

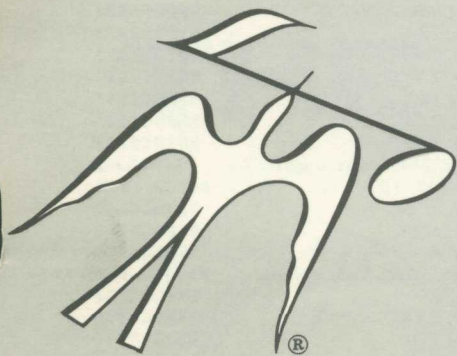
# Service Manual

# THE FISHER



# Executive IX

MODEL 960





# 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                  | Ceramic, 47, 5%, N750, 1000V               | C50070-29   |
| C2                  | Ceramic, 3, NPO, 1000V                     | C50070-28   |
| C3                  | Ceramic, 1000, GMV, 500V                   | C50089-2    |
| C4, 5, 6            | Ceramic, Feedthru, 1000, GMV               | C592-187    |
| C7                  | Ceramic, 10, 5%, NPO, 1000V                | C50070-39   |
| C8                  | Ceramic, .02uf, +80 — 20%, 100V            | C50073-1    |
| C9                  | Ceramic, 1000, GMV, 500V                   | C50089-2    |
| C10                 | Ceramic, 7, ±.5, NPO, 500V                 | CC20CJ070D5 |
| C11                 | Ceramic Trimmer                            | C662-123    |
| C12                 | Variable, FM-AM                            | C965-115    |
| C13                 | Ceramic, .02uf, +80 — 20%, 500V            | C50089-4    |
| C14, 15             | Ceramic, 18, N470, 1000V                   | C50070-13   |
| C16                 | Mylar, .047uf, 630V                        | C50197-101  |
| C17                 | Mylar, .047uf, 250V                        | C50197-52   |
| C18                 | Mylar, .047uf, 630V                        | C50197-101  |
| C19                 | Mylar, .047uf, 250V                        | C50197-52   |
| C20                 | Ceramic, .68, 500V                         | C50077-6N   |
| C21, 22             | Ceramic, 1000, 1000V                       | C50072-3    |
| C23                 | Ceramic Trimmer                            | C662-123    |
| C24                 | Ceramic, 8, ±.5, NPO, 500V                 | CC20CJ080D5 |
| C27                 | Ceramic, 68, N750, 500V                    | CC20UJ680K5 |
| C28                 | Ceramic, .02uf, +80 — 20%, 500V            | C50089-4    |
| C29                 | Ceramic, 100, 5%, N1500, 1000V             | C50070-19   |
| C30, 31             | Ceramic, 100, N1500, 1000V                 | C50070-6    |
| C32                 | Ceramic Trimmer                            | C662-123    |
| C33                 | Ceramic, 24, 5%, N150, 1000V               | C50070-8    |
| C34                 | Ceramic, 8, ±.5, N330, 500V                | CC20SJ080D5 |
| C35                 | Ceramic, 1000, 1000V                       | C50072-3    |
| C36                 | Ceramic, 68, N2200, 1000V                  | C50070-12   |
| C37                 | Ceramic, 6, 5%, NPO, 1000V                 | C50070-43   |
| C38                 | Ceramic, .02uf, +80 — 20%, 100V            | C50073-1    |
| C39                 | Ceramic, 68, N2200, 1000V                  | C50070-12   |
| C40, 41             | Ceramic, .02uf, 20%, 500V                  | C50089-5    |
| C42, 43             | Ceramic, Feedthru, 1000, GMV               | C592-187    |
| C44                 | Mylar, .047uf, 400V                        | C50197-30   |
| C45                 | Ceramic, 820, 1000V                        | C50072-7    |
| C46                 | Mylar, .047, 400V                          | C50435-25   |
| C47                 | Ceramic, 820, 1000V                        | C50072-7    |
| C48                 | Ceramic, .02, +80 — 20%, 100V              | C50073-1    |
| C49                 | Mylar, .047uf, 250V                        | C50197-52   |
| C50                 | Ceramic, 100, N1500, 1000V                 | C50070-6    |
| C51                 | Ceramic, 2700, 1000V                       | C50072-17   |
| C52, 53             | Ceramic, 5000, +80 — 20%, 500V             | C50089-6    |
| C54, 55             | Ceramic, 100, 5%, N1500, 1000V             | C50070-19   |
| C56                 | Ceramic, 1, 20%, P100, 1000V               | C50070-1    |
| C57                 | Ceramic, .02uf, 20%, 500V                  | C50089-5    |
| C58                 | Ceramic, 150, 1000V                        | C50072-18   |
| C59                 | Ceramic, 5000, +80 — 20%, 500V             | C50089-6    |
| C60                 | Mylar, .1uf, 125V                          | C50435-7    |
| C61                 | Ceramic, 2700, 1000V                       | C50072-17   |
| C62                 | Ceramic, .02uf, GMV, 1000V                 | C50071-6    |
| C63                 | Ceramic, 5000, +80 — 20%, 500V             | C50089-6    |
| C64                 | Mylar, .1uf, 125V                          | C50435-7    |
| C65                 | Electrolytic, 2uf, 70V                     | C721-142    |
| C66                 | Polystyrene, 1800, 5%, 125V                | CP50394-11  |
| C67                 | Electrolytic, .5uf, 350V                   | C50283-7    |
| C68                 | Ceramic, .02uf, 20%, 500V                  | C50089-5    |
| C69                 | Ceramic, 2200, 1000V                       | C50072-5    |
| C70                 | Ceramic, .02uf, 20%, 500V                  | C50089-5    |
| C71                 | Ceramic, 2200, 1000V                       | C50072-5    |
| C72                 | Ceramic, 24, 5%, N150, 1000V               | C50070-8    |
| C73                 | Mylar, .1uf, 125V                          | C50435-7    |
| C74                 | Ceramic, .02uf, +80 — 20%, 100V            | C50073-1    |
| C75, 76             | Ceramic, 1000, 1000V                       | C50072-3    |
| C77, 78             | Ceramic, 120, N1500, 1000V                 | C50070-9    |
| C79, 80             | Ceramic, 24, 5%, N150, 1000V               | C50070-8    |
| C81                 | Ceramic, 2700, 1000V                       | C50072-17   |
| C82, 83, 84, 85, 86 | Ceramic, 5000, +80 — 20%, 500V             | C50089-6    |
| C87                 | Electrolytic, 4 Section:<br>A — 20uf, 300V | C50180-49   |

B — 40uf, 400V  
C — 40uf, 450V  
D — 40uf, 500V

|                |   |           |
|----------------|---|-----------|
| C88, 89, 90    | Ceramic, 5000, +80 — 20%, 500V  | C50089-6  |
| C91            | Electrolytic, 4 Section:<br>A — 50uf, 250V<br>B — 50uf, 250V<br>C — 50uf, 250V<br>D — 200uf, 250V | C50180-48 |
| C92            | Mylar, .1uf, 250V   | C50197-54 |
| C93, 94        | Ceramic, 5000, +80 — 20%, 500V  | C50089-6  |
| C95            | Electrolytic, 2 Section:<br>A — 1000 uf, 35V<br>B — 1000 uf, 35V                                  | C50180-38 |
| C96            | Ceramic, 560, 1000V   | C50072-14 |
| C97            | Ceramic, 2700, 1000V  | C50072-17 |
| C98            | Electrolytic, 200uf, 250V   | C50180-20 |
| C99            | Mylar, .022uf, 250V   | C50197-49 |
| C100           | Ceramic, 5000, +80 — 20%, 500V  | C50089-6  |
| C101           | Mylar, .022uf, 250V   | C50197-49 |
| C102           | Ceramic, .02uf, GMV, 1000V  | C50071-6  |
| C103           | Ceramic, Feedthru, 1000, GMV  | C592-187  |
| C104           | Molded, .01uf, 20%, 600V  | C2747     |
| C105, 106      | Ceramic, .01uf, 20%, 500V   | C50089-3  |
| C107, 108, 109 | Ceramic, 330, 1000V   | C50072-1  |
| C110           | Molded, .01uf, 20%, 600V  | C2747     |
| C111           | Electrolytic, 8uf, 50V  | C629-138  |
| C112, 113      | Ceramic, 100, GMV, N1500, 1000V   | C50070-5  |
| C116, 117      | Electrolytic, 50uf, 10V   | C50283-6  |
| C118           | Mylar, .1uf, 125V   | C50435-7  |

## RESISTORS & POTENTIOMETERS

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

| Symbol              | Description                             | Part No.   |
|---------------------|---|------------|
| R1                  | Wirewound, 25, 10%, 5W                  | R688-117   |
| R2                  | Composition, 270, 10%, 1/2 W            | RC20BF271K |
| R3                  | Composition, 100K, 10%, 1/2 W           | RC20BF104K |
| R4                  | Composition, 330, 10%, 1W               | RC20BF331K |
| R6                  | Wirewound, 25, 10%, 5W                  | R688-117   |
| R8                  | Composition, 330, 10%, 1W               | RC30BF331K |
| R9                  | Dep. Carbon, 47                         | R12DC470J  |
| R11                 | Composition, 3.3, 10%, 1/2 W            | RC20BF3R3K |
| R12                 | Dep. Carbon, 100K                       | R12DC104J  |
| R13                 | Dep. Carbon, 1M, 1/3 W                  | R33DC105J  |
| R14                 | Composition, 100, 10%, 1/2 W            | RC20BF101K |
| R15                 | Dep. Carbon, 1.8M, 1/3 W                | R33DC185J  |
| R16                 | Composition, 47K, 10%, 1/2 W            | RC20BF473K |
| R17, 18, 19, 20     | Dep. Carbon, 1K, 1/3 W                  | R33DC102J  |
| R21, 22, 23, 24, 25 | Dep. Carbon, 330K                       | R12DC334J  |
| R26                 | Dep. Carbon, 180K, 1/3 W                | R33DC184J  |
| R27                 | Dep. Carbon, 2.2K, 1/3 W                | R33DC222J  |
| R28                 | Dep. Carbon, 180K, 1/3 W                | R33DC184J  |
| R29                 | Dep. Carbon, 2.2K, 1/3 W                | R33DC222J  |
| R30, 31             | Dep. Carbon, 68K, 1/3 W                 | R33DC683J  |
| R32                 | Dep. Carbon, 22K                        | R12DC223J  |
| R33, 34             | Dep. Carbon, 33K, 1/3 W                 | R33DC333J  |
| R35                 | Dep. Carbon, 2.2K, 1/3 W                | R33DC222J  |
| R36                 | Dep. Carbon, 220, 1/3 W                 | R33DC221J  |
| R37                 | Dep. Carbon, 2.2K, 1/3 W                | R33DC222J  |
| R38                 | Dep. Carbon, 220, 1/3 W                 | R33DC221J  |
| R39, 40             | Potentiometer, 25K, Phase Inverter Adj. | R50103-2   |
| R41                 | Composition, 18K, 10%, 1W               | RC30BF183K |
| R42, 43             | Dep. Carbon, 470K, 1/3 W                | R33DC474J  |
| R44                 | Dep. Carbon, 470K                       | R12DC474J  |
| R45, 46             | Dep. Carbon, 47K                        | R12DC473J  |
| R47                 | Potentiometer, 500K, Dual Volume        | R50160-104 |
| R48                 | Dep. Carbon, 27                         | R12DC270J  |
| R49                 | Dep. Carbon, 2.7K                       | R12DC272J  |
| R50, 51             | Dep. Carbon, 270                        | R12DC271J  |



# PARTS DESCRIPTION LIST

**R52** Composition, 1K, 10%, 1/2 W  
**R53** Composition, 2.7, 10%, 1/2 W  
**R54, 55** Dep. Carbon, 22K  
**R56** Composition, 1K, 10%, 1/2 W  
**R57** Potentiometer, 300K, Dual Balance  
**R58** Dep. Carbon, 56K  
**R59, 60** Dep. Carbon, 2.7M, 1/3 W  
**R61, 62** Dep. Carbon, 120K, 1/3 W  
**R63, 64** Dep. Carbon, 1K, 1/3 W  
**R65** Composition, 180, 10%, 1/2 W  
**R66** Dep. Carbon, 3.3M, 1/3 W  
**R67** Dep. Carbon, 39K  
**R68** Dep. Carbon, 1K  
**R69** Composition, 27K, 10%, 1/2 W  
**R70** Composition, 1K, 10%, 1/2 W  
**R71** Dep. Carbon, 39K  
**R72** Composition, 10K, 10%, 1/2 W  
**R73** Composition, 100, 10%, 1/2 W  
**R74, 75** Dep. Carbon, 220K  
**R76** Dep. Carbon, 82K  
**R77, 78** Dep. Carbon, 680K  
**R79, 80** Potentiometer, 500K,  
                     Dual Bass, Treble  
**R81** Dep. Carbon, 680K  
**R82** Dep. Carbon, 150K  
**R83** Dep. Carbon, 820K  
**R84** Composition, 150, 10%, 1/2 W  
**R85** Dep. Carbon, 470K  
**R86** Dep. Carbon, 270K  
**R87** Composition, 47K, 10%, 1/2 W  
**R88** Dep. Carbon, 47K  
**R89** Dep. Carbon, 820K  
**R90** Composition, 1K, 10%, 1/2 W  
**R91** Dep. Carbon, 820K  
**R92** Dep. Carbon, 56K  
**R93, 94** Dep. Carbon, 820K  
**R95** Dep. Carbon, 68K  
**R96** Dep. Carbon, 120K, 1/3 W  
**R97** Dep. Carbon, 1K, 1/3 W  
**R98** Dep. Carbon, 120K, 1/3 W  
**R99** Dep. Carbon, 1K, 1/3 W  
**R100** Dep. Carbon, 2.2M, 1/3 W  
**R101** Composition, 220, 10%, 1/2 W  
**R102** Dep. Carbon, 2.7M, 1/3 W  
**R103** Dep. Carbon, 1.5M, 1/3 W  
**R104** Dep. Carbon, 2.7M, 1/3 W  
**R105** Dep. Carbon, 1.5M, 1/3 W  
**R106** Composition, 220, 10%, 1/2 W  
**R107, 108** Dep. Carbon, 470K  
**R109, 110** Dep. Carbon, 330K  
**R111** Dep. Carbon, 22K  
**R112** Composition, 100, 10%, 1/2 W  
**R113** Composition, 82K, 10%, 1/2 W  
**R114** Composition, 1K, 10%, 1/2 W  
**R115** Composition, 82K, 10%, 1/2 W  
**R116** Dep. Carbon, 47K  
**R117** Composition, 22K, 10%, 1/2 W  
**R118** Dep. Carbon, 180  
**R119** Dep. Carbon, 5.6K, 1/3 W  
**R120** Composition, 2.7K, 10%, 1W  
**R121** Glass, 470, 10%, 3W  
**R122** Dep. Carbon, 15K, 1/3 W  
**R123** Composition, 1.2K, 10%, 1W  
**R125, 126** Dep. Carbon, 82K  
**R127** Wirewound, 15, 10%, 5W  
**R128** Glass, 1.2K, 10%, 7W  
**R129** Glass, 470, 10%, 3W  
**R130** Dep. Carbon, 330K  
**R131** Composition, 68K, 10%, 1/3 W  
**R132** Dep. Carbon, 330K  
**R135, 136** Dep. Carbon, 4.7M, 1/3 W  
**R137** Composition, 1K, 10%, 1/2 W  
**R138** Composition, 270, 1/2 W  
**R139, 140** Dep. Carbon, 220K, 1/3 W  
**R141, 142** Glass, 330K, 1W  
**R143** Dep. Carbon, 10K  
**R144** Glass, 2.7K, 1/2 W

**RC20BF102K**  
**RC20BF272K**  
**R12DC223J**  
**RC20BF102K**  
**R50160-130**  
**R12DC563J**  
**R33DC275J**  
**R33DC124J**  
**R33DC102J**  
**RC20BF181K**  
**R33DC335J**  
**R12DC393J**  
**R12DC102J**  
**RC20BF273K**  
**RC20BF102K**  
**R12DC393J**  
**RC20BF103K**  
**RC20BF101K**  
**R12DC224J**  
**R12DC823J**  
**R12DC684J**  
  
**R50160-101-2**  
**R12DC684J**  
**R12DC154J**  
**R12DC824J**  
**RC20BF151K**  
**R12DC474J**  
**R12DC274J**  
**RC20BF473K**  
**R12DC473J**  
**R12DC824J**  
**RC20BF102K**  
**R12DC824J**  
**R12DC563J**  
**R12DC824J**  
**R12DC683J**  
**R33DC124J**  
**R33DC102J**  
**R33DC124J**  
**R33DC102J**  
**R33DC225J**  
**RC20BF221K**  
**R33DC275J**  
**R33DC155J**  
**R33DC275J**  
**R33DC155J**  
**RC20BF221K**  
**R12DC474J**  
**R12DC334J**  
**R12DC223J**  
**RC20BF101K**  
**RC20BF823K**  
**RC20BF102K**  
**RC20BF823K**  
**R12DC473J**  
**RC20BF223K**  
**R12DC180J**  
**R33DC562J**  
**RC30BF272K**  
**RPG3W471K**  
**R33DC153J**  
**RC30BF122K**  
**R12DC823J**  
**R719-106**  
**RPG7W122K**  
**RPG3W471K**  
**R12DC334J**  
**RC20BF683K**  
**R12DC334J**  
**R33DC475J**  
**RC20BF102K**  
**RC20BF271J**  
**R33DC224J**  
**R30G334J**  
**R12DC103J**  
**R20G272J**

**R145** Dep. Carbon, 10K  
**R146** Glass, 2.7K, 1/2 W  
**R147** Composition, 820K, 10%, 1/2 W  
**R148** Dep. Carbon, 100K  
**R149** Dep. Carbon, 10  
**R150** Dep. Carbon, 100K  
**R151** Dep. Carbon, 10  
**R152** Composition, 1.5K, 1/2 W  
**R153** Composition, 1K, 1/2 W  
**R154** Dep. Carbon, 15K, 1/3 W  
**R155** Dep. Carbon, 150K  
**R156** Dep. Carbon, 68K  
**R157** Dep. Carbon, 150K  
**R158** Dep. Carbon, 68K  
**R159, 160** Dep. Carbon, 220K  
**R161, 162** Dep. Carbon, 3.3M, 5%, 1/3 W

**R12DC103J**  
**R20G272J**  
**RC20BF824K**  
**R12DC104J**  
**R12DC100J**  
**R12DC104J**  
**R12DC100J**  
**RC20BF152J**  
**RC20BF102J**  
**R33DC153J**  
**R12DC154J**  
**R12DC683J**  
**R12DC154J**  
**R12DC683J**  
**R12DC224J**  
**R33DC335J**

## COILS, CHOKES & TRANSFORMERS

| Symbol      | Description                   | Part No.   |
|-------------|-------------------------------|------------|
| L1          | FM Antenna Coil               | L965-119   |
| L2          | AM Ferrite Loop               | L990-132   |
| L3          | Choke, Ferrite Bead           | L592-189   |
| L4          | Choke, 1.5 Microhenry         | L50066-4   |
| L5          | AM-RF Transformer             | L50210-35  |
| L6          | FM-RF Coil                    | L965-116   |
| L7          | FM Mixer Coil                 | L965-117   |
| L8          | Choke, 1 Microhenry           | L50066-2   |
| L9          | AM Oscillator Coil            | L50210-28  |
| L10         | Choke, 1 Microhenry           | L50066-2   |
| L11         | FM Oscillator Coil Assembly   | A5965-120  |
| L12, 13, 14 | Choke, 1 Microhenry           | L50066-2   |
| L16 thru 27 | Choke, Filament, Ferrite Bead | L592-189   |
| L28         | Choke, 3.3 Microhenries       | L50066-8   |
| T1          | Transformer, Power            | T991-115   |
| T2          | Transformer, Output           | T991-116-1 |
| T3          | Transformer, Output           | T991-116-2 |
| Z1          | Transformer, AM, IF           | ZZ50210-41 |
| Z2          | Transformer, FM, IF           | ZZ50210-42 |
| Z3          | Transformer, FM, IF           | ZZ50210-39 |
| Z4          | Transformer, AM, IF           | ZZ2984     |
| Z5          | Transformer, FM, IF           | ZZ50210-2  |
| Z6          | FM Limiter Coil               | ZZ50210-6  |
| Z7          | FM Ratio Detector             | ZZ50210-9  |

## MISCELLANEOUS

| Symbol       | Description                   | Part No.    |
|--------------|-------------------------------|-------------|
| CR2, 3, 4, 5 | Diode, Silicon                | V50260-10   |
| CR6, 7       | Diode, Silicon                | SR50411-1   |
| F1           | Fuse, 3.2 Amp Slo-Blo         | F3319       |
| I1           | Lamp, #47 OF                  | I50009-4    |
| I2, 3        | Lamp, Dial                    | I50441-4    |
| I4           | Lamp, #47 OF, Stereo Beacon   | I50009-4    |
| J1           | Headphone Jack                | J846-120-1  |
| M1           | Meter, Tuning                 | M990-124    |
| PC1          | Printed Circuit               | PC50434     |
| PC2, 3       | Printed Circuit, High Filter  | PC50187-2   |
| PC4, 5       | Printed Circuit, Tone Control | PC50187-9   |
| PC6, 7       | Printed Circuit, Equalization | PC50187-3   |
| RL1          | Relay                         | K50314      |
| S1           | Switch, Selector              | S990-131BX  |
| S2           | Switch, Slide, AM Bandwidth   | S50200-5    |
| S3           | Switch, Speaker Selector      | S990-130    |
| S4           | Switch, Loudness Contour      | S990-129    |
| S5, 6, 7     | Switch, Slide                 | S50200-5    |
| S8           | Switch, Power                 | part of R47 |
| SR1          | Selenium Rectifier, Bridge    | SR50253-1   |
| —            | FM Dipole Assembly            | A550227-1   |
| —            | Dress Panel                   | A5990-108   |
| —            | Knob, Dummy Dual              | E50324      |
| —            | Knob, Dual, Rear              | E50221      |
| —            | Knob, Dual, Front             | E50323      |
| —            | Knob, Tuning                  | E50325-2    |
| —            | Knob, Speaker Selector        | E50325-2    |
| —            | Dial Glass                    | N990-107    |
| —            | Fuse Holder                   | X563-551    |



# ALIGNMENT INSTRUCTIONS

**Read These Instructions With Extreme Care Before Attempting Alignment.**

**CHASSIS:** Turn the station selector completely counterclockwise, without forcing. Dial pointer should be at zero index mark on logging scale. If not, reset the dial pointer. Disconnect the external antennas and the antenna link. Set Ferrite Loop to normal position, parallel to rear panel. When using an oscilloscope for alignment, set the output level controls for no overload, as shown by the proper waveform shape. Connect loads to main output and turn volume control to minimum.

**SIGNAL GENERATORS:** The signal generator equipment must be able to supply the following: FM RF modulated 30% ( $\pm 22.5$  KC deviation) at 400 cps; AM RF modulated 30% at 400 cps;

AM IF with 30KC sweep for AM bandwidth adjustment.

**INDICATOR:** DC VTVM, AC VTVM, and scope for alignment.

**ALIGNMENT:** Allow the chassis and test instruments to warm up for at least fifteen minutes. Adjust the line voltage for 117 volts AC, 50-60 cycles. Use fully insulated tools: a small screwdriver for all trimming capacitors; a K-Tran tool for Z1, Z2, Z3, Z4, Z5; a hex tool for L1, L5, L6, L7, L9, L11, Z6 and Z7. For AM alignment, short AVC lead to ground.

**NOTE: For calibrating both the AM and FM, use as low an output voltage as possible from your signal generator.**

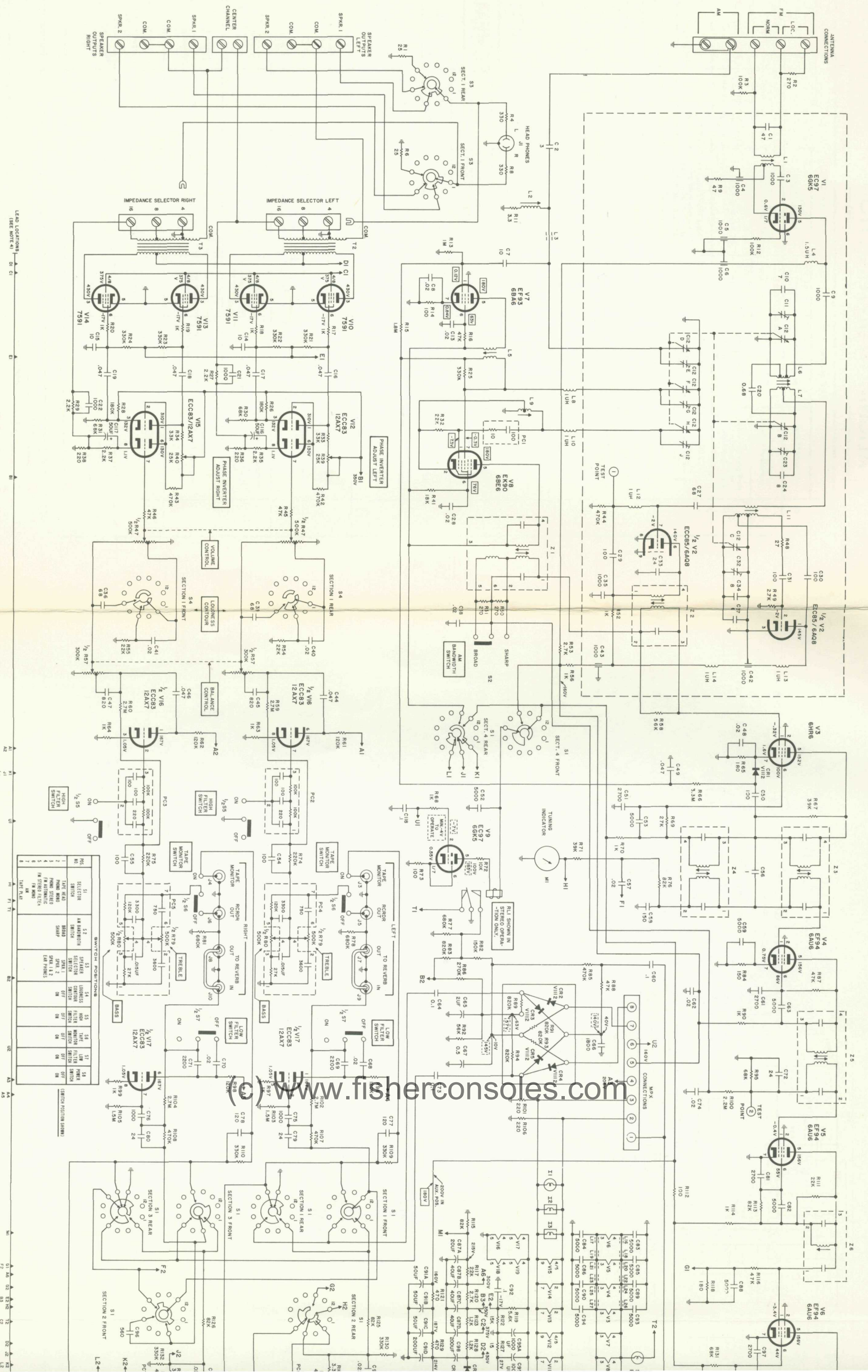
| STEPS | CHASSIS  |          |  | SIGNAL GENERATOR   |         |                                  | INDICATOR  |             | ALIGNMENT                         |   |
|-------|--|----------|--|--|---------|----------------------------------|--|-------------|-----------------------------------|---|
|       | AM BANDWIDTH   | SELECTOR | STATION SELECTOR                       | COUPLING   | FREQ.   | MOD.                             | TYPE   | CONNECTION  | ADJUST                            | INDICATION  |
| 1     | SHARP  | AM       | Point of no signal and no interference | AM Gen. connected thru .01-uf cap. in series with hot lead to V8, Pin 7                              | 455 KC  | 30% AM at 400 cps                | AC VTVM to Left  | Rec. Output | Z1, Z4 top and bottom             | Maximum voltage   |
| 2     | BROAD  | AM       | Point of no signal and no interference | AM Gen. connected thru .01-uf cap. in series with hot lead to V8, Pin 7                              | 455 KC  | 30 KC sweep                      | Scope to Left  | Rec. Output | Z4 bottom                         | Adjust slightly for symmetrical curve                           |
| 3     | SHARP  | AM       | 600 KC                                 | AM Gen. connected thru 220-uuf to the AM antenna terminal. Disconnect link between terminals.        | 600 KC  | 30% AM at 400 cps                | AC VTVM to Left  | Rec. Output | L9, L5, L2                        | Maximum voltage   |
| 4     | SHARP  | AM       | 1400 KC                                | AM Gen. connected thru 220-uuf to the AM antenna terminal. Disconnect link between terminals.        | 1400 KC | 30% AM at 400 cps                | AC VTVM to Left  | Rec. Output | C12J, C12G, C12E                  | Maximum voltage   |
| 5     | Repeat steps 3 and 4 for proper dial calibration and maximum output. |          |  |  |         |                                  |  |             |                                   |   |
| 6     |  | FM       | Point of no signal and no interference | FM Gen. connected to ungrounded tube shield of V2  | 10.7 MC | None                             | DC VTVM to test point 3  |             | Z2, Z3, Z5, Z6 Z7, top and bottom | Maximum negative voltage  |
| 7     |  | FM       | Point of no signal and no interference | FM Gen. connected to ungrounded tube shield of V2  | 10.7 MC | None                             | Connect hot lead of DC VTVM to TSP4, ground to junction of resistors (47K) connected in series from TSP3 to GND. |             | Z7, top                           | Zero reading on zero center scale                               |
| 8     |  | FM       | 90 MC                                  | FM Gen. connected thru two 120-ohm carbon resistors in series with lead to antenna terminals Normal. | 90 MC   | 30% FM (22.5 KC Dev.) at 400 cps | DC VTVM to TSP3 and scope to Left  | Rec. output | L11, L7, L6, L1                   | Check for sine waveform and adjust for maximum negative voltage |
| 9     |  | FM       | 106 MC                                 | FM Gen. connected thru two 120-ohm carbon resistors in series with lead to antenna terminals Normal. | 106 MC  | 30% FM (22.5 KC Dev.) at 400 cps | DC VTVM to TSP3 and scope to Left  | Rec. output | C32, C23, C11                     | Check for sine waveform and adjust for maximum negative voltage |
| 10    | Repeat steps 8 and 9 for proper dial calibration and maximum output. |          |  |  |         |                                  |  |             |                                   |   |

## AM ALIGNMENT

## FM ALIGNMENT

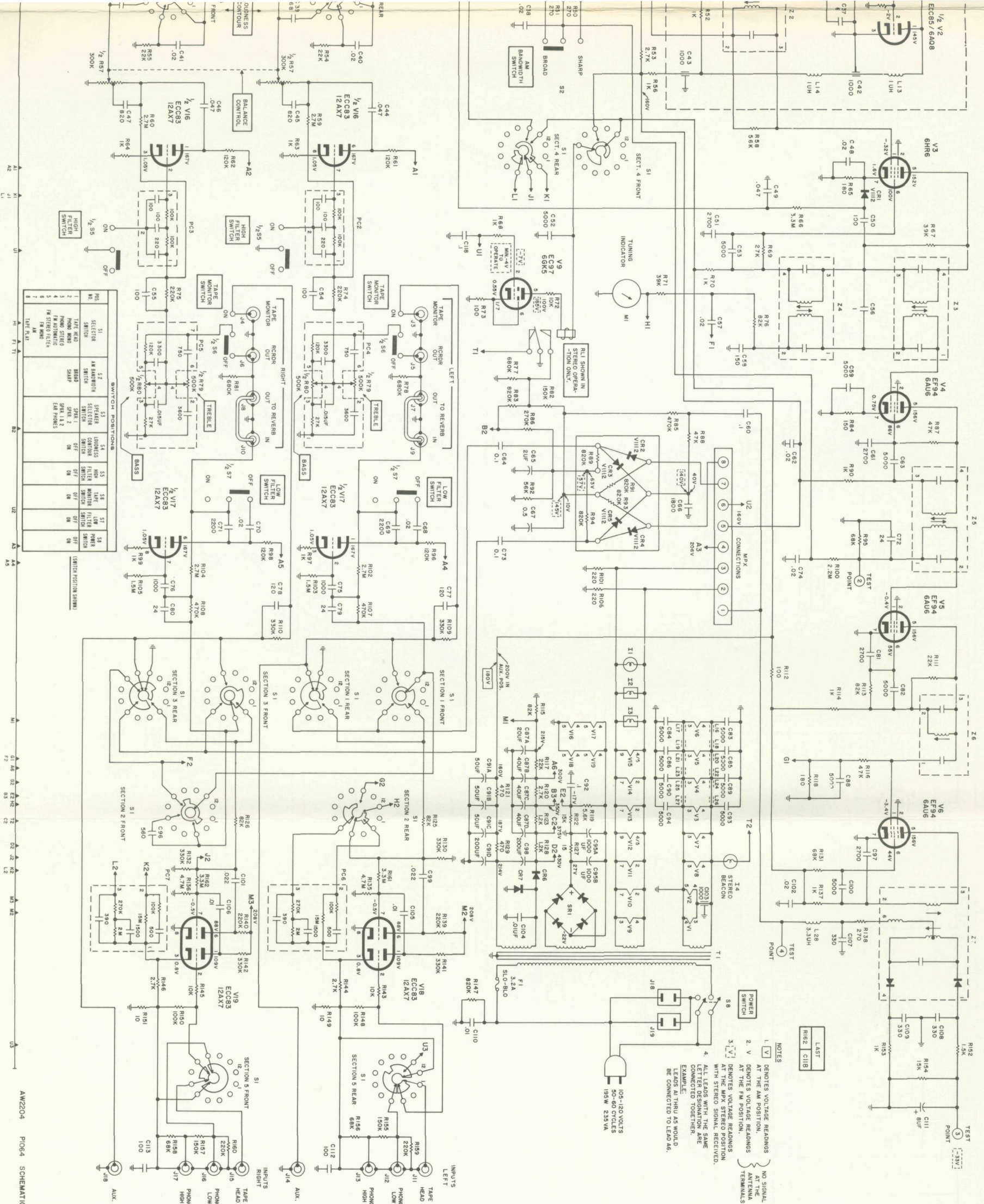


# SCHEMATIC DIAGRAM



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AW2204 P1064 SCHEMATIC



## 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      | Polystyrene, 470, 5%, 500V      | C50394-1 |
| C205      | Ceramic, 82, 1000V              | C50070-1 |
| C206      | Ceramic, 1000, GMV, 500V        | C50089-2 |
| C207      | Ceramic, 5000, +80 - 20%, 500V  | C50089-6 |
| C208, 209 | Mica, 4700, 5%, 500V            | C50332-5 |
| C210      | Electrolytic, 1uf, 350V         | C50283-3 |
| C211      | Ceramic, 1000, GMV, 500V        | C50089-2 |

|           |                                 |           |
|-----------|---------------------------------|-----------|
| C212      | Ceramic, .05uf, +80 - 20%, 100V | C50073-2  |
| C214      | Mylar, 4700, 400V               | C50197-25 |
| C215      | Mica, 3900, 5%, 500V            | C50332-6  |
| C216, 217 | Ceramic, 1000, GMV, 500V        | C50089-2  |
| C218      | Ceramic, .02uf, 20%, 500V       | C50089-5  |
| C219      | Ceramic, 330, 1000V             | C50183-5  |
| C220      | Ceramic, .02uf, 20%, 500V       | C50089-5  |
| C221, 222 | Mylar, .047uf, 250V             | C50197-52 |
| C223, 224 | Ceramic, 1000, 1000V            | C50072-3  |
| C225, 226 | Ceramic, 2200, 1000V            | C50072-5  |

### RESISTORS

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

| Symbol | Description                  | Part No.   |
|--------|------------------------------|------------|
| R200   | Composition, 22M, 10%, 1/2 W | RC20BF226K |

|            |                                    |  |
|------------|------------------------------------|--|
| R201       | Composition, 4.7K, 1/2 W           |  |
| R202       | Composition, 15K, 1/2 W            |  |
| R203       | Composition, 10M, 10%, 1/2 W       |  |
| R204       | Dep. Carbon, 1M                    |  |
| R205       | Dep. Carbon, 220K, 1/2 W           |  |
| R207       | Dep. Carbon, 1M                    |  |
| R208       | Dep. Carbon, 22K                   |  |
| R209, 210, |                                    |  |
| 211, 212   | Dep. Carbon, 33K                   |  |
| R213, 214  | Dep. Carbon, 100K                  |  |
| R215       | Potentiometer, 50K, MPX Separation |  |
| R216       | Composition, 22M, 10%, 1/2 W       |  |
| R217, 218  | Dep. Carbon, 18K, 1/2 W            |  |
| R219, 220  | Dep. Carbon, 15K, 1/2 W            |  |
| R221       | Composition, 22M, 10%, 1/2 W       |  |
| R222, 223  | Dep. Carbon, 27K                   |  |

|            |  |
|------------|--|
| RC20BF472J |  |
| RC20BF153J |  |
| RC20BF106K |  |
| R12DC105J  |  |
| R33DC224J  |  |
| R12DC105J  |  |
| R12DC223J  |  |
| R12DC333J  |  |
| R12DC104J  |  |
| R50150-4   |  |
| RC20BF226K |  |
| R33DC183J  |  |
| R33DC153J  |  |
| RC20BF226K |  |
| R12DC273J  |  |

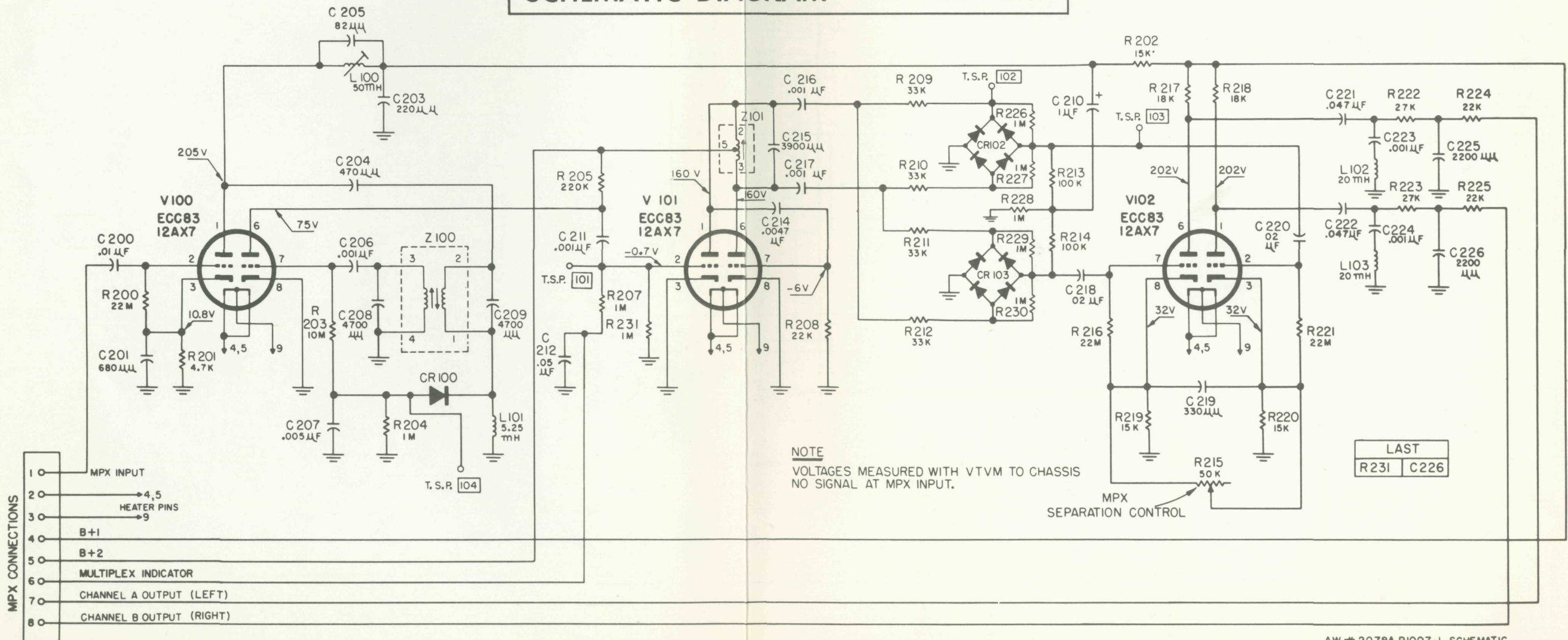
|            |                  |
|------------|------------------|
| R224, 225  | Dep. Carbon, 22K |
| R226, 227, |                  |
| 228, 229,  |                  |
| 230, 231   | Dep. Carbon, 1M  |

|           |
|-----------|
| R12DC223J |
| R12DC105J |

### MISCELLANEOUS

| Symbol      | Description       | Part No.   |
|-------------|-------------------|------------|
| CR100, 102, |                   |            |
| 103         | Diodes, Type 1112 | V-1112     |
| L100        | Coil, low pass    | L50210-30  |
| L101        | Coil, 5.25MH      | L50334-1   |
| L102, 103   | Coil, 20MH        | L50334-2   |
| Z100        | Transformer, 19Kc | ZZ50210-34 |
| Z101        | Coil, 38Kc        | ZZ50210-33 |

## SCHEMATIC DIAGRAM • MULTIPLEX SECTION





# 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 ( $\pm 5$ 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.

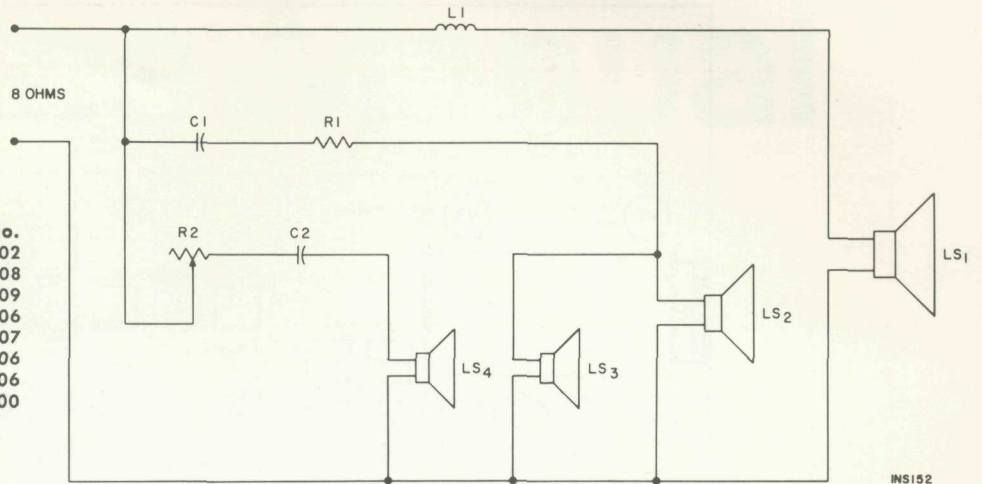
3 — If DC VTVM reading falls below -9 volts when maximum reading is obtained on the AC VTVM, readjust bottom of Z100, then repeat Step 5. Repeat this procedure until maximum AC VTVM reading is obtained with DC VTVM reading greater than -9 volts.

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



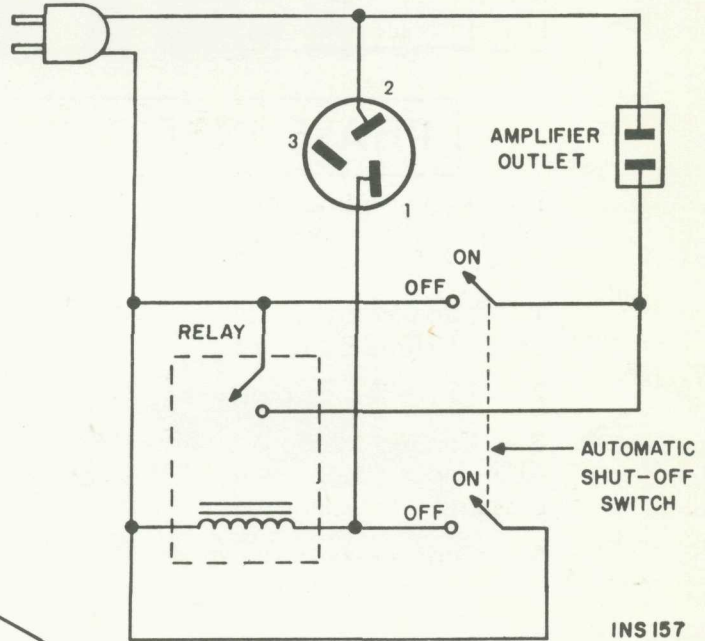
# SCHEMATIC DIAGRAM • SPEAKER SYSTEMS

| SPEAKER SYSTEM |                                  |          |
|----------------|----------------------------------|----------|
| Symbol         | Description                      | Part No. |
| LS1            | Speaker, Woofer, 12", 8 ohms     | W-102    |
| LS2, 3         | Speaker, Midrange, 5", 8 ohms    | M-108    |
| LS4            | Speaker, Tweeter, 3 1/2", 8 ohms | T-109    |
| C1             | Capacitor, 4uf                   | C-306    |
| C2             | Capacitor, 1uf                   | C-307    |
| L1             | Coil                             | L-206    |
| R1             | Resistor, 33 ohms                | R-406    |
| R2             | Potentiometer                    | P-500    |

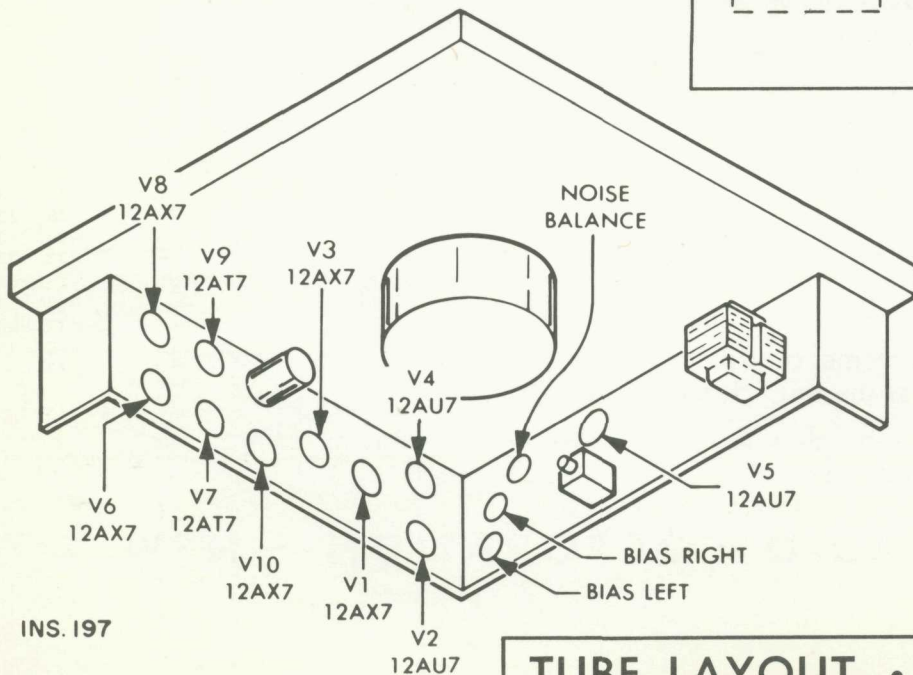


INS152

# SCHEMATIC DIAGRAM • AUTOMATIC SHUT-OFF ASSEMBLY



INS 157

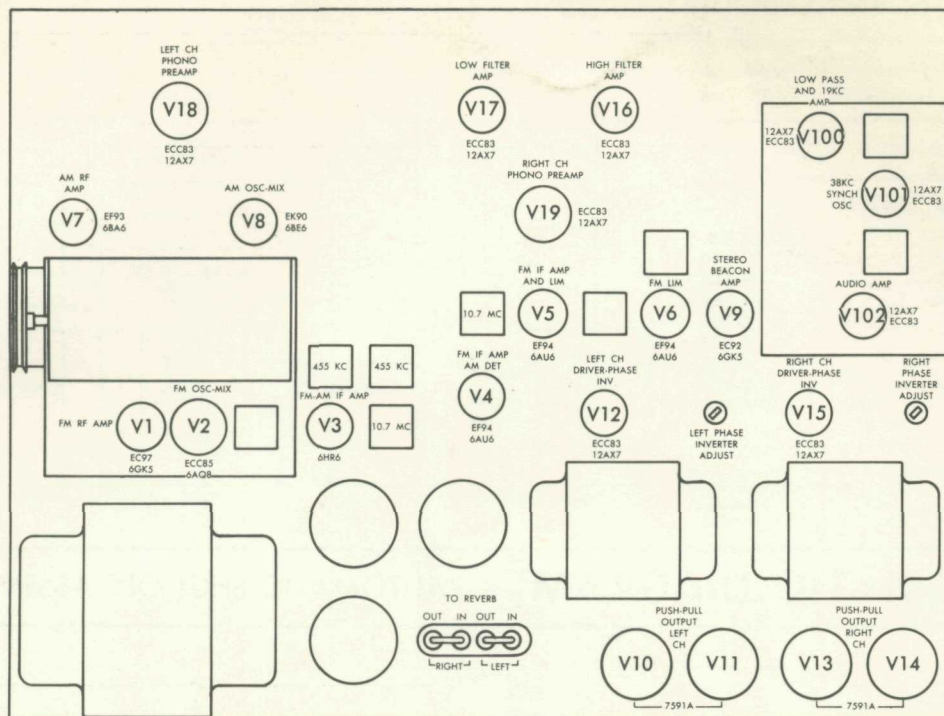


INS. 197

# TUBE LAYOUT • TAPE RECORDER



# TUBE LAYOUT



## PHASE INVERTER ADJUSTMENT

The following procedure is used to balance the phase inverter for minimum IM distortion. Two 4-ohm, 30-watt resistors and an IM distortion analyzer are required for this adjustment.

- 1 — Connect one of the two 4-ohm loads to the appropriate terminals of each channel.
- 2 — Turn the equipment on, allowing a few minutes for warmup.
- 3 — Connect the output of the IM distortion analyzer to the left channel AUX input. (First, remove the connector from the tape recorder, if present.)
- 4 — Connect the input of the IM distortion analyzer across the 4-ohm load connected to the left channel.
- 5 — Set the receiver volume control to produce a 25-watt RMS output, as measured across the left channel load.
- 6 — Set the left channel phase inverter adjustment control for minimum IM distortion.
- 7 — Connect the output of the IM distortion analyzer to the right channel AUX input, and the analyzer input across the right channel load.
- 8 — Set the Volume control to produce a 25-watt RMS output, as measured across the right channel load.
- 9 — Set the right channel phase inverter adjustment control for minimum IM distortion.

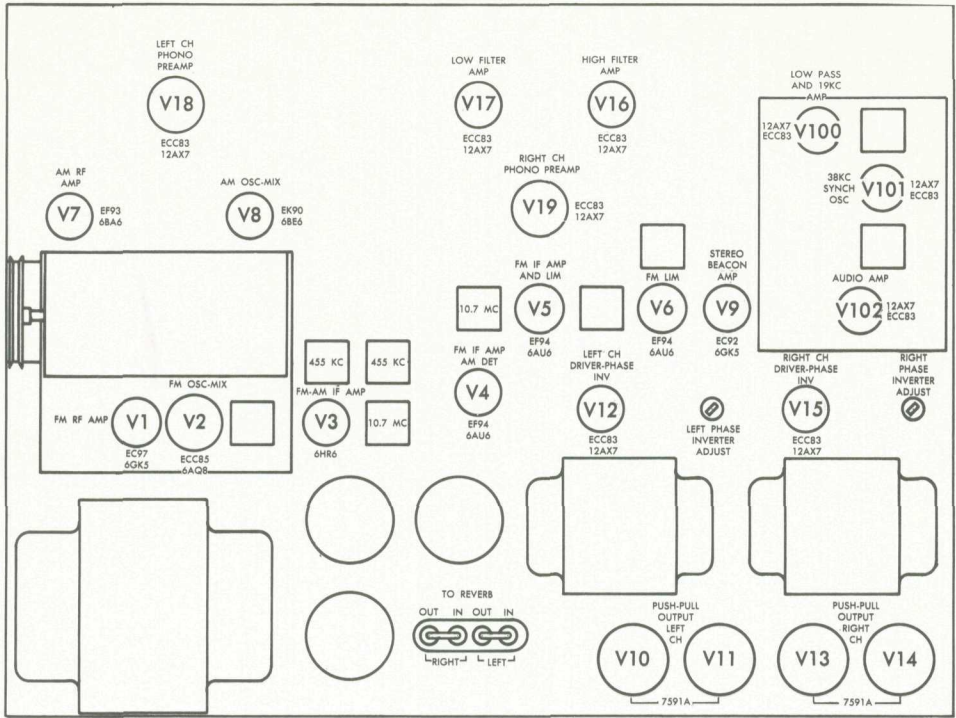
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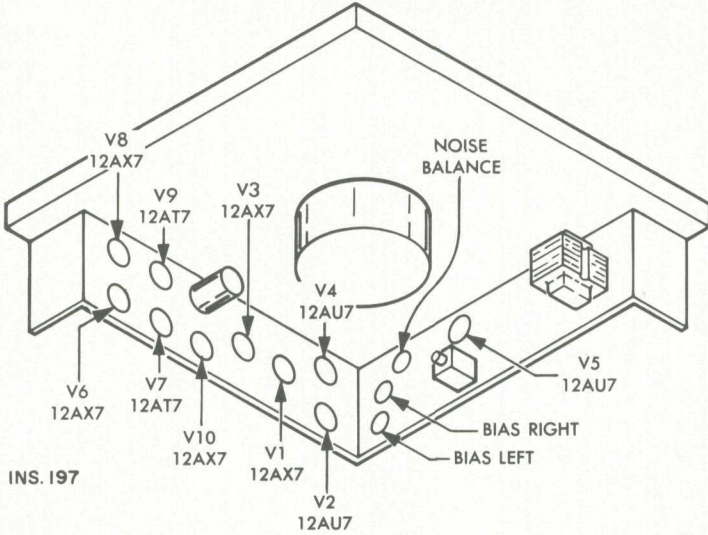


# TUBE LAYOUT DIAGRAMS

## Tuner and Amplifier



## Tape Recorder/Reproducer



# THE FISHER



105-120 VOLTS  
60 CYCLES  
395 WATTS  
460 VA

**MODEL 960**

SERIAL  
NUMBER

This apparatus uses inventions of United States patents, licensed by Radio Corporation of America. Patent numbers will be furnished on request.

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