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**The Harman-Kardon
Model 75 +**

**AM/Stereo FM
Multichannel Receiver**

Technical Manual

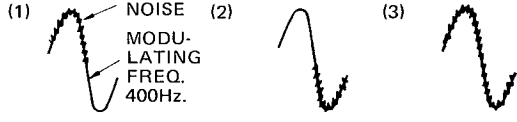
harman/kardon

ALIGNMENT PROCEDURES

FM IF & RF ALIGNMENT

INSTRUMENTS: FM S.S.G., modulator with 400Hz at 100%, V.T.V.M., Oscilloscope, and Distortion Meter.

NOTE: Set TONE control to flat response (or mechanical center of both of BASS control and TREBLE control)
Set FUNCTION selector to FM.

Step	SIGNAL SOURCE	OUTPUT METER	ADJUST	ADJUST FOR
1	Check mechanical zero center of TUNING indicator, M101 at POWER switch OFF. Adjust it if necessary.			
2	None (FM ANTENNA terminals opened). Tuning control at no signal.	TUNING indicator, connect oscilloscope and V.T.V.M. to TAPE OUT.	TOP adjuster of T101 (or RAT CAN)	Zero or center indication ON TUNING indicator M101 observing noise output with output meter.
3	Same as above.	Same as above.	Bottom adjuster of T101.	Maximum noise output on V.T.V.M.
4	Same as above.	Same as above.	TOP and bottom adjusters of 'IF' in FRONT-END	Same as above.
5	Connect SSG to FM ANT terminal, with no signal (or SSG OFF). Tuning control at no signal.	Same as above.	Readjust TOP adjuster of T101.	Zero or center indication ON TUNING indicator, M101.
6	Set SSG output to 88MHz, Tune radio to 88MHz of SSG.	Same as above.	LO, LR and LA in FRONT-END.	Maximum noise output on V.T.V.M.
7	Set SSG output to 106MHz, and tune radio to 106MHz.	Same as above.	TCO, TCR and TCA in FRONT-END.	Same as above.
8	Repeat step 6 and 7 for best sensitivity.			
9	Use very weak signals of 88MHz. Tune radio to 88MHz.	Same as above.	LA and LR.	Zero or center indication of TUNING indicator M101.
10	Use very weak signals of 106MHz. Tune radio to 106MHz.	Same as above.	TCA and TOR.	Same as above.
11	Repeat step 3 through 5 for best setting under SSG connected but no signal.			
12	Use 98MHz, 1mV signals from SSG modulated with 400Hz at 100%. Tune radio to 98MHz. (Note: If another signal exists, shift to quiet point)	Connect distortion meter, V.T.V.M. and oscilloscope to SPEAKER out.	Bottom adjuster of T101.	Minimum harmonic distortion on distortion meter keeping noise output to 3V on V.T.V.M. (adjust VOLUME CONTROL VR301 through VR601, if necessary).
13	Same as above.	Same as above.	<p>Observe output waveform with oscilloscope at S/N = 20 to 30dB. Observed waveform will be (1), (2) or (3), below:</p>  <p>UNACCEPTABLE UNACCEPTABLE ACCEPTABLE</p> <p>Wave form (1) and (2) will result from misalignment.</p> <p>(1) To correct, carefully adjust two adjusters of IF on the FRONT-END and bottom adjuster of T101.</p> <p>(2) Check TUNING meter zero center again under no signals of SSG. If necessary, adjust the zero point with TOP adjuster of T101.</p> <p>(3) For ANTENNA input of 1mV from SSG, distortion shall be adjusted with bottom adjuster of T101, if, necessary.</p>	

AM ALIGNMENT PROCEDURE

INSTRUMENTS: SSG, modulated with 400Hz at 30%, V.T.V.M., AM IF Sweep Generator, and Oscilloscope.

NOTE: Set FUNCTION selector to AM.

Connect signal source to a loop placed to radiate signals into AM ANT LOOP STICK.

Step	SIGNAL SOURCE OUTPUT	CONNECT OUTPUT METER TO	DIAL SETTING	ADJUST	ADJUST FOR
1	455kHz of sweep generator	V.T.V.M. & oscilloscope to TAPE OUT	Quiet point near 1600kHz	T162 (Black)	Maximum and symmetrical pattern on SCOPE
2				T161, input side	
3				T161, output side	
4	Repeat step 1 through 3 for best sensitivity and symmetrical pattern on oscilloscope.				
5	525kHz of S.S.G.	V.T.V.M. to TAPE OUT 1 and distortion meter together with oscilloscope to speaker out	Gang fully closed	L162 (Black)	Maximum output
6	1700kHz of S.S.G.		Gang fully opened	AM oscillator trimmer	
7	Repeat step 5 and 6 for best sensitivity				
8	600kHz of S.S.G.	Same as above	600kHz	AM ANT LOOP STICK	Same as above
9	1400kHz of S.S.G.		1400kHz	AM ANT trimmer	
10	Repeat step 8 and 9 for best sensitivity.				

SIDE CHAIN ALIGNMENT FOR MUTING & STEREO THRESHOLD

Step	SIGNAL SOURCE	OUTPUT METER 11	ADJUST	ADJUST FOR
14	Repeat 1, 2 and 3 for optimum setting.			
15	Connect SSG to FM ANT terminal. Quiet point near 98MHz. SSG set on CW	D.C. Voltmeter from ground to R141.	STEREO THRESHOLD VR012.	1.50V on DC voltmeter
16			L101 and SSG output.	Maximum on DC voltmeter; keep DC voltage to 1.50V by adjusting SSG output. TUNING indicator, M101 must indicate zero center all times.
17			MUTING ADJUSTER, VR 101.	Finally, audio output must drop by 3dB with FM MUTING switch ON.
18	Check again zero center on TUNING INDICATOR, M101 with no signal.			

$$\begin{array}{r} 136.20 \\ + 25 \\ \hline 136.45 \\ - 2240 \\ \hline 2240 \end{array}$$

$$\begin{array}{r} 14 \\ 315 \\ 2520 \\ \hline 10080 \\ 3540 \\ \hline 13620 \end{array}$$

4.72
7.5

$$\begin{array}{r} 5 \\ 4.72 \\ 7.5 \\ \hline 2360 \\ 3304 \\ \hline 2540 \end{array}$$

MPX ALIGNMENT PROCEDURE

INSTRUMENTS: S.S.G., Stereo Generator, V.T.V.M., Oscilloscope, Oscilloscope of low input capacitance, and Distortion Meter
L + R = 90%, PILOT = 9%, modulation

NOTE: Set TONE control to flat response (or mechanical center of both of BASS control and TREBLE control).
Set FUNCTION selector to FM STEREO.

Step	SIGNAL SOURCE	OUTPUT METER	ADJUST	ADJUST FOR
1	Connect SSG modulated with MPX Generator to FM ANT terminals. Output level: 1mV Pilot level: 6%	Connect low input capacitance oscilloscope to TEST POINT TP. Connect oscilloscope to TAPE OUT of both channels.	L102	For maximum on scope connected to T.P. at minimum resistance (or extreme counter clockwise) of VR101 and maximum resistance (or extreme clockwise of VR102.
2			L103	
3			L104	
4			VR101	
5	Same as above, but PILOT LEVEL: 9%, only RIGHT channel is modulated with main signal of 1kHz.		L102	For maximum stereo separation.
6	Change main signal modulation to LEFT channel.		L102	For maximum stereo separation.
7	Repeat step 5 and 6, and if unbalance of stereo separation between LEFT and RIGHT exists, correct it with VR102.			
8	Check PILOT level that STEREO INDICATION lights at 5.5% to 6.5% of PILOT LEVEL and that the INDICATION does not light at 1% of P.L.			
9	Return PILOT LEVEL to 9% and check stereo separation at 100Hz and 10kHz.			
10	At 32dB (40μV) of SSG output, adjust STEREO THRESHOLD, VR012 for STEREO INDICATION ON.			
11	Remove oscilloscope from test point, TP and adjust again L104 for best stereo separation.			

POWER AMP. UNIT (Alignment of Idle current of output transistors).

INSTRUMENTS: High sensitivity D.C. voltmeter or synchroscope.

NOTE: Set VOLUME control to minimum output.
No signal.

Step	CONNECT M.S. VOLTMETER TO	ADJUST	ADJUST FOR
1	Across emitter of Q347 and collector of Q348.	VR341	5.5mV on voltmeter.
2	Across emitter of Q447 and collector of Q448.	VR441	Same as above.
3	Across emitter of Q547 and collector of Q548.	VR541	Same as above.
4	Across emitter of Q647 and collector of Q648.	VR641	Same as above.

SQ UNIT

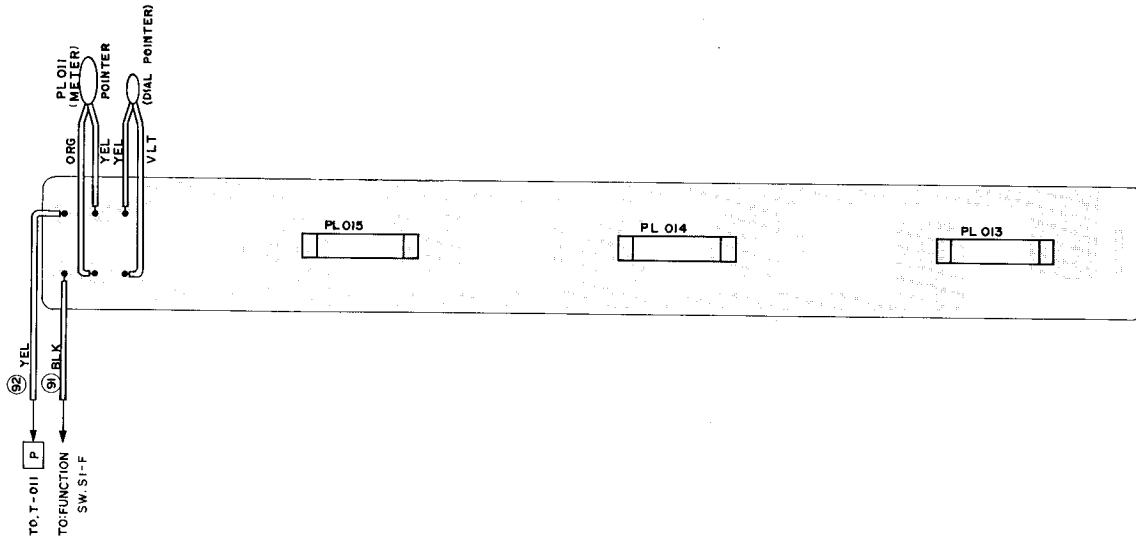
INSTRUMENTS: AF Oscillator, 2-V.T.V.M., and Oscilloscope

NOTE: Set MODE selector to ENHANCE STEREO.

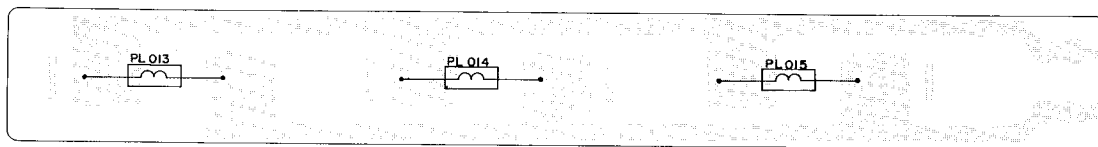
Keep AF oscillator output to 1.0V at 1000Hz during alignment.

Step	SIGNAL SOURCE	OUTPUT METER	ADJUST	ADJUST FOR
1	Connect AFO to LT.	Connect scope and V.T.V.M. to LF	VR201	1.0V on V.T.V.M.
2	Same as above.	Connect scope and V.T.V.M. to LB	VR202	1.0V on V.T.V.M.
3	Connect AFO to RT	Connect scope and V.T.V.M. to RF	VR203	1.0V on V.T.V.M.
4	Same as above.	Connect scope and V.T.V.M. to RB	VR204	1.0V on V.T.V.M.

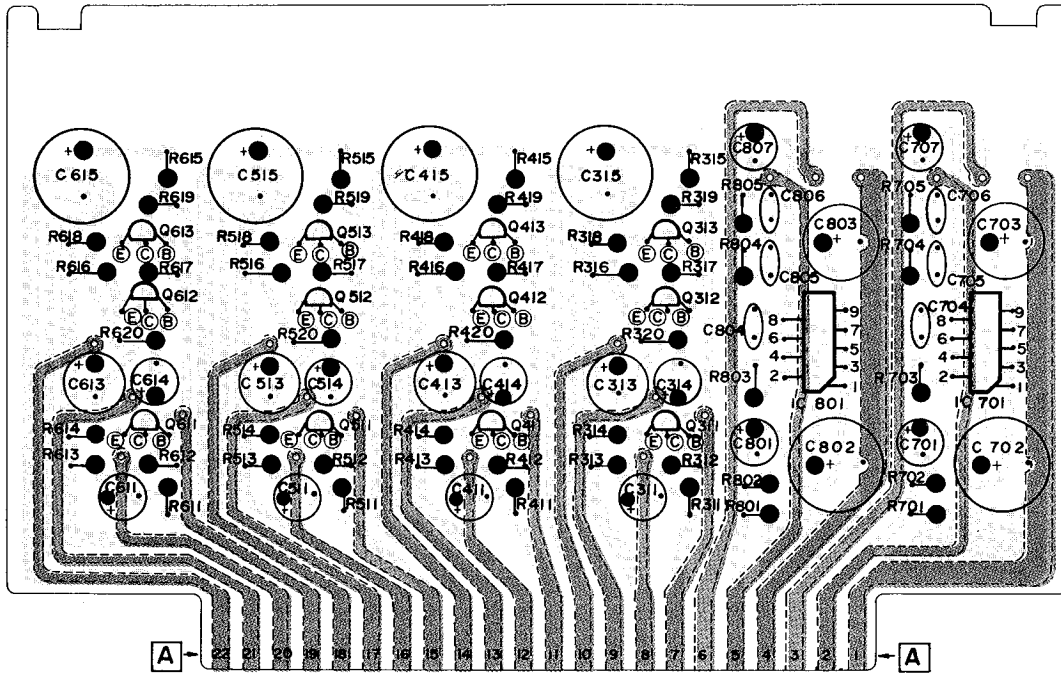
DIAL LAMP BOARD — TOP



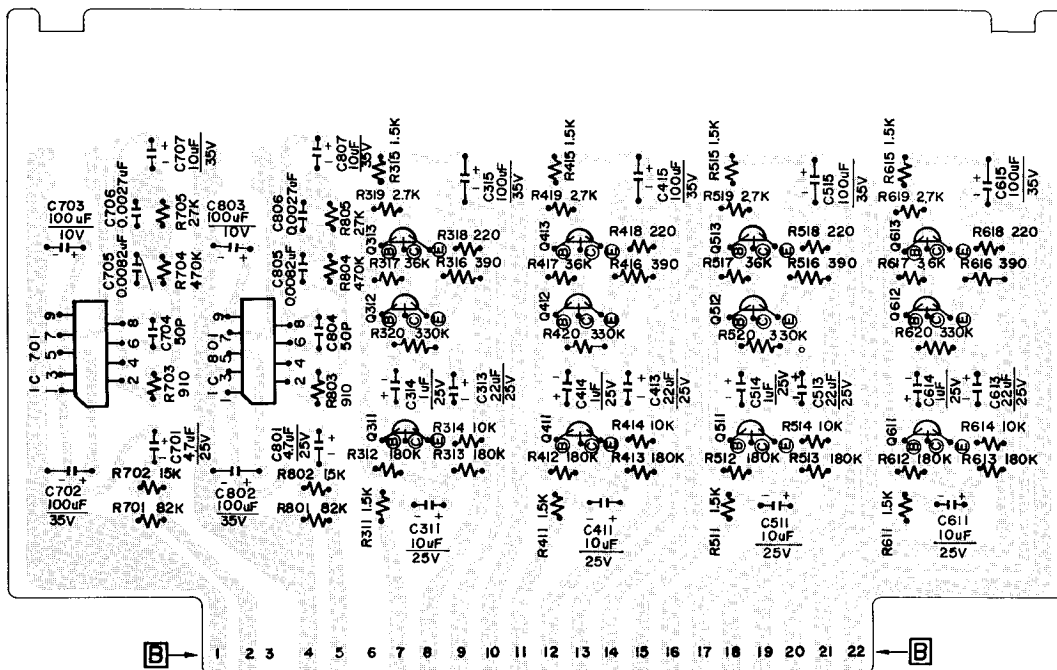
DIAL LAMP BOARD — BOTTOM



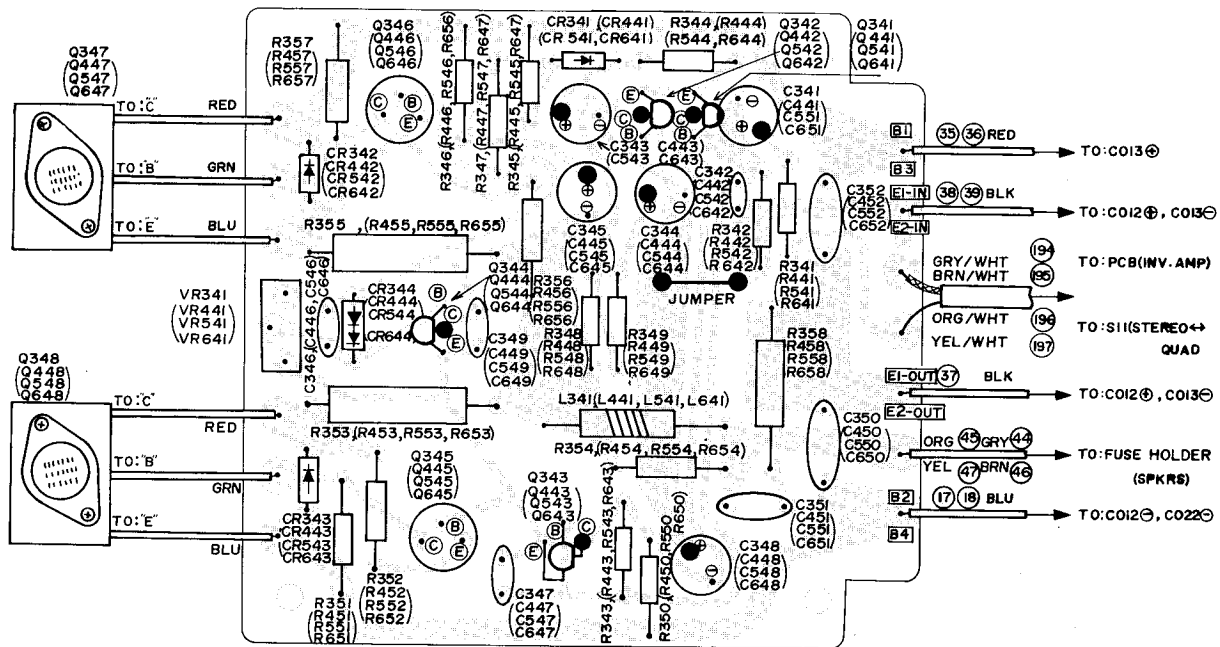
PREAMP BOARD—TOP



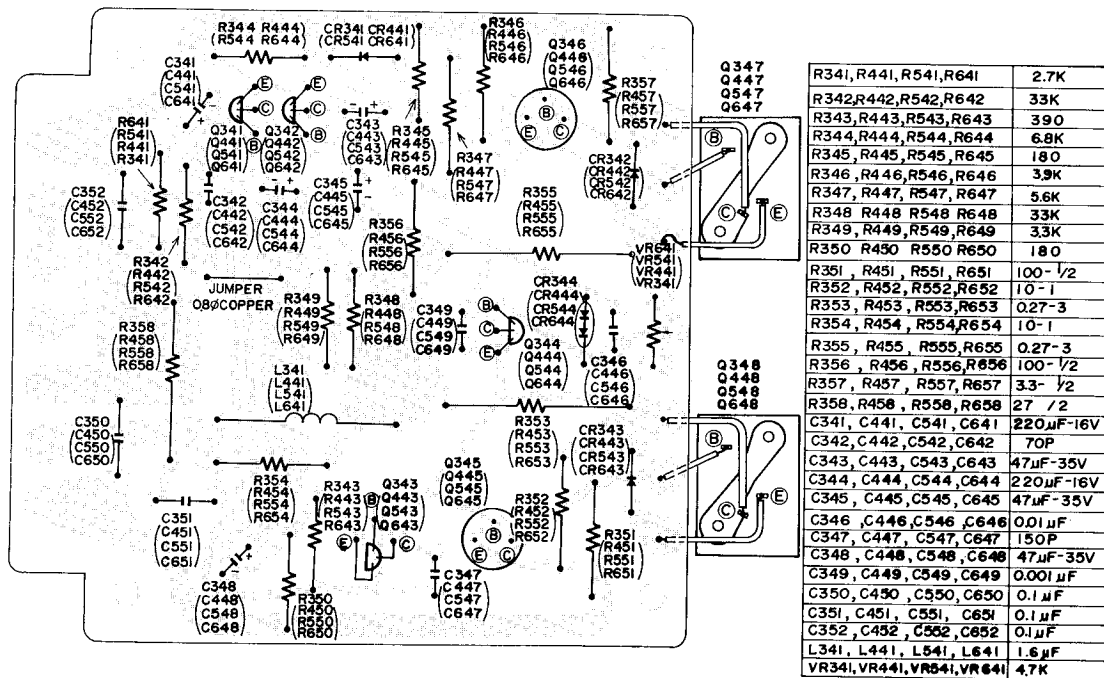
PREAMP BOARD—BOTTOM



POWER AMP BOARD — TOP

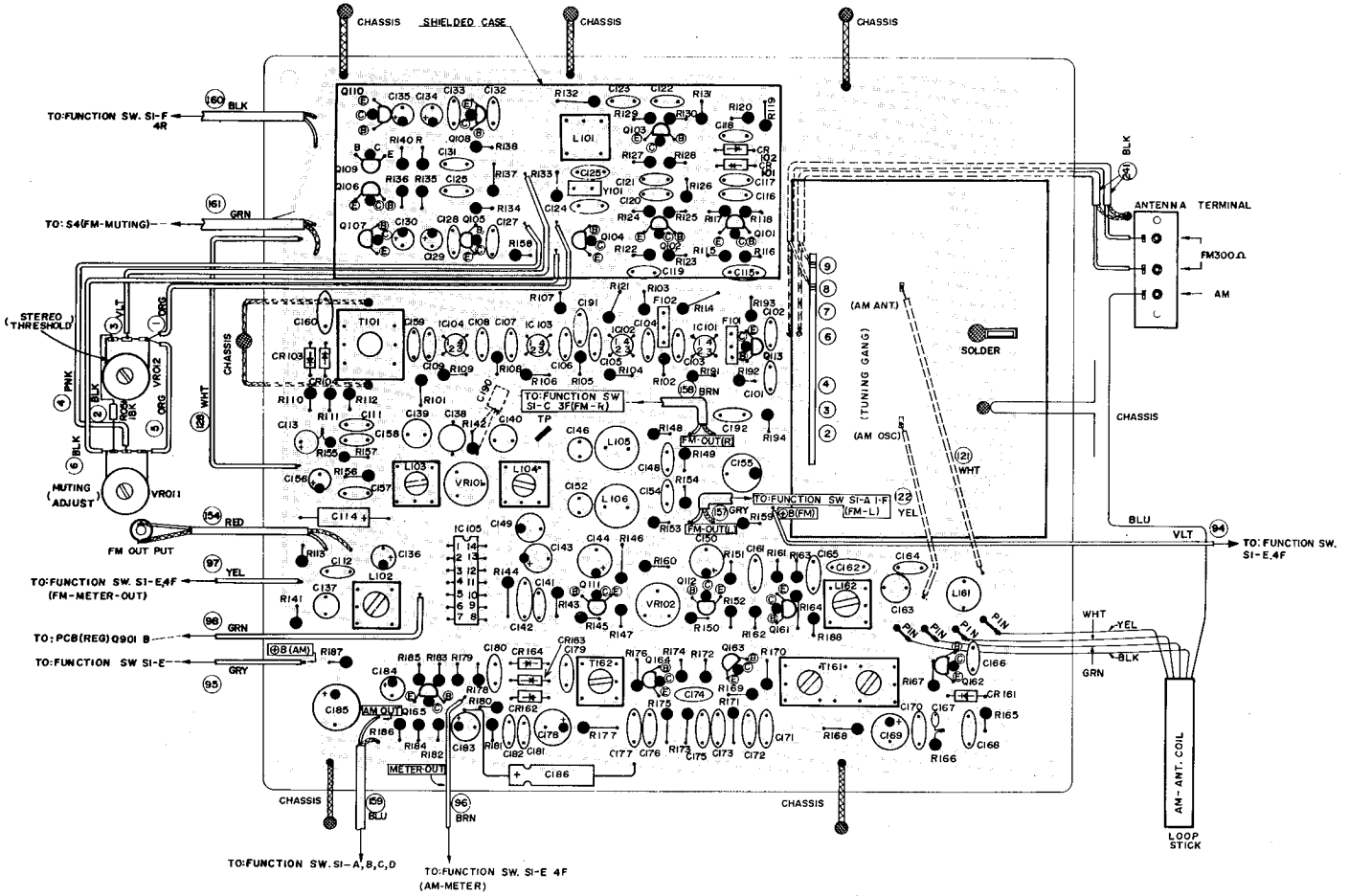


POWER AMP BOARD — BOTTOM

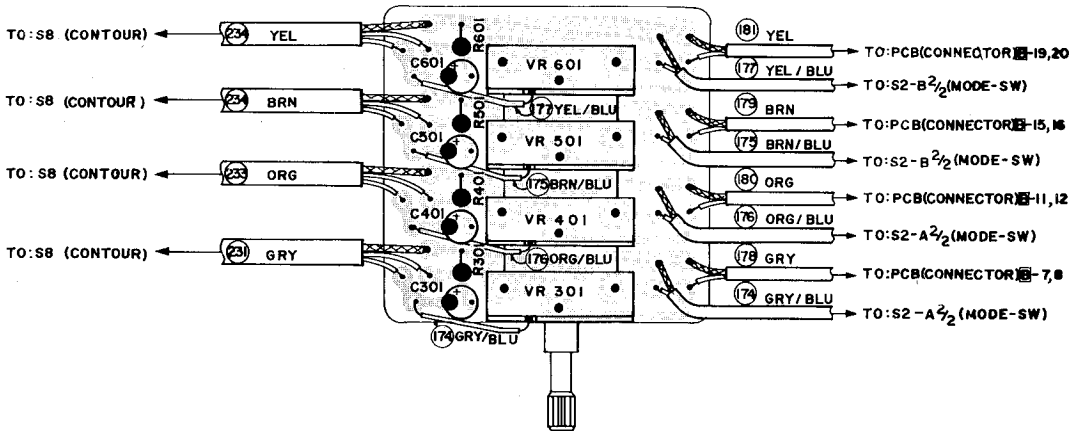


Q341-Q348	CR341-CR343	C341-C352	R341-R357	L341	VR341	LF (LEFT FRONT)
Q441-Q448	CR441-CR443	C441-C452	R441-R457	L441	VR441	LB (LEFT BACK)
Q541-Q548	CR541-CR543	C541-C552	R541-R557	L541	VR541	RF (RIGHT FRONT)
Q641-Q648	CR641-CR643	C641-C652	R641-R657	L641	VR641	RB (RIGHT BACK)

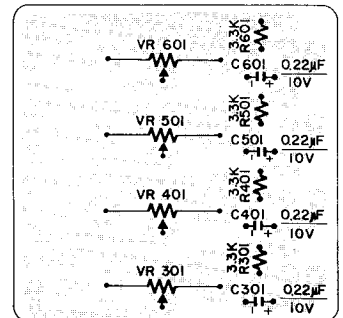
AM-FM TUNER BOARD — TOP



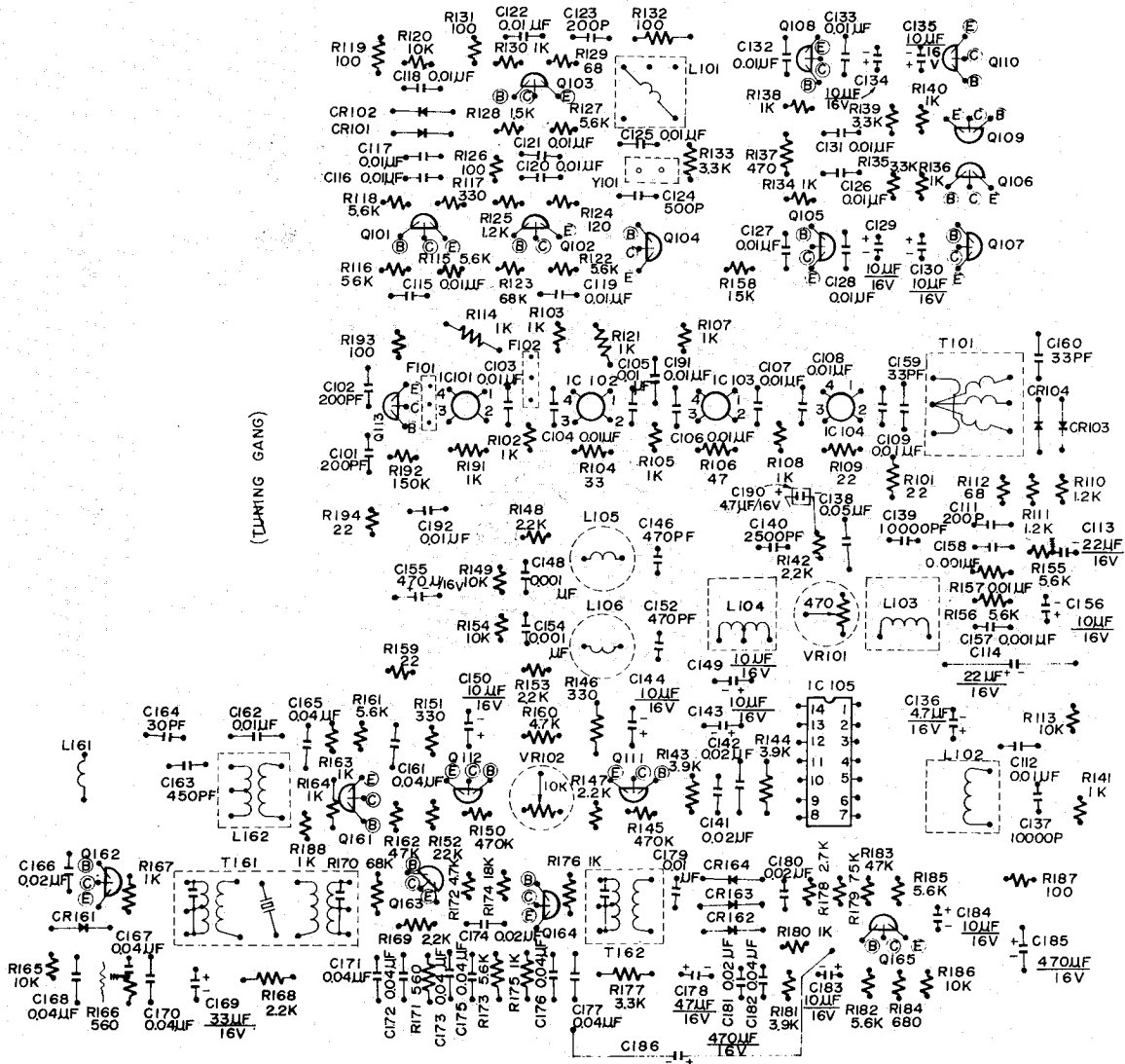
VOLUME CONTROL BOARD — TOP



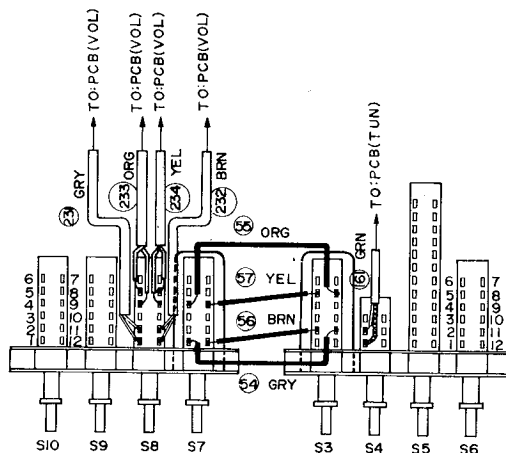
VOLUME CONTROL BOARD — BOTTOM



AM-FM TUNER BOARD — BOTTOM

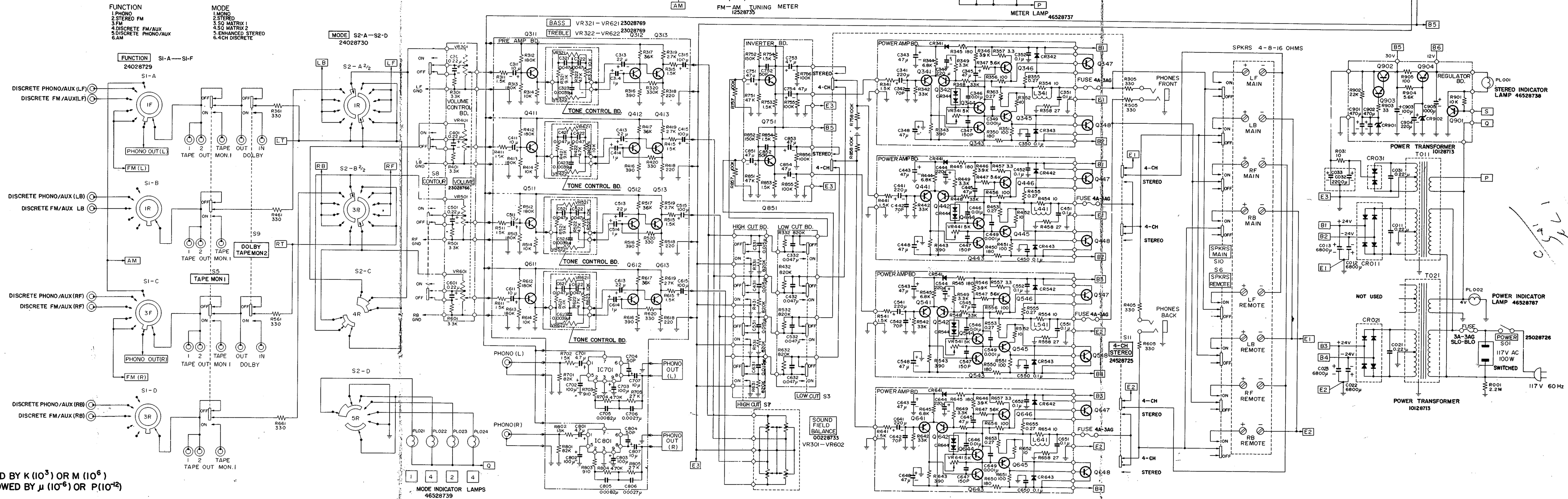
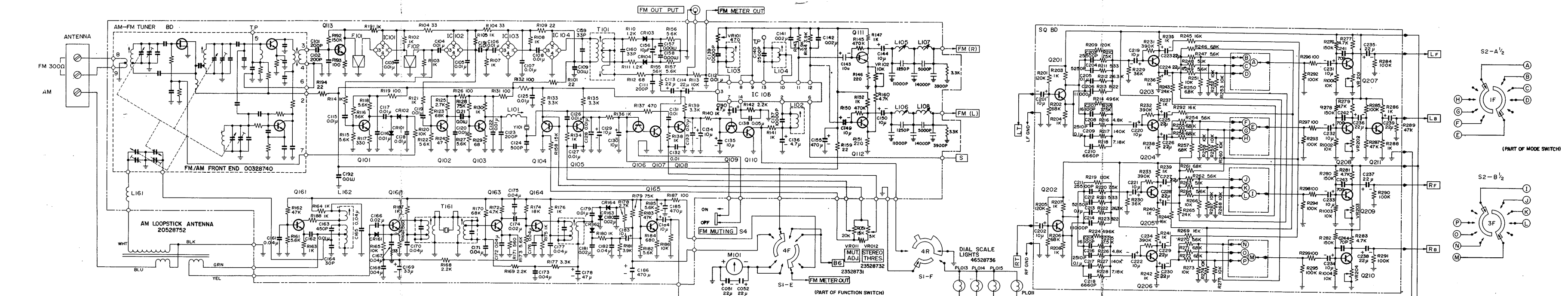


SWITCH DIAGRAM



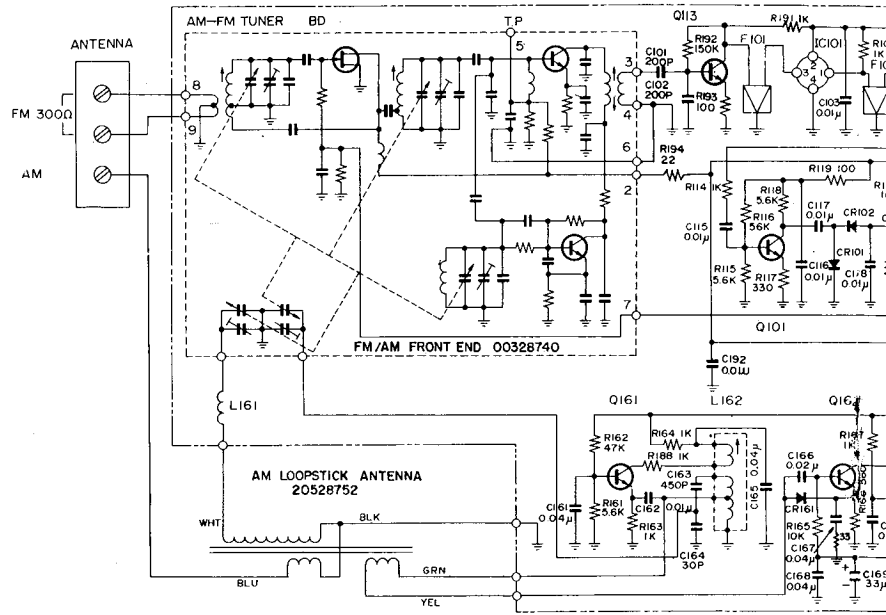
- S3 LOW CUT
- S4 FM MUTING
- S5 TAPE MON.1
- S6 SPKRS(REMOTE)
- S7 HIGH CUT
- S8 CONTOUR
- S9 EXT DOLBY NR(TAPE MON,2)
- S10 SPKRS(MAIN)

SCHEMATIC DIAGRAM — MODEL 75 +



NOTES
 1. ALL RESISTORS IN OHMS UNLESS FOLLOWED BY K (10^3) OR M (10^6)
 2. ALL CAPACITORS IN FARADS UNLESS FOLLOWED BY μ (10^{-6}) OR P (10^{-12})
 3. ALL VOLTAGES TAKEN WITH "0" SIGNAL

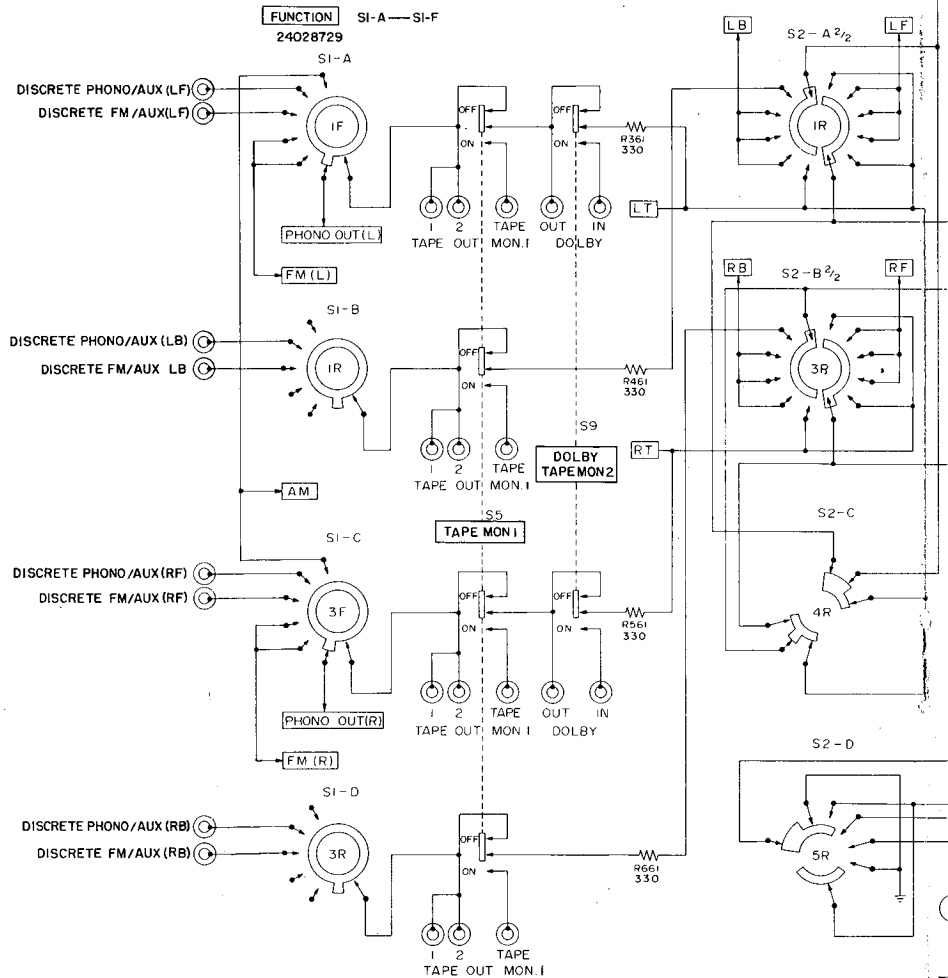
SCHEMATIC DIAGRAM — MODEL 75 +



FUNCTION
 1. PHONO
 2. STEREO FM
 3. FM
 4. DISCRETE FM/AUX
 5. DISCRETE PHONO/AUX
 6. AM

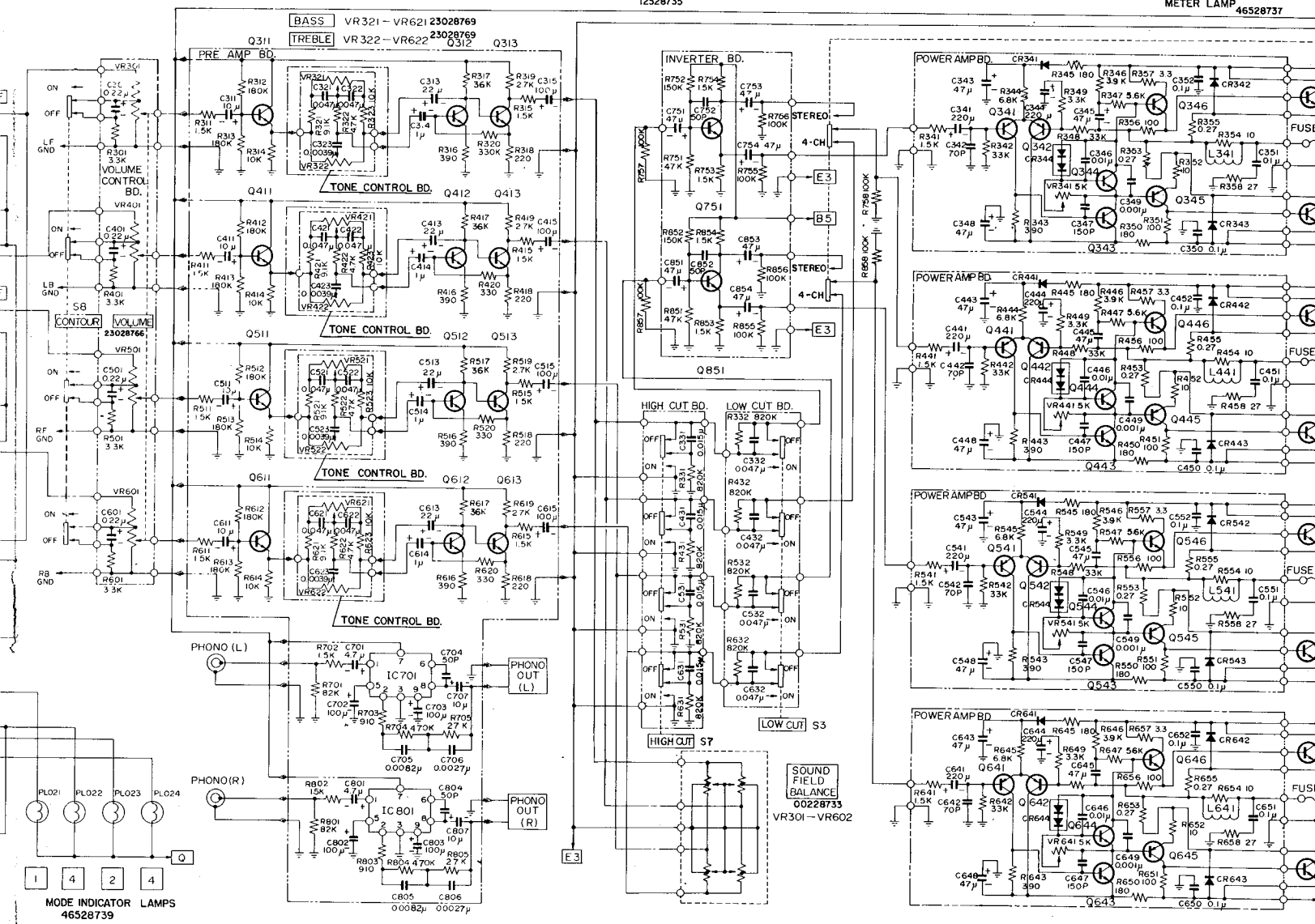
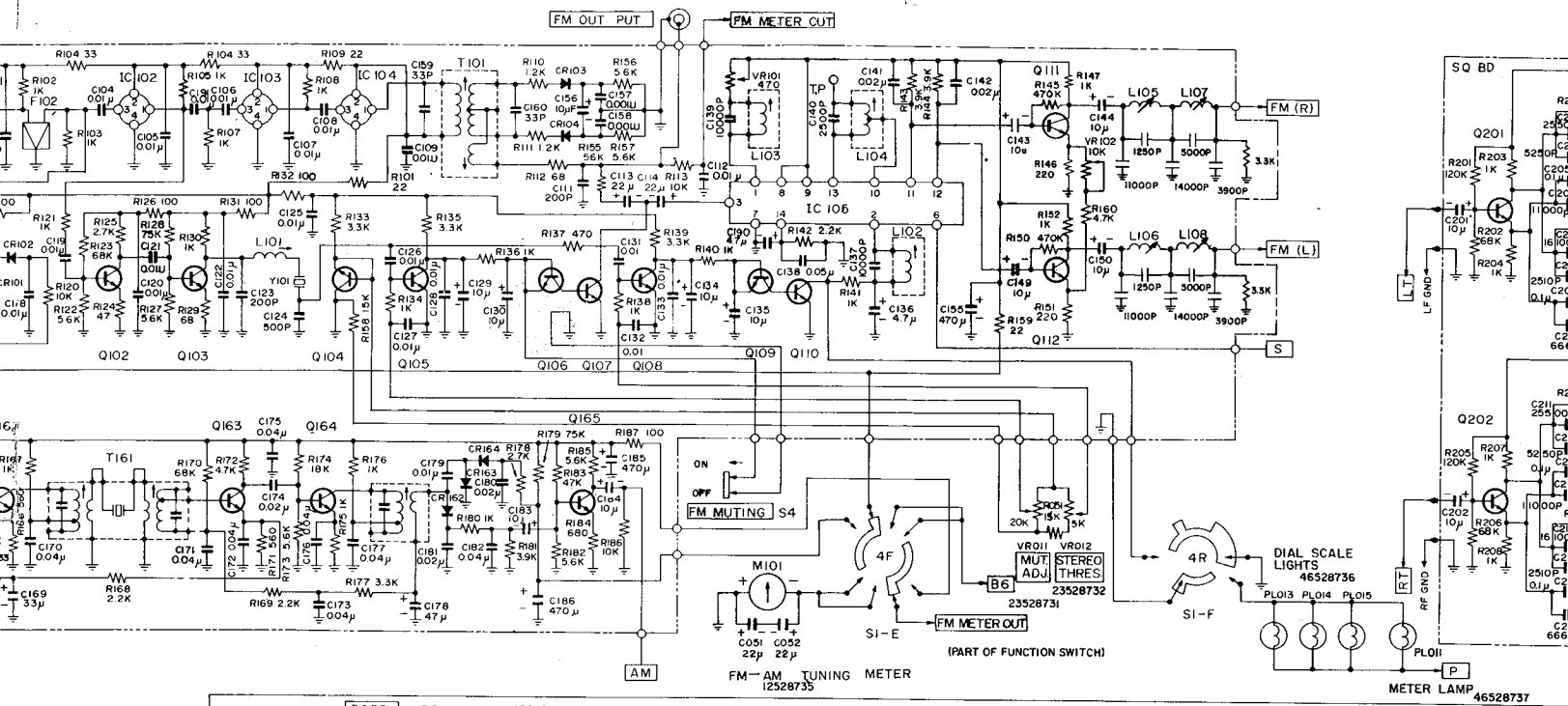
MODE
 1. MONO
 2. STEREO
 3. SQ MATRIX 1
 4. SQ MATRIX 2
 5. ENHANCED STEREO
 6. 4CH DISCRETE

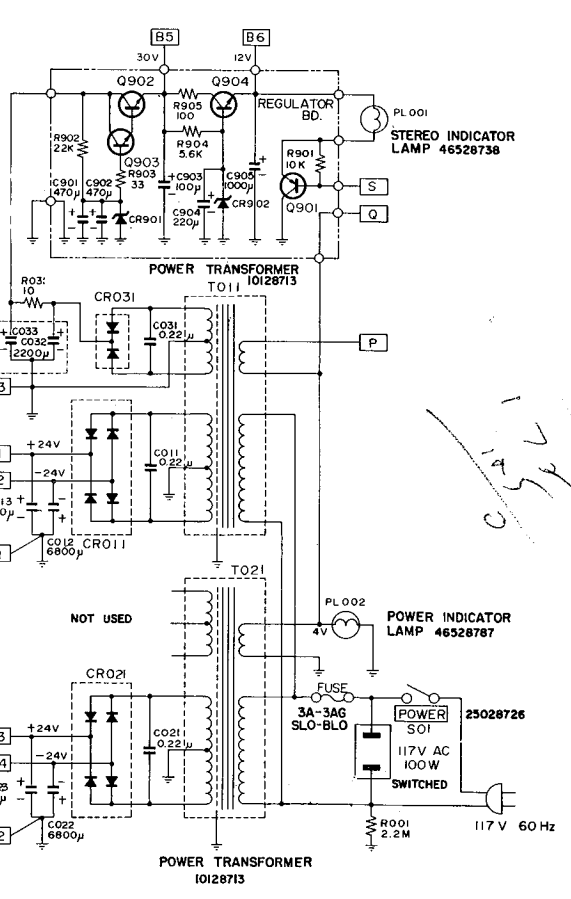
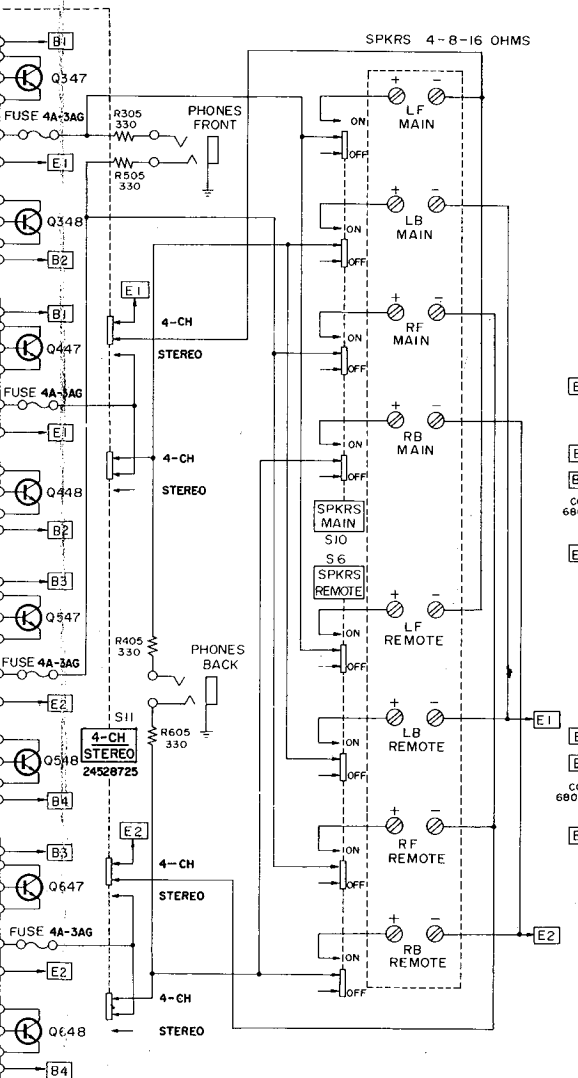
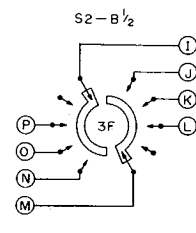
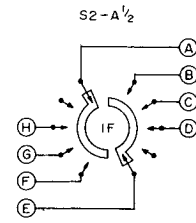
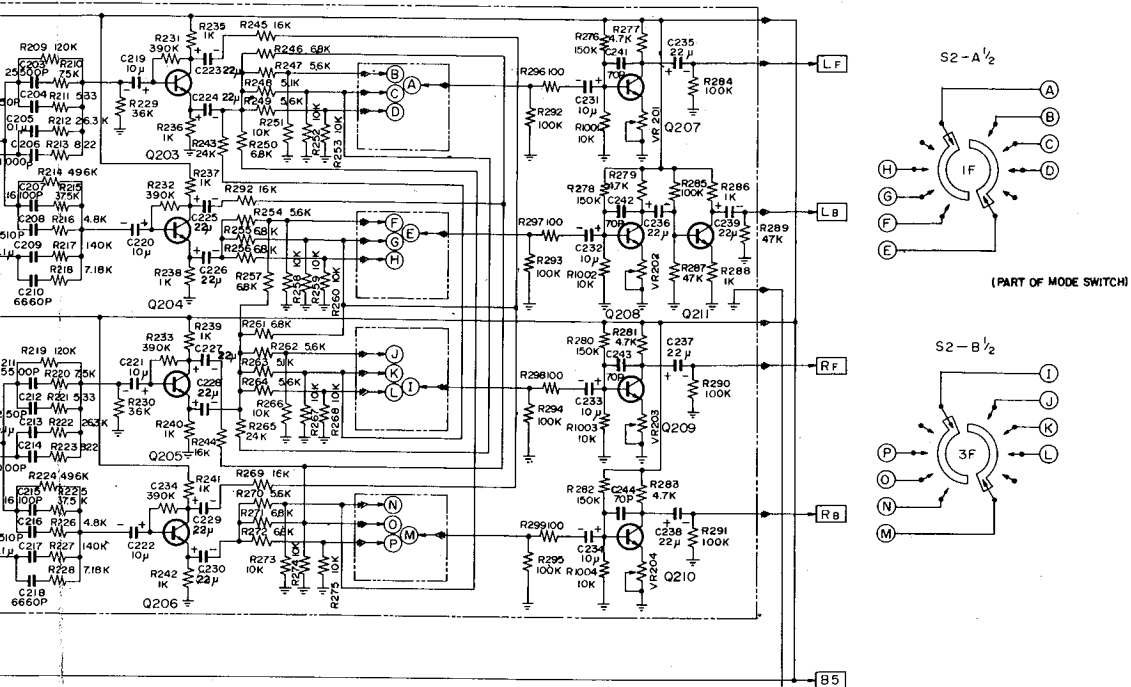
MODE S2-A—S2-D
 24028730



NOTES

1. ALL RESISTORS IN OHMS UNLESS FOLLOWED BY K (10^3) OR M (10^6)
2. ALL CAPACITORS IN FARADS UNLESS FOLLOWED BY μ (10^{-6}) OR P (10^{-12})
3. ALL VOLTAGES TAKEN WITH "0" SIGNAL

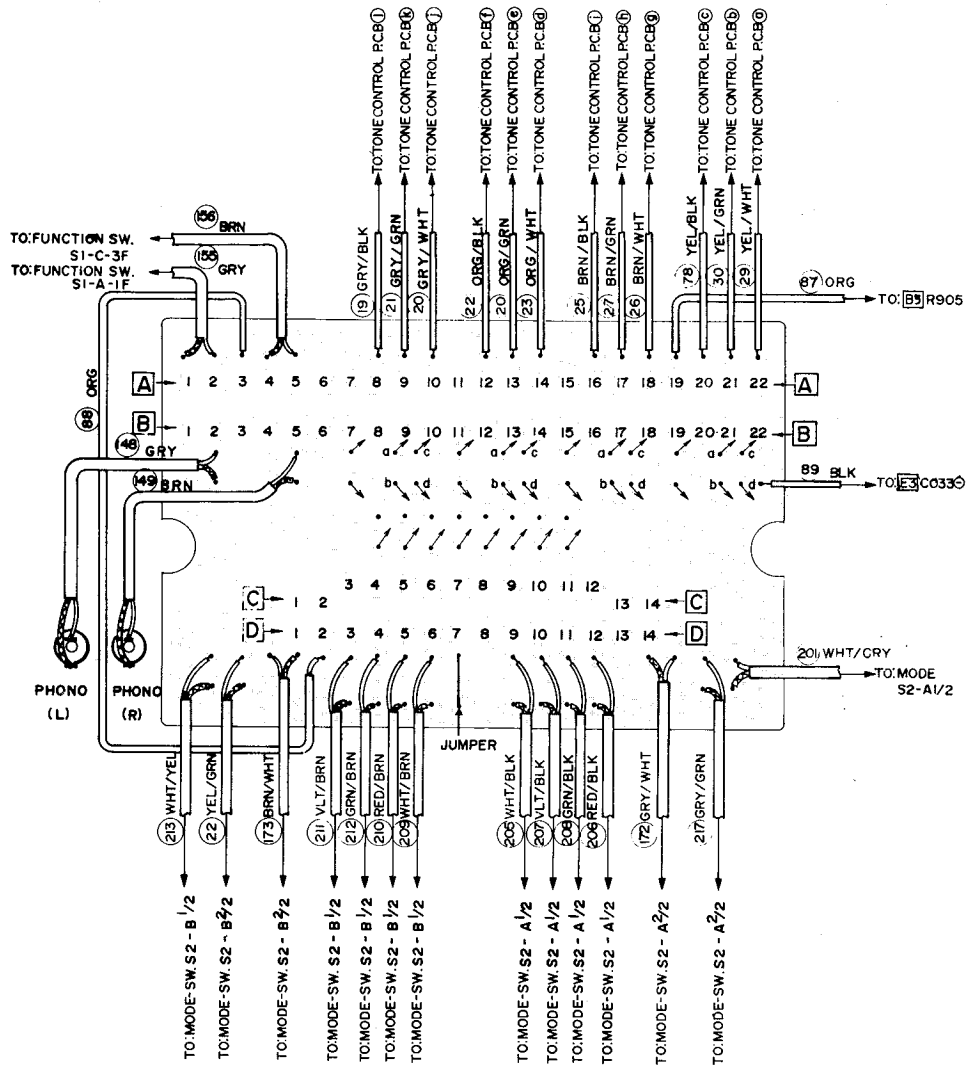




Handwritten notes:

- $\frac{30V}{12V} = 2.5$
- $\frac{12V}{30V} = 0.4$
- $\frac{30V}{12V} = 2.5$
- $\frac{12V}{30V} = 0.4$

CONNECTOR BOARD

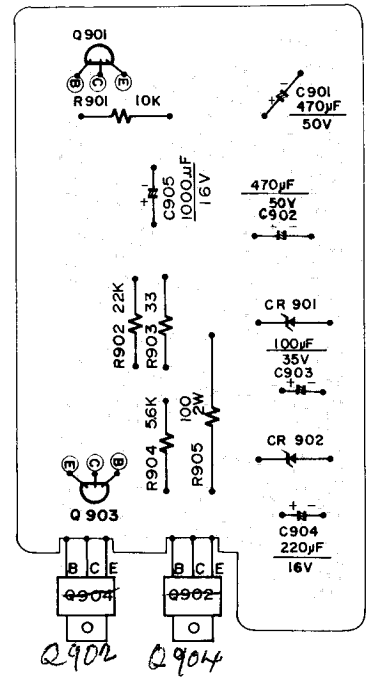
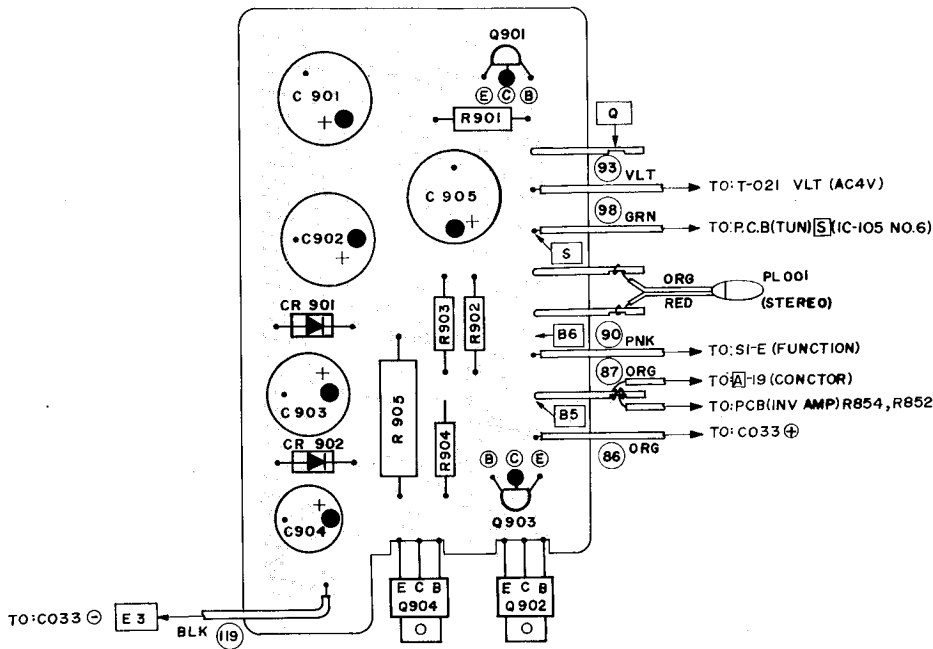


FROM	WIRE COLOR	TO
CONNECTOR-P.C.B [C] 4 / GND	(215) VLT / YEL	S2-B 1/2 (MODE-SW)
" " [C] 5 / GND	(216) GRN / YEL	S2-B 1/2 (" ")
" " [C] 6 / GND	(214) RED / YEL	S2-B 1/2 (" ")
" " [C] 7 / GND	(218) BRN / GRN	S2-B 2/2 (" ")
" " [C] 8 / GND	(218) ORG / GRN	S2-B 2/2 (" ")
" " [C] 9 / GND	(203) VLT / GRN	S2-B 1/2 (" ")
" " [C] 10 / GND	(203) GRN / GRN	S2-B 1/2 (" ")
" " [C] 11 / GND	(202) RED / GRN	S2-B 2/2 (" ")
" " [B] 7/8 GND	(178) GRY	PCB(VOLUME)
" " [B] 9a / 10b	(182) GRY / VLT	SOUND FILD BALANCE
" " [B] 9c / 10d	(184) GRY / BLK	S7(HIGH CUT)
" " [B] 11/2 GND	(184) ORG	PCB(VOLUME)
" " [B] 13a / 14b	(184) ORG / VLT	SOUND FILD BALANCE
" " [B] 13c / 14d	(182) ORG / BLK	S7(HIGH CUT)
" " [B] 15/16 GND	(173) BRN	PCB(VOLUME)
" " [B] 17a / 18b	(183) BRN / VLT	SOUND FILD BALANCE
" " [B] 17c / 18d	(187) BRN / BLK	S7(HIGH CUT)
" " [B] 19/20 GND	(181) YEL	PCB(VOLUME)
" " [B] 21a / 22b	(182) YEL / VLT	SOUND FILD BALANCE
" " [B] 21c / 22d	(184) YEL / BLK	S7(HIGH CUT)

FROM	TO
[C] 4 / [D] 4 (GND)	SQ-P.C.B - [C] 10 - 14 (GND)
[C] 1 / [D] 1 (GND)	" - [C] 10 - 11 (GND)
[C] 3 / GND	" - [C] 13 (GND)
[C] 6 / GND	" - [C] 8 (GND)
[C] 7 / GND	" - [C] 7 (GND)
[C] 2 / GND	" - [C] 2 (GND)

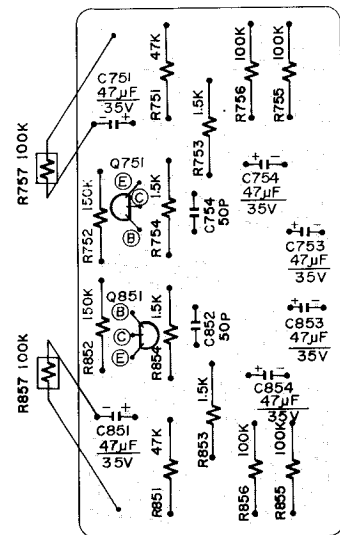
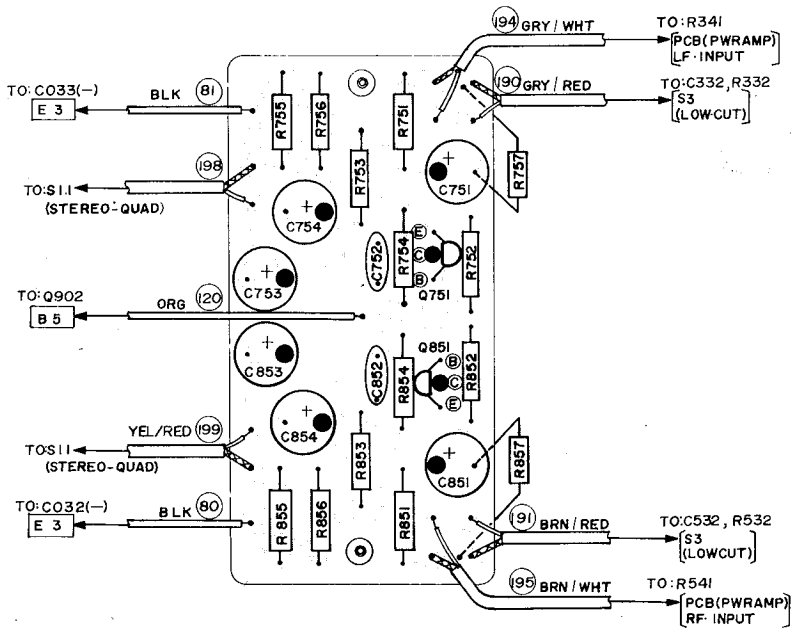
REGULATOR BOARD — TOP

REGULATOR BOARD — BOTTOM

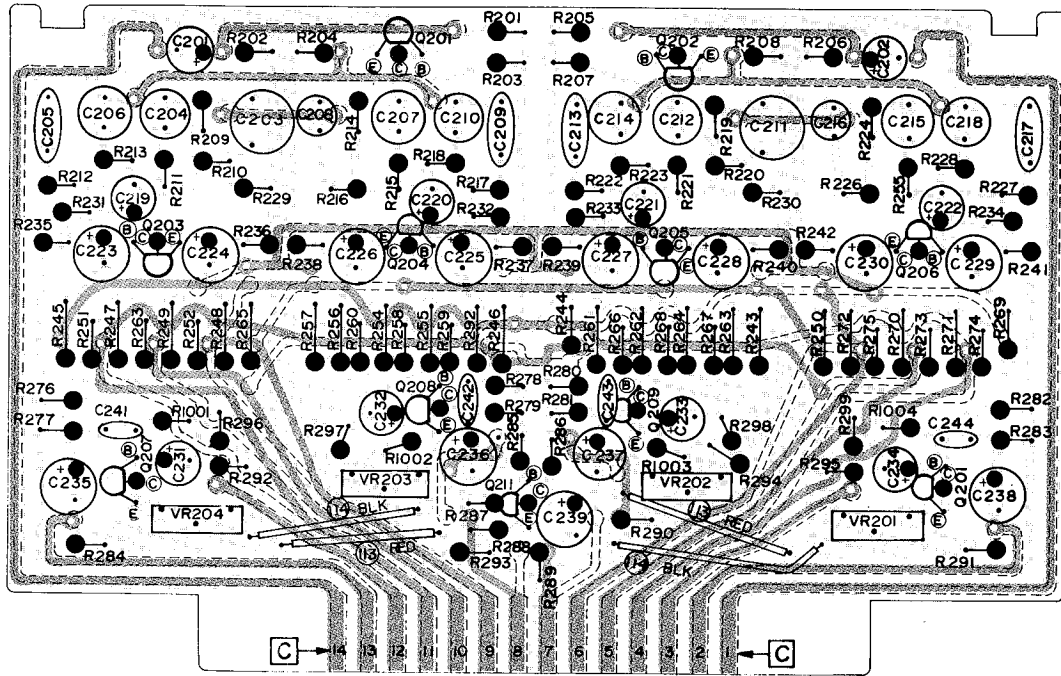


INVERTER BOARD — TOP

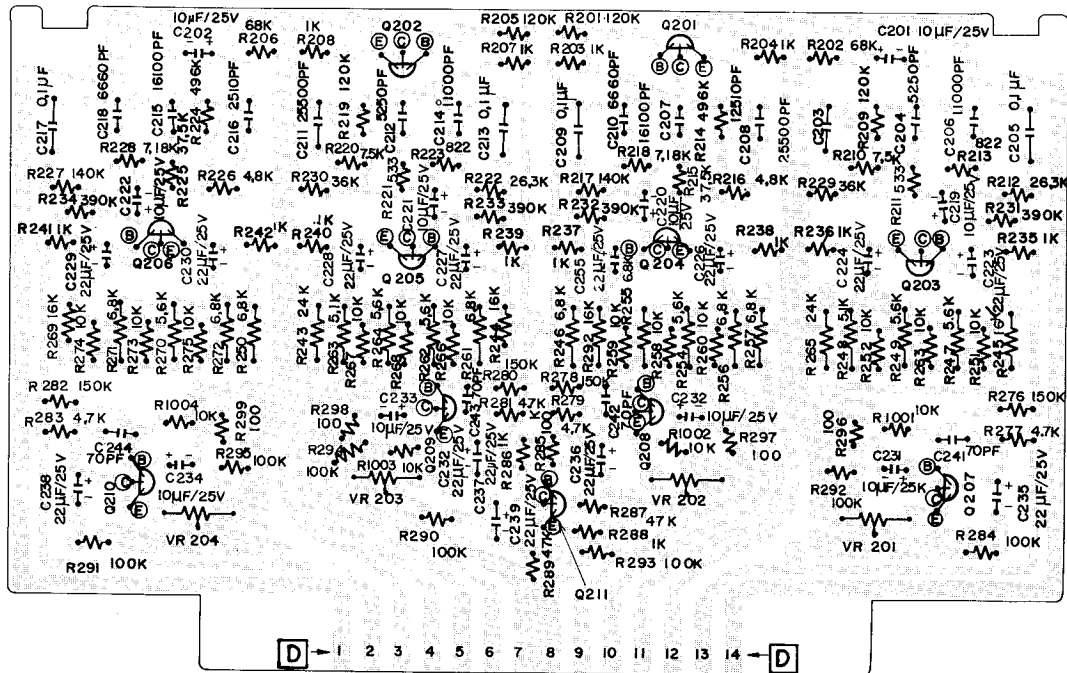
INVERTER BOARD — BOTTOM



SQ BOARD — TOP

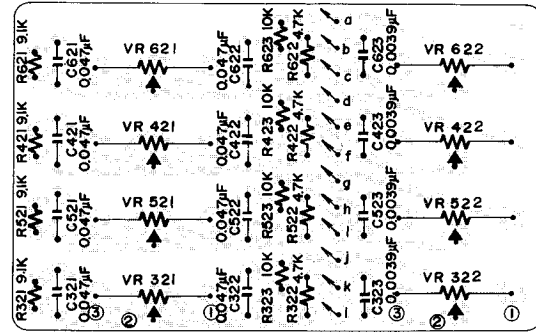
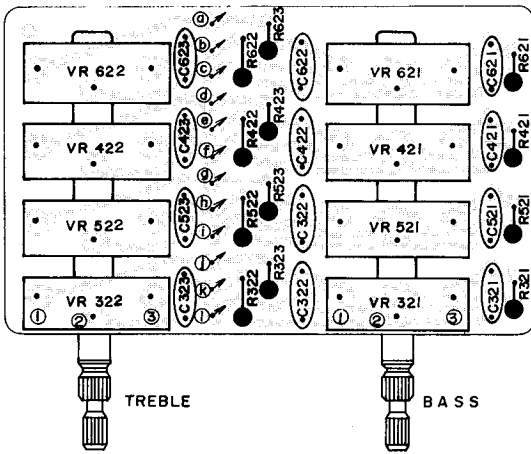


SQ BOARD — BOTTOM



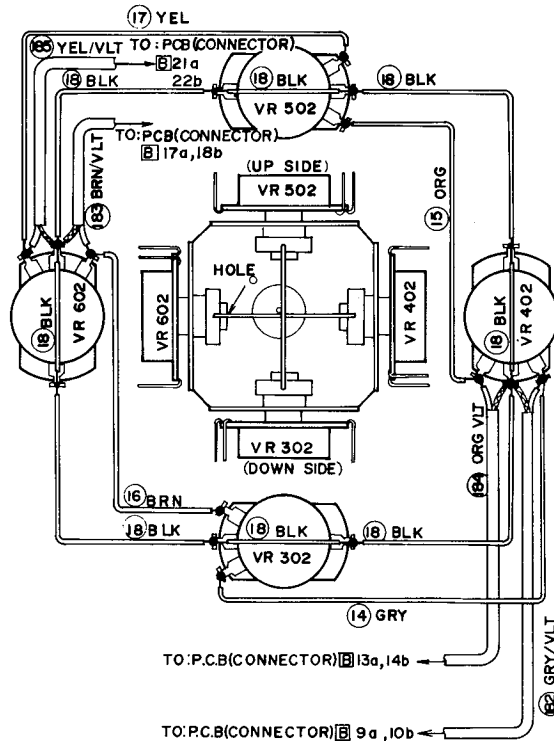
TONE CONTROL BOARD — TOP

TONE CONTROL BOARD — BOTTOM

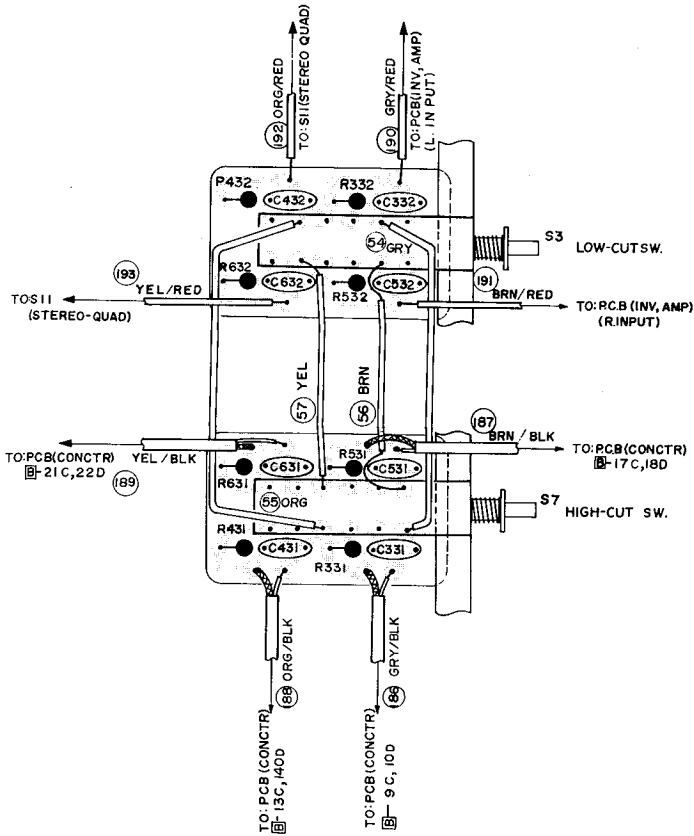


FROM	WIRE NO., COLOR	TO
TONE CONTROL PCB	① YEL / WHT	PCB(CONCTR) A-22
"	② YEL / GRN	" A-21
"	③ YEL / BLK	" A-20
"	④ ORG / WHT	" A-14
"	⑤ ORG / GRN	" A-13
"	⑥ ORG / BLK	" A-12
"	⑦ BRN / WHT	" A-18
"	⑧ BRN / GRN	" A-17
"	⑨ BRN / BLK	" A-16
"	⑩ GRY / WHT	" A-10
"	⑪ GRY / GRN	" A-9
"	⑫ GRY / BLK	" A-8

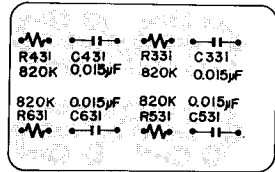
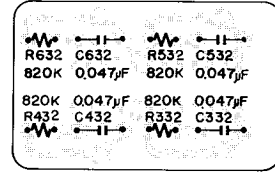
SOUND FIELD BALANCE



LOW CUT BOARD/HIGH CUT BOARD—TOP

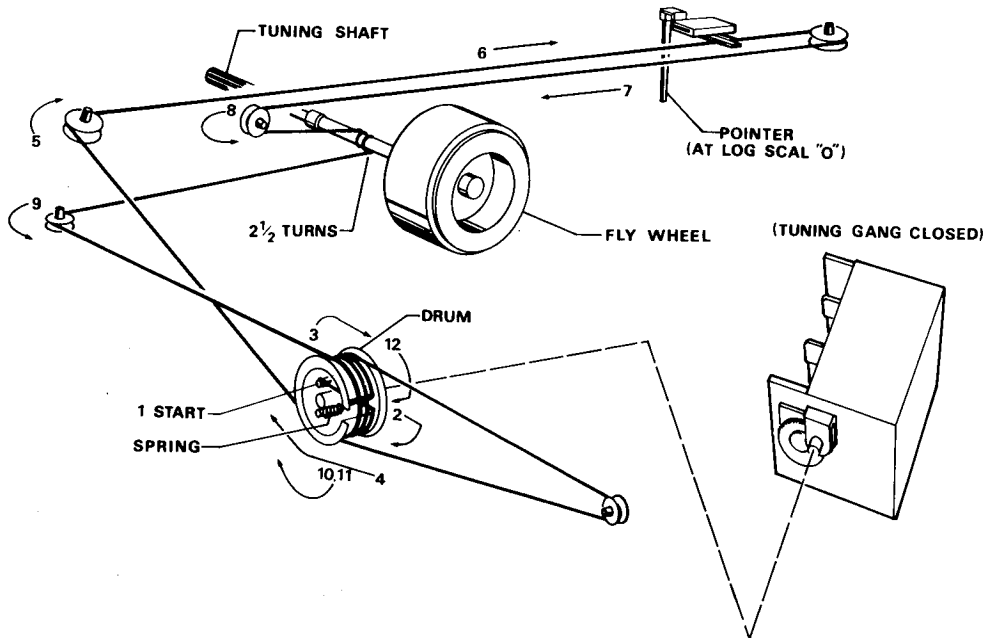


LOW CUT BOARD — BOTTOM

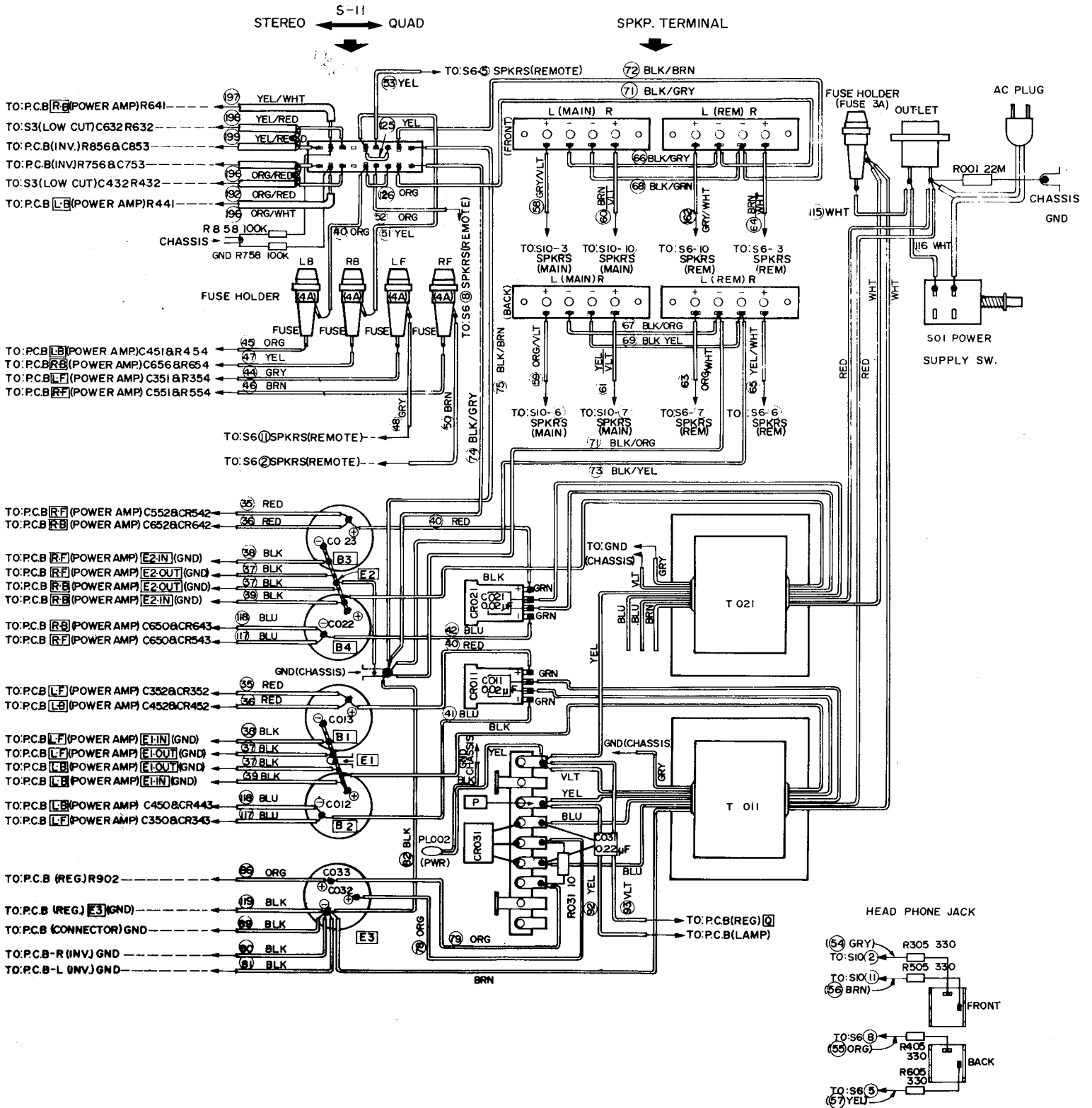


HIGH CUT BOARD — BOTTOM

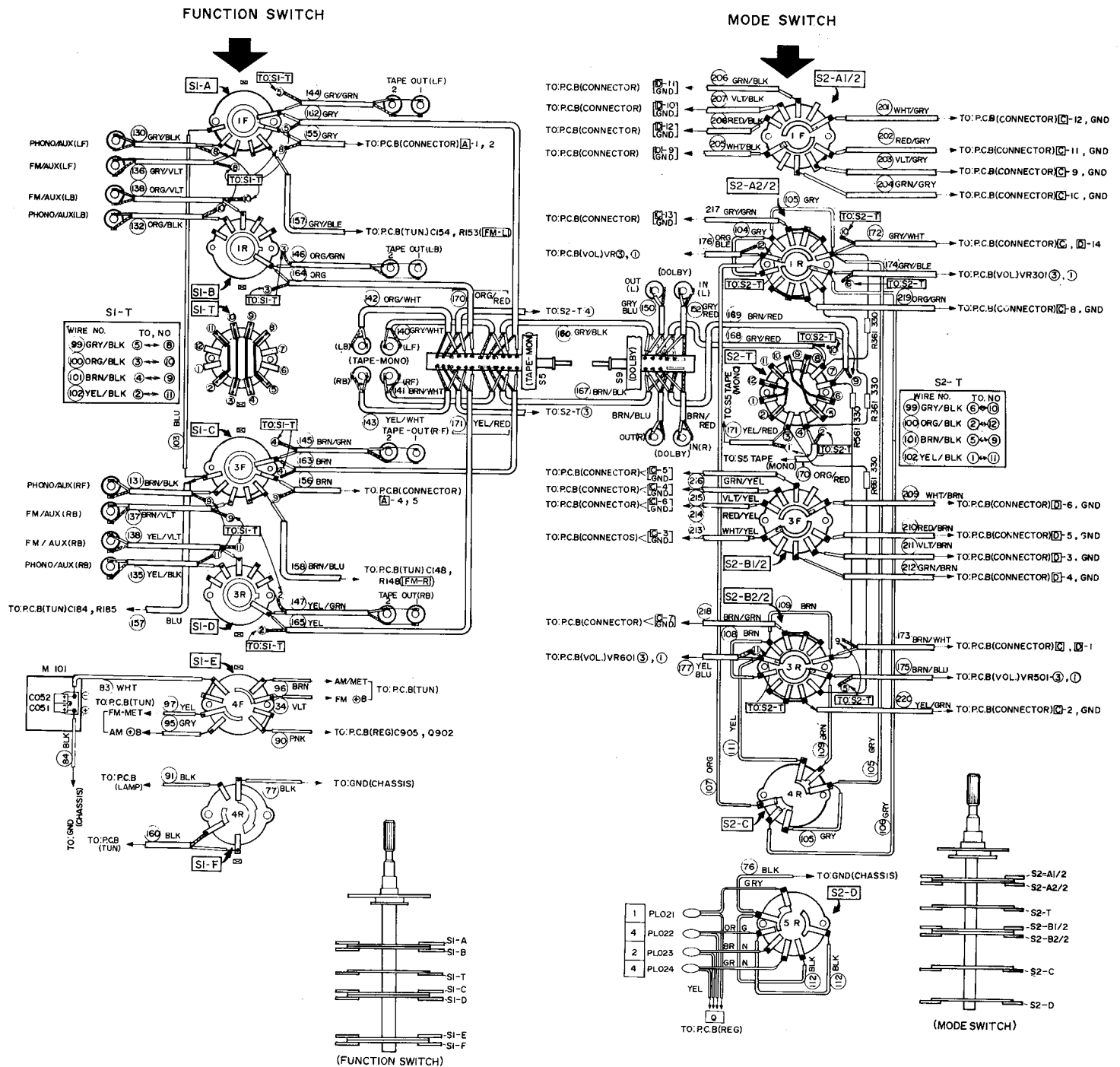
STRINGING DIAGRAM



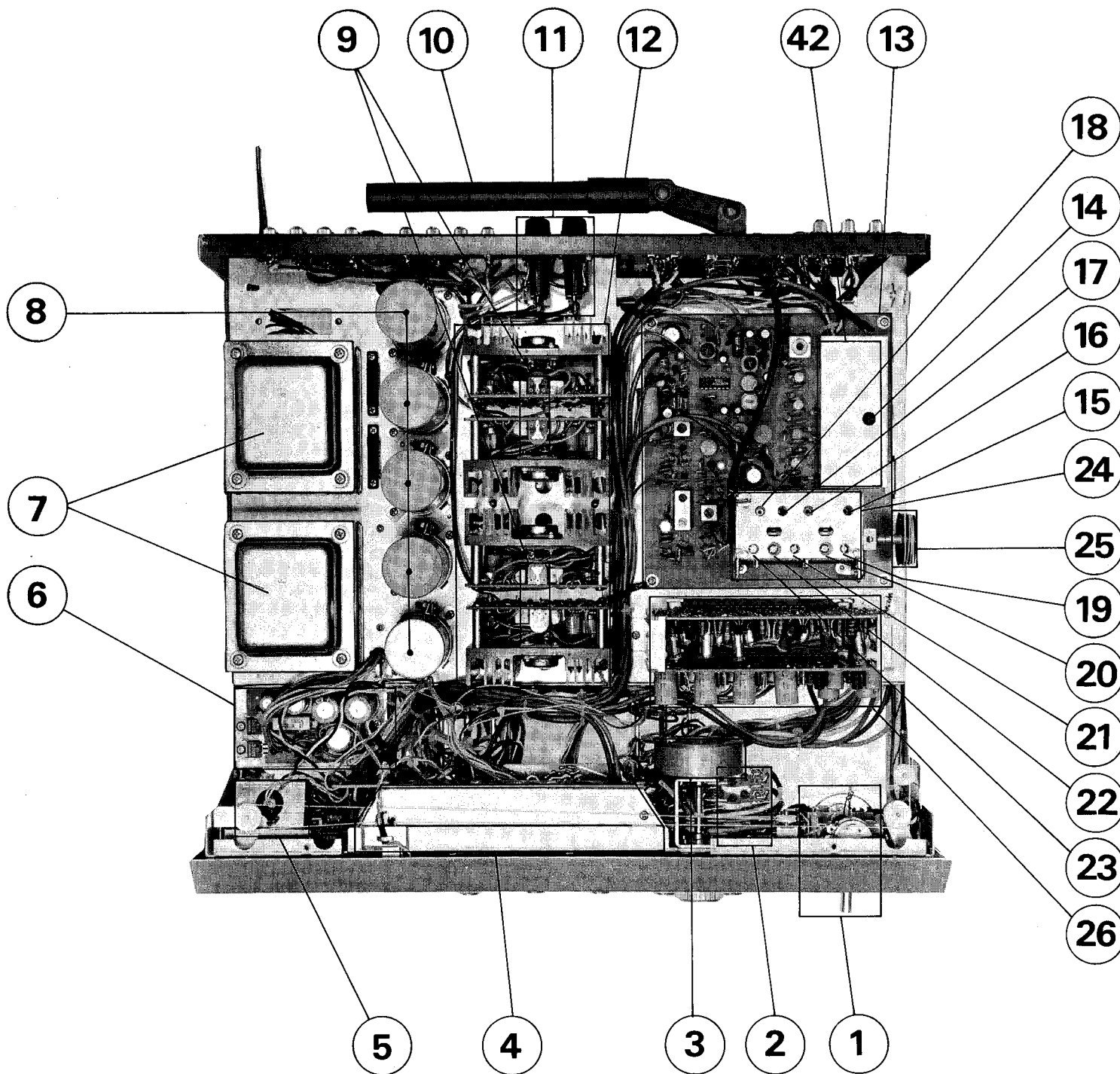
WIRING DIAGRAM (A)



WIRING DIAGRAM (B)



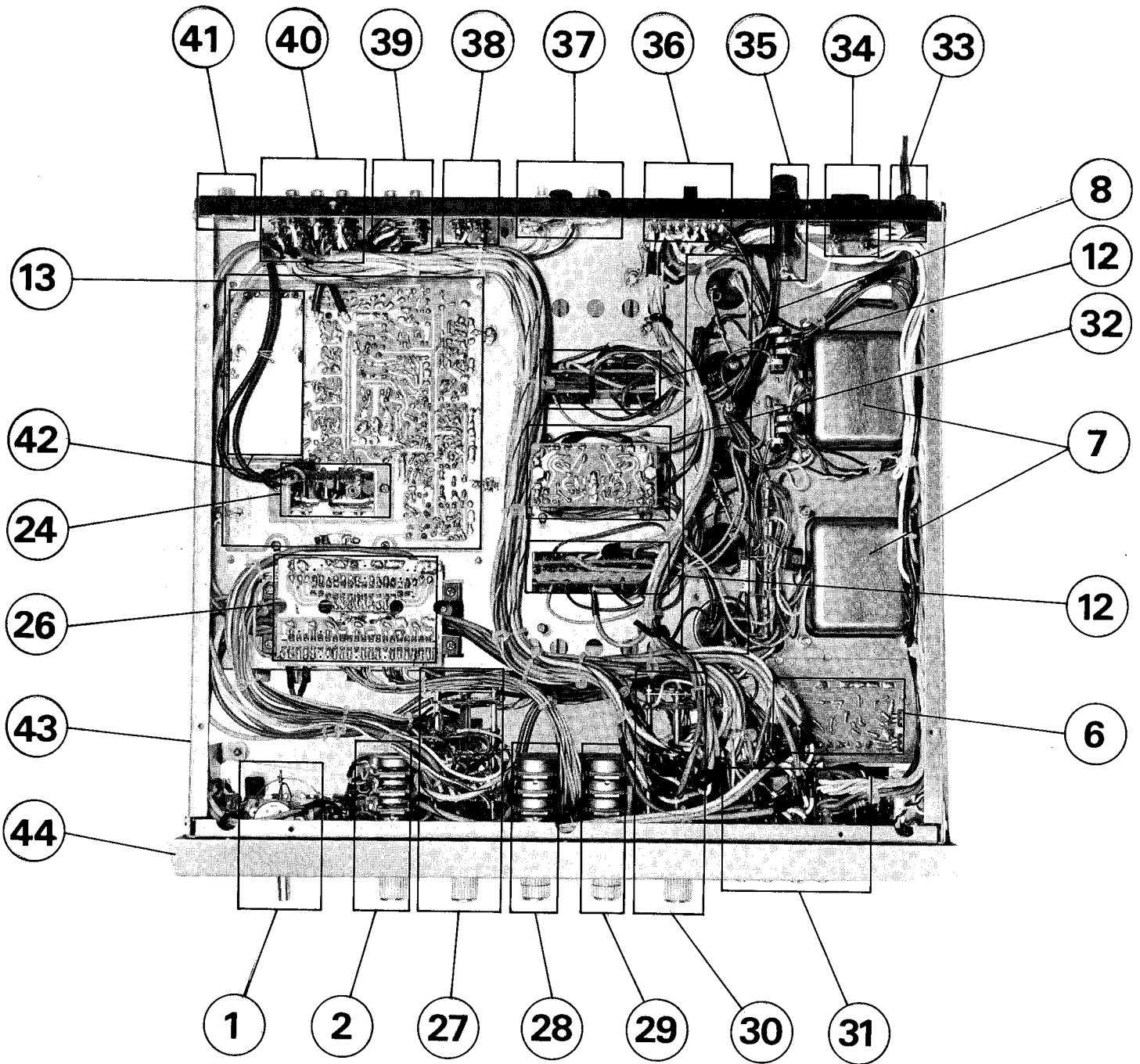
TOP VIEW



- ① JOY STICK (SOUND FIELD BALANCE)
- ② VOLUME CONTROL BD.
- ③ FLY WHEEL
- ④ DIAL LAMP HOUSE
- ⑤ METER LAMP
- ⑥ REGULATOR BD.
- ⑦ POWER TRANSFORMER
- ⑧ RIPPLE FILTER
- ⑨ IDLING ADJ. (POWER AMP.)
- ⑩ AM LOOP STICK ANTENNA
- ⑪ FUSE HOLDER (SPEAKER)
- ⑫ POWER AMP. UNIT
- ⑬ TUNER BD.

- ⑭ MUTING COIL ADJ.
- ⑮ LA FM ANTENNA COIL
- ⑯ LR FM RF COIL
- ⑰ FM IFT
- ⑱ LO FM OSC.
- ⑲ TCA FM ANT. TRIMMER
- ⑳ AM ANT. TRIM.
- ㉑ TCR FM RF TRIM.
- ㉒ AM OSC. TRIM.
- ㉓ TCO FM OSC.
- ㉔ AM-FM FRONT END
- ㉕ DIAL DRUM
- ㉖ SQ AND EQ./TONE UNIT

BOTTOM VIEW



- | | | | |
|---|-----------------------|---|----------------------------|
| ② | MODE SWITCH | ③ | STEREO—4-CH. SWITCH |
| ④ | TONE CONTROL (TREBLE) | ④ | STEREO THRESHOLD } ADJ. |
| ⑤ | " (BASS) | ⑤ | MUTING |
| ⑥ | FUNCTION SWITCH | ⑥ | JACK (DOLBY AND FM OUTPUT) |
| ⑦ | PUSH SWITCH | ⑦ | " (TAPE OUTPUT) |
| ⑧ | INVERTER AMP. | ⑧ | " (INPUT) |
| ⑨ | POWER CORD | ⑨ | GROUND TERMINAL |
| ⑩ | AC OUTLET | ⑩ | SHIELD CASE (MUTING) |
| ⑪ | FUSE HOLDER (AC LINE) | ⑪ | CHASSIS |
| | | ⑫ | ESCUTCHEON |

REPLACEMENT PARTS LIST

H-K PART NO.	REF. NO.	DESCRIPTION	H-K PART NO.	REF. NO.	DESCRIPTION
TRANSFORMERS & COILS			MISCELLANEOUS		
10128713	T011,021	Power Transformer	63028686		Escutcheon
12028753	L162	Coil, MW Osc.	63628687		Top Cover
12028754	T161	IFT, 455	60128688		Bottom Plate
12028755	T162	IFT	61028689		Dial Scale (Plexiglas)
12028756	T101	IFT, 10.7	61628690		Indicator (Stereo)
12028757	L102,103	Coil, MPX, 19	61628691		Indicator (Mode)
12028758	L104	Coil, MPX, 38	61628692		Clear Plate
12028759	L105,106,107,108	Inductor	63028693		Escutcheon Insert
12028760	F101,102	Ceramic Filter, 10.7	63028694		Joystick Insert
12028761	Y101	Ceramic Filter	62028695		Plastic Feet
12028762	L161	Coil, VHF	61628696		Bushing for Mode
12028763	L101	Inductor			Indicator Lamp
12028764	L341,441,541,641	Inductor	60128697		Reflector for Stereo Lamp
DIODES			63228698		Knob (Volume)
41028714	CR011,021	Rectifier	63228699		Knob (Tuning)
41028715	CR031	Diode DS131A(5B2)	63228700		Pushbutton
41628749	CR161,162	Diode IS188AM	63228701		Knob (Tone) Front
41628750	CR101,102	Diode IS188FM	63228702		Knob (Tone) Back
41628751	CR103,104	Diode TD73	00228703		Pushbutton Ass'y
41628778	CR341,342,343,441, 442,443,541,542, 543,641,642,643	Diode 10D1	63228704		Knob (Joystick)
42028785	CR902	Zener Diode RD13A M	63028705		Dress Ring for Joystick
42028786	CR901	Zener Diode RD35A L	61628706		Holder for Stereo Indicator
CONTROLS			60128707		Lamp Housing Cover (Dial)
23528731	VR011	Muting Adj.	00228708		Dial Pointer Ass'y
23528732	VR012	Stereo Thres.	00228709		Tuning Shaft Ass'y
00228733	VR302-602	Joystick Control Assy.	85028710		Felt for Knob
23028766	VR301,401,501,601	Volume Control	85028711		Felt for Knob
23028769	VR321,421,521,621	Bass Control	00228712		Antenna Holder Ass'y
23028769	VR322,422,522,622	Treble Control	65428716		Fuse Holder
TRANSISTORS & IC'S			45028717		Fuse 3AG-4A
43128741	IC 101-104	IC LA1221	45028718		Fuse 3AG-3A Slo-Blow
43126551	IC 105	IC MC1307	65428719		AC Outlet
43128767	IC 701,801	IC LD3130	53028720		Power Cord
43025972	Q 113	2SC839H	65428721		3P Terminal Board
43025972	Q101-103	2SC930D	65428722		(ANT Terminal)
43025972	Q104	2SC537F	511		4P Terminal Board
43025972	Q105-112,165	2SC537G	65428723		(Speaker Terminal)
43025972	Q161	2SC929C	65428724		27P Pin Jack
43025972	Q162-164	2SC929D	24528725		Ground Terminal
43025972	Q201-206	2SC945P	25028726	S11	Slide Switch
43025972	Q207-211	2SC945Q	25028727	S01	(Stereo 4-CH Sw.)
43025972	Q411-413,511-513, 611-613,751,851	2SC693G	25028728	S3,4,5,6	Pushbutton Switch
43025972	Q344,444,544,644	2SC815L			(On/Off Power)
43025972	Q343,443,543,643	2SC853M	24028729	S1	Pushbutton Switch
43025972	Q903	2SC536F	24028730	S2	(Remote, Tape Mon1, FM
Above Transistors indicated by HK Part No. 43025972 can be replaced by 2N3417			65428734		Muting, Lowcut
TRANSISTORS & IC'S			12528735		Pushbutton Switch
43027722	Q341,342,441,442, 541,542,641,642	2SC640L	46528736		(Main, Ext Dolby NR.)
43027722	Q901	2SA545L	46528737		Contour, High Cut)
Above Transistors indicated by HK Part No. 43027722 can be replaced by 2N5807			46528738		Rotary Switch (Function)
43027213	Q902	2SD330C	46528739		Rotary Switch (Mode)
43027213	Q904	2SD325C	46528787		Headphone Jack
43024216	Q347,348,447,448, 547,548,647,648	2SD322M	00328740		Meter
43026284	Q346,446,546,646	2SC959M	20528752		Pilot Lamp (Dial)
43026285	Q345,445,545,645	2SA606M	38128776		Lamp (Meter)
			66028777		Lamp (Stereo)
			90728788		Lamp (Mode Indicator)
			90728186		Lamp (Power)
			90728187		Front End

NOTE: To speed handling of your order be sure to include both the model and serial numbers which appear at the back of the chassis, 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.