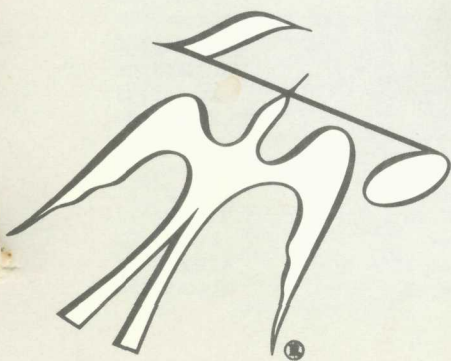


Service Manual

THE FISHER®



President X

MODEL 9010

PARTS DESCRIPTION LIST • TUNER

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, 2 | Ceramic, 100, N1500, 1000V | C50070-6 |
| C3 | Ceramic Trimmer | C662-123 |
| C4 | Variable | C857-115-1 |
| C5 | Ceramic, 10, ± 5 , NPO, 500V | CC20CJ100D5 |
| C6, 7, 8 | Ceramic Feedthru, 1000, GMV | C592-187 |
| C9 | Molded, .01uf, 20%, 600V | C2747 |
| C10 | Ceramic Feedthru, 1000, GMV | C592-187 |
| C11 | Ceramic, 1000, GMV, 500V | C50089-2 |
| C12 | Ceramic Trimmer | C662-123 |
| C13 | Ceramic, 10, ± 5 , NPO, 500V | CC20CJ100D5 |
| C14 | Ceramic, 3, NPO, 1000V | C50070-28 |
| C15 | Ceramic Trimmer | C662-123 |
| C16, 17, | | |
| 18 | Ceramic Feedthru, 1000, GMV | C592-187 |
| C19 | Electrolytic, 25uf, 6V | C639-114 |
| C20 | Mylar, .1uf, 125V | C50435-7 |
| C21 | Electrolytic, 50uf, 70V | C50283-2 |
| C22 | Electrolytic, 40uf, 250V | C581-133 |
| C23 | Electrolytic, 2 Section: | C50180-29 |
| | A — 1000uf, 35V | |
| | B — 1000uf, 35V | |
| C25 | Electrolytic, 50uf, 70V | C50283-2 |
| C26 | Ceramic Feedthru, 1000, GMV | C592-187 |
| C27 | Ceramic, 5000, 20%, 500V | C50089-1 |
| C28 | Ceramic, 8, ± 5 , NPO, 500V | CC20CJ080D5 |
| C29 | Ceramic Trimmer | C662-123 |
| C30 | Composition, 47K, 10%, $\frac{1}{2}$ W | RC20BF473K |
| C32 | Ceramic, 100, N1500, 1000V | C50070-6 |
| C33 | Ceramic, 6, ± 5 , N470, 500V | CC20TJ060D5 |
| C34 | Ceramic, 100, N1500, 1000V | C50070-6 |
| C35 | Ceramic, .05uf, +80 — 20%, 100V | C50073-2 |
| C36 | Mylar, .1uf, 250V | C50197-54 |
| C37 | Capacitor, Electrolytic, Non-polarized, 14uf, 15%, 50V | C882-252 |
| C38 | Electrolytic, 50uf, 70V | C50283-2 |
| C39 | Ceramic, 24, 5%, N150, 1000V | C50070-8 |
| C40 | Ceramic, 82, 5%, N1500, 1000V | C50070-33 |
| C41 | Ceramic Feedthru, 1000, GMV | C592-187 |
| C42 | Ceramic, 820, 1000V | C50072-7 |
| C43, 44 | Ceramic Feedthru, 1000, GMV | C592-187 |
| C45 | Ceramic, .02uf, +80 — 20%, 500V | C50089-4 |
| C46 | Ceramic, 5000, 20%, 500V | C50089-1 |
| C47, 48 | Electrolytic, 1uf, 50V | C746-144 |
| C49, 50 | Ceramic, .05uf, +80 — 20%, 100V | C50073-2 |
| C51, 52, | | |
| 53, 54, | | |
| 55, 56, | Ceramic, 5000, +80 — 20%, 500V | C50089-6 |
| C57 | Ceramic, .02uf, GMV, 1000V | C50071-6 |
| C58 | Ceramic, 2700, 1000V | C50072-17 |
| C59 | Ceramic, 5000, +80 — 20%, 500V | C50089-6 |
| C60 | Ceramic, 5000, 20%, 500V | C50089-1 |
| C61 | Ceramic, 1, 20%, P-100, 1000V | C50070-1 |
| C62, 63 | Mylar, .1uf, 125V | C50435-7 |
| C64 | Ceramic, .05uf, +80 — 20%, 100V | C50073-2 |
| C65 | Electrolytic, 4 Section: | C670-1258 |
| | A — 40uf, 300V | |
| | B — 40uf, 300V | |
| | C — 40uf, 250V | |
| | D — 40uf, 250V | |
| C71 | Ceramic, 5000, +80 — 20%, 500V | C50089-6 |
| C72 | Ceramic, 2700, 1000V | C50072-17 |
| C73 | Ceramic, 24, 5%, N150, 1000V | C50070-8 |
| C74 | Ceramic, .02uf, GMV, 1000V | C50071-6 |
| C75 | Ceramic, 5000, +80 — 20%, 500V | C50089-6 |
| C76 | Ceramic, 100, N1500, 1000V | C50070-6 |
| C77 | Ceramic, 5000, +80 — 20%, 500V | C50089-6 |
| C78 | Ceramic, 5000, 20%, 500V | C50089-1 |
| C79 | Ceramic, 56, N1500, 1000V | C50070-22 |
| C80 | Ceramic, 39, N1500, 1000V | C50070-17 |
| C81 | Ceramic, 5000, 20%, 500V | C50089-1 |
| C82 | Ceramic, 390, 1000V | C50072-6 |
| C83 | Mylar, .1uf, 125V | C50435-7 |
| C84 | Ceramic, 56, N1500, 1000V | C50070-22 |
| C85 | Ceramic, 5000, 20%, 500V | C50089-1 |
| C86 | Ceramic, 390, 1000V | C50072-6 |
| C87 | Ceramic, 39, N1500, 1000V | C50070-17 |
| C88 | Mylar, .1uf, 125V | C50435-7 |
| C89 | Ceramic, 12, NPO, 1000V | C50070-2 |
| C90 | Electrolytic, 4uf, 50V | C50283-5 |
| C91 | Ceramic, 5000, +80 — 20%, 500V | C50089-6 |
| C92 | Ceramic, 2700, 1000V | C50072-17 |
| C93 | Ceramic, .02uf, GMV, 1000V | C50071-6 |
| C94 | Ceramic, 5000, +80 — 20%, 500V | C50089-6 |
| C95 | Ceramic, 39, N1500, 1000V | C50070-17 |
| C96 | Ceramic, 2700, 1000V | C50072-17 |
| C97 | Ceramic, .01uf, +80 — 20%, 500V | C50089-7 |
| C98 | Electrolytic, 4uf, 50V | C50283-5 |
| C100 | Ceramic, 5000, +80 — 20%, 500V | C50089-6 |
| C101, 102, | | |
| 103 | Ceramic, 330, 1000V | C50072-1 |
| C104, 105 | Electrolytic, 8uf, 50V | C629-138 |
| C106 | Ceramic, .02uf, GMV, 1000V | C50071-6 |
| C107 | Mylar, .1uf, 125V | C50435-7 |
| C108 | Polystyrene, 2500, 5%, 125V | CP50394-9 |
| C109 | Mylar, .1uf, 125V | C50435-7 |
| C110 | Electrolytic, 2uf, 70V | C721-142 |
| C111 | Electrolytic, .5uf, 350V | C50283-7 |
| C112 | Mylar, .1uf, 125V | C50435-7 |
| C113 | Ceramic, 5000, +80 — 20%, 500V | C50089-6 |
| C114 | Ceramic, 560, 1000V | C50072-14 |
| C115 | Ceramic, 5000, +80 — 20%, 500V | C50089-6 |

RESISTORS & POTENTIOMETERS

In ohms, 5% tolerance, $\frac{1}{8}$ watt unless otherwise noted. K=Kilohms, M=Megohms.

| Symbol | Description | Part No. |
|---------|---|------------|
| R1 | Composition, 100K, 10%, $\frac{1}{2}$ W | RC20BF104K |
| R2 | Dep. Carbon, 2.7K | R12DC272J |
| R3, 4 | Dep. Carbon, 270 | R12DC271J |
| R5 | Composition, 120, 10%, $\frac{1}{2}$ W | RC20BF121K |
| R6 | Composition, 100K, 10%, $\frac{1}{2}$ W | RC20BF104K |
| R7 | Dep. Carbon, 820K | R12DC824J |
| R8 | Dep. Carbon, 1M | R12DC105J |
| R9, 10 | Dep. Carbon, 330K, $\frac{1}{2}$ W | R33DC334J |
| R11 | Dep. Carbon, 2.7K | R12DC272J |
| R12 | Dep. Carbon, 470K | R12DC474J |
| R13 | Dep. Carbon, 470 | R12DC471J |
| R14 | Composition, 4.7K, 10%, 2W | RC40BF472K |
| R15 | Composition, 10, 10%, 2W | RC40BF100K |
| R16 | Dep. Carbon, 10K | R12DC103J |
| R17, 18 | Composition, 220, 10%, $\frac{1}{2}$ W | RC20BF221K |
| R19 | Composition, 820K, 10%, $\frac{1}{2}$ W | RC20BF824K |
| R20 | Composition, 27, 10%, $\frac{1}{2}$ W | RC20BF270K |
| R21 | Dep. Carbon, 2.7K, $\frac{1}{2}$ W | R33DC272J |
| R22 | Dep. Carbon, 1M | R12DC105J |
| R23 | Dep. Carbon, 4.7K | R12DC472J |
| R24 | Dep. Carbon, 100K | R12DC104J |
| R25 | Composition, 10K, 10%, $\frac{1}{2}$ W | RC20BF103K |
| R26 | Composition, 47, 10%, 1W | RC30BF470K |
| R27 | Dep. Carbon, 56K | R12DC563J |
| R28 | Composition, 150, 10%, $\frac{1}{2}$ W | RC20BF151K |
| R29 | Composition, 1K, 10%, $\frac{1}{2}$ W | RC20BF102K |

PARTS DESCRIPTION LIST • TUNER

| | | |
|--|--|--|
| <p>R30 Composition, 22K, 10%, 1/2 W R31 Composition, 330K, 1/2 W R32 Composition, 10K, 10%, 2W R33 Dep. Carbon, 100K R34, 35 Dep. Carbon, 1K, 1/2 W R36 Dep. Carbon, 150K R37 Composition, 39K, 10%, 1/2 W R38, 39 Composition, 1K, 10%, 1/2 W R40 Dep. Carbon, 220K R41, 42 Glass, 270, 10%, 3W R43 Composition, 3.3K, 10%, 1W R44 Dep. Carbon, 39K R45 Composition, 100K, 10%, 1/2 W R46 Composition, 150, 10%, 1/2 W R47 Composition, 1K, 10%, 1/2 W R48 Dep. Carbon, 1M R49 Dep. Carbon, 10K R50 Dep. Carbon, 82K R51 Dep. Carbon, 1.8M, 1/3 W R52 Dep. Carbon, 4.7K R53, 54 Dep. Carbon, 100K R55 Composition, 1K, 10%, 1/2 W R56 Dep. Carbon, 22K R57 Composition, 68K, 10%, 1/2 W R58, 59 Composition, 1K, 10%, 1/2 W R60 Dep. Carbon, 100K, 1/3 W R61 Dep. Carbon, 150K, 1/3 W R62 Dep. Carbon, 680, 1/3 W R63 Dep. Carbon, 100K, 1/3 W R64 Dep. Carbon, 150K, 1/3 W R65 Dep. Carbon, 680, 1/3 W R66 Dep. Carbon, 22K R67 Dep. Carbon, 47K R68 Potentiometer, 50K, Tune-O-Matic Sensitivity R69 Dep. Carbon, 22K R70 Dep. Carbon, 4.7K R71 Composition, 22M, 10%, 1/2 W R72 Dep. Carbon, 100K, 1/3 W R73 Composition, 22M, 10%, 1/2 W R74 Dep. Carbon, 100K, 1/3 W R75 Composition, 56K, 10%, 1/2 W R76 Dep. Carbon, 15K R77, 78 Composition, 1K, 10%, 1/2 W R79 Dep. Carbon, 100K R80 Composition, 68, 10%, 1/2 W R81 Dep. Carbon, 150K, 1/3 W R82 Dep. Carbon, 470K R83 Potentiometer, 500K, Left Output Level R84 Dep. Carbon, 1.8M, 1/3 W R85 Dep. Carbon, 1M R86 Dep. Carbon, 470K R87 Potentiometer, 500K, Right Output Level R88 Dep. Carbon, 1.8M, 1/3 W R89 Dep. Carbon, 1M R90 Dep. Carbon, 100K R91 Composition, 6.8M, 10%, 1/2 W R92 Composition, 2.7M, 10%, 1/2 W R93 Dep. Carbon, 56K R94 Dep. Carbon, 100K, 1/3W R95 Composition, 18K, 10%, 1W R96 Composition, 47K, 10%, 1/2 W R97 Composition, 270, 1/2 W R98 Composition, 1K, 10%, 1/2 W R99 Dep. Carbon, 47K R100 Dep. Carbon, 470K R101 Dep. Carbon, 150K R102 Composition, 15, 10%, 1/2 W R103 Dep. Carbon, 470K</p> | <p>RC20BF223K RC20BF334J RC40BF103K R12DC104J R33DC102J R12DC154J RC20BF393K RC20BF102K R12DC224J RPG3W271K RC30BF332K R12DC393J RC20BF104K RC20BF151K RC20BF102K R12DC105J R12DC103J R12DC823J R33DC185J R12DC472J R12DC104J RC20BF102K R12DC223J RC20BF683K RC20BF102K R33DC104J R33DC154J R33DC681J R33DC104J R33DC154J R33DC681J R12DC223J R12DC473J R50103-3 R12DC223J R12DC472J RC20BF226K R33DC104J RC20BF226K R33DC104J RC20BF563K R12DC153J RC20BF102K R12DC104J RC20BF680K R33DC154J R12DC474J R50103-6 R33DC185J R12DC105J R12DC474J R50103-6 R33DC185J R12DC105J R12DC104J RC20BF685K RC20BF275K R12DC563J R33DC104J RC30BF183K RC20BF473K RC20BF271J RC20BF102K R12DC473J R12DC474J R12DC154J RC20BF150K R12DC474J</p> | <p>R104 Dep. Carbon, 56K R105 Dep. Carbon, 100K R106 Composition, 1.5K, 1/2 W R107 Composition, 1K, 1/2 W R108, 109 Composition, 4.7K, 1/2 W R110, 111, 112, 113 Dep. Carbon, 820K R114 Dep. Carbon, 1K, 1/3 W R115 Dep. Carbon, 100 R116, 117 Dep. Carbon, 39K R117 Dep. Carbon, 1.8M, 1/3W R118 Potentiometer, Bias Adjust</p> |
| COILS, CHOKES AND TRANSFORMERS | | |
| Symbol | Description | Part No. |
| L1 | FM Antenna Coil | L726-124 |
| L2 | Choke, 1 Microhenry | L50066-2 |
| L3 | Choke, .68 Microhenry | L50066-1 |
| L4 | Choke, 1.2 Microhenries | L50066-3 |
| L5 | Choke, RF | L629-180 |
| L6 | Coil, FM RF | L857-122 |
| L7 | FM Oscillator Coil Assembly | AS857-125 |
| L8 | Choke, .68 Microhenry | L50066-1 |
| L9, 10, 11, 12 | Choke, 1.2 Microhenries | L50066-3 |
| L13 | Choke, 3.3 Microhenries | L50066-8 |
| L14 | Coil, FM Mixer | L857-123 |
| T1 | Transformer, Power | T998-115 |
| Z1 | FM IF Transformer | ZZ662-117 |
| Z2 | FM IF Transformer | ZZ2987 |
| Z3 | FM IF Transformer | ZZ50210-2 |
| Z4 | FM Limiter Coil | ZZ50210-6 |
| Z5 | FM Limiter Coil Assembly | L935-122 |
| Z6 | FM Ratio Detector Assembly | ZZ50210-9 |
| Z7 | FM IF Transformer | ZZ50210-19 |
| MISCELLANEOUS | | |
| Symbol | Description | Part No. |
| CR1 | Diode, Varicap | V726-130 |
| CR2, 3 | Diode, Silicon, Type 1112 | V-1112 |
| CR4, 12 | Diode, Silicon, 200 PIV, 750MA | SR851-122 |
| CR5 | Diode, Silicon, Type 1112 | V-1112 |
| CR6 | Diode, Type 1N541 | V-IN541 |
| CR7, 8, 9, 10, 11 | Diode, Silicon, Type 1112 | V-1112 |
| F1 | Fuse, 1.5 Amp., Slo-Blo | F684-143 |
| I1, 2 | Lamp, Dial | I50441-3 |
| I3 | Dial Pointer Assembly, incl. 2.5V bulb | AS50451-1 |
| I4, 5 | Lamp #47, Sta. Indicator, Stereo Beacon | I50009-1 |
| K1, 2 | Part of Motor & Gear Assembly | P-882 |
| K3 | Relay | K50446 |
| K4 | Relay | K50314 |
| M1 | Motor, part of Motor & Gear Assembly | P-882 |
| S1 | Switch, Antenna | S998-120 |
| S2 | Switch, Right Return | S882-244-1 |
| S3 | Switch, Left Return | S882-244-2 |
| S4 | Switch, AFC | S998-122 |
| S5 | Switch, Muting | S998-121 |
| S6 | Switch, Selector | S998-123 |
| S7 | Switch, Stereo Filter | S998-124 |
| S8 | Switch, Pushbutton | S998-114 |
| SR1 | Selenium Rectifier Bridge | SR50279-1 |
| — | Dipole Assembly | AS50227-1 |
| — | Dress Panel | AS998-108 |
| — | Knob, Tuning | E50325-2 |
| — | Knob | E50325-1 |
| — | Knob, Pushbutton | E851-116 |
| — | Dial Glass | N998-107 |
| — | Fuse Holder | X563-151 |

ALIGNMENT INSTRUCTIONS • TUNER

Read These Instructions With Extreme Care Before Attempting Alignment.

CHASSIS: Disconnect the external antenna. When using an oscilloscope for alignment, set the AUDIO LEVEL control for no overload, as shown by the proper waveform shape. Set remaining controls as follows: Selector, MONO; Muting, OFF; AFC, OFF; Antenna, NORMAL; Stereo Filter, OFF; TUNE-O-MATIC Sensitivity, 0.

SIGNAL GENERATOR: The signal generator equipment must be able to supply RF ± 22.5 KC deviation at 400 cps.

INDICATOR: DC VTVM, and scope for alignment.

ALIGNMENT: Allow the chassis and test instruments to warm up for at least 15 minutes. Adjust the line voltage for 117 volts AC, 50-60 cps. Use fully insulated tools: a small screwdriver for all trimming capacitors; a K-tran tool for Z1, Z2, Z3; a hex tool for Z4, Z5, Z6, Z7, L1, L6, L14 and L7.

NOTES: 1—For accurate alignment, signal generator output voltage must be adjusted to produce meter readings within the range specified in the INDICATION column for each step.

2—Signal generator frequency should be held constant for IF, limiter, center of channel detector and ratio detector alignment (Z1 through Z7).

FM ALIGNMENT (tuner only)

| STEPS | CHASSIS | SIGNAL GENERATOR | | | INDICATOR | ALIGNMENT | |
|-------|--|---|---------|--|--|--|-----------------------------------|
| | TUNING | COUPLING | FREQ. | MOD. | TYPE CONNECTION | ADJUST | INDICATION |
| 1 | Point of no signal and no interference | FM generator connected to pin 1 of V6 | 10.7 MC | None | Connect DC VTVM to test point 3 | Z4, Z5 top, Z6 bottom and top for max. indication | Between +5 and +9 volts |
| 2 | Point of no signal and no interference | FM generator connected to pin 1 of V6 | 10.7 MC | None | Connect DC VTVM to test point 4 | Z6 top for min. indication | Zero reading on zero center scale |
| 3 | Point of no signal and no interference | FM generator connected to pin 1 of V5 | 10.7 MC | None | Connect DC VTVM to test point 2 | Z3 top and bottom for max. indication | Between -0.5 and -1.0 volt |
| 4 | Point of no signal and no interference | FM generator connected to test point 1 through wire "gimmick" (less than 0.5 uuf) | 10.7 MC | None | Connect DC VTVM to test point 2 | Z1 and Z2 top and bottom for max. indication | Between -0.5 and -1.0 volt |
| 5 | Point of no signal and no interference | FM generator connected to test point 1 through wire "gimmick" (less than 0.5 uuf) | 10.7 MC | None | Connect DC VTVM to test point 5 | Z7 top and bottom | Between +10 and +15 volts |
| 6 | 90 MC | FM generator connected to 300 ohm terminals through 120 ohm carbon resistors | 90 MC | 30% FM (22.5 KC Dev.) at 400 cps. | DC VTVM to test point 2 and scope to RIGHT or LEFT OUTPUT jack | L7, L14, L6 and L1 for sine waveform and max. neg. voltage | Less than -3 volts |
| 7 | 106 MC | FM generator connected to 300 ohm terminals through 120 ohm carbon resistors | 106 MC | 30% FM (22.5 KC Dev.) at 400 cps. | DC VTVM to test point 2 and scope to RIGHT or LEFT OUTPUT jack | C15, C29, C12 and C3 for sine waveform and max. neg. voltage | Less than -3 volts |
| 8 | Repeat steps 6 and 7 for proper dial calibration and maximum output. | | | | | | |
| 9 | 98 MC | FM generator connected to antenna term. through 120-ohm carbon resistors | 98 MC | 30% FM (22.5 KC Dev.) at 400 cps, 8uV output | Connect DC VTVM to test point 5 | TUNE-O-MATIC control to position where Station Indicator starts to light | More than +8 volts |

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, 1/2-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 • PREAMPLIFIER

CAPACITORS

10% tolerance for all fixed capacitors, unless otherwise noted or marked GMV (guaranteed minimum value).

| Symbol | Description | Part No. |
|--------------------|---|-----------|
| C1, 2 | Ceramic, 100uf, N1500, 100V | C50070-6 |
| C3, 4 | Mylar, .022uf, 250V | C50197-49 |
| C13, 14 | Mylar, .047uf, 250V | C50197-52 |
| C30, 31 | Ceramic, 100uf, N1500, 1000V | C50070-6 |
| C32 | Electrolytic, 2 section A — 1000uf, 35V B — 1000uf, 35V | C50180-29 |
| C33 | Electrolytic, 4 section A — 40uf, 450V B — 10uf, 450V C — 10uf, 450V D — 40uf, 450V | C50180-10 |
| C34 | Electrolytic, 4 section A — 30uf, 350V B — 10uf, 250V C — 30uf, 350V D — 10uf, 300V | C50180-30 |
| C35, 36 | Ceramic, .005uf, 20%, 500V | C50089-1 |
| C37, 38 | Ceramic, .0039uf, 1000V | C50072-34 |
| C41, 42 | Mylar, .1uf, 250V | C50197-54 |
| C43, 44, 45, 46 | Electrolytic, 50uf, 3V | C50283-1 |
| C47, 48 | Mylar, .1uf, 250V | C50197-54 |
| C49, 50, 51, 52 | Ceramic, 24uf, 5%, N150, 1000V | C50070-8 |
| C53, 54 | Mylar, .033uf, 250V | C50197-51 |
| C55, 56 | Ceramic, 2700uf, 1000V | C50072-17 |
| C57, 58 | Electrolytic, 50uf, 3V | C50283-1 |
| C59, 60 | Ceramic, 300uf, 1000V | C50072-39 |
| C63, 64 | Ceramic, 1000uf, 1000V | C50072-3 |
| C65, 66 | Ceramic, 220uf, 1000V | C50072-20 |
| C67, 68 | Mylar, .68uf, 250V | C50197-57 |
| C69, 70 | Ceramic, 220uf, 1000V | C50072-20 |
| C71, 72 | Mylar, .047uf, 250V | C50197-52 |
| C73, 74 | Mylar, .68uf, 250V | C50197-57 |
| C75, 76, 77, 78 | Electrolytic, 50uf, 3V | C50283-1 |
| C79, 80 | Mylar, .68uf, 250V | C50197-57 |

RESISTORS AND POTENTIOMETERS

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

| Symbol | Description | Part No. |
|-----------------|---|------------|
| R3, 4, 5, 6 | Dep. Carbon, 100K, 5%, 1/3 W | R33DC104J |
| R7, 8, 9, 10 | Dep. Carbon, 120K, 5%, 1/3 W | R33DC124J |
| R11 | Potentiometer, Dual, 250K, aux. 2 level | R50160-71 |
| R12, 13 | Dep. Carbon, 100K, 5%, 1/3 W | R33DC104J |
| R14, 15 | Dep. Carbon, 10K, 5%, 1/3 W | R33DC103J |
| R16, 17 | Glass, 2.7K, 5%, 1W | R30G272J |
| R18, 19 | Glass, 330K, 5%, 1W | R30G334J |
| R20, 21 | Dep. Carbon, 4.7M, 5%, 1/3 W | R33DC475J |
| R26, 27 | Dep. Carbon, 220K, 5%, 1/3 W | R33DC224J |
| R28, 29 | Composition, 560K | RC20BF564K |
| R30 | Dep. Carbon, 100K, 5%, 1/3 W | R33DC104J |
| R32, 33 | Potentiometer, Dual, 250K, Mag. 1 & Mag. 2 level | R50160-71 |
| R39 | Dep. Carbon, 100K, 5%, 1/3 W | R33DC104J |
| R50, 51 | Dep. Carbon, 120K, 5%, 1/3 W | R33DC124J |
| R52 | Glass, 330, 3W | RPG3W331K |
| R53 | Wirewound, 10K, 7W | R851-128 |
| R54 | Glass, 1K, 3W | RPG3W102K |
| R55 | Composition, 47K | RC20BF473K |
| R56 | Glass, 1K, 3W | RPG3W102K |
| R57, 58 | Composition, 1.5M | RC30BF155K |
| R59 | Glass, 5.6K, 3W | RPG3W562K |
| R60 | Glass, 1K, 3W | RPG3W102K |
| R61, 62 | Dep. Carbon, 220K, 5%, 1/3 W | R33DC224J |

| | | |
|-------------------------------------|------------------------------------|------------|
| R63 | Glass, 4.7K, 3W | RPG3W472K |
| R64, 65 | Composition, 300K, 5% | RC20BF304J |
| R66, 67 | Dep. Carbon, 100K, 5%, 1/3 W | R33DC104J |
| R68 | Composition, 15K | RC20BF153K |
| R69, 70 | Composition, 1.5K | RC20BF152K |
| R71, 72 | Composition, 330K | RC20BF334K |
| R73 | Dep. Carbon, 4.7M, 5%, 1/3 W | R33DC475J |
| R75, 76 | Dep. Carbon, 220K, 5%, 1/3 W | R33DC224J |
| R77, 78 | Dep. Carbon, 2.7K, 5%, 1/3 W | R33DC272J |
| R79, 80 | Dep. Carbon, 100K, 5%, 1/3 W | R33DC104J |
| R81, 82 | Dep. Carbon, 470K, 5%, 1/3 W | R33DC474J |
| R83 | Potentiometer, dual, 250K, balance | R50160-65 |
| R84, 85, 86, 87 | Dep. Carbon, 470K, 5%, 1/3 W | R33DC474J |
| R88 | Composition, 33 | RC20BF330K |
| R89, 90 | Composition, 2.7M, 5% | RC20BF275J |
| R91, 92 | Composition, 2.2M, 5% | RC20BF225J |
| R93, 94 | Dep. Carbon, 470K, 5%, 1/3 W | R33DC474J |
| R95 | Potentiometer, dual, 1M, dimension | R50160-70 |
| R96 | Dep. Carbon, 470K, 5%, 1/3 W | R33DC474J |
| R97, 98 | Dep. Carbon, 120K, 5%, 1/3 W | R33DC124J |
| R99, 100 | Composition, 1.8K | RC20BF182K |
| R101, 102, 103, 104, 105, 106 | Dep. Carbon, 47K, 5%, 1/3 W | R33DC473K |
| R107, 108 | Composition, 68K, 10%, 1W | R30BF683K |
| R109, 110 | Dep. Carbon, 470K, 5%, 1/3 W | R33DC474J |
| R111, 112 | Dep. Carbon, 10K, 5%, 1/3 W | R33DC103J |
| R113 | Dep. Carbon, 220K, 5%, 1/3 W | R33DC224J |
| R114, 115 | Dep. Carbon, 220K, 5%, 1/3 W | R33DC224J |
| R116, 117 | Dep. Carbon, 2.7K, 5%, 1/3 W | R33DC272J |
| R118, 119 | Dep. Carbon, 22K, 5%, 1/3 W | R33DC223J |
| R120 | Potentiometer, dual, 100K, volume | R50160-69 |
| R121 | Dep. Carbon, 470K, 5%, 1/3 W | R33DC474J |
| R122 | Potentiometer, dual, 1M, bass | R50160-66 |
| R123 | Potentiometer, dual, 500K, treble | R50160-67 |
| R124 | Potentiometer, 500K, center volume | R50160-68 |
| R125, 126 | Dep. Carbon, 270K, 5%, 1/3 W | R33DC274J |
| R127, 128 | Composition, 1.5K | RC20BF152K |
| R129, 130 | Composition, 180K | RC20BF184K |
| R131, 132 | Composition, 68K, 1W | R30BF683K |
| R133, 134 | Dep. Carbon, 3.3M, 5%, 1/3 W | R33DC335J |

MISCELLANEOUS

| Symbol | Description | Part No. |
|-------------------|------------------------------------|--------------|
| F1 | Fuse, .5 amp., slo-blo | F795-136 |
| I1, 2, 3, 4, 5 | Lamp, #47 | I50009-1 |
| PC1, 2 | Printed Circuit, 3 3/4", tape EQ. | PC50187-7 |
| PC3, 4 | Printed Circuit, COL, EQ | PC50187-6 |
| PC5, 6 | Printed Circuit, 78, EQ. | PC50187-8 |
| PC7, 8 | Printed Circuit, R1AA, 7 1/2", EQ. | PC50187-3 |
| PC9, 10 | Printed Circuit, tone control | PC657-140 |
| P1 | Plug, dummy | P50181 |
| S1 | Switch, low level | S851-126 |
| S2 | Switch, mono-stereo | S851-127 |
| S3 | Switch, push button | S851-119 |
| S4 | Switch, center ch., power | Part of R124 |
| S5, 6, 7, 8, 9 | Switch, slide | S50200-5 |
| S10 | Switch, power | Part of R120 |
| SR1, 2 | Diode, silicon, SD91 | SR851-121 |
| T1 | Transformer, power | T851-115 |
| — | Dress panel | AS851-106 |
| — | Shielded cable | AS50004-1 |
| — | Knob, push button | E851-116 |
| — | Knob, dual, front | E50323 |
| — | Knob, dual, rear | E50221 |
| — | Knob | E50325-1 |
| — | Jewel, red | I50162-1 |
| — | Jewel, yellow | I50162-2 |
| — | Jewel, green | I50162-4 |

PARTS DESCRIPTION LIST • MULTIPLEX SECTION

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. |
|-----------|---------------------------------|----------|
| 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 |

| | | |
|-----------|----------------------------|-----------|
| C214 | Mylar, .0047uf, 400V | C50197-25 |
| C215 | Mica, 3900, 5%, 500V | C50332-6 |
| C216, 217 | Ceramic, .001uf, GMV, 500V | C50089-2 |
| C218 | Ceramic, .02uf, 20%, 500V | C50089-5 |
| C219 | Ceramic, 330, 1000V | C50072-1 |
| C220 | Ceramic, .02uf, 20%, 500V | C50089-5 |
| 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=Kilohm, M=Megohm.

| Symbol | Description | Part No. |
|--------|------------------|------------|
| R200 | Composition, 22M | RC20BF226K |

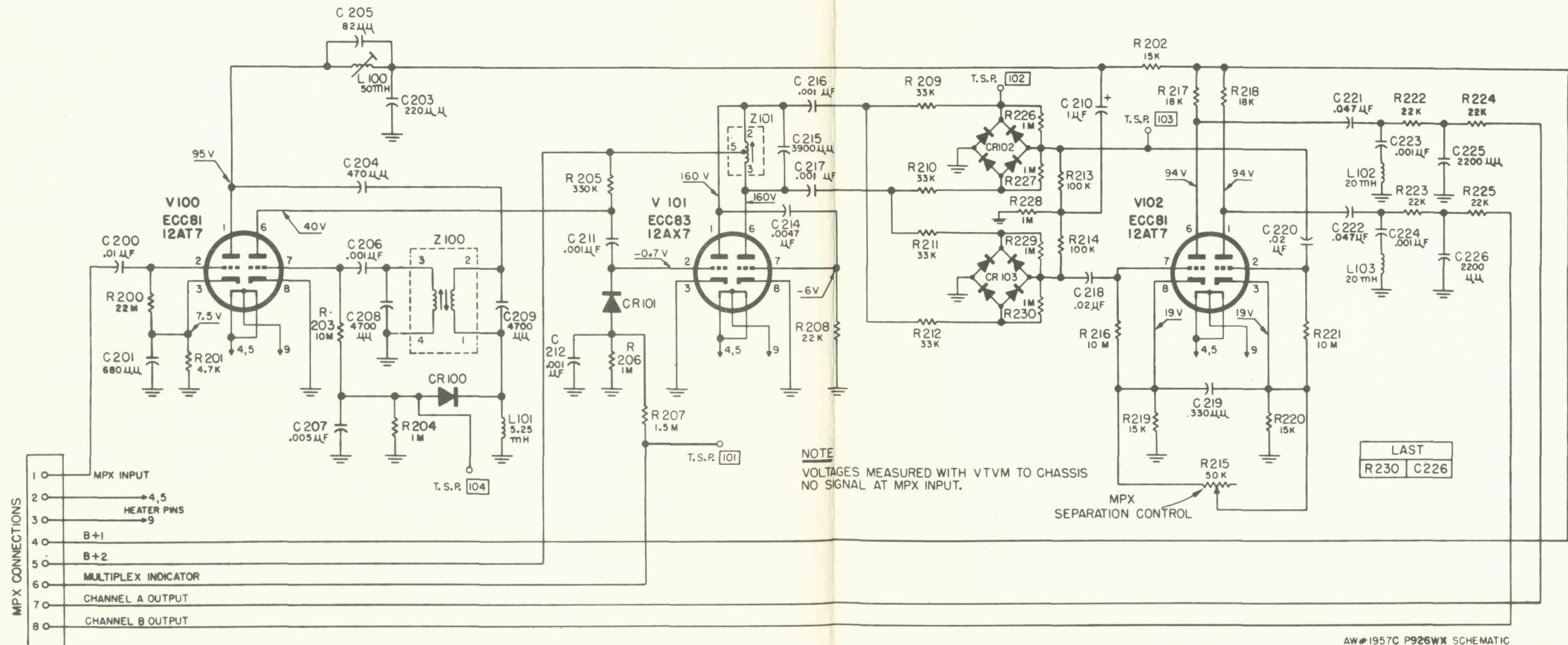
| | |
|------------|------------------------------------|
| R201 | Composition, 4.7K, 5% |
| R202 | Composition, 15K, 5% |
| R203 | Composition, 10M |
| R204 | Dep. Carbon, 1M, 5%, 1/3 W |
| R205 | Dep. Carbon, 330K, 5%, 1/3 W |
| R206 | Dep. Carbon, 1M, 5%, 1/3 W |
| R207 | Dep. Carbon, 1.5M, 5%, 1/3 W |
| R208 | Dep. Carbon, 22K, 5%, 1/3 W |
| R209, 210, | 211, 212 Composition, 33K, 5% |
| R213, 214 | Dep. Carbon, 100K, 5%, 1/3 W |
| R215 | Potentiometer, 50K, MPX-separation |
| R216 | Composition, 10M |
| R217, 218 | Dep. Carbon, 18K, 5%, 1/3 W |
| R219, 220 | Dep. Carbon, 15K, 5%, 1/3 W |

| | |
|------------|----------------------------|
| RC20BF472J | |
| RC20BF153J | |
| RC20BF106K | |
| R33DC105J | |
| R33DC334J | |
| R33DC105J | |
| R33DC155J | |
| R33DC223J | |
| R221 | Composition, 10M |
| R222, 223, | 224, 225 |
| R226, 227, | 228, 229, |
| 230 | Dep. Carbon, 1M, 5%, 1/3 W |

MISCELLANEOUS

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

SCHEMATIC DIAGRAM • MULTIPLEX SECTION



PARTS DESCRIPTION LIST • POWER AMPLIFIER

CAPACITORS

All capacitors not marked uf are pF (uuf).

| Symbol | Description |
|-----------------|--|
| C1, 2 | Ceramic, 39, 10%, 1000V |
| C3, 4 | Electrolytic, .5uf, 35V |
| C5, 6 | Electrolytic, 500uf, 10V |
| C7, 8 | Ceramic, 300, 10%, 1000V |
| C9, 10 | Ceramic, 330, 10%, 1000V |
| C11, 12 | Electrolytic, 50uf, 10V |
| C13, 14 | Electrolytic, 200uf, 35V |
| C15, 16, 17, 18 | Electrolytic, 100uf, 25V |
| C19, 20 | Ceramic, 330, 10%, 1000V |
| C21, 22 | Electrolytic, 3000uf, 40V |
| C23, 24 | Electrolytic, 200uf, 35V |
| C25 | Electrolytic, 2 section: A—1500uf, 35V B—1500uf, 45V |
| C26 | Molded, .01uf, 20%, 600V |

| Part No. |
|-----------|
| C50070-17 |
| C50483-11 |
| C50483-9 |
| C50072-39 |
| C50072-1 |
| C50283-6 |
| C50483-7 |
| C50483-6 |
| C50072-1 |
| C50180-60 |
| C50483-7 |
| C50180-62 |

C2747

RESISTORS AND POTENTIOMETERS

In ohms, 5% tolerance, 1/8 Watt unless otherwise noted. K=Kilohm, M=Megohm.

| Symbol | Description |
|-------------|--|
| P1, 2, 3, 4 | Potentiometer, wirewound, 10, 20%, 2W |
| R1, 2 | Dep. Carbon, 1M |
| R3, 4 | Dep. Carbon, 3.3K |
| R5, 6 | Dep. Carbon, 220K |
| R7, 8 | Dep. Carbon, 18K |
| R9, 10 | Dep. Carbon, 8.2K |
| R11, 12 | Dep. Carbon, 1K |
| R13, 14 | Dep. Carbon, 100 |
| R15, 16 | Dep. Carbon, 3.9K |
| R17, 18 | Dep. Carbon, 5.6K |

| Part No. |
|--------------|
| R50160-141-1 |
| R12DC105J |
| R12DC332J |
| R12DC224J |
| R12DC183J |
| R12DC822J |
| R12DC102J |
| R12DC101J |
| R12DC392J |
| R12DC562J |

| | |
|-----------------|------------------------------------|
| R19, 20 | Glass, 100, 10%, 3W |
| R21, 22 | Dep. Carbon, 390 |
| R23, 24, 25, 26 | Wirewound, 270, 2W |
| R27, 28, 29, 30 | Wirewound, 100, 2W |
| R31, 32, 33, 34 | Wirewound, 220, 2W |
| R35, 36, 37, 38 | Wirewound, 1, 3W |
| R39, 40 | Wirewound, Dual, 15 & 10, 10%, 10W |
| R41, 42 | Composition, 1K, 10%, 1/2 W |
| R43 | Wirewound, 15, 10%, 5W |
| R44 | Wirewound, 1, 3W |
| R45 | Composition, 820K, 10%, 1/2 W |

| |
|------------|
| RPG3W101K |
| R12DC391J |
| RW200W271J |
| RW200W101J |
| RW200W221J |
| RL300W010J |
| R50500-2 |
| RC20BF102K |
| R719-106 |
| RL300W010J |
| RC20BF824K |

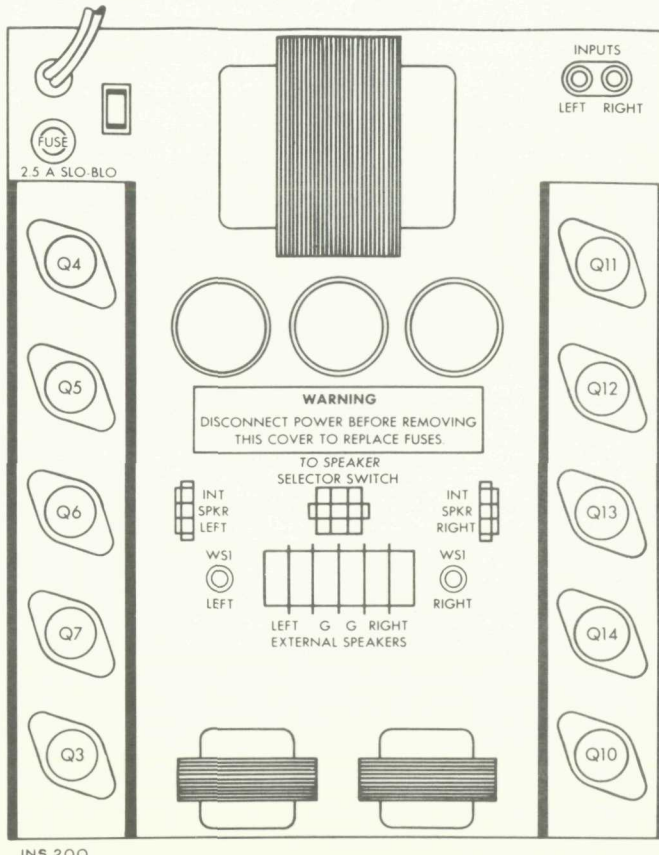
MISCELLANEOUS

| Symbol | Description |
|------------------------------------|--------------------------------------|
| CR1, 2 | Silicon Rectifier |
| F1, 2, 3, 4 | Fuse, 2 Amp |
| F5 | Fuse, 2.5 Amp, Slo-Blo |
| Q1, 2, 8, 9 | Transistor |
| Q3, 4, 5, 6, 7, 10, 11, 12, 13, 14 | Transistor |
| SR1, 2, 3, 4 | Silicon Rectifier |
| T1, 2 | Transformer, Driver |
| T3 | Transformer, Power |
| — | Mica Insulator for Power Transistors |
| — | Headphone Jack |
| — | Switch, Speaker Selector |

| Part No. |
|-----------|
| SR50411-1 |
| F50512-1 |
| F1077-118 |
| TR-2N2375 |
| TR-35144* |
| SR50517 |
| T1077-116 |
| T1077-115 |
| E50510 |
| J1061-120 |
| S1062-119 |

NOTE: *Transistor must be replaced with one from the same Beta group.

TUBE SOCKET LAYOUT • POWER AMPLIFIER



ADJUSTMENTS • TUNER MOTOR DRIVE

pointer and limit switch adjustment

1 — Turn the Tuning knob completely counterclockwise without forcing. The white line on the dial pointer should be at the zero index mark on the logging scale.

2 — If the dial pointer is not at the zero mark, reset the dial pointer by moving it along the dial string.

3 — Check for proper operation by turning the set on, disconnecting the antenna, turning the Sensitivity switch to LOC and the Muting switch to MAX. Press one of the pushbuttons. The dial pointer should traverse the entire band, and reverse direction when it reaches each end of the scale.

4 — If the dial pointer fails to reverse direction at one end of the scale, turn the set off and remove the brass front panel. The limit switch is located directly behind the dial panel. (See Figure 1.) The pointer should contact the arm of the switch, causing it to make a contact (with an audible click) which reverses the direction of the pointer travel. As the pointer starts back in the reverse direction, the switch lever should spring back, breaking the contact.

5 — If the limit switch fails to operate in this manner, loosen the screw (A) and reposition the switch by sliding it along the slots on the panel. After adjustment, check for proper operation by bringing the dial pointer to the end of the band (with the Tuning knob). As the pointer contacts the limit switch a click should be heard (with very light pressure on the Tuning knob), and another click should be heard as the dial pointer is moved toward the center of the band. Continue adjustment until this operation is observed, then repeat step 3.

6 — If correct operation is still not observed, see Mechanical Check-List section under TUNE-O-MATIC ADJUSTMENT.

electrical checklist

1 — Perform the normal alignment of the tuner, steps 1 through 9.

2 — With the test instruments connected and supplying voltages as in step 9 of the Alignment Instructions, reduce the output voltage of the signal generator to 0. The Station Indicator should go off.

3 — Increase the deviation of the FM signal generator to ± 75 KC. Make sure that the Muting Switch is OFF. Increase the generator output gradually until

the Station Indicator goes on. At this point, the generator output should be less than or equal to 20 μ V.

4 — Set the generator output to 0, the deviation to ± 22.5 KC, and the Muting Switch to NORMAL. Increase the generator output gradually until the Station Indicator goes ON. The generator output at this point should be 10-20 μ V.

5 — Repeat step 4 with the Muting Switch in the MAX position. The Station Indicator should go ON with the generator output between 200-2000 μ V.

6 — Set the generator output to 100 μ V. By using the Pushbuttons, approach the generator frequency (98 MC) from both directions. Observe the stopping point of the dial pointer in each case. The stopping points should be within one division of the logging scale. Follow the same procedure with several stations, after connecting the antenna. If proper operation is not observed, proceed with the MECHANICAL CHECK-LIST below.

mechanical checklist

1 — Turn the set OFF. Remove the center housing clip (see Figure 2) by pulling upward, and the two side brackets with two hex screws.

2 — The solenoid plungers (Figure 3) should both move inward easily under hand pressure. If they do not, remove the end clip (Figure 4) and switch lever (Figure 4). If the solenoid plunger now moves freely, the switch lever is not centered and should be rotated until it is centered on the plunger. Reposition the switch lever and end clip on the solenoid plunger.

3 — Press each solenoid plunger slowly and observe the operation of each stack switch (Figure 4). As the plunger is pressed inward, the contacts labeled 1 (in Figure 4) should make contact first, the contacts labeled 2 should make contact second, and the contacts labeled 3 should make contact third. If this is not the case, slight bending of the contact arms with a miniature set of long-nose pliers will restore the correct sequence.

4 — As shown in Figure 3 the take-off gear should be centered between the two sections of the clutch. If it is not, rotate the set screw (Figure 5) with an **allen wrench** until the gear is centered.

5 — If the two sets of gears do not mesh properly (if they either bind or slip) when engaged by pressing one of the solenoid plungers, the distance D (see Figure 3) must be adjusted by turning the brass hex post with a wrench. Rotate the hex post until the two gears turn together without slipping or binding.

ADJUSTMENTS • TUNER MOTOR DRIVE

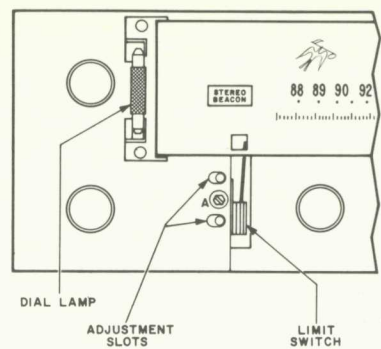


FIGURE 1 — Limit switch adjustment

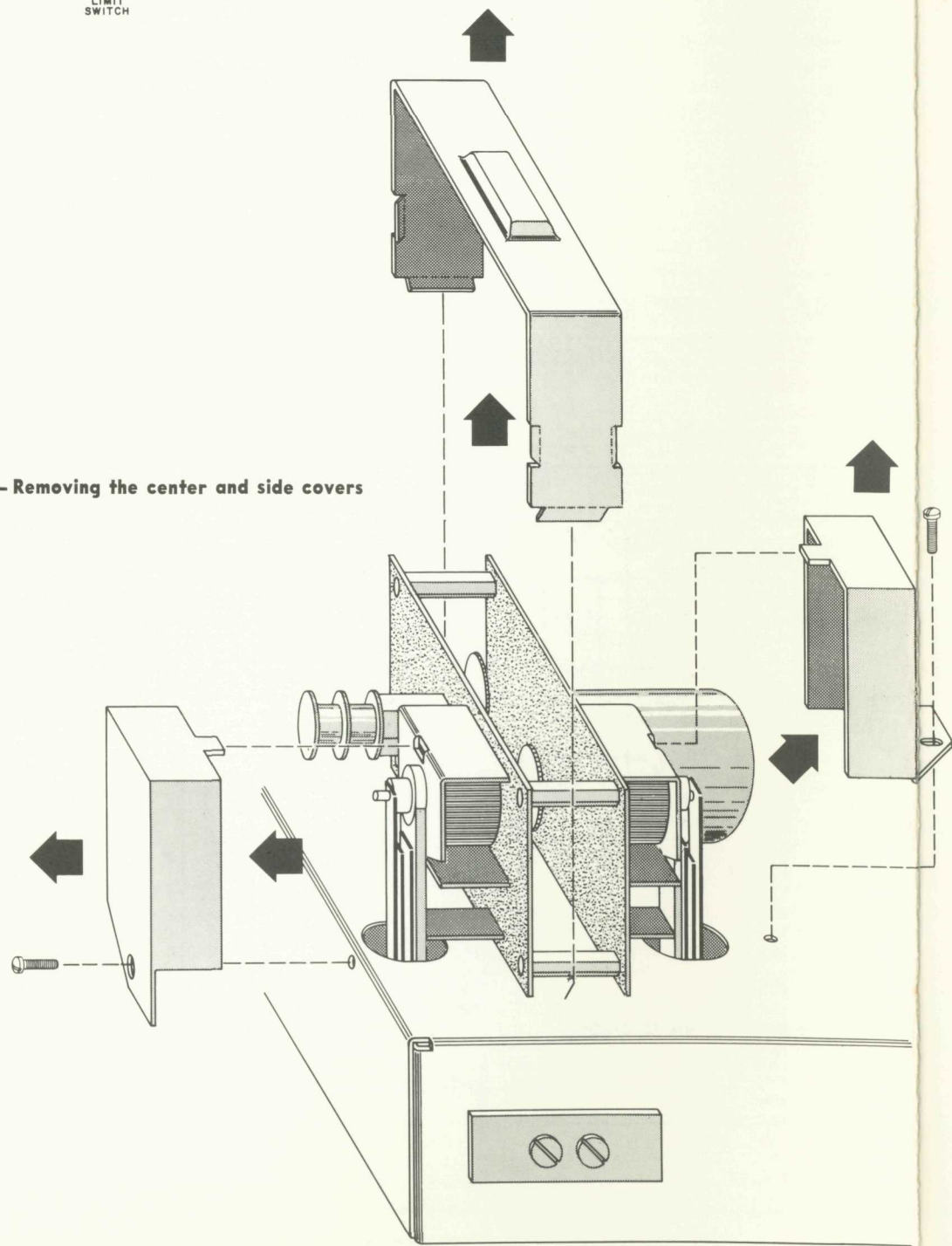
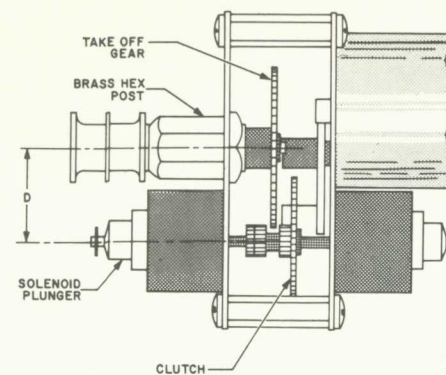


FIGURE 2 — Removing the center and side covers

FIGURE 3 — Motor drive assembly, top view



NOTE: The take-off gear should be centered between the two sections of the clutch, as shown.

FIGURE 4 — Solenoid stack switches, rear view

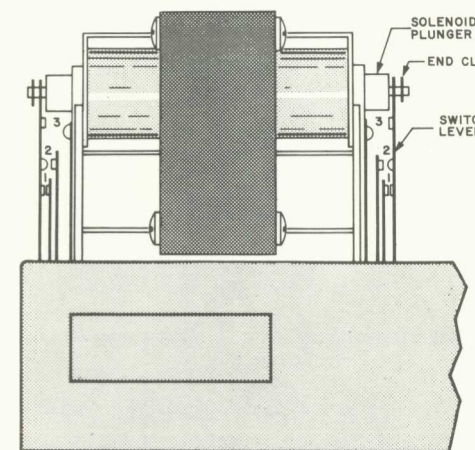
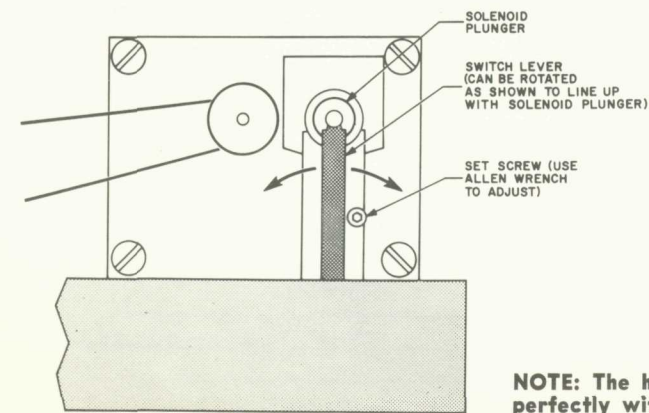
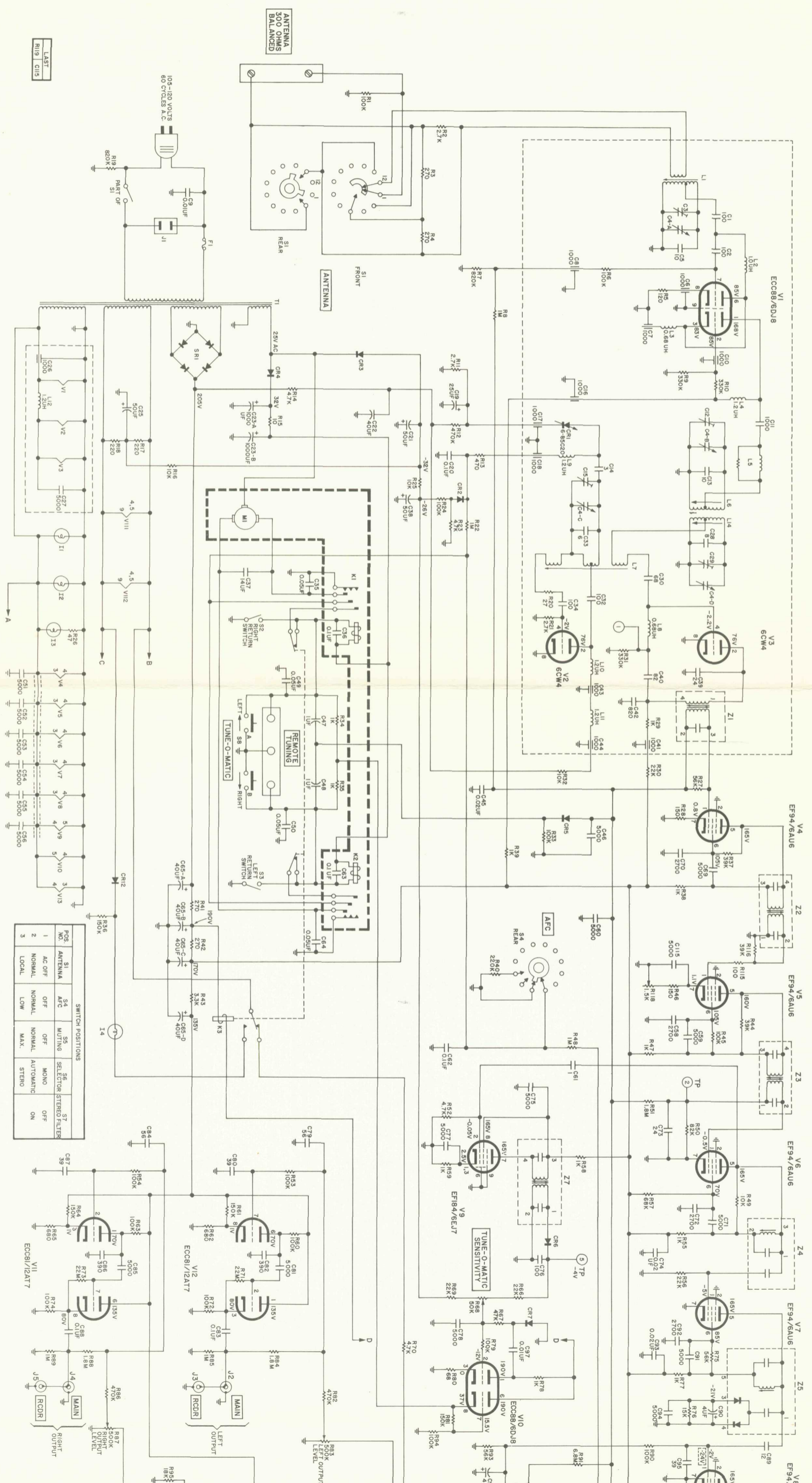


FIGURE 5 — Motor drive assembly, side view



NOTE: The hole in the switch lever must line up perfectly with the post on the solenoid plunger.

SCHEMATIC DIAGRAM • TUNER



LAST
R19 C115

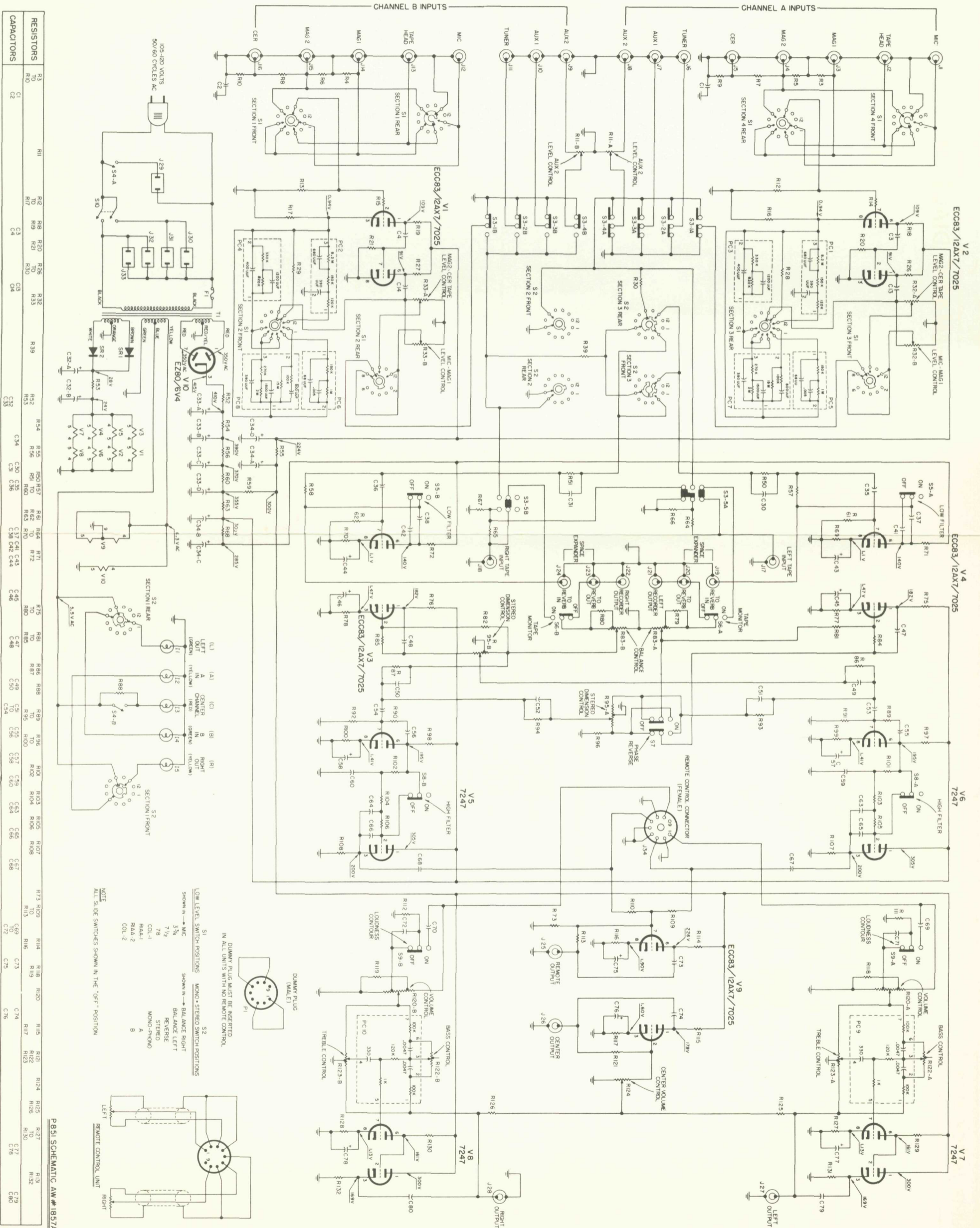
| POS. NO. | ANTENNA | AFC | MUTING | SELECTOR | STEREO FILTER |
|----------|---------|-----|--------|-----------|---------------|
| 1 | AC OFF | OFF | OFF | MONO | OFF |
| 2 | NORMAL | OFF | NORMAL | AUTOMATIC | ON |
| 3 | LOCAL | LOW | MAX. | STEREO | ON |

SWITCH POSITIONS

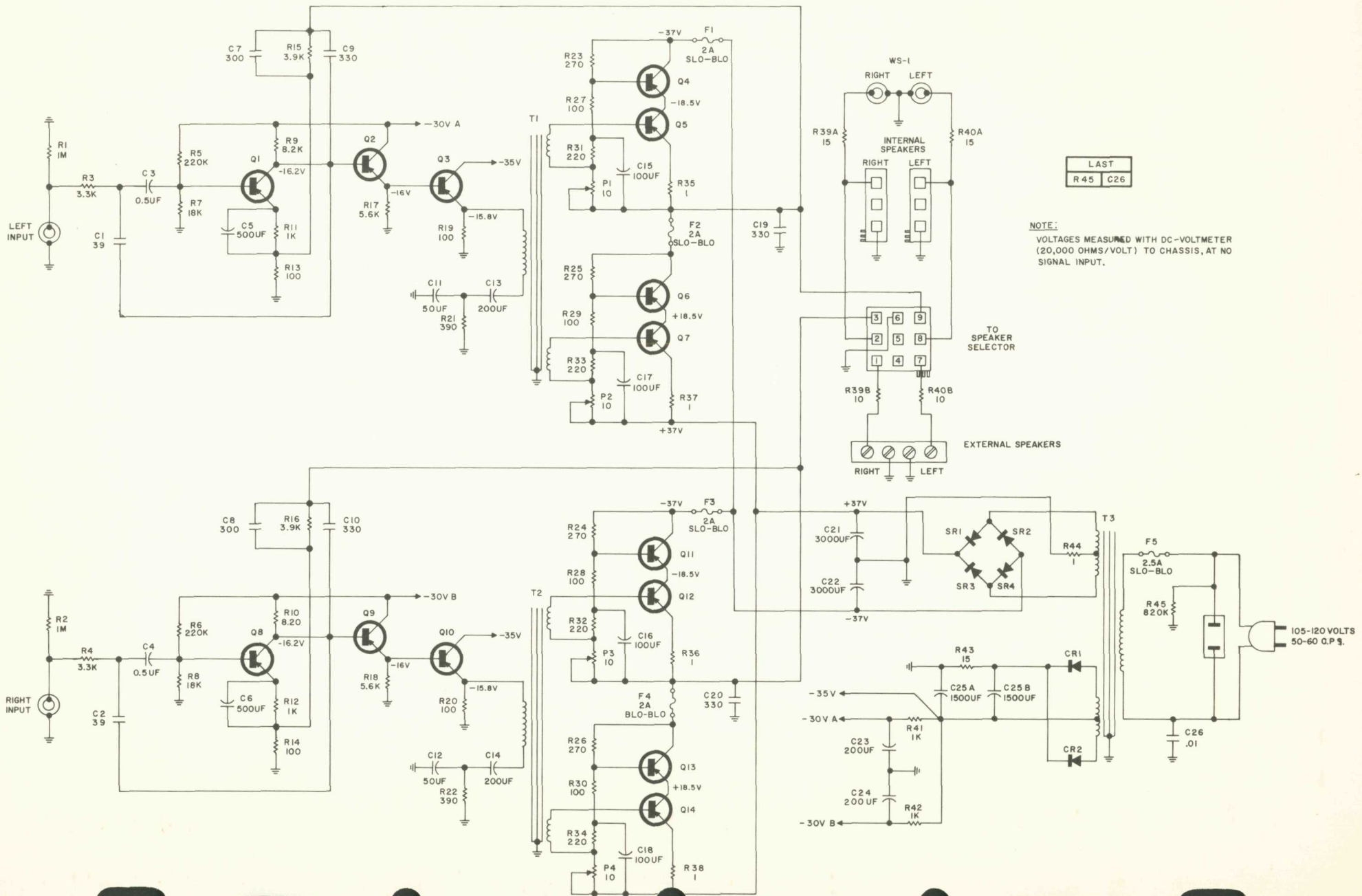
S4 ANTENNA
S5 AFC
S6 MUTING
S7 SELECTOR
S8 STEREO FILTER

MONO
AUTOMATIC
ON

SCHEMATIC DIAGRAM • PREAMPLIFIER



SCHEMATIC DIAGRAM • POWER AMPLIFIER



LAST
R 45 C 26

NOTE:
VOLTAGES MEASURED WITH DC-VOLTMETER
(20,000 OHMS/VOLT) TO CHASSIS, AT NO
SIGNAL INPUT.

TO
SPEAKER
SELECTOR

EXTERNAL
SPEAKERS

105-120 VOLT
50-60 C.P.S.

PARTS DESCRIPTION LIST • REMOTE CONTROL

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. |
|---------|--------------------------------|-----------|
| C7 | Electrolytic, 1000uf, 15V | C50283-10 |
| C8 | Electrolytic, 250uf, 25V | C50283-11 |
| C14 | Electrolytic, 100uf, 25V | C643-145 |
| C15, 16 | Electrolytic, 1uf, 50V | C746-144 |
| C17 | Ceramic, .05uf, +80 -20%, 100V | C50073-2 |
| C18 | Electrolytic, 4uf, 50V | C629-175 |
| C19 | Electrolytic, 100uf, 25V | C643-145 |
| C20 | Electrolytic, 2uf, 70V | C721-142 |
| C21 | Molded, .01uf, 20%, 600V | C2747 |
| C22, 23 | Ceramic, .02uf, GMV, 1000V | C50071-6 |

| | | |
|-----|-------------------------|-----------|
| C24 | Mylar, .68uf, 10%, 400V | C50197-35 |
|-----|-------------------------|-----------|

RESISTORS & POTENTIOMETERS

In ohms, 5% tolerance, 1/8 watt unless otherwise noted. K=Kilohms, M=Megohms.

| Symbol | Description | Part No. |
|--------|-------------------------------------|-----------------------------|
| R12 | Dep. Carbon, 47, 5%, 1/8 W | R12DC470J |
| R13 | Dep. Carbon, 47K, 5%, 1/8 W | R12DC473J |
| R14 | Dep. Carbon, 22K, 5%, 1/8 W | R12DC223J |
| R15 | Potentiometer, Dual, 250K, R854-133 | Part of Motor Pot. Assembly |
| R16 | Dep. Carbon, 47K, 5%, 1/8 W | R12DC473J |
| R17 | Dep. Carbon, 22K, 5%, 1/8 W | R12DC223J |
| R20 | Dep. Carbon, 47, 5%, 1/8 W | R12DC470J |

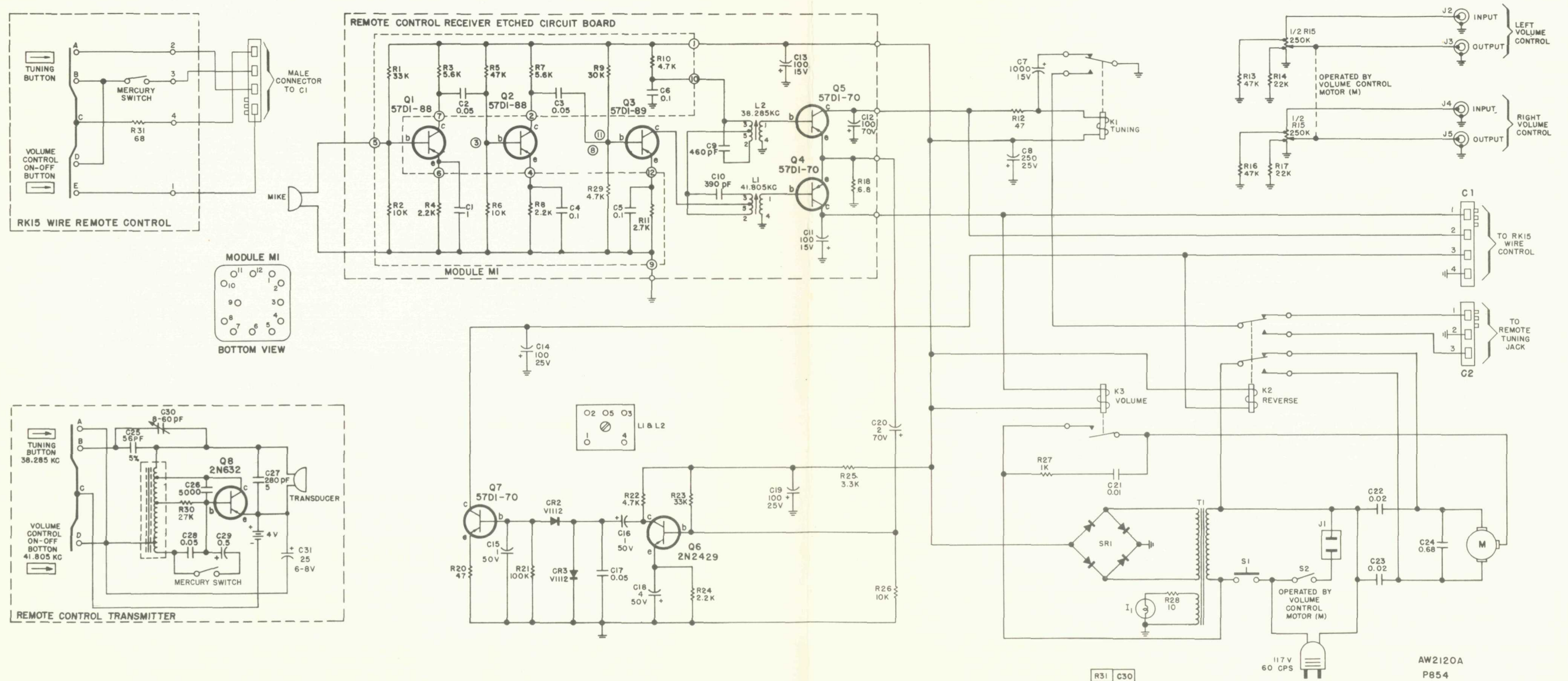
| | | |
|-----|------------------------------|------------|
| R21 | Dep. Carbon, 100K, 5%, 1/8 W | R12DC104J |
| R22 | Dep. Carbon, 4.7K, 5%, 1/8 W | R12DC472J |
| R23 | Dep. Carbon, 33K, 5%, 1/8 W | R12DC333J |
| R24 | Dep. Carbon, 2.2K, 5%, 1/8 W | R12DC222J |
| R25 | Dep. Carbon, 3.3K, 5%, 1/8 W | R12DC332J |
| R26 | Dep. Carbon, 10K, 5%, 1/8 W | R12DC103J |
| R27 | Composition, 1K, 10%, 1/2 W | RC20BF102K |
| R28 | Composition, 10, 10%, 1/2 W | RC20BF100K |

MISCELLANEOUS

| Symbol | Description | Part No. |
|--------|---------------------------|----------|
| CR1, 2 | Diode, Silicon, Type 1112 | V-1112 |
| I1 | Lamp, Volume Indicator | I50461-1 |
| K1 | Relay, Tuning | K50437 |

| | | |
|-----|---------------------------------|-----------------------------|
| K2 | Relay, Reverse | K50436 |
| K3 | Relay, Volume | K50437 |
| M | Motor Potentiometer Assembly | AS854-125 |
| S1 | Switch, Pushbutton | S854-130 |
| S2 | Switch, Power | Part of Motor Pot. Assembly |
| SR1 | Selenium Rectifier Bridge | SR755-140 |
| T1 | Transformer, Power | T854-116 |
| — | Assembled Printed Circuit Board | AS854-132 |
| — | Dress Panel | AS854-108 |
| — | Knob | E50325-1 |
| — | Remote Control Transmitter | P-853 |
| — | 4V Battery | BA853-111 |
| — | RK-15 Wire Remote Control | P-1086 |

SCHEMATIC DIAGRAM • REMOTE CONTROL



ALIGNMENT INSTRUCTIONS • REMOTE CONTROL

transmitter checkout

1 — Tilt the transmitter (hand-held unit) to the left and press the VOL pushbutton. Hold the metallic grille screen close to the ear and listen for a buzzing sound.

2 — While depressing the VOL button, tilt the transmitter to the right. The buzzing should stop.

3 — Repeat steps 1 and 2 while pressing the TUNE pushbutton.

4 — If the buzzing sound is not heard, replace the battery (Mallory TR-163 or equivalent). **DO NOT** attempt to align or adjust the transmitter if proper operation is not restored after replacement of the battery. Specially designed test equipment is needed for this alignment. Return the defective transmitter to SERVICE DEPARTMENT, FISHER RADIO CORPORATION, 21-21 44th Drive, L.I.C. 1, N. Y.

receiver checkout

EQUIPMENT NEEDED: Oscilloscope (use a low capacitance probe or a 47K ohm resistor in series with the "hot" lead), a transistor radio alignment tool (with square head).

1 — Connect the oscilloscope lead to the base (b) of transistor Q5. Connect the other lead to chassis ground.

2 — From a distance of about three feet, aim the remote control away from the metal grille on the receiver chassis. Tilt the remote control to the right and press the TUNE pushbutton. Leave the transmitter in a position which produces minimum signal and minimum flutter of the signal as observed on the oscilloscope.

3 — Using the alignment tool, adjust L2 for maximum average indication on the oscilloscope.

4 — Repeat steps 2 and 3 with the VOL button depressed and the oscilloscope connected to the

base (b) of Q4, aligning L1 for maximum signal indication on the oscilloscope.

5 — If the maximum indications on the oscilloscope for steps 3 and 4 differ by a factor of 2 or more, return the **transmitter only** to the factory for alignment.

6 — To check the operation of the relays, press the TUNE button, and tilt the transmitter to the right. Observe that the relay in the middle of the three relays (located on top of the receiver chassis) operates. Tilt the transmitter to the left, keeping the TUNE button depressed. The center and rear relay (as viewed from the front) should both operate. Press the VOL button, tilting the transmitter to the right and observe that the front relay operates. Then tilt to the left while depressing the VOL button and observe that the rear and front relays operate.

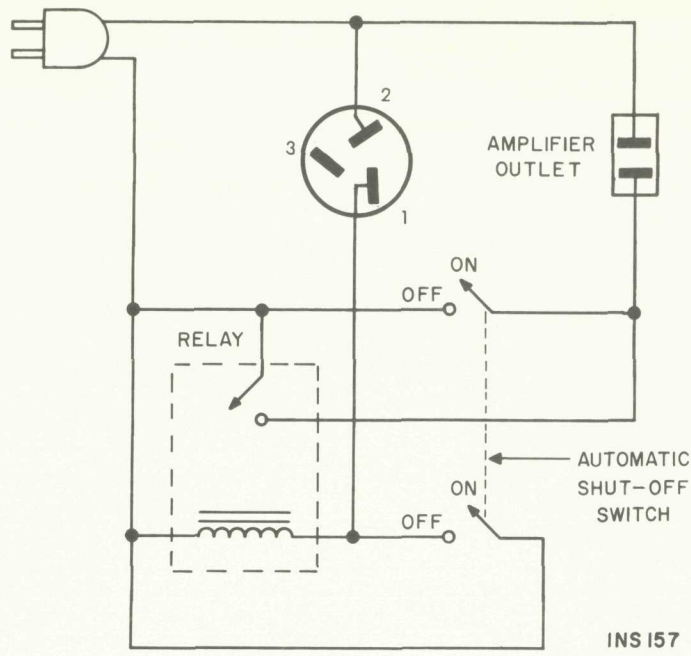
7 — As a final operating check, connect the receiver into the system, stand about 20 feet from the receiver and press the TUNE button of the transmitter while tilting the unit alternately to the left and right. Observe correct tuning action of the tuner. Then press the VOL pushbutton while tilting the transmitter to the left and then the right. Observe rotation of the receiver Volume control and alternate raising and lowering of the sound output of the amplifier to which the receiver is connected.

*If the tuner is not available for this tuning check, connect an ohmmeter across pins 1 and 2 (see schematic) of the jack marked TO REMOTE TUNING JACK. Zero resistance should be indicated when the TUNE button is depressed and the transmitter is tilted to the right. With the TUNE button depressed and the transmitter tilted to the left, a zero resistance should be indicated between pins 2 and 3. To check the operation of the VOL button, it is best to connect the receiver into the system (see the Operating Instructions) and observe proper operation with a musical or voice signal.

If replacement parts are out of stock, locally, they may be obtained directly from the Parts Department of FISHER Radio Corporation. They will be shipped "best way", either prepaid or C.O.D. unless otherwise specified.

For instrument-operation information and technical assistance write Richard Hamilton, Customer Service Department, FISHER Radio Corporation, Long Island City, New York 11101.

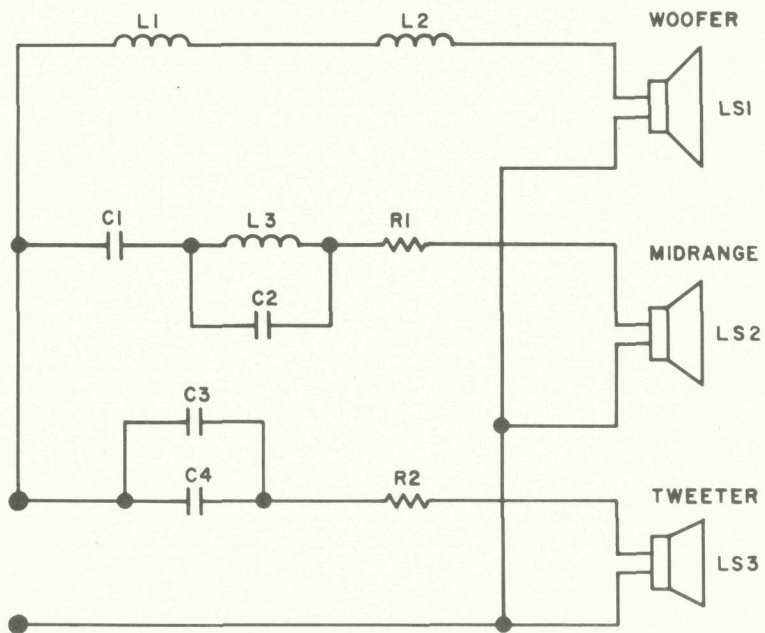
SCHEMATIC DIAGRAM • AUTOMATIC SHUT-OFF ASSEMBLY



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INS 157

SCHEMATIC DIAGRAM • SPEAKER SYSTEMS

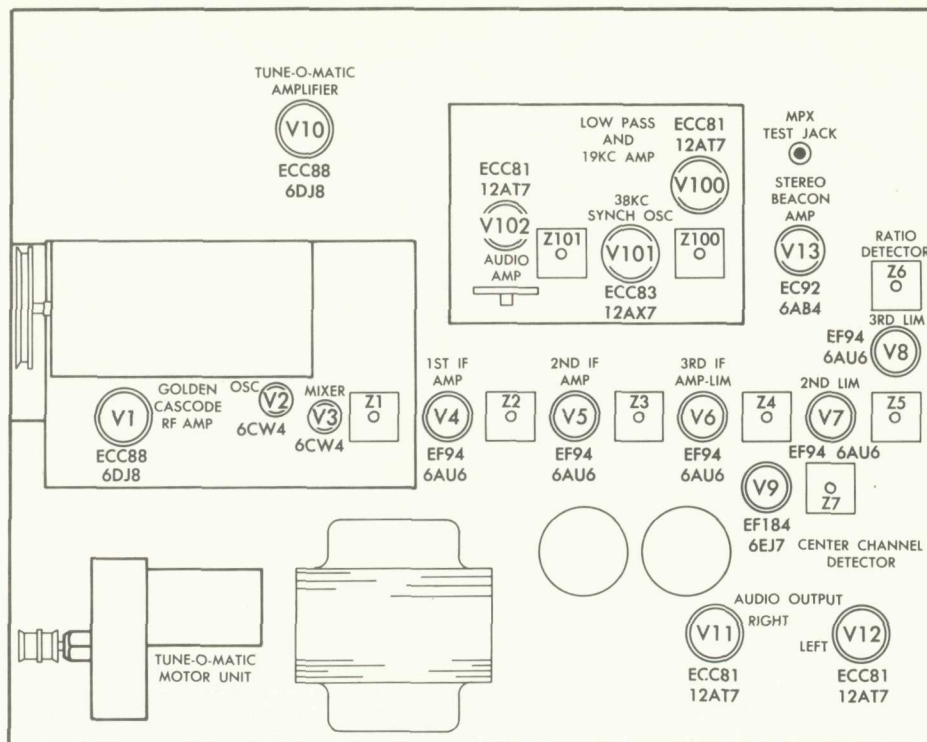


INS 304

PARTS DESCRIPTION LIST

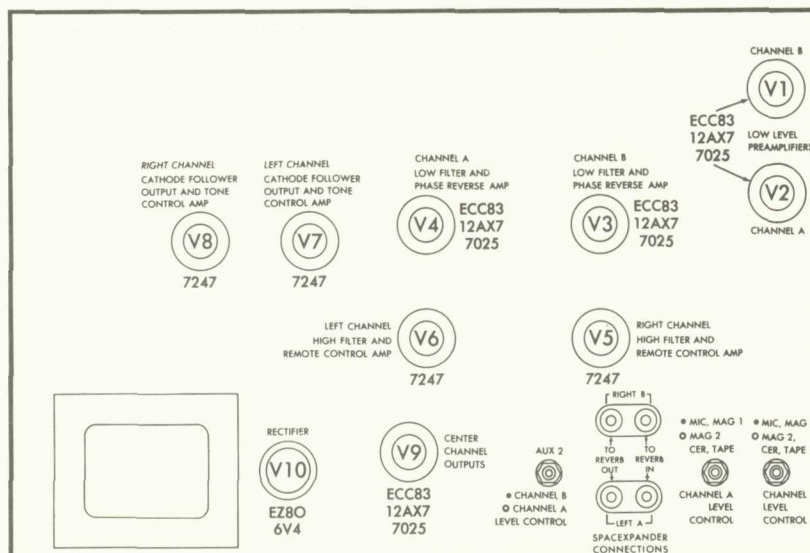
| | | |
|-------|-------------------------------------|-------|
| C1 | Capacitor, 50 μ F, nonpolarized | C350 |
| C2, 3 | Capacitor, 1 μ F, nonpolarized | C301 |
| C4 | Capacitor, 2 μ F, nonpolarized | C302 |
| L1 | Inductor | L214 |
| L2, 3 | Inductor | L220 |
| LS1 | Woofer, 15-inch | W123 |
| LS2 | Mid-range, 8-inch | M124X |
| LS3 | Tweeter, Dome | G101C |
| R1, 2 | Resistor, 9-ohms | R409 |

TUBE LAYOUT • TUNER



INS 156

TUBE LAYOUT • PREAMPLIFIER



AW1851A

SERVICE POINTS

General

One should always be careful when working with transistors, since they may be destroyed almost instantly. This is in marked contrast to tubes, which can usually bear moderate overloads for longer periods.

Special Precautions

Observe the following precautions when servicing transistor equipment:

- Never work on a transistor amplifier without first disconnecting it from its source of power.
 - Guard against shorts — one of even brief duration between the collector and base of any transistor will destroy that transistor, and often those associated with it (as in the case of Darlington-connected transistors, or those in the single-ended push-pull output stage of the power amplifier). Such shorts may be produced even in the short time it takes for a dropped screwdriver to glance off a pair of socket terminals, or between terminals and chassis.
 - Damage will occur to **any** transistor in the amplifier if its base is placed at or near the same potential as the collector. Such a condition might occur if transistor Q1 were open (blowing Q2), or resistor R7 were open (blowing Q1).
 - All of the output transistors in one channel will be destroyed if the base leg of the biasing circuit is open on the emitter side.
 - If one output transistor burns out, always remove **all** output transistors in that channel, and check the bias adjustment controls and the other parts involved in the biasing network with an ohmmeter before inserting a new transistor.
 - If transistor replacement is necessary, be sure the replacement is of the same type. For output and driver transistors (Q3 through Q6, and Q-10 through Q-14), replacements should also be from the same beta group. The group is indicated by a colored dot on the mounting flange. Be sure to specify this color when ordering replacements.
 - When mounting new power transistors, be sure that heat sinks and mica insulators are free from metal shavings, which might cause shorts, or prevent good heat transfer from transistor to heat sink.
 - Use silicon grease between heat sink and mica insulators, as well as between mica insulators and transistors, for better heat conduction.
- Use one of the following types of grease:
- Dow-Corning No. 3 compound
 - Dow-Corning No. C20194 compound
- Do **not** use an ohmmeter for testing transistors, since the voltage they apply during testing may exceed the transistor's base-emitter breakdown voltage.

Instructions For Balancing Transistor Output Stage

- 1 — Remove power from the unit.
- 2 — Connect an 8-ohm load, a DC VTVM and the input of an IM distortion analyzer across the hot and ground contacts of the left INT SPKR output. Check that you have not shorted the amplifier output.
- 3 — Connect the output of the IM distortion analyzer to the left input.

4 — Switch the amplifier on and adjust the output of the distortion analyzer until the output, as measured across the load, is 5 watts.

5 — Adjust P1 and P2 for minimum IM distortion and zero DC across the load. The use of two screwdrivers in this procedure will save time.

6 — Repeat steps (2) through (5), after attaching the test equipment to the corresponding points on the right channel, and adjust P3 and P4 for zero DC and minimum IM distortion, as described above.

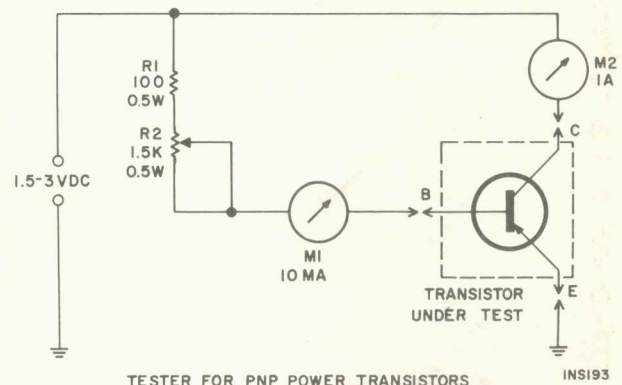
Additional Equipment Required for Servicing Transistor Equipment

A word of caution is in order about testing transistors. While most test equipment used for repairing vacuum tubes may be used to test transistors and transistorized equipment, the serviceman should be sure there are no leakage paths for line voltage in the equipment, since line voltage applied across two terminals of a transistor could cause transistor breakdown. Let us emphasize that **ohmmeters should not be used to test transistors**, since their test voltage may exceed the transistor's breakdown voltage, and therefore destroy the transistor. Instead, we recommend that a high-quality transistor tester, such as the Hickok model 870, be used.

It is also advisable for the serviceman to purchase a low-wattage soldering iron and a soldering aid for use with transistorized equipment. Again, he should make sure there is no internal leakage path to the line in his soldering iron.

Quick Transistor Tester

If a transistor tester is not available, and a quick, but not comprehensive test is desired, the tester shown in figure 1 may be constructed and utilized to determine the transistor's DC beta.



TESTER FOR PNP POWER TRANSISTORS

FIG. 1

Install the transistor in the tester and adjust resistor R2 for 0.5 amperes in the collector circuit, as indicated by M2. Calculate the beta as follows:

$$\text{Beta} = \frac{\text{reading of M2}}{\text{reading of M1}}$$

The beta should be between 50 and 250.



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