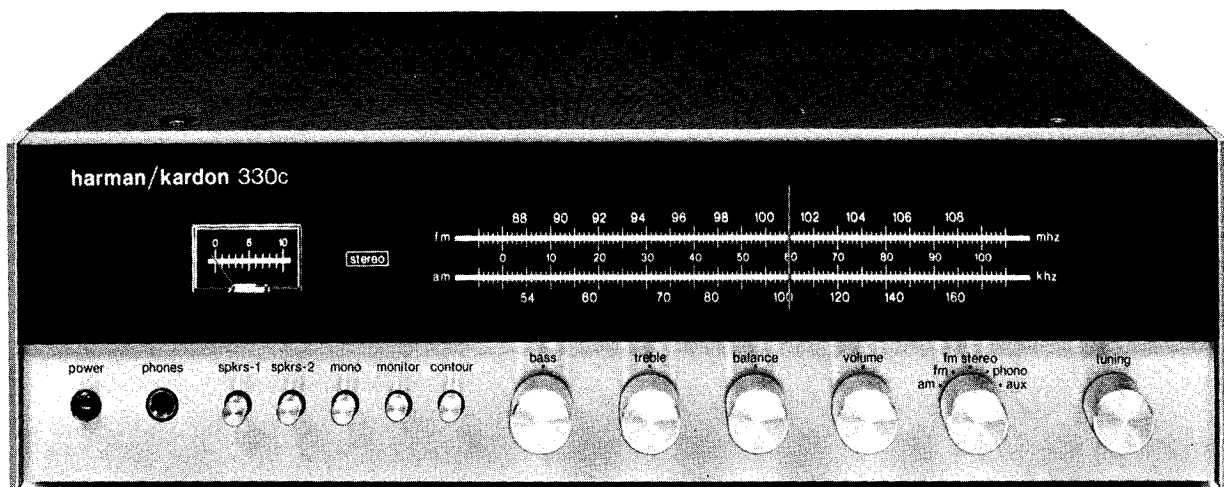


ERIC NELSON

The Harman/Kardon Model 330c

AM/FM/FM Stereo Solid State Receiver

Technical Manual



harman/kardon

PRECAUTIONS

1. Always disconnect the chassis from power line when soldering. Turning the power switch OFF is not enough. Power line leakage passing through the heating element may destroy the transistors.
2. Never attempt to do any work on the transistor amplifiers without first disconnecting the AC line cord and waiting until the power supply filter capacitors have discharged.
3. Replacement for output and driver transistors, if necessary, must be made from the same beta group as the original type.
4. If one output transistor burns out (open or short) always remove all the output transistors in that channel and check the bias adjustment, the control and other parts in the network with an ohmmeter before inserting a new transistor. All transistors in one channel will be destroyed if the base biasing circuit is open on the emitter end.
5. When mounting a replacement power transistor, be sure that the bottom of the flange, the mica insulators and the surface of the heat sink are free of foreign matter, for they may cause transistor failure.
6. Silicon grease must be applied between the transistor and the mica insulator, and between the mica insulator and the heat sink for better heat conduction.
7. Fuses must be replaced with size and type indicated. Use of other types can expose components to destructive current levels.

ALIGNMENT PROCEDURES

AM ALIGNMENT PROCEDURE

INSTRUMENTS: *AM Signal Generator modulated with 400Hz at 30%.
 *VTVM.
 *AM Sweep Generator and Oscilloscope.

NOTE: *Set Function Selector Switch to AM.
 *Connect signal source to a placed to radiate signals into AM Antenna Loop Stick (L251).

STEP	SIGNAL SOURCE	FREQUENCY	CONNECT OUTPUT METER TO	DIAL SETTING	ADJUST	ADJUST FOR
1	AM Sweep Generator	455kHz	VTVM and Oscilloscope to R269 (4.7 k ohm)	Quiet Point Near 1600kHz	T251	Maximum and Undistorted Pattern on Oscilloscope
2					T252	
3					T253	
4	Repeat Steps 1 through 3 for best sensitivity					
5	AM Signal Generator	600kHz	VTVM and Oscilloscope to R269 (4.7 k ohm)	600kHz	L252	Maximum Output
6	Same as Above	1600kHz	Same as Above	1600kHz	TC251 (on Front End)	Maximum Output
7	Repeat Steps 5 and 6 for best dial accuracy					
8	AM Signal Generator	600kHz	VTVM and Oscilloscope to R269 (4.7 k ohm)	600kHz	L251	Maximum Output
9	Same as Above	1600kHz	Same as Above	1600kHz	TC252 (on Front End)	Maximum Output
10	Repeat Steps 8 and 9 for best sensitivity					

MPX ADJUSTMENT

INSTRUMENTS: *Frequency Counter.
 *Signal Generator.

NOTE: *Set Function Selector Switch to FM.
 *Connect Signal Source to FM Antenna Terminals.

STEP	FREQUENCY	SIGNAL STRENGTH	DIAL SETTING	CONNECT OUTPUT TO	ADJUST	ADJUST FOR
1	98MHz (unmodulation)	1mV (60dB)	Tune for Volts DC at R226 (47 k ohm)	Frequency Counter to LP205	VR301	19kHz±50Hz

STEREO INDICATOR LAMP ADJUSTMENT

INSTRUMENT: *Stereo Signal Generator.

NOTE: *Set Function Selector Switch to FM.
 *Connect Signal Source to FM Antenna Terminals.

STEP	FREQUENCY	SIGNAL STRENGTH	DIAL SETTING	OUTPUT	ADJUST	ADJUST FOR
1	98MHz (Stereo Signal)	50μV (34dB)	Tune for Volts DC at R226 (47 k ohm)	Stereo Indicator Lamp	VR302	Light ON
2	Check Pilot level that Stereo Indicator lights at 6% of pilot level and that the indicator does not light at 1%.					
3	Return pilot level to 9% and check Stereo Separation at 1 kHz, 100Hz and 10 kHz.					

FM ALIGNMENT PROCEDURE

INSTRUMENTS: *FM Signal Generator modulated with 100Hz at 100%.
*AC/DC VTVM and Oscilloscope.

NOTE: *Set Function Selector Switch to FM.
*Connect Signal Source to FM Antenna Terminals.

STEP	FREQUENCY	SIGNAL STRENGTH	DIAL SETTING	CONNECT OUTPUT METER TO	ADJUST	ADJUST FOR
1			Quiet Point on Band	Oscilloscope to R226 (47 k ohm)	T201 Top and Bottom (on Front End)	Maximum Noise
2			Same as Above	Same as Above	T202 Top	Zero Volts DC
3	Near 98MHz	-1 dB of Limiter Saturation	Tune for Zero Volts DC at R226 (47 k ohm)	Oscilloscope to Tape Out Jack	T202 Bottom	Maximum Symmetric Output on Oscilloscope
4	Repeat Steps 2 and 3 until no further improvement is noticed					
5	90MHz	Approx. 10 μ V	90MHz	Oscilloscope to R226 (47 k ohm)	L201 (OSC) (on Front End)	Zero Volts DC
6	106MHz	Approx. 10 μ V	106MHz	Same as Above	TC201 (OSC) (on Front End)	Zero Volts DC
7	Repeat Steps 5 and 6 until no further improvement is noticed					
8	90MHz	-3dB of Limiter Saturation	Tune for Zero Volts DC at R226 (47 k ohm)	VTVM and Oscilloscope to Tape Out Jack	L202 (RF) T203 (ANT) (on Front End)	Maximum Output
9	106MHz	Same as Above	Same as Above	Same as Above	TC202 (RF) TC203 (ANT) (on Front End)	Maximum Output
10	Repeat Steps 8 and 9 until no further improvement is noticed					

POWER AMPLIFIER IDLING ADJUSTMENT

INSTRUMENT: *DC VTVM.

NOTE: *Set Function Selector Switch to AUX.
*Set Volume Control to minimum and set Tone/Balance controls to mid position.
*Set Stereo/Mono Switch to Stereo.
*Speaker Switch to ON.
*Connect 8 ohm (50W) resistor across left and right speaker terminals.

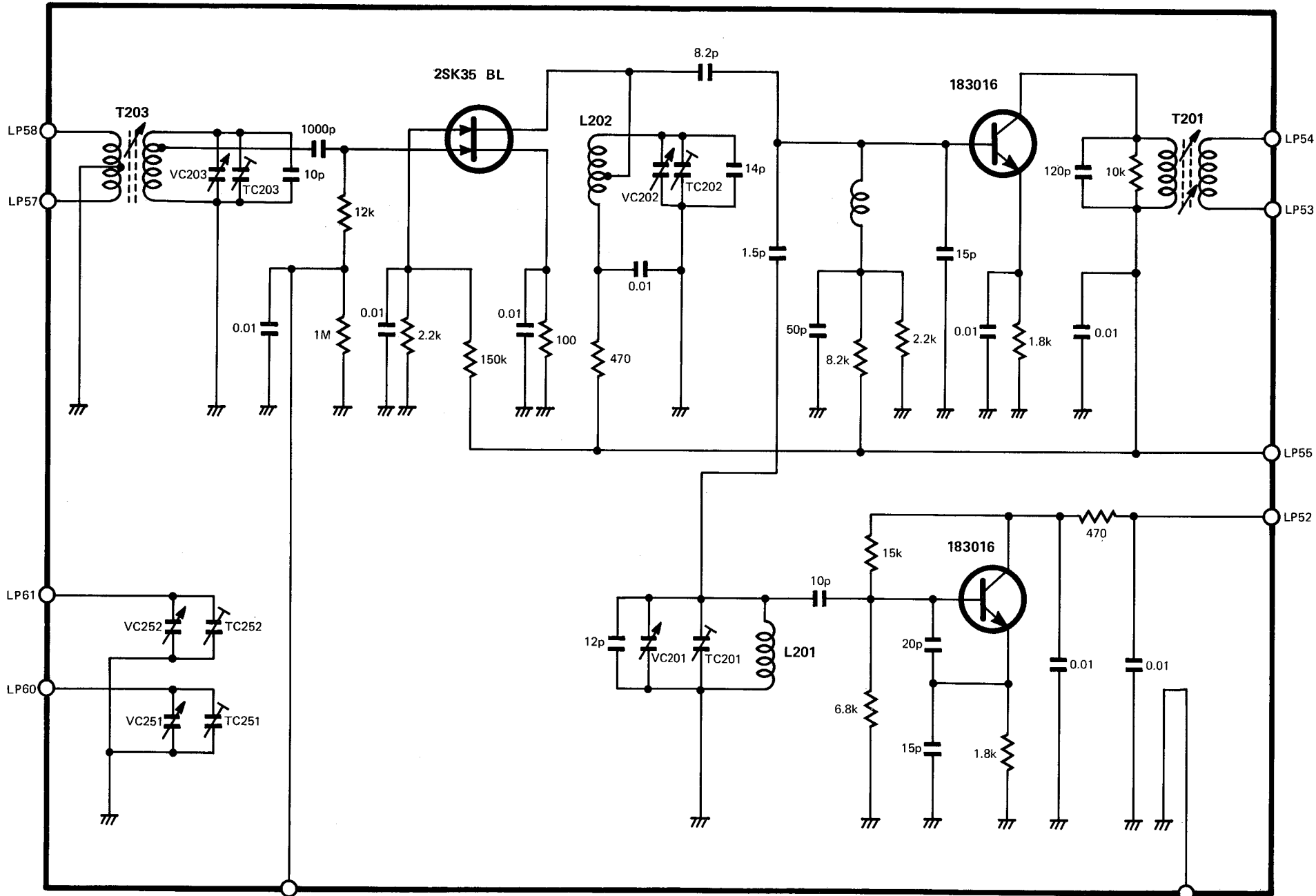
STEP	DC VOLTMETER CONNECTION	ADJUST	ADJUST FOR
1	Across R428 Resistor	VR402	10mV $\pm$ 1mV
2	Across R427 Resistor	VR401	10mV $\pm$ 1mV

TUNING INDICATOR ADJUSTMENT

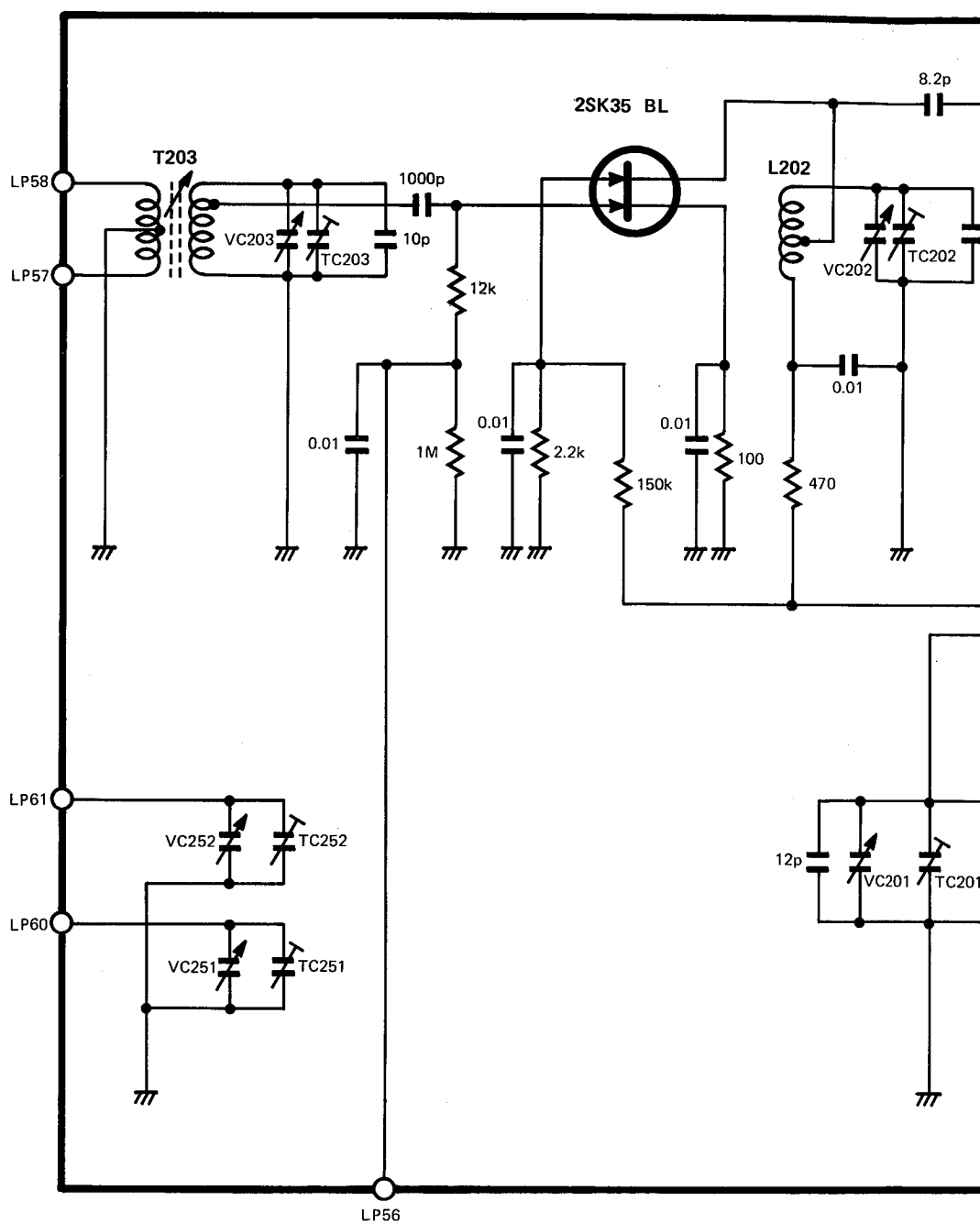
INSTRUMENT: *FM Signal Generator.

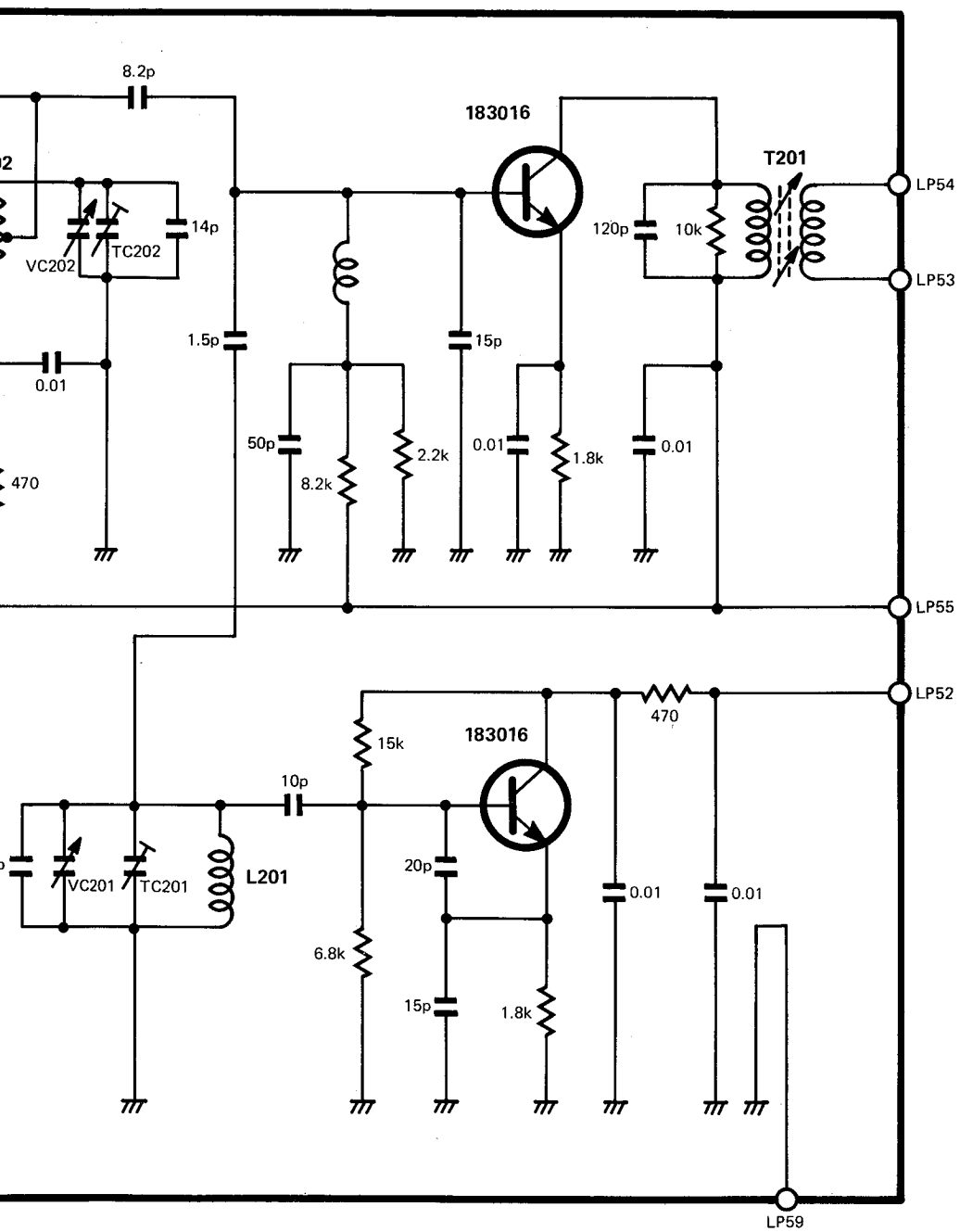
NOTE: *Set Function Selector Switch to FM.
*Connect Signal Source to FM Antenna Terminals.

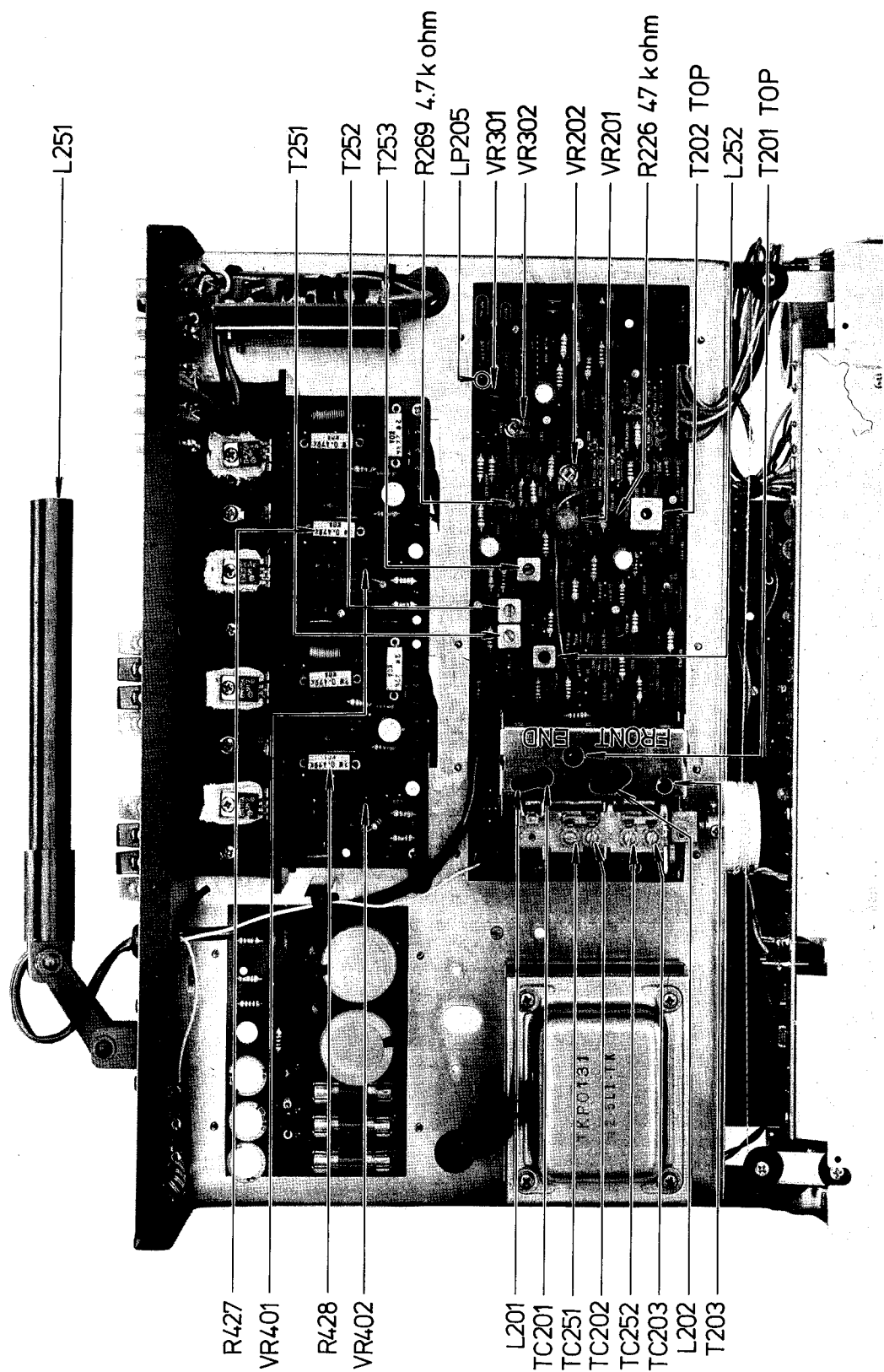
STEP	FREQUENCY	SIGNAL STRENGTH	DIAL SETTING	ADJUST	ADJUST FOR
1	98MHz	1mV(60dB)	Tune for Zero Volts DC at R226 (47 k ohm)	VR201	Maximum Needle Deflection on Tuning Meter
2	Same as Above	Same as Above	Same as Above	VR202	To Indicate 9 on Tuning Meter



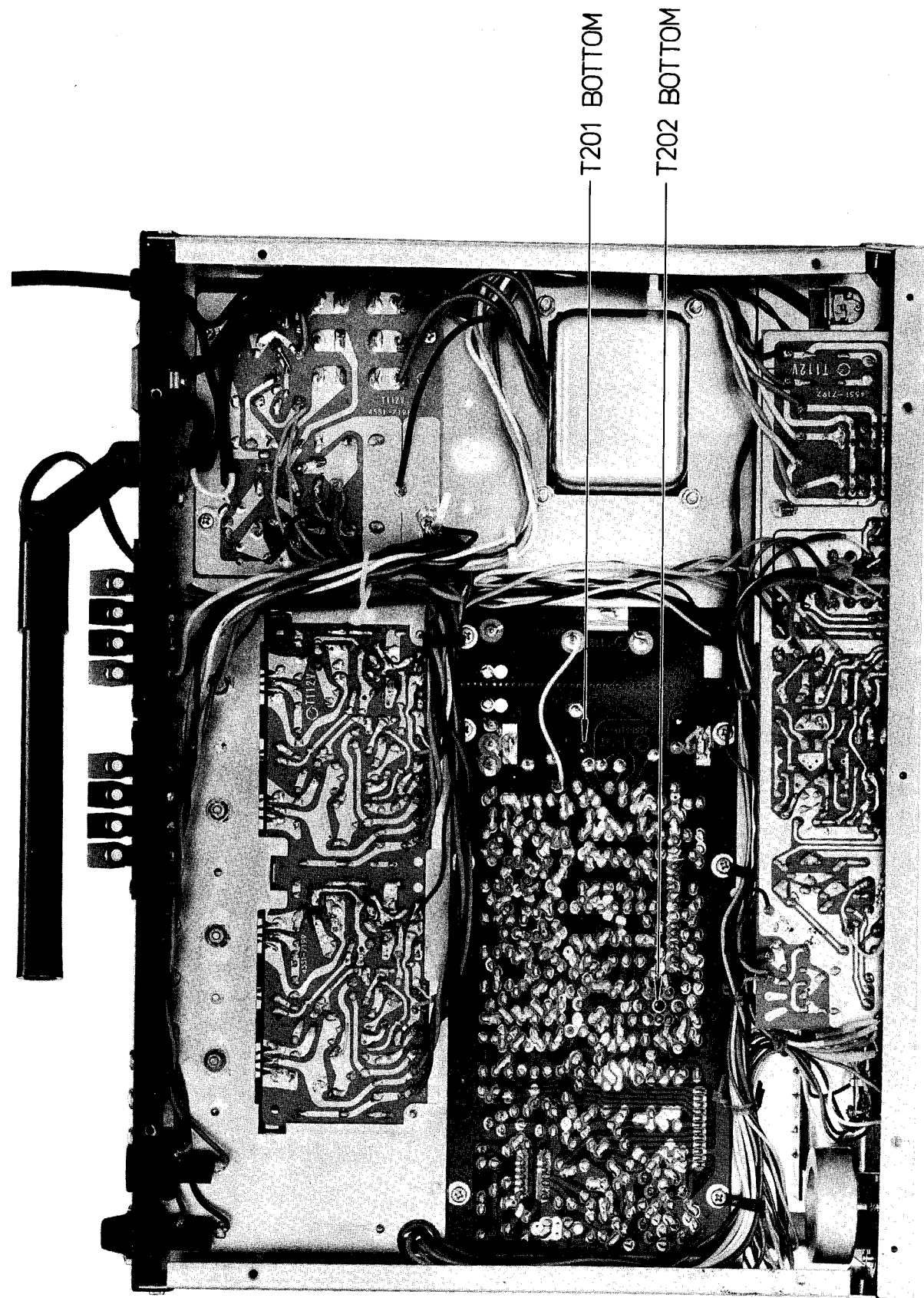
SCHEMATIC DIAGRAM – FRONT END





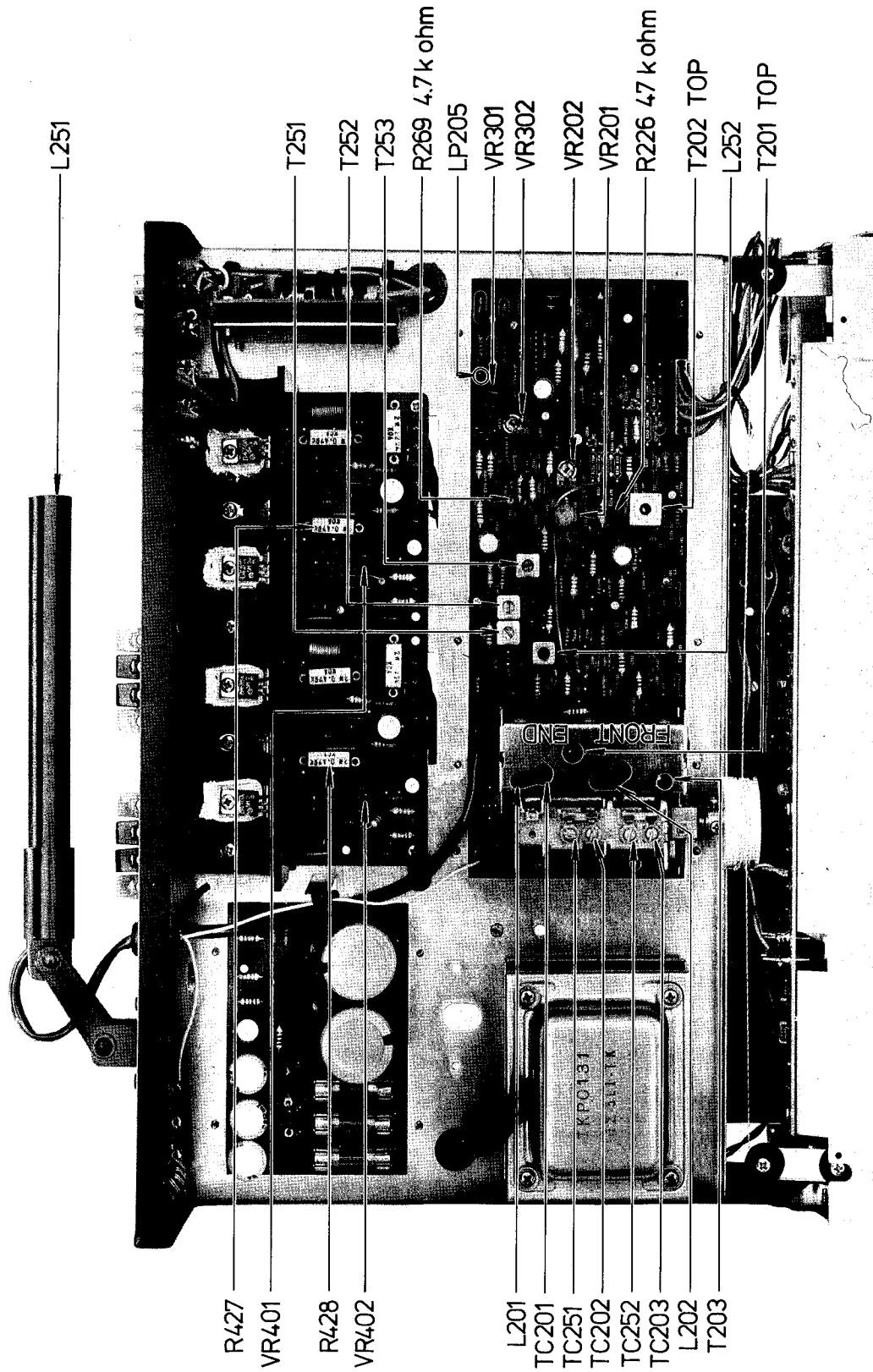


TOP VIEW

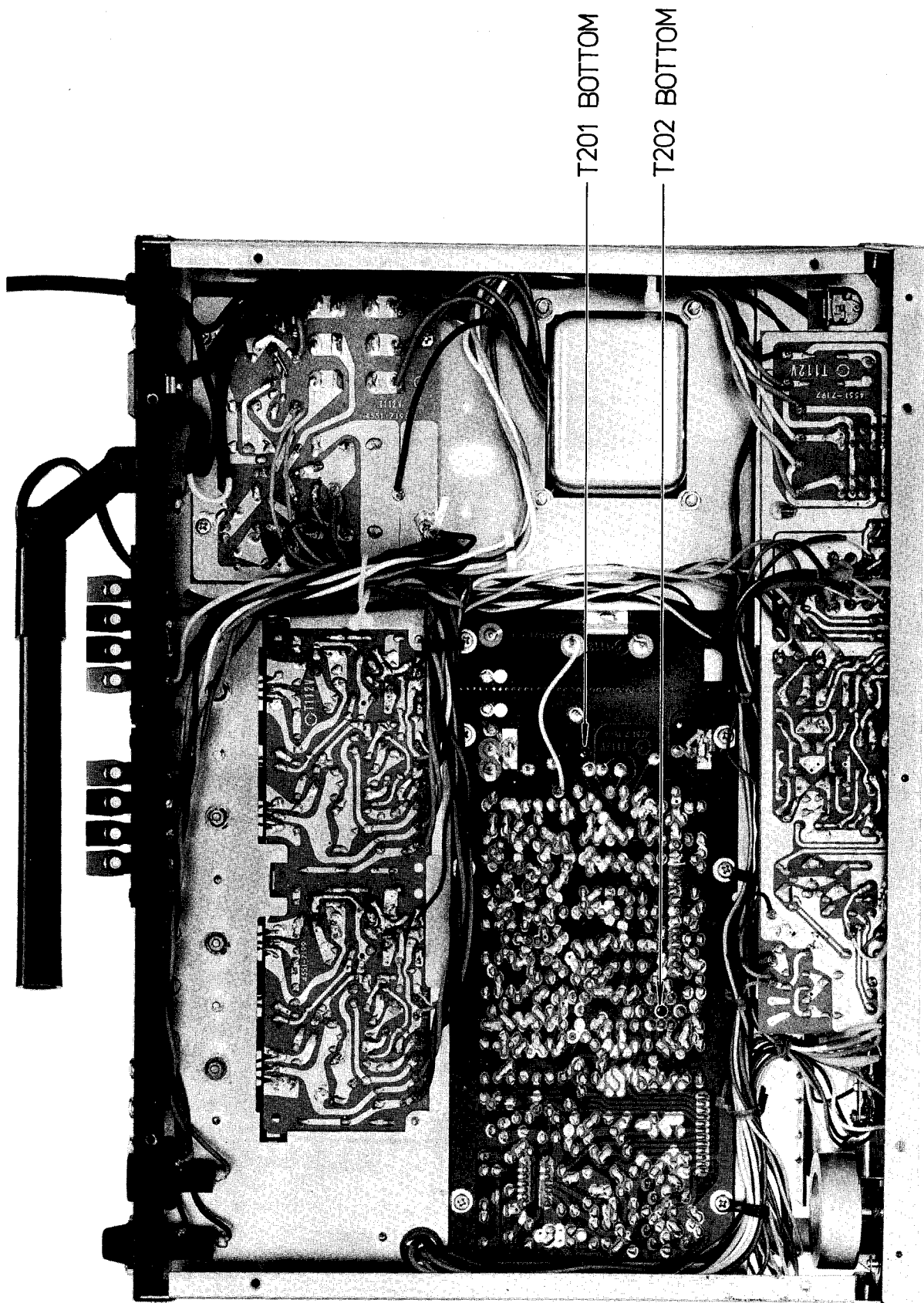


BOTTOM VIEW

ALIGNMENT POINTS



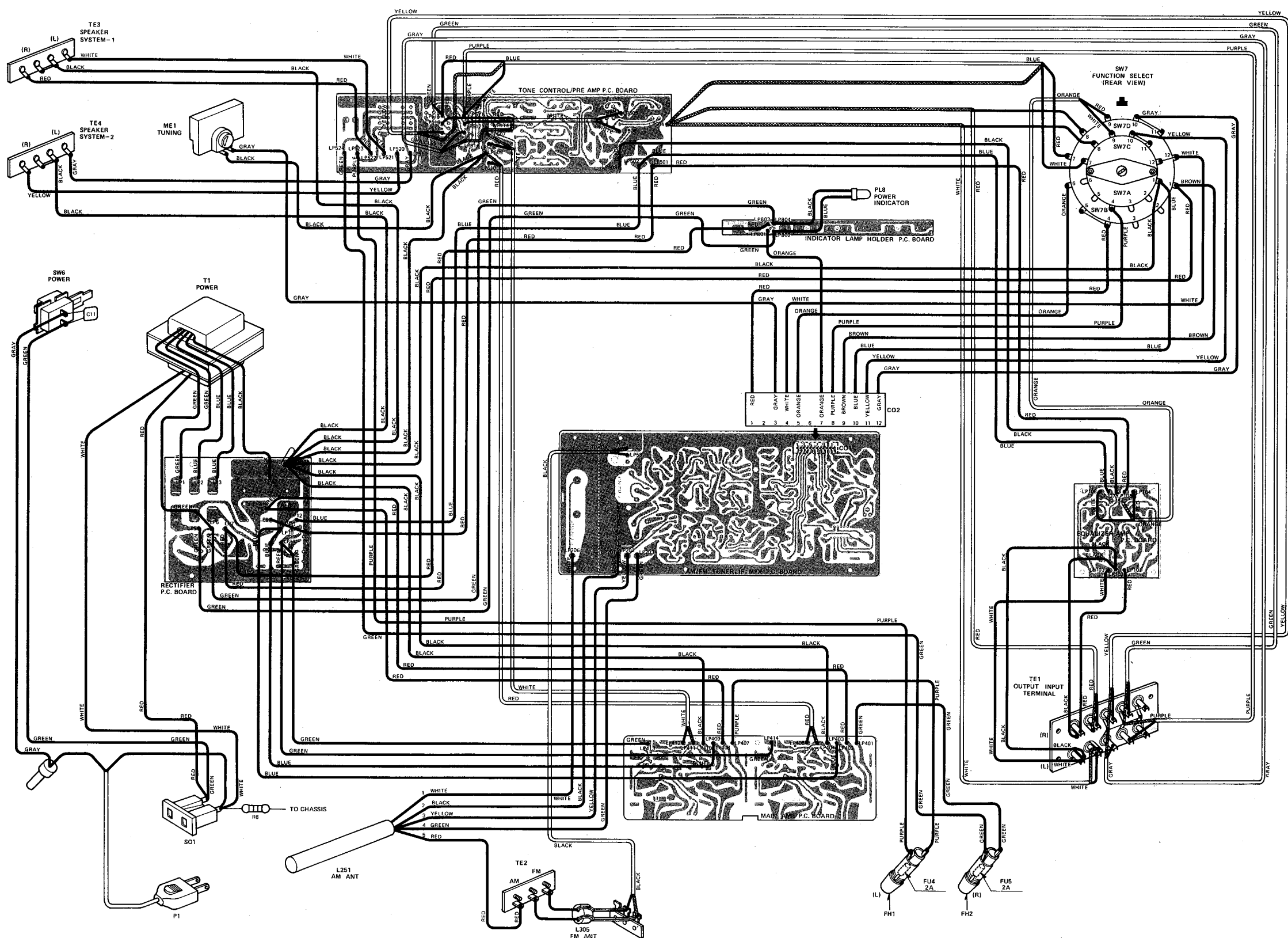
TOP VIEW



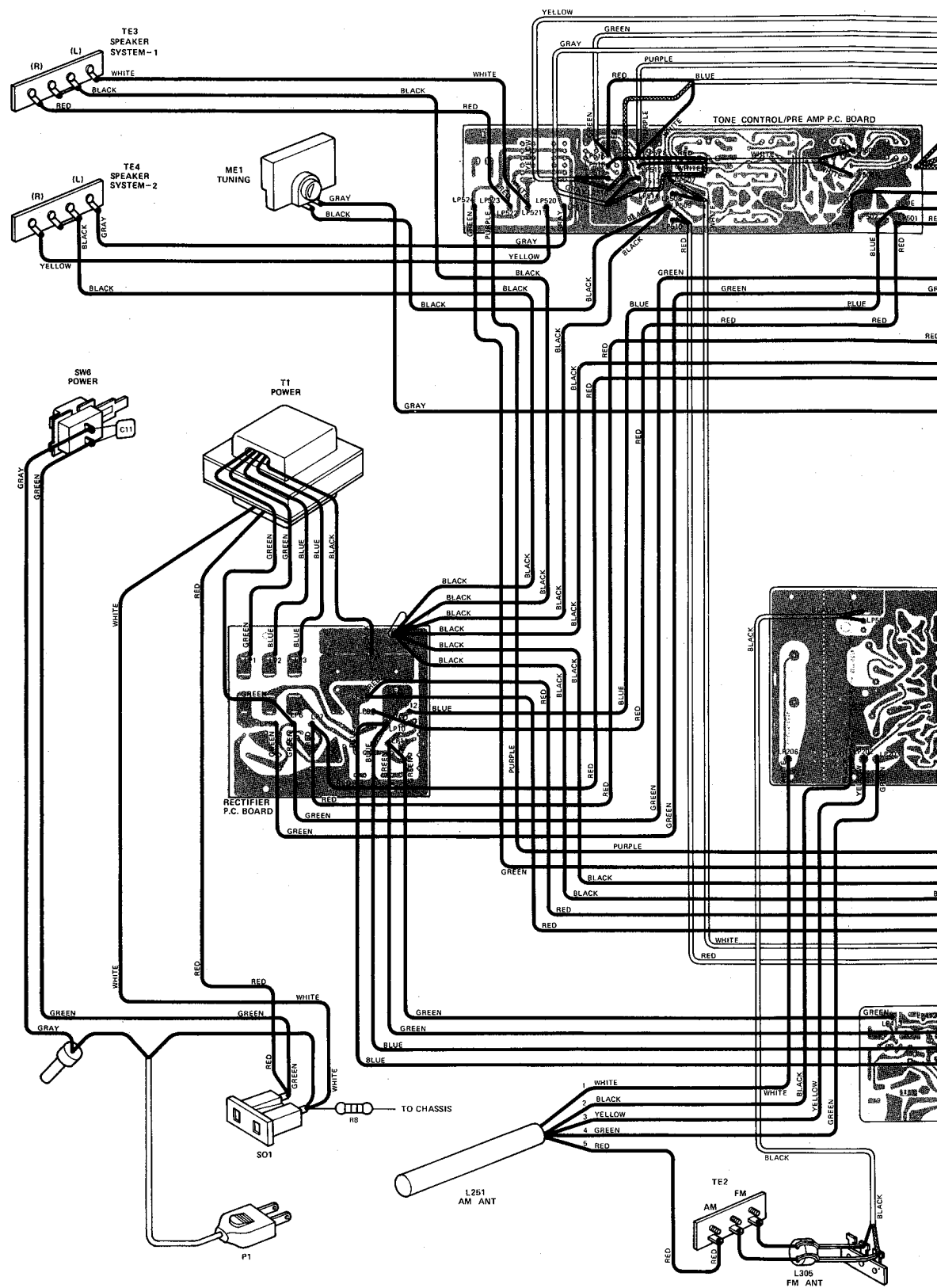
T201 BOTTOM

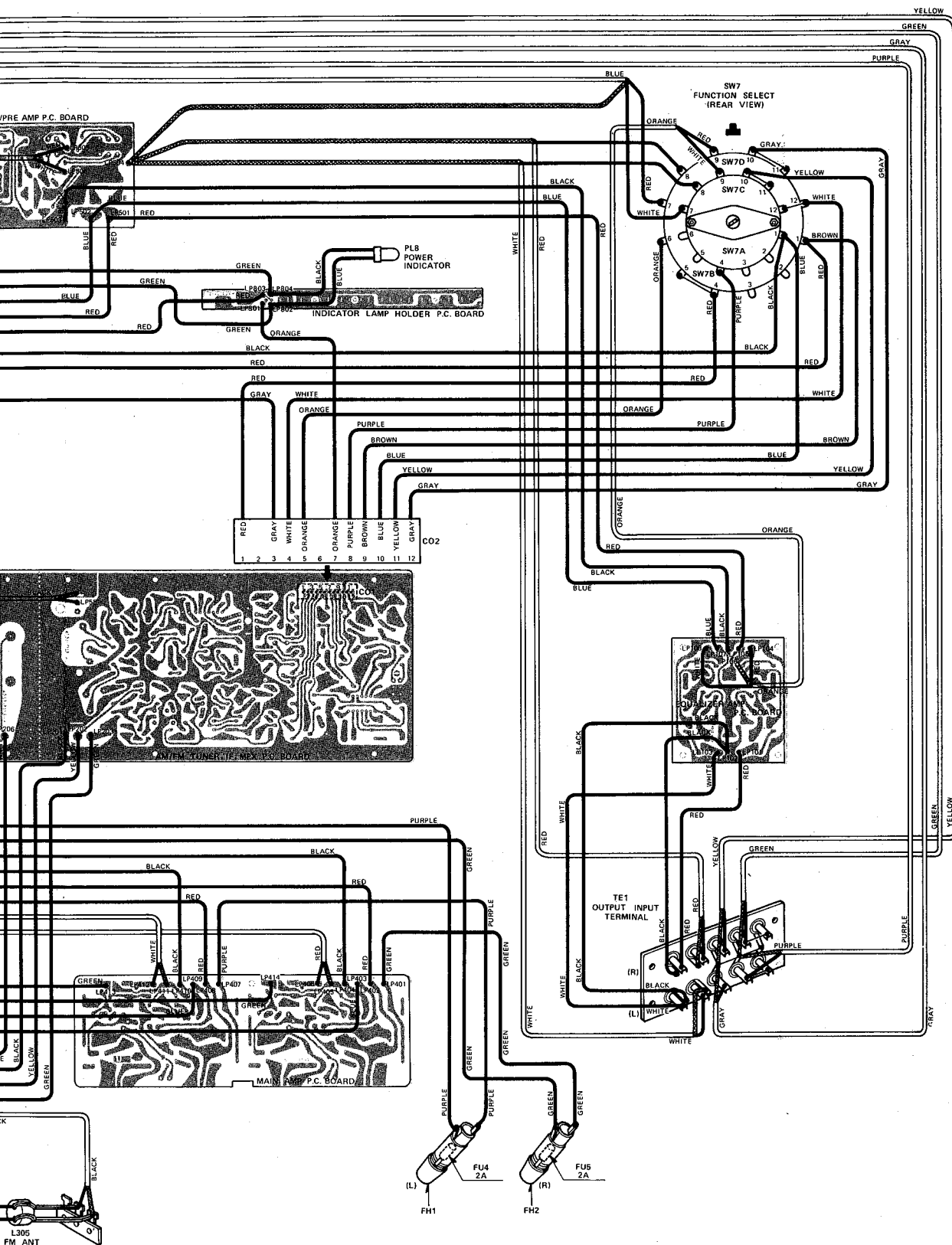
T202 BOTTOM

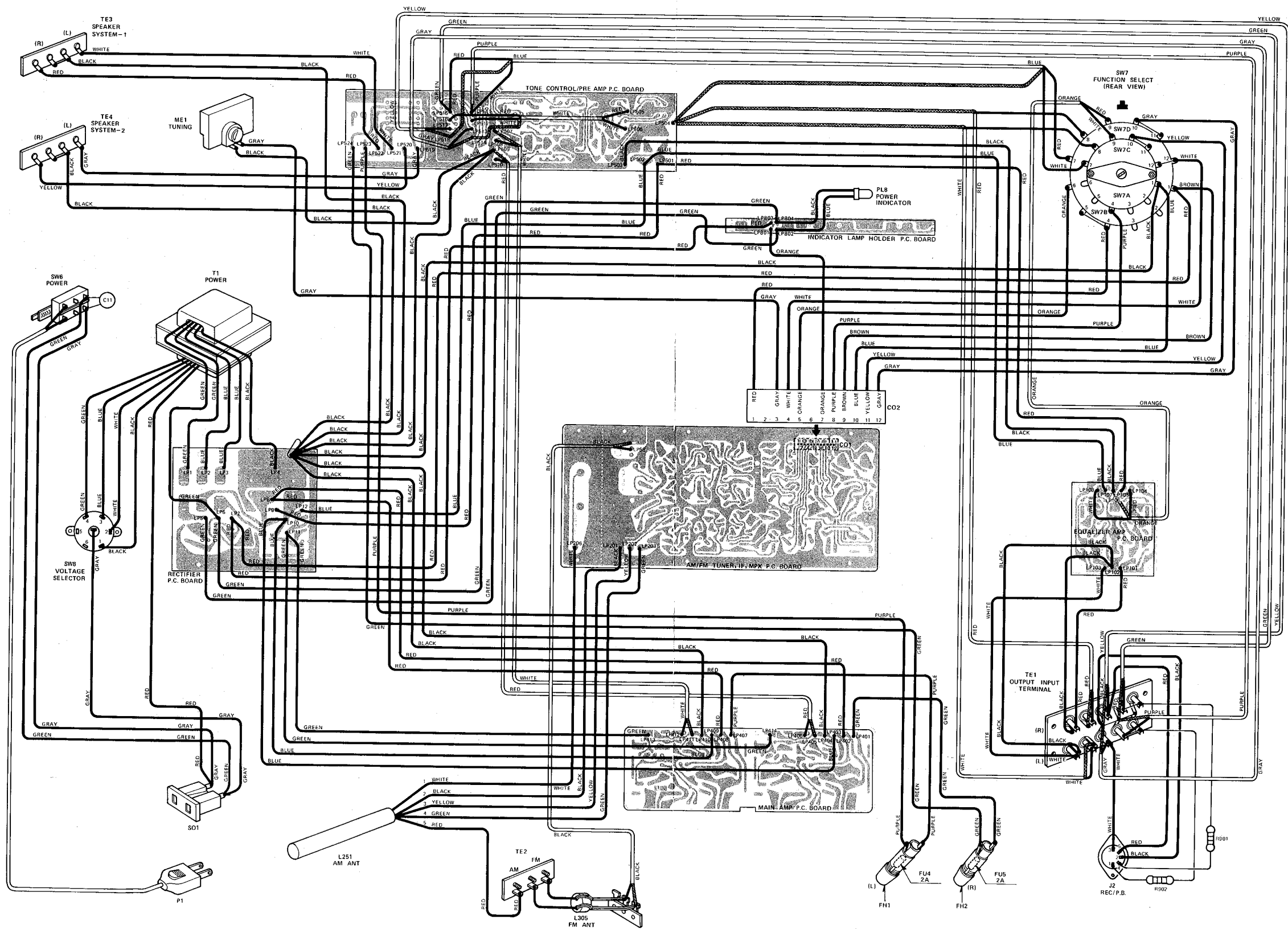
BOTTOM VIEW



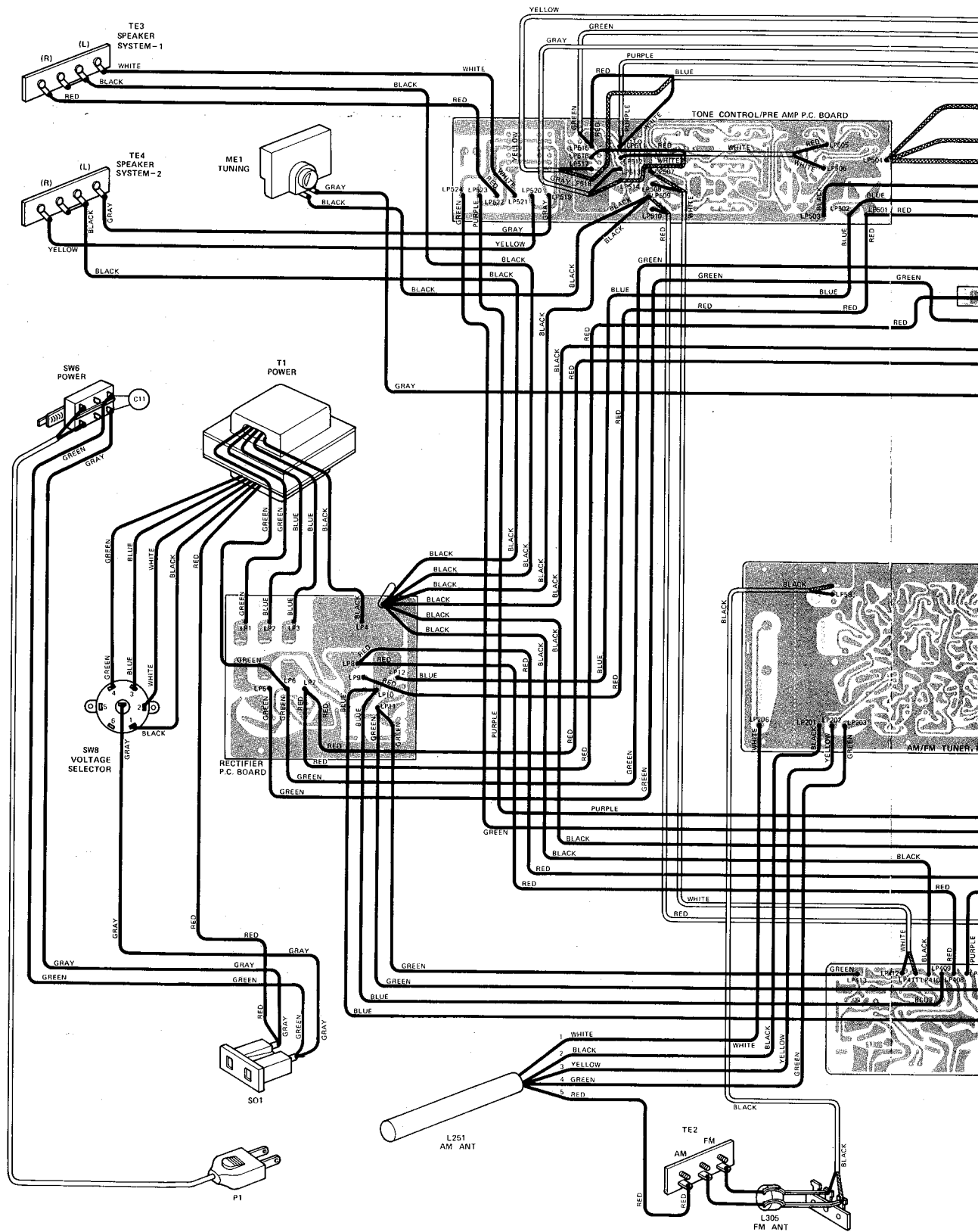
WIRING DIAGRAM – REGULAR

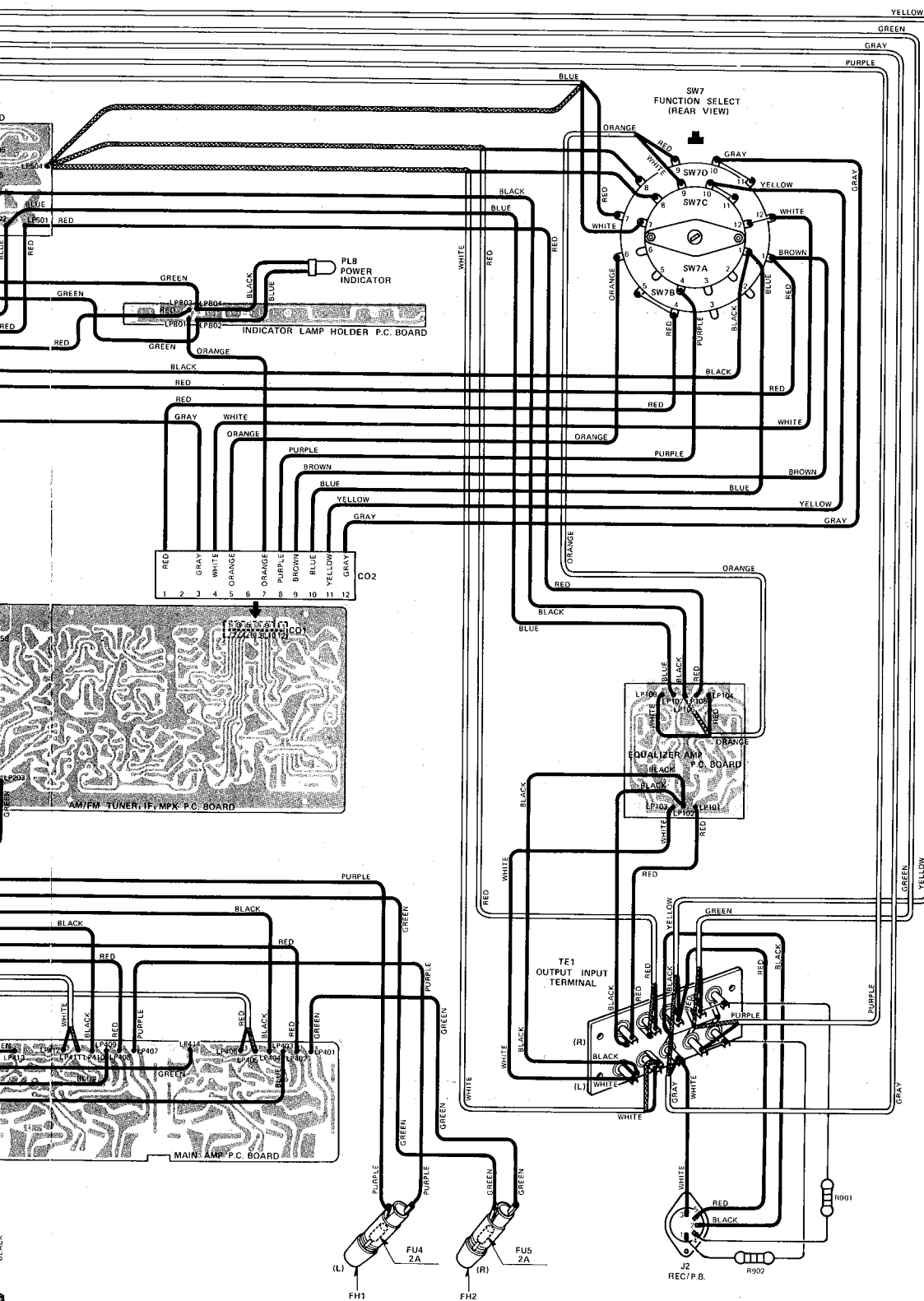




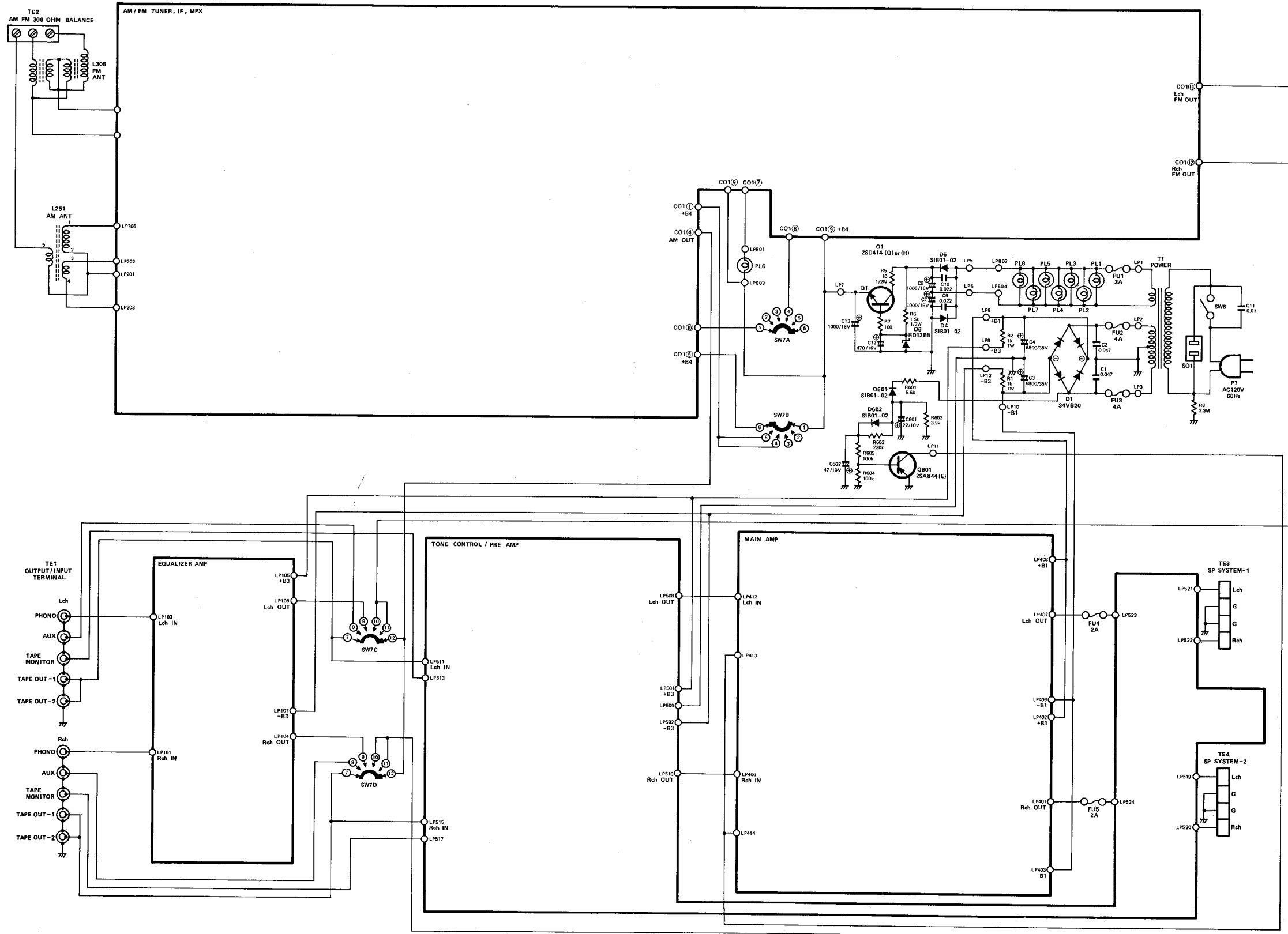


WIRING DIAGRAM – MULTI

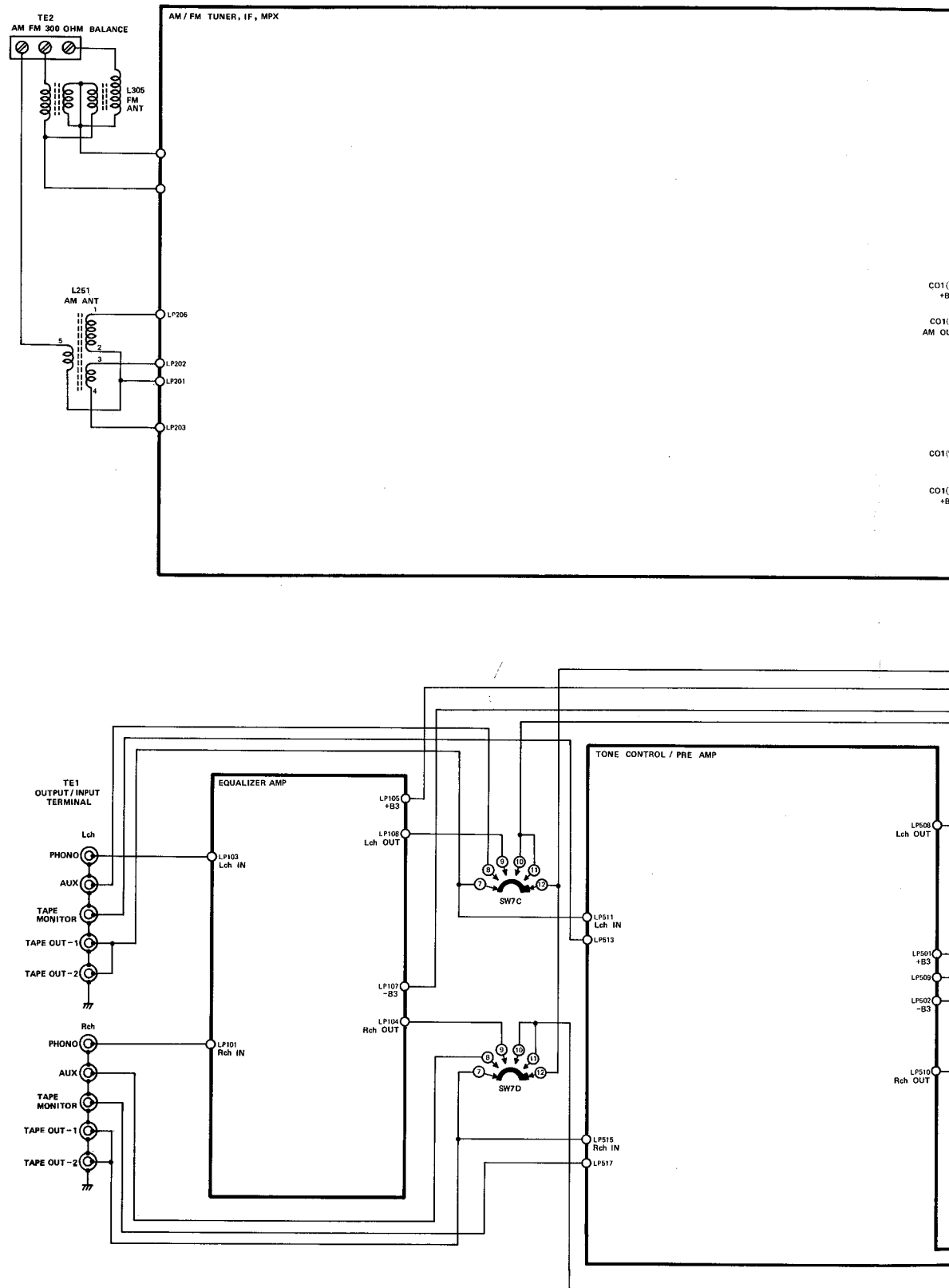


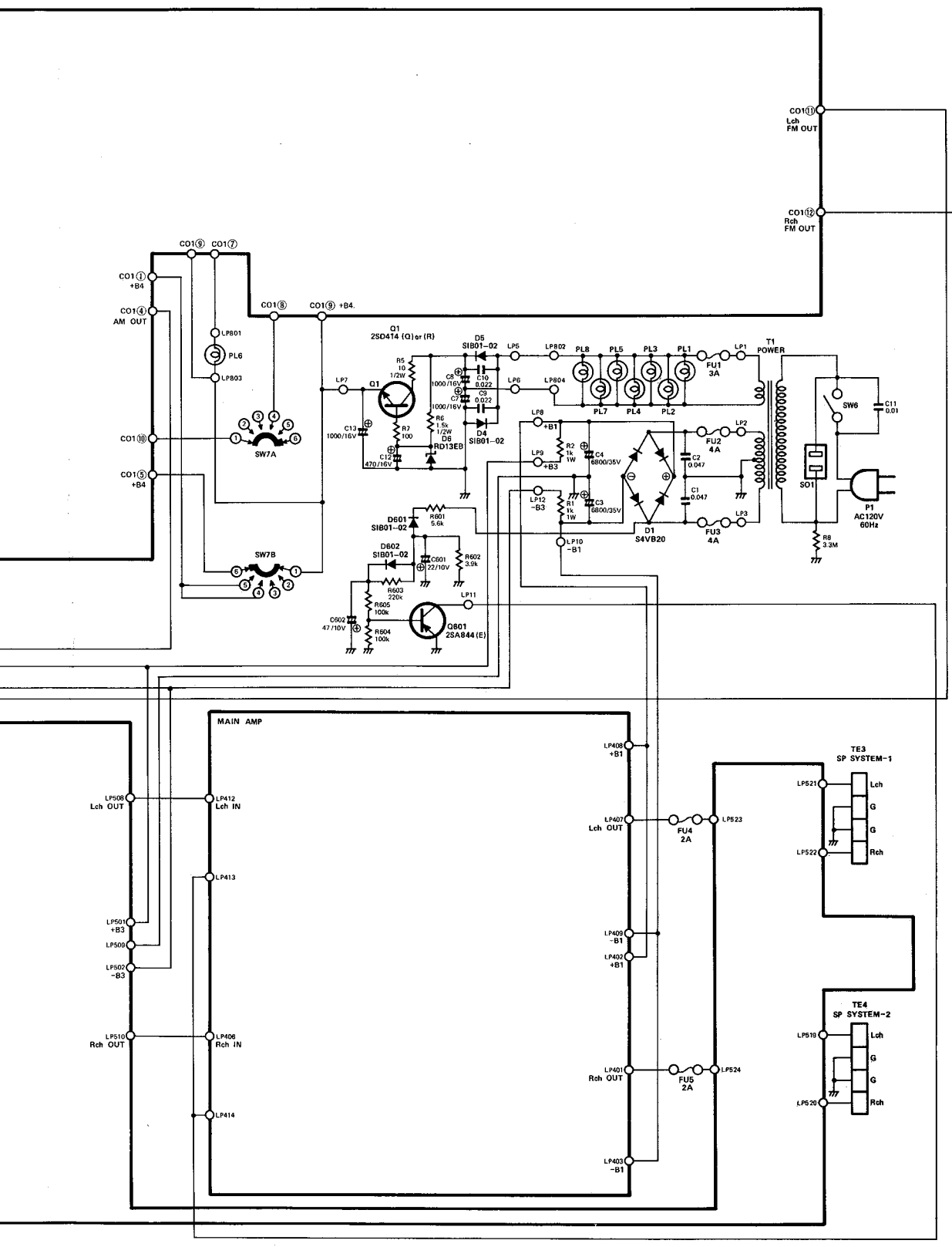


SCHEMATIC DIAGRAM – MODEL 330C SYSTEM INTERCONNECTION – REGULAR

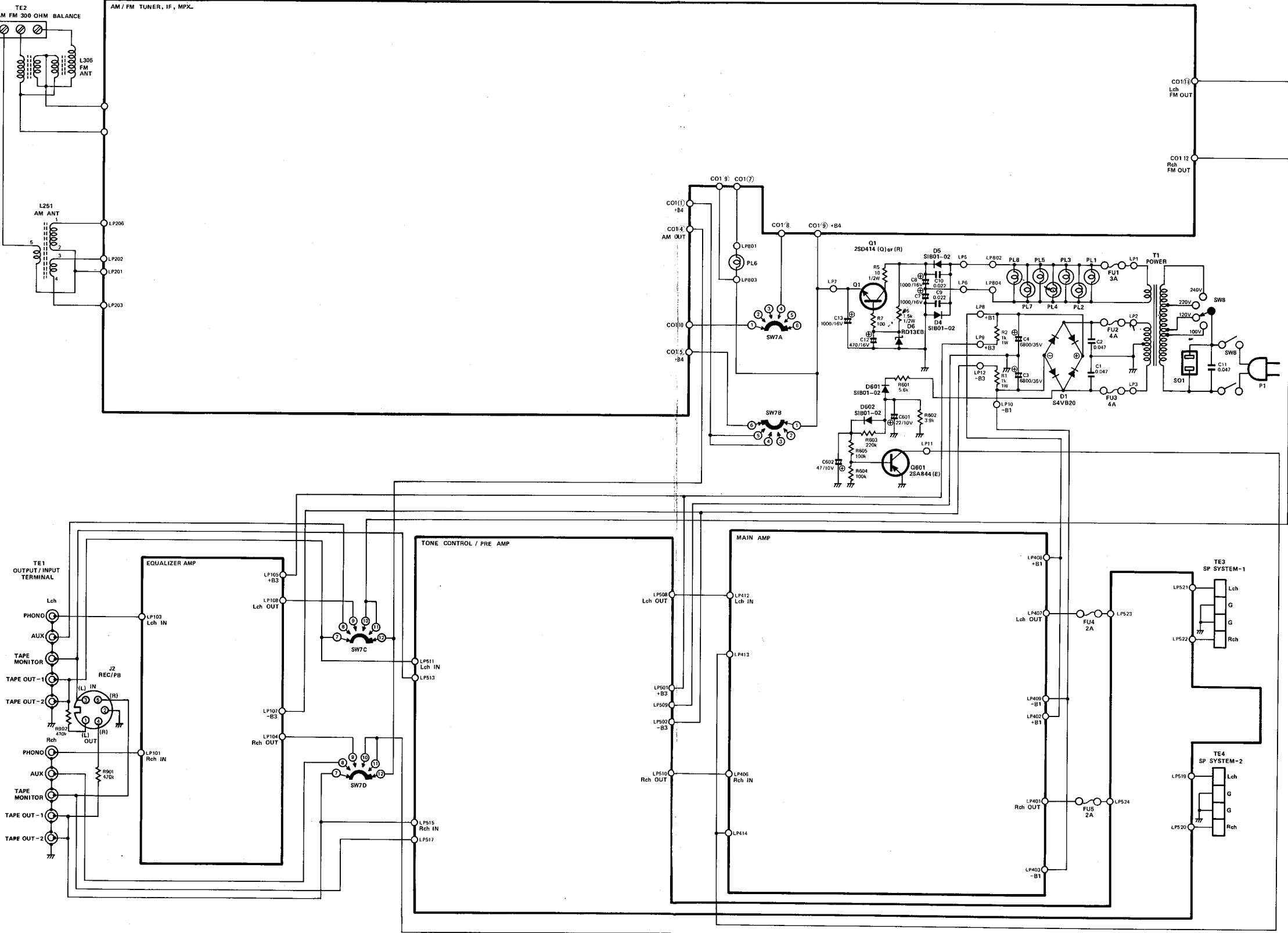


SCHEMATIC DIAGRAM — MODEL 330C SYSTEM INTERCONNECTION — REGULAR

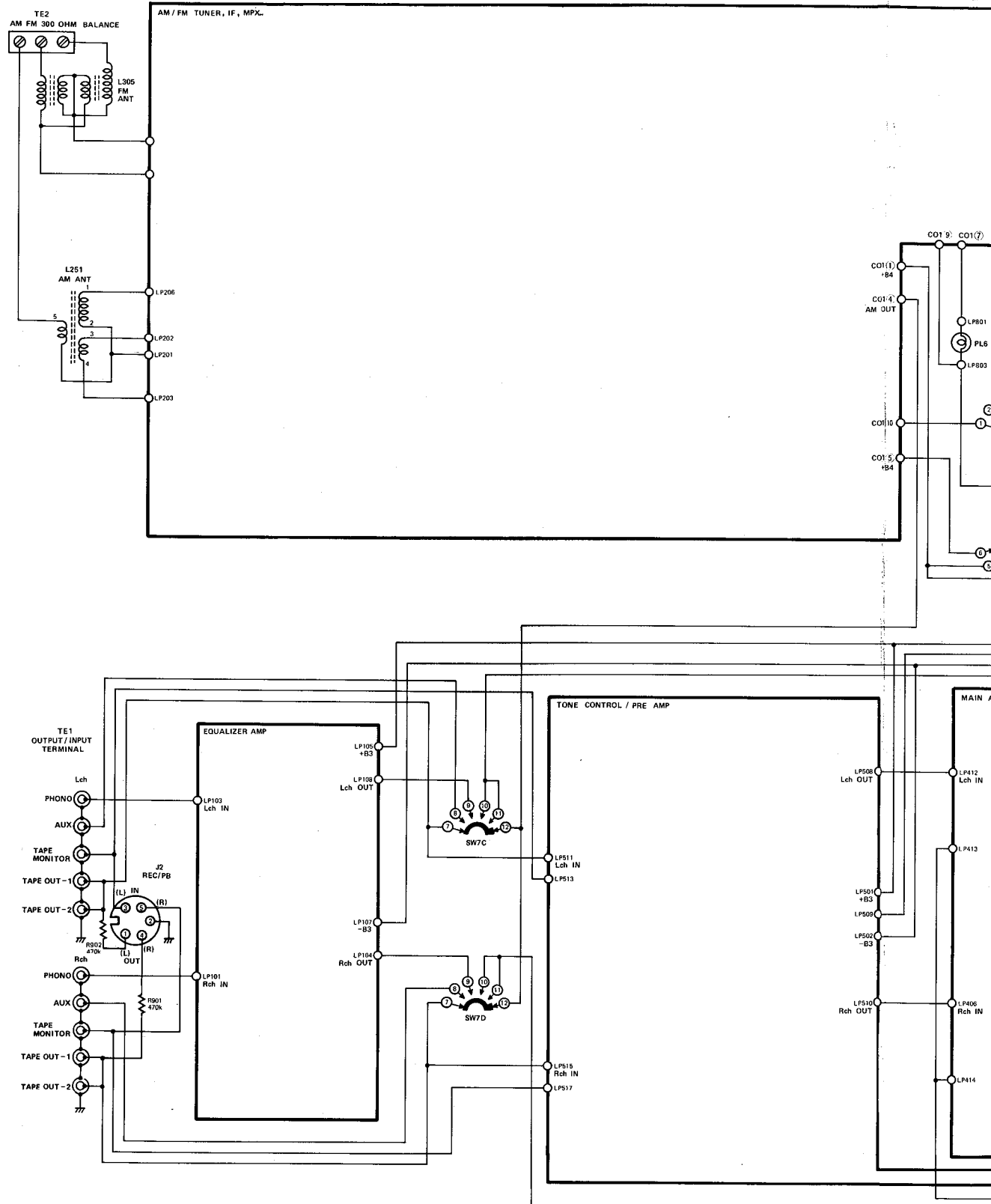


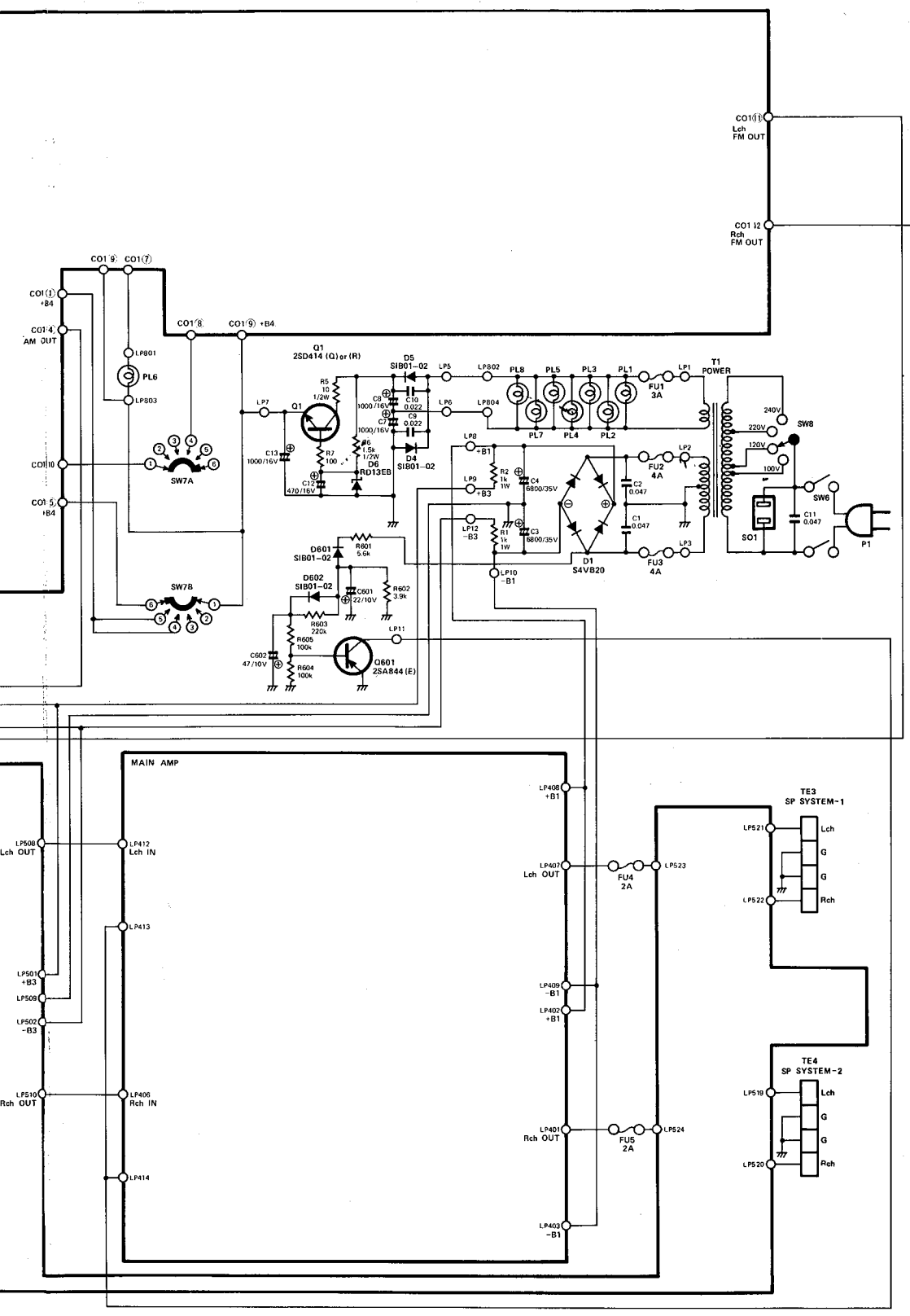


SCHEMATIC DIAGRAM – MODEL 330C SYSTEM INTERCONNECTION – MULTI

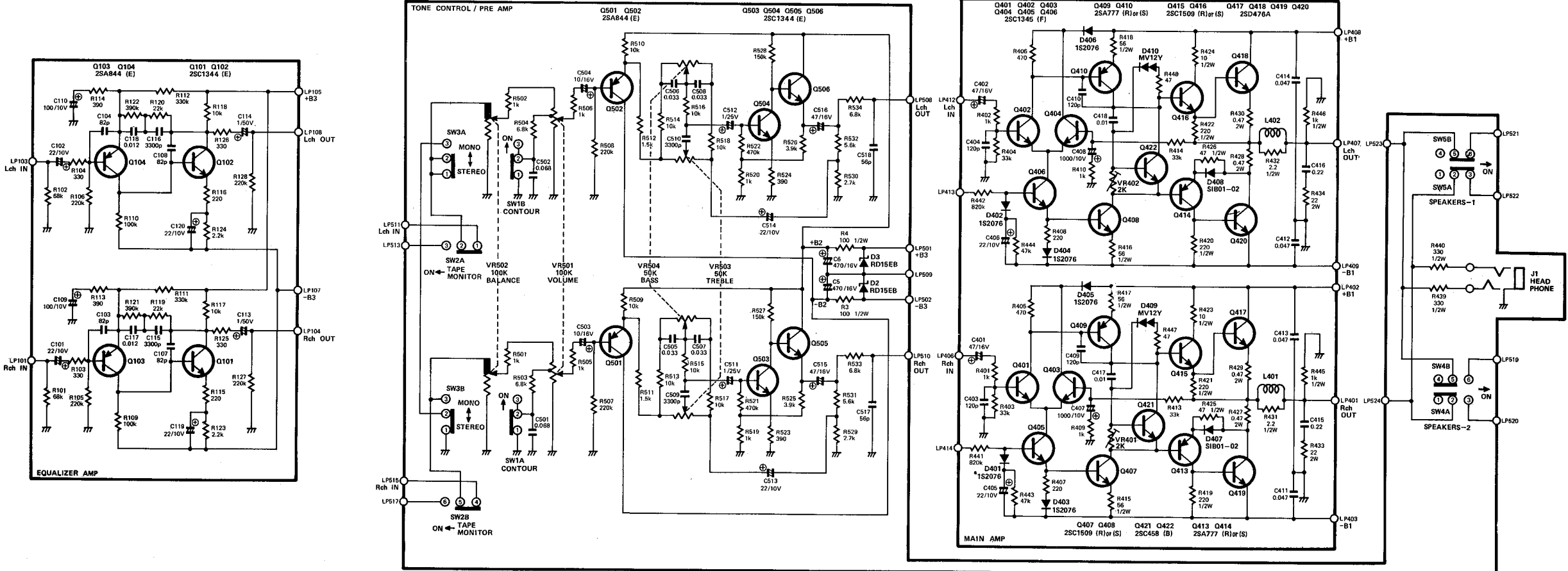
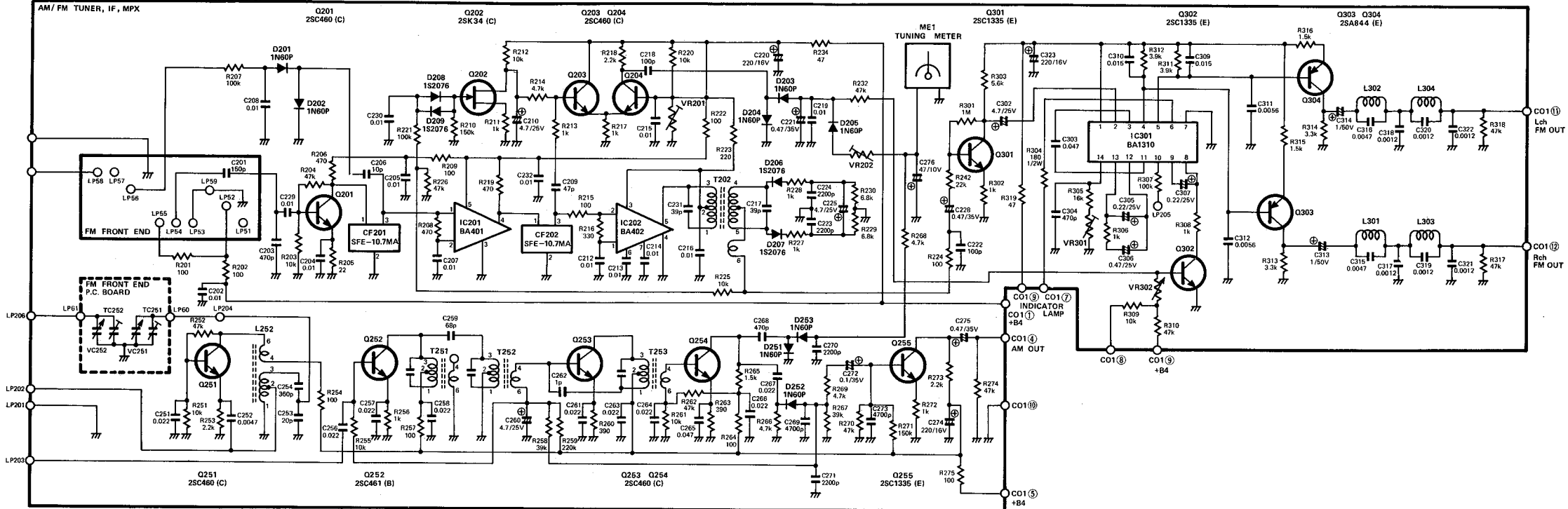


SCHEMATIC DIAGRAM – MODEL 330C SYSTEM INTERCONNECTION – MULTI

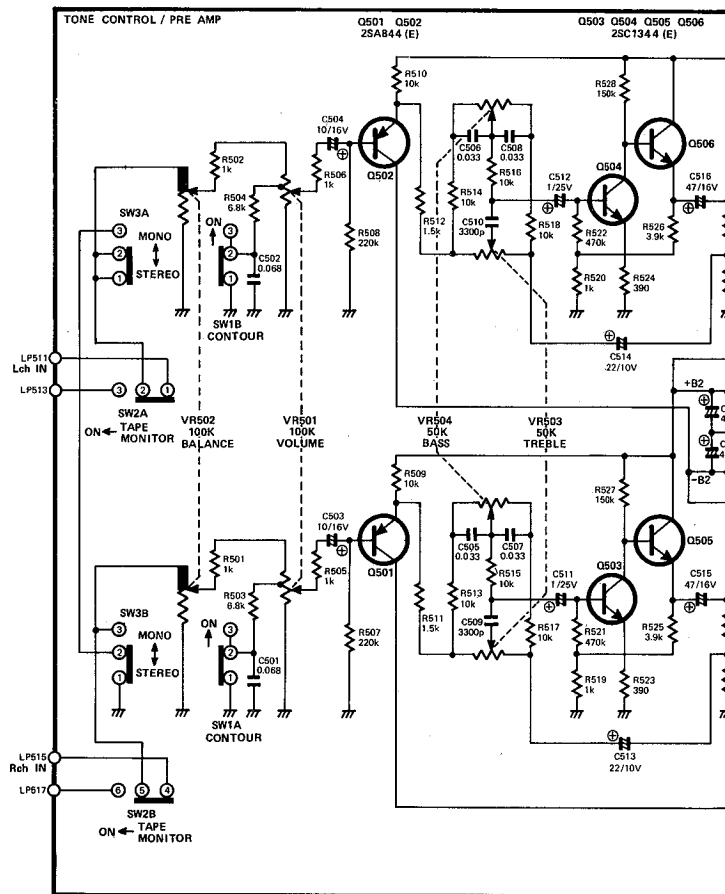
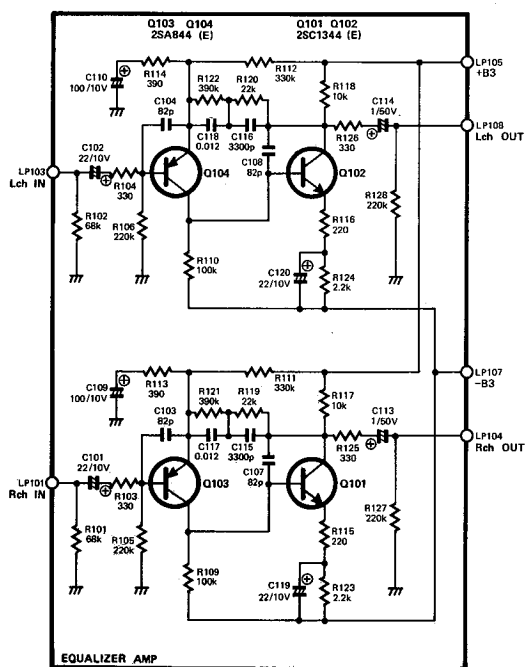
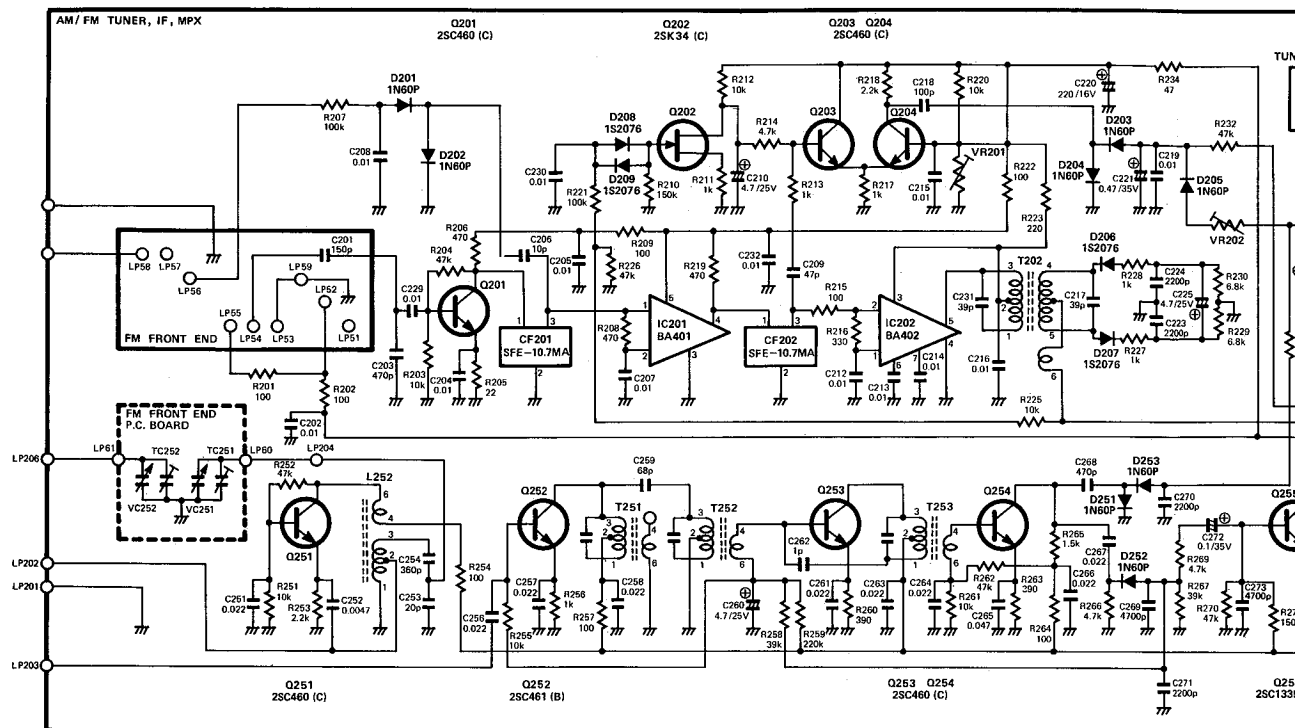




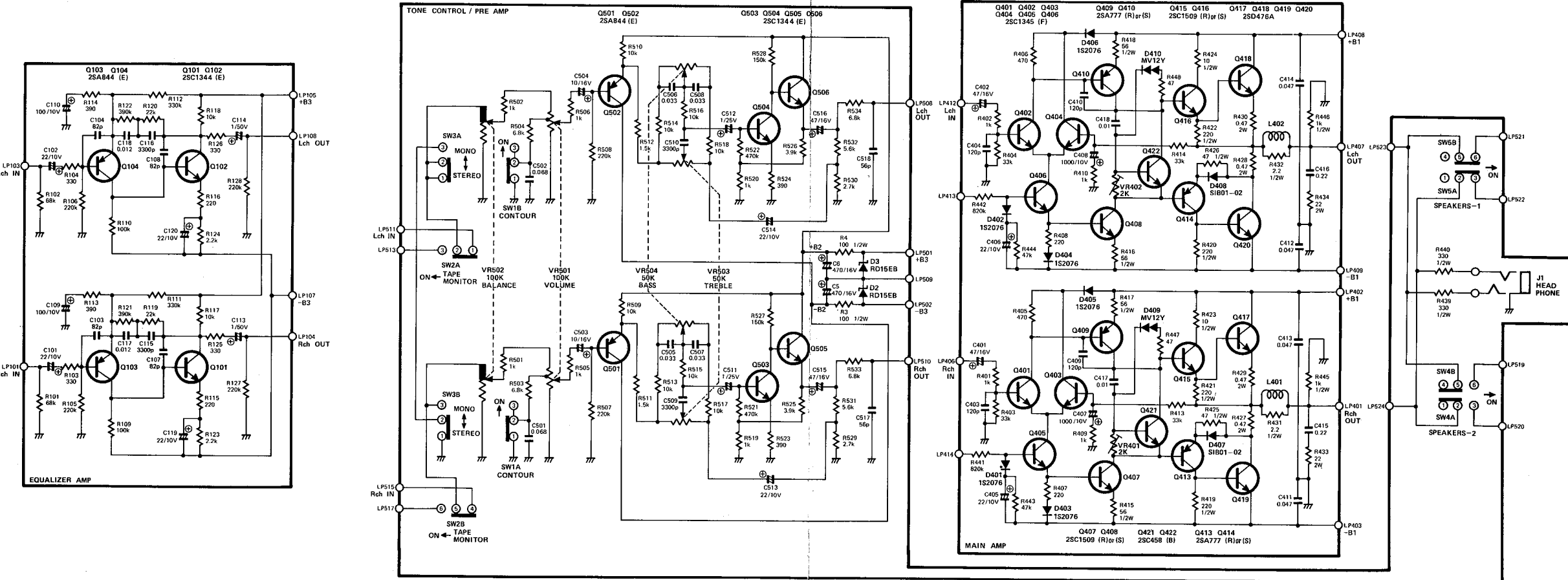
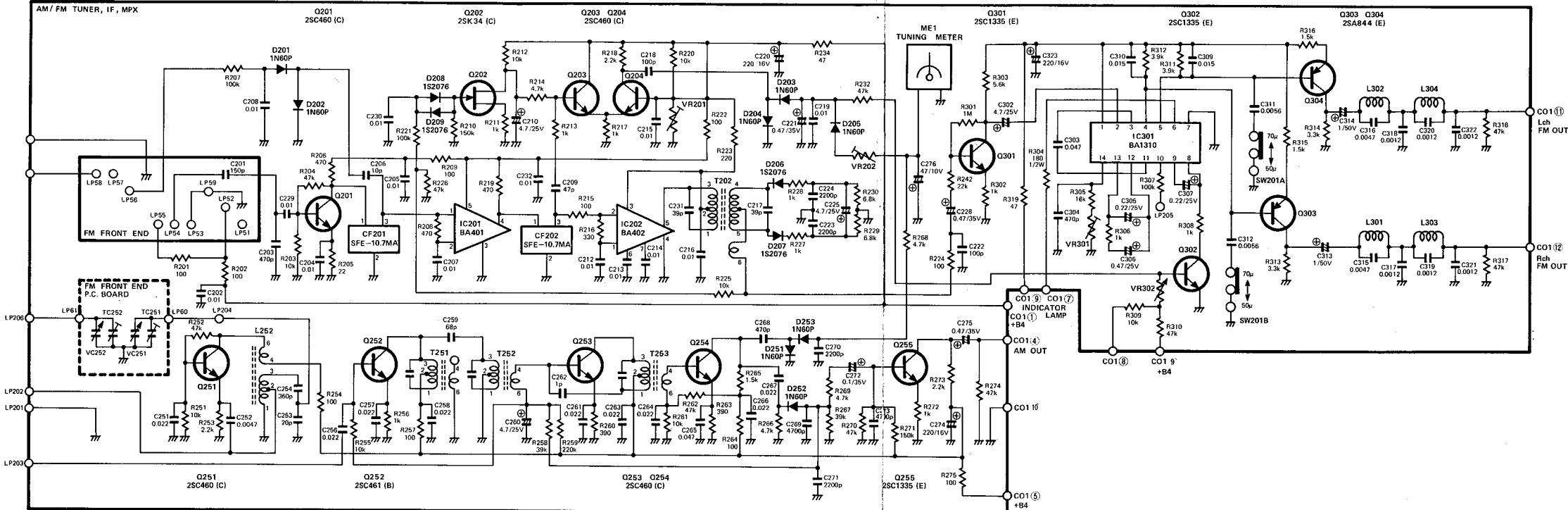
SCHEMATIC DIAGRAM – MODEL 330C REGULAR



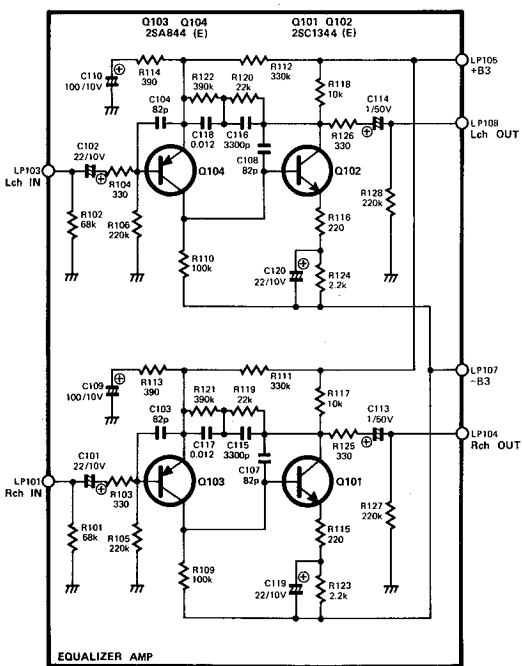
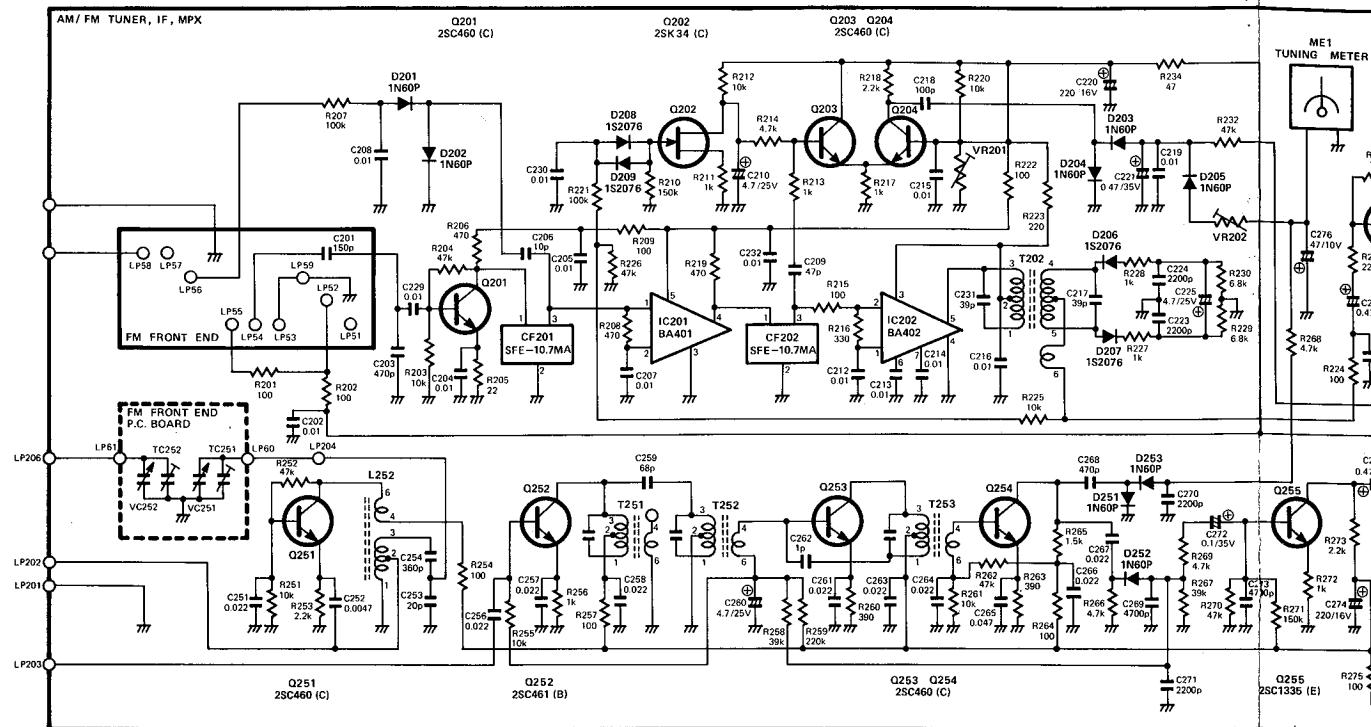
SCHEMATIC DIAGRAM – MODEL 330C REGULAR

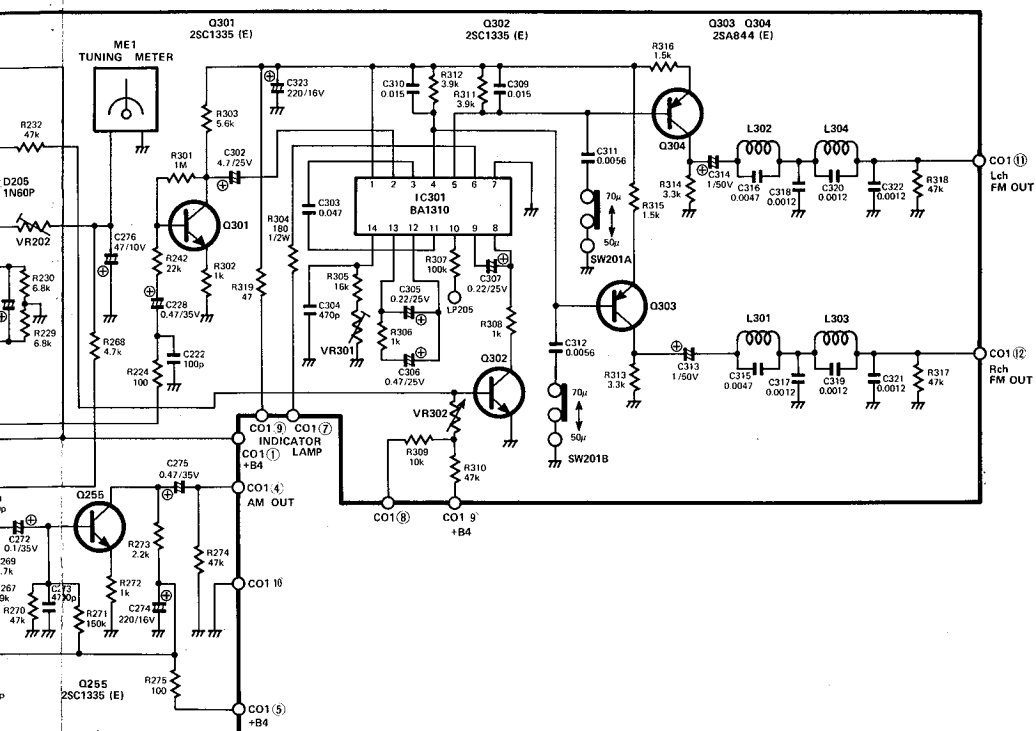


**SCHEM
MULTI**



SCHEMATIC DIAGRAM – MODEL 330C MULTI





SCHEMATIC NOTES AND VOLTAGES

- NOTES:**
1. All resistors are 1/4 watt, $\pm 5\%$, unless noted otherwise. Values are in ohms.
K = 1000 M = 1000K
 2. All capacitance values are in MF unless noted otherwise. PF = MMF
 3. Function selector switch (SW7) is in AM position.

VOLTAGE CHART

AC120V, Volume Control at Minimum, Tone Control at Mechanical Center, No Signal,
Chassis Ground

+B1		+28.50V
+B2		+14.73V
+B3		+15.16V
+B4		+12.50V
-B1		-28.50V
-B2		-14.21V
-B3		-14.48V

FM POSITION

	base	emitter	collector
Q201	+0.79V	+0.12V	+6.19V
Q202	0V (GATE)	+6.06V (DRAIN)	+0.40V (SOURCE)
Q203	+5.91V	+5.25V	+10.39V
Q204	+5.88V	+5.23V	+8.54V
Q301	+1.72V	+1.09V	+4.80V
Q302	+0.64V	0V	+0.009V
Q303,Q304	+8.02V	+8.66V	+4.82V
Q1	+12.25V	+11.66V	+17.35V
Q601	-0.56V	0V	-36.65V
Q101,102	-10.36V	-11.01V	+0.91V
Q103,104	+0.01V	+0.55V	-10.36V
Q501,502	+0.51V	+1.13V	-14.21V
Q503,504	+0.59V	+0.03V	+3.89V
Q505,506	+3.88V	+3.28V	+14.73V
Q401,402	-0.05V	-0.63V	+27.12V
Q403,404	-0.05V	-0.63V	+27.12V
Q405,406	-26.55V	-27.20V	-0.63V
Q407,408	-27.21V	-27.75V	-0.71V
Q409,410	+27.21V	+27.75V	+1.20V
Q413,414	-0.71V	-0.13V	-27.77V
Q415,416	+1.21V	+0.62V	+28.40V
Q417,418	+0.62V	+0.02V	+28.40V
Q419,420	-27.89V	-28.55V	0V
Q421,422	0V	-0.70V	+1.21V

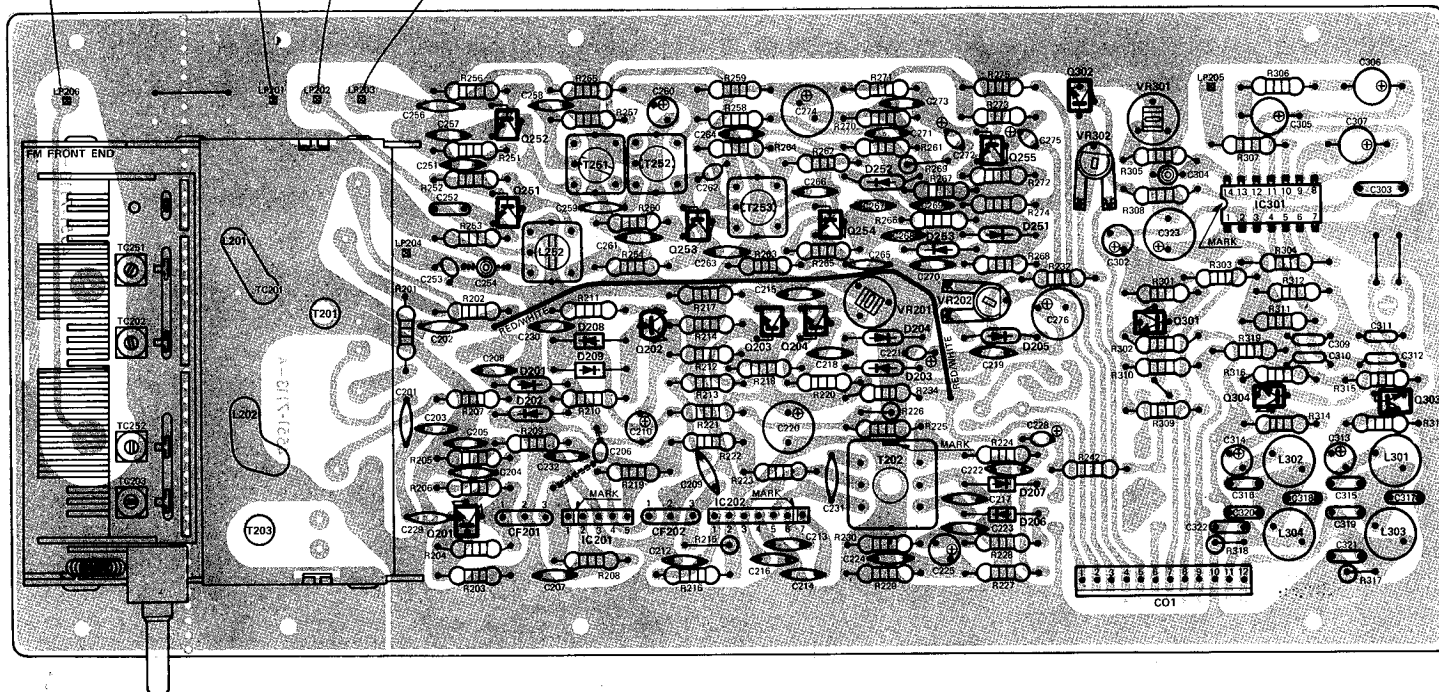
AM POSITION

	base	emitter	collector
Q251	+1.85V	+1.31V	+10.86V
Q252	+1.05V	+0.55V	+10.89V
Q253	+1.15V	+0.48V	+10.93V
Q254	+1.68V	+1.02V	+6.85V
Q255	+2.46V	+1.83V	+6.96V
IC 201			
	1. +1.36V	1. +2.03V	
	2. +1.36V	2. +2.03V	
	3. 0V	3. +8.40V	
	4. +8.56V	4. 0V	
	5. +9.24V	5. +8.12V	
		6. +2.04V	
		7. +2.03	
IC 301			
	1. +10.84V	10. +1.65V	
	2. +3.76V	11. +2.25V	
	3. +5.05V	12. +2.45V	
	4. +8.02V	13. +2.46V	
	5. +8.03V	14. +2.97V	
	6. +11.66V		
	7. 0V		
	8. +0.11V		
	9. +12.40V		

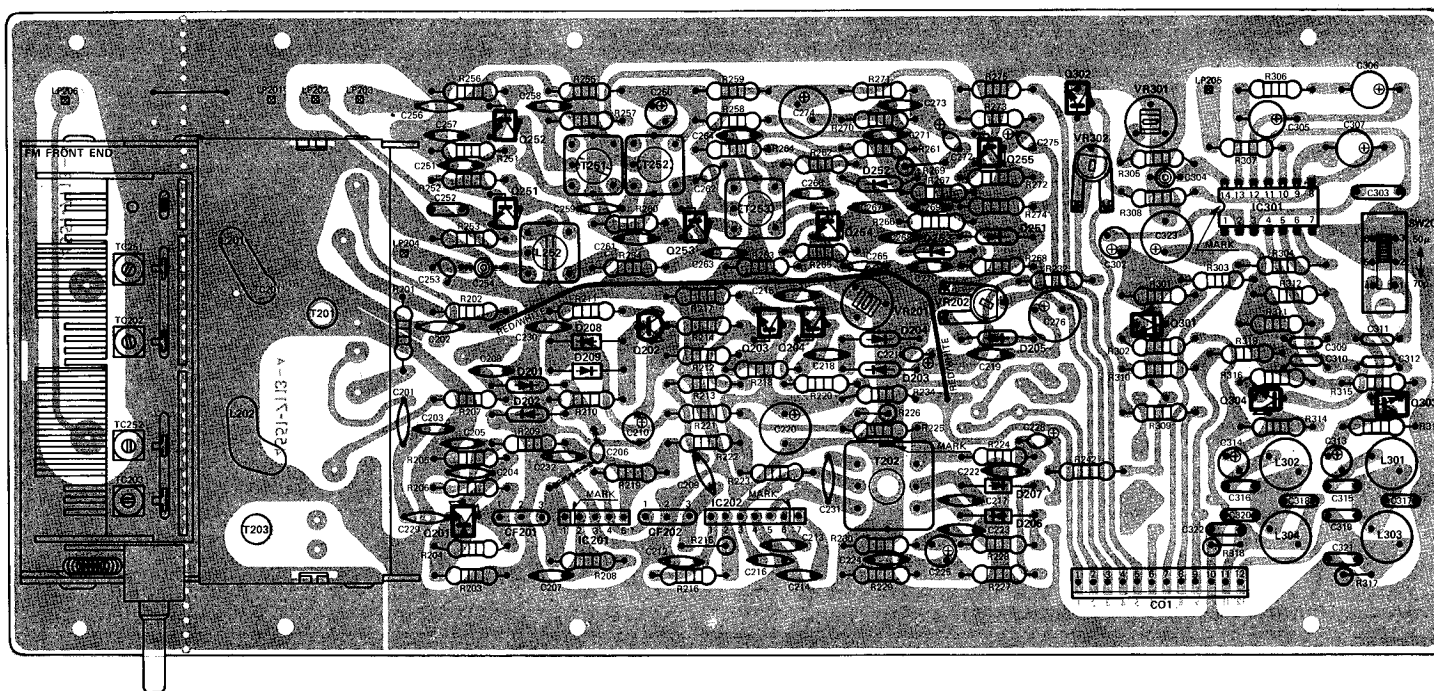
**AM/FM TUNER, IF, MPX,
PC BOARD**

CIRCUIT REF NO.	H/K PART NO.	DESCRIPTION
	00132761	PC Bd Assy, AM/FM Tuner, IF, MPX
RESISTOR		
VR201	23531305	Variable, 22K
VR202	23530559	Variable, 10K
VR301	23530554	Variable, 4.7K
VR302	23532750	Variable, 250K
CAPACITOR		
CF201, 202	12030549*	Filter, Ceramic, SFE-10.7MA
TRANSISTOR		
Q201	43029472*	2SC460(C), FM IF Amp
Q202	43031311*	2SK34(C), F.E.T. Center Zero Research
Q203, 204	43029472*	2SC460(C), Differential Amp
Q251, 253, 254	43029472*	2SC460(C), AM Osc, AM IF Amp
Q252	43029471*	2SC461(B), AM Mix
Q255	43030569*	2SC1335(E), AM IF Amp
Q301, 302	43030569*	2SC1335(E) MPX Amp, Mono-Stereo Switching
Q303, 304	43031312*	2SA844(E), MPX Output Amp
INTEGRATED CIRCUIT		
IC201	43131313*	BA401, FM IF Amp
IC202	43131314*	BA402, FM IF Amp
IC301	43128071*	BA1310, MPX
DIODE		
D201, 202, 203	41029290*	1N60P
204, 205, 251, 252, 253	41030552*	1S2076
D206, 207, 208 209	41030552*	1S2076
INDUCTOR		
L252	12031316	AM Oscillator
L301, 302, 303 304	12031317	19 kHz, 39 kHz Trap (15MH)
TRANSFORMER		
T202	11031318	Discriminator
T251, 252	11030556	AM IF
T253	11030557	AM IF
MISCELLANEOUS		
C01	65432751	Connector, 12 Pin

WHT. REGULAR BLK YELLOW GREEN

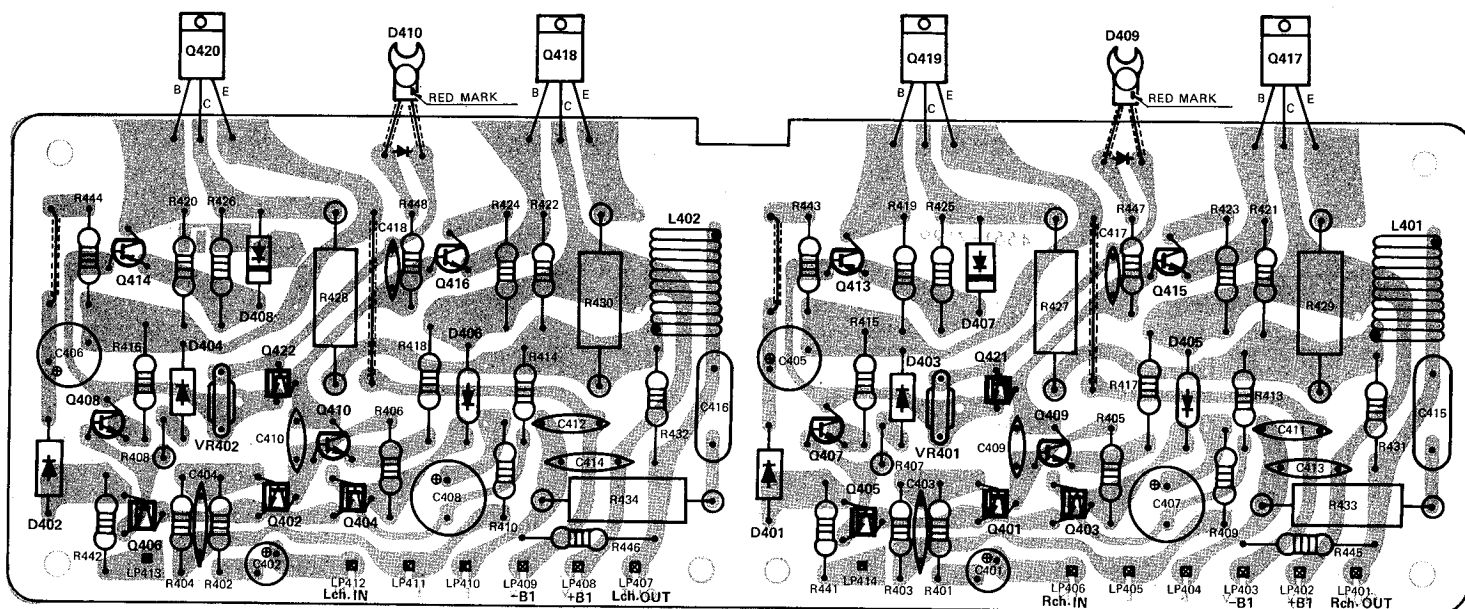


MULTI



MAIN AMP PC BOARD

CIRCUIT REF NO.	H/K PART NO.	DESCRIPTION
	00132762	PC Bd Assy, Main Amp
RESISTOR		
VR401, 402	23532752	Variable, 2K
TRANSISTOR		
Q401, 402, 403 404	43029483*	2SC1345(F), Differential Amp
Q405, 406 Q407, 408	43029483* 43029484*	2SC1345(F), Current Regulator 2SC1509(R) or (S), Current Regulator
Q409, 410 Q413, 414 Q415, 416 Q417, 418, 419 420	43029485* 43029485* 43029484* 43032753	2SA777(R) or (S), Driver 2SA777(R) or (S), Complement 2SC1509(R) or (S), Complement 2SD476A, Power Amp
Q421, 422	43027379*	2SC458(B), Bias Stabilization
DIODE		
D401, 402, 403 404, 405, 406	41030552	1S2076
D407, 408 D409, 410	41631295 41631340	SIB01-02 Varistor, MV12Y



**TONE CONTROL/PRE AMP
PC BOARD**

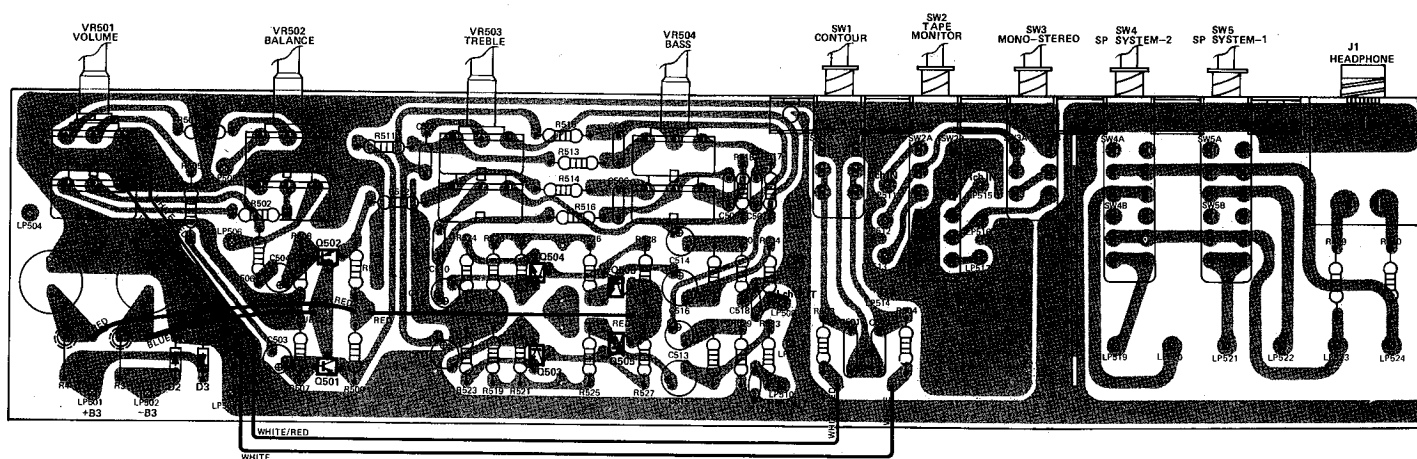
CIRCUIT REF NO.	H/K PART NO.	DESCRIPTION
	00132763	PC Bd Assy, Tone Control Pre Amp
RESISTOR		
VR501	22032754	Variable, 100K, Volume Control
VR502	22032755	Variable, 100K, Balance Control
VR503	22032756	Variable, 50K, Treble Control
VR504	22032756	Variable, 50K, Bass Control
TRANSISTOR		
Q501, 502	43031312*	2SA844(E), Pre-Amp
Q503, 504, 505	43028535*	2SC1344(E), Pre-Amp
DIODE		
D2, 3	42032757	Zener, RD15EB
MISCELLANEOUS		
SW1, 2, 3, 4, 5	25032758	Pushbutton, Switch, Contour, Tape Monitor, Mono-Stereo, Speakers-2 and Speakers-1

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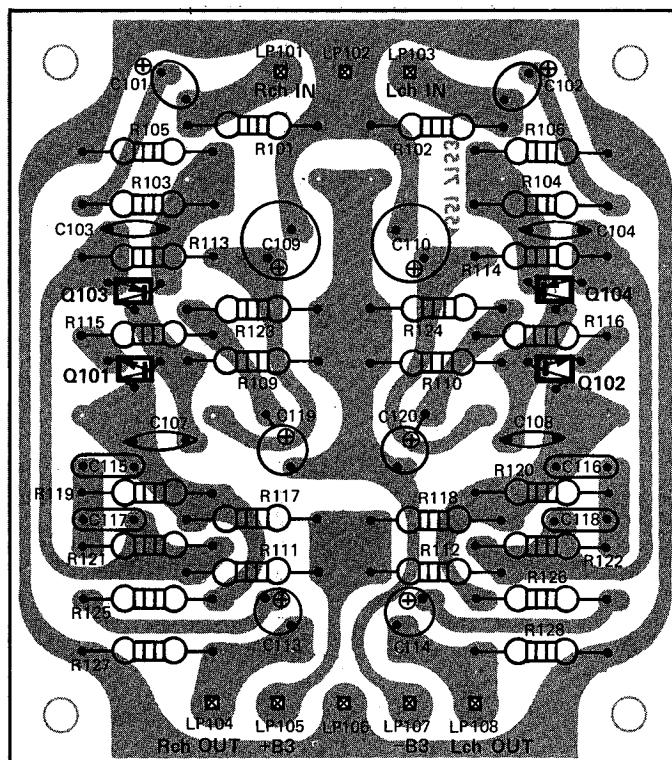
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HEADPHONE JACK



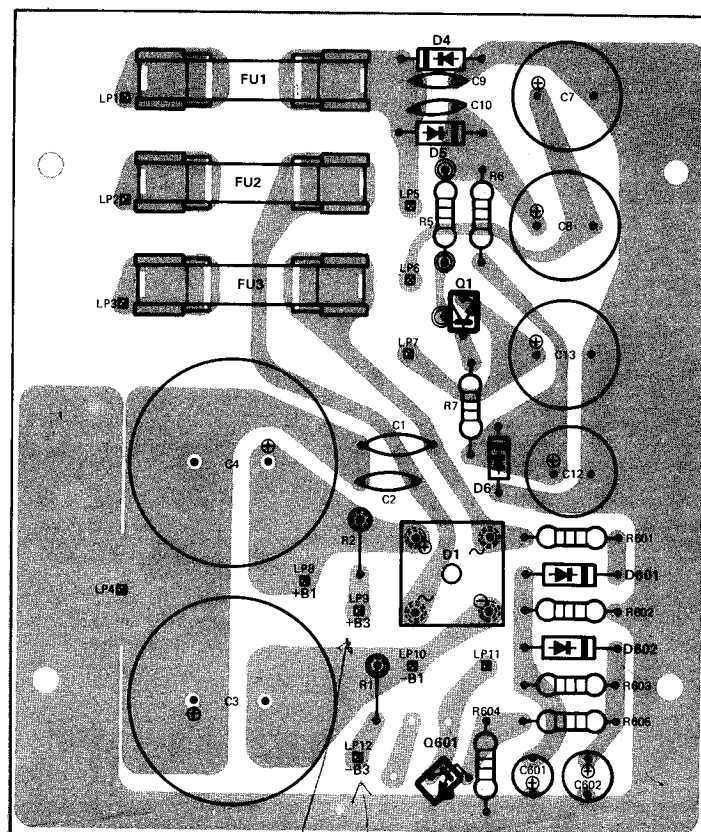
EQUALIZER AMP PC BOARD

CIRCUIT REF NO.	H/K PART NO.	DESCRIPTION
	00132764	PC Bd Assy, Equalizer Amp
CAPACITOR, LYTIC		
C109, 110	31831270	100MF, +50-10%, 10V
TRANSISTOR		
Q101, 102	43028535*	2SC1344(E), Equalizer Amp
Q103, 104	43031312*	2SA844(E), Equalizer Amp



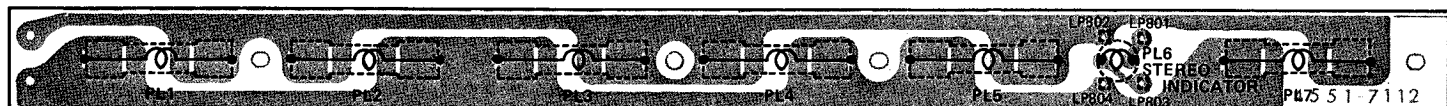
RECTIFIER PC BOARD

CIRCUIT REF NO.	H/K PART NO.	DESCRIPTION
	00132765	PC Bd Assy, Rectifier
CAPACITOR, LYTIC		
C3, 4	31831464	6800MF, +50-10%, 35v
C7, 8, 13	31831472	1000MF, +50-10%, 16V
C12	31828611	470MF, +50-10%, 16V
TRANSISTOR		
Q1	43032759	2SD414(Q) or (R), Voltage Rectifier
Q601	43031312*	2SA844(E), Voltage Rectifier
DIODE		
D1	42132159	S4VB20, Bridge, Silicone Rectifier
D4, 5	41631295*	SIB01-02
D6	42032760	Zener, RD13EB
D601, 602	41631295*	SIB01-02
MISCELLANEOUS		
FU1	45031336*	Fuse, 3A
FU2, 3	45031462*	Fuse, 4A

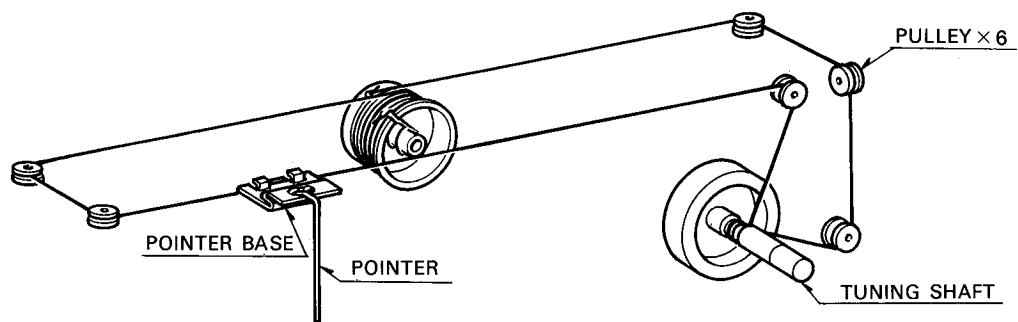


INDICATOR LAMP HOLDER
PC BOARD
VIEW FROM CIRCUIT SIDE

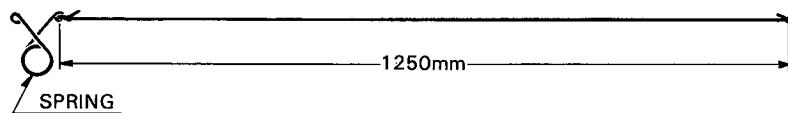
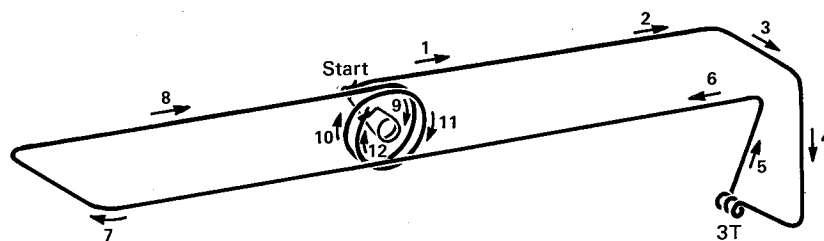
CIRCUIT REF NO.	H/K PART NO.	DESCRIPTION
	00131360	PC Bd Assy, Indicator Lamp Holder
PL1, 2, 3, 4, 5, 7	46532169*	Dial Illuminator Lamp, 8V 300MA
PL6	46531326*	Stereo Indicator Lamp, 6.3V 40MA



DIAL CORD STRINGING



Start stringing with Variable Capacitor in closed position.



CHASSIS PARTS LIST

330C

REF DES.	H/K PART NO.	DESCRIPTION
CABINETRY		
	00232744	Front Panel Assy
	60132745	Cabinet Top
	62031373	Leg, Unit
	60132746	Front Side Panel
	63231376	Knob, Tone Control, Function Selector
	63231377	Pushbutton, Control/Mode
	63232747	Knob, Tuning
	63231378	Pushbutton, Power
	00228712	Antenna Holder, AM Ferrite Bar
MISCELLANEOUS		
	00232748	Tuning Shaft Assy
	60431387	Dial Drum, (Tuning Cap.)
	60431388	Pulley, Dial Cord
	00232749	Dial Pointer Assy
	00132761	AM/FM Tuner, IF and MPX PC Bd Assy
	00132762	Main Amp PC Bd Assy
	00132763	Tone Control/Pre-Amp PC Bd Assy
	00132764	Equalizer Amp PC Bd Assy
	00132765	Rectifier PC Bd Assy
	00131360	Indicator Lamp Holder PC Bd Assy
L305	12031333	Coil, FM Antenna
L251	20531334	Antenna, AM Ferrite Bar
T1	10132766	Power Transformer
SW6	25032117	Push Switch, Power
S01	65431485	AC Socket
FH1, 2	65429516	Fuse Holder (Fuses FU4, 5)
TE1	65431482	Output/Input Terminal
TE2	65129518	Terminal, AM/FM External Antenna
TE3, 4	65431366	Terminal, Speaker Output
ME1	12532769	Tuning Meter
SW7A-D	24031363	Function Selector Switch
FU4, 5	45032129*	Fuse, 2A
PL8	46532121*	Lamp, Power Indicator, 8V, 60MA

REF DES.	H/K PART NO.	DESCRIPTION
MULTI-VOLTAGE RECEIVER		
	00132871	AM/FM Tuner, IF and MPX PC Bd Assy (Includes SW201) Pushbutton, Power
SW8	63232869	Rotary Switch, Power Source Voltage Selector
J2	65432870	Rec/PB Jack (DIN 5 PIN)
T1	10132814	Power Transformer
SW6	25029514	Pushbutton, Power
SW201	24531335	Slide Switch (on PC Bd)
	4472-7118	EXPORT FUSEHOLDER ⊕
	45033469	2A FUSES 20MM

NOTE TO WARRANTY STATIONS: Items marked by asterisk (*) are recommended spare parts stock. Printed circuit board assembly numbers are shown for reference only. Harman/Kardon does not normally supply assembled printed circuit boards.

NOTE: To speed handling of your order be sure to include both the model and serial numbers, in addition to the quantity, part number and part description of the items ordered. Orders from independent dealers, independent servicemen, and retail customers will be shipped on a cash in advance basis. Harman/Kardon reserves the right to substitute equivalent parts for those originally installed in this chassis. All parts should be ordered from Harman/Kardon, 55 Ames Court, Plainview, L.I., N.Y. 11803, Att: Parts Department.