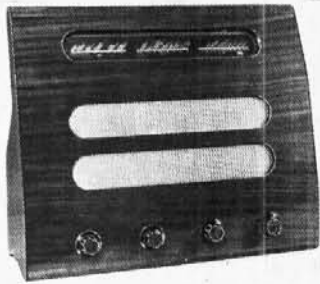


"TRADER" SERVICE SHEET

962

# MURPHY A122

Covering also Models SA122, A122C & A122M



The appearance of the A122 and SA122 receivers. An illustration of the A122M appears overleaf.

mains of 200-250 V, 50-100 c/s. The SA122 is an export model, and it has tapings at 105 V and 150 V, while its highest tapping is rated at 260 V.

A separate tuning scale is provided for each waveband, each with its own cursor and scale lamp, the illuminated scale being the one in use. Provision is made for the use of a gramophone pick-up, which may be left permanently connected, and an external speaker.

This Service Sheet was prepared from an A122, but it covers the whole series, the differences between the A122 and the others being explained under "Associated Models" overleaf.

Release dates and original prices: A122, June, 1947, £22; A122C, July, 1947, £27 10s.; A122M, January, 1949, £22. Purchase tax extra.

## CIRCUIT DESCRIPTION

Aerial input via I.F. rejector L1, C1 and coupling coils L2, L3, L4, to single-tuned circuits L5, C34 (S.W.), L6, C34 (M.W.) and L7, C34 (L.W.) which precede triode-heptode valve (V1, Mazda

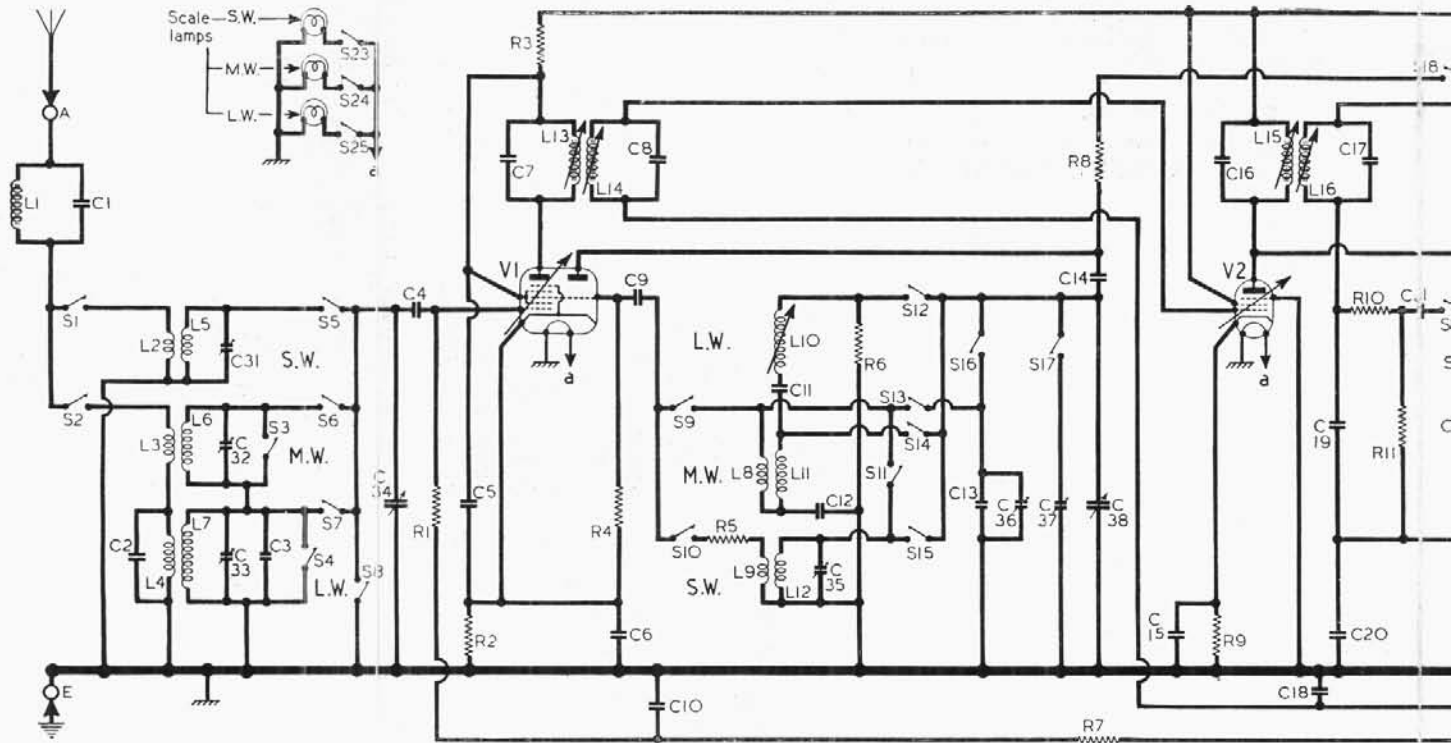
metallized TH41) operating as frequency changer with internal coupling. Image suppression on L.W. by C2 connected across L4. S3, S6 and S7 close on L.W., short-circuiting L6, and S3 closes on gram. On M.W., S6 closes and S7 opens, but S4 closes to short-circuit L7.

Oscillator anode coils L12 (S.W.), L11 (M.W.) and L10 (L.W.) are tuned by C38, but on L.W. the circuit actually becomes a Colpitts type. Owing to the unusual nature of the circuit, the S.W. band is shown in our diagram below the M.W. band, and the L.W. band is shown above it, as otherwise the circuit looks very complicated.

S11 and S13 are incidental in the design of the switch wafers, and can be neglected when reading the diagram. S10 and S15 close for S.W., and the circuit is quite straightforward. S9, S12, S14 and S17 close for M.W., connecting the trimmer C37 and short-circuiting L10, C11. For L.W. S9, S12 and S16 close, connecting the trimmers C13, C36.

For alignment adjustments, L10 is provided with a pre-set brass core, but the

FOUR models are included in the Murphy 122 series: the A122, the A122C, the SA122 and the A122M. They are all 4-valve (plus rectifier) 3-band superhets designed to operate from A.C.



Circuit diagram of the Murphy A122 receiver. The only addition in the SA122 is a pair of tapings at 105 V and 150 V on primary. The differences in the A122C and A122M are described overleaf. The order of wavebands in the aerial circuit reading our diagram is S.W., M.W. and L.W. as usual, but in the oscillator circuit it is reversed to simplify the diagram. Although switches S11 and S13 have an effect when coil resistances are being checked, they are actually only incidental in the switching action, and can be neglected with



M.W. and S.W. coils are not adjustable, although the bottom turns of L5 and L12 may be moved if the S.W. band is badly out of alignment.

Second valve (V2, Mazda metallized VP41) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings C7, L13, L14, C8 and C16, L15, L16, C17.

**Intermediate frequency 465 kc/s.**

Diode signal detector is part of double diode triode valve (V3, Mazda metallized HL41DD). Audio frequency component in rectified output is developed across R10 and R11, which are of equal value, that across R11 being passed via C21, S19, manual volume control R13 and grid stopper R14 to control grid of triode section, which operates as A.F. amplifier. The value of C20 is chosen to suit the A.F. response of the speaker and cabinet.

I.F. filtering by C19, the screening capacitance and R14 in association with the input capacitance of V3. Provision for the connection of a gramophone pick-up across R13 via S20 and D.C. isolating capacitor C23. S18, S19 open on gram to mute radio.

Second diode of V3, fed via C22 from V2 anode, provides D.C. potentials which are developed across load resistors R18, R19. The total potential is fed back to F.C. valve, and a proportion of it, de-

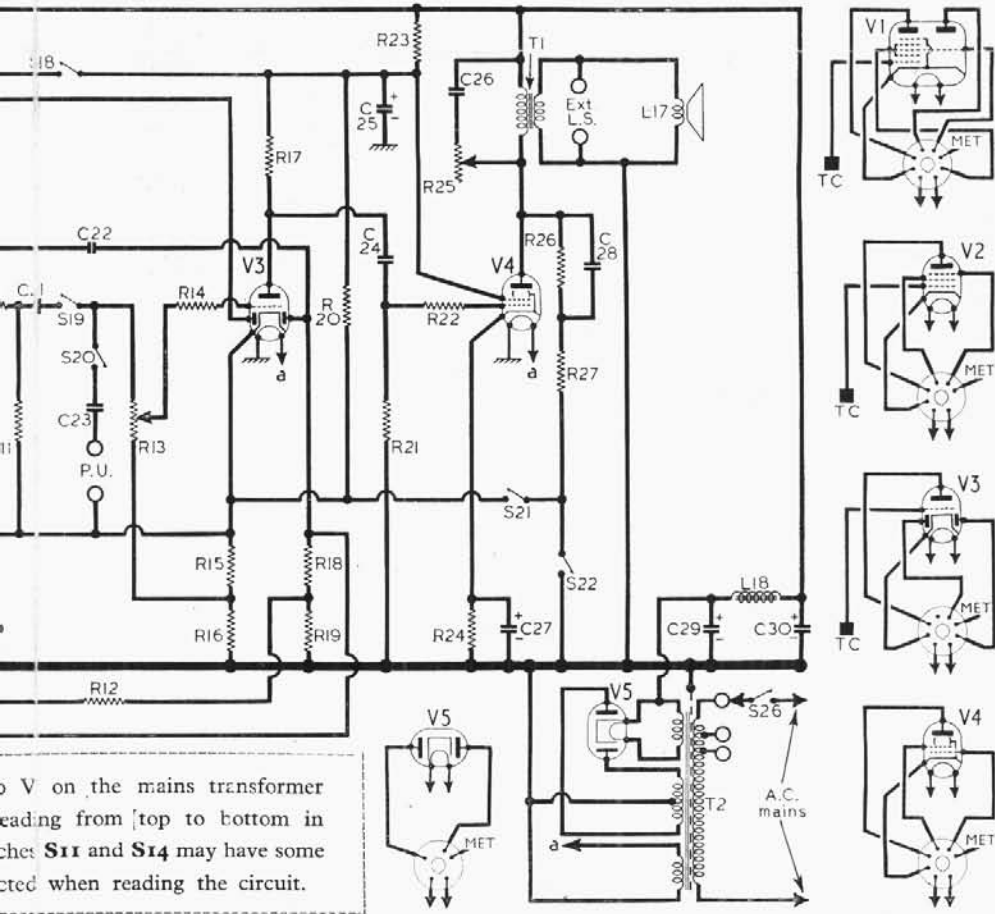
(Continued in col. 6)

**COMPONENTS AND VALUES**

CAPACITORS			RESISTORS				
	Values	Locations		Values	Locations		
C1	I.F. rejector tune ...	470pF	A1	R1	V1 C.G. ...	1MΩ	A1
C2	L.W. aerial shunt ...	470pF	H4	R2	V1 G.B. ...	220Ω	H5
C3	L.W. fixed trim... ..	27pF	H3	R3	V1 H.T. decoup. ...	15kΩ	G5
C4	V1 C.G. ...	500pF	A1	R4	V1 osc. C.G. ...	22kΩ	H5
C5	V1 H.T. decoup. ...	0.05μF	H4	R5	S.W. osc. stopper	100Ω	J4
C6	V1 cath. by-pass ...	0.05μF	H4	R6	L.W. osc. shunt ...	39kΩ	J5
C7	1st I.F. trans. tuning ...	150pF	B2	R7	V1 A.G.C. decoup.	2.2MΩ	G5
C8	ing ...	150pF	B2	R8	V1 osc. H.T. feed	39kΩ	H5
C9	V1 osc. C.G. ...	200pF	H4	R9	V2 G.B. ...	390Ω	G6
C10	V1 A.G.C. decoup.	0.05μF	F4	R10	Signal diode load ...	220kΩ	G4
C11	L.W. osc. tracker	180pF	J4	R11		220kΩ	G4
C12	M.W. osc. tracker...	620pF	J5	R12	V2 A.G.C. decoup.	1MΩ	F4
C13	L.W. fixed trim... ..	82pF	J4	R13	Volume control ...	1MΩ	F8
C14	Osc. anode coupling	100pF	H4	R14	V8 grid stopper ...	47kΩ	C2
C15	V2 cath. by-pass ...	0.05μF	H4	R15	V3 G.B. and ...	390Ω	F5
C16	2nd I.F. trans. tuning ...	150pF	B2	R16	A.G.C. delay ...	1.2kΩ	G5
C17	ing ...	150pF	B2	R17	V8 triode load ...	47kΩ	F4
C18	V2 A.G.C. decoup.	0.05μF	G4	R18	A.G.C. diode load ...	390kΩ	G4
C19	I.F. by-pass ...	200pF	G4	R19		390kΩ	G4
C20	V3 cath. by-pass ...	0.25μF	E4	R20	A.G.C. delay ...	47kΩ	E4
C21	A.F. coupling ...	0.02μF	G4	R21	V4 C.G. ...	470kΩ	F5
C22	A.G.C. coupling ...	50pF	G5	R22	V4 grid stopper ...	47kΩ	F5
C23	P.U. coupling ...	0.05μF	J4	R23	H.T. decoup. ...	2.2kΩ	F4
C24	A.F. coupling ...	0.02μF	F5	R24	V4 G.B. ...	180Ω	F5
C25*	H.T. decoupling ...	8μF	C1	R25	Tone control ...	20kΩ	B3
C26	Part tone control ...	0.1μF	F3	R26	Negative feed-back ...	270kΩ	F4
C27*	V4 cath. by-pass ...	50μF	E5	R27		47kΩ	F4
C28	Negative feed-back	0.01μF	F4				
C29*	H.T. smoothing	16μF	D1				
C30*		16μF	C1				
C31†	S.W. aerial trim. ...	35pF	H3				
C32†	M.W. aerial trim. ...	35pF	H3				
C33†	L.W. aerial trim. ...	35pF	H3				
C34†	Aerial tuning ...	544pF	A1				
C35†	S.W. osc. trimmer	35pF	H5				
C36†	L.W. osc. trimmer	35pF	J5				
C37†	M.W. osc. trimmer	35pF	J5				
C38†	Osc. tuning ...	544pF	A1				

\* Electrolytic. † Variable. ‡ Pre-Set.  
§ "Swing" value, minimum to maximum.

OTHER COMPONENTS			Approx. values (ohms)	Locations
L1	I.F. rejector ...	3.0	A1	
L2	Aerial coupling coils	Very low	B1	
L3			S.W. 1.0	B1
L4	L.W. 24.0	B1		
L5	Aerial tuning coils	Very low	B1	
L6			M.W. 3.5	B1
L7	L.W. 24.0	B1		
L8	Reaction coils	0.6	J5	
L9			S.W. Very low	J5
L10	Osc. tuning coils	5.0	J5	
L11			M.W. 1.7	J5
L12	S.W. Very low	J5		
L13	1st I.F. trans.	6.0	B2	
L14			Sec. ...	B2
L15	2nd I.F. trans.	6.0	B2	
L16			Sec. ...	B2
L17	Speech coil ...	2.1		
L18	Smoothing choke ...	270.0	G3	
T1	Output trans.	320.0	B1	
			Sec. ...	B1
T2	Total primary ...	36.0		
	Total H.T. sec. ...	310.0		
	6.3 V heater ...	Very low	D1	
	Rect. heater ...	Very low		
S1-S25	Waveband and P.U. switches ...	—	J3	
S26	Mains sw. g'd	—	E3	



**Circuit Description—continued**

veloped across R19, is fed back to I.F. valve, giving automatic gain control. Delay voltage, together with G.B. for triode section, is obtained from the potential divider R20, R15 and R16.

Resistance-capacitance coupling by R17, C24 and R21 between V3 triode and beam tetrode output valve (V4, Mazda Pen45). Variable tone control by C26 and R25 in anode circuit. Fixed negative feed-back on M.W. and L.W. between V4 anode and V3 cathode by R26, C28 and R27, via S21. On S.W., S21 opens and S22 closes, disconnecting the feed-back circuit and shunting R26, C28 and R27 across the output circuit. Provision is made for the connection of a low-impedance speaker across T1 secondary winding.

H.T. current is supplied by I.H.C. full-wave rectifying valve (V5, Mazda metallized UU6). Smoothing by iron-cored choke L18 and electrolytic capacitors C29 and C30.

to V on the mains transformer reading from top to bottom in sheet S11 and S14 may have some effect when reading the circuit.





The appearance of the Murphy A122M receiver. It has a slightly different tuning scale from the A122.

**VALVE ANALYSIS**

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on A.C. mains of 230 V, using the 230-230 V adjustment tapping. The receiver was tuned to the highest wavelength of the M.W. band, and the volume control was at maximum, but there was no signal input. Voltages, with the exception of cathode readings, were measured on the 400 V scale of a Model 7 Avometer, chassis being the negative connection.

Valve	Anode		Screen		Cath. V
	V	mA	V	mA	
V1 TH41	155	1.8	155	5.0	2.2
	Oscillator				
V2 VP41	260	6.5	260	1.7	3.0
	56 3.6				
V3 HL41DD	112	1.8	—	—	9.5
V4 Pen 45	246	37.0	222	6.8	7.5
V5 UU6	250†	—	—	—	275.0

Each anode, A.C.

**GENERAL NOTES**

**Switches.**—S1-S25 are the waveband, radio/gram and scale lamp switches, ganged in three rotary units. These are indicated in our under-chassis illustration, where they are identified by the numbers 1, 2, 3 in diamonds, arrows show the direction in which they are viewed in the diagrams in col. 2 where they are shown in detail.

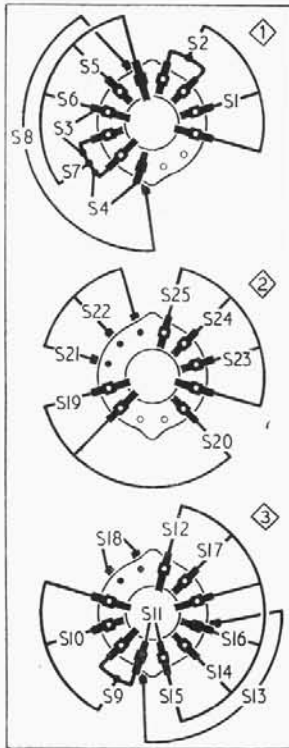
The table (col. 3) gives the switch positions for the four control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and C, closed.

S26 is the Q.M.B. mains switch, ganged with the variable tone control R25.

**Scale Lamps.**—These are three Osram M.E.S. types, with large clear spherical bulbs, rated at 6.2 V, 0.3 A.

**External Speaker.**—Two sockets are provided at the rear of the chassis for the connection of a low impedance (3-7Ω) external speaker.

**Aerial Rejectors.**—A mounting bracket is provided above the A and E sockets for an aerial rejector when one is required to avoid overloading V1 on the local station. To connect it, the existing lead from the A socket is cut and its ends are connected to the tags of the rejector, so that it is in series with the I.F. rejector, L1, C1.



Diagrams of the waveband switch units, drawn as seen from the rear of an inverted chassis. The associated switch table is seen on the right of the diagrams.

Switch	S.W.	M.W.	L.W.	Gram.
S1	C	—	—	—
S2	—	C	—	—
S3	—	—	C	—
S4	—	—	—	C
S5	C	—	—	—
S6	—	C	—	—
S7	—	—	C	—
S8	—	—	—	C
S9	—	C	—	—
S10	C	—	—	—
S11	—	—	C	—
S12	—	C	—	—
S13	C	—	—	—
S14	—	C	—	—
S15	C	—	—	—
S16	—	—	C	—
S17	—	C	—	—
S18	C	—	—	—
S19	C	C	C	C
S20	—	—	—	C
S21	—	C	—	C
S22	C	—	—	—
S23	C	—	—	—
S24	—	C	—	—
S25	—	—	C	—

**ASSOCIATED MODELS**

As compared with the A122 receiver, on a sample of which this Service Sheet was prepared, the difference in the SA122 is simply that the mains voltage adjustment tappings are arranged for 105-150 V and 210/260 V.

In the A122C console, the negative feed-back circuit is modified to suit the different cabinet and speaker, R26 being omitted and C23 becoming 0.05μF. The speaker is a 10-in model, instead of the 8-in one in the table receiver. The chassis is mounted in an inverted position, necessitating a different kind of cursor drive cord system, which is described under "Drive Cord Replacement." The inversion reverses the order of the control knobs as compared with the table model, and the waveband switch control knobs are not alike.

In the A122M, the baffle cabinet is of a different design from the A122, and the tuning scales are slightly different, involving a change in gang settings as explained under "Circuit Alignment." The pick-up socket consists of a 4-pin English valve holder, in which the anode pin is the "live" pick-up socket, and the grid pin the earthy one. The filament pins are joined together and to chassis to earth the braiding.

The negative feed-back switch S21 opens on Gram, muting the feed-back circuit, but S22 still closes only on S.W. V3 cathode by-pass capacitor C20 is moved to the junction of S21 and S22, so that on Gram it returns R27 to chassis, and as V3 cathode is not by-passed, a degree of feed-back is thus introduced there. On S.W., C20 is short-circuited by S22. On M.W. and L.W., when S21 is closed, the circuit is effectively the same as in the A122.

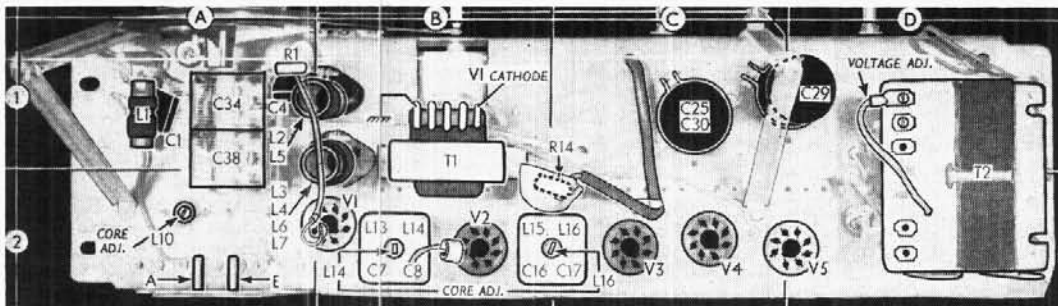
**DISMANTLING THE SET**

**Removing Chassis.**—Remove the four control knobs (recessed grub screws); remove three scale lamps (pull off) from scale assembly, and release earthing tag from left-hand end (secured by nut and lock-washer); release scale lamp leads from spring cleat in top left-hand corner of cabinet; slacken nut at bottom of cursor carriage and release drive cord;

To adjust it, connect an 0-10 V meter between V1 cathode and chassis, tune in the local station (low meter reading), then adjust the rejector for maximum meter reading. To provide a convenient connection for the meter, V1 cathode is taken to one of the end tags of T1 (location reference B1), while the opposite end tag goes to chassis.

**I.F. Transformer Cores.**—The I.F. coil iron-dust core threads are engaged in a U-shaped slot of paxolin which in turn is held in slots in the coil former, and sometimes when the cores are screwed well in, they pass right through the slotted paxolin and idle loosely beyond them. They can then be re-engaged by removing the opposite core and applying the trimming tool to them from the opposite end, as they each have a trimmer groove on each face.

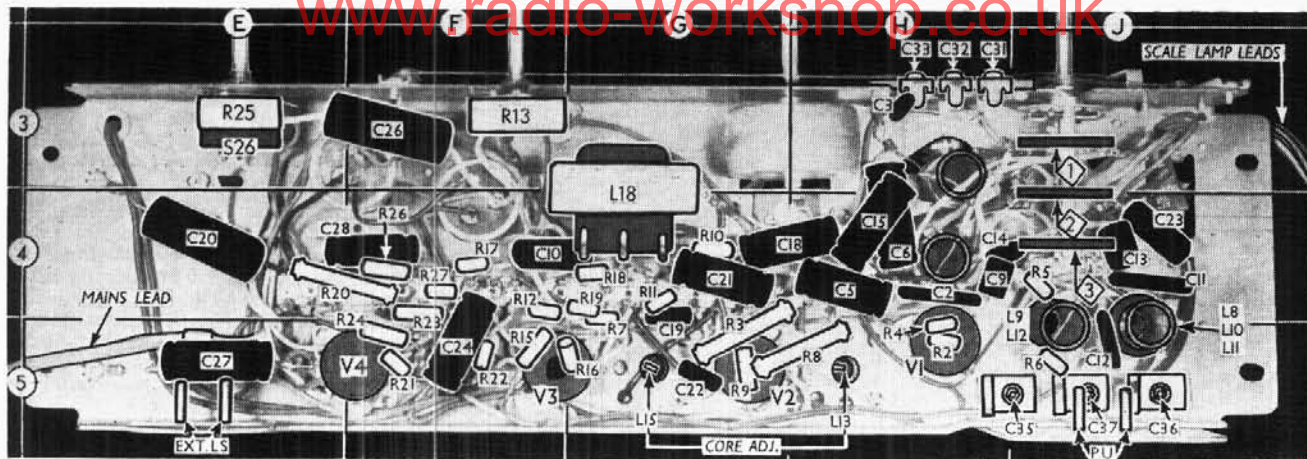
**Chassis Divergencies.**—Our chassis was an A122, and its circuit was as shown in our circuit diagram. In some chassis the lower pick-up socket will be returned to the junction of R15 and R16, and C23 will be omitted. R17 may be 50 kΩ, and R18, R19 may each be 470 kΩ instead of 390 kΩ.



Plan view of the chassis. V1 cathode is brought out to a spare tag on the output transformer T1 for the convenience of connecting a meter when adjusting a local station rejector, when fitted.



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Under-chassis view. The waveband switch units are identified by diamonds numbered 1, 2 and 3. They are shown in detail in the diagrams in col. 2. Many of the small components are mounted on a central tag strip.

unplug speaker leads from sockets at right-hand end of chassis;  
remove four chassis-fixing bolts (with large washers above and small below) securing end flanges of chassis to cabinet, and withdraw chassis.

When replacing, the cursors should coincide with the extreme right-hand edges of the scales with the gang at maximum capacitance, and the cord should bow slightly upwards to hold cursor carriage firmly to guide rail.

**Removing Speaker.**—Release speaker leads from spring cleats on right-hand side of sub-baffle; remove four 4BA nuts (with lock-washers) holding speaker to sub-baffle.

When replacing, the speech coil tags should be on the right.

**Removing Tuning Scale Assembly.**—Remove 2BA nut (with lock washer) from each end of scale backing plate.

### DRIVE CORD REPLACEMENT

The tuning drive in all the 122 series consists of two cord drives: the gang drive and the cursor drive. The gang drive is the same for all

types, but in the console the cursor drive is different from the table models.

In the A122, SA122 and A122C, the cord used originally was type 5, spec. 935, but it was changed later for a thinner cord (type 3, spec. 936) which involved a change of tuning scale grading. The former cord is used if the scale panel is type 48539/1 (see under "Circuit Alignment"), and the latter (finer cord) for scale panel type 48539/2. Calibration errors will occur if the wrong type of cord is used.

In the A122M, the finer cord only is used, and it is described as woven and waxed Italian hemp. The course taken by each cord is shown clearly in the sketches in col. 4, where in each case the drive is drawn as seen from the front of the chassis standing on its base, with the gang at maximum capacitance.

The length of cord required for the main drive is 3ft 6in in all models; 5ft is required for the cursor drive in the table models, and 4ft in the console. Where both cords are to be fitted, the gang drive should be fitted first, but where the gang drive only is to be fitted, the cursor drive should be slipped off its anchorage and the slack cord dropped temporarily off its pulleys. Calibration should be adjusted as explained under "Circuit Alignment."

scale printed on the front of the tuning drive drum. This scale is divided into 180 degrees, and readings are taken against the "V" slot in the bracket fixed to the front member of the chassis. With the gang at maximum capacitance, the scale should read zero, and if necessary the bracket can be adjusted upon slackening its fixing screw.

In models A122, SA122 and A122C either one of two types of tuning scale may be found (No. 48539/2 or No. 48539/1) and in model A122M a third type (No. 52109) is used. Each of these scales has a separate set of calibration references for the drive drum scale, and in the alignment table these references are given under "Drive Drum Setting." Before commencing alignment on models A122, SA122 and A122C it is necessary to know the type of tuning scale fitted, and this may be checked by removing the scale assembly, when the type number will be visible at the bottom centre edge of the scale panel.

Transfer "live" signal generator lead to aerial socket, using a 400Ω resistor on S.W. or a 200pF capacitor on M.W. and L.W. as a dummy aerial. Adjust R.F. and oscillator stages as shown in the alignment table for maximum output, switching to the appropriate waveband. Use an output meter connected to the external speaker sockets, and do not permit the output to exceed 0.5 W (about 1.0 V).

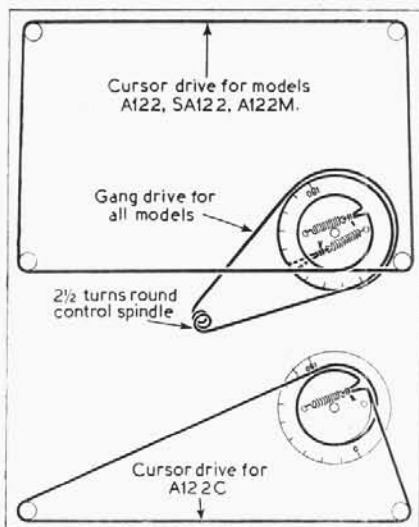
To overcome the effect of oscillator pulling on S.W., use the tuning control to hold the signal while adjusting the aerial circuit. On all bands the local oscillator frequency is higher than the signal frequency, so that if two peaks are found for C35, use that involving the smaller capacitance.

**I.F. Rejector.**—This is accurately adjusted at the factory and should not need readjustment. The core is held in position by waxed thread packing, but it can be moved if necessary by easing forward or backwards with a suitably shaped non-metallic tool. It should be adjusted at 465 kc/s for minimum output.

### CIRCUIT ALIGNMENT

**I.F. Stages.**—Remove chassis from cabinet, switch set to M.W., turn the volume and tone controls fully clockwise and the gang to maximum capacitance. Connect signal generator, via a 0.1μF capacitor in the "live" lead, to control grid (top cap) of V1 and chassis, feed in a 465 kc/s (645.16 m) signal and adjust L16, L15, L14 and L13, strictly in that order, for maximum output, using a non-metallic trimming tool. Do not readjust a core after it has been set.

**R.F. and Oscillator Stages.**—As the tuning scale is fixed to the cabinet and alignment is carried out with the chassis on the bench, adjustments are made with reference to the



Sketches showing the complete tuning drive system for the table models (above) and the cursor drive only for the console (below). They are both viewed from the front of the chassis with the gang at maximum.

### Circuit Alignment Table

Sig. Gen. Frequency	Drive Drum Setting			Switch Set to	Adjustments	Locations
	48539/2	48539/1	52109			
300 kc/s (1,000m)	168	166	167	L.W.	C36 C33	J5 H3
158 kc/s (1,898m)	31	31	31	L.W.	L10	A2
1,363 kc/s (220m)	157.5	154	156.5	M.W.	C37 C32	J5 H3
15.23 Mc/s (19.7m)	156.5	153	155.5	S.W.	C35 C31	J5 H3
7.24 Mc/s (41.4m)	53	52.5	52.5	S.W.	"Bottom" turns L5, L12	B1 J5