISION SERVICING COURSE

NAME _____

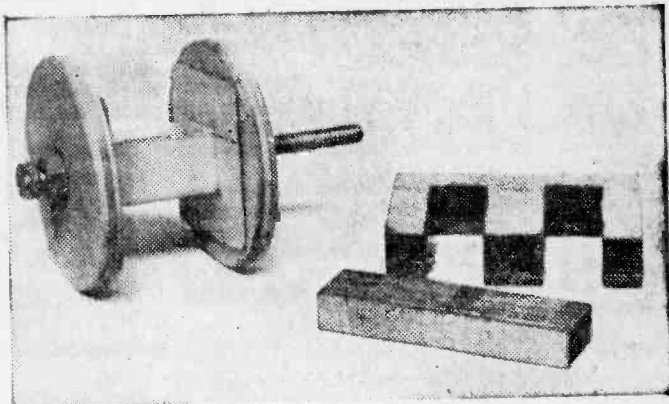
ADDRESS _____

AGE _____

Interstage Transistor Transformers

PRACTICAL INFORMATION
FOR HOME CONSTRUCTION

By D. Saull



Coil former and lamination stack.

WHEN considering the output stage of an amplifier the chief concern is matching the output impedance of the final stage to the speaker impedance. The former is usually hundreds of ohms, and the latter three ohms. A transformer is now almost a necessity in the circuit design. There are various methods of dispensing with an output transformer, such as using a low impedance power transistor and a high impedance speaker, but the former device draws heavy battery current, and high impedance speakers are expensive and more difficult to obtain, and so, in most cases, a matching transformer is used. The design of such a transformer for use with a Mullard OC72 output stage, working single-ended, will be considered in a future article, and a practical design given.

The earlier stages of an amplifier may be conveniently resistance-capacity coupled. However, greater gain, with perhaps subsequent omission of one or more of the stages, may be obtained if transformer interstage coupling is used. In this article the design of such transformers is considered.

An output transformer is a power transfer device; an interstage transformer is a current

transfer device. Consider an OC71 transistor (very similar to the "red spot" variety) working class A in an audio amplifier (Fig. 1). We require to transfer the current value flowing in the collector circuit of the preceding stage, to the base/emitter circuit of the following stage, and during this process achieve a current gain. This may be effected with the aid of a current step-up ratio transformer.

Designing Interstage Transformers

A M. and E. A. No. 21 lamination in the silcor 25 grade will do well (or any lamination having a cross-sectional area of core approximately 0.2sq. in.).

The primary inductance of the winding should be of the order of 1.5-2H, which must carry a D.C. component of 1mA (the steady D.C. current of an OC71 transistor working class A).

The method of evaluating the number of turns required to obtain the necessary inductance value, and the choice of wire gauge to fill the bobbin will be given in the future article previously mentioned. This article is given for those who prefer a practical design from which to work.

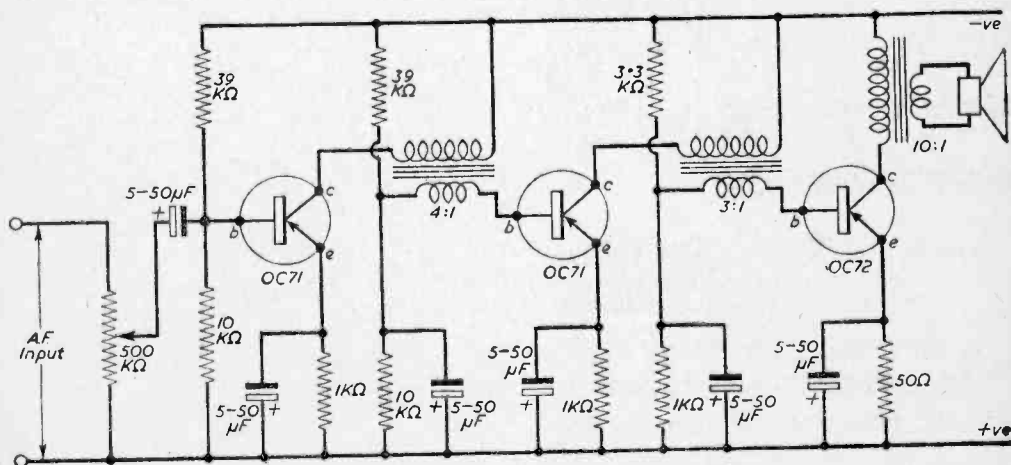


Fig. 1.—The circuit diagram of the amplifier.

In Fig. 2 is shown a pair of No. 21 laminations drawn with dimensions, and details of the bobbin construction are illustrated in Fig. 3.

The wooden winding block is made of soft wood, size 7/16in. x 7/16in. x 3in., and the bobbin cut from a post-card. Adhesive is used for cementing the bobbin together, lightly smeared on the two surfaces.

The wooden winding block is cut to the exact length of the bobbin and drilled down its centre to take a 4B.A. bolt. Two end cheek supports are then cut from 1/2in. plywood and drilled to take a 4B.A. bolt. The bobbin cheeks are pierced to take the lead-outs from the windings and assembled as illustrated in Fig. 3.

Turns Ratio

A 3:1 turns ratio is required for the coupling transformer between the second OC71 and the output transistor OC72; a 4:1 turns ratio between the first and second OC71. The primaries of both transformers are identical, only the secondary turns differ.

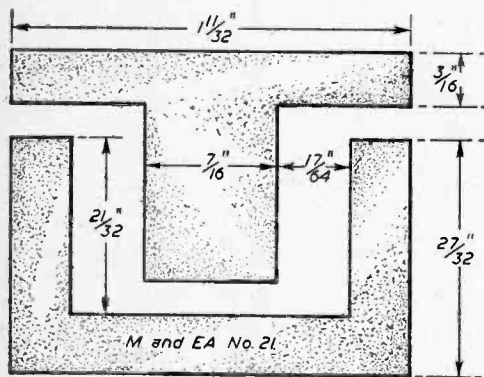


Fig. 2.—A No. 21 lamination with dimensions.

4:1 Ratio

Primary: 1000 turns of 36s.w.g. enamelled copper wire.

Secondary: 250 turns of 36s.w.g. enamelled copper wire.

3:1 Ratio

Primary: 1000 turns of 36s.w.g. enamelled copper wire.

Secondary: 333 turns of 36s.w.g. enamelled copper wire.

The bobbin may be conveniently rotated in a hand-drill, and if a black line is painted on one of the plywood cheeks, counting the number of turns on is made easier. The wire should be wound on as evenly as possible, although it does not matter if the wires cross. Care should, however, be taken not to scratch the enamel covering on the wire. If this occurs a short-circuited turn will be made and the primary inductance will fall in consequence.

Wind the primary on first (as primary and secondary wire gauges are the same). The inductance may then be checked if desired before winding on the secondary turns.

Two turns of thin paper should be wound round the first winding before commencing the second winding. When the bobbin has been wound it is laminated (interleaved) and the transformer is then ready for connecting into the circuit.

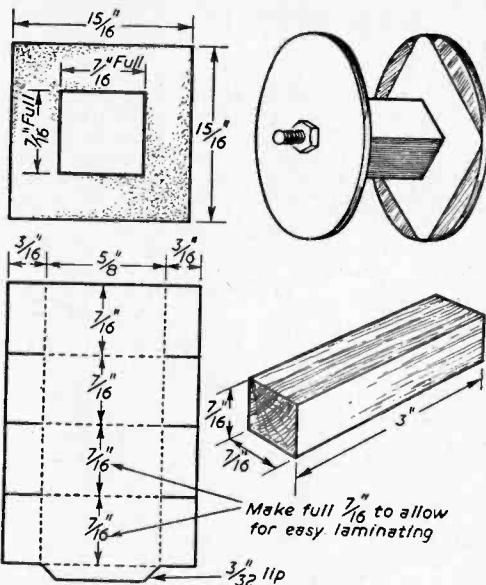


Fig. 3.—Making the coil former.

APPOINTMENTS

It is announced by A.E.I. Ltd. that Mr. L. C. Richards, until recently Chief Engineer of their Transformer Division at Manchester, has become Chief Engineer to Heavy Electricals Ltd., India. He is seconded to this position from A.E.I. Overseas Ltd., to whom he has been transferred. Mr. Richards joined the British Westinghouse Co. in 1915 and after the war joined the Transformer Engineering staff. He became Assistant Chief Engineer, Transformer Department, in August 1950, Chief Engineer Transformer Department, in October 1950 and Chief Engineer to the Division on its formation in 1959.

Mr. E. M. Whitaker, B.Sc., A.M.I.E.E., has joined Associated Electrical Industries (Woolwich) Ltd., as Assistant to the Commercial Director, Mr. J. W. Ridgeway. Mr. Whitaker will be located at 155 Charing Cross Road, London W.C.2. He joined the British Thomson-Houston Co. in 1931 as a school apprentice.

Mr. Joseph Samuels, who as a member of the Board of Winston Electronics, Ltd., Shepperton, Middlesex, has been Purchasing Director for several years, has now been appointed Works Director in charge of production. Mr. Samuels, who is 49 years old, was educated at St. Mary's College and Imperial College of Science. Before joining Winston Electronics in 1954, he was for several years with Standard Telephones and Cables and later Sunvic Controls of Associated Electrical Industries, Ltd. He joined the Board of Winston Electronics in 1956.

Making your Own Chassis

SECRETS OF THE TECHNIQUE

By V. E. Holley

CHASSIS making is an operation which constructors often avoid by purchasing the ready-made article. He who takes his hobby seriously, however, will have a continuing requirement for chassis of all shapes and sizes and will find it both economical and convenient to make

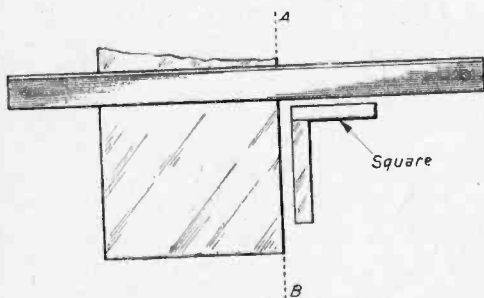


Fig. 2.—Using the clamp and square to form a straight edge at right angles to AB.

them. It is the aim of this article to show how this may be done with the minimum of tools and equipment.

Materials

The main purpose of the chassis being to hold the components together (or to keep them apart) there is no basic reason why it should be made of any particular substance. Mild steel and aluminium sheet are commonly used, the former for cheapness, the latter because it is easy to work, has superior screening properties and is non-magnetic. Aluminium is therefore the choice for the home constructor except for certain specialised jobs

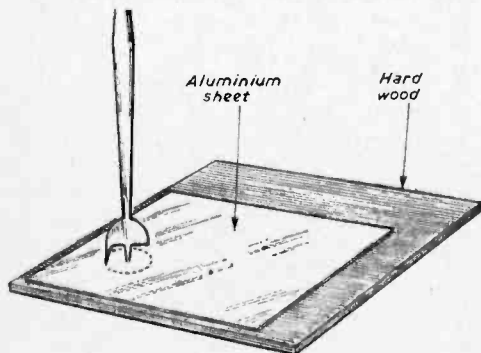


Fig. 3.—Cutting with a centre bit.

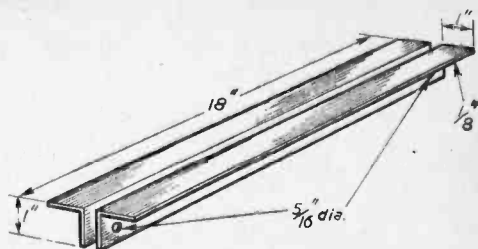


Fig. 1.—The "clamp."

where connections to the chassis must be soldered. Sheet of 20s.w.g. is suitable for light screens, small boxes and chassis up to 3in. x 3in. with no heavy components; 18s.w.g. will do for chassis up to about 10in. x 6in. with no abnormal loading, and 16s.w.g. is suitable for larger and stronger jobs.

Apparatus

It is assumed that the constructor has access to a bench having a vice firmly attached to it. Beyond this there is one inexpensive but essential piece of equipment which must be acquired and which for want of better description will hereafter be referred to as a "clamp". For this, two pieces of mild steel angle 1in. x 1/2in. and 18in. long are required and it is important that they are straight and true. Holes must be drilled at the ends and the two pieces bolted together as in Fig. 1. The holes must be accurately positioned and are best made by lining up the two pieces of angle in the vice and drilling through both in one operation. If the holes

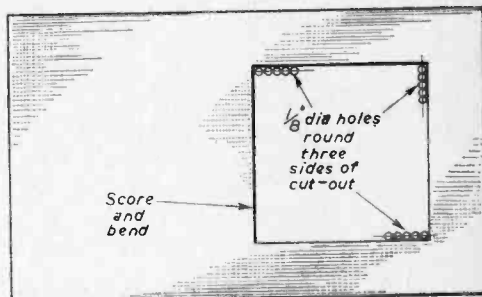


Fig. 4.—Making a rectangular cut-out.

in one piece can be threaded to receive the bolts, so much the better; otherwise nuts can be used. The bolts should not be smaller than 1/4in. and the heads should be slotted for a screwdriver.

Cutting Sheet Metal

It is inadvisable to cut aluminium with snips or shears because these tools are liable to stretch and distort it. The following method is quick and easy and produces a straight and true edge requiring no subsequent attention. First mark out the line of cut and holding a steel rule or similar metal straight edge firmly along it, score the aluminium heavily with the point of a penknife. Go over the line several times in this way (up to 12 times for 16s.w.g.), so that the metal is appreciably weakened

and then set it up in the right-hand end of the clamp in such a position that the score is about $1/32$ in. above the surface and facing the operator. Tighten the bolts and grip the clamp in the vice close to the left-hand edge of the metal. A stout piece of board about 6 in. wide and having a reasonably true and flat surface should now be

special tools sold for the purpose, but these are expensive and there are alternatives. Twist drills, operated slowly, are satisfactory up to $1/4$ in. and a hole of this size can be enlarged to $1/2$ in. for a B7G socket without much difficulty by shaving the circumference with a penknife having a small narrow blade. Do not attempt to cut too deeply at each stroke.

Circular Cut-outs

Holes of $1/4$ in. diameter and above can be made with a carpenter's centre bit of appropriate size and of the type shown in Fig. 3. Place the metal on a piece of hardwood and with a twist drill make a small hole for the point of the bit to enter. Apply the bit to the metal and as soon as the outer cutter comes into contact with the surface, lubricate it with methylated spirit to ensure smooth cutting. Rotate the bit with light pressure till the outer cutter is completely through the metal. Clean up the hole with a penknife.

Rectangular Cut-outs

Small rectangular holes are best dealt with by cutting a circular hole of appropriate diameter and then squaring it with a file. Large ones can be cut by drilling three or four $1/4$ in. holes at the corners as in Fig. 4 and running them into one to form a slot into which a hacksaw blade, held in a pad handle, can be inserted to make the cut. If three sides are so cut the fourth can with advantage be dealt with by scoring and bending.

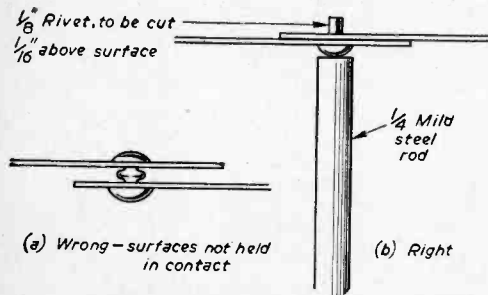


Fig. 5.—Riveting.

laid against the aluminium and the whole bent firmly and evenly away from the operator to an angle of about 45deg. Transfer the wood to the opposite surface and bend the metal back 20deg. or so. Repeat till the metal separates. If a large sheet has to be cut, it may not be possible to hold the clamp satisfactorily in the vice, but the difficulty can be overcome by fixing it temporarily to the edge of the bench with a couple of stout wood screws through the holes normally occupied by the bolts.

Bending

Good sharp bends can be made by the same method, but in this case care must be taken not to score the metal too deeply or it will be unduly weakened. In making a bend, the metal should be folded over in one operation when it will be found that the bend will go to about 85deg. If the metal is then raised in the clamp about $1/4$ in., a little more pressure will take it to 90deg.

Shaping

To produce a straight edge on a piece of sheet put it in the clamp with the irregular edge protruding and shave off the irregularities with a file. If it is desired that the new edge shall be at right angles to an existing edge, this can be ensured by adjusting the position of the sheet with the aid of a square applied between it and the bottom edge of the clamp as shown in Fig. 2.

Drilling

Aluminium being a soft metal, is best cut slowly by hand. A power drill tends to "walk about" in the metal and to the operator's surprise and chagrin, the hole may turn out to be in the wrong position although accurately marked beforehand. Large holes are, of course, best cut with one of the

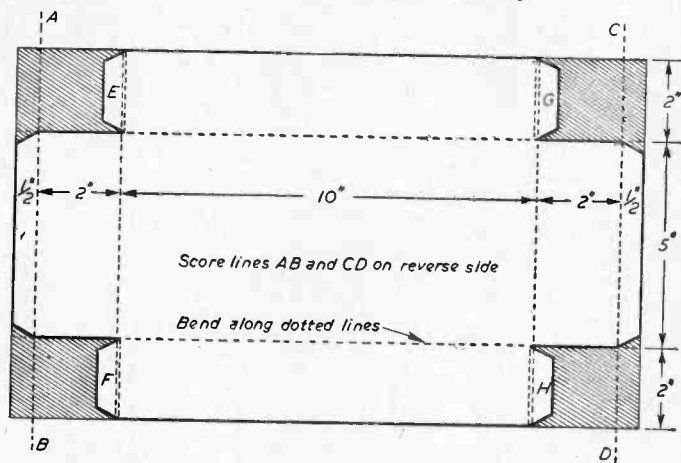


Fig. 6.—Preparing a chassis for bending.

Riveting

Rivets are a convenient and economical means of fastening for aluminium and give a professional appearance. The aluminium round-headed type, $1/4$ in. in diameter, is very suitable for general purposes and can be used for securing valve bases, small chokes and transformers, etc., as well as in the making of chassis. It is easily drilled out when required. Successful riveting requires that the rivet shall be a close fit in the hole and that it and the two surfaces to be joined shall be held in close contact during the operation. If this is not done, the rivet will bulge between the surfaces as shown

in Fig. 5 and close union will not be achieved. The head of the rivet must also be properly supported and a useful tool for this purpose can be made from a piece of $\frac{1}{2}$ in. mild steel rod about 9 in. long. Square off one end and drill it out to a concave form into which the head of the rivet will fit neatly. The rod can be held in the vice and the concave end inserted into otherwise inaccessible positions in chassis where riveting may be required. The operation is shown in Fig. 5. The tail of the rivet should be cut off about $1/16$ in. above the top surface and then hit with a light tack hammer; fifteen or twenty light taps will produce a better result than a few heavy blows. If a flush finish is required the hole can be countersunk and the tail of the rivet tapped level with the surface.

Marking out

Let us now suppose that a chassis 10 in. x 5 in. x 2 in. is required, with a $\frac{1}{2}$ in. flange at each end for securing it to a cabinet as in Fig. 6. To allow for trimming and squaring off a piece of 18 s.w.g. aluminium a little larger than 15 in. x 9 in. will be required. If one of the long sides is not already straight and true, it should be made so by the method already described and the chassis can then be marked out with a square and steel rule, working from this edge. Holes and cut-outs can also be marked at this stage if desired but none should be made till the chassis is complete because they will weaken the metal and may cause it to bend in the wrong place. When this has been done and the measurements checked, any surplus metal should be removed. The lines AB and CD should now be transferred to the reverse side of the sheet and scored ready for bending. The remaining bend lines should now also be scored, but note that in order that the corners of the chassis may be brought properly together, the scoring on what will be the sides must be displaced inwards by an amount exactly equal to the thickness of the metal. The shaded portions in Fig. 6 should now be cut away (a small hacksaw is a very good tool) and the metal is ready for bending.

Forming

Grip the metal in the clamp by each of the chassis flanges in turn and make these bends first in the manner described, using a piece of wood about 2 in. wide and bending, of course, away from the scoring. The two long sides should next be bent similarly. Now remove one of the bolts from the clamp and with the aid of the vice, grip the chassis at the extreme end of the clamp by each of the four tabs E, F, G and H in turn and bend each to 90 deg. To fold down the ends, cut a piece of stout plywood $4\frac{1}{2}$ in. wide and about 9 in. long and holding it firmly inside the chassis at the bend line, press the end down firmly and evenly on a piece of timber as in Fig. 7. The metal will fold to about 85 deg. which will be sufficient. Set the corners true and square and secure them with bolts

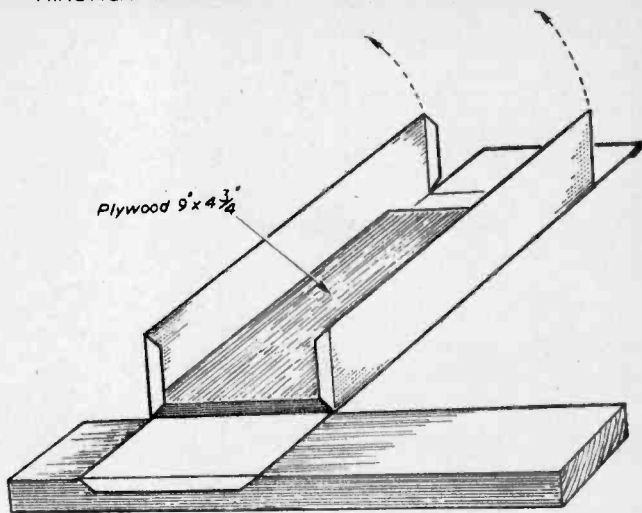


Fig. 7.—Folding the ends of a chassis.

or rivets as preferred. Holes and cut-outs for components can now be made.

Information Required

I wish to fit to my CR100 receiver a "magic eye." Can any reader supply data, etc., for fitting?
—R. W. HOWE (162 Victoria Road, Wood Green, London, W.22).

Could any reader give me particulars of the Admiralty P104 receiver or tell me what the plug connections are? I would also be grateful for any information on Monitor Unit 56.—J. B. TAYLOR (Buxton College, Buxton, Derbyshire).

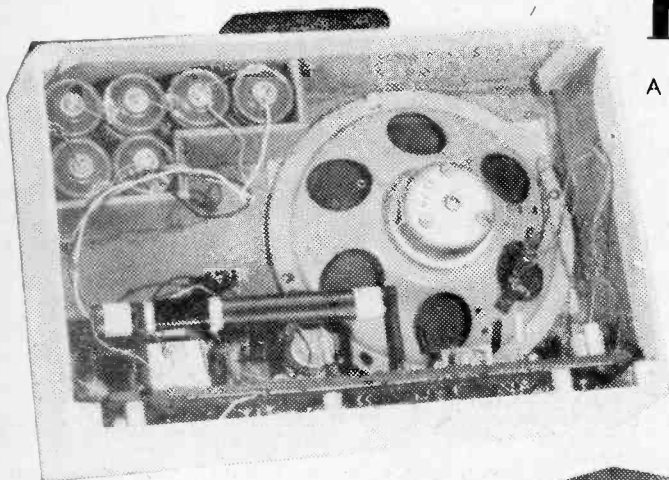
I have a V.R.L. communications type receiver purchased at least ten years ago. I have had satisfactory use from it till now. I have not been able to obtain a circuit diagram for it, and I would be grateful for any information on this receiver.—S. G. LIFTON (191 Romney Avenue, Bristol 7).

I would like information of all the R.F. units available on the surplus market, especially the 27B and 24 for conversion of R1155 to 21 and 28 Mc/s.
—V. E. BATCHELOR (24 Woodstock Rise, Sutton, Surrey). (Age 16 years.)

I have been a S.W.L. for four years now, and am thinking of building an amateur band receiver covering 160-10m in six switched bands, so I wonder if any reader could give me the aerial and oscillator coil winding details for these bands; also I would be interested to hear from S.W.L.s who have built their own receivers.—M. KELLETT (16 Lyons Colliery, Hetton-le-Hole, Co. Durham).

Four Tran

A SIMPLE CIRCUIT FOR THE BEGINN

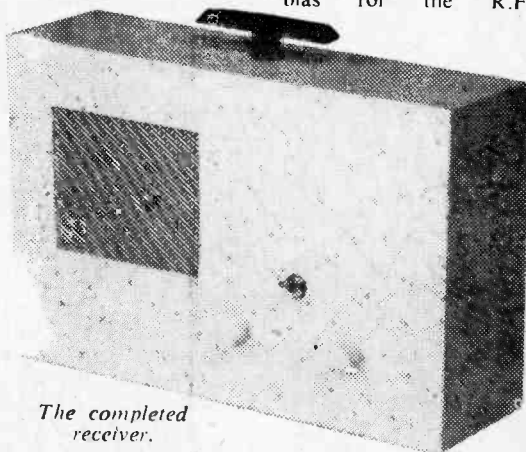


The interior of the set.

THIS receiver has been designed and presented for those who wish to construct a simple receiver, to take into the garden in the summer, or about the house, or to provide background music when reading, etc.

Design

Selectivity, simplicity, cheapness, and reasonable quality of sound reproduction have been the basis upon which the design was formed. The tuning coils are hand wound, and because medium wave coils are easier to wind than long wave coils, medium wave tuning only is provided in this design. The provision for long wave tuning is left to the reader if so desired; this modification would call for the addition of two long wave tuning coils and a wave-change switch, and because there is a tapping on each coil, a four pole wave-change switch would be necessary.



The completed receiver.

amplifier, and 6V negative for the collectors of the four transistors, leaving an additional 1½V for use when the battery voltage falls after usage.

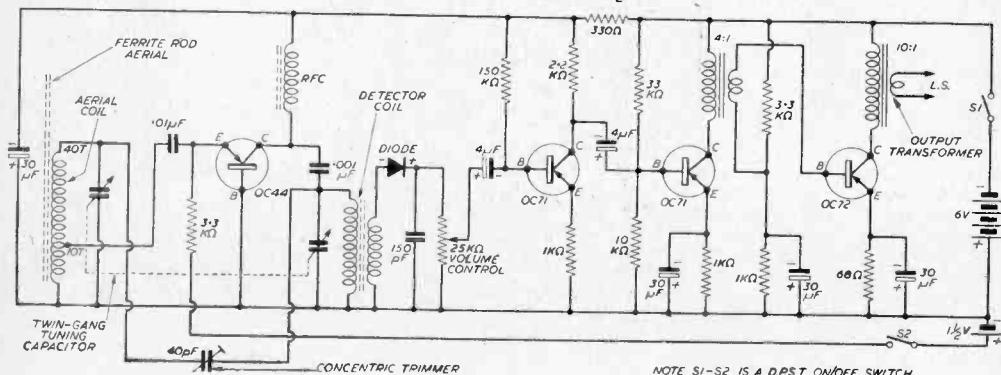
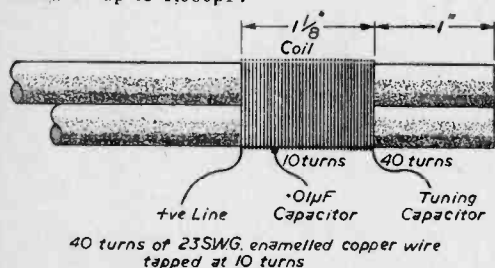


Fig 1.—The circuit diagram.

The secondary of the R.F. transformer is connected between the positive line and the diode detector. This is a crystal diode and the type is not critical. The volume control is of the miniature type and 25k in value. The shunt 150pF capacitor across the volume control is to bypass the R.F. component. This value is not critical and may be increased up to 1,000pF.



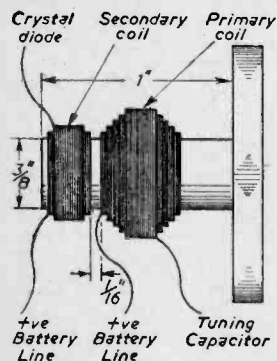
40 turns of 23SWG. enamelled copper wire tapped at 10 turns

Fig. 4.—Aerial coil winding details.

A.F. Amplifier

The remainder is a straightforward A.F. amplifier. This section of the circuit only may be built if an A.F. amplifier is required for use with a crystal pick-up. In this case, the volume control should be of the order of 1M.

The total battery drain is about 16mA and a reasonable life should be obtained from the battery. If the reader so wishes he may use surplus type transistors but the author cannot guarantee



Primary coil
1st. Layer — 30 turns
2nd. " — 25 "
3rd. " — 20 "
4th. " — 18 "
5th. " — 10 "

Secondary coil
1st. Layer — 14 turns
2nd. " — 6 "

32 SWG. cotton or silk covered copper wire used throughout

Fig. 5.—Winding the R.F. transformer.

the same low current drain. The transistors in this case would be, R.F. amplifier 'white spot'; A.F. amplifier 'red spot'; output 'green/yellow'.

Chassis

The chassis is made from hardboard, details of the layout being shown in Fig. 2. The chassis is attached to the base of the cabinet by means of four 3/16 in. lengths of 3/16 in. diameter dowel rod, drilled to prevent splitting the wood when screws are inserted.

The volume control is mounted in position on a bracket made from a rectangular piece of hardboard which is secured with adhesive. Small triangular pieces of hardboard may be cut and used to strengthen this bracket.

The circuit is laid out in 'printed circuit' form, components on one side of the chassis inter-wiring on the reverse side.

Cabinet

The cabinet is constructed from hardboard and consists of five rectangular pieces of hardboard cemented together. It is strengthened by means of small lengths of 3/16 in. by 3/16 in. stripwood cemented into the four corners on the inside to finish flush with the back of the cabinet. The back should have a number of holes drilled in it to allow a flow of air.

The battery is kept in place by means of a small compartment constructed from hardboard as shown in the illustrations.

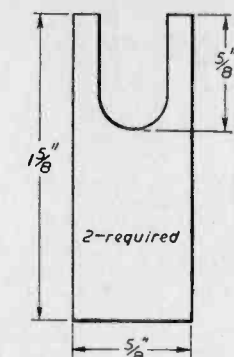


Fig. 6.—The wooden supports for the ferrite aerial.

To the inside of the back piece may be cemented a piece of sponge rubber (or plastic) to cover the batteries and keep them securely in place when the back is screwed into position.

The cabinet is of sufficient size to allow for a 6in. speaker, a larger size speaker being cheaper to purchase and giving better frequency response than a miniature type. It is covered in adhesive-backed

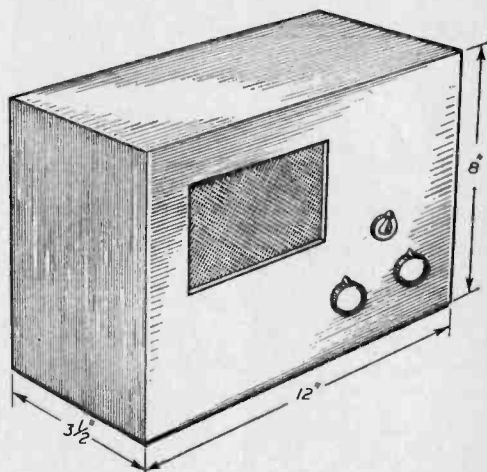


Fig. 7.—Dimensions of the case.

plastic material, using two colours, one for the front and the back, and the second for the sides, top and bottom. A plastic handle may be purchased to provide for easy carrying.

Operation

When completed, the battery is connected to the circuit, making certain that the polarity of the battery is correct. Incorrect polarity will result in burning out all the transistors immediately.

In use the tuning condenser is adjusted to receive a signal (note that the ferrite aerial is directional) and the dust core in the R.F. transformer adjusted, together with the feedback capacitor, to give the best results. Once these two adjustments have been carried out, the dust core and capacitor may be lightly sealed in position.

Model Control Transmitter Circuits

BATTERY AND MAINS UNITS

By J. Gray

VERY simple circuits can be used for model control equipment operating in the 27Mc/s band, and only one or two valves will be needed, even when the model is at a considerable distance. The circuits shown here can be made up for battery or mains operation, and any power or output valves, of triode, tetrode, or pentode type, will operate satisfactorily. Smaller valves, such as A.F. triodes, may also be used if less output is required.

For battery running, a valve such as the surplus 3D6 can be operated from dry batteries, requiring 1.4V at 0.22A for the filament. Maximum anode and screen grid currents combined total 30mA, with 180V anode and 135V maximum screen grid ratings. A large output is thus obtainable, even with one valve. Other "all-dry" output valves can be used, and surplus 2V output valves such as the 220HPT and numerous similar types also function very well, but require a 2V accumulator supply. It is generally possible to use any type of valve in the circuits shown, so the choice depends on the kind of batteries or other supplies to be used, and on the output needed.

1-Valve Battery Transmitter

A suitable circuit which can provide control up to a few hundred yards range is shown in Fig. 1. A triode may be used instead of the tetrode shown. The H.F. choke should be a good quality short wave component, the type used in receivers being

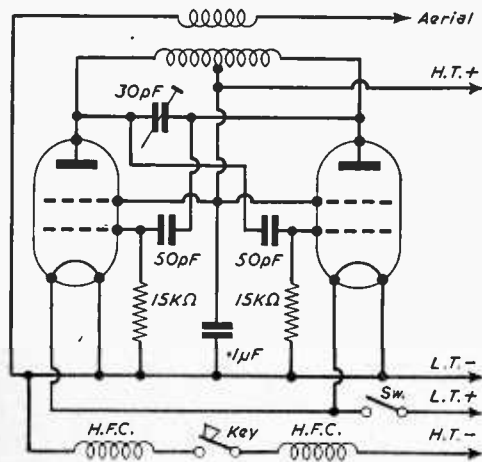


Fig. 2.—Push-pull two valve circuit.

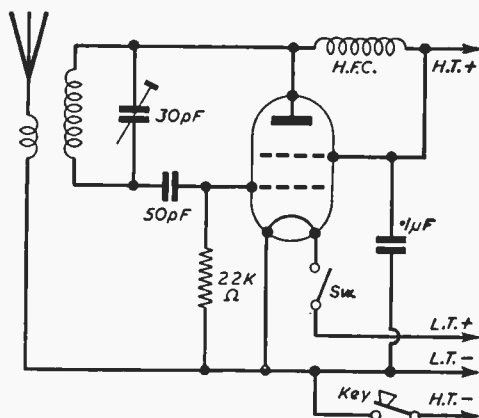


Fig. 1.—Circuit for a 1-valve transmitter.

satisfactory. The layout is not very important, provided the leads to the valve and the tuned circuit are reasonably short and direct.

The output can be modified by changing the H.T. voltage. For short range, a 90V battery will suffice. For maximum range with a particular valve, the H.T. voltage should be increased to the maximum specified for the valve type.

The tuned circuit can be made as described later, and the aerial coupled by means of a 2-turn coil. A key is included in the H.T. negative line, for control purposes. The H.T. batteries will have a long life because current is only drawn when actually keying.

Push-Pull 2-Valve Battery Circuit

The transmitter circuit shown in Fig. 2 can provide control up to many hundreds of yards range if power pentodes and adequate H.T. are used. In general, it is unlikely that a more powerful circuit will be required, for a plane, boat, or other model. The transmitter is a push-pull version of that in Fig. 1, with each valve driving the other and it is a very powerful oscillator. Triodes may be used, with reduced output. This circuit has the additional advantage that it can at any time be used as a 1-valve transmitter simply by pulling out one of the valves. Tuning then has to be slightly re-adjusted. This reduces battery consumption when reduced range is sufficient, as when controlling a boat on a small pond.

Mains 1-Valve Circuit

A self-contained mains circuit is shown in Fig. 3, with its own power supply. Mains running is very convenient for a model operated in the garden or house, or when testing receiving equipment indoors. Any type of valve, including pentodes or tetrodes, may be used, with mains transformer to suit. An H.T. voltage of some 250 or so will be ample. A valve rectifier can of course be used instead of the metal rectifier.

Keying is by breaking the cathode circuit. The usual value of bias resistor is included, as specified for the valve in normal A.F. or output circuits. This safeguards the valve against excess current if oscillation ceases for any reason.

Small triodes such as the 6C5, etc., will give adequate output for most purposes. Larger pentodes such as the 6V6 or 6L6, may be run so as to provide the maximum radiated power permitted under the terms of the model control regulations.

Transmitter Coils

The 27Mc/s band occupies frequencies around 11.1m, and any efficiently designed coil tunable to this band will be satisfactory. A coil with spaced turns, on a ribbed former, will give best results. With a former approximately $\frac{1}{2}$ in. in diameter, eleven turns of 20s.w.g. or similar wire, occupying 1 in. of winding space, will do. Using a 30pF airspaced trimmer, the 27Mc/s band can be found without difficulty, with a normal layout, and using the circuits in Figs. 1 and 3. For the circuit in Fig. 2, a turn or so must be removed, because of the extra stray capacity. Smooth formers, or formers of larger diameter, will be satisfactory, if the number of turns is adjusted until the transmitter operates in the 27Mc/s band, with the trimmer about one-half closed.

The circuits in Figs. 1, 2 and 3 will radiate on any frequency to which they are tuned. An aerial must not be attached until they have been set in the 27Mc/s band, and final re-adjustment of tuning should be done after adding the aerial.

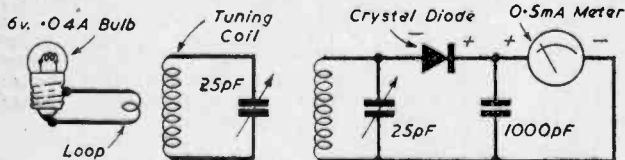


Fig. 4 (left).—A bulb meter for frequency checking.

Fig. 5 (right).—A field strength and frequency meter.

Frequency Checking

With tunable transmitters of the type mentioned, a means of checking frequency must be used. A simple frequency meter can consist of a coil of the dimensions mentioned, with a 25pF or similar short wave condenser, with pointer or scale. A 2-turn loop is connected to a low consumption bulb, as shown in Fig. 4.

Construction should be rigid, and the dial or pointer knob must be securely locked. The coil turns and loop should be cemented, or held by notches in the ribs of the coil former. The bulb should not be changed after calibration, and may best be soldered in.

To calibrate the meter, a ready-made or tuned transmitter is adjusted to 27Mc/s, and the meter coil approached to the anode coil. The condenser on the meter is then rotated until the bulb lights, and the reading marked.

To tune another transmitter into the band, set

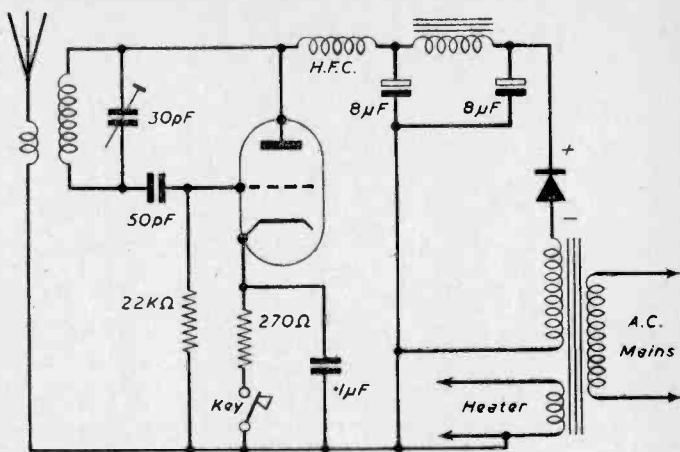


Fig. 3.—Mains 1-valve circuit with cathode keying.

the frequency meter at the correct reading, and bring it near the anode coil. The transmitter is then tuned until the bulb lights.

The meter is best kept at such a distance that the filament only just lights at the point of exact resonance. This will then give an accurate indication of frequency. It also avoids any danger of excess current "blowing" the filament, which may otherwise easily happen with mains or 2-valve battery transmitters.

A crystal diode and meter may be used instead of the bulb, as shown in Fig. 5. This gives a slightly more accurate indication than the bulb. By setting the frequency meter at some distance, the actual radiated output of the transmitter can also be compared, so that the effect of changes in aerial coupling, etc., can be seen. This type of meter must not be brought near the transmitter or coil, as described for the bulb meter, or it will be damaged. For field strength measurements up to some 20yd or so, a short aerial rod can be attached to the meter tuning

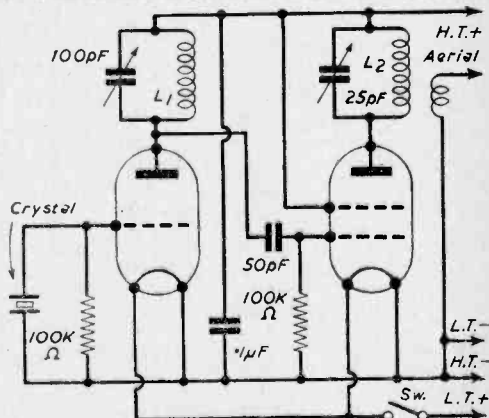


Fig. 6.—A crystal controlled battery circuit.

coil. This will make re-tuning of the meter necessary, so the rod should be removed when the instrument is used to check frequency.

Crystal Control

When no ready tuned transmitter is available, some other means of determining frequency must be used. The simplest and most accurate method is to employ a crystal controlled circuit. This may be used as a small power transmitter by itself, or it may be employed to calibrate a frequency meter of the types described. This meter may, in turn, then be used to bring tunable transmitters like those in Figs. 1, 2 and 3 into the permitted band.

A circuit for battery operation is shown in Fig. 6, output type valves being recommended. The crystal, which determines the frequency, must be of such type that a harmonic falls within the required

L2 were tuned to 18Mc/s, or 36Mc/s, as well as 27Mc/s. These differences in frequency are, however, considerable, and cannot be reached if the coil is made as suggested, and if L2 is tuned by a small condenser such as 25pF.

If the apparatus is used as a transmitter, it is only necessary to adjust as explained. The receiver is then tuned to the transmitter signal. To calibrate a frequency meter, adjust as described, then tune the bulb or frequency meter to the crystal controlled signal. The meter is then used to set tunable transmitters on frequency.

A crystal controlled circuit for mains running is shown in Fig. 7, operation and coils being as described for the battery circuit. Cathode keying can be used, as in Fig. 3. A.F. triodes such as the 6C5 will work satisfactorily in the crystal stage. The power supply circuit in Fig. 3 may be used to provide current.

With all model control transmitters it is important to remember that radiation outside the permitted band can cause TV interference over a wide area, because harmonics may fall within the tuning range of such receivers.

Aerials

For adjustments at short range, no aerial need be used on the transmitter. For moderate range, a short vertical rod will be sufficient. The length of this rod depends on the range required, and it can be made from two, three or four 1ft interlocking aerial rods. For maximum range, an 8ft 4in. vertical aerial rod can be used.

With the circuits shown in Figs. 1, 2, and 3, the aerial coupling loop is wound round the middle of the coil. For the circuits in Figs. 6 and 7, the loop is wound at the H.T. end of L2. The circuits in Figs. 1, 2 and 3 require re-tuning after any change is made to the aerial to ensure that the transmitter is still within the band. The crystal controlled circuits will provide a less powerful output than the tunable circuits, however.

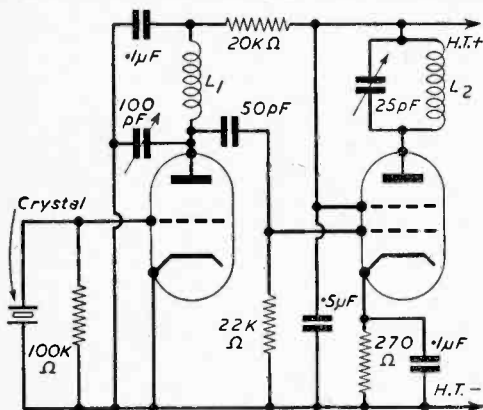


Fig. 7.—A mains crystal controlled transmitter.

band. For example, a 13.5Mc/s crystal, 9Mc/s crystal, or 6.75Mc/s crystal can be used, with a multiplication of two, three, or four times to obtain a 27Mc/s output.

Coil L1 is tuned to the crystal frequency. Using 1in. diameter formers, and 22s.w.g. wire spaced equal to the diameter of the wire between turns, 10 turns may be used for a 13.5Mc/s crystal, 17 turns for a 9Mc/s crystal, or 26 turns for a 6.75Mc/s crystal. The second valve should be removed, and a meter included in the H.T. circuit. As the 100pF condenser in parallel with L1 is adjusted, a dip in anode current will be found, showing that the crystal stage is oscillating. The best tuning point for L1 is just off resonance, where the stage starts oscillating reliably as soon as switched on. Wrong adjustment will reduce output, but not significantly change frequency, and this is, of course, the reason for using crystal control.

The second valve is then inserted, and L2, wound as described for tunable transmitters, is adjusted for best output. This can be found by bringing a bulb loop, consisting of one or two turns of wire soldered to a low consumption bulb, near the anode coil.

It is necessary to use reasonable accuracy when making the coils, because an output will be obtained on other harmonics. For example, with a 9Mc/s crystal, an output would be obtained if

PRACTICAL TELEVISION

CHIEF CONTENTS OF MAY ISSUE

Now on Sale, 1/6

PRINTED AERIAL FILTER UNIT
FRAME BLOCKING OSCILLATOR
SERVICING TV RECEIVERS
A UNIVERSAL VALVE TESTER
TELENEWS
POWER SUPPLY CIRCUITS
TV TURNTABLE
AERIAL FEEDER MATCHING
I.F. WOBBULATOR
A REMOTE CONTROLLER
MEASURING LOW RESISTANCE
UNDERNEATH THE DIPOLE
TRADE NEWS
LETTERS TO THE EDITOR
YOUR PROBLEMS SOLVED

Some Uses of Relays

IN CONNECTION WITH
CARAVAN AND CAR
RADIOS

By F. Neville Hart

THE writer travels about with a car and a caravan, and being a "short wave fan", has for a number of years operated a superhet. using mains valves, with the current supplied by the car battery, the H.T. coming from a vibrator unit. The latter was built into a metal box, including a high resistance relay and kept under the car bonnet. When the set in the caravan was switched on, the relay operated and brought the vibrator into circuit, to provide the H.T. current. This was done, because, if the vibrator unit were in the caravan with the radio, there was a voltage drop of about 1.5 along the 4ft or so of wire, with a consequent lack of efficiency. Often, after a night's listening, the drain on the battery was so great that on cold mornings there was insufficient "juice" to start the car.

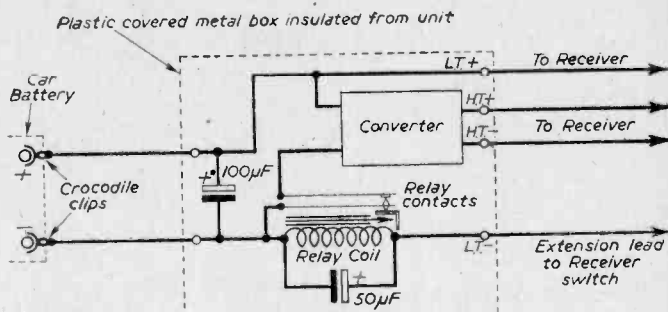


Fig. 1.—Converter unit and relay circuit.

Remote Operation

A year ago, a battery superhet was built for the caravan, using two short wave bands, and the H.T. is supplied by a transistor converter, giving 90V at 10mA. It uses a very small current, and in no way affects starting the car, however much it is used. (Fig. 1). This too, is mounted in a metal box, with a low resistance relay, in series with the filament lead, and kept under the bonnet. The relay also serves to drop the 6V to 1.5V for the valves. When the set in the caravan is switched on, the relay operates the converter.

A 4-core wire of about 4ft is used, two wires being for the L.T., and the others for the H.T. In this case, the idea of using remote control for the converter is to prevent "pick up" of the high pitched operating frequency of the oscillating transistor, but also ensures that the latter receives the full 6V, without a voltage drop which might be caused if it were at the set end of the extension. An additional 500µF condenser was found to be needed at the receiver end across the L.T., and 100µF, across H.T. negative and earth.

A relay can be very useful if a car already has a radio fitted and one wishes to use an extension loudspeaker in the caravan, to avoid braving the elements to switch on or off (Fig. 2). A 3-core extension wire can be used, in this case, if the car loudspeaker or its transformer secondary is earthed. Otherwise, a 4-core lead is necessary. The relay can be mounted in a metal box and placed near the car battery under the bonnet. The negative terminal of the relay coil will be connected to one contact on the relay switch and also by a "flying lead" to battery negative via a crocodile clip. The positive lead from the battery will go to a switch on the extension loudspeaker in the caravan, and the return lead from the switch, to the positive side of the relay.

T1.....Output Transformer
F.....Flying lead with plug breaking into car L.S. lead
L1, L2, L3.....Battery leads with crocodile clips from Converter unit
C1, C2.....Relay switch contacts

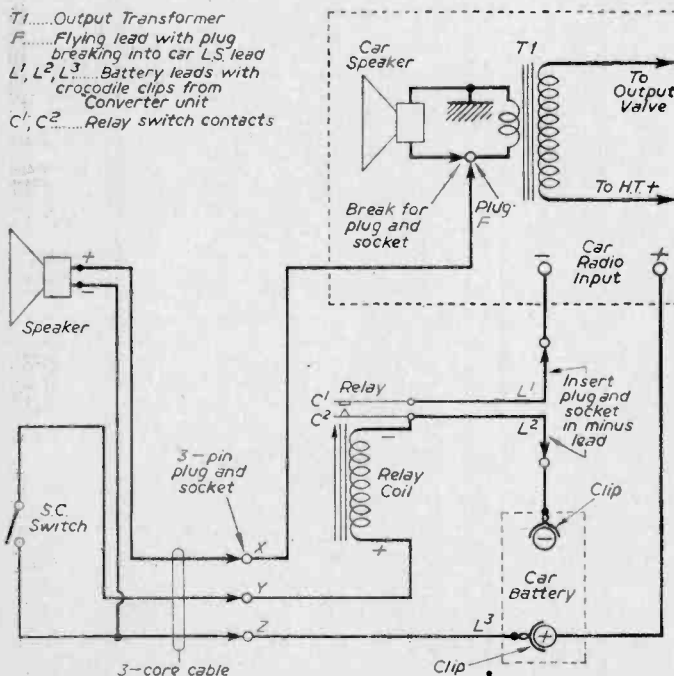


Fig. 2.—Switching the radio "on" and "off" from the caravan.

C.R.I. ISOLATION 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 AD. HIGH QUALITY, LOW CAPACITY.
1015 P.F. OPTIONAL BOOST 25%, 50%,
75%. MAINS INPUT. 16/8.

TYPE B. MAINS INPUT, MULTI OUTPUT 2,
4, 6.3, 7.5, 10 and 13 VOLTS. BOOST 25%,
AND 50%. LOW CAPACITY. 21/-

TRIMMERS, Ceramic. 30, 50, 70 pF., 8d.; 100 pF.,
15d. 1/2. 250 pF., 1/6; 500 pF., 7d. 1/2. 1/8.
RESISTORS. Preferred values. 10 ohms to 10 meg.
1/4 w., 4d.; 1/2 w., 6d.; 1 w., 8d.; 2 w., 1/1.
HIGH STABILITY. 1/4 w., 1%; 2 w., 2%. Preferred values.
100 Ω to 10 meg. Ditto, 5%, 100 Ω to 5 meg. Ω , 9d.
5 watt. WIRE-WOUND RESISTORS 1/8
10 watt, 23 ohms-10,000 ohms 1/6
15 watt 1/8
15,000 ohms-50,000 ohms, 5 w. 1/8; 10 w. 2/3

PLASTIC RECORDING TAPE

Long Play 7in. reel, 1,700ft. .. 35/-
5in. reel, 1,200ft. .. 28/-
3in. reel, 800ft. .. 21/-
3in. reel, 225ft. .. 7/6
Standard 7in. Reel, 1,200ft. .. 24/-
5in. reel, 600ft. .. 15/-

"Instant" Bulk Tape Eraser and Head De-
fluxer. 200/250 v. A.C., 27/6. Leaflet, S.A.E.

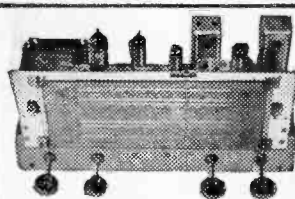
O.P. TRANSFORMERS. Heavy Duty 50 mA. 4/6.
Multi-ratio push-pull, 7/6. Miniature, 384, etc., 4/6.
P.P. 10 w., 15/6
L.F. CHOKES 15/10 H. 60/65 mA, 5/-; 10 H.
85 mA, 10/6; 10 H. 150 mA, 14/-.

MAINS TRANSFORMERS. 200/250 v. A.C.
STANDARD, 250-0-250, 80 mA, 6.3 v. 3 s.a.
tapped 4 v. 4 s. Rectifier 6.3 v. 1 s.a. 6 v.
2 s.a. or 4 v. 2 s. ditto, 350-0-350. 22/6
MINIATURE. 200 v. 20 mA, 6.3 v. 1 s.a. 10/6
MIDGET. 220 v. 45 mA, 6.3 v. 2 s.a. 15/6
SMALL. 220-0-220, 60 mA, 6.3 v. 3 s.a. 17/6
STD. 250-0-250, 65 mA, 6.3 v. 3 s.a. 17/6
HEATER TRANS. 6.3 v. 14 amp. 8/6
DITTO, tapped sec. 2, 4, 6.3 v. 14 amp. 8/6
Ditto, sec. 6.3 v. 3 amp. 10/6

ALADDIN FORMERS and core. 4in., 8d.; 4in., 10d.
0.3in. FORMERS 6937/8 and Cans TW12. 4in. core,
22in. and 3in. sq. x 1 1/2in. 2/- each, with cores.
TYANA. Midget Soldering Iron, 230 v. 40 w. 16/9.
REMPLOY Instrument Iron. 350 v. 25 w. 17/6
MAINS DROPPERS. 3in. x 1 1/2in. Adj. Sliders.
0.3 amp., 750 ohms, 4/3. 0.2 amp., 1,000 ohms 4/3.
LINE COIL. 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 F.M. 3 OHM. 6in. Roim. 17/6.
8in. Pioneer, 19/6. 6in. x 4in. Roim. 18/6. 6in. Roim.
18/6. 8 x 6in., 21/-. 10 x 6in., 27/6. 10in. Roim. 30/-
4in. Tweeter, 25/-; 12in. R.A., 30/-; 14 x 8in., 45/-
STENTORIAN HP1012. 10in. 3 to 15 ohm 10 w., 95/-
12in. Baker 15 watt 3 ohms or 15 ohms, 105/-
12in. BAKER FOAM SUSPENSION. 15 ohms, 88.
CRYSTAL DIODE. G.E.C. 2/-; GEX34 16/6
HIGH RESISTANCE PHONES. 4,000 ohms, 16/6
MIKE TRANS. 60:1, 3/9 ea.; 100:1, Potted, 10/6.
SWITCH CLEANER. Fluid quick spout. 4/3 tin.
TWIN GANTRY CONDENSERS. 365 pF.
miniature lin. x 1/2in. x 1 1/2in. 10/-; 0.0005 Standard
with trimmers, 9/-; less trimmers, 8/-; midget, 7/6.
SINGLE. 50 pF. 2/6; 80 pF. 100 pF. 160 pF. 7/-
Solid dielectric 100, 300 500 pF. 3/8.
SPEAKER FRET. GOLD CLOTH. 17in. x 25in., 5/-
25in. x 35in. 10/-; Targan lift 6in. wide, 10/-; it, 21/-
3in. wide, 5/-; it. Samples S.A.E.

New and Boxed VALVES 90-day Guarantee.

1R5	6/8	6K8G	7/8	6AB6C8	9/6	6Y8	6/6
1R5	7/6	6L6G	10/6	6B91	6/-	6HAC80	10/-
114	6/-	6N7M	6/6	6BC38	8/6		12/6
6X3	3/6	6G7G	7/6	6BC41	8/6	6HYR2A	9/6
384	7/6	6H6	6/6	6BB90	10/-	6MUL1	9/6
3V4	7/6	6H87M	6/6	6EC84	9/6	6PC84	9/6
6U4	7/6	6H87M	6/6	6EC80	9/6	6PCF80	9/6
6Y3	7/6	6H96G	6/6	6CH42	10/6	6CL82	11/6
6Z4	6/6	6X4	7/6	6CL82	10/6	6PEN25	6/6
6Z5	6/6	6X5	5/-	6EF99	5/6	6PL89	10/6
6B8	5/6	12A7	8/-	6F41	9/6	6PY80	7/6
6B8E	7/6	12A7U	8/-	6EF50	5/6	6PY81	9/6
6BH8	9/6	12A7X	8/-	6F80	8/-	6PY82	7/6
6B9W	6/6	12B26	8/6	6F81	5/-	6P81	3/6
6D7	6/-	12C	5/6	6F92	5/6	6UC41	9/6
6F6G	7/6	12Q7	8/6	6EL32	5/-	6UCH42	9/6
6H6	3/6	35L8	9/6	6EL41	9/6	6UF41	9/6
6J5	5/6	35Z4	7/6	6EL84	8/6	6UL41	9/6
6J5	5/6	80	9/6	6EM81	9/6	6UY41	8/-
6K7G	6/6	807	7/6	6EZ40	9/6	6V2	10/6
6K6GT	6/6	854	1/6	6EZ80	7/6	6VR105	6/6
6K7G	5/-	EA50	1/6	6EY51	9/6	6VR160	9/6



1960 RADIOGRAM CHASSIS

THREE WAVEBANDS FIVE VALVES
S.W. 16 m.-50 m. LATEST MULLARD
M.W. 200 m.-550 m. ECH81, EF89, EBC81,
L.W. 800 m.-2,000 m. EL84, EZ80.

A.C. 200/250 12-month Guarantee.
4-way Switch; Short-Medium-
Long-Gram. A.V.C. and Negative feedback
5 watts. Chassis 13 1/2 x 5 1/2 x 2 1/2in. Glass dial.
horizontal or vertical wording, size 10 x 4 1/2in.
Aligned and calibrated. Isolated Chassis.
£9.10.0 Carr. & Ins. 4/6.

TERMS: Dep. £5.5.0 and five monthly of £1.
MATCHED SPEAKERS FOR ABOVE CHASSIS.
8in. 17/6; 10in., 25/-; 12in., 30/-.



£6.19.6 Carr. 3/6
The World's finest designed autochanger

TERMS: Dep. £3.10.0 and four monthly of £1.
Stereo Model UA8 £7.18.6. UA12 £10.10.0.

BUILD THESE REPRODUCER BARGAINS SINGLE PLAYER KIT Ready for immediate assembly

4-speed Collaro "Junior" Unit..... £4 12 6
Handsome case, 17 1/2 x 13 1/2 x 7 1/2in.
with room to play 12in. records £2 5 0
Ready-built 3-watt amplifier with
two valves and loudspeaker £3 12 6
or **£9.15.0** complete kit post free.

COLLARO AUTO-PLAYER KIT HIGH-FIDELITY AUTOCHANGER 4-SPEEDS-10 RECORDS

Studio pick-up
OUR PRICE **£7.19.6** post free.
Or with cabinet, speaker, and amplifier
£11.19.6 Carr. 5/6.

STEREO E.M.I. 4-SPEED SINGLE RECORD
PLAYER. Acos 73 hi-fi stereo and normal T.A.
pick-up. Silent motor, heavy turntable.
Special Offer £8.19.6. Post 3/6.

ALUMINUM CHASSIS. 18 s.w.g. undrilled.
With 4 sides, riveted corners and lattice fixing
hoops. 24in. sides, 7 x 4in., 4 x 7in., 5/6;
11 x 7in., 6/8; 13 x 9in., 8/8; 14 x 11in., 10/6;
15 x 14in., 12/6; 18 x 15 in., 13/6.

TRANSISTORS. GENUINE EDISWAN
R.F. 4 Mc/s, 18/-; 2 Mc/s, 15/-; Audio. 10/-.
Red Spot 5/-; White Spot 7/6. OC 71 7/6

CRYSTAL MIKE INSERT by Acos, precision
engineered. Size only 4in. x 3 1/2in. 6/8.

HI-GAIN BAND 3 I.T.A. PRB-AMP KIT.
Cascade circuit with valve ECH84. Price 20/6.
With Power Pack, 49/6. Plans only 6/6.
Band 1 BBC version same prices.

BBC TRANSISTOR RADIO. M. & L. wave.
Complete kit 32/6, phones 7/8 extra. Deal Aid
Earpiece with Special Lead 15/-; Details 6d.

COSSOR MAINS-BATTERY POWER PACK 90
v. R.T. 1 1/2 v. L.T. Same size as BATTERY
B126 and AD 35. List 63/-, our price 39/6.

GARRARD SINGLE PLAYERS

AUDIO PERFECTION

Designed to play 16, 33, 45, 78 r.p.m. Records
7in., 10in., 12in. Lightweight Xial pick-up.
GCS plug-in head. Stereo Wired.

MODEL TA MK II £8.10.

MODEL 4 HF £18.

AUTO CHANGER R.C. 121 10 GNS.

(Stereo heads £2 extra.) Leaflet, S.A.E.

Volume Controls 80 ohm COAX
Long spindles. Guaranteed Postage 1d. per yard.
1 year. Midget Semi-air spaced tin.
5K ohms to 2 Meg. Stranded core.
No. Sw. D.P. Sw. Losses cut 50%. 6d. yd
2/- 4/8 Fringe Quality 1/- yd
Linear or Log Tracks. Air Spaced.

COAX PLUGS .. 1/- LEAD SOCKET .. 2/-
PANEL SOCKETS 1/- OUTLET BOXES .. 4/6
BALANCED TWIN FEEDER yd. 6d. 80 or 300 ohms.
DITTO SPOREED per yd. 1/8. 80 ohms only.
WIRE-WOUND POTS, 3 WATT. Pre-set Min. Ty Type. All ranges 28 ohms to 25 K. 3/- ea.
30 K. 50 K. 4/- (Carbon 30 K. to 2 meg. 3/- ea.)
WIRE-WOUND 4 WATT Pots. Long Spindle.
Values, 100 ohms to 50 K. 6/8; 100 K. 7/6.
CONDENSERS. New Stock. 0.001 mid. 7 kV.
T.C.C. 5/8. DITTO 20 kV. 5/8 0.1 mid. 7 kV, 8/6.
Tubular 500 v. 0.001 to 0.05 mid. 3k. 0.1 1/1-
0.25 1/8; 0.5/350 v. 1/8; 0.1/350 v. 8d.; 0.1/1000 v.
1/8. 0.01/2,000 v. 1/8; 0.1 mid. 2,000 volts, 3/6
CERAMIC CONDS. 500 v. 0.3 pF. to 0.01 mid., 8d.
SILVER MICA CONDENSERS. 10% 6 pF. to 500
pF. 1/-; 600 pF. to 3,000 pF. 1/8. Close tolerance
(±1 pF.) 1.5 pF. to 47 pF. 1/8. DITTO 150 pF.
to 815 pF. 1/8; 1,000 pF. to 5,000 pF. 2/-.

I.F. TRANSFORMERS 7/6 pair.

465 Kc/s Slug Tuning Miniature Can. 2 1/2in. x
1in. x 1in. High Q and good bandwidth.
By Fye Radio. Data sheet supplied.
Weatrite M800 L.F. 465 Kc/s. 12/6 per pair.
Weatrite 550 I.F. 465 Kc/s. 12/6 per pair.

NEW ELECTROLYTICS. FAMOUS MAKES.
TUBULAR TUBULAR CAN TYPES
1/350v. 2/- 50/350v. 5/8 8/500v. 3/-
2/350v. 2/3 100/25v. 3/- 16/500v. 4/-
4/450v. 2/3 250/25v. 3/- 32/350v. 4/-
8/450v. 2/3 500/12v. 3/- 100/270v. 6/8
8/500v. 2/8 8/450v. 4/8 2/500/3v. 4/-
16/450v. 3/8 8/450v. 5/- 32/32/350v. 4/8
16/500v. 4/- 8/450v. 5/- 32/32/450v. 7/8
32/450v. 5/8 8/450v. 6/8 80/450/350v. 7/6
55/225v. 1/8 16/450v. 6/8 64/120/270v. 7/6
50/225v. 1/8 16/450v. 6/8 64/120/350v. 11/6
50/60v. 2/- 32/32/350v. 4/8 100/200/270v. 12/6
SELENIUM RECTIFIER, 300 v. 85 mA. 7/6.
CONTACT COOLED 250 v. 60 mA. 7/6; 60 mA. 8/6;
85 mA. 9/6; 200 mA. 21/-; 300 mA. 27/6.
COILS Weatrite "P" type, 3/- each. Osom Midget
"Q" type, 4/- each. dual core type, all ranges.
TELETRON. M. & M. T.R.P. with reaction, 3/6.
FERRITE ROD ADJ. AERIALS. M.W. 8/8; M. & L. 12/6.
T.R.F. COILS A/HF. 7/- pair. H.F. CHOKES, 2/6.
FERRITE ROD, 7in. x 1in. dia., 2/6.

JASON F.M. TUNER COIL SET, 26/-; 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, 2/6.
COMPLETE JASON F.M. KIT FMC1 £55.0.
Set of 4 Valves £10.0. Details S.A.E.

FULL WAVE BRIDGE SELENIUM RECTIFIERS:
2, 6 or 12 v. 14 amp. 8/3; 2 a., 11/3; 4 a., 17/6
CHARGER TRANSFORMERS. Tapped input 200/
260 v. for charging at 2, 6 or 12 v. 14 amps. 16/6.
2 amps. 17/6; 4 amps. 22/6. Circuit included.
VALVE and TV TUBE EQUIPMENT, reaction, 6/6.
TOGGLE SWITCHES, 8 P. 2/-; D.P. 3/6. D.P.D.T. 4/-
WAVECHANCE SWITCHES
5 p. 4-wave 2 water long spindle .. 6/6
2 p. 2-way, or 3 p. 2-way short spindle .. 2/6
2 p. 6-way, or 3 p. 2-way, 4 p. 3-way long spindle 3/6
3 p. 4-way, or 1 p. 12-way long spindle 3/6
VALVEHOLDERS. Pax. Int. Oct., 4d. EF60, EA50,
6d. B12A, CRT, 1/3. Eng. and Amer. 4, 5, 6, and
7 pin, 1/-; MOULDED MAZDA and Int. Oct., 6d.
B7G, B8A, B8G, B9A, 6d. B7G with can, 1/6.
B9A with can, 1/8. CERAMIC EF50, B7G, B9A,
Int. Oct., 1/-; 8/Cans. B7G, B9A, 1/-.

RADIO COMPONENT SPECIALISTS

OUR ONLY ADDRESS
337 WHITEHORSE RD.,
WEST CROYDON

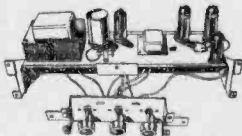
Postal service 1/-, over £2 free. (ExportExtra.) C.O.D. 1/6. (Wed. 1 p.m.)

THO 1665. Buses 133 or 68

Gladstone Radio

PUSH-PULL AMPLIFIER £5.10.0 (3/6 P. & P.)

Brand new by famous manufacturer. 200-240 A.C. mains. Bass, treble and vol. controls flying panel. With valves EZ80, ECC83 and 2-EL84 giving full 8 w. Chassis 12 x 3 1/2 x 3 1/2 in. With o.p. trans. for 2-3 ohm speaker.



COSSOR AMPLIFIER KIT TYPE 562K £5.2.6

(3/- P. & P.)

With valves EZ80, EF86 and EL84. 2 speakers (10 x 6 and 4 in. h.f.). Full instructions: printed circuit; A.C. mains, 5 watts, original carton.

FULLY BUILT BATTERY OPERATED TRANSISTOR RECORD PLAYER FOR

£7.19.6 (3/6 P. & P.)

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



BUILDING THE 6K7 SUPERHET?

(Page 835 February Issue.)

Send for price list, e.g.: Two-gang 500 pF with reduction drive incorporated in spindle 5/-; five valves 6K7 for 12.6.

AUTOMATIC RECORD CHANGERS COLLARO £7.10.0 (5/- P. & P.)

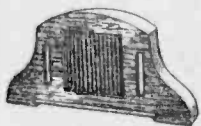
CONQUEST with manual play also. Turnover crystal pick-up, 4-speed. A.C. mains 200-250 v., see illus.

B.S.11. UAR 4-speed auto-changer £8.15.0 (5/- carr.) Garrard 4-speed autochanger RC120 £9.5.0 (5/- carr.). Garrard 4-speed single player 4SP-Dual £6.19.6 (5/- carr.). All with pick-up with crystal turnover head.



H.F. EXTENSION SPEAKER KIT 16- (Post 1.6)

Small extension speaker 12 x 6 in. high x 1 1/2 in. Placed in parallel with existing 3 ohm speaker gives amazingly improved high note reception. Ideal for mantelpiece. Med. oak finish. New. Cabinet and back 6-; speaker and cross-over condenser 11/-; post 1.6.



COSSOR EMI 10in. TV tube type 108K. Brand new and boxed. ONLY 30/- (carr. 3.8).

For the last 50 ITA Converters of this type (Brand New and Fully Guaranteed) we will accept the "Below Cost" figure of **ONLY 60/-** (3/- P. & P.) Reduced from **£4.7.6.**

Two valves ECC81—grey hammer finish—Switch positions OFF, ITA 11M. Own Power supply. **BUY IT NOW.**



60/- (3/- P. & P.)

FOR ADDRESSES SEE THE OTHER ADVERTISEMENT FOR GLADSTONE RADIO ON PAGE 116.

Precision

for 240 VOLTS

or 6v. 12v. 24v. 28v. 50v.
110v. 120v. 200v. & 230v.

SOLDERING IRONS

BIT SIZES AVAILABLE .04", 3/32", 5/32", 3/16" & 3/16" H.D.

Any voltage as listed fitted with any bit size can be supplied. Please state your exact requirements when ordering. Specially developed to prevent damage to components whilst soldering, the Precision iron is a must when soldering Transistors, Printed Circuits and Miniature Components.

Weight 1oz.
Length 6 1/2 in.



Low Voltage Irons (6-28 v.). 25/- each.
Mains Type (50-240 v.). 29/6 each.
Stands, 12/6 each.
All prices P.P.
Detailed Catalogue sent on request.

Send to:

A.N.T.E.X., 7 Idol Lane, London E.C.3

MANsion House 2716

LISTEN IN wherever you are

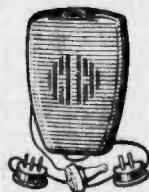
AT WORK OR PLAY—ANYTIME OF THE DAY

for only

55/-

Turn this Brand New DEAF AID into a

- HI-Q VEST POCKET RADIO
- PORTABLE FAULT FINDING SIGNAL TRACER
- SENSITIVE RADIO STETHOSCOPE (for engine noise, leaking water mains, etc.)
- "ALWAYS WITH YOU" MIDGET AUDIO OSCILLATOR OR SIGNAL GENERATOR



Made to a British Medical Research specification by one of the country's leading radio manufacturers, these compact units employ all miniature components and three special low-consumption valves in a very sensitive hi-fidelity circuit that only requires the addition of a simple tuned input circuit and a xtal diode to bring your favourite programme in loud and clear. Instructions for radio conversion and suitable aerial coil pre-wound on hi-Q ferrite rod supplied. Job can be done in less than one hour without previous experience and using only ordinary tools. (Audio Oscillator or Sig. Gen. is more ambitious—not for the Beginner).

Brand new, still in original pack, with plugs, leads, and latest type of American high quality crystal earpiece and detachable plastic ear mould, plus all parts necessary for radio conversion.

Each unit contains one of the latest types of sensitive crystal microphones suitable for immediate use with tape recorder, etc., which becomes spare on conversion to radio.

Sold Separately—**COMPLETE DEAF AID** for those not interested in conversion, but requiring a spare instrument or etc 40/- . Kit of parts for conversion to radio 15/- . Batteries 5/- post paid.

PROOPS BROS. LTD.
The Walk-around Store

52 Tottenham Court Rd., W.1
LANgham 0141.
Hrs. 9-6. Thursday 9-1

Simple Transistor Amplifiers

BASIC CIRCUITS FOR AMPLIFIER STAGES

By G. Green

A SMALL amplifier using up to three transistors will give quite good loudspeaker results, and can thus form the basis for an economical receiver. Amplifiers using only one or two transistors are also useful for "personal" receivers

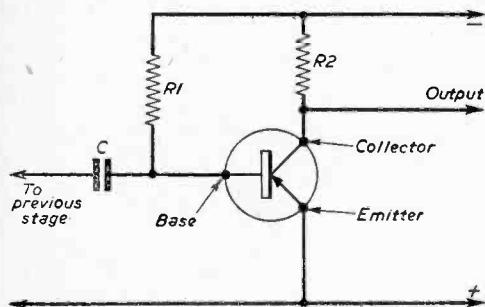


Fig. 1.—A one-transistor circuit.

intended for phones or speaker, especially as it is so easy to add an extra stage later, if needed.

A simple transistor amplifier stage is shown in Fig. 1. The value of the coupling condenser C is not critical, but should be fairly large. For coupling to a detector, $0.1\mu\text{F}$ to $2\mu\text{F}$ can be used. Between transistor stages, a rather larger capacity will improve results, and about $2\mu\text{F}$ to $8\mu\text{F}$ would be usual. A miniature low-voltage electrolytic condenser is often employed, to conserve space.

Resistor R1 produces a base voltage, and will usually be about 100k to 500k. With surplus transistors, in particular, the best value should be found by trial, because it depends on the individual transistor. The load resistor is R2—usually about 4.7k. If there is only one stage, phones may replace this resistor, being wired from collector to battery negative.

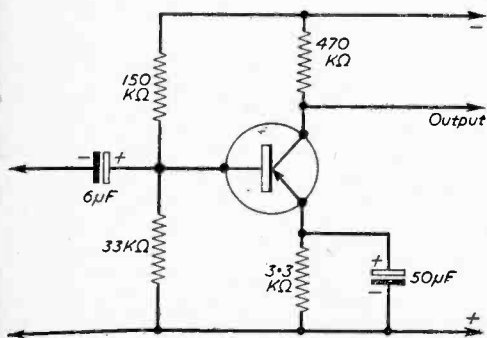


Fig. 2.—Potential divider for base supply.

A circuit of this kind can give quite good results, the actual increase in volume obtained depending considerably on the efficiency of the transistor. Cheap surplus transistors may be used with success, though naturally results cannot be expected to equal those obtained with a more expensive transistor.

Potential Divider

In Fig. 2 the base voltage is obtained from two resistors, and is thus less influenced by transistor current. The exact characteristics of the transistor are then less important. Values given are suitable for the TS2 type of transistor. However, surplus audio-frequency transistors can operate quite well.

If size or low cost is important, the 3.3k emitter resistor and $50\mu\text{F}$ condenser may be omitted, the emitter being wired as in Fig. 1. This is often done in low-cost circuits using surplus transistors.

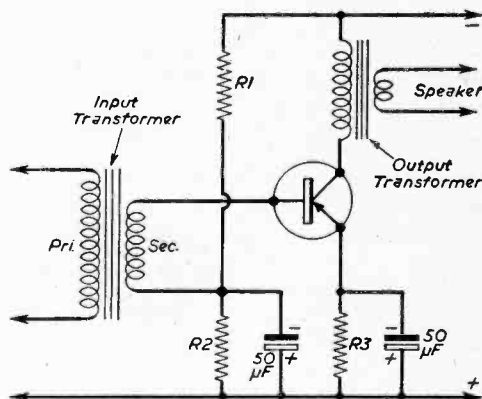


Fig. 3.—Transformer coupling.

For maximum possible amplification with any given transistor it may be necessary to modify the value of one of the base circuit resistors. However, this type of circuit will usually give good results without experiment, even with transistors of somewhat dissimilar characteristics.

A single stage of this kind may be added to a crystal set, to provide really loud headphone reception. Or it may be placed between stages in a small receiver already having one or two transistors. Where fairly high amplification is already present, less than maximum gain may be preferable from the extra stage, to avoid noise.

Transformer Coupling

For maximum possible gain, with a limited number of transistors, or only one stage, transformer coupling may be employed in the input circuit, as shown in Fig. 3. The resistors R1 and R2 provide the base voltage, through the trans-

former secondary. Resistor R3 can be of the same value as in Fig. 2.

In small receivers, midge transistor coupling transformers will be necessary. But if size is of no importance, a larger type of transformer can be fitted. Some surplus transformers can give very good results. A step-down ratio is necessary. That is, the primary has more turns than the secondary. A suitable ratio will usually be about 3:1 to 7:1 or so. Very high impedance windings, as used for valve coupling, are not required. It is thus sometimes possible to put to good use a transformer which is not satisfactory with valves.

A transformer is also required when operating a low impedance speaker from the transistor. For a simple and economical receiver, a small transformer of fairly low ratio as used to couple a small power triode, can be used. A high ratio is not required because the best impedance for the transistor is much lower than for a valve. A load of about 600 to 1,000Ω will suit many surplus and small A.F. transistors, and the transformer can thus have a ratio of about 15:1 or 20:1, for 2-3Ω speaker, or 6:1 to 8:1 for a 15Ω speaker.

With normal phones of medium impedance, no transformer is needed. But moving coil or other low impedance headsets need a transformer, for best results. For 50Ω phones, this need only have a ratio of about 4:1 or 5:1. An unnecessarily high impedance or ratio may cause mismatching worse than that experienced if the phones are used directly in the collector circuit.

Two Transistor Amplifier

A reliable, economical receiver can be made from the circuit in Fig. 4, circuit values being for

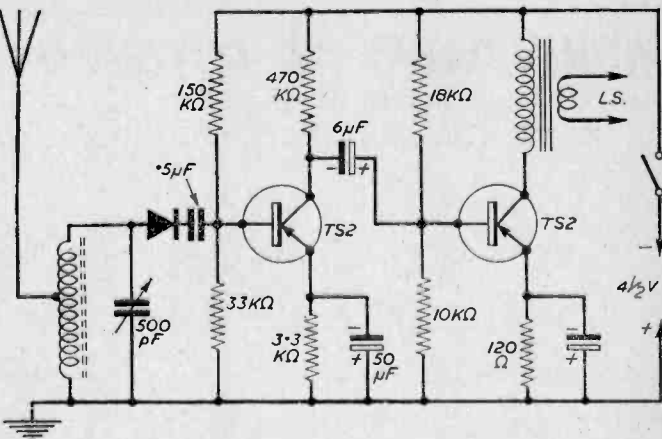


Fig. 4.—A two-stage amplifier with a detector stage.

TS2 transistors. It will be noted that values in the output stage are different from those in the first stage.

Surplus transistors can, of course, be used in such a circuit, as described. It is also quite easy to introduce a further stage, such as that in Fig. 2, between the two stages in Fig. 4. When a volume control is required, the 4.7k resistor may be replaced by a 5k potentiometer, the slider being wired to the 6μF coupling condenser.

If an outdoor or other fairly long aerial is used, aerial coupling should be reduced by moving the aerial tapping towards earth, or including a small condenser in series with the aerial lead. Tuning will otherwise be rather unselective. The circuit can, of course, be used for phone reception. If desired one stage can then be omitted. To simplify the circuit, both emitters may be returned to battery positive.

WIDE-BAND BATTERY S.W. TWO

(Continued from page 128)

With the usual medium or high impedance phones no transformer is needed, plugs attached to the phone leads being inserted directly in the output sockets.

As the receiver is particularly suitable for beginners, a few notes on operation and short-wave reception may be helpful. Various wavebands are selected by the bandset condenser, and actual tuning is then carried out with the bandspread control knob. The full 180deg. rotation of the bandspread condenser will cover about the same band of wavelengths as 8deg. movement of the bandset condenser. (The exact relationship between the two need not be known, and depends on the capacity, shape of plates, etc.) The bandset condenser is thus advanced several degrees at a time, the bandspread control then being used to tune this section of the wavelengths covered. When the various bands have been located, the reading of the bandsetting condenser should be noted. It

is then possible to return to any band at will, and tune in stations with the bandspread condenser. Owing to the low capacity of the latter, stations will not have their readings crowded together, as is so with a large condenser fitted with a single dial.

The reaction condenser is closed sufficiently to keep the set in a sensitive condition, just below the oscillation point. This control should be manipulated as necessary, while tuning. Its influence is particularly important with weak, distant stations.

Reception on the various bands varies a great deal during the day. As a rule, it will be as well to listen on the 19 and 25m. bands in the afternoon and early evening, giving more attention to the 31 and 41m. bands later. Usually, of course, some stations will be heard on all bands at any hour, but very remote stations will only be heard when the band selected is most suitable. If a log is kept, with dial readings and times of English programmes, this will soon give a good working knowledge of S.W. reception.

HOME RADIO OF MITCHAM

(Dept. P), 187 LONDON ROAD, MITCHAM, SURREY. MIT 3282

Shop Hours: 9 a.m.—6.30 p.m. Wednesday 9 a.m.—1 p.m.

COMMUNICATIONS EQUIPMENT

We carry full stocks of EDDYSTONE short wave components and receivers. Special priority for export orders. Illustrated leaflets on request. Also KW ELECTRONICS transmitters, converters, filters, etc., available from stock.



"CIRCUITS FOR AUDIO AMPLIFIERS"

Latest MULLARD book on audio design including constructional data on 12 different amplifiers, pre-amplifiers, mixers, tape amplifiers and pre-amps, stereo amplifiers, etc. An exciting and informative book on all aspects of audio. PRICE 8/6, plus 1/- post.

WE STOCK ALL THE PARTS FOR THESE DESIGNS, including Punched Chassis and all special components. PRICE LISTS 6d.



S.W. TUNING CONDENSERS

WAVE-MASTER high-grade tuning condensers with brass vanes, air spacing, and ceramic insulation. Single hole mounting, easily ganged. 15pf, 4/3; 25pf, 4/6; 40pf, 4/9; 50pf, 5/-; 60pf, 5/3; 75pf, 5/6; 100pf, 5/9; 160pf, 6/-; 200pf, 7/6. Add 9d. post please.

COSSOR AMPLIFIER KITS

Another delivery of the famous COSSOR 562K 3 watt quality amplifier kits. Supplied complete to last detail, with twin-matched speakers and cross-over network. Printed circuit and precise step-by-step instructions make it a delight to build. WONDERFUL VALUE.

£5.19.6, post 1/-.

"PERSONAL TWO" PORTABLE

Two valve dry battery headphone set. Rod aerial, ideal for bedroom, holidays or camping, etc. Smart metal case, easy to build from data sheets. Price 2/-, post paid. Parts for the set cost 41/-. Price list on request with S.A.E.



SOLDERING IRONS

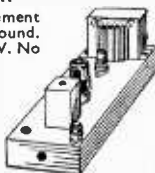
ES22 Remploy instrument soldering iron, 22/6. Tyana medium instrument iron (230-250 v. only), 16/9. Henley Solon instrument iron, 24/-. Litesold 10-watt iron for transistor and very fine work, 21/6. State voltage required. Add 9d. post to orders.

TRANSISTORS

All brand new and tested. Audio 6/-, RF 9/-. Ediswan XB102 10/-, XA103 15/-, XA104 18/-. Mullard OC71 14/-, OC72 17/-, OC78 17/-, matched pairs available. Goltops output 10/-, I.F. amp 10/-, R.F. osc. 14/-, ADD 6d. post.

ITV PRE-AMPLIFIER

Gives amazing improvement to ITV picture and sound. Suitable all makes of TV. No internal connections required. Full constructional data 1/3. Complete kit of parts £2.17.6. Ready built and tested £3.17.6. All prices post paid.



EVERY KEEN CONSTRUCTOR SHOULD HAVE THIS FINE CATALOGUE

Size 9½ x 7¼in. 128 pages packed with details of every type of radio component. Over 4,000 items listed, over 400 illustrations; every part normally available from stock. This catalogue will save you time and money. DON'T DELAY—SEND TODAY. 2/- plus 9d. post.

DON'T MISS THIS BARGAIN OFFER

Of special interest to all constructors—12 new assorted volume-controls (some with switch) for ONLY 6/- Send NOW while they fast. Post Paid.

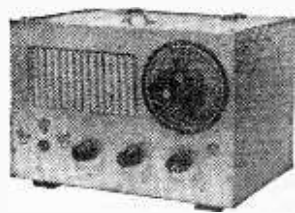


"GLOBE KING" SHORT WAVE RADIO KITS

Economical, inexpensive short wave receivers, long distance reception—ideal for invalids or hospital patients.

Kit 100/A. The famous one valver with three matched coils covering 10-100m. £3.19.6, p.1/-
Kit 200/A. New two-valve set in smart cabinet as illus. for all-dry battery operation. £10.12.0, post 2/-.

Kit 300/A. Similar to 200/A but for A.C. mains operation. Leaflets available on request, also sets can be supplied ready wired and factory tested. £11.19.6, post 2/-.



NYLON DIAL DRIVE CORD

Keep a reel of this Suffix nylon dial drive cord handy always. Non-stretch and non-slip with high tensile strength. 25 yard reels. 4/6 post paid

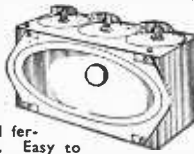


HEADPHONES

New lightweight headphones ideal for crystal sets, transistor sets, short wave sets, etc., 4000 ohms, individually boxed 15/-. High-grade Siemens Edison type (usually 45/-) 22/6. S. G. Brown's popular type "F" 37/6. Ericsons as recommended by Eddystone £2.15.0. ADD 1/- POSTAGE to order.

REPANCO "TWINETTE" PORTABLE

Inexpensive two transistor local station portable with loudspeaker and ferrite rod aerials. Easy to build, economical to run. Latest reflex circuit. Easy wiring plans and step-by-step instructions with price list 1/6, post paid. Cost of parts £5.10.0. All sold separately.



TEST METERS

Opportunity of obtaining a superb moving coil test set at well below cost price. Specially designed for testing all types of battery equipment. Ranges 6 v. D.C., 150 v. D.C., 30 mA D.C., and Ohms. Do not confuse with cheap moving iron meters, this is a genuine moving coil 5mA movement. Limited Quantity at 19/6, post 1/-.

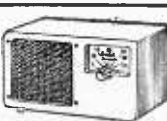


RECORDING TAPES

New American FERRODYNAMIC recording tapes. Fully guaranteed. 5in. 600ft. std. 15/6. 7in. 1200ft. std. 25/-, 7in. 1800ft. L.P. 35/-. Also Mastertape 3in. 225ft. L.P. only 6/6 each. ADD 9d. POSTAGE to orders.

MIDGET RADIO CABINETS

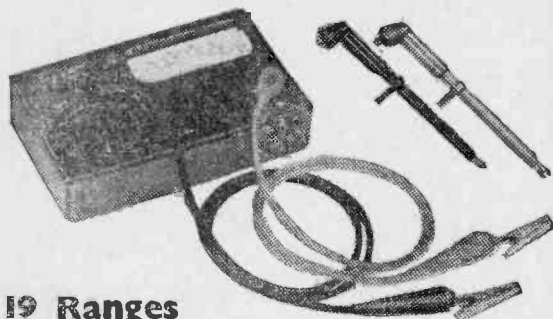
Well finished white plastic cabinet designed for midget radio or portable. Size 6½ x 4 x 2½in., complete with back and speaker grill. Ideal for transistor sets, etc. 10/6, post 1/-.
Plastic speaker grill, size 3½ x 6½in. Many uses, 2/6, post 6d.



MORSE TRANSMITTERS

Self-contained morse trs. and practice set, comprising bakelite base, adjustable buzzer, morse key, 4½ v. battery. Operates over hundreds of yards of wire with headphones. Brand new, boxed, 10/6, post 1/-.

More for less...



19 Ranges

D.C. Voltage	A.C. Voltage
0—100mV.	0—10 V
0—2.5 V.	0—25 V.
0—10 V.	0—100 V.
0—25 V.	0—250 V.
0—100 V.	0—1000 V.
0—250 V.	
0—1000 V.	
D.C. Current	
0—100μA	
0—1mA	
0—10mA	
0—100mA	
0—1A	
Resistance	
0—20,000Ω	
0—2MΩ	

List Price: **£9:10s.**
complete with Test Leads
and Crocodile Clips.
Leather Case if required 39/-
Size: 5½ x 3½ x 1½ in.
Weight: 1 lb. approx.

Designed to offer the widest possible range of accurate and reliable measurements at the lowest possible price, the versatility and usefulness of the Multiminor are now further extended by specially designed leads. These new leads, available at an extra cost, will accept crocodile clips or PRODCLIPS.

The Multiminor takes full advantage of the possibilities of printed circuit techniques to achieve outstanding compactness and economy of weight. The scale is clear and open. The fine red colour pointer and effectively damped movement facilitate easy and rapid reading.

For use in Radio, TV, Electronics, Motor Vehicles, domestic appliances, workshop equipment, you'll find the Multiminor a great little meter!

Use PRODCLIPS with the MULTIMINOR (Pat. No. 1748811)

These cleverly designed spring-loaded insulated prods are the complete answer to a long-standing problem. Press the trigger to open, release to grip. Keep your hands free no matter how difficult of access your test points may be

15/- per pair

...with the

MULTIMINOR

Write now for illustrated literature to:—

AVO LTD

AVOCET HOUSE - 92-96 VAUXHALL BRIDGE ROAD
LONDON - S.W.1

Victoria 3404 (12 lines)

A MEMBER OF THE METAL INDUSTRIES GROUP OF COMPANIES

EDDY'S (NOTTM.) LTD. 172 ALFRETON ROAD NOTTINGHAM

LOOK! at these NEW VALVE PRICES!

1A7GT	11/9	6F6G	6/-	7Y4	7/6
ID5	7/11	6F13	6/6	10P14	9/3
1HS6T	9/6	6H6	1/11	11D5	17/3
IL4	3/6	6J5G	2/6	12AH7GT	
IN5	9/6	6J5GT	3/6		6/6
IR5	6/-	6J5M	4/-	12AH8	9/6
IS5	5/11	616	3/11	12AT6	7/6
IT4	3/11	617G	5/-	12K7G	5/3
3D6	4/11	617M	7/6	12K8GT	
3Q4	7/-	6K7G	1/11		11/3
3Q5GT	8/6	6K7M	5/6	12SC7	7/11
3S4	6/3	6K8G	5/6	12SH7	4/11
3V4	7/-	6L6G	7/3	12SJ7	5/3
5U4G	5/-	6L6M	9/6	12SK7M	5/3
5Y3GT	5/11	6Q7G	6/-	12SQ7GT	
6A7	10/11	6Q7GT	9/-		5/11
6AG5	4/-	6SA7M	5/9	12Q7G	5/3
6AL5	3/9	6SG7M	4/9	19AQ5	6/11
6AM6	6/11	6SH7M	5/11	25A6G	6/11
6AT6	6/11	6S7M	5/11	25L6GT	8/11
6BBG	2/11	6SK7GT	5/-	25Z4G	7/6
6BA6	5/11	6SN7GT	4/3	25Z5G	7/11
6BE6	5/11	6V6G	4/11	35A5	10/3
6BG6G	12/3	6V6GT	6/-	35L6GT	8/11
6BJ6	5/6	6X4	5/11	35W4	6/6
6BW6	8/6	6X5GT	4/11	35Z3	9/11
6C4	3/3	7C5	7/6	35Z4G	5/3
6C6	4/-	7C6	7/3	90AV	4/3
6C9	9/3	7D3	19/11	807B	3/6
6CH6	9/-	7H7	7/6	954	1/6
6D2	3/6	7R7	10/3	955	3/6
6FI	6/6	757	9/3	956	2/6

Build your own CAR RADIO!

- 7 Transistors
- Long and Medium Waves
- Two Watts Output
- R.F. Stage and Automatic Gain Control



10 1/2 gns.

6 or 12 volts (state which)
Supplied with full instructions.

Size: 7½ x 7¼ x 2½ in.

Postage and Packing
5/- extra.

SPEAKER, extra 17/11

Any parcel insured against damage in transit for only 6d. extra per order. customers' risk. Postage and Packing 6d. per valve extra. Over £3 Free. C.O.D. charge 3/- extra. Trade Supplied.

ALL NEW OR SURPLUS GUARANTEED and TESTED BY RETURN POST

9001	3/11	ECH35	6/6	KT33C	6/3
9004	3/11	ECH42	8/3	OZ4	4/11
9006	3/11	ECH81	3/-	P61	2/-
AZ1	12/6	ECL80	7/6	PCC84	7/3
CY31	9/6	ECL82	9/11	PCF80	7/3
DAF96	7/9	EF36	3/-	PCL82	8/6
DF96	7/9	EF37	8/3	PCL83	11/3
DH77	6/3	EF37A	7/11	PEN36C	8/6
DK92	7/11	EF39	4/-	PL81	9/-
DK96	7/9	EF40	13/3	PL82	7/3
DL96	7/9	EF41	8/3	PL83	7/3
DM70	7/6	EF42	7/3	PY32	10/11
EABC80	6/11	EF50	1/9	PY80	6/11
		EF55	5/11	PY81	6/-
EAF42	8/3	EF80	5/3	PY82	6/6
EAL91	4/3	EF85	6/3	U25	10/11
EB34	1/3	EF86	10/-	UAF42	8/11
EB41	6/11	EF89	7/3	UB41	7/11
EB91	3/6	EF91	3/6	UBC41	7/6
EB93	4/11	EF92	4/6	UBF80	8/3
EB94	7/9	EF95	6/6	UCH42	7/6
EBF89	8/3	EL41	8/3	UCL82	11/3
ECC35	6/6	EL42	9/3	UF41	8/-
ECC40	19/11	EL84	6/6	UF42	7/3
ECC81	5/3	EL85	10/3	UF89	6/11
ECC82	5/11	EL91	4/6	UL41	7/3
ECC83	6/11	EY51	8/6	UL84	7/3
ECC84	8/11	EY86	7/11	UY41	6/3
ECC85	7/11	EZ40	6/6	UY1N	10/11
ECC91	5/3	EZ80	6/-	VP23	3/3
ECF80	9/6	EZ81	6/11	VP41	5/11
ECF82	9/6	GTIC	6/11		

All uninsured parcels at C.O.D. or C.W.O. only. S.A.E. with all enquiries.

A STEREO PRE-AMP

A FREQUENCY COMPENSATED CIRCUIT

By J. S. Kendall

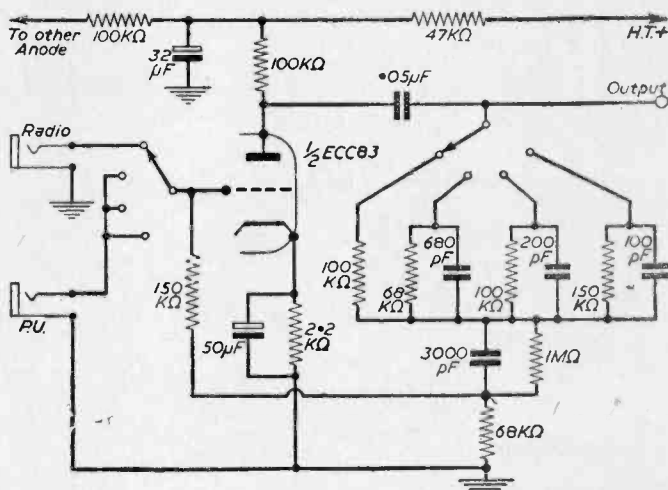


Fig. 1.—The circuit diagram (for one channel only).

ALTHOUGH most stereo amplifiers have their own balance control in the main amplifier this cannot be used to compensate for any imbalance in frequency response which may occur in other parts of the circuit. With a frequency

compensated pre-amplifier such as this design, particular care must be taken in the selection of the components in the frequency compensation network. The volume and tone controls are now readily available matched to a degree sufficient for

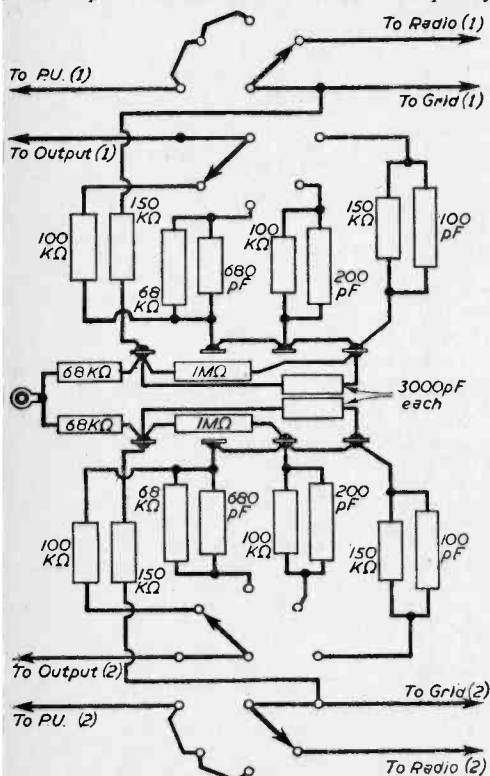


Fig. 2.—Switch wiring diagram.

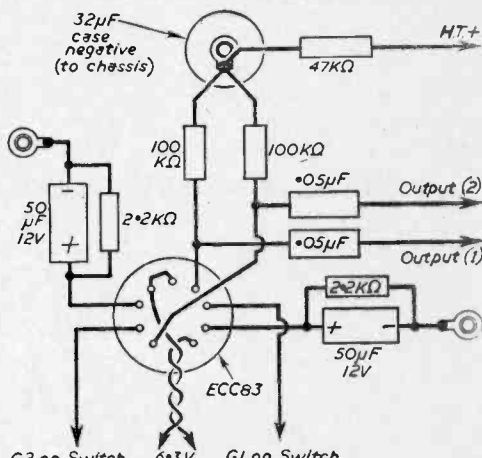


Fig. 3.—Valve base wiring.

stereo circuitry. Stray capacitance may affect the higher frequencies, but since there is heavy negative feedback at these higher frequencies in this design, layout is not over critical. The cable linking the pre-amplifier to the main amplifier can be of the "twin microphone" type which contains two individually screened conductors. Octal plugs and sockets can be used for these connections provided that a simple screen is placed at the

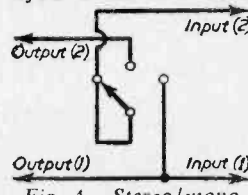


Fig. 4.—Stereo/mono switch.

socket, between the 6.3V heater circuit and the two inputs to the main amplifier.

Value

The valve used in the circuit is the ECC83. This has a high degree of amplification and even with heavy negative feedback there is sufficient gain in reserve for the bass compensation. The use of a dual valve also simplifies wiring.

The complete circuit diagram is given in Fig. 1. This is for one channel only, the other channel circuitry being identical. Component tolerances are not particularly critical although best results are achieved if resistors are within 5 per cent and capacitors within

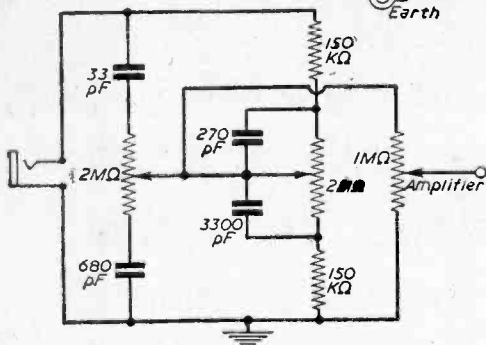


Fig. 5.—Tone and volume control circuit.

10 per cent or less. Even better results can be obtained by the use of matched pairs of components for each channel. The wiring around the valve base is shown in Fig. 3 and should be easily followed while the wiring of the components associated with the switches is given in Fig. 2. The switch should be a 4-pole 5 or 6-way type; the extra tag may be useful as an anchoring point.

DRIFT-FIELD TRANSISTORS

FOUR new drift-field transistors of the germanium p-n-p alloy type specifically designed for use in FM and AM/FM radio receivers and tuners are announced by RCA. They are the 2N1177, 2N1178, 2N1179, respectively, for R.F. amplifier, R.F. local-oscillator, and R.F. mixer service at frequencies up to 120Mc/s; the 2N1180 for I.F. amplifier service at frequencies up to 10.7Mc/s.

Because of their small physical size and use of drift-field construction, these transistors have small effective base width, low feedback capacitance, and a high collector-to-base breakdown voltage features which, for the first time make possible, high oscillator and amplifier performance in the FM band. In addition, the low-frequency characteristics of these transistors are carefully controlled to insure dependable performance in the standard AM broadcast band. As a result, these transistors provide the equipment designer with a transistor complement which makes

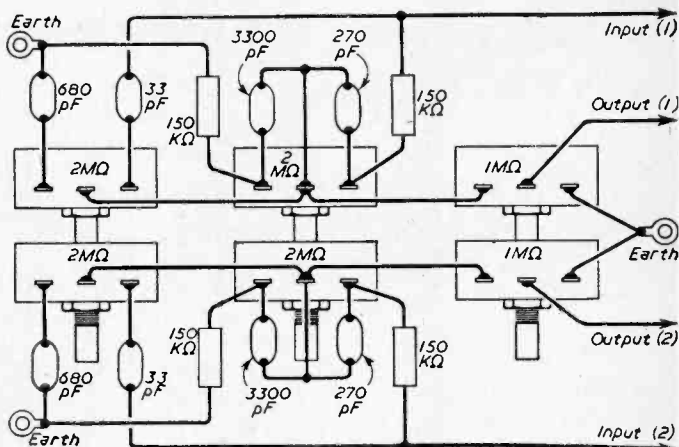


Fig. 6.—Wiring of the circuit in Fig. 5.

Volume and Tone Controls

Although it is common practice to incorporate volume and tone controls on the main amplifier it is possible to use the circuit illustrated in Fig. 1 between the pre-amplifier and the grid circuit of the first valve of the main amplifier. The wiring diagram for this tone and volume control circuit complete for two channels, is given in Fig. 6.

In certain circumstances when no stereo programme source is available, it may be wished to use the circuit with a mono source. A simple switching circuit is all that is needed and a suitable design is given in Fig. 4. A single-pole 3-way switch is needed.

This pre-amplifier circuit may generally be added as a front end to many main amplifiers and the extra degree of frequency compensation will be found particularly valuable for gramophone record reproduction. One switch position in the pre-amplifier is suitable for radio input while the other three positions have varying characteristics and frequency responses for obtaining optimum result from both L.P. and standard recordings.

practicable quantity-produced FM and AM/FM radio receivers and tuners having high gain, high sensitivity, excellent stability, good signal-to-noise ratios, and good AVC capabilities.

For example, in a typical FM tuner operating at a frequency of 100Mc/s, the 2N1177 is capable of providing a power gain of 14dB; and the 2N1178 a conversion power gain of 17dB when followed by a 10.7Mc/s I.F. amplifier stage.

The 2N1180 in a 3-stage 10.7Mc/s I.F. amplifier circuit is capable of providing a useful power gain of 65dB with neutralization of 57dB without neutralization.

The 2N1178 when operated in local-oscillator service at a frequency above that of the incoming R.F. signal, can supply a 2N1179 R.F. mixer stage with the required oscillator-injection voltage for optimum mixing throughout the FM band.

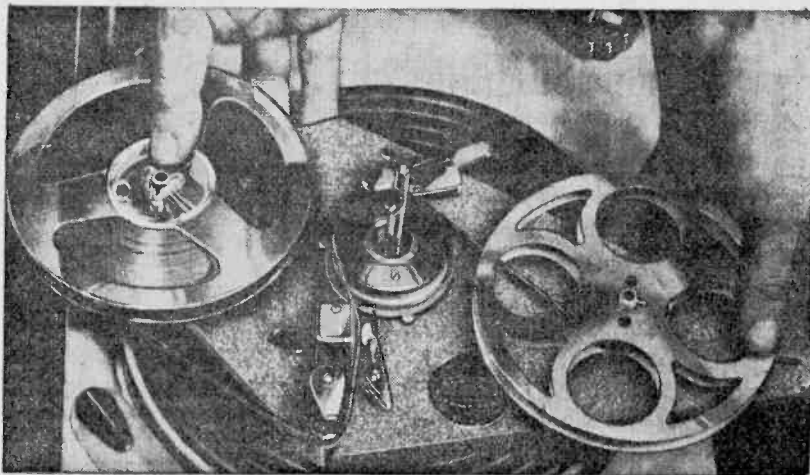
(RCA Great Britain Ltd., Lincoln Way, Sunbury-on-Thames, Middlesex.)

A REVOLUTIONARY NEW BRITISH INVENTION!

- ★ Uses standard tapes
- ★ Plays at $7\frac{1}{2}$ " per. sec. or 3 other speeds
- ★ Records direct from radio or microphone
- ★ Erase and fast rewind

£13.12s

Special moving-coil microphone and tape extra.
EASY TERMS



Instantly turns any gramophone into a first-class Tape-Recorder and back into a record-player in a moment!

Gramdeck is completely *new* . . . a revolutionary and ingenious invention that instantly turns your gramophone into a tape-recorder and back into a gramophone at will! Slip the Gramdeck on to your turntable and you have the finest tape-recorder you've ever heard! Lift it off . . . your gramophone is ready to play records again. There are no motors or valves to go wrong—and you get a quality that has to be heard to be believed! Everyone is praising the Gramdeck.

"The quality is at least equal to that obtained from a good microgroove disc," says a leading professional journal.

"Ingenious—simple . . . why on earth did no one think of it before!"—THE TAPE RECORDER. "A British challenge to Continental tape recording firms."—DAILY EXPRESS.

"Quality of reproduction excellent . . . real hi-fi results . . . potential is tremendous . . . both designer and manufacturer should be congratulated."—BRITISH RADIO & TV RETAILERS REVIEW.

"Better than many so-called hi-fi recorders . . . robust . . . carefully designed . . . excellent value."—AMATEUR CINE WORLD.

Free!



WORKS FROM ANY RECORD-PLAYER OR RADIOGRAM

Gramdeck records and reproduces with a wonderful depth and breadth of tone. Because it uses equipment that is already in your gramophone it only costs a fraction of the high-quality tape-recorder you would normally require. Full details, specifications, photographs, easy terms, etc., are given in the Gramdeck Book. Send for your FREE copy, today.

MADE BY THE FIRM THAT MAKES RADAR RUNS FOR VISCOUNTS & BRITANNIAS

FREE BOOK—POST NOW!

I would like to know how to turn my gramophone into a first-class tape-recorder . . . please send me the Gramdeck Book—FREE and without obligation.

(Write if you prefer not to cut page)

NAME

ADDRESS

Gramdeck
GRAMPHONE TAPE RECORDER

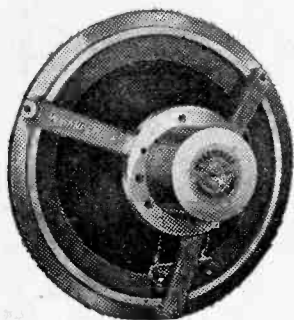
HIGH QUALITY TAPE-RECORDING FOR EVERY HOME

Gramdeck (Dept. PA/809) 29 Wright's Lane
Kensington, London W.8

GRAMDECK TURNS A TURNTABLE INTO A TAPE-RECORDER

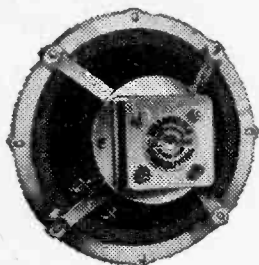
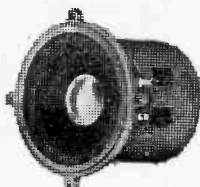
HIGH QUALITY SPEAKERS with foam surrounds by **WHARFEDALE**

THREE MORE FROM THE LARGE RANGE
OF MODELS IN PRODUCTION



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

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



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

FOAM SUSPENSION

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

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

Wharfedale
WIRELESS WORKS LTD
IDLE BRADFORD YORKS

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



Safety first every time with these patented spring-loaded AVO Prodclips.

Cleverly designed for use as insulated prods, they are invaluable for reaching and holding test points which are difficult of access.

Suitable for use with AvoMeter, Multiminor
and Avo Electronic Test Meter Leads.

Post Free
15/-
per pair.

AVO LTD · AVOCET HOUSE
92-96 VAUXHALL BRIDGE ROAD, LONDON, S.W.1
Victoria 3404 (12 lines)
A MEMBER OF THE METAL INDUSTRIES GROUP OF COMPANIES

EXPRESS ELECTRONICS ROSEDENE LABORATORIES KINGSWOOD WAY, SELSDON, SURREY VALVES NEW, TESTED AND GUARANTEED REDUCED PRICES

1C1	7/8	6B87	10/6	12Q7GT	7/6	EB81	6/8	N18	8
1C3	8/-	6BWB	7/-	12A5	10/6	EBF80	8/8	N19	7
1F1	8/-	6BW7	7/-	25A60	10/8	EBF80	8/8	PCC84	9
1F3	7/8	6C10	9/-	25L6GT	9/-	ECC81	7/8	PCF80	9
1FD1	8/-	6D2	5/8	25Z4G	9/-	ECC82	7/8	PCF82	10
1FD9	7/8	6F12	4/8	30C1	8/-	ECC83	7/8	PCF82	9
1L4	6/9	6H8GT	2/-	30L1	8/-	ECC84	9/8	PL81	12
1P1	8/-	6J7GT	8/8	35L8GT	9/-	ECC84	9/8	PL82	9
1P10	7/8	6K7G	5/8	35W4	8/8	ECC82	10/8	PL82	9
1P11	7/8	6K8G	7/8	35Z4GT	8/-	ECH42	8/-	PY81	8
1R5	7/8	6Q7G	7/8	58K11	11/6	ECH81	10/-	PY82	7
1R5	7/8	68L7GT	7/8	6763	7/8	ECL80	10/8	R19	12
1T4	7/8	68N7GT	5/-	DAF91	7/8	ECL82	9/8	U52	7
1U5	8/-	6V6G	7/8	DAF96	8/-	EP41	9/-	U76	7
3Q4	8/-	6X4	7/-	DF91	7/8	EP80	8/8	U78	7
384	7/8	6X5GT	6/-	DF96	8/-	EP86	11/-	UBC41	8
3V4	7/8	7B7	7/8	DH78	7/8	EP91	4/8	UCH42	9
5U4G	7/8	7C5	7/8	DH77	7/-	EP92	5/8	UF41	8
5V3GT	7/8	8D3	4/8	DH142	8/8	EL41	9/8	UL41	8
6Z4G	9/8	12AH3	10/8	DH150	10/-	EL84	8/8	UY41	7
6AK6	6/8	12AT6	8/8	DK91	9/-	EY51	10/8	W76	6
6AL5	6/8	12AT7	7/8	DK92	9/-	EY81	10/-	W142	8
6AM6	4/8	12AU7	7/8	DK96	8/-	EZ40	7/8	X17	7
6AT6	7/8	12AX7	7/8	DL92	7/8	EZ80	8/-	X142	9
6BA6	7/-	12BH7	8/8	DL94	7/8	EZ81	8/8	X150	9
6BE6	7/-	12K7GT	6/8	DL96	8/-	KT33C	9/8	Z77	4
6BR7	8/8	12K8GT12/8	8/-	EABCR80	8/8	N17	7/8	ZD17	7

VOLUME CONTROLS MIDGET SIZE LONG SPINDLES D.P. switch,
3/8; S.P., 3/3; Less switch, 2/6. Values 10K to 2M. Pre set 2/6.

MATCHED PAIRS

EL84 21/-, 6V6G 17/-, 6BW6 18/- per pair. Push Pull O.P. Transformers
for above 3-15Ω 14/8, 12" P.M. Speakers 3Ω 24/8, Baker's 'Selhurst' 12"
15Ω, 15W, 90/-, P. & P. 2/6, 12" Stereo Model 27/0.

SETS OF VALVES

DK91, DF91, DAF91, DL92 or DL94	23/8
DK96, DF96, DAF96, DL96	32/-
1C3, 1F1, 1FD1, 1P1	32/-
1R5, 1T4, 1S5, 384, or 3V4	23/8

Postage and packing 8d. Over £1 post free. C.O.D. 2/6.

The Compact "4 plus 1"

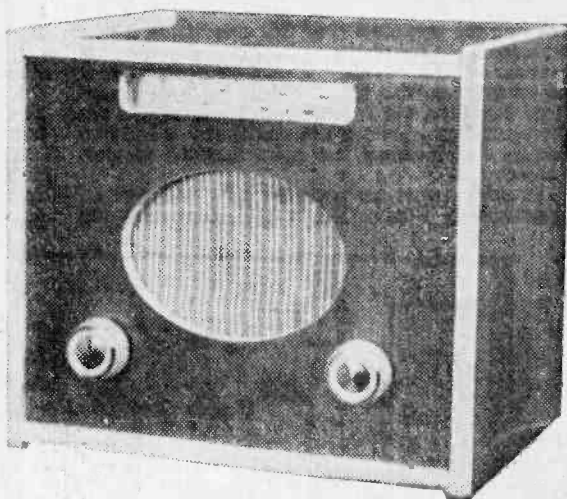
A RECEIVER FOR THE
EXPERIENCED CONSTRUCTOR

By D. H. Nash

THE requirements considered when this receiver was designed were that the overall size should be kept to a minimum, but should not be so drastically reduced as to affect the performance adversely, or to require the use of special miniature components. Consequently, the design to be described was evolved and is fitted into a cabinet 9in. wide, 8in. high and 6½in. deep (made of ¾in. thick walnut veneered 7-ply obtained from an old TV cabinet). Tonal quality of the reproduction was found to be of a high standard from the 5in. speaker. Negative feedback is incorporated in the A.F. stages to compensate for the effects of the small cabinet. A somewhat unusual tuning drive is employed, and is the means by which the small working parts involved enable a tuning dial of useful length to be used.

The Circuit

It will be seen from Fig. 1 that this receiver covers the medium waveband only thus saving space and simplifying construction of the frequency changer section (V1). From here the signal passes



Front view.

(at 465kc/s I.F.) to the I.F. amplifier (V2); the secondary winding of the first I.F. transformer is returned to earth as no AVC bias is applied to this stage. Demodulation is performed by the signal diode of V3, the second diode providing an AVC bias voltage which is applied to V1. The A.F. output is taken from the volume control slider to the grid of V3, the output of which is R/C coupled to the output valve V4. From the secondary of the output transformer, negative feedback is applied to the cathode of V3. Space considerations resulted in the heater supplies being obtained from a small transformer. The H.T. is obtained direct from the mains. V5 being used as a half-wave rectifier by strapping the anodes.

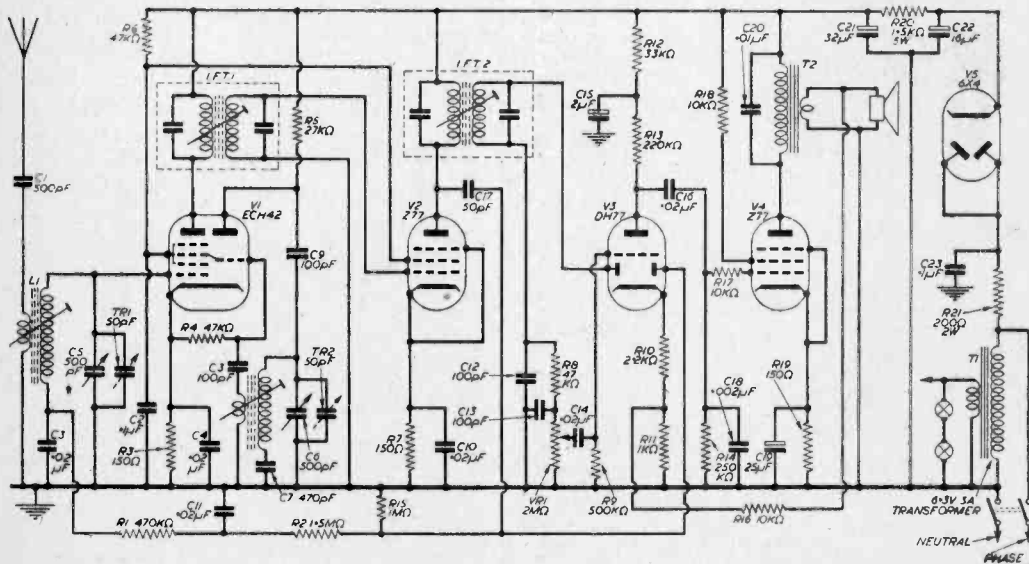


Fig. 1.—The complete circuit diagram (C1 and C23 are 750 V A.C. working).

Construction

During the preparation of this description it was considered that the reader embarking upon the construction of this receiver should previously have had experience with less compact types of equipment; therefore, the following paragraphs and the accompanying drawings are calculated mainly to describe and illustrate the more unusual features of the design.

The components are mounted upon a chassis of approximately 6½ in. x 5 in. x 2½ in. for which the

tinplate screen as indicated in Fig. 2; this is open at the side to which the two trimmers are fixed.

Tuning Drive

The principle of the tuning drive is as shown in Fig. 3 where the view is from the rear of the receiver.

The most convenient size of drum it was found possible to accommodate on the tuning condenser spindle was 1½ in. in diameter and the 5/1 reduction from the ¼ in. diameter tuning control spindle (adapted from a burnt-out volume control) proved adequate for M.W. tuning. The dial pointer travel is doubled by the use of two miniature "pulley blocks"; thus the pointer travel when using the 1½ in. drum is almost 4 in. (the circumference of the drum) for the 180deg. rotation of the condenser. It follows, therefore, that the dial cut-out width in the front panel for any given drum diameter is:—(diameter of drum in inches x 3.142) ÷ 4 in.

A threaded brass bush is fitted into a suitable hole in the front panel as extra support for the tuning spindle. The approximate positions of the various pulleys, etc., are indicated in Fig. 3. The actual sizes and mounting arrangements are left to the individual constructor as use will undoubtedly be made of materials to hand. It should be remembered that sufficient clearance is required to allow the "pulley blocks" to pass each other at certain dial settings.

Two approximately triangular ¼ in. thick plywood pieces will be needed at the upper corners of the panel to which they are glued and screwed. Before these are fixed in place, care-

(Continued on page 165)

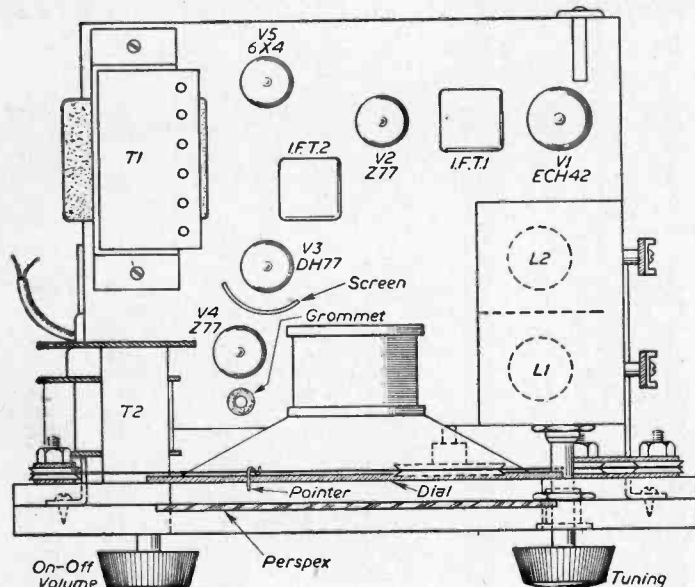


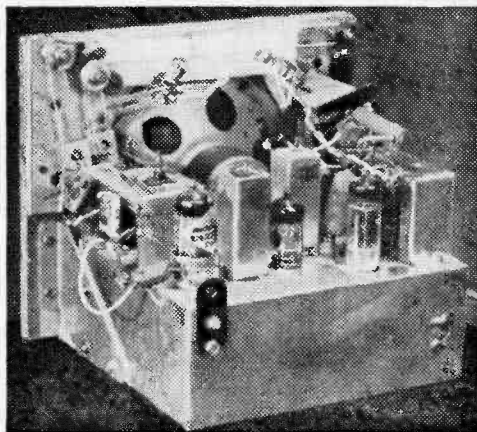
Fig. 2.—The above chassis layout.

container of a well known product was proved ideal; this is made of tinplate which facilitates the soldering of earth connections and is thin enough to make drilling, etc., easy. A 16s.w.g. reinforcing plate is fitted behind the front runner of the chassis, both this plate and the chassis being drilled to accommodate control bushes, tuning condenser fixings, etc.

It was decided to fix the front panel permanently to the chassis by means of brackets. Thus, the whole receiver, including speaker and controls, becomes one unit.

The general layout (Fig. 2) should be, in the main, adhered to as there is some risk of instability occurring if major changes are made; for the same reason care should be exercised in placing the components, especially valveholders and I.F. transformers) so that connections (particularly to valve anodes and control grids) are as short and direct as possible. The small screen between V3 and V4 should not be omitted and the condensers which are used for decoupling are best fitted with the wire end in contact with the case connected to earth. (This is usually marked with a band on the appropriate end.)

The dust-cored aerial and oscillator coils are fitted inside the simple 1½ in. high two compartment



Rear view.

LEARN RADIO & TV SERVICING

Train at home in your spare time
this new, easy, practical way!

YOUR OWN... BUSINESS... CAREER... OR FASCINATING HOBBY

Electronics is rapidly becoming a great new industry with far reaching applications into every field of modern activity.

You can learn all the essentials of this new science at home in your spare time and turn your knowledge to good purpose!

Now is your chance to set up your own business and be your own boss!

RADIOSTRUCTOR EQUIPMENT COURSES MAKE LEARNING SO SIMPLE

You learn by building actual equipment with the big kits of components and parts which we send you. You advance by simple steps using high quality equipment and performing a whole series of interesting and instructive experiments—there are no complicated mathematics! Instruction manuals and our teaching staff employ the latest techniques for showing clearly how radio works in a practical and interesting manner; in fact, you really have fun whilst learning! And you end by possessing a first-rate piece of home

equipment with the full knowledge of how it operates, and how to maintain it afterwards. In fact, for those wanting help with their radio career training, to set up their own full or part-time servicing business, or the hobbyist, this new and instructional system is exactly what is needed, and it can be provided at very moderate cost with payments available. Post the coupon now, for full details. There is no obligation of any kind.



- NO MATHEMATICS
- EASY TERMS AVAILABLE
- ALL TEST EQUIPMENT SUPPLIED
- PERSONAL TUITION
- FINEST EQUIPMENT

POST TODAY FOR FREE brochure

To RADIOSTRUCTOR (Dept. G82)
40 RUSSELL ST., READING, BERKS.
Please send Brochure without obligation to:

Name _____

Address _____

BLOCK
CAPS
PLEASE

(827) We do not employ representatives

6-60

RADIOSTRUCTOR

BRITAIN'S LEADING RADIO TRAINING ORGANISATION

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, 7/16 in. diameter, connections to
6-Tag Ring, 208 pF tuning

12/6

OSCILLATOR COIL P50/1AC

Medium wave in screening can. For 176 pF
tuning condenser

5/4

1st AND 2nd I.F. TRANSFORMERS—P50/2CC
470 Kc/s operation with 250 pF tuning in cans.

5/7

11/16 in. diameter by 3/4 in. high

3rd I.F. TRANSFORMER—P50/3CC

Last stage transformer to feed diode detector.
Size as P50/2

6/-

DRIVER TRANSFORMER—LFD2T

Upright mounting with six connecting tags—
1 5/16 in. x 7/8 in. x 1 3/4 in.

9/6

PRINTED CIRCUIT—PCA1

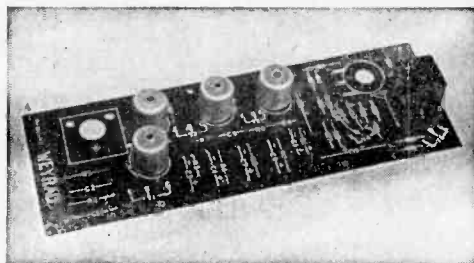
Size 2 3/4 in. x 8 1/4 in. Ready drilled and printed with component positions 9/6

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



GZAK: This Month's Bargains

VARIABLE CONDENSERS

All Brass with Ceramic End Plates and Ball Race Bearings
50 pf., 5/9; 100 pf., 6/6; 160 pf., 7/6; 250 pf., 8/6 and
300 pf., 9/6. P. & P. 1/6. Designed for the S.V.V. constructor.

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. Stranded 7/25, 140ft, 10/-; 70ft, 5/-,
P. & P. 2/-.

RIBBED GLASS. 3in. aerial insulators, 1/6 each or 6 for 7/6.
P. & P. 1/6.

CERAMIC FEEDER SPREADERS. 6in. type F.S. 9d. each
or 8/- dozen. P. & P. 2/-.

CERAMIC "T" PIECES. Type A.T. for centre of dipoles,
1/5 each or 3 for 4/- P. & P. 1/6.

2 METRE BEAM 5 ELEMENT W.S. YAGI. Complete in
box with 1 x 2 1/2 in. mast head bracket. PRICE 49/- P. & P. 3/6.

SUPER AERIAL CABLE. 75 ohm, 300 watts, very low
loss, 1/8 per yard, P. & P. 1/6. 50 ohm, 300 watt coax, very low
loss, 1/6 yd. or 20 yds. 27/6. P. & P. 1/9.

HEADPHONES H.R. TYPE. 4,000 ohms., very sensitive.
ONLY 12/6 pr. P. & P. 1/6. C.L.R. Type (low res.), 8/6.
P. & P. 1/6.

ABSORPTION WAVEMETERS. 3.00 to 35.00 Mc/s. in 3
switched bands, marked on scale. Complete with indicator
bulb. A MUST for any Ham shack. ONLY 19/6, post free.

ROTARY CONVERTERS. 6 v. Input, 250 v., 125 mA
output. ONLY 17/6. P. & P. 3/-. Also 12 v. D.C. MINIA-
TURE, output, 360 v., 30 mA cont. or 310 v. 70 mA intermit-
tent rating. 12/6 each or 22/- for 2. P. & P. 2/-.

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)

SOLDERING EQUIPMENT

by



**PRECISION
SOLDERING
for the ELECTRONICS
INDUSTRY**

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

Illustrated is the 25w. 3/16in. replaceable
bit model with safety shield.
British and Foreign Patents. Registered
designs. Suppliers to H.M. and Foreign
Governments. Agents throughout the
world.
Brochure No. S 10 sent free on request
Sole proprietors and manufacturers:

**LIGHT SOLDERING DEVELOPMENTS
LIMITED**

28 Sydenham Road, Croydon, Surrey

Phone: CROYdon 8589 Grams: Litesold Croydon



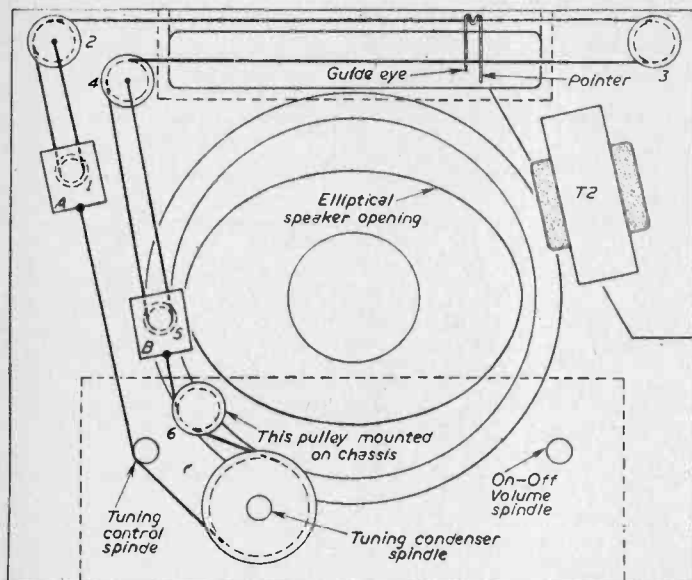


Fig. 3.—Details of the tuning drive.

ful removal of the inner layers of the panel ply for approximately $\frac{1}{4}$ in. round the dial aperture will create a slot into which a piece of Perspex can be fitted from the top, before the receiver is slid into the cabinet. The dial itself (made of paper-backed Perspex) is held against the plywood corner pieces by small clips.

The nylon drive cord is fitted in three pieces:—

(1) Starting at the anchoring point at the centre of pulley 2, round pulleys 1, 2, 3, 4 and 5 and back to the anchoring point at the centre of pulley 4.

(2) From the condenser drum, two turns round the tuning control spindle and so to the fixing on "pulley block" A.

(3) From the other side of the condenser drum via pulley 6 to the fixing on "pulley block" B.

The wire pointer is fixed to the cord between pulleys 2 and 3, and is bent to pass over the top of the dial. The other end of this wire is formed into an eye to accommodate the cord passing between pulleys 3 and 4, so preventing twisting of the cord and keeping the pointer in line.

Alignment and Testing

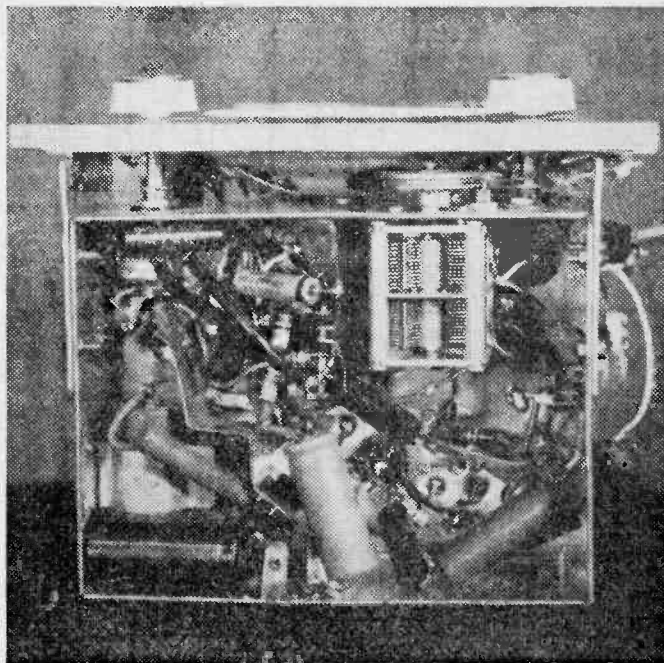
If alignment is carried out with the aid of a signal generator the constructor will doubtless be familiar with the procedure involved. In the event

of this operation having to be performed without the aid of such an instrument the procedure which has recently been amply described in these pages can be followed: one end of R16 should be left disconnected, thus rendering the feedback loop ineffective, until such time as the initial tests have been carried out, and the A.F. stages are proved to be working satisfactorily. R16 can then be connected; if this results in distortion or A.F. oscillation the phasing of the feedback loop will be incorrect and the connections to either winding of the output transformer (T2) should be reversed.

Mains Connection

It must be pointed out, for the benefit of any constructor not familiar with the method of obtaining H.T. used that the chassis is directly connected to one side of the mains; therefore, it should be ensured that this chassis connection is

to the mains neutral through a non-reversible plug, via one side of the double pole switch. No metal part which is connected to the chassis must be left within the reach of the user.



Underchassis view.

A Stable V.F.O. for 80m

AN INEXPENSIVE UNIT USING SP61 VALVES

By J. Kemp

THE main purpose of this small variable frequency oscillator is to increase the usefulness and flexibility of a crystal-controlled transmitter operating in either the 3.5, 3.8 or 7.00-7.15Mc/s amateur bands. Sufficient output is available to drive a 6V6, 6L6 or 807 crystal oscillator; and the drive control may be backed off appreciably when using smaller oscillator valves. The oscillator is very stable owing to the rigid construction, and isolation from the heat producing components such as valves and resistors. The frequency change, or drift, is never greater than 150c/s, giving the percentage stability as 0.004.

Power Supply

The power requirements are low, and could probably be met from the existing power pack. If not, the circuit of a suitable power unit will be given. The use of SP61's with their high heater current (0.6A) may be questioned, but they are cheap, well-screened and have a high slope—essential in an oscillator stage. They work much better in this application than miniature valves such as EF80's.

Another use for the unit is the reception of single sideband transmissions on any amateur band below 30Mc/s. When using external carrier injection on the incoming frequency tuning of the signal is made very much easier since the receiver has only to be set with the incoming s.s.b. inside the passband of the receiver I.F. and the V.F.O. dial moved slowly until best voice quality is obtained. The frequency stability of the receiver does not matter, and no internal B.F.O. is necessary. Amateur band CW can also be received in the same manner. If the injection signal from the V.F.O. is too strong, it may operate the A.V.C. reducing gain, but by using one or two inches of wire attached to the output socket, and by use of the "Drive" control, the correct injection of the fundamental and of harmonics up to 30Mc/s can be obtained.

Circuit Details

The circuit (Fig. 1) consists essentially of a series tuned Colpitts, or Clapp oscillator operating on the 3.5-3.8Mc/s band this range being spread over the full 180deg of the dial. This is followed by

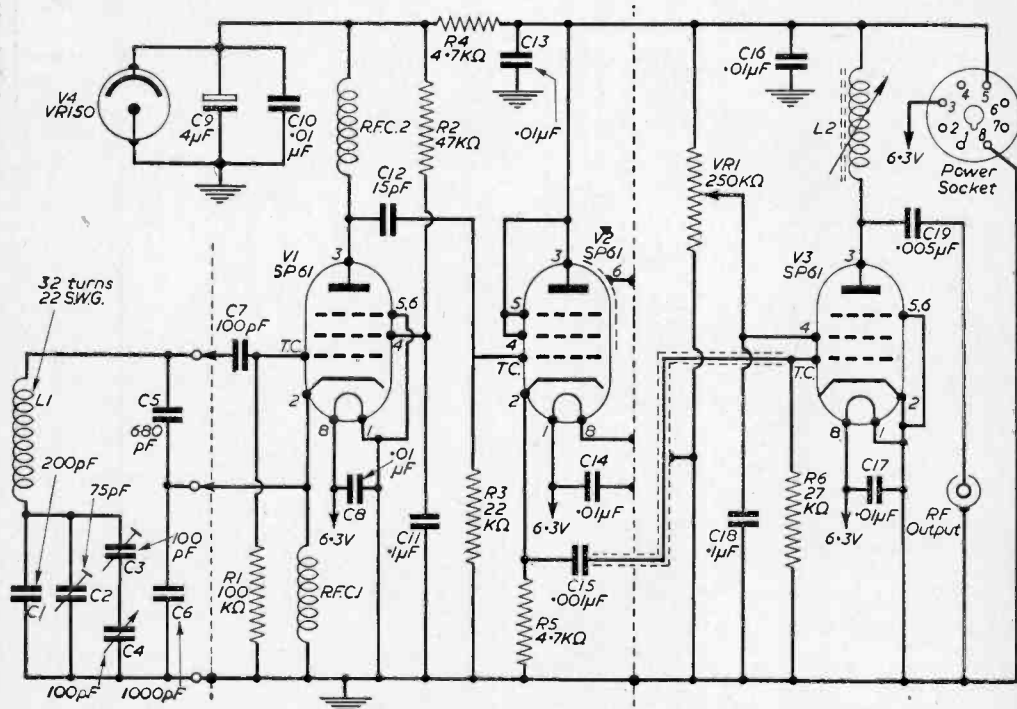


Fig. 1.—The circuit diagram of the V.F.O.

RETURN-OF-POST SERVICE

JASON F.M. TUNERS

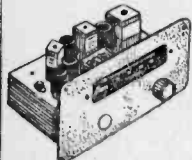
Three Jason F.M. Tuner kits with variable tuning are now available to the home constructor. Brief details are given here and our illustrated list is available free.

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

Hire Purchase Terms are available on any kit.

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

STANDARD TUNERS



FMT1. Supplied complete with a chassis-panel assembly fitted with a gold hammer finished panel and glass dial. Four EF81 valves are used and an external power supply is required. Complete kit £8.19.6. Power Pack Kit £2.1.0.

FMT2. This is a new version of the FMT1 and is supplied with a complete cabinet-chassis assembly which can be mounted in a cabinet or stood on a shelf. The circuit employs four EF80 valves and the power supply can be built into the cabinet if desired. Complete Kit less power supply £7.17.6. Kit with power supply £9.16.0.



FRINGE TUNER

FMT3. This is a fringe tuner using the same cabinet assembly as the FMT2 described above. The tuner is fitted with variable AFC and uses five EF80 and one ECC81 valves. Kit less power supply £9.19.6. Kit with power supply £11.18.0.

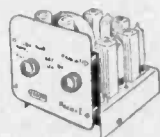
F.M.TV SWITCHED TUNERS

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

INSTRUCTION MANUALS. Our kits include these without extra charge, but the manual for either tuner can be supplied separately at 3/10, post free.



JTV2. This tuner is complete with power supply in a cabinet which can be used either for shelf or cabinet mounting. Complete kit £14.14.0.



MERCURY 2. This is similar to the JTV2 but has no provision for a power supply. It is mounted on a small chassis with printed front panel and is intended for cabinet fixing. Complete Kit £10.10.0.

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

NEW ILLUSTRATED LISTS

Illustrated lists are available on LOUDSPEAKERS, TAPE DECKS, TEST GEAR, RECORDING TAPES, GRAMOPHONE EQUIPMENT. Any will be sent free upon request.

LATEST TEST METERS

AVOMETER MODEL 8. The finest multi-range meter available. 20,000 ohms per volt on D.C. ranges. Eight D.C. Voltage ranges 2.5 v. to 2,500 v. Seven D.C. current ranges 50 microamps. to 10 amps. Seven A.C. Voltage ranges 2.5 v. to 2,500 v. Four Current ranges 100 mA. to 10 amps. Three resistance ranges. Price £23.10.0. H.P. Deposit £4.14.0 and 12 monthly payments of £1.14.6. Price with leather carrying case, £27.8.0. H.P. Deposit £5.8.0 and 12 payments of £2.0.4.

AVO MULTIMINOR. A pocket size 10,000 ohms per volt meter (1,000 ohms per volt on A.C.). Six D.C. voltage ranges 2.5 to 1,000 volts. Five A.C. voltage ranges 10 to 1,000 volts. Five D.C. current ranges 100 micro. to 1 amp. Two resistance ranges. Price £9.10.0. H.P. deposit £1.18.0 and 12 monthly payments of 14/4. With leather case £11.8.0. Deposit £2.5.0 and 12 monthly payments of 17/-.

AVOMETER MODEL 7. also available. Price £19.10.0. H.P. Deposit £3.18.0 and 12 payments of £1.8.8. With leather case £23.8.0. H.P. deposit £4.12.0 and 12 payments of £1.14.6.

CABY SUPREME MULTI-RANGE METERS. Made abroad. We can confidently recommend these meters as being accurate, well made and very good value for money.

MODEL A-10. Sensitivity 2,000 ohms per volt A.C. and D.C. Five voltage ranges 10-1,000 volts A.C. and D.C. Three D.C. current ranges 0.5-250 mA. Two resistance ranges. Size 5 1/2 x 9 1/2 x 1 1/2. Price £17.6. H.P. Deposit £1.7.6 and three monthly payments of £1.6.8.

MODEL B-20. Sensitivity 4,000 ohms per volt A.C. and D.C. Voltage ranges Five D.C. 10-1,000 volts. Four A.C. 10-1,000 volts. Four D.C. current ranges. 0.5-250 mA. Four resistance ranges. Price £6.10.0. H.P. Deposit £2 and three monthly payments of £1.13.4.

Leaflets giving full details of any of the above meters are available free upon request.

GRAMOPHONE EQUIPMENT

ALL LATEST MODELS

Hire Purchase
Cash Price Deposit Mthly/Pmts

RECORD CHANGERS

GARRARD Conquest (Studio O PU)	£7.19. 6	£1.12. 0	6 of £1.4.7
GARRARD RC121 (GC8 PU)	£9.19. 6	£1.19. 6	12 of 15/-
GARRARD RC88 (GC8 PU)	£18. 8. 0	£3. 6. 0	12 of £1.4.0
GARRARD RC98 (GC8 PU)	£18.12. 8	£3.15. 8	12 of £1.7.3
B.S.R. UA8 Monarch (TC8 PU)	£7. 5. 0	£1. 9. 0	6 of £1.2.8
B.S.R. UA14 Monarch (TC8 PU)	£28.13. 0	£1.15.0	12 of 13/7
B.S.R. UA14 Monarch (TC8 Stereo/LP/78)	£9.18.0	£1.18.0	12 of 15/-

SINGLE RECORD PLAYERS

GARRARD TA (GC8 PU)	£8.10. 0	£1.14. 0	12 of 19/-
B.S.R. TU9 (TC8 PU)	£4.10. 0	£1. 5. 0	3 of £1.5.0
GARRARD RP354 (O. P or T PU)	£28.11. 1	£1.15.11	12 of 13/7
GARRARD RP354 (O. P or T PU)	£28.18. 9	£1.18. 9	12 of 15/-
E.M.I. (Acos Stereo PU)	£6.15. 0	£1. 7. 0	12 of 10/8

TRANSCRIPTION UNITS

GARRARD 4T/200 (TX88 PU)	£18.13. 0	£3.15. 0	12 of £1.7.4
GARRARD 4TR/200 Motor only	£13.18. 3	£2.15. 3	12 of £1.0.5
GARRARD 4HF (GC8 PU)	£18. 9. 9	£3.15. 9	12 of £1.7.0

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

AMPLIFIER KITS

We have full stocks of all components for the Mullard 510, Mullard 2 and 3 valve Pre-Amplifiers, GEC 912 Plus, Jason Jupiter and J8A 2 Stereo Amplifiers. Fully detailed list on any of these sent upon request.

Instruction Manuals. Mullard. All Mullard Audio Circuits in "Circuits for Audio Amplifiers" 9/5. GEC 912, 4/6. Jason Jupiter, 2/10. J8A 2, 2/4. All post free.

WATTS RADIO
(MAIL ORDER) LTD.

54 CHURCH STREET, WEYBRIDGE, SURREY

Telephone: Weybridge 4556

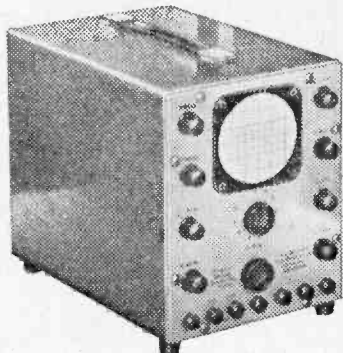
Please note: Postal business only from this address
CLOSED FOR ANNUAL HOLIDAYS AUGUST 6th to 20th

Treco Scope

LOW PRICE * HIGH PERFORMANCE VERSATILITY

The TRECOSCOPE, designed around a most modern 3" cathode ray tube and new type valves, meets all the requirements for a high performance and versatile general purpose oscilloscope. Its overall size is 7" x 8½" x 11" and the specification, too comprehensive to be fully given here, is contained in our illustrated brochure, a copy of which will gladly be sent on receipt of S.A.E.

* NOT A SINGLE ITEM OF GOVT. SURPLUS STOCK IS USED IN THIS INSTRUMENT



CONTROLS: brilliance, focus, X shift, Y shift, coarse time base, fine time base, synchronisation, Y amplitude, X amplitude, Y input selector switch.

FACILITIES: Y plates via (1) high gain amplifier, (2) low gain negative feedback amplifier, (3) isolating condenser, (4) isolating condenser and attenuator. Hard valve time base covering 5 c.p.s., to 150 kc/s. X plate deflection from external source via X amplifier. Synchronisation via sync., amplifier at Y or other frequencies. 50 c.p.s., calibrating voltage. Brilliance modulation. Flyback suppression.

The Treco scope is guaranteed for 12 months

PRICE: £17.17.0 or £22.0 down and 12 monthly payments of £19.7.

Postage and packing 10/6

THE RANGE ELECTRONICS COMPANY LTD., 3-7 WINDMILL LANE, LONDON, E.15.

Phones: MARYland 6247 and 1289.

GOVERNMENT SURPLUS AND MANUFACTURER'S CLEARANCE

METERS. 500-0-500 Microamp. 3in. dia. 37/6 ea. Dual Range 0-5 v. 0-100 v. FSD 1 mA. 20/- ea. 50-0-50 Microamp., 2in., 30/-

TV AERIALS. Combined BBC/ITV. 3 element. 32/6. 5 element. 37/6. ITV 3 element. 22/6. 5 element. 27/6.

CO-AX CABLE 6d. vd. AIR SPACED 9d. DIPLEXERS. 12/-

GERMANIUM DIODES 1/-, 10/- doz. TRANSISTORS from 6/-

VOLUME CONTROLS. Long Spindle Midget. 10K-2 meg. Less Switch. 3/-, D.P. switch. 4/6.

CONDENSERS. Twin Gang 0.0005 Standard. 5/6. Midget. 6/6.

VHF CHASSIS. contains over 50 components. 5/6 ea.

FERRITE ROD AERIALS. M. and L. wave. mfrs. surplus. 6/6 ea.

METAL BOXES. Well vent., ideal p.c. packs, etc. 11 x 11 x 7in. H 8/6 ea.

SEL. RECS. 12 v. 1 amp., 5/-, 2 amp., 11/6. 4 amp., 15/-, 500 v. 1 amp. containing 30/35 mm. discs. 10/- ea.

ELECTROLYTICS. Canned. 20 +20 mid. 450 v., 2/6 ea., 25/- doz.

VAR. SLIDERS. 10 ohms 30 w. for chargers, trains. 3/- ea.

CONNECTING WIRE. P.V.C. 10 colours. 25ft. 1/-, 100ft., 2/6.

RELAYS. Large stocks, assorted sizes, from 2/6 ea.

PICK-UP ARM with turn-over cartridge. 19/6.

SLEEVEING 2, 3, 4, 5, M/m. 3d. vard. 2/6 dozen.

VENNER SILVER-ZINC ACCUMULATORS. H.105. New. 15/-

12 v. D.C. MOTORS. 3 1/2 in. D.E. Spindle. very powerful. 12/6 ea.

VALVES TESTED ON MULLARD'S ELECTRONIC TESTER

1L4	5/-	6F1	7/6	8D2	4/6	EB41	7/6	P81	4/-
1T4	6/6	6F6	7/6	9D2	5/-	EB91	5/6	PEN45	7/6
1U4	6/6	6F10	7/6	10F1	7/6	ECH42	8/-	PEN46	7/-
3A4	6/-	6J5	6/-	12A6	7/6	ECL90	9/-	PL81	12/6
3Z4	9/-	6V6	6/-	12A18	8/-	EF36	5/-	PL83	9/-
4D1	4/-	6V7	6/-	12AT7	7/6	EF37	9/-	SP41	4/-
6AG5	5/-	6K7	4/6	12AU7	7/-	EF39	5/6	SP61	4/-
6AL5	5/-	6L6	6/6	12AX7	7/-	EF59	3/6	VR150/30	4/-
6AM5	5/-	6SA7	6/-	12BH7	10/-	EF50	5/-		
6AN6	6/-	6SC7	4/6	12H7	5/-	EF60	8/-		
6AU6	6/-	6SJ7	5/-	12SK7	5/-	EF91	6/-	UL84	9/-
6AUG	7/-	6SK7	5/-	12SK7	5/-	EF92	7/-	VR97	15/-
6BA6	8/-	6SL7	6/-	15D2	6/-	EL32	5/-		
6BE6	5/6	6SN7	7/-	50C5	10/-	EL91	5/6	VCR138A	25/-
6BH6	5/-	6U6	6/6	30T	6/-	EY51	5/-	VCR139A	25/-
6BW6	6/6	6V6	6/6	EAS50	1/6	EY81	8/-		
6C4	5/-	6X4	7/-	EAB80	8/-	EY86	9/6		
6D2	6/-	6X5	7/-						

SECONDHAND VALVES. YOUR CHOICE. £1.0.0 (or EIGHT. ECL90, 8C4, 6AM6, 6AG6, 6J6, EF50, 6B26, 3A4, EF80, SP61, P61, 6J5, PY80, PY82, 7T7, 6AL5, 6K7, 6SJ7, EL32, EF42, 6D2, 20F1, 6P13, SP41, EY51, EF91, EF39, PCL33, EF36, PEN45, PEN46.

ENQUIRIES-S.A.E. PLEASE
HUGGETT'S LIMITED
2-4 PAWSONS ROAD, WEST CROYDON

Get these FREE CIRCUITS & WIRING DIAGRAMS

T.R.F. Circuits
Battery Circuits
Portable Circuits
S'het Circuits
Mains Circuits
Filter Circuits
F.M. Tuner

Single Valve F.M. Tuner.
2 Valve F.M. Complete Set.
Same on Printed Circuit, etc., etc.
Send Postage (1/- stamps)

OSMOR COILS are regularly used and recommended by designers writing in "Practical Wireless," "Wireless World" and "Radio Constructor." Why not follow the experts?

"Q Coils" All ranges
Potted Coils
F.M. COILS
TAPE COILS
ROD AERIALS
SUB-MINIATURE COILS
Coils and I.F.s for Transistor Circuits
Speaker Cross-over Coils
Midget I.F. Trans. With ferrite cores

OSMOR

418 Brighton Road,
South Croydon.
Telephone: CRO 5148/9

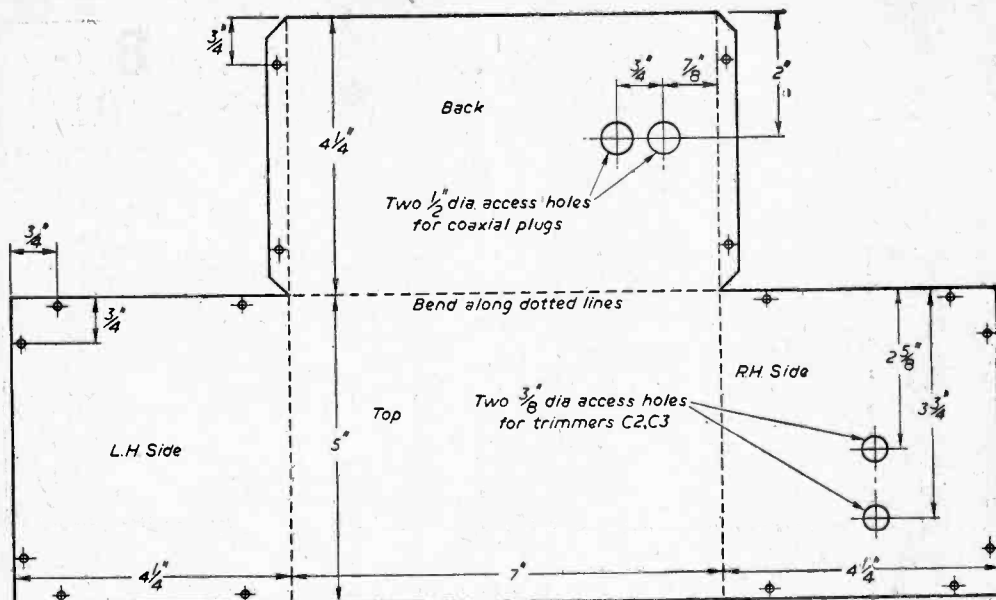


Fig. 2.—The top and back for the tuned circuit box.

an isolating cathode follower stage; followed by a tuned-anode voltage amplifier with variable screen-control.

The tuned circuit is in the upper box of the unit, being joined to the oscillator valve by two short lengths of coaxial cable. The tuning capacitor C4

(100pF) must be of a solid, well built airspaced type with ceramic insulation in order to prevent microphony as must also the 100pF airspaced trimmer in series with it and the 75pF airspaced trimmer in parallel with the combination. The coil, preferably with a ceramic former, should be mounted a

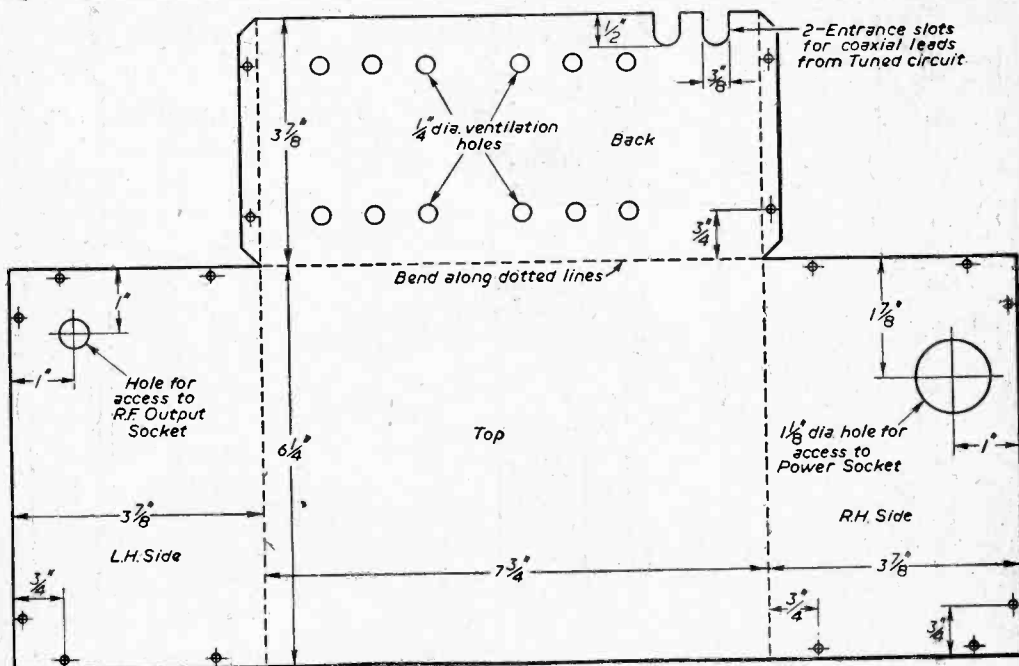


Fig. 3.—Back, top and sides of the R.F. section.

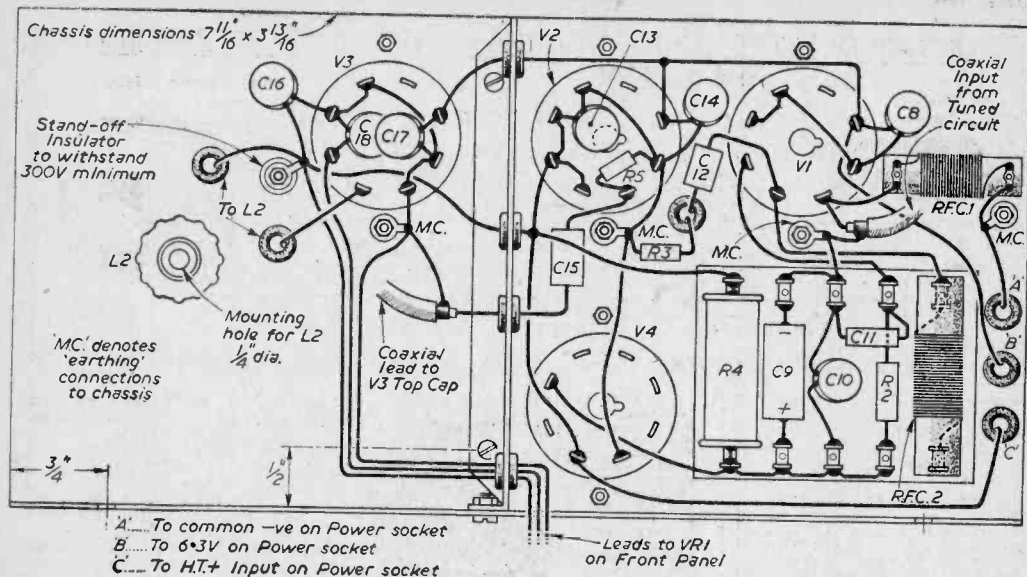


Fig. 4.—Wiring diagram of the sub-chassis.

LIST OF MAIN COMPONENTS

C1—200pF mica.
C2—75pF pre-set.
C3—100pF pre-set.
C4—100pF variable.
C5—680pF silver mica.
C6—1000pF silver mica.
C7—100pF silver mica.
C8—0.01μF disc ceramic.
C9—4μF 150V electrolytic.
C10—0.01μF disc ceramic.
C11—0.1μF paper 250VW.
C12—15pF silver mica.
C13—0.0μF disc ceramic 300VW.
C14—0.01μF disc ceramic.
C15—0.001μF mica.
C16—0.01μF disc ceramic 300VW.
C17—0.01μF disc ceramic.

C18—0.1μF paper 250VW.
C19—0.005μF mica.
R1—100k $\frac{1}{4}$ W 10 per cent.
R2—47k $\frac{1}{4}$ W 10 per cent.
R3—22k $\frac{1}{4}$ W.
R4—4.7k 5W.
R5—4.7k 1W.
R6—27k $\frac{1}{4}$ W.
VR1—250k w.w. or nearest.
RFC1 } Surplus type 1½in. long.
RFC2 } ½in. diameter close wound.
L1—32 turns 22s.w.g. enamelled on ½in. diameter former (close wound).
L2—Denco blue range 3 chassis-mounting coil.
V1—SP61 (VR65).
V2—SP61 (VR65).
V3—SP61 (VR65).
V4—VR150, S130 or similar.

least ½in. from the sides of the box, and the coaxial sockets. The fixed condensers shown should be of 2 per cent tolerance silver mica type, and all wiring done with short thick copper connecting wires used between components.

Rubber feet (grommets) should be fitted to the base to prevent vibration from reaching the tuned circuit which might cause F.M. The dialysis of white cardboard covered with clear varnish and marked with frequencies in ink. An epicyclic 5:1 drive is fitted to the spindle of C4 and a larger diameter knob and short pointer fitted.

(To be continued)

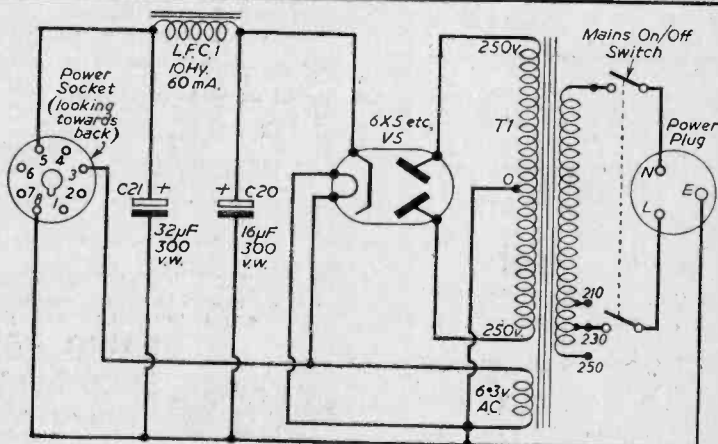


Fig 5.—Circuit of the power unit for the V.F.O.

... and NOW

THE TOURIST PORTABLE

Size only 8in. x 5½in. x 4in.

TRS

MAINS
UNIT KIT
NOW
Available
only 45/-

4-valve, 2 waveband (Med. and L.W.) Lightweight Battery

Radio. Wt. 3½ lbs., incl. B.114 Battery 8/- extra.

Complete Receiver Component Kit ... 57/6 P. & P. 1/6

Set 4 miniature valves (96 series) ... 35/- P. & P. 9d.

5in. Speaker & O/Put Trans. ... 21/- P. & P. 1/6

Cabinet, Dial & Knobs, etc. ... 22/6 P. & P. 2/-

Parts List and Instruction Booklet, 1/6. (Free with Kit.)

Latest circuitry delayed AVC & A.F. Neg. feedback.

Sensitive Ferrite Rod Internal Aerial. Contemporary style 'weight

Cabinet. Operates from B.114 Battery, 69 v. + 1½ v. (8/-) extra.

Terrific performance — Remarkable size — Staggering value



Complete Kit
post free £6.10.0

Record Player Bargains

Latest 4-speed Models

NEW RELEASE by E.M.I.—4-speed Single Player Unit fitted with latest stereo and monaural Xtal cartridge and dust suppressor stylus. Auto stop and start. A fidelity unit and bargain buy at only £6.19.8. Carr. and Ins. 4/6.

SINGLE PLAYERS. BSR (TUS), 90/-; COLLARO JUNIOR with latest Studio P.U. £4.10.0; GARRARD (48P), £6.17.8; GARRARD (TA Mk. II) de Luxe Model, £7.19.8. Carr. and Ins. 3/6.

AUTOCHANGERS. BSR (UAS), £6.19.8. COLLARO CONQUEST, £7.19.8; GARRARD (RC121, 4D Mk. II) plug-in head, with GCS xtal. stereo adapted, 10 gns. Stereo head (G810) £2 extra.

2-VALVE 2-WATT AMPLIFIER

Twin stage ECL82 with vol. and neg. feedback. Tone controls A.C. 200/250 volt with double-wound Mains trans. Complete with knobs, etc., ready wired to fit above cabinet.

£2.17.6 P. & P. 1/-

6-in. Speaker and matching trans., 22/- P. & P. 1/6

TRANSISTOR "ONE-WATT" AMPLIFIER 6v. Battery Operated

Latest push-pull 4 transistor circuit giving full 1 watt output into standard 3Ω speaker. Good sensitivity and improved frequency response. Neg. feed back. Var. tone and volume controls. Chassis size 6½ x 3½ x 1½in. Current consumption 10mA quiescent—200 mA at 1 watt.

2 matched G.E.C. GET15 transistors. Price 42/- per pair.

2 G.E.C. GET3 transistors. Price 21/- per pair.

Driver Trans., 8/6.

O.P. Trans. (to 3Ω), 10/6.

Complete kit of parts inc. chassis, etc., less speaker, ONLY 99/6. P. & P. 2/6.

Circuit and instruction booklet 1/6 post free.

JASON FM TUNER UNITS (87-105 Mc/s)

Designer-approved kits of parts for these quality and highly popular tuners available as follows.

STANDARD MODEL (FMT1)—as previously extensively advertised. COMPLETE KIT, 5 gns., post free. Set of 4 spec. valves, 30/-, post free.

LATEST MODEL (FMT2)—attractively presented shelf mounting unit to enclosed Metal Cabinet with Built-in Power Supply. COMPLETE KIT, 27 p. & p. 3/6. Set of 5 spec. valves, 39/6.

ON ALL JASON UNITS. 48 hr. Alignment Service, 7/6, p. & p. 2/6.

NEW JASON COMPREHENSIVE F.M. HANDBOOK, 2/6, post free.

CONDENSERS.—Silver Mica. All pref. values. 2 pt. to 1,000 pt. 6d. each. Ditto, ceramics 9d. each. Tubulars 450 v. T.C.C., etc., .001 mfd. .01 and 1/350 v. 6d. each. 500-1,500 v., 1/- each. 25 Hunts. 1/6. .5 T.C.C., 1/8. .001 6 kv., 5/6. .001 10 kv., 9/6.

RESISTORS.—FULL RANGE 10 ohms—10 mega-ohms 20% i w. and i w., 5d. i w., 5d. (indist. type) modern ratings, 1 w. 6d. 5 w., 10% HI-STAB, i w., 5d. i w., 7d. 5% i w., 9d., 1% HI-STAB, i w., 1/8 (10-100 ohms 2/-).

RECORD PLAYER CABINETS

Contemporary style, rexine covered cabinet in fawn and brown with cream interior. Size 18½ x 13½ x ht. 8½in., fitted with all accessories, including baffle board and anodised metal fret. Space available for all modern amplifiers and auto changers etc. Uncut record player mounting board 14 x 18in. supplied.

Cabinet Price £3.3.0

Size Carr. and Ins. 3/6



NEW BOXED	VALVES	ALL GUARANTEED
1R5, 1T4 7/6	6F98 9/-	6F86 13/6
1R5 7/6	6K96 9/-	6F91 8/6
834, 3V4 8/-	DL96 9/-	EL41 10/6
5Z4 9/6	EAC80 9/6	EL44 9/6
6K7 5/6	BC084 10/6	EY51 10/-
6K8 8/6	ECP90 11/6	EY56 10/-
6Q7 9/6	ECH42 10/6	EZ81 7/6
6V6 7/6	ECL80 10/6	MU14 9/6
DAF96 9/-	EF80 9/6	IPCC84 10/6

SPECIAL PRICE PER SET
1R5, 1T4, 1R5, or 3V4 or 3V4, 27/6. DK96, DP96, DAF96, DL96, 35/- 6K8, 6K7 6Q7, 6V6, 5Z4 or 6X5, 35/-.

COAX 80 OHM CABLE

Stand 1½in. dia. Low Loss Semi-Air Spaced Aerial. A high-grade coax at Special Reduced Prices.

20 yds. 12/6, p. & p. 1/6; 60 yds., 32/6, p. & p. 3/-; 40 yds., 22/6, p. & p. 2/6; All other lengths, 8d. per yard.

Coax Plugs 1/-, Sockets 1/6, Couplers 1/3, Cable End Sockets 1/6, Outlet Boxes 4/6.

Manufacturer's Surplus Bargain 7 VALVE AM/FM RADIOGRAM CHASSIS

Valve Line-up: ECC85, ECH81, EF89, EABC80, EL84, EM81, EX80.

Three Waveband and Switched Gram positions. Med. 200-500 m. Long 1,000-2,000 m. VHF/FM 88-108 Mc/s. Philip's Continental Tuning insert with permeability tuning on FM and combined AM/FM IF transformers 460 Kcs and 10.7 Mc/s. Dust core tuning all coils. Latest circuitry including AVC and Neg. Feedback. Three watt output. Sensitivity and reproduction of a very high standard. Chassis size 13½ x 4½in. Height 7½in. Edge illuminated glass dial 1½ x 3½in. Vertical pointer. Horizontal station names. Gold on brown background. A.C. 200/250 v. operation.

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

Complete with 4 Knobs—walnut or ivory to choice.
Three ohm P.M. speaker only required. Recommended quality speakers.
8in Goodman's special cone.....£1/6 10in. Rola (Heavy Duty).....30/- Post & Pkg. 1/6.
ONLY A FEW ITEMS ARE LISTED FROM OUR COMPREHENSIVE STOCK
WRITE NOW FOR FULL BARGAIN LISTS. 3d.

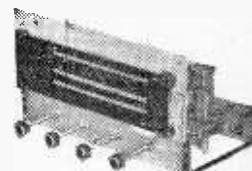
RADIO COMPONENT SPECIALISTS

70 Brigstock Road, Thornton Heath, Surrey

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

Terms: C.W.O. or C.O.D. post and packing up to 4lb. 7d.: 1lb. 1/1: 3lb. 1/6 5lb. 2/-: 10lb. 2/9.

TRS



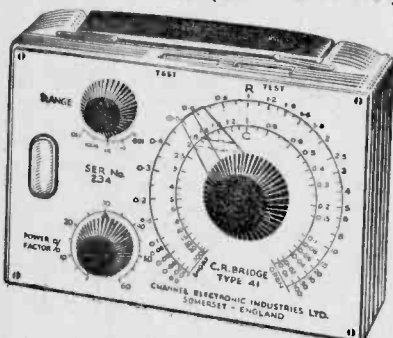
GOOD COMPANIONS

MINIATURE TRANSISTORIZED SIGNAL GENERATOR TYPE 40

- ★ Up to 20 Mc/s on fundamentals.
- ★ R.F. and Audio Output, Attenuated.
- ★ Accuracy better than 2%.
- ★ Miniature size only 4½ in. x 3½ in.

PRICE NET **£5.15.0.** Battery 2/6 extra

Post (C.O.D. or C.W.O.), 2/6.



MINIATURE TRANSISTORIZED R.C. BRIDGE TYPE 41

- ★ Capacitance 5 µF to 20 µF.
- ★ Resistance 5 Ω to 20 MΩ.
- ★ Magic Eye Balance Indicator.
- ★ Calibrated Power Factor Check.
- ★ Miniature Size—Light Weight.

PRICE NET **£5.10.0.** Battery 3/3 extra
Post (C.O.D. or C.W.O.), 2/6.



SEND S.A.E. FOR LEAFLETS, OR ORDER TODAY, FROM—

CHANNEL ELECTRONIC INDUSTRIES LTD. DEPT. P., DUNSTAN RD.,
BURNHAM-ON-SEA, SOM.

● 1960 EDITION

RADIO AMATEUR'S HANDBOOK

32/6 by The A.R.R.L. Post 2/-

FUN WITH SHORT WAVES

by G. Davey. 11/6. Postage 1/-
**HOW TO GET THE MOST OUT
OF YOUR VOLTMETER** by
T. Jaski. 23/- Postage 1/-

**RADIO SERVICING. Vol. 4, Fault
Finding** by G. N. Patchett. 5/-
Postage 6d.

**GUIDE TO BROADCASTING
STATIONS** by "WW". 3/6.
Postage 6d.

**AN ELECTRONIC ORGAN FOR
THE HOME CONSTRUCTOR**
by A. Douglas. 15/- Postage 9d.

HI-FI STEREOGRAPHIC SOUND
by L. Mallory. 7/6. Postage 8d.

RADIO VALVE DATA. Compiled by
"WW", 6th Ed. 5/- Postage 9d.

VALVE & TELETYPE MANUAL
by Brimar. No. 8. 6/- Postage 1/-

NEW 1960 CATALOGUE 1/-.

THE MODERN BOOK CO.

BRITAIN'S LARGEST STOCKISTS
of British and American Technical Books

19-23 PRAED STREET,
LONDON, W.2.

Phone: PADdington 4185.

Open 6 days 9-6 p.m.

NEW VALVES!

Guaranteed Set Tested
24 HOUR SERVICE

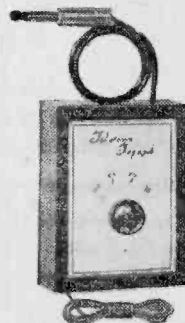
1R5, 1S5, 1T4, 3S4, 3V4, DAF91, DF91, DK91,
DK92, DL92, DL94, SET of 4, 21/6.
DAF96, DF96, DK96, DL96, SET of 4, 27/6.

1D5	7/6	DL33	8/8	PCL82	8/0
1R5	6/3	DL35	10/6	PCL83	14/6
1S5	4/0	DL92	6/3	PEN44	11/-
1T4	4/-	DL94	7/3	PEN360	8/-
3S4	6/3	DL96	6/11	PL38	14/6
3V4	7/3	EBG41	7/11	PL38	14/6
5U4G	5/3	EBF80	8/-	PL81	9/-
5Y3GT	8/-	ECC81	5/6	PL82	7/6
5Z4G	7/6	ECC82	6/-	PL83	7/6
6X4G	2/-	ECC83	6/8	PT32	11/-
6K8G	6/0	ECC84	8/3	PY80	14/6
6Q7G	6/3	ECC85	8/-	PY81	6/3
6SL7GT	6/-	ECC80	9/0	PY82	8/0
6SN7GT	4/6	ECH35	8/0	PY83	7/3
6V8G	5/-	ECH42	8/0	U25	12/6
6V8GT	6/3	ECL42	7/9	U26	11/-
6X5GT	5/-	EF41	8/6	U52	5/3
12K7GT	5/6	EF80	5/-	UABC80	7/6
12K8GT	11/6	EF85	6/6	UAF42	9/-
12K7GT	5/6	EF89	10/3	UBC41	7/0
35L8GT	9/-	EF89	7/6	UBF80	8/8
35Z4GT	5/6	EL41	7/3	UCC84	12/0
A231	8/0	EL84	6/9	UCC85	7/-
B36	8/6	EY85	8/6	UCF80	14/-
CL33	12/6	EY85	8/-	UCH42	7/0
DAF91	5/6	EZ40	6/0	UCH81	8/-
DAF96	6/11	EZ41	7/6	UCL82	10/-
DF33	9/0	EZ80	6/3	UCL83	12/6
DF91	9/0	FZ81	7/-	UF41	8/3
DF96	9/11	GZ32	9/-	UF42	7/-
DH77	6/6	KT83	6/6	UF89	6/8
DK32	12/-	NU14	7/-	UL41	7/6
DK91	6/3	PCC84	7/6	UL84	7/6
DK92	8/-	POP80	7/-	UY21	11/-
DK96	6/11	POP82	8/6	UY85	6/9
				VP4B	8/6

Postage 6d. per valve extra. Any Parcel
Insured Against Damage in Transit 6d. extra
Any C.O.D. Parcel 2/6 extra.

Office address, no callers.
GERALD BERNARD
90 CARR MANOR AVENUE
LEEDS 17

TELETRON TAPEJAK



The first Transistorized Radio Tuner, specially designed for use with Tape Recorders. Converts your Recorder to a high quality Radio receiver. Direct Recording on Tape.
5 x 3½ x 1½ in.

- ★ High sensitivity.
- ★ Twin Tuned Circuits.
- ★ Pre-setting for M.W. Programmes.
- ★ Fixed Tuned for 1,500 M.
- ★ Switched programme selector.
- ★ Self powered.

Tested and ready for use.
£5.9.0. BATTERY EXTRA.

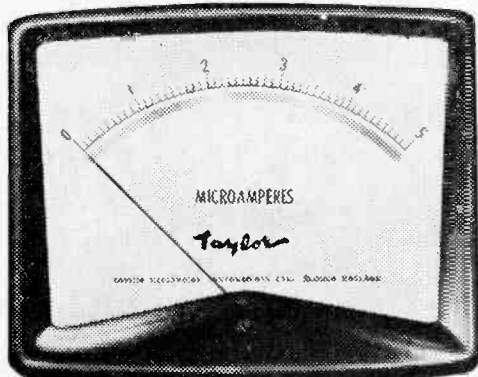
**THE
TELETRON CO. LTD.,**
112B Station Rd., London, E.4
'Phone: SIL. 0836.

Trade News

NEW PRODUCTS AND DEVELOPMENTS

NEW PANEL METERS

SEVERAL new panel meters have recently been introduced by Taylor Electrical Instruments Ltd. These meters are in modern mouldings with scale lengths from 2in. to 5in. They incorporate the



One of the new Taylor panel meters.

well established centre pole movement with sensitivities from $5\mu\text{A}$ and the cases are available in various colours to harmonise with existing equipment. A new AM/FM signal generator, Model 61a, incorporating Sweep and Crystal Calibrator is also now on the market. Further information is available from *Taylor Electrical Instruments Ltd., Montrose Avenue, Slough.*

SHURE PRODUCTS

THE products of one of America's oldest manufacturers of audio equipment have been released for the first time in the United Kingdom. The manufacturer is Shure Brothers, Inc. and the products include pick-ups, cartridges and microphones. Their factory in Evanston, Illinois, is one of the most up to date in the country and is fully equipped for electro-acoustic research and development. Anechoic chambers and laboratory equipment have been designed by the firm's own engineering staff. Special control techniques and devices ensure the maintenance of precision quality manufacture. The model M212 studio stereo "Dynetic" integrated tone arm and cartridge (illustrated right) tracks at $1\frac{1}{2}$ -2½ grams, reducing record wear and, the makers claim, making it impossible to scratch

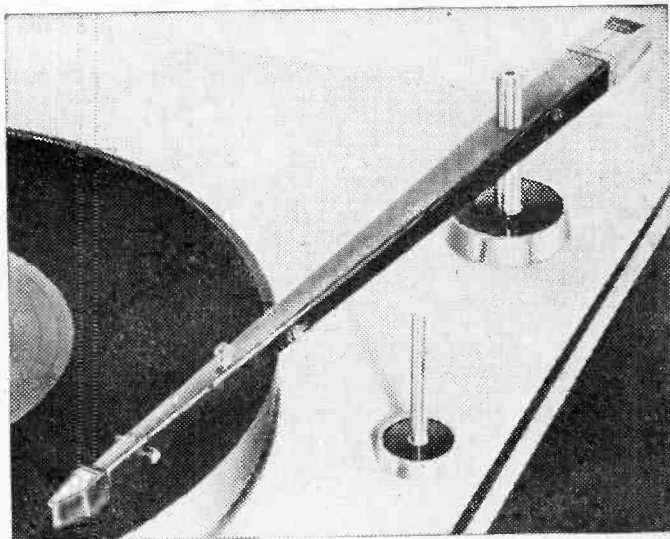
records. The cartridge is fitted with a 0.0007in. diamond stylus and is compatible for mono and stereo reproduction. The arm counterbalance floats on a damped suspension bar providing critical damping without impeding normal motion. Further details of this and other Shure products are available from the sole United Kingdom representative, J. W. Moulder, 95 Hayes Lane, Beckenham, Kent.

AUTOMATIC RECORD PLAYER

AN automatic record player, model ST.561A has recently been placed on the market by Stella Radio and Television Ltd. Fitted with a 4-speed, push-button changer, it will also play single records automatically or manually. The pickup head has twin sapphire styli and the plastic-covered wood carrying case is finished in beige and red. The player is equipped with a stereo socket so that, with additional equipment, it can be used for playing stereophonic records. Priced at 23 guineas (tax paid), model ST.561A is made by *Stella Radio and Television Ltd., Astra House, 121-123, Shaftesbury Avenue, London, W.C.2.*

EVENT RECORDER and HOUR METER

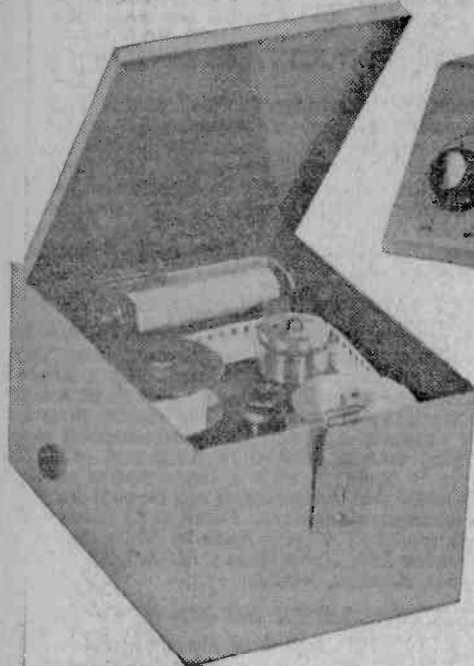
A RELIABLE record of the date and time at which electrical equipment is switched on and off, and of the period of time for which it operates, is provided by the A.E.I. Event Recorder and Hour Meter. Because its drive operates independently off any supply, the Event Recorder can be used to record the time during which a machine is shut down through mains failure. It incorporates a 15-day clockwork movement with



Shure Model M212 stereo "Dynetic" pick-up.

an accuracy of plus or minus five minutes throughout the 15-day cycle. This movement drives a

blue and dark grey hammertone. Further information and details of the price, etc., may be obtained



The A.E.I. Event recorder.

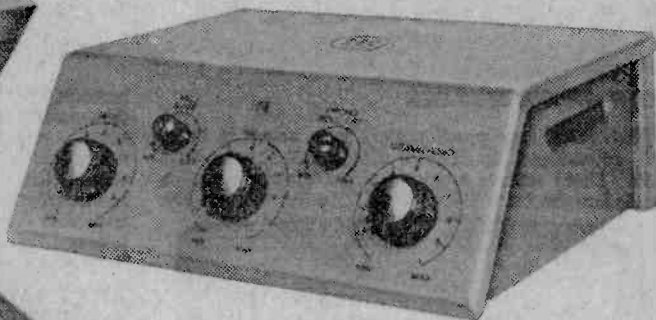
recording chart at a speed of 1 in. per hour. The recorder is available as a separate unit. Further information is available from the *Special Products Department of A.E.I. Radio and Electronic Components Division, 155 Charing Cross Road, London, W.C.2.*

SERVICE OSCILLOSCOPE

A NEW service Oscilloscope, Model OS-1, is now added to the range of Heathkits. A printed circuit board is used which provides a firm mounting for most of the components and permits a high degree of circuit stability. This is silk screen printed to show the exact location and value of each component. Features include a wide Y-amplifier frequency response, built-in voltage calibrator, timebase output socket, calibrated CRT graticule and a frequency compensated X10 attenuator input. The price is £18 19s. 6d. and the oscilloscope is available from *Daystrom Ltd., Gloucester.*

TRANSISTOR AMPLIFIER

A NEW transportable transistor amplifier, the BCS2429, has been produced by the General Electric Co. Ltd. Providing 15W of audio power, the amplifier allows up to three large projector horn loudspeakers or between ten and twenty smaller cabinet speakers to be operated at good volume with high reproduction quality. It operates from any 12-14V battery capable of supplying 2.5A (peak). The average consumption is 1A. The main frame of the amplifier consists of a lightweight webbed metal casting which forms the heat sink for the power transistors and carries the main wound components. The unit is finished in silver

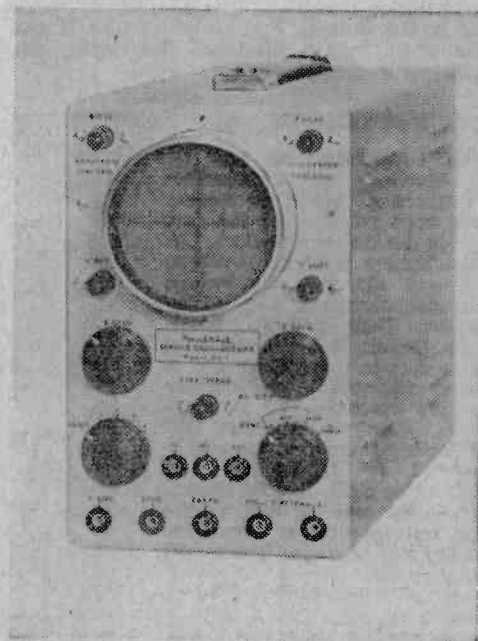


The G.E.C. transistor amplifier.

from the *General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2.*

ALLOY JUNCTION TRANSISTOR

THE OC204 is the first large-signal device in the Mullard range of silicon alloy junction transistors. The significant features are its high peak current rating of 0.25A coupled with the high current gain of 50 at 10mA collector current and 25 at 150mA. The maximum junction temperature rating is 150degC and, like other Mullard silicon transistors, the OC204 has a metal can around the glass envelope which allows it to be clamped securely in position. It has an extremely low leakage current of 10mA at 25degC ambient temperature. Further details may be obtained from *Mullard Ltd., Mullard House, Torrington Place, London, W.C.2.*



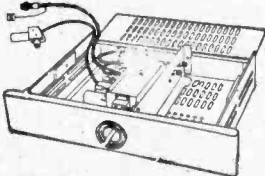
The Heathkit oscilloscope, Model OS-1.

CHANNEL TUNER

Will tune to all Band 1 and Band III stations. BRAND NEW by famous manufacturer. Complete with PCC84 and PCT90 valves (in series) I.F. 16-19 or 33-38. Also can be modified as an aerial converter (instructions supplied).

Complete with knobs.

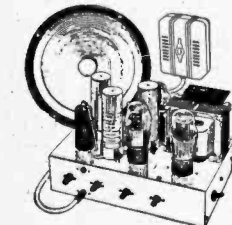
22/6 Plus 3/6 P. & P.
HEATER TRANSFORMER to suit the above. 200-250 v., 6/-, Plus 1/6 P. & P.



8-WATT PUSH-PULL AMPLIFIER COMPLETE WITH CRYSTAL MIKE AND 8IN. LOUDSPEAKER

A.C. mains 200-250 v. Size 10 1/2 in. x 5 1/2 in. x 2 1/2 in. Incorporating 6 valves. H.P. pen., 2 triodes, 2 output pens and rectifier. For use with all makes and type of pick-up and mike. Negative feedback. 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.

± 2db; 4 db down to 20 K/c/s. Output 8 watts at 5% total distortion. Noise level 40 db down all hum. Output transformer tapped for 3 and 15 ohm speech coils. For use with Std. or L.P. records, musical instruments such as Guitars, etc. **£4.19.6** Plus P. & P. 7/6. Or 20/- deposit Plus P. & P. 7/6, and 4 monthly payments of 23/-.



B.S.R. MONARCH UA8 WITH FUL-FI HEAD

4-speed plays 10 records 12 in., 10 in. or 7 in. at 16, 33, 45 or 78 r.p.m. Intermixes 7 in., 10 in. and 12 in. records of the same speed. Has manual play position; colour brown. Dimensions: 12 in. x 10 in. Space required above baseboard 4 1/2 in., below baseboard 2 1/2 in. Fitted with Ful-Fi turnover crystal head.

£6.19.6 Plus 5/- Postage & Packing.

With Stereo Head, £7.19.6, plus 5/- P. & P.



TRANSISTOR TESTER

For both P.N.P. and N.P.N. transistors incorporating moving coil meter. In metal case size 4 1/2 in. x 3 1/2 in. x 1 1/2 in. Scale marked in gain and leakage. **19/6** Plus P. & P. Complete and ready for use.

MAINS TRANSFORMERS

All with tapped primaries 200-250 volts. 0-160, 180, 200 v., 60 mA., 6.3 v. 2 amps. 10/6. 320-0-320 v. 75 mA., 6.3 v., 2.5 amp., 5 v., 2 amp. 10/6. 280-0-280 v. 80 mA. 6.3 v., 2 amp., 6.3 v., 1 amp. 10/6. 350-0-350 v. 70 mA. 6.3 v., 1 amp., 6.3 v., 2 amp. 10/6. 250-0-250 v. 70 mA. 6.3 v. 2 A. 10/6. Postage and packing on the above 3/-.

PORTABLE AMPLIFIER

On printed circuit for A.C. Mains 200/250 v. Size 4 in. x 3 in. with tone and volume control. Valves: ECL82 and E280. **39/6** P. & P. 2/6.

BUILT POWER SUPPLY UNIT

A.C. Mains 200-250 v. **21/-** Plus 3/6 P. & P.
 D.C. Output 250 v. at 75 mA.
 Also 6.3 v., 2 amp. heater windings.

WOLSEY 3-ELEMENT FOLDED DIPOLE

I.T.V. Aerial less mounting bracket for External use, complete with 12 yds. of coaxial cable, 15/-; 4 element. 17/6; 5 element. 25/-, P. & P. on above. 3/6.

INTERCOM or BABY ALARM

In plastic Cabinet with 8 in. speaker and 3 valves. Transistorised input. Provision for talk back. **49/6** Plus 5/- P. & P.

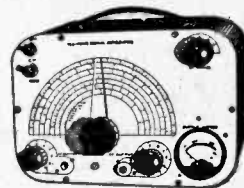
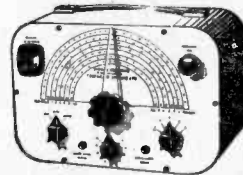
SIGNAL GENERATORS

Cash £8.19.6 or 25/- deposit and 6 monthly payments of 21/6. Post and Packing 5/- extra.

Coverage 100 Kc/s-100 Mc/s on fundamentals and 100 Mc/s to 200 Mc/s on harmonics. Metal case 10 in. x 6 in. x 5 1/2 in., grey hammer finish incorporating three miniature valves and Metal Rectifier. A.C. Mains 200/250 v. Internal Modulation of 400 c.p.s. to a depth of 30%; Modulated or unmodulated R.F. output continuously variable 100 millivolts. C.W. and mod. switch, variable A.F. output. Incorporating magic eye as output indicator. Accuracy plus or minus 2%.

Cash £4.19.6 or 25/- deposit and 4 monthly payments of 21/6. Plus Postage and Packing 5/-.

Coverage 120 Kc/s-84 Mc/s Metal case 10 in. x 6 in. x 4 1/2 in. Size of scale, 6 1/2 in. x 3 in. 2 valves and rectifier. A.C. mains 230-250 v. Internal modulation of 400 c.p.s. to a depth of 30%, modulated or unmodulated R.F. output continuously variable 100 millivolts. C.W. and mod. switch variable A.D. output and moving coil output meter. Grey hammer finished case and white panel. Accuracy plus or minus 2%.

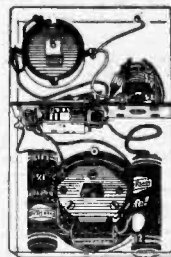


2-TRANSISTOR POCKET RADIO

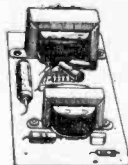
Plus Germanium diode, fully tuneable over medium and long waves. Size 3 1/2 in. x 4 1/2 in. x 1 in. Complete set of components including case, 2 transistors and earpiece (less batteries obtainable anywhere at 10d.)

19/6 Plus P. & P. 1/6.

Point to point wiring diagram 1/6, free with kit.



PUSH-PULL OUTPUT STAGE



Inclusive of transistors with input and output transformers to match 3 ohms speech coil, suitable for use with the above kit. Complete kit of parts including transistors.

19/6 Plus Post and Packing 1/6.

Point to point wiring diagram 1/6 free with kit.

A.C./D.C. POCKET MULTI-METER KIT



Comprising 2 in. moving coil meter, scale calibrated in A.C./D.C. volts, ohms and milliamperes. Voltage range A.C./D.C. 0-50, 0-100, 0-250, 0-500. Milliamperes 0-10, 0-100. Ohms range 0-10,000. Front panel, range switch, wire-wound pot (for ohms zero setting), toggle switch, resistor and rectifier. In grey hammer finish case.

19/6 Plus P. & P. 1/6.

Point to point wiring diagram 1/-, free with kit.

F.M. TUNER UNIT

By famous German Manufacturer. Coverage 88-100 Mc/s. Complete with ECC85. **25/-** Plus P. & P. 1/6.
 Size 4 in. x 2 in. x 2 in.
 Circuit diagram 1/-, free with unit. 10.7 Mc/s I.F. and Discriminator Coil. 4/- p.u.r.

RADIO & T.V. COMPONENTS (Acton) LTD.

23 HIGH STREET, ACTON LONDON, W.3.

All enquiries S.A.E.

Goods not dispatched outside U.K.

LASKY'S RADIO

SPECIAL OFFER!

"ALFA" RADIO TEST METER



A.C. and D.C. 3333 ohms per volt. Ohms ranges up to 2 megs. Volts A.C. and D.C. up to 1,200. 300 micro-amps—300 m/a. Decibels, 2 ranges, —20 to +23 and —20 to +37 db. Accuracy $\pm 3\%$. Large full vision dial.

Overall size: $5\frac{1}{2} \times 3\frac{3}{8} \times 1\frac{1}{2}$ in.

LASKY'S PRICE 89/6 Post 2/-
Including Leads

207 EDGWARE ROAD, W.2

Near Praed Street

PAD 3271/2

42 TOTTENHAM COURT ROAD, W.1

Nearest Station Goode Street

MUS 2605

Both addresses open all day Saturday. Close 1 p.m. Thursday.

All Mail Orders to: Lasky's Radio Dept. PW, 207 Edgware Road, London W2

LASKY'S LATEST! TAPE RECORDER KITS!

Look at these star features

- ★ Very latest Printed Circuit.
- ★ T.C.C. Condensers.
- ★ Amplifier can be supplied fully assembled and connected to Deck.
- ★ New Mullard Valves, EF86, ECC83, EL84, EM34 magic eye, EZ80 rect.
- ★ Choice of Speaker, 7 x 4in., 8 x 5in., 9 x 4in., 6 $\frac{1}{2}$ in., 8in., etc.
- ★ Collaro Studio or B.S.R. Monardeck Tape Deck.
- ★ Complete with Acos 39/1 Mike, Tape and Spool.
- ★ Choice of Carrying Cases.

Prices from

20 Gns.

(B.S.R. Deck)

25 Gns.

(Collaro Deck)

All components available separately.

Full details and shopping list post free on request.

SEND FOR LASKY'S 100-PAGE price 2/-
COMPONENTS CATALOGUE post 6d.
Our latest 12-page Bargain Bulletin included
free, or available by post separately, price 6d.



LASKY'S CAR RADIO

CAN BE BUILT FOR

£12.19.6

using all brand new components and complete with 7 x 4in. elliptical speaker.

Instruction booklet giving full details, circuit diagram, etc. 2/6, post free (returned if you order).

BUILD THE COSSOR

"TRAVELLER'S FRIEND"

4-Transistor Pocket S'het. Uses 9 v. PP4 battery; covers 190-550 metres; power o.p. 30 MW. All components including 2 $\frac{1}{2}$ in. Speaker, Case (6 x 3 $\frac{1}{2}$ x 1 $\frac{1}{2}$ in.), printed circuit and instructions.

Originally nearly £20.

Lasky's Price £7.19.6

Post 2/6.

A FIRST COURSE IN WIRELESS

Fourth Edition

Illustrated

By "Decibel"

The fourth edition of a non-technical introduction to radio. It has been generally revised and also a new chapter has been added covering transistors which now replace thermionic valves for many applications. Price 12/6 net.

From all booksellers.

PITMAN Parker Street
KINGSWAY, LONDON W.C.2

Special Bargain Offers

AVOMETER MODEL 'D' 34 range testmeter. D.C. volts to 1,500 v. (10 ranges). A.C. volts to 1,500 v. (8 ranges). D.C. current to 30 A (8 ranges). A.C. current to 15 A (6 ranges). Ohms 0-1 k, 0-10 k. A robust instrument with 5in. mirror scale and cut out. With battery and leads. Guar. £8.19.6. Post 3/6.

G.E.C. SELECTEST. 34 range testmeter. D.C. volts to 1,500 v. (10 ranges). A.C. volts to 1,500 v. (8 ranges). D.C. current to 30 A (8 ranges). A.C. current to 15 A (6 ranges). Ohms 0-1k Ω , 0-10k Ω . A robust instrument with 5in. mirror scale and cut out. Complete with battery leads. Fully tested, £7.10.0. Post 3/6.

ADVANCED SIGNAL GENERATORS. Type 20. Ex-Govt. These fine instruments cover 100 Kc/s to 30 Mc/s in 6 bands. Mod. R.F. C.W. and 400 cps audio outputs are provided. Individual charts are missing but guidance charts will be provided. A.C. Mains. Not new but in good cond. & wks. order. As only a limited No. are available **CALLERS ONLY £5.10.0.**

T.C.C. VISCONOL CONDENSERS. 8 mfd., 800 v., D.C. wkg. at 71°C. CP 162V. 3 x 1 $\frac{1}{2}$ x 5 $\frac{1}{2}$ in. high. BRAND NEW. Boxed. 8/6 each. post paid.

R-1155-B, with latest drive, first-class condition, £9.19.6.

R-1155-L. £12.19.6. Power Packs, £6.10.0. S.A.E. details.

CIRCU COMMUNICATION RECEIVERS. Covers 60 Kc/s—30 Mc/s in 8 bands. 11 valves, 2 R.F. and 3 I.F. stages. Crystal gate. BFO, etc. Ready for 200-250 V. A.C. mains. 24 watts output for 3 ohms speaker. **SUPERB CONDITION AND OUTSTANDING PERFORMANCE for ONLY £21.** S.A.E. for illustrated details.

HRO COMMUNICATION RECEIVERS, complete with 9 coils. From 18 Gns. S.A.E. for full particulars.

RCA AR-88 SPEAKERS. 3 Ω 8in. P.M. speaker in heavy gauge black crackled steel cabinet 11 x 10 x 6in. with rubber feet. A **SUPER QUALITY** unit. BRAND NEW. for ONLY 45/- Post 3/6.

MINIATURE 33 I.F. STRIPS.—For F.M. tuner described in P.W. With 3 of EF91, 2 of EF92 and EB91. A fresh release enables us to offer these once again. BRAND NEW with circuit and full P.W. Reprint, 35/- OR less valves. 12/6. Post either 2/6.

MOVING COIL PHONES.—Finest quality Canadian, with Chamolac ear-muffs and leather-covered headband. With lead and jack plug. Noise excluding, supremely comfortable, 19/6. Post 1/6. R.F. UNITS. R.F.25, 17/6; R.F.27, 22/6. Good condition. Post each 3/6.

PLEASE ADD POSTAGE OR CARRIAGE ON ALL ITEMS

CHARLES BRITAIN (RADIO) LTD.

11 Upper Saint Martin's Lane, London, W.C.2

Temple Bar 0545

Shop Hours 9-6 p.m. (9-1 p.m. Thursday). Open All Day Saturday.

.....Club News.....

REPORTS OF CURRENT ACTIVITIES

ALDRESHOT AND DISTRICT AMATEUR RADIO SOCIETY

The Cannon Hotel, Victoria Road, Aldershot, Hants.
Hon. Sec.: A. M. Laidler, "Pondside", Sandy Lane, Churt, near Farnham, Surrey.

At the annual general meeting on March 9th it was decided that the society should have its own station operating as soon as possible and that a committee should be set up to organise an Amateur Radio Rally to be held during the summer. The age limit for junior members was lowered from 21 years of age to 18 years. Morse practice will now be held at every session and also on Tuesday nights if sufficient members were interested. The club meets every Wednesday at Gibraltar Barracks and on the second Wednesday in each month at the Cannon Hotel. A syllabus of the course for the Radio Amateurs Examination is available from the Secretary.

AMATEUR RADIO CLUB OF NOTTINGHAM

Woodthorpe House, Mansfield Road, Nottingham.
Hon. Sec.: E. Weatherall, 16 Avebury Close, Clifton, Nottingham.
The club has two transmitters, one covering top band and the other covering 80m. to 10m. Morse classes and talks are held on Tuesdays and R.A.E. classes under the direction of G3LXL are held on Thursdays. This year the club will be entering the National Field Day Contest.

AMATEUR RADIO MOBILE SOCIETY

Hon. Sec.: G. E. Storey, 10 Avon Road, Sunbury-on-Thames, Middlesex.

On April 10th the first ARMS Rally of the season was held and went very well. The society's net is on 28.5 M/c every Tuesday from 9.30. Net M.C. is G3MOW who operates under G3NMS. On March 26th, thirty members of the society had a night out at the Pigalle.

CHESTER & DISTRICT RADIO SOCIETY

Press Sec.: G. Bagley, G3JJS, Astbury Cottages, Parkgate Road, Saughall, near Chester.

On March 5th the Annual Dinner was held and about 26 people were present including XYL's and visitors. The Annual General Meeting was held on March 8th and Mr. J. Morris, G3ATZ, was re-elected as Hon. Sec. A net night is held on the first Tuesday in each month on "Top Band" at approximately 8 p.m. Meetings are held on Tuesday nights at the Y.M.C.A. St. John's House, Chester, at 8 p.m.

GRAY VALLEY RADIO CLUB

An invitation is extended to all interested in Amateur Radio Transmission and kindred subjects. Meetings are held on the fourth Tuesday of each month at the Station Hotel, Sidcup, Kent.

Future Events

May 24th. A Brains Trust at 8 p.m.
Further details from H. Miles, G2NK, 59 Amherst Drive, St. Mary Cray, Kent.

HARLOW AND DISTRICT RADIO SOCIETY

"Black Cat", Abbess Roding, Ongar, Essex.
A mobile rally will be held on June 5th at the Village Hall, Magdalene Laver, near Harlow, Essex. In addition to the items of interest to the radio minded other attractions will be arranged to amuse the wives and children. Two stations will be on the air to guide visitors, G3ERN on 160 and G3JMA on 2 metres.

RADIO SOCIETY OF GREAT BRITAIN

I.A.R.U. Region I Conference to be held in Folkestone.

An International Amateur Radio Union (Region I Division) Conference will be held at the Grand Hotel, Folkestone, Kent, from Monday, June 13 to Friday, June 17, 1960, with the Radio Society of Great Britain acting as Host Society.

Invitations to attend the Conference have been sent to all subscribing I.A.R.U. Member Societies in Region I and acceptances have been received from Denmark (E.D.R.), Finland (S.R.A.L.), France (R.E.F.), Germany (D.A.R.C.), Ireland (I.R.T.S.), Italy (A.R.I.), the Netherlands (V.E.R.O.N.), Norway (N.R.R.L.), Poland (P.Z.K.), Spain (U.R.E.), Sweden (S.S.A.), Switzerland (U.S.K.A.), Yugoslavia (S.R.J.), Replies are awaited from Belgium (U.B.A.) and Luxembourg (R.L.).

In addition to the delegates officially appointed by the Member Societies, Observers will be permitted to attend the Conference provided their names and addresses are submitted to the General Secretary of the R.S.G.B. at least two weeks before the opening of the Conference.

Visitors to the Conference will be accommodated at the Grand Hotel at the specially reduced inclusive charge of 50/- per day which will cover service and all meals (breakfast, lunch, afternoon tea and dinner). The hotel—situated on the famous Leas—has a commanding view of the English Channel and is one of the best appointed on the South Coast.

The Conference will be opened at 2.30 p.m. on Monday, June 13th, by the Mayor of Folkestone, after which a Plenary Meeting will be held to elect the Chairman and Secretaries of

Committees. Three main Committees will be set up, namely, Administrative and Operational, Technical and V.H.F., plus an *ad hoc* Credentials and Finance Committee.

A tentative programme of events is set out below:

Sun., June 12th Delegates assemble at the Grand Hotel.
Mon., June 13th 9.30 a.m. Meeting of the Executive Committee.

2.30 p.m. Official Opening.
3.00 p.m. Plenary Meeting.
4.00 p.m. Meetings of main Committees.
5.00 p.m. Meeting of Credentials and Finance Committee.
9.00 p.m. Film Show "The Geneva Radio Conference" by Major Per-Anders Kinnman, SM5ZD (Vice Chairman, Executive Committee.)

Tues. June 14th 9.30 a.m. to 5.30 p.m. Meetings of Committees.
9.00 p.m. Display of Colour Transparencies by Mr. Arthur Milne, G2MI, and Dr. Arthur C. Gee, G2UK.

Wed., June 15th 9.30 a.m. to 5.30 p.m. Meetings of Committees.
8.00 p.m. Evening Coach Trip.

Thurs. June 16th 9.30 a.m. to 12.30 p.m. Free for shopping.
2.30 p.m. Visit to Canterbury and the Weald of Kent as guests of the Mayor and Corporation of Folkestone.

Fri., June 17th 9.30 a.m. to 5.30 p.m. Plenary Meetings.
7.30 p.m. Conference Dinner.

Sat., June 18th Delegates depart.
The cost of the Conference Dinner is not expected to exceed 21/- a head.

The Folkestone Corporation is to issue tri-lingual Privilege Tickets, which will enable delegates, observers, and their ladies to enjoy many local facilities free of charge.

Further details can be obtained from the General Secretary of the R.S.G.B. (Mr. John Clarricoats, O.B.E.), 28 Little Russell Street, London W.C.1.

SLADE RADIO SOCIETY

The Church House, High Street, Erdington, Birmingham 23.

The club station G3JBN at the Church House is available for the use of members for constructional purposes. Thursday evenings include informal discussions, operation of the club transmitter and instructional Morse Classes.

Future Events:

May 20th.—"A Tropical Film Show" presented by R. Heaton.
June 3rd.—Technical Problems in Sound and Vision.
June 17th.—The Collins S-Line Equipment and KWM-Mobile Equipment.

A lecture/demonstration by Mr. John Savage, Director of Engineering, Collins Radio Co. of England Ltd. Admission by ticket only, these may be obtained by personal application to the secretary. Full particulars of the society available from the Hon. Sec., Charles N. Smart, 110 Woolmore Road, Erdington, Birmingham 23.

WORCESTER AND DISTRICT AMATEUR RADIO CLUB

Y.M.C.S. Building, Henwick Road, Worcester.

Hon. Sec.: R. D. Pritchard, G3HNX, 42a Avon Road, Worcester.

On February 27th an open air meeting was held for those interested in forming a club and 38 were present. A room was allocated for club use by the Y.M.C.A. and suitable gear was loaned by members. It is hoped that a complete transmitting station will be in operation shortly. The club room is open seven nights per week and plans are under way for lectures, demonstrations, morse code classes, R.A.E. coaching, a mobile rally, Field Days, exhibition and social events.

PRACTICAL WIRELESS CIRCUITS

17th Edition

By F. J. CAMM

17/6, by post 18/7

from

GEORGE NEWNES, LTD.

Tower House, Southampton Street, Strand, W.C.1.

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.

ONE VALVE CIRCUIT

SIR,—Since I started radio in 1913, Coherer Receiver, I have never seen published a one valve circuit in which the aerial, grid, and reaction coil work is all done on one straight coil.

Having just tried out this circuit here on the border of Kenya and Tanganyika, near Lake Victoria, I received Voice of America, Washington, at 6 a.m. at almost loudspeaker strength on this set—one IL4 with G2 strapped to anode to make it a detector. Other stations came in at surprising strength from many parts of the world, some audible with phones held about six inches away from my ears. Is this something missed in the past, or is it known but discarded. I can hardly believe such a remarkably good circuit would not be published, as this one beats any other one valve circuit I have ever used, and I have tried them all out. With 15 turns of 16 gauge silver plated wire on a 2½ in. diameter low-loss former, the turns taking up 3 in. length of coil, any part can be used for either of the three circuits, and some arrangements produce overlapping of two or three all using some of the turns at the same time. The set is stable and reaction almost perfect in operation; and by shorting turns it can be taken down from about 60 metres to below 12 metres with ease, and alterations can be made almost instantly, giving the ideal infinite variability without changing coils, or switching. The parts used are the minimum, and no screening appears to be necessary, provided tuning is set accurately. I should be grateful to know whether this is a "find" or something discarded years ago, and also for details of Voice of America, Washington, wavelength and power used. The other strongest station would probably be China from the type of music heard. Many others also failed to declare their origin during my brief periods of testing by day and night. By adding a one valve power amplifier and loudspeaker I expect to get results equal to my Superhet, but much purer. For the first time I can hear the deep, low orchestra notes as well as the high notes, and all done on one IL4 valve.—W. H. M. GOODWIN (Nyanza, Kenya).

TRANSISTORISED SUPER REGENERATOR

SIR,—Yesterday as I was about to construct a suitable version of the "Transistorised Super Regenerator" (page 1039, April 1960 issue) with the idea of experimenting with it as a short range 27Mc/s Radio/Control receiver, I was surprised

to notice so many errors in the circuit diagram, that I hastily read through the article to see if you were offering a suitable transistor for these higher frequencies as a prize for the reader who spotted the most errors. But alas no! Concerning the first transistor TR1 the emitter and the collector seem obviously transposed in the diagram. With this error corrected the collector of TR1 will at least be at its correct potential. I have always been under the impression that a transistor will not oscillate and rectify at the same time therefore would not a more sensitive receiver result if the emitter instead of the base was earthed, and a diode and R.F. choke were suitably connected to the "livelier" base of the TR1. However, I may be wrong as I have not yet had occasion to experiment with these higher frequencies. The collector of TR2, is also shown receiving a positive potential, an error which, if carried out in practice, would of course ruin the transistor. The battery connections too seem muddled and the single pole switch S1, serves only one battery whilst the other would be always in current. Finally it seems that the two batteries B1 and B2 are transposed in the diagram. Surely the larger battery should supply the collectors? What's that—it does. Then why is it shown at the bottom of the circuit diagram where the smaller battery normally is? And why is TR1 shown "upside down". Oh dear, I see it all now! Yet it has been necessary for me to write all this nonsense and to waste so much of your time reading it, for the penny to drop and for the light to dawn, for it is clear now that the only error in the diagram is that caused by your wicked printer, in transposing the potential signs of the 3 volt battery, B1. Please forgive me and him.—F. G. SMITH (Bideford).

MAINS POLARITY

SIR,—Referring to my letter "Mains Polarity" in "Open to Discussion" (your issue March, 1960), I should have stated that there are two types of miniature circuit breakers which are now being installed on some new electrical installations, one type is the ordinary miniature circuit breaker, and the other is the earth leakage circuit breaker which can be used on installations in rural and country areas where earthing facilities are poor. It is the earth leakage circuit breaker type which I should have referred to in my letter.

It does appear that this is the type of circuit breaker which could be effective if the A.C. radio set with three core lead is connected to the earth (that is using the earth wire of the three core lead and connecting same to the earth terminal of the plug), therefore using the earth of the socket outlet for earthing the apparatus. If an independent outside earth were used for earthing the same

(Continued on page 180)



FOR VALVES - TUBES AND COMPONENTS - BY RETURN POST SERVICE

ACHLDDD	EF50SYL	7/-	PCC84	9/-	UCC84	10/11	5Z4G	9/-	6U7G	7/-	12AH8	12/-	20P3	23/3	142BT	3/6
AC/P	EF54	6/-	PCC85	14/7	N78	10/11	5Z4M	10/-	6V6G	6/-	12AT6	10/6	20P5	23/3	185BT	33/2
ACSPEND	EF55	10/-	PCC88	23/11	N339	17/6	6A7	10/-	6V6GT	7/9	12AT7	7/6	25A6G	10/6	210DDT	4/6
AC6PEN	EF80	7/6	PCC89	19/11	OZ4	5/6	6A8G	9/-	6X4	7/6	12AU6	8/-	25L6GT	10/-	210VPT	3/6
ATP4	EF85	7/6	PCF82	12/6	P61	3/6	6AC7	4/-	6X5G	7/-	12AU7	8/-	25Z4	9/6	83	10/-
AZ1	EF91	5/9	PCF84	16/7	PAB80		6AG5	5/6	6X5GT	7/-	12AX7	8/-	25Z5	8/-	301	10/6
AZ31	EF91 (BVA)		PCL82	12/-			6AK5	4/6	6/30L2	12/6	12BA6	9/-	25Z6	10/-	302	10/6
AZ41			PCL83	14/6			6AL5	4/6	7B6	10/6	12BE6	9/-	27SU	19/11	304	10/6
B36	EF97	13/3	PL38	17/6			6AM5	7/6	7B7	8/6	12C8	7/6	30C1	10/6	305	10/6
BBL	EF98	13/3	PCL84	16/7			6AM6	4/6	7B8	8/6	12H6	3/6	30F5	10/6	306	10/6
CB1	EL32	4/6	PL36	14/6			6AQ7	7/6	7C5	8/-	12J5GT	3/-	30FL1	10/6	807	6/6
CCH35	EL33	14/-	PL81	12/6			6AT6	8/6	7C6	8/-	12J7GT	10/6	30L1	19/11	954	2/-
CL4	EL34	19/11	PL82	8/6			6AU6	10/6	7D6	13/6	12K7GT	7/6	30L15	23/3	955	4/-
CL33	EL36	19/11	PL83	11/6			6B8G	4/-	7H7	9/-	12K8GT	13/6	30P4	15/-	956	3/6
CY31	EL38	26/6	PL84	12/7			6BA6	7/6	7Q7	9/-	12K8M	13/6	30P12	12/6	960	5/6
CY1	EL41	10/6	PL80	18/7			6BE6	8/-	7S7	9/-	12Q7GT	7/6	30P16	9/6	9002	5/6
CV73	EL42	10/6	PX25	12/6			6B6G	23/3	7Y4	8/6	12SG7	7/6	30PL1	12/6	9004	5/6
C36A	EL81	16/7	PY31	16/7			6B6G	23/3	8D2	2/9	12SH7	6/-	30PL13	12/6	9006	5/6
DAF96	EL83	19/11	PY32	17/11			6B6G	23/3	9D2	3/6	12SH7	6/-	35L6GT	10/-	Diodes	
DE96	EL84	9/-	PY80	7/6			6B6G	23/3	10C1	17/3	12SK7	6/-	25Y5	7/6	OA70	4/-
DH63	EL91	5/6	PY82	7/6			6B6G	23/3	10C2	17/3	12SL7	8/-	35W4	9/6	OA79	4/-
DK96	EL82	26/6	PY83	8/6			6B6G	23/3	10D2	12/6	12SL7	8/-	35Z4GT	8/-	OA81	4/-
DL96	EL91	5/6	PZ30	19/11			6B6G	23/3	10F1	12/6	12SN7GT	10/-	42	8/-	CG6E	4/-
DM70	EM80	10/-	PEN4DD	26/6			6C4	4/6	10F3	23/3	12SQ7	8/6	35Z3	16/7	CG12E	4/-
DN41	EM81	10/6	PEN4YA	10/-			6C5GT	6/6	10F9	15/3	1457	17/-	35Z5GT	9/-	Transistors	
EA50	EY51	10/6	PEN25	6/-			6C6	5/-	10F18	15/3	15D2	7/9	50C5	11/6	OC45	23/-
EABCB80	EY81	13/3	PEN46	7/-			6C9	17/3	10L1	15/11	19A05	9/9	50CD6G		OC66	25/-
EACSP2	EY86	10/-	PEN383	23/3			6C31	7/6	10LD11	12/-	19B6G	23/3	29/10		OC70	14/-
EB34	EZ35	16/7	PEN220A	4/-			6D6	5/-	10M2	23/3	20D1	15/3	50L6GT	8/6	OC71	14/-
EB41	EZ40	7/6	PEN45DD	26/6			6CH6	10/6	10P13	15/-	20F2	26/6	75	10/6	OC72	17/-
EB91	EZ41	7/6					6F6G	7/6	10P14	19/3	20L1	26/6	77	7/6	XB102	10/-
ECB33	EZ80	7/-					6F6M	7/6	12A6	5/-	20P1	26/6	80	8/6	XB104	10/-
ECB41	EZ81	7/-														
ECB81	EZ90	7/6														
ECB90	EL148	2/6														
ECB91	FC4	26/6														
EBF80	FC13	6/6														
EBF89	FW4/500															
EBL21	GTIC	27/6														
EBL31	GZ32	12/-														
EC31	H30	5/-														
EC40	H63	10/-														
EC82	HL23DD	8/6														
EC83	HL22	6/6														
EC84	HL22	6/6														
EC85	HL23	8/6														
EC86	HL23	8/6														
EC87	HL23	8/6														
EC88	HL23	8/6														
EC89	HL23	8/6														
EC90	HL23	8/6														
EC91	HL23	8/6														
EC92	HL23	8/6														
EC93	HL23	8/6														
EC94	HL23	8/6														
EC95	HL23	8/6														
EC96	HL23	8/6														
EC97	HL23	8/6														
EC98	HL23	8/6														
EC99	HL23	8/6														
EC100	HL23	8/6														
EC101	HL23	8/6														
EC102	HL23	8/6														
EC103	HL23	8/6														
EC104	HL23	8/6														
EC105	HL23	8/6														
EC106	HL23	8/6														
EC107	HL23	8/6														
EC108	HL23	8/6														
EC109	HL23	8/6														
EC110	HL23	8/6														
EC111	HL23	8/6														
EC112	HL23	8/6														
EC113	HL23	8/6														
EC114	HL23	8/6														
EC115	HL23	8/6														
EC116	HL23	8/6														
EC117	HL23	8/6														
EC118	HL23	8/6														
EC119	HL23	8/6														
EC120	HL23	8/6														
EC121	HL23	8/6														
EC122	HL23	8/6														
EC123	HL23	8/6														
EC124	HL23	8/6														
EC125	HL23	8/6														
EC126	HL23	8/6														
EC127	HL23	8/6														
EC128	HL23	8/6														
EC129	HL23	8/6														
EC130	HL23	8/6														
EC131	HL23	8/6														
EC132	HL23	8/6														
EC133	HL23	8/6														
EC134	HL23	8/6														
EC135	HL23	8/6														
EC136	HL23	8/6														
EC137	HL23	8/6														
EC138	HL23	8/6														
EC139	HL23	8/6														
EC140	HL23	8/6														
EC141	HL23	8/6														
EC142	HL23	8/6														
EC143	HL23	8/6														
EC144	HL23	8/6														
EC145	HL23	8/6														
EC146	HL23	8/6														
EC147	HL23	8/6														
EC148	HL23	8/6														
EC149	HL23	8/6														
EC150	HL23	8/6														

CONVERT YOUR RADIOGRAM WITH ONE OF THESE MODERN AUTOMATIC RECORD CHANGER UNITS

Monarch UA8, 4-speed automatic record changers with Full-Fi turnover crystal cartridge £6.19.6. Carriage 3/6. Collaro Conquest, 4-speed fully mixing changer, complete with Studio "O" Crystal cartridge, £7.19.6. Garrard KC120/D, Mk. 11, 4-speed unit manual control to enable records to be played singly, £8.19.6. Carriage 3/6. Latest Collaro Studio Tape Transcriptor, 3 motors, 3-speed, 1½, 3½, 7½ i.p.s. takes 7in. spools. Push-button controls. Price £15.15.0. Tape extra. Carr. and Ins. 12/6. Latest B.S.R. "Monardeck", Single-speed, 3½ i.p.s. takes 5½ spools. Simple controls. Price £9.19.6. Tape extra. Carr. and Ins. 12/6.

COLLARO JUNIOR

Single 4-speed record player unit in cream, complete with pick-up fitted turnover cartridge, special price 75/- each, post 3/6.

ACOS MICROPHONES

Acos Mic 39/1. Crystal Stick Microphones for use as a hand, desk or floor stand unit for high quality recording, broadcasting and public address work. List Price £5.5.0. OUR PRICE 39/6. With stand 47/6. With floor stand adaptor 52/6. Postage 1/6.

Acos Mic 40, as supplied with most modern tape recorders, with folding rest and 8 ft. lead, response 40-6000 c.p.s. Listed at 35/- OUR PRICE 25/-.

REGUNDED

Television Tubes. 12 Month Guarantee. 12in. to 14in. £5.10.0. 15in. to 17in. £6.0.0. Carr. and Ins. 10

LETTERS TO THE EDITOR

(Continued from page 178)

apparatus, then there would be a parallel earth created, depending on the resistance of the two earths. Therefore, in this case it would appear to affect the operation of the earth leakage circuit breaker. One well known maker of earth leakage circuit breakers states regarding parallel earth paths:—

"It is often found in practice that fortuitous or deliberate parallel earth paths exist between the protected metalwork and earth in addition to the Earth Leakage Circuit Breaker earth. Whatever the resistance of these parallel earth paths, full protection against dangerous fault voltages will always be afforded by the circuit breaker providing it is connected up correctly and operates when the test button is depressed."

As regards the ordinary miniature circuit breaker, if earthing of the socket outlets in the installation is correct, also the earthing of other apparatus if connected to a good earth, if in any apparatus relying on such good earths a fault developed from the live side to the earth of the apparatus it should then operate the miniature circuit breaker, even if another independent earth is connected to such apparatus. As space does not permit me to give full technical details, readers who are interested in miniature circuit breakers and earth leakage circuit breakers could get some valuable information from Chilton Electric Products Ltd., Hungerford, Berks, or J. A. Crabtree and Co. Ltd., Lincoln Works, Walsall. They are two well known firms who manufacture such circuit breakers. I may add that miniature circuit breakers are being used extensively these days on all types of installations.—A. DEARDEN (Johannesburg, S. Africa).

THE "OLD DAYS"

SIR,—Much has been said concerning the old and new generations of wireless constructors, now is the time that I would like to say my piece. In the March edition A. Trowbridge wrote attacking soldering. In the modern world of wireless soldering is an essential, it makes small light, strong and very neat joints. Mr. Trowbridge states that "many amateurs have no facilities for soldering. How so? It cannot be for the cost of a soldering iron and solder, for an electric soldering iron can be purchased from an advertiser in PRACTICAL WIRELESS for 16/9, and a gas heated iron can be purchased at any ironmongers for 2/6. I therefore conclude that this statement relates to the absence of power supplies in some districts, but amateurs in these districts are few and far between, but if the need arises a battery soldering iron can be purchased cheaply.

The next statement in Mr. Trowbridge's letter reports that many amateurs are not allowed to solder. Again how so? The only reasonable excuse would seem to be that of age and this can be remedied by waiting for some time. The correspondent then goes on to condemn many of the modern components on the grounds of "impressiveness". Just who is Mr. Trowbridge hoping to impress? Condensers he asserts were interesting pieces of equipment; anyone who can find more interest in a foil covered jam-jar with efficient terminals than in a finely constructed modern condenser is away behind times. He also states his modern

impression of a condenser to be "a plain common roll, covered in paraffin wax and with a wire sticking out each end". But there are many other types of condenser, disc, ceramic, can electrolytic . . . etc. Mr. Trowbridge complains of the lack of attractive cartons. In modern times condensers are sold for their use and not the carton, which is probably discarded in any case. The old resistances had metal cones at each end and fitted into clips which were then fixed to the base board, but in a modern set there may be upwards of fifty resistances and that means fifty clips which can be replaced by 6d. worth of solder, that means a large saving in money. Transformers were magnificent and iron shrouded: magnificent probably meaning that they weighed about five pounds, what is the use of using a huge component where a small one with probably more efficiency could be used. I therefore suggest that these transformers are buried in their iron shrouds. Coils were composite and shielded triumphs. They were probably wound on twelve inch diameter formers and needed much more efficient shielding than would a modern component of similar performance. The larger a chassis the harder it becomes to store and the harder one has to fight wives and mothers who are not at all impressed. As for Mr. Trowbridge's assertion that modern chassis contain wires and components in a jumbled heap I would say that if he looks carefully he will see a method in the madness.—J. M. CHESWORTH (Wallasey, Cheshire).

THE R1155

SIR,—I recently acquired an R1155 and would be very grateful if anyone could lend me a copy of PRACTICAL WIRELESS Sept./Oct. 1956 which I understand is now out of print, or any other data concerning the R1155. I have a power pack and the details of a 1.6 to 3.0Mc/s and 18.5 to 31.5Mc/s converter, and "S" meter. I would also like to correspond with another SWL of my own age who has an R1155 and who is interested in making additional equipment for the set. I hope to make radio my future career and find your magazine very interesting and helpful.—J. A. ROSE (104 Mount Grace Road, Potters Bar, Middx.).

TEST SET 43

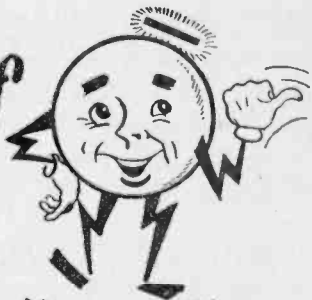
SIR,—I wonder if any of your readers have converted "Test Set 43" to a general purpose scope, and would they be so kind to send me any details they have. I will pay postage. — A. C. WOODLEY (194 Allenby Road, Southall Middx.).

CORRESPONDENCE WANTED

SIR,—I am 14 years old and have been interested in radio construction for several years. I have an amateur receiver and would like to correspond with an aspiring amateur of the same age as myself. —A. GRAY (39 Cardowan Drive, Stepps, Glasgow E.3.).

SIR,—I am 14 years old and I am very interested in radio. I would like to communicate with others of around my age. I have been reading PRACTICAL WIRELESS for about two years. Has anyone a circuit of a radio receiver using 56B and 56C valves.—P. BEESLEY (42 Croydon Road, Penge, S.E.20).

LOTS & LOTS of



TINKERS, TAILORS, ★ SOLDIERS, SAILORS, AIRMEN, APPRENTICES & Ordinary Chaps like You and Me Are Learning BASIC ELECTRICITY & BASIC ELECTRONICS THIS NEW **PICTURE BOOK** WAY *Why don't you too?*

Now available to Civilian Readers, in eleven illustrated Manuals, is this NEW-STYLE Training Course, developed for the U.S. Navy by the New York firm of Management Consultants, VAN VALKENBURGH, NOOGER & NEVILLE, INC., and adapted to British usage by a special team investigating the most modern methods of teaching Electricity and Electronics at Training HQ of the Royal Electrical and Mechanical Engineers.

IT HAS ALREADY BEEN ADOPTED for Training by:—**REME**—Royal Signals—Technical Training Command, RAF—N.Z. and S. African Air Forces—Army of Pakistan—National Cash Register Co.—Richard Thomas & Baldwins—Uganda Electricity Board—Addressograph-Multigraph — Mullard.

★ To be honest, we're not yet 100% sure of either the Tinkers or the Tailors. But there's no doubt that they all could learn Electricity and Electronics this wonderfully simple "PICTURE-BOOK WAY" if they wanted to!

COUPON - SEND NOW!

To THE TECHNICAL PRESS LTD.

1 Justice Walk, Lawrence St., London S.W.3.

Please send me your FREE prospectus, describing 'BASIC ELECTRICITY' and 'BASIC ELECTRONICS'

NAME

ADDRESS

PW

HOLIDAY ACCOMMODATION

REGULVER LODGE (PW), Beltinge, Kent. For weekends or holidays.

RECEIVERS & COMPONENTS

TRANSISTORS. SPECIAL PRICES! Red Spot 3/11; White Spot 4/11; Mullard OC44 19/11; OC45 17/6. Post and Packing 6d. per parcel. Insurance 6d. per parcel extra. **EDDY'S SURPLUS STORES**, 172, Alfreton Rd., Nottingham.

TRANSISTORS.—OC44, XA102, 12/6; OC45, 10/6; OC71, 6/6; Gold Spot R.F., 17/6; XC101, 11/6; XA101, 7/6; XB102, 10/-; XB103, 10/-; OC72 type, 7/6. **D. B. CARTER (ELECTRONICS)** 347, Ladypool Road, Birmingham 12.

TUBES 18 Months Guarantee MAZDA & MULLARD TYPES

12" & 14"	£5.10
17"	£6.10
21"	£8

others S.O.E. Terms C.W.O.
Postage & Insurance 10/-

W.R.S. 4 Bruce Grove, Meadows Nottingham.

SPEAKER REPAIRS. Cones/Fields fitted. Clock Coils Wound. **L.S. REPAIRS**, Pluckley, Ashford, Kent.

POWER IN PACKETS—This month ONLY. Pre stocktaking sale. 426A Xtal control units (6Xtal type) 27/6 ea., 426A Xtal control units (1 Xtal type) 21/6 ea. Wavemeter/Oscillator type W1649 comp. with attenuator and circuit details and instructions. Guaranteed to please, 28/6 ea. CV 1397 similar to 97 tube but slightly longer persist, 7/6 ea. crated. All delivered free U.K. 18 set Hts. and Hts. as usual. Don't miss these snips, our stocks will not last. **DIGGINS**, 129/133 Radnor Street, Hulme, Manchester 15.

● KINGSLAND ELECTRONIC COMPONENTS Stupendous Offers

Hurry while stocks last. Set of 4 Files with handles. Set of 13 Drills from 1/4 in. in case, and Neon Mainstester, 11/-, p. & p. 1/3. Set of 4-Piece Two-way Screwdrivers in case. All Metal Plane. Junior Hack saw, 10/6, p. & p. 1/9.

BARGAIN PACK. Pair Throat Microphones, 150 Assorted Screws, 2ft. 2in. Screened Lead with socket, one 5 Henry 200 mΩ choke, 3 Electrolytic Condensers, 6 Knobs, 3 Toggle Switches, 6 Octale Valve Bases, 1 Waveband Switch, 6 Coax. Plugs, 6 Assorted Coils, 6 Cartridge Fuses, 6 Potentiometers, 3 W.W. Multipliers, Festoon Lamp and Holder, Coil of Wire, 15/6, p. & p. 3/6.

New 115 v. Relay's 15 amp., 7/6, p. & p. 2/6. Instrument Rectifiers with Circuits, 5/6. 6 v. or 12 v. Vibrators, 2/6 each, p. & p. 1/-, 6 Assorted Droppers, 5/6. Radio Chassis, over 200 useful parts, 7/6, p. & p. 4/6.

Mike and Pick-up Transformers. Ideal for Baby Alarms, 4/6, p. & p. 1/-, 100 Assorted Condensers or Resistances or 50-50, 5/-, p. & p. 1/9.

New Headphones, low impedance, ideal for crystal sets, etc., 4/6, p. & p. 1/6.

6 Assorted Potentiometers, 5/-, p. & p. 1/6. **182 KINGSLAND RD., SHOREDITCH, E.2 Tel.: SHO 6572. Sorry, U.K. only.**

RATES: 5/6 per line or part thereof, average five words to line, minimum 2 lines. Box No. 1/- extra. Advertisements must be prepaid and managed to "Practical Wireless," Tower House, Southampton St., Strand, London, W.C.2.

RECEIVERS & COMPONENTS (continued)

"WEYRAD" TRANSISTOR RECEIVER

COMPLETE KIT—LONG & MEDIUM-WAVE. PUSH-PULL O.P. CONSTRUCTORS BOOKLET £9/12/6 Send S.A.E. for Shopping List.

WESTHAM RADIO SUPPLIES

Rear of 176, Abbotbury Road Weymouth, Dorset

BENDIX RECEIVERS RA-10. 4-band superhet. 150ks/s-10Mc/s. 8 valves; 6SK7-R.F.; 6K8-Mixer; 2-6SK7-I.F.; 6R7-sec. det.; 6C5-BFO; 6K6-OP; 6H6-diode. Built-in P.U. 24V. Clean. Size 6 1/2 in. x 1 1/2 in. Easily converted to mains as described on p. 453 Sept. 1957 "P.W." £4, p.p. 10/-.

AMERICAN RT-37/PPN-2 lightweight portable Tx-Rx 214-235Mc/s. brand new composed of Tx-Rx (9 valves: 5-3AS, 3-155, 1-1R5); built-in 2V. Vibrator Pack; square vibrator; head set; connector leads; 10ft collapsible aerial; instr. book. £3/15/-, p.p. 7/6. **CRYSTAL FILTER UNITS.** HRO 455kc/s with crystal set and phasing controls. new boxed. £1, p.p. 2/-.

E.W.S. CO. 69 Church Road, Moseley, Birmingham 13.

T/R 1143A: (100/140 Mc/s). Containing transmitter type 50. Receiver type 71. Ampl. type 165. Full of useful components incl. 5 relays, 6 min. ceramic var. tuners, 2 and 3 gang ditto, and 19 octal valves. As new at only £4. Pye cabinet P.A. speakers 10in., H.D. units, Jack and long lead enclosed. £2/10/-, U52 valves 4/-.

Prices C.P. CUMMINS, Tillingham, Southminster, Essex.

50-WATT POWER AMPLIFIERS. rack mounting, input 200/250 v. A.C.; only 35/- (15-) less valves, requires —MH4 2-PX25, 1-504; 2 1/2 in. **WILLIAM METERS**, 2 1/2 in. 0/1. 20/- (2/6). **TYPE 3 POWER UNITS**, de luxe model with 2 meters, 55/- (17/6 includes 10-returnable case). **MONITOR 56** (Indicator 248 and Power Unit 675), 28 (20/-). **VIBRA-PAKS**, 6 v. D.C. to 250 v. 100 m.a., smoothed. In case 15/- (3/6). **MOTOKOLA POLICE CAR TRANSMITTERS**, 30/40 mcs., P.M. 6 v. input, 10 valves, 30 watts. £12/10/- (12/6). **BC-659J TRANSMITTER RECEIVERS**, 6, 12, or 24 v. input, with separate Power Unit, £12/10/- (15/-). **PLENEX 6 FT. TRANSMITTER CABINETS**, open front for standard 19 in. panels, full length rear door with latch, ventilated top and slides, £4/10/- (20/-). **IT-201 BRIDGE UNITS** give D.C. output from Radio Receiver for teleprinter, 150 v. input, 200 v. input, £12/10/- (15/-). **DA-30 OUTPUT VALVES**, 20/- (1/-). **40IN. MOBILE WHIP AERIALS**, one piece, with loading coil in base effectively increasing length to 12ft.

SEND FOR 40-PAGE LIST OF OVER 1,000 DIFFERENT ITEMS.

American super finish, 35/- (5/-). **AMPLIFIERS AMERICAN**, 40-250 ohms input, 300 and 2,000 ohms output with 2-125S and 2-12A6; 28 v. input, with dynamotor, 9in. x 5in. x 5in., 20/- (5/-).

Amounts in brackets are carriage England and Wales

We have large quantities of "bits and pieces", and can probably help your needs. Please enquire—everyone answered.

P. HARRIS, Organford, Dorset

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., Ilford, Essex.

RECOVERED SPEAKER bargains, 6in., 8in., 7in. x 4in. 5/-, p.p. 2/6. All guaranteed. **J. R. CALVERLEY & CO. LTD.**, 130, Water Street, Radcliffe, Lancs.

MULLARD TUBES, reclaimed, 6 months' guarantee. 9in., 30/-, 12-14in., 59/6, 17in. 79/6. All pictures tested. **FITTED FREE.** Picture shown to callers. Other makes types, cheap. Salvaged spares for modern and obsolete sets. Prices from: LOT 17/6, FOT 7/6, Osc. Tr. 6/-. Mains tr. 10/-. Valves, 1,000 types in stock. EP91, EB91, 6J5, 2/6. EF80, 10F1, UF42, 3/6. Save money. Send a S.A.E. with enquiries or for free list. "ST. JOHN'S RADIO" 156 John's Hill, S.W. 11. (BAT9838).

FM-AM STEREO

Radiogram chassis - CB8

Paired output 6 watts. Plain or Stereo Records. A hand-built quality unit with two speakers.

ONLY £20.

BEL SOUND PRODUCTS CO. Marlborough Yard, London, N.19. ARC 5078

COMPONENTS. Valves, Tubes, etc. Write or phone for free list. **ARION TELEVISION**, 4, Maxted Rd., Peckham, S.E.15. (New X 7152.)

VALVES (12 months' guarantee) and components of all kinds (not surplus). Send stamp for lists. **A.1 RADIO COMPONENTS**, 14 The Borough, Canterbury.

GUARANTEED VALVES from 6d. Lists 3d. **HAMILTON RADIO (W)**, 237, Sedlescombe Road N., Hastings.

ANNAKIN

Tx.105A. Has 2-CV63, 1-CV73, valves. Selector Drive Unit, many useful parts. New. Boxed. A real bargain. 7/6 ea., post 3/9. **Tx.51.** Has 1-TT15, 1-QV047, 2-EL91, 2-EF91, 1x1, 5 tuned cts., 45/- ea., post 2/3. **Mod.105.** Has 1-EL91, 1-EF92, 2-6C4, Mike and P.P. transt. Only 20/- ea., post 2/-. **Rx.114.** Has 2-EL91, 3-EF91, 5 tuned cts., 124-156 Mc. Only 25/- ea., post 2/-.

IF.476. Has 3-EF92, 1-EF91, 1-EB91, 1-EAC91, A 9.7 Mc IF strip. Bargain at 32/6 ea., post 2/-.

Valves.—EC52, 6d. VR150/30, 4/-, EC53, 3/6. RK34, 3/-, EF37, 4/-, Post 6d. per valve. **Switches.**—Slider toggle, 250 v., 3 A., 1/-, post 6d.

Periscope Prismas.—3/- pair, post 1/9. **Shaft Couplers.**—Eddystone type 1/- ea., post 6d.

Lecher Lines.—450 Mc. New, 6d. ea., post 6d. **AF Transformers.**—1 ohm, P. 200 ohm, S. A fine job at 1/- ea., post 1d. 8/- doz. post 2/6.

Phones.—Single, LR Headband, 2/- ea., post 1/3.

Modulation Transformers.—Also OK for output transformers for EL32 valves, 2/- ea., post 1/6.

Motors.—4-6 v. small, new, 6/- ea., post 6d. **Mike.**—Carbon, 3/-, post 1/6. **Throat.** 1/8, post 6d.

Moving Coil Phones.—HS-38, double. Cord. plug. No headbands. Real bargain. 200 ohm, 7/-, post 1/-.

Smoothing Chokes.—10 H., 60 mA, 1 K, 2/- ea., post 1/6.

Mainland only. No Export. CWO only. Send stamped addressed envelope for Lists. **25 ASHFIELD PLACE, OTLEY, Yorks.**

RECEIVERS & COMPONENTS

(continued)

MEGGER insulation testers, unused 50 volt constant pressure by Evershed and Vignoles. £30 each. H. H. BRADFORD LTD., Ramsey, Harwich, Essex.

RESISTORS—100 new, wire ended, assorted all types, 7/6 box post free. COOK'S OF BEDFORD, 29, St. Mary's St., Bedford.

FOR SALE

THROAT MICROPHONES. New model Waterproof. Ideal for use with Motorcycle combination Intercom. Sets 5/6; Headphone Sets, L.R. with breast microphone 16/9. Single Earpieces for Crystal Set Reception 7/3. All articles post free. AMATEURS PARADISE, 155, Humberstone Road, Leicester.

SUB-MINIATURE SOLDERING INSTRUMENTS

Ultra-lightweight—only 1/4 oz.! The most efficient tool for all Transistor and other delicate soldering. 8 volt 9 watt, 10/9 post free, or with isolating transformer for A.C. Mains, 14/6 plus 1/9 p. & p.

KENNETT & COMPANY
DOE PARK, DENHOLME, YORKS.
Trade enquiries invited.

100 BAYS of brand new adjustable steel shelving, 72in. high x 34in. wide x 12in. deep, stove enamelled, dark green, sent unassembled, six-shelf bay, £3/15/-. Sample delivered free, quantity discounts. N. C. BROWN LTD., Eagle Steelworks, Heywood, Lancs. Tel.: 69018.

METERS. We have a large and varied stock of meters, 2in. to 8in. dia. for all purposes.
500 micro amps., 25/-; 1 mA, 2 1/2 in., 25/-; 5 mA, 2 1/2 in., 17/6; 2in., 20 amps., 10/-; 2in., 20 volts, 10/-.
Send for list.

RELAYS. Type 600 and type 3000 new surplus. 3-make contacts, 6/6; 2-C/O contacts, 6/6; 2-C/O, 1-make, contacts, 7/6. Send for list.

TOGGLE SWITCHES. Bulgin on-off S.P., 1/3.

MOTORS: 1/10th H.P., 110/230 volts A.C. series wound capacitor start, 2500 r.p.m., 35/-, post 3/6, with capacitors. Easily fitted to garden mower for motor drive.

THE LESDIX ELECTROTOR. 4 1/2 volts D.C., 1in. dia., 2 ozs. Ideal for your motor boat. Send for leaflet giving full particulars, 6/6, post 6d.

THE TRANSAIR TRANSISTOR RADIO KIT. Can be built in 45 minutes following our simple pictorial plans. Picks up local stations and many outside the British Isles. Kit complete with case and watch receiver, diagrams and instructions, 29/6. Wiring diagram and instruction sheet, only 1/6.

ELECTRADIX RADIOS

(Dept. P), 214 Queenstown Road, Battersea, S.W.8.
-Macaulay 2159.

FOR SALE

(continued)

FOR SALE, R208 Ex. Govt. Receiver. good condition. 10-60mc/s. Mains or 6 volt battery, £7. LOCKWOOD, 11 Cannon Place, N.W.3.

BLANK CHASSIS MADE TO ORDER SAME DAY SERVICE

Metalwork Dept.

H. L. SMITH & CO. LTD.

287-289 Edgware Road, London, W.2.
PAD: 5891-7595.

TELEPHONE SETS, 7/9.

Ex. W.D. Wireless, remote control unit. E.M.K11. New condition. morse tapper, switch, jack plugs, etc. Less phone. P. & P. 3/6.

COMPASSES, 12/6.

Ex. A.M. Type P. 4.A. 6 1/2 in. dia. Ideal for boats, cars, etc. Inc. & Carr. 3/6.

P. P. COMPONENTS LTD.

219, Ilford Lane, Ilford, Essex.
MAIL ORDER ONLY.

UNUSED OAK CABINETS, 4 drawer, overall size 20in. x 16in. x 11in. Ideal for valve storage, etc. 27/6 each. S.A.E. for picture. D. S. DISCOUNT SCALES, Holyhead Road, Chirk, nr. Wrexham, N. Wales.

NEW DESIGNS IN STEREO CABINETS



Write for lists for
Cabinets, Equipment
and Enclosures.

A. L. STAMFORD LTD.

(Dept. 829)

84 Weymouth Terrace, London, E.2
Phone: SHO 5003

WANTED

A PROMPT CASH OFFER for your surplus Brand New Valves, Speakers, Components. Test Instruments, etc. R.H.S., 155, Swan Arcade, Bradford, 1.

URGENTLY REQUIRED. New Radio, Television or Industrial Valves. Also old and obsolete types. Cash prices offered for any quantity. Write, call or phone: MIT 6202, 201, Streatham Rd., Mitcham, Surrey.

WANTED. Service Sheets and Manuals. No quantity too large, or too small. Highest prices paid. SULTAN RADIO, 29, Church Road, Tunbridge Wells, Kent.

WANTED VALVES

All types for prompt cash. Must be new. State quantity.

WILLIAM CARVIS LTD.

103, North Street, Leeds, 7.

SOUND RECORDINGS

TAPE DISC/TAPE transfer. 1,800ft. American LP tape. 32/8. UNIMIXER Mixing Units for quality. SOUND NEWS, 10 Clifford St., London, W.1.

MISCELLANEOUS

PROTECT YOUR CAR AT NIGHT

"LITON"

PHOTOELECTRIC PARKING LIGHT SWITCH

will switch your lights on at dusk—off at dawn, automatically, while you are at work, in bed, or away from home. Controlled by light. Transistorised. Avo-J accidents, fines. Save your battery.

KIT OF PARTS, 52/6

BUILT AND TESTED, 57/6

Pat. Pending. Send 6d. stamp for pamphlet. "St. John's Radio," 156 St. John's Hill, S.W.11. BATTERSEA 9838

ELECTRONICALLY TIMED and tested watch repairs, cases and jewellery, etc., repaired. 12 months' written guarantee. Send registered, estimate free, no obligation. BANKS, 13, Kirby Road, Sheffield 9.

YOU READ MUSIC?

Then how about making yourself an electronic organ? Constructual 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 booklet and further details to C. & S., 20, Maude Street, Darlington, Durham.

SERVICE SHEETS

SERVICE SHEETS. — We have the largest stock of Radio and TV Sheets in the country for sale at 4/- ea. Why tolerate delay in obtaining your supplies when we will dispatch by return? 1960 Radio and Television Service Sheet List Now Ready, 1/- . Also Manuals for sale and hire. List 9d. S.A.E. please. Mail orders only. S.P. DISTRIBUTORS, 11 Old Bond Street, London W.1.

SERVICE SHEETS.—Huge stock at 4/- ea. List 1/- . Immediate delivery. GLOBE SUPPLIES, 33 Fairfield Close, Sidcup, Kent.

SERVICE SHEETS. TV 4/- ea. Radio 3/- ea. List 1/- . All orders dispatched on day received. C.O.D. if required. Also Manuals for sale and hire. Mail orders only. SULTAN RADIO, 29 Church Road, Tunbridge Wells, Kent.

SERVICE SHEETS for sale, all types, from 1/- . Free fault-finding guide with all service sheets. 100 T/V Service Sheets covering 330 popular models, 18/6. Radio, T/V, Electronic Books; s.a.e. lists/enquiries. HAMILTON RADIO (W), 237, Sedlescombe Rd. N., Hastings.

FAULTFINDER FILES, showing common faults that each receiver is prone to, and other useful servicing information, 2/- ea. List 9d., plus postage. S.P. DISTRIBUTORS, 11 Old Bond Street, London, W.1.

(continued on next page)

SERVICE SHEETS

(continued)

SERVICE SHEETS. Radio, TV, 5,000 models. Lists 1/- S.A.E. enquiries. TELRAY, 11, Maudland Bk., Preston.

SERVICE SHEETS

RADIO and Television

Over 100,000. S.A.E. for List. Large stock of obsolete Radio and Television Valves.

JOHN GILBERT RADIO

20, Extension
Shepherd's Bush Market, London, W.12
SHE 3052

SITUATIONS VACANT

IONOSPHERIC ASSISTANTS required by FALKLAND ISLANDS DEPENDENCIES SURVEY for service in the ANTARCTIC for two years. Salary at a basic rate of £500 a year with extra allowances for qualification and experience. Officers appointed will be required to undergo courses of training before leaving U.K. in October/November. Whilst in the Antarctic everything is provided free of charge including clothing, cigarettes, etc. Liberal leave on full salary. While on duty in U.K. an extra allowance of £150 a year is paid before departure and £200 a year on return. Candidates must have knowledge of radar and radio with some maintenance experience. The appointment will be made with the advice of the DSIR Radio Research Station. Write to the CROWN AGENTS, 4 Millbank, London S.W.1. State age, name in block letters, qualifications and experience and quote M3C/52985/PU.

T/V 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% success. For details of Exams and Courses (including practical apparatus) in all branches of Radio, T/V and Electronics, write for 148-page handbook, free. B.I.E.T. (Dept. 242G), 29, Wright's Lane, London, W.8.

A.M.I.Mech.E., A.M.Brit.I.R.E., City and Guilds, G.C.E., etc., bring high pay and security. "No pass-no fee" terms. Over 95% success. 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.

STUDY RADIO, TELEVISION AND ELECTRONICS with the world's largest Home study organisation, I.C.S. Courses for the enthusiast and for those seeking examination qualification. Brit.I.R.E., City and Guilds, R.T.E.B., etc. Build your own equipment with Practical Radio Course. Write today for Free book: INTERNATIONAL CORRESPONDENCE SCHOOLS, Intertext House, Parkgate Rd. (Dept. 541A), London, S.W.11.

CITY AND GUILDS (Electrical, etc.), on "No pass-no fee" terms. Over 95% success. 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.

ENGINEER to Service Electro-Medical apparatus. Driving experience essential. Write experience and salary required to STANLEY COX LTD, 93-95, New Cavendish Street, London W.1.

EDUCATIONAL

Southampton County Borough
Education Committee
Southampton Technical College
**COMMUNICATION ENGINEERING
AND ELECTRONICS**

The Electrical Engineering Department offers a three years full-time course in Communication Engineering and Electronics, leading to a College Diploma. The Final Examinations are assessed by the British Institution of Radio Engineers for exemption from their Graduateship Examination. Details of the course, fees, etc. from the Registrar, Southampton Technical College, St. Mary St., Southampton.

INCORPORATED Practical Radio Engineers home study courses of radio and TV engineering are recognised by the trade as outstanding and authoritative. Moderate fees to a limited number of students only. Syllabus of Instructional Text is free. The "Practical Radio Engineer" journal, sample copy 2/-. 6,000 Alignment Peaks for Superhets, 5/9. Membership and Entry Conditions booklet, 1/-, all post free from the SECRETARY, I.P.R.E., 20, Fairfield Road, London, N.8.

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.

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-STRUCTUR, 40, Russell St., Reading, Berks.

LEARN-AS-YOU-BUILD Course in basic radio, electronic and electrical theory with practical training building a 4-valve TRF and 5-valve superhet radio receiver; Signal Generator and High-quality Multi-tester. Write for free book: INTERNATIONAL CORRESPONDENCE SCHOOLS, Intertext House, Parkgate Road (Dept. 541), London, S.W.11.

★ LEARN ★

RADIO & T/V
SERVICINGfor your OWN
BUSINESS/HOBBY

● by a new exciting no-maths system, using practical equipment, recently introduced to this country.

Free Brochure from:—
RADIOSTRUCTUR

DEPT. G77, 40 RUSSELL STREET,
READING, BERKS. 6/60

COYNE'S NEW

TROUBLE-SHOOTING
SERIES TAKE HEADACHES
OUT OF ALL SERVICING
PROBLEMS!

Pin-Point

TV troubles
in 10 minutes

Find the exact sound or picture trouble in ANY TV set from 700 possibilities! 300 pages; 300 diagrams, check charts 31/6, postage 10d.

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/-.

Simple Check Chart
System Saves Time

These amazing practical handbooks with **ENTIRELY NEW METHOD** show you how to find the trouble in ANY TV, or transistor circuit FAST! Index tells you where to look; famous Check-Charts help you to pin-point the exact trouble in minutes! These on-the-job books quickly pay for themselves in profitable new business and valuable time saved!

SEND NO MONEY

Just mail coupon for free trial. After 7 days, send only low price or return books and pay nothing! If you keep both books, send only £1 after 7 days and £1 a month until 79/-, plus 1/- postage is paid.

FREE TRIAL OFFER
Mail Coupon Now!

Mail Order Division, Sim-Tech Book Company, 3 Hurst Close, Totton, Southampton, Hants.

- ☐ Rush 2-book PIN-POINT Series for 7-day FREE TRIAL per offer. For individual books, check below.
☐ TRANSISTORS, 47/6, plus postage.
☐ TV TROUBLES, 31/6, plus Postage.

Name _____ Age _____

Address _____

City _____ County _____

☐ Check here if enclosing full price; we pay postage. 7-day money-back guarantee.

RADIO DEALERS WHO WISH TO
STOCK THESE BOOKS PLEASE
WRITE FOR TRADE TERMS

UNIVERSAL AVOMETER MODEL D

Just released by the Air Ministry, these famous AC/DC Test Meters are a "snip" for anyone requiring a First Grade General Purpose Instrument, Normal Avometer size, 7 1/2 in. x 6 1/2 in. x 3 1/2 in., with carrying strap. Indication being given on a 5 in. Mirror Scale. Thoroughly overhauled and complete with batteries and instructions. Provides 34 ranges of current, voltage and resistance, as follows:

D.C. Voltage	A.C. Voltage	D.C. Current	A.C. Current
150 mv.	7.5 v.	15 ma.	75 ma.
300 mv.	15 v.	30 ma.	150 ma.
1.5 v.	75 v.	150 ma.	750 ma.
3 v.	150 v.	300 ma.	1.5 amp.
15 v.	300 v.	1.5 amp.	7.5 amps.
30 v.	600 v.	3 amps.	15 amps.
150 v.	750 v.	15 amps.	
300 v.	1,500 v.	30 amps.	Resistance
750 v.			1,000 ohms.
1,500 v.			10,000 ohms.

ONLY £8.19.6 (carriage 3/6).

SELECT TESTMETER DIII. Manufactured by General Electric Co., and has exactly the same ranges as the Avometer Model D above, but has an even larger Mirror Scale. Size 9 x 7 x 5 1/2 in., with carrying strap. Thoroughly overhauled and in perfect order, with batteries and instructions. A real "snip" while they last, at ONLY £7.10.0 (carriage 3/6).

RECEIVER R 107. A few more of these fine receivers. 9 valves, 3 wavebands, covering 1.2-17.0 Mc/s (18-250 metres), incorporating built-in speaker and 2 power packs for use on 100-250 volts A.C. and 12 volts D.C. in magnificent condition, the finest we have yet had. ONLY £15 (carriage £1).

POWER UNITS TYPE 234. Designed for R.A.F. R132 Receiver. Primary 20/250 v. 50 cycles. Outputs of 250 v. 100 mA., and 6.3 v. 4 amps. Fitted double smoothing. For normal rack mounting (or bench use) having grey front panel size 19 1/2 in. x 7 1/2 in. BRAND NEW. ONLY 59/6 (carriage 7/6).

INTERCOM. TELEPHONE SET. Two pairs of Brand New Headphones connected to Breast Microphones, with leads, etc., in fitted carrying cases. Supplied with 44 volt battery, 10 yards twin wire, and full instructions for connecting to make super intercom. ONLY 27/6 (post 3/6). Extra Wire 3d. per yard.

RCA 8 in. P.M. SPEAKER. In heavy black crackle metal case. Can be used as normal 3 ohm extension. Size 11 1/2 in. x 10 1/2 in. x 8 in. NEW IN MAKER'S CARTONS. ONLY 45/- (post 2/6).

COMMUNICATIONS RECEIVER RH55. The famous Bomber Command receiver known the world over to be supreme in its class. Covers 5 wave ranges 18.15 to 7.5 Mc/s. 7.5 to 3 Mc/s. 1,500 to 600 kc/s. 500 to 200 kc/s. and 200 to 75 kc/s. and is easily and simply adapted for normal mains use. Full details being supplied. All sets thoroughly tested and in perfect working order before dispatch, and on demonstration to callers. Fitted latest type super slow-motion tuning assembly. Have had some use but in excellent condition. ONLY £9.19.6. **A.C. MAINS POWER PACK OUTPUT STAGE.** for the above in black crackle case to match receiver, enabling it to be operated immediately, by just plugging in, without any modification. With built-in 8 in. speaker. £6.10.0. DEDUCT 10/- IF PURCHASING RECEIVER AND POWER PACK TOGETHER.

Send S.A.E. for illustrated leaflet, or 1/3 for 14-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.

RH55 SUPER SLOW-MOTION TUNING ASSEMBLY. As used on all late model RH55s. Easily fitted to "A" sets, etc. BRAND NEW. ONLY 12/6.

HIT TRANSFORMERS. 7 kv. (Rect.) with 2 v. 1 a., 80/6. 2.5 kv. (Rect.) with 2-0-2 v. 1.1 a., 2-0-2 v. 2 a. (for VCR97 tube, etc.). 47/6 (postage 2/- per trans.).

POCKET VOLTMETERS. Read 0-15 volts and 0-300 volts A.C. or D.C. BRAND NEW and UNUSED. ONLY 18/6.

10/- CONSTRUCTORS PARCEL. 10 yards each of 6 colours wiring wire, solder, 24 each assorted Resistors and Condensers.

RESISTORS. 100 assorted values. NEW. 10/-.

CONDENSERS. 100 assorted mica and silvermica. NEW. 12/6.

SPRAGUE CONDENSERS. Metal cased, wire ends. New. 0.1 mfd. 1,000 volt, and .1 mfd. 500 volt, 7/6 per dozen. Special quotes for quantities.

MINIATURE MOTORS. Ideal for models. Will operate 3-8 v. D.C. Size 1 1/2 x 1 1/2 in. plus 1 spindle BRAND NEW only 7/6.

HARRIS ELECTRONICS

(LONDON) LTD.

138 Gray's Inn Road, London, W.C.1.

(Phone TERminus 7937)

Please include carriage costs on all items.
(Open until 1 p.m. Saturdays? We are 2 mins. from High Holborn
(Chancery Lane Station) and 5 mins. by bus from King's Cross.)

Electronics Ltd

FLEET ST

Dept. 8

152/3 Fleet St., London, E.C.4. Tel. FLE 2833

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

Stockists for

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

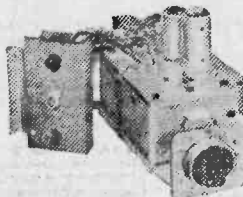
ANOTHER OF OUR AMAZING SCOOPS

A Snip for the Constructor

Build this Cossor Pocket 4 Transistor Superhet Receiver

Circuit Description:

4 transistors (OC44/OC45, OC45, OC72), two OA70 diodes, two AGC systems, coverage 190-550 metres. Power output 30 M/V. Ferrite slab aerial, 2 1/2 in. moving coil speaker, printed circuit, attractive tuning control knob, leatherette case 6 x 3 1/2 x 1 1/2 in. All components including theoretical and point to point diagrams for easy construction. ONLY £7.19.6, post and packing 2/6. All parts available separately. 9 v. PP4 battery 2/- Makers' original price nearly £20.

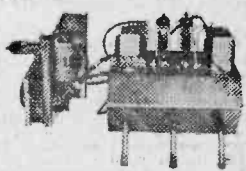


CONVERT YOUR TV TO ITA

Limited number of Cossor turret tuners, 2 valve cascade R.F. amplifier using one 7aa7 valve, 1 fr. changer 8AB, output from converter, sound 10.1 Mc/s vision, 13.6 Mc/s. Fitted with aerial panel, fine tuning control. Brand new in makers' carton with full instructions and circuit. Original price 7 gns. our price 39/6. P. & Pkg. 2/-. Can be used in sets made by Cossor, Argosy, Baird, Decca, Murphy, Peto Scott, Philips, Philco, Regentone, RGD and Stella. Available for London and Birmingham channels.

THIS OFFER FOR LIMITED PERIOD ONLY

Made by famous mfr. Stereo amplifier on compact chassis, 3 watts each channel, separate balance and tone controls, volume and switch, 3 ohm impedance, designed for crystal pick-up, channel reverse switch, separate power pack. Our price £6.19.6. P. & Pkg. 4/6.



BARGAINS IN PICKUP CARTRIDGES

Brand new and complete with sapphire styli. BSR TC8 less bracket 15/- each. BSR Hi-G 37/1 with bracket 17/6. Acos Hi-G with bracket 17/6. Acos Hi-G 59 with bracket 17/6. The R.C.A. diamond LP stylus, will fit most Collaro studio cartridges, brand new in sealed containers. Only 25/- P. & Pkg. 1/- STARR dual LP and 78 cartridge 15/-.

CONVERT YOUR BATTERY PORTABLE

This Cossor Eliminator is completely assembled and supplied with 4ft of Mains Lead and Torpedo-type on/off switch. It is housed in 2 metal containers approximately the same size as the Ad35 and B126 Batteries, and suitable for such Receivers as the Cossor 543, 551 and 552 or Receivers operating on 1.4 volt L.T. and 90 volt H.T. for use on 200-250 v. A.C. mains. Size: L.T. unit 3 in. x 2 1/2 in. x 1 1/2 in., H.T. Unit 4 in. x 2 1/2 in. x 2 in. Original Price 3 gns. OUR PRICE for a limited period only, 37/6 plus 2/- P. & P.

3 SPEAKER SNIPS BY FAMOUS MANUFACTURERS

4 in. Speaker ... 12/6, 1/6 P. & P.
8 x 6 in. Speaker with heavy magnet ... 17/6, 1/6 P. & P.
10 x 6 in. Speaker with heavy magnet ... 22/6, 1/6 P. & P.

be TRANSISTOR-WISE! be POCKET-WISE!



"RECO" MIDDY ONE

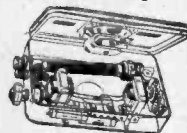
(Medium and Long Waves.) Size $4\frac{1}{2} \times 3\frac{1}{2} \times \frac{1}{2}$ in. Variable regen. control. High gain Vari Q Ferrite Rod Aerial. "Sonotone" Dynamic Earpiece. Months of listening pleasure from $1\frac{1}{2}$ volt pencil. Complete Kit with EDISWAN TRANSISTOR and easy build plans, 39/6, post 1/6, Data 1/6.

"RECO" PUSH-PULL FIVE TRANSISTOR KIT

(Size $6\frac{1}{2} \times 4\frac{1}{2} \times 1\frac{1}{2}$ in.) Medium, Long Waves and Trawler Band. Indoors or outdoors this brilliant radio brings Home and Continental Stations to your finger-tips. High Grade 3 in. Moving Coil Speaker. Regenerative receiver with EDISWAN TRANSISTORS. Push-pull Output Stage. High Gain Ferrite Rod Aerial. Gleaming Pale Blue Polystyrene Case with Contrasting Speaker Grille in Red. Complete Kit with 4 1st grade EDISWAN TRANSISTORS and 3 volt battery. £5.9.6, p.p. 2/6, Data 2/6 (Free with Kit). A customer in Dorset writes—"Makes fine car radio."

"RECO" PUSH - PULL FOUR TRANSISTOR KIT

(Medium and Long Waves with two S/W Coils FREE upon request.) Case size as PP5. New improved circuit. 3 in. High Grade Moving Coil Speaker. Bias sensitivity volume control. Ferrite Rod Aerial. Gleaming Pale Blue Polystyrene Case with Contrasting Speaker Grille in Red. Complete Kit with 4 1st grade EDISWAN TRANSISTORS and 3 volt battery. £5.3.6, p.p. 2/6. Data 2/6.



AMAZON THREE TRANSISTOR KIT

Covers Medium and Short Waves
New, super sensitive reflexed circuit. EDISWAN transistors. Ferrite rod aerial. Complete kit with easy build diagrams and miniature earpiece. 72/6, p.p. 2/6.
SUPER AMAZON THREE. Medium and long waves, fitted sensitive $2\frac{1}{2}$ in. speaker. Finger tip tuning, regeneration control, Ferrite Rod Aerial, Ediswan Transistors. Intended for local station use but will get other stations under suitable reception conditions. £4.9.6, p.p. 2/6 (ideal for beginners).

"RECO" TRANSIGEN THREE TRANSISTOR KIT

(Case as PP5.) (Medium, Long Waves and Trawler Band.) Fitted Super High Gain Ferrite Rod Aerial. R.F. Stage, EDISWAN TRANSISTORS. On test: tuned in Home, Light, Third, Radio Luxemburg, A.F.N. and many others at good listening level. The Prototype was tested at approximately 50 miles from nearest transmitter. Complete Kit with Super B.A. Reproducer and battery, 75/-, p.p. 2/6. Or with super dynamic miniature earpiece, 79/6. Data 1/6.



"RECO" INJECTOBOOST

Add an R.F. stage to your receiver; bring in those weak stations, improve selectivity. Complete kit. Plastic case, wiring diagram, etc. Simple—effective. 29/6, p.p. 1/6. (Suitable for Diode Front End and Crystal Sets.) Plans with kit only.

AFTER SALES SERVICE

RADIO EXCHANGE CO.

27 HARPUR ST., BEDFORD.

Telephone 2367

Name, address BLOCK letters please.

Closed 1 p.m. Saturdays.

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, Johannesburg.
Australia: P.O. Box 4570, Melbourne

A.R.R.L. RADIO AMATEURS HANDBOOK 1960

New edition 32/6, Postage 1/9.

Radio and TV Engineers' Reference Book. New edition by Hawker. 100/-.

F.M. Radio Servicing Handbook, by King, 25/-, postage 1/3.

Using an Oscilloscope, by Easterling, 8/6, postage 6d.

Short Wave Receivers for the Beginner, 6/-, postage 6d.

World Radio Handbook 1960, by Johansen, 15/6, postage 1/-.

Transistor Superhet Receivers, by Sinclair, 7/6, postage 8d.

Practical Wireless Service Manual, New revised edition by Camm, 21/-, postage 1/-.

Radio Amateur Operators' Handbook, by Data, 3/6, postage 6d.

TV Fault Finding, by Data, 5/-, postage 6d.

Brimar Valve and TV Tube Manual No. 8, 8/-, postage 6d.

UNIVERSAL BOOK CO.

12 Little Newport Street, London, W.C.2

(adjoining Lisle Street)

A.C./D.C. MULTIMETER KIT

For your 1 mA meter, showing colossal saving. Ranges 10, 100, 1000 v. A.C./D.C.; 1 v. D.C.; 1, 10, 100, 1000 mA; Ohms. Contents:—7 x $1\frac{1}{2}$ watt Hi-Stabs, 3 x $1\frac{1}{2}$ shunts, wirewound pot. 1 p. 11 w. and SPCO switches. Listed over 50/-, our price 25/- with circuit and instructions. Hurry, only 50 sets offered.

1,800 o.h.v. Kit as previously advertised, with mA meter, 45/-.

Metall. cased condensers. 0.1/600, 0.02, 0.05 uF, 4/- dozen, 8d. each.

Wirewound Pots 1K, 5K, 10K, 50K, 2/6 each.

Switches 1p 11w 3/11; 2p 11w 6/3; 3p 4w, 4p 2w 3/6; Toggles, SPST 2/-, DPST 2/6.

Transistors Red Spot 48. White Spot 5/-.

Transistor Test Set as previously advertised 37/6 post 1/6.

Instrument Rectifiers Salford 1mA 7/6; 5mA 7/6.

New list available, S.A.E. with enquiries please. Postage extra.

PLANET INSTRUMENT CO.

25 DOMINION AVENUE, LEEDS 7

BENSON'S BETTER BARGAINS

WIRE glass braided, new 10/010, 100 yd. reels;

12/8; or 28/010, 15/-.

POWER UNITS. Input A.C. 115/250 v. Outputs: D.C. 330 v., 100 mA, and 6.3 v. A.C. twice, new (post 3/6), 30/-.

MONITOR 58 Triggered Oscilloscope, comprising Indicator 248 and Power Unit 673. Valves

VCR138A, 3/EP50, 2/EC33, 5/EP55, EF34A, 6V6, 3/EA50 and 2/5U4C, VU120A. Two units

each 12 x 9 x 18in., black finish, 230 v. A.C. input; 18-way cable and mains cable; probe unit

extra, 17/6. £3 10s. (Rail 20/-).

RELAYS (Contactors), two heavy-make contacts: 12 v. or 24 v. either 3/4.

INDICATORS. Type 101, with VCR130 and 2/EB91, 2/EF91, 2/RI10, new (post 3/6), 30/- (post 7/6).

Type 1 with VCR130, 2/RI10, 2/EF91, 5/6JG, 1/6V6, 1/6V5, 2/EB91, 3/EF91, RF 1 L2.

Generator and 28 k.c/s. xtal, 45/- (Rail 7/6).

Type 97 with VCR151, 10 valves, 30/- (Rail 7/6).

HEADPHONES, CLN, 7/6. CR100 Noise Limiter, with valve, 3/6.

VIBRATORS, Mallory 06840 or ST, 12 v. 4-pin, 7/6; 6 v. 5-pin reversible, 7/6.

RI155B, good condition, tested with handbook £7.10.0 (Rail 10/-).

DRIVES: slow-motion Admiralty 200:1 ratio, scaled 0-100, 5/6.

RI185 3 M. "N" type, new, 10/6. VIBRAPAK, 6 v. D.C. to 250 v. 60 mA, smoothed case, 22/6

12 v. to 250 v. 60 mA, 21/- (p.p. 3/6).

DYNAMOTORS (post 3/6): 12 v. to 250 v. 65 mA, 11/6.

6 v. to 250 v., 60 mA, 11/6. Potentiometers, miniature wirewound, 0.1, 10, 100, 600Ω, 1 & 2 k each 1/-.

METAL RECTIFIERS, 240 v. 100mA, 4/-; 240 v. 30mA, 3/6; 600 v. 30mA, 5/6;

240 v. 80 mA, 5/6; 1,000 v. 30 mA, 7/6. Mic. Inserts, G.P.O. carbon, 2/6, bal. armature type, 2/6.

TRANSFORMERS, input 230 v. output 6.3 v. 1.5 A., 6/9; 3 A., 8/8; 1 A., and 3 A., 8/6;

325 v. 20 mA and 6.3 v. 1 A., 8/6. "C" Core input 230 v. Outputs: 265/315 v., 350 mA, and 790/850 v. 480 mA, half-wave (Rail 7/6), 30/-.

Input 110/230 v. Outputs: 315-0-315 v., 60 mA (push), 6.3 v. 1.5 A., and 1 v. 2 A., 25/- (p. 3/6).

COMMAND Receiver (medium wave) 250/1500 k/c/s. New, with 6 valves 97/6; used, 82/6.

Conversion data to Car Radio, with circuit, 1/3.

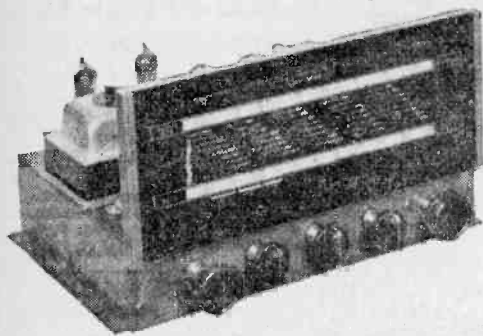
AMPLIFIER 195/215 Mc/s. 29 db gain, with 2/6V8, 1/EP54, with power unit, 45/- (Rail 5/6).

LIST AND ENQUIRIES S.A.E. please. Terms, C.W.O. Postage extra. Immediate dispatch.

Callers and Post: W. A. BENSON (PW), 138 Rathbone Road, Liverpool 15. SEF6853.

Callers: SUPERADIO (Whitechapel) LTD., 118 Whitechapel, Liverpool 2. ROY 1130.

Modernise Your Radiogram with an *Armstrong Chassis*



AF 208 (illustrated)

22 GNS.

5 watts output • Full VHF band (87-108 mc/s) and medium wave • Switched inputs for different crystal pick-ups • Inputs for tape record and playback • Separate bass and treble controls • Dimensions (as for Stereo 44) 12in. x 8in. x 7in. high. • Full instruction booklet free with every model.

STEREO 44

27 GNS.

8 watts output, 4 each channel • Full VHF band and medium wave • Stereo and monaural inputs for all crystal pick-ups, tape record and playback • Separate bass and treble controls • Mullard EL84 output valves • Dual volume control for stereo balance • Full instruction booklet free with every model.

It is not at all difficult to fit a new chassis into an old radiogram or even to build a completely new radiogram into the cabinet of your choice. Why bother? Well, it's less expensive than all but the cheapest commercial radiograms and you get incomparably better quality into the bargain. Aren't those two splendid reasons? It's cheaper AND it's better.

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

Post this coupon or write for descriptive literature or call at our Holloway Showroom for full, unburied demonstration and professional advice on your installation. Open 9-5.30 weekdays and 9-5 Saturdays.

NAME

ADDRESS

PIC

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 Denoc 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), 11, Old Bond Street,
London, W.1.

Please send me FREE and without obligation your 1960 literature.

NAME

ADDRESS

VALVES SAME DAY SERVICE

NEW! TESTED! GUARANTEED!

SETS 1R5, 1R5, 1T4, 3S4, 3V4, DAF91, DF91, DK91, DK92, DL92, DL94, any 4 for 23/6
DAF96, DF96, DK96, DL96 4 for 30/-
8K7G, 8K8G, 8Q7G, 6V6G, 6X5G, or 6Y3G 5 for 27/-

1A7GT 12/-	6L18 12/3	25Z4G 8/-	EBF89 8/9	EZ41 7/8	R19 13/6
1D5 8/-	6LD20 10/-	25Z6GT 9/6	EBL21 20/6	EZ80 6/3	T41 15/6
1H5GT 10/-	6P25 9/-	30C1 7/3	EC92 11/-	EZ81 7/-	U25 13/6
1N5GT 10/-	6Q7G 8/9	30L1 7/9	ECC91 5/9	FW4/500 8/-	U26 11/6
1R5 6/9	6Q7GT 9/6	35L6GT 10/-	ECC92 6/6	G232 9/-	U50 7/6
1S4 9/-	6SL7GT 8/3	35Z4GT 9/-	ECC83 7/-	KT330 7/-	U52 5/3
1S5 5/9	6SN7GT 4/9	35Z6GT 8/6	ECC84 8/9	KT41 14/8	U76 6/-
1T4 4/9	6U4GT 11/-	50CD6G 8/9	ECC85 8/3	KT44 9/-	U78 6/-
1U3 6/6	6V6G 5/-	50L6GT 8/9	ECC86 10/-	KT61 10/-	UABC90 7/9
3A5 10/6	6V8GT 6/6	185BT 25/-	ECC87 10/-	KT63 6/6	UAF42 9/6
3Q4 8/6	6X4 5/-	A231 9/9	ECH21 20/6	KT71 8/6	UBC41 7/9
3S4 6/9	6X5GT 5/6	B36 8/9	ECH35 6/9	MH4 6/-	UBF90 9/6
3V4 7/6	7B7 7/6	CL33 13/-	ECH42 8/9	MU14 7/6	UBF89 8/6
5U4G 5/3	7C5 7/6	DAC32 10/-	ECH81 8/6	MX40 12/6	UBL21 20/6
5V4G 9/6	7C8 7/6	DAF91 5/9	EL84 9/-	N18 8/6	UCH81 8/6
5Y3GT 8/9	7H7 7/6	DAF96 8/9	ECL82 10/-	PCC84 8/9	UCC8 7/6
5Z4G 7/9	787 9/9	DCC90 10/6	EF89 4/6	PCC89 12/-	UCF80 14/-
6AL5 3/9	7Y4 7/-	DF33 10/-	EF41 8/9	PCF80 7/3	UCH21 20/6
6AM6 3/6	10C1 14/6	DF91 4/9	EF12 11/6	PCF82 9/3	UCH42 9/-
6A8 6/-	10C2 17/6	DF93 6/6	EF89 6/6	PCF83 8/6	UCH81 8/6
6A78 7/3	10F1 15/6	DH78 6/6	EF85 6/9	PCL83 14/6	UCL82 10/9
6BA6 6/-	10P13 14/6	DH77 7/3	EF88 10/6	PCL84 8/-	UCL83 13/-
6BE6 6/-	12A8H 10/6	DK32 12/-	EF89 8/-	PEN44 11/-	UF41 8/9
6BH8 5/9	12A17 5/9	DK91 6/9	EF91 24/6	PEN36C 6/6	UF42 7/6
6B78 5/9	12A27 6/6	DK92 8/6	EF92 4/6	PEN45 8/-	UP89 7/-
6BR7 10/-	12AX7 7/9	DK96 7/9	EL33 10/-	PEN46 5/6	UL41 8/-
6BW6 8/6	12BA6 8/-	DL33 9/-	EL38 21/6	PL36 11/8	UL34 8/-
6BW7 6/6	12K7GT 5/6	DL35 10/6	EL41 9/-	PL38 14/6	UR1C 8/-
6CPD6G 22/6	12K8GT 11/6	DL92 6/9	EL42 10/6	PL81 2/6	UY21 11/3
6F1 14/6	12Q7GT 7/6	DL94 7/-	EL84 7/-	PL82 9/6	UY41 6/6
6F9G 6/6	12Z3 5/6	DL86 7/9	EM34 8/6	PL83 8/-	UY85 6/9
6F13 12/6	14S7 16/9	EABC80 7/-	EM80 9/-	PY32 12/-	VP4B 9/6
6F14 17/6	19A45 7/-	EAF42 8/6	EM81 9/-	PY80 7/6	VP41 6/-
6K7G 3/9	30F2 17/6	EB91 3/9	EM84 10/-	PY81 6/9	W76 6/6
6KTGT 6/-	20L1 17/6	EB93 5/-	EY61 9/-	PY82 7/-	W77 4/6
6KBG 10/-	25A8G 10/-	EBC41 8/6	EY86 8/3	PY83 7/9	X76M 11/6
6L1 15/-	25LGT 9/-	EBCF80 8/-	EZ40 6/9	PZ30 17/-	Z77 3/6

READERS RADIO

24 COLBERG PLACE, STAMFORD HILL
LONDON, N.16. STA. 4587

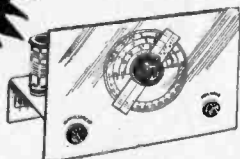
Post 6d. per valve extra.
Any Parcel Insured
Against Damage in
Transit 6d. extra.
Any C.O.D. Parcel 2/6 extra.

CONSTRUCTORS CORNER

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

Explore the world on short-wave radio (10-100 m)

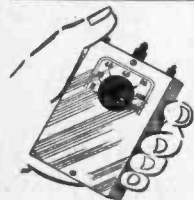
FOR ONLY **35/-**



TRANSISTOR POCKET RADIO

Two-stage circuit using variloopstick coil.

- Ideal for the beginner.
- Can be built in 30 minutes.
- Works for months off 7d. battery.
- Fits into palm of your hand.



The ideal low-cost transistor pocket radio for the beginner.
Send 2/- for data and list of components.

ONLY **30/-**

CRYSTAL RECEIVER

Covers M/W Band

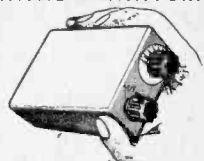
All components including case **12/6** for Ideal for the beginner.

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

ENSURE SUCCESS WITH R.C.S.

SENSATIONAL RESULTS WITH 2 TRANSISTORS

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



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

BUILD THIS AMAZING RADIO

POWERFUL! PERSONAL! PORTABLE!

- ★ Sturdy metal case.
- ★ No holes to drill.
- ★ Detachable rod aerial.
- ★ All batteries self contained.
- ★ Can be built in 1 hour.
- ★ Covers medium waves.
- ★ Loud clear tone.
- ★ Selective tuning.
- ★ All parts are sold separately.

This delightful set is designed to give you a completely personal portable radio.
Bronze-finished case. Ideal for the beach, the bedroom, the office—in fact, anywhere.
Send 2/- for wiring diagram and component price list.



FOR ONLY **35/-**

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

Still available — a comprehensive, practical "basic" course in TV transmission and reception ...

A BEGINNER'S GUIDE TO TELEVISION

by F. J. CAMM. 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.

RES/CAP. BRIDGE

37/-

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. PZ) Raleigh Mews, Raleigh Street, Nottingham

Morse Code operating ...

... as a PROFESSION

45 years of teaching Morse Code is proof of the efficiency of the Candler system. Send 3d. stamp for Payment Plans and full details of all Courses.

CANDLER SYSTEM CO. Dept. 5LO 52b Abingdon Road, London, W.8 Candler System Co., Denver, Colorado, U.S.A.

DO IT YOURSELF

Build your own electronic keyboard and play everything! Send for free leaflet. Guitar, cello, flute and trumpet are all easy. Write now ...

C. & S., 20 Maude Street, Darlington, Co. Durham.

ASTRAL RADIO PRODUCTS

'HOME RADIO.' 32-page illustrated booklet. Simple wiring instructions for Crystal Set, 1, 2, 3 Valves, 2/-, post 3d. TRF COILS, 7/- pr., post 6d. DUAL WAVE HF Coil with REACTION, Specified for 'Summer All Dry Portable'. 'A.C. Double Triode 1' etc., 4/6, post 3d. LFT's Miniature, 1'x1'x2' in cans. Extra high 'Q'. Special offer, 9/-, pr., post 6d. Crystal Set Coils, L. & M.W. 2/6, post 3d. 82 Centurion Road, Brighton

"GLOBE-KING"

WORLD-FAMOUS KITS AND RECEIVERS for the Radio Amateur and S.W. Listener. Catalogue Free, enclose stamp for Postage. Kits from 79/6 at your dealers, or direct from JOHNSONS (RADIO) ST. MARTINS GATE, WORCESTER

TRANSFORMERS

Suppliers to B.B.C., I.T.A. and leading radio manufacturers, single or long runs, prompt delivery home and export

Rewinds to all makes

H. W. FORREST (Transformers) LTD. Shirley, Solihull, Warwickshire Tel. 8Hilley 2483

LOOK! IT'S TRUE

4/- TRANSISTORS 4/-

Red Spot Transistors, 4/- each; White Spots, 4/6 each; Yellow/Green, 5/- each; Red/Yellow, 7/6 each; Crystal Diodes, 1/- each, 3 for 2/6; GEX34-OA70, OA79 or OA81 Diodes, all 4/- each; Crystal Set Coils M & L with Circuit, 2/6; DRR2 Coils with Circuits, 4/- each; Vari-Loopstick Coil MW with Transistor Circuit, 4/6 each; Reaction Condensers, 0.0001, 3/-, 0.0003, 3/9, 0.0005, 4/-, Miniature 0.0005, 4/-; Transistor Holders, 1/3 each. All sent POST FREE in U.K. by:

PETHERICK'S Radio Supplies, 22, High Street, Bideford, N. Devon We stock components by EDDYSTONE, JACKSON BROS., RADIOSPARES, TELETRON, REPANCO, etc., etc.

Premier RADIO

23, TOTTENHAM COURT ROAD, LONDON, W.1.

TEL.: MUSEUM 3451/2



The "Petite" PORTABLE

MAY BE BUILT FOR

£7.0.0 Plus
p. & p. 3/-

BATTERIES EXTRA.
H.T. 10/- (Type B126) or
equivalent L.T. 1/6 (Type
AD35) or equivalent.

★ Size only 8in. x 8in. x 4 1/4in.
★ Instruction book 1/6.

BATTERY ELIMINATOR
housed in two containers
which are approx. the same
size as AD35 and B126
batteries. 37/6, plus 2/- p. & p.
MAY BE CONSTRUCTED.



2-BAND RECEIVER

MAY BE BUILT FOR £5.10.0 plus
3/- packing and postage. This
receiver uses the latest type
circuitry and supplied complete
with easy to follow point-to-
point wiring diagrams, suitable
for use on A.C. mains 200/250 v.
When constructed the Receiver
is housed in an attractive walnut
finished Bakelite Cabinet or if
required, Wooden Walnut Cabinet. Overall dimensions 12 x
6 1/2 x 5 1/2in. Instruction Books available separately. PRICE 1/-.

required, Wooden Walnut Cabinet. Overall dimensions 12 x
6 1/2 x 5 1/2in. Instruction Books available separately. PRICE 1/-.

VISIT

Our new Branch at
309 Edgware Road, W.2.

Telephone PAD 6963

THE "MID-FI"

A NEW DESIGN
4 1/2 WATT AMPLIFIER KIT
MAY BE BUILT FOR 95/- plus 3/-
p. & p.



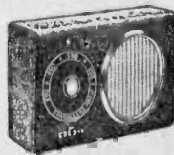
A new circuit for the home con-
structor requiring a good quality
medium powered Amplifier for
reproduction of Records or F.M.
Broadcasts. For use with Loud-
speakers of 3 or 15 ohms impedance.
Technical Specifications: Separate
bass and treble controls. Valve line-
up EF86, EL84, EZ80. Voltage adjustment for A.C. mains from
200-250 volt. Negative feedback. Size 7 x 5 x 2 1/2in., overall height
5in. Silver hammered finish Chassis. Instruction Book 1/-.

THE COSSOR TRANSISTOR

Traveller's Friend

Pocket Receiver may be Built
for £7.19.6. plus 2/- P. & P.

This receiver uses the most up-to-date
printed circuit method and with the
point to point instructions, assembly
is simplicity itself. Four supplied Edi-
son Swan transistors are used, one
XA102, two XA101, one XC101 and
two diodes. The receiver covers 190/559 meters on medium wave
operating on a P.P. 4.9 v. battery. When constructed it is housed
in an attractive beige leather case. Size 5 1/2 x 4 1/4in., weight 17 ozs.
Instruction books available 2/6. Battery 2/-.



JUST RELEASED

REPANCO TRANSISTOR AMPLIFIER AND FEEDER UNIT CIRCUITS

Envelope of theoretical and practical
layout diagrams or:

350/500 milliwatt Transistor Amplifier.

Simple T.R.F. Band Pass Feeder Unit.

Medium wave T.R.F. Feeder Unit with
R.F. Stage.

Medium and Long wave Unit with
R.F. Stage.

Medium and Long wave Superhet
Feeder Unit.

Microphone Pre-amplifier.

Send now 2/- (post free)
for envelope.

RADIO EXPERIMENTAL PRODUCTS LTD.

33 MUCH PARK STREET
COVENTRY

POCKET TRANSISTOR RADIO

All parts, plans and instructions supplied
for 25/-. Limited number available com-
pletely built, tested and guaranteed, with
personal phone and batteries 37/6.

CRYSTAL SET 8/6

All parts plans, instructions, etc.
Send stamp for details of above sets and
lists of

VALVES, BOOKS, SERVICE SHEETS
Transistors: Red Spot 4/-. White Spot 5/-.

HAMILTON RADIO (W)

227 Sedlescombe Road North, Hastings,
SUSSEX

A.R.R.L. Radio Amateurs Handbook. New
Edition 1960, 32/8, Postage 1/6.
Multiband Circuits for Audio Amplifiers. 8/6,
Postage 5/-.
High Fidelity Loudspeaker Enclosures. Sinclair,
5/-, Postage 4d.
Practical Stereo. Sinclair, 5/-, Postage 4d.
Portable Transistor Radio and Radiogram.
2/8, Postage 3d.
Practical Transistor Receivers. Sinclair, 5/-,
Postage 4d.
Transistor Circuits. Gregory, 2/8, Postage 3d.
Servicing Transistor Receivers. Pettit, 8/6,
Postage 5d.
Electronic Novelties. Bradley, 5/-, Postage 5d.
Electronic Gadgets. Bradley, 3/6, Postage 4d.
Radio Control of Models. Sommerhoff, 5/-,
Postage 5d.
Boys Book of Crystal Sets and Simple Circuits.
2/6, Postage 3d.

SELRAY BOOK CO.

60 Hayes Hill, Hayes, Bromley, Kent

IS YOUR T.V. TUBE DIMMING?

YOU CAN EXTEND THE LIFE OF
THAT TUBE AND IMPROVE THE
PICTURE



PRICE 30/-

P.P. & Ins. 2/6
C.W.O. O.O.D.
Satisfaction or money re-
funded within
7 days.

NO SOLDERING • NO
WIRING • JUST PLUG IN • IT'S
AUTOMATIC • IT'S GUARANTEED!
We can offer these units for any make
of set. Important. State name, address,
& make & model no. of set, & tube
in block caps.

SINCLAIR ELECTRONICS,
Dept. P.W., 33, BERWICK ST., W.1.
Callers Welcome — REGent 5520.

LYONS RADIO LTD.

Dept. M.P., 3, GOLDHAWK ROAD,
SHEPHERD'S BUSH, LONDON, W.12

Telephone: SHEpherd's Bush 1729

MORE TRANSFORMER BARGAINS.

Type A/L. Pri. 230 v. 45/85 cycles. Sec.
475/0/475 v. at 500 mA; 450/0/450 v. (One wdg.
tapped at 300 v.) at 60 mA. and 6.3 v. at 0.3 A.
Oiled filled, potted types absolutely as
brand new by famous maker, size only
7 x 6 1/2 x 5 1/4in. PRICE ONLY 32/6, carriage 5/-.
Type M/L. Pri. 180/230 v. 50 cps. Sec. 4.2 v.
twice at 10 A. Ideal as a soil heating trans-
former, etc. PRICE ONLY 17/6, post 3/8.

CRYSTAL MICROPHONES. Brand new
by famous maker. "TIC & MIKE" designed
for high quality recording, broadcasting,
P.A., etc. List price 3 gns. OUR PRICE
ONLY 39/6. HAND or DESK type as
supplied with most modern tape recorders,
List 35/-. OUR PRICE ONLY 27/6. Post. 2/-.

MODULATION INDICATORS. (Ex. Gvt.)

This is a battery operated test set designed
to measure depth of modulation of a signal
between 2.4 to 6.25 Mc/s. Housed in neat
metal cases 11 1/2 x 7 1/2 x 6 1/4in. Fitted with 2 1/2in.
dia. 0/500 micro-ammeter. 1 mA meter
rectifier, valve, etc. These Units should
serve as an excellent basis for a first class
Valve Voltmeter at an exceptionally low
PRICE, only 35/-, post. 3/6.

INVERTERS. Known as Motor Generator
Type 7. Air Min. Ref. 5U 3228. Input 21/24 v.
D.C. Output 80 v. at 1,000 cycles. 240 VA.
Carbon pile V/R and filter unit incorporated.
In good condition, PRICE ONLY 45/-,
carriage 5/-.

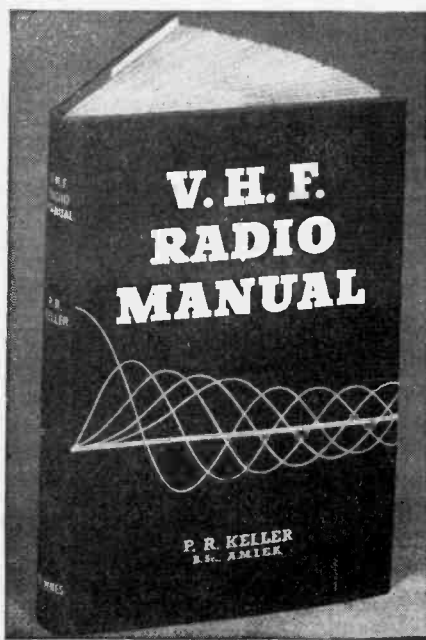
DYNAMOTORS. Type "PC". Input 12 v.
D.C. Output D.C.—275 v. at 110 mA and
500 v. at 50 mA. Overall size approx. 8 x
4 1/2 x 4 1/2in. Condition as new. PRICE ONLY
25/-, post. 3/6.

The book which comprehensively covers the principles and practice involved in the design of V.H.F. Systems . . .

V.H.F. RADIO MANUAL

by P. R. Keller,
B.Sc., A.M.I.E.E.

THE very-high-frequency radio spectrum has in recent years assumed a unique importance in radio and television engineering. This band



194 Illustrations
30s. net

development, maintenance and servicing,
and also to advanced amateur experimenters.

CONTENTS

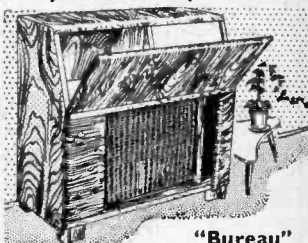
Introduction; Amplification at Very High Frequencies; Modulation; Demodulation; Transmission Lines; Aerials; Propagation; Measurements; F.M. Broadcast Transmitters; F.M. Broadcast Receivers; Television Tuners; Single-Channel Two-way Communication Equipment; Multi-channel Communication Systems; Amateur V.H.F. Equipment; Installation and Servicing

FROM ALL BOOKSELLERS

... or in case of difficulty 31s. 6d. by post from the publishers, GEORGE NEWNES LTD., Tower House, Southampton Street, London, W.C.2.

CABINETS & HI-FI EQUIPMENT

We can supply any Cabinet to your own specification



"Bureau"
£16.16.0

This is only one example taken from our extensive range of stock cabinets. Write for our NEW 24 page fully illustrated catalogue on:
THE LARGEST RANGE OF CABINETS IN THE COUNTRY.

Equipment is also our speciality and we now offer, in a novel book form: A NEW EQUIPMENT COMPARATOR illustrating our range of radio chassis, speakers, tape decks, single players and autochangers.
SEND TODAY for a copy of these two books, which are absolutely FREE.

LEWIS radio

120 (PW660) Green Lanes, Palmers Green
London N.13, BOWES Park 1155/6
(Nr. The Cock Tavern)

12in. SPEAKER AND 5in. TWEETER by leading manufacturer, 75/- This is less than half list price. 3 or 15 ohms.

CUT PRICE TOOLS. 5in. side cutters, 5/-, 5in. plated round nose tapered pliers, 5/-, 7in. flat-nosed tapered pliers, 8/6. Pocket neon testers with retractable screwdriver, 5/-, 7in. combination pliers, 6/-, 8in. Steel Block Planes 14in. blade, 10/6. FULL SIZE H/S CHR/VAN TWIST DRILLS. Sets 7-1/16 to 1/2in. in Wallet, 6/-, Smaller size sets, 4/-.

TRANSFORMERS. 230/50v. 1 a. and 250/25-32 v. 4 a. 22/6 each.

STUDIO 0 CARTRIDGES. 21/-, PAXOLIN PANELS, 12 x 6 x 1/2in., 3/6, PAXOLIN TUBING, 1 1/2 x 3/16 x 72 in., 17/6.

OUR FAMOUS TRANSFORMERS. Input 200/250. Output tapped 3 to 30 v. 2 a. or 5, 11, 17 v. 5 a. Each 24/6.

F.W. METAL RECTIFIERS. 126 volt, 1 a., 7/6; 3 a., 13/-; 4 a., 17/6; 8 a., 27/6.

TOGGLE SWITCHES DPDT. 3/6.

MICRO SWITCHES. Make & Break. 5/6.

MAINS TRANSFORMER & RECTIFIER. Output 12 v. 1 a. D.C. 19/6.

NICKEL NIFE BATTERIES. 1.2 v. 2.5 a. Size 3 x 2 1/2 x 1 1/2in. 6/-, or 3 for 18/-, 4 for 21/-.

ARMY MORSE KEYS, 3/- and 8/6.

RELAYS. We hold large stocks. Any contact combination and operating coil voltage supplied from 3/-.

KEY SWITCHES from 3/-.

6 OR 12 v. RELAYS. With 4 make contacts. 6/-, 2 for 11/6, 3 for 16/-, 4 for 21/-.

VERY POWERFUL GEARED SMALL 12 v. D.C. MOTORS, 3 x 1 1/2in., 16/6.

All items new, guaranteed and post free except where stated.

Lists sent on request. Post orders only to

THE
RADIO & ELECTRICAL MART
29 STATION APPROACH, SUDBURY
TOWN, WEMBLEY, MIDDXX.

THE LINEAR LI/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 pre-amplifier 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., 20-20,000 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

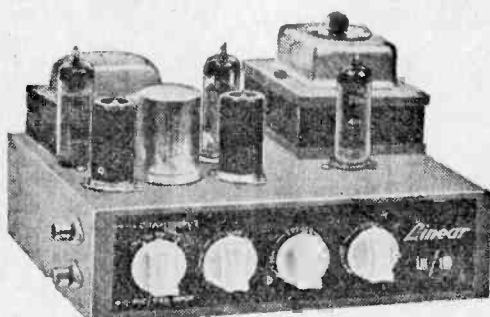
+14 d.b. to -10 d.b. at 50 c.p.s.

HUM LEVEL

Refer 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

speaker and practically any make of deck. Negative feedback equalization adjustment by multi-position switch for 3 $\frac{1}{2}$, 7 $\frac{1}{2}$ and 15in. per set. 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.

L3/3 STEREPHONIC AMPLIFIER. Sensitivity 150 m.v. Output 3 watts on each channel. Retail 7 gns.

L5/5 STEREO AMPLIFIER. 5 + 5 watt. 12 gns.

LINEAR PRODUCTS LTD. ELECTRON WORKS, ARMLEY, LEEDS.

PADGETTS RADIO STORE

40, MEADOW LANE, LEEDS, 11

Tel.: Cleckheaton 2866

TELE-PARTS

We have just dismantled 2000 12in. TV Sets and 500 14in.

12in. chassis with L.O.T. 10/-, carr. 5/- 12in. chassis less L.O.T. 5/-, carr. 4/-

Scan Coils, 5/-, post 2/- Good tubes, 12in., 3mths. guar. 30/-, carr. 7/-

Good tubes but want boost, 10/-, carr. 7/- Good 14in. Rectangle tubes, 3 mths. guar., 22.0.0, carr. 7/-

Speakers, 7 x 4 and 6 x 4, 10/-, post 2/- 8in. and 6in., 6/6, post 2/- All Perfect P.M.

S.A.E. with enquiry please

TV VALVES with a 90 days' guarantee. Set tested. All Post Free.

EF80 2/6, ECL80 4/-, PL81 4/-, PY81 4/-, PY82 4/-, PL82 4/-, PL83 4/-, EL38 5/-, PZ30 5/-, EB91 3/-, EF91 3/-, EL91 3/-, 6V4 3/-, 6HL5 3/-, 6BW6 3/-, 6D3 3/-, 6CD6 3/-, 27SV 5/-, 35 5/-, 10F1 3/-, 20P3 5/- Most types fitted in 9, 10, 12 and 14in. BBC type TV Sets at Low Rate.

Tube Unit BC929A. Complete with a good tube 3BP1 (guaranteed) less Valves, Switch, Motor, and 500 cycle transformer. Store sold, 18/-, carr. 6/-

Indicator Units. Type 116. Complete with VOR97 tube and seven EF50 valves. Good condition. 25/-, carr. 7/6.

Ultra 14in. TV. Models 815 and 815. BBC. ITV. Perfect results and sold with a money back guarantee. £12 only, carr. 17/- Tube in separate carton.

Remote Control Unit for No. 19 Set. Few boxed, two for 20/- less phones and mike, carr. 7/6.

Brand New in crates, 12in. Tubes. Type CV429, 6/- each, carr. 7/6, also brand new 8in. tubes, type CU1397, 4/- each, carr. 7/6.

Brand new crated VOR97 tubes, 10/-, carr. 7/6. Free insurance on tube.

New Coaxial Cable. Best make, 6d. per yd. Post free. 50 yds. for 20/-, 100 yds. for 37/-

WEYRAD

2-wave 6-transistor
PORTABLE RADIO
EASY TO BUILD

Printed Circuit. Push button output

Performance Guaranteed

Equal to ready-made receivers

Do it yourself and save pounds

KIT, with Ediswan transistors

£9.10.0

Construction book with price

list of components, 2/-.

PARK RADIO

Hardwick St., Weymouth

BBC - ITV - F.M. AERIALS

BBC (BAND 1). Telescope loft, 19/6. External, S/D. 26/3.

ITV (BAND 3). 3 Element loft array, 24/-, 5 Element, 32/6. Wall mounting, 3 Element, 33/6. 5 Element, 41/3.

COMBINED BBC + ITV. Loft 1+3 Element, 41/3. 1+5 Element, 48/9.

Wall mounting, 1+3 Element, 56/3. 1+5 Element 63/9. Chimney and mast

mounting units also available.

F.M. (BAND 2). Loft "H", 28/-, 3 Element loft, 52/6. S/D loft, 12/4. External S/D 26/3. State channel when ordering.

C.W.O. or C.O.D. P.P. 2/6. Coaxial cable, 8d. yd. Coaxial plugs, 1/3. Send 6d. stamps for illustrated lists.

K.V.A. ELECTRONICS (Dept. P.W.)

38, Godstone Road, Kenley, Surrey

TRANSISTORS

Red Spots, 4/-; White Spots, 5/-; Yell/GR 5/-; Ediswan XB104, 8/6; XA103 (4 Mc/s), 10/-; XA104 (6/8 Mc/s), 12/-; Mullard OC70, 14/-; OC71, 14/-; OC72, 17/-; OC44, 26/-; OC45, 23/-; OC170 (70 Mc/s), 35/-; Newmarket V15/10P (110 watt power), 17/6; Diodes, 1/- and 2/6; Mullard Diode, 4/-; Transistor Holders, 1/-; Electrolytics (sub. min. 15 v.) 2, 4, 8, 50, 100 uf, 3/- each; Ardente Trans. D239, 8/6; D240, 8/6; D131, 12/6; D132, 12/6; T1079, 12/-; D167, 12/-; Headphones L.R., 8/6; H.R., 17/6; Resistors 10% tol. 6d.; 5% tol. 1/-; Tannoy Mike, 5/-; Desk Mike, 31/6; Balance Inserts (use as earpiece or speaker), 2/6; M.C. Earpiece (use Min. Speaker), 5/-; Vestalite Contact Rectifier 250 v., 60 mA, 7/6; Trans 200/250 v. in, out 250-0-250, 6.3 v., 5 v., 15/-; Phillips Trimmers 30 pl., 1/-; Jack P. and Socket, 2/6; 365 pl. Air Var. (suit T.X.S.), 3/-; 6 v. Vibrator Supply 120 v. 60 mA out, 12/6.

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

Popular Valves

200 TYPES AVAILABLE AT PRICES LESS THAN USUAL. SEND FOR FREE LIST PV2.

J. T. FILMER,

82, DARTFORD RD., DARTFORD, KENT.

Tel.: Dartford 24057.

FREE LISTS

BY RETURN OF POST

VALVES, TUBES, MAINS TRANSFORMERS, QUARTZ CRYSTALS, METERS, TEST UNITS, TRANSISTORS, CHOKES, MINIATURE COMPONENTS, RECTIFIERS, CONTROLS, ETC.

UNBEATABLE VALVE PRICES !

ALL GUARANTEED: SEND FOR FREE COMPLETE LIST OF OVER 600 TYPES. INCLUDES TX, TUBES AND INDUSTRIAL UNITS

0A2 10/-	3V4 7/6	6C5 5/-	6S07 6/-	12SC7 6/-	83 10/-	DL91 7/-	KT66 12/6
0B2 10/-	5V4 10/-	6F6 7/6	6SR7 6/-	12SG7 6/-	807USA 7/6	DK92 7/6	KTW61 6/6
0Z4 5/-	5X4G 10/-	6F8 7/6	6SS7 6/-	12SH7 6/-	AC/SG 10/-	DL94 7/6	KTW63 5/-
1A5 5/-	5Y3GT 6/-	6F12 5/-	6U4 12/6	12SJ7 6/-	AC2PENDD 12/6	DM70 8/6	MVS PEN 10/-
1A7 12/6	5Y4G 10/-	6F32 7/6	6U7 5/-	12SK7 6/-	AC/PEN 10/-	EB91 5/-	MS PEN 10/-
1C5 10/-	5Z3 10/-	6F33 5/-	6V6G 8/6	12SQ7 8/6	AC/VP1 10/-	EBC33 6/6	MU14 7/6
1H5 10/-	5Z4G 8/6	6J5M 5/-	6V6GT 7/6	14S7 14/-	AC/VP2 10/-	EF50 4/-	MX40 10/-
1L4 5/-	5Z4M 10/-	6J7M 7/6	6V6M 10/-	25A6 10/-	AR8 5/-	EL32 5/-	N14 10/-
1L0S 5/-	6A7 9/-	6K7G 5/-	6X4 6/-	25L6 10/-	AL31 10/-	EL33 12/6	PEN4VA 10/-
1LN 5/-	6AB8 10/-	6K7M 7/6	6X5GT 5/-	25Z4 9/-	CL33 12/6	EM34 7/6	PEN25 5/-
1N5 10/-	6AC7 5/-	6K8M 10/-	7A7 9/-	25Z5 9/-	CY1C 10/-	EM80 10/-	PEN46 5/-
1R5 7/-	6AG5 5/-	6L6M 10/-	7D5 10/-	25Z6GT 10/-	DAF91 7/-	EM81 10/-	PP36 10/-
1S4 7/-	6AK5 6/-	6Q7G 7/6	7D5 10/-	28D7 4/-	DC92 9/-	EM85 11/-	PPX25 12/6
1S5 6/6	6AL5 5/-	6R7 6/-	7S7 9/-	35Z5 8/6	DF91 7/-	FC4 10/-	Q21 5/-
1T4 6/-	6AM5 5/-	6SA7 6/-	7Y4 7/-	42 7/6	DH63 7/6	FW4/800 10/-	Q25 6/6
3A4 7/-	6AM6 5/-	6SC7GT 7/6	9D6 5/-	43 10/-	DK32 12/6	GZ32 10/-	SP4 10/-
3A5 9/-	6B8C 4/6	6SG7 6/6	12AH7 6/-	50B5 10/-	DK43 10/-	GZ34 11/-	TDD4 10/-
3D6 4/6	6BR7 12/6	6SH7 5/-	12AU5 9/-	50C5 10/-	DK45 10/-	HL23/DD 6/6	U50 6/-
3Q4 7/6	6BW6 8/6	6S17 6/-	12BE6 10/-	75 10/-	DK91 7/-	KT33C 8/6	UCH42 10/-
3Q5 9/-	6C4 5/-	6SK7 6/-	12I7 10/-	80 8/6			
3S4 7/-	6D6 6/6	6SL7 6/-	12K8 10/-	83V 10/-			

Special reductions for sets of valves. Send for free list. P.P. 6d. per valve. Orders above £3 post free. C.O.D. or C.W.O.

TRANSISTORS

FREE COMPLETE LIST AND DATA ON REQUEST. FULLY GUARANTEED EDISWAN

XA131 250 Mc/s. Ideal for F.M.	35/- ea.
XC121 400mV Push-Pull Pairs	34/- pr.
XC101 325mV in Push-Pull	32/- pr.
XA104 6 Mc/s osc/mixer, R.F.	18/- ea.
XA103 4 Mc/s R.F., I.F. amp.	15/- ea.
XB104 Audio Output Driver	10/- ea.
XB104 Pairs, 250mV Output	20/- pr.
XA102 9 Mc/s osc/mixer, R.F.	26/- ea.
XA101 5 Mc/s, R.F., I.F. amp.	23/- ea.
XC131 Matched prs., 500mV	34/- pr.

SEMICONDUCTORS

SB078 20 Mc/s Short Wave, R.F.	10/- ea.
SB305 25 Mc/s Radio Control	15/- ea.
SB231 30 Mc/s Radio Control	22/6 ea.
SB231R 35 Mc/s, H.F. osc/mixer	30/- ea.

Above are direct equivalents of SB344; SB100; SB101, etc.

MULLARD

OC72 Power Driver	16/- ea.
OC45 6 Mc/s, R.F., I.F.	18/6 ea.
OC71 Audio Driver	10/- ea.
OC72 400mV Push-Pull Pairs	30/- pr.
OC170 70 Mc/s Short Wave	35/- ea.
OC139 N.P.N. 4 Mc/s	66/- ea.
OC140 N.P.N. 6 Mc/s	72/- ea.
OC16 Power Output	54/- ea.
OC76 R.C. Switching	15/- ea.

SURPLUS

Red Spot Audio Driver	5/- ea.
White Spot R.F., I.F., amp.	7/6 ea.
Photo-Transistor (General)	10/- ea.

NEWMARKET

V15/10P Power Output, 2 watt	15/- ea.
V15/20P High Gain Power	39/- ea.
V15/10P Up to 10 watt pairs	30/- pr.
V15/20P Intermediate Power	25/- ea.
V30/30P High Gain Power	57/- ea.

Largest Range in the Country

Transistor Reductions when purchased in sets. Send for New List.

WE ARE ABLE TO SUPPLY MOST OF THE COMPONENTS USED ON CIRCUITS PUBLISHED IN THIS AND OTHER MAGAZINES AND BOOKLETS. WHERE THE EXACT ITEM IS NOT AVAILABLE WE CAN RECOMMEND A SUITABLE SUBSTITUTE.

TRADE INQUIRIES INVITED ON ALL ITEMS AND DO-IT-YOURSELF UNITS

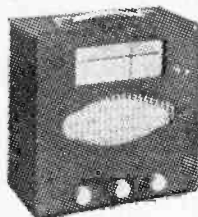
8-IN. R.C.A. SPEAKER

Complete in Black Crackle Case. 3 ohms High-Flux Speaker, 45/- P.P. 2/6.

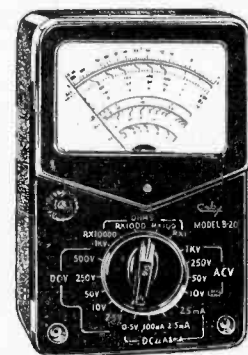
SUB-MIN. TRANSISTOR CONDENSERS

2mfd 1½VW: 4mfd 6VW, 2/- ea. 2mfd 9VW: 8mfd: 10mfd: 6mfd: 50mfd, 2/3 ea. 500mfd 6VW, 1/6: 500mfd 25VW, 3/-

Complete list by return of post.



Chassis Size 10 x 10 x 4in.



CRYSTAL MICROPHONES AND INSERTS

ACOS AND OTHER WELL-KNOWN MAKES. BRAND NEW.

2in. Square...	3/6
1½in. Square...	7/6
1in. Round...	7/6
1in. Round...	8/6
1in. Round Acos 19-4	14/-
2in. Round Acos 6-9	12/6

All guaranteed. P.P. 6d. any type. Acos 39-1 Stick Mic. 39/6, P.P. 1/6 Acos 40 Desk Mic. 25/-, P.P. 1/6

SHORT-WAVE RADIO

- ★ 3 Wavebands (10 to 550 metres)—450 kc/s to 2 Mc/s, 3 to 11 Mc/s, 11 Mc/s to 30 Mc/s.
- ★ 5-valve Marconi Superhet.
- ★ A.C./D.C. 200 to 250 v. mains.
- ★ 7 x 4in. Speaker, ★ Gram. input.
- ★ Slow-motion Drive. ★ Frame Aerial.

NOW £6.15.6 P.P. 3/6. Inc. Speaker. OR COMPLETE IN PORTABLE CABINET, £7.12.6, P.P. 4/-

- ★ ALTERNATIVE MODEL: MEDIUM, LONG AND SHORT. IDEAL GRAM CHASSIS.

— THE WORLD IN YOUR HOME —

BRAND NEW "POCKET TESTMETERS"

Ideal for Radio, TV Servicing, Amplifier, Equipment Testing and all Transistor work. Use them for checking: car electrical wiring, household wiring, batteries, model railways, etc.

— FULLY GUARANTEED —

TWO MODELS AVAILABLE

A-10: 500 micro-amp movement: 2,000 ohms/volt. General purpose Testmeter, 15 different scale readings, size 5½ x 3½ x 1½in. Weight 17oz. Price including test leads. Full instructions and built-in long life batteries. £4.17.6 P.P. 1/6

B-20: 100 micro-amp movement: 10,000 ohms/volt. More sensitive than A-10; 20 different scales. Size 5½ x 3½ x 2½in. Weight 24oz. PRICE INCLUDING TEST LEADS, INSTRUCTIONS AND BATTERIES £6.10.0 P.P. 2/-

HENRY'S (RADIO) LTD.

Opposite Edgware Road Tube Station, PADDINGTON 1008/9.

5 HARROW ROAD, EDGWARE ROAD, PADDINGTON, LONDON W.2

OPEN MONDAY to SAT. 9-6. THURS. 1 o'clock.

SEE BACK PAGE

Practical Wireless

BLUEPRINT

SERVICE

ALL OF these blueprints are drawn full-size and although the issues containing descriptions of these sets are now out of print, an asterisk in the list below denotes that constructional details are available free with the blueprint.

The index letters which precede the Blueprint Number indicate the periodical in which the description appeared. Thus PW refers to PRACTICAL WIRELESS; AW to *Amateur Wireless* and WM to *Wireless Magazine*.

Send (preferably) a postal order to cover the cost of the Blueprint (stamps over 6d. unacceptable) to

PRACTICAL WIRELESS, Blueprint Dept., George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2.

SPECIAL NOTE

THE following blueprints include some pre-war designs and are kept in circulation for those constructors who wish to make use of old components which they may have in their spares box. The majority of the components for these receivers are no longer stocked by retailers.

Title	Number	Price
CRYSTAL SETS		
Junior Crystal Set	PW94*	2/-
Dual-wave Crystal Diode	PW95*	2/6

STRAIGHT SETS		
Battery Operated		
Modern One-valver	PW96*	2/6
All-dry Three	PW97*	3/6
Modern Two-valver	PW98*	3/6

SUPERHETS		
Mains Operated		
A.C. Band-pass Three	PW99*	4/-
A.C. Coronet-4	PW100*	4/-
A.C./D.C. Coronet	PW101*	4/-

MISCELLANEOUS		
The PW 3-speed Autogram	—*	8/-
The PW Monophonic Electronic Organ	—	8/-

TELEVISION		
The PT Band III Converter	—*	1/6

Title	Number	Price
A.C. Fury Four	PW20*	2/6
Experimenter's Short Wave	PW30a*	2/6
Midget Short Wave Two	PW38a*	2/6
Band-Spread Three (Battery)	PW68*	2/6
Crystal Receiver	PW71*	2/-
Signet Two (Battery)	PW76*	2/6
Simple S.W. One-valver	PW88*	2/6
Pyramid One-valver	PW93*	2/6
BBC Special One-valver	AW387*	2/6
Short-Wave Two	AW429*	2/6
Short-Wave World Beater	AW436*	3/6

Standard Four Valve S.W.	WM383*	3/6
Enthusiast's Power Amplifier	WM387*	3/6
Standard Four Valve	WM391*	3/6
Listener's 5-Watt Amplifier	WM392*	3/6

TELEVISION

Argus Television Receiver	—*	3/-
Simplex Television Receiver	—*	3/6

QUERY COUPON

This coupon is available until 7th June, 1960 and must accompany all queries in accordance with the notice on our "Open to Discussion" page.

PRACTICAL WIRELESS, JUNE, 1960

Just right for a day's outing

"CONTINENTAL-6" Combined Portable/Car Radio

MEDIUM AND LONG WAVE FULL TUNING

- ★ Plessey Printed Circuit
- ★ 6 Top Grade Ediswan Transistors
- ★ 5" High Fidelity Speaker
- ★ 400mW Push-Pull Output
- ★ Internal Ferrite Aerial
- ★ Slow Motion Tuning
- ★ Full instructions
- ★ Printed Circuit marked with Component Numbers
- ★ Double Tuned I.F.s
- ★ All Components Guaranteed

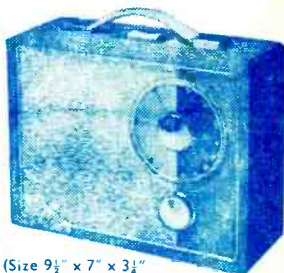
All components available separately.
Send for descriptive leaflet and prices.
CALL FOR DEMONSTRATION

Total Cost of all Components

£11.10.0 p.p. 3/6

including Cabinet, Battery,
Transistors, Car Radio, AVC
and all necessary items.

A highly sensitive and selective portable fully tunable on medium and long waves. Performs equally well as a car radio. Low running costs, good looks and care of construction combine to produce a radio equal to commercial receivers in the 20 gns. class.



(Size 9½" x 7" x 3½"
Weight 4 lbs.)

For Style, Quality
Performance and
Value for Money

All Components for the Popular **"TRANSISTOR 8"** £10.19.6 P.P. 2/6. **FREE BOOKLET**

NO EXTERNAL AERIAL OR EARTH — NO REACTION CONTROLS

MAJOR-2

(Two-transistor Pocket Radio)



69/6 TOTAL COST
P.P. 1/6

ILLUSTRATED BOOKLET FREE: All components sold separately. Ideal for Beginner.
GOOD RECEPTION ANYWHERE!

- ★ 4-stage reflex!
- ★ Medium wave: tunable!
- ★ Very sensitive!
- ★ No aerial or earth!
- ★ Complete layout!
- ★ Over 6 months on one battery.
- ★ 4½ x 3 x 1½ in.
- ★ Weight only 4 ozs.
- ★ Personal 'phone.

MAJOR-3

(THREE TRANSISTOR POCKET RADIO)



(As Described in "R.C." Sept. '59)

TOTAL 87/6 P.P. 1/6 NEW BOOKLET FREE
COST
FANTASTIC OUTPUT, TERRIFIC RECEPTION. GUARANTEED ANYWHERE.

- ★ 5-stage Reflex Circuit.
- ★ No Aerial or Earth.
- ★ Min. Volume Control.
- ★ 3 Ediswan Transistors.
- ★ Medium Wave Tuning.
- ★ Size 4½ x 3 x 1½ in.
- ★ Personal 'phone.

RED-SPOT

TRANSISTORS

5/- EACH

WHITE SPOT

7/6

NEW FREE LIST
ON REQUEST
Fully Guaranteed
(See complete list)

SPECIAL OFFER—LIMITED PERIOD

The TELETRON "TRANSIDYNE" 6-TRANSISTOR SUPERHET



6½ x 3½ x 1½ in.

- ★ Medium and Long Waves.
- ★ 2½ in. Rola Speaker.
- ★ All Ediswan transistors.
- ★ Marked printed circuit.
- ★ Illustrated instructions.

Includes cabinet, battery, transistors, etc.
FREE LEAFLET, BOOKLET 1/- POST FREE

NOW ONLY

£9.10.0

P.P. 2/-

Special Offer of MERCURY Batteries

1.3 volts, 500 mA/H
Size ½ in. diam. x ½ in. length.
ONLY 1/3 ea. P.P. 3d. ea.
or 12/- dozen. P.P. 9d.
IDEAL FOR ALL TRANSISTOR WORK

TELESCOPIC CHROME AERIALS

7-Sections, 3ft. 6ins. open; 6ins. closed. Ideal for Portable Receivers, Walkie-talkies, Radio Control, etc. 12/6, P.P. 1/-.

250mW POWER STAGE

2-Transistor Push-Pull Amplifier for use with Major 2 or 3 or Similar. All parts with 3-inch Speaker, etc. 59/6, P.P. 1/6.

RF, IF, OSCILLATOR

Harmonic Output 450 Kc/s. to 3 Mc/s. or more. Ideal for Radio Testing, etc. All components, 25/-, P.P. 1/-.

"PRACTICAL TRANSISTOR CIRCUITS"

14 Circuits for the Home Constructor, including data, prices and information. 1st Edition, 2/-, post free.

RF, IF, AUDIO SIGNAL TRACER

2-Transistor Unit. Size 4½ x 3 x 1½ in. Headphone output. 37/6, P.P. 1/6 or 32/6, P.P. 1/6 Less Phones.

2-WATT POWER STAGE

For use with "Continental". Works from 12-volt supply. Overall size 4½ x 3½ x 2½ in. All parts with Power transistor, less speaker, 52/6, P.P. 2/-.

All Sizes of Speakers in Stock

SEE OTHER
ADVT. INSIDE

HENRY'S (RADIO) LTD.

5 HARROW ROAD, EDGWARE ROAD,
PADDDINGTON, LONDON W.2

Opposite Edgware Road Tube Station. PADddington 1008/9 OPEN MONDAY to SAT. 9-6, THURS. 1 o'clock