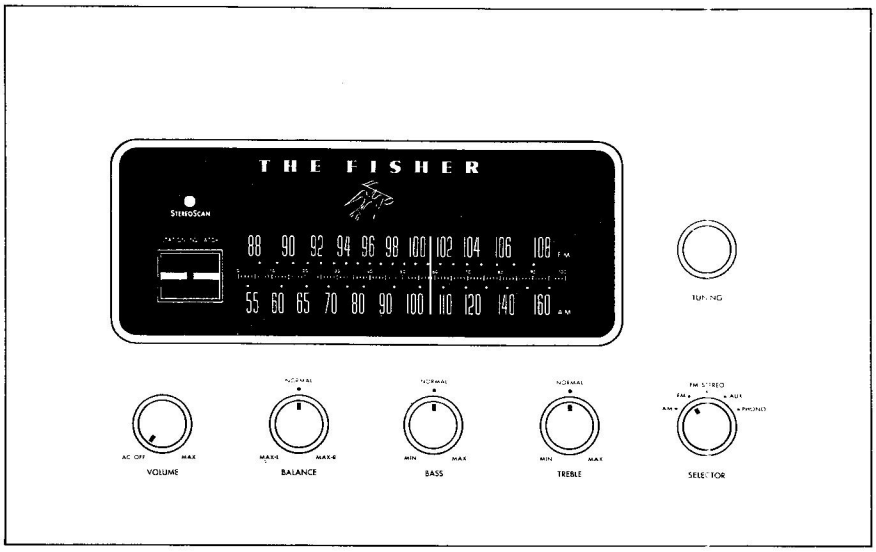
$1.00

Service Manual

THE FISHER®

Consoles



29T

RECEIVER

FISHER RADIO CORPORATION · LONG ISLAND CITY 1 · NEW YORK

CAUTION: This is a FISHER precision high-fidelity instrument. It should be serviced only by qualified personnel — trained in the repair of transistor equipment and printed circuitry.

EQUIPMENT AND TOOLS NEEDED

The following are needed to completely test and align modern high-fidelity instruments such as amplifiers, tuners and receivers.

Test Instruments

Vacuum-Tube Voltohmmeter DC VTVM
Audio (AC) Vacuum-Tube Voltmeter (AC VTVM)
Oscilloscope (Flat to 100 kc minimum)
Audio (Sine-wave) Generator
Intermodulation Analyzer
Sweep (FM) Generator (88 to 108 mc)
Marker Generator
Multiplex Generator (preferably with RF output — FISHER Model 300 or equal).

Miscellaneous

Adjustable-Line-Voltage Transformer or line-voltage regulator

Load Resistors (2) — 8-ohm, 50-watt (or higher)

Stereo source (Turntable with stereo cartridge or Tape Deck)

Speakers (2) Full-range, for listening tests

Soldering iron (with small-diameter tip). Fully insulated from power line.

PRECAUTIONS

Many of the items below are included just as a reminder — they are normal procedures for experienced technicians. Shortcuts can be taken but often they cause additional damage — to transistors, circuit components or the printed-circuit board.

Soldering—A well-tinned, hot, clean soldering iron tip will make it easier to solder without damage to the printed-circuit board or the many many circuit components mounted on it. It is not the wattage of the iron that counts — it is the heat available at the tip. Low-wattage soldering irons will often take too long to heat a connection — pigtail leads will get too hot and damage the part. Too much heat, applied too long, will damage the printed-circuit board. Some 50-watt irons reach temperatures of 1,000° F — others will hardly melt solder. Small-diameter tips should be used for single solder connections — larger pyramid and chisel tips are needed for larger areas.

- When removing defective resistors, capacitors, etc., the leads should be cut as close to the body of the circuit component as possible. (If the part is not being returned for in-warranty factory replacement it may be cut in half — with diagonal-cutting pliers — to make removal easier.)

- Special de-soldering tiplets are made for unsoldering multiple-terminal units like IF transformers and electrolytic capacitors. By unsoldering all terminals at the same time the part can be removed with little chance of breaking the printed-circuit board.

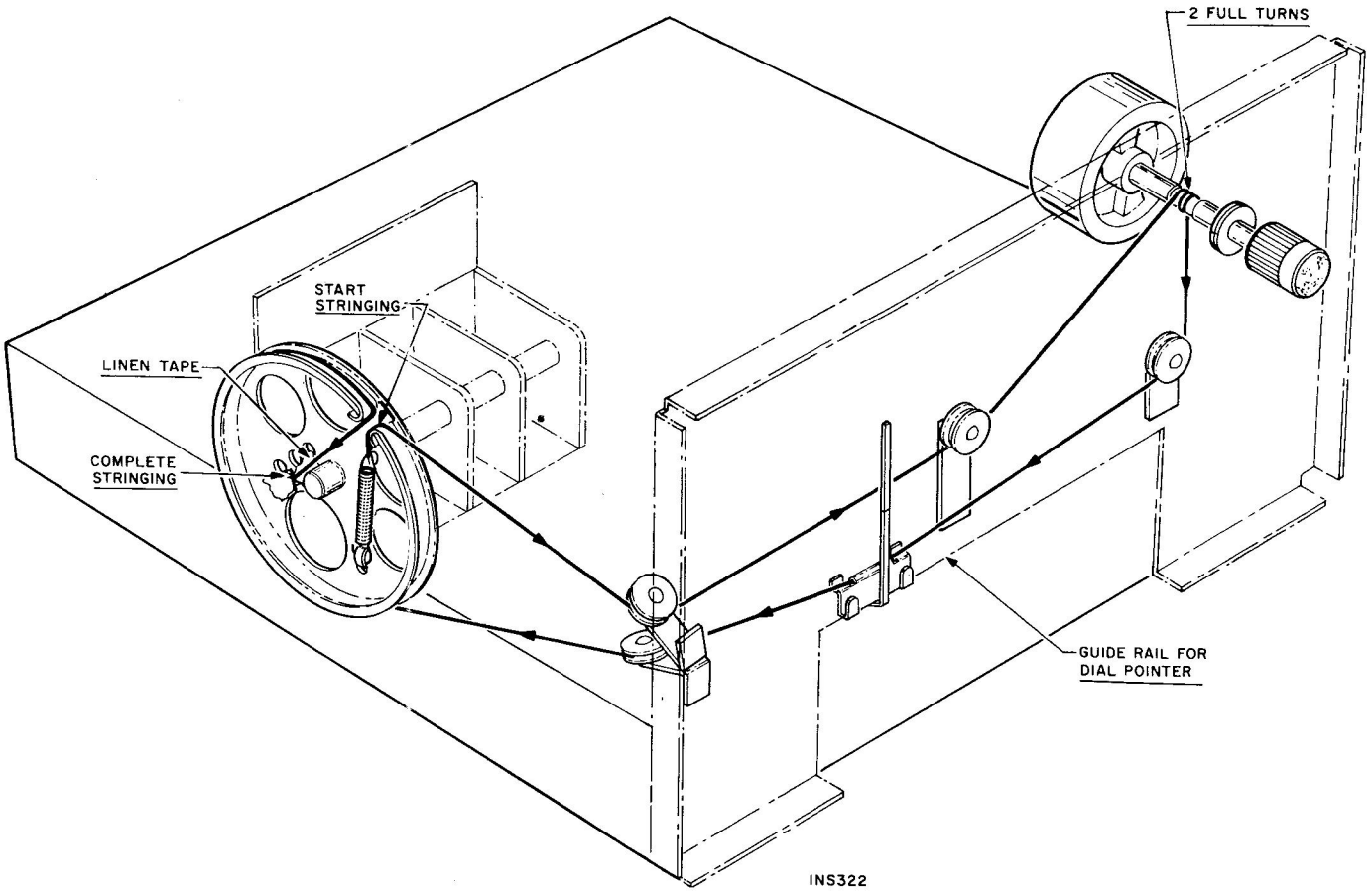
- Always disconnect the chassis from the power line when soldering. Turning the power switch OFF is not enough. Power-line leakage paths, through the heating element, can destroy transistors.

- Use care when making connections to speakers and output terminals. Any frayed wire ends can cause shorts that may burn out the output transistors — they are direct-coupled to the speakers. There is no output transformer — nothing to limit current through the transistors except the fuses. To reduce the possibility of shorts at the speakers, lugs should be used on the exposed ends — at least the ends of the stranded wires should be tinned to prevent frayed wire ends. The current in the speakers and output circuitry is quite high. Any poor contact or small-size wire, can cause power losses in the speaker system. Use 14 or 16 AWG for long runs of speaker-connecting wiring.

DC-Voltage Measurements—These basic tests of the transistor circuitry are made without the signal generator. Without any signal input measure the circut voltages — as indicated on the schematic. The voltage difference between the base and the emitter should be in the millivolt range — a sensitive DC meter is needed for these readings. A low-voltage range of 1 volt, full scale — or lower — is needed.

Audio-Voltage (gain) Measurements—The schematic and printed-circuit board layout diagrams are used. Input signals are injected at the proper points — found most quickly by using layout of the printed-circuit board instead of the schematic. An AUDIO (AC) VTVM connected to the test points should indicate voltages close to those values shown in the boxes on the schematic. Many of the signal levels in the input stages are only a few millivolts — they can not be read on the AC ranges supplied on most Vacuum-Tube AC/DC Volt-ohmmeters (VTVMs). Even with a 1-volt range a signal level of 100 millivolts (.1 volt) will be the first 1/10 of the meter scale. A reading of 1 millivolt (.001 volt) will hardly even move the meter needle.

DIAL STRINGING PROCEDURE



◐ Tie the dial cord to one of the loops on the ends of the tension spring.

◐ Hook the free end of the spring over the bottom-right tab in the front-end drive-drum (with the drum rotated to its extreme clockwise position.

◐ Stretch the tension spring until the loop on spring sticks out of the slot in the edge of the drive drum. Now insert a length of stiff wire, about 1-inch long (a piece of straightened-out paper clip will do nicely) through the loop to keep the spring stretched while stringing the dial cord. Place the piece of stiff wire in the groove of the drive-drum; bridging the slot in the rim.

◐ Thread the dial cord across the guide pulleys and around the flywheel drive shaft—wrapping two full turns around the drive shaft.

◐ Guide the dial cord into the other pulleys and back to the drive-drum—into the groove at the bottom of the rim—around into the slot.

◐ Secure the end of the dial cord to the drive drum.

◐ With the front-end drive-drum positioned to its maximum clockwise rotation set the dial pointer to the zero (0) on the logging scale and cement the pointer into place.

TROUBLESHOOTING GUIDE

When a defect occurs in an electronic circuit the first component suspected is usually the vacuum tube. Many of the inexpensive tube testers will not indicate all the possible internal faults in a vacuum tube--slight defects often sneak past these testers. **It is better to substitute another tube of the same type.**

Sometimes it is possible to switch (transpose) tubes from one circuit to another. This method of testing is most suitable when testing an individual stereo channel. When a good tube is switched with a defective one of the same type the symptom will be transferred from one stereo channel to the other.

When substituting tubes it is absolutely necessary to be certain the tube being inserted is good—a new tube, from a freshly opened carton, is not necessarily a perfect tube. Defects can occur from shipping and handling.

If you have any doubts about the quality of a tube try it in an identical circuit that is operating properly. For example, a tube with heater-cathode leakage may operate normally in a circuit with its cathode grounded; transpose (switch) it with one in a circuit that has a cathode-bias resistor and it will cause a lot of hum.

Does not go on—(pilot or dial lamps do not light)—in any position of the SELECTOR switch.

Check:
- Fuse F1, AC-interlock plug and socket.
- Power cord and plug, wall outlet.
- Automatic shut-off switch S3 (part of SELECTOR switch).

Does not go on—(pilot or dial lamps do not light)—only in PHONO position of the SELECTOR switch.

Check:
- Automatic shut-off switch S3 (part of SELECTOR switch)
- J17 (changer connector) and its plug and interconnecting cable.
- Automatic shut-off switch on the record changer.

Distortion
No audio output **(both channels) in any position of the SELECTOR switch.**

Test:
- V9, or substitute DC voltages at CR4, C75, R84, R85; R81, R85, C62C; R76, R81, C62B; R76, C62A.

Hum—in any position of the SELECTOR switch.

Check:
- Setting of HUM ADJUST CONTROL (R87).
- 300-volt DC power supply filter (C62A, B, C) for AC ripple.
- Bias supply (CR6 and C77) for AC ripple.

Distortion **(LEFT channel only) SELECTOR in PHONO and FM positions.**
Hum or
No audio output

Test:
- (filament leakage for hum) or substitute V9, V8, V7.

Distortion **(RIGHT channel only) SELECTOR in PHONO and FM positions.**
Hum or
No audio output

Test:
- (filament leakage for hum) or substitute V9, V11, V10.

Distortion Check:
Hum or—(PHONO only) No audio output
- J10, J12, J17 and plugs and cables from record changer.
- Clean and tighten all ground connections.
- Reverse AC line-cord plug in wall outlet.
- Reverse AC line-cord plug from record player in J18 (on chassis) if used.

Distortion **(AM only)**
Hum or
No audio output
- Try other stations,
- Reverse AC line-cord plug in wall outlet.

Test:
- (filament leakage for hum) V2, V3 or substitute.

Distortion **(FM only)**
Hum or
No audio output
- Try other stations,
- Reverse AC line-cord plug in wall outlet.

Test:
- (filament leakage for hum) V1, V5, V6 or substitute.

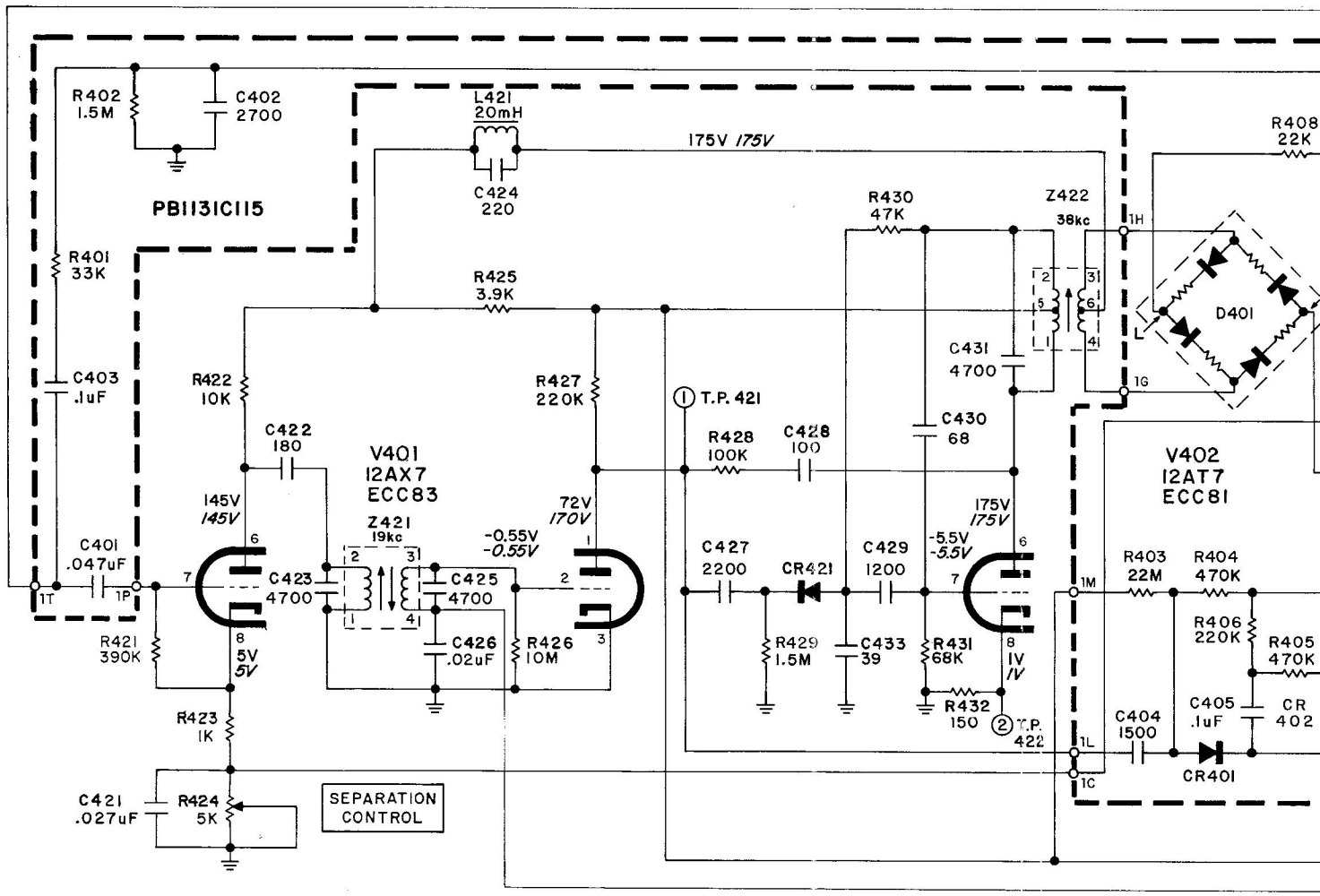
Distortion **(AM and FM, but not PHONO)**
Hum or
No audio output Test:
- (filament leakage for hum) V4 or substitute.

Distortion **(FM STEREO only)**
Hum or
No audio output

Test:
- filament leakage for hum) V401, V402 or substitute.

Check:
- Balanced modulator D401 and C409, C410; C407, C412; L401, L402.

P 1131-2 SCHEMATIC DIAGRAM



PARTS DESCRIPTION LIST

All circuit components with symbols beginning with 401 are located on the printed-circuit board; those beginning with 421 are mounted on the metal subchassis.

CAPACITORS

20% tolerance for all fixed capacitors, unless otherwise noted or marked GMV (guaranteed minimum value). All capacitors not marked uF are pF (uuf).

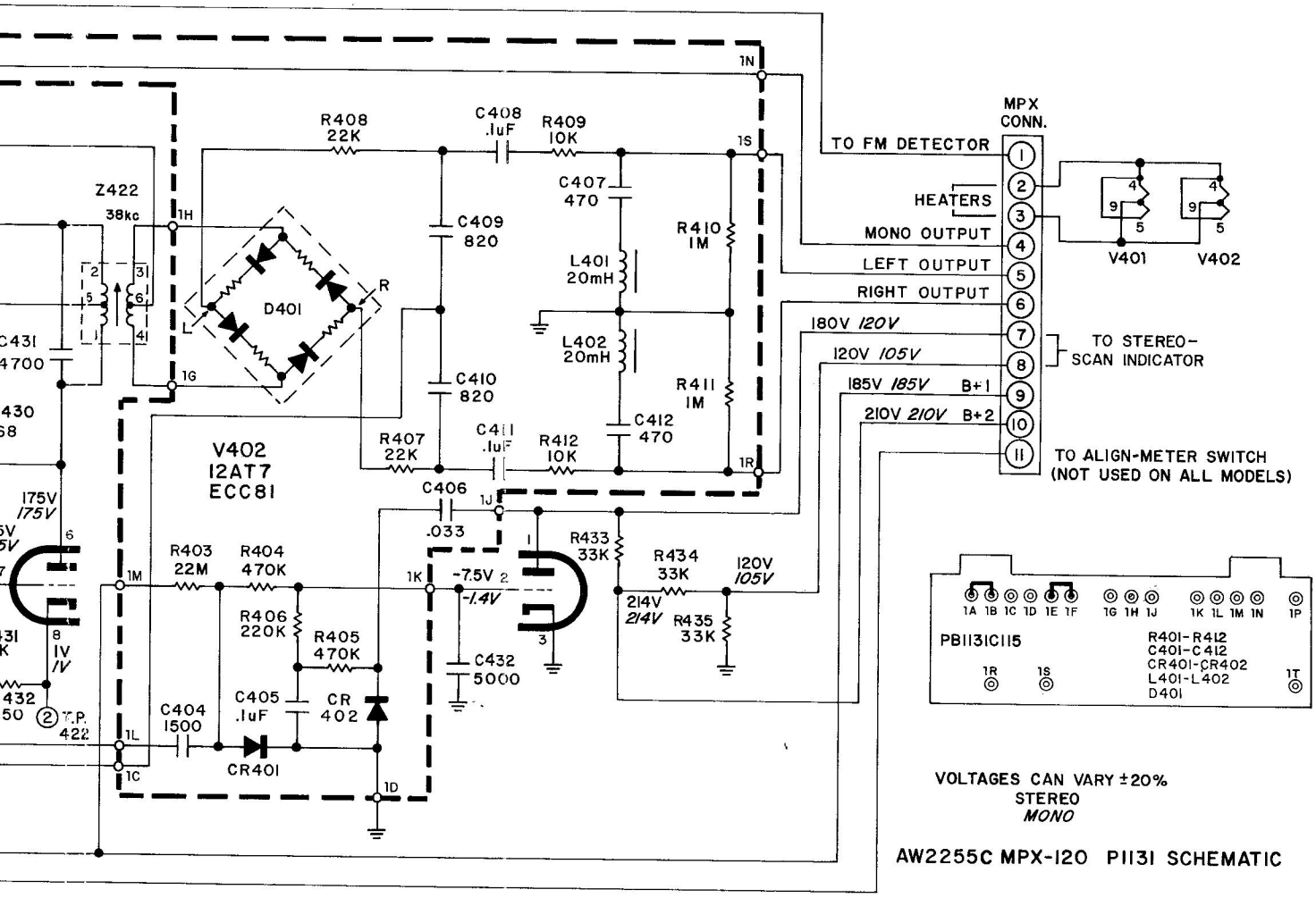
Symbol	Description	Part No.
C401	Capacitor, Mylar, .047uF 10% 100V	C50B574-5
C402	Capacitor, Polystyrene, 2700 5% 125V	C50B634-20
C403	Capacitor, Plastic Film, .1uF 20% 250V	C50B633-1
C404	Capacitor, Cer. Disc., 1500, 10%	C50B576-4
C405	Capacitor, Plastic Film, 1uF 20% 250V	C50B633-1
C406	Capacitor, Plastic Film, .033uF 20% 400V	C50B633-20
C407	Capacitor, Cer. Disc, 470 pF 10%	C50B576-1
C408	Capacitor, Plastic Film, .1uF 20% 250V	C50B633-1
C409	Capacitor, Cer. Disc, 820 10%	C50B576-3
C410	Capacitor, Cer. Disc, 820 10%	C50B576-3
C411	Capacitor, Plastic Film, .1uF 20% 250V	C50B633-1
C412	Capacitor, Cer. Disc, 470 pF, 10%	C50B576-1
C421	Mylar, .027 uF, 5%, 100V	C50B574-6
C422	Polystyrene, 180, 5%, 500V	C50B634-1
C423	Polystyrene, 4700, 5%, 125V	C50B634-21
C424	Polystyrene, 220, 5%, 500V	C50B634-2
C425	Polystyrene, 4700, 5%, 125V	C50B634-21
C426	Ceramic, .02 uF, +80, −20%, 500V	C50089-4
C427	Ceramic, 2200, 20%, 1000V	C50183-10
C428	Ceramic, 100, 20%, 1000V	C50183-9
C429	Ceramic, 1200, 10%, 1000V	C50183-8
C430	Ceramic, 68, 10% NPO, 1000V	C50070-46
C431	Mica, 4700, 5%, 300V	C50332-7
C432	Ceramic, 5000, 20%, 500V	C50089-1
C433	Ceramic, 39, 10%, N1500, 1000V	C50070-17

RESISTORS

Symbol	Description	Part No.
R401	Resistor, Dep. Carbon, 33k 5%, 1/8W	R12DC333J
R402	Resistor, Dep. Carbon, 1.5m, 5%, 1/3W	R33DC155J
R403	Resistor, Composition, 22M, 10%, ½W	RC20BF226K
R404	Resistor, Dep. Carbon, 470k, 5%, 1/8W	R12DC474J
R405	Resistor, Dep. Carbon, 470k, 5%, 1/8W	R12DC474J
R406	Resistor, Dep. Carbon, 470k, 5%, 1/8W	R12DC224J
R407	Resistor, Dep. Carbon, 22k, 5%, 1/8W	R12DC223J
R408	Resistor, Dep. Carbon, 22k, 5%, 1/8W	R12DC223J
R409	Resistor, Dep. Carbon, 10k, 5%, 1/8W	R12DC103J
R410	Resistor, Dep. Carbon, 1m, 5%, 1/8W	R12DC105J
R411	R	
R412	R	
R421	D	
R422	D	
R423	D	
R424	P	
R425	D	
R426	C	
R427	D	
R428	D	
R429	D	
R430	D	
R431	D	
R432	D	
R433, 434, 435	C	

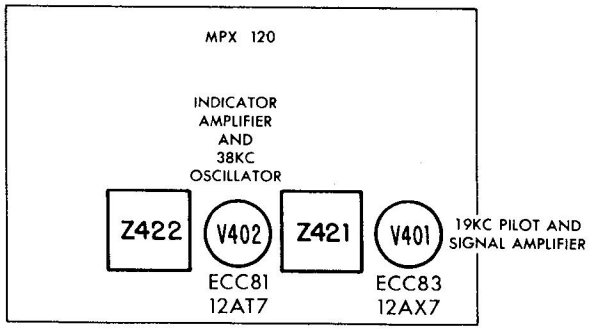
Symbol	D
CR401	D
CR402	D
CR421	D
D401	R
L401	C
L402	C
L421	C
Z421	T
Z422	T
–	P
–	M
–	SI

MATIC DIAGRAM • MULTIPLEX SECTION



AW2255C MPX-120 P1131 SCHEMATIC

Part No.	Symbol	Description	Part No.
C50B634-21	R411	Resistor, Dep. Carbon, 1m, 5%, 1/8W	R12DC105J
C50B634-2	R412	Resistor, Dep. Carbon, 10k, 5%, 1/8W	R12DC103J
C50B634-21			
C50089-4	R421	Dep. Carbon, 2.2M, 5%, 1/3W	R33DC225J
C50183-10	R422	Dep. Carbon, 10K, 5%, 1/3W	R33DC103J
C50183-9	R423	Dep. Carbon, 1K, 5%, 1/3W	R33DC102J
C50183-8	R424	Potentiometer, 5K Separation Control	R50150-11
C50070-46			
C50332-7	R425	Dep. Carbon, 3.9K, 5%, 1/3W	R33DC392J
C50089-1	R426	Composition, 10M, 10%, 1/2W	RC20BF106K
C50070-17	R427	Dep. Carbon, 220K, 5%, 1/3W	R33DC224J
	R428	Dep. Carbon, 100K	R12DC104J
	R429	Dep. Carbon, 1.5M, 5%, 1/3W	R33DC155J
Part No.	R430	Dep. Carbon, 47K, 5%, 1/3W	R33DC473J
	R431	Dep. Carbon, 68K	R12DC683J
R12DC333J	R432	Dep. Carbon, 150, 5%, 1/3W	R33DC151J
R33DC155J	R433, 434, 435	Composition, 33K, 10%, 1W	RC30BF333K
W RC20BF226K			
R12DC474J		MISCELLANEOUS	
R12DC474J	Symbol	Description	Part No.
	CR401	Diode	V111W
R12DC224J	CR402	Diode	V50A260-15
	CR421	Diode	V1112
R12DC223J	D401	Ring Demodulator	V50A260-18
	L401	Coil	L50334-2
R12DC223J	L402	Coil	L50334-2
	L421	Coil, 20 uH	L50334-2
R12DC103J	Z421	Transformer, 19 kc	ZZ50210-34
	Z422	Transformer, 38 kc	ZZ50210-54
R12DC105J	–	Printed Circuit Bd.	PB1131B111
	–	Mini. Pin Term.	A50A577
	–	Sleeving 23-32" Lg.	E50A684-4



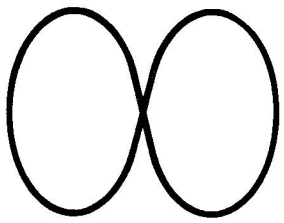


FIGURE 1. Lissajous pattern for MPX Oscillator alignment.

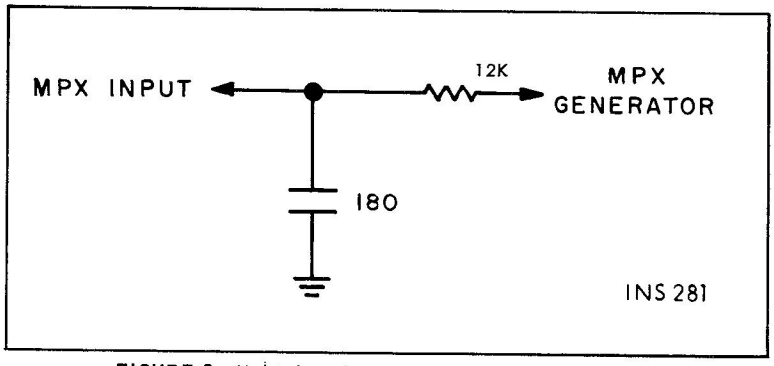
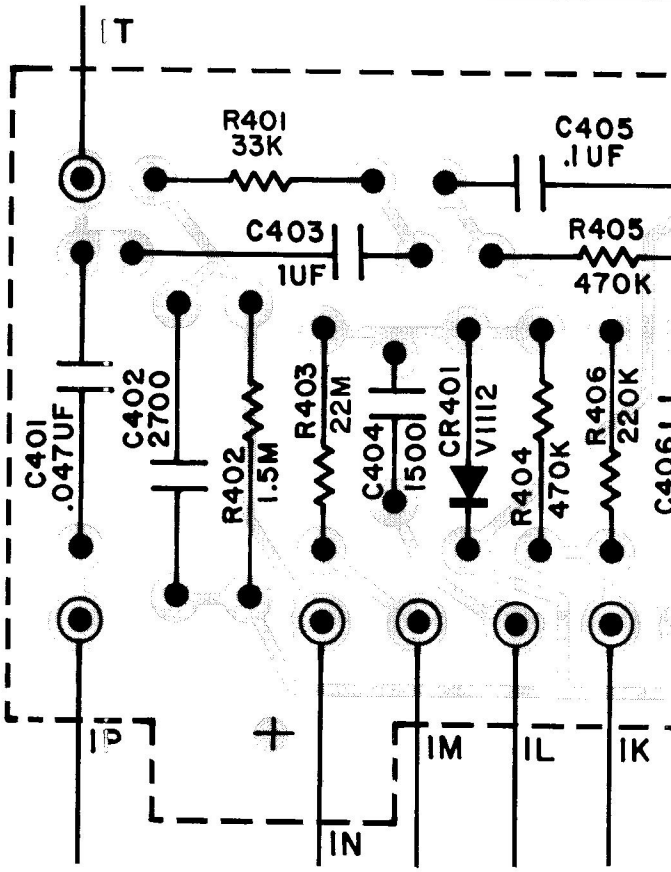


FIGURE 2. Multiplex-alignment coupling network circuit.



ALIGNMENT INSTRUCTIONS •

GENERAL

The preferred alignment procedure, in table 1 below, uses a multiplex generator with an RF output, like the FISHER Model 300. Optimum performance will be obtained only when the multiplex decoder is connected to the FM detector with which it will be used. Check IF alignment first—poor alignment can prevent proper multiplex decoder operation.

TEST EQUIPMENT REQUIRED: MULTIPLEX GENERATOR, AUDIO (AC) VTVM, 100 KC OSCILLOSCOPE WITH EXTERNAL SWEEP JACKS, ALIGNMENT TOOL.

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TABLE 1

STEPS	GENERATOR			INDICATOR	ALIGNMENT	
	CONNECTION	MODULATION	R F DEVIATION	TYPE AND CONNECTION	ADJUST	INDICATION
1	Multiplex generator RF output to antenna terminals	19 kc pilot only	±7.5 kc	VTVM to TP 1	Z421 top and bottom	Maximum reading on VTVM
2	19 kc output of generator to oscilloscope horizontal input; generator not connected to MPX section	———	———	Vertical input of oscilloscope to TP 2; set oscilloscope for external sweep	Z422	Set frequency of free-running oscillator as close as possible to 38 kc. Lissajous pattern (see figure 1) should be as slow-moving as possible.
3	Same as Step 1	Composite MPX; 1000 cps on left channel only	±75 kc	VTVM and oscilloscope vertical input to right channel output lug (terminal 1R)	Z421 top	Maximum reading on VTVM; clean 1000 cps sine wave on oscilloscope
4	Same as Step 1	Composite MPX; 1000 cps on right channel only	±75 kc	Same as Step 3	MPX separation control (R424)*	Minimum reading on VTVM should be at least 33 db below reading obtained in Step 3
5	Same as Step 1	Same as Step 4	±75 kc	VTVM and oscilloscope vertical input to right channel output lug (terminal 1S)	———	Same VTVM reading as obtained in Step 3 ± 2 db; clean 1000 cps sine wave on oscilloscope
6	Same as Step 1	Composite MPX; 1000 cps on left channel only	±75 kc	Same as Step 5	MPX separation control (R424), if necessary*	Minimum reading on VTVM should be at least 33 db below reading obtained in Step 5.

* If adjustment is required, adjust for best compromise readings in Steps 4 and 6.

STEPS	
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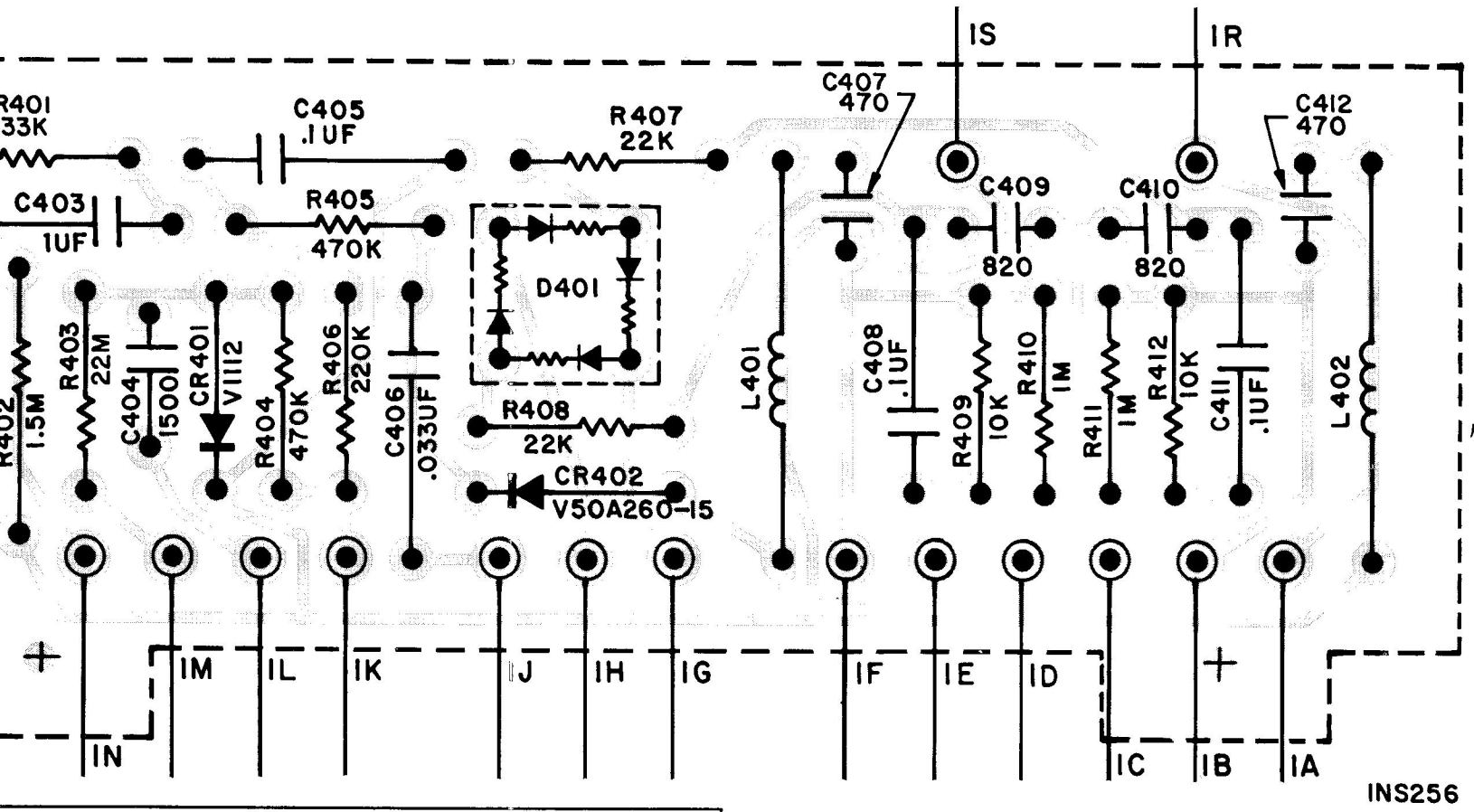
2	19 gene scope genera to
3	Sa
4	Sa
5	Sa
6	Sa

* If adjustment is r

1131-2 MULTIPLEX DECODER



T INSTRUCTIONS • MULTIPLEX SECTION

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ALTERNATE ALIGNMENT PROCEDURE

For multiplex generators without an RF output

When using this alignment procedure, it is necessary to disconnect the ratio detector from the multiplex decoder at the point where the generator is connected. Unsolder point 1T carefully. The generator input must be through a simple low-pass filter—a 12 K resistor between the multiplex generator and the MPX input with a 180 pF capacitor from the MPX input end of the resistor to ground (Figure 2).

TEST EQUIPMENT REQUIRED: MULTIPLEX GENERATOR, AUDIO (AC) VTVM, 100 KC OSCILLOSCOPE WITH EXTERNAL SWEEP JACKS, ALIGNMENT TOOL.

TABLE 2

STEPS	GENERATOR			INDICATOR	ALIGNMENT	
	CONNECTION	AUDIO	LEVEL	TYPE AND CONNECTION	ADJUST	INDICATION
1	Composite output of MPX generator to input of MPX demodulator (Point 1)	19 kc pilot only	100 mV RMS (280 MV P-P)	AC VTVM to TP 1	Z421 top and bottom	Maximum reading on VTVM
2	19 kc output of generator to oscilloscope horizontal input; generator not connected to MPX section	———	———	Oscilloscope vertical input to TP 2	Z422	Set frequency of free-running oscillator as close as possible to 38 kc. Lissajous pattern (see figure 1) should be as slow-moving as possible.
3	Same as Step 1	1000 cps on left channel only	0.7 V RMS (3.92 V P-P)	AC VTVM and oscilloscope vertical input to left channel output lug (terminal 1R)	Z421 top	Maximum reading on VTVM; clean 1000 cps sine wave on oscilloscope
4	Same as Step 1	1000 cps on right channel only	0.7 V RMS (3.92 V P-P)	Same as Step 3	MPX separation control (R424)*	Minimum reading on VTVM should be at least 33 db below reading obtained in Step 3
5	Same as Step 1	Same as Step 4	0.7 V RMS (3.92 V P-P)	VTVM and oscilloscope vertical input to right channel output lug (terminal 1S)	———	Same VTVM reading as obtained in Step 3 ± 2 db; clean 1000 cps sine wave on oscilloscope
6	Same as Step 1	1000 cps on left channel only	0.7 V RMS (3.92 V P-P)	Same as Step 5	MPX separation control (R424), if necessary*	Minimum reading on VTVM should be at least 33 db below reading obtained in Step 5.

* If adjustment is required, adjust for best compromise readings in Steps 4 and 6.

MAIN CHASSIS • 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, 3, NPO, 1000V	C50070-28
C2, 3	–Deleted–	– – –
C4	Ceramic, 21, 5%, N750, 1000V	C50070-32
C5-A-H	Variable, Tuning AM-FM	C953-115
C6	Ceramic, 1000, GMV, 500V	C50089-2
C7	Ceramic, 100, GMV, N1500, 500V	C50070-5
C8	Mylar, .022uF, 400V	C50197-28
C9	Mylar, .022uF, 250V	C50197-49
C10	Ceramic, 150, 1000V	C50072-18
C11	Mylar, .022uF, 400V	C50197-28
C12	Mylar, .022uF, 250V	C50197-49
C13	Ceramic, 150, 1000V	C50072-18
C14	Ceramic, Feedthru, 1000, GMV	C592-187
C15	Ceramic, .02uF, +80 –20%, 500V	C50089-4
C16	Ceramic, 5, ±.5pF, NPO, 500V	CC20CJ050D5
C17	Ceramic, Trimmer	C662-123
C18	Ceramic, 1000, GMV, 500V	C50089-2
C19, 20	Electrolytic, 50uF, 10V	C50483-15
C21, 22, 23, 24	–Deleted–	– – –
C25	Ceramic, 33, 5%, N750, 1000V	C50070-25
C26	Ceramic, Feedthru, 1000, GMV	C592-187
C27	Ceramic, 24, 5%, N150, 1000V	C50070-8
C28	Ceramic, Trimmer	C662-123
C29	Ceramic, 100, GMV, N1500, 1000V	C50070-5
C30	Ceramic, Feedthru, 1000, GMV	C592-187
C31	Ceramic, 68, N750, 1000V	C50070-16
C32	Ceramic, .02uF, 20%, 500V	C50089-5
C33	Ceramic, 68, N750, 1000V	C50070-16
C34	Ceramic, .02uF, 20%, 500V	C50089-5
C35	Ceramic, 68, 5%, N750, 1000V	C50070-35
C36, 37	Ceramic, 560, 1000V	C50072-14
C38	Ceramic, 82, 5%, N1500, 1000V	C50070-33
C39	Ceramic, 5, ±.5pF, N150, 500V	CC20PJ050D5
C40	Ceramic, .02uF, +80 –20%, 500V	C50089-4
C41	Ceramic, 1000, 1000V	C50072-3
C42	Ceramic, 10, ±.5pF, NPO, 500V	CC20CJ100D5
C43, 44	Ceramic, Feedthru, 1000 GMV	C592-187
C45, 46	Ceramic, 3300, 1000V	C50072-11
C47	Ceramic, 5000, +80 –20%, 500V	C50089-6
C48	Mylar, .047uF, 250V	C50197-52
C49, 50	Ceramic, 680, 1000V	C50072-1
C51	Ceramic, 2700, 1000V	C50072-17
C52	Ceramic, Feedthru, 1000 GMV	C592-187
C53, 54	Ceramic, 68, N750, 1000V	C50070-16
C55	Ceramic, 5000, +80 –20%, 500V	C50089-6
C56	Ceramic, 1, 20%, P100, 1000V	C50070-1
C57	Ceramic, 5000, 20%, 500V	C50089-1
C58	Ceramic, 100, N1500, 1000V	C50070-6
C59	Ceramic, 5000, +80 –20%, 500V	C50089-6
C60	Ceramic, 2700, 1000V	C50072-17
C61	Ceramic, 5000, +80 –20%, 500V	C50089-6
C62	Electrolytic, 4-Section A–20uF, 350V B–20uF, 350V C–40uF, 350V D–40uF, 350V	C50180-45
C63	Ceramic, .02uF, GMV, 1000V	C50071-6
C64	Ceramic, .02uF, +80 –20%, 500V	C50089-4
C65	Ceramic, 5000, +80 –20%, 500V	C50089-6
C66	Ceramic, 2700, 1000V	C50072-17
C67	Electrolytic, 10uF, 350V	C644-146
C68	–Deleted–	– – –
C69	Ceramic, 330, 1000V	C50072-1
C70, 71	Ceramic, 5000, +80 –20%, 500V	C50089-6
C72	–Deleted–	– – –
C73, 74	Ceramic, 330, 1000V	C50072-1
C75	Electrolytic, 100uF, 250V	C836-122
C76	Mylar, .047uF, 250V	C50197-52
C77	Electrolytic, 8uF, 50V	C629-138
C78	Molded, .01uF, 20%, 600V	C2747
C79	Electrolytic, 8uF, 50V	C629-138
C80	Molded, .01uF, 20%,600V	C2747
C81	Electrolytic, 100uF, 250V	C836-122
C82	Ceramic, Feedthru, 1000, GMV	C592-187

MISCELLANEOUS

Symbol	Description	Part No.
CR1	Diode, 1N38	V1N38
CR2, 3	–Deleted–	– – –
CR4, 5	Diode, Silicon	SR50472
F1	Fuse, 2A. Slo-Blo	F643-154
I1	Lamp, Cabinet Pilot	I50009-9
I2, 3, 4	Lamp, Dial	I50009-7
I5	Stereo Scan Indicator	I50B621-1
L1	Loopstick, AM Antenna	L50210-36
L2	Coil, FM Antenna	L818-113
L3	Choke, 1.5 Microhenry	L50066-4
L4	Coil, AM RF.	L50210-35
L5	Choke, RF.	L629-180
L6	Coil, FM RF.	L953-119
L7	Choke, .68 Microhenry	L50066-1
L8	Coil, Assembly, FM Oscillator	AS953-116
L9	Coil, AM Oscillator	L50210-28
L10	Choke, .2 Microhenry	L50066-21
L11	Choke, 3.3 Microhenry	L50066-8
PC1, 2	Printed Circuit, Tone Control	PC50187-9
S1	Switch, Selector	S1193B114
S2	Switch, Power	Part of R41
S3	Switch, Automatic Shut-off	Part of S1
T1, 2	Transformer, Output	T992-116-1
T3	Transformer, Power	T1023-115
Z1	Transformer, FM IF	ZZ662-117
Z2	Transformer, AM IF	ZZ2984
Z3	Transformer, FM IF	ZZ2987
Z4	Transformer, AM IF	ZZ2984
Z5	Coil, FM Limiter	ZZ50210-6
Z6	Transformer, FM Ratio Detector	ZZ50210-9

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.

MAIN CHASSIS • PARTS DESCRIPTION LIST

RESISTORS

Deposited Carbon, in ohms, 5% tolerance, 1/8 watt unless otherwise noted: K=Kilohms, M=Megohms.

Symbol	Description	Part No.
R1	Composition, 100K, 10%, ½W	RC20BF104K
R2	–Deleted–	– – –
R3	470K, 1/3W	R33DC474J
R4, 5	–Deleted–	– – –
R6	4.7M, 1/3W	R33DC475J
R7	1000	R12DC102J
R8, 9	1M	R12DC105J
R10	1000	R12DC102J
R11	6.8K	R12DC682J
R12	1000	R12DC102J
R13, 14	1M	R12DC105J
R15	1000	R12DC102J
R16	6.8K	R12DC682J
R17	Composition, 470K, 10%, ½W	RC20BF474K
R18	Composition, 2.2M, 1/3W	R33DC225J
R19	Composition, 4.7M, 1/3W	R33DC475J
R20	Composition, 470, 10%, ½W	RC20BF471K
R21	Composition, 47K, 10%, ½W	RC20BF473K
R22, 23	Composition, 150K, 1/3W	R33DC154J
R24	–Deleted–	– – –
R25	47K, 1/3W	R33DC473J
R26	82K, 1/3W	R33DC823J
R27	47K, 1/3W	R33DC473J
R28	82K, 1/3W	R33DC823J
R29	180K, 1/3W	R33DC184J
R30	390K, 1/3W	R33DC394J
R31	1000	R12DC102J
R32	390K, 1/3W	R33DC394J
R33	1000	R12DC102J
R34	47K	R12DC473J
R35	220	R12DC221J
R36	47K	R12DC473J
R37	220	R12DC221J
R38	Composition, 1.5K, 10%, ½W	RC20BF152K
R39	Composition, 150K, 10%, ½W	RC20BF154K
R40	Composition, 100, 10%, ½W	RC20BF101K
R41, A, B	Pot., 500K, Dual, Volume	R50160-160
R42	–Deleted–	– – –
R43	Composition, 22K, 10%, ½W	RC20BF223K
R44, 45	22K	R12DC223J
R46	Pot. 500K, Balance	R50160-161
R47	47K, 1/3W	R33DC473J
R48A, B	Pot., 500K, Dual, Tone	R50160-159
R49	47K, 1/3W	R33DC473J
R50	–Deleted–	– – –
R51, 52	Composition, 1K, 10%, ½W	RC20BF102K
R53	Composition, 18K, 10%, 1W	RC30BF183K
R54A, B	Pot., 500K, Dual, Tone	R50160-159
R55	–Deleted–	– – –
R56, 57	1000	R12DC102J
R58	Composition, 10M, 10%, ½W	RC20BF106K
R59	Composition, 8.2M, 10%, ½W	RC20BF825K
R60	Composition, 10M, 10%, ½W	RC20BF106K
R61	Composition, 8.2M, 10%, ½W	RC20BF825K
R62	Composition, 180, 10%, ½W	RC20BF181K
R63	2.2M, 1/3W	R33DC225J
R64	100K, 1/3W	R33DC104J
R65	820K	R12DC824J
R66	100K, 1/3W	R33DC104J
R67	820K	R12DC824J
R68	Composition, 27K, 10%, ½W	RC20BF273K
R69	Composition, 22M, 10%, ½W	RC20BF226K
R70	150K	R12DC154J
R71	100K	R12DC104J
R72	Composition, 100, 10%, ½W	RC20BF101K
R73	Composition, 47K, 10%, ½W	RC20BF473K
R74	Composition, 1000, 10%, ½W	RC20BF102K
R75	–Deleted–	– – –
R76	Composition, 3300, 10%, ½W	RC20BF332K
R77	3.3M	R33DC335J
R78	47K	R12DC473J
R79	Composition, 1000, 10%, ½W	RC20BF102K
R80	Glass, 3.3K, 10%, 7W	RPGW332K
R81	Composition, 1800, 10%, ½W	RC20BF182K
R82	Composition, 68K	RC20BF683K
R83	Composition, 1000, 10%, ½W	RC20BF102K
R84	Glass, 560, 10%, 3W	RPG3W561K
R85	Composition, 330, 10%, 1W	RC30BF331K
R86	Composition, 270, 5%, ½W	RC20BF271J
R87	Pot., 500, Hum Adjust	R50353-1
R88	Composition, 1500, 5%, ½W	RC20BF152J
R89	Composition, 1000, 5%, ½W	RC20BF102J
R90	470	R12DC474J
R91	Composition, 15K, 10%, ½W	RC20BF153K
R92	220	R12DC224J
R93	Composition, 820K, 10%, ½W	RC20BF824K
R94, 95	Pot., 500K, Phase Inverter	R50160-6
R96	Composition, 10M, 10%, ½W	RC20BF106K
R97, 98	470K	R12DC474J
R99	270K	R12DC274J

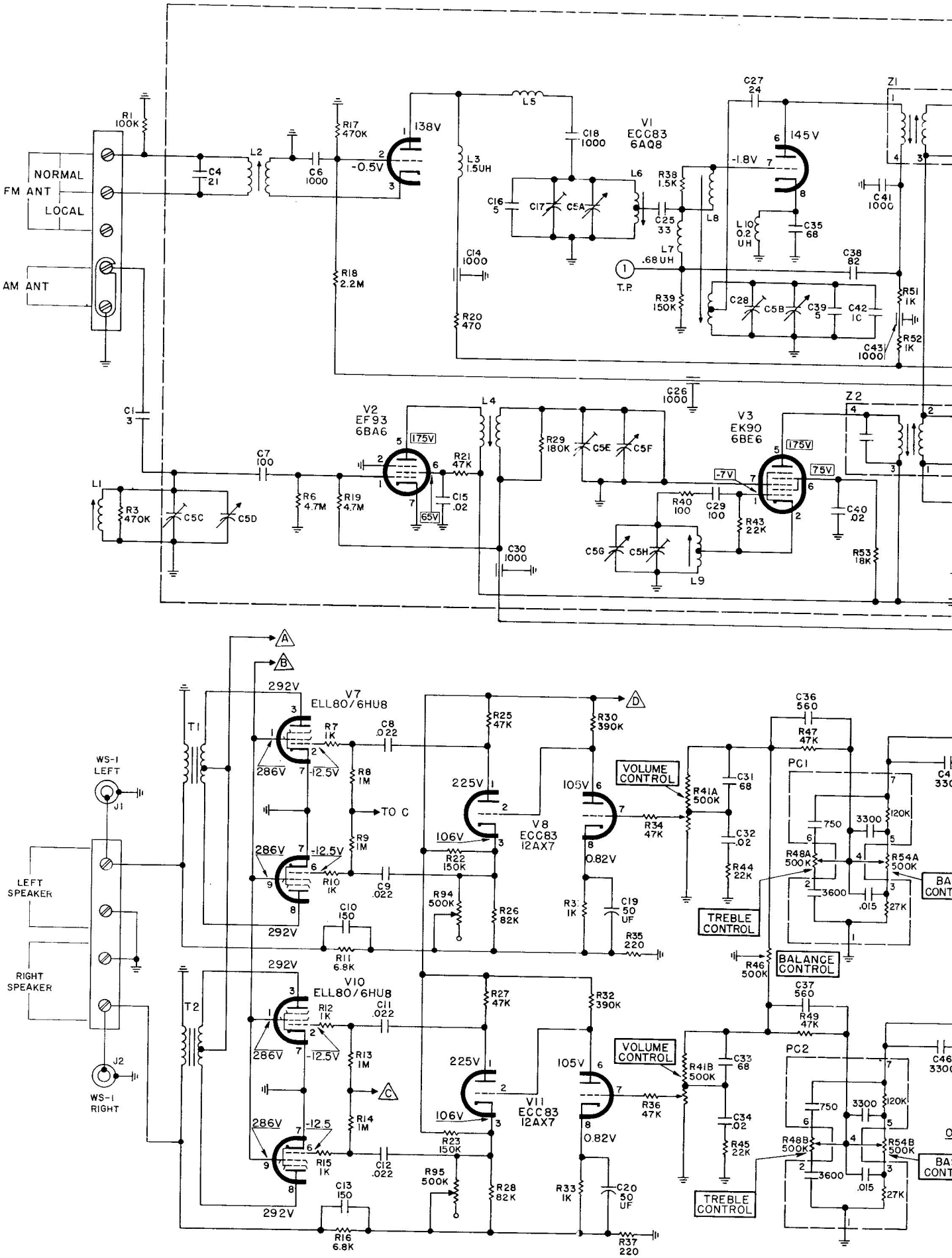
REPLACING THE DIAL LAMPS

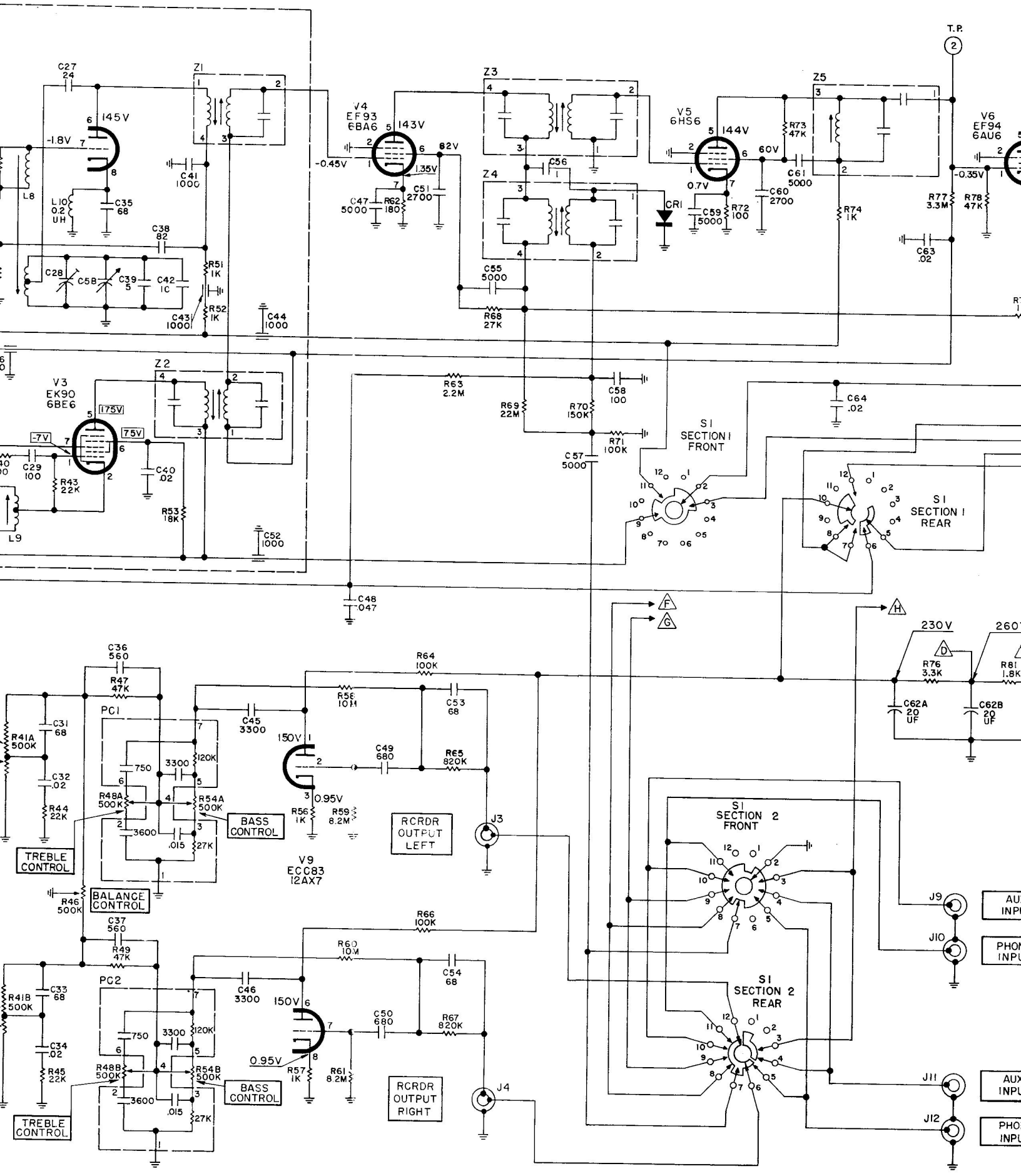
Three lamps are used. To replace any one of them, remove the composition board rear panel of the console. The lamp assemblies can then be reached from the rear of the set. Press the metal clip holding the assembly to the chassis and pull downward. Once the assembly has been removed from the chassis the lamp can be detached by turning it counterclockwise.

CAUTION: As a safety precaution, disconnect the power cord before removing the back panel of the console cabinet.

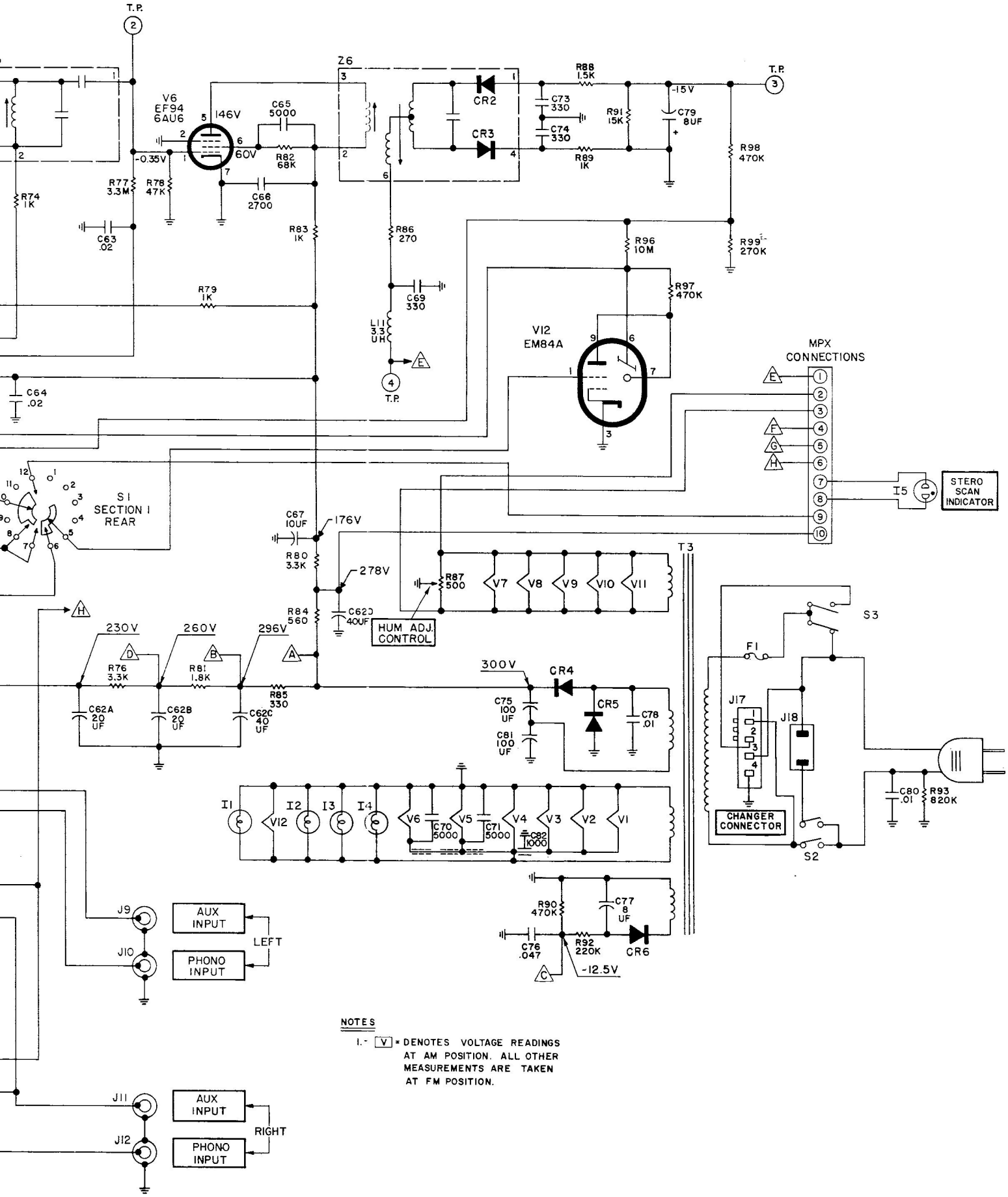
Lamps can be ordered from Fisher Radio Corporation, 21-21 44th Drive, Long Island City, New York 11101. The part number is 150009-7.

MAIN CHASSIS • SCHEMATIC





TO MODIFY ANY



NOTES

1.- [V] = DENOTES VOLTAGE READINGS AT AM POSITION. ALL OTHER MEASUREMENTS ARE TAKEN AT FM POSITION.

SERVICE NOTES

ALIGNMEN

Read These Instructions With E

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

SIGNAL GENERATORS: The signal generator equipment must be able to supply the follo
FM RF modulated 30% (±22.5 KC deviation) at 400 cps; AM RF modulated 30% at 40

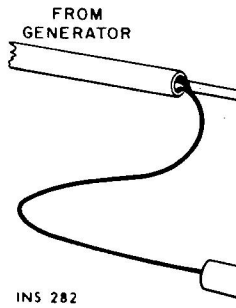
AM ALIGNMENT

FM ALIGNMENT

NOTE: For calibrating both the A

STEPS	CHASSIS			
	AM BANDWIDTH	SELECTOR	STATION SELECTOR	
1	SHARP	AM	Point of no signal and no interference	
2	BROAD	AM	Point of no signal and no interference	
3	SHARP	AM	600 KC	
4	SHARP	AM	1400 KC	
5	Repeat steps 3 and 4 for proper dial calibratio			
6		FM	Point of no signal and no interference	
7		FM	Point of no signal and no interference	
8		FM	90 MC	†
9		FM	106 MC	†
10	Repeat steps 8 and 9 for proper dial calibratio			

NOTE: For final calibration, use lowest possib



INS 282

ALIGNMENT INSTRUCTIONS

Read These Instructions With Extreme Care Before Attempting Alignment.

elector completely counterclockwise, without forcing. Dial pointer on logging scale. If not, reset the dial pointer. Disconnect the nna link. Set Ferrite Loop to normal position, parallel to rear panel. alignment, set the output level controls for no overload, as shown Connect loads to main output and turn volume control to minimum.

signal generator equipment must be able to supply the following: 5 KC deviation) at 400 cps; AM RF modulated 30% at 400 cps; AM IF with 30KC sweep for AM bandwidth adjustment.

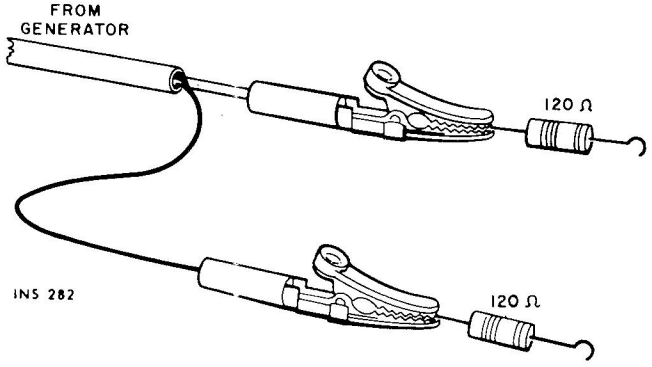
INDICATOR: DC VTVM, AC VTVM, and scope for alignment.

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; a hex tool for L1, L2, L5,6 L6, L10, Z6 and Z5. For AM alignment, short AVC lead to ground.

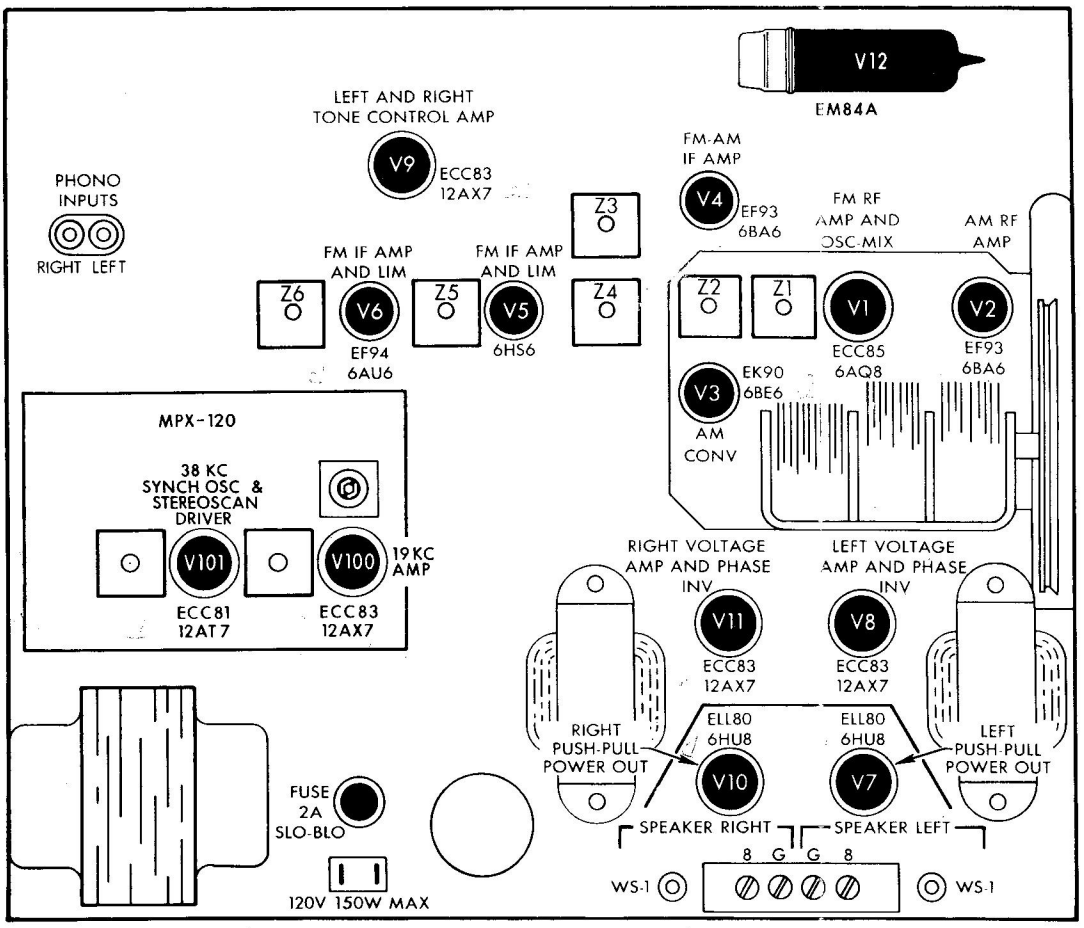
NOTE: For calibrating both the AM and FM, use as low an output voltage as possible from your signal generator.

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 to ungrounded tube shield over V3	455 KC	30% AM at 400 cps	AC VTVM to Ch. B Rec. Output	Z2, Z4, top and bottom	Maximum voltage
2	BROAD	AM	Point of no signal and no interference	AM Gen. connected to ungrounded tube shield over V3	455 KC	30 KC sweep	Scope to Ch. B 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 Ch. B Rec. Output	L10, L5, L1	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 Ch. B Rec. Output	C7H, C7E C7D	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 V1	10.7 MC	None	DC VTVM to test point 3	Z1, Z3, Z5 and Z6, top	Maximum negative voltage
7		FM	Point of no signal and no interference	FM Gen. connected to ungrounded tube shield of V1	10.7 MC	None	Connect hot lead of DC VTVM to MPX output, ground to junction of resistors (47K) connected in series from TSP3 to GND.	Z6, 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 DISTANCE.	90 MC	30% FM (22.5 KC Dev.) at 400 cps	DC VTVM to TSP3 and scope to Ch. A. Rec. output	L9, L6 and L2	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 DISTANCE.	106 MC	30% FM (22.5 KC Dev.) at 400 cps	DC VTVM to TSP3 and scope to Ch. A. Rec. output	C25, C20	Check for sine waveform and adjust for maximum negative voltage .
10	Repeat steps 8 and 9 for proper dial calibration and maximum output.								

NOTE: For final calibration, use lowest possible generator voltage.



CHASSIS LAYOUT



12AT7 =
6AU6 = 1
12AX7 = 4

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10 M