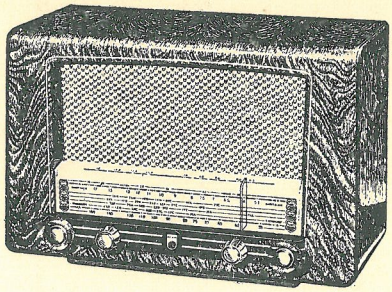
PHILIPS RADIOPLAYER: MODEL BZ437A



5 Valve Superheterodyne Receiver
Mains Supply—210-250 volts 50 C/s. A.C.
Wave Ranges—Broadcast 535-1635 K/cs.
Short Wave 5.5-19 Mc/s.
Bandspread 31 and 25 Metre Bands
Intermediate Frequency 455 Kc/s.

REMOVAL FROM THE CABINET

The majority of service work may be carried out without removing the chassis from the cabinet. However, for repairs to dial drive, replacement of volume or tone control, etc., it will be found necessary to remove the chassis and the following procedure should be adopted:—

Remove the mains plug from the supply.

Remove the bottom cover—there are four screws under the cabinet and three in the back of the chassis. Loosen off the pointer clamping screw, which is accessible from under the cabinet, and lift the cable free.

Slip the wave band indicator cord from the lever screw.

Disconnect the plate aerial by turning the speed fix nut holding the phosphor bronze contact through 90 degrees. Slide both nut and contact off the boss.

Remove the speaker plug from its socket.

Remove the four moulded control knobs by unscrewing and removing the four grub screws. Note that the tuning and tone control knobs have small semicircular packing pieces in them. These must be correctly replaced in the knobs before refitting.

Remove four chassis mounting bolts and the chassis may now be lifted clear of the cabinet. To replace the receiver reverse the above procedure.

REMOVAL OF DIAL SCALE

To remove the dial scale, remove the control knobs as above.

Unscrew the two ornamental screws on the knob escutcheon and lift clear.

Lift off the injection moulded scale.

REPLACING THE PANEL LAMP

Remove the bottom cover plate.

Unscrew the pilot lamp bracket mounting screw and slide the holder out of position.

When replacing the holder, place the bracket in position and refit the screw, but do not tighten.

Switch on the receiver and adjust the position of the pilot lamp for the best illumination of the dial by sliding the bracket along the screw. When best results are achieved, tighten the clamping screw. Replace the bottom cover.

ALIGNMENT OF THE RECEIVER

All alignment adjustments are accessible while the chassis is assembled in the cabinet.

Remove the bottom cover to expose the trimmers. The intermediate frequency filters and coil adjustments are accessible on the top of the chassis (see trimmer location diagram).

Switch on the receiver and allow it to warm up for a few minutes.

Turn the volume control to the maximum position and the tuning condenser to maximum capacity.

Set the pointer to the reference line at the low frequency end of the scale, and the waveband switch in the broadcast position.

Apply a signal of 455 Kc/s modulated 30% through a capacity of 0.01 mfd to the control grid of the ECH42.

Adjust the intermediate frequency filters for maximum output by means of the adjusting slugs at the side of the cans.

1. Diode Coil
2. EAF42 plate coil
3. ECH42 plate coil
4. EAF42 grid coil

Repeat the above until maximum output is obtained.

Disconnect the .01 coupling condenser from the control grid of ECH42 and connect the signal generator through a standard dummy aerial to the aerial and earth wire of the receiver.

Turn the pointer to the 1500 Kc/s position on the scale and apply a signal of 1500 Kc/s to the aerial.

Adjust the broadcast oscillator trimmer until the signal is tuned in, and adjust the aerial trimmer for maximum output.

Turn the pointer to the 600 Kc/s reference point on the scale and apply a signal of 600 Kc/s to the aerial.

Adjust the broadcast padder until the signal is tuned in and adjust the aerial inductance slug for maximum output.

Turn the pointer to the 1500 Kc/s position on the scale, and adjust as before.

Check the sensitivity and calibration at 950 Kc/s.

If the calibration is not correct, the sensitivity will be low, and if 950 Kc/s tunes in at a lower frequency on the scale then the oscillator inductance adjusting slug should be screwed in, slightly over-correcting, and the oscillator padder adjusted to correct 600 Kc/s, and the oscillator trimmer to correct 1500 Kc/s.

If 950 Kc/s tunes in at a higher frequency on the scale then the oscillator inductance adjusting slug should be screwed out, again slightly over correcting, and the oscillator padder adjusted to correct 600 Kc/s and the oscillator trimmer adjusted to correct 1500 Kc/s.

Note: Once the aerial inductance and trimmer have been adjusted at their respective frequencies, they should not be moved during calibration adjustments.

Turn the waveband switch to the short wave band position.

Turn the oscillator trimmer to maximum capacity and the padder trimmer to the half way position.

Set the pointer to the 17 Mc/s position on the scale, and apply a signal of 17 Mc/s to the aerial.

Turn the oscillator trimmer out until the second signal is tuned in and adjust the short wave aerial

trimmer for maximum output, rocking the tuning either side of the signal as the aerial adjustment is made.

Turn the pointer to the 6 Mc/s position on the scale, and apply a signal of 6 Mc/s to the aerial terminal of the receiver. Adjust the short wave oscillator inductance until the signal is tuned in, and adjust the aerial inductance for maximum output.

Turn the pointer to the 17 Mc/s position on the scale, apply a signal of 17 Mc/s to the aerial and re-adjust as before, for calibration and sensitivity.

Apply a signal of 10 Mc/s to the aerial, and check for calibration. If the calibration is not correct, the oscillator inductance should be adjusted, slightly over correcting as in broadcast, and adjust the 17 Mc/s position with the short wave oscillator trimmer and 6 Mc/s with the short wave oscillator padder.

This oscillator padder must be adjusted with an insulated trimmer tool as the outside plates are at the oscillator grid potential (see circuit diagram C5).

After short wave has been correctly aligned, and satisfactory calibration and sensitivity figures obtained, switch the wave band switch to bandspread position.

Before alignment of bandspread is attempted it is advisable to have available an accurate 1000 Kc/s and 100 Kc/s harmonic generator, capable of giving reasonable output as high as 12 Mc/s, so that the calibration of the signal generator may be checked, as alignment proceeds. Turn the 25 Metre bandspread oscillator trimmer to minimum capacity. If the receiver has been previously aligned, it will be necessary to replace the two wire trimmers C9 and C10 allowing adequate time for them to cool down after soldering. Apply a signal of 9.6 Mc/s to the aerial and turn the pointer to the 9.6 Mc/s position on the scale.

Adjust the 31 Metre band oscillator wire trimmer until the **second** peak is tuned in.

Turn the pointer to the 11.8 Mc/s position on the scale, and apply a signal of 11.8 Mc/s to the aerial.

Adjust the 25 Metre bandspread oscillator trimmer by increasing its capacity until 11.8 Mc/s is tuned in.

Check the calibration at 9.6 Mc/s and it will be found necessary to slightly reduce the capacity of the 31 Metre band oscillator wire trimmer.

Check, and if necessary, adjust the calibration at 11.8 Mc/s repeating the above until the calibrations at 11.8 Mc/s and 9.6 Mc/s are accurately placed on the dial scale.

Turn the pointer to the 11.8 Mc/s position on the scale, and apply a signal of 11.8 Mc/s to the aerial.

Adjust the aerial bandspread wire trimmer for maximum sensitivity removing the wire until a **second** peak is reached.

Check the sensitivity at 9.6 Mc/s and see that the image is on the correct side of the signal.

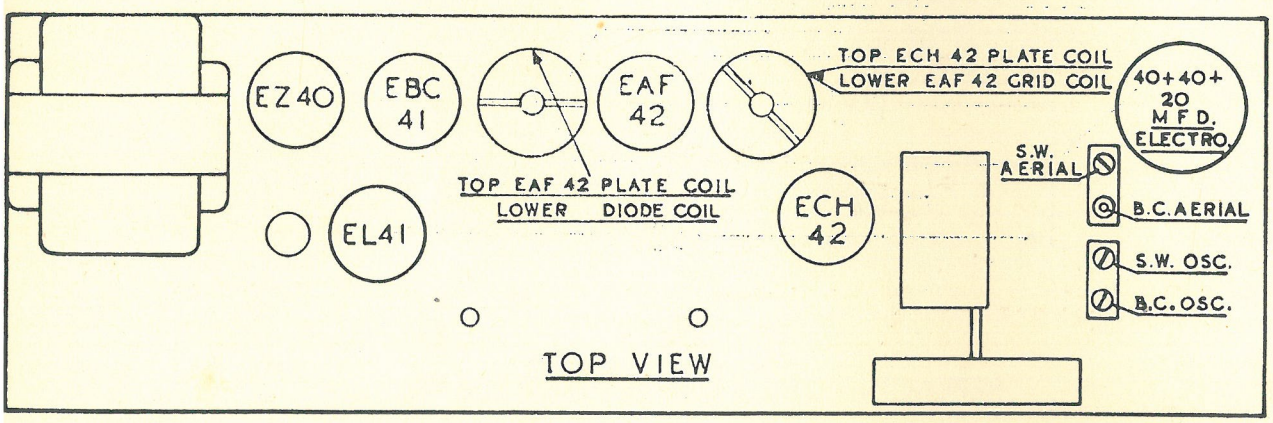
Since the oscillator is at a frequency **higher** than the signal frequency on the 31 Metre band, it should be possible to tune in a signal of 10.51 Mc/s as well as 9.6 Mc/s at the 9.6 Mc/s position on the scale.

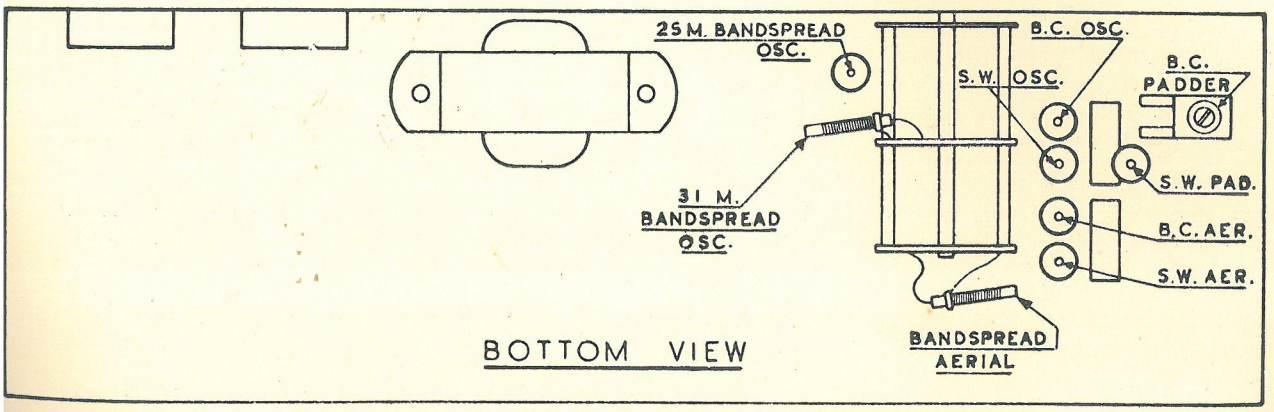
On the 25 Metre band the oscillator is at a **lower** frequency than the signal frequency so that at 11.8 Mc/s it should be possible to tune in an applied signal of 10.89 Mc/s. If the aerial circuit is correctly adjusted then the two image frequencies should require a much greater input from the signal generator than the fundamentals to obtain standard output.

When all adjustments are completed, seal all trimmers and adjusting slugs.

Average sensitivity figures are overleaf. These are given mainly as a guide and sensitivity should, if anything, be better than the figures quoted. The standard output is 50 milliwatts into a 5 ohm load.

CHASSIS LAYOUT (Showing Trimmer Positions)





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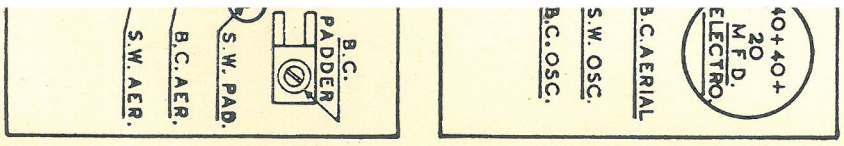

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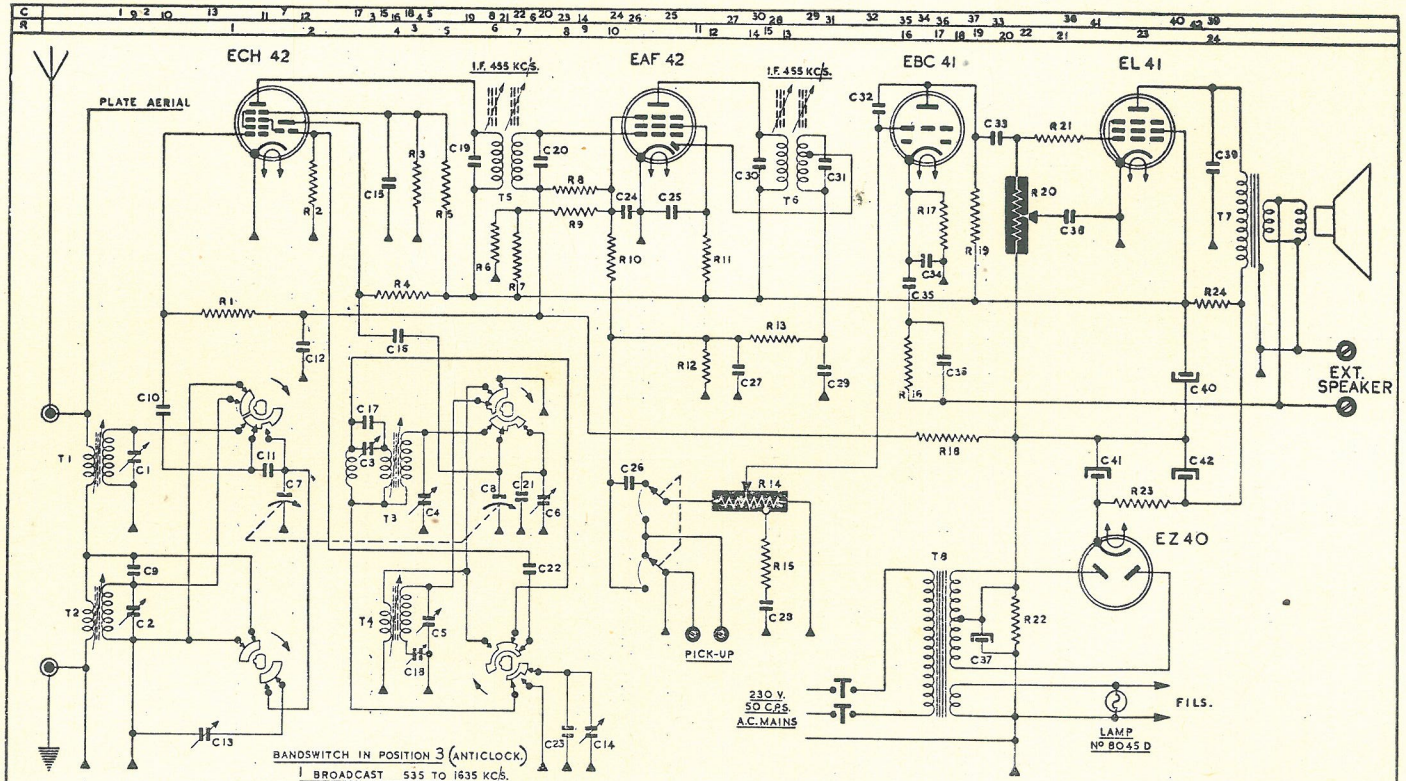
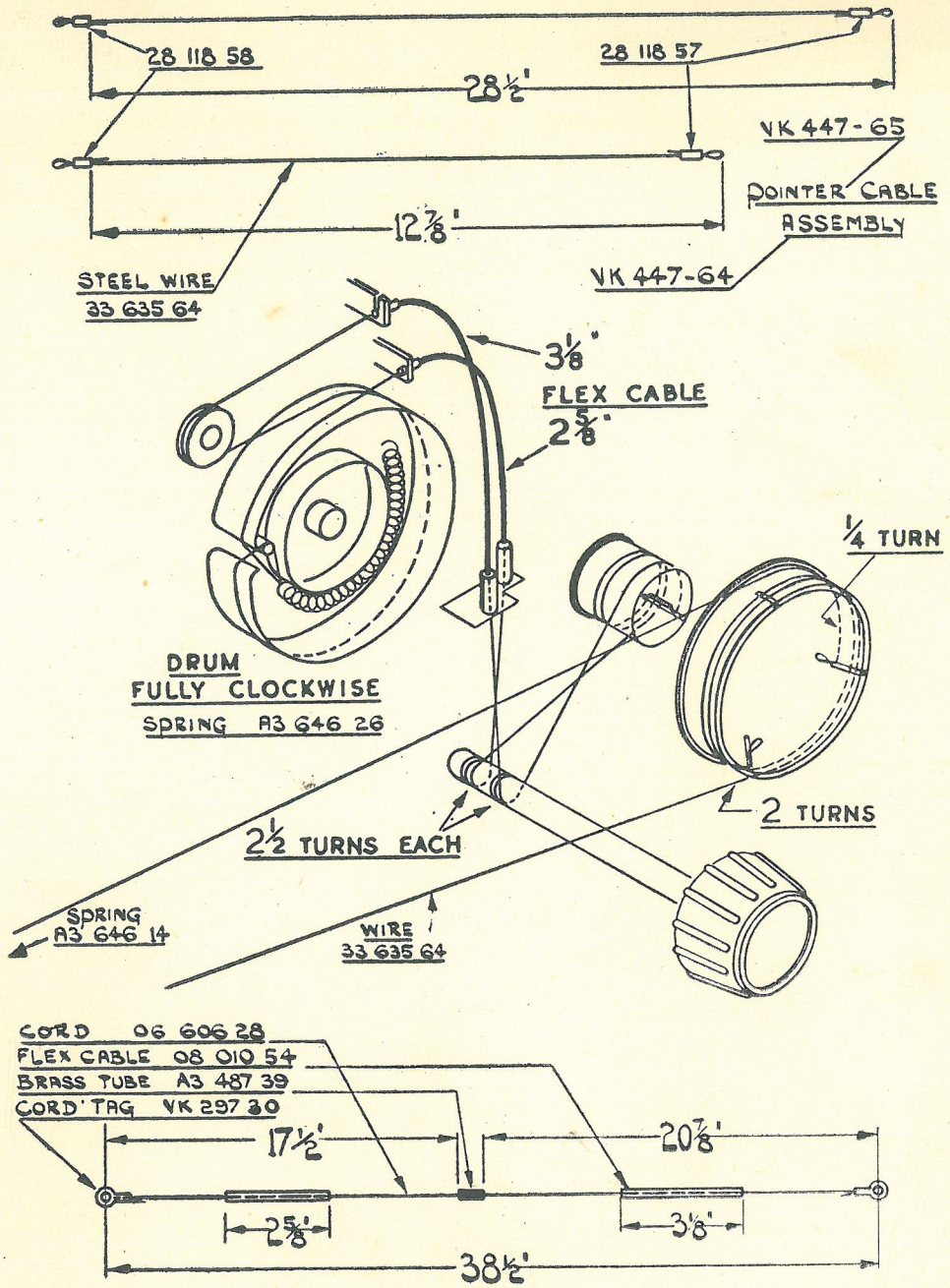


DESIGN MHA. K11-53

C1	3-30 MMFD	RIB TRIMMER	C18	150-750 MMFD	PADDER	C35	·05 MFD	350 V. PAPER	R5	25 K	1 W. CARBON.
C2	" "	" "	C19	110 MMFD	I.F. CONDENSER	C36	500 MMFD	MICA	R6	100 K	½ W. "
C3	" "	" "	C20	110 "	" "	C37	100 MFD	10 V. ELECTROLYTIC	R7	470 K	½ W. "
C4	" "	" "	C21	190 MMFD	MICA	C38	·01 MFD	500 V. PAPER	R8	750 K	½ W. "
C5	" "	" "	C22	56 MMFD	CERAMIC	C39	·005 MFD	750 V. "	R9	10 MEG.	½ W. "
C6	" "	" "	C23	120 MMFD	"	C40	20 MFD	350 V.) TRIPLE	R10	1 "	½ W. "
C7	12-500 MMFD	TUNING CONDENSER	C24	500 MMFD	MICA	C41	40 "	350 V.) ELECTROLYTIC	R11	100 K	½ W. "
C8	" "	" "	C25	·01 MFD	500 V. PAPER	C42	40 "	350 V.)	R12	250 K	½ W. "
C9	3·9 "	CERAMIC	C26	·005 MFD	500 V. "				R13	68 K	½ W. "
C10	150 "	"	C27	100 MMFD	CERAMIC				R14	2 M + 650K	VOLUME CONTROL
C11	233 "	" ± 1%	C28	·01 MFD	500 V. PAPER				R15	47 K	½ W. CARBON
C12	·05 MFD	500 V. PAPER	C29	100 MMFD	CERAMIC				R16	75 K	½ W. "
C13	175 MMFD	W.W. TRIMMER	C30	110 MMFD	I.F. CONDENSER				R17	22,000 Ω	½ W. "
C14	" "	" "	C31	110 "	" "	R1	1 MEG.	½ W. CARBON	R18	2·2 M.	½ W. "
C15	·01 MFD.	500 V. PAPER	C32	10 MMFD	CERAMIC	R2	47 K	½ W. "	R19	150 K	½ W. "
C16	300 MMFD	CERAMIC	C33	·01 MFD.	500 V. PAPER.	R3	47 K	½ W. "	R20	·5 MEG.	TONE CONTROL
C17	120 "	"	C34	·25 MFD	150 V. "	R4	27 K	½ W. "	R21	10 K	½ W. CARBON.

R22	120 Ω	1 W.	CARBON.
R23	500 Ω	4 W.	WIRE WOUND
R24	6200 Ω	2 W.	CARBON.
T1	S.W. AERIAL COIL		VK 469-55
T2	B.C. "		VK 469-54
T3	S.W. OSCILLATOR COIL		VK 471-37
T4	B.C. "		VK 471-36
T5	FIRST I.F. FILTER		A3 121-94
T6	SECOND " "		A3 121-94
T7	OUTPUT TRANSFORMER		VK 670-73
T8	POWER "		VK 630-77



REPLACING THE POINTER DRIVE CABLE

With the ganged condenser in the maximum capacity position, place the smaller brass clamp (28-118-58) of the cable VK-447-64 in the longest slot of the pointer driving drum, which should be at approximately 4 o'clock position.

Take up the cable on to the drum, by placing over the drum in an anti-clockwise direction and turning the ganged condenser to minimum capacity. The longer slot in the drum will turn through approximately 510 degrees so that in the minimum capacity position it should be at approximately 9 o'clock position, with 1¾ turns of cable on the drum.

The spring A3-646-14 is attached to the free end of the cable, and the other end of the spring is attached to the cable VK-447-65 at the loop in the end (formed with the brass clamp 28-118-57), and the cable is passed over the left-hand idler pulley, and on to the bottom of the drum in an anti-clockwise direction.

Stretch the spring to allow the cable to be placed round the drum and fit the brass clamp (28-118-58) into the slot at the 1 o'clock position.

The cables should now be adjusted on the drum so that they do not cross. The rear cable should progress toward the back of the drum rim when it is taking up cable and the front cord should progress toward the front.

AVERAGE SENSITIVITY, ETC.

Frequency	SIGNAL APPLIED TO	Sensitivity
455 Kc/s	ECH42 control grid via 0.01 mfd condenser	20 μv
600 Kc/s	Standard dummy to aerial connection	10 μv
950 Kc/s	" " " " "	10 μv
1500 Kc/s	" " " " "	10 μv
6 Mc/s	" " " " "	15 μv
10 Mc/s	" " " " "	15 μv
17 Mc/s	" " " " "	15 μv
9.6 Mc/s	" " " " "	20 μv
11.8 Mc/s	" " " " "	20 μv

VOLTAGE TABLE

All readings taken with a primary input of 230 volts 50 C/s. A.C.
Full load primary current should not exceed 180 mA.

Valve	Function	Fil.	Plate	Screen	Cathode
			Conv. Osc.		
ECH42	Frequency converter and oscillator	6.2	190 80	85	0
EAF42	I.F. amplifier, demodulator and delayed A.V.C.	6.2	190	65	0
EBC41	Audio voltage amplifier	6.2	100	—	1.2
EL41	Power output amplifier	6.2	235	190	0
EZ40	Full wave rectifier	6.2	A.C. per plate 245	—	265
8045D	Panel lamp	6.2	—	—	—

Back bias —5.6 volts across R.

The above voltages are measured between the points indicated and chassis with a meter having a resistance of 20,000 ohms per volt on D.C. and 1000 ohms per volt on A.C. ranges. Variations up to ±5% are permissible. Wave band switch in position BROADCAST and tuning condenser at maximum capacity.

COIL AND TRANSFORMER RESISTANCES

Code No.	Function	Winding	D.C. Resistance
VK-469-54	Aerial coil—broadcast	Primary	71 ohms
		Secondary	2.45 ohms
VK-469-55	Aerial coil—short wave	Primary	1.5 ohms
		Secondary	0.16 ohms
VK-471-36	Oscillator coil—broadcast	Tuned	11 ohms
		Feedback	4.7 ohms
VK-471-37	Oscillator coil—short wave	Tuned	0.16 ohms
		Feedback	0.345 ohms
		Padder	1.5 ohms
A3-121-94	Intermediate frequency filter	Each winding	7.25 ohms
		Tap	4.4 ohms
VK-670-73	Audio output transformer	Primary	320 ohms
		Secondary	.55 ohms
VK-630-77	Power transformer	Primary	37.5 ohms
		Secondary	250 ohms
		"	240 ohms
		Filament	0.082 ohms

REPLACING THE GANG DRIVE CORD

It is necessary when replacing the gang drive cord, to remove the pointer drive cable drum. This is done by removing the pointer cable from the drum and removing the three fixing screws and sliding the drum forward.

Turn the gang to the maximum capacity position and attach the spring A3-646-26 (see diagram) securely to the drum, by bending the lug on the drum over one end of the spring.

The small bakelite driving drum has a slot across the rim, with two small grooves to position the cord (VK-447-22). Under the slot is a round hole into which the brass tube on the cord is fitted, with the short end (17⅝") of the cord towards the back of the drum. With the slot in the drum at 10 o'clock the back cord is passed round the drum one and a half times in a clockwise direction towards the front of the drum, and the front cord is passed round the drum one and a quarter times in an anti-clockwise direction. A small piece of sellotape placed over the turns and drum will assist in keeping the cord in place while further threading operations are carried out.

The back cord is next fed over the drive shaft in an anti-clockwise direction for three turns towards the chassis, and the flex cable (3") is fitted into the right-hand cable socket on the chassis bracket, and the lower cable socket on the gang condenser bracket. This end of the cord is then placed over the gang drum and brought through the slot in the drum and the tag placed over the end of the spring. The gang condenser should now be opened slightly to take up the slack in the cord, without placing any tension on the small driving drum. The front cord of the driving drum is now fed under the driving shaft in a clockwise direction for two and a half turns towards the front of the shaft and the flex cable (3¼") is fitted into the left-hand cable socket on the chassis bracket and the upper socket on the gang condenser bracket. This end of the cord is next placed round the small brass pulley and round the gang drum in a clockwise direction.

Remove the sellotape from the small driving drum and with a pair of pliers expand the spring, at the same time taking up the slack in the free end of the cord, until it can be continued round the drum, and passes through the slot in the drum, round the capstan and over the end of the spring. Release the spring and see that the cord is positioned on the drive shaft in such a way that it does not bind in the chassis bearing and close up any gaps between adjacent turns. Turn the drive shaft a few times so that the tension is equalised, over the cord.

Replace the large pointer driving drum so that when the gang is in the maximum capacity position the longest slot in the rim of the drum is approximately at 4 o'clock.

PROVISIONAL DATA ONLY

Philips Radioplayer Model BZ437A

Condenser Values

C1	3-30	MMFD	Air Trimmer
C2	"	"	" "
C3	"	"	" "
C4	"	"	" "
C5	"	"	" "
C6	"	"	" "
C7	12-500	"	Tuning Condenser
C8	"	"	" "
C9	3.9	"	Ceramic
C10	150	"	"
C11	233	"	" ± 1%
C12	.05	MFD	500V. Paper
C13	175	MMFD	W.W. Trimmer
C14	"	"	" "
C15	.01	MFD	500V. Paper
C16	300	MMFD	Ceramic
C17	120	"	"
C18	150-750	"	Padder
C19	110	"	I.F. Condenser
C20	110	"	" "
C21	190	"	Mica
C22	56	"	Ceramic
C23	120	"	"
C24	500	"	Mica
C25	.01	MFD	500V. Paper
C26	.005	"	500V. "
C27	100	MMFD	Ceramic
C28	.01	MFD	500V. Paper
C29	100	MMFD	Ceramic
C30	110	"	I.F. Condenser
C31	110	"	" "
C32	10	"	Ceramic
C33	.01	MFD	500V. Paper
C34	.25	"	150V. "
C35	.05	"	350V. "
C36	500	MMFD	Mica
C37	100	MFD	10V. Electrolytic
C38	.01	"	500V. Paper
C39	.005	"	750V. "
C40	20	MFD	350V.) Triple
C41	40	"	350V.) Electrolytic
C42	40	"	350V.)

Resistor Values

R1	1	MEG	½ W.	Carbon
R2	47	K	¼ W.	"
R3	47	K	½ W.	"
R4	27	K	½ W.	"
R5	25	K	1 W.	"
R6	100	K	½ W.	"
R7	470	K	¼ W.	"
R8	750	K	¼ W.	"
R9	10	MEG	¼ W.	"
R10	1	"	¼ W.	"
R11	100	K	½ W.	"
R12	250	K	¼ W.	"
R13	68	K	¼ W.	"
R14	2	M plus 650 K.		Volume Control
R15	47	K	¼ W.	Carbon
R16	75	K	¼ W.	"
R17	2200	ohms	¼ W.	"
R18	2.2	M	¼ W.	"
R19	150	K	½ W.	"
R20	.5	MEG	Tone Control	
R21	10	K	¼ W.	Carbon
R22	120	ohms	1 W.	"
R23	500	"	4 W.	Wire
R24	2200	"	2 W.	Carbon

T1	S.W.	Aerial Coil	VK469-55
T2	B.C.	" "	VK469-54
T3	S.W.	Oscillator Coil	VK471-37
T4	B.C.	" "	VK471-36
T5	First I.F. Filter		A3 121-94
T6	Second " "		A3 121-94
T7	Output Transformer		VK670-73
T8	Power "		VK630-77