

E K C O S E R V I C E M A N U A L

MODEL A242 is a five-valve (including rectifier) superheterodyne receiver for free tuning over a wide range of frequencies on the SW and MW bands.

Features include concentric type controls, bandspread tuning on three of the four SW bands, and provision for the connection of a high output pick-up and extension loud-speaker.

The receiver is fully tropicalised and operates from A.C. mains only.

MAINS SUPPLY :

100-150 volts, 200-250 volts, 40-100 c/s.

MAINS CONSUMPTION :

430 mA at 115 volts input, 240 mA at 210 volts input.

WAVEBAND COVERAGE :

Band 1 SW (bandspread) 22.1—15.8 Mc/s.
13.6—18.9 metres.

Band 2 SW (bandspread) 15.8—11.5 Mc/s.
18.9—26.0 metres.

Band 3 SW (bandspread) 11.1—7.6 Mc/s.
27.0—39.5 metres.

Band 4 SW 7.6—2.5 Mc/s. 39.5—120 metres.

Band 5 MW 1600—525 Kc/s. 187.5—571 metres.

CONTROLS :

The four operating controls are positioned to each side of the front of the chassis, and appear as two pairs of concentric control knobs functioning as follows:

Left side, inner: VOLUME ON/OFF.
outer: TONE.

Right side, inner: WAVEBAND SELECTOR.
outer: TUNING.

VALVES : All Mullard manufacture.

VI—UCH42, Frequency Changer.
V2—UF41, IF Amplifier.
V3—UBC41, Demodulator, AVC, AF Amplifier.
V4—UL41, AF Amplifier.
V5—UY41, Half-wave Rectifier.

PILOT LAMP : 6.5 volts, 300 mA MES.

OUTPUT : 2.5 watts.

LOUD-SPEAKER IMPEDANCE : 3 ohms at 400 c/s.

PICK-UP :

Provision is made for the connection of a high impedance pick-up of the crystal or ceramic type, to sockets at the rear of the chassis.

INTERMEDIATE FREQUENCY : 460 Kc/s.

CIRCUIT DETAILS :

Frequency Changer

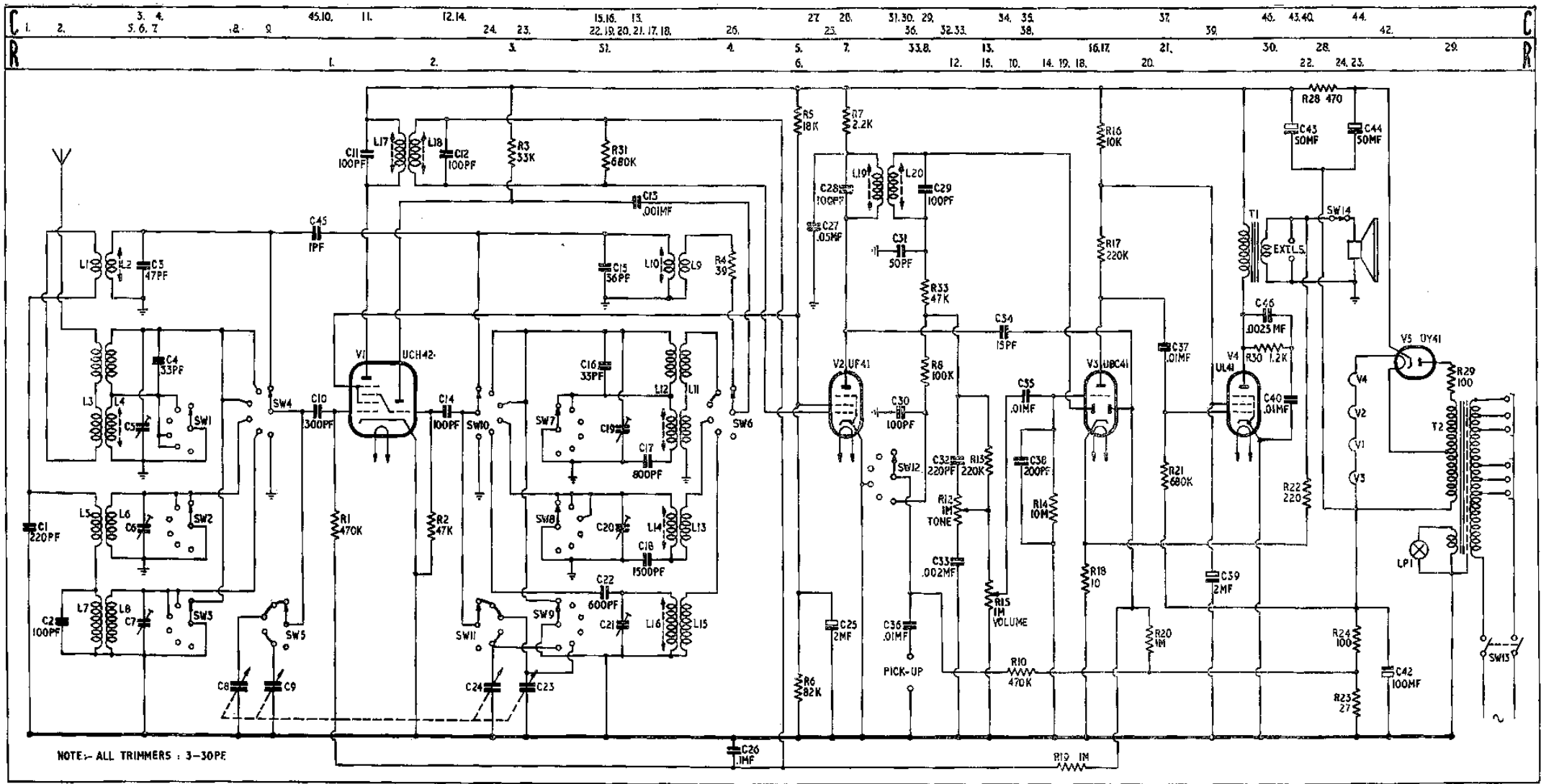
Input signals pass via the appropriate aerial coil, selector switch SW4 and C10 to the control grid of a triode-hexode frequency changer V1. The Shortwave 1, 4 and M.W. bands have individual core or trimmer tuned circuits, but for Shortwave 2 and 3 a common coil assembly with a tapped secondary is used. L4 is core tuned for Shortwave 3, whilst the upper section only, shunted by C4, is tuned by C5 for Shortwave 2. To prevent absorption on the selected waveband, the secondary windings of certain unused bands are short-circuited to earth by one or more of the switches SW1, SW2 and SW3. The two signal sections of the ganged tuning capacitor are separately connected to V1 grid circuit by the switch SW5, which selects C8 for tuning the three higher frequency bands Shortwave 1, 2 and 3, or C9 for tuning Shortwave 4 and MW Bands.

In the oscillator circuit are conventional parallel fed H.F. transformers covering the five wavebands. The secondary coil is selected on each band by SW10 and coupled to the triode grid by C14, and the primary by SW6 and C13 to the triode anode. As in the signal section, some secondary windings are shorted to earth by switches SW7, SW8 and SW9, to prevent absorption. The oscillator coils are arranged in the same manner as the aerial coils, with individual tuned circuits for Shortwave 1, 4 and MW, and a common coil assembly with a tapped grid winding for Shortwave 2 and 3. The two oscillator sections of the tuning capacitor are separately connected in circuit by SW11, which selects C23 for tuning the Shortwave bands 1, 2 and 3, or C24 for tuning Shortwave 4 and MW bands.

IF, Detector and AF Stages

The oscillator and aerial signals combine to form an IF signal at the anode of V1. From this point, the signal is fed via the 1st IF transformer L17.L18 to the grid of V2 for amplification.

From the anode of V2, the signal is passed via a further IF transformer L19.L20 to one diode of V3 for demodulation.



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The rectified AF component is developed across the diode load R33.R13 and R15, and fed via C35 to the triode section of V3 for AF amplification, the output from this triode being resistance/capacity coupled to the output stage V4 for final amplification.

Negative feedback is provided from the output circuit of V4, being taken from the speaker transformer secondary and fed back to the cathode of V3 via R22.R18.

AVC.

AVC voltage is developed by coupling a small part of the signal from V2 anode by C34 to the second diode of V3, which is held at a pre-determined level by bias derived from R23.

Signal voltages above this level are rectified and fed back, as negative bias, to the control grids of V1.V2. via a filter network R19.C26.

Bias

Bias is obtained from two resistors R23.R24, included in the HT return circuit to develop two levels of potential negative to chassis, for use as bias to V4, as delay voltage for the AVC diode of V3, and as a cut-off bias for V3 signal diode when on gram.

Grid leak bias is used for V3 triode, being obtained from the resistor R14.

Tone Circuit

The tone correction circuit which consists of C32.R12.C33 in series, is connected across the volume control circuit to enable the AF response to be varied as desired.

Gram Operation

Changeover from radio to gram is effected automatically when the waveband switch is turned to 'Gram.' A pick-up output is applied to sockets at the rear of the chassis which are connected between chassis and the AF feed via a compensating network C36.C30 and R8. The input circuit is designed for pickups with high outputs, such as the crystal or ceramic types.

Power Supply

The secondary circuit of the mains transformer T2 is unconventional in that the tapped winding provides (a) high AC voltage for the anode of a half-wave rectifier V5, and (b) current for the heaters of all five valves connected in series.

A low voltage secondary winding is also provided to supply the pilot lamp.

The DC output from V5 is smoothed by R28 in conjunction with C43 and C44 to supply the main HT line.

DRIVE CORD/WIRE FITTING : Before fitting new cord, it should be stretched for about 24 hours to prevent slack drive developing after short use.

Suggested method: Suspend a length of new cord and to the bottom end hang a weight of 14 lbs. (6 Kgm.).

The method of fitting the cord and wire is shown in the diagram, which gives the relative positions with the tuning capacitor fully closed (tuning control fully clockwise). Cord and wire should be joined with a small but firm knot, then clip the free loop of the wire over the hook in the drive wheel. Follow the diagram for laying in the wire and cord, maintaining a slight tension to prevent kinks and slackness. Finish off by pulling the free end of the cord so that the spring expands about three eighths of an inch (1 cm.) then tie off.

A replacement wire length with ready made loops is available (See Spare Parts List). Cord length 23 ins. (58.5 cm.). Wire length 22 $\frac{5}{8}$ ins. (57.5 cm.).

CURSOR SETTING:

With the tuning capacitors fully closed, the pointer should coincide with the datum marks at the right hand end of the scale.

If an error exists, slide the cursor along the drive cord as necessary.

CHASSIS REMOVAL : Pull off the control knobs and remove the back cover. Unclip the pilot lamp holder from the baffle clip. Remove the four screws in the cabinet base. The chassis can then be withdrawn to the extent of the loud-speaker leads. Re-assemble in reverse order.

NOTE:—If the chassis is to be tested, insulate the lamp holder from chassis.

ALIGNMENT :

Connect an output meter, or low range A.C. voltmeter across the LS terminals, leaving SW14 closed.

I.F. Alignment

Switch to MW, tune to 525 Kc/s and inject 460 Kc/s. (Mod. 30% at 400 c/s.) via a 0.1 mfd capacitor to the signal grid (pin 6) of V1. Set the volume control for a suitable output level.

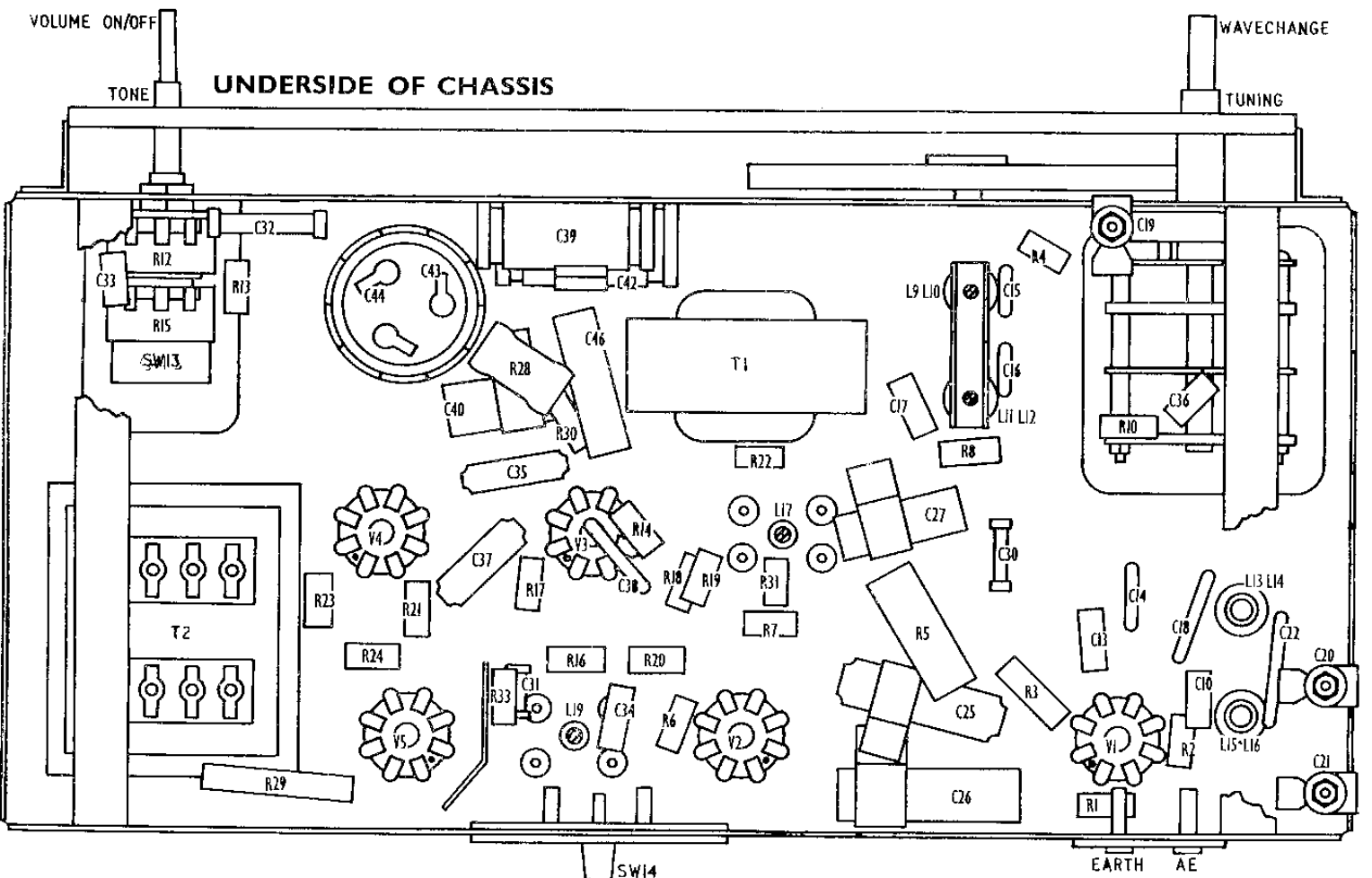
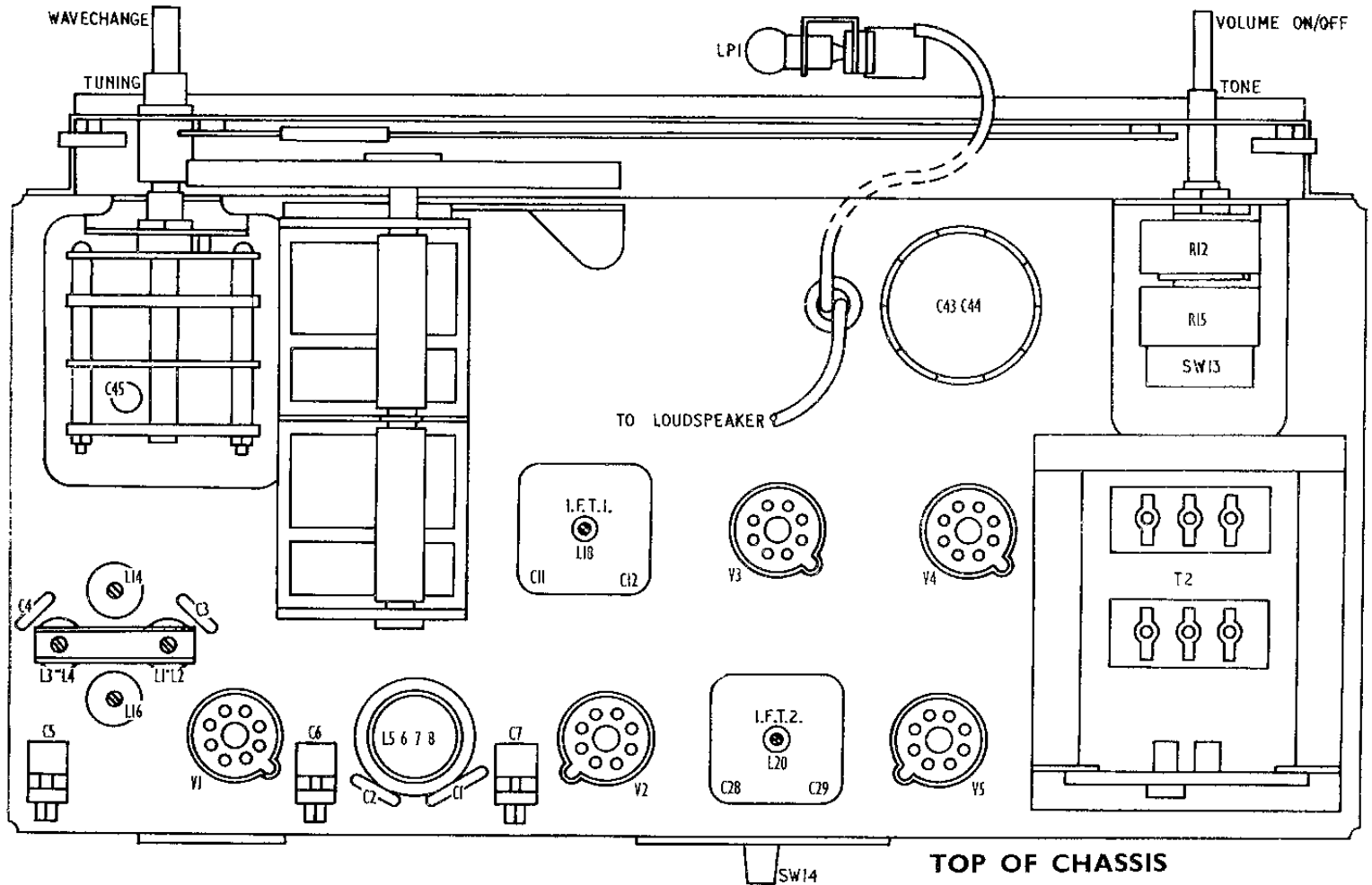
Adjust cores of L20.L19.L18 and L17 in that order, for maximum response.

Check for symmetry and centre frequency, re-adjusting slightly if necessary.

Tolerance for symmetry and centre frequency is ± 0.5 Kc/s.

RF Alignment

All inputs to be modulated 30% at 400 c/s and injected via a standard dummy areal to the A.E. sockets of the receiver.



Switch to MW

Tune to and inject 1300 Kc/s, then adjust oscillator trimmer C21 for calibration and aerial trimmer C7 for maximum response.

Tune to and inject 600 Kc/s, and adjust core of L16 for calibration.

Inject 850 Kc/s, check calibration and tracking.

Switch to SW (band 4)

Tune to and inject 6.0 Mc/s, then adjust oscillator trimmer C20 for calibration and aerial trimmer C6 for maximum response.

Tune to and inject 3.0 Mc/s. and adjust core of L14 for calibration.

Inject 4.0 Mc/s, check calibration and tracking.

Note : The sequence of the following alignment instructions must be adhered to, since certain capacitors and inductances are common to Bands 2 and 3.

Switch to SW (band 2)

Tune to and inject 15.0 Mc/s. then adjust oscillator trimmer C19 for calibration and aerial trimmer C5 for maximum response.

Switch to SW (band 3)

Tune to and inject 9.0 Mc/s., then adjust core of L12 (lower half) for calibration. Tune to and inject 10.5 Mc/s. then adjust core of L4 for maximum response.

Repeat SW2 alignment, then check calibration and tracking at 12 Mc/s. Repeat SW3 alignment then check calibration and tracking at 10.5 Mc/s.

Switch to SW (band 1)

Tune to and inject 17.0 Mc/s., then adjust core of L10 for calibration and core of L2 for maximum response. Check calibration and tracking at 21.5 Mc/s.

Calibration Errors

Bands 1, 2 and 3 (SW), not more than $\frac{3}{16}$ " (5 m.m.).
Bands 4 SW and MW, not more than $\frac{1}{16}$ " (1.5 m.m.).

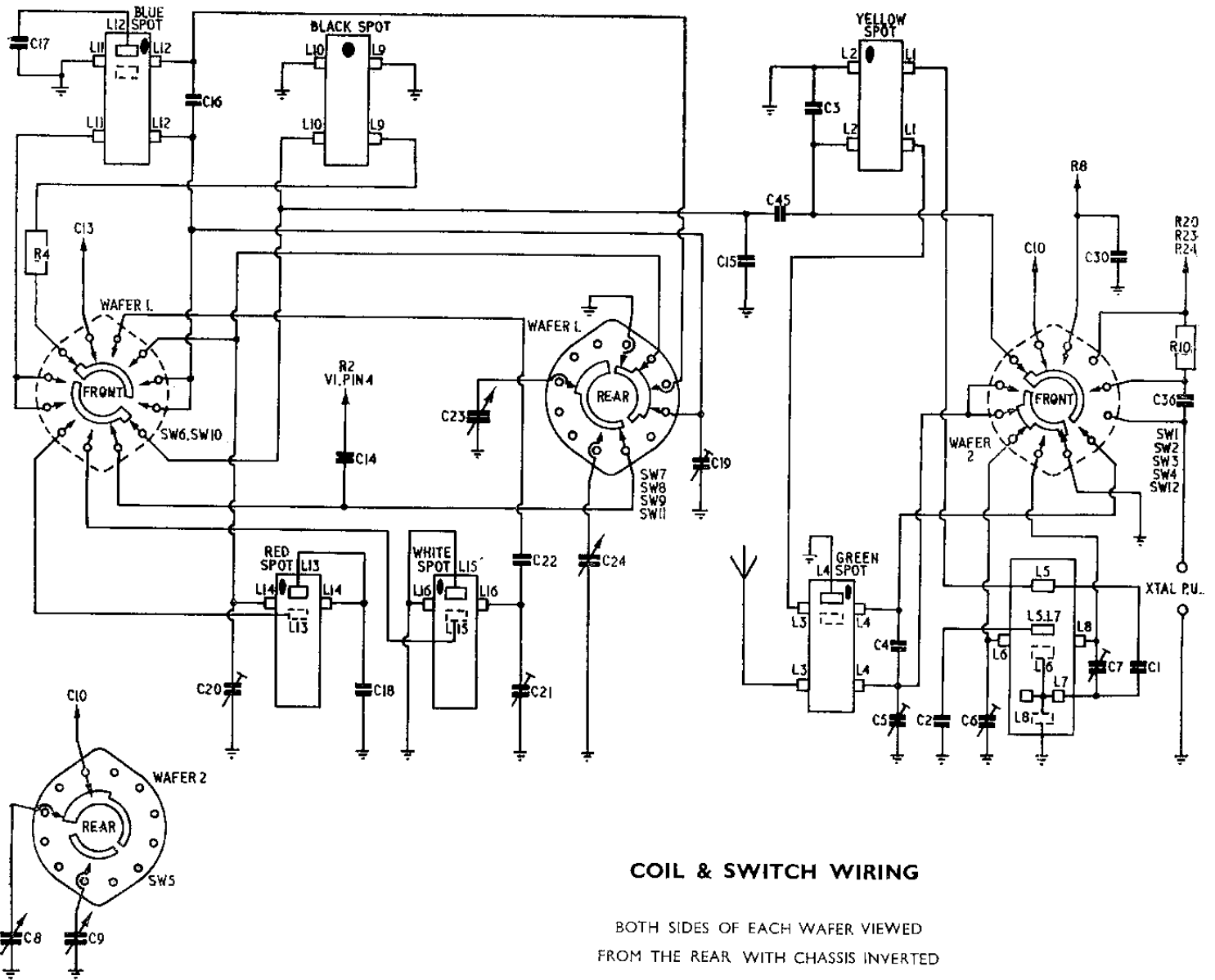
VOLTAGE AND CURRENT DATA

Valve	Type	Anode		Screen		Cathode	
		V	mA	V	mA	V	mA
V1	UCH42	190	2.7	86	3.9	—	} 10.1
V1 (Osc.)		78	3.5	—	—	—	
V2	UF41	180	4.3	86	1.2	—	5.7
V3	UBC41	62	0.4	—	—	—	0.4
V4	UL41	175	38	135	6.3	—	44.3
V5	UY41	234(RMS)	85	—	—	225	60

OTHER MEASUREMENTS :

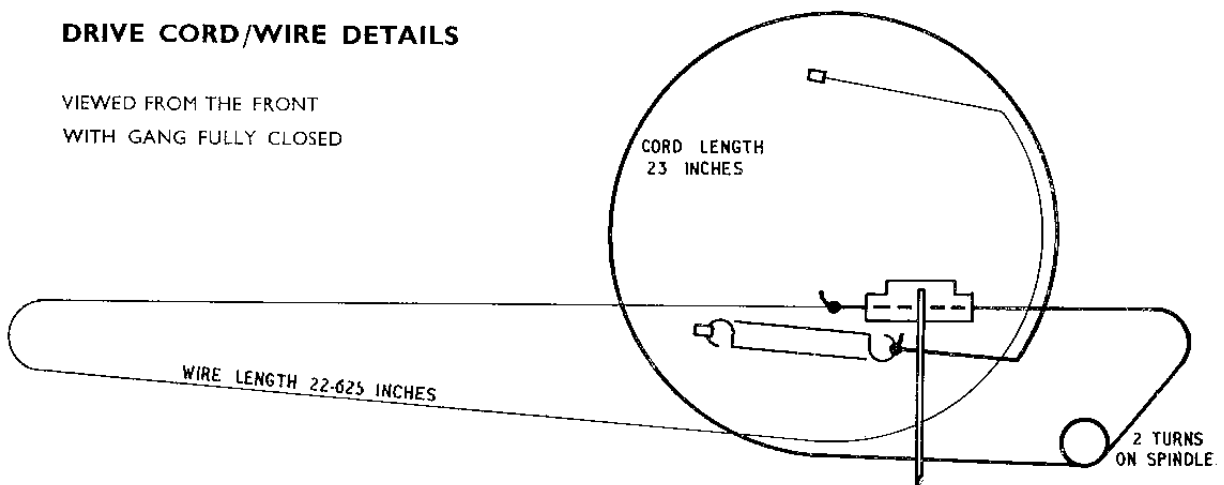
HT unsmoothed, to chassis	...	...	225V
HT smoothed, to chassis	...	...	195V
Heater volts (total)	...	...	112V
Bias voltage (total)	...	...	7.6V
Bias voltage (tap)	...	...	1.7V
Screen pot. current on V1.V2	...	...	1.15 mA
Total HT current	...	...	60 mA
Scale lamp voltage	...	...	5.8V

All readings are taken with an AVO meter model 8 with the receiver tuned to 1 Mc/s. (no signal input) and the volume control at minimum. 240V 50 c/s AC input to 230/250 volts tapping.



DRIVE CORD/WIRE DETAILS

VIEWED FROM THE FRONT WITH GANG FULLY CLOSED



VALVE BASE DATA

<i>Valve</i>	<i>Pins</i>								<i>Base</i>
	1	2	3	4	5	6	7	8	
V1 UCH42	H	A	At	Gt	G2.G4	G1	K	H	B8A
V2 UF41	H	A	—	—	G2	G1	K	H	B8A
V3 UBC41	H	A	G	I.S.	D2	D1	K	H	B8A
V4 UL41	H	A	K.G3	—	G2	G1	K.G3	H	B8A
V5 UY41	H	A	—	—	—	—	K	H	B8A

D.C. RESISTANCE OF WINDINGS

<i>Component</i>	<i>Ohms</i>
L5	5.66
L6	1.05
L7	23.4
L8	3.65
L15	1.01
L16	3.41
L17	11.5
L18	11.5

<i>Component</i>	<i>Ohms</i>
L19	11.5
L20	11.5
T1 Pri.	380
T1 Sec.	0.25
T2 Pri.	35.2
T2 HT Sec.	35 + 93
T2 LT Sec.	1.52

*All other windings are less than
1 ohm.*

SPARE PARTS LIST

RESISTORS

<i>Circuit Ref.</i>	<i>Ohms</i>	<i>Tolerance %</i>	<i>Type</i>	<i>Part No.</i>
R1.10	470K	20	RMA9	93029
R2.33	47K	20	RMA9	93023
R3	33K	10	RMA8	94080
R4	39	20	RMA9	93369
R5	18K	10	RMA10	96340B
R6	82K	10	RMA9	93085
R7	2.2K	20	RMA9	93015
R8	100K	20	RMA9	93025
R12.15	1M	—	Tone & Volume	C49750
R13.17	220K	20	RMA9	93027
R14	10M	20	RMA9	93037
R16	10K	20	RMA9	93019
R18	10	20	RMA9	93001
R19.20	1M	20	RMA9	93031
R21.31	680K	20	RMA9	93030
R22	220	20	RMA9	93009
R23	27	10	RMA9	93043
R24	100	10	RMA9	93050
R28	470	10	Welwyn	33742/10
R29	100	5	Welwyn	33742/6
R30	1.2K	20	RMA8	94063

CAPACITORS

<i>Circuit Ref.</i>	<i>Capacity</i>	<i>Tolerance %</i>	<i>Type</i>	<i>Part No.</i>
C1	220pf	10	PSM	51978
C2.14	100pf	10	PSM	51834
C3	47pf	2	PSM	52490
C4.16	33pf	1pf	PSM	52556
C5.6.7.19.20.21	3-30pf	—	Trimmer	48247
C8.9.23.24	—	—	Tuning Capacitor	D49858
C10	300pf	10	MM	50030
C11.12.28.29	100pf	2	PSM	44922
C13	.001mf	—	MM	50051
C15	36pf	2	PSM	52552
C17	800pf	10	MSM	51060
C18	1500pf	5	PSM	51951
C22	600pf	1	PSM	51412
C25	2mf	(350V)	Electrolytic	C49362/25
C26	0.1mf	(350V)	Tubular	53430
C27	0.05mf	(350V)	Tubular	C53254/1
C30	100pf	10	Erie BD/GPI	53702
C31	50pf	10	Erie AD/GPI	53709
G32	220pf	10	Erie CD/GPI	53010
C33	0.002mf	(350V)	W99	C41904/2
C34	15pf	10	Ceramicon	52864
C35	0.01mf	—	Metalmite	41852
C36	0.01mf	(350V)	W99	C41904/4
C37	0.01mf	—	Metalmite	52658/1
C38	200pf	10	PSM	51860
C39	2mf	(350V)	Electrolytic	C23686/18
C40	0.01mf	(600V-AC)	Tubular	B19266/5
C42	100mf	(12V)	Electrolytic	C49153
C43.44	50 × 50 mf	(275V)	Electrolytic	44866
C45	1pf	20	Ceramic bead	51642
C46	0.0025mf	(600V-AC)	Tubular	B19266

COILS AND TRANSFORMERS

<i>Circuit Ref.</i>	<i>Component</i>	<i>Part No.</i>
L1	Aerial Coil Pri. (SW1)	DP23333
L2	Aerial Coil Sec. (SW1)	
L3	Aerial Coil Pri. (SW2, 3)	DP23335
L4	Aerial Coil Sec. (SW2, 3)	
L5	Aerial Coil Pri. (SW4)	DP23449
L6	Aerial Coil Sec. (SW4)	
L7	Aerial Coil Pri. (MW)	
L8	Aerial Coil Sec. (MW)	
L9	Osc. Coil Pri. (SW1)	DP23334
L10	Osc. Coil Sec. (SW1)	
L11	Osc. Coil Pri. (SW2, 3)	DP23336
L12	Osc. Coil Sec. (SW2, 3)	
L13	Osc. Coil Pri. (SW4)	DP23326
L14	Osc. Coil Sec. (SW4)	
L15	Osc. Coil Pri. (MW)	DP22707/3
L16	Osc. Coil Sec. (MW)	
L17	1st IF Pri.	SA5062
L18	1st IF Sec.	
L19	2nd IF Pri.	SA5062/1
L20	2nd IF Sec.	
T1	Output Transformer	SA5061/E
T2	Mains Transformer	SA5459

OTHER COMPONENTS

<i>Component</i>	<i>Circuit Ref.</i>	<i>Part No.</i>
Drive Drum	—	DP23372
Drive Cord	—	B40014/11
Drive Wire	—	B33563/31
Pilot lamp holder	PL1, PL2	A32314
Pilot lamp	PL1, PL2	A5767
Spring (Drive cord)	—	B33559
Mains lead	—	DP22714/3
Waveband switch	—	D49981
Scale	—	D49885
Scale clip	—	A43471
Knob and Ring Ass.	Tuning	DP23329
Knob and Ring Ass.	Tone	DP23330
Knob	Volume-On/Off	D49861
Knob	Waveband	D49752
Loud-speaker	—	D40603
Pointer	—	B105016
Trade mark button	—	C34416/2
Cabinet	—	F49732
Back cover	—	D49787
Iron dust core for L2	—	B44921
Iron dust core for L4, L10, L12	—	B34658
Iron dust core for L14	—	B44921/3
Iron dust core for L16	—	B44921/1

Addendum for Model A242/11

Some models of the A242 receiver are modified to cover the 11 metres broadcast band, necessitating the following changes from the published data.

ALTERNATIVE WAVEBAND COVERAGE :

Band 1—S.W. (bandspread), 26.5—17.4 Mc/s., 11.3—17.3 Metres.

Band 2—S.W. (bandspread), 15.8—11.5 Mc/s., 18.9—26.0 Metres.

Band 3—S.W. (bandspread), 11.1—7.6 Mc/s., 27.0—39.5 Metres.

Band 4—S.W., 7.6—2.5 Mc/s., 39.5—120 Metres.

Band 5—M.W., 1600—525 Kc/s., 187.5—571 Metres.

S.W. R.F. ALIGNMENT :

Switch to Band 2. Tune to and inject 15 Mc/s., adjust C19 for calibration and C5 for maximum output.

Switch to Band 3. Tune to and inject 9.0 Mc/s., then adjust core of L12 (lower half) for calibration. Tune to and inject 10.5 Mc/s., then adjust core of L4 for maximum output. Repeat Band 2 alignment, then check calibration and tracking at 12 Mc/s. Repeat Band 3 alignment then check calibration and tracking at 10.5 Mc/s.

Switch to Band 1. Tune to and inject 20 Mc/s., adjust L10 for calibration and L2 for maximum output, check the calibration at 25 Mc/s. Alignment procedure for bands 4 and 5 is as given in the A242 service manual.

CALIBRATION ERRORS :

Bands 1, 2 and 3 (S.W.) not more than 3/16" (5 mm).
Bands 4 (S.W.) and 5 (M.W.) not more than 1/16" (1.5 mm).

SPARE PARTS LIST

<i>Circuit Ref.</i>	<i>Value</i>	<i>Part No.</i>
C3	22pF	53568
C15	10pF	53904
L1, L2	—	DP23333/1
Scale	—	D106351