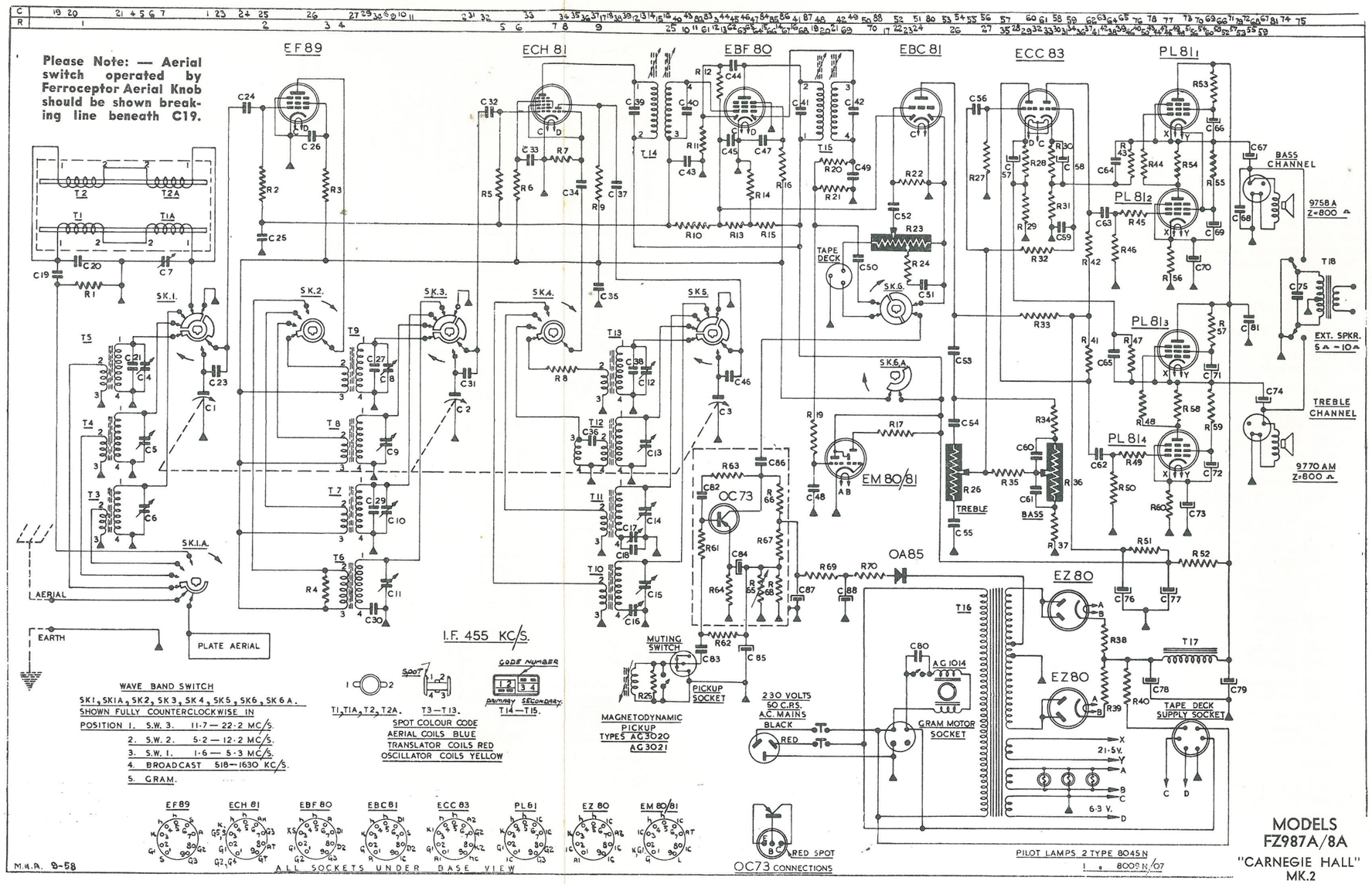
CONDENSERS

C1 11-500 mmfd } 3 gang variable
C2 11-500 mmfd }
C3 11-518 mmfd }
C4 2-20 mmfd ceramic trimmer
C5 2-20 mmfd ceramic trimmer
C6 2-20 mmfd ceramic trimmer
C7 2-20 mmfd ceramic trimmer
C8 2-20 mmfd ceramic trimmer
C9 2-20 mmfd ceramic trimmer
C10 2-20 mmfd ceramic trimmer
C11 2-20 mmfd ceramic trimmer
C12 3-30 mmfd air trimmer
C13 3-30 mmfd air trimmer
C14 3-30 mmfd air trimmer
C15 3-30 mmfd air trimmer
C16 150-750 mmfd adjustable padder
C17 150-750 mmfd adjustable padder
C18 1500 mmfd ± 5% mica
C19 330 mmfd ± 10% ceramic
C20 3000 mmfd ± 5% styroflex
C21 22 mmfd ceramic
C23 233 mmfd ± 1% ceramic
C24 100 mmfd ceramic
C25 0.047 mfd 350v. paper
C26 0.01 mfd 500v. paper
C27 22 mmfd ceramic
C29 10 mmfd ceramic
C30 3000 mmfd ± 5% styroflex
C31 233 mmfd ± 1% ceramic
C32 100 mmfd ceramic
C33 0.01 mfd 500v. paper
C34 47 mmfd ceramic
C35 0.1 mfd 350v. paper
C36 100 mmfd ceramic
C37 560 mmfd ceramic
C38 22 mmfd ceramic
C39 110 mmfd ceramic } in 1st I.F. can
C40 195 mmfd ceramic }
C41 110 mmfd ceramic } in 2nd I.F. can
C42 195 mmfd ceramic }
C43 1500 mmfd ceramic
C44 10 mmfd ceramic
C45 400 mmfd mica
C46 233 mmfd ± 1% ceramic
C47 0.01 mfd 500v. paper
C48 0.022 mfd 500v. paper
C49 47 mmfd ceramic
C50 0.01 mfd 500v. paper
C51 0.022 mfd 500v. paper
C52 0.01 mfd 600v. paper
C53 0.022 mfd 500v. paper
C54 150 mmfd ceramic
C55 1500 mmfd paper
C56 680 mmfd ± 2% mica
C57 25 mfd 25v. electrolytic
C58 25 mfd 25v. electrolytic
C59 680 mmfd ± 2% mica
C60 2200 mmfd paper
C61 0.022 mfd paper
C62 200 mmfd ceramic
C63 0.01 mfd paper
C64 6800 mmfd 400v. paper
C65 150 mmfd ceramic
C66 8 mfd 450v. electrolytic
C67 8 mfd 450v. electrolytic
C68 0.25 mfd 200v. paper
C69 8 mfd 450v. electrolytic
C70 50 mfd 25v. electrolytic
C71 8 mfd 450v. electrolytic
C72 8 mfd 450v. electrolytic
C73 50 mfd 25v. electrolytic
C74 8 mfd 450v. electrolytic
C75 400 mmfd mica
C76 40 mfd } 450v. double
C77 40 mfd } electrolytic
C78 40 mfd } 450v. double
C79 40 mfd } electrolytic
C80 0.022 mfd 600v. paper



MODELS
FZ987A/8A
"CARNEGIE HALL"
MK.2

C81 0.05 mfd 500v. paper
C82 1000 mmfd 125v. styroflex
C83 1.0 mfd styroflex
C84 32 mfd 3v. electrolytic
C85 10 mfd 3v. electrolytic
C86 0.022 mfd 350v. ceramic
C87 20 mfd 70v. electrolytic
C88 20 mfd 70v. electrolytic

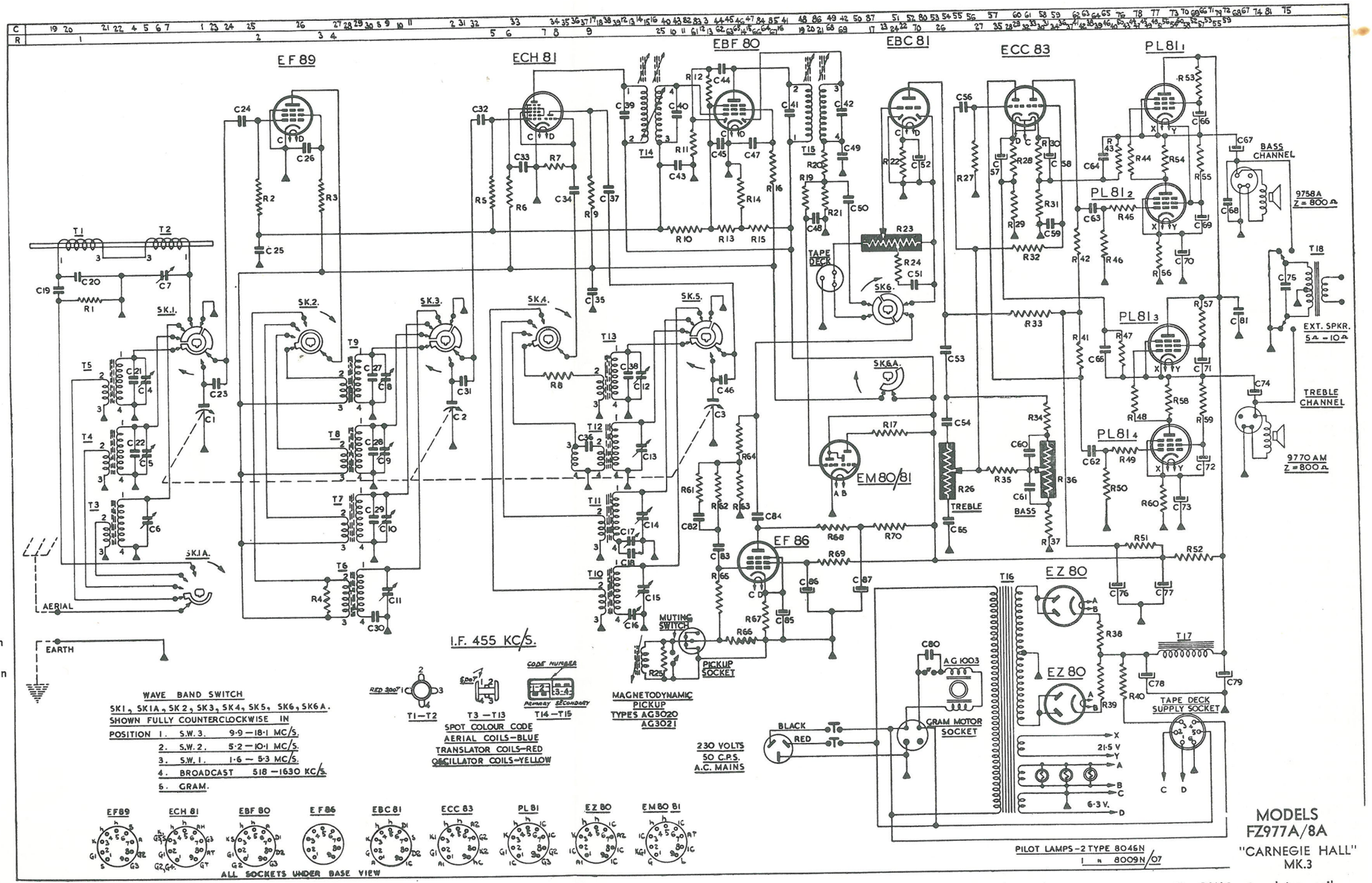
RESISTORS

R1 10k ½w. carbon
R2 1m ½w. deposited carbon
R3 68k ½w. deposited carbon
R4 1500 ohms ½w. deposited carbon
R5 1m ½w. deposited carbon
R6 33k 1w. deposited carbon
R7 47k ½w. carbon
R8 56 ohms ½w. carbon
R9 33k 1w. carbon
R10 1m ¼w. carbon
R11 1m ¼w. carbon
R12 1m ¼w. carbon
R13 10m ¼w. carbon
R14 100k ¼w. carbon
R15 2.2m ¼w. carbon
R16 100k ½w. carbon
R17 470k ¼w. carbon
R19 2.2m ¼w. carbon
R20 100k ¼w. carbon
R21 150k ¼w. carbon
R22 4.7m ½w. carbon
R23 650k + 2m carbon potentiometer
R24 39k ¼w carbon
R25 470k ¼w. carbon
R26 2m carbon potentiometer
R27 470k 5% ¼w. carbon
R28 1800 ohms ½w. carbon
R29 180 ohms ½w. carbon
R30 1800 ohms ½w. carbon
R31 180 ohms ½w. carbon
R32 470k 5% ¼w. carbon
R33 100k 1w. deposited carbon
R34 100k 5% ½w. carbon
R35 100k ¼w. carbon
R36 500k carbon potentiometer
R37 10k ¼w. carbon
R38 50 ohms 4w wire wound
R39 50 ohms 4w. wire wound
R40 3900 ohms 1w. carbon
R41 220k 1w. deposited carbon
R42 220k 1w. deposited carbon
R43 33k 1w. deposited carbon
R44 1000 ohms ½w. carbon
R45 1000 ohms ½w. carbon
R46 470k 5% ¼w. carbon
R47 56k 1w. deposited carbon
R48 1000 ohms ½w. carbon
R49 1000 ohms ½w. carbon
R50 470k 5% ¼w. carbon
R51 10k 1w carbon
R52 2500 ohms 4w. wire wound
R53 8200 ohms 1w. carbon
R54 220 ohms 1w. deposited carbon
R55 12k 1w. carbon
R56 220 ohms 1w. deposited carbon
R57 8200 ohms 1w. carbon
R58 220 ohms 1w. deposited carbon
R59 12k 1w. carbon
R60 220 ohms 1w. deposited carbon
R61 10k ¼w. carbon
R62 56k ½w. carbon
R63 330k ¼w. carbon
R64 10k ¼w. carbon
R65 47k at 25°c N.T.C.
R66 100k ¼w. carbon
R67 200k ¼w. carbon
R68 20k ½w. carbon
R69 47k ½w. carbon
R70 1000 ohms ½w. carbon

T1 Ferroceptor rod aerial coil VK 469-83
T1A Ferroceptor rod aerial coil VK 469-83
T2 Ferroceptor rod aerial coil VK 469-83
T2A Ferroceptor rod aerial coil VK 469-83
T3 S.W.1 aerial coil VK 469-76
T4 S.W.2 aerial coil VK 469-77
T5 S.W.3. aerial coil VK 469-82
T6 Broadcast translator coil VK 473-22
T7 S.W.1 translator coil VK 473-23
T8 S.W.2 translator coil VK 473-24
T9 S.W.3 translator coil VK 473-26
T10 Broadcast oscillator coil VK 471-52
T11 S.W.1 oscillator coil VK 471-53
T12 S.W.2 oscillator coil VK 471-56
T13 S.W.3 oscillator coil VK 471-57
T14 Micro "12" variable bandpass filter A3 127-34
T15 Micro "12" bandpass filter A3 126-84
T16 Power transformer VK 631-09
T17 Filter choke VK 460-59
T18 Extension speaker transformer VK 671-05

CONDENSERS

C1 11-500 mmfd } 3 gang variable
C2 11-500 mmfd }
C3 11-518 mmfd }
C4 2-20 mmfd ceramic trimmer
C5 2-20 mmfd ceramic trimmer
C6 2-20 mmfd ceramic trimmer
C7 2-20 mmfd ceramic trimmer
C8 2-20 mmfd ceramic trimmer
C9 2-20 mmfd ceramic trimmer
C10 2-20 mmfd ceramic trimmer
C11 2-20 mmfd ceramic trimmer
C12 3-30 mmfd air trimmer
C13 3-30 mmfd air trimmer
C14 3-30 mmfd air trimmer
C15 3-30 mmfd air trimmer
C16 150-750 mmfd adjustable padder
C17 150-750 mmfd adjustable padder
C18 1500 mmfd ± 5% mica
C19 330 mmfd ± 10% ceramic
C20 3000 mmfd ± 5% styroflex
C21 33 mmfd ceramic
C22 22 mmfd ceramic
C23 233 mmfd ± 1% ceramic
C24 100 mmfd ceramic
C25 0.05 mfd 350v. paper
C26 0.01 mfd 500v. paper
C27 33 mmfd ceramic
C28 22 mmfd ceramic
C29 10 mmfd ceramic
C30 3000 mmfd ± 5% styroflex
C31 233 mmfd ± 1% ceramic
C32 100 mmfd ceramic
C33 0.01 mfd 500v. paper
C34 47 mmfd ceramic
C35 0.1 mfd 350v. paper
C36 47 mmfd ceramic
C37 560 mmfd ceramic
C38 22 mmfd ceramic
C39 110 mmfd ceramic } in 1st. I.F. can
C40 195 mmfd ceramic }
C41 110 mmfd ceramic } in 2nd. I.F. can
C42 195 mmfd ceramic }
C43 1500 mmfd ceramic
C44 10 mmfd ceramic
C45 500 mmfd mica
C46 233 mmfd ± 1% ceramic
C47 0.01 mfd 500v. paper
C48 0.02 mfd 500v. paper
C49 47 mmfd ceramic
C50 0.01 mfd 500v. paper
C51 0.02 mfd 500v. paper
C52 25 mfd 25v. electrolytic
C53 0.02 mfd 500v. paper
C54 150 mmfd ceramic
C55 1500 mmfd paper
C56 680 mmfd ± 2% mica
C57 25 mfd 25v. electrolytic
C58 25 mfd 25v.
C59 680 mmfd ± 2% mica
C60 2200 mmfd paper
C61 0.022 mfd paper
C62 200 mmfd ceramic
C63 0.01 mfd paper
C64 6800 mmfd 400v. paper
C65 150 mmfd ceramic
C66 8 mfd 450v. electrolytic
C67 8 mfd 450v. electrolytic
C68 0.25 mfd 200v. paper
C69 8 mfd 450v. electrolytic
C70 50 mfd 25v. electrolytic
C71 8 mfd 450v. electrolytic
C72 8 mfd 450v. electrolytic
C73 50 mfd 25v. electrolytic
C74 8 mfd 450v. electrolytic



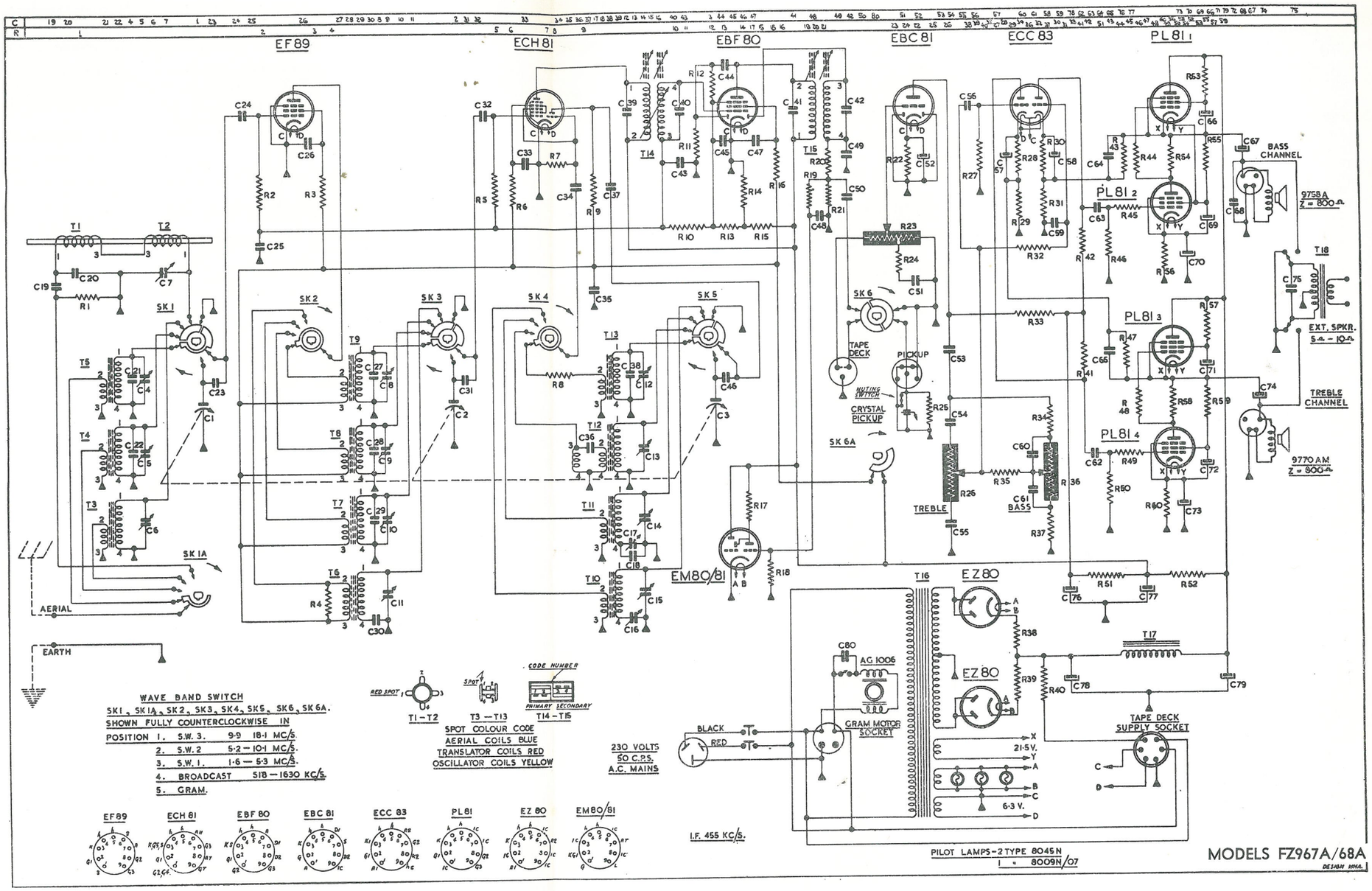
MODELS FZ977A/8A "CARNEGIE HALL" MK.3

C75 400 mmfd mica
C76 40 mfd } 450v. double
C77 40 mfd } electrolytic
C78 40 mfd } 450v. double
C79 40 mfd } electrolytic
C80 0.022 mfd 600v. paper
C81 0.05 mfd 500v. paper
C82 22 mmfd ceramic
C83 100 mmfd ceramic
C84 0.005 mfd 400v. paper
C85 50 mfd 12v. electrolytic
C86 20 mfd } 350v. double
C87 20 mfd } electrolytic

RESISTORS

R1 10k ¼w. carbon
R2 1m ½w. deposited carbon
R3 68k ½w. carbon
R4 1500 ohms ¼w. deposited carbon
R5 1m ½w. deposited carbon
R6 33k 1w. deposited carbon
R7 47k ½w. carbon
R8 100 ohms ¼w. carbon
R9 33k 1w. carbon
R10 1m ¼w. carbon
R11 1m ¼w. carbon
R12 1m ¼w. carbon
R13 10m ¼w. carbon
R14 100k ¼w. carbon
R15 2.2m ¼w. carbon
R16 100k ½w. carbon
R17 470k ¼w. carbon
R20 100k ¼w. carbon
R21 150k ¼w. carbon
R22 1800 ohms ¼w. carbon
R23 650k + 2m carbon potentiometer
R24 39k ½w. carbon
R25 470k ¼w. carbon
R26 2m carbon potentiometer
R27 470k 5% ½w. carbon
R28 1800 ohms ¼w. carbon
R29 180 ohms ¼w. carbon
R30 1800 ohms ¼w. carbon
R31 180 ohms ¼w. carbon
R32 470k 5% ½w. carbon
R33 100k 1w. deposited carbon
R34 100k 5% ½w. carbon
R35 100k ¼w. carbon
R36 500k carbon potentiometer
R37 10k ¼w. carbon
R38 50 ohms 4w. wire wound
R39 50 ohms 4w. wire wound
R40 3900 ohms 1w. carbon
R41 220k 1w. deposited carbon
R42 220k 1w. deposited carbon
R43 33k 1w. deposited carbon
R44 1000 ohms ¼w. carbon
R45 1000 ohms ¼w. carbon
R46 470k 5% ¼w. carbon
R47 56k 1w. deposited carbon
R48 1000 ohms ¼w. carbon
R49 1000 ohms ¼w. carbon
R50 470k 5% ¼w. carbon
R51 10k 1w. carbon
R52 2500 ohms 4w. wire wound
R53 8200 ohms ½w. carbon
R54 220 ohms 1w. deposited carbon
R55 12k 1w. carbon
R56 220 ohms 1w. deposited carbon
R57 8200 ohms 1w. carbon
R58 220 ohms 1w. deposited carbon
R59 12k 1w. carbon
R60 220 ohms 1w. deposited carbon
R61 330k ¼w. carbon
R62 2.2 meg. ¼w. carbon
R63 330k ¼w. carbon
R64 680k ¼w. carbon
R65 470k ¼w. carbon
R66 68k ¼w. carbon
R67 2k2 ½w. carbon
R68 220k ½w. carbon
R69 1m5 ½w. carbon
R70 100k ½w. carbon

T1 Ferroceptor rod aerial coil VK 469-79
T2 Ferroceptor rod aerial coil VK 469-79
T3 S.W.1. aerial coil VK 469-76
T4 S.W.2 aerial coil VK 469-77
T5 S.W.3. aerial coil VK 469-78
T6 Broadcast translator coil VK 473-22
T7 S.W.1. translator coil VY 473-23
T8 S.W.2. translator coil VK 473-24
T9 S.W.3. translator coil VK 473-25
T10 Broadcast oscillator coil VK 471-52
T11 S.W.1. oscillator coil VK 471-53
T12 S.W.2. oscillator coil VK 471-54
T13 S.W.3. oscillator coil VK 471-55
T14 Micro "12" variable band-pass filter A3 127-34
T15 Micro "12" bandpass filter A3 126-84
T16 Power transformer VK 631-06
T17 Filter choke VK 460-59
T18 Extension speaker transformer VK 671-05



CONDENSERS:

C1	3-gang variable	11-500 mmfd
C2		11-500 mmfd
C3		11-518 mmfd
C4	2-20 mmfd ceramic trimmer	
C5	2-20 mmfd ceramic trimmer	
C6	2-20 mmfd ceramic trimmer	
C7	2-20 mmfd ceramic trimmer	
C8	2-20 mmfd ceramic trimmer	
C9	2-20 mmfd ceramic trimmer	
C10	2-20 mmfd ceramic trimmer	
C11	2-20 mmfd ceramic trimmer	
C12	3-30 mmfd air trimmer	
C13	3-30 mmfd air trimmer	
C14	3-30 mmfd air trimmer	
C15	3-30 mmfd air trimmer	
C16	150-750 mmfd adjustable padder	
C17	150-750 mmfd adjustable padder	
C18	1500 mmfd ± 5% mica	
C19	330 mmfd ± 10% ceramic	
C20	3000 mmfd ± 5% styroflex	
C21	33 mmfd ceramic	
C22	22 mmfd ceramic	
C23	233 mmfd ± 1% ceramic	
C24	100 mmfd ceramic	
C25	0.05 mfd 350v. paper	
C26	0.01 mfd 500v. paper	
C27	33 mmfd ceramic	
C28	22 mmfd ceramic	
C29	10 mmfd ceramic	
C30	3000 mmfd ± 5% styroflex	
C31	233 mmfd ± 1% ceramic	
C32	100 mmfd ceramic	
C33	0.01 mfd 500v. paper	
C34	47 mmfd ceramic	
C35	0.1 mfd 350v. paper	
C36	47 mmfd ceramic	
C37	560 mmfd ceramic	
C38	22 mmfd ceramic	
C39	110 mmfd ceramic	in 1st
C40	195 mmfd ceramic	I.F. can
C41	110 mmfd ceramic	in 2nd
C42	195 mmfd ceramic	I.F. can
C43	1500 mmfd ceramic	
C44	10 mmfd ceramic	
C45	500 mmfd mica	
C46	233 mmfd ± 1% ceramic	
C47	0.01 mfd 500v. paper	
C48	0.02 mfd 500v. paper	
C49	47 mmfd ceramic	
C50	0.01 mfd 500v. paper	
C51	0.02 mfd 500v. paper	
C52	25 mfd 25v. electrolytic	
C53	0.02 mfd 500v. paper	
C54	150 mmfd ceramic	
C55	1500 mmfd paper	
C56	680 mmfd ± 2% mica	
C57	25 mfd 25v. electrolytic	
C58	25 mfd 25v. electrolytic	
C59	680 mmfd ± 2% mica	
C60	2200 mmfd paper	
C61	0.022 mfd paper	
C62	200 mmfd ceramic	
C63	0.01 mfd paper	
C64	6800 mmfd 400v. paper	
C65	150 mmfd ceramic	
C66	8 mfd 450v. electrolytic	
C67	8 mfd 450v. electrolytic	
C68	0.25 mfd 200v. paper	
C69	8 mfd 450v. electrolytic	
C70	50 mfd 25v. electrolytic	
C71	8 mfd 450v. electrolytic	
C72	8 mfd 450v. electrolytic	
C73	50 mfd 25v. electrolytic	
C74	8 mfd 450v. electrolytic	
C75	400 mmfd mica	
C76	40 mfd 450v.	double
C77	40 mfd 450v.	electrolytic
C78	40 mfd 450v.	double
C79	40 mfd 450v.	electrolytic
C80	0.022 mfd 600v. paper	

RESISTORS:

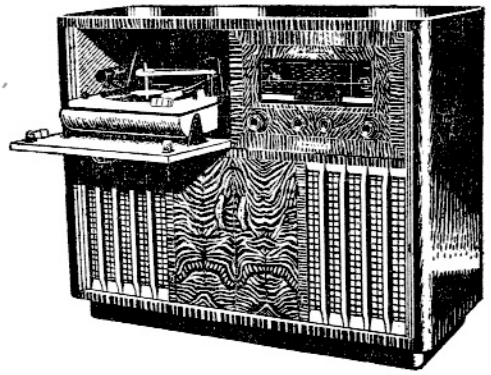
R1	10k ½w. carbon
R2	1M ½w. deposited carbon
R3	68k ½w. carbon
R4	1500 ohms ½w. deposited carbon
R5	1M ½w. deposited carbon
R6	33k 1w. deposited carbon
R7	47k ½w. carbon
R8	100 ohms ½w. carbon
R9	33k 1w. carbon
R10	1M ½w. carbon
R11	1M ½w. carbon
R12	1M ½w. carbon
R13	10M ½w. carbon
R14	100k ½w. carbon
R15	2.2M. ½w. carbon
R16	100k. ½w. carbon
R17	470k. ½w. carbon
R18	4.7M ½w. carbon
R19	2.2M ½w. carbon
R20	150k ½w. carbon
R21	150k ½w. carbon
R22	1800 ohms ½w. carbon
R23	650k. + 2M carbon potentiometer
R24	39k ½w. carbon
R25	470k ½w. carbon
R26	2M carbon potentiometer
R27	470k ½w. carbon
R28	1800 ohms ½w. carbon
R29	180 ohms ½w. carbon
R30	1800 ohms ½w. carbon
R31	180 ohms ½w. carbon
R32	470k ½w. carbon
R33	100k 1w. deposited carbon
R34	100k ½w. carbon
R35	100k ½w. carbon
R36	500k carbon potentiometer
R37	10k ½w. carbon
R38	50 ohms 4w. wire-wound
R39	50 ohms 4w. wire-wound
R40	3900 ohms 1w. carbon
R41	220k 1w. deposited carbon
R42	220k 1w. deposited carbon
R43	33k 1w. deposited carbon
R44	1000 ohms ½w. carbon
R45	1000 ohms ½w. carbon
R46	470k ½w. carbon
R47	56k 1w. deposited carbon
R48	1000 ohms ½w. carbon
R49	1000 ohms ½w. carbon
R50	470k ½w. carbon
R51	10k 1w. carbon
R52	2500 ohms 4w. wire-wound
R53	8200 ohms 1w. carbon
R54	220 ohms 1w. deposited carbon
R55	12k 1w. carbon
R56	220 ohms 1w. deposited carbon
R57	8200 ohms 1w. carbon
R58	220 ohms 1w. deposited carbon
R59	12k 1w. carbon
R60	220 ohms 1w. deposited carbon

COILS:

T1	Ferrite aerial	VK 469-79
T2	Ferrite aerial	VK 469-79
T3	SW1 aerial	VK 469-76
T4	SW2 aerial	VK 469-77
T5	SW3 aerial	VK 469-78
T6	Broadcast translator	VK 473-22
T7	SW1 translator	VK 473-23
T8	SW2 translator	VK 473-24
T9	SW3 translator	VK 473-25
T10	Broadcast oscillator	VK 471-52
T11	SW1 oscillator	VK 471-53
T12	SW2 oscillator	VK 471-54
T13	SW3 oscillator	VK 471-55
T14	Micro-12 variable bandpass filter	A3 127-34
T15	Micro-12 bandpass filter	A3 126-84
T16	Power transformer	VK 631-06
T17	Filter choke	VK 460-59
T18	Extension speaker transformer	VK 671-05

PHILIPS "CARNEGIE HALL"

MkI, MkII, MkIII



Console Radiograms

Superheterodyne Receivers

Mains Supply: 220-240 volts, 50 c/s, 120 watts

Intermediate Frequency: 455 Kc/s

	MKI	MKII	MKIII
MODEL	FZ967A FZ968A	FZ977A FZ978A	FZ987A FZ988A
WAVE RANGES Broadcast	518-1630 Kc/s	518—1630 Kc/s	518—1630 Kc/s
WAVE RANGES SW—1	1.6— 5.3 Mc/s	1.6— 5.3 Mc/s	1.6— 5.3 Mc/s
WAVE RANGES SW—2	5.2—10.1 Mc/s	5.2—10.1 Mc/s	5.2—12.2 Mc/s
WAVE RANGES SW—3	9.9—18.1 Mc/s	9.9—18.1 Mc/s	11.7—22.2 Mc/s
Broadcast Aerial	Rotatable Ferroxcube rod, 2 coil	Externally controlled semi-rotatable Ferroxcube rod, 2 coil	Fully rotatable shielded Ferroxcube, 2 rod, 4 coil type, front knob controlled
RECORD CHANGER	AG1006	AG1003	AG1014
PICKUPS	AG3015, AG3012 Crystal	AG3020, AG3021 Magneto dynamic	AG3020, AG3021 Magneto dynamic
PICKUP PREAMPLIFIER		Valve Type EF86	Transistor Type OC73
TAPE DECK	EL8005	EL8005	EL8007

Removing the Chassis from the Cabinet

To remove the chassis from the cabinet proceed as follows:

Remove the mains plug from the supply.

Remove the six control knobs, by sliding off the shafts.

Remove the back cover board from the receiver compartment, and remove the bass and treble speaker plugs, the tape deck power supply plug, if fitted, the gram motor power supply plug, the pickup plug, and the tape deck signal plug, if fitted. When no tape deck is fitted (Models FZ967A, FZ977A, FZ987A) the miniature 3-pin socket will have a shorting bar plug inserted, so that when service work is to be done on a chassis where a tape deck is fitted (Models FZ968A, FZ978A, FZ988A) a shorting bar plug must be inserted (see circuit diagrams).

Unscrew the two countersunk wood screws at the two back corners of the chassis mounting board, and slide the chassis and mounting board out of the cabinet.

Check that the position of the chassis is clearly marked on the mounting board, and note the position of any packing under the chassis mounting bolts, then remove the four chassis mounting bolts, and lift the chassis clear of the board. To replace the chassis, reverse the above procedure.

Removing the Record Changer from the Cabinet

Remove the cover from the radio compartment, and remove the pickup plug and gram motor supply plug, from the sockets in the back of the radio chassis. Release these two wires from the clip on the record changer mounting. Release the two counter loading springs from the screw eyes at the top of the cabinet. Remove the four mounting screws which are located one at each corner of the unit, lift clear of the mounting base and place on the service jig. When removing or replacing the AG1006 record changer, always place the record diameter selecting lever in the 7in. position. Models FZ977A, FZ978A, FZ987A and FZ988A are fitted with an adjustable back stop on the mounting base. For service adjustments reference should be made to the separate information on the appropriate record changer models.

FZ968A, FZ978A and FZ988A Removing the Tape Deck from the Cabinet

Remove the cover from the radio compartment, remove the tape recorder plug (miniature 3-pin) and the tape recorder supply plug from the sockets in the back of the radio chassis. Feed the two leads through the hole in the cabinet. Loosen off the knurled thumb screw in the left hand slide rail and slide the tape recorder off the rails clear of

the cabinet. When removing the deck from the mounting base, push the leads back into the box a little, so that they do not bind between the rim of the box and the connecting lugs in the unit. For service adjustments reference should be made to the separate information on the appropriate type of tape deck.

Replacing the Tuning Condenser and Pointer Drives

It is advisable when replacing the tuning condenser drive cord, to remove the dial and back-plate. Slip the I.F. variable selectivity drive cord off the lever arm. Remove the cheese-head screws from the tone control shaft. Loosen the nuts and slide the tuning indicator out of the clamp. Slide the three pilot lamps off the mounting brackets. Remove the dial glass, and the four screws holding the backplate to the support brackets, then slide the tone control shafts from the stubs on the controls and the back plate can then swing away clear of the chassis. Place the tuning condenser in the maximum capacity position, and fix the spring A3-646-57 to the lug in the tuning condenser drum. Place the cord tag on one end of the cord assembly VK-447-98 through the side of the drum and over the other end of the spring. The cord passes round the drum in an anti-clockwise direction and round the bakelite pulley of the bracket mounted on the tuning condenser. Place the ferrule on the end of the bowden cable in the back slot in the bracket and the ferrule on the other end of the bowden cable into the right hand slot of the pulley bracket mounted on the chassis. Pass the cord round the tuning shaft 3¼ turns in a clockwise direction progressing towards the chassis, then over the large right hand pulley, under the large left hand pulley mounted on the chassis and over the large pulley mounted on the left hand dial support bracket. The tag on the end of the cord is now attached to the 3/16in. loop on the cable assembly VK-448-00, with the coupling hook, and the cable placed over the pulley on the right hand dial support bracket, and round the small pulley on the pulley bracket mounted on the chassis. The insulated ferrule on the end of the bowden cable is placed in the slot in the bracket and the ferrule on the other end of the bowden cable is placed in the front slot in the pulley bracket mounted on top of the tuning condenser. The cable makes 1¾ turns round the drum in an anti-clockwise direction and passes through the slot in the side of the tuning condenser drum. With the spring stretched, the cable will then pass round the brass capstan in the drum and the ⅜in. loop can be placed over the lug in the drum.

Turn the tuning shaft and adjust the cord and cable so they do not bind on the shaft and drum. Replace the dial backplate, the dial glass, pilot lamps, and tuning indicator. Place the tone control shafts on the stubs of the controls and couple up. Replace the variable selectivity drive on the treble tone control. Turn the tuning condenser to the maximum capacity position and attach the pointer to the cable at the low frequency end of the scale. Switch on the set, and adjust the position of the panel lamps to obtain the best illumination of the dial and check the calibration.

For the replacement of wave band indicator cable, variable selectivity drives and tone control indicators, see diagrams Figs. 1 and 4 which are self-explanatory.

Replacement of Ferroceptor Aerial Drive Assembly (Models FZ987A and FZ988A

Unsolder the three flexible wires fed through the centre bush of the drum to the connections on the connecting plate. Remove the two screws fixing the aerial assembly to the bakelite drum and lift off the assembly. Remove the wire ring from the volume control shaft and slide off the driving drum assembly. With the parts listed in Fig. 2 make up a new cable assembly as shown in the drawing and clamp the brass tube 28-118-57 securely to the cord. Slide the driving drum on to the shaft again and replace the wire retaining ring. Turn the drum so that the brass tube is at the 6 o'clock position and place the right hand end of the cord round the drum 1¼ turns and place the ferrule on the end of the 13in. piece of bowden cable in the right hand slot in the bracket. The left hand end of the cord passes round the drum quarter turn in an anti-clockwise direction and the ferrule on the end of the 14in. piece of bowden cable fits into the left hand slot in the bracket. Place a piece of cellulose tape over the cords on the rim of the driving drum to hold the cord in place while further threading up operations are completed. Slide the piece of P.V.C. tubing over the two bowden cables and place the brass ferrule of the left hand cable in the rear slotted bracket and the brass ferrule of the right hand bowden cable in the front slotted bracket on the Ferroceptor mounting assembly. Pass the left hand cord round the bakelite drum, one complete turn, and hook the tag on the end of the cord round the spring. Turn the bakelite drum in a clockwise direction, stretching the spring, and pass the right hand cord round the drum in an anti-clockwise direction, until the cord can be passed through the slot in the side of the drum and the tag on the end of the cord hooked over the loop in the spring. Remove the cellulose tape from the driving drum, then position the cord on the two drums. Check that the brass pin on the underside of the bakelite drum is operating the aerial switch correctly. Replace the aerial assembly and solder the three wires to the correct lugs on the contact plate.

Alignment of Receiver

It is necessary to remove the chassis from the cabinet before alignment is attempted unless aerial or translator peaking only is required.

Connect a low impedance speaker and output meter to the extension speaker terminals, and switch the extension speaker switch to the "on" position.

If the set operates in conjunction with a tape deck, fit a suitable shorting plug into the miniature 3-pin socket in the back of the chassis.

Switch on the receiver and allow it to warm up for a few minutes. Turn the tuning condenser to the maximum capacity position, and check the pointer adjustment at the low frequency end of the scale.

I.F. Alignment

The intermediate frequency transformers are adjusted in the factory by means of a frequency modulated oscillator* and cathode-ray oscilloscope†. If this equipment is available, proceed as follows: Connect the oscilloscope across the diode load resistor R21. Turn the treble tone control to the minimum treble position, and check that the variable plunger on the first I.F. filter is touching the stop. This adjustment is fixed by means of the screw on the pulley bracket and the plunger movement should be 7mm. (9/32in.). When the tone control is in the minimum treble position, the first I.F. filter is in the minimum bandwidth position.

Turn the tuning condenser to the minimum capacity position (high frequency end of the dial scale), and turn all the I.F. adjusting cores nearly right out apply an amplitude modulated signal of 455. By means of a Philips GM2884 Signal Generator kc/s modulated 400 C/s 30 per cent. to the control grid (pin No. 2) of the ECH81 valve, via

a 0.01 mfd condenser. Turn off the time base of the oscilloscope with the aid of the vertical for maximum output with the aid of the vertical trace of the oscilloscope in the following sequence:

1 — Diode coil. 2 — EBF80 plate coil. 3 — ECH81 plate coil. 4 — EBF80 grid coil.

Apply a frequency modulated signal of 455 Kc/s, synchronised with the time base of the oscilloscope and display the pattern on the oscilloscope.

If the circuits have been carefully peaked, a symmetrical narrow resonance curve will be shown.

If the curve is not symmetrical, the peaking adjustment as described above should be checked.

Turn the treble control to the maximum treble position, watching the resonance curve display on the oscilloscope. The curve should become broader and the peak flatten out slightly, but remain symmetrical. A slight shift in symmetry may be adjusted by a slight adjustment of the diode coil of the second I.F. filter. Check that the curve is still symmetrical in the narrow bandwidth position. When an amplitude modulated oscillator only is available, then the I.F. adjusting cores should be adjusted for maximum output in the narrow bandwidth position as previously described, then by moving the signal generator from 445 Kc/s to 465 Kc/s, note the symmetry by means of the output meter in the maximum bandwidth position, and, if necessary, shift the diode coil adjustment slightly. The input from the signal generator (A.M. 30 per cent.) should not exceed 30 microvolts for an output of 50 milliwatts into a 5 ohm load (extension speaker terminals).

R.F. Alignment

Disconnect the signal generator from the control grid of the ECH81 valve and connect to the aerial and earth wires of the set via a standard dummy aerial. Remove the oscilloscope from the diode load, and turn the volume control to maximum, the bass control to minimum and the treble control to minimum. Short out the Ferroxcube rod aerial coil. On all bands F osc = F sig + 455 Kc/s. The trimming points have been arranged on all four wave-bands so that they coincide exactly with the trim points of 550 Kc/s and 1600 Kc/s on the broadcast band.

Alignment adjustments should be carried out in the sequence given in the following table.

FZ967A, FZ968A, FZ977A and FZ978A

* Philips GM2886. † Philips GM5655.

MODELS FZ967A, FZ968A, FZ977A and FZ978A

Wave Band Switch Position	Input Frequency	Trimming Point On Dial Scale	Adjust For Tuning	
Broadcast	550 Kc/s	550 Kc/s	Broadcast Padder	C 16
S.W.1	1.7 Mc/s	550 Kc/s	S.W.1 padder	C 17
S.W.2	5.3 Mc/s	550 Kcs/	S.W.2 Osc. coil	T 12
S.W.3	10.1 Mc/s	550 Kc/s	S.W.3 Osc. coil	T 13
S.W.3	18 Mc/s	1600 Kc/s	S.W.3 Osc. trimmer	C 12
S.W.2	10 Mc/s	1600 Kc/s	S.W.2 Osc. trimmer	C 13
S.W.1	5.2 Mc/s	1600 Kc/s	S.W.1 Osc. trimmer	C 14
Broadcast	1600 Kc/s	1600 Kc/s	Broadcast osc. trimmer	C 15

MODELS FZ987 and FZ988A

Wave Band Switch Position	Input Frequency	Trimming Point On Dial Scale	Adjust For Tuning	
Broadcast	550 Kc/s	550 Kc/s	Broadcast padder	C 16
S.W.1	1.7 Mc/s	550 Kc/s	S.W.1 padder	C 17
S.W.2	5.4 Mc/s	550 Kc/s	S.W.2 Osc. coil	T 12
S.W.3	12 Mc/s	550 Kc/s	S.W.3 Osc. coil	T 13
S.W.3	22 Mc/s	1600 Kc/s	S.W.3 Osc. trimmer	C 12
S.W.2	12 Mc/s	1600 Kc/s	S.W.2 Osc. trimmer	C 13
S.W.1	5.2 Mc/s	1600 Kc/s	S.W.1 Osc. trimmer	C 14
Broadcast	1600 Kc/s	1600 Kc/s	Broadcast Osc. trimmer	C 15

Repeat the above until no further adjustments are necessary and the calibration is correct at both ends of the dial scale. Check the calibration at 950 Kc/s on the broadcast band and at 3 Mc/s on the S.W.1 band. If this calibration is not correct adjust T 10 on broadcast and T 11 on S.W.1, compensating at the high and low frequency ends of the dial with the respective padders (Broadcast C 16 and S.W.1, C 17) and oscillator trimmers (Broadcast C 15 and S.W.1, C 14). When the calibration is correct at all three places on these two bands, proceed to peak the translator and aerial circuits. Remove the short circuit across the Ferroxcube rod aerial.

CONTINUED ON PAGE 10

MODELS FZ967A, FZ968A, FZ977A and FZ978A

Wave Band Switch Position	Input Frequency	Trimming Point On Dial Scale	Adjust For Maximum Output	
Broadcast	550 Kc/s	550 Kc/s	Broadcast trans. coil	T 6
Broadcast	550 Kc/s	550 Kc/s	Broadcast aerial coil	T 1
S.W.1	1.7 Mc/s	550 Kc/s	S.W.1 trans. coil	T 7
S.W.1	1.7 Mc/s	550 Kc/s	S.W.1 aerial coil	T 3
S.W.2	5.3 Mc/s	550 Kc/s	S.W.2 trans. coil	T 8
S.W.2	5.3 Mc/s	550 Kc/s	S.W.2 aerial coil	T 4
S.W.3	10.1 Mc/s	550 Kc/s	S.W.3 trans. coil	T 9
S.W.3	10.1 Mc/s	550 Kc/s	S.W.3 aerial coil	T 5
S.W.3	18 Mc/s	1600 Kc/s	S.W.3 trans. trimmer	C 8
S.W.3	18 Mc/s	1600 Kc/s	S.W.3 aerial trimmer	C 4
S.W.2	10 Mc/s	1600 Kc/s	S.W.2 trans. trimmer	C 9
S.W.2	10 Mc/s	1600 Kc/s	S.W.2 aerial trimmer	C 5
S.W.1	5.2 Mc/s	1600 Kc/s	S.W.1 trans. trimmer	C 10
S.W.1	5.2 Mc/s	1600 Kc/s	S.W.1 aerial trimmer	C 6
Broadcast	1600 Kc/s	1600 Kc/s	Broadcast trans. trimmer	C 11
Broadcast	1600 Kc/s	1600 Kc/s	Broadcast aerial trimmer	C 7

MODELS FZ987 and FZ988A

Wave Band Switch Position	Input Frequency	Trimming Point On Dial Scale	Adjust For Maximum Output	
Broadcast	550 Kc/s	550 Kc/s	Broadcast trans. coil	T 6
Broadcast	550 Kc/s	550 Kc/s	Broadcast aerial coil	T 1
S.W.1	1.7 Mc/s	550 Kc/s	S.W.1 trans. coil	T 7
S.W.1	1.7 Mc/s	550 Kc/s	S.W.1 aerial coil	T 3
S.W.2	5.4 Mc/s	550 Kc/s	S.W.2 trans. coil	T 8
S.W.2	5.4 Mc/s	550 Kc/s	S.W.2 aerial coil	T 4
S.W.3	12 Mc/s	550 Kc/s	S.W.3 trans. coil	T 9
S.W.3	12 Mc/s	550 Kc/s	S.W.3 aerial coil	T 5
S.W.3	22 Mc/s	1600 Kc/s	S.W.3 trans.trimmer	C 8
S.W.3	22 Mc/s	1600 Kc/s	S.W.3 aerial trimmer	C 4
S.W.2	12 Mc/s	1600 Kc/s	S.W.2 trans.trimmer	C 9
S.W.2	12 Mc/s	1600 Kc/s	S.W.2 aerial trimmer	C 5
S.W.1	5.2 Mc/s	1600 Kc/s	S.W.1 trans. trimmer	C 10
S.W.1	5.2 Mc/s	1600 Kc/s	S.W.1 aerial trimmer	C 6
Broadcast	1600 Kc/s	1600 Kc/s	Broadcast trans. trimmer	C 11
Broadcast	1600 Kc/s	1600 Kc/s	Broadcast aerial trimmer	C 7

Repeat the above adjustments, and check that on the S.W.2 and S.W.3 bands the image is on the correct side of the fundamental. The input required from a standard signal generator for an output of 50 milliwatts into a 5 ohm load, should not exceed 3 microvolts on the four short wave bands, and 5 microvolts on broadcast.

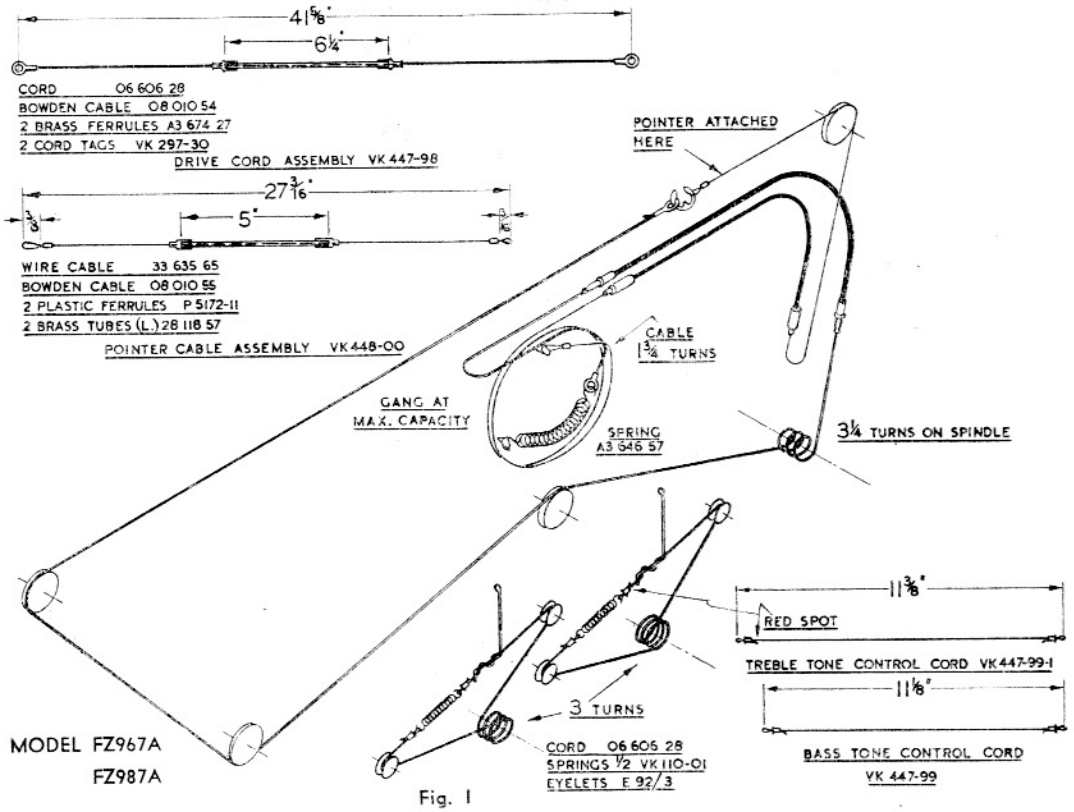
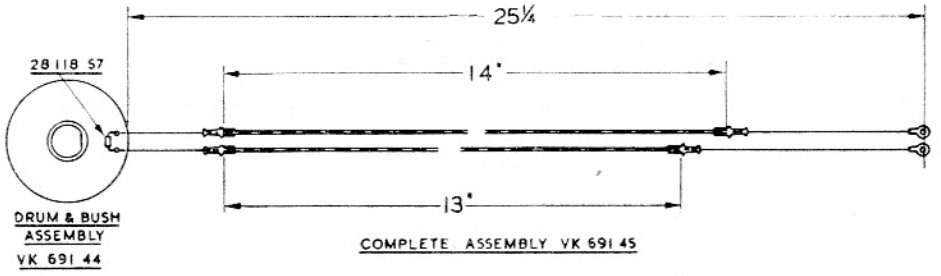
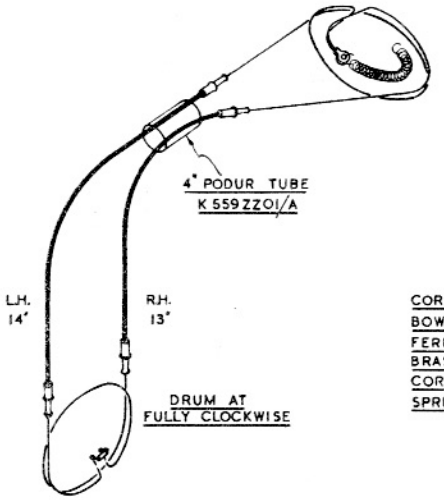


Fig. 1



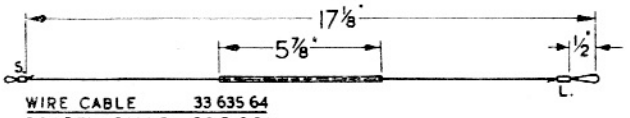


CORD	06 606 28
BOWDEN CABLE	08 010 54
FERRULES	A3 674 27
BRASS TUBE	28 118 57
CORD TAGS	VK 297 30
SPRING	VK 110 08

Fig. 2

MODEL FZ967A

FERROCEPTOR DRIVE



WIRE CABLE	33 635 64
BOWDEN CABLE	08 010 54
BRASS TUBE S.	28 118 58
BRASS TUBE L.	28 118 57

WAVE BAND INDICATOR CABLE

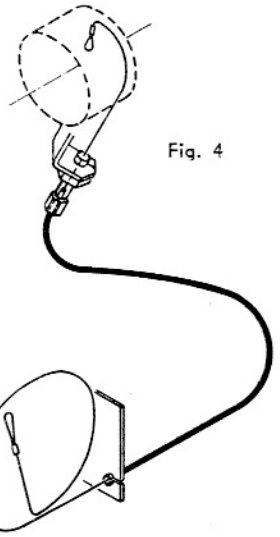
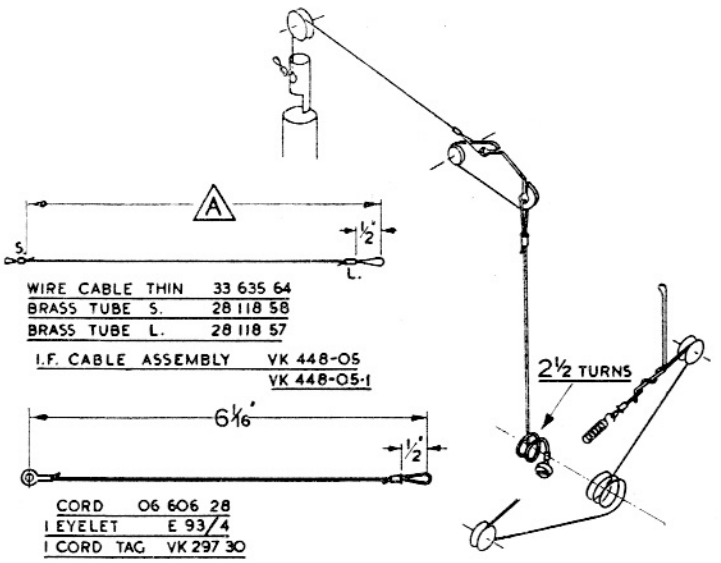


Fig. 4



WIRE CABLE THIN	33 635 64
BRASS TUBE S.	28 118 58
BRASS TUBE L.	28 118 57

I.F. CABLE ASSEMBLY VK 448-05
VK 448-05-1

CORD	06 606 28
1 EYELET	E 93/4
1 CORD TAG	VK 297 30

I.F. CORD ASSEMBLY VK 448-04

MODEL FZ987A (A) = 5 1/16" VK 448-05

FZ977A
FZ987A (A) = 4 13/16" VK 448-05-1

Fig. 3
FERROCEPTOR DRIVE

TRIMMERS TOP VIEW

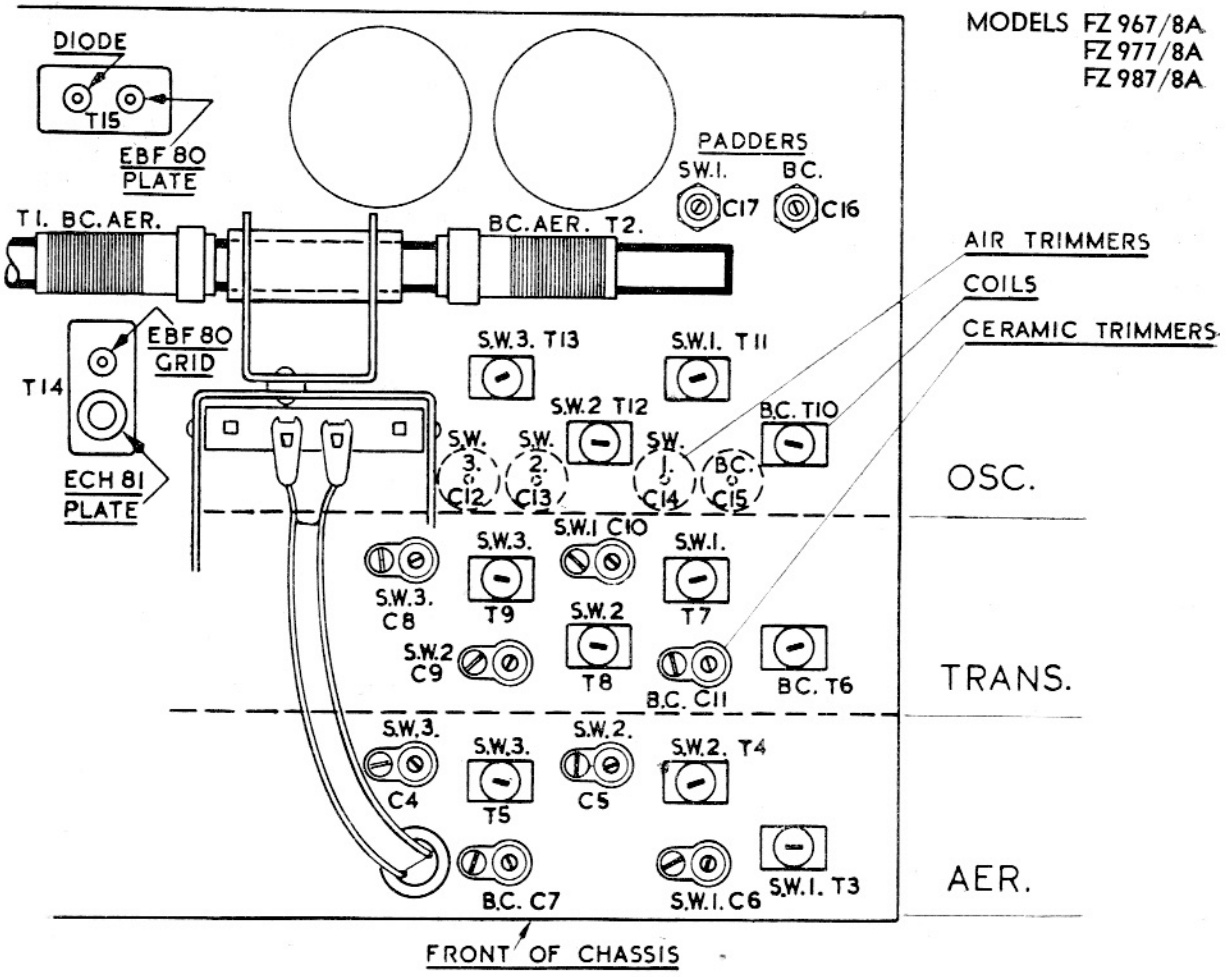
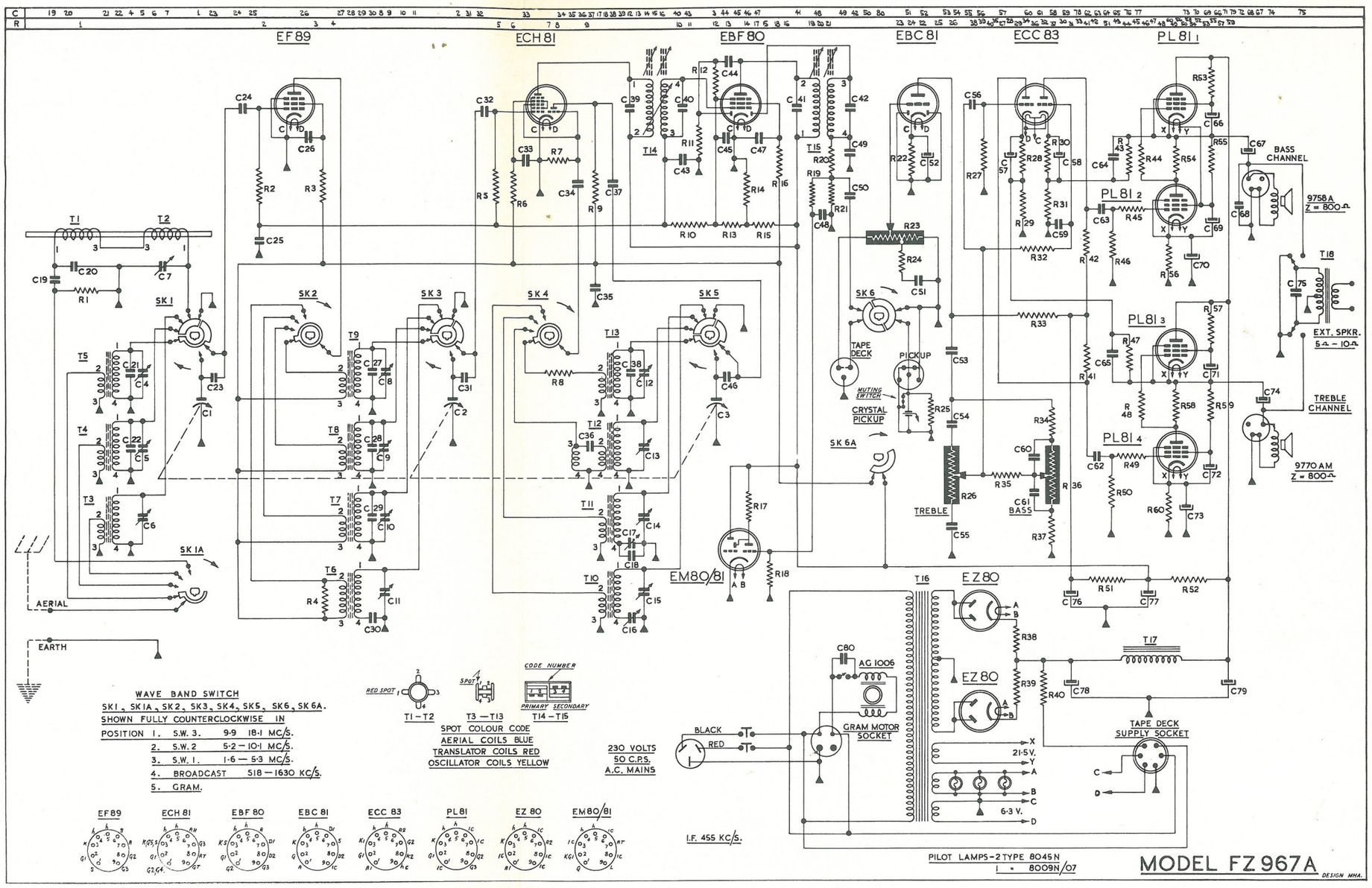


Fig. 5

F. VOLTAGE TABLE FZ967/68, FZ977/78, FZ987/88

VALVE	PLATE	SCREEN	CATHODE	FILAMENT	REMARKS
EF89	225	66		6.3	
ECH81	100 OSC. 235	65		6.3	
EBC81	130		1.4		
EBF80	225	60		6.3	
ECC83	125	-		1.3	Treble
ECC83	137	-		1.6	Bass Channel
PL81(1)	142	135	12.2	21'2	Bass Chahnel
PL8(2)	132	115	12.6	21.2	Bass Channel
PL8(3)	138	118	12.0	21.2	Treble Channel
PL81(4)	138	120	12.7	21.2	Treble Channel
EM81	33	Target 225		6.25	
EF86	55	62	1.42	6.3	Preamp FZ977/8A
OC73	37v.A.C. at Tnx. Tap, 28v.D.C. at C87/Ro9 Preamp FZ987/988				

INTERIM CIRCUIT — PHILIPS Carnegie Hall — Model FZ967/8A



CONDENSERS:

C1	3-gang variable	11-500 mmfd
C2		11-500 mmfd
C3		11-518 mmfd
C4		2-20 mmfd ceramic trimmer
C5		2-20 mmfd ceramic trimmer
C6		2-20 mmfd ceramic trimmer
C7		2-20 mmfd ceramic trimmer
C8		2-20 mmfd ceramic trimmer
C9		2-20 mmfd ceramic trimmer
C10		2-20 mmfd ceramic trimmer
C11		2-20 mmfd ceramic trimmer
C12		3-30 mmfd air trimmer
C13		3-30 mmfd air trimmer
C14		3-30 mmfd air trimmer
C15		3-30 mmfd air trimmer
C16		150-750 mmfd adjustable padder
C17		150-750 mmfd adjustable padder
C18		1500 mmfd ± 5% mica
C19		330 mmfd ± 10% ceramic
C20		3000 mmfd ± 5% styroflex
C21		33 mmfd ceramic
C22		22 mmfd ceramic
C23		233 mmfd ± 1% ceramic
C24		100 mmfd ceramic
C25		0.05 mfd 350v. paper
C26		0.01 mfd 500v. paper
C27		33 mmfd ceramic
C28		22 mmfd ceramic
C29		10 mmfd ceramic
C30		3000 mmfd ± 5% styroflex
C31		233 mmfd ± 1% ceramic
C32		100 mmfd ceramic
C33		0.01 mfd 500v. paper
C34		47 mmfd ceramic
C35		0.1 mfd 350v. paper
C36		47 mmfd ceramic
C37		560 mmfd ceramic
C38		22 mmfd ceramic
C39	1st I.F. can	110 mmfd ceramic
C40	1st I.F. can	195 mmfd ceramic
C41	2nd I.F. can	110 mmfd ceramic
C42	2nd I.F. can	195 mmfd ceramic
C43		1500 mmfd ceramic
C44		10 mmfd ceramic
C45		500 mmfd mica
C46		233 mmfd ± 1% ceramic
C47		0.01 mfd 500v. paper
C48		0.02 mfd 500v. paper
C49		47 mmfd ceramic
C50		0.01 mfd 500v. paper
C51		0.02 mfd 500v. paper
C52		25 mfd 25v. electrolytic
C53		0.02 mfd 500v. paper
C54		150 mmfd ceramic
C55		1500 mmfd paper
C56		680 mmfd ± 2% mica
C57		25 mfd 25v. electrolytic
C58		25 mfd 25v. electrolytic
C59		680 mmfd ± 2% mica
C60		2200 mmfd paper
C61		0.022 mfd paper
C62		200 mmfd ceramic
C63		0.01 mfd paper
C64		6800 mmfd 400v. paper
C65		150 mmfd ceramic
C66		8 mfd 450v. electrolytic
C67		8 mfd 450v. electrolytic
C68		0.25 mfd 200v. paper
C69		8 mfd 450v. electrolytic
C70		50 mfd 25v. electrolytic
C71		8 mfd 450v. electrolytic
C72		8 mfd 450v. electrolytic
C73		50 mfd 25v. electrolytic
C74		8 mfd 450v. electrolytic
C75		400 mmfd mica
C76	double	40 mfd 450v.
C77	electrolytic	40 mfd 450v.
C78	double	40 mfd 450v.
C79	electrolytic	40 mfd 450v.
C80		0.022 mfd 600v. paper

RESISTORS:

R1	10k ¼w. carbon
R2	1M ½w. deposited carbon
R3	68k ½w. carbon
R4	1500 ohms ¼w. deposited carbon
R5	1M ½w. deposited carbon
R6	33k 1w. deposited carbon
R7	47k ½w. carbon
R8	100 ohms ¼w. carbon
R9	33k 1w. carbon
R10	1M ¼w. carbon
R11	1M ¼w. carbon
R12	1M ¼w. carbon
R13	10M ¼w. carbon
R14	100k ¼w. carbon
R15	2.2M. ¼w. carbon
R16	100k. ½w. carbon
R17	470k. ¼w. carbon
R18	4.7M ¼w. carbon
R19	2.2M ¼w. carbon
R20	150k ¼w. carbon
R21	150k ¼w. carbon
R22	1800 ohms ¼w. carbon
R23	650k. + 2M carbon potentiometer
R24	39k ¼w. carbon
R25	470k ¼w. carbon
R26	2M carbon potentiometer
R27	470k ¼w. carbon
R28	1800 ohms ¼w. carbon
R29	180 ohms ¼w. carbon
R30	1800 ohms ¼w. carbon
R31	180 ohms ¼w. carbon
R32	470k ¼w. carbon
R33	100k 1w. deposited carbon
R34	100k ¼w. carbon
R35	100k ¼w. carbon
R36	500k carbon potentiometer
R37	10k ¼w. carbon
R38	50 ohms 4w. wire-wound
R39	50 ohms 4w. wire-wound
R40	3900 ohms 1w. carbon
R41	220k 1w. deposited carbon
R42	220k 1w. deposited carbon
R43	33k 1w. deposited carbon
R44	1000 ohms ¼w. carbon
R45	1000 ohms ¼w. carbon
R46	470k ¼w. carbon
R47	56k 1w. deposited carbon
R48	1000 ohms ¼w. carbon
R49	1000 ohms ¼w. carbon
R50	470k ¼w. carbon
R51	10k 1w. carbon
R52	2500 ohms 4w. wire-wound
R53	8200 ohms 1w. carbon
R54	220 ohms 1w. deposited carbon
R55	12k 1w. carbon
R56	220 ohms 1w. deposited carbon
R57	8200 ohms 1w. carbon
R58	220 ohms 1w. deposited carbon
R59	12k 1w. carbon
R60	220 ohms 1w. deposited carbon

COILS:

T1	Ferrite aerial	VK 469-79
T2	Ferrite aerial	VK 469-79
T3	SW1 aerial	VK 469-76
T4	SW2 aerial	VK 469-77
T5	SW3 aerial	VK 469-78
T6	Broadcast translator	VK 473-22
T7	SW1 translator	VK 473-23
T8	SW2 translator	VK 473-24
T9	SW3 translator	VK 473-25
T10	Broadcast oscillator	VK 471-52
T11	SW1 oscillator	VK 471-53
T12	SW2 oscillator	VK 471-54
T13	SW3 oscillator	VK 471-55
T14	Micro-12 variable bandpass filter	A3 127-34
T15	Micro-12 bandpass filter	A3 126-84
T16	Power transformer	VK 631-06
T17	Filter choke	VK 460-59
T18	Extension speaker transformer	VK 671-05

FZ967/8A