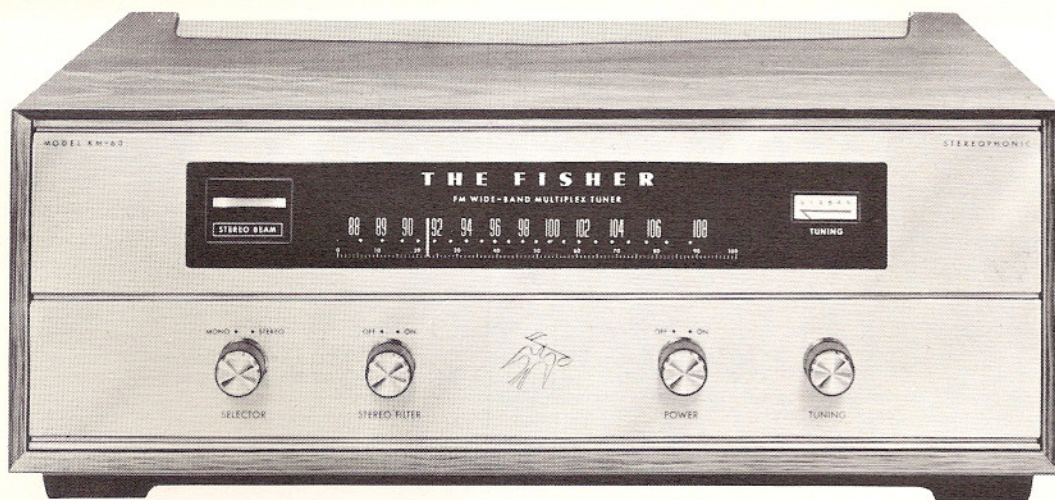


Service Manual

THE FISHER



KM-60

and Factory-Wired KM-61

ALIGNMENT WITHOUT INSTRUMENTS

1. Plug the power cord into a wall outlet and turn the power switch ON. While waiting for the tubes to heat up, read through the entire alignment procedures to familiarize yourself with it.
2. Connect a twin-lead folded dipole antenna to the "DIST" (distant) antenna terminals at the back of the KM-60. Set the meter switch to position 2.
3. While watching the meter, tune the FISHER KM-60 from one end of the dial to the other. When it is tuned to a station, the meter pointer will move upscale (clockwise) toward "5". Tune in a station that gives a reading between 1 and 2 on the meter scale. If all stations give meter readings greater than 2½, coil up part of the dipole antenna or disconnect one of the antenna terminals, while watching the meter, to reduce the signal strength. If none of the stations produce a meter reading greater than 1, connect the KM-60 to an outdoor rooftop antenna.
4. Use a hex alignment tool to carefully adjust the limiter coil from the top of the chassis by rotating the tool clockwise. If the meter reading decreases (moves toward zero) rotate the tool counter-clockwise. Continue adjusting until the meter pointer stops moving upscale (toward 5) and starts to move back downscale. The correct adjustment is for maximum meter reading.
5. Next, use the other (flat-edge) alignment tool and adjust the 3rd IF transformer for maximum meter reading just as you did the limiter coil. First adjust the transformer from underneath the chassis. After reaching a "peak," adjust it from the top of the chassis for a peak reading.
6. Next, adjust the 2nd IF transformer. However, it may not be possible to "peak" this transformer properly. When the signal becomes strong enough the 3rd and 4th IF — limiter stages will begin to "limit" so that further increases in signal strength will no longer cause higher meter readings.
7. Adjust the 2nd IF transformer from underneath the chassis and then adjust it from the top. As before, adjust for a peak reading. Should the adjustment not change the reading, as indicated above, proceed to the next step.
8. Turn the meter switch to Position 1. Now carefully adjust the tuning knob to be sure the KM-60 is still tuned to the station — a slight touch-up may increase the meter reading.
9. Now it is necessary to re-adjust the limiter coil, 3rd IF transformer and 2nd IF transformer for maximum reading, using the same procedure as before. Begin first by adjusting the limiter coil, then proceed as follows:
 - A. Adjust the 3rd IF transformer from underneath the chassis.
 - B. Adjust the 3rd IF from the top of the chassis.
 - C. Adjust the 2nd IF from underneath the chassis.
 - D. Adjust the 2nd IF from the top of the chassis.
10. Next with the tuning knob, tune the KM-60 between stations in order to pick-up hiss. This noise will result in a slight meter reading. Now, use this noise to "touch-up" the adjustments of the transformers and limiter coil. Adjust for maximum meter reading, as follows:
 - A. The limiter coil.
 - B. The 3rd IF transformer from underneath the chassis.
 - C. The 3rd IF transformer from the top of the chassis.
 - D. The 2nd IF transformer from underneath the chassis.
 - E. The 2nd IF transformer from the top of the chassis.
 - F. The 1st IF transformer from underneath the chassis, through the hole on the front-end bottom cover.
 - G. The 1st IF transformer from the top of the chassis.
11. Finally turn the meter switch to position 2. Use a hex alignment tool to adjust the ratio-detector transformer from underneath the chassis for maximum meter reading. Then use the hex tool to adjust the ratio-detector transformer from the top of the chassis for maximum reading.
12. Turn the meter switch to position 1 — this is the normal "tuning" position and tune the KM-60 to a strong local station. This should cause a meter reading between 3 and 5. This completes the alignment of the FISHER KM-60. However, it may well be worth while to repeat the "noise alignment" procedure, particularly where the tuner will not be used in a metropolitan area or if it is desired to listen to stations more than 20 miles away. Simply leave the meter in switch position 1 and repeat steps 10, 11 and 12.

ALIGNMENT PROCEDURE

Read These Instructions With Extreme Care Before Attempting Alignment.

Test Equipment:

FM Signal Generator, DC VTVM, Oscilloscope.

Chassis:

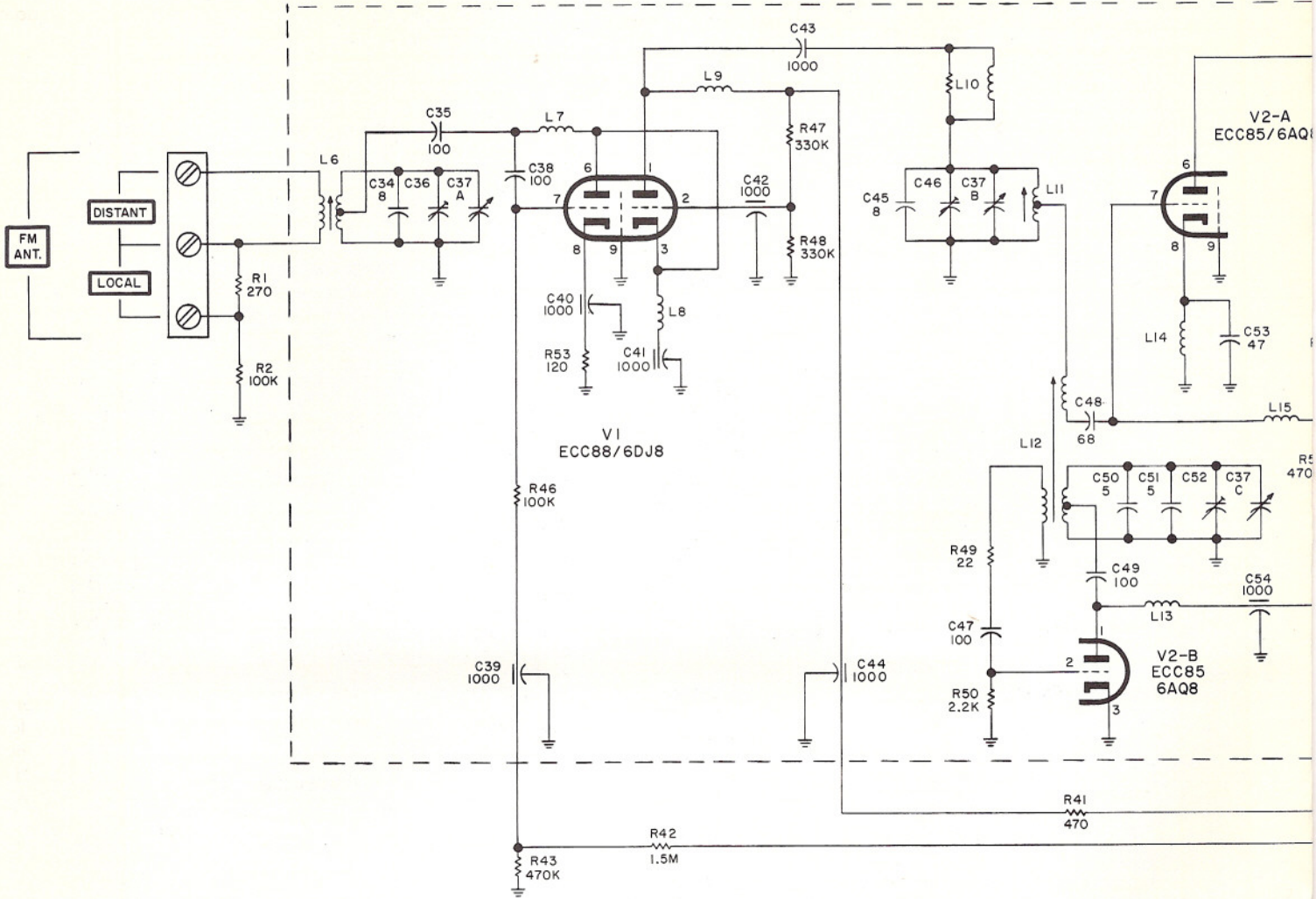
1 — For the entire alignment procedure, set the Selector Switch to Mono position, and all level controls to maximum.

2 — Turn the Tuning knob maximum counterclockwise. (Dial pointer should line up with calibration mark at the beginning of the dial. Reset the dial pointer if necessary.)

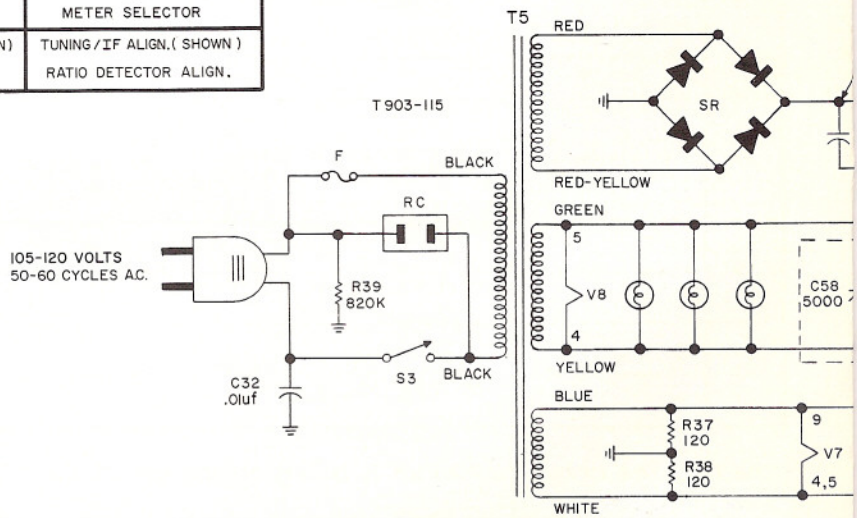
3 — Allow the tuner and test equipment at least 5 minutes warm-up time. Adjust the line voltage for 117 volts AC 50-60 cps. Use fully insulated tools: a small screw-driver for trimmer capacitors C52, C46, and C36, a K-Tran tool for T1, T2 and T3; a hex tool for L1, T5, L6, L11 and L12.

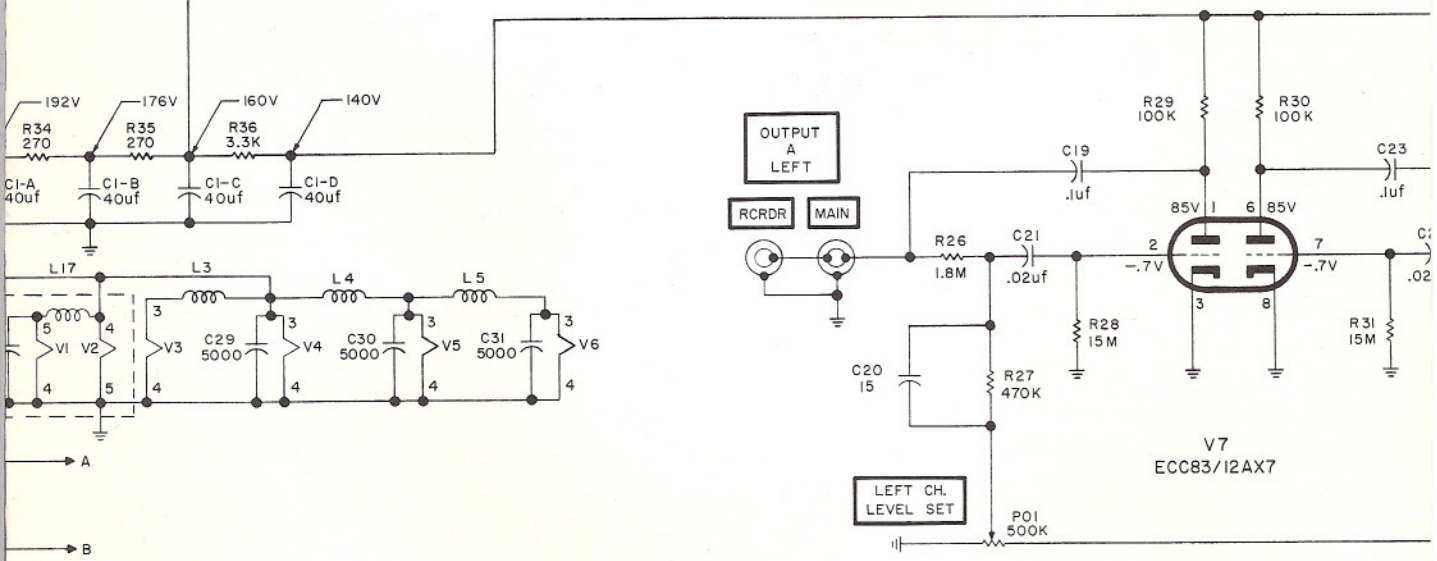
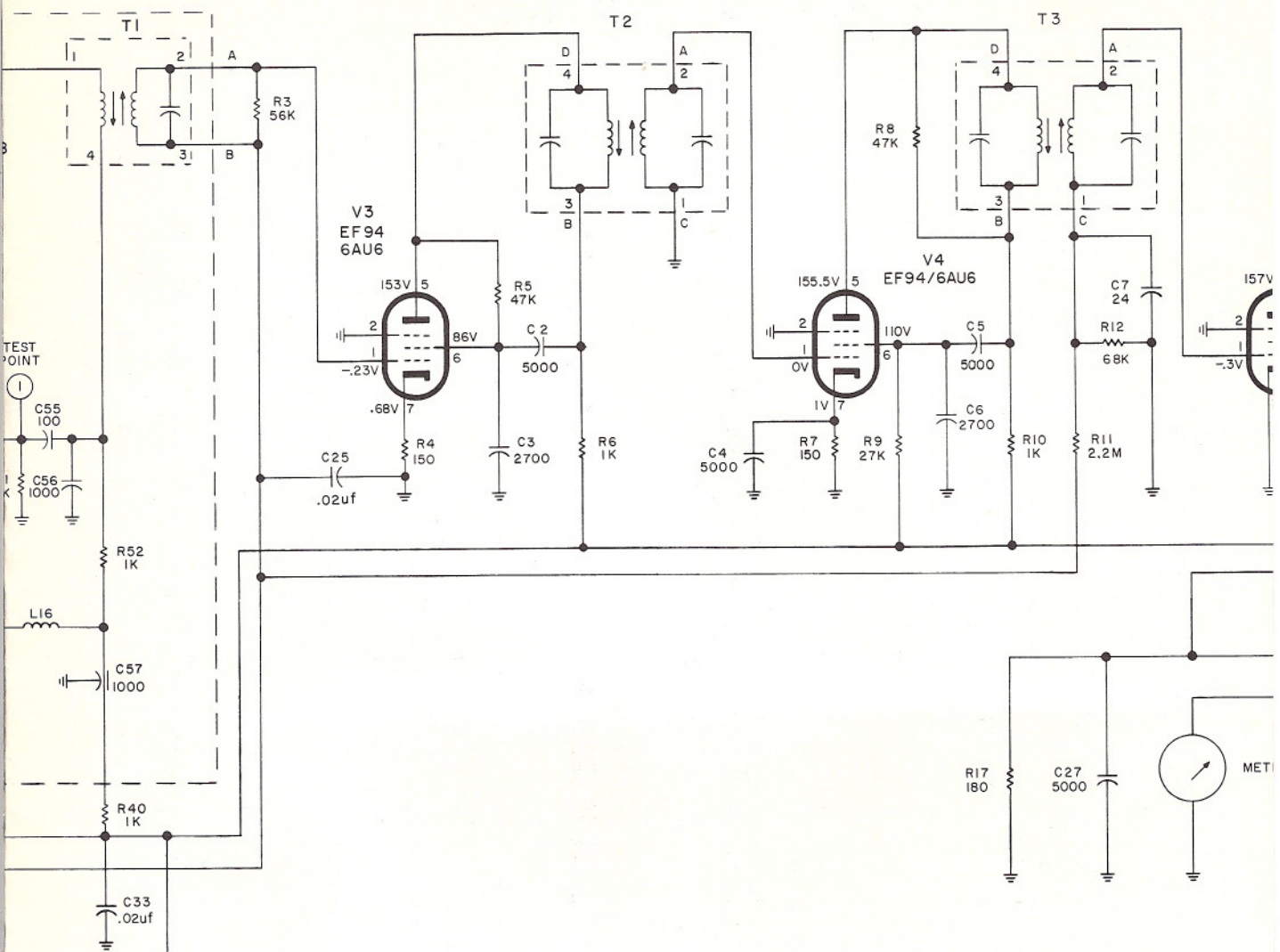
STEP	DIAL	SIGNAL GENERATOR			DC VTVM	ADJUST	INDICATION
		GENERAL COUPLING	FREQ.	MOD.			
1	Set dial pointer for extreme C.C.W. position	To ungrounded V2 tube shield	10.7 MC	None	Through 220K to Test Point 2	T1, T2, T3 top and bottom and top L1	Maximum negative voltage below 5 volts.
2			10.7 MC	None	Test Point 3	T4 top and bottom	Maximum negative voltage below 10 volts.
3	90 MC	Two 120 ohm carbon resistor in series with generator leads to antenna terminals marked DIST	90 MC	±22.5 KC deviation at 400 cps.	Through 220K to Test Point 3	First L12 than L11 and L6	Adjust for maximum negative voltages and check for sine wave-form.
4	106 MC		106 MC	±22.5 KC deviation at 400 cps.	Through 220K to Test Point 2	First C52 than C46 and C36	

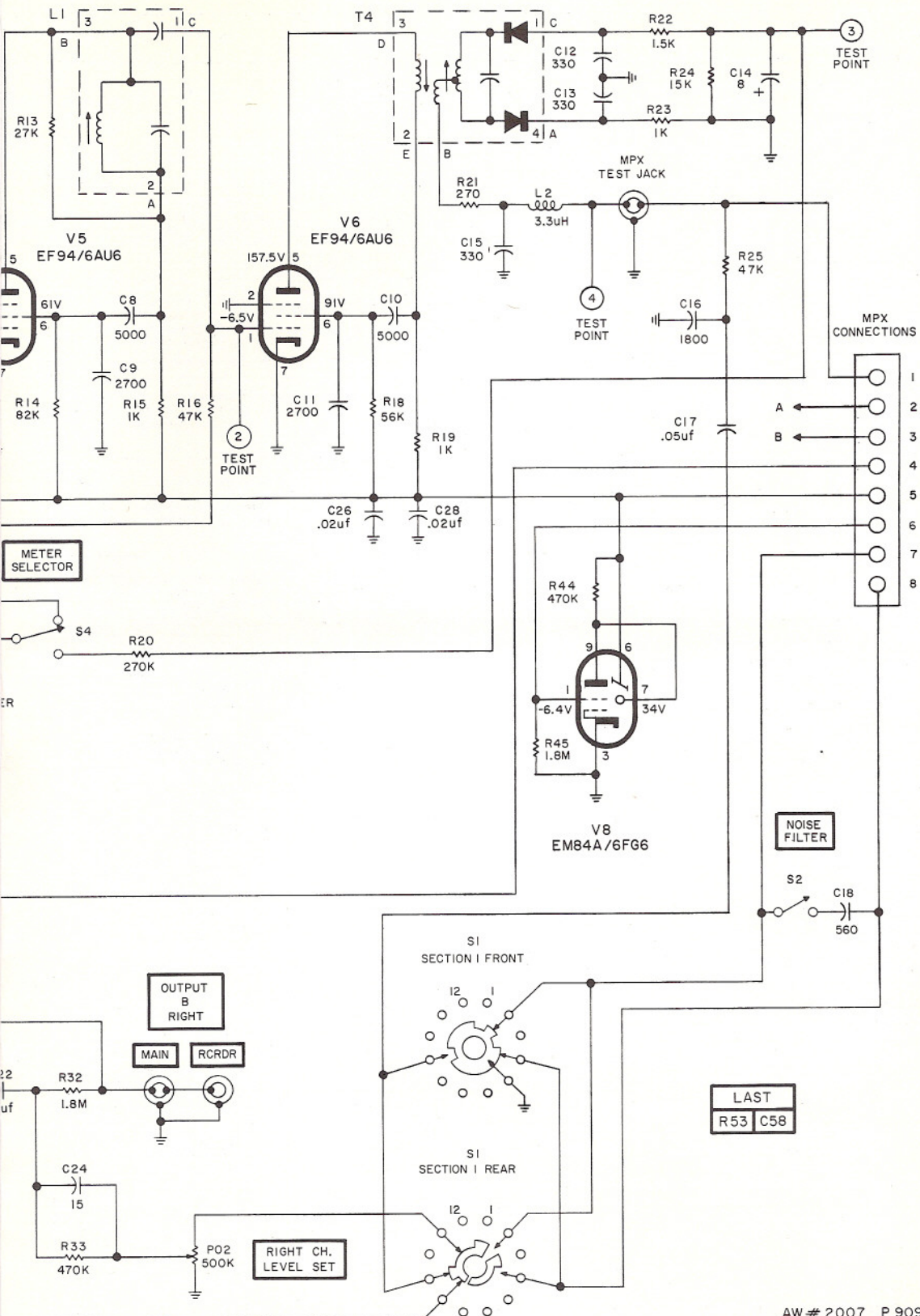
SCHEMATIC DIAGRAM



SWITCH POSITIONS				
POS. NO.	S1 SELECTOR	S2 NOISE FILTER	S3 POWER	S4 METER SELECTOR
1	FM MONO (SHOWN)	OFF (SHOWN)	OFF (SHOWN)	TUNING/IF ALIGN.(SHOWN)
2	FM STEREO	ON	ON	RATIO DETECTOR ALIGN.







ALIGNMENT INSTRUCTIONS • MULTIPLEX SECTION

STEPS	GENERATOR			INDICATOR	ALIGNMENT		
	CONNECTION	AUDIO FREQUENCY	RF MODULATION	TYPE & CONNECTION	ADJUST	INDICATION	NOTES
1	Audio oscillator connected to lug 1	80 KC—1 volt	None	AC VTVM to junction of C210 and R228	L100 (Use hex alignment tool)	Minimum voltage	
2	Multiplex generator audio output to lug 1 (See Note 1)	19 KC (± 5 cps) pilot tone, 100 mv	None	DC VTVM to T.S.P. 101	Z100 top and bottom (Use hex alignment tool)	Maximum voltage	1
3	Same as Step 2	19 KC pilot tone, 50 mv	None	Scope horiz. input to 19 KC output of gen.; vert. input to junction of C216 and R209. External sweep	Z101 (Use K-tran alignment tool)	Stable 2:1 Lissajous pattern. Disregard phase of pattern	1
4	Same as Step 2	19 KC	None	Same as Step 3	Vary generator 19 KC output from 50 to 200 mv	Lissajous pattern should remain stationary over the entire 150 mv range	1, 2
5	Same as Step 2	1000 cps on left (A) channel only, 1 volt rms (2.8 P-P)	None	AC VTVM and scope vert. input to channel A output lug. Internal sweep. DC VTVM to T.S.P. 101	Z100 top (Use hex tool)	Maximum indication on AC VTVM. Clean 1000 cps waveform on scope	1, 3
6	Same as Step 2	1000 cps on right (B) channel only, 1 volt rms (2.8 P-P)	None	Same as Step 5	MPX separation R215	Minimum reading on AC VTVM should be at least 33 db below reading obtained in Step 5	1
7	Same as Step 2	Same as Step 6	None	Move scope input and AC VTVM to channel B output lug	-----	Note and record voltage reading on AC VTVM	1
8	Same as Step 2	1000 cps on left (A) channel only, 1 volt rms (2.8 P-P)	None	Same as Step 7	-----	AC VTVM reading should be at least 33 db below reading observed in Step 7	1
9	Same as Step 2	8000 cps on right (B) channel only, 1 volt rms (2.8 P-P)	None	Same as Step 7	-----	AC VTVM reading should be the same as observed in Step 7	1
10	Same as Step 2	8000 cps on left (A) channel only, 1 volt rms (2.8 P-P)	None	Same as Step 7	-----	AC VTVM reading should be at least 18 db below reading observed in Step 9	1
11	Repeat Steps 9 and 10 with scope and AC VTVM connected to channel A output lug, but start with 8000 cps applied to left channel for first reading, then switch to right channel for second reading.						
12	Multiplex generator RF output to 300-ohm antenna terminals	1000 cps on left (A) channel only	100% (75 KC Dev.) No pre-emphasis	Move scope input and AC VTVM to channel A output lug	-----	Note and record voltage reading on AC VTVM	4
13	Same as Step 12	1000 cps on right (B) channel only	Same as Step 12	Same as Step 12	R215	Minimum reading on AC VTVM should be at least 33 db below reading observed in Step 12	4
14	Same as Step 12	8000 cps on left (A) channel only	Same as Step 12	Same as Step 12	-----	AC VTVM reading should be 10 db below reading observed in Step 12	4
15	Same as Step 12	8000 cps on right (B) channel only	Same as Step 12	Same as Step 12	-----	AC VTVM reading should be 28 db below reading observed in Step 12	4

NOTE: The above procedure is based on the use of the FISHER Model 300 Multiplex Generator.

1 — In steps 2 through 11, the audio output of the Multiplex Generator should be connected to lug 1 of the multiplex sub-chassis through a 12,000 ohm, ½-watt, carbon resistor, and a 180 uuf capacitor should be connected between lug 1 and ground. The wiring from the MPX TEST jack on the main chassis to lug 1 must be disconnected during Steps 2 through 11.

2 — The vertical amplitude of the Lissajous pattern will increase slightly

as the generator output is increased. This is a normal occurrence.

3 — If DC VTVM reading falls below -9 volts when maximum reading is obtained on the AC VTVM, readjust bottom of Z100, then repeat Step 5. Repeat this procedure until maximum AC VTVM reading is obtained with DC VTVM reading greater than -9 volts.

4 — Tune the FISHER to the RF output frequency of the Multiplex Generator.

PARTS DESCRIPTION LIST

CAPACITORS

10% tolerance for all fixed capacitors, unless otherwise noted or marked GMV (guaranteed minimum value). All capacitors not marked uf are pF (uuf).

Symbol	Description	Part No.
C1	Electrolytic, 4 Section: A — 40uf, 300V B — 40uf, 300V C — 40uf, 250V D — 40uf, 250V	C670-125B
C2	Ceramic, 5000, +80 — 20%, 500V	C50089-6
C3	Ceramic, 2700, 1000V	C50072-17
C4, 5	Ceramic, 5000, +80 — 20%, 500V	C50089-6
C6	Ceramic, 2700, 1000V	C50072-17
C7	Ceramic, 24, 5%, N150, 1000V	C50070-8
C8	Ceramic, 5000, +80 — 20%, 500V	C50089-6
C9	Ceramic, 2700, 1000V	C50072-17
C10	Ceramic, 5000, +80 — 20%, 500V	C50089-6
C11	Ceramic, 2700, 1000V	C50072-17
C12, 13	Ceramic, 330, 1000V	C50072-1
C14	Electrolytic, 8uf, 50V	C629-138
C15	Ceramic, 330, 1000V	C50072-1
C16	Ceramic, 1800, 1000V	C50072-8
C17	Ceramic, .05uf, +80 — 20%, 100V	C50073-2
C18	Ceramic, 560, 1000V	C50072-14
C19	Mylar, .1uf, 250V	C50197-54
C20	Ceramic, 15, N75, 1000V	C50070-18
C21, 22	Ceramic, .02uf, +80 — 20%, 500V	C50089-4
C23	Mylar, .1uf, 250V	C50197-54
C24	Ceramic, 15, N75, 1000V	C50070-18
C25	Ceramic, .02uf, +80 — 20%, 500V	C50089-4
C26	Ceramic, .02uf, GMV, 1000V	C50071-6
C27	Ceramic, 5000, +80 — 20%, 500V	C50089-6
C28	Ceramic, .02uf, GMV, 1000V	C50071-6
C29, 30		
31	Ceramic, 5000, +80 — 20%, 500V	C50089-6
C32	Molded, .01uf, 20%, 600V	C2747
C33	Ceramic, .02uf, GMV, 1000V	C50071-6
C34	Ceramic, 8 ± .5, NPO, 500V	CC20CJ080D5
C35	Ceramic, 100, N1500, 1000V	C50070-6
C36	Ceramic, Trimmer	C662-123
C37	FM, Variable	C726-116
C38	Ceramic, 100, N1500, 1000V	C50070-6
C39, 40,		
41, 42	Ceramic, Feedthru, 1000, GMV	C592-187
C43	Ceramic, 1000, 1000V	C50072-3
C44	Ceramic, Feedthru, 1000, GMV	C592-187
C45	Ceramic, 8, ± .5, NPO, 500V	CC20CJ080D5
C46	Ceramic, Trimmer	C662-123
C47	Ceramic, 100, N1500, 1000V	C50070-6
C48	Ceramic, 68, N750, 500V	CC20UJ680K5
C49	Ceramic, 100, N1500, 1000V	C50070-6
C50	Ceramic, 5, ± .5, N220, 500V	CC20RH050D5
C51	Ceramic, 5, ± .5, N150, 500V	CC20PJ050D5
C52	Ceramic, Trimmer	C662-123
C53	Ceramic, 47, N750, 1000V	C50070-4
C54	Ceramic, Feedthru, 1000, GMV	C592-187
C55	Ceramic, 100, 5%, N1500, 1000V	C50070-19
C56	Ceramic, 1000, 1000V	C50072-3
C57	Ceramic, Feedthru, 1000, GMV	C592-187
C58	Ceramic, 5000, 20%, 500V	C50089-1

RESISTORS

In ohms, 10% tolerance, 1/2 watt, otherwise noted. K=Kilohms, M=Megohms.

Symbol	Description	Part No.
R1	Composition, 270	RC20BF271K
R2	Composition, 100K	RC20BF104K
R3	Composition, 56K	RC20BF563K
R4	Composition, 150	RC20BF151K
R5	Composition, 47K	RC20BF473K

R6	Composition, 1K	RC20BF102K
R7	Composition, 150	RC20BF151K
R8	Composition, 47K	RC20BF473K
R9	Composition, 27K	RC20BF273K
R10	Composition, 1K	RC20BF102K
R11	Dep. Carbon, 2.2M, 5%, 1/3 W	R33DC225J
R12	Composition, 68K	RC20BF683K
R13	Composition, 27K	RC20BF273K
R14	Composition, 82K	RC20BF823K
R15	Composition, 1K	RC20BF102K
R16	Dep. Carbon, 47K, 5%, 1/3 W	R33DC473J
R17	Composition, 180, 5%	RC20BF181J
R18	Composition, 56K	RC20BF563K
R19	Composition, 1K	RC20BF102K
R20	Dep. Carbon, 270K, 5%, 1/3 W	R33DC274J
R21	Composition, 270, 5%	RC20BF271J
R22	Composition, 1.5K, 5%	RC20BF152J
R23	Composition, 1K, 5%	RC20BF102J
R24	Dep. Carbon, 15K, 5%, 1/3 W	R33DC153J
R25	Dep. Carbon, 47K, 5%, 1/3 W	R33DC473J
R26	Dep. Carbon, 1.8, 5%, 1/3 W	R33DC185J
R27	Dep. Carbon, 47K, 5%, 1/3 W	R33DC474J
R28	Composition, 15M	RC20BF156K
R29, 30	Dep. Carbon, 100K, 5%, 1/3 W	R33DC104J
R31	Composition, 15M	RC20BF156K
R32	Dep. Carbon, 1.8M, 5%, 1/3 W	R33DC185J
R33	Dep. Carbon, 470K, 5%, 1/3 W	R33DC474J
R34, 35	Glass, 270, 3W	RPG3W271K
R36	Composition, 3.3K	RC20BF332K
R37, 38	Composition, 120	RC20BF121K
R39	Composition, 820K	RC20BF824K
R40	Composition, 1K	RC20BF102K
R41	Composition, 470	RC20BF471K
R42	Dep. Carbon, 1.5M, 5%, 1/3 W	R33DC155J
R43	Dep. Carbon, 470K, 5%, 1/3 W	R33DC474J
R44	Composition, 470K	RC20BF474K
R45	Dep. Carbon, 1.8M, 5%, 1/3 W	R33DC185J
R46	Composition, 100K	RC20BF104K
R47, 48	Composition, 330K	RC20BF334K
R49	Composition, 22	RC20BF220K
R50	Composition, 2.2K	RC20BF222K
R51	Composition, 470K	RC20BF474K
R52	Composition, 1K	RC20BF102K
R53	Composition, 120	RC20BF121K

POTENTIOMETERS

Symbol	Description	Part No.
PO1, PO2	Potentiometer, 500K, Channel A & B Level	R50103-6

COILS, CHOKES AND TRANSFORMERS

Symbol	Description	Part No.
L1	Limiter Coil Assembly	ZZ50210-6Y
L2	Choke, 3.3 Microhenries	L50066-8
L3, 4, 5	Choke, Filament	L520-156
L6	Coil, FM Antenna Assembly	A5726-122
L7	Choke, 1 Microhenry	L50066-2
L8, 9	Choke, .56 Microhenries	L50066-19
L10	Choke, RF	L629-180
L11	Coil, FM RF	L726-126
L12	Coil, FM Oscillator Assembly	A5726-123
L13	Choke, 1 Microhenry	L50066-2
L14	Choke, .56 Microhenry	L50066-19
L15	Choke, 1 Microhenry	L50066-2
L16, 17	Choke, 1.2 Microhenries	L50066-3
T1	Transformer, FM IF	ZZ662-117
T2	Transformer, FM IF	ZZ2987Y
T3	Transformer, FM IF	ZZ50210-2Y
T4	Transformer, FM Ratio Detector	ZZ50210-9Y
T5	Transformer, Power	T903-115

PARTS DESCRIPTION LIST

SWITCHES

Symbol	Description	Part No.
S1	Switch, Selector	S909-113
S2	Switch, Filter	S918-114
S3	Switch, Power	S50358-3
S4	Switch, Meter	S909-114

MISCELLANEOUS

Symbol	Description	Part No.
F	Fuse, 1 amp., Slo-Blo	F692-132
SR	Selenium Rectifier, Bridge Type	SR50279-1
—	Meter	M909-120
—	Dial Lamps	150082-7
—	Meter Lamp, #470F	150009-4
—	Dipole Assembly	A550227-1
—	Audio Cables	A550004-1
—	Dial Pointer	A50242-16
—	Meter Lamp Socket	AS909-121
—	Dress Panel	AS909-118
—	Tube Shield, 7 Pin	E3330
—	Tube Shield, 9 Pin	E3287
—	Knob, Tuning	E50325-2
—	Knob	E50325-1
—	Line Cord	W50023-1
—	Fuse Holder	X1036

PARTS LIST MPX CHASSIS

CAPACITORS

Symbol	Description	Part No.
C200	Ceramic, .01uf, +80 —20%, 500V	C50089-7
C201	Ceramic, 680, 1000V	C50072-2
C203	Ceramic, 220, 1000V	C50183-3
C204	Mica, 470, 5%, 300V	C50332-4
C205	Ceramic, 82, N1500, 1000V	C50070-7
C206	Ceramic, .001uf, GMV, 500V	C50089-2
C207	Ceramic, .005uf, +80 —20%, 500V	C50089-6
C208, 209	Mica, 4700, 5%, 500V	C50332-5
C210	Electrolytic, 1uf, 350V	C50283-3
C211, 212	Ceramic, .001uf, GMV, 500V	C50089-2
C213	Ceramic, .05uf, +80 —20%, 100V	C50073-2
C214	Mylar, .0047uf, 400V	C50197-25
C215	Mica, 3900, 5%, 500V	C50332-6

C216, 217	Ceramic, .001uf, GMV, 500V	C50089-2
C218	Ceramic, .005uf, 20%, 500V	C50089-1
C219	Ceramic, 330, 1000V	C50072-1
C220	Ceramic, .005uf, 20%, 500V	C50089-1
C221, 222	Mylar, .047uf, 10%, 250V	C50197-52
C223, 224	Ceramic, .001uf, 1000V	C50072-3
C225, 226	Ceramic, 2200, 1000V	C50072-5

RESISTORS AND POTENTIOMETERS

In ohms, 10% tolerance, 1/2 watt, unless otherwise noted. K=Kilohms, M=Megohms.

Symbol	Description	Part No.
R200	Composition, 22M	RC20BF226K
R201	Composition, 4.7K, 5%	RC20BF742J
R202	Composition, 15K, 5%	RC20BF135J
R203	Composition, 10M	RC20BF106K
R204	Dep. Carbon, 1M, 5%, 1/3 W	R33DC105J
R205	Dep. Carbon, 330K, 5%, 1/3 W	R33DC334J
R206	Dep. Carbon, 1M, 5%, 1/3 W	R33DC105J
R207	Dep. Carbon, 1.5M, 5%, 1/3 W	R33DC155J
R208	Dep. Carbon, 22K, 5%, 1/3 W	R33DC223J
R209, 210, 211, 212	Composition, 33K, 5%	RC20BF333J
R213, 214	Dep. Carbon, 100K, 5%, 1/3 W	R33DC104J
R215	Potentiometer, 50K, MPX-separation	R50150-4
R216	Composition, 10M	RC20BF106K
R217, 218	Dep. Carbon, 18K, 5%, 1/3 W	R33DC183J
R219, 220	Dep. Carbon, 15K, 5%, 1/3 W	R33DC153J
R221	Composition, 10M	RC20BF106K
R222, 223, 224, 225	Dep. Carbon, 22K, 5%, 1/3 W	R33DC223J
R226, 227, 228, 229, 230	Dep. Carbon, 1M, 5%, 1/8 W	R12DC105J

MISCELLANEOUS

Symbol	Description	Part No.
CR100, 101, 102, 103	Diode, Type 1112	V-1112
L100	Coil, Low Pass	L50210-30
L101	Coil, 5.25 MH, 5%	L50334-1
L102, 103	Coil, 20 MH, 5%	L50334-2
Z100	Transformer, 19kc	ZZ50210-33
Z101	Coil, 38kc	ZZ50210-34



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