

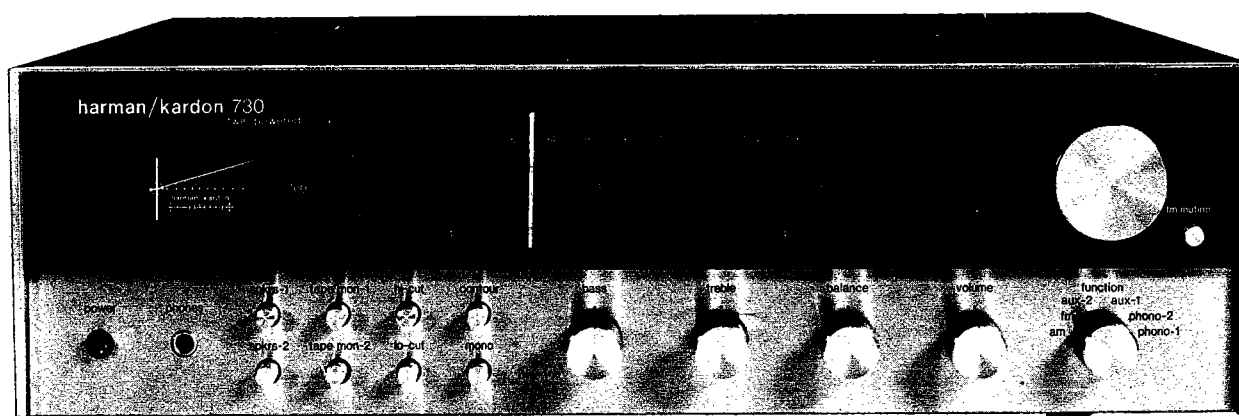


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The Harman/Kardon Model 730

**AM/FM/Stereo FM
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

SEPARATION ADJUSTMENT

INSTRUMENTS: Stereo Signal Generator
VTVM

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 Right Signal	1mV (60dB)	Tune for Zero Volts DC at R220 (15 k ohm)	VTVM to Left Tape Out Jack	VR302	Minimum Output
2	98MHz Left Signal			VTVM to Right Tape Out Jack	VR302	Minimum Output
3	Get best balanced minimum output after repetitive check between right and left above.					

STEREO INDICATOR LAMP ADJUSTMENT

INSTRUMENTS: 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)	32μV (30dB)	Tune for Zero Volts DC at R220 (15 k ohm)	Stereo Indicator Lamp	VR353	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 1kHz, 100Hz and 10kHz.					

QUIETING METER 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	OUTPUT	ADJUST	ADJUST FOR
1	----	-----	Quiet Point on Band	Quieting Meter	VR351	Needle to Deflect Over Zero (to Right)
2	----	-----			VR352	To Indicate Zero
3	98MHz	20μV (26dB)	Tune for Zero Volts DC at R220 (15 k ohm)		VR351	To Indicate 6

FM ALIGNMENT PROCEDURE

INSTRUMENTS: FM Signal Generator modulated with 1000Hz at 100%. (75kHz)
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 R220 (15 k ohm)	IF Top and Bottom (on Front End)	Maximum Noise
2	----	-----			T201 Top	Zero Volts DC
3	Near 98MHz	-1dB of Limiter Saturation	Tune for Zero Volts DC at R220 (15 k ohm)	Oscilloscope to Tape Out Jack	T201 Bottom	Maximum Symmetry on Oscilloscope
4	Repeat Steps 2 and 3 until no further improvement is noticed.					
5	90MHz	Approx. 10μV	90MHz	Oscilloscope to R220 (15 k ohm)	LO (on Front End)	Zero Volts DC
6	106MHz	Approx. 10μV	106MHz		TC0 (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 R220 (15 k ohm)	VTVM and Oscilloscope to Tape Out Jack	LR1 LR2 LA	Maximum Output
9	106MHz				TCR1 TCR2 TCA	Maximum Output
10	Repeat Steps 8 and 9 until no further improvement is noticed.					

MPX ADJUSTMENT

INSTRUMENT: 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 (unmodulated)	1mV (60dB)	Tune for Zero Volts DC at R220 (15 k ohm)	Frequency Counter to LP301	VR301	19kHz ±50Hz

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 test loop placed to radiate signals into AM Antenna Loop Stick (L252).

Step	SIGNAL SOURCE	FREQUENCY	CONNECT OUTPUT METER TO	DIAL SETTING	ADJUST	ADJUST FOR
1	AM Sweep Generator	455kHz	VTVM and Oscilloscope to R272 (4.7 k ohm)	Quiet Point Near 1600kHz	T252 (Ceramic Filter)	Maximum and Top Flat Pattern on Oscilloscope
2					T253	Maximum Output
3					T254	Maximum Output
4	Repeat Steps 1 through 3 for best sensitivity.					
5	AM Signal Generator	600kHz	VTVM and Oscilloscope to R272 (4.7 k ohm)	600kHz	L251	Maximum Output
6		1600kHz		1600kHz	TC1 (on Front End)	Maximum Output
7	Repeat Steps 5 and 6 for best dial accuracy.					
8	AM Signal Generator	600kHz	VTVM and Oscilloscope to R272 (4.7 k ohm)	600kHz	L252 T251	Maximum Output
9		1600kHz		1600kHz	TC2 TC3	Maximum Output
10	Repeat Steps 8 and 9 for best sensitivity.					

POWER AMPLIFIER IDLING ADJUSTMENT

INSTRUMENTS: DC VTVM

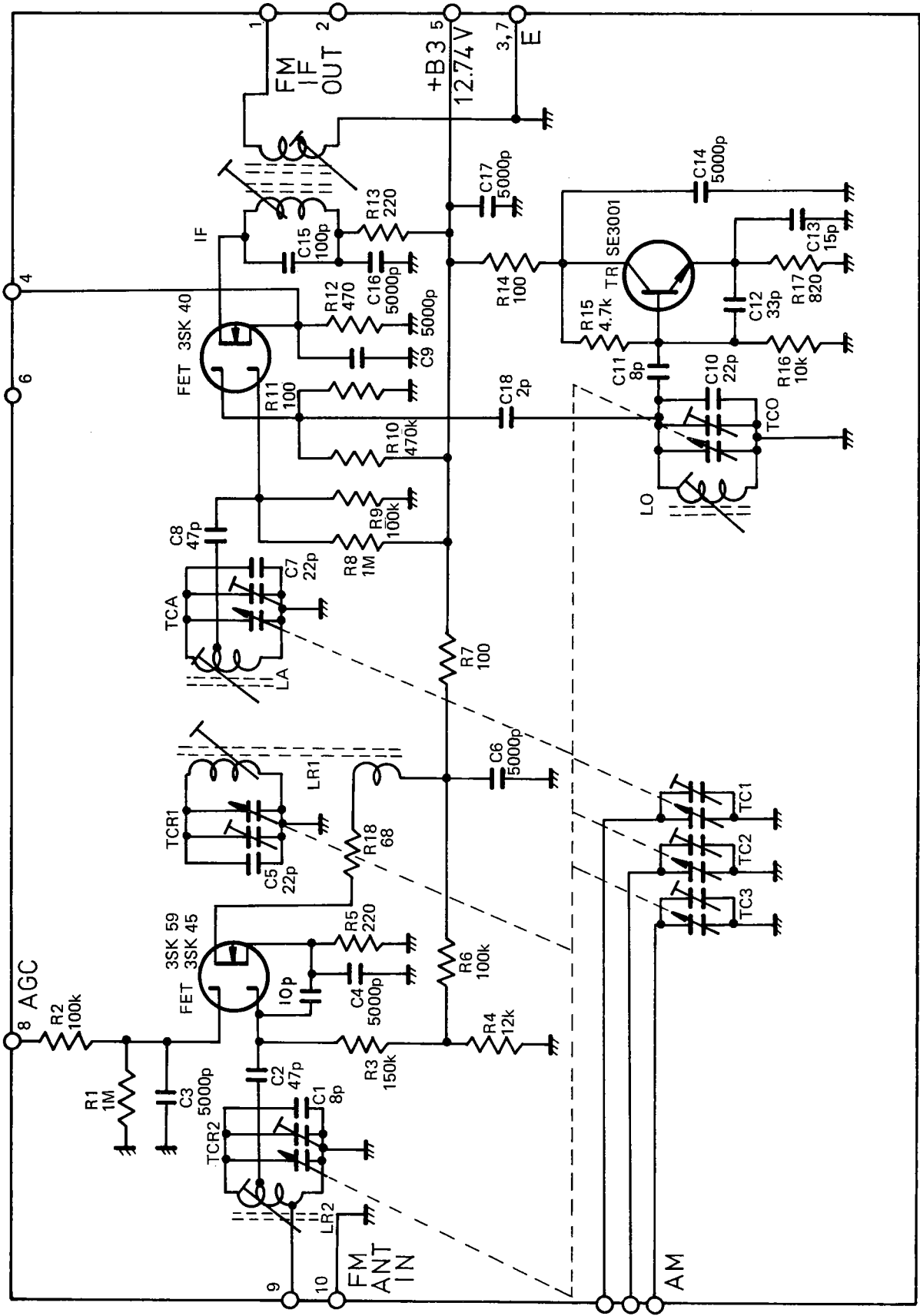
NOTE: Set Function Selector Switch to AUX
Set Volume Control to minimum and set Tone/Balance controls to mid position.

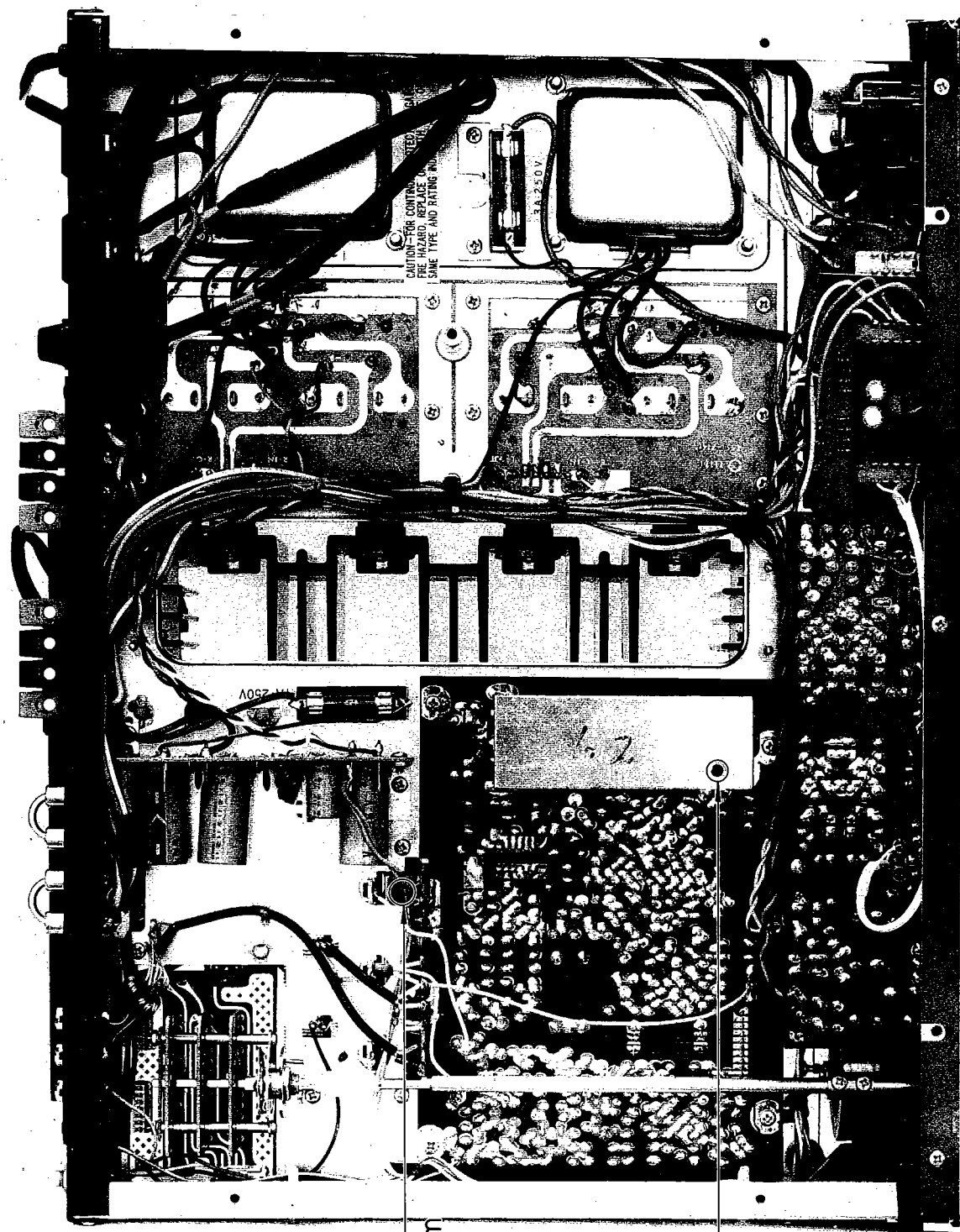
Set Stereo/Mono Switch to Stereo.
Speaker Switch to ON.

Connect 8 ohm (50W) resistor across left and right speaker terminals.

Step	CONNECT OUTPUT TO	ADJUST	ADJUST FOR
1	DC VTVM between Q418 (collector) and Q420 (Collector)	VR402	35mV ±5mV
2	DC VTVM between Q417 (collector) and Q419 (Collector)	VR401	35mV ±5mV

SCHEMATIC DIAGRAM — FRONT END

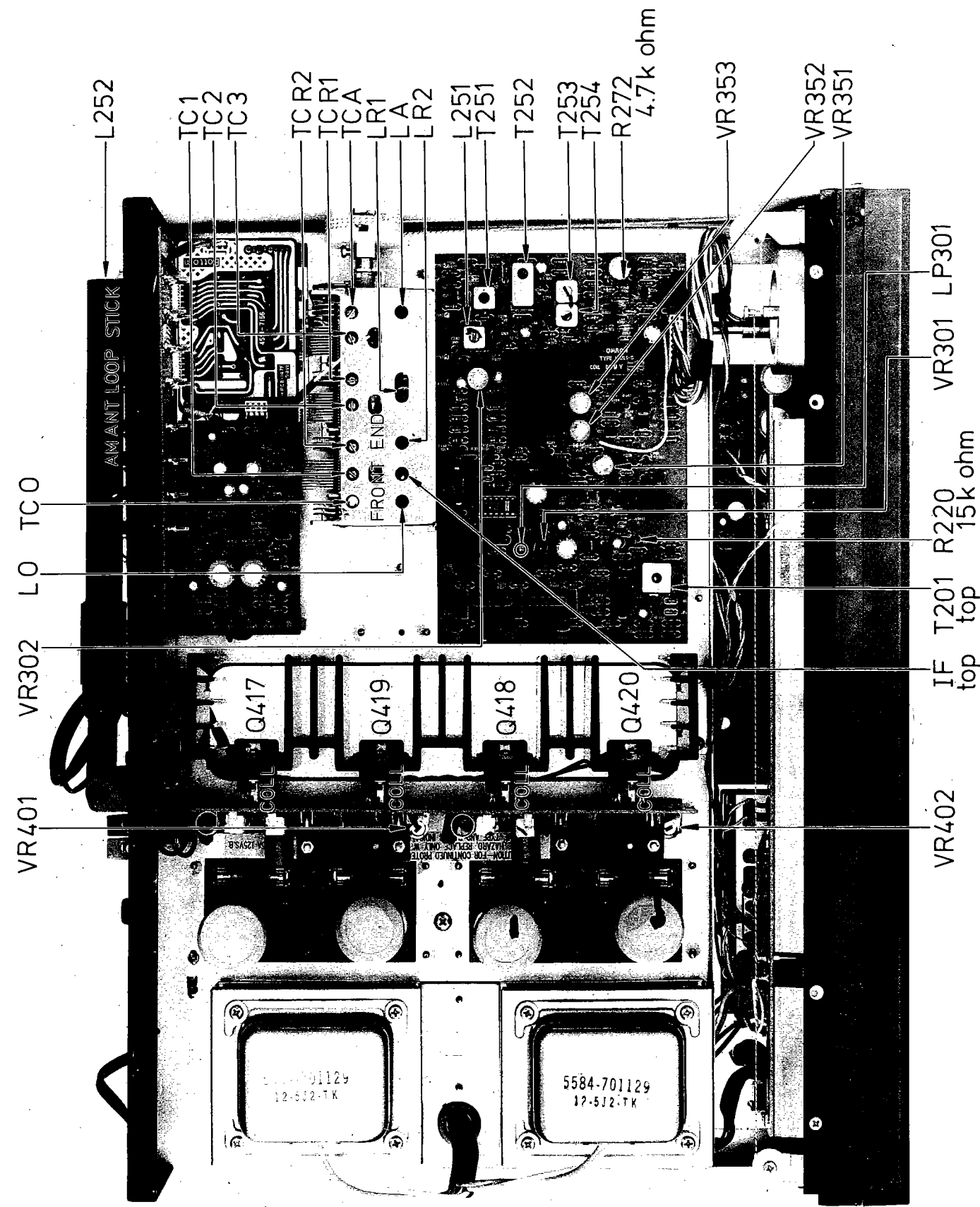




IF
bottom

T201
bottom

BOTTOM VIEW



VR401

VR302

LO TCO

AMANT LOOP STICK

L252

TC1

TC2

TC3

TCR2

TCR1

TCA

LR1

LA

LR2

L251

T251

T252

T253

T254

R272

4.7k ohm

VR353

VR352

VR351

IF top

T201 top

R220

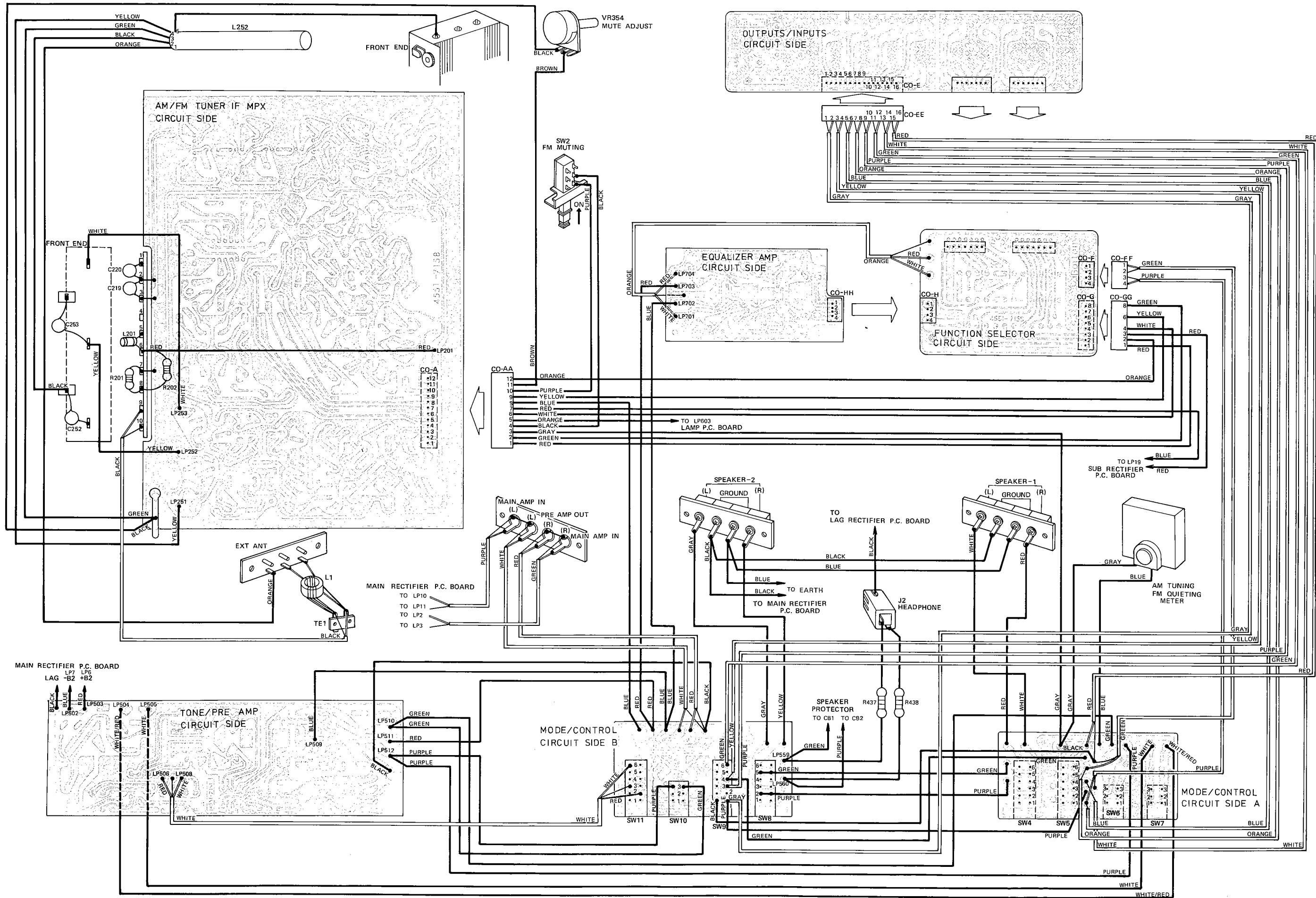
15k ohm

VR301 LP301

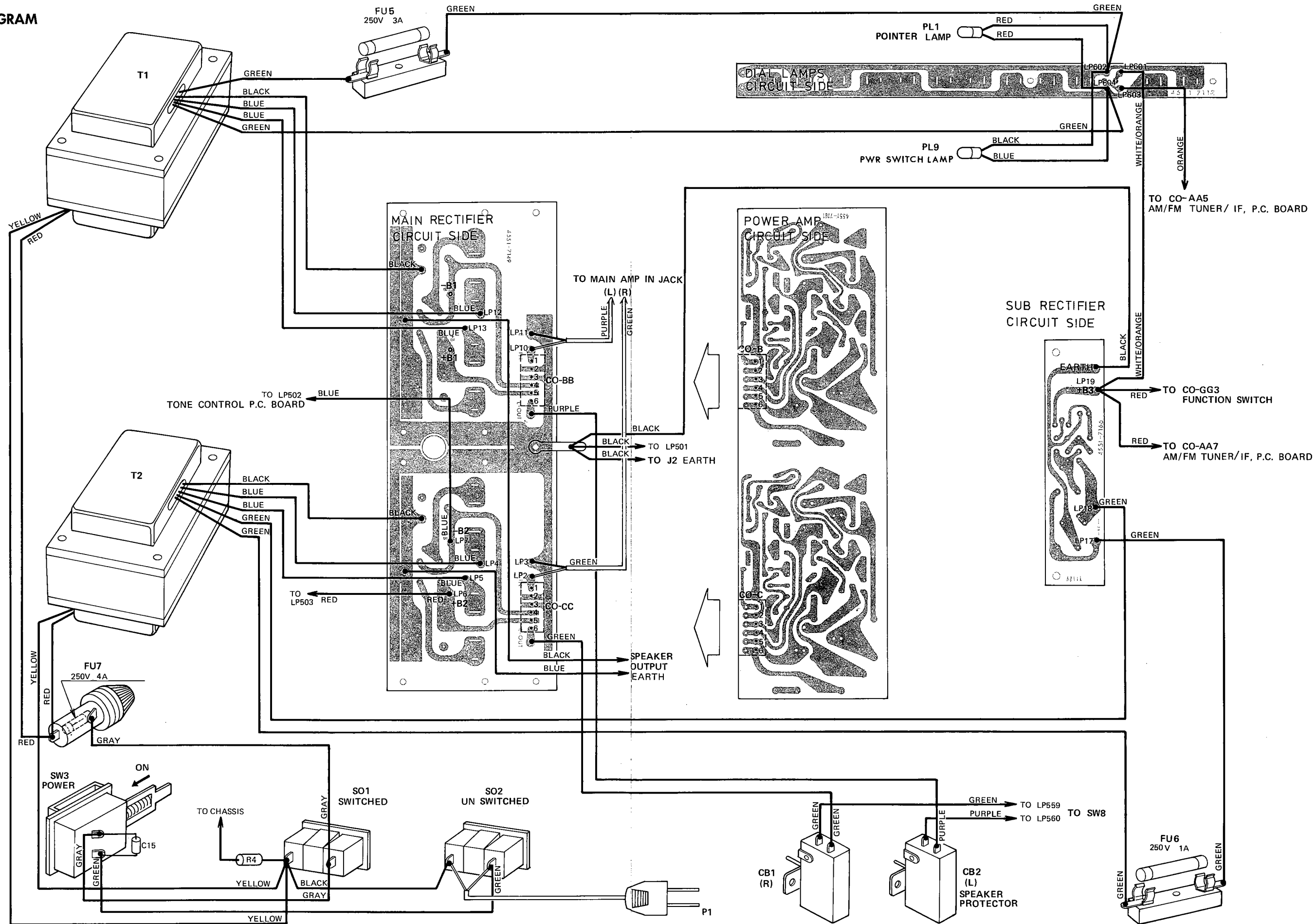
VR402

TOP VIEW

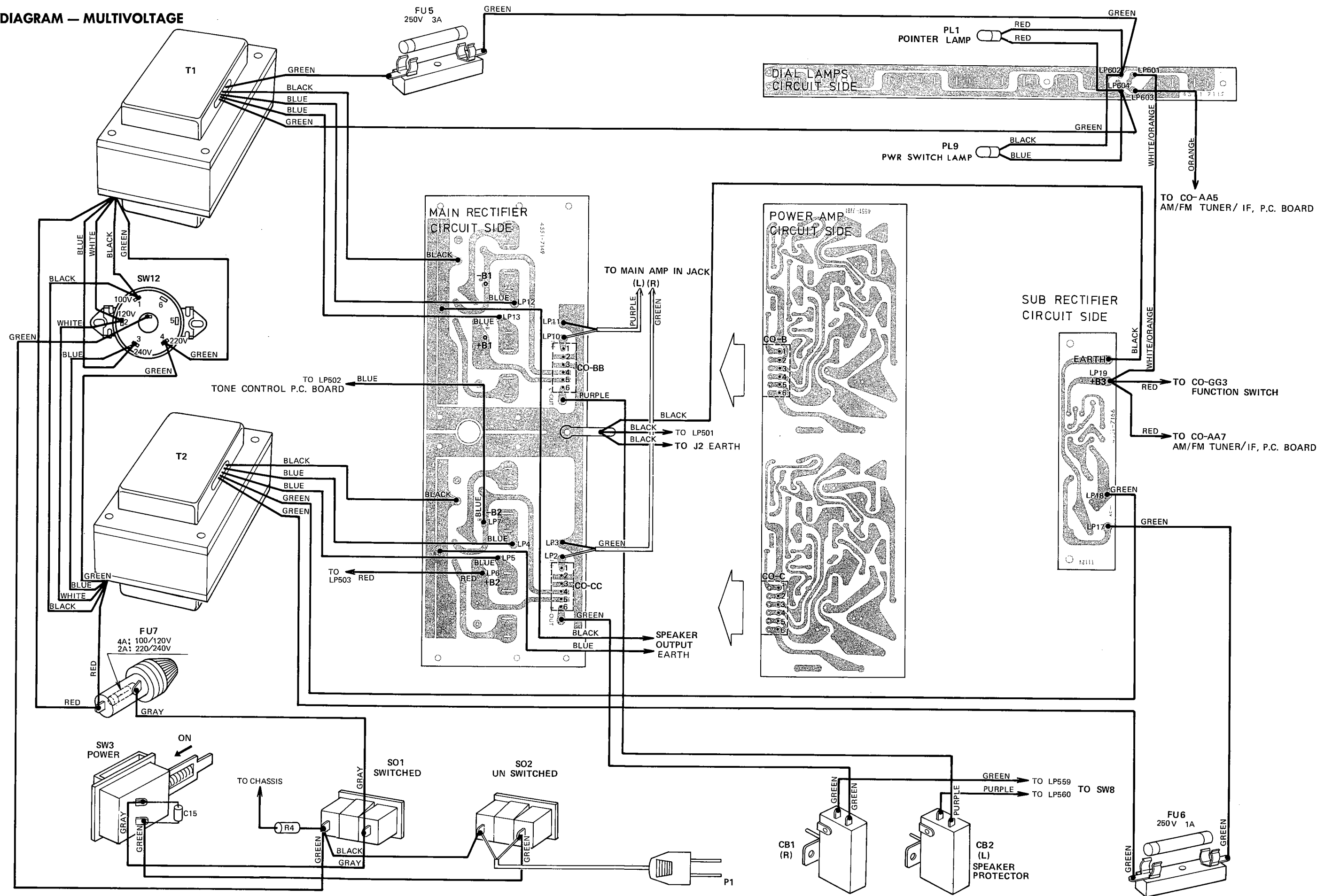
WIRING DIAGRAM — REGULAR AND MULTIVOLTAGE



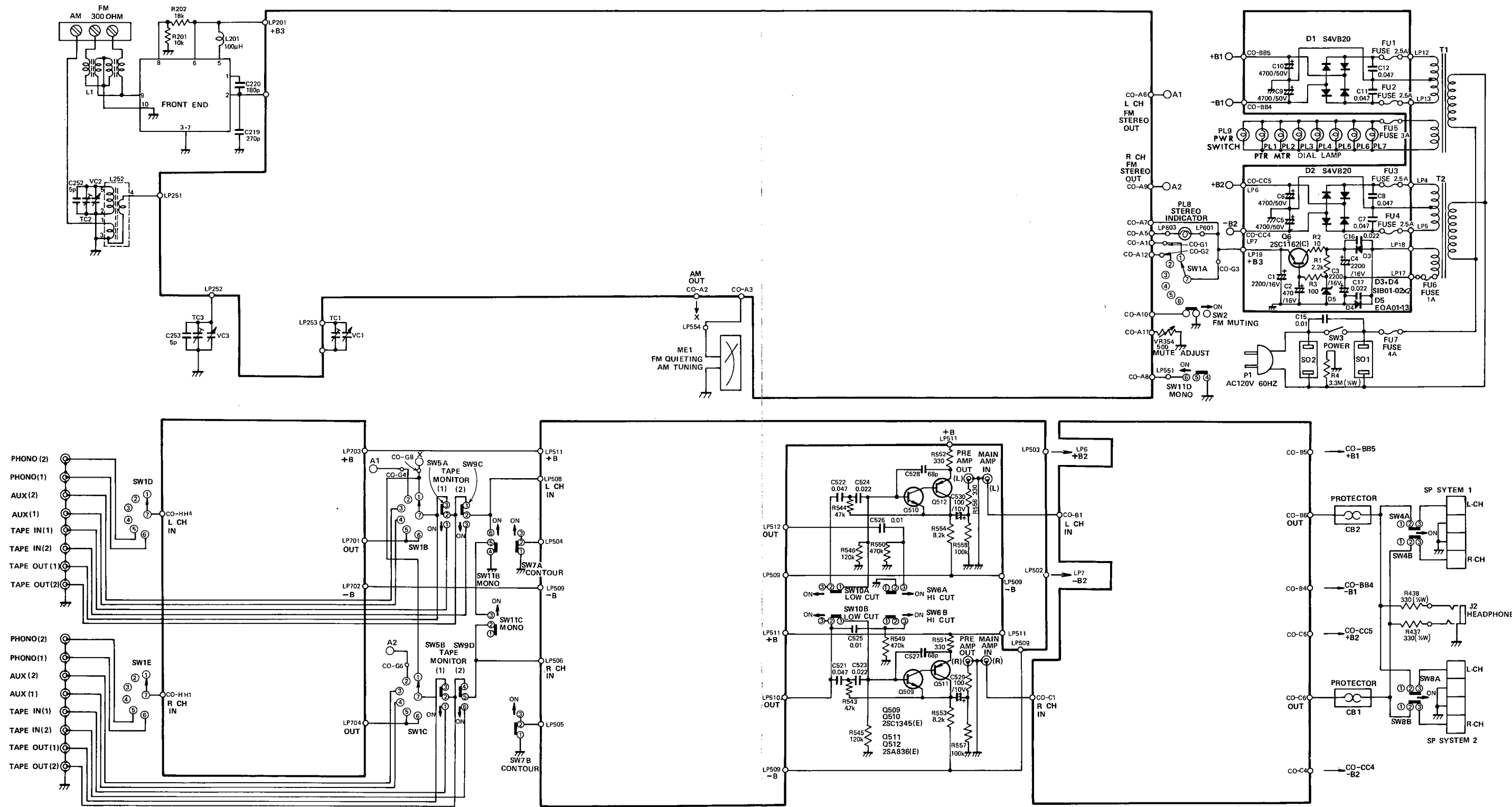
WIRING DIAGRAM



WIRING DIAGRAM — MULTIVOLTAGE

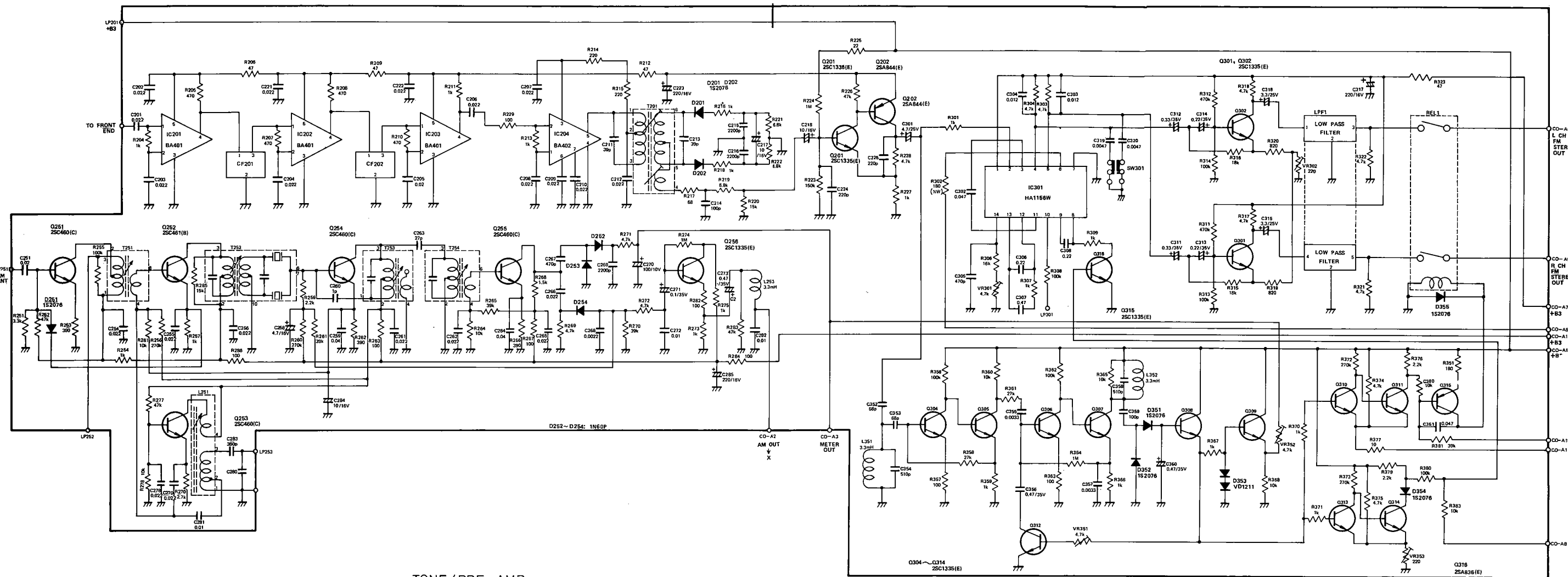


SCHEMATIC DIAGRAM — MODEL 730
SYSTEM INTERCONNECTION



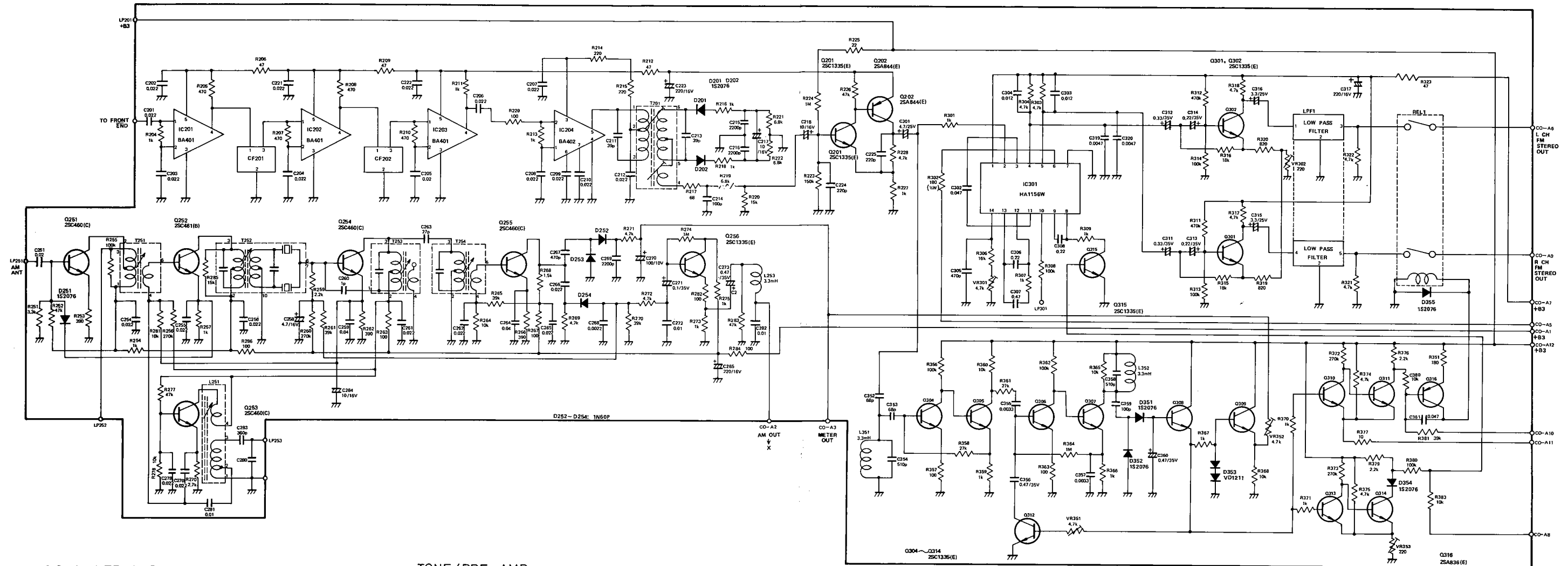
SCHEMATIC DIAGRAM — MULTIVOLTAGE — MODEL 730

AM/FM TUNER, IF, MPX

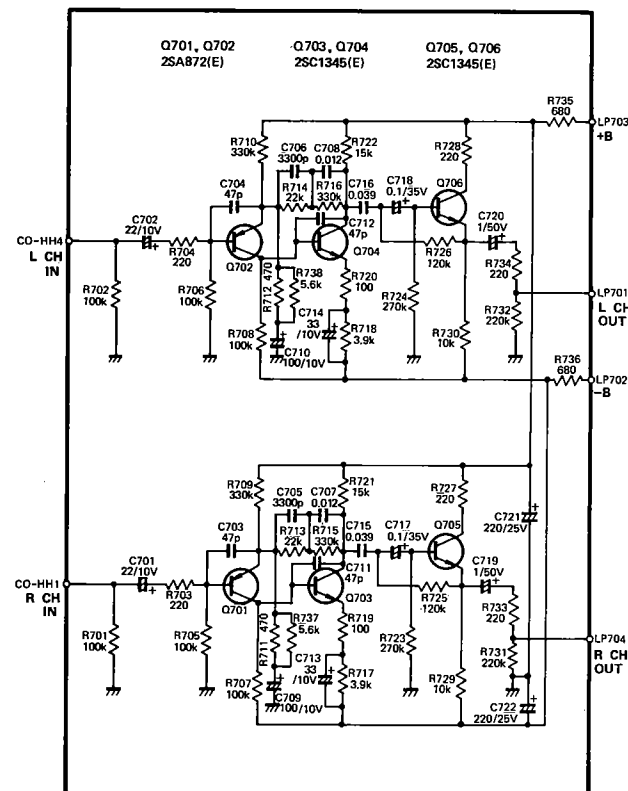


SCHEMATIC DIAGRAM — MODEL 730

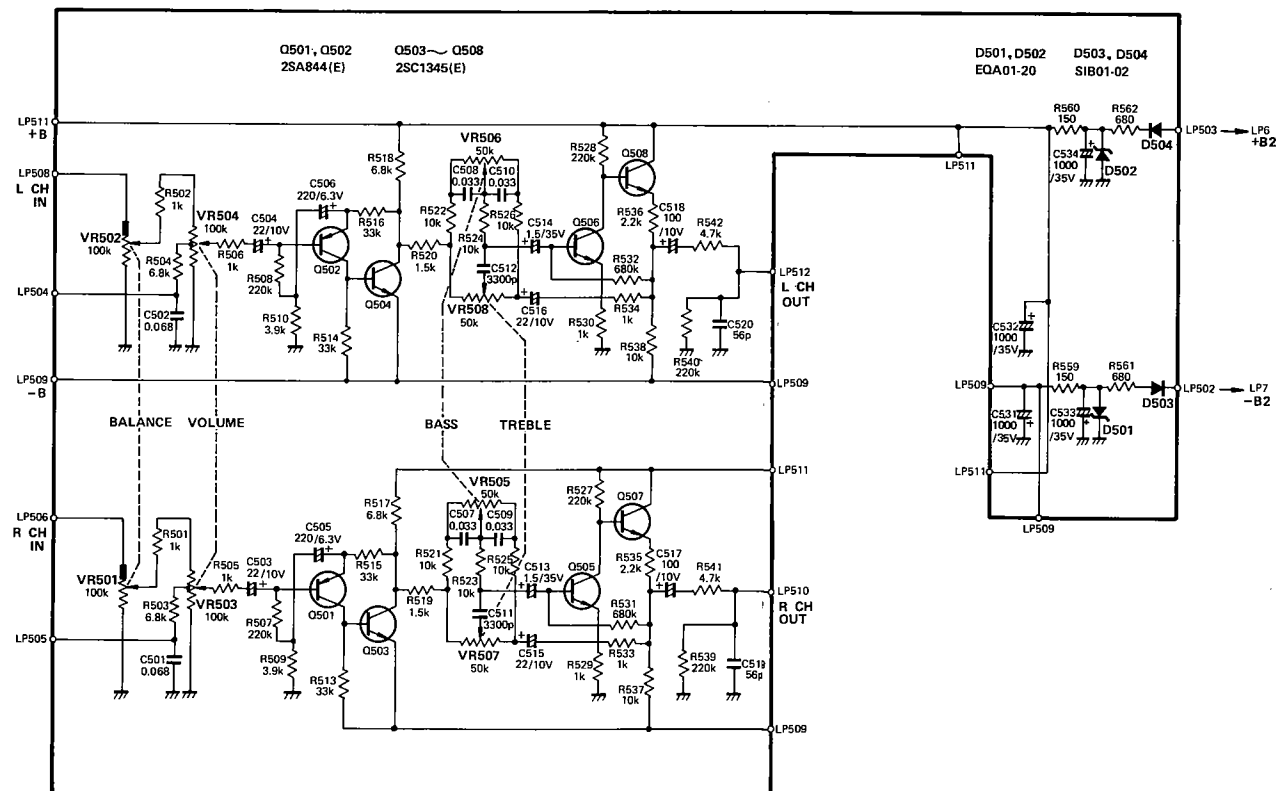
AM/FM TUNER,IF,MPX



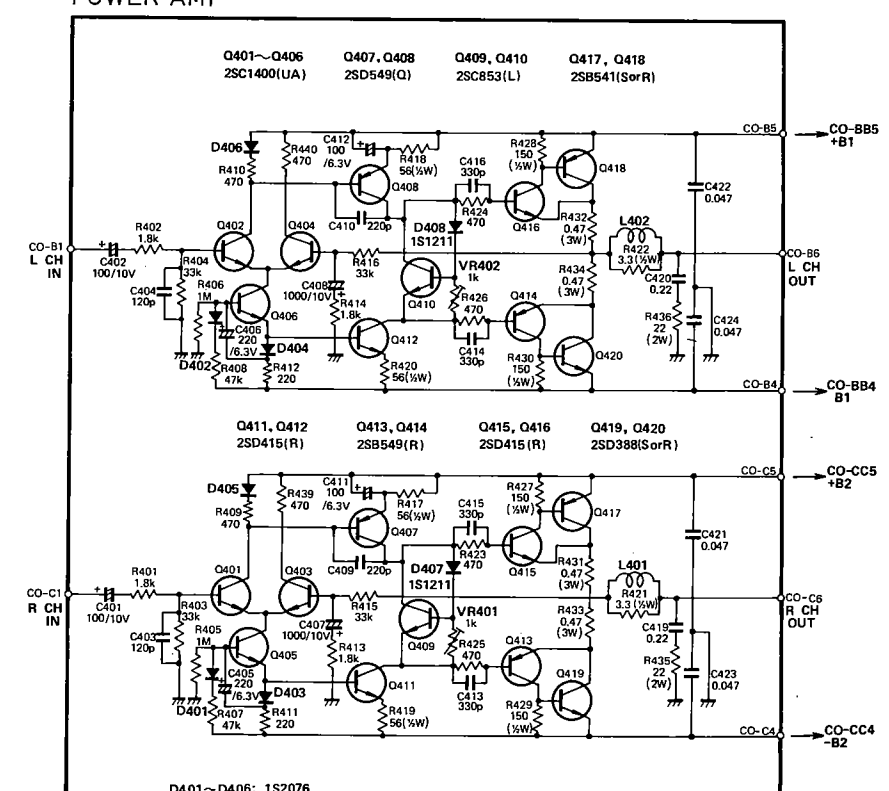
EQUALIZER AMP



TONE/PRE AMP



POWER AMP



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SCHEMATIC NOTES AND VOLTAGES

NOTES: Unless otherwise specified

1. Resistors are 1/4 watt. Values are in ohms, K = 1000, M = 1000K.
2. Capacitor values are in microfarads, UF, P = UUF.

VOLTAGE CHART

AC120V
No Signal
Chassis Ground

Volume Control at Minimum
Tone Control at Mechanical Center

+B1, +B2 +39.78V
-B1, -B2 -39.78V
+B3 +12.74V

Equalizer Amp +B +14.87V
Equalizer Amp -B -14.87V
Tone/Pre/Filter +B +18.12V
Tone/Pre/Filter -B -18.12V

IC201

1 1.43V
2 1.44V
3 0V
4 9.13V
5 9.85V

IC202

1 1.44V
2 1.44V
3 0V
4 9.39V
5 10.12V

IC203

1 1.44V
2 1.44V
3 0V
4 9.01V
5 10.68V

IC204

1 2.03V
2 2.03V
3 9.11V
4 0V
5 10.11V
6 2.04V
7 2.03V

IC301

1 11.93V
2 3.04V
3 5.08V
4 8.49V
5 8.43V
6 12.66V
7 0V
8 0.08V
9 2.27V
10 1.53V
11 2.15V
12 2.32V
13 2.31V
14 3.17V

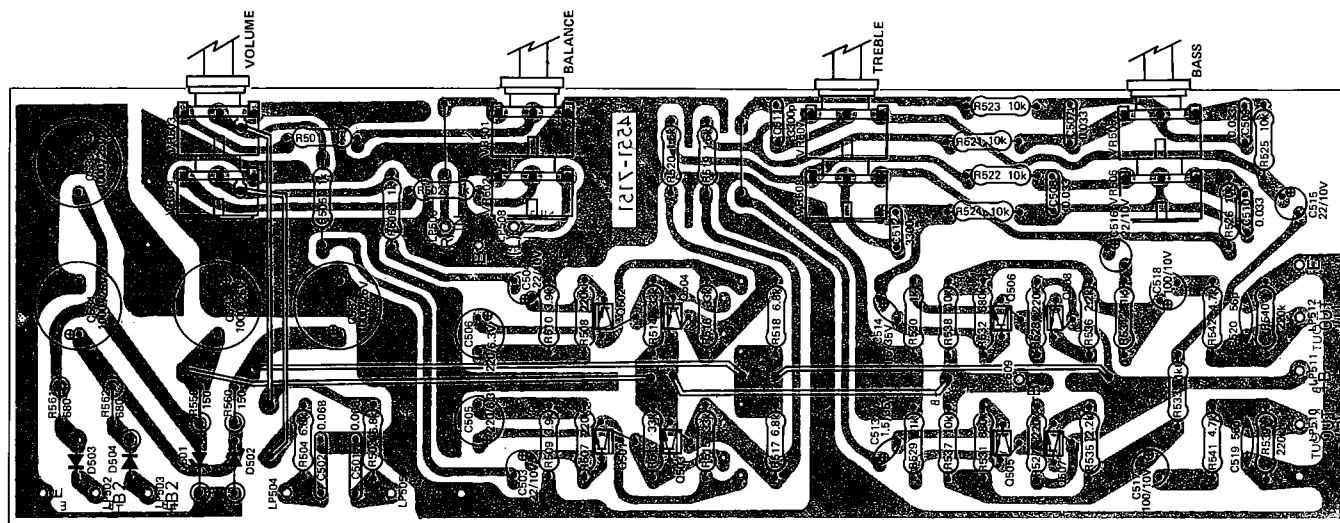
TRANSISTOR ELEMENTS VOLTAGE CHART

	base	emitter	collector
Q6	13.42V	12.74V	20.58V
Q201	1.53V	1.03V	11.38V
Q202	11.38V	12.00V	5.88V
Q301,302	1.83V	1.21V	5.05V
Q304	0.57V	0.012V	1.18V
Q305	1.18V	0.58V	6.74V
Q306	0.58V	0.011V	1.41V
Q307	1.41V	0.82V	12.64V
Q308	2.71V	2.04V	12.74V
Q309	1.16V	0.57V	12.64V
Q310	1.23V	0.55V	0.56V (mute OFF)
Q311	0.56V	0.55V	12.14V (mute OFF)
Q312	0.87V	0V	0.05V (mute OFF)
Q313	1.34V	0.67V	0.68V (mute OFF)
Q314	0.68V	0.67V	12.67V (mute OFF)
Q316	9.90V	10.59V	7.93V (mute OFF)
Q315	0.60V	0V	0.01V (mute OFF)
Q251	0.74V	0.11V	11.28V
Q252	0.87V	0.36V	11.78V
Q253	1.89V	1.38V	11.01V
Q254	1.19V	0.52V	11.63V
Q255	2.11V	1.42V	6.09V
Q256	3.68V	3.12V	8.94V

Function Selector Switch to phono-1 Position

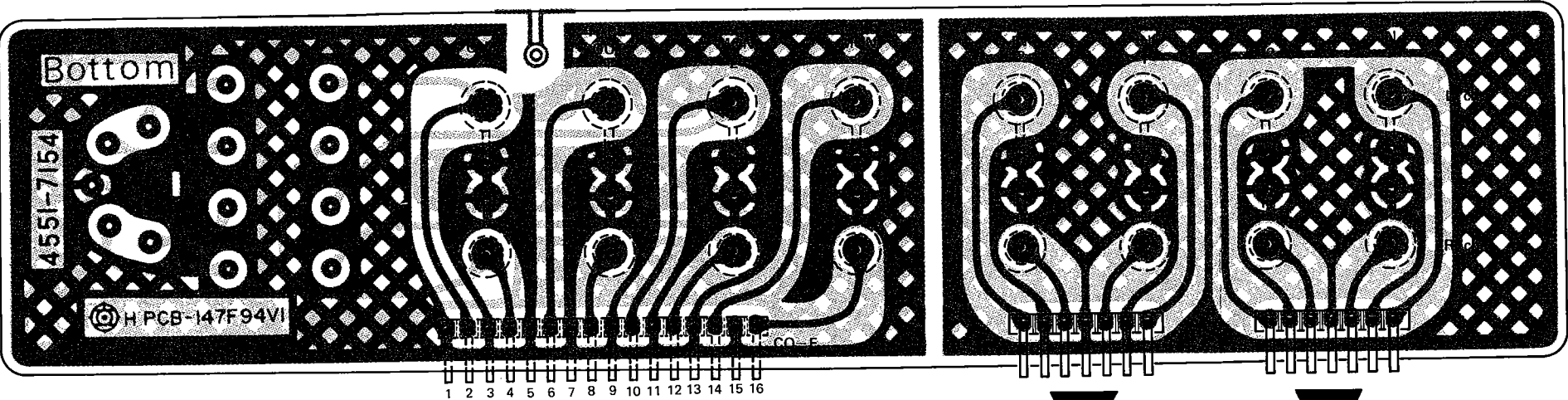
	base	emitter	collector
Q401,402	-0.052V	-0.60V	38.30V
Q403,404	-0.067V	-0.60V	38.03V
Q405,406	-37.55V	-38.25V	-0.60V
Q407,408	38.27V	38.73V	0.61V
Q409,410	0.013V	-0.63V	0.61V
Q411,412	-38.25V	-38.72V	-0.63V
Q413,414	-0.61V	-0.03V	-39.23V
Q415,416	0.58V	0.02V	39.20V
Q417,418	39.23V	39.78V	0.020V
Q419,420	-39.23V	-39.78V	-0.023V
Q501,502	0.008V	0.54V	-17.42V
Q503,504	-17.42V	-18.12V	1.29V
Q505,506	0.61V	0.05V	5.44V
Q507,508	5.44V	4.80V	18.12V
Q509,510	-0.09V	-0.48V	16.90V
Q511,512	16.90V	17.49V	-0.48V
Q701,702	0.55V	0.007V	-10.71V
Q703,704	-10.71V	-11.39V	1.14V
Q705,706	-0.60V	-1.24V	14.78V

**TONE/PREAMP
PC BOARD**

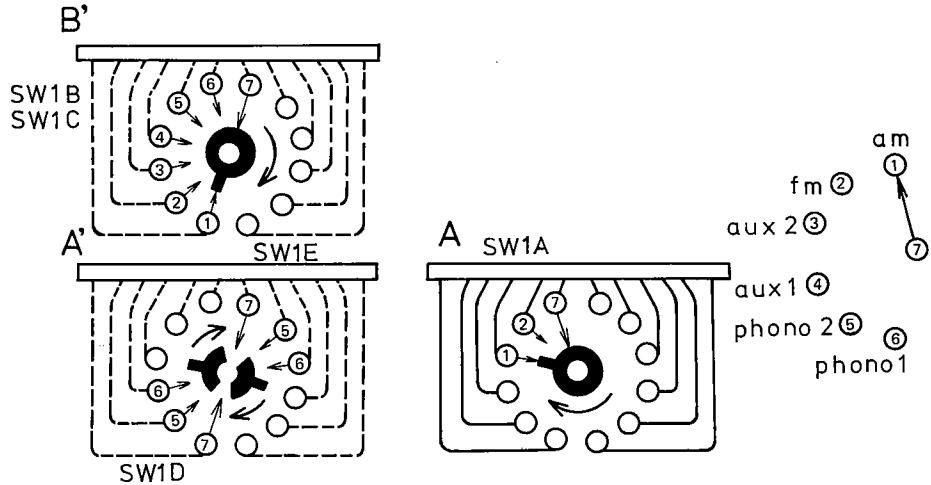


CIRCUIT REF.	H/K PART NO.	DESCRIPTION
	00132097	P.C. Board Assy., Tone/Preamp
VARIABLE RESISTOR		
VR501, 502	22031320	100K Ohm, Balance Control
VR503, 504	22031319	100K Ohm, Volume Control
VR505-508	22031321	50K Ohm, Bass and Treble Control
CAPACITOR, ELECTROLYTIC		
C503, 504, 515, 516	31831322	22UF, 10V
C505, 506	31832152	220UF, 6.3V
C517, 518	31818932	100UF, 10V
C531-534	31832153	1000UF, 25V
DIODE		
D501, 502	42032154*	Zener, EQA01-02 20V \pm 1V
D503, 504	41631295*	S1B01-02
TRANSISTOR		
Q501, 502	43031312*	PNP, 2SA844(E)
Q503-508	43029483*	NPN, 2SC1345(E)

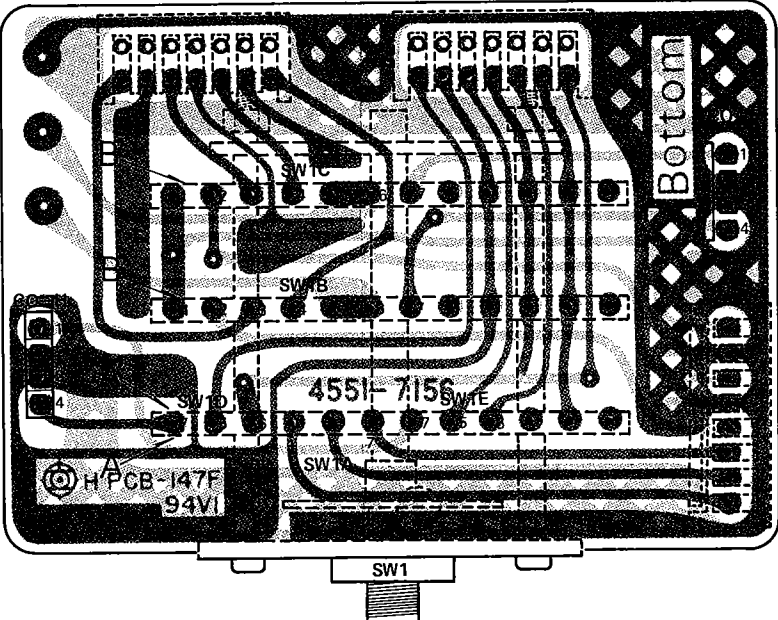
OUTPUT INPUT JACKS PC BOARD
VIEWED FROM CIRCUIT SIDE



FUNCTION SELECTOR SWITCH
VIEWED FROM KNOB END

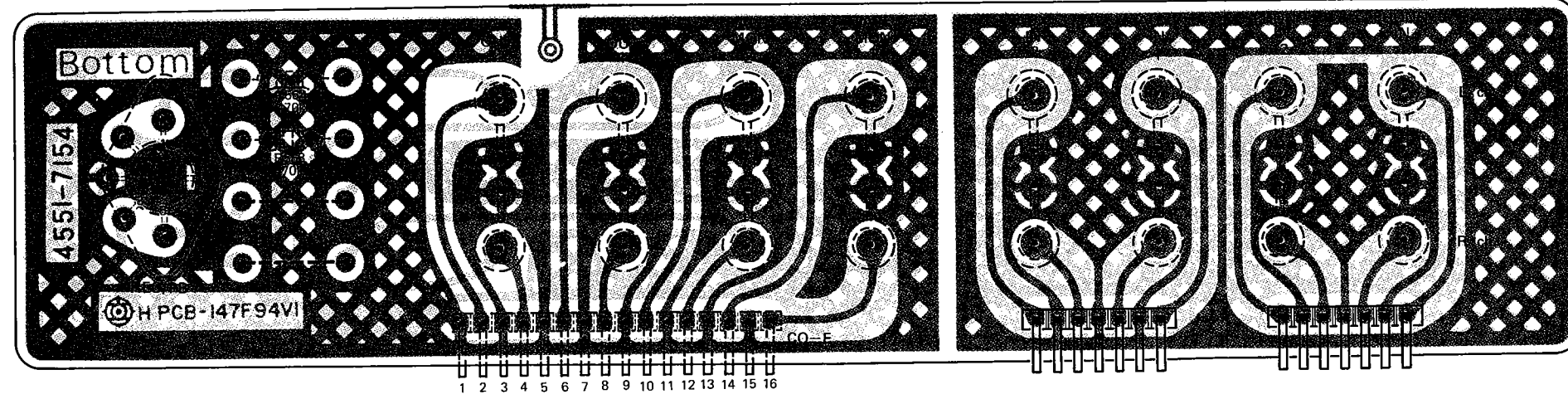


FUNCTION SELECTOR
SWITCH
PC BOARD
VIEWED FROM
CIRCUIT SIDE

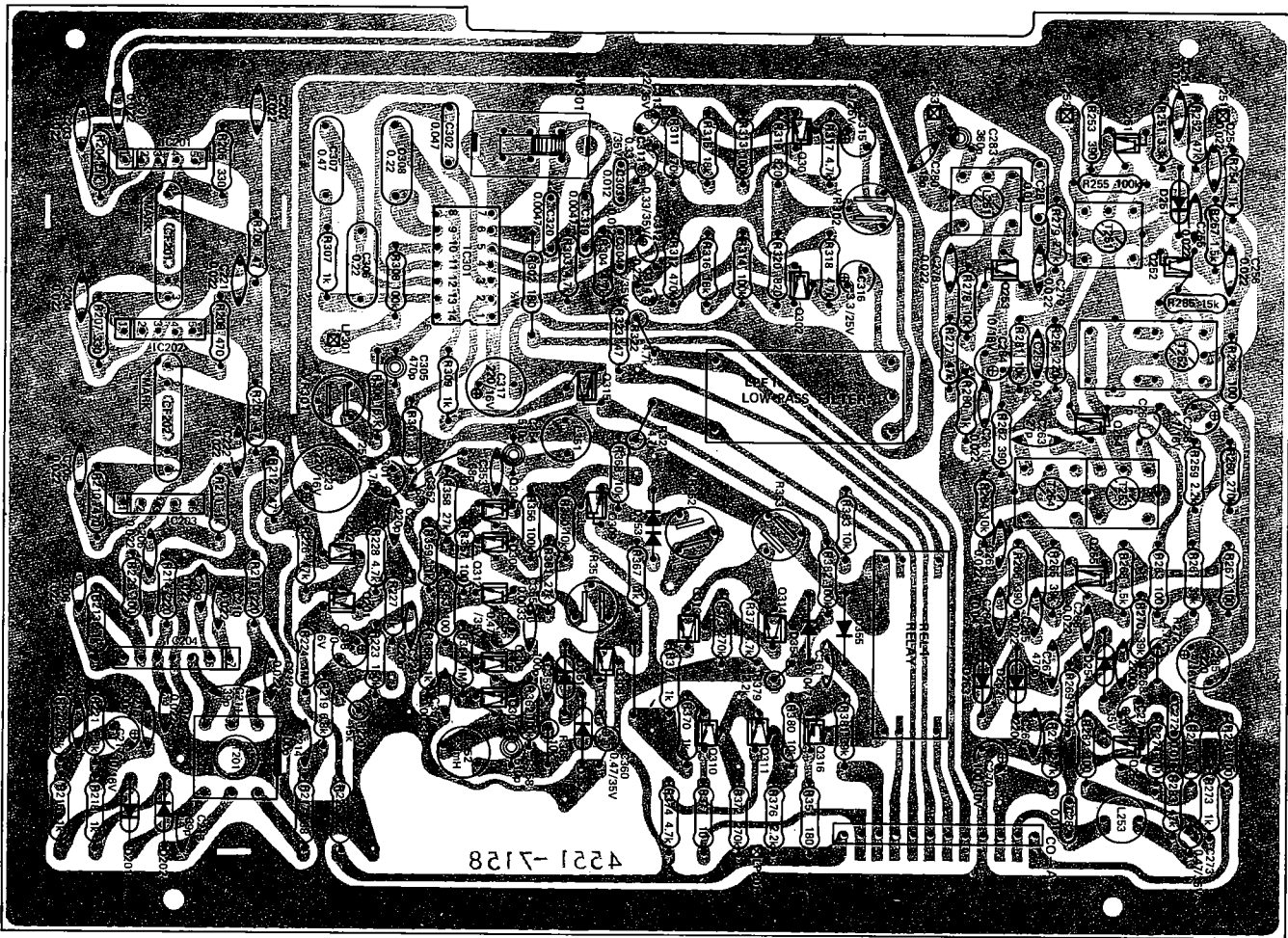
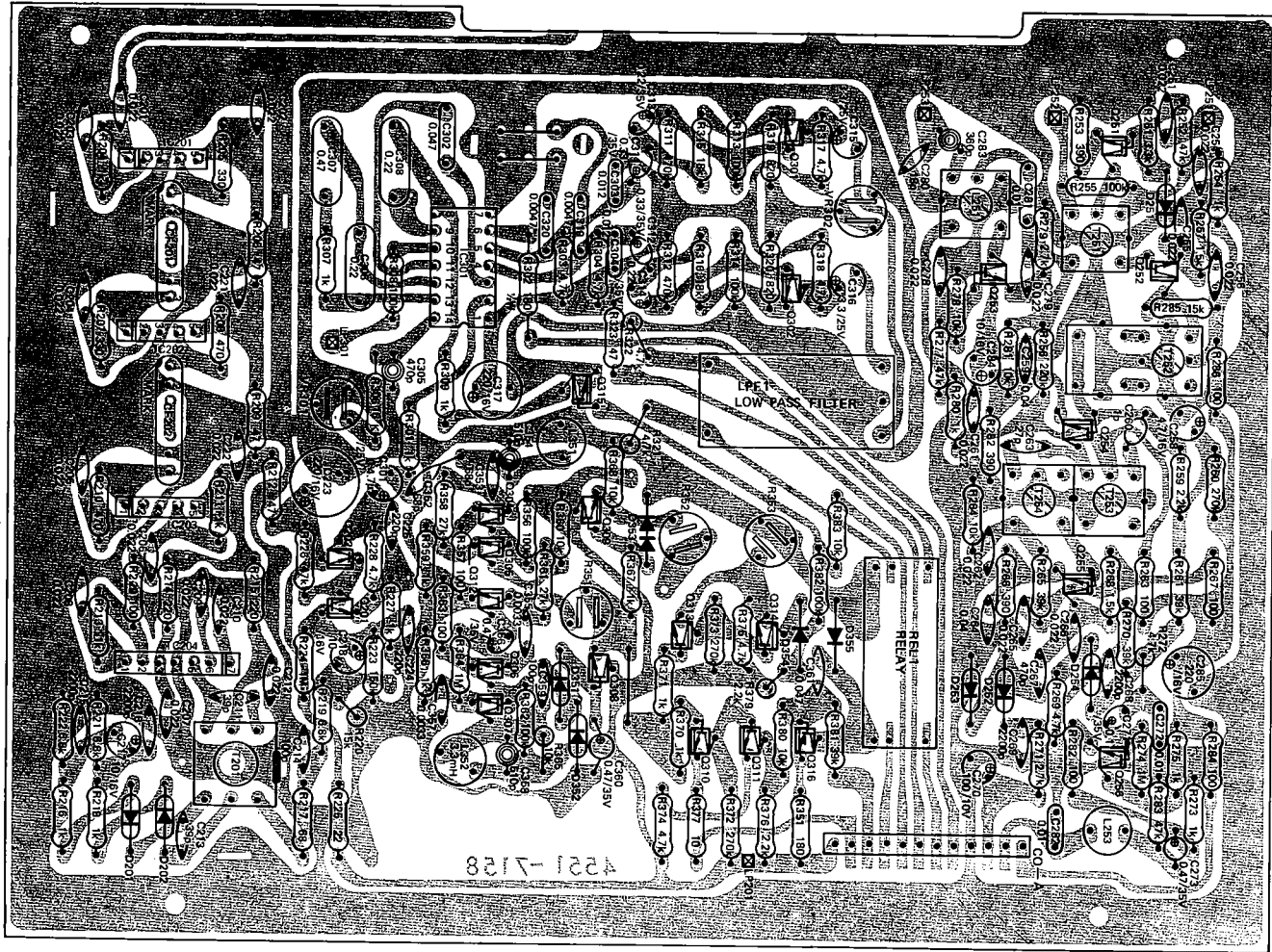


CIRCUIT REF.	H/K PART NO.	DESCRIPTION
	00132104	P.C. Board Assy., Output/Input Jacks
	65432171	16 Pin RCA Jack

CIRCUIT REF.	H/K PART NO.	DESCRIPTION
	00132105	P.C. Board Assy., Function Selector
SW1	24032172	Switch, Rotary Function Selector



OUTPUT INPUT JACKS PC BOARD MULTIVOLTAGE
VIEWED FROM CIRCUIT SIDE

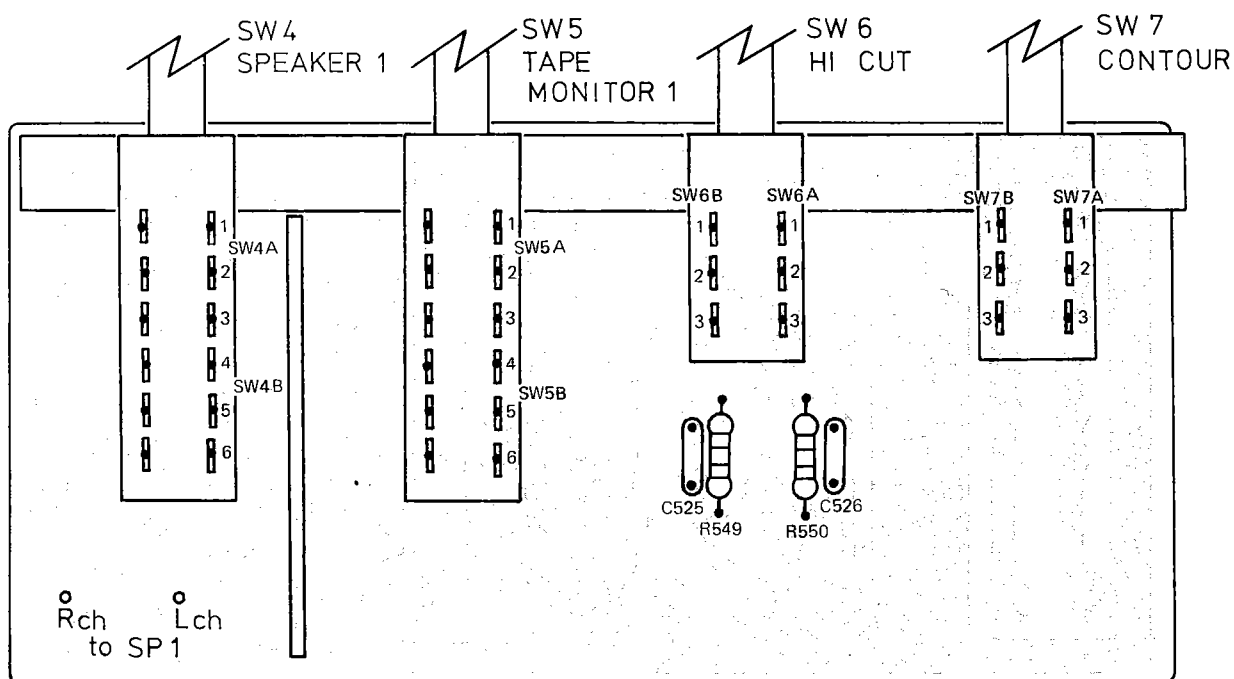


CIRCUIT REF.	H/K PART NO.	DESCRIPTION
	00132094	P.C. Board Assy., AM/FM Tuner, IF, MPX
VARIABLE RESISTOR		
VR301, 351, 352	23530554	4.7K Ohm
VR302, 353	23532130	220 Ohm
DIODE		
D201, 202, 251, 351, 352, 354, 355	41039552*	1S2076
D252, 253, 254	41029290*	1N60P
VARISTOR		
D353	41632133*	VD1211
TRANSISTOR		
Q201, 256, 301, 302, 304-315	43030569*	NPN, 2SC1335(E)
Q202	43031312*	PNP, 2SA844(E)
Q251, 253, 254, 255	43029472*	NPN, 2SC460(C)
Q252	43029471*	NPN, 2SC461(B)
Q316	43032132*	PNP, 2SA836(A)

CIRCUIT REF.	H/K PART NO.	DESCRIPTION
INTEGRATED CIRCUIT		
IC201, 202, 203	43131313*	
IC204	43131314*	
IC301	43132131*	
COIL		
L251	12031316	
L253, 351, 353	12032144	
TRANSFORMER		
T201	11031318	
T251	11032146	
T253, 254	11030557	
MISCELLANEOUS		
REL1	13032134	
LPF1	12032135	
T252	12032136	
CF201, 202	12032137	

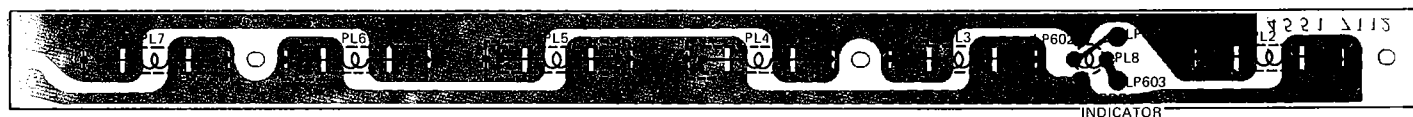
CIRCUIT REF.	H/K PART NO.	DESCRIPTION
MULTIVOLTAGE		
SW301	24531335	Switch, Slide, De-emphasis
BA401, FM IF Amp		
BA402, FM IF Amp		
HA1156W, FM MPX		
AM OSC		
3.3UH		
FM Discriminator		
AM RF		
AM IF		
DC Relay		
Low Pass Filter		
Ceramic Filter, AM IF		
Ceramic Filter, FM IF		

MODE/CONTROL SWITCH A **PC BOARD**



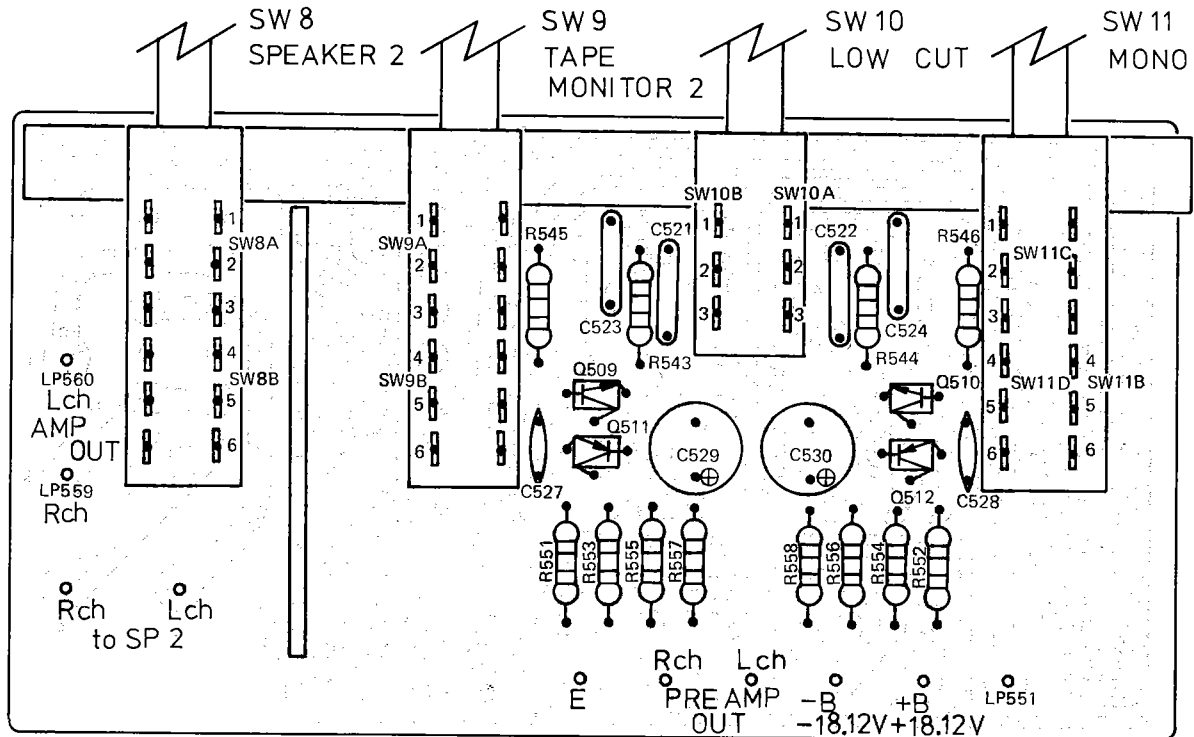
CIRCUIT REF.	H/K PART NO.	DESCRIPTION
	00132098	P.C. Board Assy., Mode/Control Switch A
SW4, 5, 6, 7	25032155	Switch Pushbutton Contour/Hi Cut/Tape Mon 1/Spkr 1

DIAL LIGHT PC BOARD VIEWED FROM CIRCUIT SIDE



CIRCUIT REF.	H/K PART NO.	DESCRIPTION
	00132103	P.C. Board Assy., Dial Lamps
LAMP		
PL2-7	46532169*	Dial and Meter Lamp, 8V, 300MA
PL8	46531326*	Stereo Indicator Lamp, 6.3V, 40MA

**MODE/CONTROL SWITCH B
PC BOARD**



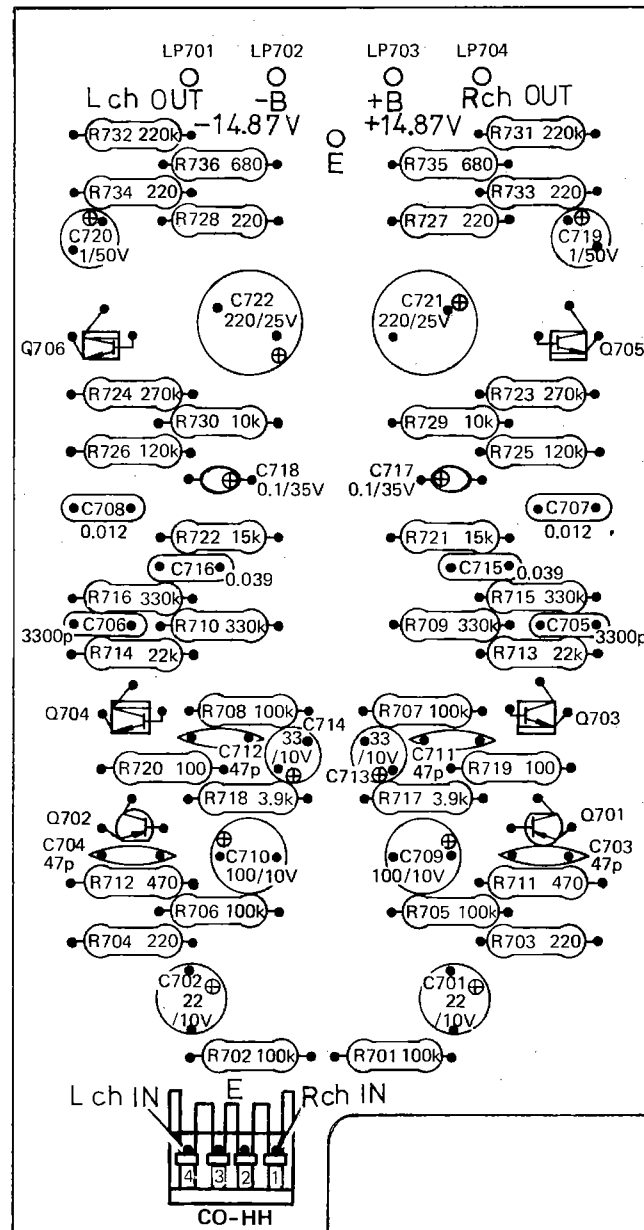
CIRCUIT REF.	H/K PART NO.	DESCRIPTION
	00132099	P.C. Board Assy., Mode/Control Switch B

CAPACITOR, ELECTROLYTIC		
C529, 530	31818932	100UF, 10V

TRANSISTOR		
Q509, 510	43029483*	NPN 2SC1345(E)
Q511, 512	43032132*	PNP 2SA836(E)

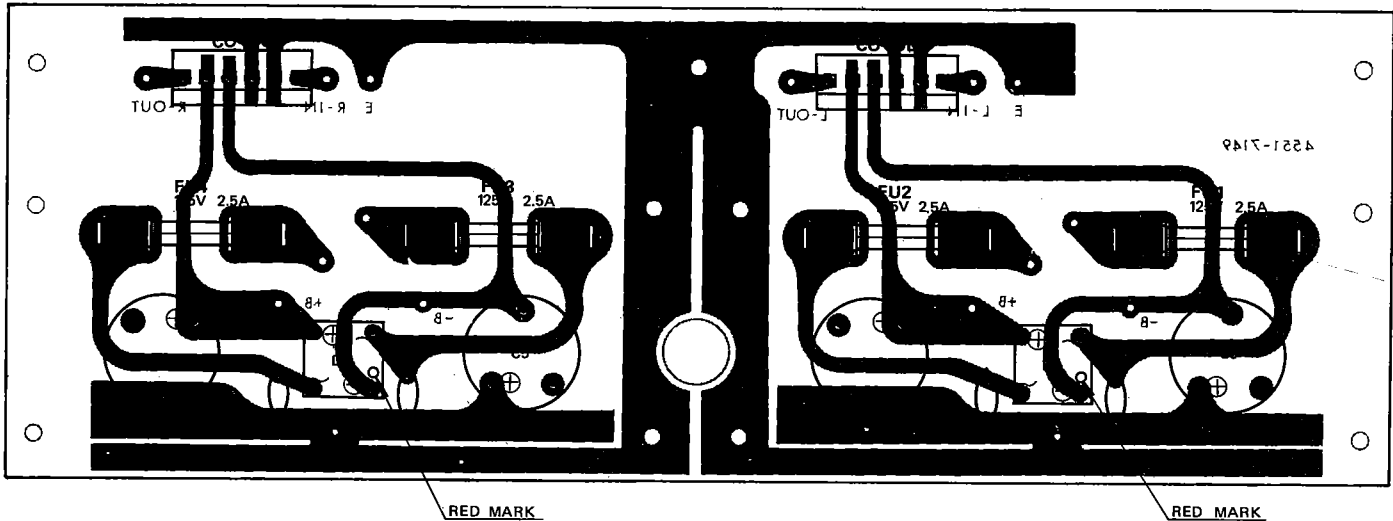
SWITCH PUSHBUTTON		
SW8, 9, 10, 11	23532156	Mono/Low Cut/Tape Mon 2/Spkr 2

EQUALIZER AMP PC BOARD



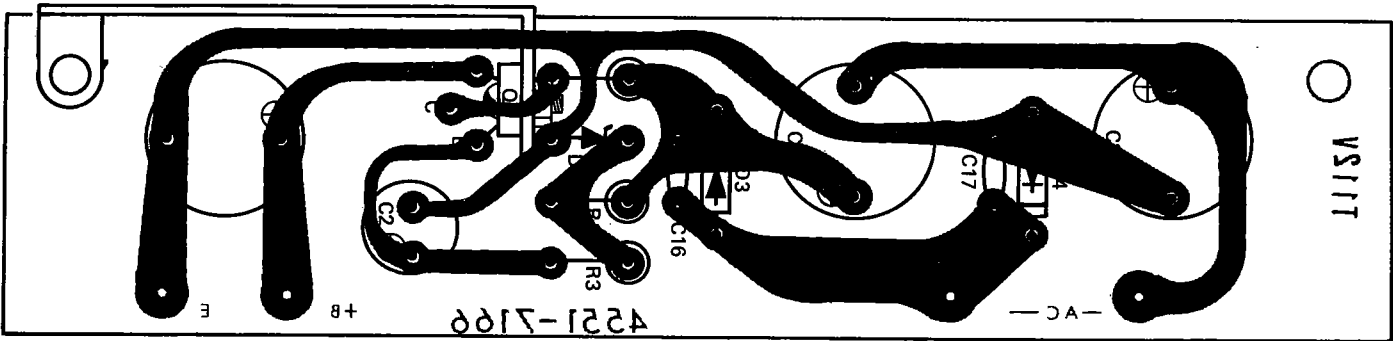
CIRCUIT REF.	H/K PART NO.	DESCRIPTION
	00132096	P.C. Board Assy., Equalizer Amp
CAPACITOR, ELECTROLYTIC		
C701, 702	31832147	22UF, 10V
C709, 710	31818932	100UF, 10V
C713, 714	31832148	33UF, 10V
C717, 718	30731310	0.1UF, 35V Tantalum
C719, 720	31832149	1UF, 50V
C721, 722	31832150	220UF, 25V
TRANSISTOR		
Q701, 702	43032151*	PNP 2SA872(E)
Q703-706	43029483*	NPN 2SC1345(E)

MAIN RECTIFIER PC BOARD



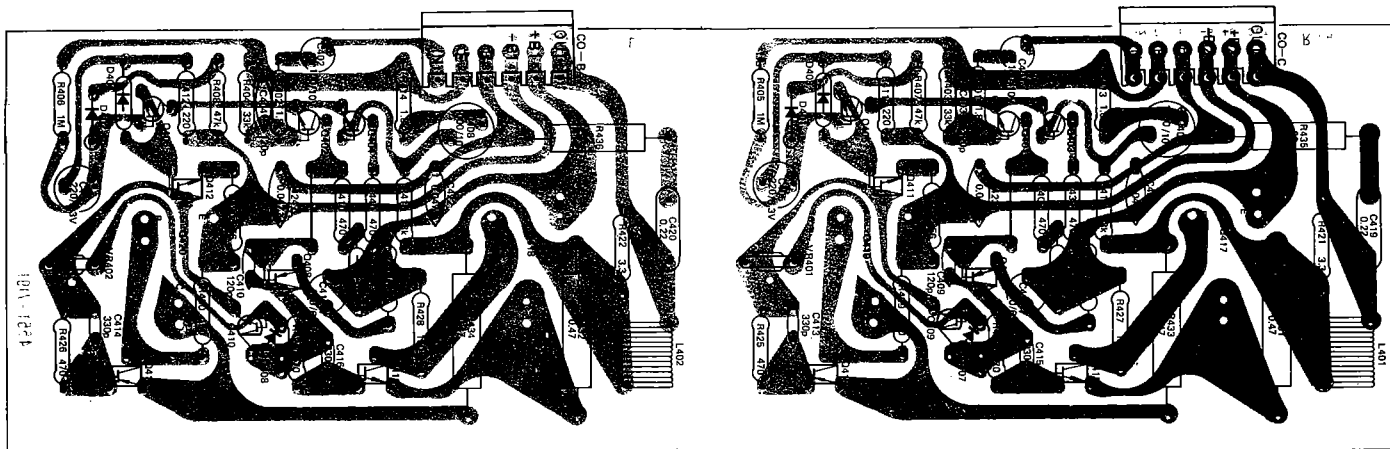
CIRCUIT REF.	H/K PART NO.	DESCRIPTION
	00132100	P.C. Board Assy., Main Rectifier
CAPACITOR, ELECTROLYTIC		
C5, 6, 9, 10	31832157	4700UF, 50V
DIODE		
D1, 2	42132159*	Bridge, Silicon, S4VB20
FUSE HOLDER		
	65432158	Holder for FU1, 2, 3, 4

SUB RECTIFIER PC BOARD



CIRCUIT REF.	H/K PART NO.	DESCRIPTION
	00132101	P.C. Board Assy., Sub Rectifier
CAPACITOR, ELECTROLYTIC		
C1, 3, 4	31832161	220UF, 16V
C2	31828611	470UF, 16V
DIODE		
D3, 4	41631295*	SIB01-02
D5	42029566*	Zener EQA01-02, 13.2V \pm 0.7V
TRANSISTOR		
Q6	43032160*	NPN 2SC1162(C)

POWER AMP PC BOARD



CIRCUIT REF.	H/K PART NO.	DESCRIPTION
	00132102	P.C. Board Assy., Power Amp
RESISTOR		
R431-434	33514781	0.47 Ohm, 2W
R435, 436	33512201	22 Ohm, 2W
VR401, 402	23531300	Variable, 1K Ohm
CAPACITOR, ELECTROLYTIC		
C401, 402	31818932	100UF, 10V
C405, 406	31832152	220UF, 6.3V
C407, 408	31831465	1000UF, 10V
C411, 412	31832162	100UF, 6.3V
DIODE		
D401-406	41030552*	1S2076
TRANSISTOR		
Q401-406	43032163*	NPN 2SC1400(UA)
Q407, 408, 413, 414	43032164*	PNP 2SB549(R)
Q409, 410	43032165*	NPN 2SC853(L)
Q411, 412, 415, 416	43032166*	NPN 2SD415(R)
VARISTOR		
D407, 408	41632167*	1S1211
COIL		
L401, 402	12032168	RF Choke

CHASSIS PARTS LIST

CIRCUIT REF.	H/K PART NO.	DESCRIPTION
CABINETRY		
	60131368	Cabinet, Top Cover
	62031373	Foot, Rubber
	60131372	Front Panel, Left and Right
	00232089	Front Panel Assy.
	61032090	Dial Panel
	63231375	Knob, Tuning
	63231376	Knob, Funtion Selector and Tone Controls
	63231377	Knob, Pushbutton, Muting/Mode/Control
	63231378	Knob, Pushbutton, Power
	61631380	Mounting Bracket, AM Ferrite Bar Antenna
MISCELLANEOUS		
	00232092	Tuning Shaft Assy.,
	00232093	Dial Pointer Assy., (without Lamp)
	60431388	Pulley, Dial Cord
	60431387	Dial Drum
	00132094	P.C. Board Assy., AM/FM Tuner, 1F, MPX
	00132096	P.C. Board Assy., Equalizer Amp
	00132097	P.C. Board Assy., Tone/Preamp
	00132098	P.C. Board Assy., Mode/Control Switch A
	00132099	P.C. Board Assy., Mode/Control Switch B
	00132100	P.C. Board Assy., Main Rectifier (without Fuses)
	00132101	P.C. Board Assy., Sub Rectifier
	00132102	P.C. Board Assy., Power Amp (without Pwr. Transistors)
	00132103	P.C. Board Assy., Dial Lamps
	00132104	P.C. Board Assy., Output/Input Jacks
	00132105	P.C. Board Assy., Function Selector
ELECTRICAL		
	00232106	Front End Assy.
L1	12032107	Coil, FM Matching
L201	12032108	Coil, 100UH
L252	20532109	AM Ferrite Bar Antenna
	65129518	External Antenna Terminal
VR354	23532111	Variable Resister 500 ohm
		Mute Adjust
Q417, 418	43032112*	Pwr. Transistor PNP, 2SB541(S) or (R)
Q419, 420	43032113*	Pwr. Transistor NPN, 2SD388(S) or (R)
	60232114	Heat Sink, Pwr. Transistor
T1, 2	10132115	Transformer, Power
SW2	25032116	Switch, Pushbutton, FM Muting
SW3	25032117*	Switch, Pushbutton, Power
	12532537	Meter, AM Tuning/FM Quieting
	65431366	Terminal, Speaker Outputs, System 1 and 2

CIRCUIT REF.	H/K PART NO.	DESCRIPTION
ELECTRICAL (continued)		
	65432118	4 Pin Jack, Main Amp In/Preamp Out
	57532091	Junction Pin for 65432118
J2	65432119	Headphone Jack
PL1	46532120*	Lamp, Pointer, 8V, 50MA
PL9	46532121*	Lamp, Power Switch, 8V, 60MA
SO1, 2	65431485	AC Socket, External, Switch and Unswitched
FU1, 2, 3, 4	45032122*	Fuse, 2.5A, 125V P/O Main Rectifier P.C. Bd.
FU5	45031336*	Fuse 3A, 250V
FU6	45032123*	Fuse 1A, 250V
	65431365*	Fuse Holder for FU5, 6
FU7	45031462*	Fuse 4A, 250V
	65429516*	Fuse Holder for FU7
CB1, 2	45532124*	Circuit Breaker, Speaker Protector

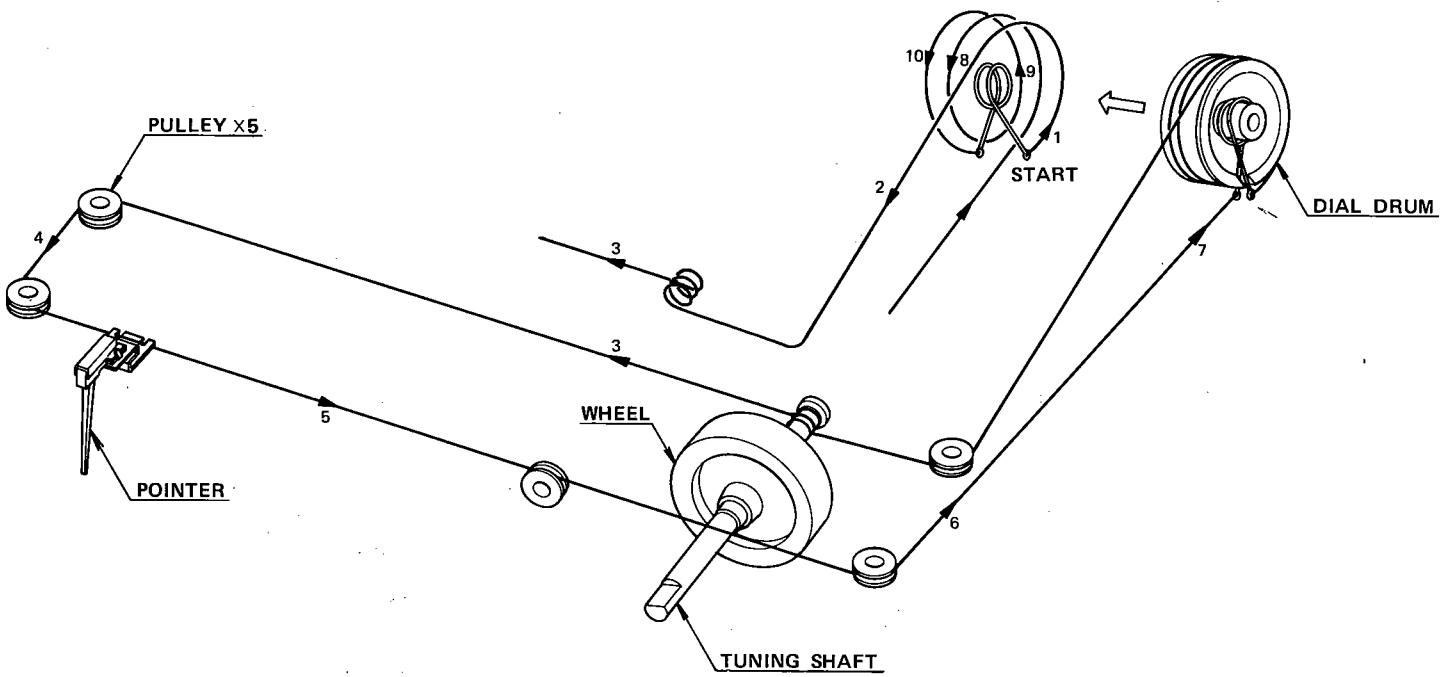
MULTIVOLTAGE RECEIVER

	00132125	P.C. Board Assy., Output/Input Jacks
	00132126	P.C. Board Assy., AM/FM Tuner, IF, MPX
J1	65432127	Jack, Din 5 Pin, Rec/PB
SW12	24031338	Switch, Rotary, Power Source Voltage Selector
SW301	24531335	Switch, Slide, De-emphasis
T1, 2	10132128	Transformer, Power
FU7	45031462*	Fuse 4A, 250V for 220V/240V Pwr. Source
FU7	45032129*	Fuse 2A, 250V for 100V/120V Pwr. Source

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.

STRINGING DIAGRAM



Start stringing with Variable Capacitor in closed position.

