Service Manual

THE FISHER®

600-T

CHASSIS SERIAL NUMBERS
FROM 21000 to 27000

$2.00

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 this high-fidelity instrument.

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.

Transistors—Never attempt to do any work on the transistor amplifiers without first disconnecting the AC-power linecord — wait until the power supply filter-capacitors have discharged.

- Guard against shorts — it takes only an instant for a base-to-collector short to destroy that transistor and possibly others direct-coupled to it. [In the time it takes for a dropped machine screw, washer or even the screwdriver, to glance off a pair of socket terminals (or between a terminal and the chassis) a transistor can be ruined.]
- DO NOT bias the base of any transistor to, or near, the same voltage applied to its collector.
- DO NOT use an ohmmeter for testing transistors. The voltage applied through the test probes may be higher than the base-emitter breakdown voltage of the transistor.

Output Stage and Driver—Replacements for output and driver transistors, if necessary, must be made from the same beta group as the original type. The beta group is indicated by a colored dot on the mounting flange of the transistor. Be sure to include this information, when ordering replacement transistors.

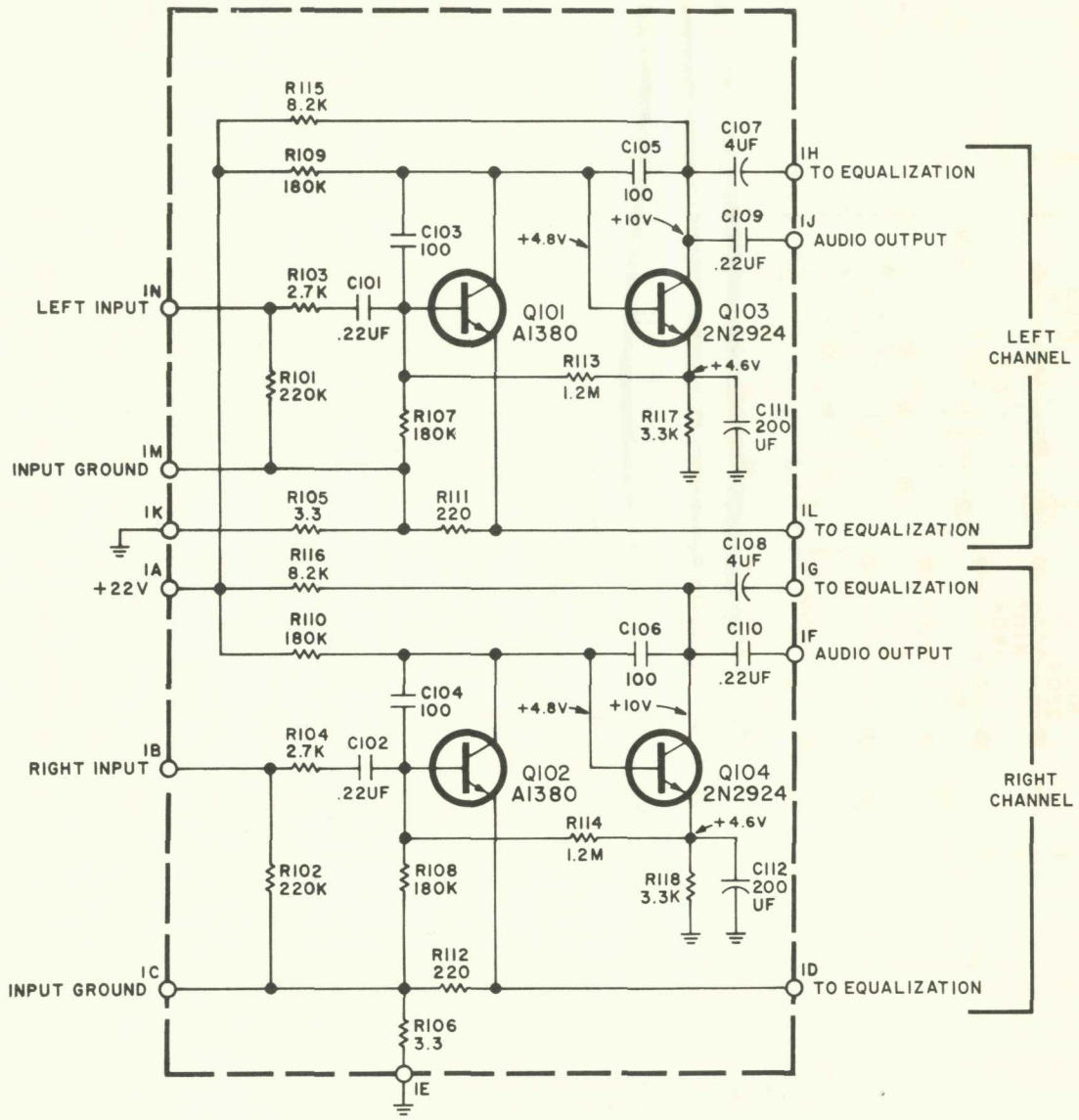
- If one output transistor burns out (open or shorts), always remove all output transistors in that channel and check the bias adjustment, the control and other parts in the network with an ohmmeter before inserting a new transistor. All output transistors in one channel will be destroyed if the base-biasing circuit is open on the emitter end.
- When mounting a replacement power transistor be sure the bottom of the flange, the mica insulator and the surface of the heat sink are free of foreign matter. Dust and grit can prevent perfect contact. This reduces heat transfer to the heat sink. Metallic particles can puncture the insulator and cause shorts — ruining the transistor.
- Silicone grease must be used between the transistor and the mica insulator and between the mica and the heat sink for best heat conduction. Heat is the greatest enemy of electronic equipment. It can shorten the life of transistors, capacitors and resistors. (Use Dow-Corning DC-3 or C20194 or equivalent compounds made for power transistor heat conduction.)
- 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.

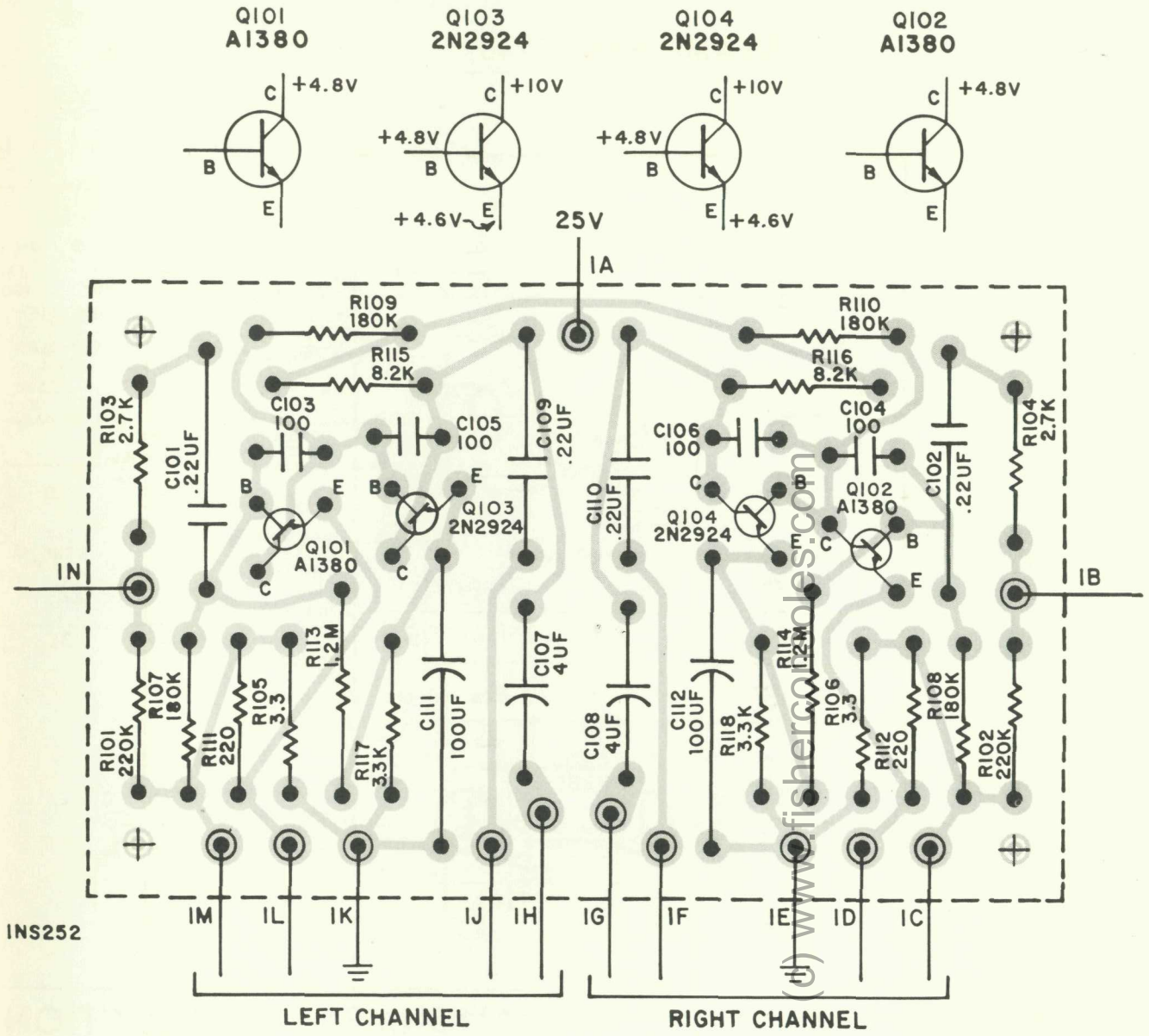
SCHEMATIC DIAGRAM

PREAMPLIFIER (P1240)



AW# 2293 A

P 1240 PRINTED-CIRCUIT LAYOUT

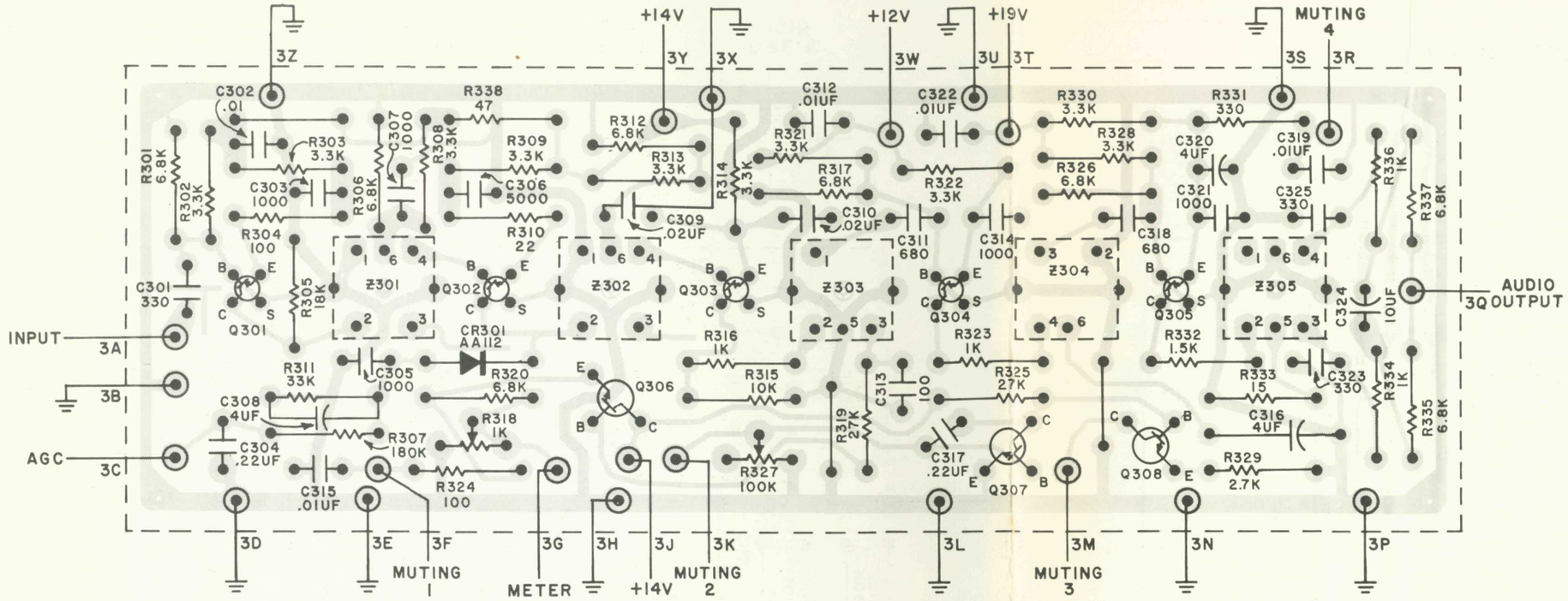


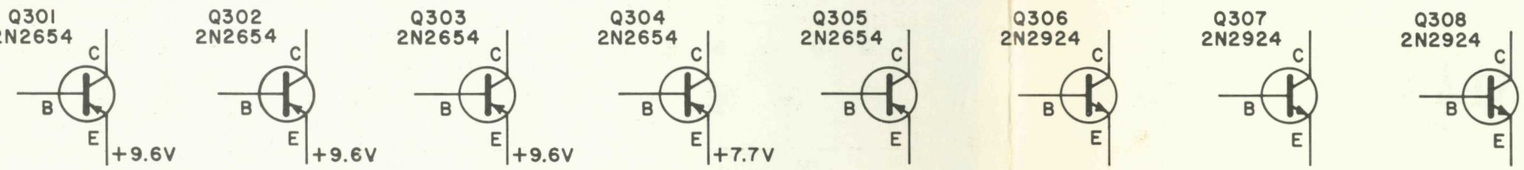
INS252

PARTS DESCRIPTION LIST

Symbol	Description	Part No.	Symbol	Description	Part No.
R101	Resistor, 220K	R12DC224J	C101	Capacitor, .22UF/160V	C50B575-3
R102	Resistor, 220K	R12DC224J	C102	Capacitor, .22UF/160V	C50B575-3
R103	Resistor, 2.7K	R12DC272J	C103	Capacitor, 100/±10%	C50B568-3
R104	Resistor, 2.7K	R12DC272J	C104	Capacitor, 100/±10%	C50B568-3
R105	Resistor, 3.3	R12DC3R3J	C105	Capacitor, 100/±10%	C50B568-3
R106	Resistor, 3.3	R12DC3R3J	C106	Capacitor, 100/±10%	C50B568-3
R107	Resistor, 180K	R12DC184J	C107	Capacitor , 4UF/35V	C50483-1
R108	Resistor, 180K	R12DC184J	C108	Capacitor , 4UF/35V	C50483-1
R109	Resistor, 180K	R12DC184J	C109	Capacitor, .22UF/160V	C50575-3
R110	Resistor, 180K	R12DC184J	C110	Capacitor, .22UF/160V	C50575-3
R111	Resistor, 220	R12DC221J	C111	Capacitor , 100UF/15V	C50483-5
R112	Resistor, 220	R12DC221J	C112	Capacitor , 100UF/15V	C50483-5
R113	Resistor, 1.2M	R33DC125J	Q101	Transistor	A1380
R114	Resistor, 1.2M	R33DC125J	Q102	Transistor	A1380
R115	Resistor, 8.2K	R12DC822J	Q103	Transistor	2N2924
R116	Resistor, 8.2K	R12DC822J	Q104	Transistor	2N2924
R117	Resistor, 3.3K	R12DC332J	——	Transistor Spacer	E50A624
R118	Resistor, 3.3K	R12DC332J	——	Printed Circuit Board	PB1240

1254 IF AMPLIFIER





INS 292

ALIGNMENT INSTRUCTIONS

IF ALIGNMENT (General Maintenance)

Set selector switch to FM MONO. MONO pushbutton depressed. HIGH FILTER, LOW FILTER and MUTING switches "OFF" (out position). VOLUME to lowest output (maximum CCW) position.

1—Connect sweep generator output to the insulation of wire connected to front-end TP #1. Connect scope input and DC VTVM (through diode probe — Fig. 1) to lead to collector of Q303, and ground.

NOTE: The connection between the lead of the 1K resistor and the diode probe **must** be as short as possible.

2—Adjust top and bottom slugs of Z1 (front end) for maximum gain and a symmetrical curve (Fig. 2). Keep generator output as low as possible.

3—Connect scope input to the left or right RCDR output jack. Ratio detector curve should be like that in Fig. 3.

IF ALIGNMENT (After part replacement)

Use same switch positions as above.

1—Connect 10.7 mc generator output lead to the collector of Q303. DO NOT use AM or FM modulation.

2—Connect DC VTVM across C325 (ratio-detector filter). Use 100K resistor in series with each lead — DO NOT ground VTVM.

3—Adjust Z303, Z304 bottom cores and Z305 top and bottom cores for maximum DC VTVM reading. Readjust generator output during alignment to keep DC VTVM reading between 4 and 5.5 volts.

4—Connect DC VTVM and scope to diode probe (as in Step 1 — General Maintenance alignment, above).

5—Connect sweep generator to point 3B of IF amplifier board. Adjust top and bottom cores of Z301 and Z302, and bottom core of Z303 for maximum gain and a symmetrical curve. (Figure 2.) Adjust generator output during alignment to keep DC VTVM reading between —0.5 and —2 volts.

6—Connect sweep-generator output lead to the insulation of the wire going to TP-1 (front end). Adjust top and bottom cores of Z1 for maximum gain and a symmetrical curve on scope. Generator output must be adjusted during alignment to keep DC VTVM readings between —0.5 and —1.5 volts. IF response curve should now be like that in Figure 4.

7—Connect scope vertical input to point M1 on the IF-amplifier board and adjust the top core of Z303 for maximum gain and curve like that in Figure 5.

FM FRONT-END ALIGNMENT

NOTE: This step is not necessary unless the circuitry has been disturbed or components replaced.

1—Connect DC VTVM to point M1 on the IF board FM-signal generator (with two 120-ohm composition resistors in series with the leads) to the 300-ohm antenna terminals.

2—Set generator and tuner dials to 90 mc. Adjust the oscillator coil (L5) slug first — then adjust RF coils (L3 and L4) for maximum VTVM reading.

3—Set generator and tuner dials to 106 mc. First adjust the oscillator trimmer (C14) and then the RF trimmers (C5 and C7).

4—Repeat steps 2 and 3 several times until calibration is accurate when VTVM reading is maximum. Use as little generator output as possible.

5—Set generator and tuner dials to 98 mc. Adjust antenna coil (L2) for maximum DC VTVM reading.

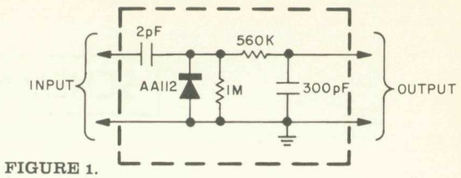


FIGURE 1.

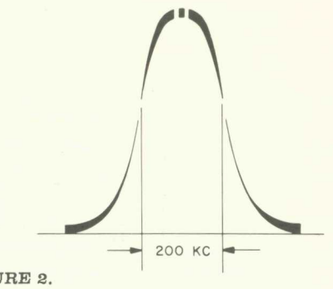


FIGURE 2.

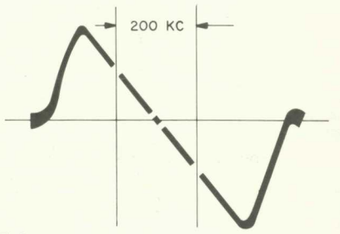


FIGURE 3.

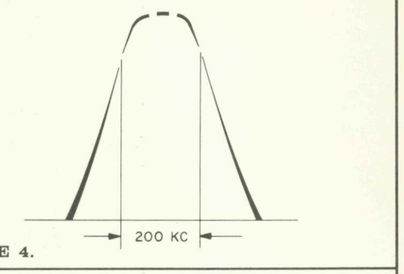


FIGURE 4.

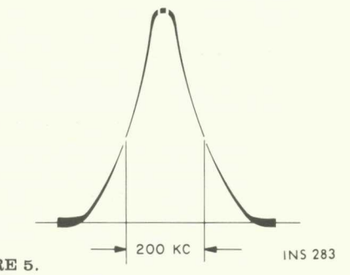


FIGURE 5.

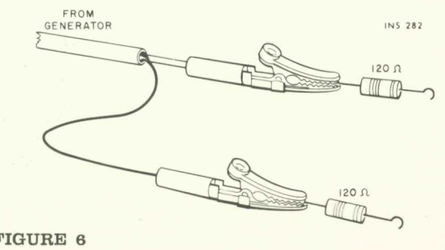
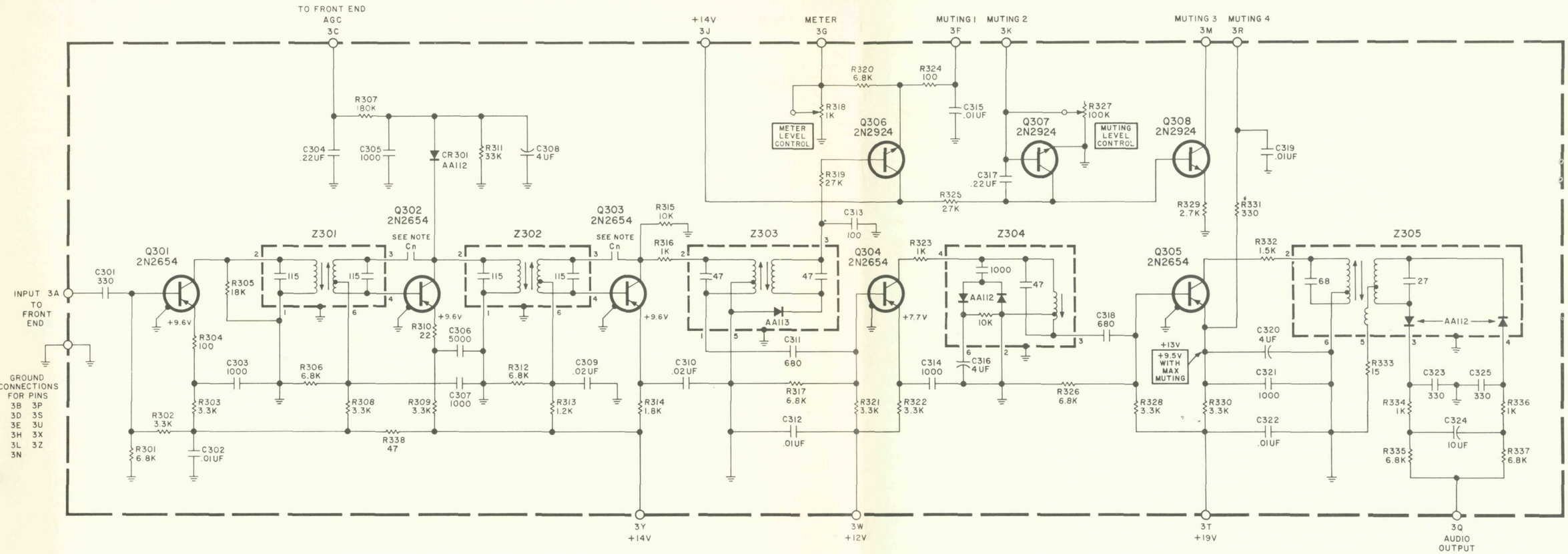


FIGURE 6

P1254 IF AMPLIFIER



NOTE:
CAPACITORS LABELLED Cn CONSIST OF 2 PARALLEL STRIPS ON THE PRINTED CIRCUIT BOARD.

P1254
AW#2354C

PARTS DESCRIPTION LIST

PB 1254

CAPACITORS

Symbol	Description	Part No.
C301	Ceramic, 330pF, 10%, 1000V	C50569-1
C302	Ceramic, .01uF, +80—20%, 1000V	C50570-1
C303	Ceramic, 1000pF, 20%, 1000V	C50569-4
C304	Mylar, .22uF, 10%, 250V	C50575-2
C305	Ceramic, 1000pF, 20%, 1000V	C50569-4
C306	Ceramic, 5000pF, 20%, 500V	C50567-2
C307	Ceramic, 1000pF, 20%, 1000V	C50569-4
C308	Electrolytic, 4uF, 35V	C50483-1
C309	Ceramic, .02uF, +80—20%, 100V	C50073-1
C310	Ceramic, .02uF, +80—20%, 100V	C50570-2
C311	Ceramic, 680pF, 10%, 1000V	C50569-2
C312	Ceramic, .01uF, +80—20%, 1000V	C50570-1
C313	Ceramic, 100pF, 10%, N1500, 1000V	C50568-3
C314	Ceramic, 1000pF, 20%, 1000V	C50569-4
C315	Ceramic, .01uF, +80—20%, 1000V	C50570-1
C316	Electrolytic, 4uF, 35V	C50483-1
C317	Mylar, .22uF, 10%, 250V	C50575-2
C318	Ceramic, 680pF, 10%, 1000V	C50569-2
C319	Ceramic, .01uF, +80—20%, 1000V	C50570-1
C320	Electrolytic, 4uF, 35V	C50483-1
C321	Ceramic, 1000pF, 20%, 1000V	C50569-4
C322	Ceramic, .01uF, +80—20%, 1000V	C50570-1
C323	Ceramic, 330pF, 10%, 1000V	C50569-1
C324	Electrolytic, 10uF, 35V	C50483-2
C325	Ceramic, 330pF, 10%, 1000V	C50569-1

RESISTORS AND POTENTIOMETERS

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

Symbol	Description	Part No.
R301	6.8K	R12DC682J
R302, 303	3.3K	R12DC332J
R304	100	R12DC101J
R305	18K	R12DC183J
R306	6.8K	R12DC682J
R307	180K	R12DC184J
R308, 309	3.3K	R12DC332J
R310	22	R12DC220J
R311	33K	R12DC333J
R312	6.8K	R12DC682J
R313	1.2K	R12DC122J
R314	1.8K	R12DC182J
R315	10K	R12DC103J
R316	1K	R12DC102J
R317	6.8K	R12DC682J
R318	Potentiometer, 1K, 30%, Meter Level	R50694-3
R319	27K	R12DC273J
R320	6.8K	R12DC682J
R321, 322	3.3K	R12DC332J
R323	1K	R12DC102J
R324	100	R12DC101J
R325	27K	R12DC273J
R326	6.8K	R12DC682J
R327	Potentiometer, 100K, 30%, Muting Level	R50694-6
R328	3.3K	R12DC332J
R329	2.7K	R12DC272J
R330	3.3K	R12DC332J
R331	330	R12DC331J
R332	1.5K	R12DC152J
R333	15	R12DC150J
R334	1K	R12DC102J
R335	6.8K	R12DC682J
R336	1K	R12DC102J
R337	6.8K	R12DC682J
R338	47	R12DC470J

MISCELLANEOUS

Symbol	Description	Part No.
CR301	Diode, A112	V50260-16
Q301, 302, 303	Transistor, 2N2654	TR2N2654
Q304, 305	Transistor, 2N2654	TR2N2654
Q306, 307, 308	Transistor, 2N2924	TR2N2924
Z301, 302	Transformer, IF	ZZ50210-46
Z303	Coil, Limiter	ZZ50210-69
Z304	Coil, Limiter	ZZ50210-52
Z305	Transformer, Ratio Detector	ZZ50210-55

AUDIO AMPLIFIER

Control Positions for Tests

1—Unplug unit from AC-power line.

2—Set **Balance**, **Bass** and **Treble** controls to their center positions.

Press **Monitor** pushbutton in. Set **Speaker** selector to position 1. **Hi-Filter** and **Low-Filter** switches out. **Selector** switch to **AUX**. **Mono** switch in the out position. The impedance selector (on the rear apron of chassis) is to be set to the 8-16 ohms position.

Output Stage Balancing and IM Distortion Measurements

1—Connect an 8-ohm, 50-watt resistor across the left output terminals. In parallel to the load resistor connect the input leads of an IM (Inter-Modulation) distortion analyzer and the leads of a DC VTVM capable of reading 0.1 volt with accuracy.

2—Connect IM-analyzer generator output to the left **Monitor** input.

3—Apply AC power and rotate **Volume** control to its maximum clockwise position—full volume.

4—Increase signal input to amplifier for 40-watts output. (14.7 VAC across 8-ohm load resistor). After one full minute of warm-up time proceed to next step. ***The warm-up time is very important (to get proper balance) — the characteristics of the transistors change slightly as their internal temperature rises. A longer warm-up time will not damage the transistors. Once they are warm the tests and adjustments should be completed without delay — before they can cool off.***

5—Reduce IM-analyzer generator output for 5 watts output from amplifier (5.16 VAC across load).

6—Adjust P1 and P2 (P3 and P4 for right channel) for minimum IM distortion and zero DC voltage across the load. (IM distortion should be less than 0.8% and DC voltage lower than ±0.1 volts across the 8-ohm load. Use two screwdrivers to adjust the controls—it's faster than shifting from one control to the other.)

7—Increase signal input for 40 watts output from amplifier. IM reading should be less than 1% — DC across load should be less than ±0.3 volt.

REPEAT steps 1 through 7 (above) for **right**-channel tests.

NOTE—If any of the above instructions are different from those supplied with the IM analyzer instruction manual, it is best to follow those in the manual. If a load resistor of 50-watts rating is built into the IM analyzer, a separate load resistor is not required for the channel under test — one should be wired across the other channel as a precaution. For best results the IM range switch should be set to give a reading in the center to full-scale portion of the meter scale — this gives greater accuracy.

Harmonic Distortion Test

1—Set amplifier controls to positions indicated above (control positions).

2—Connect an audio (sine-wave) generator to the **left** AUX input. Connect the harmonic-distortion analyzer to the left speaker #1 terminals across an 8-ohm, 50-watt resistive load.

3—Apply AC power — rotate **Volume** control to its maximum clockwise position.

4—Set the frequency control of the audio generator to 20 cycles. Adjust the output level for 40 watts (17.9 VAC) across the 8-ohm load. Harmonic distortion should be less than 1%.

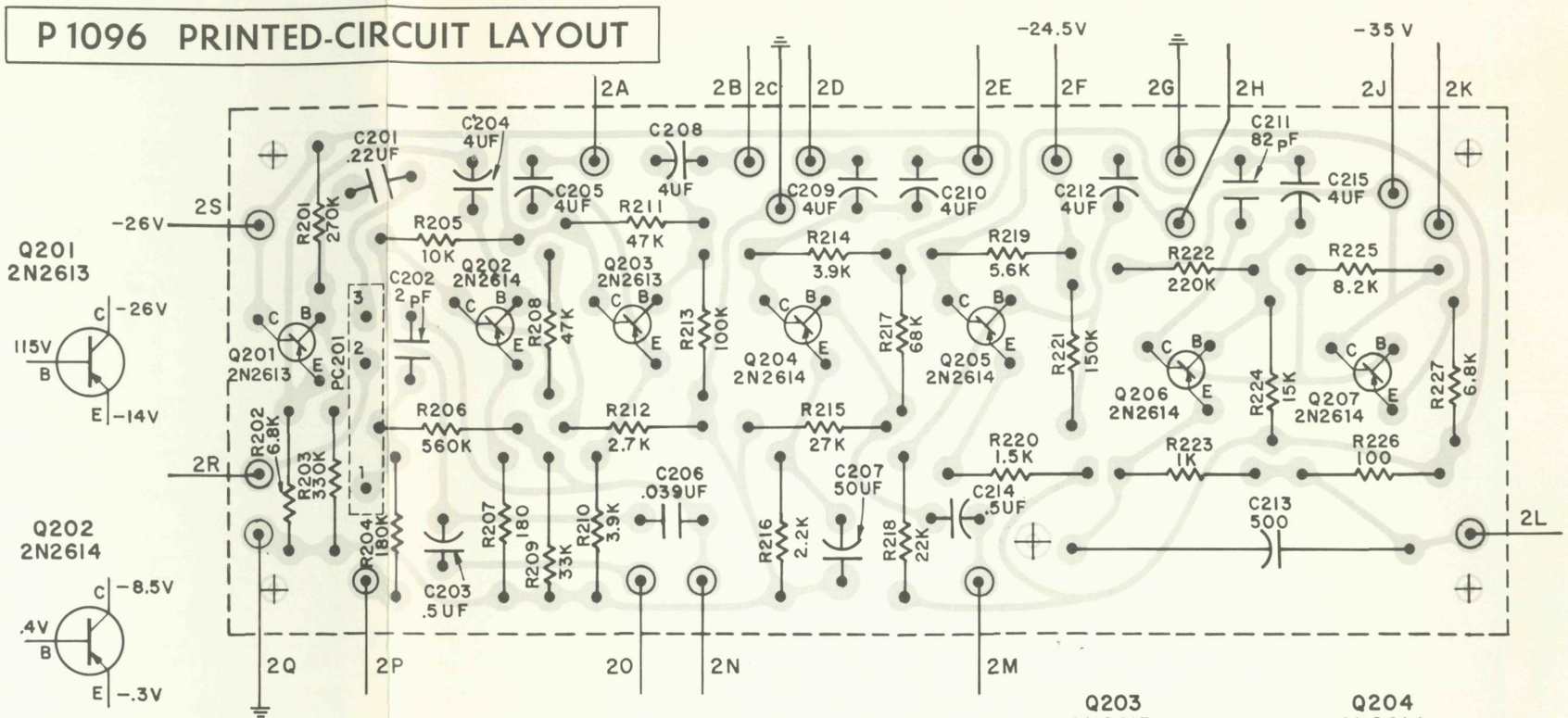
REPEAT steps above for **right**-channel harmonic-distortion measurements.

Stability Test

1—Connect audio (sine-wave) generator to the **left** AUX input. Across the **left**-speaker terminals connect an 8-ohm, 50-watt load resistor and the vertical-input leads of an oscilloscope.

2—Set amplifier controls to positions listed above (control positions).

P 1096 PRINTED-CIRCUIT LAYOUT



3—Apply AC power—rotate **Volume** control to its maximum clockwise positions — full volume.

4—Set the frequency control of the audio generator to 20 cycles. Increase the output level of the audio generator until the sine waves, as viewed on the scope, start to distort — the peaks are clipped from overdriving the amplifier. Check waveforms on scope for instability — changes in wave shape or oscillation (thicker line at a portion of the waveform).

5—Repeat the above steps using a 0.1-uf capacitor as a load. Remove the 8-ohm resistor.

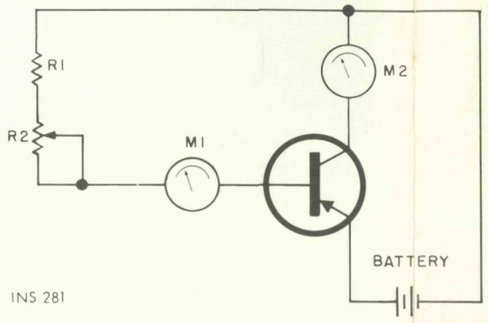
REPEAT steps 1 through 5, above, for the **right** stereo channel.

Transistor Testing

If a power-transistor tester is not available the circuit in Figure can be used to determine the DC beta of the transistors. This is not a complete test of the transistor.

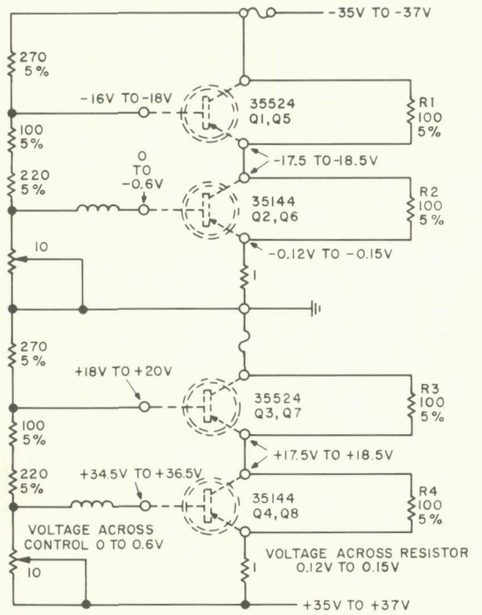
OPERATION: Connect the transistor to the test circuit. Adjust R2 for a 0.5-ampere reading on M2 in the collector circuit. The DC beta is then calculated by: $\text{DC beta} = \frac{\text{reading of M2}}{\text{reading of M1}}$

The DC beta should be between 50 and 250.



INS 281

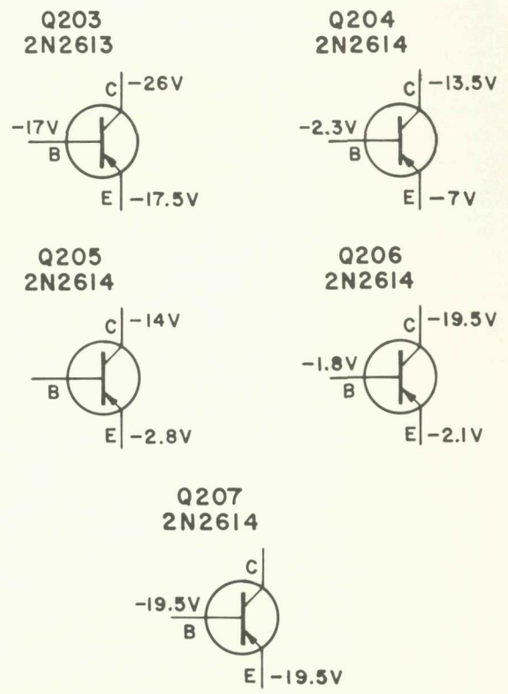
Voltage tests can be made with safety — without ruining transistors — by substituting resistors for the emitter-collector circuit of the power transistors. Voltages and resistor values are given



INS 284

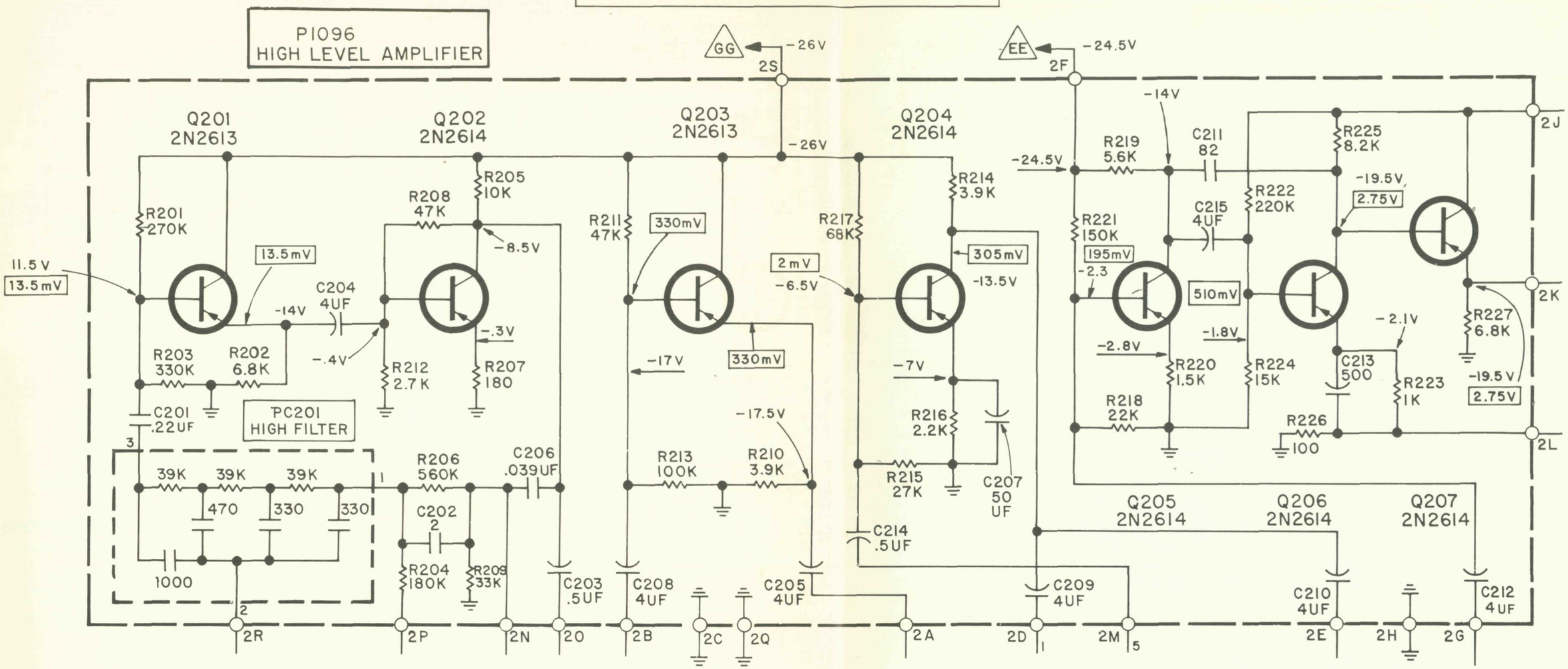
NOTES:

1. VALUES MEASURED WITH DCVTVM TO GROUND, UNLESS OTHERWISE SPECIFIED.



Output Stage and Driver—Replacements for output and driver transistors, if necessary, must be made from the same beta group as the original type. The beta group is indicated by a colored dot on the mounting flange of the transistor. Be sure to include this information, when ordering replacement transistors.

P1096 SCHEMATIC DIAGRAM



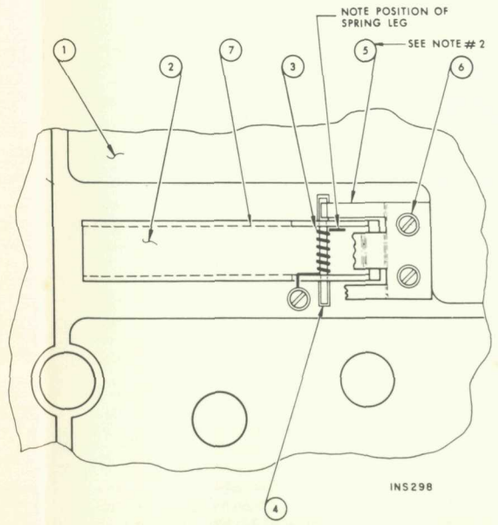
PARTS DESCRIPTION LIST

Symbol	Description	Part No.
R201	Resistor, 270K	R12DC274J
R202	Resistor, 6.8K	R12DC682J
R203	Resistor, 330K	R12DC334J
R204	Resistor, 180K	R12DC184J
R205	Resistor, 10K	R12DC103J
R206	Resistor, 560K	R12DC564J
R207	Resistor, 180	R12DC181J
R208	Resistor, 47K	R12DC473J
R209	Resistor, 33K	R12DC333J
R210	Resistor, 3.9K	R12DC392J
R211	Resistor, 47K	R12DC473J
R212	Resistor, 2.7K	R12DC272J
R213	Resistor, 100K	R12DC104J
R214	Resistor, 3.9K	R12DC392J
R215	Resistor, 27K	R12DC273J
R216	Resistor, 2.2K	R12DC222J
R217	Resistor, 68K	R12DC683J
R218	Resistor, 22K	R12DC223J
R219	Resistor, 5.6K	R12DC562J
R220	Resistor, 1.5K	R12DC152J
R221	Resistor, 150K	R12DC154J
R222	Resistor, 220K	R12DC224J
R223	Resistor, 1K	R12DC102J
R224	Resistor, 15K	R12DC153J
R225	Resistor, 8.2K, ½ W	RC20BF822J
R226	Resistor, 100	R12DC101J
R227	Resistor, 6.8K, ½ W	RC20BF682K

Symbol	Description	Part No.
C201	Capacitor, .22uF, 250V	C50B575-2
C202	Capacitor, 2	C50B568-1
C203	Capacitor, .5uF, 70V	C50483-11
C204	Capacitor*, 4uF, 35V	C50483-1
C205	Capacitor*, 4uF, 35V	C50483-1
C206	Capacitor, .039uF	C50B575-4
C207	Capacitor*, 50uF, 10V	C50483-15
C208	Capacitor*, 4uF, 35V	C50483-1
C209	Capacitor*, 4uF, 35V	C50483-1
C210	Capacitor*, 4uF, 35V	C50483-1
C211	Capacitor, 82	C50B568-2
C212	Capacitor*, 10uF, 35V	C50483-2

Symbol	Description	Part No.
C213	Capacitor, 500uF, 10V	C50483-9
C214	Capacitor, .5uF, 70V	C50483-11
C215	Capacitor*, 10uF, 35V	C50483-2
Q201	Transistor	2N2613
Q202	Transistor	2N2614
Q203	Transistor	2N2613
Q204	Transistor	2N2614
Q205	Transistor	2N2614
Q206	Transistor	2N2614
Q207	Transistor	2N2614
PC201	Printed Circuit, Hi-Filter	PC50B187-13
——	Printed Circuit Board	PB1096
——	Transistor Spacer	E50A624

*Electrolytic type



Symbol	Description	Part No.
1	Dress Panel	A946C205H
2	Door, Nameplate	A946C215B
3	Spring, Return	A946B208
4	Pivot Pin	A946A210
5	Catch, Door	A946B209
6	Screw, Binding HD	H181S110AA
7	Insert, Nameplate	N50590D

NOTE 1 — Pivot pin (4), return spring (3) and door nameplate (2) must be assembled before they are put into place in dress panel.

NOTE 2 — Position legs of door catch (5) in dress panel slots before inserting screws (6) in mounting holes.

1249-2 MULTIPLEX DECODER

MULTIPLEX DECODER TESTS

- Modulate FM generator with 19 kc, ±6.5 kc deviation. (Use external modulation if necessary.)
- Connect the FM generator output to the antenna terminals of the unit under test.
- With the FM generator set for an output of 25 uV at the antenna terminals the stereo indicator should light up. If the generator output is reduced to 5 uV, at the antenna terminals, the indicator light should remain ON.
- Reduce FM generator output to zero and the indicator light should go OFF.
- If the stereo indicator light does not respond properly to the tests above, readjust the trigger control (R401) until the stereo indicator lamp just turns ON with a 4 uV signal applied to the antenna terminals.

PREFERRED ALIGNMENT INSTRUCTIONS

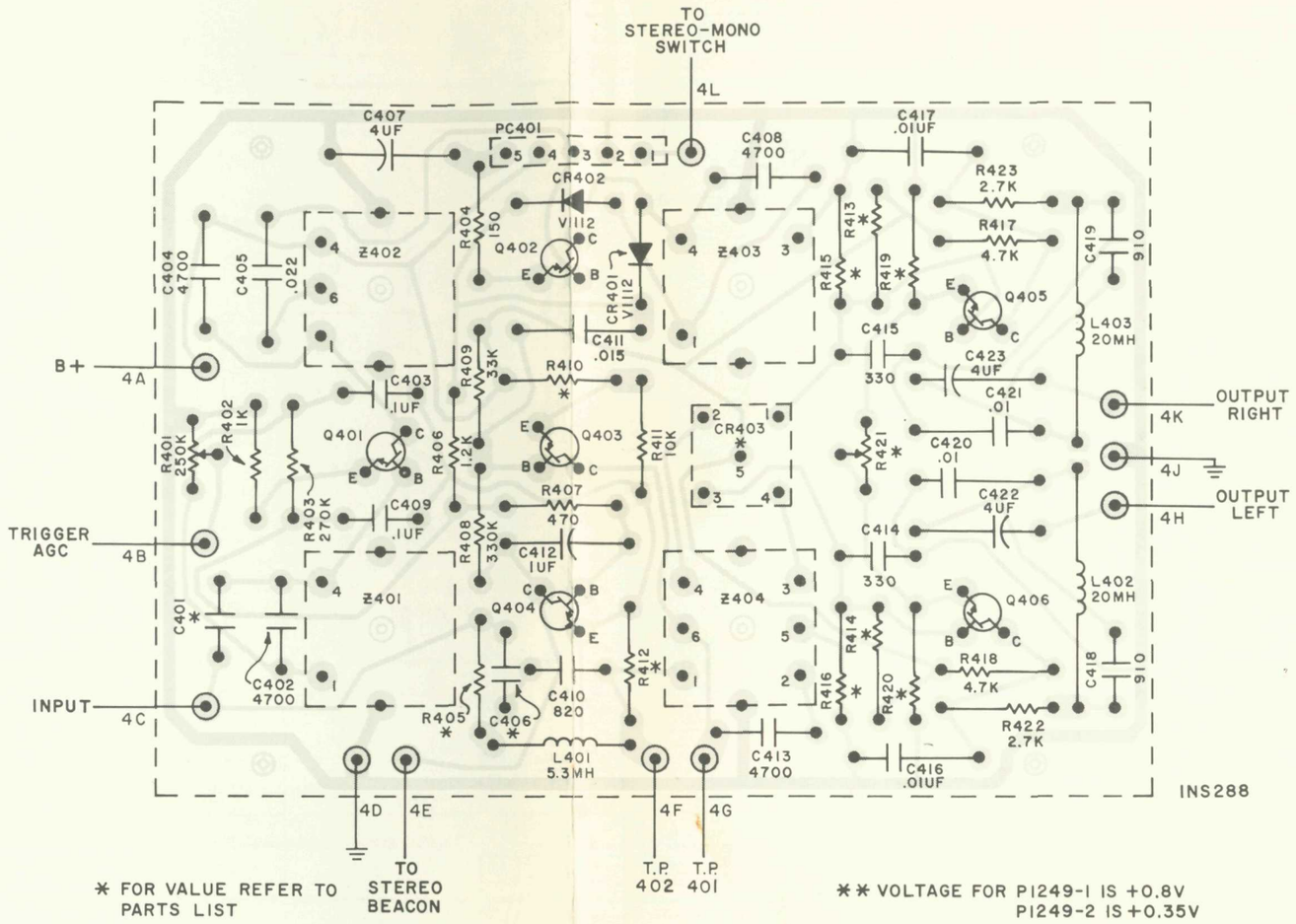
(Using multiplex generator with RF and 19 kc outputs and with 1 kc modulation)

In Table 1, below, a multiplex generator with an RF output is used. This is the better method of alignment since the multiplex circuitry is connected to the tuner with which it will be used. Check the alignment of the IF stages before making multiplex adjustments. Poor IF alignment can make proper multiplex operation impossible.

This table is based on the FISHER Model 300 multiplex generator. Another alignment procedure, for MPX generators without an RF output, is shown in Table 2.

TEST EQUIPMENT: Multiplex Generator, Audio (AC) Vacuum-Tube Voltmeter (RMS type preferred), Vacuum-Tube Voltohmeter (DC VOM), Oscilloscope (100 kc minimum) with external sweep input.

WARNING: Use only the proper alignment tool to prevent core breakage.



* FOR VALUE REFER TO PARTS LIST

** VOLTAGE FOR P1249-1 IS +0.8V
P1249-2 IS +0.35V

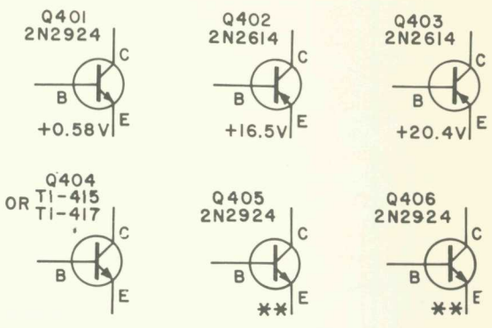


FIGURE 1. Multiplex-alignment hi-pass filter circuit.

ALTERNATE ALIGNMENT INSTRUCTIONS

(For multiplex generators without an RF output)

Disconnect the ratio detector from the multiplex unit before using this procedure. A low-pass filter (Figure 2) is used between the MPX generator output and the input to the multiplex circuitry. It has about the same loading effect as the output of the ratio detector in the tuner.

TABLE 1

MULTIPLEX-GENERATOR RF OUTPUT CONNECTED TO ANTENNA TERMINALS

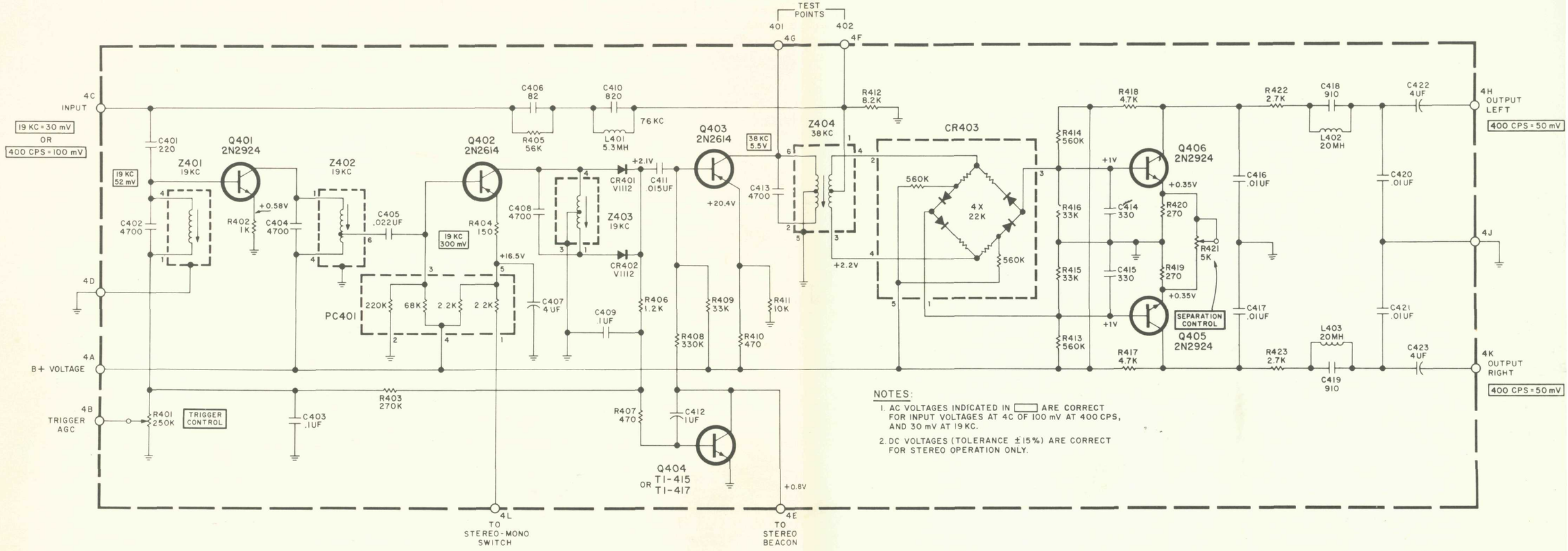
STEP	GENERATOR MODULATION	RF DEV.	INDICATOR TYPE AND CONNECTION	ALIGNMENT	
				ADJUST	INDICATION
1	70 to 76 kc (connect external audio generator to SCA input of multiplex generator.)	±25kc	Audio (AC) VTVM input to TP402 with a 10 pF capacitor in series with lead.	--	Read minimum AC voltage between 70 and 76 kc.
2	19 kc pilot only	±6.5	DC VTVM to TP401	Z401, 402, 403 and 404	Maximum AC voltage (38 kc)
3	Composite MPX signal 1 kc on left channel only	±75kc	Audio (AC) VTVM and oscilloscope vertical input to left channel output lug (4H)	Z402	Maximum AC voltage with clean 1 kc sine wave on oscilloscope
4	Composite MPX signal 1 kc on right channel only	±75kc	Same as Step 3	MPX Separation Control (R421)	Minimum reading on Audio (AC) VTVM--should be at least 35db below reading obtained in Step 3.
5	Same as Step 4	±75kc	Audio (AC) VTVM and oscilloscope vertical input to right channel output lug (4K)	--	Same Audio (AC) VTVM reading as obtained in Step 3 (±2db); clean 1kc sine wave on scope.
6	Same as Step 4	±75kc	Same as Step 5		Minimum reading on Audio (AC) VTVM should be at least 35db below reading in Step 5.

TABLE 2

COMPOSITE OUTPUT OF MULTIPLEX GENERATOR CONNECTED TO INPUT OF MPX DECODER THROUGH LOW-PASS FILTER

STEP	GENERATOR MODULATION	LEVEL (RMS)	INDICATOR TYPE AND CONNECTION	ALIGNMENT	
				ADJUST	INDICATION
1	70 to 76 kc.	100mV	Audio (AC) VTVM input to TP402 with a 10 pF capacitor in series with lead.	—	Read minimum AC voltage between 70 and 76 kc.
2	19 kc pilot only	50mV	DC VTVM to TP401	Z401, 402, 403 and 404	Maximum AC voltage (38 kc)
3	Composite MPX signal 1 kc on left channel only	300mV	Audio (AC) VTVM and oscilloscope vertical input to left channel output lug (4H)	Z402	Maximum AC voltage with clean 1 kc sine wave on oscilloscope
4	Composite MPX signal 1 kc on right channel only	300mV	Same as Step 3	MPX Separation Control	Minimum reading on Audio (AC) VTVM--should be at least 35db below reading obtained in Step 3.
5	Same as Step 4	300mV	Audio (AC) VTVM and oscilloscope vertical input to right channel output lug	—	Same Audio (AC) VTVM reading as obtained in Step 3 (±2db); clean 1kc sine wave on scope.
6	Same as Step 4	300mV	Same as Step 5	—	Minimum reading on Audio (AC) VTVM should be at least 35db below reading obtained in Step 5.

P 1249 MULTIPLEX DECODER



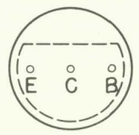
NOTES:

1. AC VOLTAGES INDICATED IN ▭ ARE CORRECT FOR INPUT VOLTAGES AT 4C OF 100 mV AT 400 CPS, AND 30 mV AT 19 KC.
2. DC VOLTAGES (TOLERANCE ±15%) ARE CORRECT FOR STEREO OPERATION ONLY.

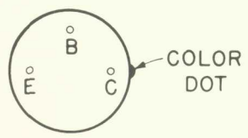
P1249-2
AW#2341B

TI 415
TI 417

2N2924
2N2925



2N2613
2N2614



INS 305

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.
C401	†Ceramic, 68, 5%, N220	C50568-5
	*Ceramic, 220, 5%, N1500	C50568-6
C402	Mica, Silver, 4700, 5%, 100VDC	C50571-2
C403	Mylar, 0.1uF, 20%, 250V	C50635-1
C404	Polystyrene, 4700, 5%, 33V	C50636-23
C405	Mylar, .022uF, 100V	C50574-7
C406	Ceramic, 15, P100, 1000V	C50568-14
C407	Electrolytic, 4uF, 35V	C50483-1
C408	Polystyrene, 4700, 5%, 33V	C50636-23
C409	Mylar, 0.1uF, 20%, 250V	C50635-1
C410	Polystyrene, 220, 5%, 33V	C50636-3
C411	Mylar, .015uF, 100V	C50574-2
C412	Electrolytic, 1uF, 70V	C50483-16
C413	Polystyrene, 4700, 5%, 33V	C50636-23
C414, 415	Polystyrene, 330, 5%, 33V	C50636-4
C416, 417	Mylar, .01uF, 5%, 100V	C50574-1
C418, 419	Polystyrene, 910, 5%, 33V	C50636-6
C420, 421	Mylar, .01uF, 5%, 100V	C50574-1
C422, 423	Electrolytic, 4uF, 35V	C50483-1
C424	Polystyrene, 120, 5%, 33V	C50636-8

†Used on PB1249-1 Board—(Tube-type IF Amplifiers)
*Used on PB1249-2 Board—(Transistor-type IF Amplifiers)

RESISTORS AND POTENTIOMETERS

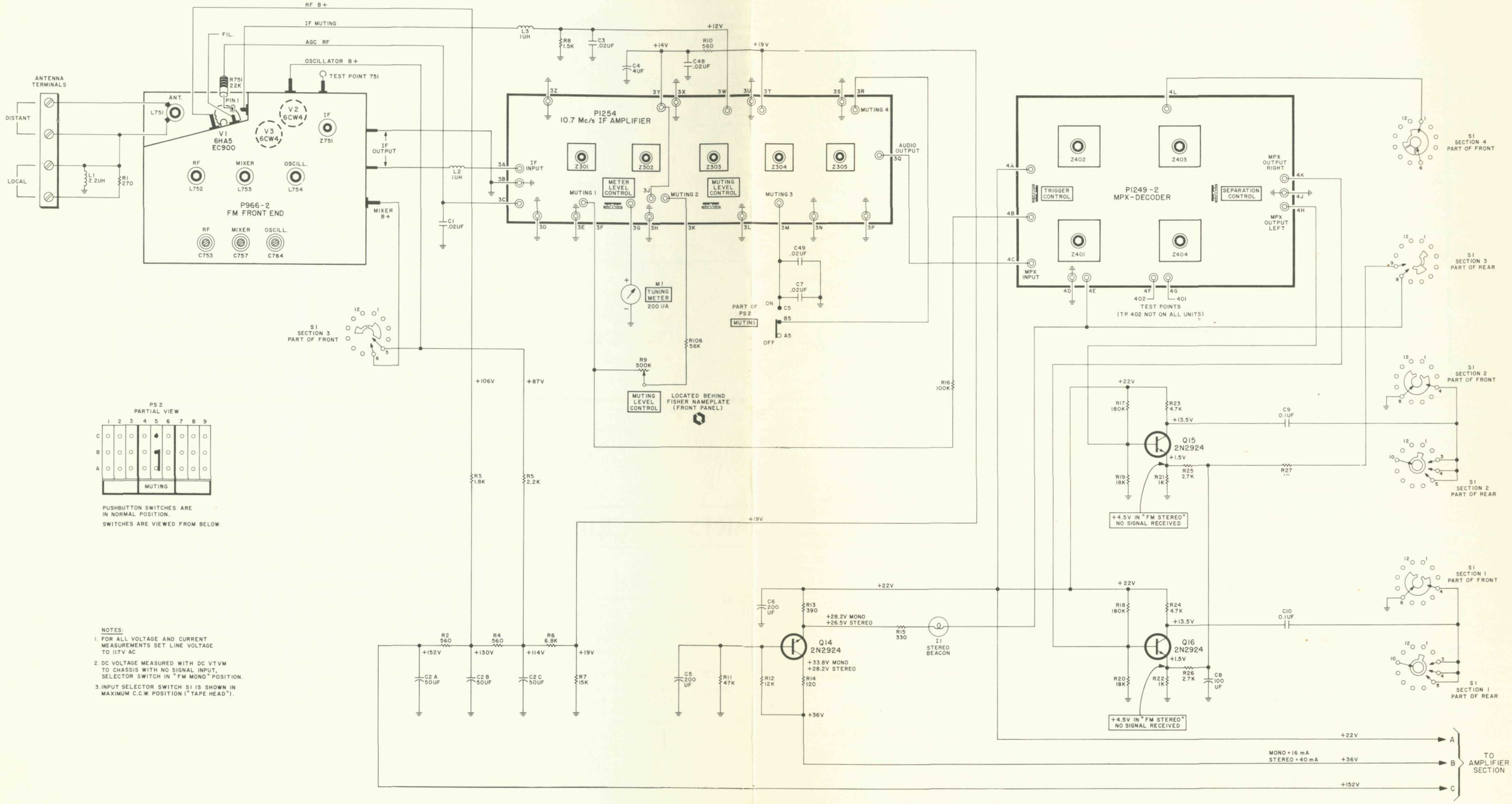
Deposited Carbon, in ohms, 5% tolerance, ⅛-watt, unless otherwise noted. K=Kilohms, M=Megohms.

Symbol	Description	Part No.
R401	Potentiometer, Trimmer, 250K, ±30%	R50694-4
R402	Composition, 1K, 10%, ½ W	RC20BF102K
R403	270K	R12DC274J
R404	150	R12DC151J
R405	39K	R12DC393J
R406	1.2K	R12DC122J
R407	470	R12DC471J
R408	330K	R12DC334J
R409	33K	R12DC333J
R410	390	R12DC391J
R411	10K	R12DC103J
*R412	15K	R12DC153J
R413, 414	470K	R12DC474J
R415, 416	68K	R12DC683J
R417, 418	4.7K	R12DC472J
R419, 420	560	R12DC561J
R421	Trimmer, 25K, ±30%, Separation C'trol	R50694-2
R422, 423	2.7K	R12DC272J
R424	22K	R12DC223J

MISCELLANEOUS

Symbol	Description	Part No.
CR401, 402	Diode, V1112	V1112
CR403	Ring Demodulator	V50260-29
L401	Coil, 20mH	L50334-2
L402, 403	Coil, 20mH	L50334-6
Q401	Transistor, 2N2924	TR2N2924-18
Q402, 403	Transistor, 2N2614	TR2N2614
Q404	Transistor, TI 417	TR9100-18
Q405, 406	Transistor, 2N2924	TR2N2924-18
PC401	Printed Circuit	PC50B187-21
Z401	Transformer, 19Kc	ZZ50210-63
Z402	Transformer, 19Kc	ZZ50210-67
Z403	Transformer, 19Kc	ZZ50210-64
Z404	Transformer, 38Kc	ZZ50210-65

SCHEMATIC DIAGRAM • TUNER



PS2
PARTIAL VIEW

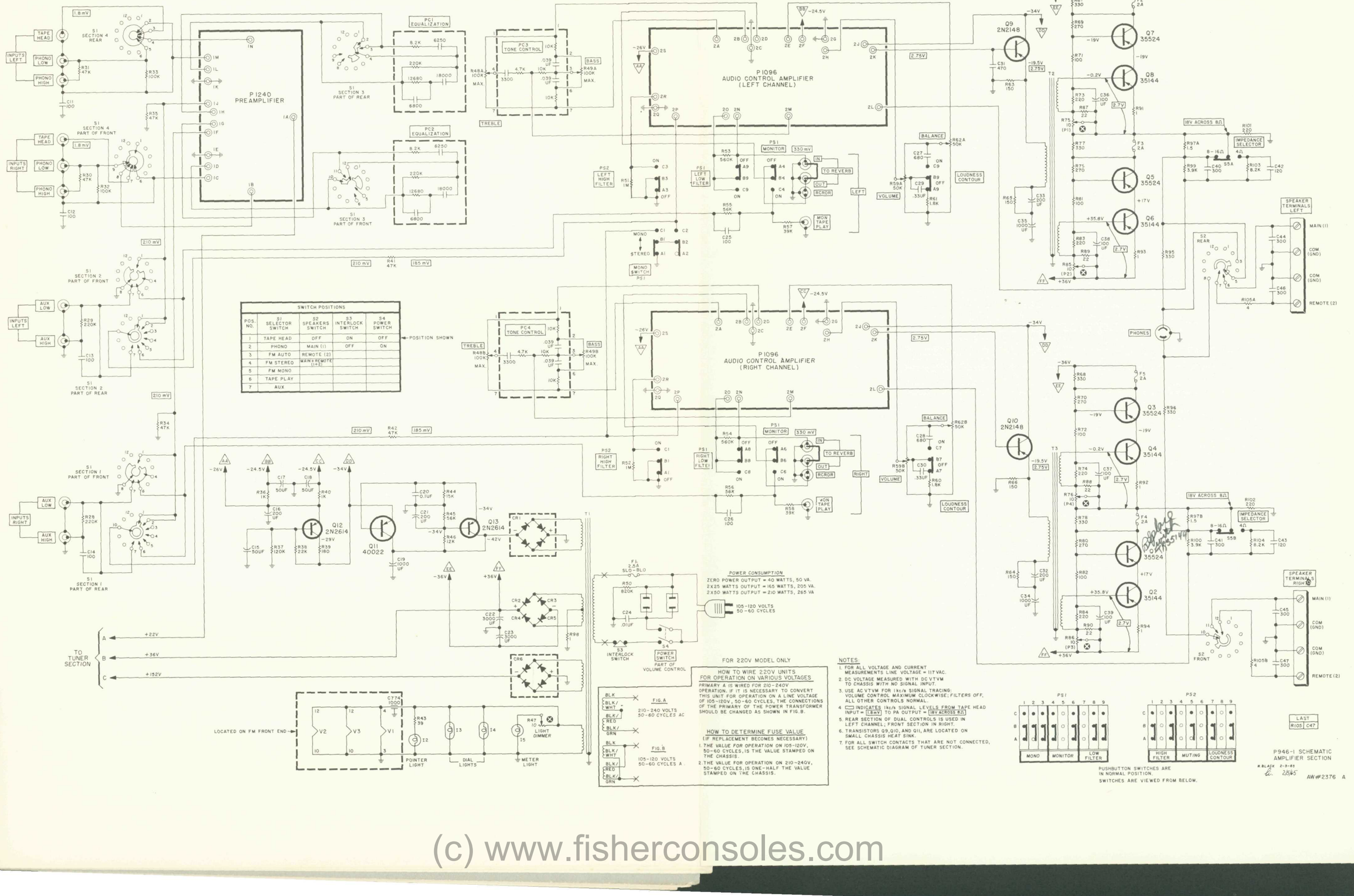
PUSHBUTTON SWITCHES ARE IN NORMAL POSITION.

SWITCHES ARE VIEWED FROM BELOW.

NOTES:

1. FOR ALL VOLTAGE AND CURRENT MEASUREMENTS SET LINE VOLTAGE TO 117V AC.
2. DC VOLTAGE MEASURED WITH DC VTVM TO CHASSIS WITH NO SIGNAL INPUT, SELECTOR SWITCH IN "FM MONO" POSITION.
3. INPUT SELECTOR SWITCH S1 IS SHOWN IN MAXIMUM C.C.W. POSITION ("TAPE HEAD").

SCHEMATIC DIAGRAM • AMPLIFIER

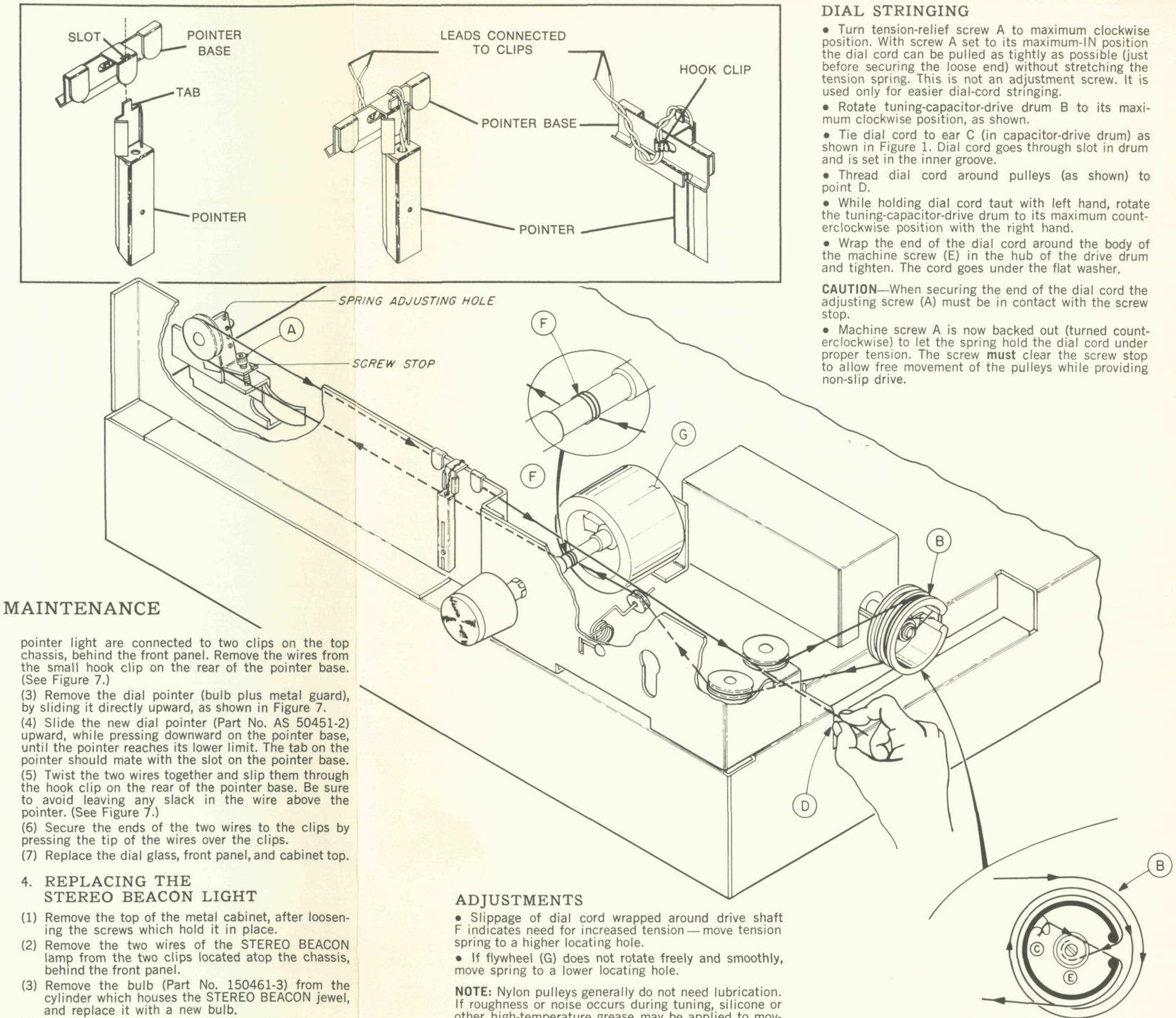


TUNING METER CALIBRATION

- Connect FM generator output leads to antenna terminals.
- Set generator output to 100 mV, ±22.5 kc deviation at 400 cps.
- Adjust meter control (on IF printed-circuit board) for tuning meter indication of 4.

MUTING CONTROL ADJUSTMENT

- Connect FM generator output leads to antenna terminals and AC VTVM to right or left RCDR jack.
- Set generator and tuner to 98 mc. Modulate generator with 400 cps to ±75 kc deviation.
- Rotate muting-level (behind FISHER nameplate) to maximum counterclockwise (CCW) position.
- Set FM generator output attenuator for 8 uV and make a note of the signal amplitude (AC VTVM reading) at the RCDR jack.
- Push in MUTING pushbutton and adjust muting-level control (on IF printed-circuit board) for a reading 1 to 5 db lower than previously noted. Reduce generator output to zero — no signal (noise) should be at the RCDR jack.
- Increase generator output to 20 uV. Note reading on the AC VTVM.
- Adjust the muting-level control (behind nameplate) until AC VTVM reading decreases 1 to 3 db.
- Set generator output attenuator for 100 uV signal to the antenna terminals. Signal at the RCDR jack should be about the same level as before it was adjusted in the previous step. Reduce generator output to 10 uV. No signal or noise should be at the RCDR jacks.



DIAL STRINGING

- Turn tension-relief screw A to maximum clockwise position. With screw A set to its maximum-IN position the dial cord can be pulled as tightly as possible (just before securing the loose end) without stretching the tension spring. This is not an adjustment screw. It is used only for easier dial-cord stringing.
- Rotate tuning-capacitor-drive drum B to its maximum clockwise position, as shown.
- Tie dial cord to ear C (in capacitor-drive drum) as shown in Figure 1. Dial cord goes through slot in drum and is set in the inner groove.
- Thread dial cord around pulleys (as shown) to point D.
- While holding dial cord taut with left hand, rotate the tuning-capacitor-drive drum to its maximum counterclockwise position with the right hand.
- Wrap the end of the dial cord around the body of the machine screw (E) in the hub of the drive drum and tighten. The cord goes under the flat washer.

CAUTION—When securing the end of the dial cord the adjusting screw (A) must be in contact with the screw stop.

- Machine screw A is now backed out (turned counterclockwise) to let the spring hold the dial cord under proper tension. The screw **must** clear the screw stop to allow free movement of the pulleys while providing non-slip drive.

ADJUSTMENTS

- Slippage of dial cord wrapped around drive shaft F indicates need for increased tension — move tension spring to a higher locating hole.
- If flywheel (G) does not rotate freely and smoothly, move spring to a lower locating hole.

NOTE: Nylon pulleys generally do not need lubrication. If roughness or noise occurs during tuning, silicone or other high-temperature grease may be applied to moving parts. Accumulations of dust should be removed **before** any lubricant is applied. Often cleaning will eliminate the need for lubrication.

INS230

FIGURE 1

FRONT PANEL MAINTENANCE

1. CLEANING THE DIAL GLASS

(1) Remove the front panel. Disconnect the set from AC power as a precaution. Remove all knobs, but not the pushbuttons. Remove the three hex nuts located at the points occupied by the Volume control, the Selector switch and the Speakers switch. Then lift off the front panel.

(2) Loosen the screws that retain the clips to the dial glass. (When you replace the dial glass, make certain to rest it by placing it firmly against the lower left-hand corner.) Swing the clips aside, and then lift off the glass.

(3) Remove lust with a dry rag. If you wish to clean more thoroughly, ***use a soap and water solution only;*** if you use any stronger cleaning agent, you may damage the markings on the glass.

2. REPLACING DIAL LAMPS

First, disconnect the AC power cord as a precaution. Remove the front panel as described above. The lamps are held in place by spring clips and can be removed with the fingers. Replace with a new lamp from your FISHER Dealer (Part Number 1-50441-1).

3. REPLACING THE DIAL POINTER LIGHT

(1) Remove the top of the metal cabinet, after loosening the screws which fasten it in place.

(2) Remove the front panel and dial glass as described in the paragraph above. The two wires from the dial pointer light are connected to two clips on the top chassis, behind the front panel. Remove the wires from the small hook clip on the rear of the pointer base. (See Figure 7.)

(3) Remove the dial pointer (bulb plus metal guard), by sliding it directly upward, as shown in Figure 7.

(4) Slide the new dial pointer (Part No. AS 50451-2) upward, while pressing downward on the pointer base, until the pointer reaches its lower limit. The tab on the pointer should mate with the slot on the pointer base.

(5) Twist the two wires together and slip them through the hook clip on the rear of the pointer base. Be sure to avoid leaving any slack in the wire above the pointer. (See Figure 7.)

(6) Secure the ends of the two wires to the clips by pressing the tip of the wires over the clips.

(7) Replace the dial glass, front panel, and cabinet top.

4. REPLACING THE STEREO BEACON LIGHT

(1) Remove the top of the metal cabinet, after loosening the screws which hold it in place.

(2) Remove the two wires of the STEREO BEACON lamp from the two clips located atop the chassis, behind the front panel.

(3) Remove the bulb (Part No. 150461-3) from the cylinder which houses the STEREO BEACON jewel, and replace it with a new bulb.

(4) Fit the ends of the two wires from the lamp over the clips.

(5) Replace the cabinet top.

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, .02uF, +80—20%, 100V	C50095-1
C2A, B, C	Electrolytic, 3-Section, 50uF, 200V	C50180-70
C3	Ceramic, .02uF, +80—20%, 100V	C50095-1
C4	Electrolytic, 4uF, 35V	C50483-1
C5, 6	Electrolytic, 200uF, 35V	C50483-7
C7	Ceramic, .02uF, +80—20%, 100V	C50095-1
C8	Electrolytic, 100uF, 25V	C50483-6
C9, 10	Mylar, .1uF, 20%, 250V	C50575-1
C11, 12	Ceramic, 100, GMV, N1500, 1000V	C50070-5
C13, 14	Ceramic, 100, N1500, 1000V	C50070-6
C15	Electrolytic, 50uF, 35V	C50483-4
C16	Electrolytic, 200uF, 35V	C50483-7
C17, 18	Electrolytic, 50uF, 35V	C50483-4
C19	Electrolytic, 100uF, 50V	C50180-71
C20	Mylar, .1uF, 20%, 250V	C50575-1
C21	Electrolytic, 200uF, 35V	C50483-7
C22, 23	Electrolytic, 3000uF, 40V	C50180-60
C24	Molded, .01uF, 20%, 600V	C2747
C25, 26	Ceramic, 100, N1500, 1000V	C50070-6
C27, 28	Ceramic, 680, 1000V	C50072-2
C29, 30	Mylar, .33uF, 250V	C50633-2
C31	Ceramic, 470, 1000V	C50072-13
C32, 33	Electrolytic, 200uF, 15V	C50483-13
C34, 35	Electrolytic, 1000uF, 25V	C50483-14
C36, 37, 38, 39	Electrolytic, 100uF, 25V	C50483-6
C40, 41	Ceramic, 300, 1000V	C50072-39
C42, 43	Ceramic, 120, N1500, 1000V	C50070-9
C44, 45, 46, 47	Ceramic, 300, 1000V	C50072-39
C48, 49	Ceramic, .02uF, +80—20%, 100V	C50095-1

RESISTORS AND POTENTIOMETERS

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

Symbol	Description	Part No.
R1	Composition, 270, 10%, 1/2 W	RC20BF271K
R2	W.W., 560, 5%, 2W	RW200W561J
R3	Composition, 1.8K, 10%, 1/2 W	RC20BF182K
R4	Composition, 560, 10%, 1/2 W	RC20BF561K
R5	Composition, 2.2K, 10%, 1/2 W	RC20BF222K
R6	Composition, 6.8K, 10%, 2W	RC40BF682K
R7	Composition, 15K, 10%, 1/2 W	RC20BF153K
R8	1.5K	R12DC152J
R9	Potentiometer, 500K, Muting Level	R50150-10
R10	Composition, 560, 10%, 1/2 W	RC20BF561K
R11	Composition, 47K, 10%, 1/2 W	RC20BF473K
R12	Composition, 12K, 10%, 1/2 W	RC20BF123K
R13	Composition, 390, 10%, 1/2 W	RC20BF391K
R14	Composition, 120, 10%, 1/2 W	RC20BF121K
R15	330	R12DC331J
R16	100K	R12DC104J
R17, 18	180K	R12DC184J
R19, 20	18K	R12DC183J
R21, 22	1K	R12DC102J
R23, 24	4.7K	R12DC472J
R25, 26	2.7K	R12DC272J
R27	1K	R12DC102J
R28, 29	220K	R12DC224J
R30, 31	47K	R12DC473J
R32, 33	100K	R12DC104J
R34, 35	47K	R12DC473J
R36	Composition, 1K, 10%, 1/2 W	RC20BF102K
R37	Composition, 120K, 10%, 1/2 W	RC20BF124K
R38	Composition, 22K, 10%, 1/2 W	RC20BF223K
R39	Composition, 180, 10%, 1/2 W	RC20BF181K
R40	Composition, 1K, 10%, 1/2 W	RC20BF102K
R41, 42	47K	R12DC473J
R43	Composition, 39, 10%, 1/2 W	RC20BF390K
R44	Composition, 15K, 10%, 1/2 W	RC20BF153K
R45	Composition, 56K, 10%, 1/2 W	RC20BF563K
R46	Composition, 12K, 10%, 1/2 W	RC20BF123K
R47	Potentiometer, 10, Light Dimmer	R50160-154-1
R48A, B	Potentiometer, 100K, Dual, Treble	R50160-155
R49A, B	Potentiometer, 100K, Dual, Bass	R50160-155
R50	Composition, 820K, 10%, 1/2 W	RC20BF824K
R51, 52	1M	R12DC105J
R53, 54	560K	R12DC564J
R55, 56	56K	R12DC563J
R57, 58	39K	R12DC393J
R59A, B	Potentiometer, 50K, Dual, Volume	R50160-151
R60, 61	1.8K	R12DC182J
R62A, B	Potentiometer, 50K, Dual, Balance	R50160-157
R63	W.W., 150, 10%, 3W	RPG3W151K
R64, 65	150	R12DC151J
R66	W.W., 150, 10%, 3W	RPG3W151K
R67, 68	W.W., 330, 5%, 2W	RW200W331J
R69, 70	W.W., 270, 5%, 2W	RW200W271J
R71, 72	W.W., 100, 5%, 2W	RW200W101J
R73, 74	W.W., 220, 5%, 2W	RW200W221J
R75, 76	Potentiometer, 10, DC Balance	R50160-142-1
R77, 78	W.W., 330, 5%, 2W	RW200W331J
R79, 80	W.W., 270, 5%, 2W	RW200W271J
R81, 82	W.W., 100, 5%, 2W	RW200W101J
R83, 84	W.W., 220, 5%, 2W	RW200W221J
R85, 86	Potentiometer, 10, DC Balance	R50160-142-1
R87, 88, 89, 90	Composition, 22, 10%, 1/2 W	RC20BF220K
R91, 92, 93, 94	W.W., 1, 5%, 3W	RL300W010J
R95, 96	W.W., 330, 5%, 2W	RW200W331J
R97A, B	W.W., Dual, 1.5+1.5, 10%, 10W	R50500-3
R98	W.W., 1, 5%, 3W	RL300W010J
R99, 100	3.9K	R12DC392J
R101, 102	W.W., 220, 5%, 2W	RW200W221J
R103, 104	8.2K	R12DC822J
R105A, B	W.W., Dual, 4+4, 10%, 10W	R50500-4
R106	56K	R12DC563J

MAIN CHASSIS PARTS DESCRIPTION LIST

CONTROLS

Symbol	Description	Part No.
R9	Potentiometer, 500K, Muting Level	R50150-10
R47	Potentiometer, 10, Light Dimmer	R50160-154-1
R48A, B	Potentiometer, 100K, Dual, Treble	R50160-155
R49A, B	Potentiometer, 100K, Dual, Bass	R50160-155
R59A, B	Potentiometer, 50K, Dual, Volume	R50160-151
R62A, B	Potentiometer, 50K, Dual, Balance	R50160-157
R75, 76	Potentiometer, 10, DC Balance	R50160-142-1
R85, 86	Potentiometer, 10, DC Balance	R50160-142-1
S1	Switch, Selector, Input	S946-235
S2	Switch, Speakers	S946-216
S3	Switch, Interlock	S946-176
S4	Switch, Power (On Volume Control)	Part of R52
S5A, B	Switch, Impedance Selector	S50200-2
PS1	Switch, P.B., Low Filter, Monitor Volume	S946-226
PS2	Switch, P.B., Loudness, Muting, High Filter	S946-225

MISCELLANEOUS

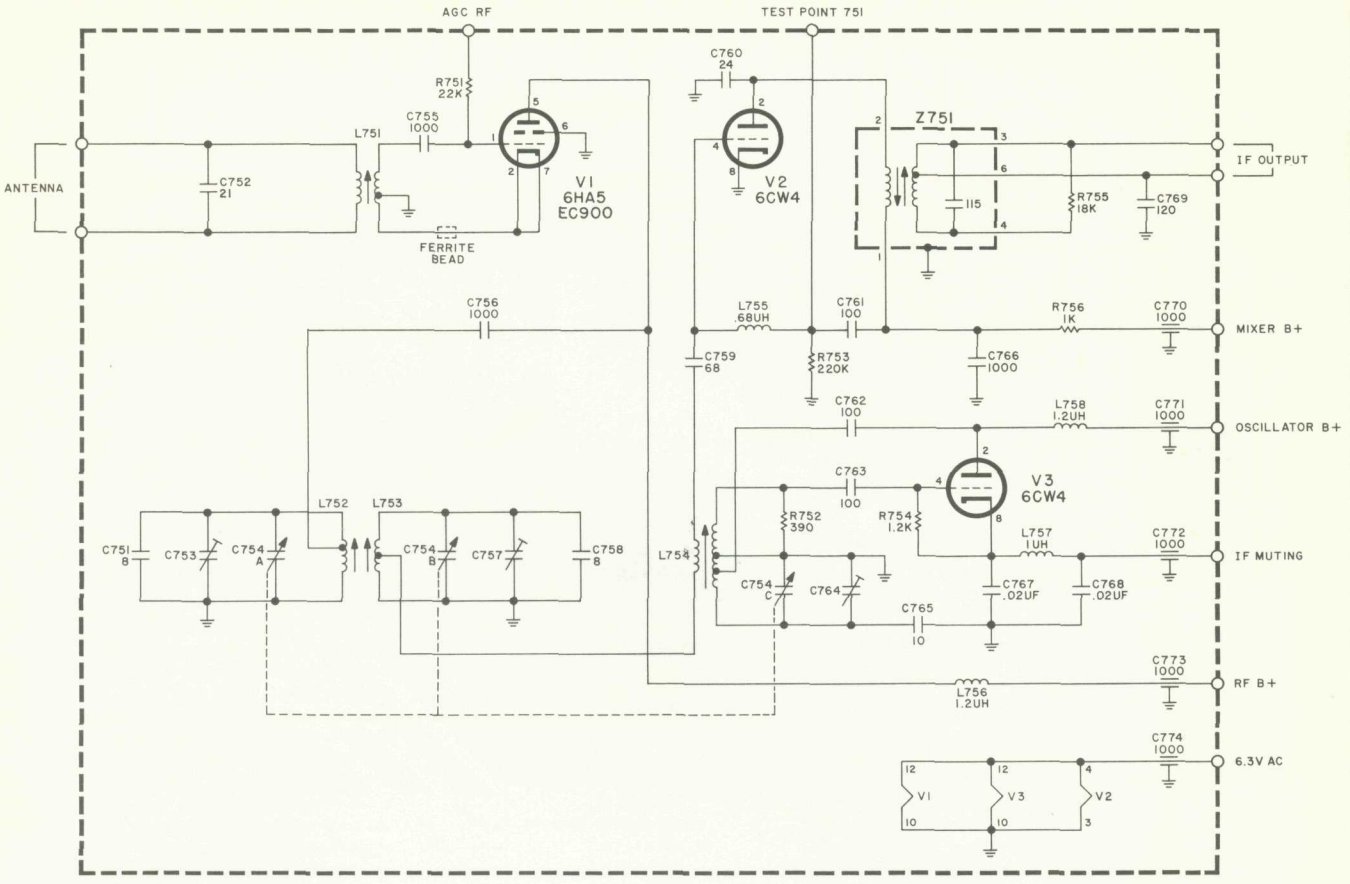
Symbol	Description	Part No.
CR1	Rectifier, Selenium	SR50597-2
CR2, 3, 4, 5	Rectifier, Silicon	SR50517
CR6	Rectifier, Selenium	SR50253-2
F1	Fuse, 2.5 Amp, Slo-Blo	F1077-118
F2, 3, 4, 5	Fuse, 2 Amp	F755-145
*I1	Lamp, Stereo Beacon	I50594-1
I1	Lamp, Stereo Beacon	I50594
I2	Lamp, Pointer, part of assembly	AS50451-2
I3, 4	Lamp, Dial	I50441-1
L1	Choke, 2.2 Microhenry	L50066-6
L2, 3	Choke, 1 Microhenry	L50066-2
PC1, 2	Printed Circuit, Equalization	PC50187-14
PC3, 4	Printed Circuit, Tone	PC50489
Q1, 3, 5, 7	Transistor, 35524	TR35524
Q2, 4, 6, 8	Transistor, 35144	TR35144
Q9, 10	Transistor, 2N2148	TR2N2148
Q11	Transistor, 40022	TR40022
Q12, 13	Transistor, 2N2614	TR2N2614
T1	Transformer, Power	T946-217
T2	Transformer, Driver, Left Channel	T946-218-1
T3	Transformer, Driver, Right Channel	T946-218-2
———	Insert, Dress Panel, Screened (Upper)	AS946-201
———	Insert, Dress Panel, Screened (Lower)	AS946-202
———	Knob, Balance	E50561
———	Knob, Volume	E50562-1
———	Knob, Dual, Top, Tone Control	E50563
———	Knob, Dual, Bottom, Tone Control	E50564
———	Knob, Speaker Selector	E50565-1
———	Knob, Tuning	E50565-2
———	Screws, For Cage & Bottom Cover	H50598-7
———	Drive Wheel, Tuning Capacitor	E50588
———	Barrier Strip, Antenna	E50596
———	Barrier Strip, Speaker	E50170-4
*———	Stereo Beacon Assembly	AS950-157
———	Stereo Beacon Assembly	AS946-231
———	Insulator, Transistor Socket	E50510
———	Socket, Transistor	X50509
———	Jack, Phone	J50545
———	Nameplate Assembly, Dress Panel	AS946-228
———	Dial, Glass	N946-203
———	Meter, Tuning Indicator	M946-213
———	Printed Circuit Board, I.F.	PB1254
———	Printed Circuit Board, MPX	PB1249-2
———	Printed Circuit Board, Pre-Amp	PB1240
———	Printed Circuit Board, Audio	PB1096
———	Front End	P966-2

*Serialization 21000-22000 only.

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.

P966-2 F M FRONT END SCHEMATIC DIAGRAM



PARTS DESCRIPTION LIST

P966-2 FM FRONT END

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.
C751	Ceramic, 8, 5 %, NPO, 1000V	C50070-45
C752	Ceramic, 21, 5 %, N750, 1000V	C50070-32
C753	Trimmer	C662-123
C754A,B,C	Variable, Tuning	C966C117-1
C755, 756	Ceramic, 1000, GMV, 500V	C50089-2
C757	Trimmer	C662-123
C758	Ceramic, 8, 5 %, NPO, 1000V	C50070-45
C759	Ceramic, 68, 5 %, N750, 1000V	C50070-35
C760	Ceramic, 24, 5 %, N150, 1000V	C50070-8
C761	Ceramic, 100, 5 %, N1500, 1000V	C50070-19
C762, 763	Ceramic, 100, N1500, 1000V	C50070-6
C764	Trimmer	C662-123
C765	Ceramic, 10, ±.5pF, P100, 500V	CC20AJ100D5
C766	Ceramic, 1000, 1000V	C50072-3
C767, 768	Ceramic, .02uF, +80—20 %, 100V	C50095-1
C769	Ceramic, 120, N1500, 1000V	C50070-9
C770,771, 772,773, 774	Ceramic, Feedthru, 1000, GMV	C592-187

RESISTORS

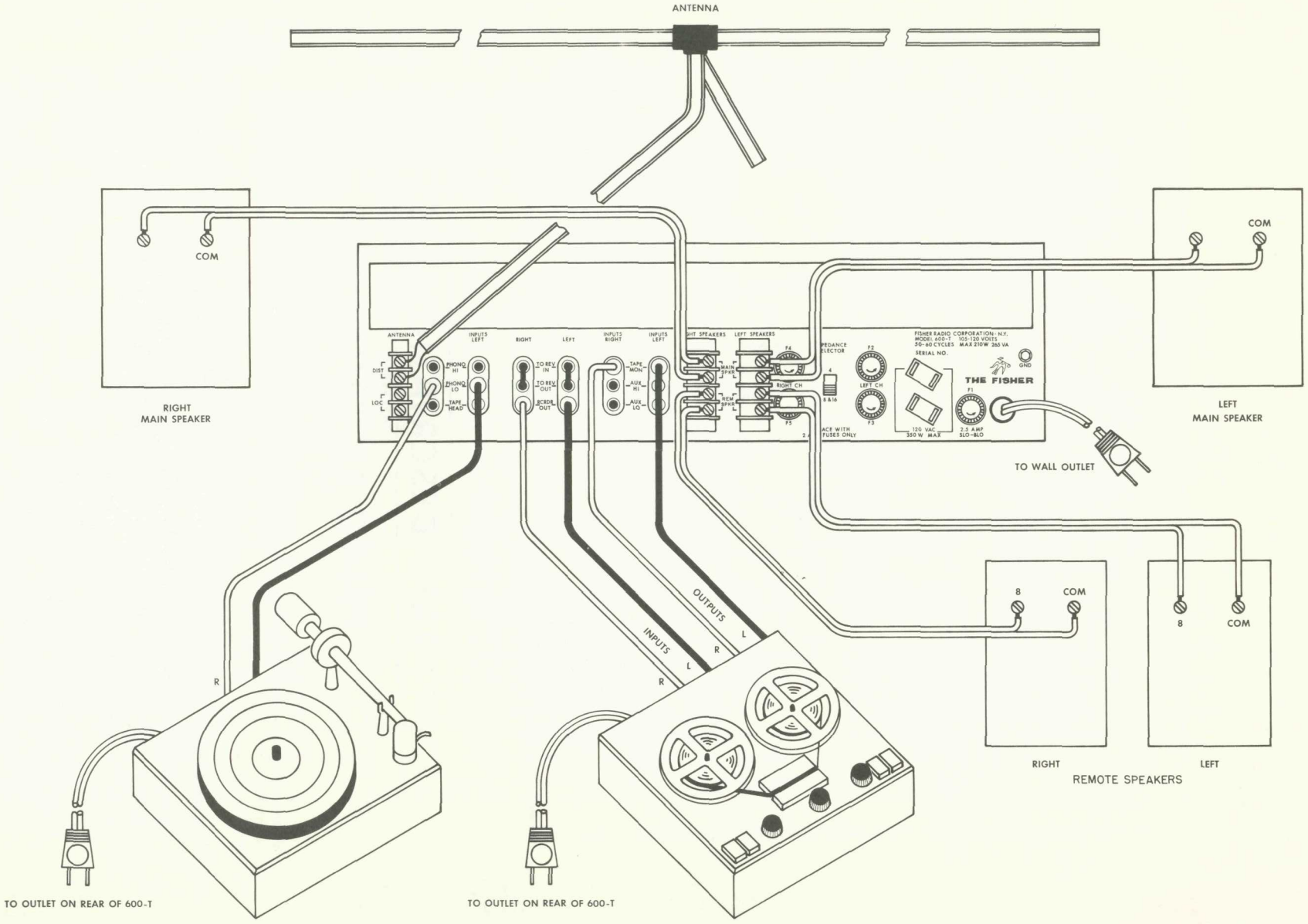
Deposited Carbon, in ohms, 5 % tolerance, 1/8 watt. K = Kilohms, M = Megohms.

Symbol	Description	Part No.
R751	22K	R12DC223J
R752	390	R12DC391J
R753	220K	R12DC224J
R754	1.2K	R12DC122J
R755	18K	R12DC183J
R756	1K	R12DC102J

MISCELLANEOUS

Symbol	Description	Part No.
L751	Coil, Antenna	L966-113
L752	Coil, RF	L1034-113
L753	Coil, Mixer	L966-115
L754	Coil, Oscillator	AS966-107
L755	Choke, .68 Microhenry	L50066-1
L756	Choke, 1.2 Microhenry	L50066-3
L757	Choke, 1 Microhenry	L50066-2
L758	Choke, 1.2 Microhenry	L50066-3
V751	Tube, EC900/6HA5	V-EC900
V752,753	Nuvistor, 6CW4	V-6CW4
Z751	Transformer, IF	ZZ50210-45

COMPONENT CONNECTIONS



INS 212

FISHER RADIO CORPORATION · NEW YORK

N 946 - 103 Ax

PRINTED U.S.A. 75 M 35

SERVICE BULLETIN

966 F M FRONT END

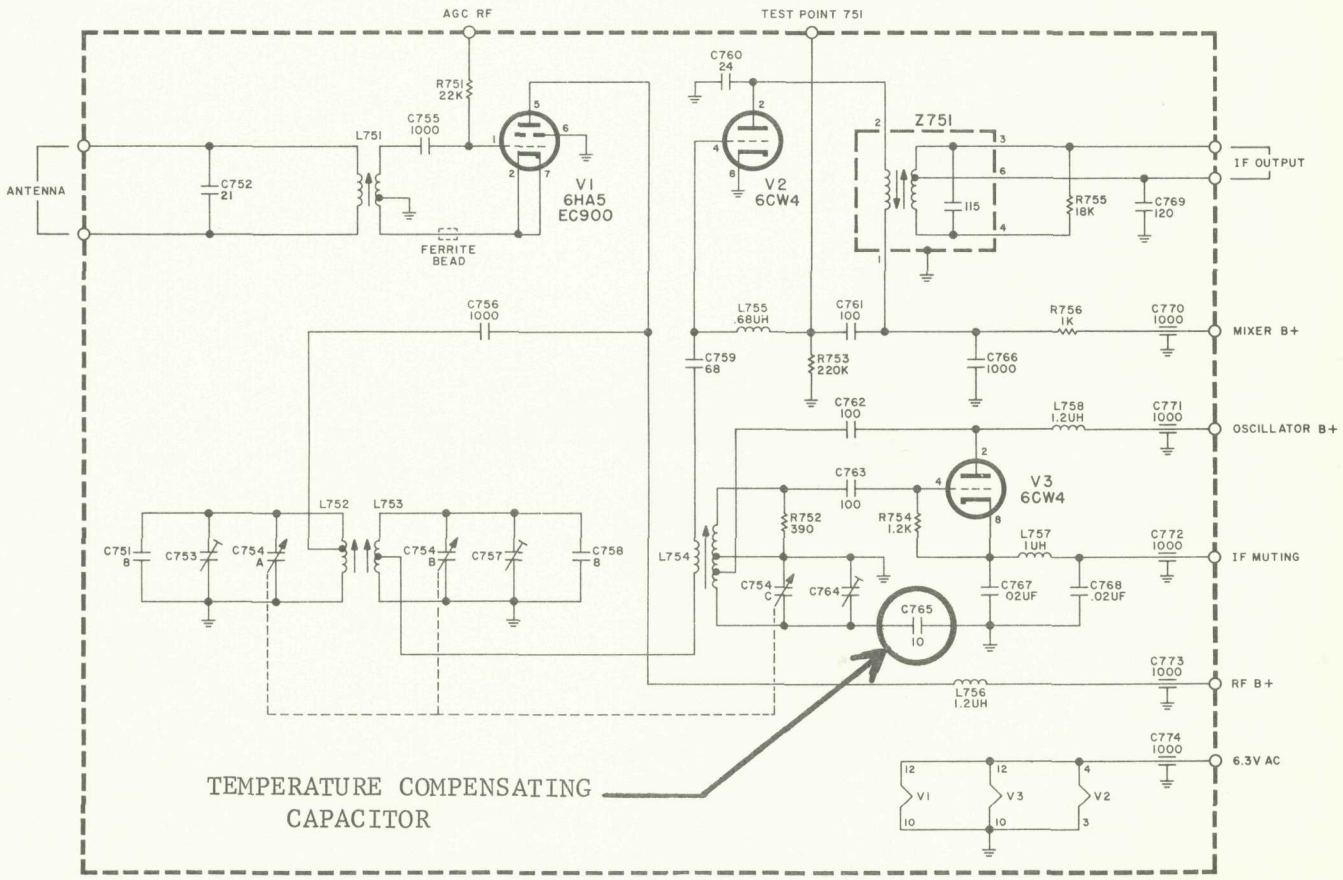
MODELS 600-T, TFM-300, TFM-200, 500-C and FM-100-C

In order to prevent drifting, under unusual or extreme conditions, it is suggested that the Temperature Compensating Capacitor in the oscillator circuit be changed.

The original part value was 10pF ± .5pF, P 100 @ 500V. The new part value is 10pF ± .5pF, NPO @ 500V. Our part number is CC20CG100D5.

Refer to the Schematic Diagram below and to the Service Manual for the unit requiring service:

500-C Front End	966-1; C-24
600-T, TFM-300	966-2; C-765
FM-100-C	966-3; C-17
TFM-200	966-5; C-765



SCHEMATIC DIAGRAM

FISHER RADIO CORPORATION · LONG ISLAND CITY 1 · NEW YORK