

SERVICE MANUAL

FOR RECEIVER

22B

FOR FEEDING BY BATTERIES

GENERAL DATA

Wave bands:
Short waves : 16.8 - 51 m (17.86 - 5.98 Mc/s)
Medium waves : 198 - 585 m (1515 - 513 kc/s)
Long waves : 708 - 2000 m (424 - 150 kc/s)

Dimensions:
Width : 50 cm }
Height : 27.5 cm } Knobs including.
Depth : 20 cm }

Weight: 8.4 kg (including tubes).

Knobs:

- From left to right on the front panel:
1. Volume control and dial light switch.
 2. Tone control.
 3. Tuning.
 4. Waverange switch.
- On the left-hand side: Battery-switch.

ADJUSTING THE RECEIVER

General remarks

Before trimming the receiver must be taken out of the cabinet because a few of the wire trimmers are only accessible from the underside of the chassis. The position of the trimmers is indicated in fig.1 and 2.

A. The I.F. circuits and the wave trap

1. Earth the set and switch it to long waves.
2. Set the variable condenser and the volume control at maximum.
3. Connect the output indicator via the trimming transformer to the additional speaker sockets.
4. Apply a modulated signal of 128 kc/s to the 1st grid of L1, via a condenser of 32000 uuf.
5. Shunt S16 with a resistance of 25000 ohms.
6. Trim C25, C26 and C21 to maximum output.
7. Shift the damping resistance to S17.
8. Trim C20 to maximum output.
9. Remove the damping resistance and the artificial aerial.
10. Apply to the aerial socket, via the normal artificial aerial, a modulated signal of 128 kc/s.
11. Make the signal very powerful and trim C4 to minimum output.
12. Seal the trimmers with wax.

B. The H.F. and oscillator circuits.

I. Medium waves.

1. Earth the set and switch it to medium waves.
2. Turn the volume control to maximum.
3. Fit the 15° gauge, connect the output indicator.
4. Turn the variable condenser firmly against the gauge (minimum capacity).

5. Apply a modulated signal of 1442 kc/s (208m) to the aerial socket via the standard artificial aerial.
6. Trim to maximum output successively C15-C6-C11.
7. Fix the trimmers with wax.

II. Long waves.

1. Earth the set and switch it to long waves; connect the output indicator.
 2. Turn the volume control to maximum.
 3. Check whether the variable condenser is still against the 15° gauge.
 4. Apply to the aerial socket, via the standard artificial aerial, a modulated signal of 404 kc/s (742.5 m).
 5. Trim the C16 to maximum output.
 6. Fix C16 with wax.
- Note: The short-wave band is not trimmed separately.

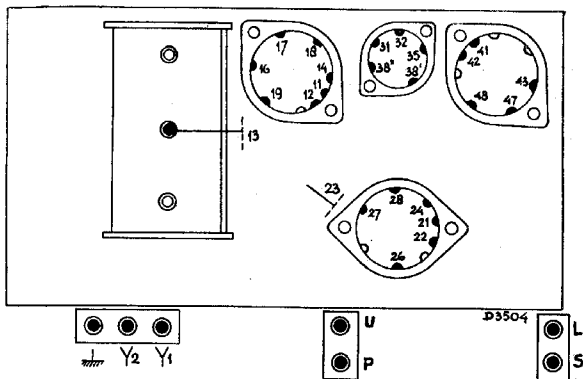
C. Image frequency filter.

1. Switch the set to medium waves, connect the output indicator.
2. Apply to the aerial socket, via the standard artificial aerial, a powerful signal of 968 kc/s (310 m).
3. Tune the set accurately to the image of this signal at about 420 m.
4. Trim C7 to minimum output.
5. Fix C7 with wax.

D. Dial adjustment

1. Switch the set to medium waves.
2. Apply a modulated signal of 320 m via the standard artificial aerial to the aerial socket.
3. Accurately tune the receiver to this signal.
4. Set the pointer at 320 m and secure it.

MEASURING TABLE



RESISTANCE

12	11/12	41/42	14	18	24	26	28	35	38"	3 x Y			U	L	S
	10			10	10	10	10	10	10	S.W.	M.W.	L.W.			
11	18	48													
	190	440													
10	16	3 x 19													
		S.W.	M.W.	L.W.											
	220	210	200	200											
9	3 x 13			2 x 17		23	27	28	38'	2 x 43					
	S.W.	M.W.	L.W.	A.	B.					C.	D.				
	70	70	70	280	430	65	320	400	215	205	120				

CAPACITY

12	28/43									10	47 ^c				
	C.										400				
11	13									9					
	130														

Wavebandswitch on M.W.

Variable condenser maximum.

Battery leads interconnected.

1) +B lead free from the other leads.

A. Economy switch "Economy".

B. Economy switch "Normal".

C. Tonecontrol "High".

D. Tonecontrol "Low"

LIST OF SPARE PARTS AND TOOLS

When ordering, always state:

1. Description,
2. Codenumber,
3. Type of set.

Description	Codenumber	Price
Cabinet	A1 245	36.0
Speaker silk	06 601	34.0
Ornamental Strip	A1 950	29.3
House of economy switch (col. 038)	28 857	22.0
Knobs in centre (col. 038)	23 610	72.0
Knobs at right and at left (col. 038)	23 612	60.1
Station name dial	A1 892	93.0
Pointer	28 860	98.0
Bottom grommet	28 890	24.0
Plugsocketplate for aerial and earth	28 874	31.0
Plugsocket for pick-up	28 874	52.0
Cable lug	08 191	12.0
Plug (black)	28 898	16.0
Plug (rod)	49 289	07.0
Indication plate	25 600	96.0
Plugsocket plate for external speaker	28 876	14.0
Rear panel	A1 715	33.0
Diallampholder	08 515	21.1
Tension spring for the driving cord	28 740	51.0
Clip for fixing the variable condenser	28 084	76.0
Spring for the spindle of the volume control	28 731	12.0
Switch element No.1	49 543	06.1
Switch element No.2	49 543	07.0
Economy switch	A1 138	07.1
LOUDSPEAKER TYPE 9614		
Clamping Ring	25 870	75.0
Paper ring	28 445	39.0
Centring gauge	09 992	42.0
TOOLS		
Universal test apparatus	GM 4286	
Service Oscillator	GM 2880 F	
Universal and tube test apparatus	GM 7629	
Insulated trimming key 8 mm	09 991	31.0
Insulated trimming key 6 mm	23 635	56.0
15 Ω jig	09 992	44.0

For Parts, not mentioned in the above list, see "General Parts list".

x When replacing a stationamedial always take a dial bearing the same codenumber as the one to be replaced.

CONDENSERS

	Value	Codenumber	Price
C1	11-490 uuF	28 212	30.0
C2	11-490 uuF		
C3	11-490 uuF		
C4	200 uuF	28 212	08.1
C5	18 uuF	49 055	19.0
C6	3-30 uuF	See "Coils"	
C7	3-30 uuF	49 005	00.1
C8	53 uuF	49 055	22.0
C9	15000 uuF	49 128	16.0
C10	27000 uuF	49 128	19.0
C11	3-30 uuF	See "Coils"	
C12	18 uuF	49 055	19.0
C13	0.1 uF	49 128	26.0
C14	100 uF	49 055	28.0
C15	3-30 uuF	See "Coils"	
C16	3-30 uuF		
C17	760 uuF	49 081	21.0
C18	1490 uuF	49 081	22.0
C19	3.9 uuF	49 055	11.0
C20	12-170uuF	See "Coils"	
C21	125 uuF	28 212	07.1
C22	27 uuF	49 055	21.0
C23	10000 uuF	49 128	14.0
C24	0.1 uF	49 128	26.0
C25	12-170 uuF	See "Coils"	
C26	125 uuF	28 212	07.1
C27	39 uuF	49 055	23.0
C28	10000 uuF	49 128	14.0
C29	220 uuF	49 055	32.0
C30	390 uuF	49 055	35.0
C31	390 uuF	49 055	35.0
C32	1000 uuF	49 128	30.0
C33	2x0.47-0.94 uF	49 128	34.0
C35	150 uuF	49 055	30.0
C37	47000 uuF	49 128	22.0
C38	100 uuF	49 055	28.0
C39	50 uF	28 185	67.1
C40	47000 uuF	49 128	22.0

TUBES

L1	L2	L3	L4
KCH 1	KP 4	KB 2	KL 5

Diallightlamp L5: 8017 D-00

CURRENTS AND TENSIONS

Tube	L 1		L 2		L 3		
	Normal	Economy	Normal	Economy	Normal	Economy	
Va	triode 50 hexode 135	27 135	72	60	123	128	V
Vg2	50	30	77	66	135	135	V
Ia	triode 2.24 hexode 0.83	2.28 0.2	0.5	0.61	5.5	1.9	mA
Ig2	1.5	0.26	0.18	0.22	0.96	0.31	mA

Vf = 2 V Va total = 144 V
 If (L5 out = 0.43 A Ia total "Economy" = 5.9 mA
 (L5 in = 0.6 A Ia total "Normal" = 11.7 mA

The voltages are measured by means of a voltmeter with a resistance of 2000 ohms per volt.

COILS

	Value		Codenumber	Price
S1	130 ohm	}	28 587 88.0	
S2	25 ohm			
S3	5 ohm	}	28 570 54.2	
S4	95 ohm			
S5	45 ohm	}	28 570 49.1	
S6	3-30 uuF			
S7	5 ohm	}	28 588 27.0	
S8	45 ohm			
C11	3-30 uuF	}	28 573 56.1	
S9	<1 ohm			
S10	<1 ohm	}	28 572 60.1	
S11	12 ohm			
S12	4.5 ohm	}	28 570 72.0	
S13	35 ohm			
S14	9 ohm	}	28 537 03.1	
S15	<1 ohm			
S16	135 ohm	}	28 220 43.0	
S17	135 ohm			
C20	12-170 uuF	}		
C25	12-170 uuF			
S18	135 ohm	}		
S19	135 ohm			
S20	620 ohm	}		
S21	<1 ohm			
S22	5 ohm			

8.

RESISTANCES

	Value		Codenumber	Price
R1	1200 ohm	}	49 376 25.0	
R2	0.1 M.ohm			
R3	27000 ohm	}	49 376 48.0	
R4	0.27 M.ohm			
R5	56000 ohm	}	49 376 41.0	
R6	0.68 M.ohm			
R7	1.8 M.ohm	}	49 376 53.0	
R8	0.22 M.ohm			
R9	47000 ohm	}	49 376 45.0	
R10	0.5 M.ohm			
R11	0.1 M.ohm	}	49 376 58.0	
R12	0.47 M.ohm			
R13	0.3 M.ohm	}	49 376 63.0	
R14	0.3 M.ohm			
R15	120 ohm	}	49 376 52.0	
R16	560 ohm			
R17	47000 ohm	}	49 376 44.0	
R18	2.2 M.ohm			
R19	390 ohm	}	49 376 64.0	
R20	0.22 M.ohm			
R21	100 ohm	}	49 376 19.0	
R22	2200 ohm			
R23	22 ohm	}	49 376 28.0	
R24	27000 ohm			

x Carbonpotentiometer.

9.

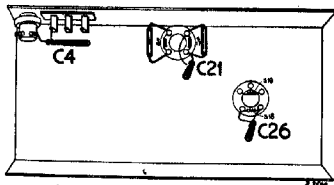


Fig. 1

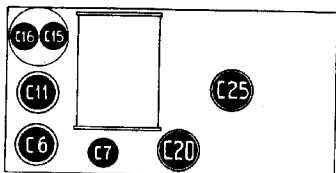


Fig. 2

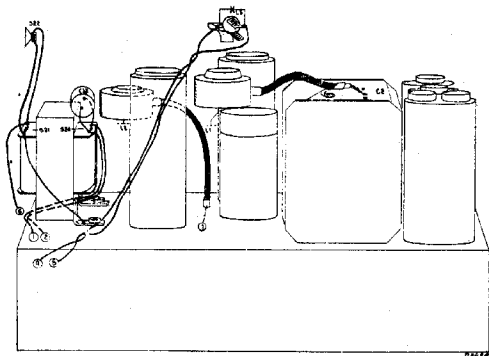
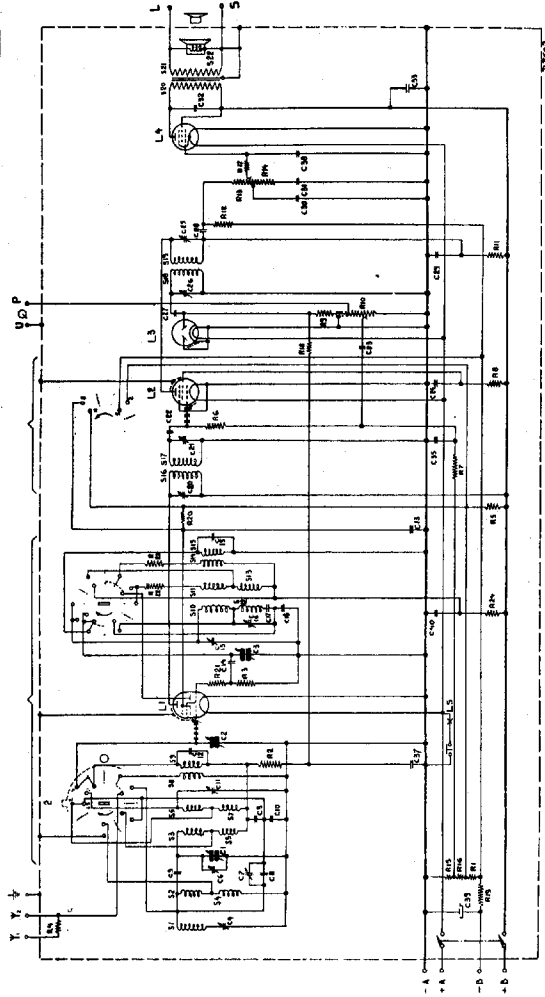


Fig. 5

22B

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100



Wavebandswitch.
 Designed position : S.W.
 Sequence : S.W., M.W., L.W.

Fig. 3

Economy switch.

Designed position: Economy.
 Sequence : Economy, Normal.

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S: 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

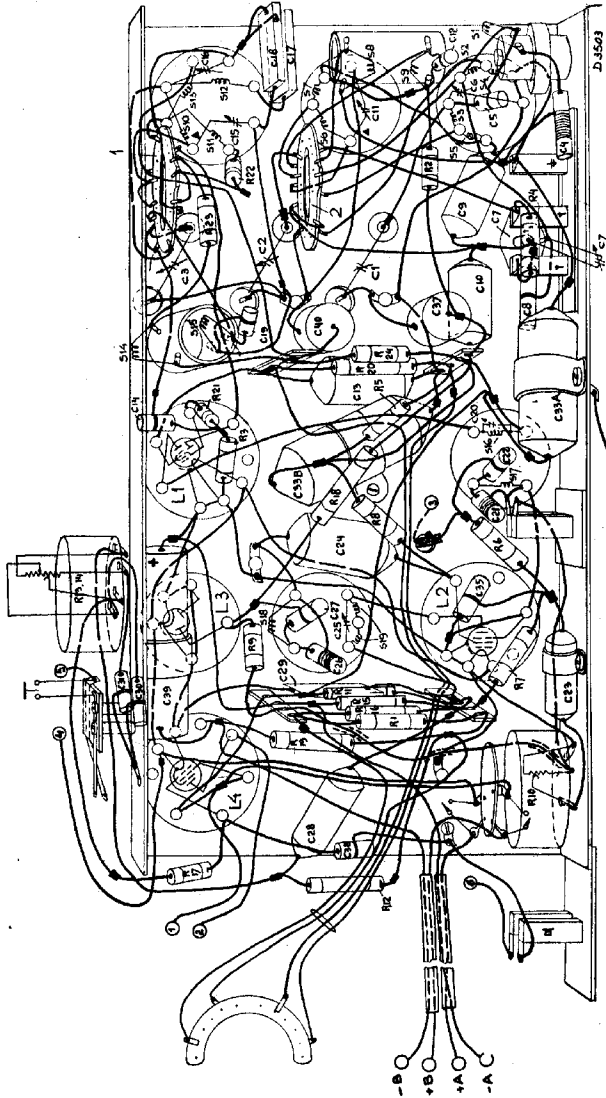


Fig. 4