Philips "Philette" BZ166U

MARK I and MARK II

and "Philette Fiesta" BZ167U

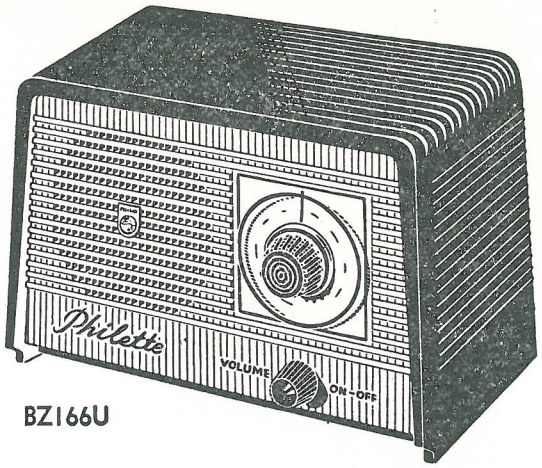
4 VALVE SUPERHETERODYNE RECEIVERS

Mains Supply: 210 - 250 volts. A.C. 50 - 100 c/s or D.C.

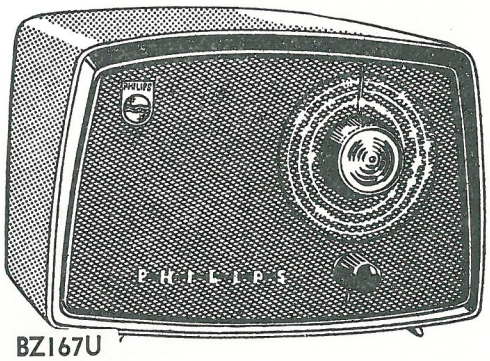
Input Power: 40 watts.

Tuning Range: 535 - 1590 Kc/s.

Intermediate Frequency: 455 Kc/s.



BZ166U



BZ167U

Removing The Chassis from The Cabinet

To remove the chassis from the cabinet, the following procedure should be adopted.

Remove the mains plug fom the supply. Remove the back cover. Remove the two knobs. The volume control knob grub screw is tapped into the shaft, but the tuning knob is fixed to the shaft with two grub screws, which need only to be loosened.

The chassis is fixed in the cabinet with two Philips head type Y self-tapping screws into two bosses in the front of the cabinet. One screw fits through a hole in the volume control mounting bracket, to the left of the control, and the other fits through a hole in the angle bracket at the extreme right hand front cover of the chassis. Remove these two screws. Unsolder the two speaker wires from the lugs on the output transformer.

Slide the chassis clear of the cabinet.

To replace the chassis reverse the above procedure. It is important to make certain the back cover is securely fitted after the job is completed.

Alignment of The Receiver

Attention is drawn to the fact that the high tension supply is rectified from the mains, so that in the event of the mains flex being incorrectly connected it is possible that the phase of the supply is connected to the chassis. Therefore, before commencing work on the chassis it is desirable to check the mains plug for correct phasing. A further check may be carried out by connecting a neon lamp between chassis and earth, or measuring the potential of the chassis with respect to neutral or earth, with a low consumption A.C. voltmeter.

A suitable 1:1 isolating transformer is recommended.

If complete alignment of the receiver is necessary, the tuning knob should be fixed to the shaft and an auxiliary pointer fixed to one of the 3 mm tapped holes in the top of the tuning condenser.

The tuning condenser shaft rotates through an angle of 324 degrees, and the maximum and minimum positions are given by the spaces in the three circles on the scale. Set the pointer to the maximum capacity position, at the low frequency end of the scale. Switch on the receiver and allow it to warm up for a few minutes.

Turn the volume control to maximum, and the tuning condenser to minimum capacity position. Unscrew the adjusting cores on the I.F. transformers nearly right out. Apply a signal of 455 Kc/s. modulated 30 per cent through a capacity of 0.01 mfd to the control grid (pin No. 2) of the UCH 81 valve, and adjust for maximum output in the following sequence. (See trimmer position diagram):

1. Diode coil.
2. UBF 80 plate coil.
3. UCH 81 plate coil.
4. UBF 80 grid coil.

If the above adjustments are carefully carried out no further movement of the adjusting cores should be made. The input required for a power output of 50 milliwatts should not exceed 50 microvolts. Remove the 0.01 mfd condenser from the control grid of the UCH 81 valve, and connect the signal generator by means of a standard dummy aerial to the aerial socket of the receiver. Connect the earth of the signal generator to the chassis of the set.

Apply a signal of 600 Kc/s to the aerial and turn the dial to the 600 K/cs position.

Adjust the oscillator coil inductance until the signal is tuned in, and adjust the coil on the Ferroxcube rod aerial, by sliding the coil along the rod with an insulated stick. Hold the coil in place with a piece of cellulose tape until final adjustments are made. Turn the dial round to the 1400 Kc/s position on the scale and apply a signal of 1400 Kc/s to the aerial.

Adjust the oscillator trimmer until the signal is tuned in, and adjust the aerial trimmer for maximum output. Repeat as for 600 Kc/s and 1400 Kc/s until the calibration is correct. The connection of a signal generator to the aerial terminal damps the rather high "Q" value of the Ferroxcube rod aerial. For optimum performance from the rod aerial final adjustment of the rod should be made by inducing a signal into it by means of a loop, consisting of six turns, six inches in diameter, connected to the signal generator. The rod coil, and aerial trimmer should be adjusted at 600 Kc/s and 1400 Kc/s respectively. This means that when no external aerial is used the rod will give maximum performance, and when a good external aerial is used the effect of damping will be offset by the increased signal. When all adjustments are completed seal the trimmers, the oscillator coil, and the aerial coil to the rod.

Model BZ166U was produced in two circuit versions, Mk I serial Nos. 7801-9800 inclusive and Mk II serial Nos. 14001-15000 inclusive.

The alterations made in the Mk II version are briefly the omission of the mains filter choke 460-63 and the inclusion of a new type 1st I.F. filter A3 127-42. Also in the later version, the oscillator voltage is increased, the converter screen voltage is decreased and the UCL 82 triode plate voltage is decreased. These figures are detailed in the separate voltage tables and separate schematic diagrams are provided for both versions.

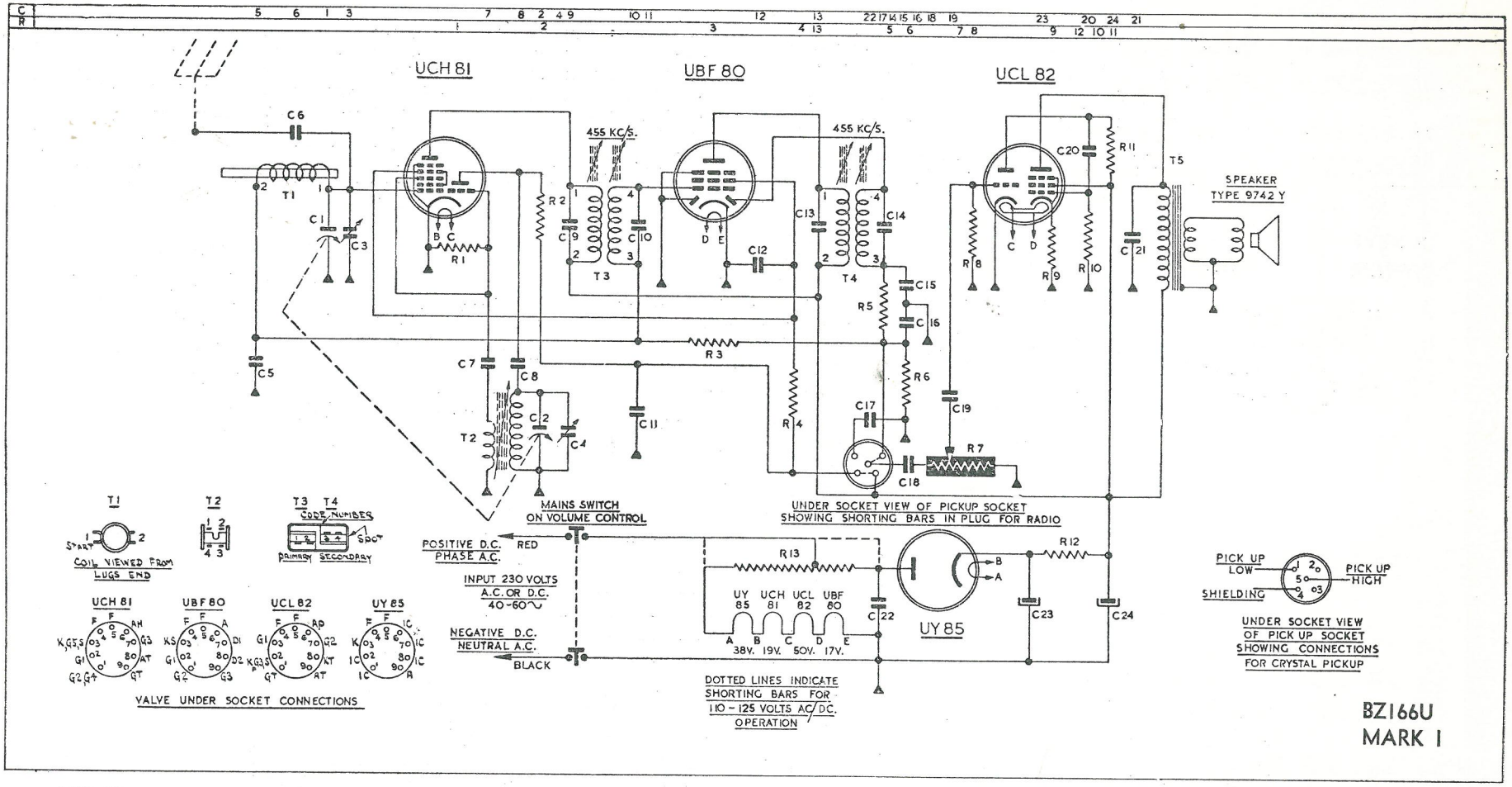
LIST OF SPARE PARTS

Cabinet	BZ167U .... 771 45 BZ166U A3 750 60	Tuning Knob	A3 769 02
Speaker Ring	VK 398 21	Grub Screw for Volume Control Knob	A3 324 16
Spring Clips for Back	A3 449 00	Volume Control Switch	48 904 30/DL/M4 + 1M6
Back Cover	BZ167U .... A3 259 06 1 BZ166U .... VK 396 86	Tuning Condenser	49 002 00
Volume Control Knob	A3 752 64	Wire Wound Filament Resistor	B1 634 18
Dial Scale	BZ167U .... VK 852 37 BZ166U .... VK 852 23	Ferroxcube Rod	56 681 65/4B

VOLTAGE TABLE BZ166U MK 1

All readings taken with an input of 230 volts 50 c/s. Full load input current (moving iron ammeter) 200 mA. Input power: 40 watts.

Valve	Function	Filament	Plate	Screen	Cathode
UCH81	Frequency Converter and Oscillator	19	Conv. 220 Osc. 137	55	—
UBF80	I.F. Amplifier, Demodulator and Delayed A.V.C.	17	220	55	—
UCL82	Voltage Amplifier and Power Output	50	Triode. 85 Pentode. 210	220	15
UY85	Half Wave Rectifier	38	220 AC.	—	245



CONDENSERS

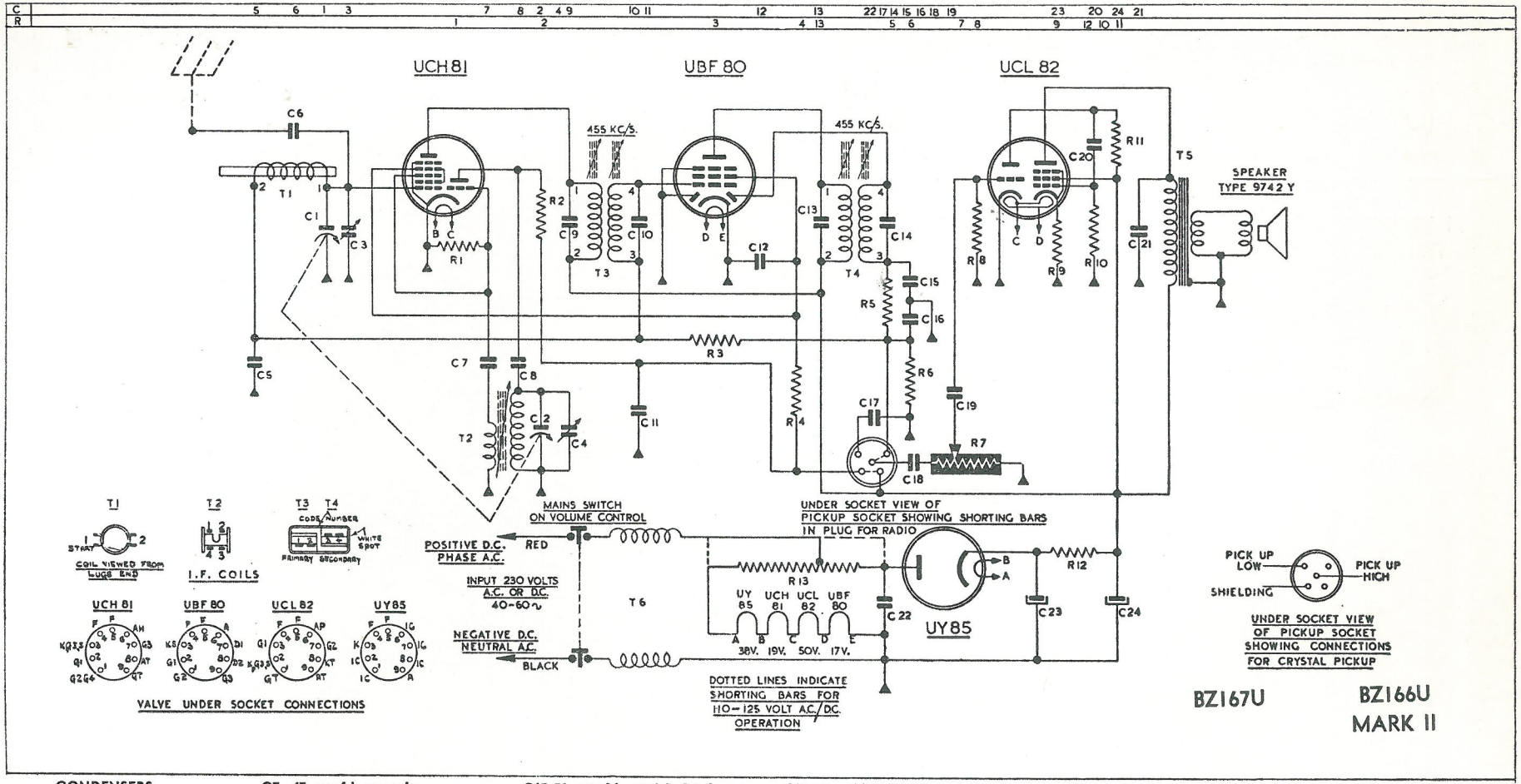
C1 10-332 mmfd } ganged
C2 9-132 mmfd }
C3 3-30 mmfd trimmer on gang
C4 3-30 mmfd trimmer on gang
C5 0.05 mfd 100v. paper
C6 10 mmfd ceramic
C7 47 mmfd ceramic
C8 150 mmfd ceramic
C9 110 mmfd ceramic
C10 195 mmfd ceramic
C11 0.01 mfd 750v. paper
C12 0.047 mfd 400v. paper
C13 110 mmfd ceramic
C14 195 mmfd ceramic
C15 100 mmfd } with R5 forms
C16 100 mmfd } diode filter
C17 0.01 mfd 750v. paper
C18 0.01 mfd 750v. paper
C19 0.01 mfd 500v. paper
C20 0.01 mfd 500v. paper
C21 0.005 mfd 750v. paper
C22 0.022 mfd 1000v. paper
C23 50 mfd 350v. } double
C24 50 mfd 350v. } electrolytic

RESISTORS

R1 47k ¼w. carbon
R2 15k ¾w. carbon
R3 2.2m ¼w. carbon
R4 39k ¾w. carbon
R5 47k ¼w. carbon
R6 330k ¼w. carbon
R7 2m carbon potentiometer
R8 4m7 ¼w. carbon
R9 390 ohms ¾w. carbon
R10 330k ¼w. carbon
R11 100k ¼w. carbon
R12 500 ohms 4w. wire wound
R13 1200 ohms tapped at 120 ohms 12w. w.w.

In early production R9 220 ohms R12 1000 ohms, and plate supply to UCL82 pentode was taken from cathode of UY85.

T1 Ferrocepior rod aerial coil VK 469-75
T2 Oscillator coil VK 471-51
T3 Micro "12" I.F. filter A3 126-84
T4 Micro "12" I.F. filter A3 126-84
T5 Output transformer VK 671-06
T6 Mains filter choke VK 460-63



CONDENSERS

C1 10—332 mmfd } ganged
C2 9—132 mmfd }
C3 3—30 mmfd trimmer on gang
C4 3—30 mmfd trimmer on gang
C5 0.05 mfd 100v. paper
C6 10 mmfd ceramic
C7 47 mmfd ceramic
C8 150 mmfd ceramic
C9 110 mmfd ceramic
C10 110 mmfd ceramic
C11 0.01 mfd 750v. paper
C12 0.047 mfd 400v. paper
C13 110 mmfd ceramic
C14 195 mmfd ceramic
C15 50 mmfd } with R5 forms
C16 50 mmfd } diode filter
C17 0.01 mfd 750v. paper
C18 0.01 mfd 750v. paper
C19 0.005 mfd 750v. ceramic
C20 0.005 mfd 750v. ceramic
C21 0.005 mfd 750v. paper
C22 0.022 mfd 1000v. paper
C23 50 mfd 350v. } double
C24 50 mfd 350v. } electrolytic

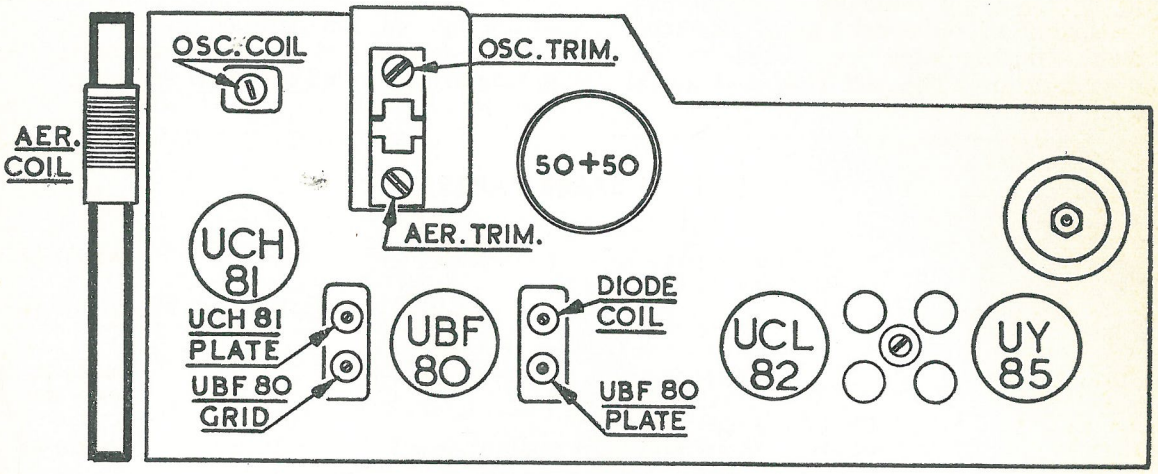
RESISTORS

R1 47k ½w. carbon
R2 15k ½w. carbon
R3 2.2m ½w. carbon
R4 39k ½w. carbon
R5 47k ½w. carbon
R6 330k ½w. carbon
R7 M4 + 1m6 carbon potentiometer
R8 4m7 ½w. carbon
R9 390 ohms ½w. carbon
R10 680k ½w. carbon
R11 220k ½w. carbon
R12 500 ohms 4w. wire wound
R13 1200 ohms tapped at 120 ohms 12w. w.w.
T1 Ferroceptor rod aerial coil VK 469-75
T2 Oscillator coil VK 471-51
T3 Micro "12" I.F. filter A3 127-42
T4 Micro "12" I.F. filter A3 126-84

For Model BZ167U read:
T4 Micro "12" I.F. filter A3 127-42
T5 Output transformer VK 671-06

COIL AND TRANSFORMER RESISTANCES

T1	Ferroceptor Rod Aerial Coil	VK 469 75		1.18 ohms
T2	Oscillator Coil	VK 471 51	Tuned Feedback	7.7 ohms 3 ohms
T3	1st. I.F. Filter MK1	A3 126 84	Primary Secondary	8.4 ohms 4.7 ohms
	" " MKII	A3 127 42	Primary Secondary	14.5 ohms 14.5 ohms
T4	2nd. I.F. Filter	A3 126 84	Primary Secondary	8.4 ohms 4.7 ohms
T5	Output Transformer	VK 671 06	Primary Secondary	320 ohms 1.12 ohms
T6	Mains Filter Choke MK1 only	VK 460 63	Each Winding	3.7 ohms



VOLTAGE TABLE BZ166U MK II AND BZ167U

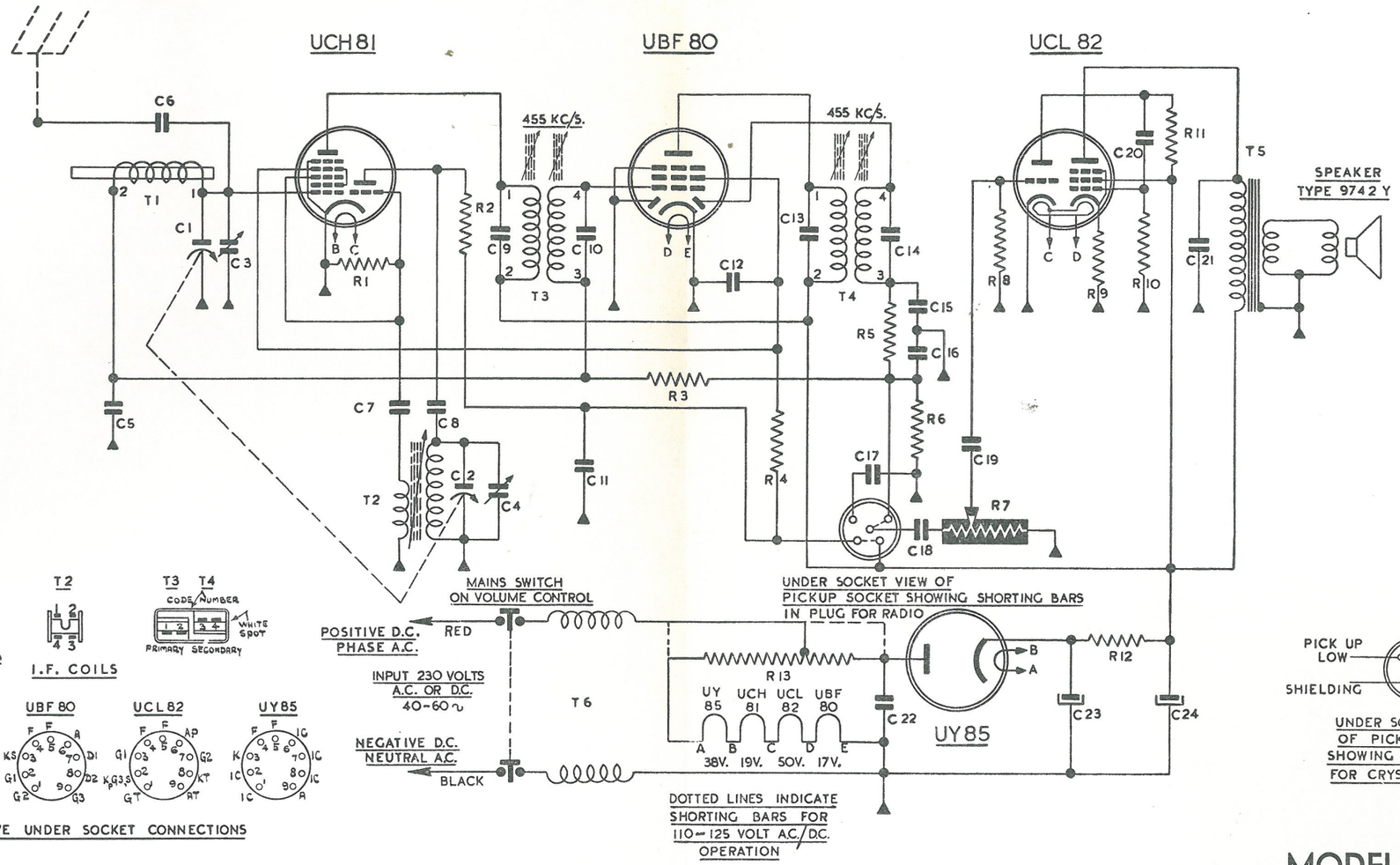
Valve	Function	Filament	Plate	Screen	Cathode
UCH81	Frequency Converter and Oscillator	19	Conv. 220 Osc. 145	50	—
UBF80	I.R. Amplifier, Demodulator and Delayed A.V.C.	17	220	50	—
UCL82	Voltage Amplifier and Power Output	50	Triode. 70 Pentode. 210	220	15
UY85	Half Wave Rectifier	38	220 AC	—	245

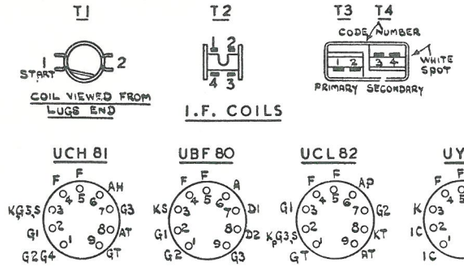
The above voltages are measured between the points indicated and chassis except in the case of the filament voltages which are measured directly between the valve socket terminals, the meter used having a movement of 20,000 ohms per volt on D.C. ranges and 1000 ohms per volt on A.C. ranges. Variations up to ± 5% are permissible.

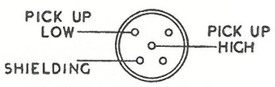
T1 Ferroceptor rod aerial coil VK 469-75
ohms 12w. w.w.
T5 Output transformer VK 671-06
A3 127-42
R4 39k ½w. carbon
R5 47k ½w. carbon
R6 330k ½w. carbon
C21 0.005 mfd 750v. paper
C22 0.022 mfd 1000v. paper
C13 110 mmfd ceramic
C14 195 mmfd ceramic
C5 0.05 mfd 100v. paper
C6 10 mmfd ceramic

INTERIM CIRCUIT — Philips Philette — Model BZ166U

C	5	6	1	3	7	8	2	4	9	10	11	12	13	22	17	14	15	16	18	19	23	20	24	21
R	1				2					3		4	13	5	6		7	8			9	12	10	11







UNDER SOCKET VIEW OF PICKUP SOCKET SHOWING CONNECTIONS FOR CRYSTAL PICKUP

MODEL BZ166U
PHILETTE

C1	10-332 mmfd }	C13	110 mmfd ceramic
C2	9-132 mmfd } Ganged condenser	C14	195 mmfd ceramic
C3	3-30 mmfd Trimmer on Gang	C15	100 mmfd } with R5 forms
C4	3-30 mmfd Trimmer on Gang	C16	100 mmfd } diode filter
C5	0.05 mfd 100v paper	C17	0.01 mfd 750v paper
C6	10 mmfd ceramic	C18	0.01 mfd 750v paper
C7	47 mmfd ceramic	C19	0.01 mfd 500v paper
C8	150 mmfd ceramic	C20	0.01 mfd 500v paper
C9	110 mmfd ceramic	C21	0.005 mfd 750v paper
C10	195 mmfd ceramic	C22	0.022 mfd 1000v paper
C11	0.01 mfd 750v paper	C23	50 mfd 350v } double
C12	0.047 mfd 400v paper	C24	50 mfd 350v } electrolytic

R1	47k ¼w carbon	R10	330k ¼w carbon
R2	15k ½w carbon	R11	100k ½w carbon
R3	2.2M ¼w carbon	R12	1k 4w wire wound
R4	39k ¾w carbon	R13	1200 ohms tapped at 120 ohms 12w W.W.
R5	47k ¼w carbon		
R6	330k ¼w carbon		
R7	2M carbon potentiometer		
R8	4MT ¼w carbon		
R9	220 ohms ¾w carbon		

T1	Ferroceptor rod aerial coil	VK 469-75
T2	Oscillator coil	VK 471-51
T3	Micro '12' I.F. Filter	A3 126-84
T4	Micro '12' I.F. Filter	A3 126-84
T5	Output transformer	VK 671-06
T6	Mains filter choke	VK 460-63