



modular  
**hi-fi**  
components

**MHF-37**

for

*Bell & Howell 3650*

*Electrohome Manhattan, SC420*

*General Electric Ch. PK170*

*Hitachi DPK-340*

*Morse/Electroponic R-12A, T-100A, T600A*

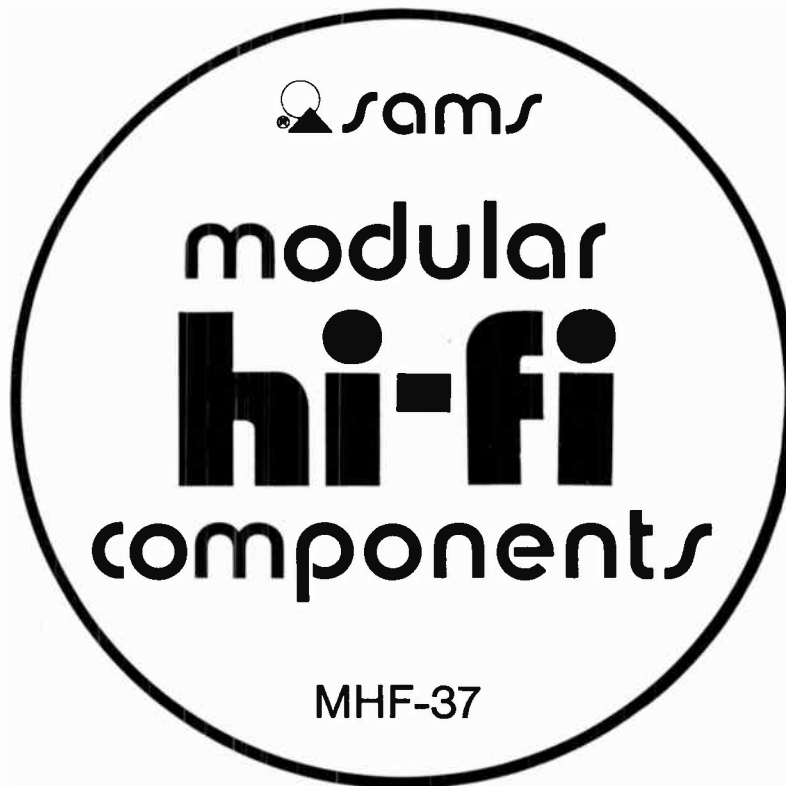
*Panasonic SA-5800 — RCA YZD596W*

*Sears-Silvertone 548.74210000 — Sony HP-510*

*Symphonic 1253, 1253T*



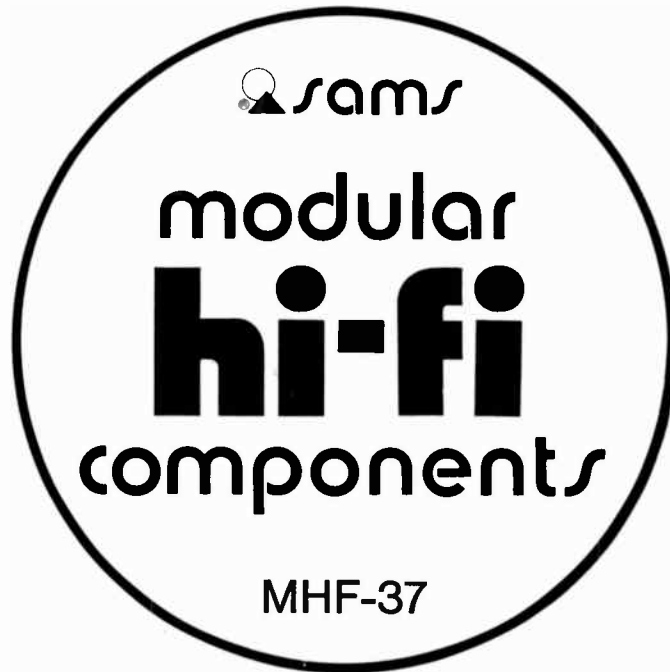
\$3.95  
\$4.95 IN CANADA  
Cat. No. MHF-37



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— modular **hi-fi** components —

# TABLE OF CONTENTS

---

<i>Model Number</i>	<i>Page</i>
<i>Bell &amp; Howell 3650</i> . . . . .	<i>5</i>
<i>Electrohome Manhattan (Ch. H18-202),</i> . . . . .	<i>15</i>
<i>SC420 (Ch. H18-201)</i>	
<i>General Electric A505g/h, C172g, C460g,</i> <i>C467g/h, G270g, G504g/h, G507g,</i> <i>P774g, P775g (Ch. PK170)</i> . . . . .	<i>23</i>
<i>Hitachi DPK-340</i> . . . . .	<i>33</i>
<i>Morse/Electrophonic R-12A, T-100A, T600A</i> . .	<i>43</i>
<i>Panasonic SA-5800</i> . . . . .	<i>63</i>
<i>RCA YZD596W</i> . . . . .	<i>73</i>
<i>Sears-Silvertone 548.74210000</i> . . . . .	<i>81</i>
<i>Sony HP-510</i> . . . . .	<i>91</i>
<i>Symphonic 1253, 1253T</i> . . . . .	<i>111</i>
<hr/>	
<i>Cumulative Index to Prior Volumes</i> . . . . .	<i>127</i>

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## GENERAL SERVICING INFORMATION

The following information applies to all players in this volume, and should be followed before any adjustments are made or trouble diagnosis is attempted. Any exceptions or additions will be found in the detailed servicing procedures for each player.

### POWER SOURCES

Many players require full supply voltage for proper operation. Be sure the supply voltage is maintained at the rated value under load while making adjustments.

### CLEANING

Head faces should be cleaned with head cleaner to remove dust and accumulated oxide. (An applicator may be fashioned from absorbent cotton.) Do not use a screwdriver or any metallic object near the head faces.

*CAUTION: Avoid getting head cleaner on any plastic surface.*

Clean capstans, pressure rollers, and tape guides with alcohol using a soft lint-free cloth. Also use alcohol to remove oil and grease from drive belts and other driving surfaces.

### LUBRICATING

Clean all surfaces before lubricating. Apply a few drops of #20 machine oil to all bearings and rotating bushings. Apply a thin film of light, nonhardening grease to all cam surfaces and pawls, if they have been factory lubricated. Always wipe excess oil or grease from parts that have been lubricated.

*CAUTION: Oil and grease must be kept off all driving surfaces as well as any parts which may transfer oil or grease to them.*

### DEMAGNETIZING

Heads require demagnetizing at regular intervals to maintain high-frequency response, dynamic range, and low distortion. (Follow instructions included with the demagnetizing unit.) After demagnetizing the heads, keep all screwdrivers and other metallic objects away from the head faces. Tape guides may also require occasional demagnetizing.

*IMPORTANT: Be sure to demagnetize the heads after making resistance measurements in the head circuits.*

### CARTRIDGES

Many problems associated with tape players result from defective cartridges. Always try a cartridge known to be good before attempting repairs.

Pages 5-14 Courtesy of BELL & HOWELL GENERAL SERVICE DEPARTMENT

## ALIGNMENT INSTRUCTION

### Circuit adjustment

The instructions for adjusting the FM and AM circuits will be given in this section.

#### 1. FM Circuit

##### 1-1. Test Equipment Required :

FM band signal generator : 400 Hz 30% modulation (22.5 KHz deviation); 300 ohm Output.

FM IF sweep generator : 10.7 MHz  $\pm$  500KHz

VTVM : Low range AF

Oscilloscope : High sensitivity general purpose.

Accurate audio generator (SCA signal generator 7KHz dev.)

FM stereo signal generator : For MPX tests.

##### 1-2. IF Amplifier Alignment :

Note :

- For safety, the output should be connected to the loudspeaker or equivalent resistance loads.
- Set the panel controls as follows:
  - FUNCTION selector to FM
  - VOLUME control at minimum output.
  - FM AFC switch to OFF.

V curve

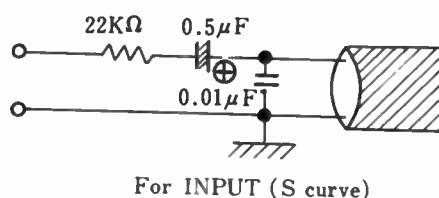
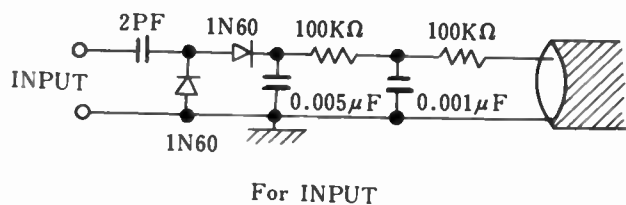
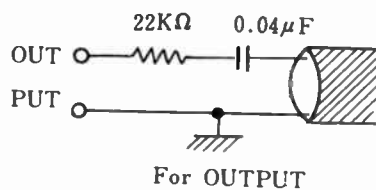
c. The output of IF sweep generator should be connected to Test Point A (the connecting point of R106, 220ohm and C109 2pF).

d. The input of IF sweep generator should be connected to Test Point B (Q9 2SC460 collector).

S curve

e. The input of IF sweep generator should be removed from Test Point B (Q9 2SC460 collector) and be connected to Test Point C (R336 15k ohm).

f. The probe for input or output of IF sweep generator should be connected as Fig.1.



STEP	ADJUST	WAVEFORM
1	T, T2, T5, T9, T11, T13, (Primary)	Best V Curve
2	T13 (Secondary)	Best S Curve

### 1-3. FM Tuner Pack

The FM tuner may require adjustments when the signal is distorted or when the sensitivity has been lowered. Set the FUNCTION selector to FM and the FM AFC switch to OFF. In the steps to follow, the FM signal generator is set for at 30% modulation at 400Hz at the RF output frequencies. For the output indication, the VTVM and the scope in parallel are connected to the Right speaker outjack.

Step 1. Set the generator output to 87 MHz and tune the receiver to this signal. Adjust the trimmer FCT3 and Coil L5 for maximum output.

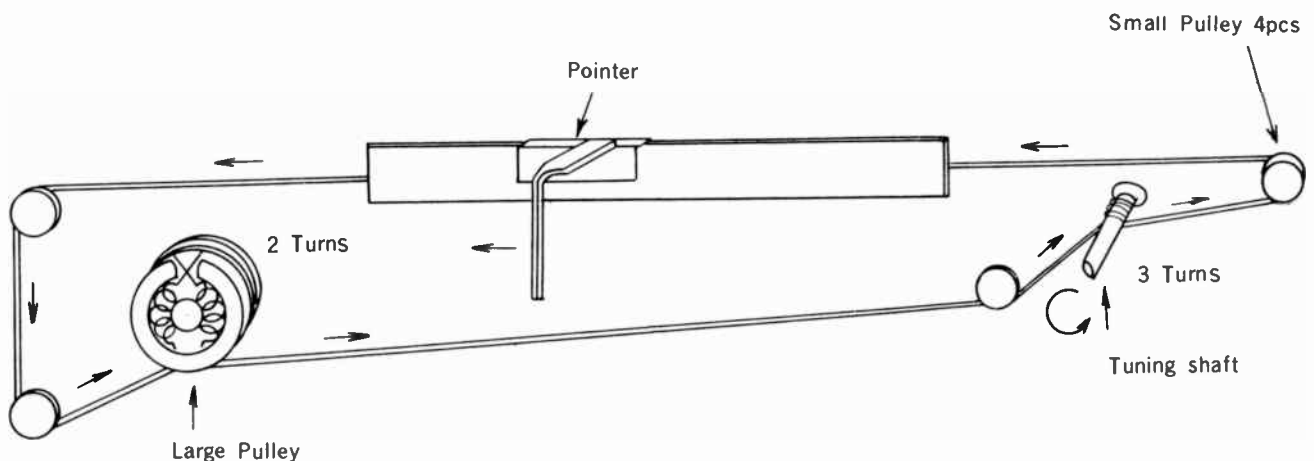
Step 2. Set the generator output to 108.5 MHz and tune the receiver to this signal. Adjust the trimmer FCT2 and Coil L3 for maximum output.

Step 3. Set the generator output to 98 MHz and tune the receiver to this signal. Adjust the trimmer FCT1 for maximum output.

Step 4. Repeat the adjustment of Steps 1, 2, and 3.

Note: In the above adjustments, do not forget to keep the generator output level as low as possible for the best results.

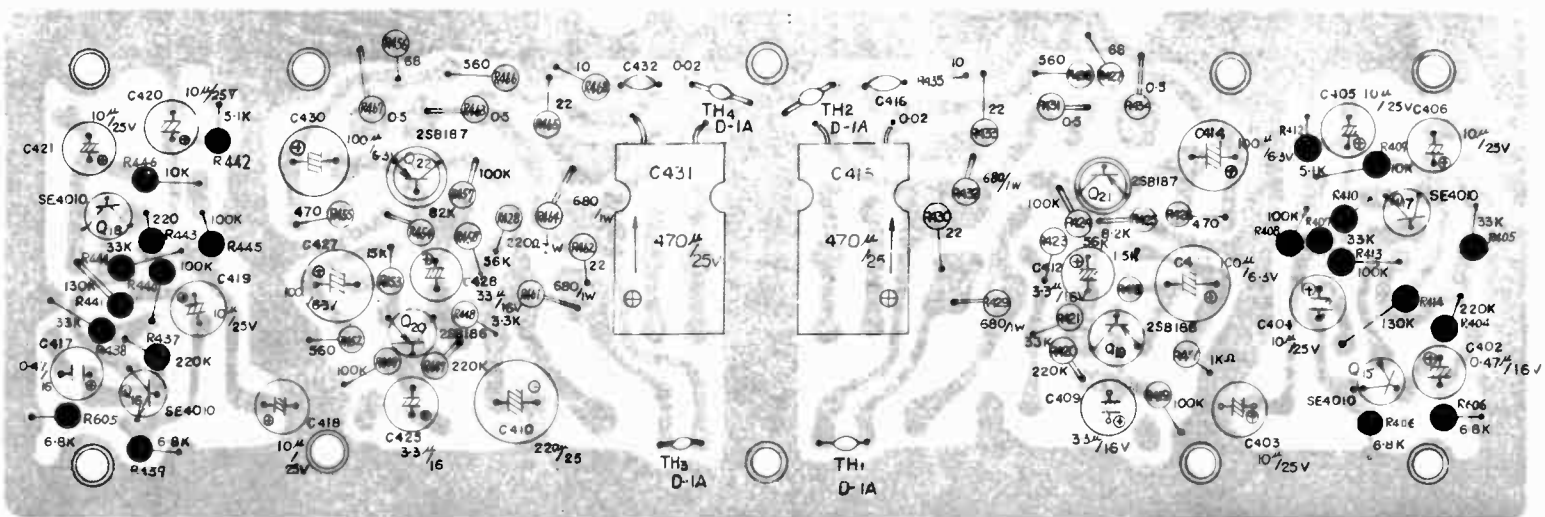
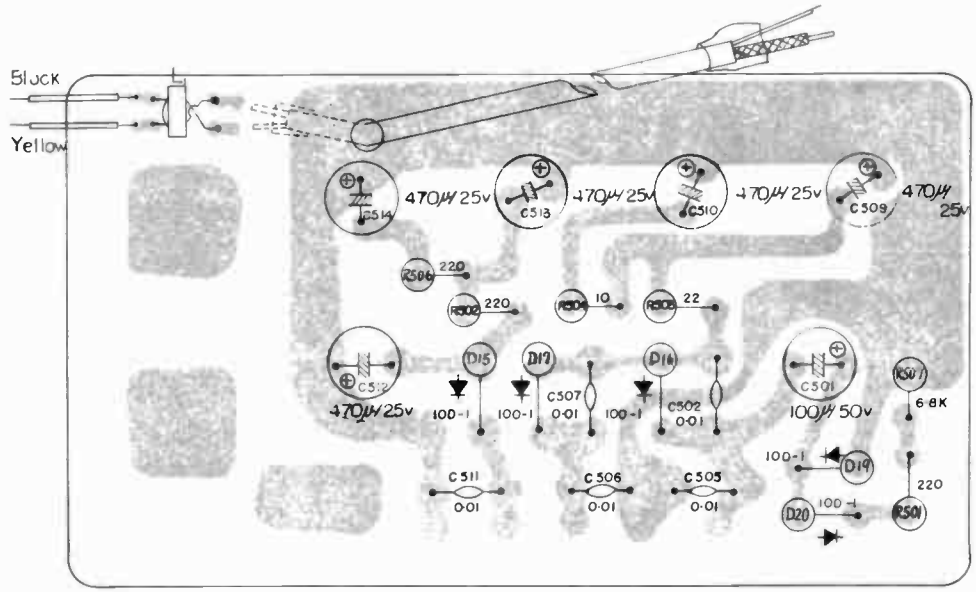
## DIAL STRINGING



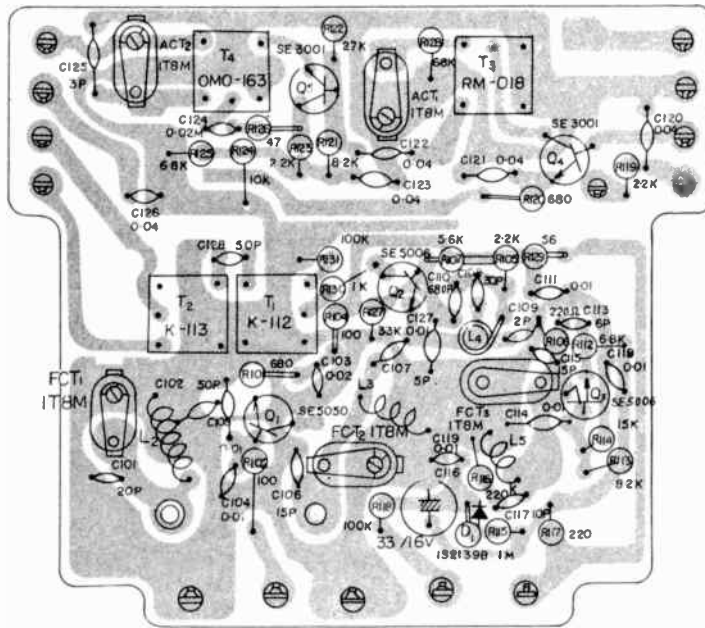


POWER SUPPLY PC BOARD

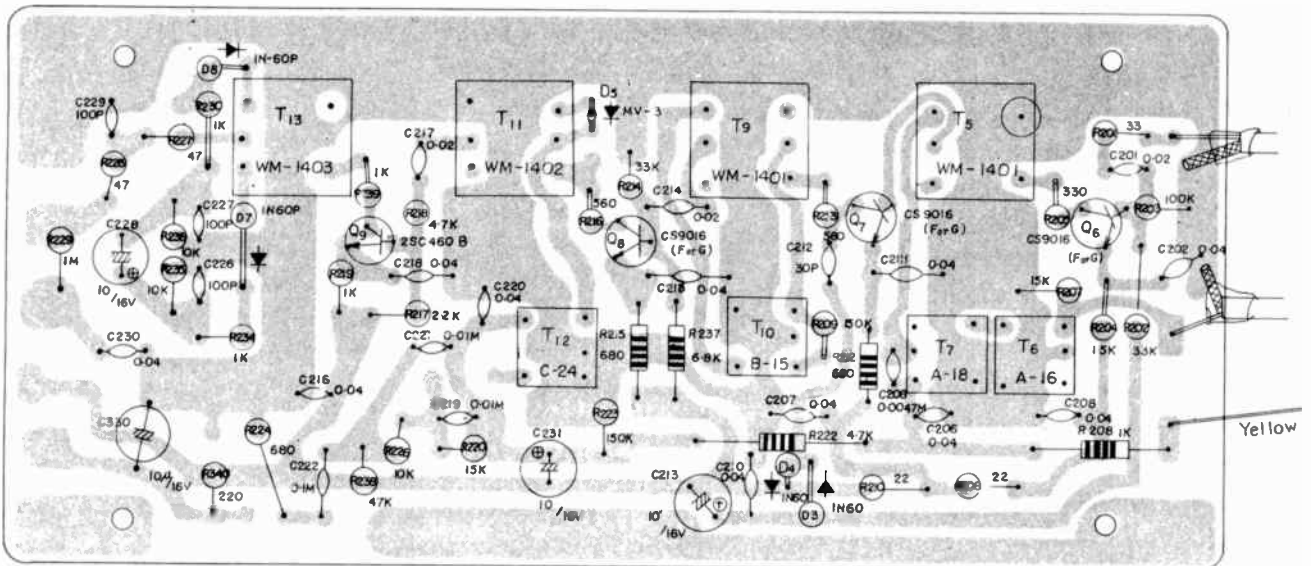
AUDIO PC BOARD

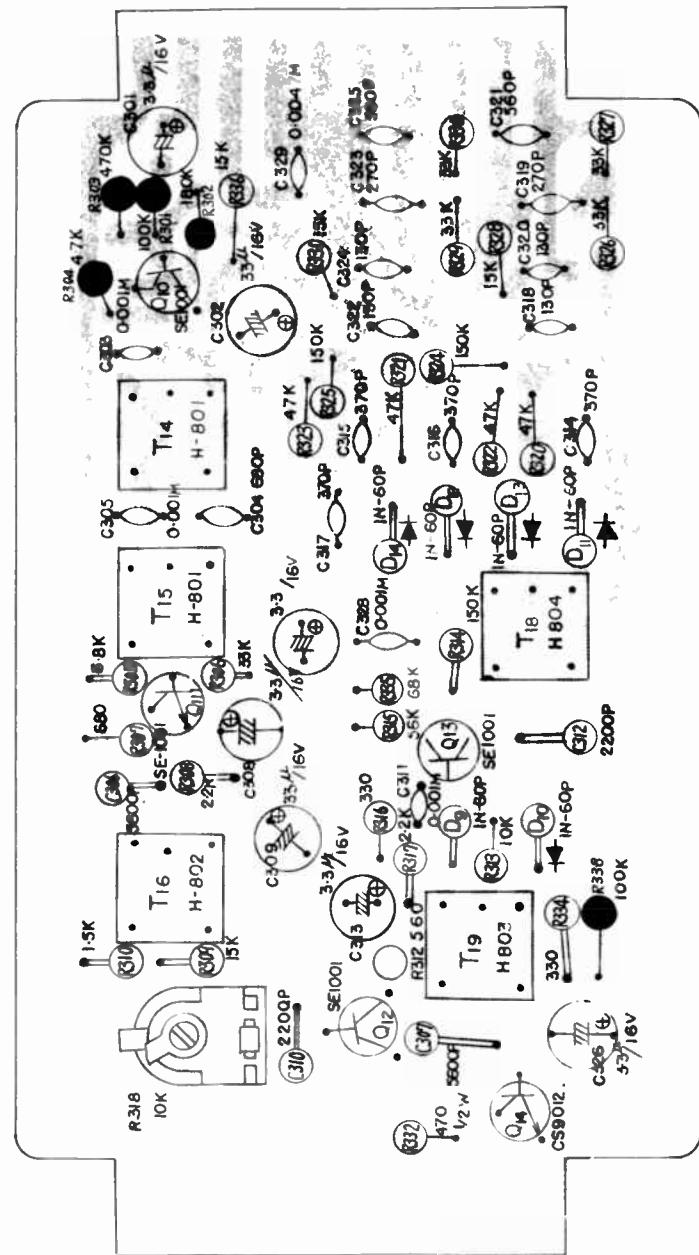


## PARTS LOCATION OF TUNER PC BOARD



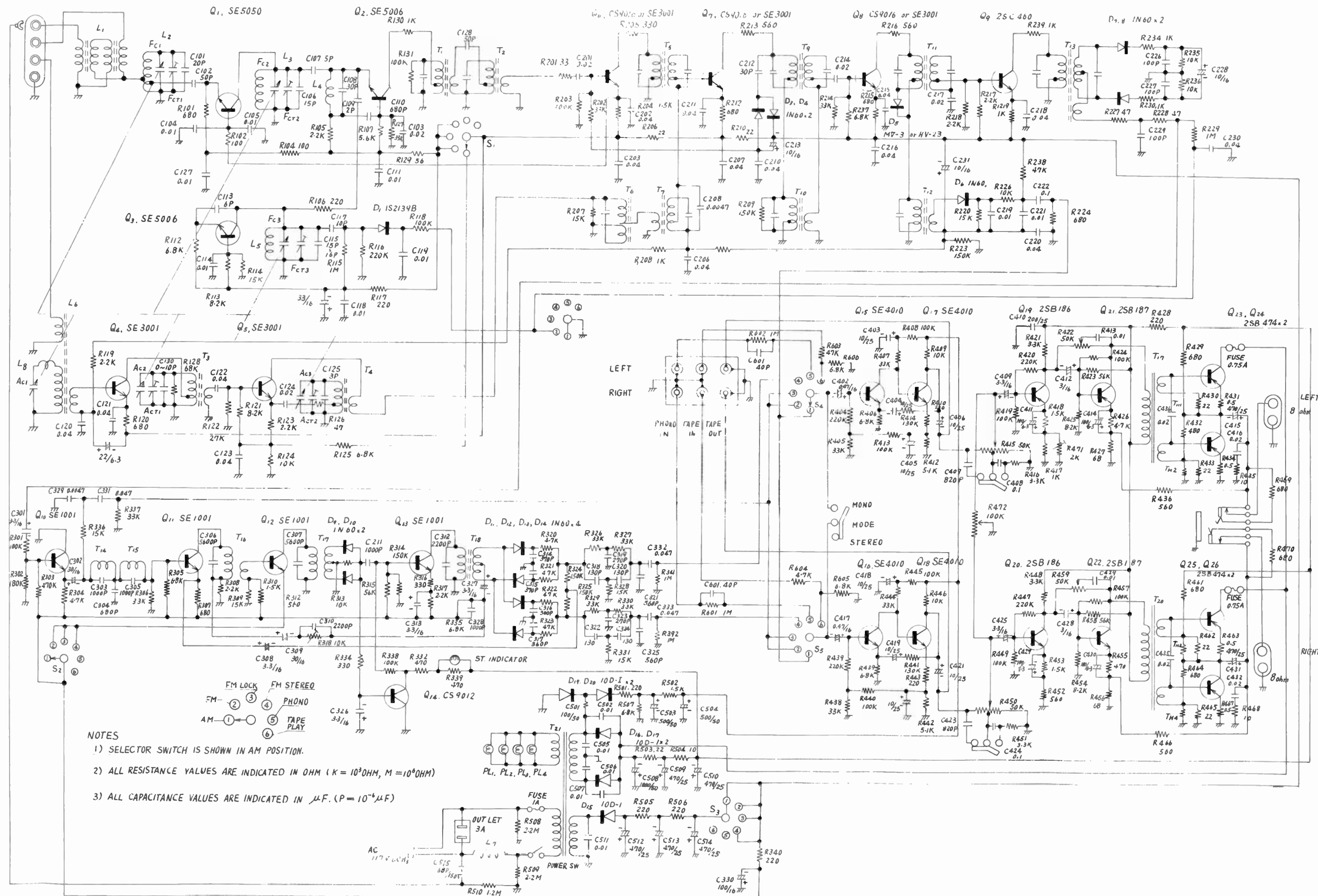
## PARTS LOCATION OF IF PC BOARD





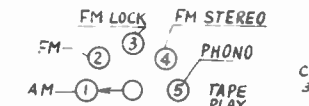
Note; Resistors with dark markings are low noise types.

**PARTS LOCATION OF MPX PC BOARD**



**NOTES**

- 1) SELECTOR SWITCH IS SHOWN IN AM POSITION.
- 2) ALL RESISTANCE VALUES ARE INDICATED IN OHM (K = 10<sup>3</sup>OHM, M = 10<sup>6</sup>OHM)
- 3) ALL CAPACITANCE VALUES ARE INDICATED IN μF. (P = 10<sup>-6</sup>μF)



NOTE: WHEN ORDERING PARTS NOT OTHERWISE LISTED, ORDER FROM MANUFACTURER BY ITEM NUMBER AND DESCRIPTION.

1-4. FM Multiplex Circuit

a. Test Equipment required

- SCA signal generator: { 67KHz output 0.5V Dev 7KHz  
Modulation 1KHz or 400Hz
- MPX signal generator: { Modulation 1KHz  
Deviation L 33.7KHz Dev. (45%)  
R 33.7KHz Dev. (45%)  
Pilot signal 7.5KHz Dev. (10%)
- FM signal generator: { Frequencies 98 MHz  
Deviation 75KHz (100%)

VTVM: Low Range AF

Dummy load selector: (With L ch, R ch, exchange switch and 8 ohm Resistor built-in) Refer to Fig.2.

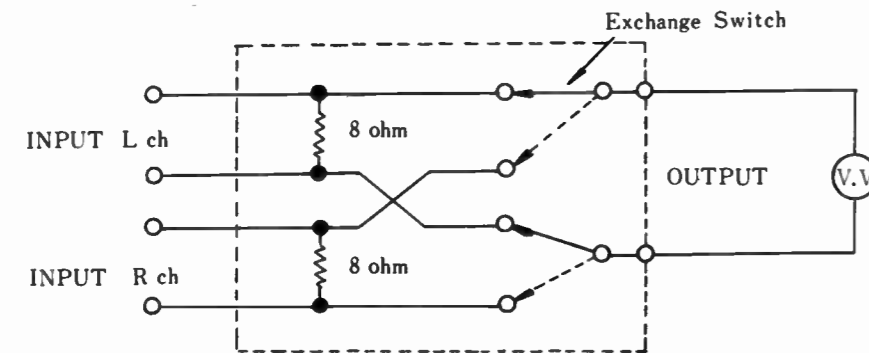


Fig. 3 Dummy Load Selector

Oscilloscope: High sensitivity general purpose

b. SCA Circuit Adjustments

- Step 1. SCA SG output are connected to C301 (3uF/16V) and VTVM & 8 ohm resistor are connected to the jack of right speaker in parallel.
- Step 2. FUNCTION selector is set to FM Stereo position.
- Step 3. Adjust the transformers T14 and T15 to maximum audio output power shown by SCA signal.

c. STEREO Circuit Adjustments

- Step 1. The output of FM signal generator is connected to the ANTENNA terminal (300 ohm) of the set.
- Step 2. The modulation of Stereo signal generator is changed to "R"ch signal by following methods.
  - a. Turn the Dummy load selector to "R"ch
  - b. FUNCTION selector is set to FM position
- Step 3. The output of FM signal generator should be turned to 98 MHz, 30uV accurately.
- Step 4. Set the FUNCTION selector to FM STEREO position.
- Step 5. Connect the VTVM to transformer T18 (secondary).  
Adjust the transformers T16, T17 and T18 for maximum output.
- Step 6. Connect the VFVM to right speaker and adjust the transformer T18 for maximum output.

d. SEPARATION Adjustments

- Step 1. Set the output of FM signal generator to 60 dB (1mV)
- Step 2. Set "R"ch volume control R450 to the position of 2V (8 dB)
- Step 3. Turn the stereo signal generator from "R"ch to "L"ch and bring down the dummy load selector switch to "R"ch.
- Step 4. Set "L"ch volume control R415 to the output position of 2V (8dB)
- Step 5. Turn the dummy load selector switch to "R"ch side without changing the modulation of stereo signal generator, and then adjust the volume control R318 for "R"ch output less than 18dB.
- Step 6. Change the modulation of Stereo signal generator by "R"ch and switch on dummy load selector to "L"ch, and then confirm to be less than 18db for "L"ch audio output.

e. Check of Stereo indicator lamp

Check the Stereo indicator lamp whether it is illuminated or not when the stereo signal of the outputs (26db) is received from FM signal generator.

AM Circuit

Test Equipment Required

AM standard signal generator covering the 455KHz IF band the medium wave band.

The modulation is set to 30% for 400Hz modulation frequency. (If available, a sweep generator for the 455KHz band will speed up the alignment.)

VTVM: Low range AF

Oscilloscope: General purpose

IF Amplifier alignment

Note:

- a. For safety, the output should be connected to loud speakers or equivalent resistance loads.
  - b. Set the panel controls as follows:
    - FUNCTION selector to AM
    - MODE selector to MONO
    - VOLUME control at fully clockwise (maximum)
  - c. The modulated 455KHz signal is connected to transistor Q4 (SE3001) Base, and should be kept at a low level consistent with good measurement.
- Step 1. Connect the VTVM to the Right speaker terminal.
  - Step 2. Connect the resistor 100K ohm to the transformer T7 (secondary).
  - Step 3. Adjust the IF transformer T6, T7, T10, and T12 for maximum indication.
  - Step 4. Repeat the step 3 two or three times.
  - Step 5. Disconnect the resistor 100k ohm from the transformer T7 (secondary).

AM Tuning circuit

The panel control setting is the same as for IF amplifier tests.

The VTVM (and scope) connection is made to the right speaker terminal.

The signal generator is set to 30% modulation of 400Hz output.

- Step 1. Set the generator to 600KHz and connect to loop antenna.  
Tune the receiver to this signal.
- Step 2. Adjust the oscillator coil T4 and the shorting ring on the antenna loopstick L6 for maximum output.
- Step 3. Set the generator to 1,400KHz and tune the receiver to this signal.
- Step 4. Adjust the trimmers ACT1, and ACT2 for maximum output.
- Step 5. Repeat the steps 1 through 4 two or three times for the best tracking.

SEMICONDUCTORS

ITEM	PART NO./TYPE	Q4	SE3001
D1	1S2139B	Q5	SE3001
D3	1N60	Q6	CS9016
D4	1N60	Q7	CS9016
D5	HV-23	Q8	CS9016
D6	1N60	Q9	2SC460
D7	1N60(P)	Q10	SE1001
D8	1N60(P)	Q11	SE1001
D9	1N60(P)	Q12	SE1001
D10	1N60(P)	Q13	SE1001
D11	1N60(P)	Q14	CS9012
D12	1N60(P)	Q15	SE4010
D13	1N60(P)	Q16	SE4010
D14	1N60(P)	Q17	SE4010
D15	10D-1	Q18	SE4010
D16	10D-1	Q19	2SB187
D16	10D-1	Q20	2SB187
D17	10D-1	Q21	2SB186
D19	10D-1	Q22	2SB186
D20	10D-1	Q23	2SB474
Q1	SE5050	Q24	2SB474
Q2	SE5006	Q25	2SB474
Q3	SE5006	Q26	2SB474

ELECTROLYTIC/VARIABLE CAPS

ITEM	VALUE
AC1	AM Tuning Gang
AC2	AM Tuning Gang
AC3	AM Tuning Gang
ACT1	AM Antenna Trimmer
ACT2	AM Oscillator Trimmer
C116	33mfd 16V
C129	22mfd 6.3V
C213	10mfd 16V
C228	10mfd 16V
C231	10mfd 16V
C301	33mfd 16V
C302	33mfd 16V
C308	3.3mfd 16V
C309	33mfd 16V
C313	3.3mfd 16V
C326	3.3mfd 1.6V
C330	100mfd 16V
C402	.47mfd 16V
C403	10mfd 25V
C404	10mfd 25V
C405	10mfd 25V
C406	10mfd 25V
C409	3.3mfd 16V
C410	220mfd 25V
C411	100mfd 6.3V
C412	3.3mfd 16V
C414	100mfd 6.3V
C415	470mfd 25V
C417	.47mfd 16V
C425	3.3mfd 16V
C427	100mfd 6V
C428	3.3mfd 16V
C430	100mfd 6V
C431	470mfd 25V
C501	100mfd 50V
C504	500mfd 50V Dual
C508	1000mfd 50V
C510	470mfd 25V
C512	470mfd 25V
C513	470mfd 25V
C514	470mfd 25V

ITEM	PART NO./TYPE	DESCRIPTION
FC1	FM Tuning Gang	
FC2	FM Tuning Gang	
FC3	FM Tuning Gang	
FCT1	FM RF Tuner	
FCT2	FM Antenna Trimmer	
FCT3	FM Oscillator Trimmer	

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R318	R382002	10K Separation
R335		6.8 ohm
R431		.5 ohm WW
R434		.5 ohm WW
R463		.5 ohm WW
R467		.5 ohm WW
R471	R382009	2000 ohms Gain
R472	R361033	100K Balance
TH1	D-1A	Thermistor
TH2	D-1A	Thermistor
TH3	D-1A	Thermistor
TH4	D-1A	Thermistor

COILS/TRANSFORMERS

ITEM	PART NO.	DESCRIPTION
T1	K-112	T12 C-24
T2	K-113	T13 WM1403
T3	RM018	T14 H801
T4	OM0163	T15 H801
T5	WM1401	T16 H802
T6	A-16	T17 R120049
T7	A-18	T18 H804
T9	WM1401	T19 H803
T10	B-15	T20 R120049
T11	WM1402	T21 R110080

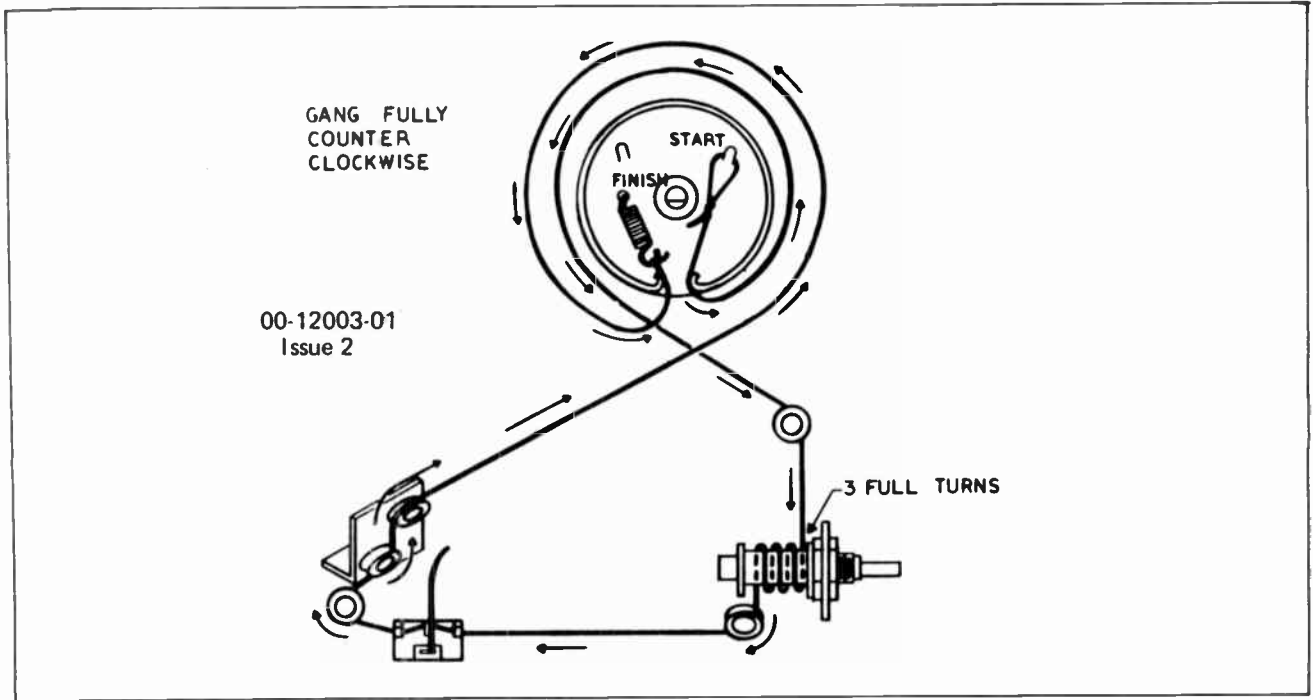
MISCELLANEOUS

NAME	PART NO.
Fuse, 1A	R412009
Fuse, .7A	R412010
P.C. Board, RF	R530188A
P.C. Board, IF	R530189B
P.C. Board, MPX	R530191B
P.C. Board, Audio	R530192B
Switch, Selector	R421023
Switch, Power	R429025
Switch, Mode	R429024
Switch, Loudness	R429024

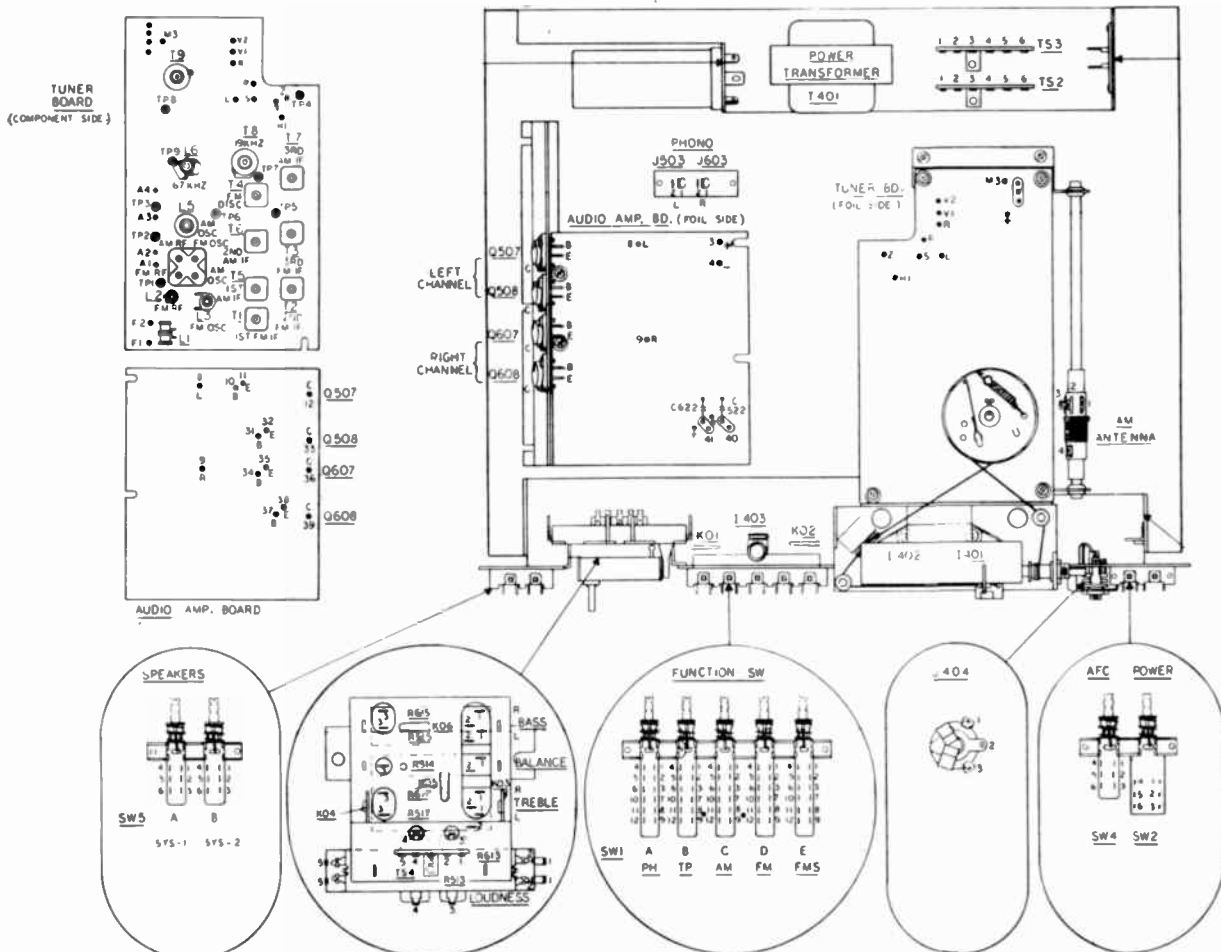
CABINET PARTS

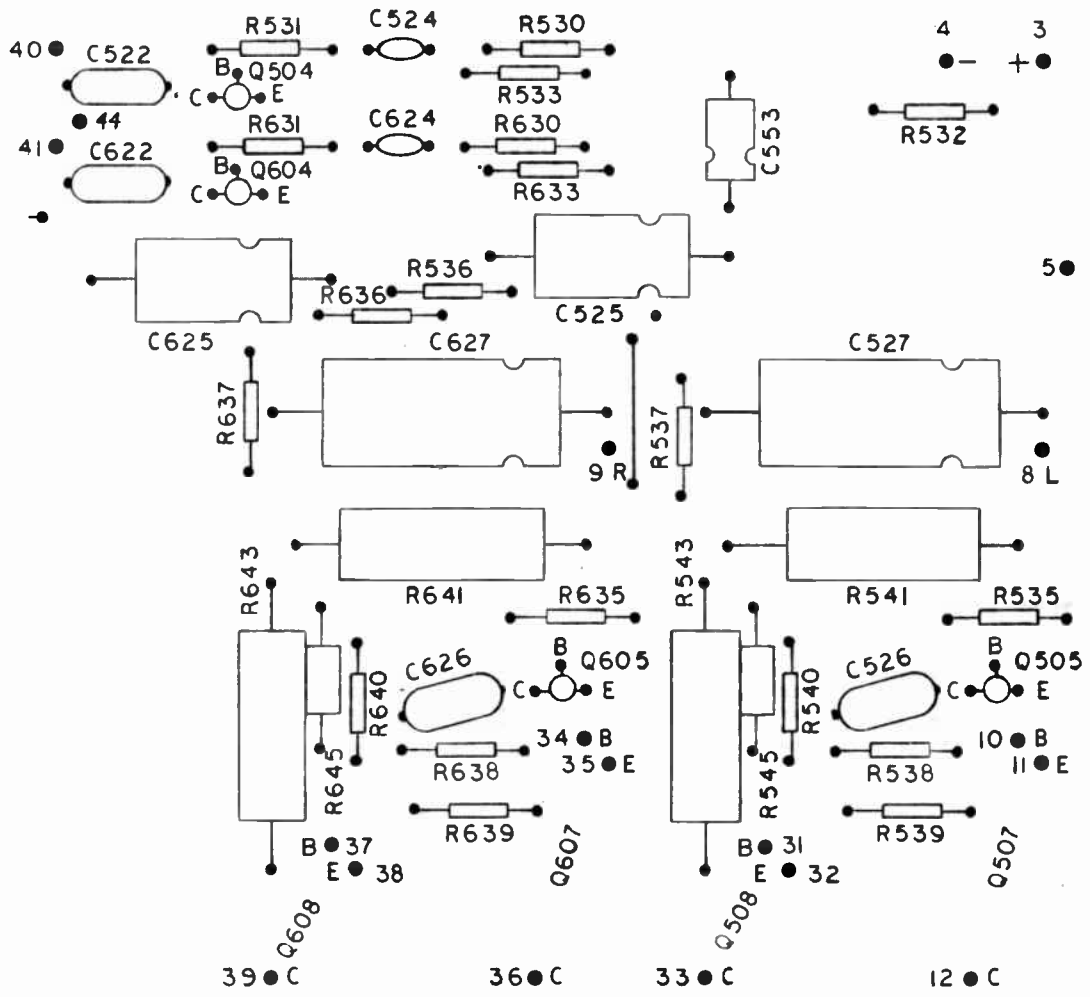
NAME	PART NO.
Board, Side	R849027
Cover, Top	R651396
Cover, Bottom	R651169
Panel, Rear	R651383
Plate, Control	R636491
Plate, Decoration	R636492
Trim, Escutcheon	R810900
Knob, Selector	R871129
Knob, Tuning	R871128
Assembly, Speaker Cabinet	R849028

**STRINGING DETAIL**



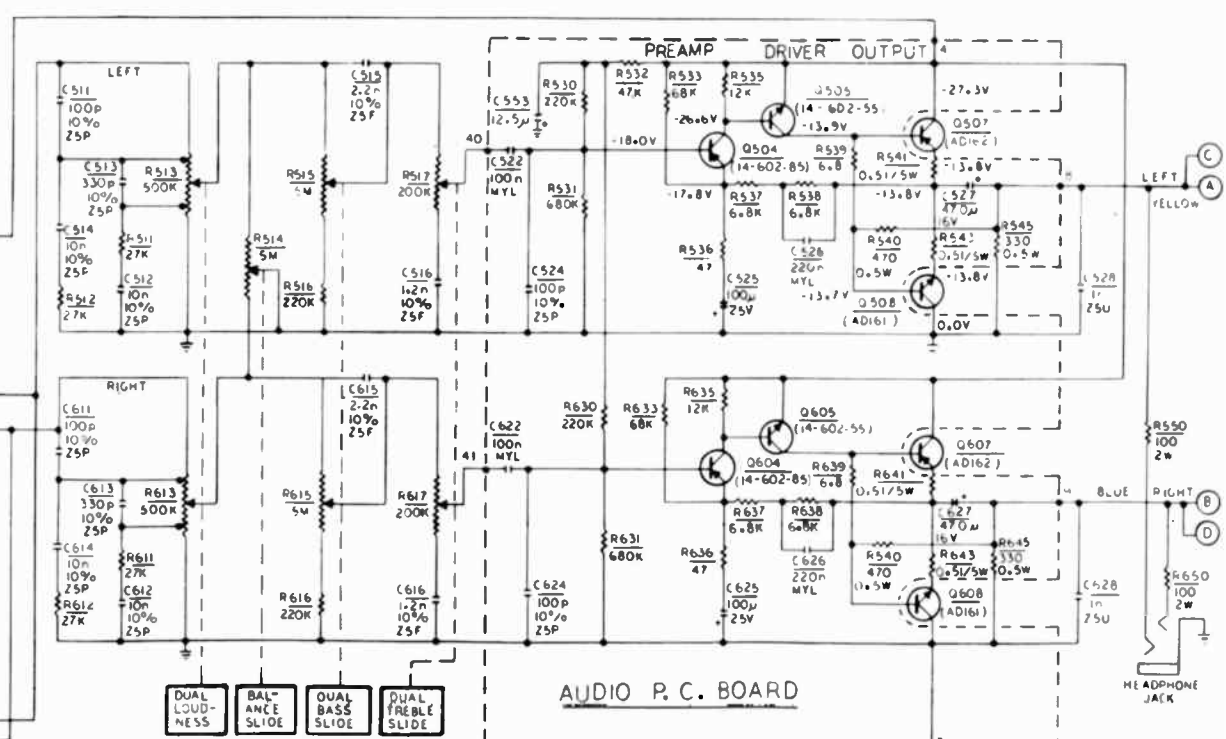
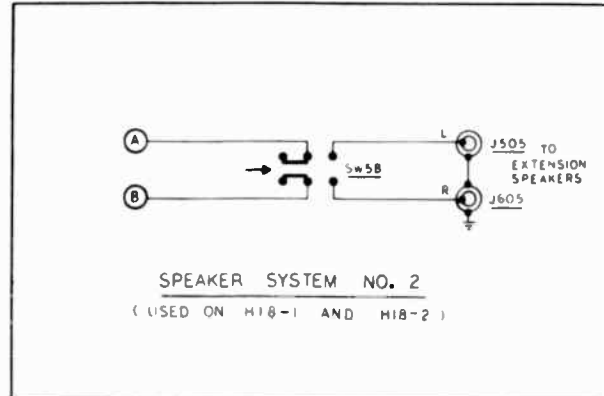
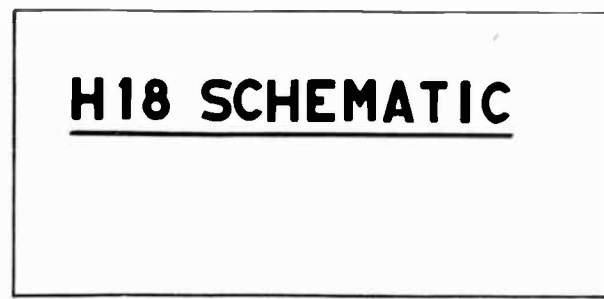
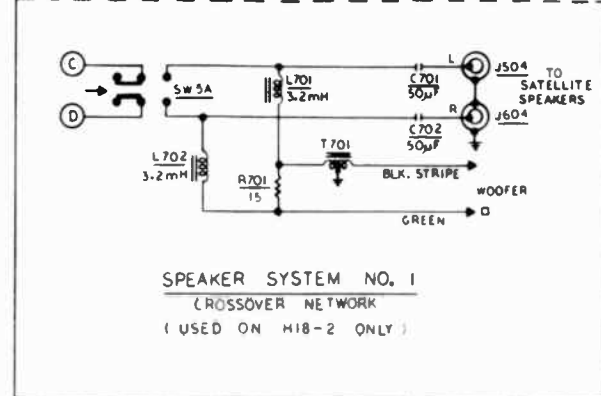
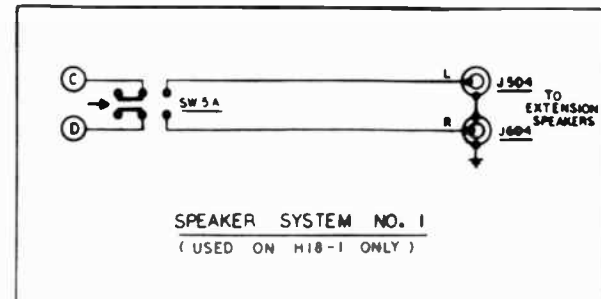
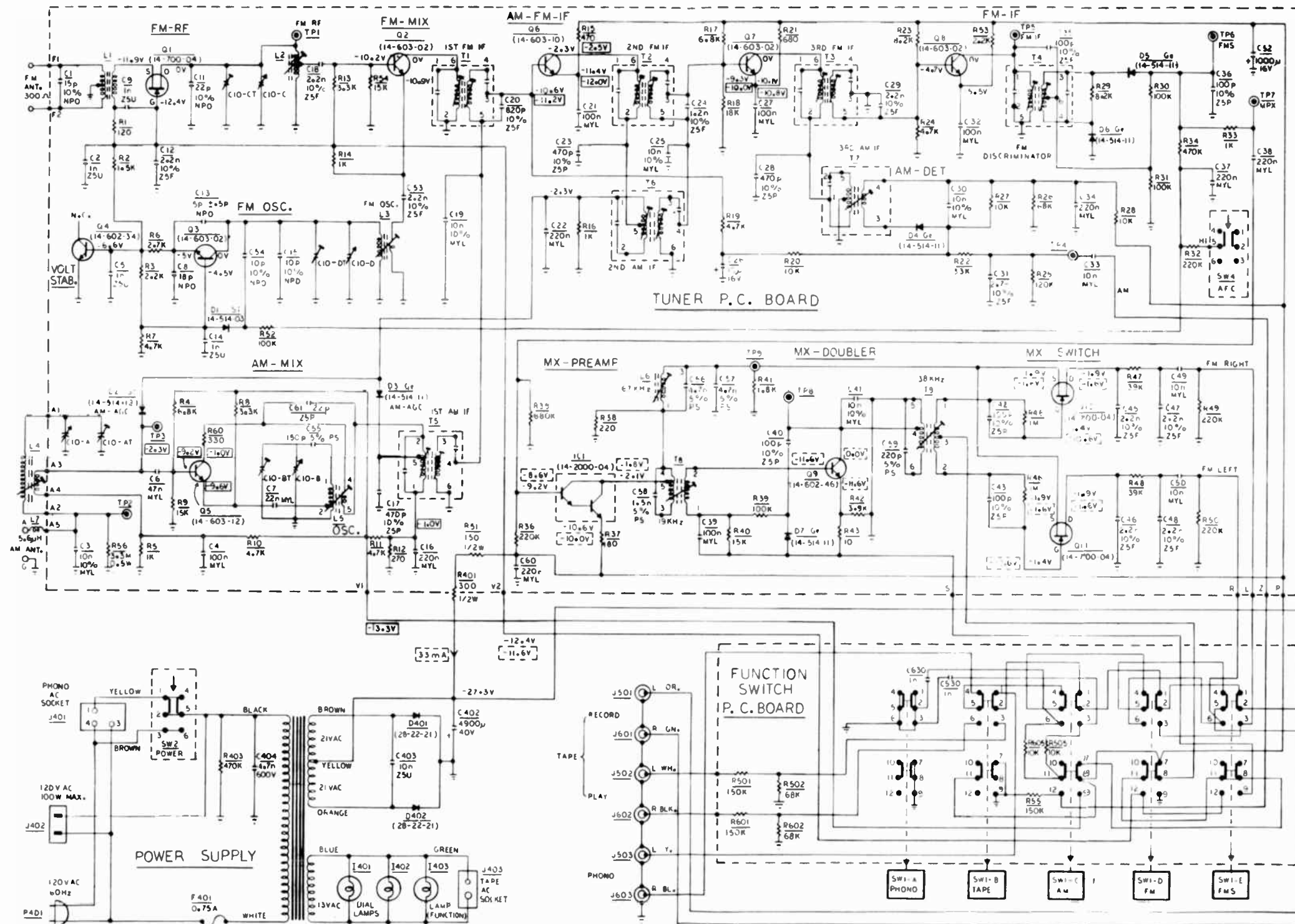
**CHASSIS LAYOUT**





TRANSISTOR VOLTAGES				
PHONO FUNCTION				
NO SIGNAL				
LEFT Q	RIGHT Q	B	E	C
504	604	-18.0	-17.8	-26.6
505	605	-26.6	-27.3	-13.9
507	607	-13.9	-13.8	-27.3
508	608	-13.7	-13.8	0

### AUDIO AMPLIFIER COMPONENT LAYOUT



**LEGEND**

<b>RESISTORS</b> UNIT: OHM (Ω) 1/4 WATT - 5% TOLERANCE UNLESS OTHERWISE SPECIFIED	<b>SPECIAL CAPACITOR IDENTIFICATION</b> OF OIL FILLED M MICA PS SILVER MICA PW POLYSTYRENE MYL METALIZED MYLAR MP METALIZED PAPER
<b>CAPACITORS</b> UNIT: FARAD (F) VOLTAGE D.C.W.V.	<b>TEMPERATURE COEFFICIENT EXAMPLES:</b> NPO NEGATIVE POSITIVE ZERO N220 NEGATIVE 220 P/P °C
TUBULAR CURVED LINE - OUTSIDE FOIL	
ELECTROLYTIC CURVED LINE - CAN	
CERAMIC, MICA OR OTHER TYPE WITH NO OBVIOUS OUTSIDE OR GROUNDED SIDE, TOLERANCE AND TEMPERATURE CHARACTERISTIC NOTED IF CRITICAL	

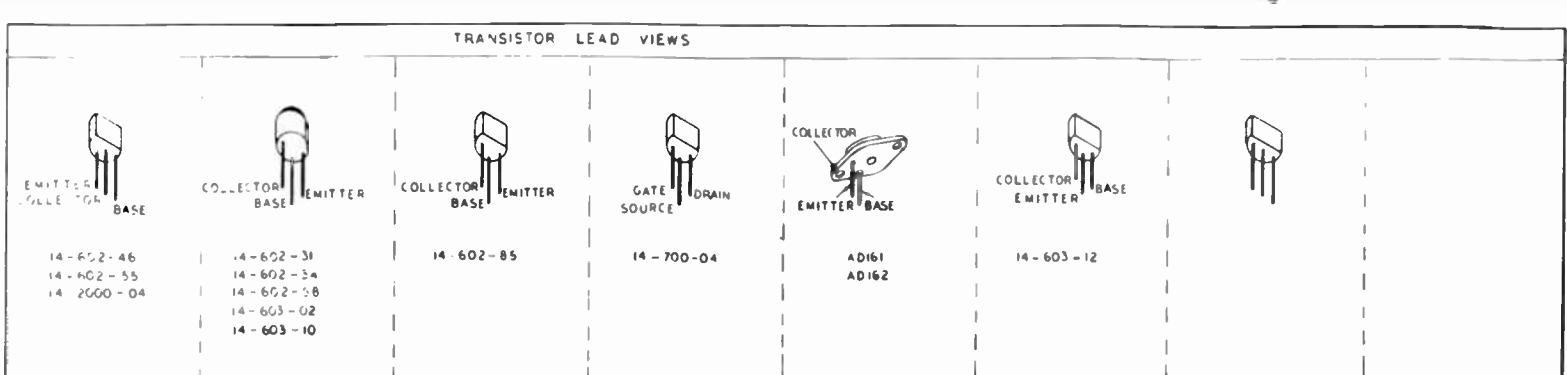
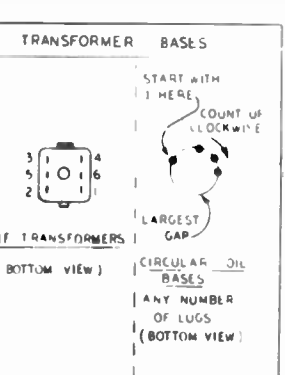
**MULTIPLIERS**

MULTIPLE OR SUB-MULTIPLE	PREFIX	SYMBOL
10 <sup>6</sup>	MEGA	M
10 <sup>3</sup>	KILO	K
10 <sup>-3</sup>	MILLI	m
10 <sup>-6</sup>	MICRO	μ
10 <sup>-9</sup>	NANO	n
10 <sup>-12</sup>	PICO	p

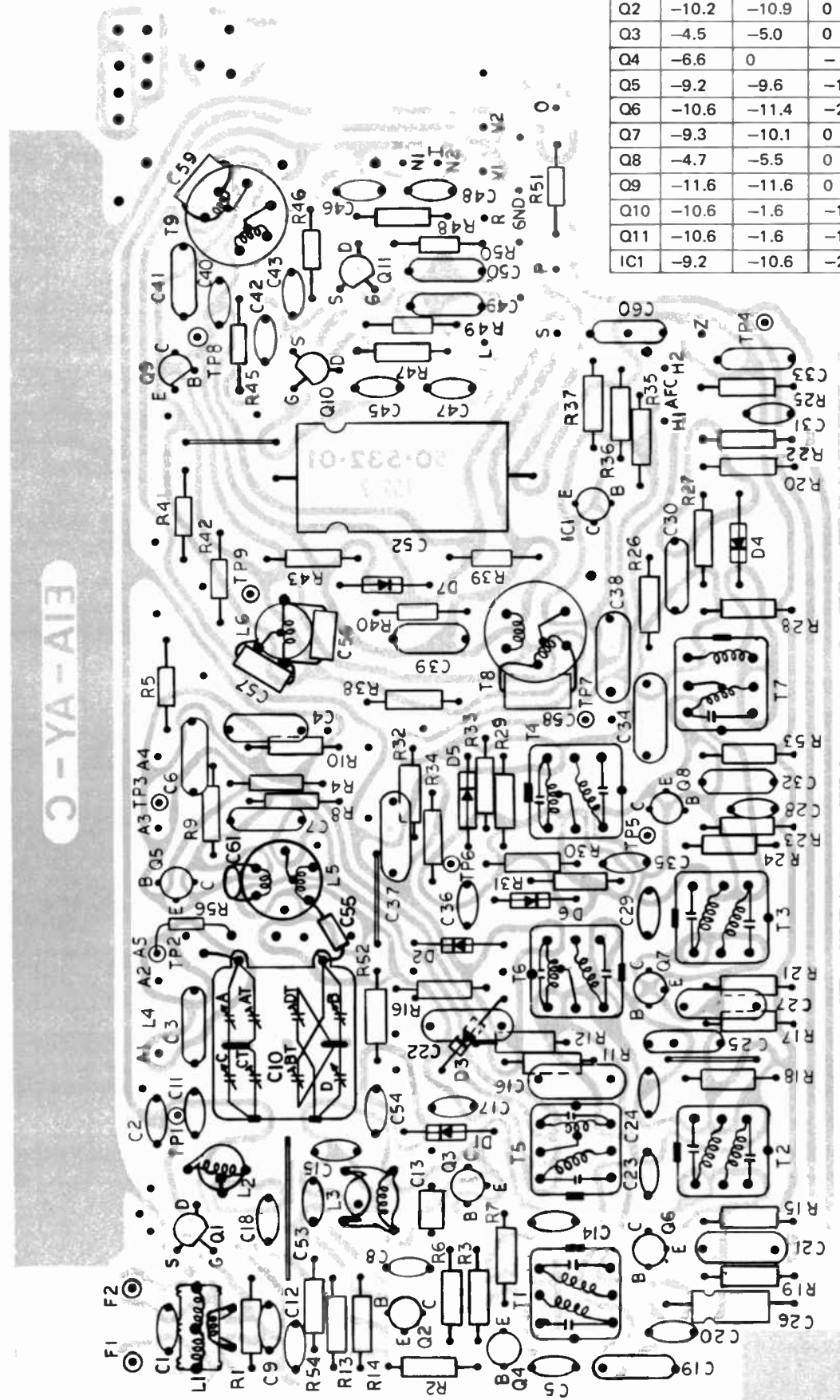
EXAMPLE: 1nF = 10<sup>-9</sup> FARAD = .001 μF = 1000 pF

**VOLTAGE NOTATION**

DC VOLTAGES	±10%			
TUNER	FUNCTION	FMS	SIGNAL	LOUDNESS
0.0V	AM	OFF	NO	FULLY CC-W.
0.0V	FM	OFF	NO	FULLY CC-W.
0.0V	FM	ON	STEREO	FULLY CC-W.
0.0V	PHONO	OFF	NO	FULLY CC-W.



# TUNER COMPONENT LAYOUT



Q	B	G	E	S	C	D	FUN.
Q1	-12.4		-11.9		0		FM
Q2	-10.2		-10.9		0		FM
Q3	-4.5		-5.0		0		FM
Q4	-6.6		0		-		FM
Q5	-9.2		-9.6		-1.0		AM
Q6	-10.6		-11.4		-2.3		FM
Q7	-9.3		-10.1		0		FM
Q8	-4.7		-5.5		0		FM
Q9	-11.6		-11.6		0		FMS
Q10	-10.6		-1.6		-1.6		FMS
Q11	-10.6		-1.6		-1.6		FMS
IC1	-9.2		-10.6		-2.1		FM

# ALIGNMENT INSTRUCTIONS

Step	Dummy Antenna	Signal Frequency	Signal Applied to	Function Switch Setting	Dial Setting	Indicator	Adjust	Remarks
1	0.1uF	455 KHz 400 Hz, 30%	TP #3	AM	600 KHz	AC VTVM Scope TP #4 Coupling Capacitor 10uF	T7 Top & Bottom T8 Top & Bottom T5 Top & Bottom	Adjust for maximum indication, set gen. output to keep indicator reading below 50 mV.
AM RF		600 KHz	Radiated to Rod Loop	Same	Same	Same	L5 Dc Rod Loop	Same
2	Same	1400 KHz	Same	Same	1400 KHz	Same	Trimmers C10-BT & C10-AT	Same
Repeat Steps 2 & 3 until no further improvement can be made. FM IF CW ALIGNMENT								
4	0.1uF	10.7 MHz No modulation AM	TP #1	FM	Point of no Interference	DC VTVM thru Dial. Probe to TP #5	T1 Top & Bottom T4 Bottom Slug T3 Top & Bottom T2 Top & Bottom	Adjust for maximum indication, set gen. output to keep indicator reading below 0.5 V.
5	Same	Same	Same	Same	Same	DC VTVM Dial. Probe* to TP #6	T4 Top Slug	Adjust for zero D.C. Volts
FM IF SWEEP ALIGNMENT								
4a	Same	10.4 to 11 MHz Sweep	Same	Same	Same	Scope thru Dial. probe* to TP #5	T4 Bottom Slug T3, T2 & T1 Top & Bottom Slugs	Adjust for Waveform A
5a	Same	Same	Same	Same	Same	Scope to TP #6	T4 Top Slug	Adjust for Waveform B
FM RF 400Hz 22.5KHz DEVIATION								
6	FM Dummy Ant.	90 MHz	FM Ant. Terminal	Same	90 MHz	AC VTVM TP #5	L3, L2	Adjust for maximum indication.
7	Same	104 MHz	Same	Same	104 MHz	Same	Trimmers C10-DT C10-CT	Adjust for maximum indication.
Repeat Steps 6 & 7 until no improvement can be made. MULTI-PLEX ALIGNMENT								
8	-	67 KHz 0.5V Rin 600 ohm	TP #7	FMS	Point of no Interference	AC VTVM to TP #9	L8, 87 KHz	Adjust for minimum indication
9	-	FM multiplex generator modulated by 19 KHz pilot.	FM Antenna	FMS	Same	AC VTVM to TP #8	T8, T9	Adjust for maximum indication, set input level as low as possible.
10	FM MPX gen. modulated by composite signal - right channel.	Same	Same	FMS	Same	AC VTVM to right channel	T8, 19 KHz	Adjust for maximum indication on right channel, minimum indication on left channel.
FM STEREO "ON THE AIR" ALIGNMENT								
11	Good outside ant.	Local FM Stereo Station	FM Antenna Terminal	FMS	Tune to local FM Stereo Station	Listen to local one-channel modulation	T8, T9	Adjust for maximum on desired channel & minimum on the other.

N.B. Audio output leads, power transformer, A.C. line leads should be kept away from ferrite rod and input of the tuner at least 4".

# Electrohome Manhattan (Ch. H18-202), SC420 (Ch. H18-201)

# SEMICONDUCTORS

ITEM	PART NO.	TYPE
D1	14-514-03	1N43182AFC
D2	14-514-12	
D3	14-514-11	1N542
D4	14-514-11	1N542
D5	14-514-11	1N542
D6	14-514-11	1N542
D7	14-514-11	1N542
D401	28-22-21	
D402	28-22-21	
IC1	14-2000-04 (14-2000-05)	
Q1	14-700-04	TIS88
Q2	14-603-02	SE5006
Q3	14-603-02	SE5006
Q4	14-602-34	S1891B
Q5	14-603-12	BF255
Q6	14-603-10	SE5006
Q7	14-603-02	SE5006
Q8	14-603-02	SE5006
Q9	14-602-46	BC169C
Q10	14-700-04	TIS88
Q11	14-700-04	TIS88
Q504	14-602-58	S24612
Q505	14-602-55	TIS90
Q507 &	14-604-03	AD161/162
Q508		
Q604	14-602-58	S24612
Q605	14-602-55	TIS90
Q607 &	14-604-03	AD161/162
Q608		

# COILS/TRANSFORMERS

ITEM	PART NO.
L1	21-638-02
L2	21-653-01
L3	21-654-01
L4	21-652-02
L5	21-622-03
L6	21-607-07
L7	21-1400-03 (21-1400-09)
T1	21-646-01
T2	21-646-02
T3	21-646-02
T4	21-647-01
T5	21-648-01
T6	21-648-01
T7	21-649-01

# MISCELLANEOUS

ITEM	NAME	PART NO.
F401	Fuse, .75A	27-14-04
SW1	Switch, Function	26-203-28
SW2	Switch, Power	26-203-29
SW4	Switch, AFC	26-203-29
SW5	Switch, Speakers Assembly, Tuner	26-203-04 02-70142-01 (02-70142-10)
	P.C. Board, Tuner	50-532-01
	P.C. Board, Audio Amp	50-536-01
	P.C. Board, Function Switch	50-551-01

# ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
C26	44-110005-03	10mfd 16V
C52	44-110205-17	1000mfd 16V
C402	44-201-27	4900mfd 40V
C525	44-110106-06	100mfd 25V
C527	44-147105-09	470mfd 16V
C553	44-115006-04	15mfd 25V
C625	44-110106-06	100mfd 25V
C627	44-147105-09	470mfd 16V
	45-68-01	Tuning Gang

# CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R513 &	41-279-01	500K Dual Volume
R613		
R514	41-275-02	5meg Balance
R515 &	41-276-03	5meg Dual Bass
R615		
R517 &	41-276-01	200K Dual Treble
R617		
R541	42-41-02	.51 ohm 5% 5W
R543	42-41-02	.51 ohm 5% 5W
R641	42-41-02	.51 ohm 5% 5W
R643	42-41-02	.51 ohm 5% 5W

# CABINET PARTS

NAME	PART NO.
Panel, Control	30-429-01
Scale, Dial	30-430-01
Knob, Bass/Treble/Balance	53-1261-01
Knob, Loudness	53-1261-02
Knob, Tuning	53-1295-01
Pushbutton, Function	53-1296-01
Pushbutton, AFC/Power	53-1296-02
Pushbutton, Speaker System 1	53-1296-03
Pushbutton, Speaker System 2	53-1296-04
Cover, Dust (Models H18-201, SC420)	53-1297-01



### ALIGNMENT INSTRUCTIONS

CAUTION: Use isolation transformer or observe polarity when connecting test equipment. Maintain line voltage at 117VAC. Allow a 15-minute warm-up period. Use only enough generator output to obtain a suitable indication.

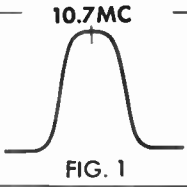
#### AM ALIGNMENT—SELECTOR IN AM POSITION

Connect generator across loop fashioned of several turns of wire. Set volume at maximum.

	GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
1.	455KC 400 cycle modulation	Tuning gang fully open.	Output Meter across voice coil.	T110, T107, T104, T103	Adjust for maximum. Repeat until no further improvement can be made.
2.	"	"	"	TC105	Adjust for maximum.
3.	600KC	"	"	L107	Rock tuning gang and adjust for maximum. Repeat steps 2 and 3 until no further improvement can be made.

#### FM IF ALIGNMENT USING AM SIGNAL GENERATOR—SELECTOR IN FM POSITION

High side of generator thru .001mfd to junction of C110 and C111, low side to ground.

	GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
4.	10.7MC Unmodulated	Point of non-interference	DC probe of VTVM to junction of VR101 and C145, common to ground	T111, T109, T106, T105, T102, T101	Adjust for maximum. 
5.	"	"	DC probe of VTVM to junction of R132 and R133, common to ground	T112	Adjust for zero reading. A positive or negative reading will be obtained on either side of the correct setting.

#### FM IF ALIGNMENT USING FM SIGNAL GENERATOR—SELECTOR IN FM POSITION

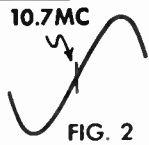
High side of generator thru .001mfd to junction of C110 and C111, low side to ground. Use only enough marker signal for indication. Use 60 cycle frequency modulated signal with 450KC sweep. Use 60 cycle sawtooth voltage in scope for horizontal deflection.

	GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
4.	10.7MC 450KC Sweep	Point of non-interference	Vert. amp of scope to junction of VR101 and C145, low side to ground.	T111, T109, T106, T105, T102, T101	Disconnect stabilizing capacitor C147. Adjust for maximum gain and symmetry of response similar to Fig. 1 with marker as shown. Reconnect C147.
5.	"	"	Vert. amp of scope to junction of R132 and R133, low side to ground.	T112	Adjust T112 Secondary to place marker at center of "S" curve similar to Fig. 2. Readjust T111 Primary for maximum amplitude and straightness of line.

**FM RF ALIGNMENT—SELECTOR IN FM POSITION**

Connect generator across antenna terminals with 120-ohm carbon resistor in series with each lead.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
6. 108.5MC	High freq. end	DC probe of VTVM to junction of VR101 and C145, common to ground	C108, TC101, TC105	Adjust for maximum.
7. 90MC Unmodulated	Tune to signal.	"	L101	Rock tuning and adjust for maximum. Repeat steps 7 and 8 until no further improvement can be made.



**FM STEREO MULTIPLEX ALIGNMENT USING FM STEREO SIGNAL GENERATOR**

High side of generator thru 47K to point  $\Delta$ , low side to ground.

GENERATOR FREQUENCY	INDICATOR	ADJUST	REMARKS
8. 19KC	Vert. amp of scope thru 47K to junct of R310 and T302, low side to ground.	T301	Adjust for maximum.
9. "	Vert. amp of scope thru 47K to junct of D303 and D304, low side to ground.	T302	Adjust for maximum 38KC response.
10. Modulated Left Channel	Vert. amp of scope to point $\Delta$ , low side to ground.	T304, T311	Adjust for MINIMUM. This step should require only slight adjustment.
11. Modulated Right Channel	Vert. amp of scope to point $\Delta$ , low side to ground	T303	Check for MINIMUM. If necessary make compromise adjustment of T311.

**SEMICONDUCTORS**

ITEM	PART NO.*
D101	EA2502/EA16X27
D102	EA2502/EA16X27
D103	EA2502/EA16X27
D104	EA2502/EA16X27
D105	EA2502/EA16X27
D106	EA2502/EA16X27
D107	EA2502/EA16X27
D108	EA2502/EA16X27
D110	EA2503/EA16X28
O301	EA2502/EA16X27
D302	EA2502/EA16X27
D303	EA2502/EA16X27
D304	EA2502/EA16X27
D305	EA2502/EA16X27
D306	EA2502/EA16X27
O307	EA2502/EA16X27
D501	EA2501/EA16X34
D502	EA2501/EA16X34
D503	EA2501/EA16X34
D504	EA2501/EA16X34
D505	EA2499/EA16X33
D506	EA2499/EA16X33
D507	EA2500/EA16X6
Q101	EA2812/EA15X130
Q102	EA2495/EA15X131
Q103	EA2493/EA15X132
Q104	EA2491/EA15X133
Q105	EA2496/EA15X134
Q106	EA2494/EA15X135
Q107	EA2494/EA15X135
Q301	EA2497/EA15X140
Q302	EA2497/EA15X140
Q303	EA2498/EA15X141
Q304	EA2770(N)/EA15X137
Q501	EA2489/EA15X136
Q502	EA2489/EA15X136
Q503	EA2489/EA15X136
Q504	EA2489/EA15X136
Q505	EA2490/EA15X153
Q506	EA2490/EA15X153
Q507	EA2488/EA15X160

**ELECTROLYTIC/VARIABLE CAPS**

ITEM	PART NO.*	VALUE
C107	EA2522/EA18X137	1mfd 15V
C147	EA2523/EA31X132	10mfd 15V
C149	EA2523/EA31X132	10mfd 15V
C150	EA2509/EA31X124	220mfd 15V
C301	EA2551/EA31X154	.47mfd 25V
C306	EA2552/EA31X153	3.3mfd 25V
C320	EA2550/EA31X146	1mfd 25V
C411	EA2509/EA31X124	220mfd 15V
C512	EA2509/EA31X124	220mfd 15V
C521	EA2510/EA31X150	4.7mfd 16V
C522	EA2510/EA31X150	4.7mfd 16V
C525	EA2509/EA31X124	220mfd 10V
C526	EA2509/EA31X124	220mfd 10V
C527		220mfd 16V
C528		220mfd 16V
C529	EA2508/EA31X151	100mfd 25V
C530	EA2508/EA31X151	100mfd 25V
C535	EA2511/EA31X149	470mfd 25V
C536	EA2511/EA31X149	470mfd 25V
C537	EA2774(N)/EA31X165(N)	220mfd 25V
C538	EA2511/EA31X149	470mfd 25V
C539	EA2506/EA31X152	1000mfd 35V
C540	EA2775(N)/EA31X166(N)	470mfd 35V
C543	EA2774(N)/EA31X165(N)	220mfd 25V
C544	EA2777(N)/EA31X168(N)	.22mfd 16V
C545	EA2506/EA31X152	1000mfd 35V
C546	EA2506/EA31X152	1000mfd 35V
C547	EA2506/EA31X152	1000mfd 35V

**CONTROLS/SPECIAL RESISTORS**

ITEM	PART NO.*	DESCRIPTION
VR301	EA2779(N)/EA49X144	
VR501	EA2780/EA49X143	Treble
VR502	EA2781/EA49X165	Treble
VR505 &	EA2782/EA49X142	Volume
VR506	EA2783/EA49X168(N)	Volume

# General Electric A505g/h, C172g, C460g, C467g/h, G270g, G504g/h, G507g, P774g, P775g (Ch. PK170)

## COILS/TRANSFORMERS

ITEM	PART NO.*
L101	EA2576/EA61X54
L102	EA2564/EA61X55
L103	EA2578/EA61X56
L104	EA2577/EA61X72
L106	EA2578/EA61X56
L107	EA2579/EA61X59
T101	EA2566/EA61X73
T102	EA2568/EA61X76
T103	EA2571/EA61X47
T104	EA2572/EA61X49
T105	EA2568/EA61X76
T106	EA2568/EA61X76
T107	EA2568/EA61X76
T108	EA2568/EA61X76
T109	EA2573/EA61X78
T110	EA2574/EA61X51
T111	EA2569/EA61X52
T112	EA2570/EA61X77
T301	EA2582/EA61X79
T302	EA2580/EA61X70
T304	EA2581/EA61X71
T401	EA2565/EA61X73
T501	EA2505/EA61X73
Power AM Ant.	EA2565/EA61X74 EA3107

## MISCELLANEOUS

NAME	PART NO.
<b>(MODEL A505g)</b>	
Assembly, Record Changer Cartridge, Phono Needle, Phono Speaker, 6" Woofer Speaker, 3" Tweeter	RD630-2 EA80X234 EA80X235 EA95X63 EA95X59
<b>(MODELS A505h, G504h)</b>	
Assembly, Record Changer Cartridge, Phono Needle, Phono Speaker, 6" Woofer Speaker, 3" Tweeter Speaker, 3KC Horn	RD730-2 EA80X234 EA80X235 EA95X63 EA95X59 EA95X56
<b>(MODEL C172g)</b>	
Assembly, Record Changer Cartridge, Phono Needle, Phono Speaker, 6" Woofer Speaker, 3" Tweeter Speaker, 3KC Horn	RD630-4 EA80X234 EA80X235 EA95X63 EA95X59 EA95X56
<b>(MODEL C460g)</b>	
Assembly, Record Changer Cartridge, Phono Needle, Phono Speaker, 6" Woofer Speaker, 3" Tweeter	RD630-3 EA80X234 EA80X235 EA95X63 EA95X45
<b>(MODEL G270g)</b>	
Assembly, Record Changer Cartridge, Phono Needle, Phono Speaker, 6" Woofer Speaker, 3" Tweeter	RD730-2 EA80X234 EA80X235 EA95X63 EA95X45
<b>(MODELS C467g, C467h)</b>	
Assembly, Record Changer Cartridge, Phono Needle, Phono Speaker, 6" Woofer Speaker, 3" Tweeter	RD730-1 EA1013/EA80X234 EA1014/EA80X235 EA8090/EA95X63 EA8089/EA95X45
<b>(MODELS G504g, G507g)</b>	
Assembly, Record Changer Cartridge, Phono Needle, Stylus Speaker, 6" Woofer Speaker, 3" Tweeter Speaker, 3KC Horn	RD630-2 EA80X234 EA80X235 EA95X63 EA95X59 EA95X56

## (MODEL P774g)

Assembly, Record Changer Cartridge, Phono Needle, Phono Speaker, 6-1/2"	RD730-4 EA1013 EA1014 EA2935
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## (MODEL P775g)

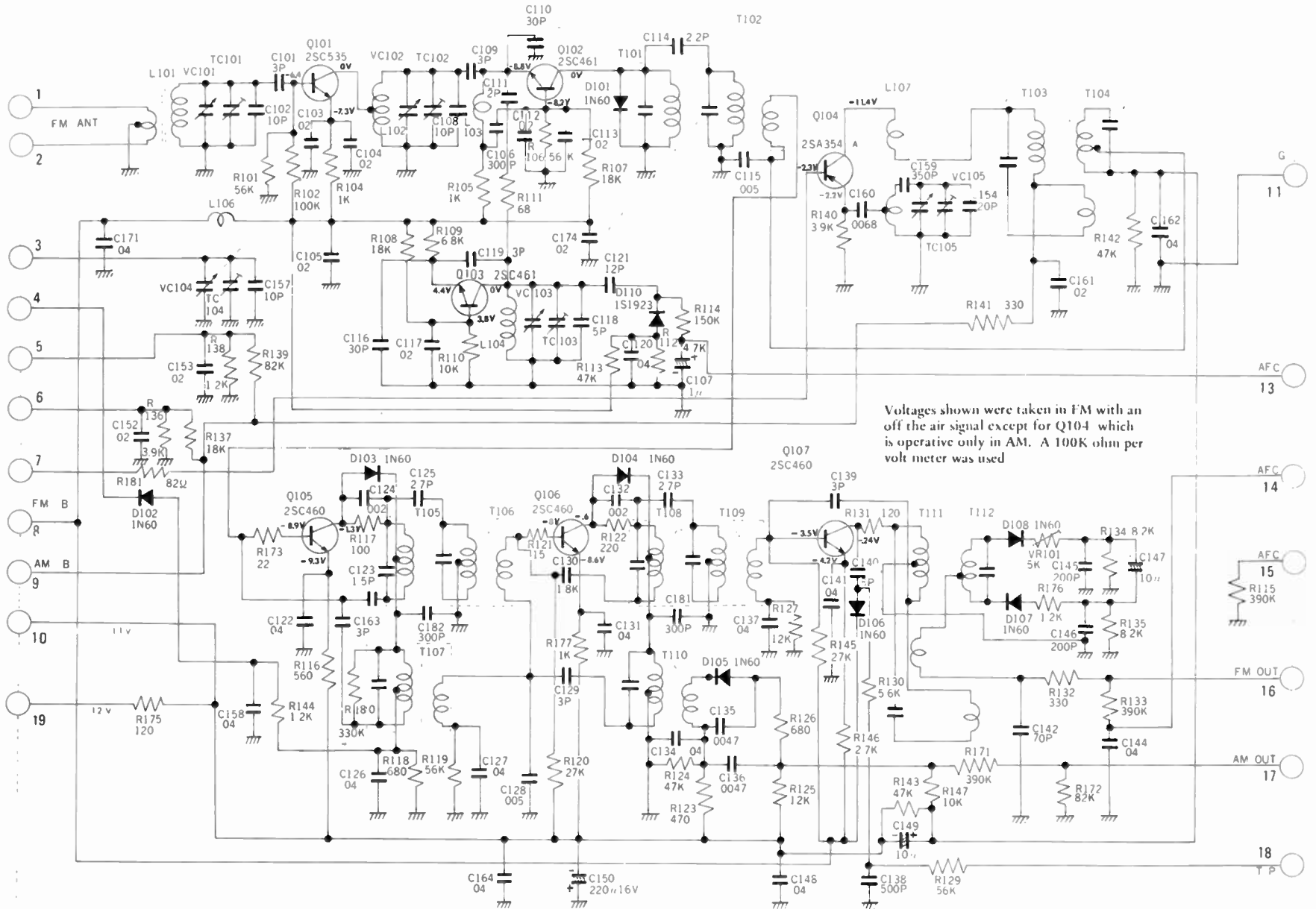
Assembly, Record Changer Cartridge, Phono Needle, Phono Speaker, 6" Woofer Speaker, 3" Tweeter	RD630-4 EA1013 EA1014 EA8468 EA8048
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## CABINET PARTS

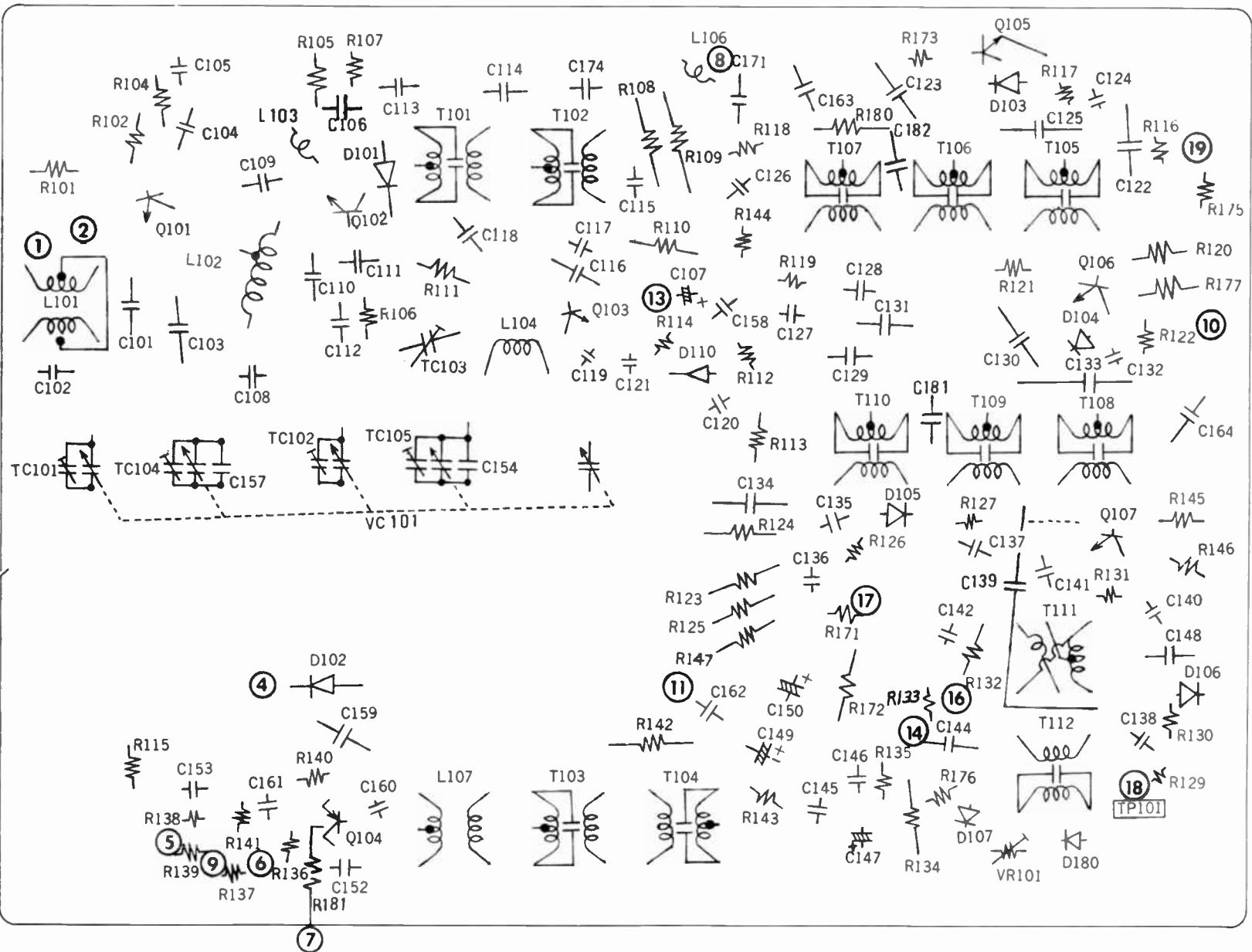
NAME	PART NO.*
<b>(COMMON)</b>	
Escutcheon, Front (All models except G270g)	EA2453/EA89X147
Inlay, Aluminum (All models except G270g)	EA2455/EA4X294
Window, Plastic Knob, Control Knob, Tuning	EA2454/EA4X293 EA2461/EA43X185 EA2462/EA43X186
<b>(MODEL A505h)</b>	
Enclosure, Speaker, Right Enclosure, Speaker, Left	EA99X220-n EA99X221-n
<b>(MODEL C172g)</b>	
Top, Cabinet Bottom, Cabinet Cabinet, Speaker Cover, Dust	EA96842 EA96X843 EA96X665 EA96X839
<b>(MODEL C460g)</b>	
Cabinet, Tuner/Amp Cabinet, Speaker Cabinet, Changer Cover, Dust	EA99X213 EA99X202 EA99X201 EA96X749
<b>(MODEL C467g)</b>	
Assembly, Main Cabinet Assembly, Speaker Cabinet Assembly, Changer Cabinet Cover, Dust	EA8785/EA99X213 EA8463/EA99X202 EA8556/EA99X201 EA8321/EA96X749
<b>(MODEL C467h)</b>	
Assembly, Main Cabinet Assembly, Speaker Cabinet Assembly, Changer Cabinet Cover, Dust	EA8819/EA99X234 EA8463/EA99X202 EA8556/EA99X201 EA8321/EA96X749
<b>(MODEL G270g)</b>	
Enclosure, Right Speaker Enclosure, Left Speaker Escutcheon, Control Inlay, Aluminum Glass, Dial	EA99X227-n EA99X228-n EA89X164-n EA4X334-n EA4X335-n
<b>(MODEL G504h)</b>	
Enclosure, Right Speaker Enclosure, Left Speaker	EA99X222-n EA99X223-n
<b>(MODEL P774g)</b>	
Assembly, Cabinet Cover, Dust Enclosure, Speaker	EA8776 EA8625 EA8724
<b>(MODEL P775g)</b>	
Top, Cabinet Bottom, Cabinet Cabinet, Speaker Cover, Dust	EA8622 EA8623 EA8463 EA8625

\* GE Major Appliance Distributor Part Number/GE Service Facility Part Number

SCHEMATIC DIAGRAM - RF BOARD

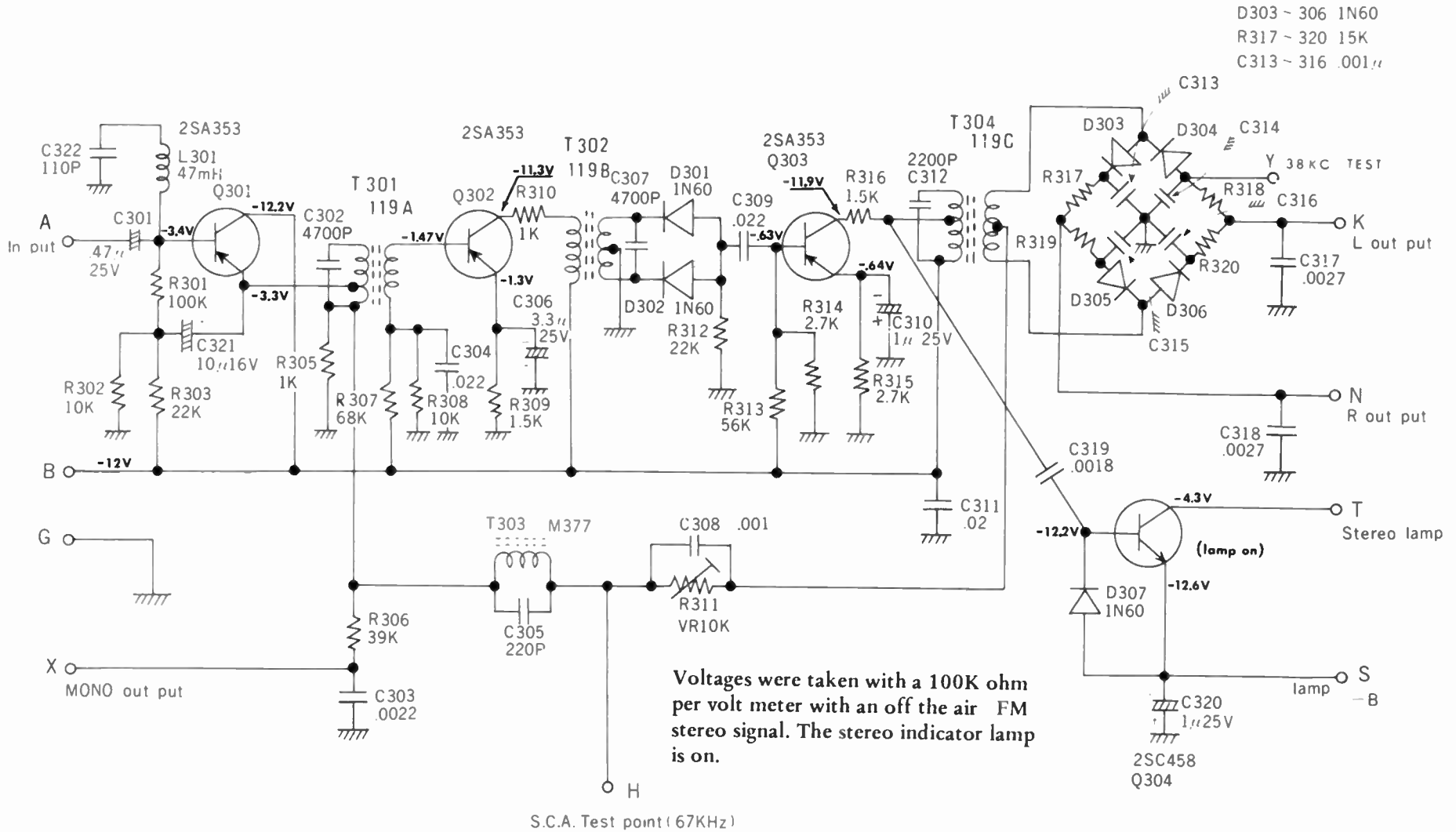


**COMPONENT LAYOUT - RF BOARD  
(BOTTOM VIEW)**

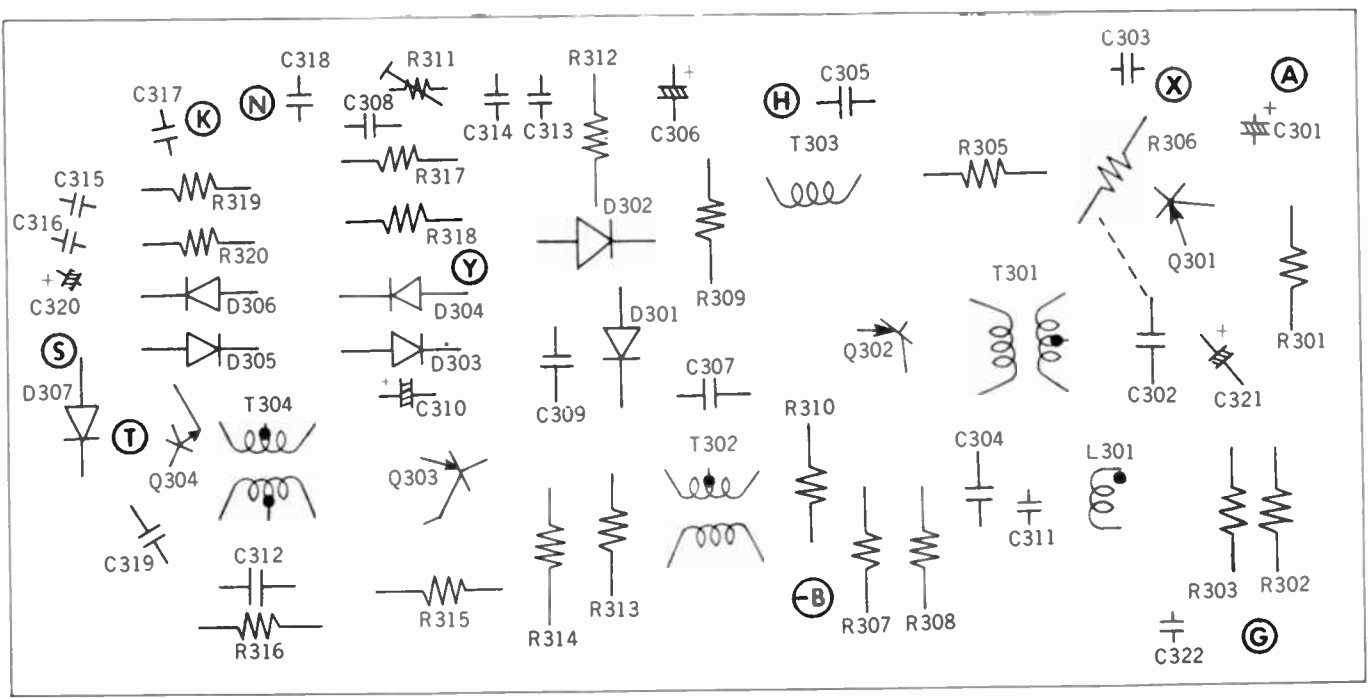


*General Electric A505g/h, C172g, C460g, C467g/h,  
G270g, G504g/h, G507g, P774g,  
P775g (Ch. PK170)*

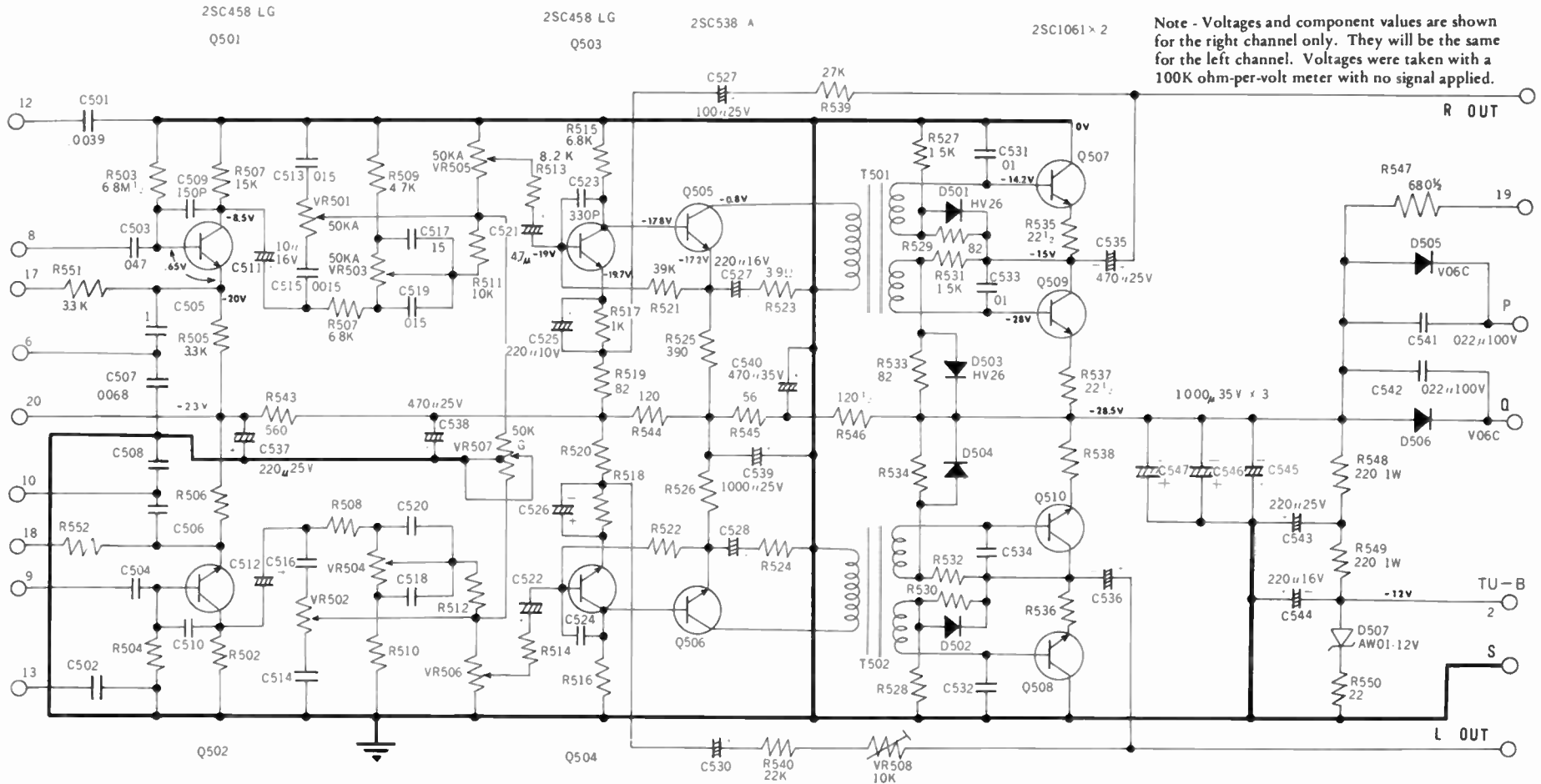
# SCHEMATIC DIAGRAM - MPX BOARD



*General Electric A505g/h, C172g, C460g, C467g/h,  
G270g, G504g/h, G507g, P774g,  
P775g (Ch. PK170)*



**COMPONENT LAYOUT - MPX BOARD  
(BOTTOM VIEW)**

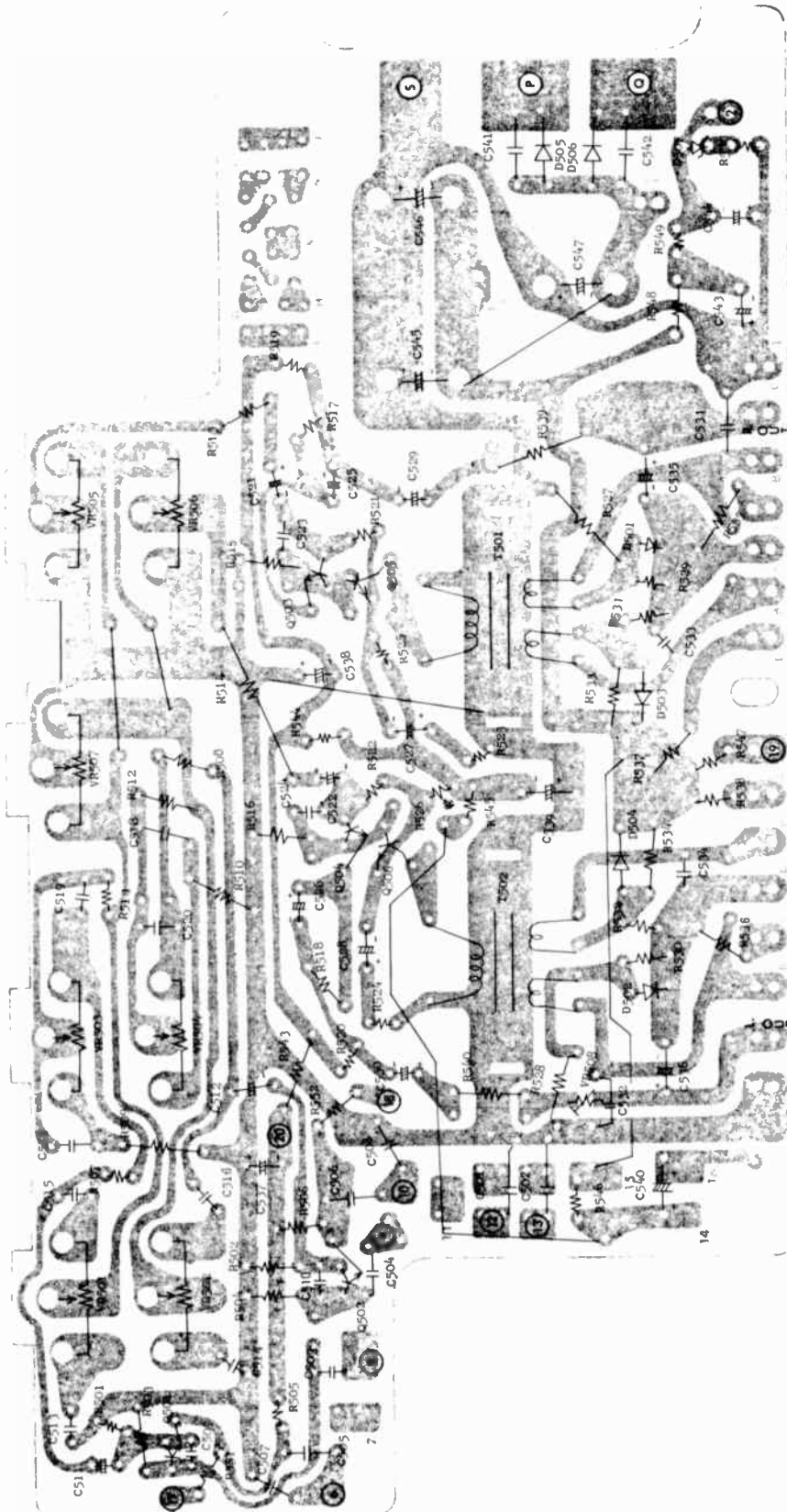


Note - Voltages and component values are shown for the right channel only. They will be the same for the left channel. Voltages were taken with a 100K ohm-per-volt meter with no signal applied.

**SCHEMATIC DIAGRAM - AUDIO BOARD**  
**PK170**

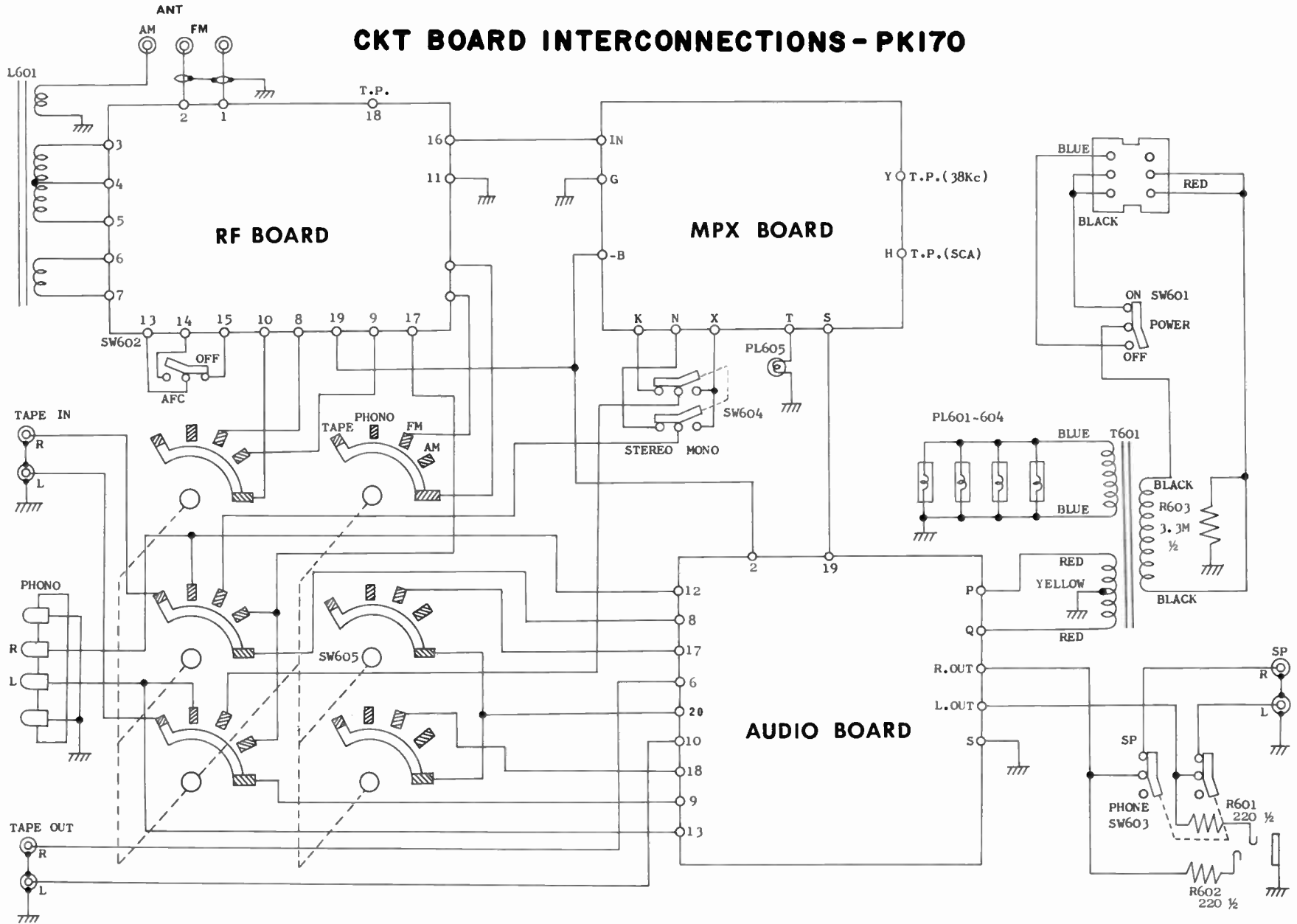


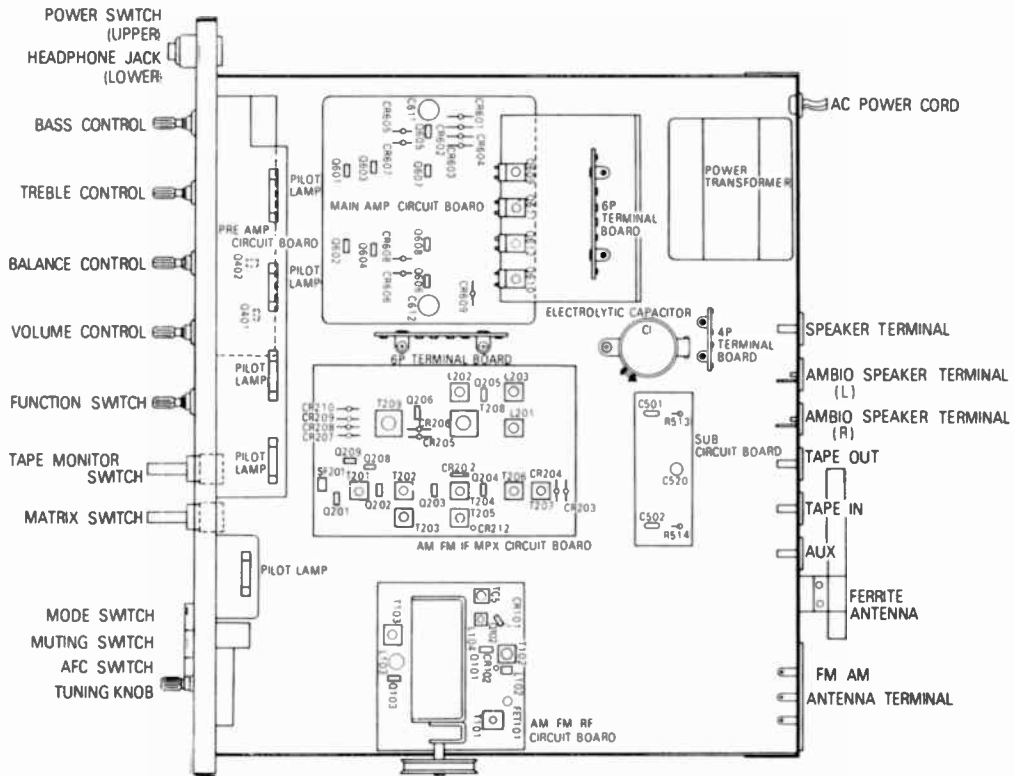
**General Electric A505g/h, C172g, C460g, C467g/h,  
G270g, G504g/h, G507g, P774g,  
P775g (Ch. PK170)**



**COMPONENT LAYOUT-AUDIO BOARD  
(BOTTOM VIEW) PK170**

# CKT BOARD INTERCONNECTIONS - PK170





**AM IF & RF ALIGNMENT**

Set function selector switch to AM

Output of signal generator should be no higher than necessary to obtain an out reading.

STEP	SIGNAL GENERATOR		TUNING DIAL SETTING	OUTPUT CONNECTED TO	ADJUSTMENT	REMARKS
	CONNECTED TO	FREQUENCY				
1	Connect the loop antenna to AM Signal Generator	455 kHz	Quieting point on band	Tape recorder "OUT" terminal AC VTVM	T103, T203 & T205	Adjust for maximum output Set VR201 center
2	Connect the loop antenna to AM Signal Generator	600 kHz Input 74dB 400 Hz 30% mod.	600 kHz	Tape recorder "OUT" terminal AC VTVM	L103	Adjust for maximum output
3	Connect the loop antenna to AM Signal Generator	1400 kHz Input 74dB 400 Hz 30% mod.	1400 kHz	Tape recorder "OUT" terminal AC VTVM	TC4	Adjust for maximum output
4	Repeat step 2 & 3 until no further improvement is possible.					
5	Connect the loop antenna to AM Signal Generator	600 kHz Weak input 400 Hz 30% mod.	600 kHz	Tape recorder "OUT" terminal AC VTVM	L1	Adjust for maximum output
6	Connect the loop antenna to AM Signal Generator	1400 kHz Weak input 400 Hz 30% mod.	1400 kHz	Tape recorder "OUT" terminal AC VTVM	TC3	Adjust for maximum output
7	Repeat step 5 & 6 until no further improvement is possible.					
8	Connect the loop antenna to AM Signal Generator	1000 kHz Input 74dB 400 Hz 30% mod.	1000 kHz	Tape recorder "OUT" terminal AC VTVM	VR201	Adjust for 250mV ±2dB

## 4-2 FM IF & RF ALIGNMENT

Do not attempt alignment unless the following equipment is available.

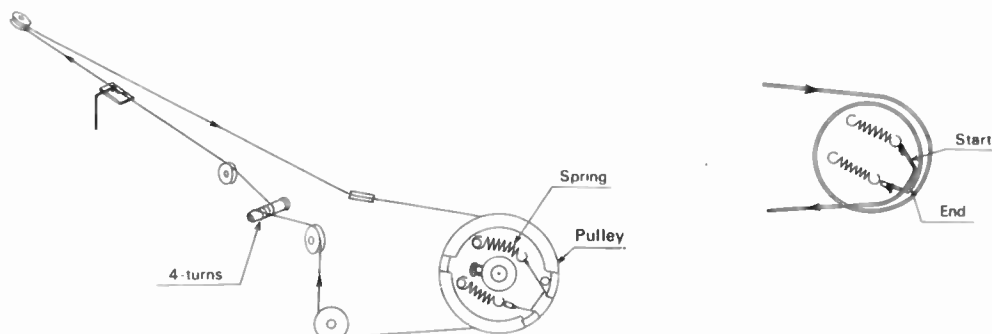
Equipment Description

FM Signal Generator, Oscilloscope, DC VTVM, AC VTVM

Set function selector switch to FM, set AFC switch to OFF

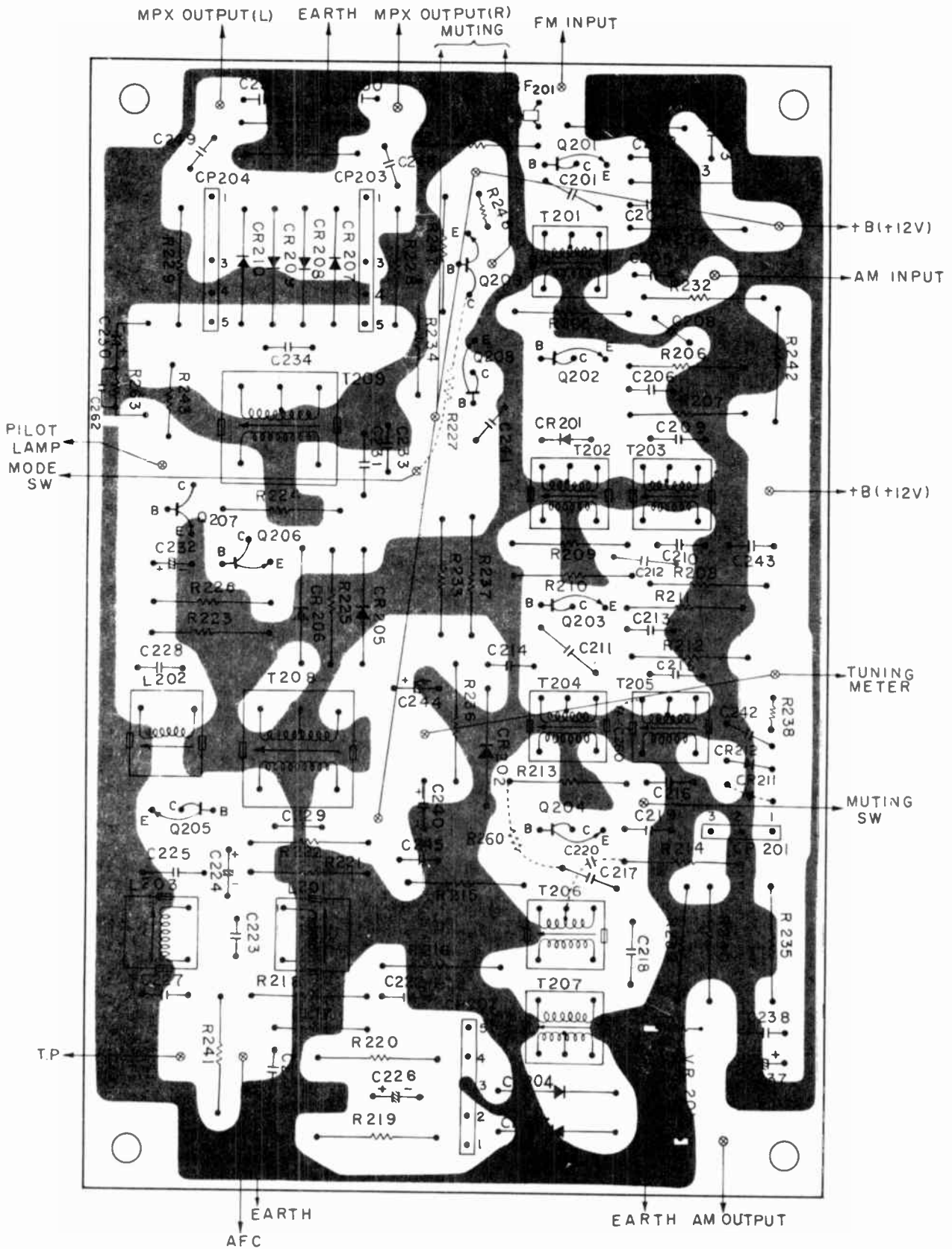
STEP	SIGNAL GENERATOR		TUNING DIAL SETTING	OUTPUT CONNECTED TO	ADJUSTMENT	REMARKS
	CONNECTED TO	FREQUENCY				
1	Connect the output of FM Signal Generator to FM antenna terminal	10.7 MHz unmod.	Quieting point on band	C226 side DC VTVM Common to ground	F102 T201, T202 T204 & T206	Adjust for maximum output
2	Connect the output of FM Signal Generator to FM antenna terminal	10.7 MHz unmod.	Quieting point on band	Junction R218, R201 DC VTVM Common to ground	T207	Adjust for zero reading
3	Connect the output of FM Signal Generator to FM antenna terminal	90 MHz Input 60dB 400 Hz 75 kHz dev.	90 MHz	Tape recorder "OUT" terminal AC VTVM	L104	Adjust for maximum output
4	Connect the output of FM Signal Generator to FM antenna terminal	106 MHz Input 60dB 400 Hz 75 kHz dev.	106 MHz	Tape recorder "OUT" terminal AC VTVM	TC5	Adjust for maximum output
5	Repeat step 3 & 4 until no further improvement is possible.					
6	Connect the output of FM Signal Generator to FM antenna terminal.	90 MHz Input 20dB 400 Hz 75 kHz dev.	90 MHz	Tape recorder "OUT" terminal AC VTVM	L101 T101	Adjust for maximum output
7	Connect the output of FM Signal Generator to FM antenna terminal	106 MHz Input 20dB 400Hz 75 kHz dev.	106 MHz	Tape recorder "OUT" terminal AC VTVM	TC1 TC2	Adjust for maximum output
8	Repeat step 6 & 7 until no further improvement is possible.					

## DIAL CORD SETTING

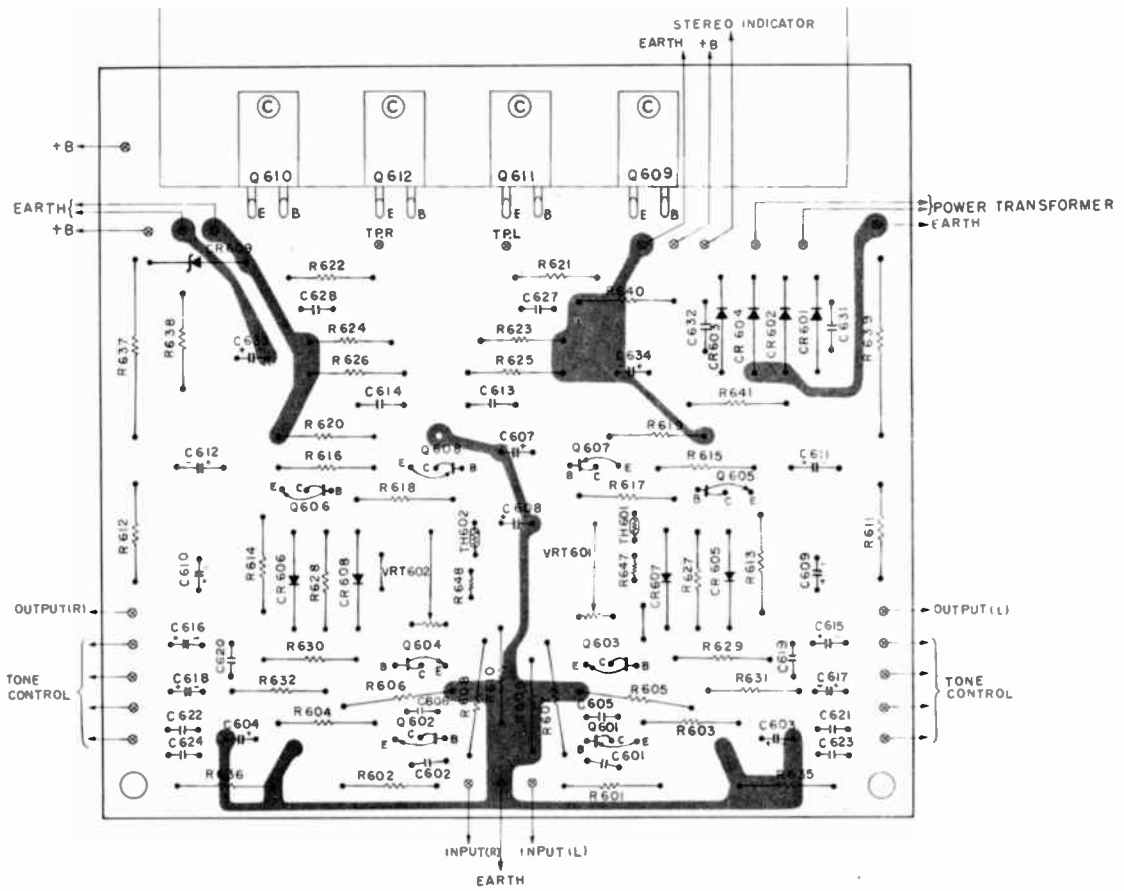


Note 1 The dial thread reel shows the position that the variable condenser is turned to the counter clockwise direction  
2 The arrows show the direction of thread winding

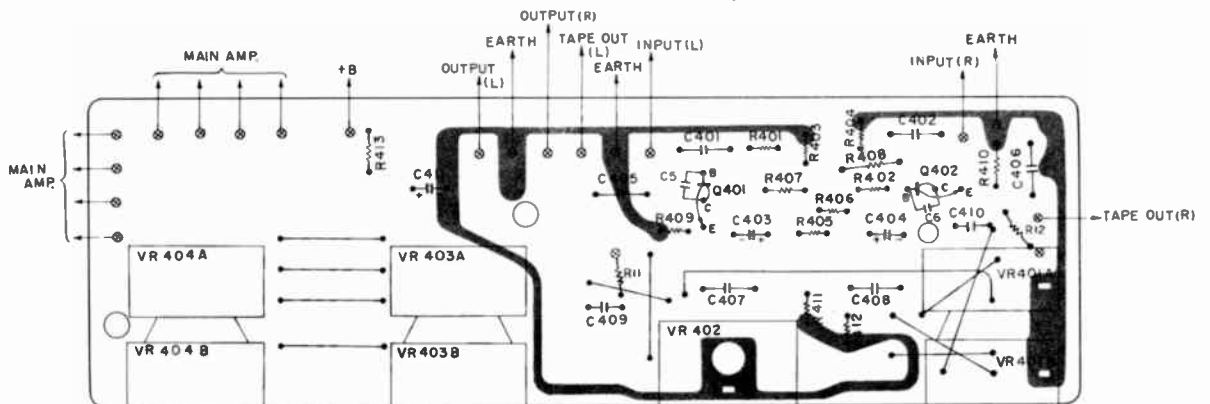
AM-FM IF MPX CIRCUIT BOARD



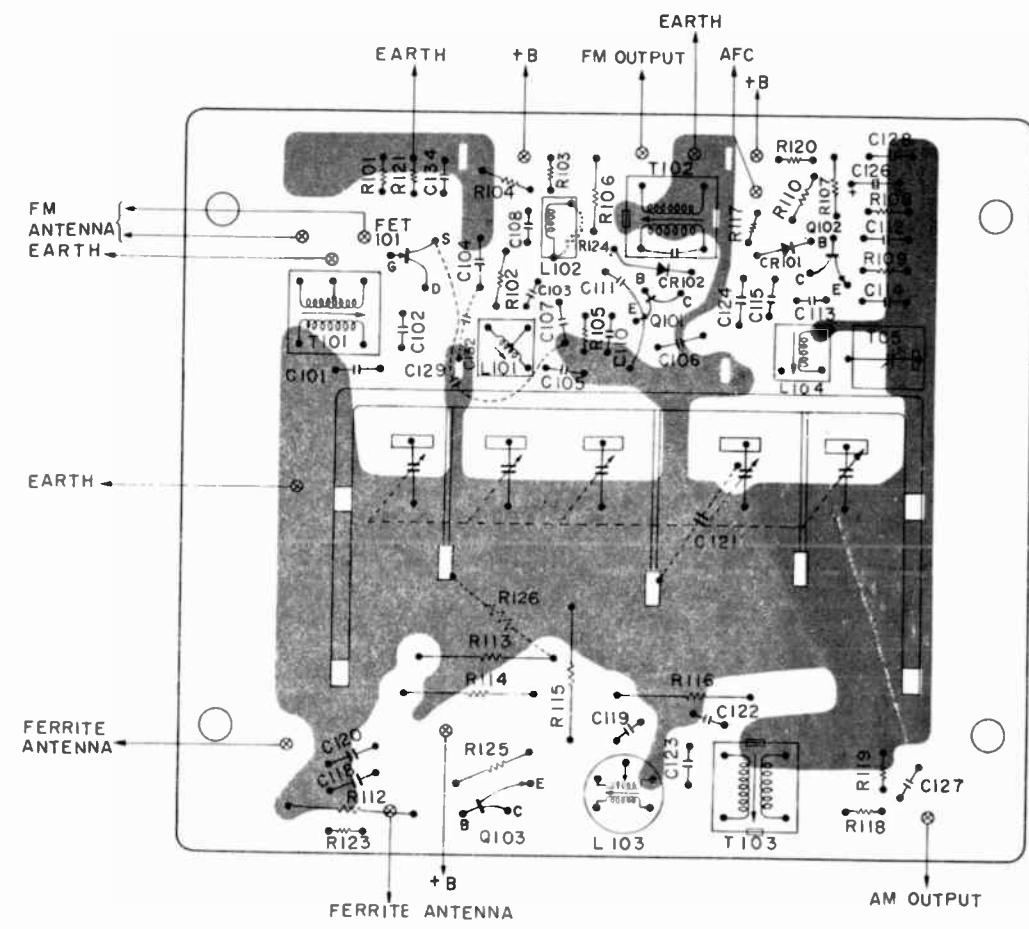
# MAIN AMPLIFIER CIRCUIT BOARD



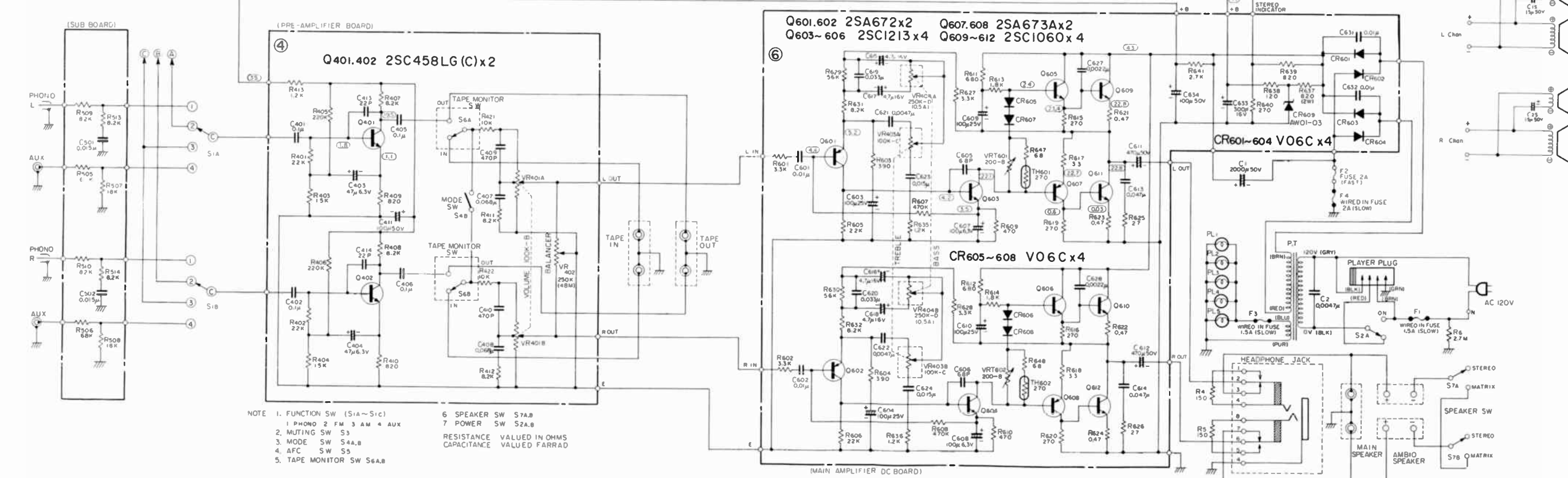
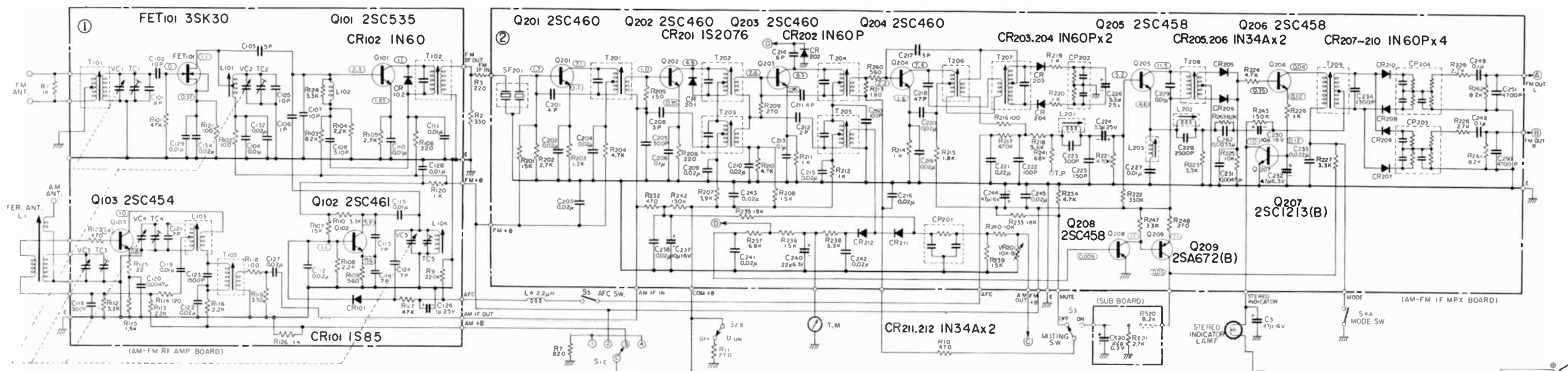
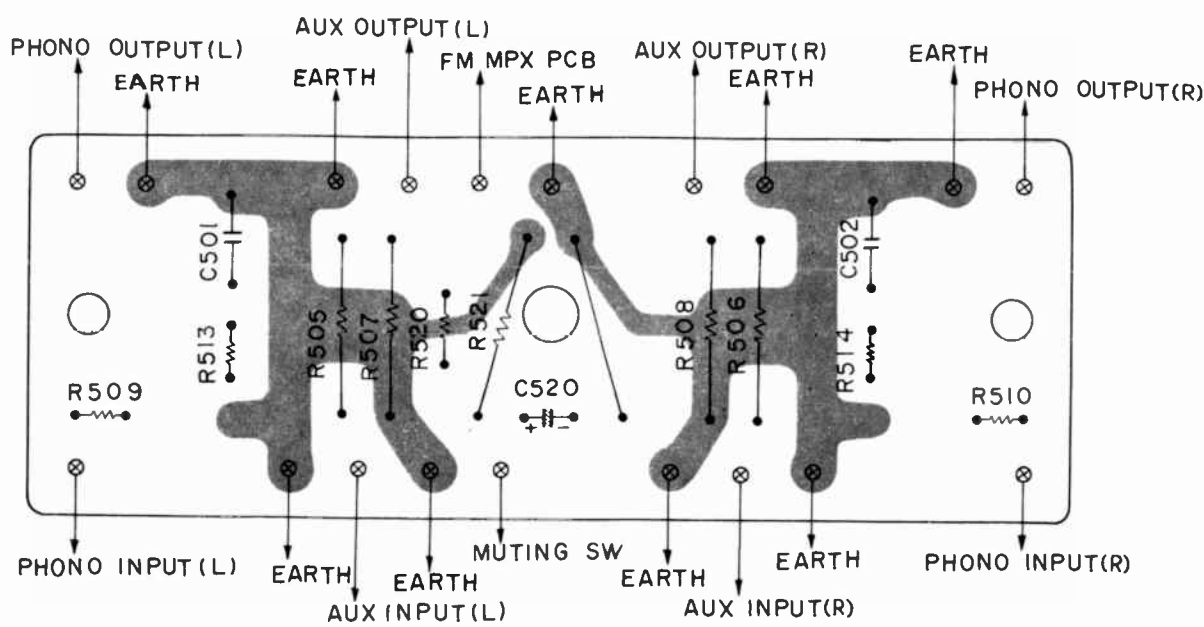
# PRE-AMPLIFIER CIRCUIT BOARD



**AM-FM RF CIRCUIT BOARD**



**SUB CIRCUIT BOARD**



- NOTE
1. FUNCTION SW (S1A-S1C)
  2. PHONO 2 FM 3 AM 4 AUX
  3. MODE SW S4A.B
  4. AFC SW S5
  5. TAPE MONITOR SW S6A.B
  6. SPEAKER SW S7A.B
  7. POWER SW S2A.B
- RESISTANCE VALUED IN OHMS  
CAPACITANCE VALUED FARRAD

### 4-3 AM IF & RF ALIGNMENT WITH SWEEP GENERATOR

Do not attempt alignment unless the following equipment is available.

Equipment Description

AM Sweep Generator, AM Signal Generator, AC VTVM, Oscilloscope

Output of signal generator should be no higher than necessary to obtain an out reading.

Set function selector switch to AM

STEP	SIGNAL GENERATOR		TUNING DIAL SETTING	OUTPUT CONNECTED TO	ADJUSTMENT	REMARKS
	CONNECTED TO	FREQUENCY				
1	One gut on to ferrite antenna something which is turned lead wire three times to genescopes output terminal	455kHz	Quieting point on band	Junction R240, VR201	T103 T203, T205	Adjust for maximum output Refer to Fig. 2 Set VR201 center
2	After then, repeat the same procedure said above (AM, IF & RF ALIGNMENT, step 2-8).					

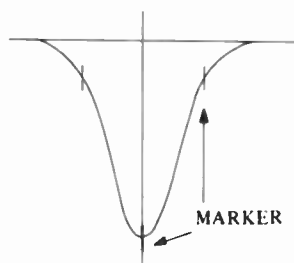


Fig. 2

### 4-4 FM IF & RF ALIGNMENT WITH SWEEP GENERATOR

Do not attempt alignment unless following equipment is available.

Equipment Description

FM Sweep Generator, FM Signal Generator, AC VTVM, Oscilloscope

Set function selector switch to FM

Set AFC switch to OFF

STEP	SIGNAL GENERATOR		TUNING DIAL SETTING	OUTPUT CONNECTED TO	ADJUSTMENT	REMARKS
	CONNECTED TO	FREQUENCY				
1	Connect the output of genescopes to junction R104, L102, C108, R103	10.7 MHz (Sweep generator)	Quieting point on band	FM IF Output (TP)	T207	Core of T207, turn to clockwise
T102, T201, T202, T204, T206					Adjust for maximum Refer to Fig.3	
T207					Adjust for S curve Refer to Fig. 4	
2	After then, repeat the same procedure said above (FM IF & RF ALIGNMENT, step 3-8).					

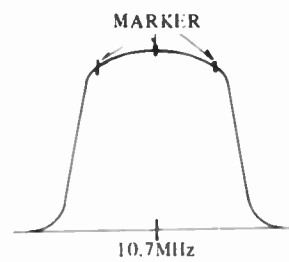


Fig. 3

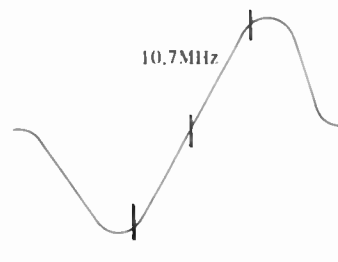


Fig. 4

### 4-5 MPX ALIGNMENT

Do not attempt alignment unless the following equipment is available.

Equipment Description

- FM Signal Generator
- FM Stereo Modulator
- Oscilloscope
- AC VTVM
- Audio Oscillator
- Set function selector switch to FM
- Set AFC switch to OFF

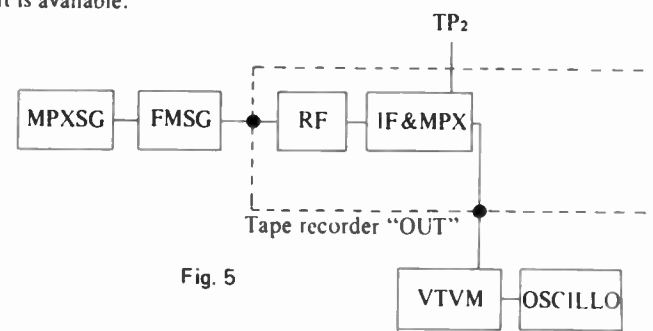


Fig. 5

STEP	SIGNAL GENERATOR		TUNING DIAL SETTING	OUTPUT CONNECTED TO	ADJUSTMENT	REMARKS
	CONNECTED TO	FREQUENCY				
1	Connected the output of generator to FM antenna terminal	67 kHz Input 60 dB Used FM Signal Generator only	98 MHz	T209 Center point (Secondary) AC VTVM	L201 L202	Adjust for minimum output
2	Connected the output of generator to FM antenna terminal Refer to Fig. 4	19 kHz Pilot only 7.5 kHz dev. Input 60dB	98 MHz	Junction D207, D209	L203 T208 T209	Adjust for maximum output
3	Connected the output of generator to FM antenna terminal Refer to Fig. 4	19 kHz Pilot 7.5 kHz dev. Composite L (=R) chan. 400Hz 67.5 kHz dev.	98 MHz	Tape recorder "OUT" terminal 1. channel AC VTVM	T209	Adjust for maximum output
4	Connected the output of generator to FM antenna terminal Refer to Fig. 4	19 kHz Pilot 7.5 kHz dev. Composite L (=R) chan. 400Hz 67.5 kHz dev.	98 MHz	Tape recorder "OUT" terminal R channel AC VTVM	L203 T208 T209	Adjust for minimum output
5	Repeat step 2, 3 & 4 until no further improvement is possible.					

### 4-6 PREDRIVER/DRIVER ALIGNMENT

- Set Balance, Bass and Treble control to their center position.
- Set selector switch to AUX.
- Connect 8 ohm resistor across L speaker terminals. in parallel with the load resistor connect the vertical input loads of the oscilloscope and VTVM.
- Connect AC power cord and adjust crossover distortion adjust VR601 until the crossover is extinguished rotate volume control to counter-clockwise position to get 0.1 watt [0.9 RMS VTVM] output. Or adjust idling current, using a DC mV meter, rotate VR601 to obtain a 20mV reading on DC mV meter. (No signal input). DC mV meter connected Emitter of Q 611 (T.P.L.) to Ground.
- Repeat proceeding step for right channel.

### SEMICONDUCTORS

ITEM	PART NO.	TYPE
CR101	0575010	1S85
CR102	0575019	1N60P
CR201	2337011	1S2076
CR202	0575019	1N60P
CR203	0575010	1N60P
CR204	0575019	1N60P
CR205	0575002	1N34A
CR206	0575002	1N34A
CR207	0575019	1N60P
CR208	0575019	1N60P
CR209	0575019	1N60P
CR210	0575019	1N60P
CR211	0575002	1N34A
CR212	0575002	1N34A
CR601	2327041	V06C
CR602	2327041	V06C
CR603	2327041	V06C
CR604	2327041	V06C
CR605	2327041	V06C
CR606	2227041	V06C
CR607	2327041	V06C
CR608	2327041	V06C
CR609	2327074	AW01-13
FET101	2327142	3SK30
Q101	0573510	2SC535(B)
Q102	0573507	2SC461(B)
Q103	0573491	2SC454(B)
Q201	0573486	2SC460(B)
Q202	0573486	2SC460(B)
Q203	0573486	2SC460(B)
Q204	0573486	2SC460(B)
Q205	2320063	2SC458(C)
Q206	2320063	2SC458(C)
Q207	2327332	2SC1213(B)
Q208	2320063	2SC458(C)
Q209	2327262	2SA672(B)
Q401	2320073	2SC458LG(C)
Q402	2320073	2SC458LG(C)
Q601	2327262	2SA672(B)
Q602	2327262	2SA672(B)
Q603	2327293	2SC1213A(C)
Q604	2327293	2SC1213A(C)
Q605	2327292	2SC1213A(B)
Q606	2327292	2SC1213A(B)
Q607	2327282	2SA673A(B)
Q608	2327282	2SA673A(B)
Q609	2327203	2SC1060(C)
Q610	2327203	2SC1060(C)
Q611	2327203	2SC1060(C)
Q612	2327203	2SC1060(C)

### ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
C1	0259741	2000mfd 50V
C1S	0257052	1.5mfd 50V
C2S	0257052	1.5mfd 50V
C3	0252525	47mfd 16V
C126	0252611	1mfd 25V
C226	0252613	3.3mfd 25V
C230	0252521	10mfd 16V
C232	0252225	47mfd 6.3V
C237	0252521	10mfd 16V
C240	0252222	22mfd 15V
C244	0252525	47mfd 16V
C403	0252225	47mfd 6.3V
C404	0252225	47mfd 6.3V
C411	0252831	100mfd 50V
C520	0252222	22mfd 6.3V
C603	0252631	100mfd 25V
C604	0252631	100mfd 25V
C607	0252231	100mfd 6.3V
C608	0252231	100mfd 6.3V
C609	0252631	100mfd 25V
C610	0252631	100mfd 25V
C611	0252835	470mfd 50V
C612	0252835	470mfd 50V

C615	0252515	4.7mfd 16V
C616	0252515	4.7mfd 16V
C617	0252515	4.7mfd 16V
C618	0252515	4.7mfd 16V
C633	0252533	330mfd 16V
C634	0252831	100mfd 50V
TC5	0283113	Trimmer
VC1	0282098	Tuning Gang
VC2		
VC3		
VC4		
VC5		

### CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R621	0119017	.47 ohms
R622	0119017	.47 ohms
R623	0119017	.47 ohms
R624	0119017	.47 ohms
TH601	0576041	Thermistor
TH602	0576041	Thermistor
VR201	0151224	10K AM Level
VR401	0153686	100K Dual Volume
VR402	0153711	250K Balance
VR403	0156137	100K Dual Treble
VR404	0156136	250K Dual Bass
VRT601	0151223	200 ohms Crossover Distortion
VRT602	0151223	200 ohms Crossover Distortion

### COILS/TRANSFORMERS

ITEM	PART NO.	DESCRIPTION
L4	2227032	T103 2140441
L101	2134051	T201 2140151
L102	2134041	T202 0322203
L103	2120034	T203 2134361
L104	2134054	T204 0322203
L201	5120145	T205 2134362
L202	0323002	T206 2134123
L203	0324005	T207 2134124
T101	2134062	T208 0313062
T102	0322327	T209 0313062
		Power 2217133

### MISCELLANEOUS

ITEM	NAME	PART NO.
CP201	Component Combination	0599723
CP202	Component Combination	0186003
CP203	Component Combination	0186007
CP204	Component Combination	0186007
F1	Fuse, 1.5A	2727082
F2	Fuse, 2.5A Fast	2720032
F3	Fuse, 1.5A	2727082
S1	Switch, Function	2617172
SF201	Filter, Mechanical	2140403
SW2	Switch, Power	2637201
	Holder, Fuse	2727062
	Meter, Tuning	2577091
	P. C. Board, RF	2518812
	P. C. Board, IF/MPX	2518691
	P. C. Board, Preamp	2518194
	P. C. Board, Subcircuit	2518681
	P. C. Board, Main Amp	2518671
	Speaker, 6-1/2"	2400201
	Speaker, 2"	2400101

### CABINET PARTS

NAME	PART NO.
Assembly, Cabinet	4926201
Assembly, Dust Cover	3915291
Assembly, Escutcheon	3241493
Cover, Indicator	4680281
Knob, Tuning	3280712
Knob, Control	3280982



8-TRACK TAPE DECK

EQUIPMENT:

- |                                    |                                      |
|------------------------------------|--------------------------------------|
| 1. VTVM.                           | 4. Dummy load = 8 ohm, 10W resistor. |
| 2. Oscilloscope.                   | 5. Refer to P.C. Board (OP-055).     |
| 3. Test Tape Cartridge:            | 6. Refer to Figure T-1.              |
| a. #323 (RCA) or VTT-807 (NIVICO). |                                      |
| b. #326 (RCA) or VTT-809 (NIVICO). |                                      |
| c. #327 (RCA) or VTT-820 (NIVICO). |                                      |
| d. #328 (RCA) or VTT-804 (NIVICO). |                                      |

ADJUSTMENTS:

Selector is set to "TAPE" position.  
Balance, Bass and Treble Controls are set to center.

Head Azimuth

VTVM and Oscilloscope (paralleled dummy load) are connected to Speaker Jack (R or L) located at Rear Panel.  
Insert Cartridge #326 (RCA) into Pack Door.  
Volume Control is set to non-clipping output level at Oscilloscope.  
Loosen Screw "C".  
Adjust Screw "A" to maximum, non-clipping output.  
(Channel position is better at 2 or 3)  
Tighten Screw "C".

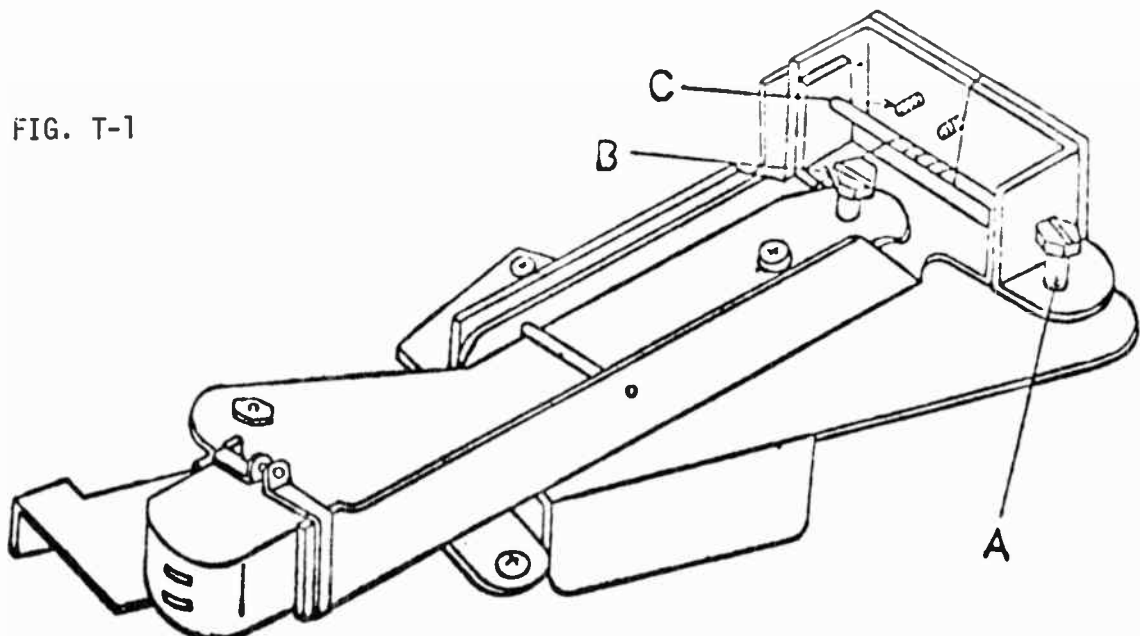
Head Position (Cross-talk)

Equipment connection is same as Step 2.  
Insert Cartridge #327 (RCA) into Pack Door.  
Volume Control is set to maximum position.  
Adjust Screw "B" for MINIMUM output at Channels 1, 3 and next 1, 3 while changing Channel.  
Next, change the Cartridge to #328 (RCA), and adjust minimum output at Channels 2, 4 and next 2, 4.

Output Level.

VTVM or Oscilloscope (paralleled dummy load) is connected to each Speaker Jack (L and R).  
Insert Cartridge #323 (RCA).  
Volume Control is set to maximum position.  
Adjust VR301 and VR302 for 5 Watts, 6.33V across 8-ohm, 10-Watt resistor (Model T-600A) or 2 Watts, 4V (Models T-100A).

FIG. T-1



## ALIGNMENT INSTRUCTIONS

- EQUIPMENT NEEDED:**
1. VTVM.
  2. AM/FM SSG (Standard Signal Generator).
  3. AM/FM IF GS (Gene-scope).
  4. FM MPX SSG.
  5. Audio SG.
  6. Oscillo (-scope).
  7. Besides;

Non-metallic Alignment Tool  
Dummy-load = 8 ohm- 10W resistor.

**PROCEDURE & NOTES:**

1. Balance, Bass, and Treble Controls are set to their center.
2. Volume Control is set to maximum.
3. Signal input level must be kept as low as possible.
4. Standard modulation is 30% (or 22.5 KHz dev.) - 400 Hz.
5. Standard output is 50 mW, 0.63V at 8-ohm dummy load.
6. FM Antenna input load is 300-ohm balanced.
7. Cf. Parts Location View of TUP-007 = P.C.B.
8. Low sides of signal sources and output indicators are connected to earth-line nearest point of high-side's connections, unless otherwise noted.
9. Selector must be set to each position being adjusted.

Article	Step	Signal-Source Connect .....	Set Signal To .....	Output Indicator connect to	Set Radio Dial To..	Adjust .....	Adjust For ..		
IFT Adj. 455 KHz	1.	Selector is set to "AM" position.							
	2.	IF GS * Output to Standard Loop Antenna	Sweep centered 455 KHz	IF GS Input to (9), (30) or (17)	Minimum Freq.	* T107 (yellow)	Maximum		
	3.	"	"	"	"	* T108 (white)	"		
	4.	"	"	"	"	* T109 (black)	"		
	5.	Repeat step 2 - 4, a few times.							
	10.7 MHz	1.	Cut off lead-wire of C139 (1 MF, 16V). Set Selector to "FM".						
		2.	IF GS * Output to TM101 & TM102	Sweep @ + 1MHz centered 10.7 MHz	IF GS Input to lead-wire of C139	Maximum Freq.	* T101 (orange)	Maximum symmetrical "V" curve.	
		3.	IF GS * Output to TM101 & TM102	Sweep @ + 1MHz centered 10.7 MHz	IF GS Input to lead-wire of C139	Maximum Freq.	* T102 (black)	Maximum symmetrical "V" curve.	
		4.	"	"	"	"	* T103 (black)	"	
		5.	"	"	"	"	* T104 (blue)	"	
6.		Repeat step 2 - 5, a few times, and re-connect lead of C139.							

# Morse/Electroponic R-12A, T-100A, T600A

IFT Adj	10.7 MHz	7.	IF GS * Output to TM101 & TM102	Sweep @ + 1MHz centered 10.7 MHz	IF GS Input to (ME)	Maximum Freq.	* T105 (Brown)	Symmetrical "S" curve.
Bandwidth Adj.	AM	1.	SSG (AM) *Output to Standard Loop Antenna	525 KHz	VTVM & Oscillo(paralleled dummy load) Input to Speaker Jack(R or L)	Minimum Freq. (close VC)	* T106 (red)	Maximum
		2.	"	1650 KHz in summer 1660 KHz in autumn or spring 1670 KHz in winter	"	Maximum Freq. (open VC)	* TC104 or VC101-7 or TC101-4	"
		3.	Repeat step 1 - 2, a few times.					
	FM	1.	SSG (FM) * Output to TM101 & TM102	86 MHz	VTVM & Oscillo(paralleled dummy load) Input to Speaker Jack(R or L)	Minimum Freq. (close VC)	**L104	"
		2.	"	109.5 MHz	"	Maximum Freq. (open VC)	* TC102 or VC102 or TC101-2	"
		3.	Repeat step 1 - 2, a few times.					
Tracking Adj.	AM	1.	SSG (AM) *Output to Standard Loop Antenna	600 KHz	VTVM & Oscillo(paralleled dummy load) Input to Speaker Jack(R or L)	Tune on signal	L105 (Bar Antenna)	Maximum
		2.	SSG (AM) * Output to Standard Loop Antenna	1400 KHz	VTVM & Oscillo(paralleled dummy load) Input to Speaker Jack(R or L)	Tune on signal	* TC103 or VC101-6 or TC101-3	Maximum
		3.	Repeat step 1 - 2, a few times.					

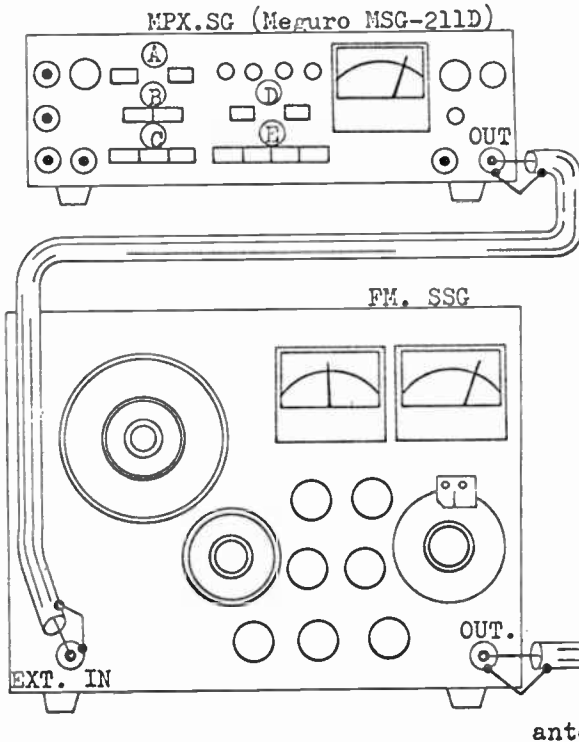
Tracking Adj.	FM	1.	SSG (FM) * Output to TM101 & TM102	90 MHz	VTVM & Oscillo(paralleled dummy load) Input to Speaker Jack(R or L)	Tune on signal	**L102	Maximum
		2.	"	98 MHz	"	"	* L101	"
		3.	"	106 MHz	"	"	*TC101 or VC101 or VC105	"
		4.	Repeat step 1 - 3, a few times.					

FM MPX Adj.	1.	Audio SG output to ( - pole) of C201 (1 MV,10V)	67 KHz	VTVM & Os- cillo. Input to (BASE) or Q201	@ 98 MHz	* T201	Minimum
	2.	FM SSG & FM MPX SSG (See Fig.R-1)	98 MHz (See Fig. R-1)	VTVM & Os- cillo. Input to (COLLECTOR) of Q202.	Tune on signal	* T202 & *T203	Maximum (38 KHz =Carrier)
	3.	"	"	VTVM & Os- cillo. Input to (L) or (R)	"	* T204	Minimum (19 KHz = Pilot leak)
	4.	"	"	"	"	*VR201	Minimum (400 Hz = leak of the other ch.)

- NOTES: 1. \* output = standard modulated signal.  
 2. (\*) marked = adjust with alignment tool.  
 3. (\*\*) marked = adjust by compressing or expanding.

Fig. R-1

Setting of Switches (A ~ E)



Switch	Step	2.	3.	4.
(A) INT. OSC. SELECTOR		400Hz	"	"
(B) AUDIO, OSC. IN/MOD. IN SELECTOR		AUDIO OSC.	"	"
(C) PRE-EMPHASIS SWITCH		75 $\mu$ sec.	"	"
(D) MAIN & SUB CH. SWITCH		MAIN & PILOT	PILOT ONLY	MAIN & PILOT
(E) OUTPUT-SIGNAL SELECTOR		MAIN	"	CHANGE L $\leftrightarrow$ R

## SEMICONDUCTORS

ITEM	PART NO.	TYPE
D101	5101N60	1N60
D102	535C-15	SC-15
D103	5101N60	1N60
D104	5101N60	1N60
D105	5403-MS	1S334
D107	5101N60	1N60
D108	5101N60	1N60
D109	51P1N60	1N60(P)
D110	51P1N60	1N60(P)
D201	51P1N60	1N60(P)
D202	51P1N60	1N60(P)
D203	51S1S34	1S34S
D204	51S1S34	1S34S
D205	51S1S34	1S34S
D206	51S1S34	1S34S
D207	5101S34	1S34
D208	5101S34	1S34
D401	5601-MS	1S1210
D402	5601-MS	1S1210
D403	5601-NI	1S1210
D404	5601-NI	1S1210
D501	5203RNI	10DC-1R
D503	5205-NI	10D-1
Q101/TR101	50C1047	25C1047
	50C784	25C784
Q102/TR102	50C829	25C829
Q103/TR103	50C829	25C829
Q104/TR104	50C829	25C829
Q105/TR105	50C829	25C829
Q106/TR106	50A102	25A102
Q201/TR201	50C828	25C828
Q202/TR202	50C828	25C828
Q203/TR303	50C828	25C828
Q301/TR301	50C644	25C644
Q302/TR302	50C644	25C644
Q303/TR303	50C644	25C644
Q304/TR304	50C644	25C644
Q401/TR401	50C644	25C644
Q402/TR402	50C644	25C644
Q403/TR403	50C828	25C828
Q404/TR404	50C828	25C828
Q405/TR405	50C828	25C828
	50C538*	25C538*
Q406/TR406	50C828	25C828
	50C538*	25C538*
Q407/TR407	50D261	25D261
	50C1226*	25C1226*
Q408/TR408	50D261	25D261
	50C1226*	25C1226*
Q409/TR409	50A643	25A643
	50A699*	25A699*
Q410/TR410	50A643	25A643
	50A699*	25A699*

\* Model T600A Only.

## ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
C115	CL3-106	1mfd 16V
C121	CL3-107	10mfd 10V
C124	CL3-478	470mfd 10V
C139	CL4-106	1mfd 16V
C142*	CL4-108	100mfd 16V
C201	CL3-106	1mfd 10V
C205	CL3-107	10mfd 10V
C208	CL3-107	10mfd 10V
C215	CL3-106	1mfd 10V
C303	CL4-476	4.7mfd 16V
C304	CL4-476	4.7mfd 16V

## ELECTROLYTIC/VARIABLE CAPS (CONT)

ITEM	PART NO.	VALUE
C305	CL4-478	470mfd 16V
C308	CL3-107	10mfd 10V
C309	CL3-107	10mfd 10V
C312	CL4-476	4.7mfd 16V
C313	CL4-476	4.7mfd 16V
C401	CL3-228	220mfd 10V
C402	CL3-475	.47mfd 10V
C403	CL3-475	.47mfd 10V
C404	CL2-337	33mfd 6V
C405	CL2-337	33mfd 6V
C406	CL3-106	1mfd 10V
C407	CL3-106	1mfd 10V
C408*	CL3-475	.47mfd
C409*	CL3-475	.47mfd
C410	CL4-228	220mfd 16V
C419	CL3-107	10mfd 10V
	CL4-476*	4.7mfd 16V*
C420	CL3-107	10mfd 10V
	CL4-476*	4.7mfd 16V
C421	CL3-108	100mfd 10V
	CL3-228*	220mfd 10V*
C422	CL3-108	100mfd 10V
	CL3-228*	220mfd 10V*
C423	CL3-107	10mfd 10V
C424	CL3-107	10mfd 10V
C425	CL3-108	100mfd 10V
	CL3-478*	470mfd 10V
C426	CL3-108	100mfd 10V
	CL3-478*	470mfd 10V
C429*	CL3-228	220mfd 10V
C430*	CL3-228	220mfd 10V
C435	CL3-478	470mfd 10V
C436	CL3-478	470mfd 10V
C505	CL4-479	4700mfd 16V
VC101	2103-MS	Tuning Gang
	2103-AL	Tuning Gang
VC102	2308-MM	Trimmer

\* Model T-600A Only.

## CONTROLS

ITEM	PART NO.	DESCRIPTION
VR201	2608-TY	1000 ohms Separation
VR301	2616-TY	50K Tape Level
	2631-MS*	20K Tape Level*
VR302	2616-TY	50K Tape Level
	2631-MS*	20K Tape Level*
VR401	2607-MS(2)	50K Balance (2)
	2632-MS*	50K Balance*
VR402-1	2701-MS(2)	50K Volume (2)
VR402-2		50K Volume (2)
VR402-1	2810-MS*	50K Volume *
VR402-2		50K Volume *
VR402 &	2701-MS(1)	50K Volume (1)
VR403		50K Volume (1)
VR403-1	2803-MS(2)	50K Treble (2)
VR403-2		50K Treble (2)
VR403-1	2809-MS*	50K Treble *
VR403-2		50K Treble *
VR404 &	2803-MS(1)	50K Treble (1)
VR405		50K Treble (1)
VR404-1	2803-MS(2)	50K Bass (2)
VR404-2		50K Bass (2)
VR404-1	2809-MS*	50K Bass*
VR404-2		50K Bass *
VR406 &	2803-MS(1)	50K Bass (1)
VR407		50K Bsss (1)

\* Model T-600A  
(1) Model T-100A  
(2) Model R-12A

## COILS/TRANSFORMERS

ITEM	PART NO.
L101	0102-SU
L102	0025-TD
L103	0013-TD
L104	0015-TD
L105	0816-KM
L501	0012-KM
L502	0012-KM
T101	0513-SU
T102	0514-SU
T103	0514-SU
T104	0520-SU
T105	0521-SU
T106	0233-SU
T107	0401-SU
T108	0408-SU
T109	0409-SU
T201	0601-MM
T202	0609-MS
T203	0609-MS
T204	0603-MM
T501	1327-TK
	1309-TK*

\* Model T-600A only.

## MISCELLANEOUS (MODEL R-12A)

ITEM	NAME	PART NO.	
SW101 SW102 SW103 SW401 SW402	Switch, Function		
SW501		Switch, Power	See VR402
PR101		P.C. Board, Main	2461-SE (TUP-007)
PR401		P.C. Board, Audio Preamp	2010-TN (TP-008)
PR402		P.C. Board, Auxiliary Input	2412-SE (HRP-002)
PR501	P.C. Board, Line Choke	2462-SE (ACP-005)	

## MISCELLANEOUS (MODEL T-100A)

ITEM	NAME	PART NO.	
SW101 SW102 SW103 SW401 SW402 SW504	Switch, Function		
SW501		Switch, Power	See VR402
SW503		Switch, Motor	7105-0101
SW506		Switch, Ch. Selector	8802-0225
		Switch, Automatic Ch. Selector	7102-0383 & 7102-0207
		Switch, Indicator Lamps	2461-SE (TUP-007)
PR101	P.C. Board, Main	2460-SE (OP-213)	
PR301	P.C. Board, Motor Circuit	2429-TN (OP-055)	
PR302	P.C. Board, Tape Preamp	2404-TN (OP-018)	
		2405-TN (OP-019)	
PR303	P.C. Board, Pilot Lamps	2010-TN (TP-008)	
PR401	P.C. Board, Audio Preamp	2412-SE (HRP-001)	
PR402	P.C. Board, Phono Input	2462-SE (ACP-005)	
PR501	P.C. Board, Power Choke	7104-0288	
	Flywheel	7104-0297	
	Belt	7104-0175	
	Motor	7104-0364	
	Motor Pulley	7101-0150	
	Head, Playback	7102-0553	
	Solenoid		

## MISCELLANEOUS (MODEL T-600A)

ITEM	NAME	PART NO.	
SW101	Switch, AFC		
SW102 SW103 SW401 SW402 SW504	Switch, Function	FSRE365LDAP	
SW501		Switch, Power	5012-0017
SW502		Switch, Motor	7105-0101
SW503		Switch, Motor	7102-005 & 7102-0383 & 7102-0207
SW505		Switch, Pilot Lamps	5013-0016
SW506	Switch, Manual Ch. Select	8802-0225	
	Switch, Automatic Ch. Select		
PR101	P.C. Board, Main	2461-SE (TUP-007)	
PR301	P.C. Board, Motor Circuit	2460-SE (OP-213)	
PR302	P.C. Board, Tape Preamp	2429-TN (OP-055)	
		2404-TN (OP-018)	
PR303	P.C. Board, Pilot Lamps	2405-TN (OP-019)	
PR401	P.C. Board, Audio Preamp	2419-SE (TP-011)	
PR402	P.C. Board, Controls	2420-SE (TP-013)	
PR501	P.C. Board, Power Choke	2462-SE (ACP-005)	
PR502	P.C. Board, Phono Input	2412-SE (HRP-001)	
	Belt	7104-0297	
	Motor	7104-0175	
	Motor Pulley	7104-0364	
	Head, Playback	7101-0150	
	Solenoid	7102-0553	

## CABINET PARTS (MODEL R-12A)

NAME	PART NO.
Cabinet	TFB-0207
Cabinet Rear Cover	TFB-0323
Cabinet Front Panel	TFA-0140
Dial Pointer	TIA-0503
Knob, 6 used	TIB-0235

## CABINET PARTS (MODEL T-100A)

NAME	PART NO.
Cabinet	TFB-0270
Cabinet, Rear Cover	TFB-0320
Escutcheon	TFA-0485
Dial Pointer	TIA-0450
Push Button, Channel	TIB-0275
Knob, 6 used	TIB-0235

## CABINET PARTS (MODEL T-600A)

NAME	PART NO.
Cabinet	TFB-0316
Escutcheon, Controls	TFA-0448
Dial Pointer	TIA-0536
Knob, Slide Controls	TIA-0524
Knob, Tuning	TIB-0221
Knob, Volume	TIB-0220

VOLTAGES (MODEL R-12A)

ITEM	BASE	EMITTER	COLLECTOR
Q101	2.6V	2.1V	6.7V
Q102	1.5V	1.1V	6.7V
Q103	3.4V	2.7V	6.0V
Q104	2.3V	1.4V	7.2V
Q105	3.1V	2.2V	6.5V
Q106	0V	0V	0V
Q201	2.1V	1.5V	5.5V
Q202	1.5V	0.9V	6.5V
Q203	0V	0V	10.0V
Q401,402	1.5V	0.8V	4.3V
Q403,404	2.2V	1.6V	3.1V
Q405,406	1.0V	0.3V	5.0V
Q407,408	5.0V	5.3V	0V
Q409	5.8V	5.5V	10.3V
Q410	5.5V	5.5V	10.3V

NOTE: Voltages measured with VTVM; no signal; volume at MINIMUM; Bass, Treble, and Balance controls at center; and Selector at FM Stereo position.

VOLTAGES (MODEL T-100A)

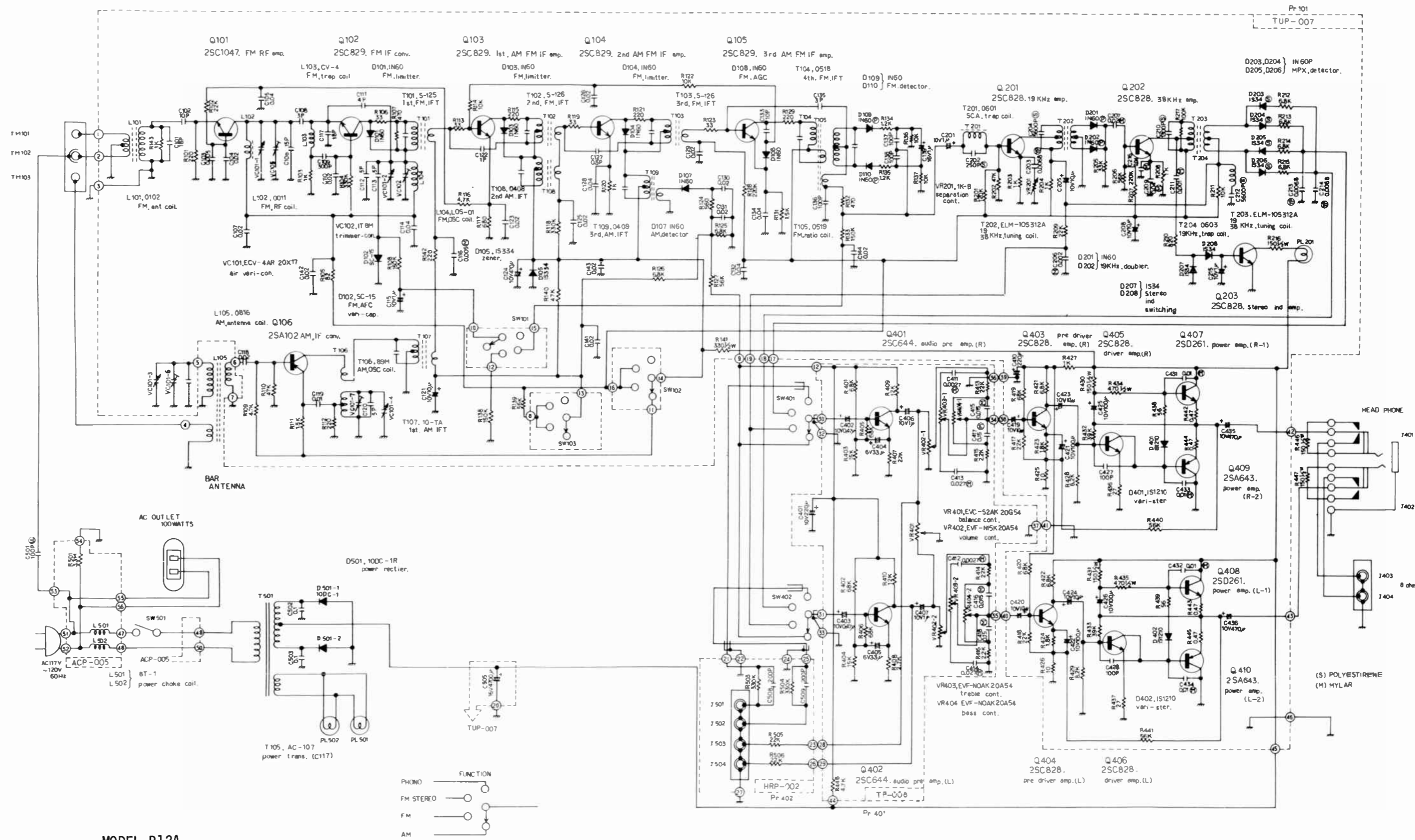
ITEM	BASE	EMITTER	COLLECTOR
Q101	2.6V	2.1V	6.7V
Q102	1.5V	1.1V	6.7V
Q103	3.4V	2.7V	6.0V
Q104	2.3V	1.4V	7.2V
Q105	3.1V	2.2V	6.5V
Q106	0V	0V	0V
Q201	2.1V	1.5V	5.5V
Q202	1.5V	0.9V	6.5V
Q203	0V	0V	10.0V
Q301,302	0.8V	0V	1.4V
Q303,304	1.4V	0.8V	3.1V
Q401,402	1.5V	0.8V	4.3V
Q403,404	2.2V	1.6V	3.1V
Q405,406	1.0V	0.3V	5.0V
Q407,408	5.0V	5.3V	0V
Q409,410	5.8V	5.5V	10.3V

NOTE: Voltages measured with VTVM; no signal; Bass, Treble, and Balance controls at center; Volume at MINIMUM; and Selector at FM Stereo position.

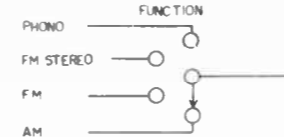
VOLTAGES (MODEL T-600A)

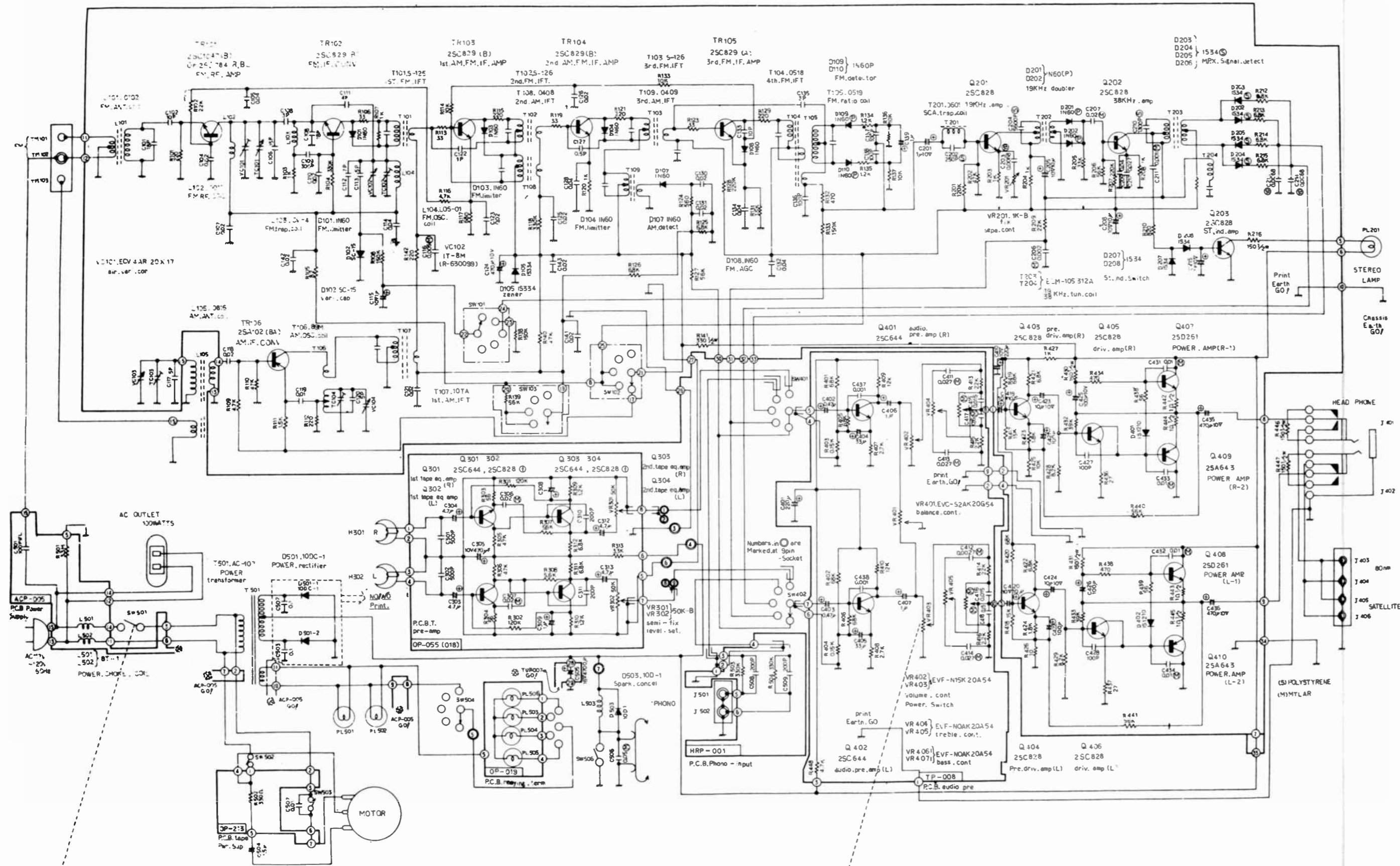
ITEM	BASE	EMITTER	COLLECTOR
Q101	0.95V	0.20V	7.80V
Q102	1.60V	1.30V	8.00V
Q103	2.10V	1.40V	8.00V
Q104	2.70V	2.10V	7.80V
Q105	3.70V	3.10V	7.80V
Q106	0V	0V	0V
Q201	2.40V	1.80V	6.50V
Q202	1.70V	1.10V	8.20V
Q203	0V	0V	20V
Q301,302	0.75V	0V	1.49V
Q303,304	1.49V	0.85V	5.80V
Q401,402	2.10V	1.60V	6.70V
Q403,404	1.80V	1.20V	5.50V
Q405,406	1.25V	0.75V	9.80V
Q407,408	10.70V	10.20V	20V
Q409,410	9.70V	10.20V	0V

NOTE: Voltages measured with VTVM, Selector at FM Stereo position, and no signal.

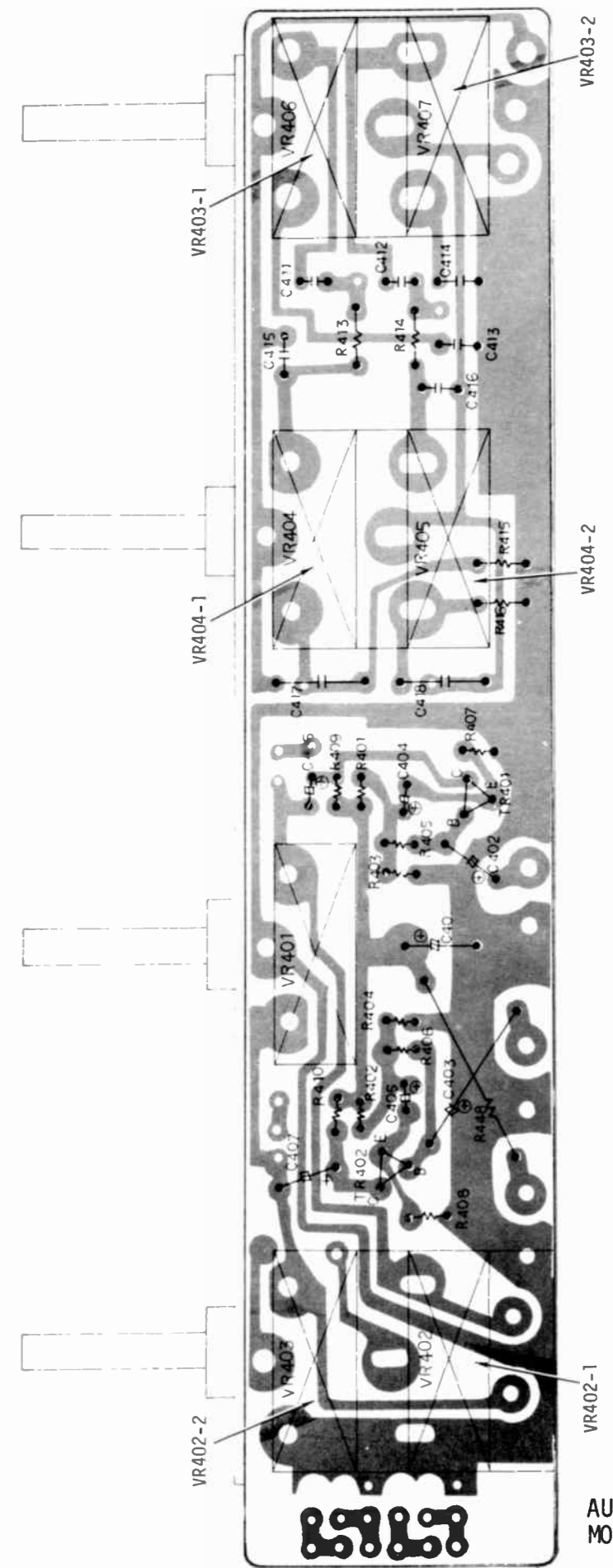


MODEL R12A



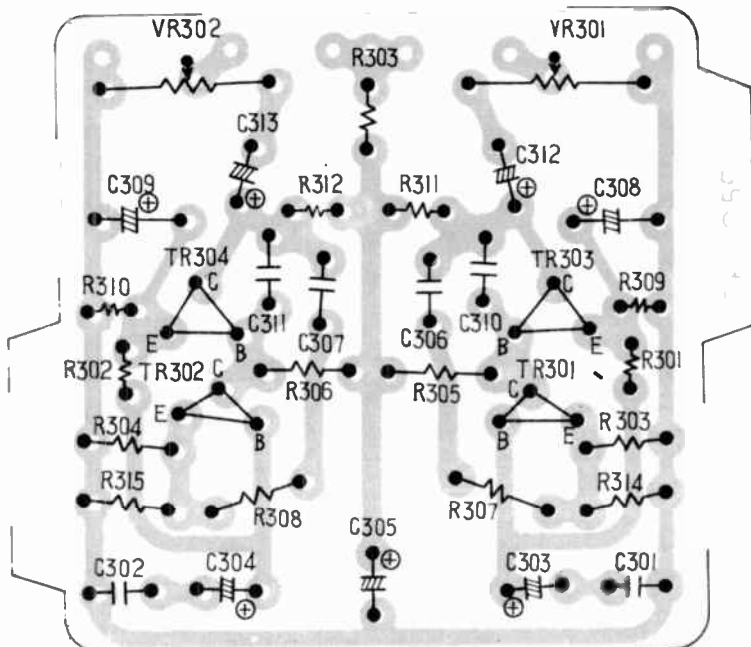


MODEL T-100A

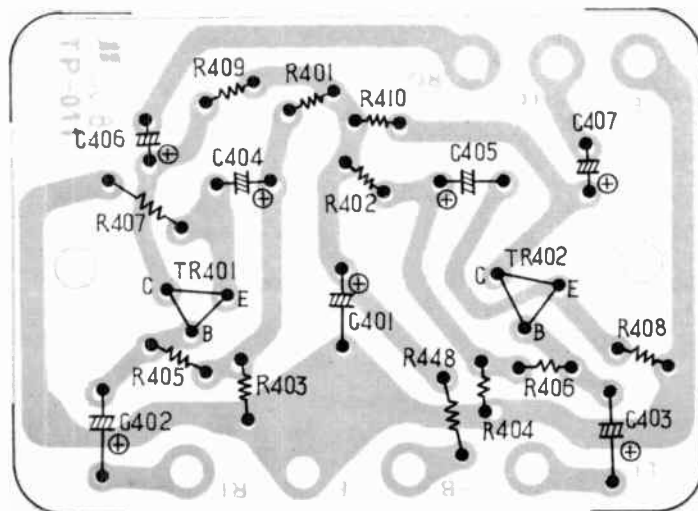


AUDIO PREAMP (TP-008)  
MODELS R-12A, T-100A

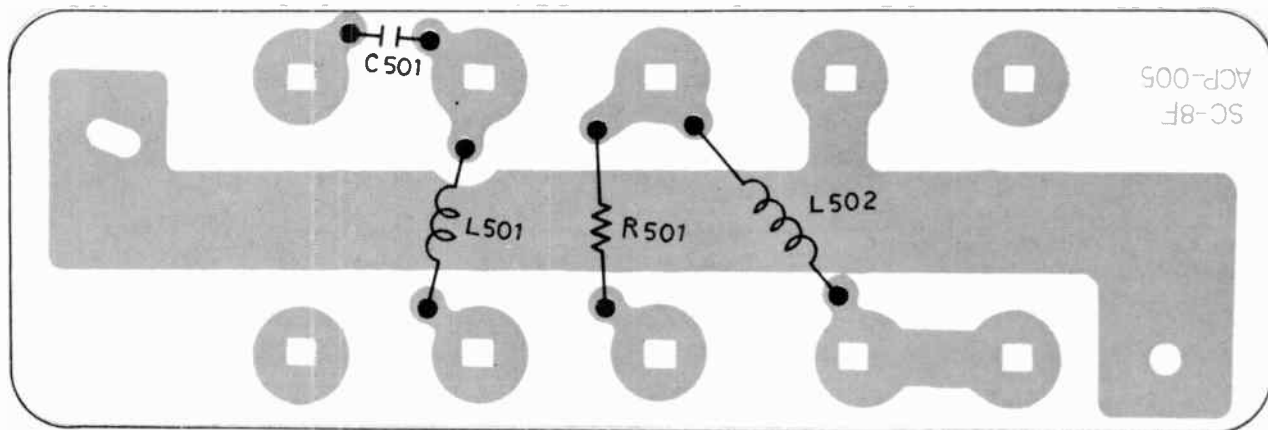




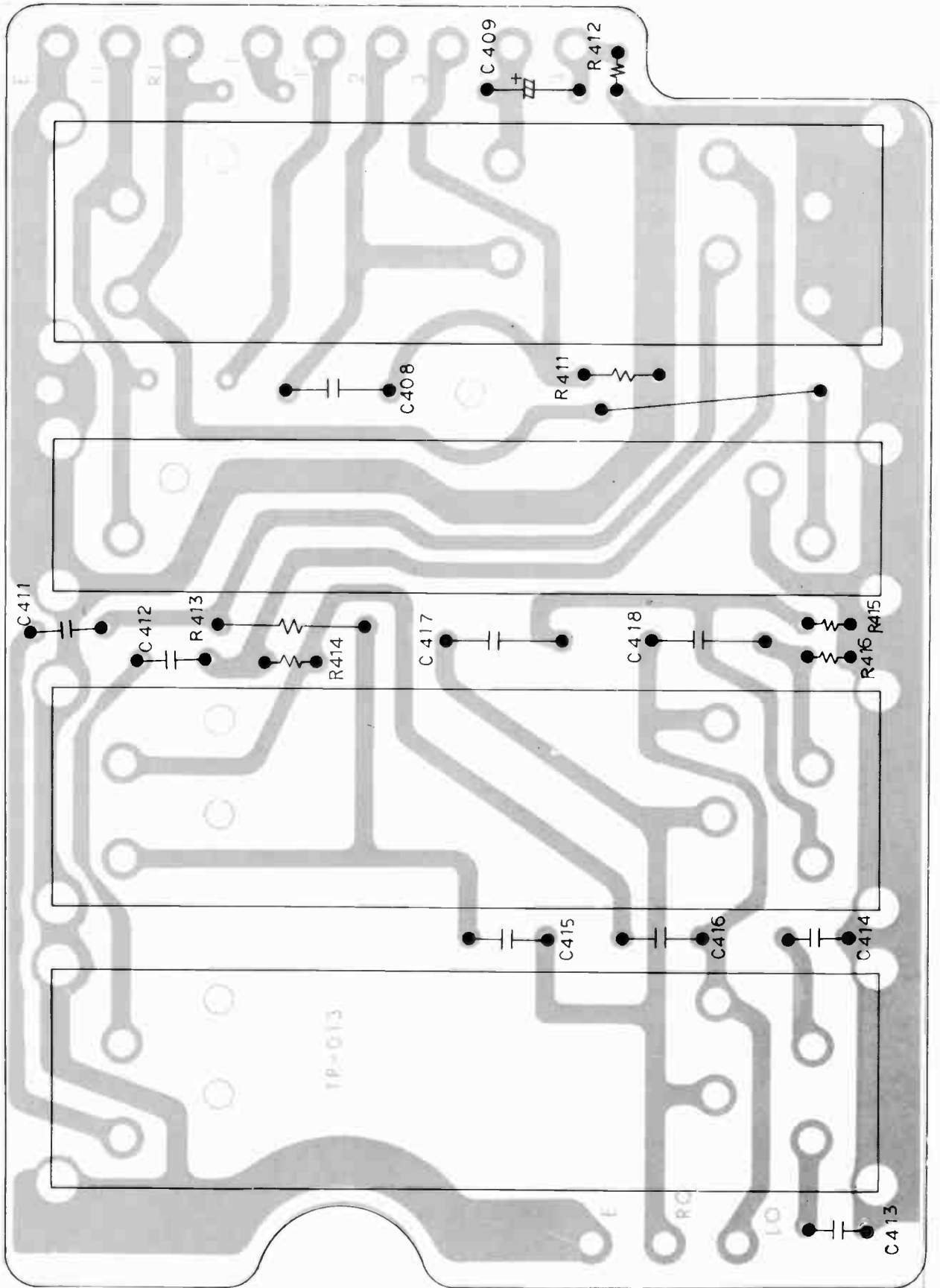
TAPE PREAMP (OP-055)  
MODELS T-100A, T600A



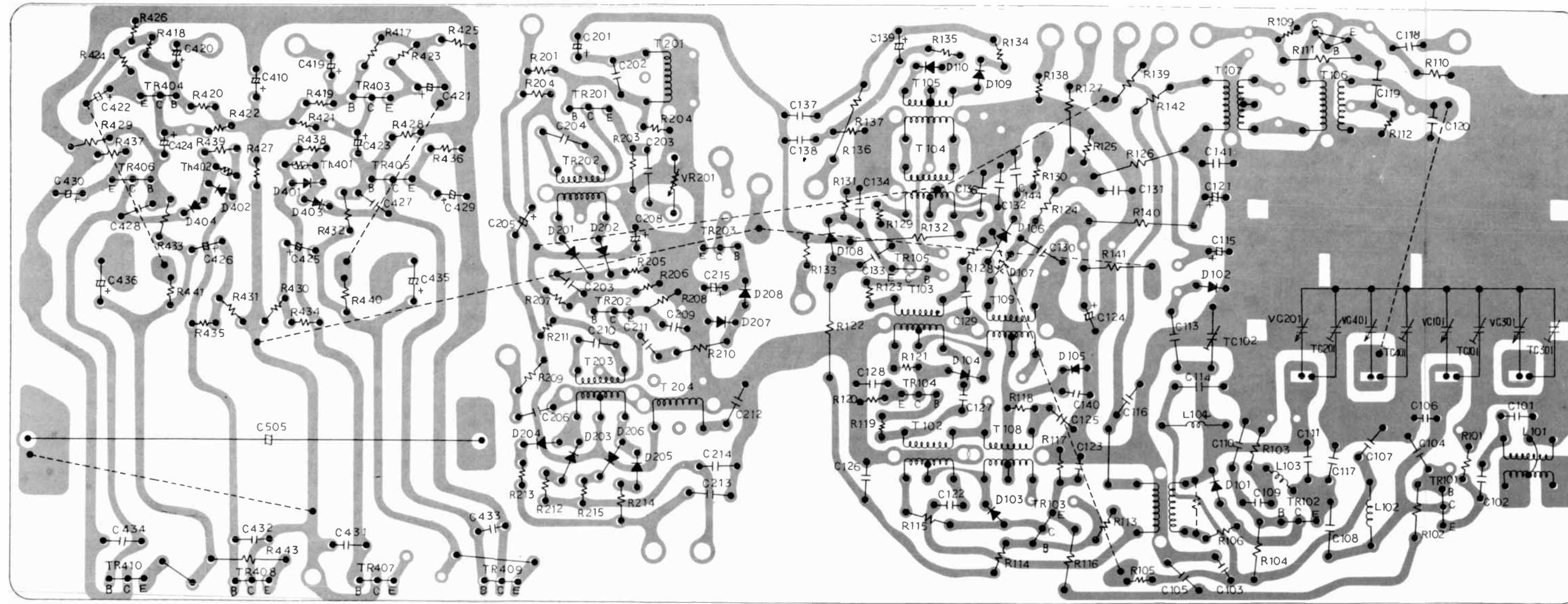
AUDIO PREAMP (TP-011)  
MODEL T600A



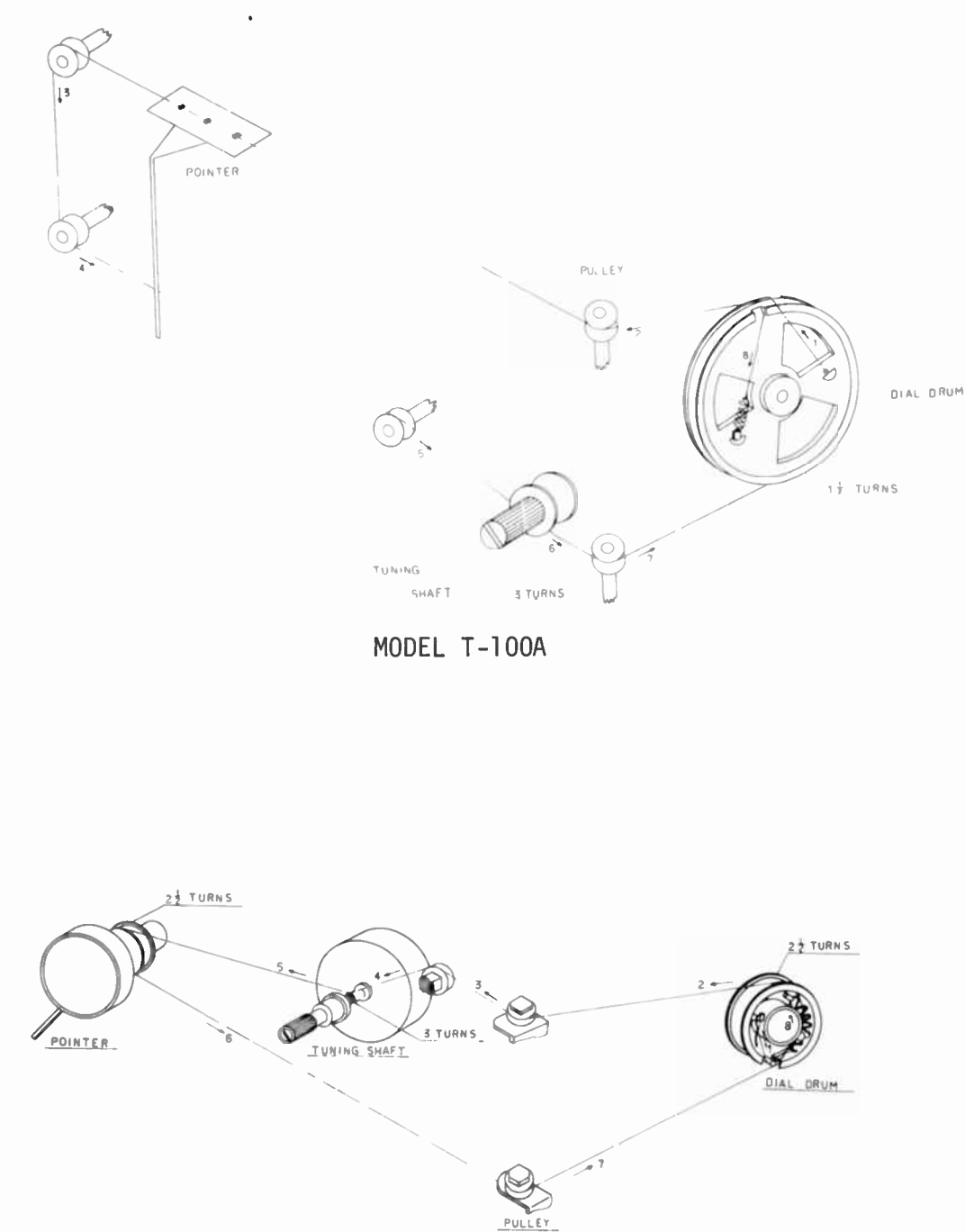
LINE CHOKE (ACP-005)  
ALL MODELS



CONTROLS (TP-013)  
MODEL T600A

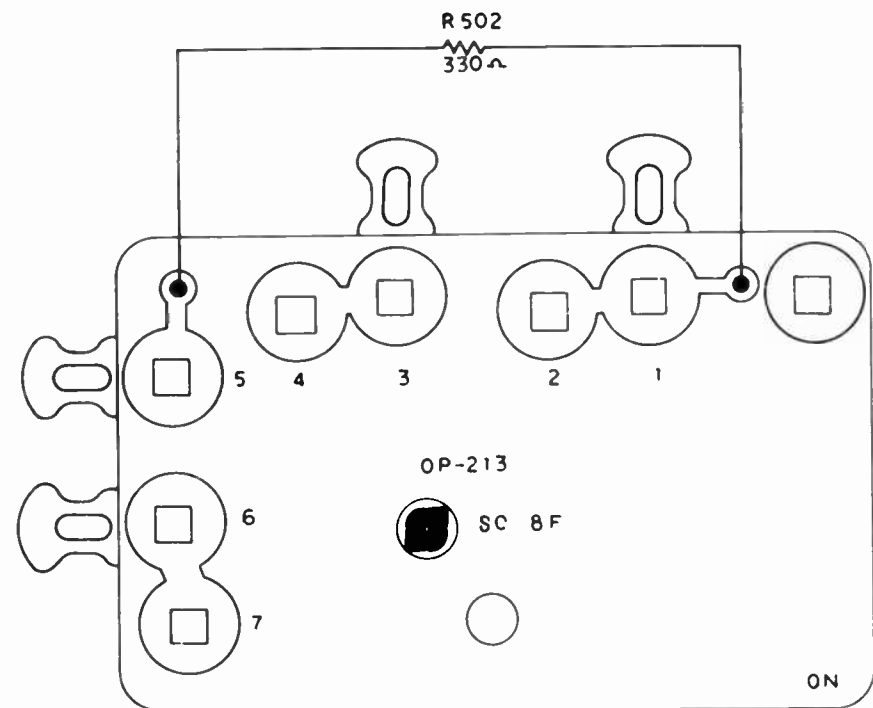


MAIN BOARD (TUP-007)  
ALL MODELS

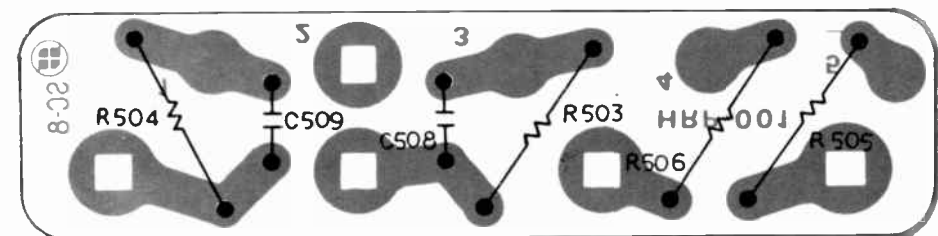


MODEL T-100A

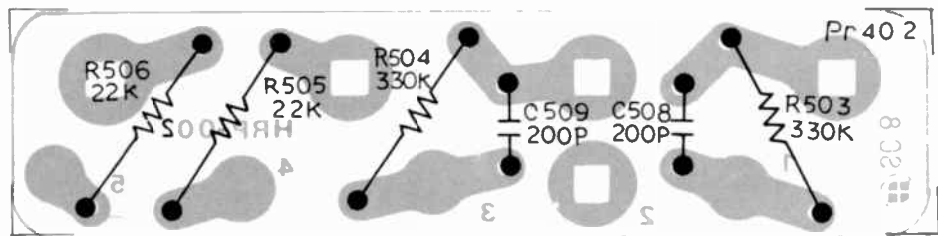
MODEL T600A



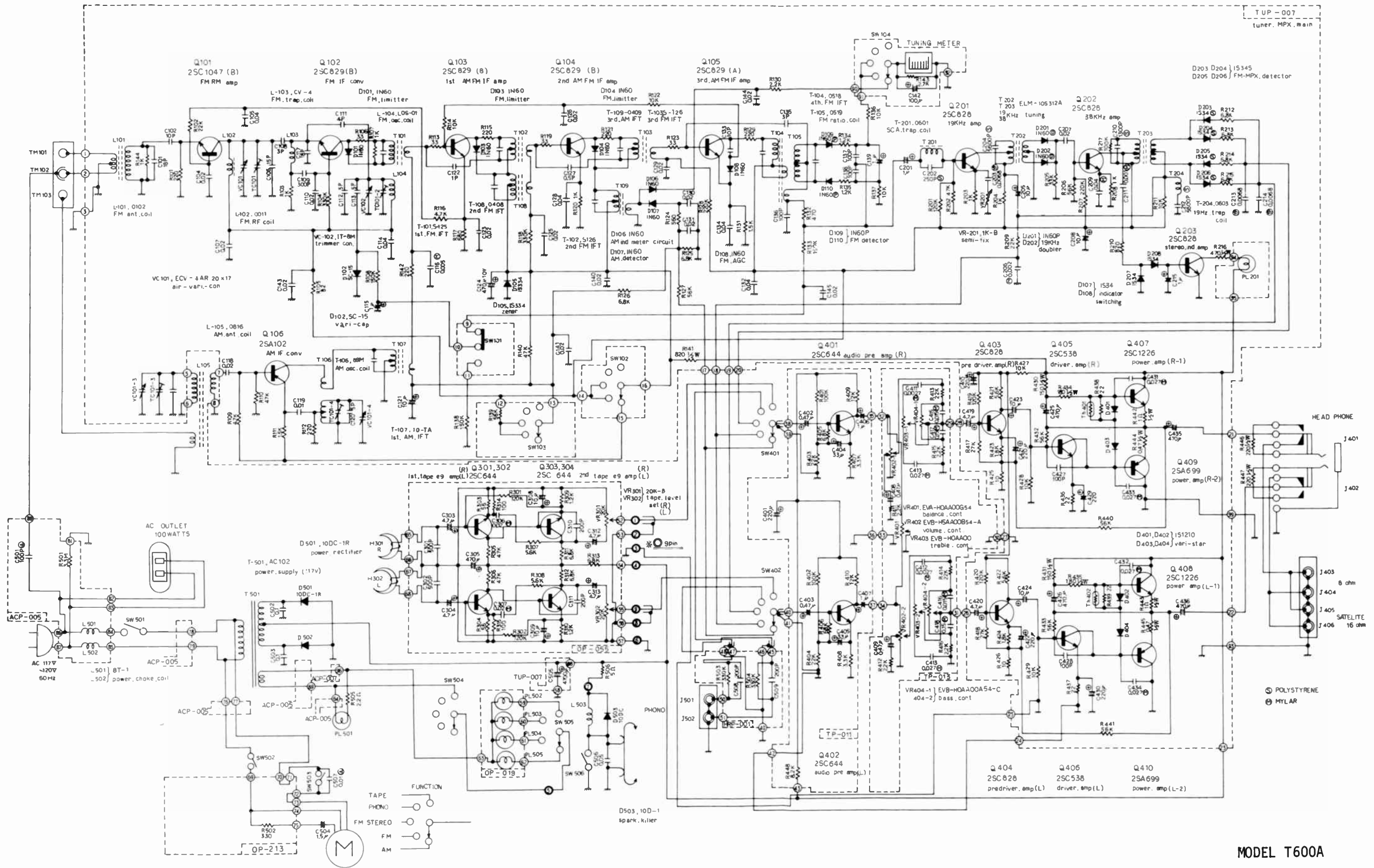
MOTOR CIRCUIT (OP-213)  
MODELS T-100A, T600A



PHONO INPUT (HRP-001)  
MODELS T-100A, T600A



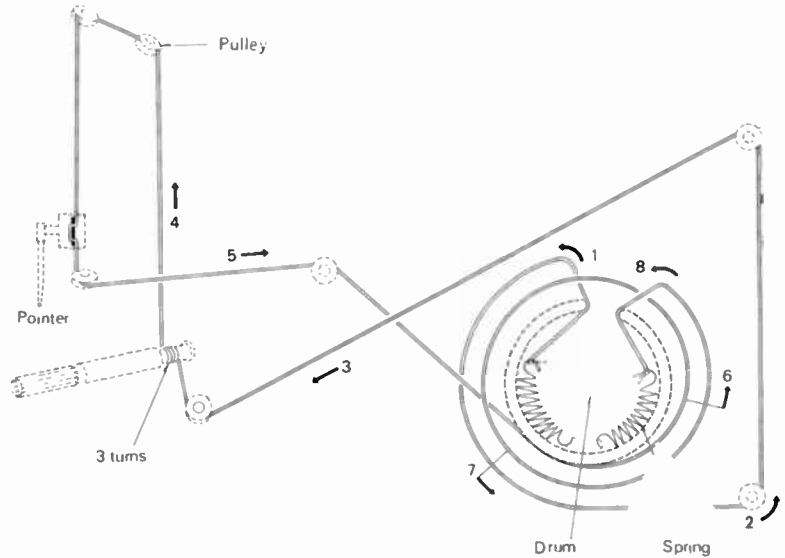
PHONO INPUT (HRP-002)  
MODEL R-12A



MODEL T600A

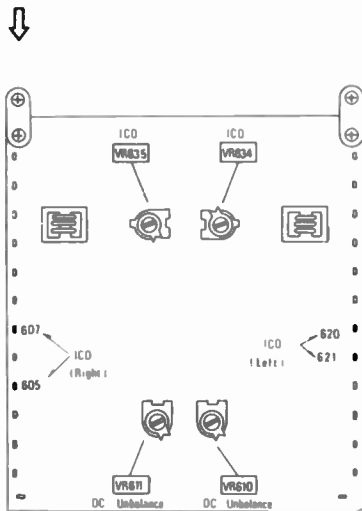
**■ DIAL CORD  
INSTALLATION GUIDE**

1. Dial cord length is  $63 \frac{1}{8}$ " (160cm).
2. Tuning gang is positioned at minimum capacity. (Frequency is maximum.)
3. Arrow marks (1~8) indicate correct order and direction of stringing dial cord.
4. Cement dial cord first and ends.

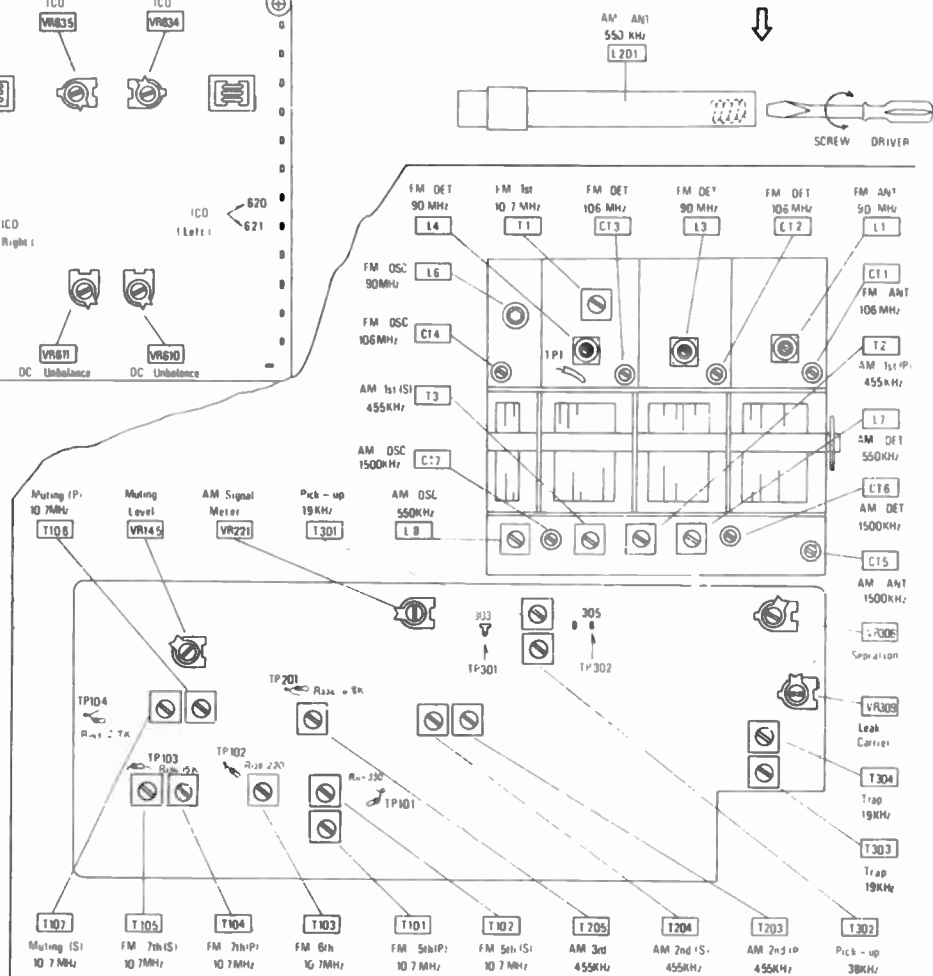


**■ ALIGNMENT POINTS**

**Main Amp Alignment**



**AM/FM-RF Alignment  
AM/FM-IF & Stereo Alignment**



## ALIGNMENT INSTRUCTIONS-READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

**Notes :**

- |   |  |
|---|--|
| 1. Volume control ..... Minimum           | 4. Maintain line voltage at 120 volts.   |
| 2. Speakers switch..... Main              | 5. Before the adjustment, Icq adjusting volumes (VR <sub>634</sub> and VR <sub>635</sub> ) should be turned to the left side completely. |
| 3. Other controls ..... Optional position |  |

CIRCUIT	VTVM CONNECTION	ADJUSTMENT	REMARKS
<b>MAIN AMP ALIGNMENT</b>			
1 DC UNBALANCE	Connect VTVM to speakers terminal.	VR <sub>610</sub> (Left) VR <sub>611</sub> (Right)	Make sure that VTVM become 0V.
2 Icq	Connect to No. 620 + , 621 - (left) and No. 605 + , 607 - (right) terminals.	VR <sub>634</sub> (Left) VR <sub>635</sub> (Right)	Make adjustments so that the indication on VTVM becomes 12.5 mV.

**Notes :**

- |   |  |
|---|--|
| 1. Volume control ..... Maximum (AM-RF)<br>Minimum (AM-IF, FM-IF)<br>Variable (FM-RF) | 6. High filter switch ..... OFF  |
| 2. Bass and treble control ..... Center   | 7. Tape-monitor switch ..... Source  |
| 3. Band selector switch ..... AM, FM-Mono (FM-IF)<br>FM-Auto (FM-RF)                  | 8. Mode switch ..... Stereo  |
| 4. Loudness switch ..... OFF  | 9. Speakers switch..... Main or Remote   |
| 5. Muting switch..... OFF   | 10. Maintain line voltage at 120 volts.  |
|   | 11. Output of signal generator should be no higher than necessary to obtain an output reading. |

SIGNAL GENERATOR or SWEEP GENERATOR CONNECTION	FREQUENCY	RCVR. DIAL SETTING (DISTANCE)	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS
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### AM ALIGNMENT

3	—	—	Signal meter of set.	VR <sub>211</sub>	Adjust for "0" signal meter indication.	
4	High side through 0.001 mfd to antenna terminal, Common to chassis.	455 kHz (20 kHz Sweep)	Point of non-interference (on/about 600 kHz)	Connect vert. amp. of scope to TP <sub>201</sub> .	T <sub>2</sub> (1st IFT) (P) T <sub>3</sub> (1st IFT) (S) T <sub>203</sub> (2nd IFT) (P) T <sub>204</sub> (2nd IFT) (S) T <sub>205</sub> (3rd IFT)	Adjust for maximum output
5	Fashion loop of several turns of wire and radiate signal into loop of receiver.	550 kHz (30% Mod. with 400Hz)	550 kHz (20.5mm ( 3/8" ))	Connect meter to main speakers terminal of set.	L <sub>8</sub> (OSC Coil) L <sub>201</sub> (ANT Coil) L <sub>7</sub> (DET Coil)	Adjust for maximum output. Adjust L <sub>201</sub> by ferrite core.
6	"	1500 kHz ( " )	1500 kHz (160.2mm (6 3/8" ))	"	CT <sub>7</sub> (OSC Trimmer) CT <sub>5</sub> (ANT Trimmer) CT <sub>6</sub> (DET Trimmer)	Adjust for maximum output. Repeat steps (5) and (6)

### FM-IF, TUNING METER AND MUTING CIRCUIT ALIGNMENT

7	High side through 0.001 mfd. to TP <sub>1</sub> .	10.7 MHz (400 kHz Sweep)	Point of non-interference. (on/about 90 MHz)	Connect vert. amp. of scope through detector to FM-IF p.c.b. TP <sub>101</sub> , Common to chassis. (Refer to fig. 1)	T <sub>1</sub> (FM 1st IFT)	Adjust for maximum amplitude and proper linearity between ±100 kHz markers. (Refer to fig. 2)
8	"	"	"	Connect scope through detector to TP <sub>102</sub> .	T <sub>101</sub> (FM 5th IFT) (P) T <sub>102</sub> (FM 5th IFT) (S) T <sub>103</sub> (FM 6th IFT)	"
9	"	"	"	Tuning meter of set.	T <sub>105</sub> (FM 7th IFT) (S)	Adjust for center of tuning meter indication. (Refer to fig. 3)
10	"	"	"	Connect vert. amp. of scope to TP <sub>103</sub> .	T <sub>104</sub> (FM 7th IFT) (P)	Adjust T <sub>104</sub> so that 10.7 MHz marker appears at the center. (Refer to fig. 4)
11	"	"	"	Connect vert. amp. of scope to TP <sub>104</sub> .	T <sub>106</sub> (Muting IFT) (P) T <sub>107</sub> (Muting IFT) (S)	Adjust for maximum sharp and proper linearity. (Refer to fig. 2)

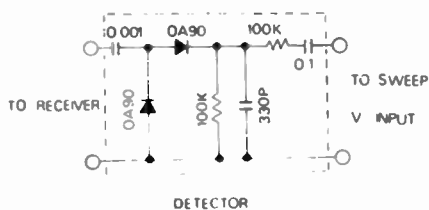


Fig. 1

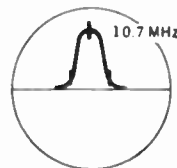


Fig. 2

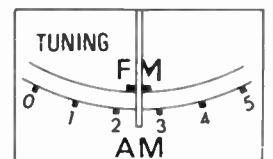


Fig. 3

SIGNAL GENERATOR		RCVR DIAL SETTING [ DISTANCE ]	INDICATOR VTVM or SCOPE	ADJUSTMENT	REMARKS
CONNECTION	FREQUENCY				
<b>FM-RF ALIGNMENT</b>					
12	Connect to FM antenna terminal through FM dummy antenna. (Refer to fig. 5)	90 MHz (30% Mod. with 400 Hz)	90 MHz [ 21.3mm (5/8") ]	Output meter across speaker terminals	L6 (FM OSC Coil) L3 (FM DET Coil) L4 (FM DET Coil) L1 (FM ANT Coil)  Adjust for maximum output.
13	"	106 MHz ( " )	106 MHz [ 150.3mm (5 29/32") ]	"	CT4 (FM OSC Trimmer) CT2 (FM DET Trimmer) CT3 (FM DET Trimmer) CT1 (FM ANT Trimmer)  Adjust for maximum output. Repeat steps (12) and (13).
<b>MUTING LEVEL ALIGNMENT</b>					
Note: Muting switch .....ON					
14	Connect to FM antenna terminal through FM dummy antenna.	98 MHz (100% Mod. with 400Hz) Output 28 dB	98 MHz	Output meter or speaker across speaker terminals.	VR145  Adjust so that output can be obtained.
<b>FM-MONO DISTORTION ALIGNMENT</b>					
Note: Muting switch ..... OFF					
15	Connect to FM antenna terminal through FM dummy antenna.	98 MHz (100% Mod. with 400Hz) Output 60 dB	98 MHz	Connect distortion meter to speaker terminals.	T104 (FM 7th IFT) (P)  Adjust for minimum distortion.
<b>Notes:</b> Stereo-modulator ..... Connect stereo-modulator output to EXT. MOD. terminal of signal generator. Internal OSC 1kHz. Pilot signal modulation 10%. Signal generator ..... Frequency approximately 98 MHz. Output level 60 dB. Moduration mode FM. 1. Band selector ..... FM-Auto 2. Bass and treble control ..... Center 3. High filter switch ..... OFF 4. Mode switch ..... Stereo 5. Maintain line voltage at 120 volts. 6. Muting switch ..... OFF 7. Loudness switch ..... OFF 8. Speaker switch ..... Main 9. Tape monitor switch ..... Source 10. Dummy load ..... 8Ω, L and R Main terminal					
<b>19 kHz, 38 kHz COIL AND PHASE ALIGNMENT</b>					
SIGNAL GENERATOR CONNECTION	STEREO MODULATOR MODE and MOD. RATE	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS	
16	FM antenna terminal thru. dummy antenna.	—————	Connect scope to TP302. Common to chassis.	T301 (19 kHz Coil)  Adjust for maximum output.	
17	"	—————	Connect scope to TP301. Common to chassis.	T302 (38 kHz Coil)  "	
18	"	L (or R) 100%	Connect scope to speaker terminals.	T301 (19 kHz Coil)  Adjust for minimum right (or left) output.	
<b>SEPARATION ALIGNMENT</b>					
19	FM antenna terminal thru. dummy antenna.	L (and R) 30%	Output meter across speaker terminals through low pass filter. (Refer to fig. 6)	VR30E  Adjust for minimum right (and left) output.	
<b>LEAK CARRIER AND 19 kHz TRAP ALIGNMENT</b>					
20	FM antenna terminal thru. dummy antenna.	100% Mod. with 1kHz.	Connect VTVM to speaker terminals.	Volume control of set.	Adjust for 0dB (3V range) output.
21	"	0% Modulation	"	VR309	Adjust for minimum leak carrier.
22	"	"	"	T303 (19 kHz Trap) T304 (19 kHz Trap) Right	Adjust for minimum output. (left and right side)

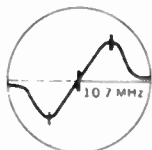


Fig. 4

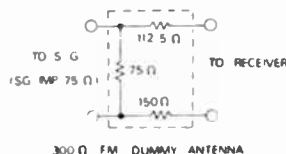


Fig. 5

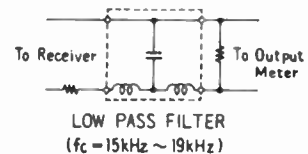
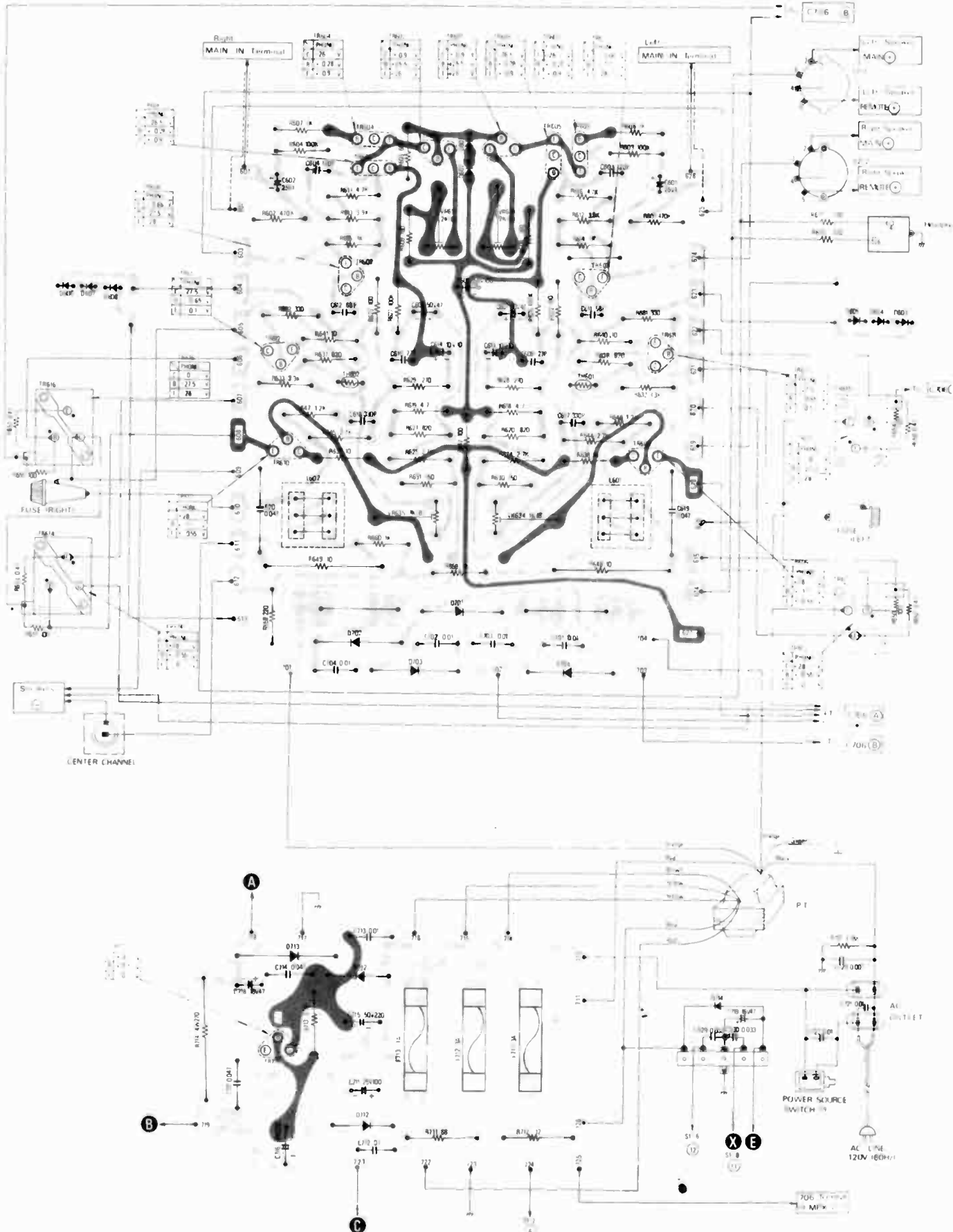
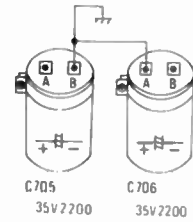
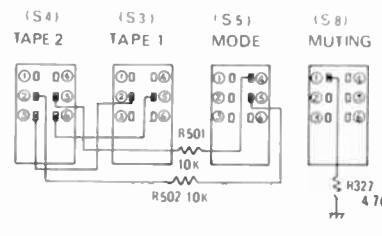
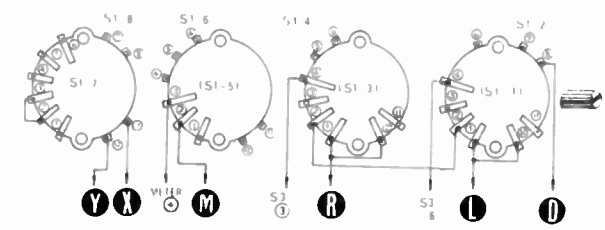


Fig. 6

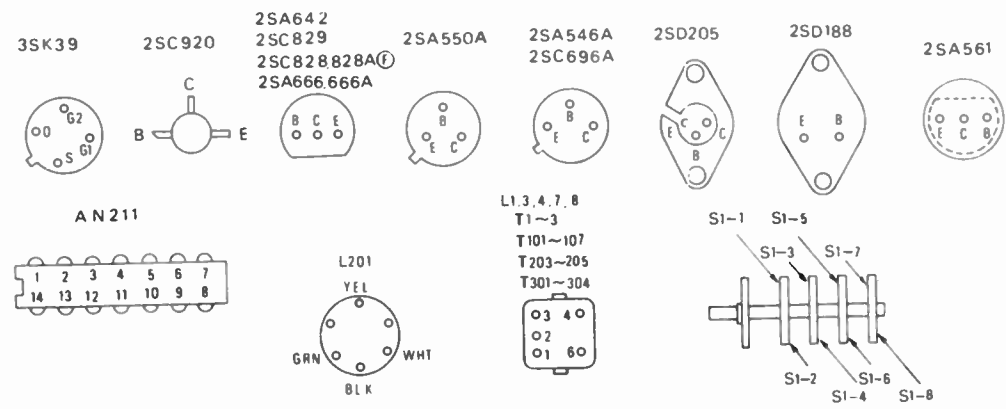
# Driver & Power Supply Circuit Board





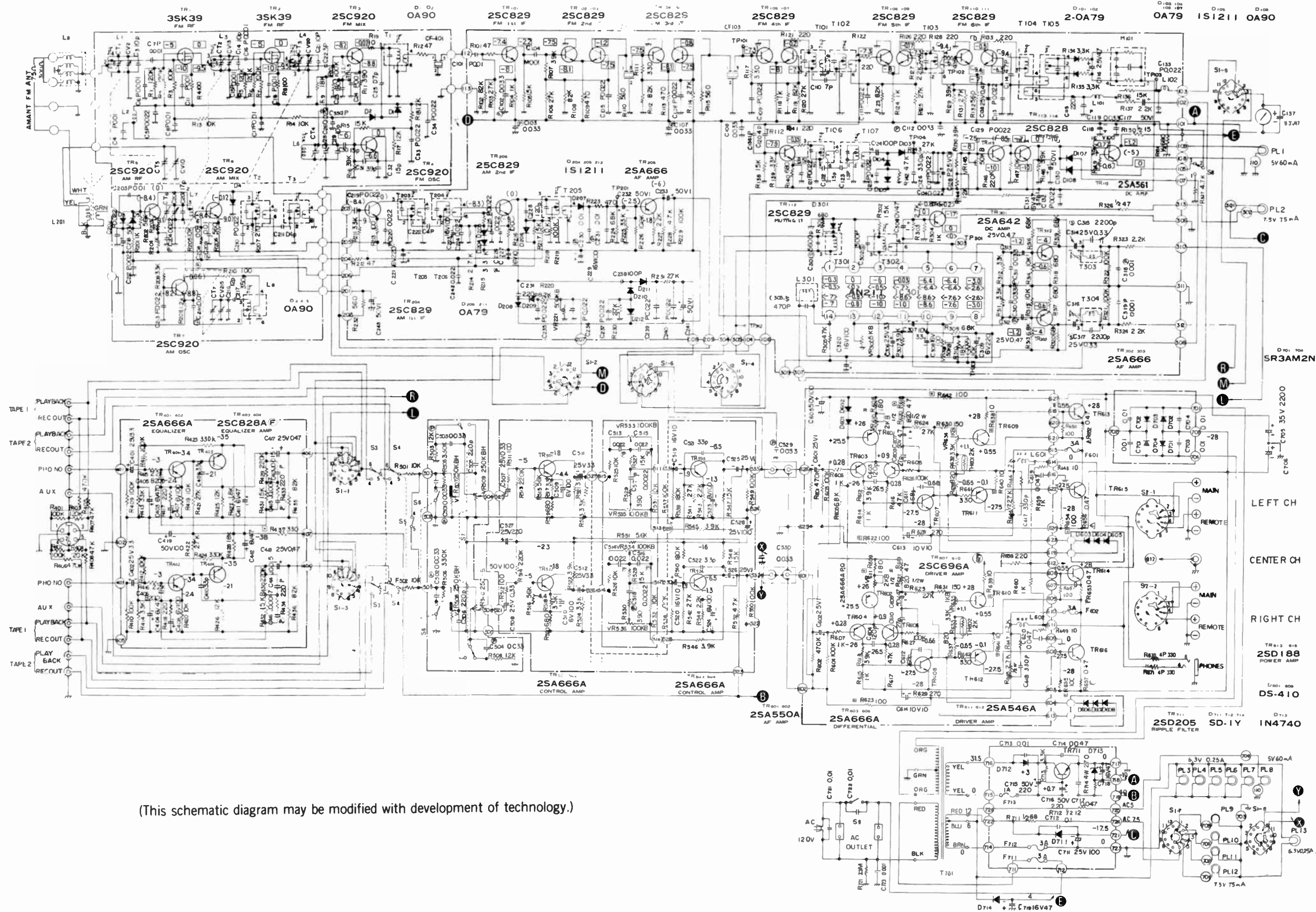


**BOTTOM VIEW**

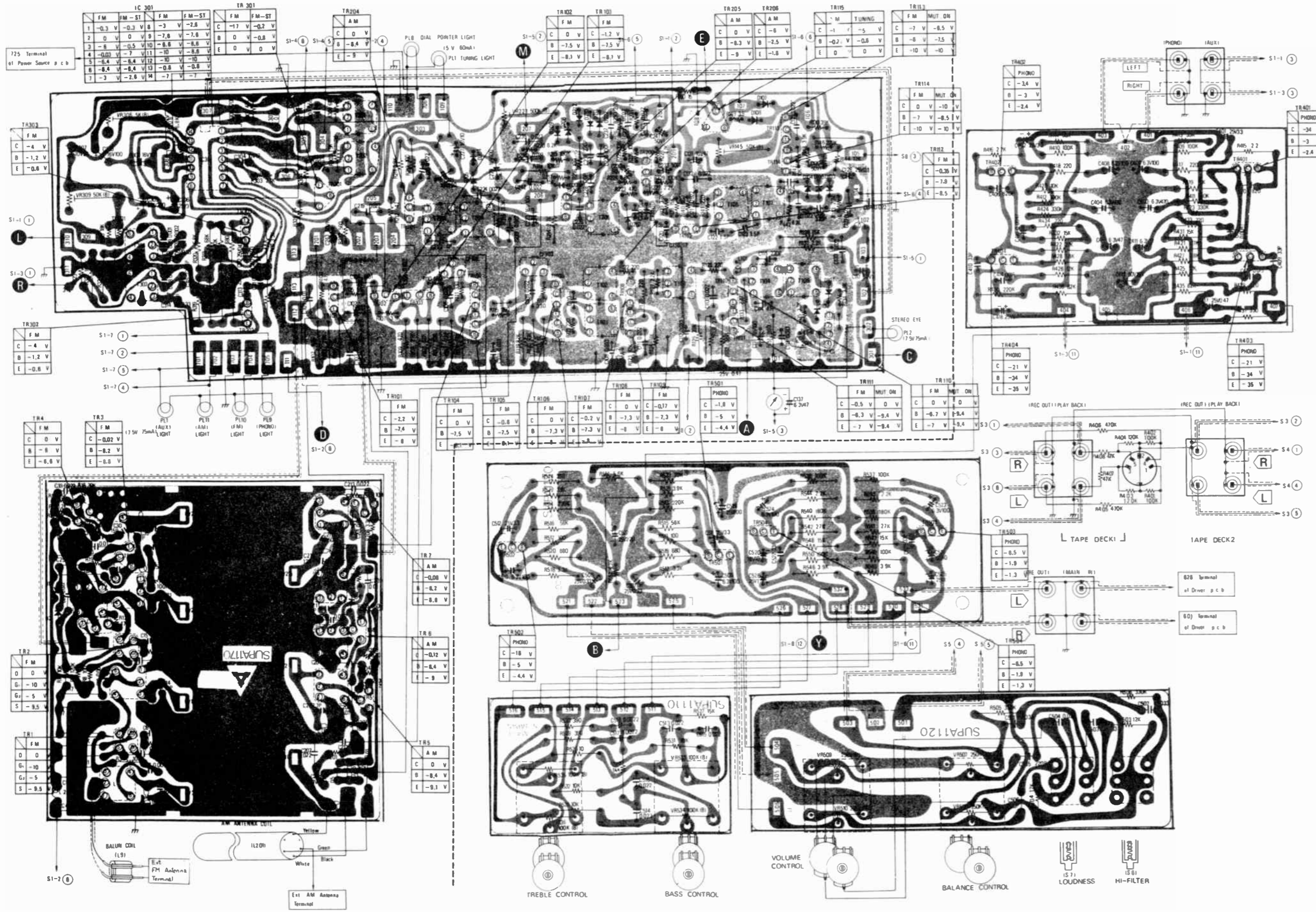


- Notes
- S1.1 Select/af switch in PHONO position
  - S1.2 Select/af switch in FM AUTO - FM MTRND - AM - AUX
  - S1.3 Speakers selector switch in PHONES position
  - S1.4 Tape monitor 1 switch in SOURCE position
  - S1.5 Tape monitor 2 switch in SOURCE position
  - S1.6 Mode switch in STEREO position
  - S1.7 High filter switch in OFF position
  - S1.8 Loudness switch in OFF position
  - S1.9 Muting switch in ON position
  - S1.10 Power source switch in OFF position
  - DC voltage measurements are taken with circuit tester from chassis ground
  - FM position
  - FM stereo position
  - Muting ON position
  - AM position
  - Other voltage is PHONO position

- VR145 Muting level adjustment
- VR221 AM Meter zero adjustment
- VR206 Stereo separation adjustment
- VR209 Leak carrier adjustment
- VR207 Balance control
- VR208 Volume control
- VR210 Bass control
- VR211 Treble control
- VR212 DC unbalance adjustment
- VR214 Ico adjustment



(This schematic diagram may be modified with development of technology.)



SEMICONDUCTORS

ITEM	PART NO./TYPE	ITEM	PART NO./TYPE	ITEM	PART NO./TYPE
D1	0A90	TR7	2SC9200	C608	ECEA50V47
D2	0A90	TR101	2SC829C	C613	ECEA10V10
D3	0A90	TR102	2SC829C	C614	ECEA10V10
D4	0A90	TR103	2SC829C	C705	ECEM5R22Z
D5	0A90	TR104	2SC829C	C706	ECEM5R22Z
D101	2-0A79	TR105	2SC829C	C711	ECEA25V100
D102	2-0A79	TR106	2SC829C	C715	ECEA50V220
D103	0A79	TR107	2SC829C	C716	ECEA50V220
D104	0A79	TR108	2SC829C	C718	ECEA16V47
D105	1S1211	TR109	2SC829C	C719	ECEA10V220
D106	1S1211	TR110	2SC829C	CT1	ECV1Z10P12
D107	0A79	TR111	2SC829C	CT2	ECV1Z10P50
D108	0A90	TR112	2SC829C	CT3	ECV1Z10P50
D204	1S1211	TR113	2SC829C	CT4	ECV1Z10P12
D205	1S1211	TR114	2SC829C	CT5	ECV1Z10P12
D206	0A79	TR115	2SA561V,GR	CT6	ECV1Z20P12
D207	0A79	TR204	2SC829C	CV2	CV10
D208	0A79	TR205	2SC829C	CV7	CV10
D209	0A79	TR206	2SA666Q,R	CV8	CV10
D210	0A79	TR301	2SA642,S,M	CV20	ECV7PN34P12G
D211	0A79	TR302	2SA666Q,R	CV28	CV25
D212	1S1211	TR303	2SA666Q,R	CV206	CV215
D301	0A90	TR401	2SA666A-P,Q		
D501	RV005-410	TR402	2SA666A-P,Q		
D602	RV005-410	TR403	2SA666A-P,Q		
D603	RV005-410	TR404	2SA666A-P,Q		
D604	RV005-410	TR501	2SA666A-P,Q		
D605	RV005-410	TR502	2SA666A-P,Q		
D606	RV005-410	TR503	2SA666A-P,Q		
D607	RV005-410	TR504	2SA666A-P,Q		
D608	RV005-410	TR601	2SA550A-1-Q,R,S		
D701	RVDSR3AM2H	TR602	2SA550A-1-Q,R,S		
D702	RVDSR3AM2H	TR603	2SA666A-1-P,Q thru 2SA666A-7-P,Q		
D703	RVDSR3AM2H	TR604	2SA666A-1-P,Q thru 2SA666A-7-P,Q		
D704	RVDSR3AM2H	TR605	2SA666A-1-P,Q thru 2SA666A-7-P,Q		
D711	RVDS-1Y	TR606	2SA666A-1-P,Q thru 2SA666A-7-P,Q		
D712	RVDS-1Y	TR607	2SC696A-A,B,D,E,H		
D713	RVDM1A740	TR608	2SC696A-A,B,D,E,H		
D714	RVDS-1Y	TR609	2SC696A-A,B,D,E,H		
IC301	AN211	TR610	2SC696A-A,B,D,E,H		
TR1	3SK390	TR611	2SA546A-A,B,D,E,H		
TR2	3SK390	TR612	2SA546A-A,B,D,E,H		
TR3	2SC9200	TR613	2S0188M		
TR4	2SC9200	TR614	2S0188M		
TR5	2SC9200	TR615	2S0188M		
TR6	2SC9200	TR616	2S0188M		
		TR617	2S0188M		
		TR618	2S0205K,L		

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R648	ERU2P100	10 ohm 2W Fusible
R649	ERU2P100	10 ohm 2W Fusible
R652	ERU2PR47	.47 ohm 2W MW
R653	ERU2PR47	.47 ohm 2W MW
R656	ERU2PR47	.47 ohm 2W MW
R657	ERU2PR47	.47 ohm 2W MW
R670	ERM4P331	330 ohms 4W MW
R671	ERM4P331	330 ohms 4W MW
R714	ERM4P271	270 ohms 4W MW
RT103	RT103	Thermistor
RTA202-2	RTA202-2	Thermistor
TH602	RTA202-2	Thermistor
VR145	EVL33A00B54	50K Muting
VR221	EVL33A00B55	500K AM Meter Zero
VR306	EVL33A00B53	5000 ohms Separation
VR509	EVL33A00B54	50K Carrier Leak
VR507 & VR508	EVFN0AL30252	250K Dual Balance
VR509 & VR510	EVEN7AL30B5	250K Dual Volume
VR510	EVF34AN01B15	100K Dual Bass
VR534	EVF34AN01B15	100K Dual Treble
VR610	EVL33A00B23	2000 ohms DC Unbalance
VR611	EVL33A00B23	2000 ohms DC Unbalance
VR634	EVL33A00B13	1000 ohms ICQ
VR635	EVL33A00B13	1000 ohms ICQ

ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
C116	ECEA25V4R7	4.7mf 25V
C117	ECEA50V1	1mf 50V
C118	ECEA16V10	100mf 16V
C128	ECAG25ER1	1mf 25V
C130	ECEA50V1	1meg 50V
C131	ECEA16V47	47mf 16V
C135	ECAG25ER47	47mf 25V
C137	ECEA6V47	47mf 6.3V
C218	ECEA50V1	50V
C221	ECEA16V220	220mf 16V
C223	ECEA16V100	100mf 16V
C227	ECEA16V10	10mf 16V
C229	ECEA16V100	100mf 16V
C232	ECEA50V1	1mf 50V
C233	ECEA50V1	1mf 50V
C241	ECEA50V1	1mf 50V
C243	ECEA50V1	1mf 50V
C304	ECEA10V47	47mf 10V
C306	ECEA25V3R3	3.3mf 25V
C307	ECEA10V33	33mf 10V
C308	ECEA16V100	100mf 16V
C309	ECEA6V220	220mf 6.3V
C312	ECAG25ER47	47mf 25V
C313	ECAG25ER47	47mf 25V
C314	ECAG25ER33	.33mf 25V
C316	ECAG25ER33	.33mf 25V
C320	ECEA16V100	100mf 16V
C401	ECS225EF3R3	3.3mf 25V
C402	ECS225EF3R3	3.3mf 25V
C403	ECEA6V470	470mf 6.3V
C404	ECEA6V470	470mf 6.3V
C407	ECEA6V100	100mf 6.3V
C408	ECEA6V100	100mf 6.3V
C411	ECEA6V47	47mf 6.3V
C412	ECEA6V47	47mf 6.3V
C417	ECAG25ER47	47mf 25V
C418	ECAG25ER47	47mf 25V
C419	ECEA50V100	100mf 50V
C507	ECAG25ER33	.33mf 25V
C508	ECAG25ER33	.33mf 25V
C509	ECEA6V100	100mf 6.3V
C510	ECEA6V100	100mf 6.3V
C511	ECAG25ER68	68mf 25V
C512	ECAG25ER68	68mf 25V
C519	ECEA16V10	10mf 16V
C520	ECEA16V10	10mf 16V
C523	ECEA6V100	100mf 6.3V
C524	ECEA6V100	100mf 6.3V
C525	ECS225EF1	1mf 25V
C526	ECS225EF1	1mf 25V
C527	ECEA25V220	220mf 25V
C528	ECEA25V100	100mf 25V
C601	ECAG25E1	1mf 25V
C602	ECAG25E1	1mf 25V
C605	ECEA50V100	100mf 50V
C607	ECEA50V47	47mf 50V

COILS/TRANSFORMERS

ITEM	PART NO.	ITEM	PART NO.	ITEM	PART NO.
L1	SLAA4N6-Z	L201	SLFA2F10-0	T105	SLIA4C56
L2	SLQX151-1Y	L301	SLMA1X1-K	T106	SLIA4C24
L3	SLDA4N6-Z	L601	SLEA5001-N	T107	SLIA4C24
L4	SLDA4N14-Z	L602	SLEA5001-N	T203	RL12C257-M
L5	RLQY15G5	T1	SLIA4C101	T204	RL12C257-M
L6	SLOA4N7-T	T2	RL12C157-M	T205	RL12C450-M
L7	SLOA2C3	T3	RL12C157-M	T301	RLM1C16
L8	SLOA2C3	T101	SLIA4C23	T302	RLM1C17
L9	SLAA4M	T102	SLIA4C23	T303	SLMA1C1-K
L101	SLQX151-1Y	T103	SLIA4C23	T304	SLMA1C1-K
L102	SLQX151-1Y	T104	SLIA4C54	T701	SLTA5R95-W

MISCELLANEOUS

ITEM	NAME	PART NO.
CF101	Filter, Ceramic	RVFCF10M12C-G,B,R,W,Y
CF102	Filter, Ceramic	RVFCF10M12C-G,B,R,W,Y
F601	Fuse, Speaker (3A)	KBAS1A3001
F602	Fuse, Speaker (3A)	KBAS1A3001
F711	Fuse, Power (3A)	KBAS183003
F712	Fuse, Power (3A)	KBAS183003
F713	Fuse, Power (1A)	KBAS181001
M101	Component Combination	EKA5L04C
S1	Switch, Selector	ESRCASL30AS
S2	Switch, Speaker	ESRC224L30BS
S3	Switch, Tape Monitor 1	SSLA85
S4	Switch, Tape Monitor 2	SSLA85
S5	Switch, Mode	SSLA35
S6	Switch, High Filter	SSHAI35
S7	Switch, Loudness	SSHAI35
S8	Switch, Muting	SSLA35
S9	Switch, Power Source Meter, Tuning	SSHAI65
		SSMA13

CABINET PARTS

NAME	PART NO.
Assembly, Cabinet	SKAA380
Panel, Front	SYEA17
Panel, Rear	SGP440B
Knob, Speakers/Selector	SBNA49
Knob, Power/High Filter/Loudness	SBNA56
Knob, Bass/Treble (Outer)	SBNA50
Knob, Bass/Treble (Inner)	SBNA48
Knob, Balance/Volume	SBNA46
Knob, Tape/Muting/Mode	SBNA51S
Knob, Tuning	SBNA47

## ALIGNMENT PROCEDURES

### INSTRUMENTS REQUIRED

1. Oscilloscope (RCA WO-91C or equivalent)

2. Vacuum tube voltmeter (RCA WV-98C or equivalent)

3. RCA test tape #321 (or equivalent)

### HEAD HEIGHT/CROSS TALK

NOTE: Driving Pawl Assy. (20) must be moved out of contact with selector Cam (13) to adjust head height correctly (See Fig. 1 at right).

1. Set volume control to maximum.
2. Load instrument with RCA #321 or equivalent 6 to 8 kHz test tape.
3. Set track selector to track 2.
4. Connect VTVM and vert input of oscilloscope to LEFT channel output.
5. Adjust cross talk (head height) adjustment screw (18) for a null on VTVM while monitoring with oscilloscope. Out of phase 1 kHz tones are on each side of correct adjustment. Null indicates precise head height.

### AZIMUTH

6. Connect VTVM and vert input of oscilloscope to RIGHT channel output.
7. Adjust AZIMUTH screw (A) for maximum indication on VTVM, while monitoring adjustment on oscilloscope. Adjustment must be made carefully for maximum peak. A slight misadjustment may result in out-of-phase signal pickup.

NOTE: The two adjustments—Head Height and Azimuth—interact to some degree. Adjustment of one will normally require rechecking the other to optimize the settings.

### HEAD RESIDUAL MAGNETISM

1. If head becomes magnetized poor high frequency response and excessive hiss will result, even with correct azimuth setting.
2. To correct, follow demagnetizer instruction carefully. In most cases, demagnetizer may be inserted to head surface through tape compartment opening.

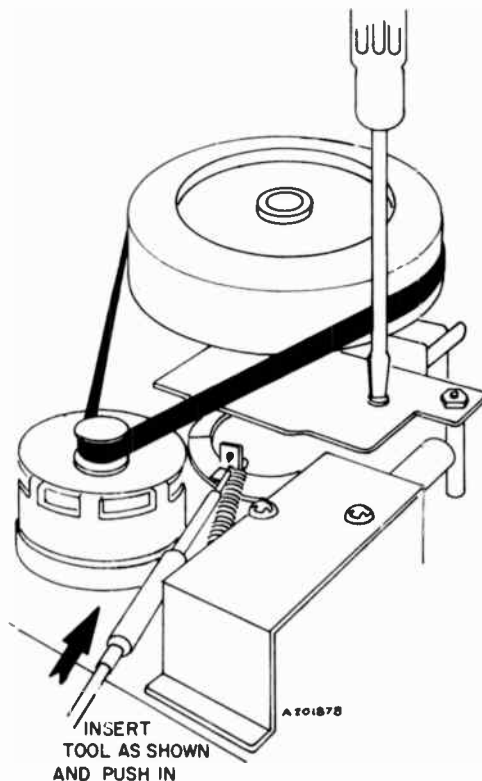


Fig. 1

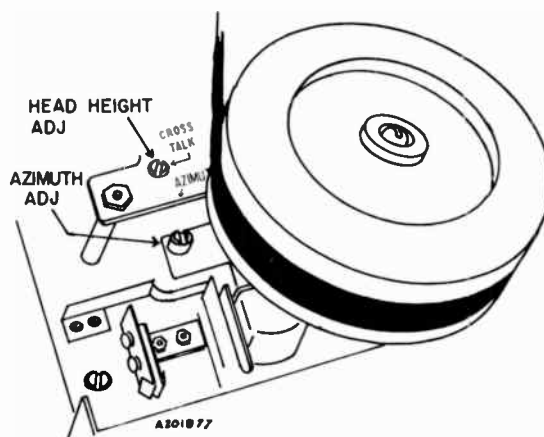
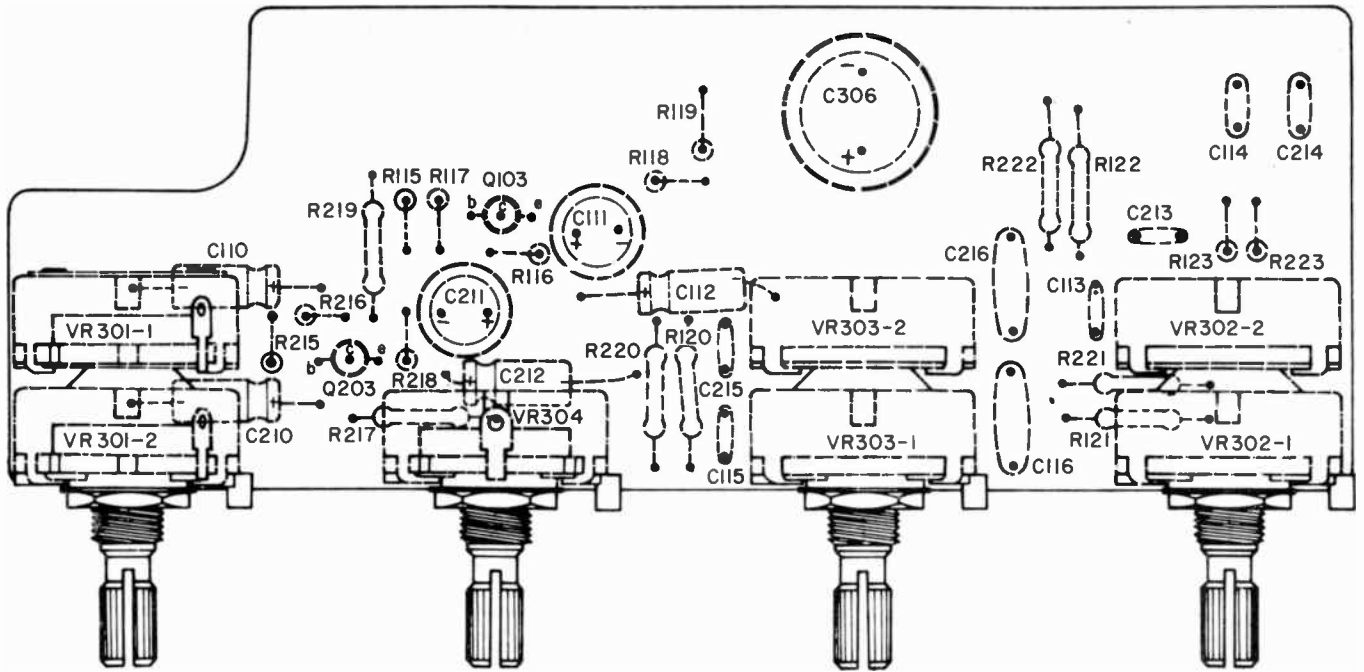
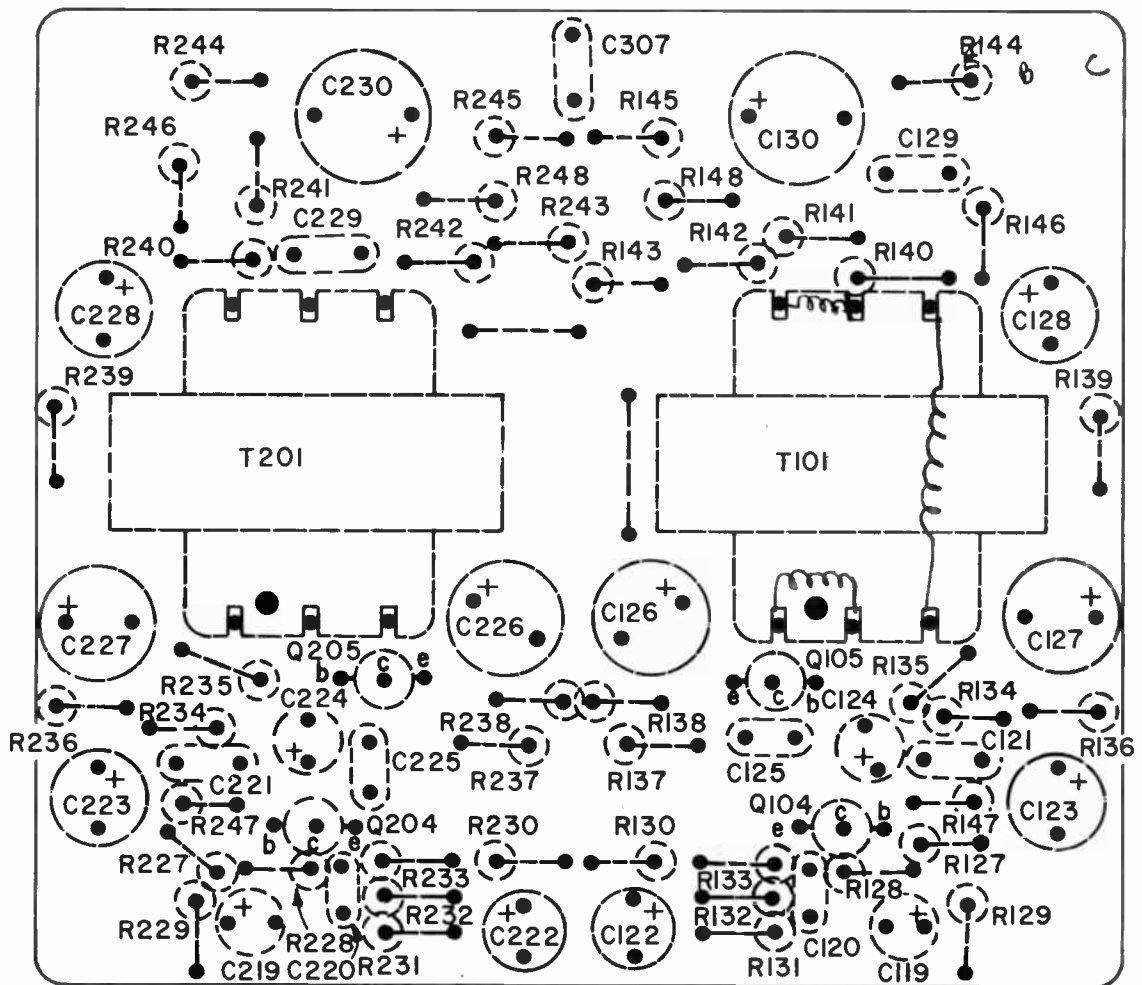


Fig. 2  
Alignment Points

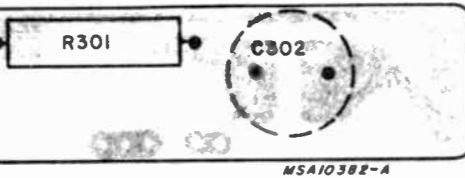
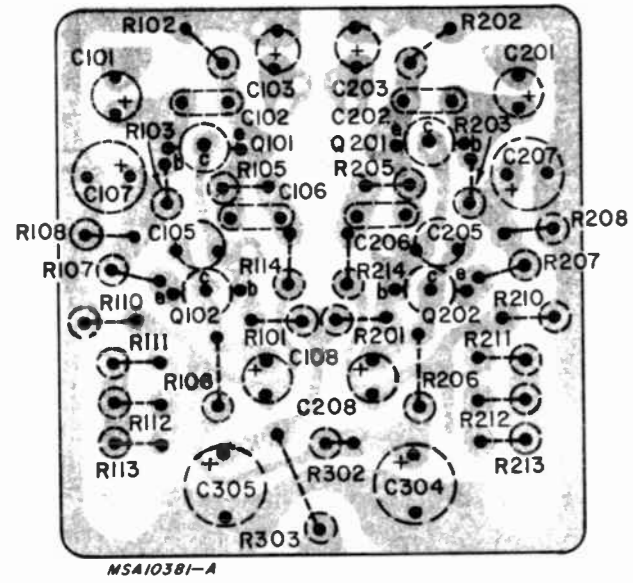


Component Location—Control Board



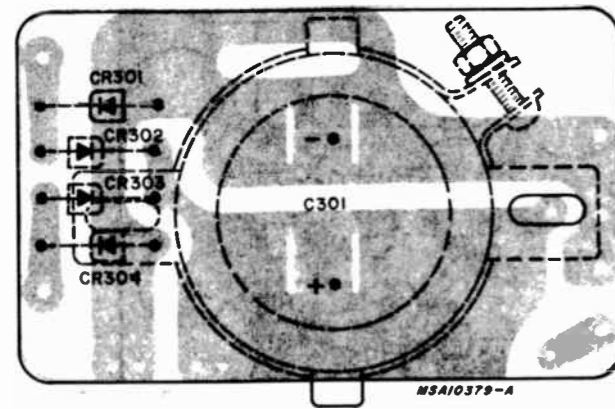
MSA10388-A

Component Location—Amp Board

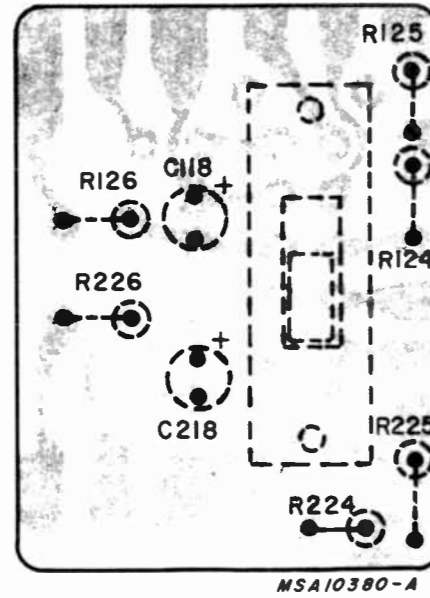


Component Location—Power Board

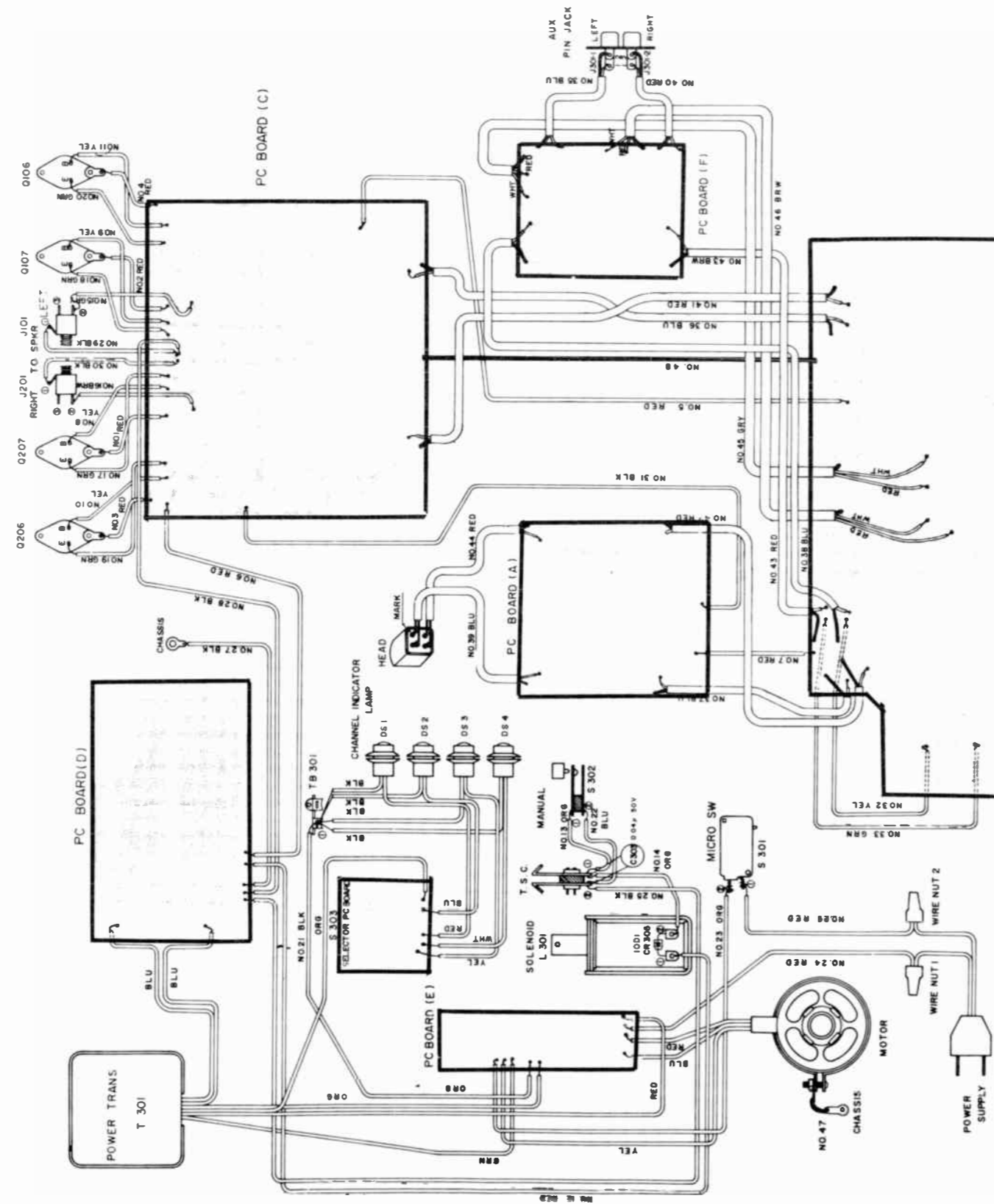
Component Location—Pre-Amp Board



Component Location—Rectifier Board



Component Location—Switch Board



YZD 596—Chassis Wiring Diagram

SEMICONDUCTORS

ITEM	PART NO.	TYPE
CR301	127695	10D1
CR302	127695	10D1
CR303	127695	10D1
CR304	127695	10D1
CR305	127695	10D1
Q101	168405	2SC693
Q102	167956	2SC693FU
Q103	168405	2SC693
Q104	167957	2SC536E1
Q105	167957	2SC536E1
Q106	167958	2SD142F
Q107	167958	2SD142F
Q201	168405	2SC693
Q202	167956	2SC693FU
Q203	168405	2SC693
Q204	167957	2SC536E1
Q205	167957	2SC536E1
Q206	167958	2SD142F
Q207	167958	2SD142F

ELECTROLYTIC CAPS

ITEM	PART NO.	VALUE
C101	127478	4.7mfd 10V
C103	168493	.1mfd 10V
C107	168470	33mfd 10V
C108	168469	10mfd 10V
C110	168469	10mfd 10V
C111	168472	100mfd 10V
C112	168469	10mfd 10V
C118	168494	.2mfd 10V
C119	168468	3.3mfd 10V
C122	168471	47mfd 6.3V
C123	168473	100mfd 25V
C124	168469	10mfd 10V
C126	168474	220mfd 10V
C127	168478	220mfd 20V
C128	168473	100mfd 25V
C130	168475	470mfd 16V
C201	127478	4.7mfd 10V
C203	168493	.1mfd 10V
C207	168470	33mfd 10V
C208	168469	10mfd 10V
C210	168469	10mfd 10V
C211	168472	100mfd 10V
C212	168469	10mfd 10V
C218	168494	.2mfd 10V
C219	168468	3.3mfd 10V
C222	168471	47mfd 6.3V
C223	168473	100mfd 25V
C224	168469	10mfd 10V
C226	168474	220mfd 10V
C227	168478	220mfd 25V
C228	168473	100mfd 25V
C230	168475	470mfd 16V
C301	168477	3300mfd 35V
C304	168472	100mfd 10V
C305	168430	100mfd 16V
C306	168476	1000mfd 25V

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R301	167929	300 ohm 7W WW
VR301	168460	50K Dual Volume
VR302	168459	50K Dual Treble
VR303	168459	50K Dual Bass
VR304	168461	15K Balance

COILS/TRANSFORMERS

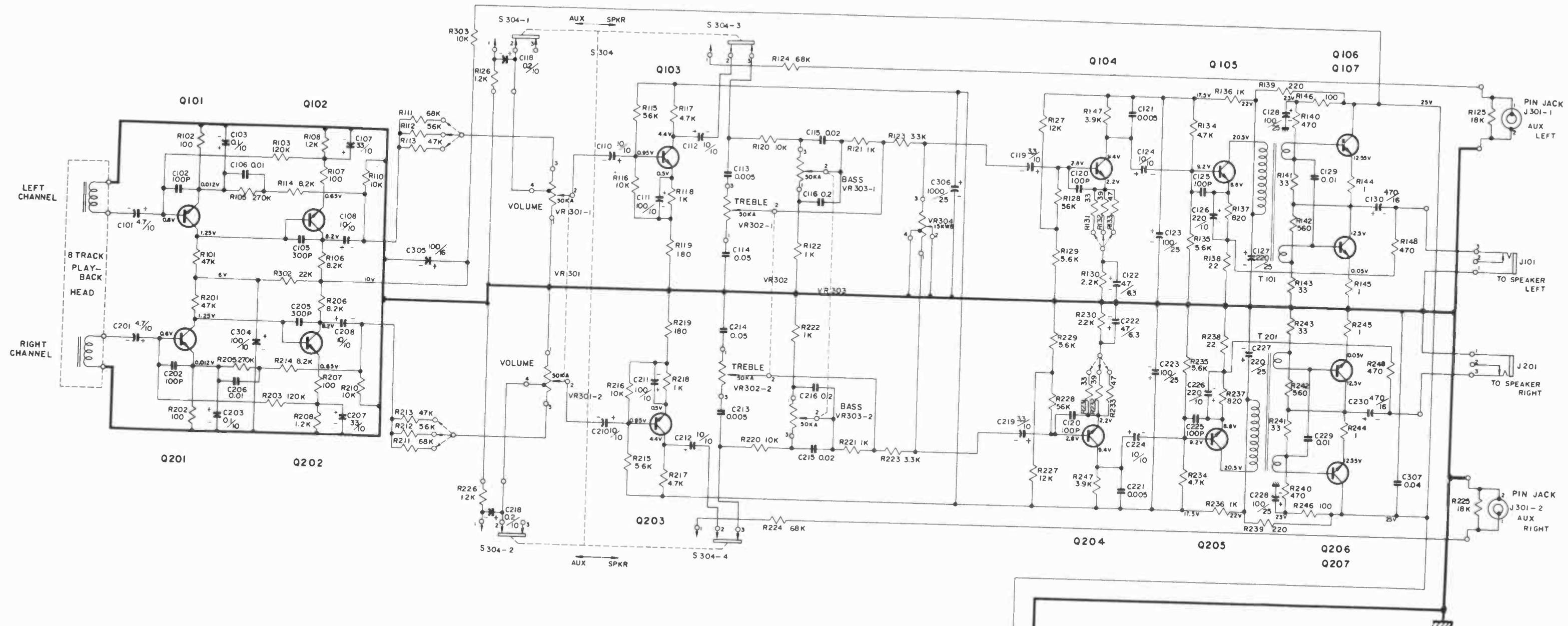
ITEM	PART NO.
T101	167960
T201	167960
T301	168462

MISCELLANEOUS

ITEM	NAME	PART NO.
S304	Switch, Aux/Speaker	167962
SP101	Speaker, 9", 8 ohm	168463
SP201	Speaker, 9", 8 ohm	168463
	Head, Magnetic	168381
	Solenoid	168480
	Belt, Drive	167952
	Motor, Drive	167955
	P.C. Board, "A"	168487
	P.C. Board, "D"	168490
	P.C. Board, "B"	168488
	P.C. Board, "C"	168489
	P.C. Board, "E"	168491
	P.C. Board, "F"	168492

CABINET PARTS

NAME	PART NO.
Enclosure, Speaker	168457
Escutcheon, Front	168452
Overlay, Escutcheon	168453
Panel, Cabinet Rear	168451
Panel, Speaker Rear	168458
Panel, Front	168450
Button, Channel Select	168455
Knob, Control	127607



RESISTOR VALUES ARE IN OHMS K=1000

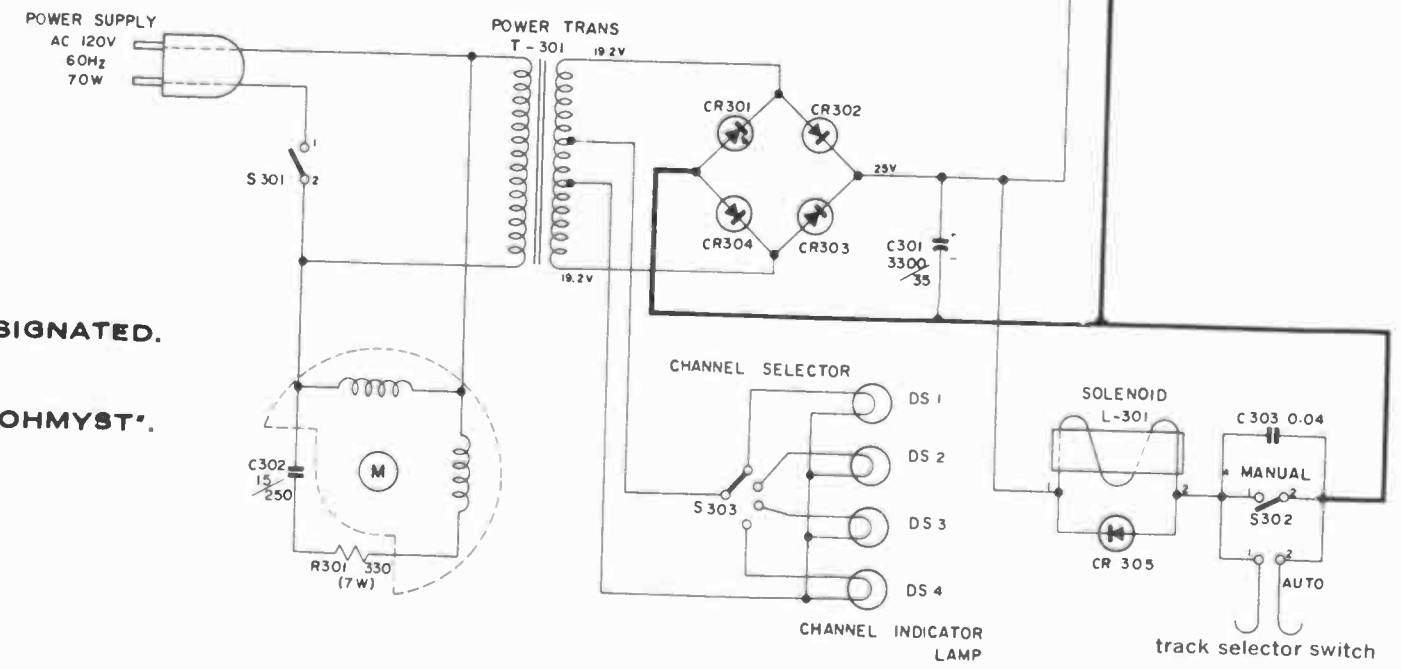
CAPACITOR VALUES GREATER THAN 1.0 ARE IN PF.

THOSE 1.0 AND LESS ARE IN MFD, UNLESS OTHERWISE DESIGNATED.

VOLTAGES MEASURED WITH RESPECT TO  $\text{⏏}$  USING A 'VOLTOHMYST'.

NO SIGNAL CONDITION, AND SHOULD HOLD WITH  $\pm 20\%$ .

$\text{⏏}$  INDICATES GROUND.



	Q101	Q102	Q103	Q104	Q105	Q106	Q107
Q201	Q202	Q203	Q204	Q205	Q206	Q207	Q207
C	1.25V	8.2V	4.4V	9.4V	20.5V	25V	12.5V
B	0.6V	1.25V	0.95V	2.8V	9.2V	13.4V	0.9V
E	0.012V	0.65V	0.5V	2.2V	8.8V	12.55V	0.05V

Pages 81-90 Courtesy of SEARS, ROEBUCK AND COMPANY

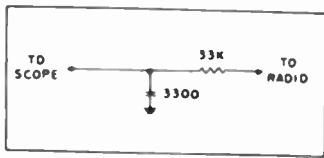
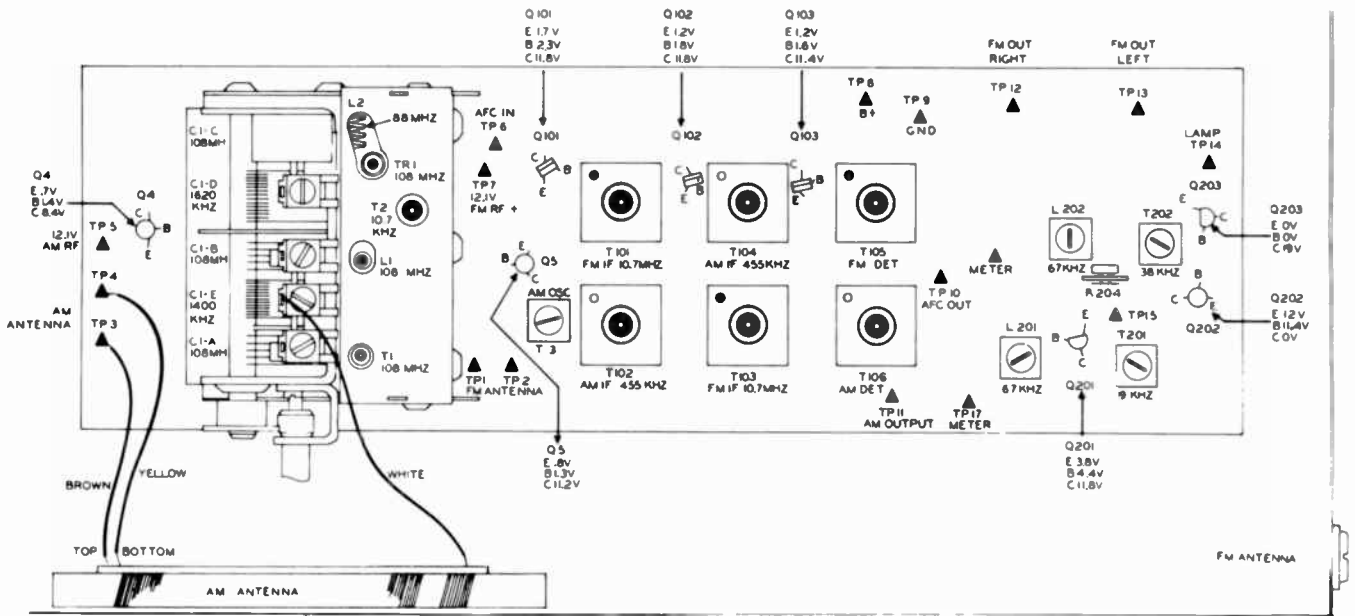


FIGURE 1

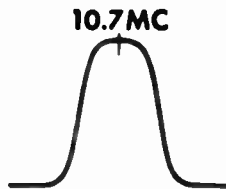


FIGURE 2



FIGURE 3

**ALIGNMENT PROCEDURE**

Alignment is an exacting procedure and is usually not necessary. Replacement coils are shipped pre-tuned from factory and do not usually require alignment.

**AM-FM ALIGNMENT EQUIPMENT REQUIRED:**

1. AM Signal Generator with a frequency range of at least from 455KHZ to 1630KHZ.
2. FM Signal Generator with a frequency range of 87.5 MHZ to 108.5 MHZ.
3. Voltmeter (AC-VTVM) or VOM

4. Sweep Signal Generator with a sweep range of at least 300KC and a 10.7 MHZ marker.
5. An oscilloscope with a video range amplifier of approximately 100KC.
6. A test loop or two turns of insulated wire.
7. Multiplex Generator.

NOTES: During all alignment, keep the signal generator outputs at the lowest level that will maintain a useable output from the set. Maintain a good ground connection between the test equipment and chassis. General Modulation: AM – 30 percent; 400 HZ; Multiplex – 67 percent (50KHZ)

## RADIO ALIGNMENT

### FM ALIGNMENT (Selector Switch on FM)

Before proceeding with FM alignment disconnect positive lead of C116 at test point 16.

Sweep Generator		Tuning Gang	Connect Oscilloscope	Adjust	Remarks
Connect	Frequency				
Thru .01 MFD To FM Gang C1-8	10.7 MHZ 250 KHZ Sweep	High End of Dial	Tie Point 16 Thru Network Fig. 1, Page 7	T101,T102,T103 Top & Bottom T105 Bottom	Maximum Amplitude Keeping 10.7 MHZ Marker Centered (Fig. 2, Page 7)
Thru .01 MFD To FM Gang C1-8	10.7 MHZ 250 KHZ Sweep	High End of Dial	Tie Point 18	T105 Top Slug	Maximum Amplitude and Symmetry (Fig. 3, Page 7)
FM-Ant Terminals	90 MHZ	90 MHZ	Tiepoint 18	LZ (Vary couplings of turns)	Center Fig. 3 On Oscilloscope
FM-Ant Terminals	90 MHZ	90 MHZ	Tie Point 18	T1-L1	Maximum Amplitude
FM-Ant Terminals	106 MHZ	106 MHZ	Tie Point 18	TR-1	Center Fig. 3 On Oscilloscope
FM-Ant Terminals	106 MHZ	106 MHZ	Tie Point 18	C1-A,C1-B	Maximum Amplitude

Reconnect C116

### AM ALIGNMENT (Selector Switch on AM)

Thru .05 MFD To AM Gang C3-D	455 KHZ	Hi End Of Dial	Across Voice Coil	T102, T104 Top & Bottom T106 Slug	Maximum Amplitude
Radiated Signal	540 KHZ	540 KHZ	Across Voice Coil	T3	Maximum Amplitude
Radiated Signal	1620 KHZ	1620 KHZ	Across Voice Coil	C1-D	Maximum Amplitude
Radiated Signal	1400 KHZ	1400 KHZ	Across Voice Coil	C1-E (Rock Tuning Gang)	Maximum Amplitude

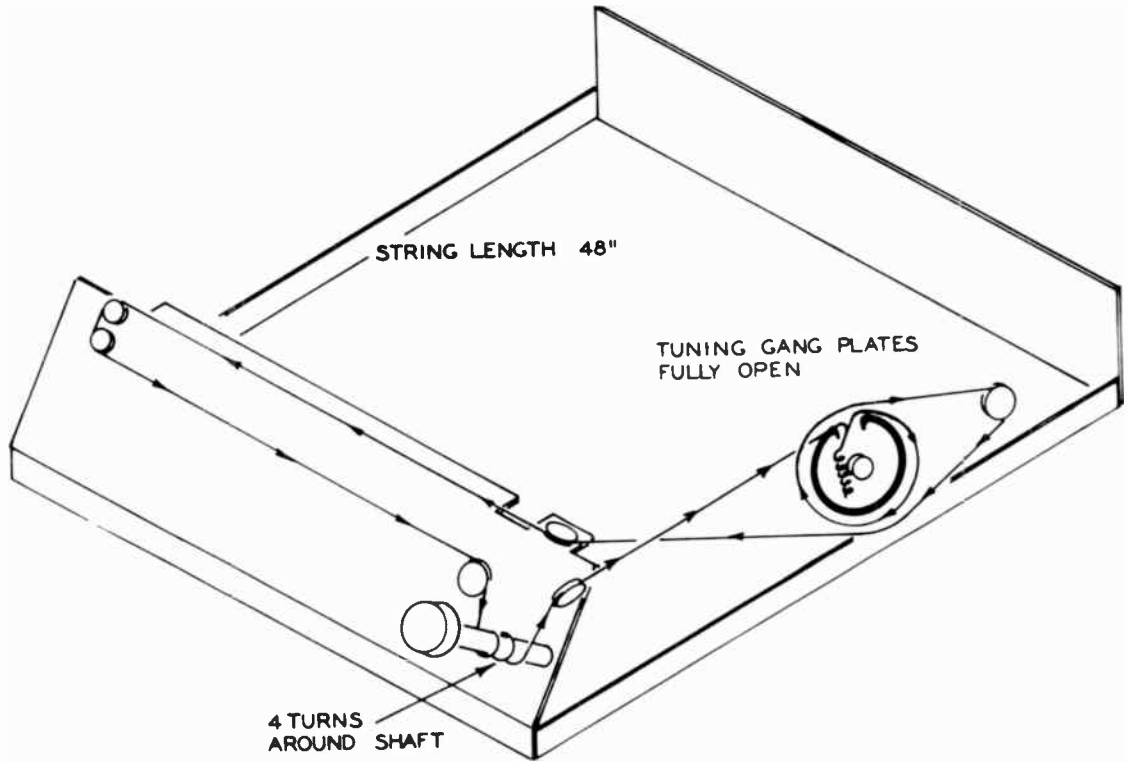
### MULTIPLEX ALIGNMENT (Selector Switch on FM)

FM RF generator to quiet place on dial. Modulate 67 percent (50 KHZ) Connect to FM-ANT-Terminals. Radio tuned to generator.

Modulation FIC Frequency	Connect Oscilloscope	Adjust	Remarks
19 KHZ	Junction D203-D204	T201-T202	Maximum Output
67 KHZ	Junction D203-D204	L201-L202	Minimum Output
Composite Multiplex Left On Right Off	TP 12 Right Output	T201-T202 R24	Minimum Output Note Amplitude
Composite Multiplex Right On Left Off	TP 13 Left Output	T201-T202 R24	Minimum Output Note Amplitude

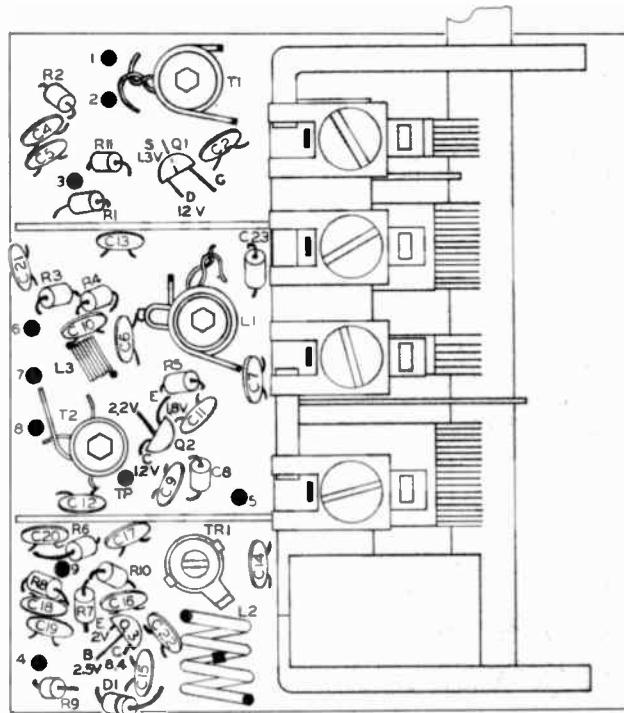
Make compromise adjustment of T201-T202-R24 so that "Minimum Output" of left and right channels are equal.





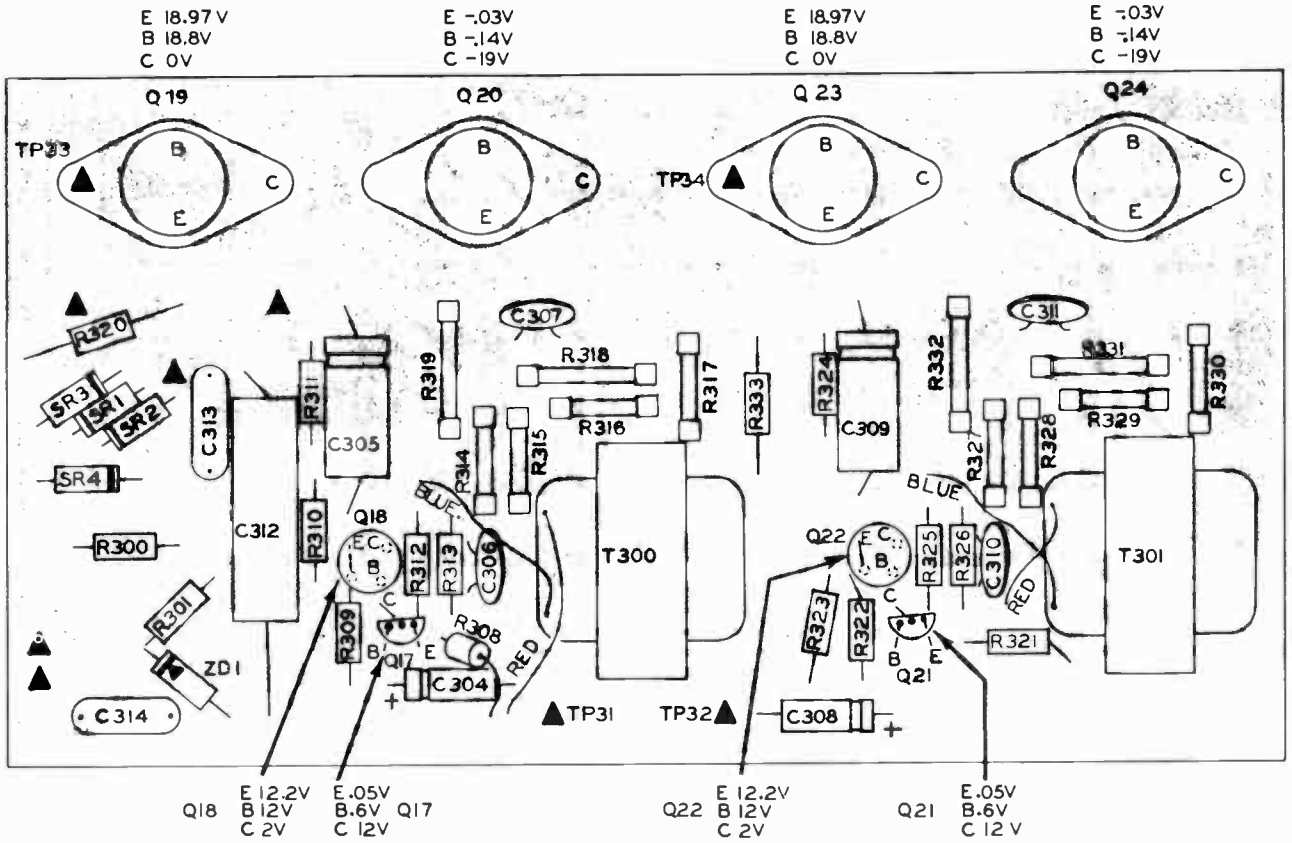
STRINGING DIAGRAM

FM TUNER

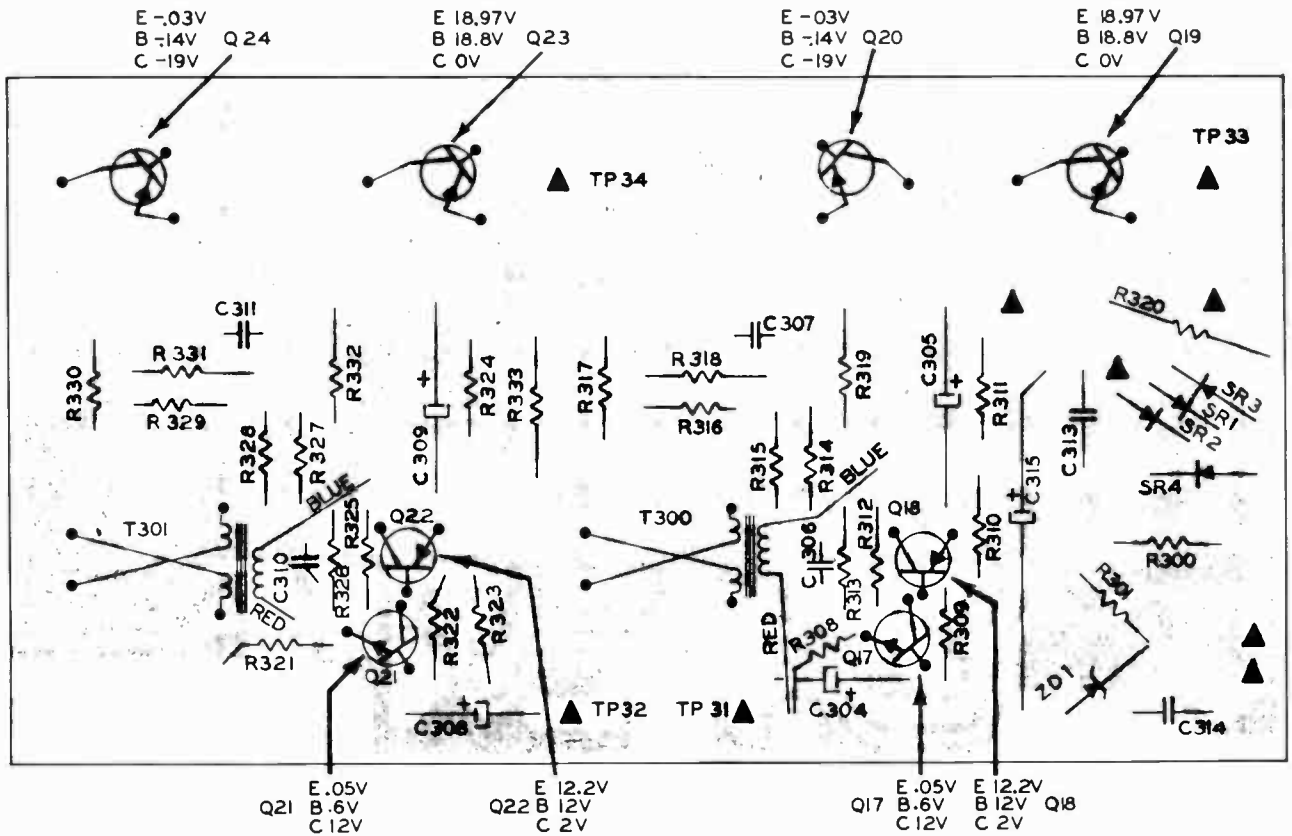


COMPONENT SIDE

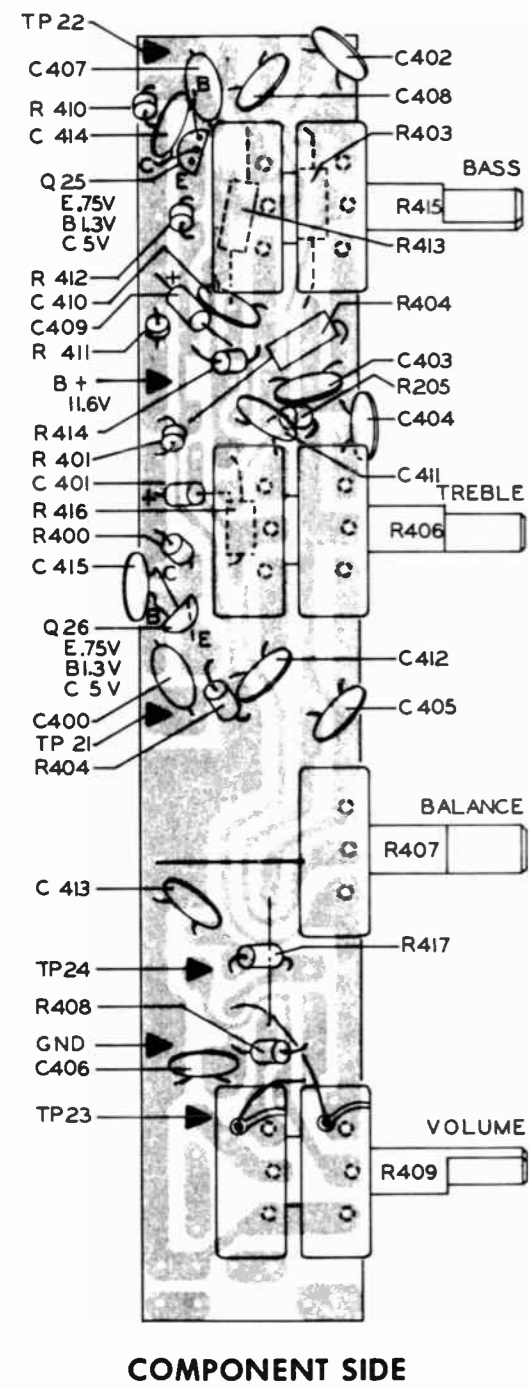
## AMPLIFIER CIRCUIT BOARD COMPONENT SIDE



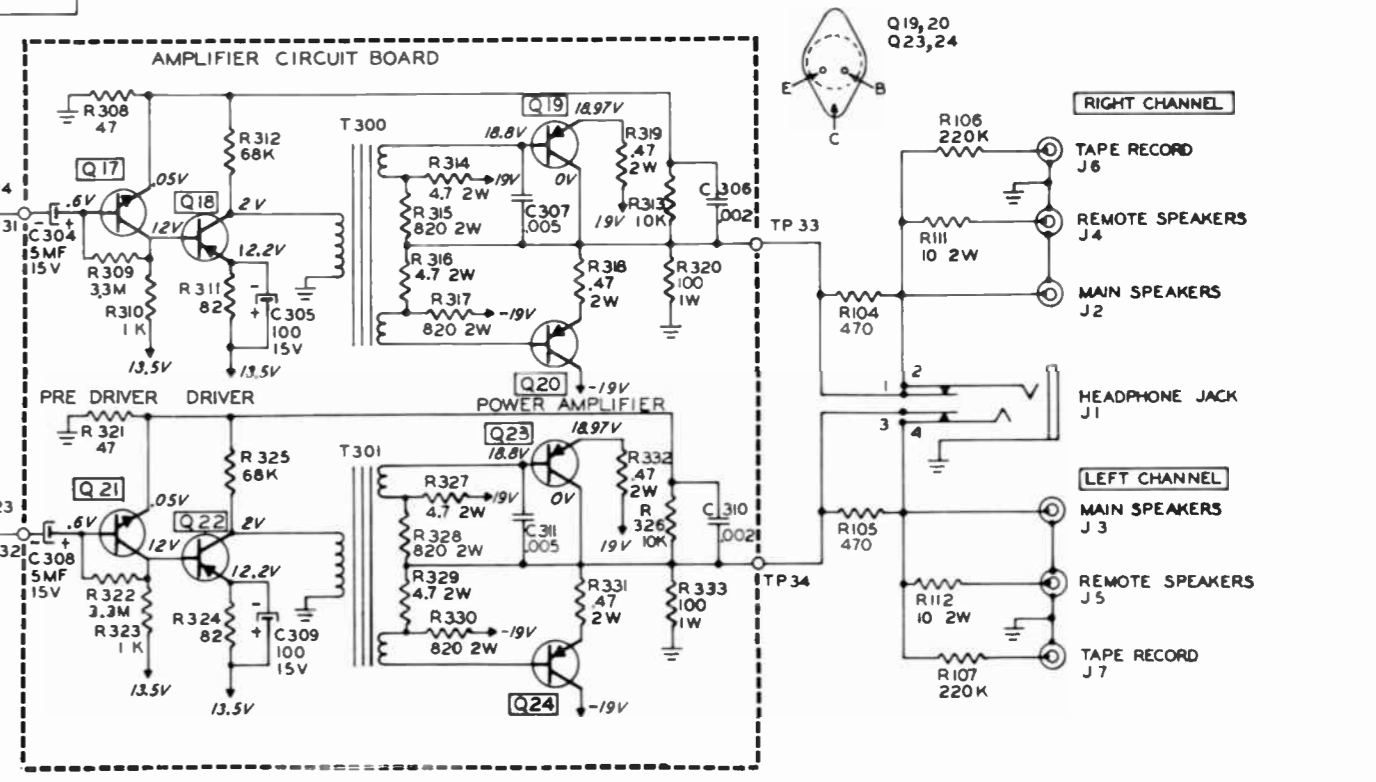
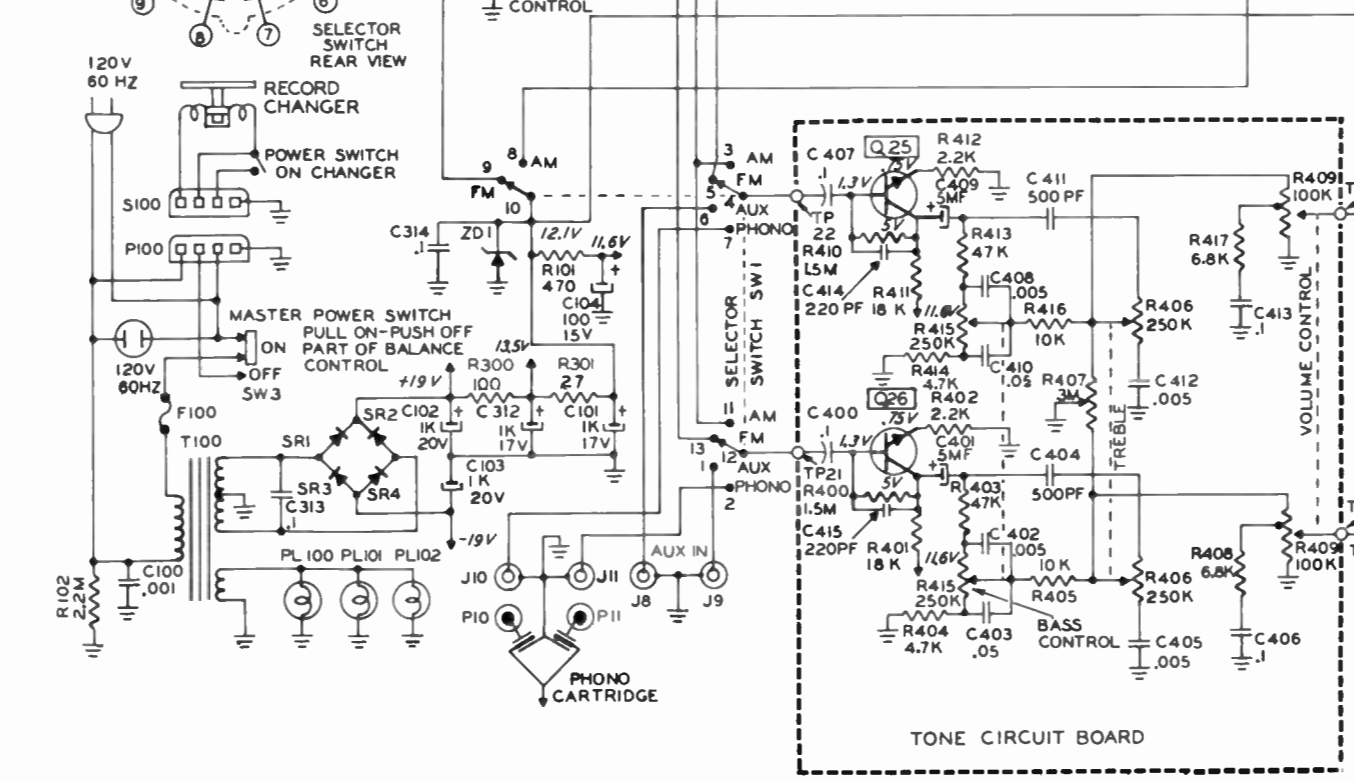
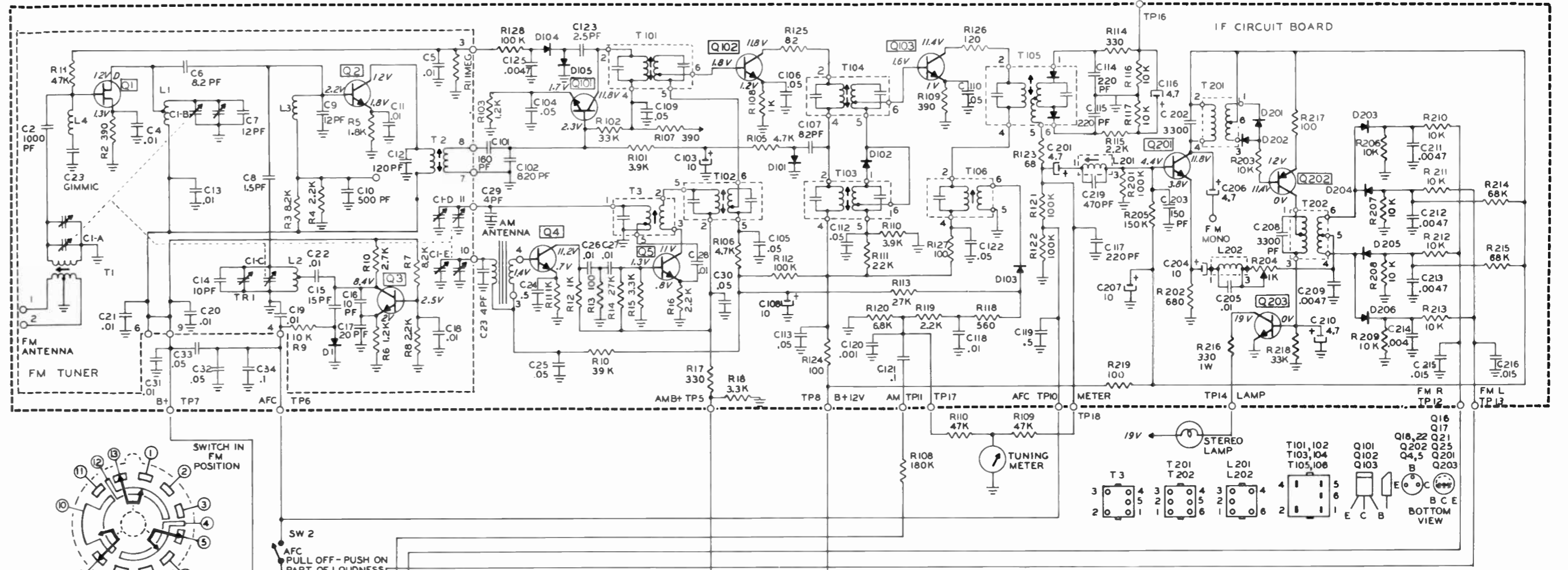
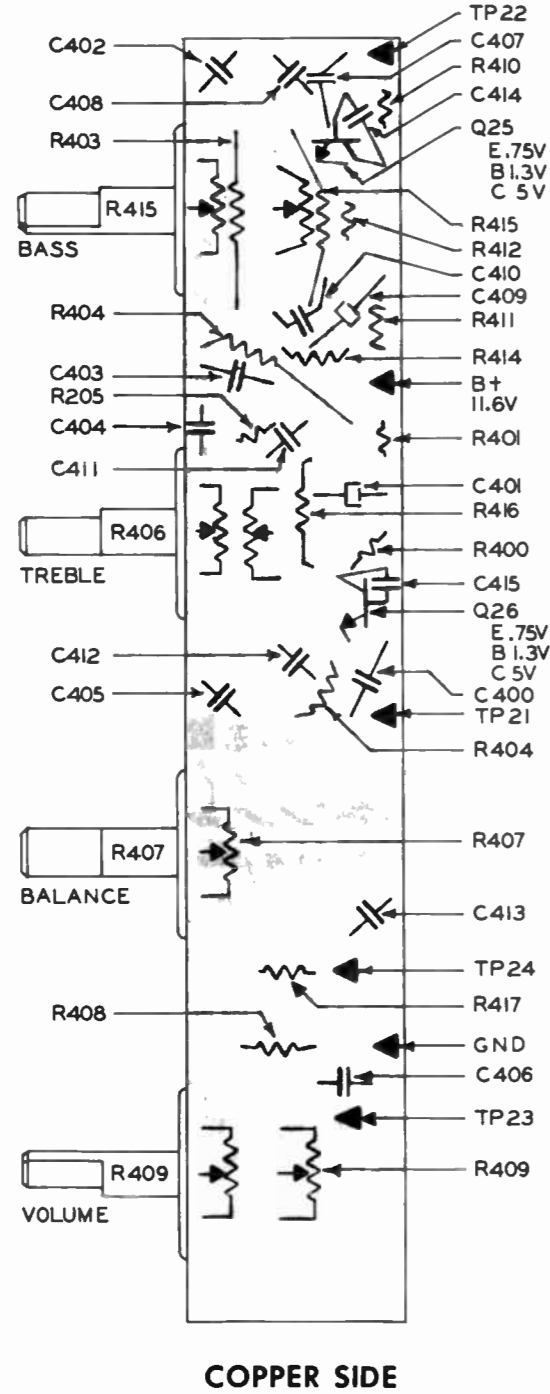
## AMPLIFIER CIRCUIT BOARD COPPER SIDE



**TP22**  
**TONE CONTROL ASSEMBLY**



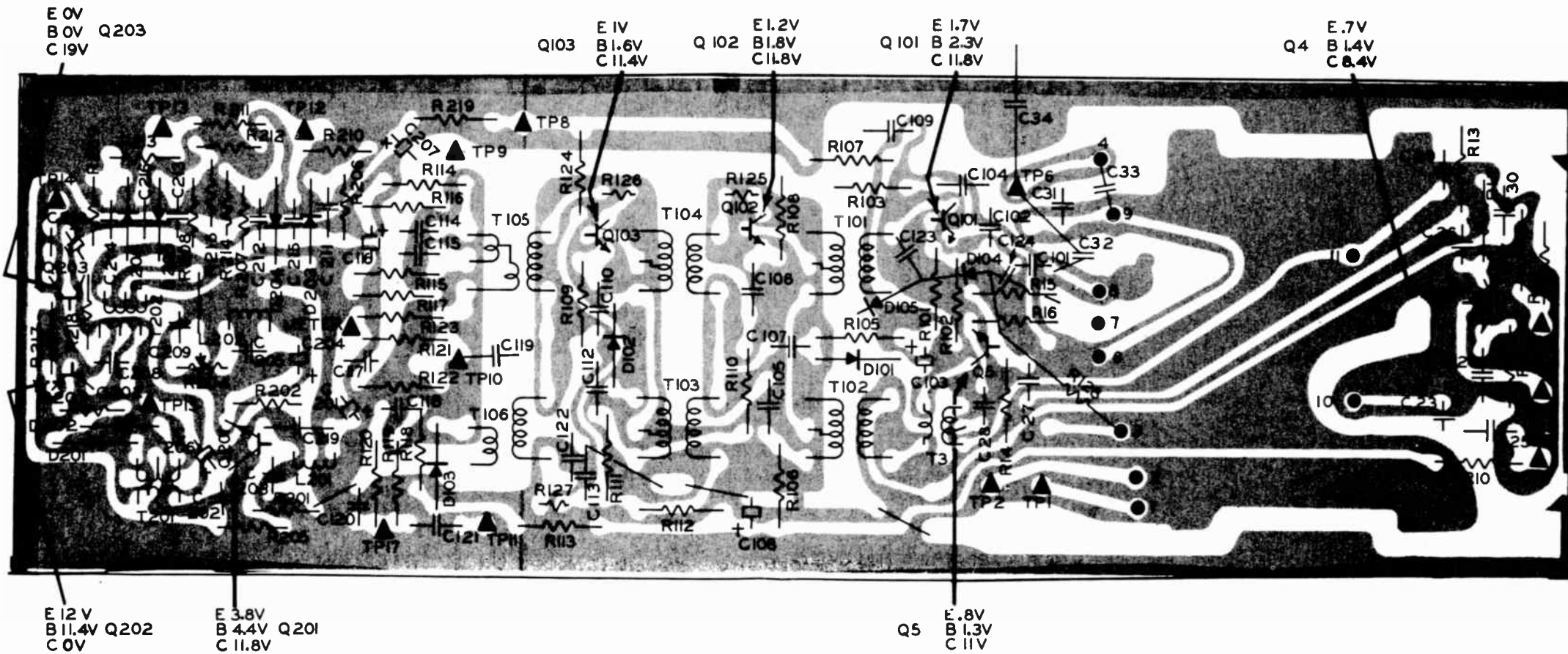
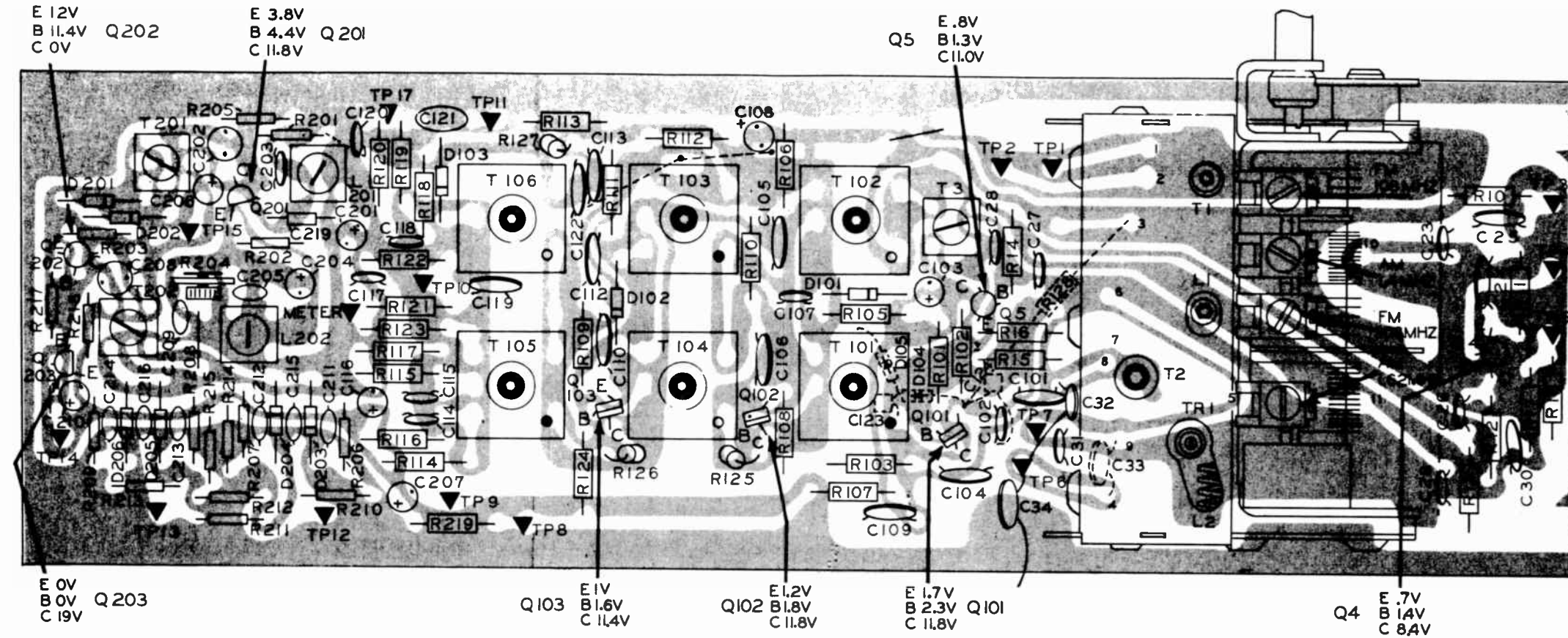
**TONE CONTROL ASSEMBLY**



AM-FM-IF ASSEMBLY

Sears-Silvertone 548.74210000

NOTE: FOR COMPLETE RECORD CHANGER DATA, SEE PHOTOFACT SET 921, FOLDER 4.



SEMICONDUCTORS

ITEM	PART NO./TYPE
D1	1S341W1,W2,W3
D101	1N34A (1N60)
D102	1N60M3
D103	1N60 (1N34A)
D104	1N60 (1N34A)
D105	1N60 (1N34A)
D201	1N60 (1N34A)
D202	1N60 (1N34A)
D203	1N60 (1N34A)
D204	1N60 (1N34A)
D205	1N60 (1N34A)
D206	1N60 (1N34A)
Q1	2N5485
Q2	SPS4168
Q3	SPS4169
Q4	SE1010 (2SC454A)
Q5	SE1001 (2SC454B)
Q16	2787/2N3392
Q17	2787/2N3392
Q18	2781/2N2953
Q19	2780/DTG110
Q20	2780/DTG110
Q21	2787/2N3392
Q22	2781/2N2953
Q23	2780/DTG110
Q24	2780/DTG110
Q25	2787/2N3392
Q101	2SC460B
Q102	2SC460C
Q103	2SC460C
Q201	SE4010 (2SC374V)
Q202	C59012 (2SA610B)
Q203	2SC374BL
SR1	2794
SR2	2794
SR3	2794
SR4	2794

(TONE CONTROL)

ITEM	PART NO.	VALUE
C401	932	5mfd
C409	932	5mfd

CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R204	VRPB102E	1000 ohm Separation
R316	5515	4.7 ohm 2W
R318	693-1	.47 ohm 2W
R319	693-1	.47 ohm 2W
R327	5515	4.7 ohm 2W
R329	5515	4.7 ohm 2W
R331	693-1	.47 ohm 2W
R332	693-1	.47 ohm 2W
R406	4114A	250K Dual Treble
R407	4112A	3meg Balance/Switch
R409	4118A	100K Dual Volume/Switch
R415	4114A	250K Dual Bass

COILS/TRANSFORMERS

ITEM	PART NO.
L1	154302
L2	154061
L3	153019-1
L201	154223
L202	154215
T1	154045
T2	153022-6
T3	154181
T101	153121
T102	153073
T103	153121
T104	153073
T105	153072
T106	153075
T201	154224
T202	154225
T300	1227
T301	1227
Power	1129

ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
(TUNER)		
TR1	CV06DCH50	Trimmer
(CHASSIS)		
C101	943	1000mfd 17V
C102	999	1000mfd 20V
C103	999	1000mfd 20V
C104	931	100mfd 15V
(AM/FM)		
C103	025N100-0610	10mfd
C108	025N100-0610	10mfd
C116	016N4R7-0510	4.7mfd
C201	016N4R7-0510	4.7mfd
C204	025N100-0610	10mfd
C206	016N4R7-0510	4.7mfd
C207	025N100-0610	10mfd
C210	016N4R7-0510	4.7mfd

MISCELLANEOUS

NAME	PART NO.
P.C. Board, Tone Control	3151A
P.C. Board, Amplifier	3161
Fuse, 1A Slo-Blo	156
Meter, Tuning	4110A
Switch, Function	4104A
Speaker, 4" Tweeter	3602
Speaker, 6" Woofer	3605
Assembly, Record Changer (BSR UA65)	2353
Cartridge, Phono	88552
Needle, Phono	88332

CABINET PARTS

NAME	PART NO.
Cabinet, Radio	3079-W
Back, Cabinet	3856A
Cover, Dust	2352
Glass, Dial	3937
Panel, Front	3958
Knob, Tuning	3432
Knob, Control	3433
Enclosure, Speaker	3071-W
Back, Speaker Enclosure	3854

(AMPLIFIER)

ITEM	PART NO.	VALUE
C304	932	5mfd 15V
C305	931	100mfd 15V
C308	932	5mfd 15V
C309	931	100mfd 15V
C312	943	1000mfd 17V

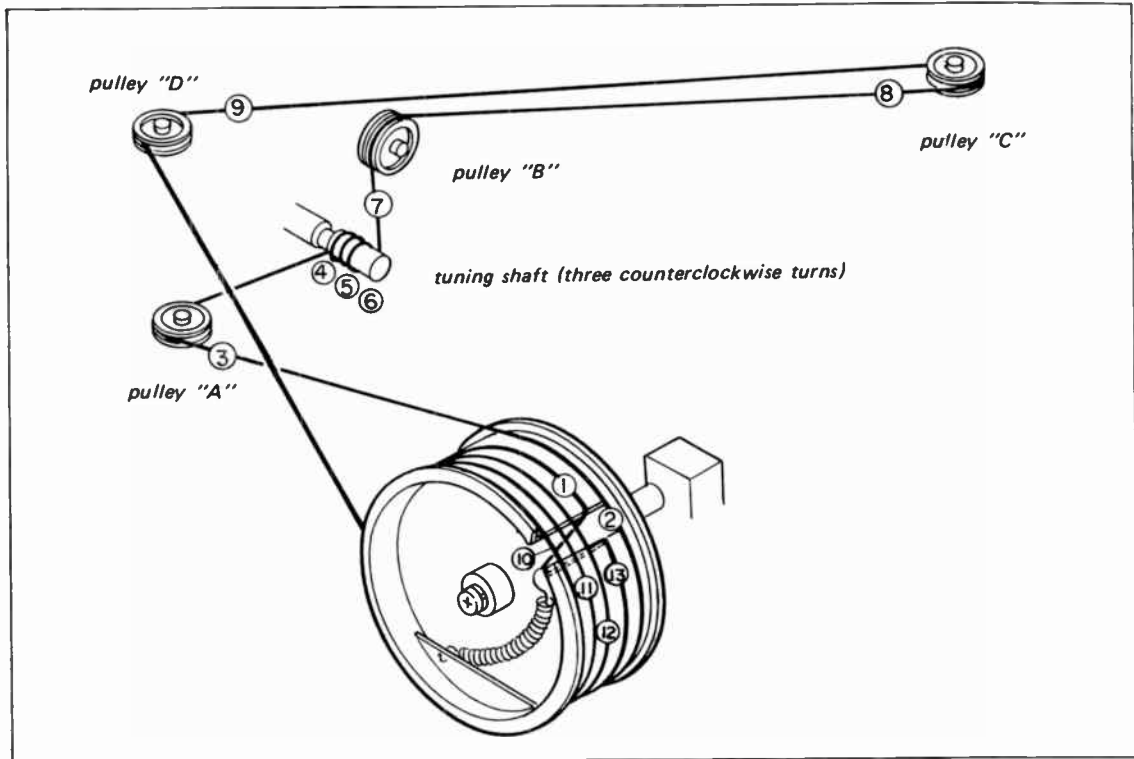


Fig. 2-10. Coil spring installation

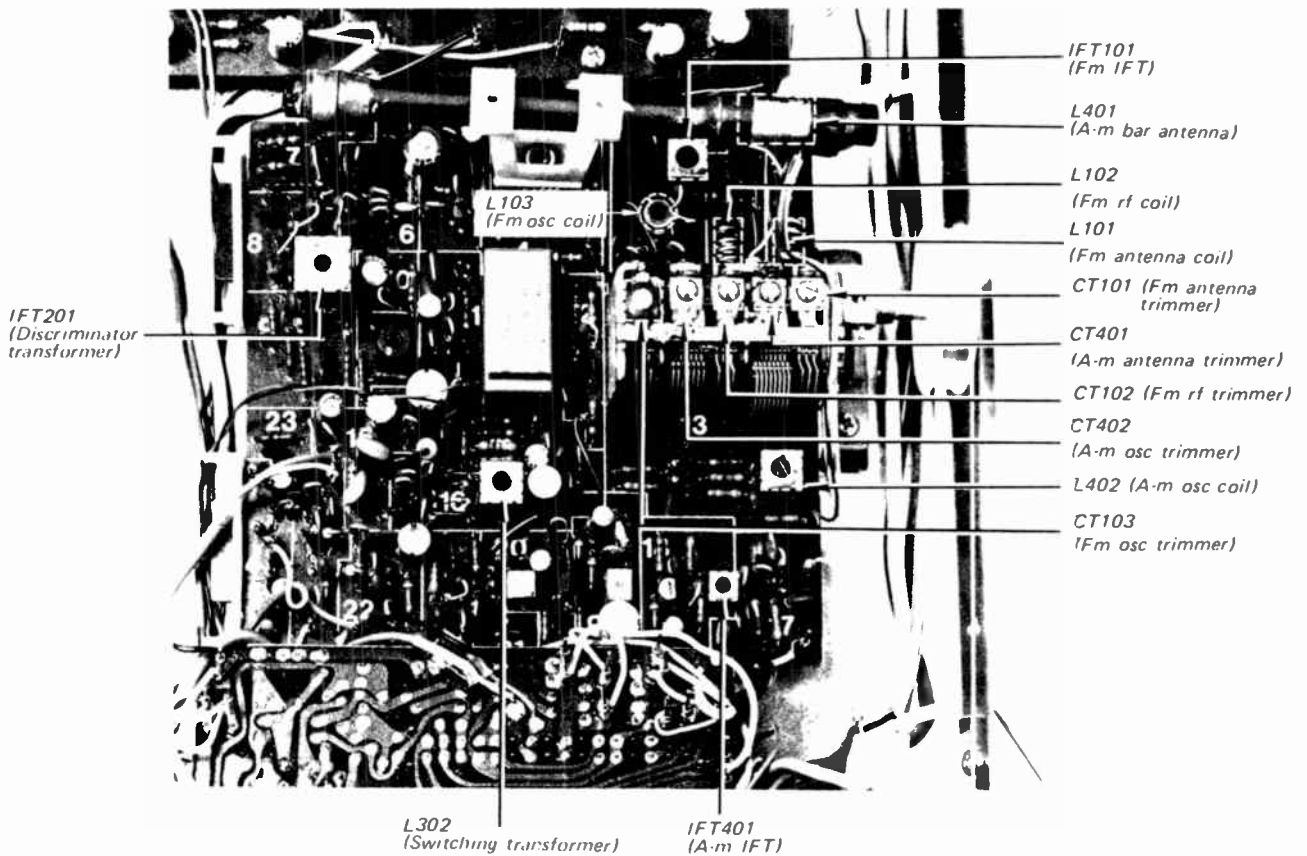


Fig. 3-11. Adjusting parts location

## ALIGNMENT AND ADJUSTMENT PROCEDURES

### 3-1. FM I-F AND DISCRIMINATOR ALIGNMENT

#### CAUTION

The ceramic filters in the fm i-f circuit are selected according to their specified center frequencies and color coded as shown in Fig. 3-1 and listed in Table 3-1. Check the color code of the filters to identify the same center frequency when replacing any of these filters.

TABLE 3-1.  
FM I-F CERAMIC FILTERS

Part No.	Color	Specified Center Freq.
1-403-562-11	red	10.70 MHz
1-403-562-21	black	10.66 MHz
1-403-562-31	white	10.74 MHz
1-403-562-41	green	10.62 MHz
1-403-562-51	yellow	10.78 MHz

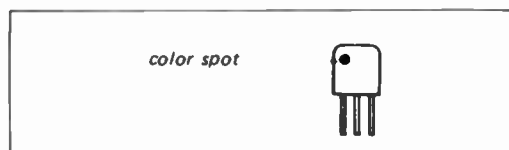


Fig. 3-1. Color dot on ceramic filter

**Note:** Two methods of i-f discriminator alignment are available, sweep generator alignment and signal generator alignment. You can use either of them. In either case, the local oscillator should be killed. To stop the local oscillator's operation, remove the shield cover over the local oscillator capacitor, if necessary, and then shunt the oscillator capacitor with a  $0.02\mu\text{F}$  capacitor. See Fig. 3-2.

#### Sweep Generator Alignment

##### Test Equipment Required

1. 10.7 MHz sweep generator
2. Oscilloscope
3. Ceramic capacitor,  $0.02\mu\text{F}$
4. Alignment tools

##### Preparation

1. Remove the record changer as described in Procedure 2-4.
2. Connect the input cable of the oscilloscope with alligator clips to R221 and ground on the fm a-m tuner circuit board, and solder a  $0.02\mu\text{F}$  capacitor across these clips, as shown in Fig. 3-3.
3. Connect the output cable of the sweep generator across CV102 on tuner and MPX board. Use alligator clips and make the connection through a  $0.02\mu\text{F}$  coupling capacitor as shown in Fig. 3-4.

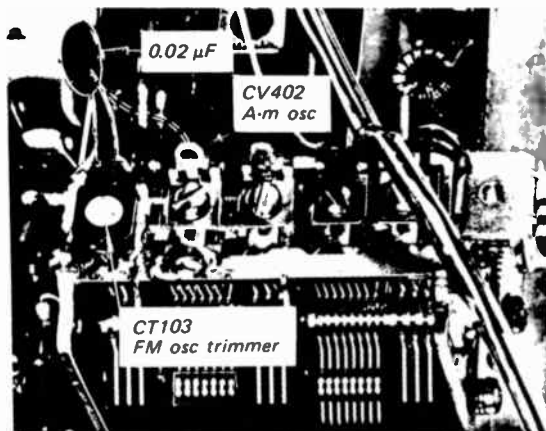


Fig. 3-2. Interruption of fm or a-m local oscillator

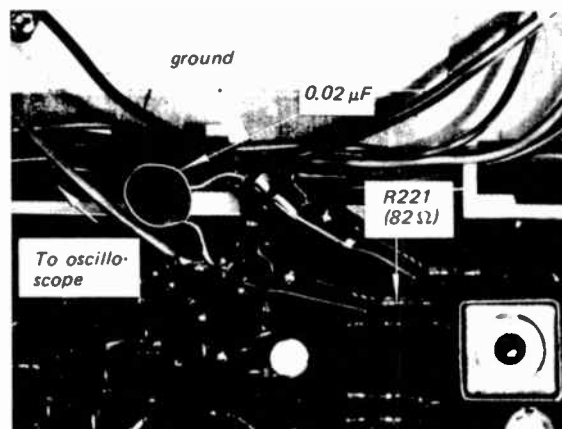


Fig. 3-3. Fm discriminator output connection

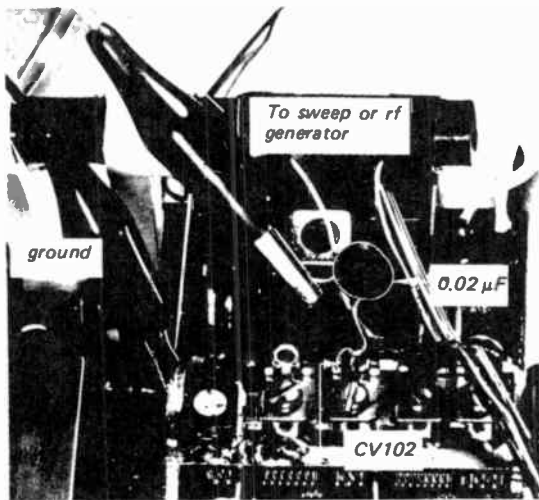


Fig. 3-4. 10.7 MHz signal injection



Fig. 3-6. "S" curve response

**Procedure**

1. With the equipment connected as shown in Fig. 3-5, set the sweep generator's controls as follows:

Center frequency ..... Specified frequency of ceramic filter.  
See Table 3-1.

Sweep width ..... 1 MHz

2. Set the receiver's controls as follows:

FUNCTION switch ..... FM AUTO STEREO  
VOLUME control ..... Minimum

3. Adjust the oscilloscope controls to provide a visible indication.

**Note:** Two or three traces will be observed on the oscilloscope as the center frequency of the sweep generator varies. The trace you are looking for has the largest amplitude. Once you get it, decrease the sweep generator output low enough to obtain rather noisy output.

4. Turn the top core (secondary side) of discriminator transformer IFT201 with an alignment tool to obtain the "S" curve response, and equalize the positive and negative peaks of the "S" curve response, as shown in Fig. 3-6.
5. Adjust i-f transformer IFT101 (see Fig. 3-11) and primary side of discriminator transformer (IFT201 bottom core) to obtain a maximum-amplitude "S" curve response.

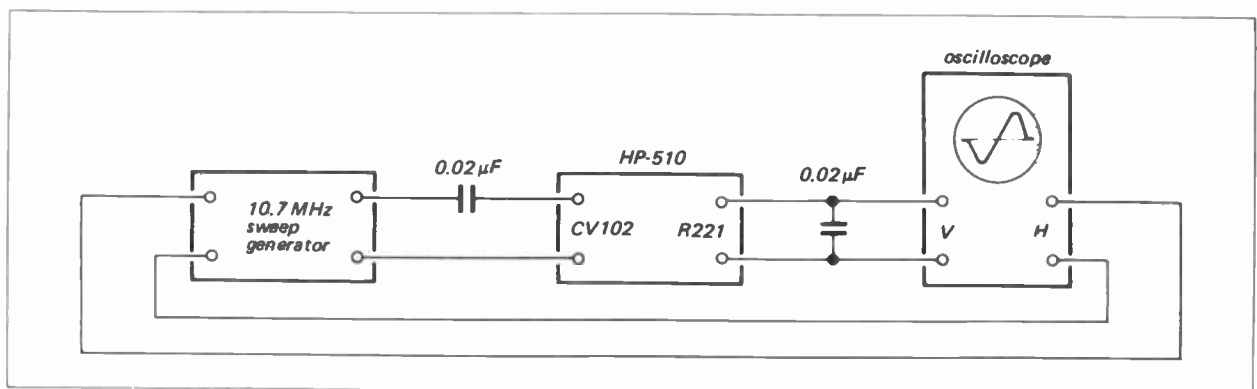


Fig. 3-5. Test setup for discriminator alignment by sweep generator

## Signal Generator Alignment

### Test Equipment Required

1. Standard signal generator which can generate a 10.7-MHz a-m/fm signal.
2. Oscilloscope  
Vertical sensitivity ..... 100 mV/cm  
minimum
3. Alignment tools

### Preparation

Same as described for the sweep generator method.

### Procedure

1. With the equipment connected as shown in Fig. 3-7, set the signal-generator's controls as follows:
 

Frequency .....	Specified frequency of ceramic filter. See Table 3-1.
Modulation .....	Fm, 400 Hz, 100% (75 kHz)
Output level .....	10,000 $\mu$ V (80 dB)
2. Set the receiver's controls as follows:
 

FUNCTION switch ....	FM AUTO STEREO
VOLUME control .....	Minimum
3. Adjust the signal generator's frequency slightly to obtain a maximum output, and then change the signal generator's modulation to a-m, 400 Hz, 30%.

4. If the discriminator transformer is not aligned correctly, 400-Hz ripple will be observed as shown in Fig. 3-8.
5. Turn the top core of transformer IFT201 with an alignment tool to obtain a minimum indication on the oscilloscope as shown in Fig. 3-8.

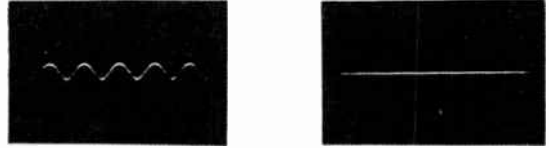


Fig. 3-8. Fm discriminator alignment output response

**Note:** Turn the core carefully and slowly because the output appearing on the oscilloscope jumps up and down when turning the core. This might cause difficulty in determining the point of minimum output.

Also, at both extreme positions of the top core, decreased output will be observed. The real null point should be obtained in the middle of the core thread length, and maximum output occurs at each side of the true null point.

6. Change the signal generator's modulation to fm, 400 Hz, 100% (75 kHz).
7. Turn the core of fm IFT101 (see Fig. 3-11), to obtain the maximum output.

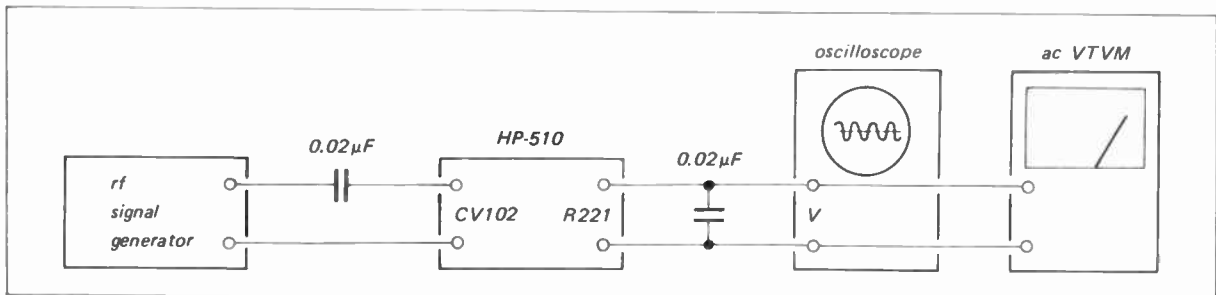


Fig. 3-7. Test setup for fm discriminator alignment by rf signal generator



### 3-2. FM FREQUENCY COVERAGE ALIGNMENT

**Note:** Before starting this alignment, the discriminator-transformer alignment should be performed.

#### Test Equipment Required

1. Standard fm signal generator
2. Ac VTVM
3. Alignment tools

#### Preparation

1. Remove the record changer as described in Procedure 2-4.
2. Connect the equipment as shown in Fig. 3-10.
3. Set the receiver's controls as follows:  
 FUNCTION switch .....FM AUTO  
 VOLUME control .....Minimum
4. Short the connection point of R307 and C305 (AFC circuit) to ground as shown in Fig. 3-9.

#### Generator Alignment

Follow the procedures given in Table 3-2 when performing this alignment with an fm signal generator. Be sure that the dial is mechanically calibrated.

#### Off-the-Air Alignment

Accurate dial calibration and a frequency-coverage test can also be performed by utilizing off-the-air local fm signals. However, before

performing the following procedure, be sure that the dial is mechanically calibrated and AFC circuit is shorted to ground.

#### Procedure

1. Tune the receiver to the lowest-frequency station.
2. Check the dial scale for a calibration accuracy of  $\pm 300$  kHz from the carrier frequency of the station. If the dial-accuracy deviation exceeds this limit, turn the local-oscillator coil L103 (shown in Fig. 3-11) slightly until optimum dial calibration is obtained.
3. Tune the receiver to the highest-frequency station in your locality. If the dial-calibration error is excessive, adjust local-oscillator trimmer CT103 to obtain maximum calibration accuracy. See Fig. 3-11.

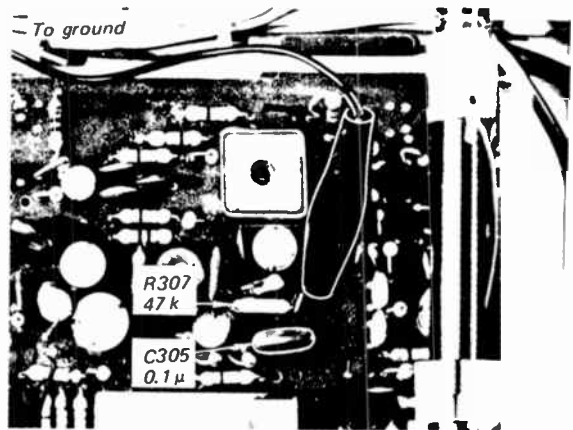


Fig. 3-9. Interruption of AFC circuit

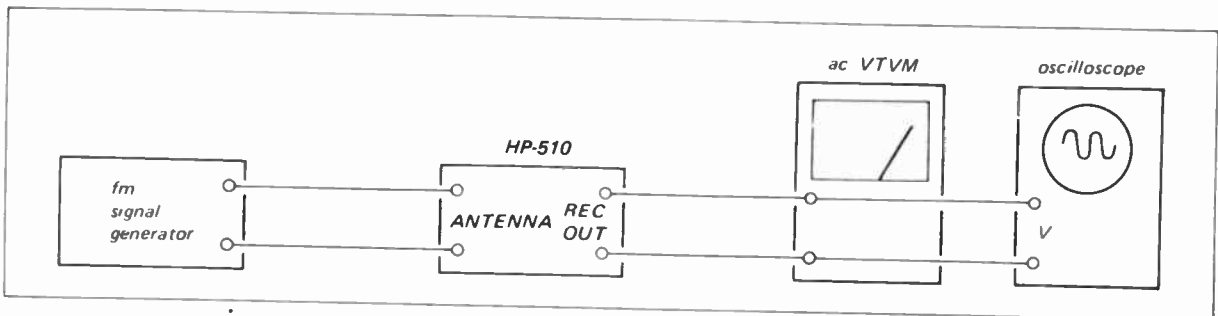


Fig. 3-10. Fm frequency coverage and tracking alignment test setup

TABLE 3-2. FM FREQUENCY COVERAGE ALIGNMENT

Step	Coupling Between Front End and SSG	SSG Frequency and Output Level	Tuner Dial Indication	Scope Connection	Adjust	Indication
1.	Direct coupling	86 MHz 400 Hz 100% mod. 10 $\mu$ V (20 dB)	lowest position	REC OUT	OSC coil L103 See Fig. 3-11	Maximum VTVM reading
2.	Same as above	109.5 MHz 400 Hz 100% mod. 10 $\mu$ V (20 dB)	highest position	Same as above	OSC trimmer CT103 See Fig. 3-11	Same as above

### 3-3. FM TRACKING ALIGNMENT

**Note:** Tracking alignment should be performed with a signal generator.

#### Test Equipment Required

1. Standard fm signal generator
2. Ac VTVM
3. Alignment tools

#### Preparation

1. Remove the record changer as described in Procedure 2-5.

2. Set the receiver's control as follows:

FUNCTION switch ..... FM AUTO STEREO  
VOLUME control ..... Minimum

3. Short the connection point of R307 and C305 (AFC circuit) to ground as shown in Fig. 3-9.

#### Procedure

1. With the equipment connected as shown in Fig. 3-10, follow the procedures given Table 3-3.

TABLE 3-3. FM TRACKING ALIGNMENT

Step	Coupling Between Receiver and SSG	SSG Frequency and Output Level	Tuner Dial Indication	Ac VTVM Connection	Adjust	Indication
1.	Direct coupling	86 MHz 400 Hz 100% mod. 10 $\mu$ V (20 dB)	lowest position	REC OUT	RF coil L102 Antenna coil L101 See Fig. 3-11	Maximum VTVM reading
2.	Same as above	109.5 MHz 400 Hz 100% mod. 10 $\mu$ V (20 dB)	highest position	Same as above	RF trimmer CT102 Antenna trimmer CT101 See Fig. 3-11	Maximum VTVM reading

### 3-4. A-M I-F STRIP ALIGNMENT

#### Preparation

Remove the record changer as described in Procedure 2-4. Then set the receiver's FUNCTION switch to AM.

**Note:** To perform this alignment, the local oscillator should be killed. To do this, shunt the local oscillator capacitor CV402 with a 0.02 $\mu$ F ceramic capacitor as shown in Fig. 3-2.

#### Sweep Generator Alignment

##### Test Equipment Required

1. Sweep generator, 455 kHz.
2. Oscilloscope
3. Alignment tools

##### Procedure

1. Connect the sweep generator's output directly to the AM EXT ANT terminal.
2. Connect the input cable of the oscilloscope with alligator clips to the connection point of R418 and R419 and ground on the tuner and MPX circuit board as shown in Fig. 3-12.
3. Set the sweep generator's control as follows.  
 Center frequency ..... 455 kHz  
 Sweep width ..... 25 kHz  
 Output ..... as low as possible
4. With the equipment connected as shown in Fig. 3-13, adjust the oscilloscope controls and generator output to provide a visible indication.

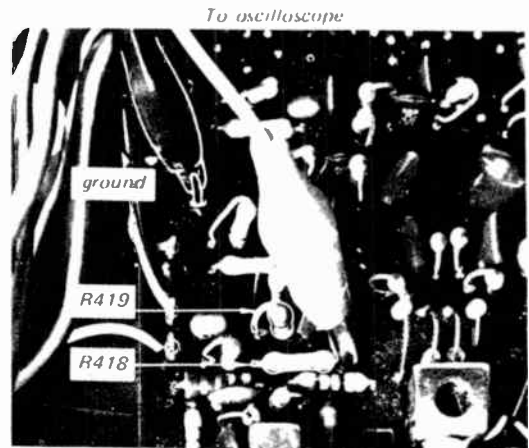


Fig. 3-12. A m detector output connection

5. Turn the top core of H 1401 (see Fig. 3-11) to obtain a maximum and symmetrical response as shown in Fig. 3-14.

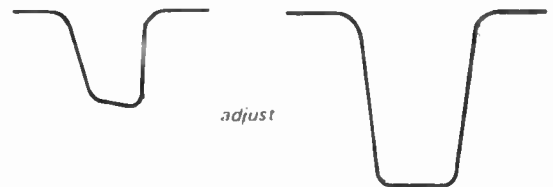


Fig. 3-14. A m i-f response

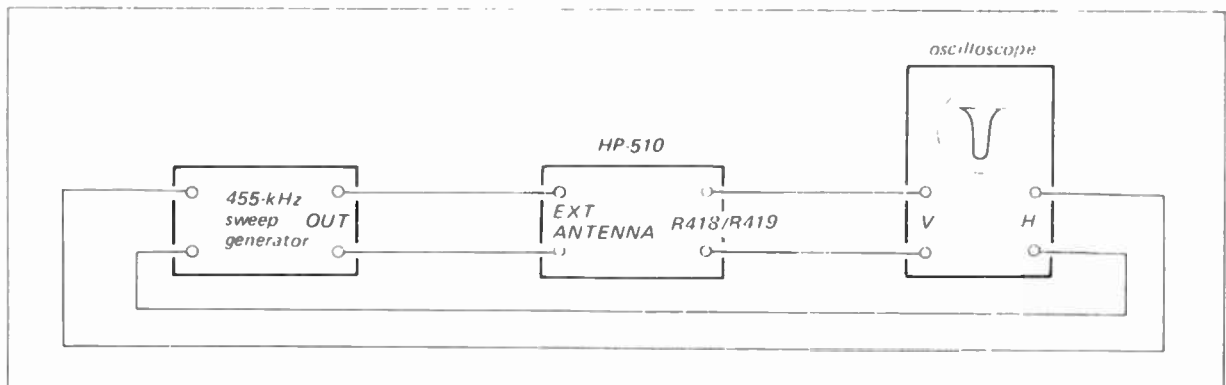


Fig. 3-13. A-m i-f alignment by sweep generator test setup

## Rf Signal Generator Method

### Test Equipment Required

1. Signal generator, a-m modulation
2. Oscilloscope
3. Alignment tools

### Procedure

1. Set the rf signal generator's controls as follows:

Modulation ..... INTERNAL  
 Frequency ..... 455 kHz  
 OUTPUT level ..... 1,000 $\mu$ V (60 dB)

2. Connect the rf signal-generator's output to the AM EXT ANT terminal.

3. With the equipment connected as shown in Fig. 3-15, turn the top core of IFT401 (see Fig. 3-11) to obtain the maximum output.

## 3-5. A-M FREQUENCY COVERAGE AND TRACKING ALIGNMENT

### Preparation

Remove the record changer as described in Procedure 2-4. Then, set the receiver's Function switch to AM.

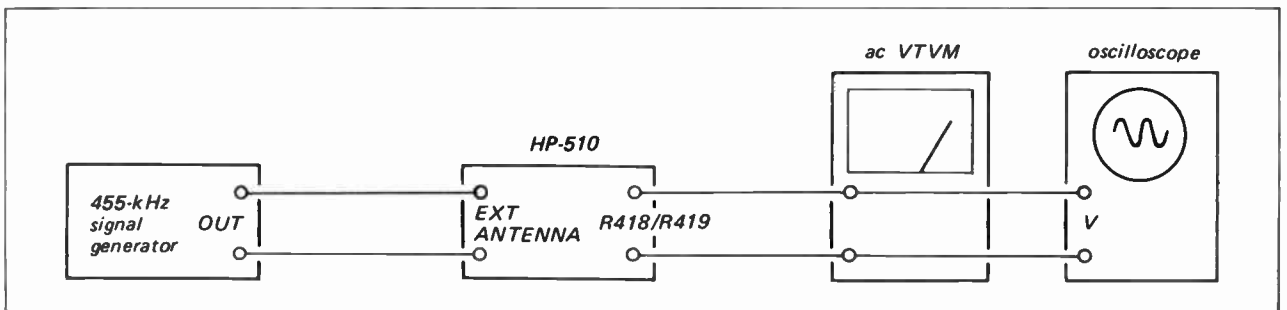


Fig. 3-15. Test setup for a-m i-f alignment by rf signal generator

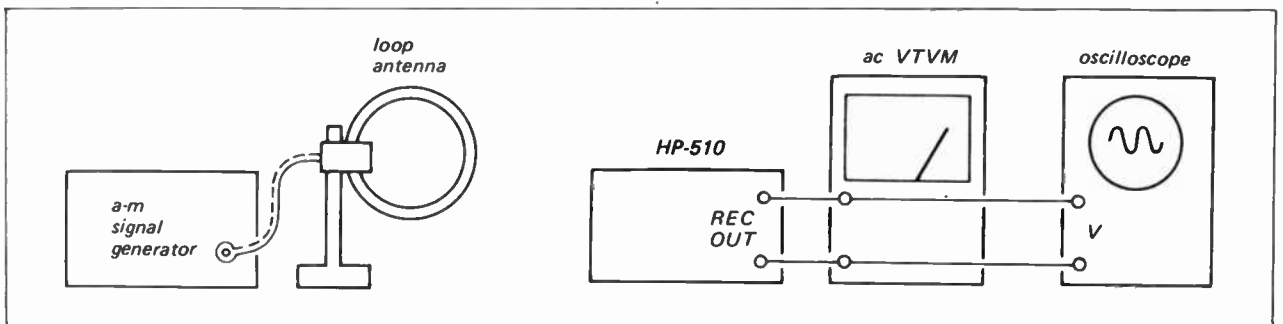


Fig. 3-16. Am frequency coverage and tracking alignment test setup

**Signal Generator Method**

**Test Equipment Required**

1. Signal generator
2. Loop antenna
3. Ac VTVM

**Procedure**

With the equipment connected as shown in Fig. 3-16, follow the procedures given in Tables 3-4 and 3-5 when performing this alignment with an a-m signal generator.

**Off-the-Air Signal Method**

Accurate dial calibration, and a frequency-coverage and tracking test can also be performed by utilizing off-the-air local a-m signals. However,

before performing the following procedure, be sure that the dial is mechanically calibrated.

**Frequency Coverage Alignment**

1. Tune the receiver to the lowest-frequency station in your locality.
2. Check the dial scale for a calibration accuracy of  $\pm 15$  kHz from the carrier frequency of the lowest and  $\pm 30$  kHz at the highest station. If the dial-calibration error exceeds these limits, turn the local oscillator-coil L402 (shown in Fig. 3-11) slightly until optimum dial calibration is obtained.
3. Tune the receiver to the highest-frequency station in your locality. If the dial-calibration error is excessive, adjust local-oscillator trimmer-capacitor CT402 (see Fig. 3-11) to obtain maximum calibration accuracy.

TABLE 3-4. A-M FREQUENCY COVERAGE ALIGNMENT

SSG Coupling	SSG Frequency and Output Level	Tuner Dial Indication	Scope Connection	Adjust	Indication
Loop antenna	520 kHz 400 Hz 30% mod. 1,000 $\mu$ V (60 dB)	lowest position	REC OUT	OSC coil L402 See Fig. 3-11	Maximum VTVM reading
Loop antenna	1,680 kHz Same as above	highest position	Same as above	OSC trimmer CT402 See Fig. 3-11	Same as above

TABLE 3-5. A-M TRACKING ALIGNMENT

SSG Coupling	SSG Frequency and Output Level	Tuner Dial Indication	Scope Connection	Adjust	Indication
Loop antenna	620 kHz 400 Hz 30% mod. Output level as low as possible	620 kHz	REC OUT	Position of antenna coil L401 See Fig. 3-11	Maximum VTVM reading
Loop antenna	1,400 kHz Same as above	1,400 kHz	Same as above	Antenna trimmer CT401 See Fig. 3-11	Same as above

#### 4-5. STYLUS FORCE ADJUSTMENT

1. The stylus force should always be set to the recommended value which is indicated on the stylus force gauge (see Fig. 4-8) as listed below.

**Note:** Make sure that the tone arm is balanced when stylus gauge is set to (0). If not, follow the tone arm balance adjustment procedure.

#### 4-6. TONE ARM BALANCE ADJUSTMENT

1. Set the stylus force gauge to "0" position, and then release the arm from the arm-rest.
2. Take a horizontal balance of the arm by turning the tone arm balance adjustment knob as shown in Fig. 4-8.

**Note:** Make sure that the tone arm floats freely and the changer is not in mid cycle.

#### 4-7. CUEING HEIGHT ADJUSTMENT

**Note:** The cueing height is preset to permit the stylus to clear a stack of six records.

1. Cueing-height can be varied by turning the cueing height adjustment screw as shown in Fig. 4-8.

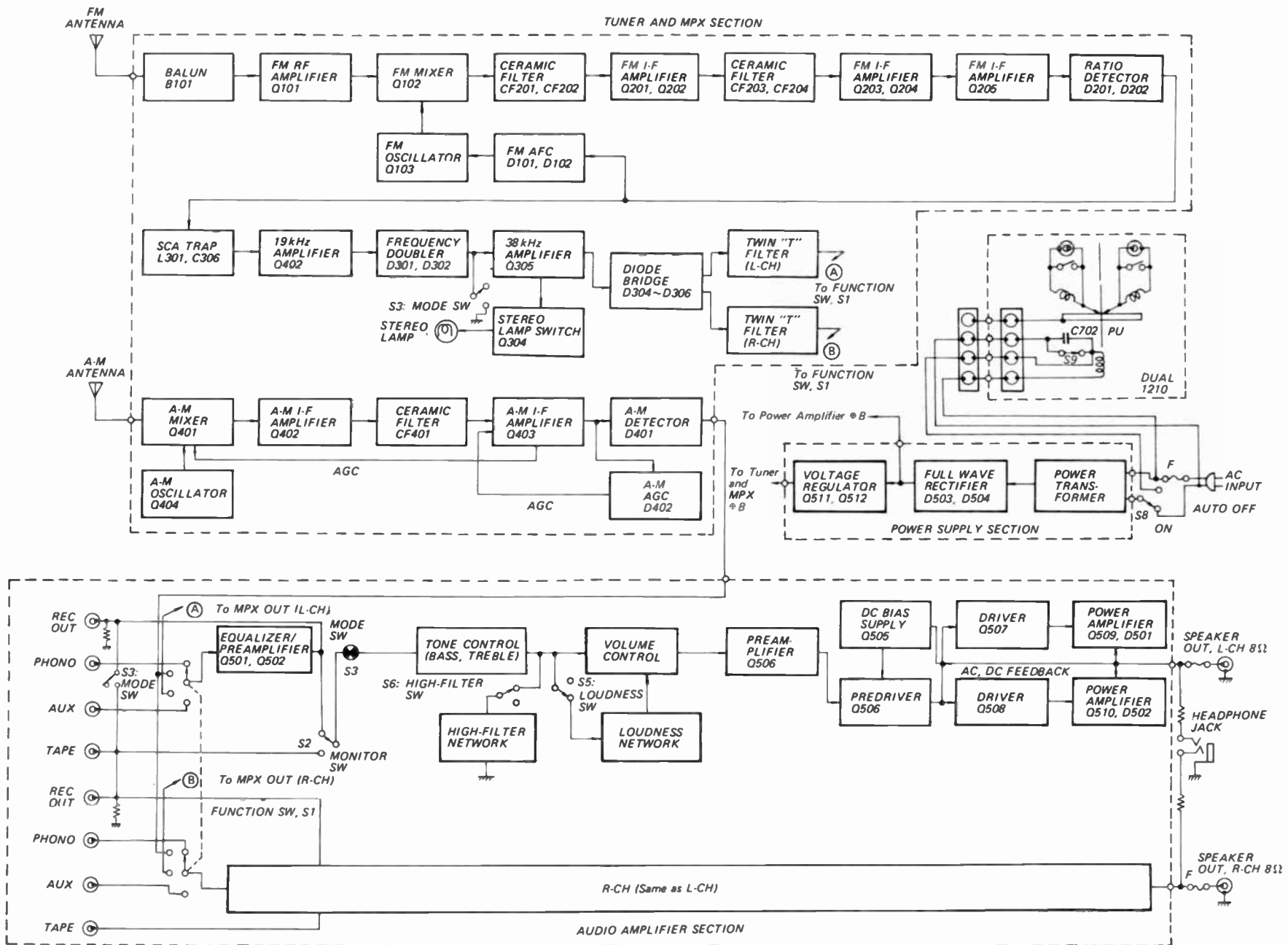
#### 4-8. STYLUS SET-DOWN ADJUSTMENT

1. The correct position for stylus set-down is 3 mm ( $1/8$  inch) from the edge of the record. The position is adjusted by turning the set-down adjusting screw through the opening located near the arm rest (see Fig. 4-8) which appears only when the record size selector is set to 7". Therefore the adjusting is best done with 7-inch (17 cm) records on the turntable.

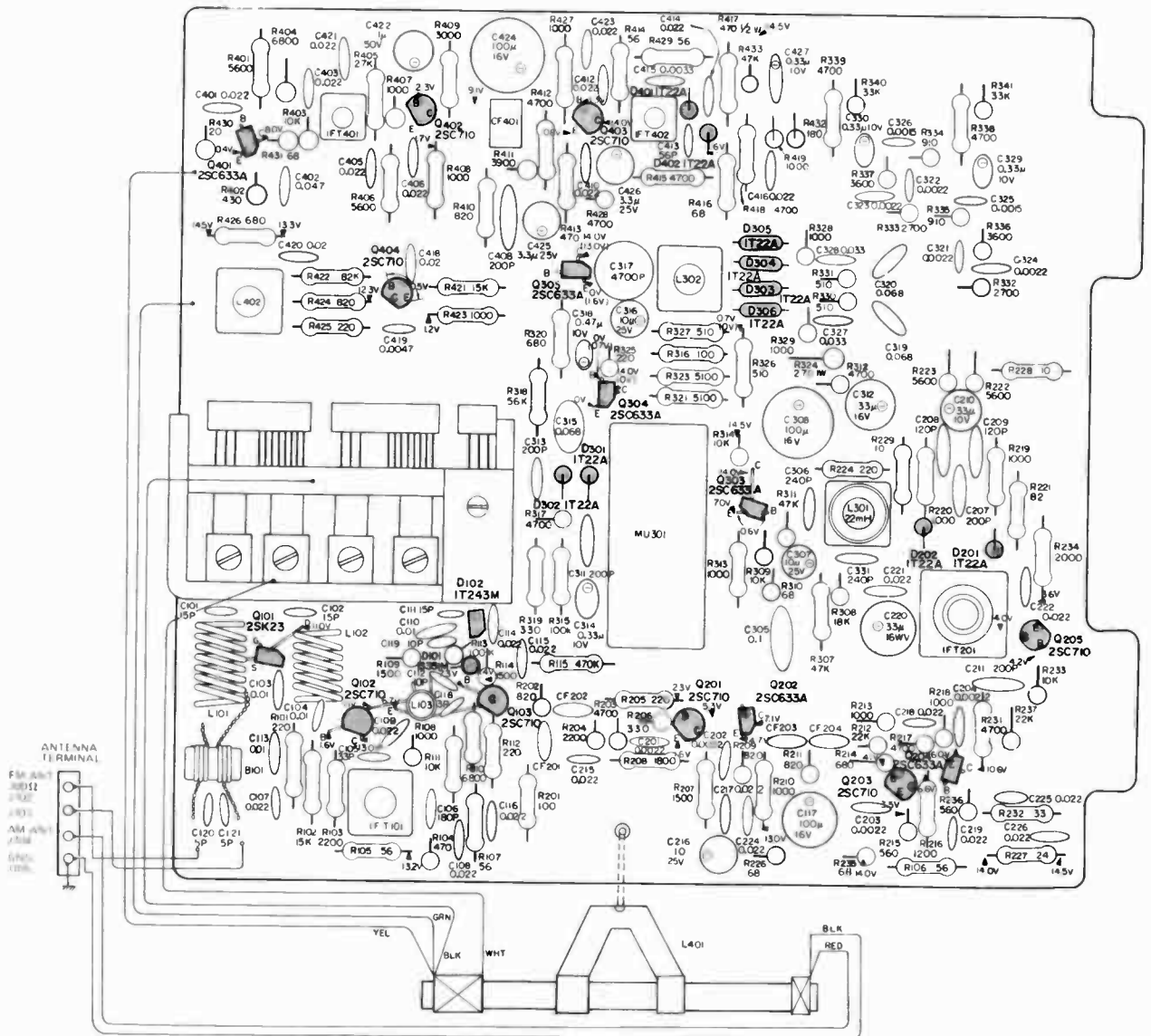
**Note:** When correctly positioned for 7" (17 cm) record the set-down will also be corrected for 10" (25 cm) and 12" (30 cm) records.



Fig. 4-8. Adjusting parts location

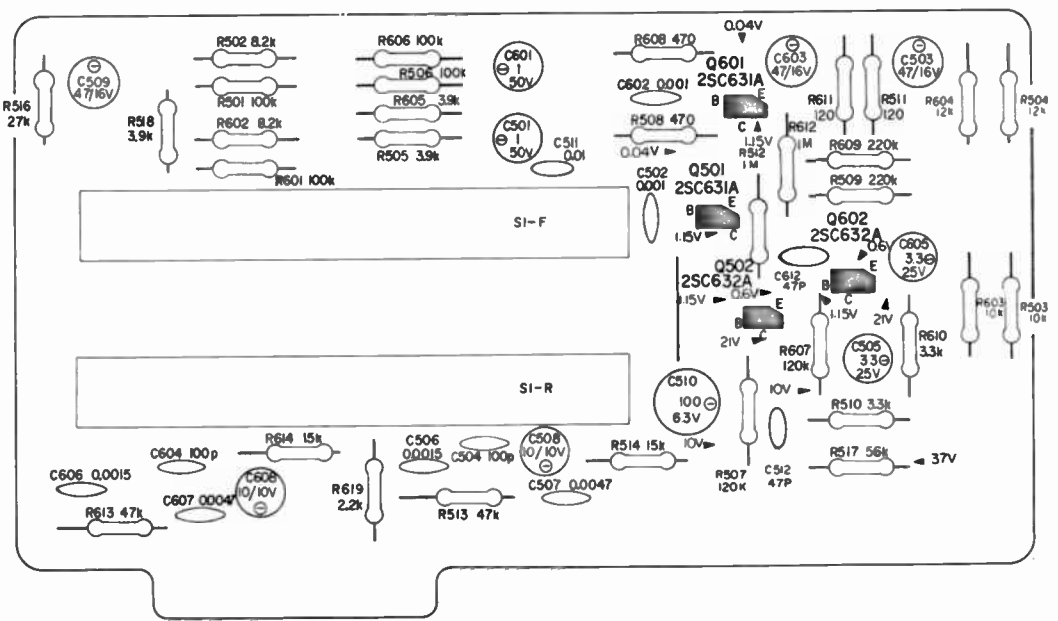


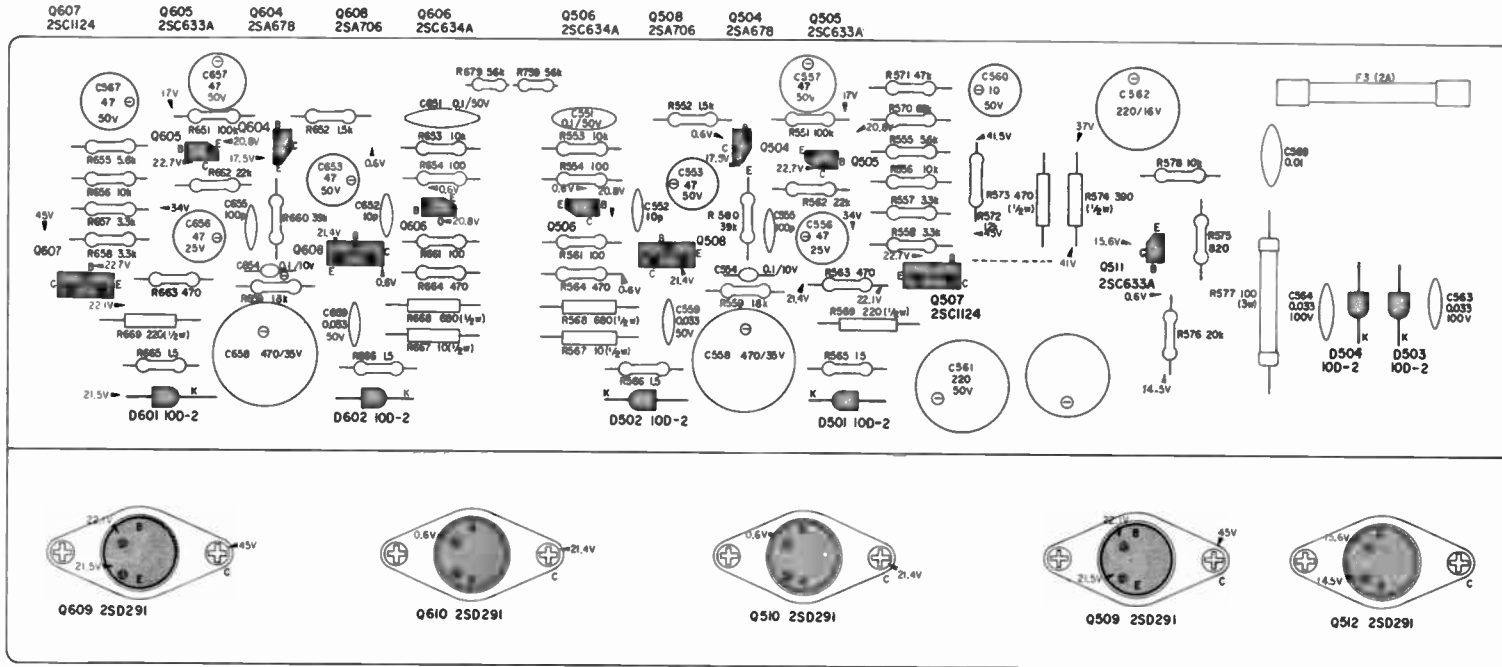
MOUNTING DIAGRAM – Tuner and MPX Board –  
 – Component Side –



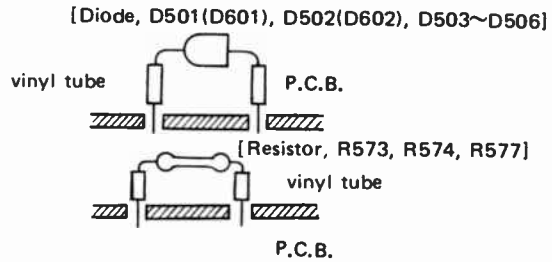
Note: ( ) STEREO OPERATION



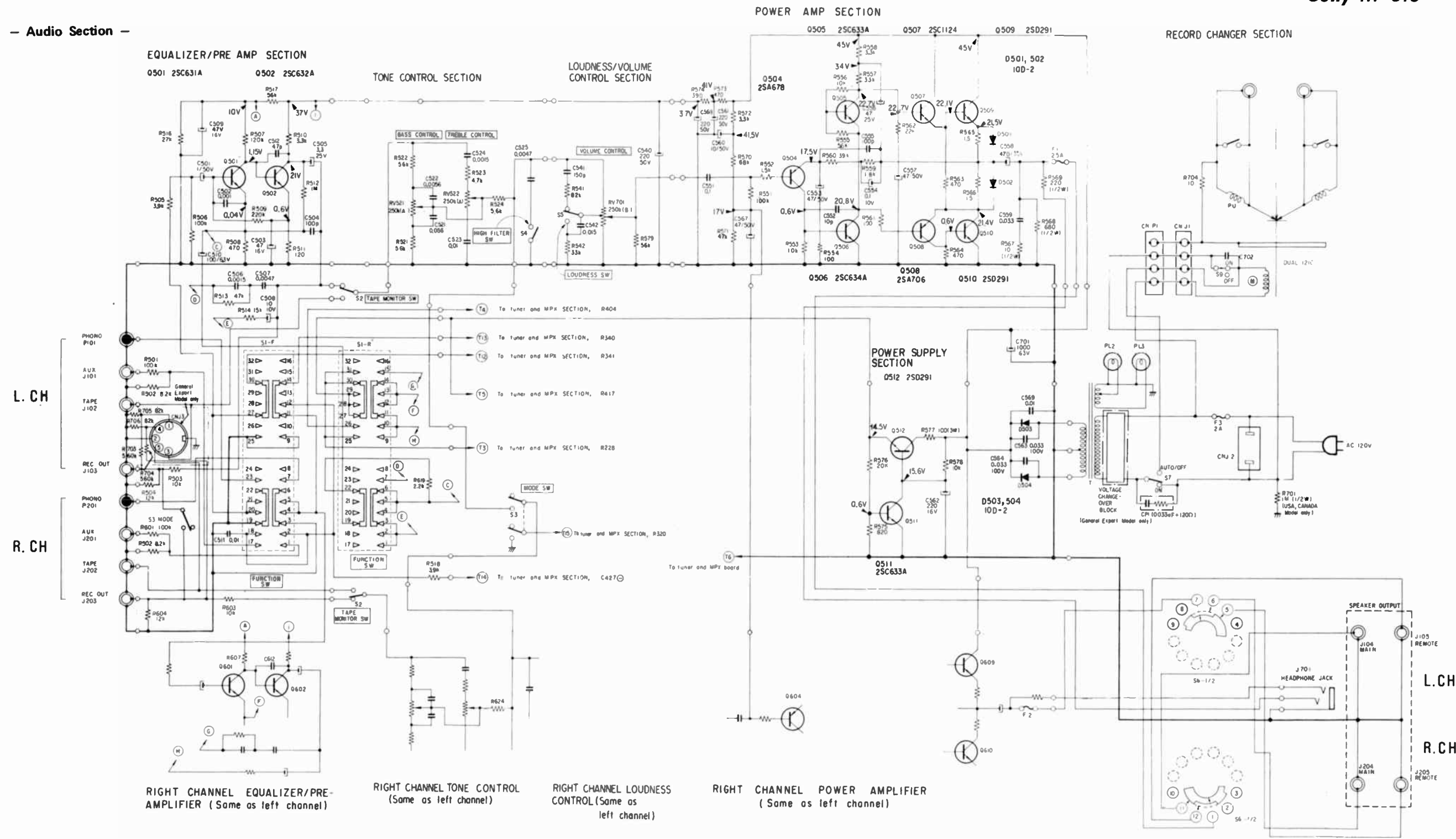




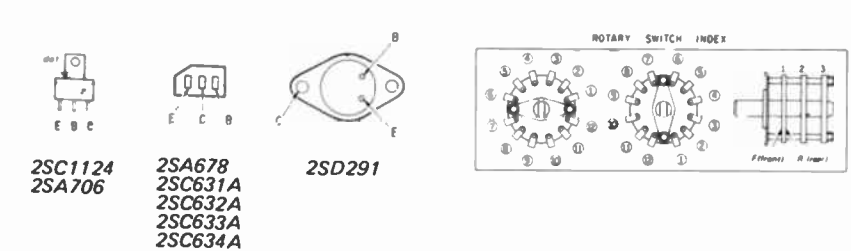
**CAUTION**  
All the components as listed below should be stand off from the surface of PCB by using insulating vinyl tube as illustrated.



— Audio Section —



Ref. No.	Description	Position	Ref. No.	Description	Position
S1	FUNCTION (1) SW (AUX - AM - FM AUTO - PHONO) STEREO	FM AUTO STEREO	S5	LOUDNESS SW (ON - OFF)	ON
S2	TAPE MONITOR SW (SOURCE - TAPE)	SOURCE	S6	SPEAKER SW (REMOTE - OFF - MAIN - BOTH)	MAIN
S3	MODE SW (STEREO - MONO)	STEREO	S7	POWER SW (ON - OFF)	ON
S4	HIGH FILTER SW (ON - OFF)	OFF	S8	SLEEP SW (ON - OFF)	ON



Note:  
 All resistance values are in ohms. k=1,000, M=1,000k.  
 All capacitance values are in  $\mu$ F except as indicated with  $\mu$ , which means  $\mu$ F.  
 All voltages represent an average value and should hold within  $\pm 20\%$ .  
 All voltages are dc measured with a VOM which has an input impedance of 20k ohms/volt. No signal in.

SEMICONDUCTORS

ITEM	PART NO./TYPE
D101	1S351M
D102	1T243M
D201	1T22A
D202	1T22A
D301	1T22A
D302	1T22A
D303	1T22A
D304	1T22A
D305	1T22A
D306	1T22A
D401	1T22A
Q402	1T22A
D501	10D-2
D502	10D-2
D503	10D-2
D504	10D-2
D601	10D-2
D602	10D-2
Q101	2SK23
Q102	2SC710
Q103	2SC710
Q201	2SC710
Q202	2SC633A
Q203	2SC710
Q204	2SC633A
Q205	2SC710

Q303	2SC633A
Q304	2SC633A
Q305	2SC633A
Q401	2SC633A
Q402	2SC710
Q403	2SC710
Q404	2SC710
Q501	2SC631A
Q502	2SC632A
Q504	2SA678
Q505	2SC633A
Q506	2SC634A
Q507	2SC1124
Q508	2SA706
Q509	2SD921
Q510	2SD921
Q511	2SC633A
Q512	2SD291
Q601	2SC631A
Q602	2SC632A
Q604	2SA678
Q605	2SC633A
Q606	2SC634A
Q607	2SC1124
Q608	2SA706
Q609	2SD291
Q610	2SD291

ITEM	PART NO.	DESCRIPTION
CT101	1-151-217	Tuning Gang
CT102		
CT103		
CT401		
CT402		
CV101		
CV102		
CV401		
CV402		

ITEM	PART NO.	DESCRIPTION
R565	1-244-605	1.5 ohm
R566	1-244-605	1.5 ohm
R665	1-244-605	1.5 ohm
R666	1-244-605	1.5 ohm
RV521 & RV621	1-222-539	50K Dual Bass
RV522 & RV622	1-222-539	50K Dual Treble
RV701 & RV702	1-222-501	250K Dual Volume

ITEM	PART NO.	DESCRIPTION
B101	1-417-025-12	L301 1-407-418
IFT101	1-403-556-21	L302 1-425-260
IFT201	1-403-291	L401 1-401-386
IFT401	1-403-152	L402 1-405-391
IFT402	1-403-128	Power 1-441-776
L101	1-401-391-11	(USA, Canada)
L102	1-425-547	Power 1-441-790
L103	1-405-434	(General Export)

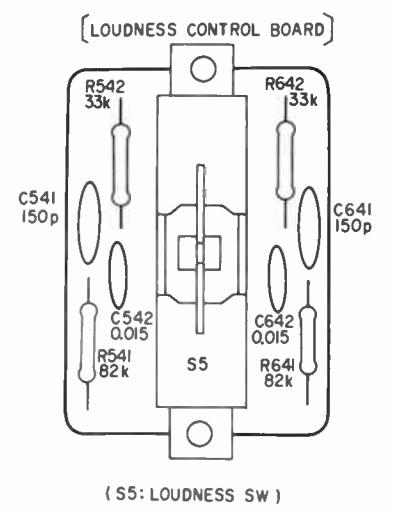
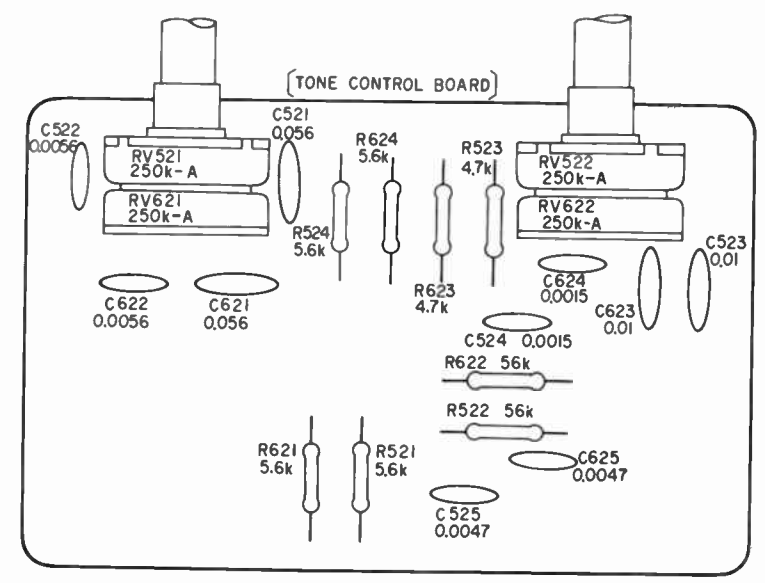
ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
C117	1-121-415	100mfd 16V
C210	1-121-402	33mfd 10V
C216	1-121-398	10mfd 25V
C220	1-121-403	33mfd 16V
C307	1-121-398	10mfd 25V
C308	1-121-415	100mfd 16V
C312	1-121-403	33mfd 16V
C314	1-127-021	.33mfd 10V
C316	1-121-398	10mfd 25V
C318	1-127-022	.47mfd 10V
C329	1-127-021	.33mfd 10V
C330	1-127-021	.33mfd 10V
C334	1-121-391	1mfd 50V
C422	1-121-391	1mfd 50V
C424	1-121-415	100mfd 16V
C425	1-121-392	3.3mfd 25V
C426	1-121-392	3.3mfd 25V
C427	1-127-021	.33mfd 10V
C501	1-121-391	1mfd 50V
C503	1-121-409	47mfd 16V
C505	1-121-392	3.3mfd 25V
C508	1-121-469	10mfd 10V
C509	1-121-409	47mfd 16V
C510	1-121-413	100mfd 6.3V
C553	1-121-410	47mfd 25V
C554	1-127-019	.1mfd 10V
C556	1-121-410	47mfd 25V
C557	1-121-411	47mfd 50V
C558	1-121-361	470mfd 35V
C560	1-121-738	10mfd 50V
C561	1-121-423	220mfd 50V
C562	1-121-421	220mfd 16V
C567	1-121-411	47mfd 50V
C568	1-121-423	220mfd 50V
C601	1-121-391	1mfd 50V
C603	1-121-409	47mfd 16V
C605	1-121-392	3.3mfd 25V
C608	1-121-469	10mfd 10V
C653	1-121-410	47mfd 25V
C654	1-127-019	.1mfd 10V
C656	1-121-410	47mfd 25V
C657	1-121-411	47mfd 50V
C658	1-121-361	470mfd 35V
C701	1-121-923	1000mfd 63V

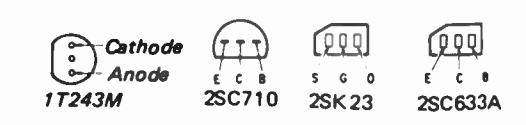
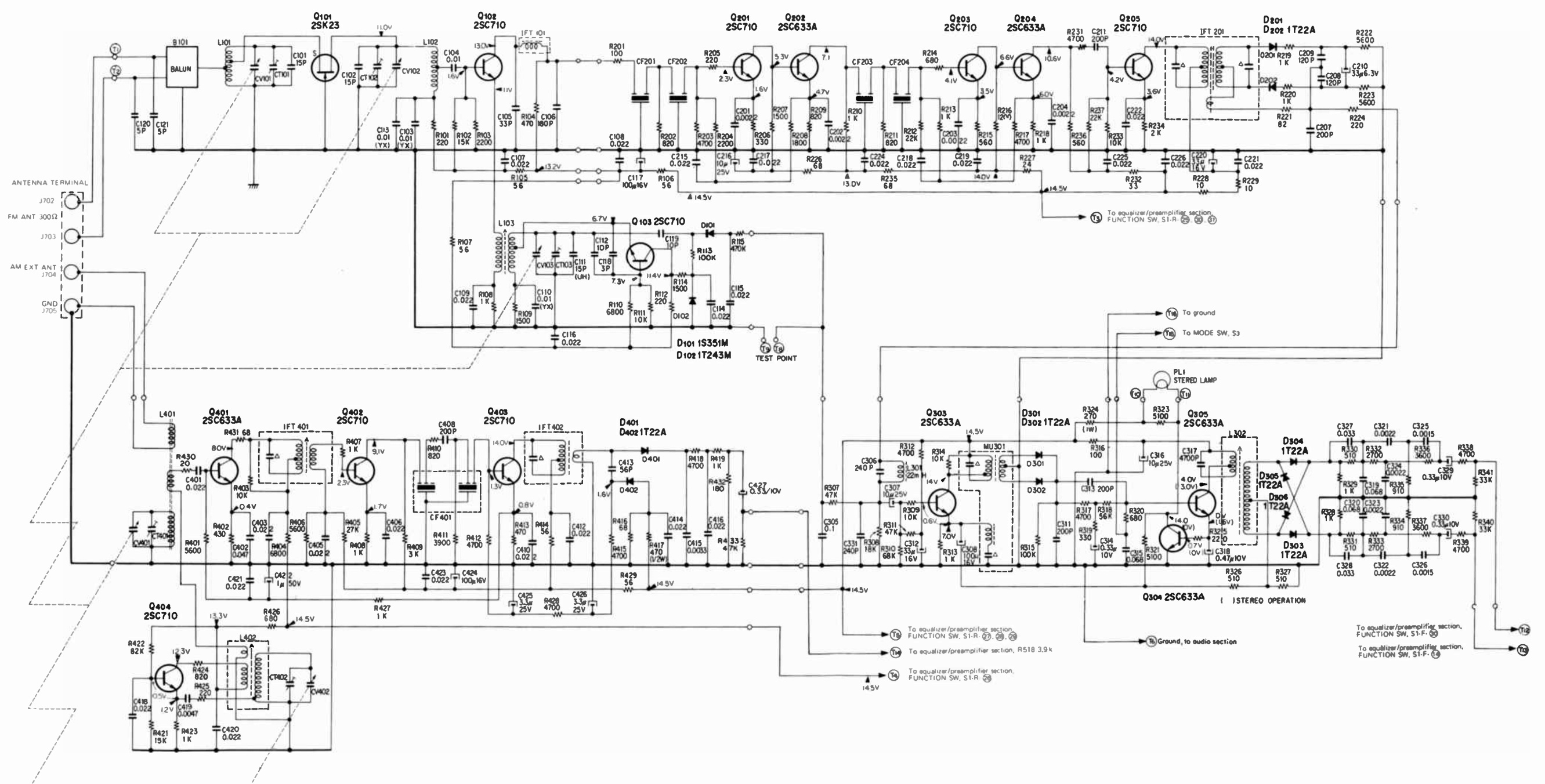
ITEM	NAME	PART NO.
CF201	Filter, FM IF	10.70MHz 1-403-562-11
CF202		10.66MHz 1-403-562-21
CF203		10.74MHz 1-403-562-31
CF204		10.62MHz 1-403-562-41
		10.78MHz 1-403-562-51
CF401	Filter, 455KHz	1-403-153-14
F1	Fuse, 2.5A	1-532-319
F2	Fuse, 2.5A	1-532-319
F3	Fuse, 2A (USA, Canada)	1-532-268
F3	Fuse, 2A (General Export)	1-425-548
MU301	Unit, MPX	1-514-874-21
S1	Switch, Function	1-514-874-21
S2	Switch, Monitor	1-514-664
S3	Switch, Mode	1-514-899
S4	Switch, High Filter	1-514-664
S5	Switch, Loudness	1-514-664
S6	Switch, Speaker	1-514-507
S7	Switch, Power	1-513-346-21
	Assembly, Record Changer (Dual 1210)	1-550-007-11
	Cartridge (USA Model)	1-549-015
	Cartridge (General Export, Canadian Models)	1-549-039
	P.C. Board, Tuner/MPX	8-982-595-11
	P.C. Board, Buffer/Tone Control	8-982-605-05
	P.C. Board, Power Amp/Power Supply	8-982-605-21
	P.C. Board, Loudness	8-982-605-85
	P.C. Board, Equalizer/Preamp	8-982-605-89

NAME	PART NO.
Assembly, Wooden Cabinet	X-48095-01
Assembly, Dust Cover	X-48095-05
Panel, Front	X-48095-04
Scale, Dial	4-809-522
Knob, Treble/Bass/Function/ Speaker	X-48030-04-1
Knob, Tuning	X-48058-01-2
Knob, Volume, Left	X-48030-08
Knob, Volume, Right	X-48030-07

**MOUNTING DIAGRAM – Tone Control Board –**  
 – Component Side –



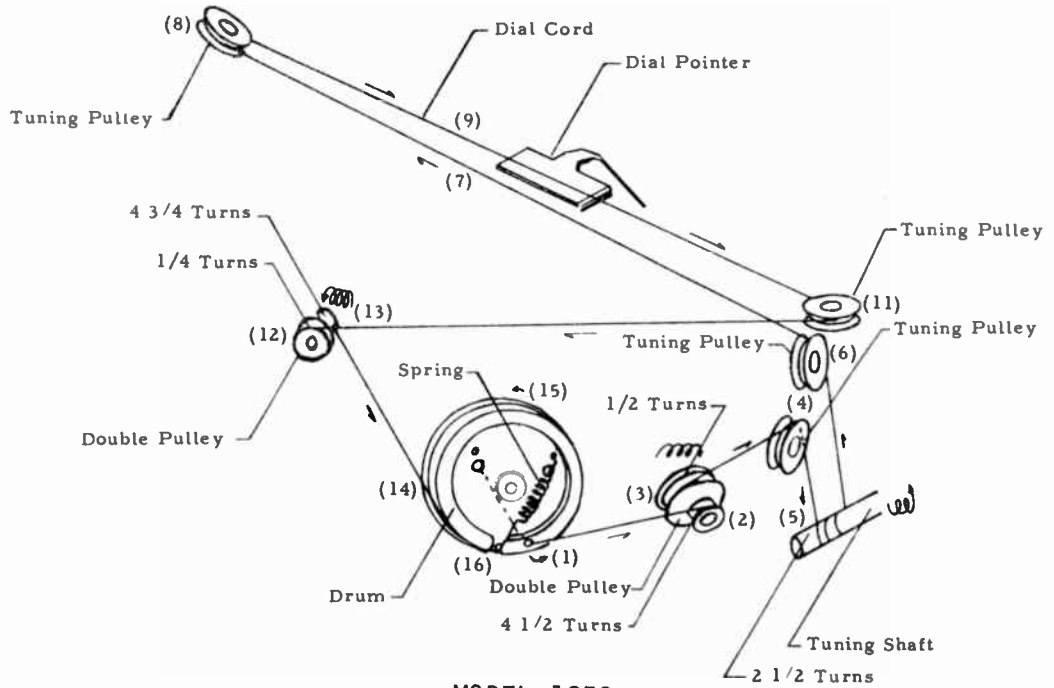
**SCHEMATIC DIAGRAM**  
 – Tuner Section –



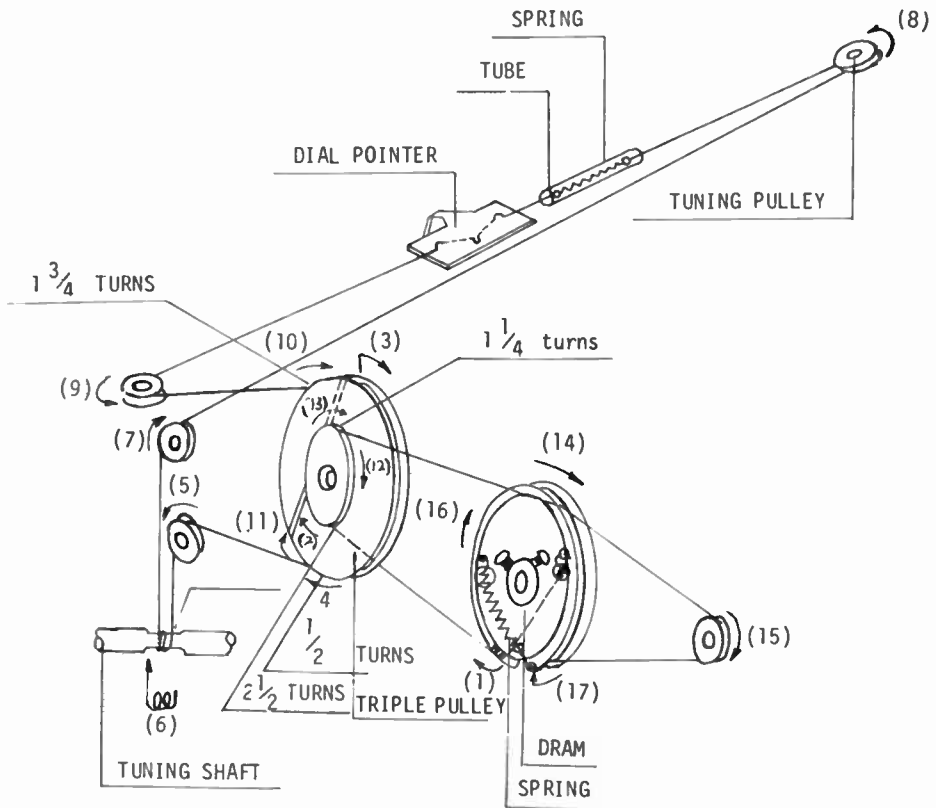
**Note:**  
 All resistance values are in ohms. k = 1,000, M = 1,000 k  
 All capacitance values are in  $\mu\text{F}$  except as indicated with p, which means  $\mu\text{F}$ .  
 All voltages represent an average value and should hold within  $\pm 10\%$ .  
 All voltages are dc measured with a VOM which has an input impedance of 20k ohms/volt. No signal in.

DIAL CORD STRINGING DIAGRAM

To restring dial cord, place tuning capacitor in closed position



MODEL 1253



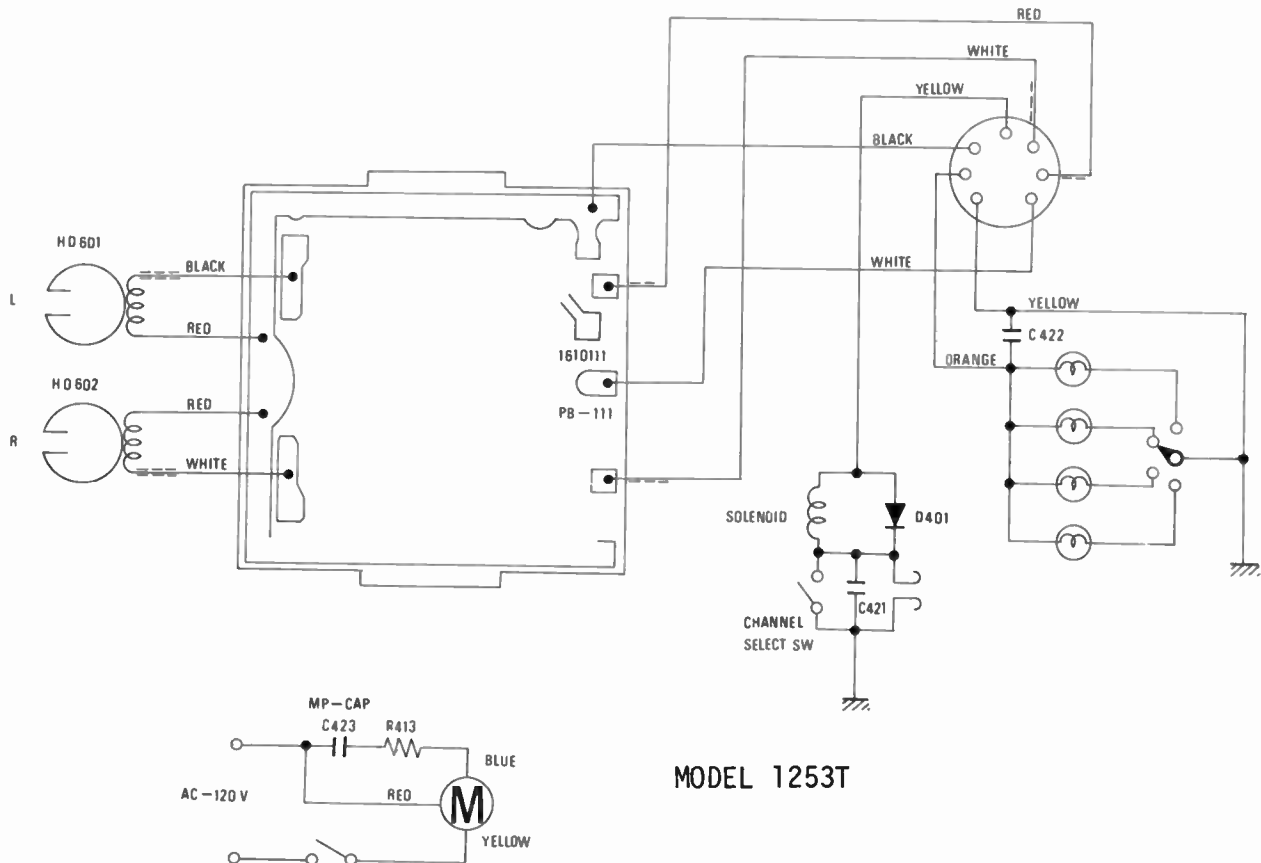
MODEL 1253T

## ALIGNMENT INSTRUCTIONS

Steps	Connect Signal Source To -	Set Signal To - Insert Marker To -	Connect Alignment Indicator To -	Set Radio Dial To -	Adjust As Indicated	
<b>FM IF ALIGNMENT (Function Switch in the position "FM")</b>						
1	Sweep Generator To - Point ( A )	10.7MHz Marker at 10.6, 10.7 and 10.8MHz	Oscilloscope to Point ( C ) through o diode	Quiet point on band	T 101, T 102, T 105, T 106, T 108, T 109, T 111 for maximum.	
<b>RATIO DETECTOR ALIGNMENT (Function Switch in the position "FM")</b>						
2	Sweep Generator To - Point ( A )	10.7MHz Marker at 10.6, 10.7 & 10.8MHz	Oscilloscope to Point ( B ) through o diode	Quiet point on band	T 112 for Straightness of "S" Curve at 10.7 MHz Marker	
3	Repeat 1 and 2					
<b>FM RF ALIGNMENT (Function Switch in the position "FM")</b>						
1	RF Generator To - Point ( D ) through matching network. (Antenna impedance 300 $\Omega$ balanced)	87MHz	VTVM as an audio meter - across a dummy resistor 8 $\Omega$ . (A dummy resistor of 8 $\Omega$ must be connected between audio amp. output terminals before alignment.)  Tuning Meter May Also be Used as Audio Meter	87MHz ( Tuning gang closed )	L 104 for Maximum	
2		109MHz		109MHz ( Tuning gang open )	TC 103 for Maximum	
3		90MHz		90MHz	L 101, L 102 for Maximum	
4		106MHz		106MHz	TC 101, TC 102 for Maximum	
5						
6						
7	Repeat 1, 2, 3, and 4					
Check overall response curve and repeat above steps as necessary to obtain maximum sensitivity						
<b>AM ALIGNMENT (Function Switch in the position "AM")</b>						
1	Sweep Generator To - Point ( E )	455KHz	Oscilloscope to Point ( F )	Quiet point on band	T 103, T 104, T 107, T 110 for Maximum	
2	Connect RF Generator to a short piece of wire or a loop of wire placed near AM Antenna	525KHz	VTVM - as an audio meter - across dummy resistor 8 $\Omega$ connected between the audio output terminals  Tuning Meter May Also be Used as Audio Meter	525KHz ( Tuning gang closed )	L 107 for Maximum	
3		1650KHz		1650KHz ( Tuning gang open )	TC 105 for Maximum	
4		600KHz		600KHz	L 603 for Maximum	
5		1400KHz		1400KHz	TC 104 for Maximum	
Repeat 2, 3, 4, and 5 as necessary to obtain maximum sensitivity						

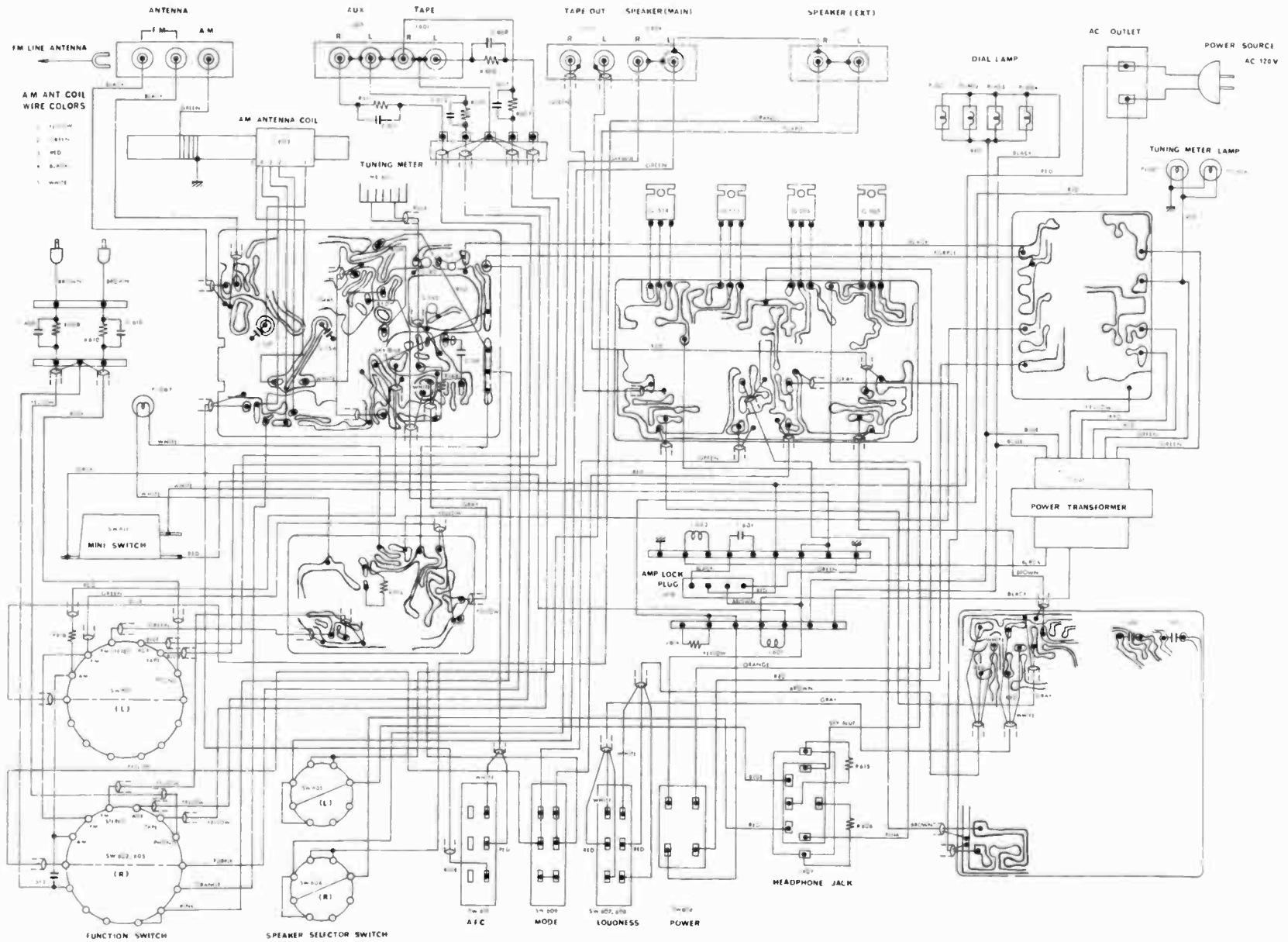
## MULTIPLEX ALIGNMENT PROCEDURE

STEPS	Audio Freq. Sel. Set to-	Function Switch Set to-	Output Indicator Connect to-	Adjust As Indicated
1	19KHz (Pilot Signal on FM Stereo Simulator)	Pilot	VTVM to Point (Y)	T 301 (19KHz Coil) for Maximum
2			Repeat Steps 2 and 3 Until Maximum is Obtained.	
3				VTVM to Point (Z)
4				
5	1KHz	Stereo Right	VTVM Across Dummy Resistor of $8\Omega$ Connected Between Right Channel Output Terminals.	VR 301 for Minimum Left Channel
6	1KHz	Stereo Left	VTVM Across Dummy Resistor of $8\Omega$ Connected Between Left Channel Output Terminals.	
7	1KHz	Repeat Step 5 and 6 Until Absolute Minimum is Achieved.		
8	1KHz	Stereo L - R	Oscilloscope to Point (Z)	Check for Over-Modulation. If there is Over-Modulation Repeat



MODEL 1253T

# WIRING DIAGRAM







NOTE: WHEN ORDERING PARTS NOT OTHERWISE LISTED, ORDER FROM MANUFACTURER BY ITEM NUMBER AND DESCRIPTION.

### SEMICONDUCTORS

ITEM	PART NO./TYPE		
D101	1N60	Q103	2SC461
D102	1N60	Q104	2SC354
D103	1N60	Q105	2SC460
D104	1N60	Q106	2SC460
D105	1N60	Q107	2SC460
D106	1N60	Q301	2SC828
D107	1N60	Q302	2SC828
D108	1N60	Q303	2SC828
D109	1N60	Q401	2SC644FS
D110	1S1923	Q402	2SC644FS
D301	0A90	Q402	2SC644FS
D302	0A90	Q404	2SC644FS
D303	0A90	Q501	2SC458LG
D304	20A90	Q502	2SC458LG
D305	20A90	Q503	2SA562
D306	20A90	Q504	2SA561
D307	20A90	Q505	2SC734
D501	HV46	Q506	2SC1061
D502	HV46	Q507	2SC1061
D503	HV23	Q508	2SC458LG
D504	HV23	Q509	2SC458LG
D601	10D-1	Q510	2SA562
D602	10D-1	Q511	2SA561
D604	BZ-12	Q512	2SC734
Q101	2SC535	Q513	2SC1061
Q102	2SC461	Q514	2SC1061

### COILS/TRANSFORMERS

ITEM	PART NO.
L101	111B209
L102	111B244
L103	111B077
L104	113B178
L106	111B077
L107	113M146
L301	1170015
L302	1170017
L601	1170020
L602	1170020
L603	111B380
T101	11JM053
T102	11LM105
T103	11AM085
T104	11AM102
T105	11LM105
T106	11LM105
T107	11BM004
T108	11LM105
T109	11LM105
T110	11CH004
T111	11DM060
T112	11EM060
T301	11PD119
T302	11ND119
T601	118G104

### ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
C107		1mfd 10V
C120		10mfd 10V
C147		10mfd 10V
C149		47mfd 10V
C150		220mfd 10V
C166		10mfd 10V
C301		.47mfd 50V
C319		10mfd 50V
C320		4.7mfd 25V
C409		10mfd 16V
C410		10mfd 16V
C411		10mfd 16V
C412		10mfd 16V
C413		4.7mfd 16V
C414		4.7mfd 16V
C415		220mfd 16V
C504		47mfd 25V
C505		47mfd 25V
C510		4.7mfd 25V
C511		100mfd 10V
C512		10mfd 25V
C513		10mfd 25V
C515		47mfd 10V
C516		470mfd 25V
C520		47mfd 25V
C521		4.7mfd 25V
C526		4.7mfd 25V
C527		100mfd 10V
C528		10mfd 25V
C529		10mfd 25V
C531		47mfd 10V
C532		470mfd 25V
C533		220mfd 35V
C534		100mfd 35V
C604		220mfd 35V
C605		220mfd 35V
C606		100mfd 16V
TC-103	1280027 1291093	Trimmer Tuning Gang

### CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
R527	1330008	.22 ohms
R528	1330008	.22 ohms
R557	1330008	.22 ohms
R558	1330008	.22 ohms
VR101	1390120	5000 ohms Detector Balance
VR102	1390171	10K
VR103	1390175	3000 ohms Separation
VR501 &	139A218	50K Dual Treble
VR502		
VR503 &	139A218	50K Dual Bass
VR504		
VR505	139A219	50K Balance
VR506 &	139A125	50K Dual Volume
VR507		

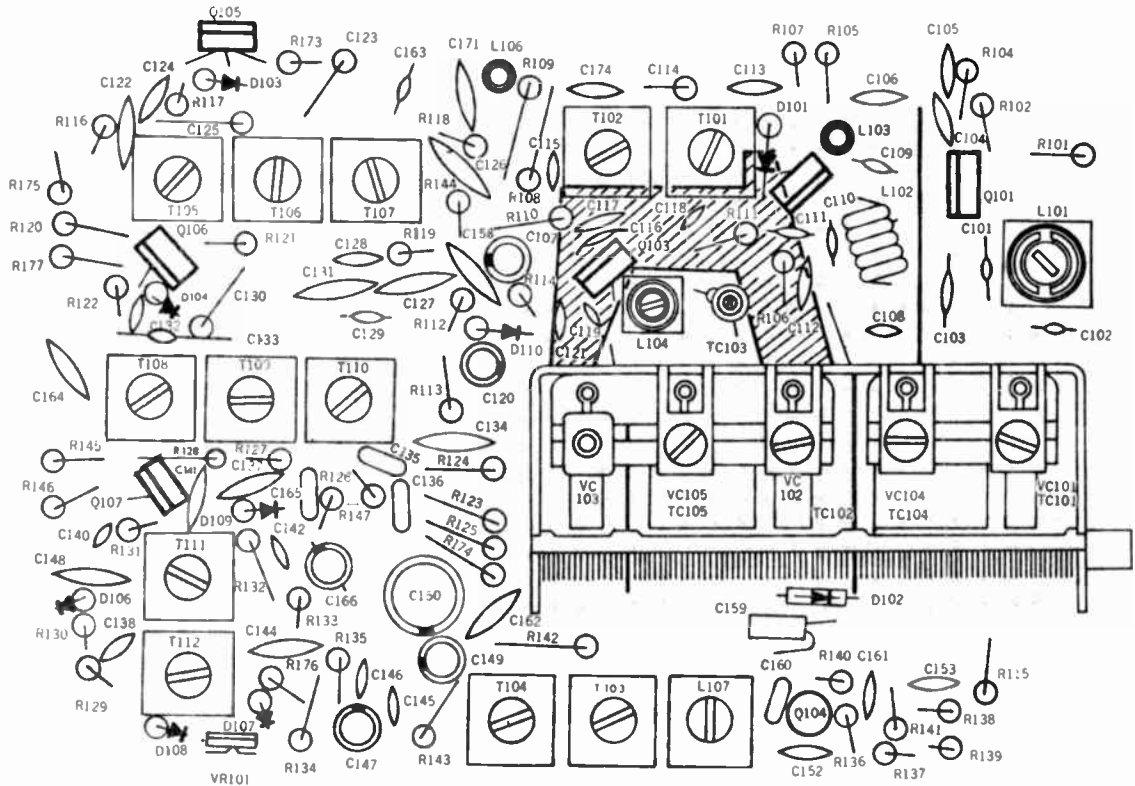
### MISCELLANEOUS

ITEM	NAME	PART NO.
(COMMON)		
SW601	Switch, Function	1620130
SW602		
SW603		
SW606		
SW604 &	Switch, Speaker	1620132
SW605		
SW606	Assembly, Push Switch	1622019
SW607		
SW608		
SW609		
	Meter, Tuning	1831029
	Fuse, 2A	1790036
	Assembly, Record Changer	AC-565
	Motor, Phono Drive	60373
	Cartridge, Phono	TN48D
	Needle, Phono	N4D
(MODEL 1253)		
	Speaker, 6"	1520153
	Speaker, 2-1/2"	1520154
(MODEL 1253T)		
B31	Belt, Drive	21V7011
D3	Motor, Tape Drive	164N003
O6	Head, Tape	165N006
D10	Solenoid	1661013
	Speaker, 8"	SP-859
	Speaker, 3"	SP-305

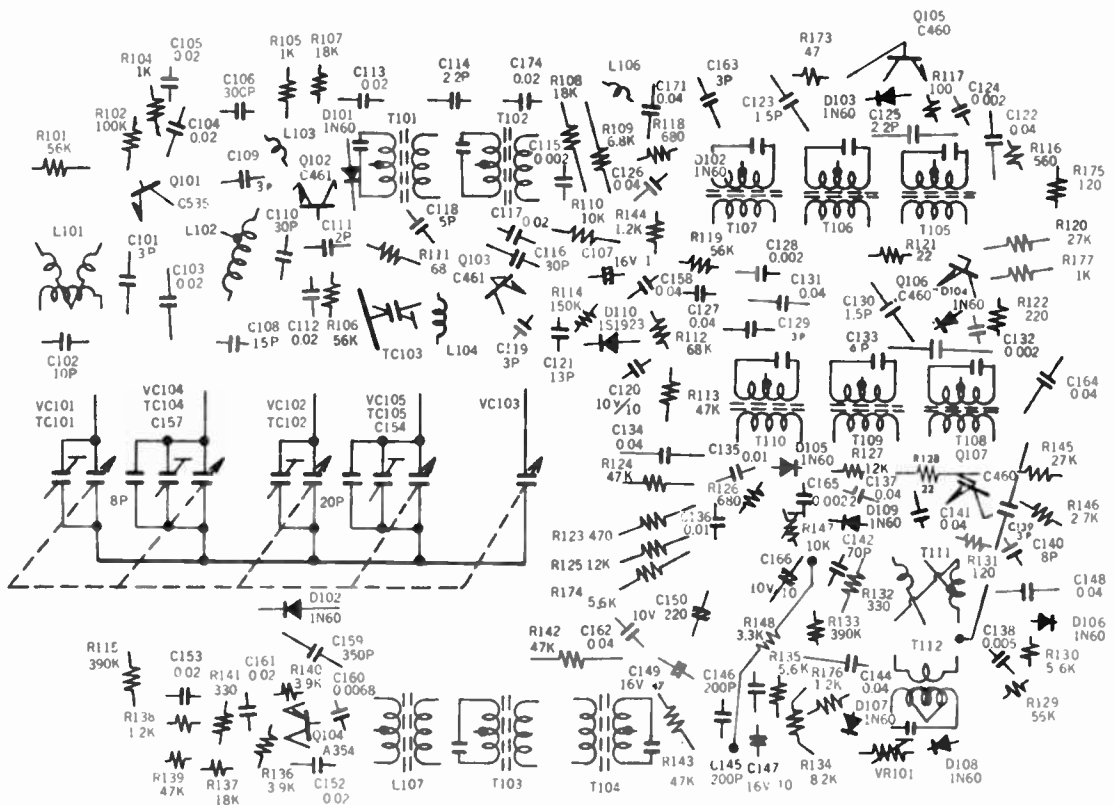
### CABINET PARTS

NAME	PART NO.
(MODEL 1253)	
Cabinet, Main	27C4024
Cabinet, Speaker	27C4043
Panel, Dial	21D4025
Panel, Control	21U4013
Knob, Slide Control	21N4022
Knob, Push	21N4033
Knob, Tuning	W1N4021
Cover, Dust	DC-116-1
(MODEL 1253T)	
Cabinet, Main	27C4061
Cabinet, Speaker	SB-162
Panel, Dial	21O4058
Panel, Control	21V4029
Knob, Tuning	21N4021
Knob, Control	21N4023
Cover, Dust	DC-117

**TUNER BOARD TOP VIEW**

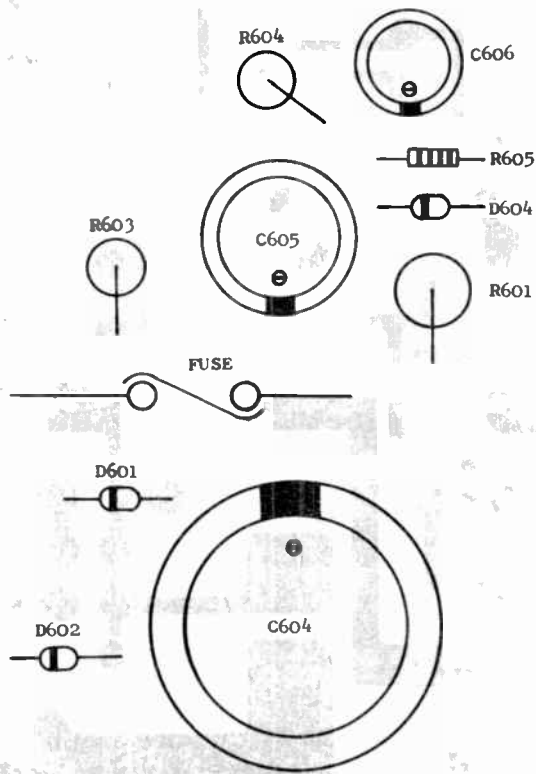


**TUNER BOARD BOTTOM VIEW**

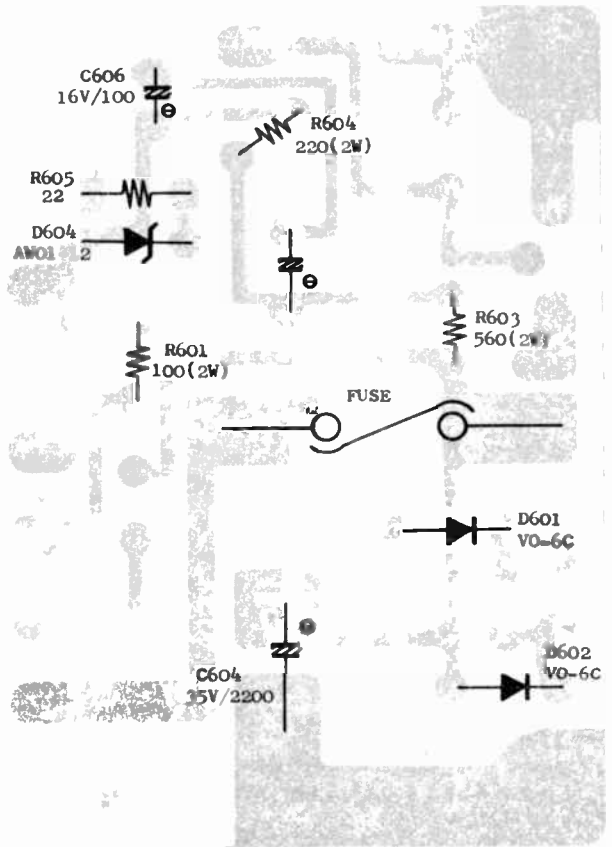




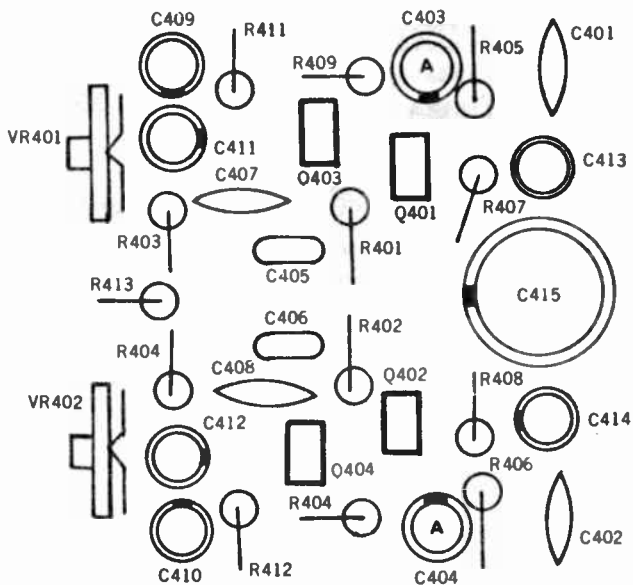
**POWER SUPPLY TOP VIEW**



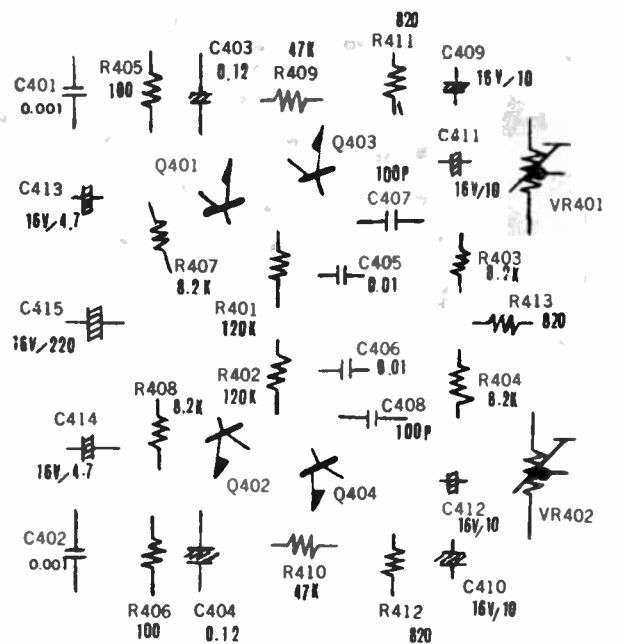
**POWER SUPPLY BOTTOM VIEW**



**PRE-AMP TOP VIEW**



**PRE-AMP BOTTOM VIEW**



# VOLTAGE CHART MODEL 1253

## FUNCTION SWITCH IN FM POSITION

Q#	Transistor #	E	B	C	Function
Q101	2SC535	7.20	5.90	0.00	FM RF
Q102	2SC461	8.50	7.94	0.00	FM Mixer
Q103	2SC461	4.25	3.60	0.00	FM OSC.
Q104	2SA354	1.85	1.90	11.10	AM Conv.
Q105	2SC460	9.00	8.40	0.80	FM IF
Q106	2SC460	7.40	6.80	0.48	FM IF
Q107	2SC460	3.80	3.16	0.24	FM IF
Q301	2SC828	6.90	6.30	0.61	19KHz Amp.
Q302	2SC828	9.50	6.45	0.00	38KHz Amp.
Q305	2SC828	----	----	----	Stereo Ind.
Q501/508	2SC458LG	5.25	5.05	2.80	Input (Aud.)
Q502/509	2SC458LG	4.45	3.80	2.25	Pre-Driver
Q503/510	2SA562	1.65	2.25	12.00	Pre-Driver
Q504/511	2SA561	13.10	13.60	25.70	Driver (PNP)
Q505/512	2SC734	12.50	11.80	0.00	Driver (NPN)
Q506/513	2SC1061	26.00	25.20	13.00	Output
Q507/514	2SC1061	13.00	12.40	0.00	Output

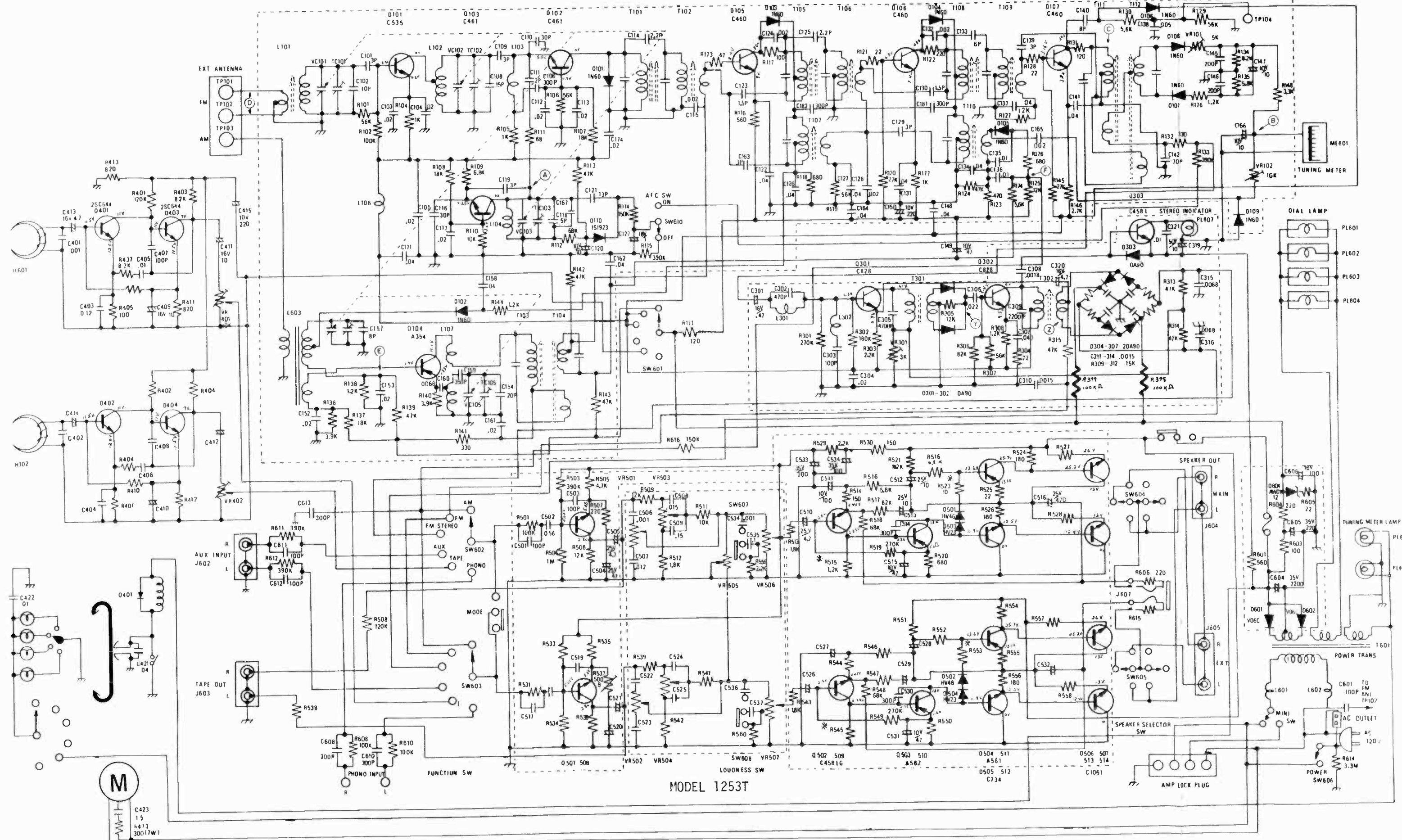
## FUNCTION SWITCH IN AM POSITION

Q105	2SC460	10.80	10.15	0.58	AM IF
Q106	2SC460	8.00	8.00	0.57	AM IF

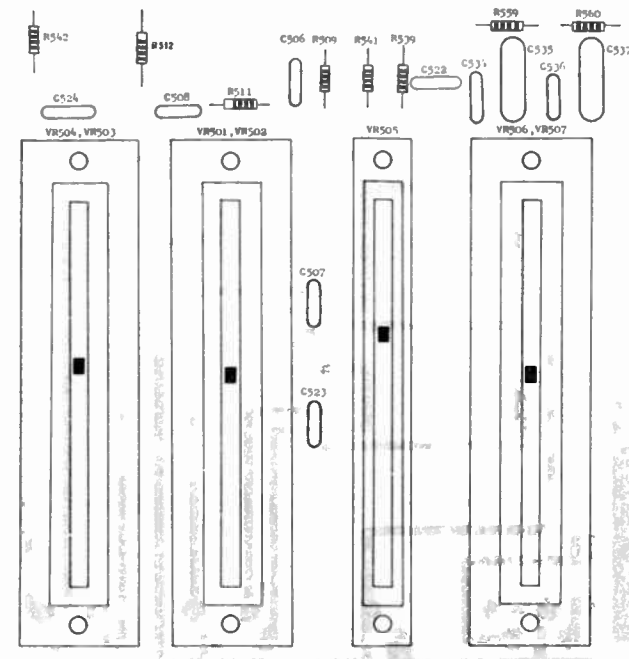
Line Voltage 117Volts. No Signal in.

All Measurements Taken with a VTVM.

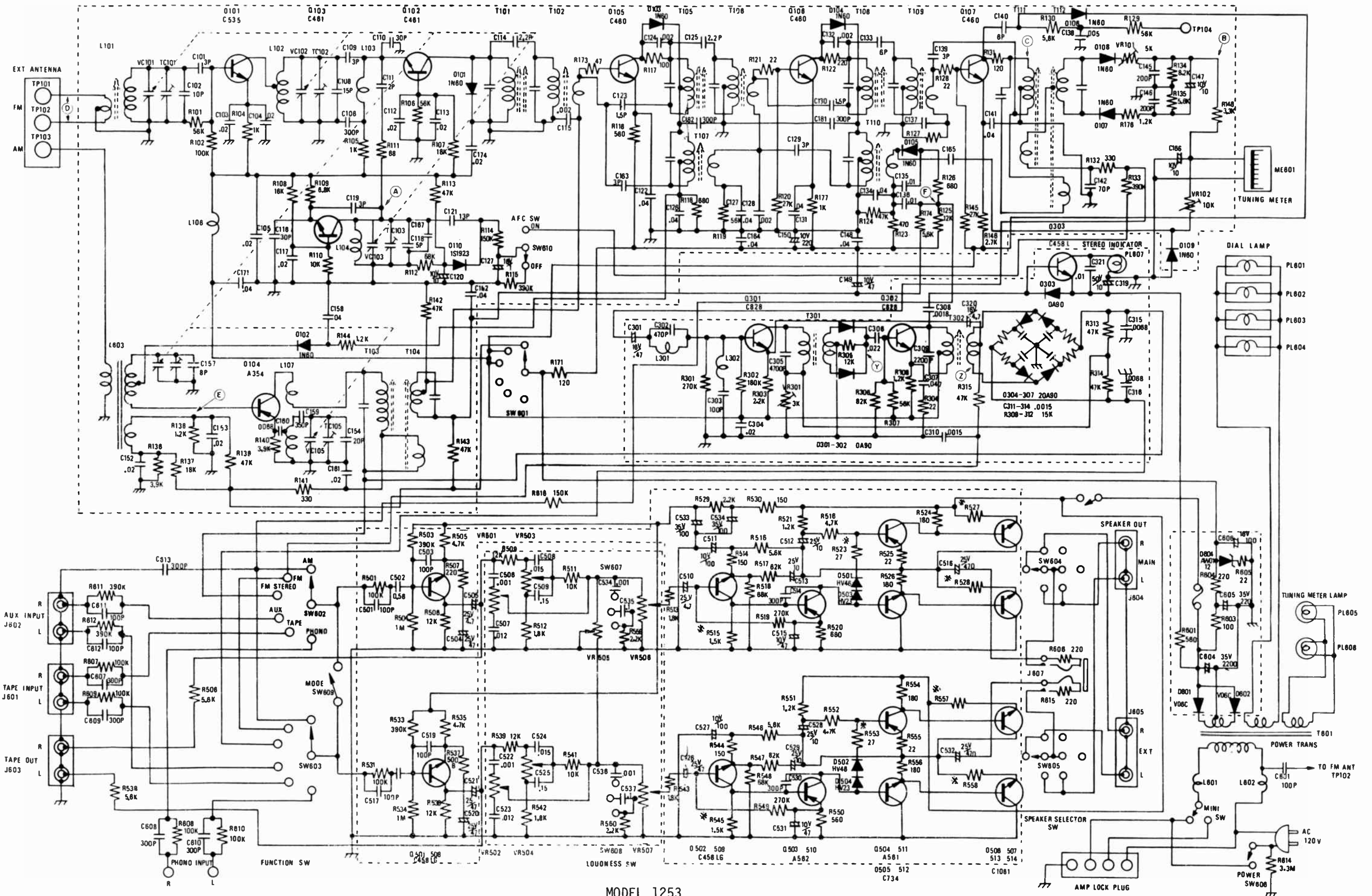
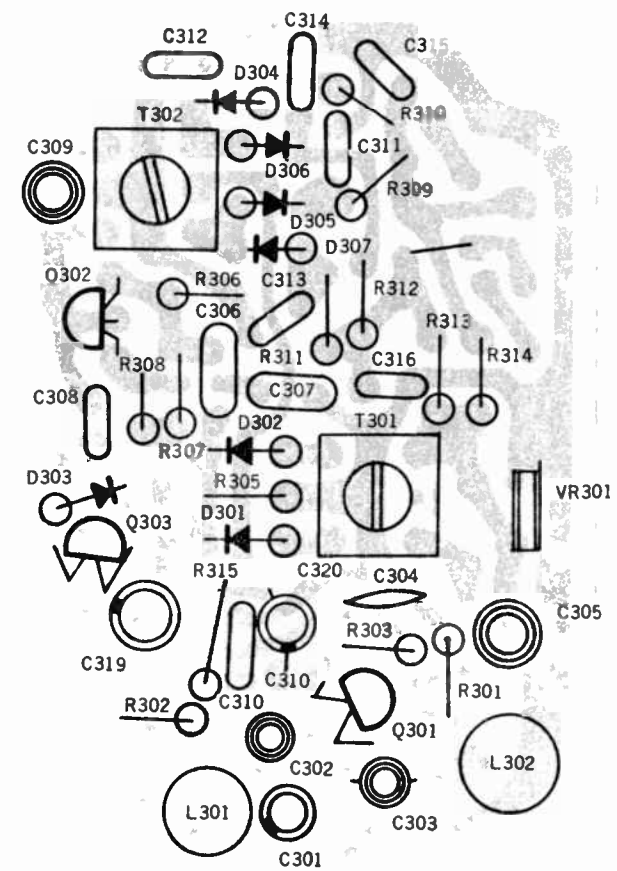
Symphonic 1253, 1253T



CONTROL BOARD TOP VIEW



MULTIPLEX BOARD TOP VIEW





# INDEX

This index lists all Compact, Component, and Modular Hi-Fi Equipment in "PHOTOFAC MODULAR HI-FI SERIES" and "SAMS MODULAR HI-FI COMPONENTS" volumes

ADMIRAL	VOL.	CONCORD (CONT.)	VOL.	JULIETTE (CONT.)	VOL.	MIDLAND (CONT.)	VOL.	PENNEY'S-PENNCREST	VOL.
Chassis		HES-50 .....	8	RT-2525X .....	18	19-576 .....	30	1100 .....	10
4Y4, 8G5 .....	18	HES-55 .....	8	RT-2626X .....	15	19-640 .....	9	1310 .....	26
10J2 .....	26	STA-12 .....	25					1312 .....	28
20G5, 20G5A, 20G5B .....	28	STA-15 .....	30	LAFAYETTE				1330A .....	31
50A1 .....	25			LR-20 (99-3549) .....	12			1701 .....	29
PSS51, PSS51-M .....	18	DECCA		LR-100 (99-02214WX) .....	23			1702 .....	34
STC711 .....	26	DP-110 .....	7	LR-808 (17-01846WX) .....	16	R-12 .....	18	1760 .....	36
STC731, STC741, STC751 .....	28	DP-111 .....	9	LR-1500TA(99-01950WX) .....	19	R-12A .....	37	5910 .....	35
STC761 .....	25	DP-112 .....	4	LRC-60T .....	7	R-13 .....	36	5925 .....	30
		ELECTROPHONE		LRK-1600(99-02172WX) .....	15	RC-13 .....	36	6015B .....	1
ALLIED		LSC-25(24-03236WX) .....	9	LSC-50 .....	3	T-11 .....	19	6422, 6422A .....	9
395 (31-5016) .....	27	LSC50 .....	3	LSC-100(24-02907WX) .....	11	T-100A .....	37	6651 .....	12
1450 (14A50502) .....	22	LSC-100(24-02907WX) .....	11	LSC-888(24-03228WX) .....	17	T-107 .....	22	6681 .....	24
2600 (10-5057U) .....	13	SC-393 .....	32	24-0316WX .....	3	T-108 .....	23	6825, 6825A .....	21
2690 (10A4268U) .....	8	SC-393 .....	32	655 .....	3	T-109 .....	23	6900A .....	6
		SC420 (H18-201) .....	37	Chassis		T-113 .....	20	6912A .....	33
AMPEX		SC421 (H19-201) .....	36	99-01893WX .....	7	T-500A .....	26	8511 .....	1
ASR-100 .....	25	SC430 (H19-202) .....	36	LEAR JET		T-600 .....	17	8551 .....	1
ARVIN		711 .....	32	II-410, II-460 .....	5	T-600A .....	37	8571A .....	1
30X76-18 .....	34	Chassis		LLOYD'S		T-700 .....	26		
50X36-19 .....	34	H18-201 .....	37	IM10-94A .....	18	T-800 .....	28	Chassis	
50X92-18 .....	33	H18-202 .....	37	IM53-07A .....	27	T-800A .....	21	R681 .....	31
80L33-18 .....	27	H19-201 .....	36	IV56W-34A .....	10	T-4100 .....	21		
80L77-18 .....	29	H19-202 .....	36	9F15-08 .....	15	T-4200 .....	27	PHILCO-FORD	
80P25-19 .....	26	ELECTROPHONIC		9F15-08 .....	15	T-4600 .....	34	M3720U .....	30
80P37-19 .....	31	(See Morse/Electroponic)		9F85 .....	6	4DT411 .....	35	M3760U .....	35
80X76-18 .....	34	ELGIN		9M19 .....	12	102R, 105 .....	15	M4720U .....	30
Chassis		RM-4100, RM-4200, .....		9M20-07A .....	15	124870 .....	1	M4760U .....	35
1.00231 .....	33	RM-4210, RM-4300, .....		9M39-94A .....	13	125265 .....	1	35-1613-1, 35-1613-2 .....	30
1.00991 .....	27	RM-4340 .....	29	9M73 .....	12	Chassis			
1.01001 .....	29	EMERSON		MAGNAVOX		SK102GW .....	24	T20STS, T20STSR .....	30
1.01041 .....	26	31M15 .....	26	1K8891, 1K8892 .....	20	SK104GW .....	22	T70STS, T70STSR .....	35
1.01051 .....	31	31M16, 31M16A .....	30	1P9281 .....	16	SK106GW .....	26	PILOT	
1.01141 .....	34	31M17, 31M17A .....	24	1P9282 .....	21	SK107GW .....	24	NC-20 .....	7
1.01161 .....	34	31M25, 31M25B .....	36	1R1710 .....	1	TT39FW .....	20	NC-30 .....	10
1.01171 .....	34	FISHER		1R1811, 1R9270, .....				Chassis	
AUTOMATIC		250-T .....	24	1V9053, 1V9054 .....	27	4210 .....	3	123011 .....	7
HMX-4000 .....	27	400-T .....	24	2K8886 .....	24	4320 .....	3	123012 .....	10
BELL & HOWELL		GENERAL ELECTRIC		2P9281 .....	16	8920 .....	6	PIONEER	
3600 .....	36	A505g/h .....	37	701454-1 .....	27	9810 .....	9	SX-440 .....	22
3650 .....	37	C172g .....	37	Chassis		OLYMPIC		SX-770 (FVW, KCV) .....	24
BRADFORD		C460g .....	37	AS11-01-AA .....	16	CS821 .....	25	SX-990 .....	21
WTG-5330 .....	29	C467g/h .....	37	AS12-01-AA .....	21	CS843 .....	36	RCA	
WTGS1839 .....	33	C670g .....	37	R233-01-AA/-02-AA, .....	20	CS844 .....	36	RK-325A .....	3
WTGS3553 .....	36	G504g/h .....	37	R234-01-AA/-02-AA .....	20	CS845 .....	36	RK-329B .....	3
WTG30-96438A .....	5	G507g .....	37	R235-01-AA .....	13	CST850 .....	36	RK329C .....	33
1404B40 (WTGS3553) .....	36	M8650A (Similar .....	32	R235-02-AA .....	13	CS822 .....	25	RK329E .....	27
1404E42 (WTGS3553) .....	33	to page 37) .....	32	R240-01-AA .....	24	Chassis		RK335A .....	34
1405C30 .....	5	P365g, P365h .....	35	R264-08-CB .....	1	330-1 .....	36	RZC288 .....	29
1405M31 .....	26	P462g .....	20	R265-06-AA .....	10	PACKARD BELL		RZC291W .....	20
1427A31 .....	29	P572g, P572h .....	35	R271-01-AA/-02-AA, .....	14	RTS-22 .....	1	RZC292 .....	31
2104E31 (WTG-61028) .....	28	P774g .....	37	R271-71-AA/-72-AA .....	14	RTS-24 .....	25	RZC295W .....	18
53322 .....	32	P775g .....	37	R278-01-AA, .....	27	RTS123 (Similar to .....	25	RZC936WK .....	20
53702 .....	25	SKT300 (Similar .....	32	R278-02-AA .....	27	RTS24) Page 78 .....	25	RZC941WK .....	24
59089 .....	34	to page 37) .....	32	MARANTZ		RTS123A .....	27	SPK250W .....	3
CAPEHART		T2010, T2010A-1 .....	31	22 .....	29	PANASONIC		SS3000W .....	18
P880 .....	10	T2020, T2020A .....	30	28 .....	31	RE-7080, RE-7080C .....	17	SS4000 .....	3
8T70 .....	10	T2040, T2040A .....	28	MASTRWORK		RE-7412 .....	29	TCT800 .....	30
770 .....	10	T2050A .....	32	M500 .....	25	RE-7430, RE-7430C .....	24	TCT801 .....	34
2001 .....	13	8630A .....	25	M502 .....	31	RE-7670, RE-7670C .....	12	VMP68W, VMP69W, .....	5
CLARICON		Chassis		M503 .....	33	RE-7700, RE-7700C .....	5	VMP99WK .....	8
35-130 .....	2	PK6 .....	35	M504 .....	28	RE-7800, RE-7800C .....	22	VPP64W .....	8
35-140 .....	14	PK16 .....	35	M506 .....	32	RE-8080, RE-8080C .....	32	VS1300HW .....	28
35-160, 35-180 .....	5	PK170 .....	37	M2415 .....	10	RJH1AS .....	32	VS1400Y .....	29
6720 .....	2	T7NK .....	20	M4002 .....	1	RS-2535 .....	35	VS1420Y .....	31
67230 .....	14	HITACHI		M4700 .....	3	RS-820S .....	23	VS3000 .....	33
67350 .....	5	DPK-321(U) .....	26	M4710 .....	10	SA-40 .....	27	VS3001W .....	27
CONCERTONE		DPK-340 .....	37	M4720 .....	34	SA-5500 .....	30	VS4000 .....	26
SAT-1010X .....	16	DPK-345 .....	33	M5130 .....	1	SA-5800 .....	37	VS6025 .....	34
CONCORD		KS-2200II .....	2	M5132 .....	1	SA-6200 .....	36	YZ0572W .....	36
CE-15 .....	2	KS-2210 .....	24	M7005 .....	3	SB-551 .....	6	YZ0596W .....	37
F-600 .....	7	KS-2300 .....	35	M7050 .....	17	SC-555A .....	19	YZ0599W .....	30
HES-20 .....	4	KS-2400H .....	13	MIDLAND		SC-666 .....	14	Chassis	
HES-25 .....	4	SR-300 .....	30	19-520 .....	6	SC-777 .....	31	RC-1227L .....	5
HES-40 .....	2	SR-301 .....	32	19-525, 19-527 .....	31	SD-15 .....	6	RC-1240A/B, RK-327, .....	16
HES-45 .....	2	SR-600 .....	31	19-544 .....	9	SD-203 .....	28	RK-327B .....	16
		SR-800 .....	36	19-545 .....	11	SL-840 .....	34	RS-255A .....	2
		SR-120C (USA), (UK) .....	34	19-570 .....	28	SL-850 .....	33	RS-255B .....	8
		JULIETTE		19-572 .....	30	SL-970 (Similar to .....	18	REALISTIC	
		R-2424X .....	14	19-571 .....	28	SL-1519 .....	6	SC-70 (13-1045) .....	11
						SE-2030 .....	28	12-694 .....	20
						SE-2070 .....	26		
						SI-999 .....	2		

REALISTIC (CONT.)	VOL.	SHARP	VOL.	SYLVANIA (CONT.)	VOL.	TELEFUNKEN	VOL.	WESTINGHOUSE (CONT.)	VOL.
12-1470 (Modulaire) .	17	SA-104U .....	32	Exponent 4/4SW .....	4	T201 .....	35	PAS7150A .....	25
12-1487 .....	19	SA-301U .....	28	MS150W .....	4	TOSHIBA		RCF9100A .....	26
22W (13-1138) .....	12			MS2720 .....	27			RCF9120A .....	24
<b>REALTONE</b>		<b>SILVERTONE</b>		MS2728 (Similar		SN-350 .....	33	RCF9150A .....	29
4356 .....	7	(See Sears-Silvertone)		to page 115) .....	31	SSOC .....	26	RCF9620A, RCF9620B,	
<b>ROSS</b>		<b>SINGER</b>		Chassis				RCF9624A .....	30
RE-3430 .....	15	HE-925 .....	1	P55-1 .....	4	<b>TOYO</b>		<b>Chassis</b>	
<b>SANYO</b>		HE-4020 .....	33	P55-2 .....	4	CRH-661 .....	34	V2541-1 .....	32
DCX2500K .....	35	<b>SONY</b>		Q28-3 .....	4			V2544-2 .....	32
DXLS480 .....	32	CF-500 .....	32	R33-3/-4) .....	27	<b>TRUETONE</b>		V2693-1 .....	32
<b>SEARS-SILVERTONE</b>		HP-150(CSA), (E), (UL) .	28	R49-3 .....	25	DC1055 .....	35	V2694-1 .....	32
499.74060000/60001 ..	23	HP-180W .....	27	R63-3 .....	31	MAE6105A-17(4DC6105) .	12	V3012C01 .....	26
499.74180000 .....	30	HP-188 .....	3	R63-15 (Similar		MIC1055A07 (DC1055) .	35	V-3014-C01 .....	24
528.32860000/1/2/3/4/		HP-450A(CSA), (UL) .	33	to page 115) .....	31	SYR6096A-07/968-07		V-3014-C02 .....	29
5/6 .....	19	HP-465 .....	4	R63-55 (Similar		(4DC6069/69B) .....	15	V-4003-C03 .....	25
528.32861100 .....	31	HP-465A .....	31	to page 115) .....	31			V-4007-C01 .....	12
528.32870000/1/2 .....	19	HP-480, A .....	8	S38-3 .....	4	<b>WARDS AIRLINE</b>		<b>ZENITH</b>	
528.32880100 .....	25	HP-510 .....	37	<b>SYMPHONIC</b>		GEN-1745A .....	25	AS64W .....	2
548.74210000 .....	37	HP-580 .....	11	11238, 1123G .....	34	GEN-2930A .....	8	AS89W .....	3
2050 .....	2	HST-110 .....	30	1143 .....	23	GEN-6011A .....	23	CS85W .....	29
2056 .....	9	HST-230A .....	34	1253 .....	37	GEN-6031A .....	24	CS87W .....	24
7403 .....	4	HST-330 .....	35	1253T .....	37	GEN-6111A .....	25	Z590P/W .....	1
7413 .....	6	TA-1144 .....	36	1323CR, 1323T .....	33	JWR-2812A/B .....	10	<b>Chassis</b>	
7415 .....	7	8FS-50W .....	13	1324, 1324CR, 1324T ..	33	JWR-2814A, JWR-2814B .	21	10AT37 .....	2
7423 .....	11	<b>SOUNDESIGN</b>		1433 .....	32	<b>WEBCOR</b>		102T30 .....	1
7433 .....	14	4370 .....	10	2123 .....	34	ST180 .....	29	112T27 .....	1
7473 .....	7	4488 .....	9	2223 .....	34	WFX158 .....	32	20AT31Z .....	3
74033 .....	4	<b>SYLVANIA</b>		4202TK .....	8	350 .....	35	29CT20 .....	24
<b>Chassis</b>		ACS14 .....	27	5001WA .....	8	<b>WESTINGHOUSE</b>			
132.51701 .....	9	CR280 .....	25	5202WA .....	16	H394C .....	32		
132.52601/602 .....	2	CR2740 .....	27	<b>Chassis</b>		PAS7118A .....	12		
540.10030 .....	4	CR2742 .....	31	A-881-1 .....	8				
540.10050 .....	6	CR2742A (Similar		A-881-9 .....	8				
540.10070 .....	11	to page 115) .....	31	R-835 .....	23				
540.10090 .....	14	CRT2730W .....	29	R-840 .....	34				
540.10100 .....	7	CS20W .....	4	R-845 .....	34				
		CS35P .....	4						

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