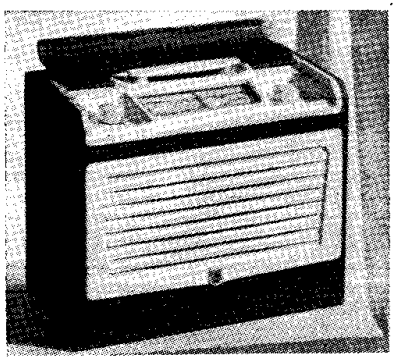
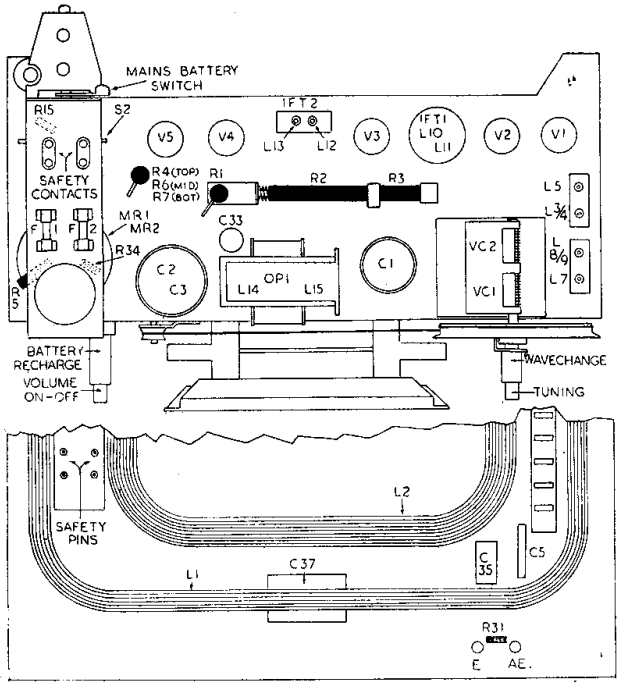
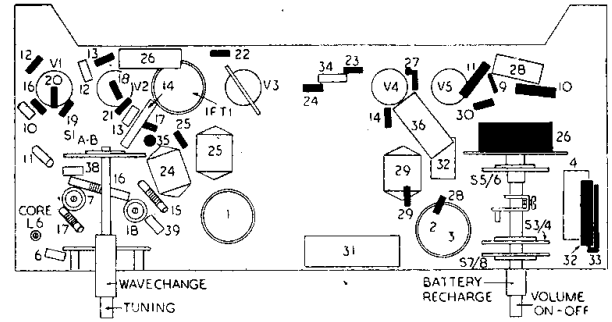
PHILIPS 523UB



Five-valve two waveband mains-battery portable receiver with self-contained frame aerials. Sockets provided for an external aerial and earth. HT battery charging circuit is incorporated to extend life of battery. Housed in smoke-blue or apple-green rexine covered case fitted with cream plastic mouldings and spring-loaded carrying handle. Suitable for operating from all-dry batteries and 200-250V AC/DC mains. Manufactured by Philips Electrical, Ltd., Century House, Shaftesbury Avenue, London, WC2.





Price £23 2s. 0d. (£17 9s. 9d. plus £5 12s. 3d. tax). Date released: June, 1953.

CAPACITORS

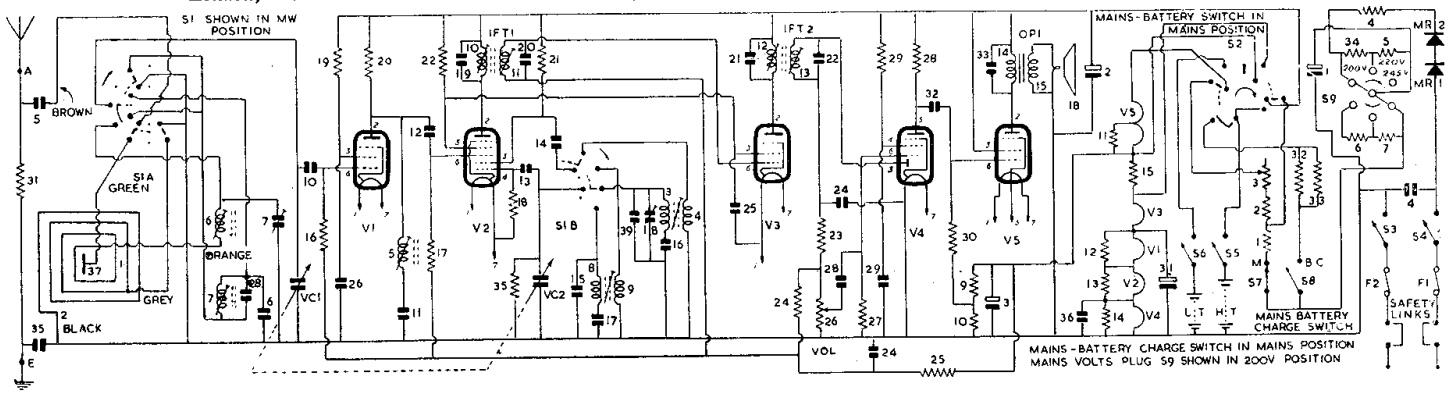
C	Capacity	Type
1	50 Electrolytic 350V	
2	100 Electrolytic 150V	
3	250 Electrolytic 12V	
4	.01 Tubular 600V	
5	150pF Ceramic	
6	97pF Ceramic	
7	3-30pF Trimmer	
8	No Components	
9		
10	100pF Ceramic	
11	18pF Ceramic	
12	100pF Ceramic	
13	100pF Ceramic	
14	470pF Ceramic	
15	148pF Wire Wound	Type
16	530pF Wire Wound	Type
17	195pF Wire Wound	Type
18	3-30pF Trimmer	
19	115pF	Special
20	115pF	Drawn Wire
21	115pF	Capacitors
22	115pF	
23	No Component	
24	.0047 Tubular 125V	
25	.047 Tubular 125V	
26	.047 Tubular 125V	
27	No Component	
28	.0022 Tubular 400V	
29	.047 Tubular 125V	
30	No Component	
31	100 Electrolytic 12V	
32	.0022 Tubular 400V	
33	.0022 Tubular 400V	
34	100pF Ceramic	
35	.0047 Tubular 1000V	
36	.1 Tubular 125V	
37	Capacity Between Copper Foil and L1	
38	10pF Ceramic	
39	12pF Ceramic	

RESISTORS

R	Ohms		Watt
1	1432	WW	17
2	1500	WW	10
3	550	WW	4
4	175	WW	3
5	68		1
6	160	WW	3
7	263	WW	3
8	No Component		
9	620	HS	¼
10	250	HS	¼
11	380	HS	¼
12	560		¼
13	330		¼
14	220		¼
15	18		¼
16	820K		¼
17	820K		¼
18	27K		¼
19	68K		¼
20	18K		¼
21	33K		¼
22	39K		¼
23	47K		¼
24	5.6M		¼
25	8.2M		¼
26	1M Log Law Potr		
27	10M		¼
28	1M		¼
29	4.7M		¼
30	1M		¼
31	1M		¼
32	47K		¼
33	47K		¼
34	33		1
35	33K		½

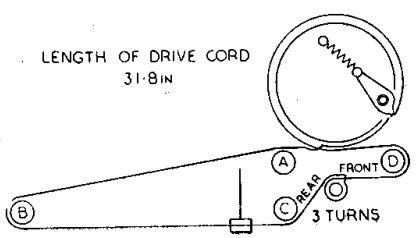
INDUCTORS

L	Ohms
1	.75
2	1.25
3	10
4	9
5	29.5
6	2.5
7	34
8	20
9	15
10	7.5
11	7.5
12	12
13	12
14	550
15	25
16	No Components
17	
18	3



V1—DF91	V2—DK92	V3—DF91	V4—DAF91	V5—DL94
G2 43V ·7MA; A 61V 1·5MA; F-G3; G1; F-	G2 33V 1·65MA; A 88V ·7MA; G1; G4 56V 15MA; G3; F-; F+G5	G2 56V ·6MA; A 89V 1·5MA; F-G3; G1; F-	G2 18V ·2MA; D; A 20V ·07MA; F-G3; G1; F+	G2 86V 1·5MA; A 84V 5·9MA; FCTG3; G1; F-

Total HT Current = 14·5 MA Mains Consumption = 80MA Approx Bias Volts Across C3 = 5·8V



AERIAL—The receiver is fitted with series connected MW and LW frame aerials L1 L2, together with separate loading coils L6 (MW) L7 (LW). Sockets are provided to enable an external aerial and earth to be used in low signal strength areas. Aerial and earth sockets are isolated from receiver by C5 C35 respectively, with R31 functioning as a static drain resistor.

When wavechange switch is placed in its MW position, then LW frame L2 and its loading circuit L7 C38 C6 are shorted down to the chassis by S1A. At the same time the MW circuit, consisting of frame L1, series loading coil L6, and trimmer C7, is switched to aerial tuning capacitor VC1.

Signal from an external aerial, when used, is fed through isolating capacitor C5 and S1A and

capacitively coupled to MW frame L1 through C37.

In LW position of S1A the frame aerials and loading coils are all connected in series and tuned by VC1, the external aerial signal in this instance being coupled to bottom end of LW loading coil L7. LW circuit is trimmed by adjustment of core of L7.

L15 C11 constitute a tuned IF filter.

Oscillator employs g1 and g2 of heptode V2 as a triode connected in a tuned grid shunt fed anode circuit. The grid coils L3 (MW) L8 (LW), trimmed by C18-C39 and padded by C16 C17 respectively, are switched by S1B to oscillator tuning capacitor VC2 and coupled by C13 to g1 of V2. Automatic bias for grid is developed on C13 with R18 as leak resistor. Anode reaction voltages are developed inductively from L4 (MW) L9 (LW) and switched by S1B through C14 to oscillator anode (g2) of V2, of which R21 is load.

IF amplifier operates at 470kc/s.

Output stage. Signal at anode V4 is fed by C32 to g1 of pentode output amplifier V5. Valve is biased by approximately 6V, this being the potential difference between centre tap of its filament, which is at high potential side of LT supply, and earthy end of its grid resistor R30, which is connected to a potential dividing network R9 R10 across series filaments of V1 to V4. Screen voltage is obtained direct from HT line, decoupling being provided by C2. Audio output is transformer coupled by OP1 to a 5-in. PM speaker L18.

HT of 90V is provided by two 45V Ever Ready B104 or equivalent type batteries connected in series, or alternatively from the mains. Receiver HT line is switched by S2 to either source of supply.

HT battery is decoupled by C2, which on mains-generated HT functions as a smoothing capacitor. S5, which is operated by volume control spindle, is HT battery on-off switch.

When receiver is operated from mains supply the HT is provided by series connected metal rectifiers MR1 MR 2 fed direct from input mains. HT is resistance-capacity smoothed by R1 C1 C2 with R5 R6 R7 R34 switched in or out of circuit by S9 to give voltage adjustment.

Reservoir smoothing capacitor C1 should be rated to handle 175mA ripple current.

Battery vitalizing. When receiver is fitted with batteries it is possible to prolong life of HT battery by "charging" it from the mains. To do this the receiver should be connected to the mains supply and switched on. The Mains-Battery Charge switch should then be placed in its Battery Charge position. This opens S7 and closes S8, thereby disconnecting rectified HT feed from main voltage dropper and smoothing resistor R1, and reconnecting it through R32 R33 S2 and S5, to HT battery. The charging current is approximately 7mA.

LT of 9V for the series connected filaments of V1 to V5 is provided by two 4.5V Ever Ready Alldry 28, or equivalent type, batteries connected in series, or if the receiver is operated from the mains, from the rectified and smoothed HT through droppers R2 R3. Additional smoothing to LT line is given by C3 C31, whilst C36 is RF bypass capacitor. R3 is factory adjusted to give a filament current of 46.4mA with receiver set for 245V and operated from 241V 50c/s input. R11 R12 R13 R14 are current bypass resistors to maintain correct voltage across each filament. R15, which is connected in series with filament line between V3 and V5, is short circuited when S2 is placed in its Battery position. S6, which is ganged to S5 and operated by volume control spindle, is LT battery on-off switch.

S3 and S4 which are ganged together and also operated by volume control spindle, form mains on-off switch. C4 is mains filter capacitor. Mains input incorporates safety contacts and a 160mA fuse in each lead. The safety contacts are open circuited and hence mains supply to receiver broken when rear panel of cabinet is removed.

Removal of chassis. Remove rear panel of cabinet by fully slackening off the four captive fixing screws. Disconnect leads from tag block on rear panel by unplugging them from the sockets. Remove the two knobs (held by grub screws) and then the two lower push-on concentrically mounted switch controls. Release battery leads from their clamp. Place receiver on its front and undo and remove the two chassis fixing bolts. The chassis is removable by lifting rear edge of chassis towards you, to clear the locating pegs, and then downwards towards base of cabinet.

Removal of top moulding. Remove chassis as described above. Remove the two outer rear fixing bolts and centre rear spire nut. Slacken the two outer front bolts and turn brackets out of slots in cabinet. Moulding is now free to be removed.

Renewal of cursor drive cord. Turn gang condenser to maximum capacity. Place tensioning spring over anchoring lug on drum and attach one end of cord to end of spring. Lead cord over stud, and around pulleys A B and C. Wind three turns clockwise around tuning spindle, and then pass cord anti-clockwise round pulley D, clockwise round the drum and hook end of cord on to spring. The latter operation is made easier if the cord is temporarily removed from pulley B—the spring can then be stretched sufficiently to allow cord to be replaced around that pulley. Pointer is secured to cord by a set screw. With gang at maximum capacity the pointer should line up with letter " m " at right-hand end of LW scale.

TRIMMING INSTRUCTIONS

Apply Signal as stated below	Tune Receiver to	Trim in Order stated for Max. Output
(1) Place gang at minimum capacity, volume control to maximum and switch to MW band.		
(2) 470 kc/s to g3 of V2 via .047 capacitor	—	Cores L13, L12, L11 and L10
(3) 470 kc/s to g1 of V1 via .047 capacitor	—	Core L5 for *minimum*
(4) 540 kc/s as above	Gang at maximum	Core L3
(5) 1.585 mc/s as above	Gang at minimum	C18 and repeat (4) and (5)
(6) 140 kc/s as above	Gang at minimum	Core L8
(7) Remove chassis from case and reassemble frame, and chassis on bench. Batteries should be placed approximately in their normal positions with respect to chassis, whilst frame aerial needs to be kept about 3½in. from rear of chassis. Couple signal generator to frame via a loop in close proximity.		
(8) 600 kc/s to frame via loop	Tune for maximum output	Core L6 (Bot)
(9) 1.5 mc/s as above	Ditto	C7, repeat (8) and (9)
(10) 150 kc/s as above	Ditto	Core L7 (Top)

GEC BT5147—*Continued from p. 29*

does not exceed 20 volts. Similarly, the sound output, as indicated by the AC voltmeter, should not exceed approximately 30 volts. In the instructions which follow, "maximum vision response" implies maximum video output as indicated by maximum change downwards in DC voltmeter readings while "maximum sound" indicates maximum deflection of AC voltmeter indicating sound output.

Procedure. Adjust the signal generator to 35.625mc/s. (unmodulated). Connect 330-ohm resistor across L16 (using short leads) and adjust core L17 for maximum vision response. Remove shunt resistor and similarly adjust L16. Transfer shunt to L9 and adjust L10. Remove shunt resistor and similarly adjust L9.

With signal generator set to 32.625mc/s. (unmodulated) adjust L7 for *minimum* vision output. Adjust signal generator to 35.625mc/s. and re-check L9. Roughly tune L15 for maximum vision response.

Set signal generator to deliver a modulated input at 37.625mc/s. Roughly tune T1 and T2 for *minimum* vision response. Short circuit trimmer T1 and adjust L12 for maximum vision response. Remove short circuit from T1 and give final adjustment to T1 and T2 for *minimum* vision response. Adjust L5 and L4 respectively for maximum sound output.

Re-set signal generator to 35.625mc/s. (unmodulated) and give final adjustment to L15 for maximum vision response.

This completes the IF alignment operations except for the sealing of the varioucoil slugs a djusted, which may be achieved by applying a small dab of Bostik or similar adhesive between the dust cores and the coil formers.

CORRECTION OF FAULTY RESPONSE

Sound on vision. Assuming that adjustment of oscillator (L11) does not clear this, the sound take off and rejection circuits should be adjusted. This may be carried out with the use of a signal generator by careful adjustment of T1 and T2 on a transmission. A sensitive indication may be obtained by adjusting the Horizontal Hold control to slip the picture so that the edge can be seen; the presence of even a small amount of sound on vision causes this to appear ragged or wavy. Following adjustment of T1 and T2 for optimum results, it may be worth re-checking the oscillator setting for further improvement. Where the circuits concerned are well out of adjustment, re-alignment on a signal generator will have to be carried out, as detailed in the previous section.

Vision on sound. Where present, this will be due to cross modulation. It may be remedied by interchanging V1 or V3 with any other Z77 in the receiver, except V2. In cases where the receiver is connected straight to aerial and is running nearly at maximum gain, this is the only remedy, but in other cases, where there is plenty of gain in hand, the fitting of an aerial attenuator, or the use of a different value if an aerial attenuator is already in use, may clear the trouble by allowing the receiver to operate at a different gain control ("Contrast") setting for same picture contrast.

"Plastic" (excessive white after black) or "Overshoot." A frequent cause of this is misalignment of the aerial circuit. The remedy is to adjust L1/L2 while observing a test pattern such as Test card C. Adjust to compromise between "plastic" at one extreme and "fuzziness" at the other as judged by the 2.5 and 3.0 mc/s. bars. In other cases similar adjustment of L15 and L16 may be effective.

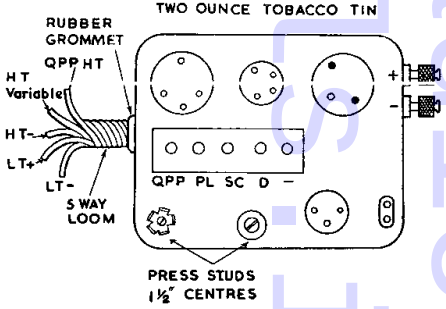
SERVICE CASEBOOK

MODIFICATION TO ELIMINATOR

A WELL KNOWN service eliminator providing variable HT and LT seemed to have only limited use since its bulk on the bench tended to restrict accessibility to the set on test. The shortness of the usual battery leads prevented the instrument being placed elsewhere.

To overcome this the various sockets and terminals were removed from the main panel and it was found that by careful grouping, all could be fitted into a two-ounce tobacco tin. Even the dropping resistors and their decoupling condensers were accommodated, the whole being covered with a sheet of thin insulation before the lid was fitted and fixed with two small blobs of solder. Connected to the main instrument with a five-way loom this modified eliminator was found to be most useful, presenting as it does a rapid form of basic testing.

As the off-load and on-load readings on the voltmeters are by no means identical, open circuits are at once shown up. And with the LT adjusted well below normal the removal of each valve "in turn" (just sufficiently to break the filament circuit) is indicated by a rise in the readings of both HT and LT meters due to removal of load. If no rise, then there's no circuit. Only the demodulator takes so little current that its effect on HT passes unobserved. —E. H. MEADOWS, Alton.



REGENTONE A353

THIS set was completely dead. Checking the voltages I was amazed to read 20V on the DDT cathode. Grid checked OK, but a high-voltage registered on another pin, which proved to be the AVC diode.

The AVC feed condenser had obviously developed a bad leak, and a replacement put everything in order.

METAL RECTIFIERS

METAL rectifiers, considered prewar to be almost infallible, now seem to need changing as frequently as valve rectifiers.

Intermittent working in the Ekco Stroller, MBP99, is usually due to low rectifier output reducing LT voltage to the FC valve.

I recently replaced both HT and LT rectifiers in an all-dry mains unit only 18 months old because of low output.

The Ultra Twin is another example. Sets have been tested with 5V or less LT.—E. C.

PHILIPS 371U; MULLARD MUS221

HERE is quite a common fault in these sets. No continuity can be measured from pin to pin on the mains plug. Mains dropping resistor is OK. Dial bulb also. Valve heaters intact, switch OK and mains lead OK.

Have a look at R33 and R34 (33ohms and 82ohms, respectively) as they form a bias network between one side of the mains and chassis. I have had several cases of burn-outs here and find it profitable to replace with a higher-wattage component.—K.U.