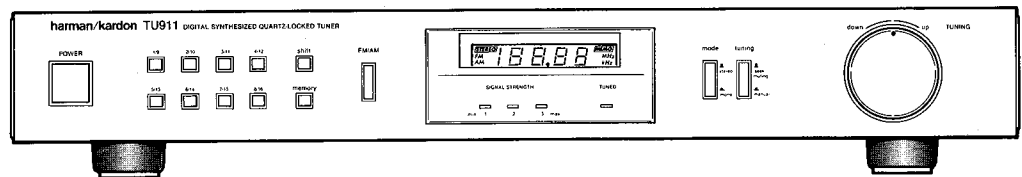


The Harman Kardon Model TU911

Manual 119A

DIGITAL SYNTHESIZED QUARTZ-LOCKED TUNER

Technical Manual



The following marks found in the parts list of this manual identify the models as follows.

- JA** : North America area model
- BK** : North America area model Black version
- G** : General model
- GB** : General model Black version

harman/kardon

240 Crossways Park West, Woodbury, N.Y. 11797
1112-315119A3 P-088709 1500 Printed in Japan

SPECIFICATIONS

● FM SECTION

	Nominal	Limit
Tuning range	87.5 ~ 108.0MHz	
50dB Quieting Sensitivity		
Mono	14.2dBf	≦ 19dBf
Stereo	37.2dBf	≦ 41dBf
Usable Sensitivity	11.7dBf	≦ 15dBf
Image Ratio	49dB	≦ 40dB
IF Rejection	92dB	≦ 75dB
Spurious Response Rejection	94dB	
Capture Ratio	1.5dB	≦ 2dB
Alternate Channel Sensitivity	60dB	≦ 50dB
AM Rejection	59dB	≦ 45dB
Signal to Noise Ratio		
Mono	80dB	≦ 75dB
Stereo	73dB	≦ 68dB
Total Harmonic Distortion		
Mono	0.15%	≦ 0.3%
Stereo	0.18%	≦ 0.5%
Stereo Separation at 1 kHz	42dB	≦ 35dB
Output Level/Impedance (Stereo)	750mV/2.2kΩ	

● AM SECTION (North America area model only)

	Nominal	Limit
Tuning range	520 ~ 1,710kHz	
Usable Sensitivity		
External Antenna	12μV	≦ 20μV
Loop Antenna	355μV/m	≦ 700μV/m
Selectivity	33dB	≦ 26dB
Signal to Noise Ratio	53dB	≦ 48dB
Image Rejection	40dB	≦ 30dB
IF Rejection	66dB	≦ 50dB
● DIMENSION	17-7/16" × 2-11/16" × 14-3/16"	
(W × H × D)	(443 × 68 × 360 mm)	
● WEIGHT	7.3 lbs. (3.3 kg)	
● POWER SUPPLIES		
for North America area model	AC 120V, 60Hz	
for General mode	AC 220/240V, 50/60Hz	
● POWER CONSUMPTION	14W	

This specification is the target of servicing.
But, there is a care that the specification is not applicable to the measurement condition and instrument.

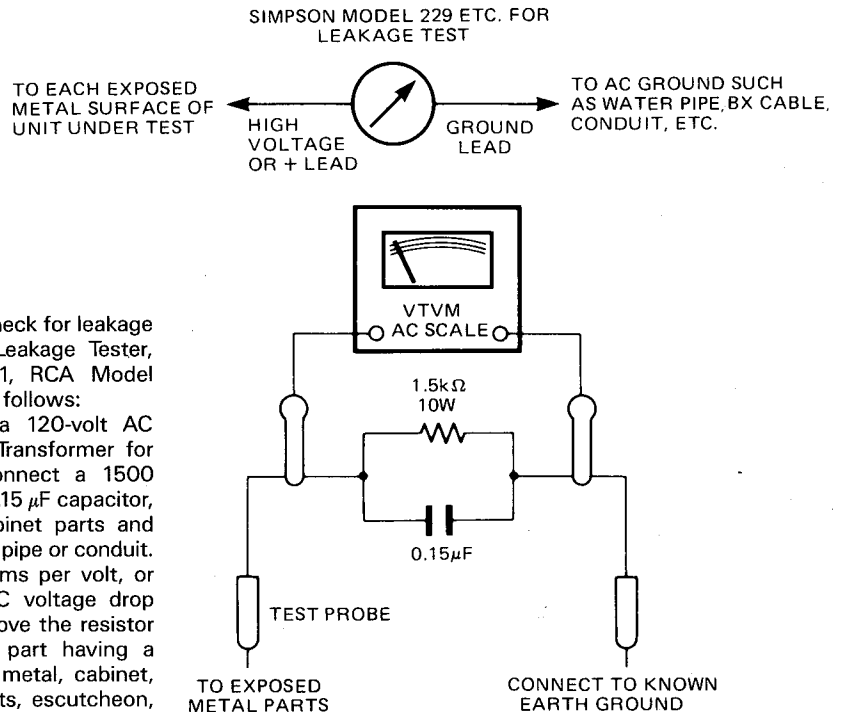
Specifications and components subject to change without notice. Overall performance will be maintained or improved.

LEAKAGE TEST (FOR SERVICE ENGINEERS IN THE U.S.A.)

Before returning the unit to the user, perform the following safety checks:

1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the unit.
2. Be sure that any protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc. which were removed for servicing are properly reinstalled.
3. Be sure that no shock hazard exists; check for leakage current using Simpson Model 229 Leakage Tester, standard equipment item No. 21641, RCA Model WT540A or use alternate method as follows:
Plug the power cord directly into a 120-volt AC receptacle (do not use an Isolation Transformer for this test). Using two clip leads, connect a 1500 Ohm, 10-watt resistor paralleled by a 0.15 μF capacitor, in series with all exposed metal cabinet parts and a known earth ground, such as a water pipe or conduit. Use a VTVM or VOM with 1000 Ohms per volt, or higher sensitivity to measure the AC voltage drop across the resistor. (See Diagram.) Move the resistor connection to each exposed metal part having a return path to the chassis (antenna, metal, cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor. (This test should be performed with the power switch in both the On and Off positions.)

A reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the unit to the owner.



DISASSEMBLY PROCEDURES (REFER TO PAGES 6 THROUGH 8 AND 12)

① CABINET TOP REMOVAL

Remove 6 screws (A) and then remove the Cabinet Top (131).

② FRONT PANEL ASS'Y (AA) REMOVAL

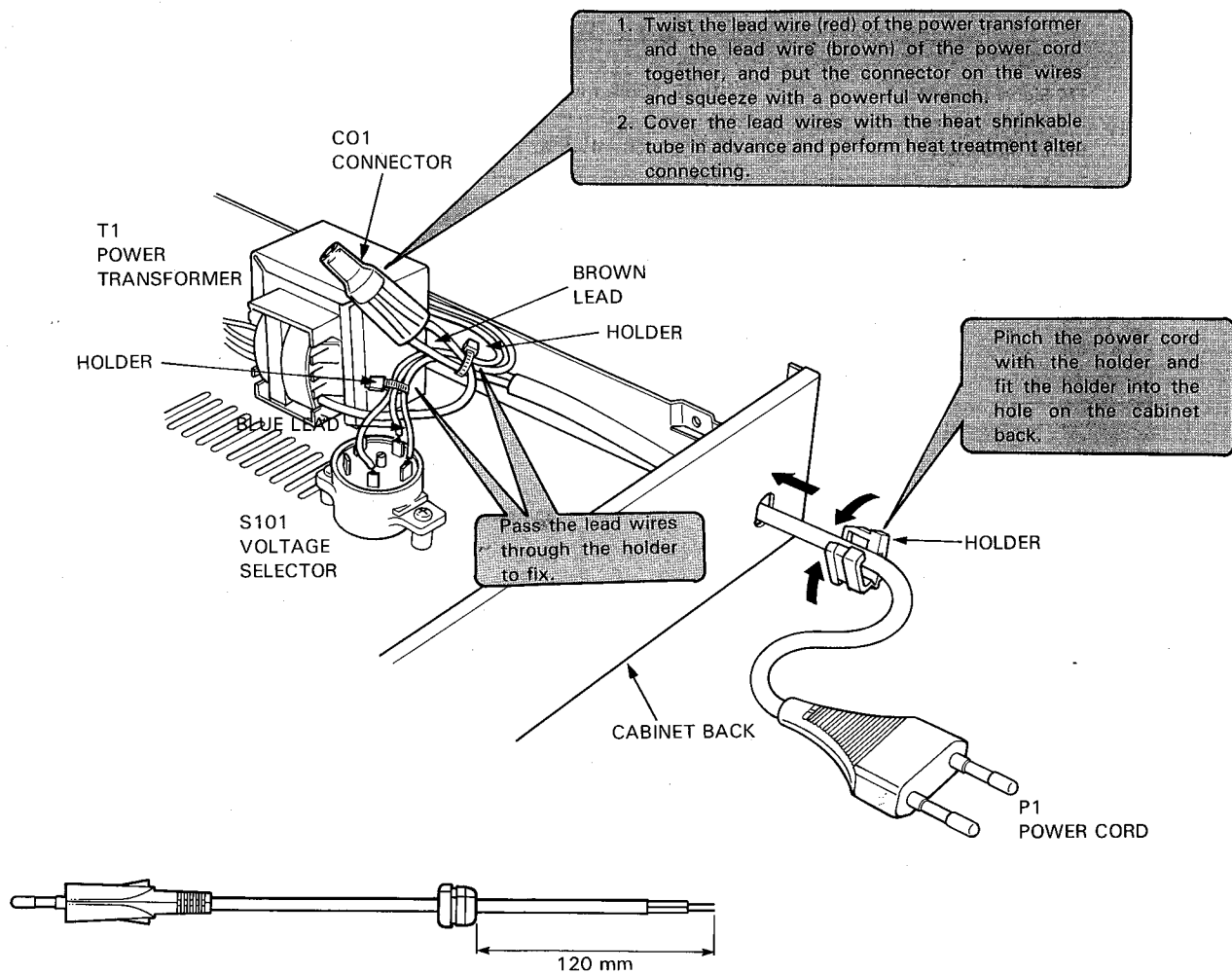
1. Remove the Cabinet Top (131), referring to the previous step ①.
2. Remove 7 screws (B) and then remove the Front Panel Ass'y (AA).

③ MAIN P. C. BOARD (PCB-1) REMOVAL

1. Remove the Front Panel Ass'y (AA), referring to the previous step ②.
2. Unsolder the lead wires connected to the Main P. C. Board (PCB-1).
3. Remove 8 screws (C) and then remove the Main P. C. Board (PCB-1) with the Preset Switches and Tuning Switches P. C. Boards (PCB-2 and PCB-3) Chassis (173), etc.
4. Remove 2 screws (D) and then remove the Chassis (173) with PCB-2 and PCB-3.

POWER CORD REPLACEMENT (FOR SERVICE ENGINEERS OTHER THAN NORTH AMERICA)

In order to prevent fire or shock hazard when replacing the power cord, follow the procedure below to replace the part with the standard supply parts.



ALIGNMENT PROCEDURES (REFER TO PAGES 10, 11, 17 AND 18)

■ AM ADJUSTMENT

- Conditions :
- Set the AM mode by pressing the "FM/AM" button.
 - Press the "mode" switch to the "mono" (button in) position.
 - Standard modulation of the AM signal Generator is 400Hz at 30%.

Step	Alignment	Connection Equipments	Measurement Frequency	Station Display	Adjustment	For
1	IF	<ul style="list-style-type: none"> • Connect the AM Test Loop Antenna cable into the output jack of AM Signal Generator. Place AM Test Loop Antenna close enough to couple signal into the AM Loop Antenna. • Connect the VTVM and oscilloscope to the OUTPUT jacks. 	1400kHz	1400kHz	T251	Maximum output level and symmetrical curve on scope.
2	Tracking		1400kHz	1400kHz	TC251	Maximum output.
3			600kHz	600kHz	L251	Maximum output.
4			Repeat steps 2 and 3 for optimum sensitivity.			
5			Tuned indicator	1000kHz	1000kHz	

■ FM ADJUSTMENT

- Conditions :
- Set the FM mode by pressing the "FM/AM" button.
 - Press the "mode" switch to the "mono" (button in) position.

	U.S.A. model	General model
FM Signal Generator	1kHz, 100% modulation	1kHz, 45% modulation
Stereo Modulator	L + R = 45.5%, L - R = 45.5%, 19kHz = 9%	L + R = 22.5%, L - R = 22.5%, 19kHz = 8%

Step	Alignment	Connection Equipments	Measurement Frequency	Station Display	Adjustment	For
1	Discriminator	<ul style="list-style-type: none"> • Connect the FM Signal Generator to FM 300Ω BAL Antenna terminals through the 300Ω balanced dummy. [1mV (65dBf) input] • Connect the Oscilloscope and Distortion meter to the OUTPUT jacks. 	98.1MHz \pm 30 ~ 40kHz	98.1MHz	T201(A)	Adjust so that the TUNED indicator lights in the same range on both plus (+) and minus (-) sides of 98.1MHz.
2			98.1MHz	98.1MHz	T201(B)	Minimum distortion.
3			Repeat steps 1 and 2 for optimum sensitivity.			
4	Tuned indicator		98.1MHz	98.1MHz	VR351	Adjust so that the TUNED indicator lights at 18 μ V input. (14 μ V/75 Ω input for General model)
5	Signal indicator		98.1MHz	98.1MHz	VR351	Adjust so that the three SIGNAL STRENGTH indicator lights at 500 μ V input. (140 μ V/75 Ω input for General model)
6	Separation	<ul style="list-style-type: none"> • Connect the Stereo Modulator to FM Signal Generator. Connect FM Signal Generator to FM 300Ω BAL Antenna terminal through the 300Ω balanced dummy. • Connect the VTVM and Oscilloscope to the OUTPUT jacks. • Press the "mode" switch to the "stereo" (button out) position. 	98.1MHz	98.1MHz	VR301	Adjust so that the left channel output becomes minimum when only the right channel of the Stereo Modulator is ulated.
					VR301	Adjust so that the right channel output becomes minimum when only the left channel of the Stereo Modulator is modulated.
7	AGC voltage	<ul style="list-style-type: none"> • Connect the FM Signal Generator to FM 300Ω BAL Antenna terminals through the 300Ω balanced dummy. (500μV/75Ω input) • Connect the VTVM to TP1 (+) and ground (-). 	98.1MHz	98.1MHz	VR101	Adjust so that voltage becomes 1.7V.

CIRCUIT DESCRIPTION

■ FM TUNER SECTION

The FM signal which has entered through the antenna is high-frequency amplified in the front end unit FE101, mixed with the output of the local oscillator and converted into the 10.7MHz intermediate-frequency.

The 10.7MHz signal is amplified in the intermediate-frequency amplifying section which consists of CF201, Q201 and CF202 and fed to 1 pin of IC201. In IC201, the signal is transmitted through the IF amplifier in two steps, and after being detected in the quadrature, it is transmitted through the post amplifier to 12 pin and then input to 2 pin of IC301. In IC301, the pilot signal is detected out of the signal which has been fed and 38kHz signal is produced. Then by this signal, stereo signal is demodulated, output from 4 pin for the left channel and from 7 pin for the right channel be fed to the amplifier.

■ AM TUNER SECTION (North America area model only)

The AM signal which has entered through the antenna is transmitted through the tuning circuit consisting of L251 and TC251 to IC201. In IC201 it undergoes high-frequency amplification, intermediate-frequency amplification and detection, and then output from 15 pin. This signal is turned ON and OFF at Q703 and Q704 according to the signal from the input selector and fed to 2 pin of IC301.

■ MUTING CIRCUIT

If FM is received out of tuning or in a very weak field intensity, 28 pin of IC702 becomes high level. This is fed to the base of Q351, whose collector then becomes low level and the collector of Q4 high level. As a result, Q301 (L ch) and (R ch) are conducted to mute the output.

■ SYNTHESIZER SECTION

● FM

The local oscillation output at the front end is fed to 5 pin of the prescaler IC701 and after being frequency divided into 30 or 32, it is fed to 37 pin of the PLL synthesizer IC702. In IC702, the standard frequency is oscillated by the crystal oscillator, compared with the divided local oscillation output signal and output to 34 pin. This voltage is level converted at Q701 and Q702, and fed to the varicap diode at the front end.

● AM (North America area model only)

The local oscillation output is fed from 24 pin of IC201 to 39 pin of IC702. In IC702, the standard frequency is oscillated by the crystal oscillator, compared with the local oscillation output and output to 34 pin.

■ INDICATOR SECTION

● FREQUENCY DISPLAY

The serial data sent out of 27 pin of the PLL synthesizer IC702 is fed to 2 pin of the frequency indicating driver IC751, where the data is decoded to provide a signal which turns ON the indicator.

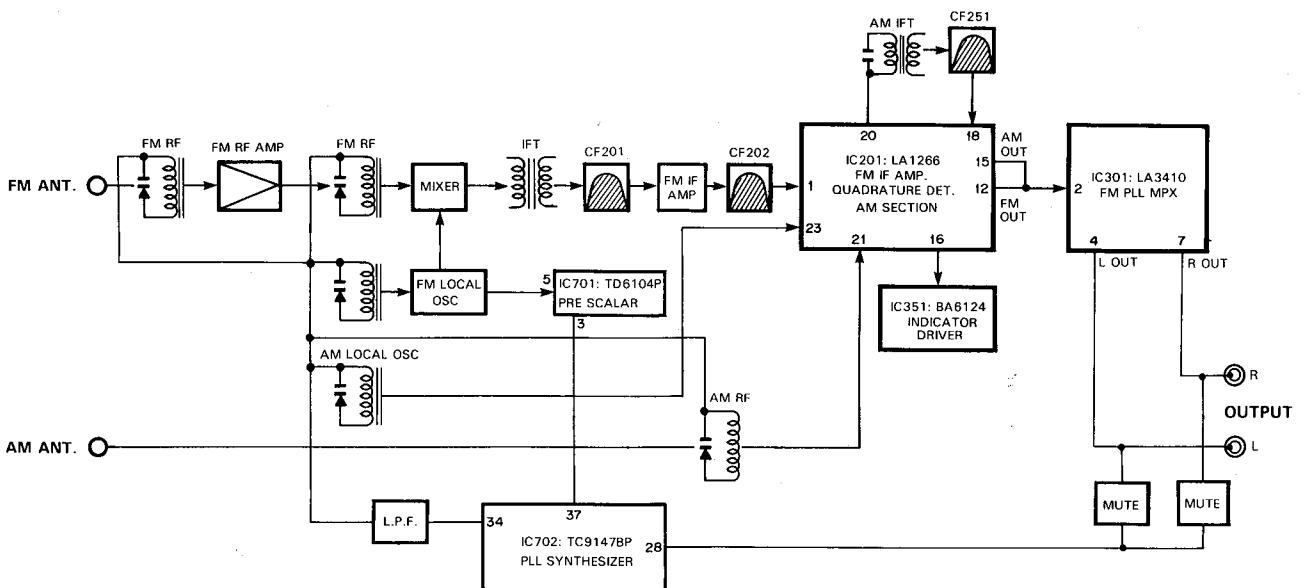
● SIGNAL STRENGTH

The voltage corresponding to the signal level is output from 16 pin of IC201 and input into 8 pin of the level comparator IC351. D367, D368 and D369 of the signal strength indicator turn ON according to the signal level.

● TUNING

8 pin of IC201 becomes low level when tuned and the tuned indicator D370 connected there turns ON.

BLOCK DIAGRAM

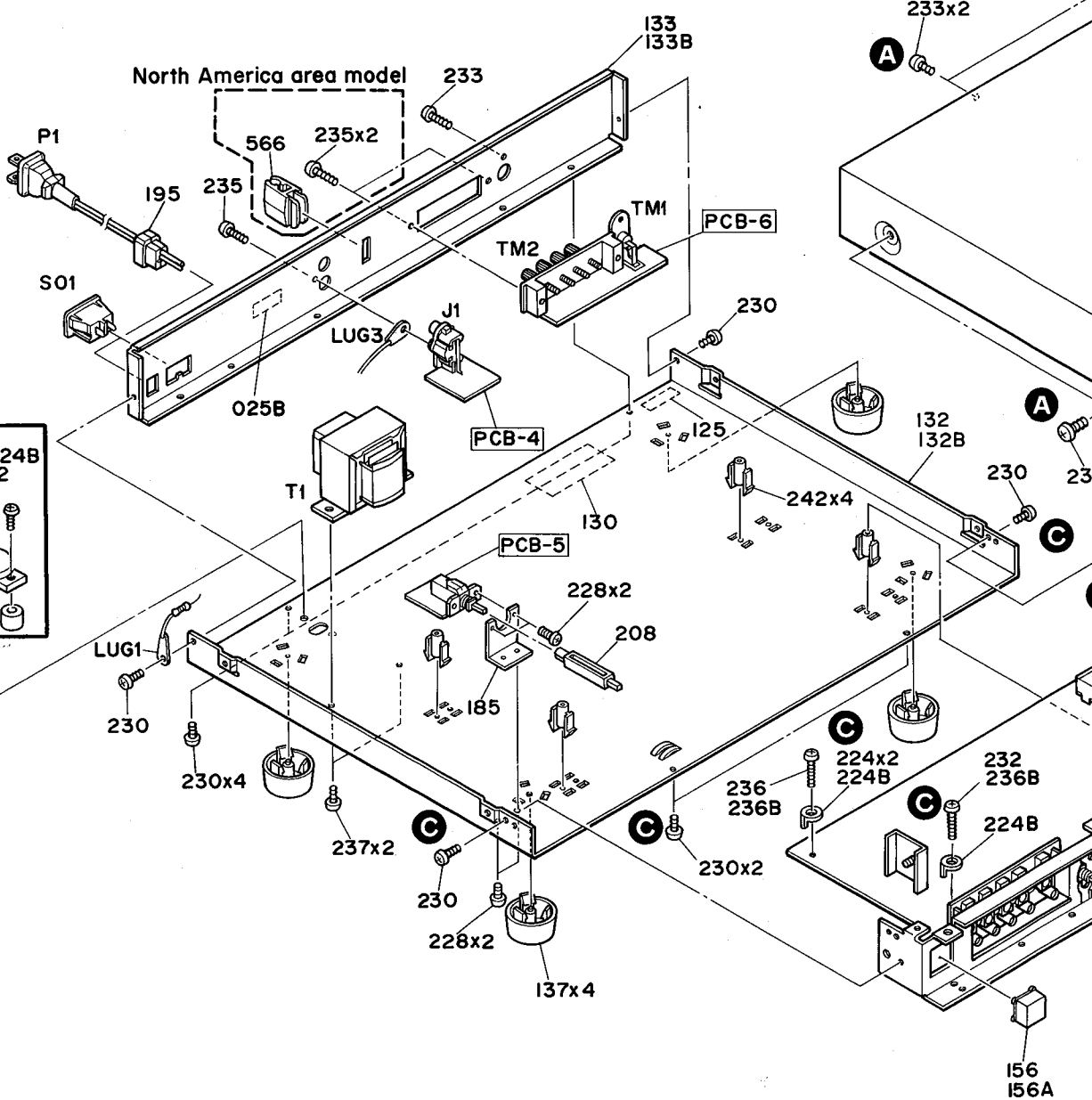


GENERAL UNIT
EXPLODED VIEW

General model

- 024B x2
- S101
- 023B x2

North America area model



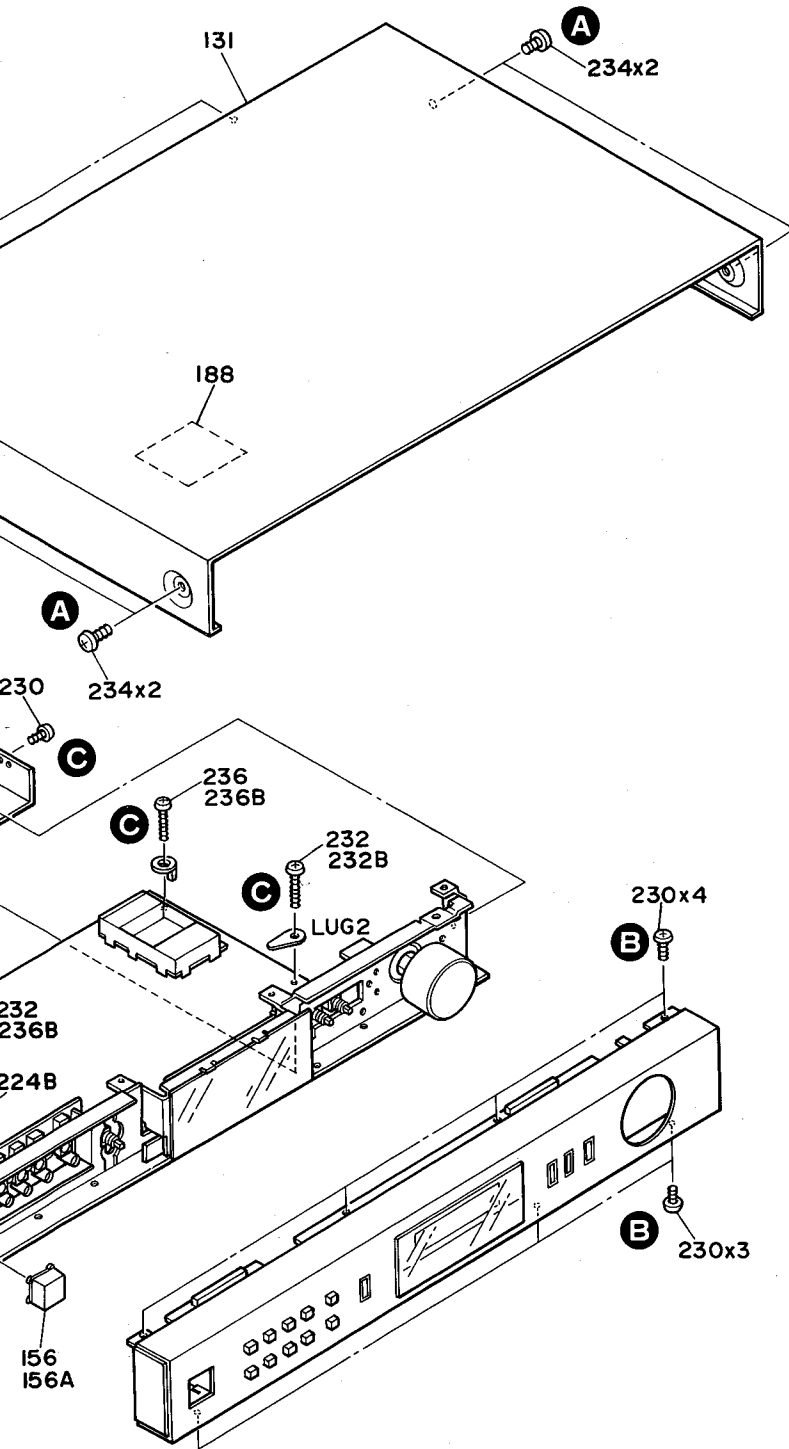
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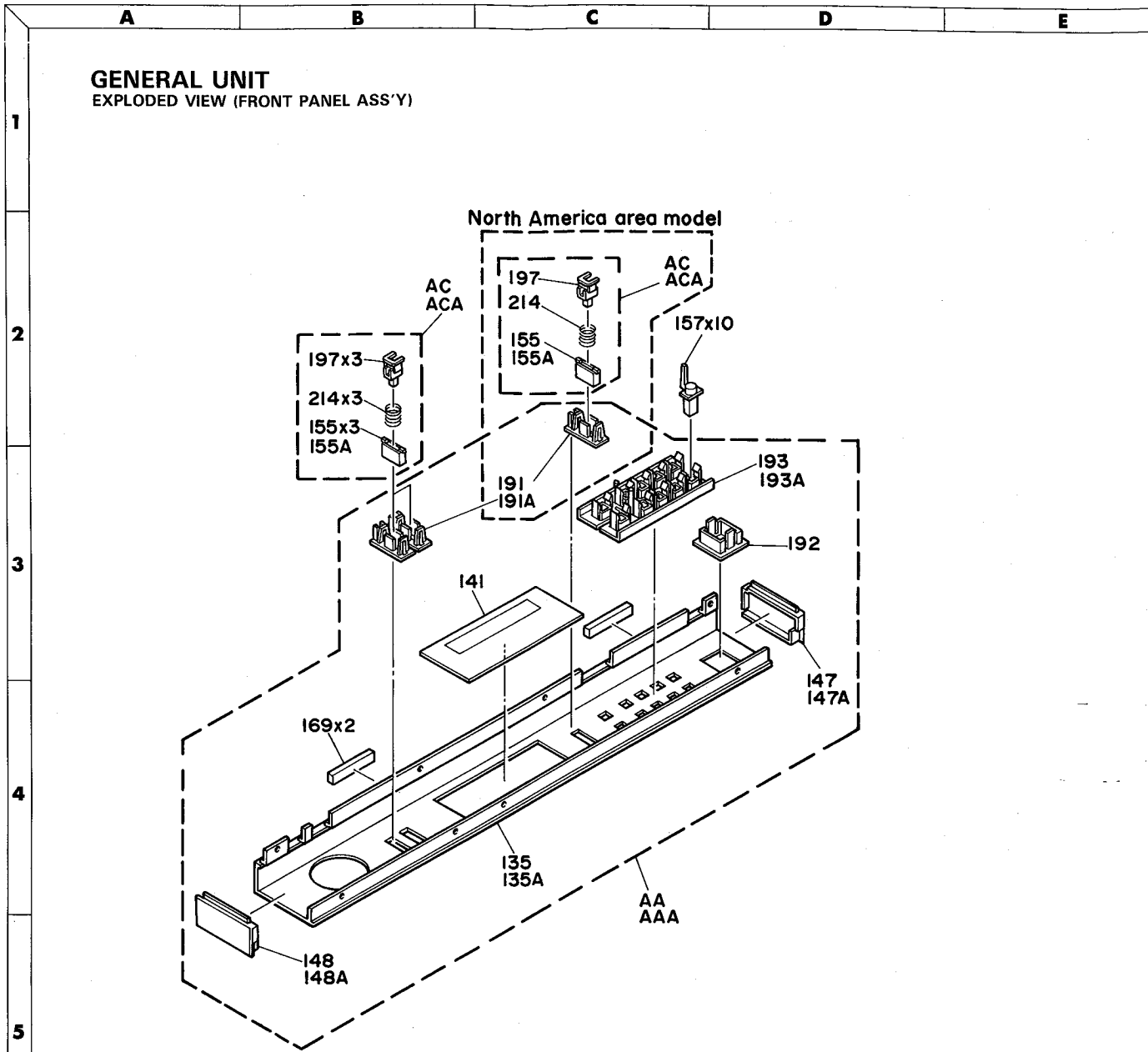
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PARTS LIST

Ref. No.	Part No.	Description
023B	2132-7116	SPACER G GB
024B	2347-R0130122	SCREW G GB
025B	1756-14505	LABEL, FTZ G GB
LUG1	4211-4	LUG UA BK
LUG2	4211-4	LUG G GB
LUG3	4211-4	LUG G GB
125	1117-78	SERIAL LABEL
130	1756-CSA	LABEL UA BK
131	1414-02201	CABINET TOP
132	1424-23101	CABINET BOTTOM UA BK
132B	1424-23102	CABINET BOTTOM G GB
133	1424-18803	CABINET BACK UA BK
133B	1424-23501	CABINET BACK G GB
137	1319-0139	LEG
156	1660-00401	PUSH BUTTON UA G
156A	1660-00403	PUSH BUTTON BK GB
185	2219-7984	METAL FITTG
188	2224-7091	INSULATOR
195	2240-364	HOLDER
208	2672-7018	LEVER
224	2219-7975	METAL FITTG
228	2327-R0130062	SCREW
230	2347-R0130062	SCREW
232	2347-R0130162	SCREW
233	2347-R0130064	SCREW
234	2347-R0140064	SCREW
235	2347-R0130104	SCREW
236	2347-R0130202	SCREW
237	2347-R0130082	SCREW
242	2360-7015	SPECIAL BOSS
566	2240-7208	HOLDER
ΔPI	4161-71147	CORD W/PLUG UA BK
ΔPI	4161-7256	CORD W/PLUG G GB
ΔT1	5584-701562	XFORMER, POWER UA BK
ΔT1	5584-702562	XFORMER, POWER G GB
ΔS101	4411-102729	ROTARY SWITCH G GB
J1	4482-0133	PIN JACK, 2P
TM1	4214-166	TERMINAL UA BK
TM1	4214-167	TERMINAL G GB
TM2	4214-164	TERMINAL UA BK



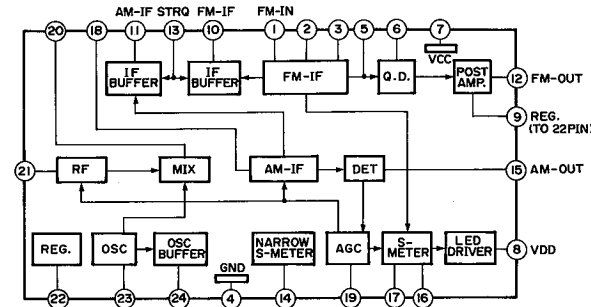
GENERAL UNIT
EXPLODED VIEW (FRONT PANEL ASS'Y)

PARTS LIST

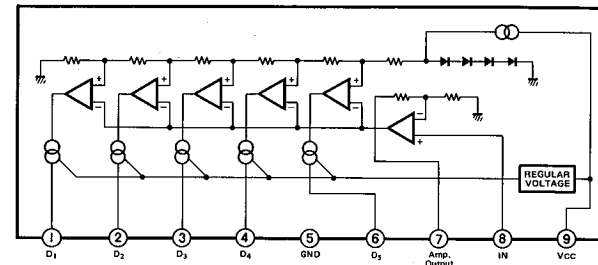
Ref. No.	Part No.	Description	Code	Part No.	Description	Code
AA	A443-TU911A	FRONT PANEL ASS'Y	UA G	148A	FRAME R	BK GB
AAA	A443-TU911B	FRONT PANEL ASS'Y	BK GB	155	PUSH BUTTON	UA G
AC	A662-TU911A	PUSH BUTTON ASS'Y	UA G	155A	PUSH BUTTON	BK GB
ACA	A662-TU911B	PUSH BUTTON ASS'Y	BK GB	157	PUSH BUTTON	
135	1443-11101	PANEL	UA	169	SPONGE	
135A	1443-11102	PANEL	BK	191	HOLDER	UA G
135B	1443-11201	PANEL	G	191A	HOLDER	BK GB
135C	1443-11202	PANEL	GB	192	HOLDER	
141	1531-07002	WINDOW		193	HOLDER	UA G
147	1562-02501	FRAME L	UA G	193A	HOLDER	BK GB
147A	1562-02502	FRAME L	BK GB	197	SHAFT	
148	1562-02601	FRAME R	UA G	214	SPRING	

IC BLOCK DIAGRAM

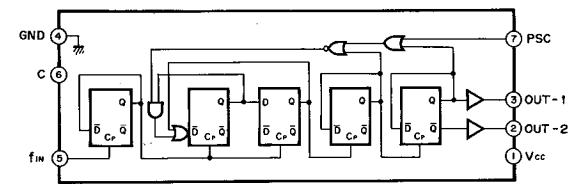
LA1266 : IC201 FM/AM IF



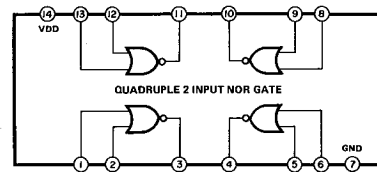
BA6124 : IC351 LEVEL METER DRIVER



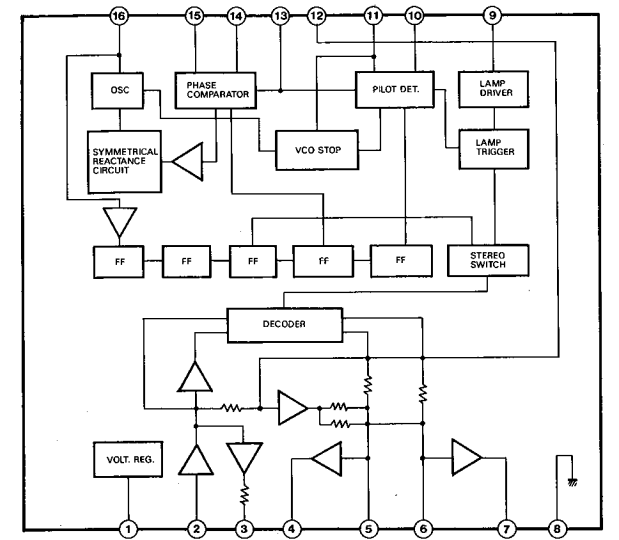
TD6104P : IC701 FM ECL PRE-SCALLER



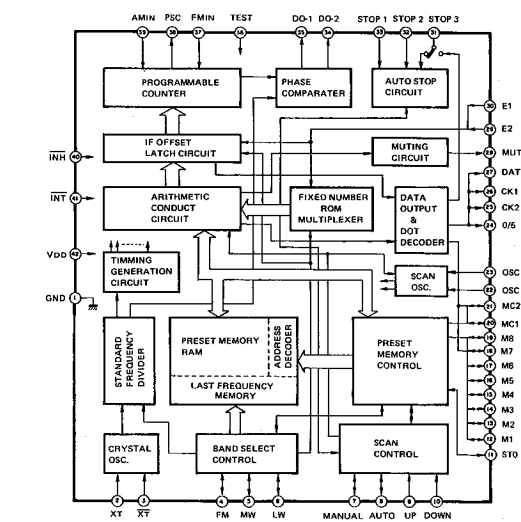
TC4001BP : IC703 QUAD 2 INPUT NOR GATE



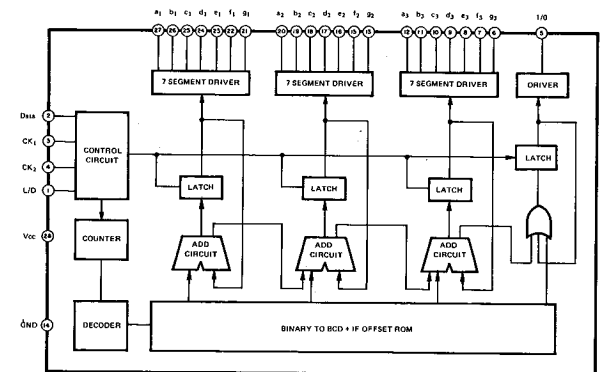
LA3410 : IC301 PLL MPX



TC9147BP : IC702 DIGITAL TUNING SYSTEM LSI

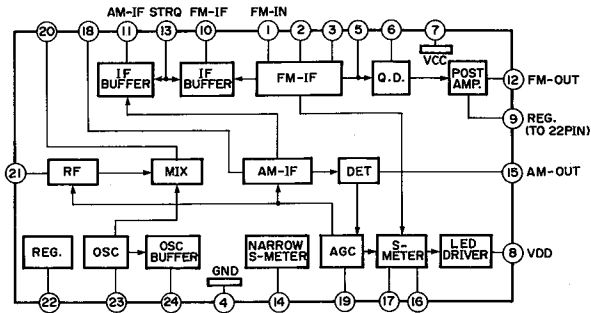


TD6301AN : IC751 LCD DRIVER

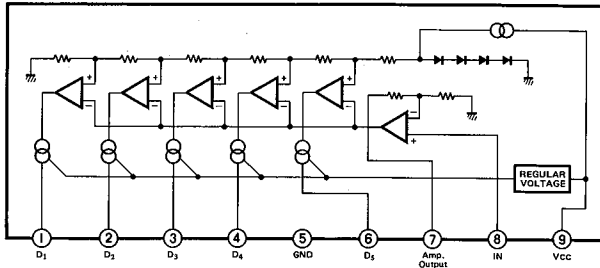


IC BLOCK DIAGRAM

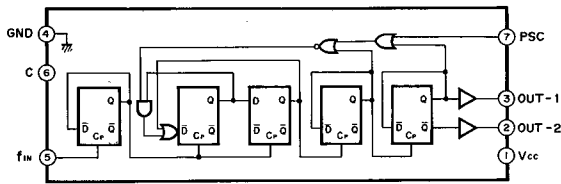
LA1266 : IC201 FM/AM IF



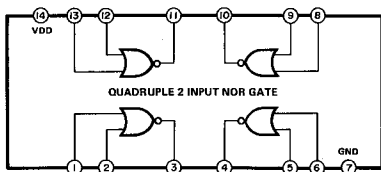
BA6124 : IC351 LEVEL METER DRIVER



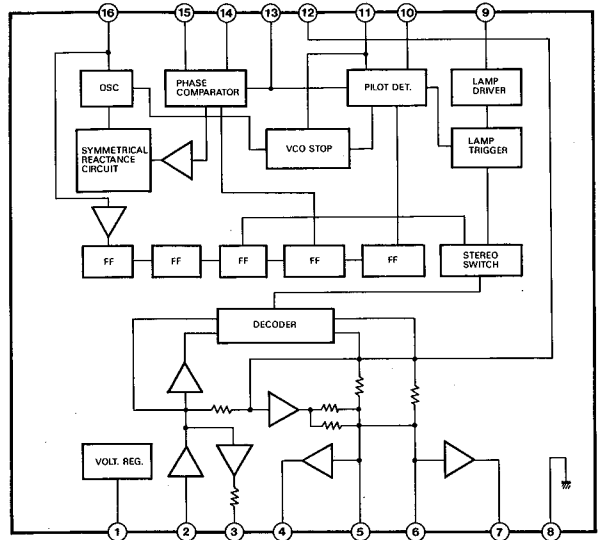
TD6104P : IC701 FM ECL PRE-SCALLER



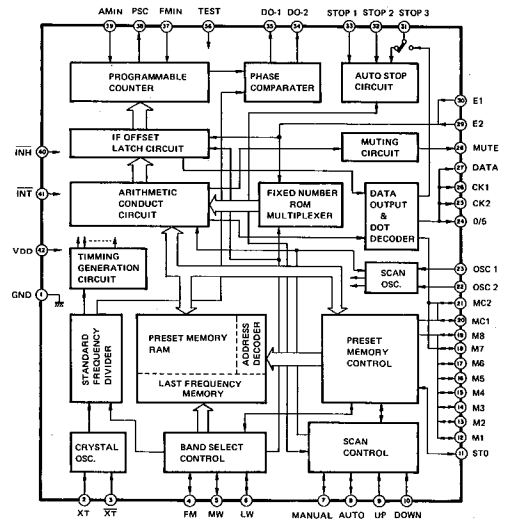
TC4001BP : IC703 QUAD 2 INPUT NOR GATE



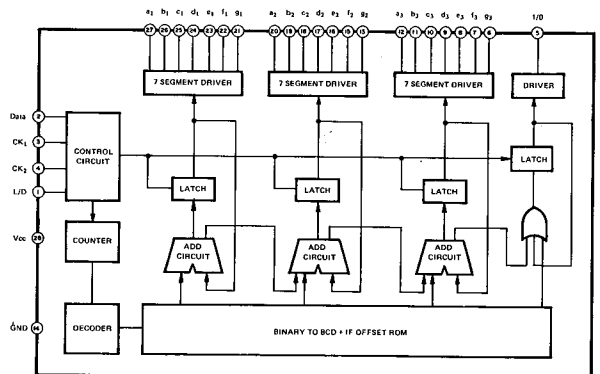
LA3410 : IC301 PLL MPX



TC9147BP : IC702 DIGITAL TUNING SYSTEM LSI

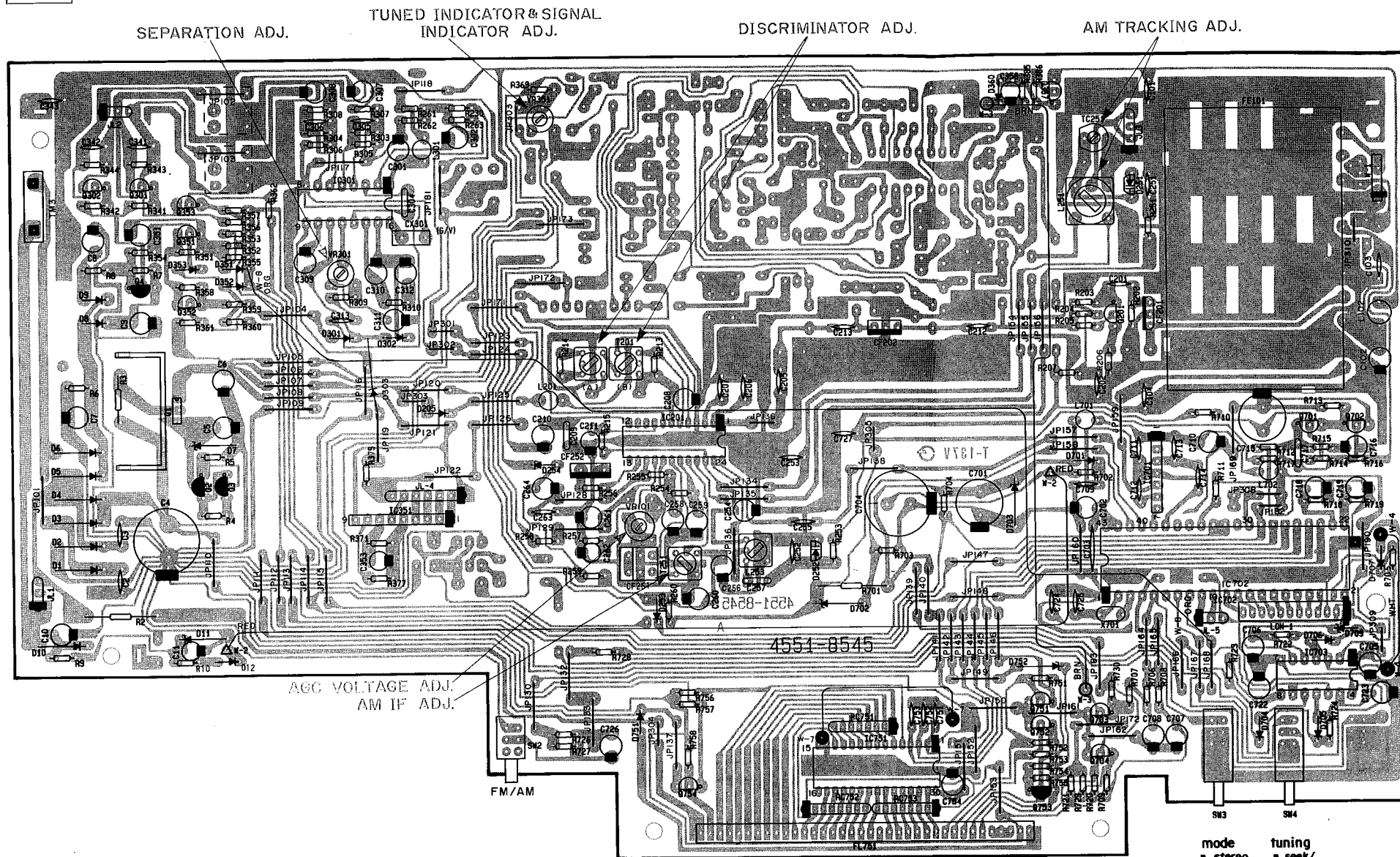


TD6301AN : IC751 LCD DRIVER

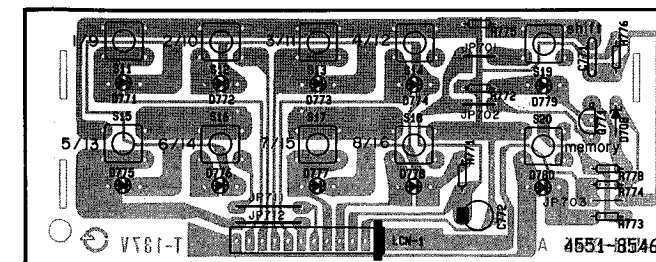


P. C. BOARDS

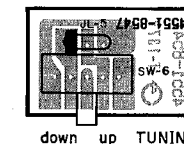
PCB-1 Main P. C. Board



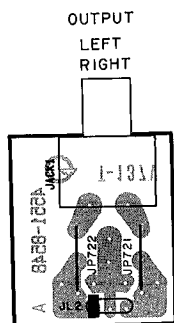
PCB-2 Preset Switches P. C. Board



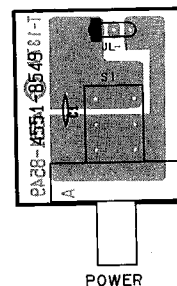
PCB-3 Tuning Switch P. C. Board



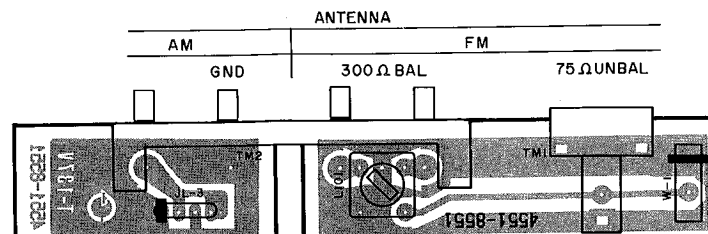
PCB-4 Output Jack P. C. Board



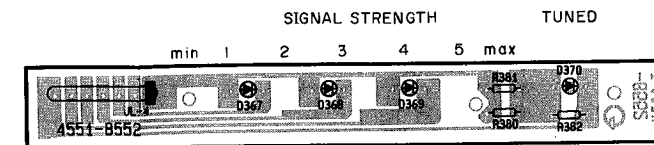
PCB-5 Power Switch P. C. Board



PCB-6 Antenna Terminal P. C. Board



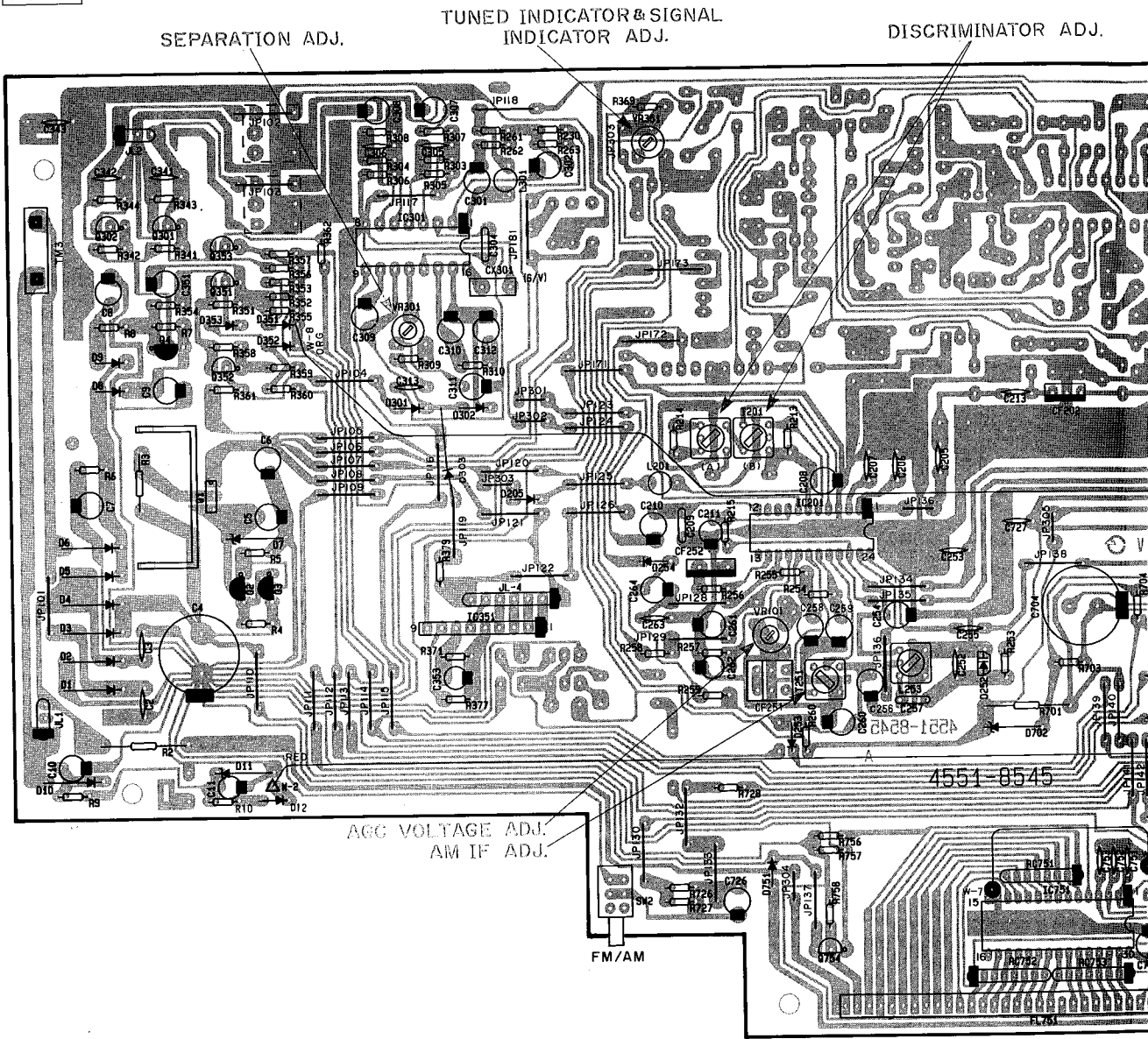
PCB-7 Indicators P. C. Board



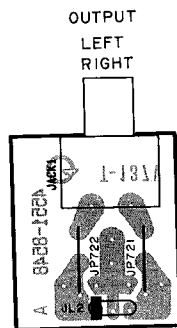
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P. C. BOARDS

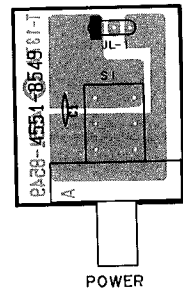
PCB-1 Main P. C. Board



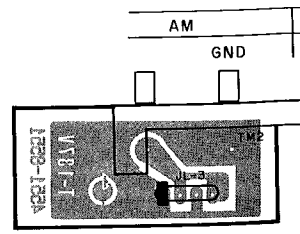
PCB-4 Output Jack P. C. Board



PCB-5 Power Switch P. C. Board



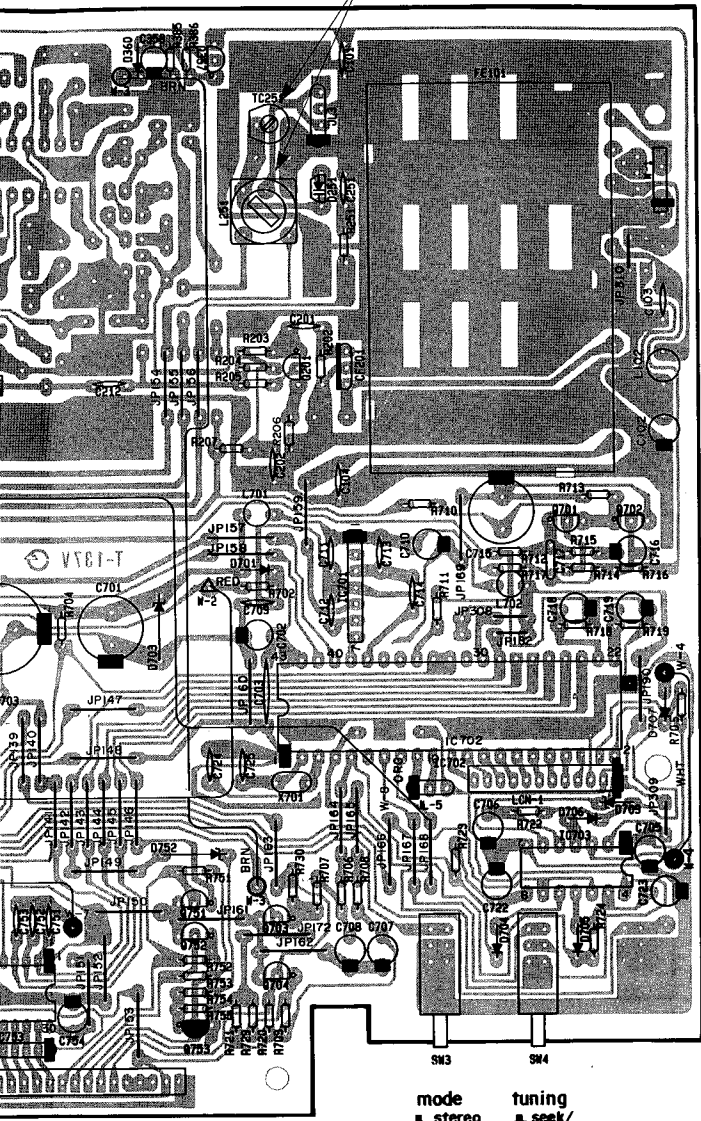
PCB-6 An



F G H I J

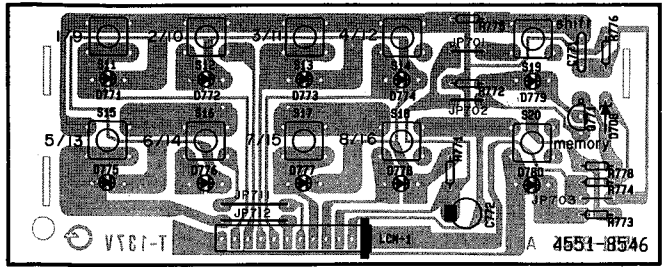
DJ.

AM TRACKING ADJ.

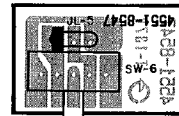


mode tuning
 ▲ stereo ▲ seek/
 ▲ mono ▲ muting
 ▲ manual

PCB-2 Preset Switches P. C. Board

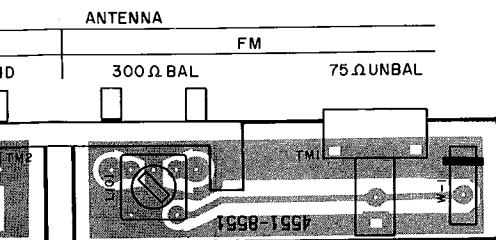


PCB-3 Tuning Switch P. C. Board

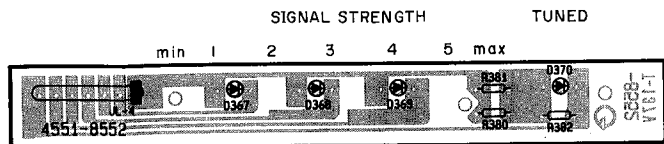


down up TUNING

6 Antenna Terminal P. C. Board

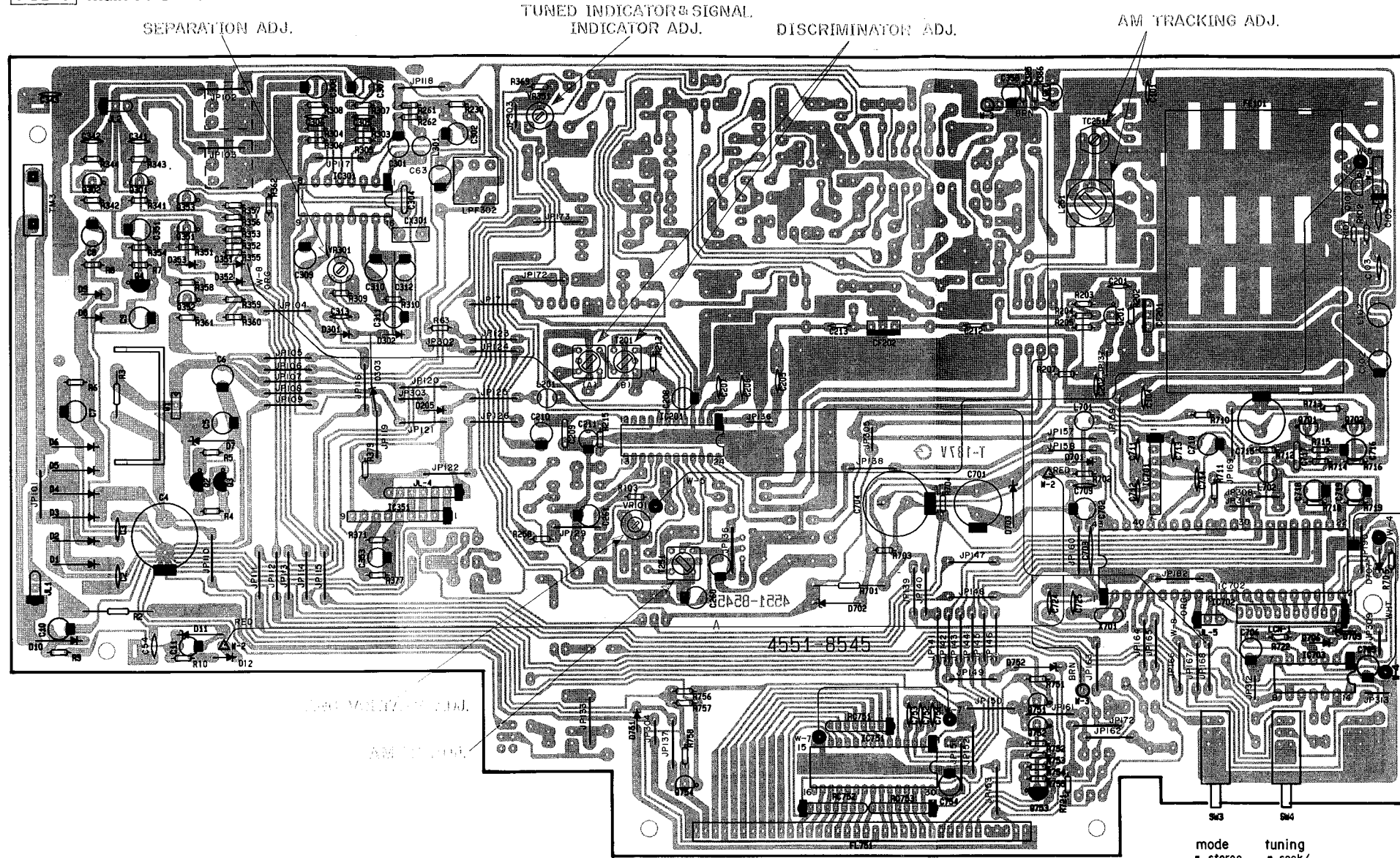


PCB-7 Indicators P. C. Board

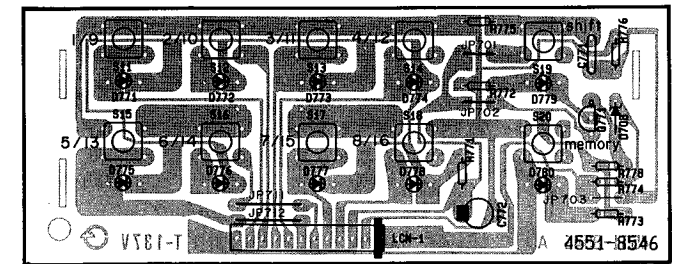


P. C. BOARDS (For General model)

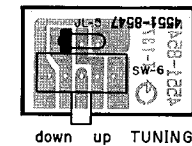
PCB-1 Main P. C. Board



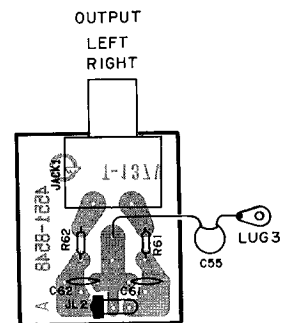
PCB-2 Preset Switches P. C. Board



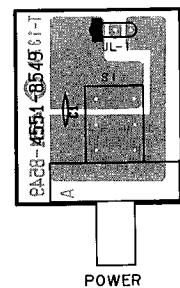
PCB-3 Tuning Switch P. C. Board



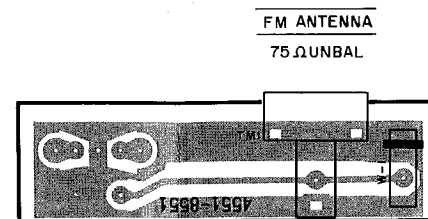
PCB-4 Output Jack P. C. Board



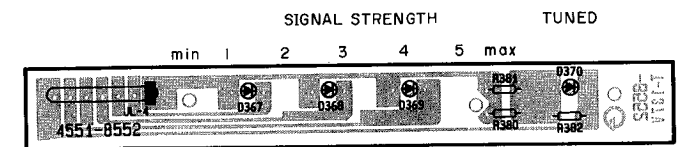
PCB-5 Power Switch P. C. Board



PCB-6 Antenna Terminal P. C. Board



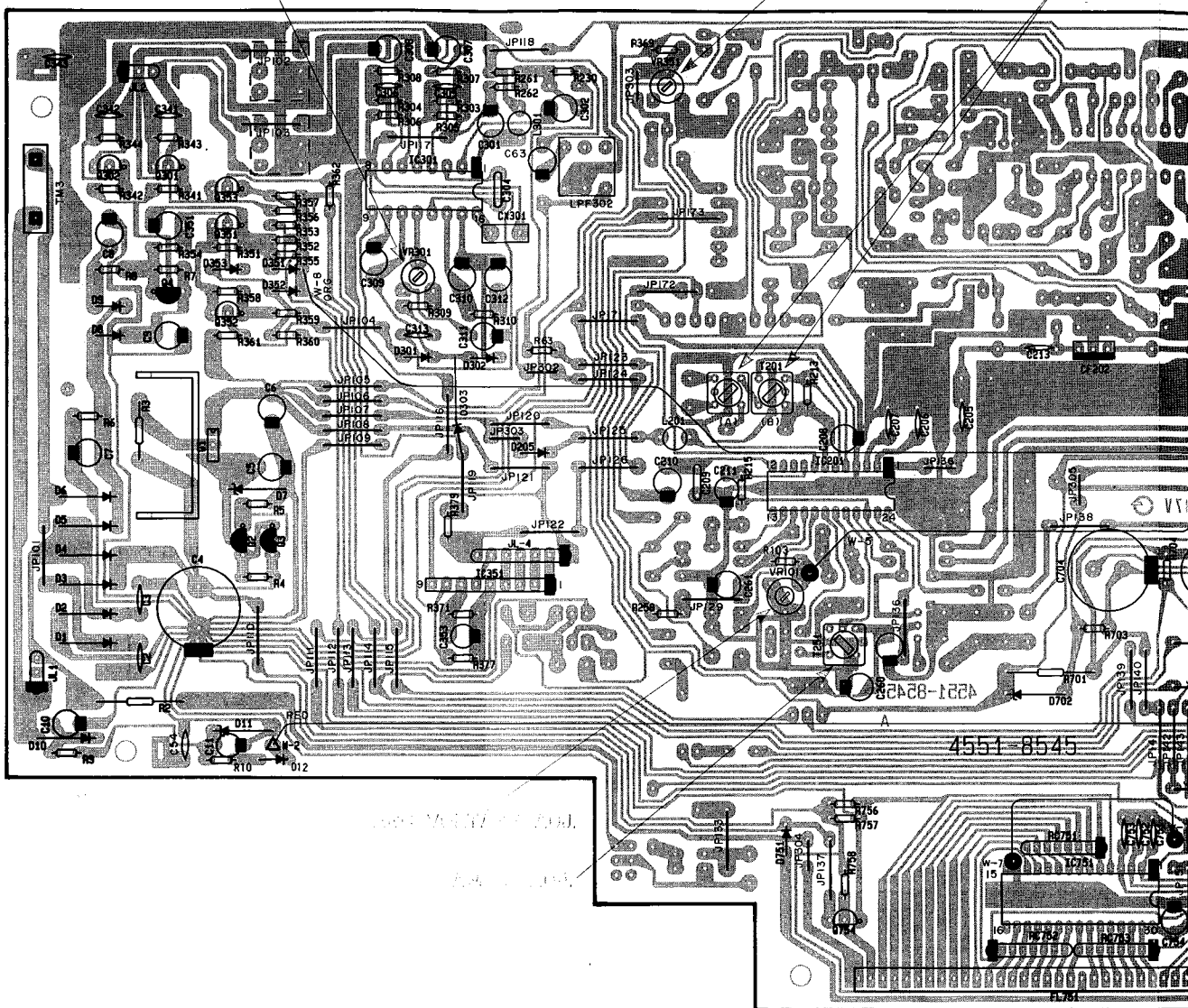
PCB-7 Indicators P. C. Board



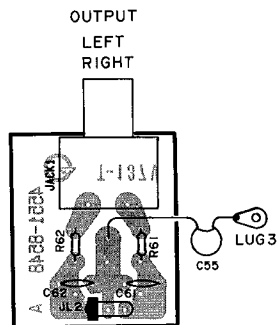
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P. C. BOARDS (For General model)

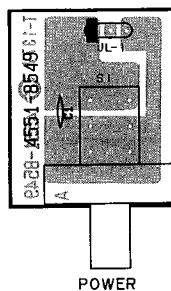
PCB-1 Main P. C. Board



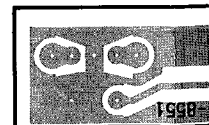
PCB-4 Output Jack P. C. Board



PCB-5 Power Switch P. C. Board

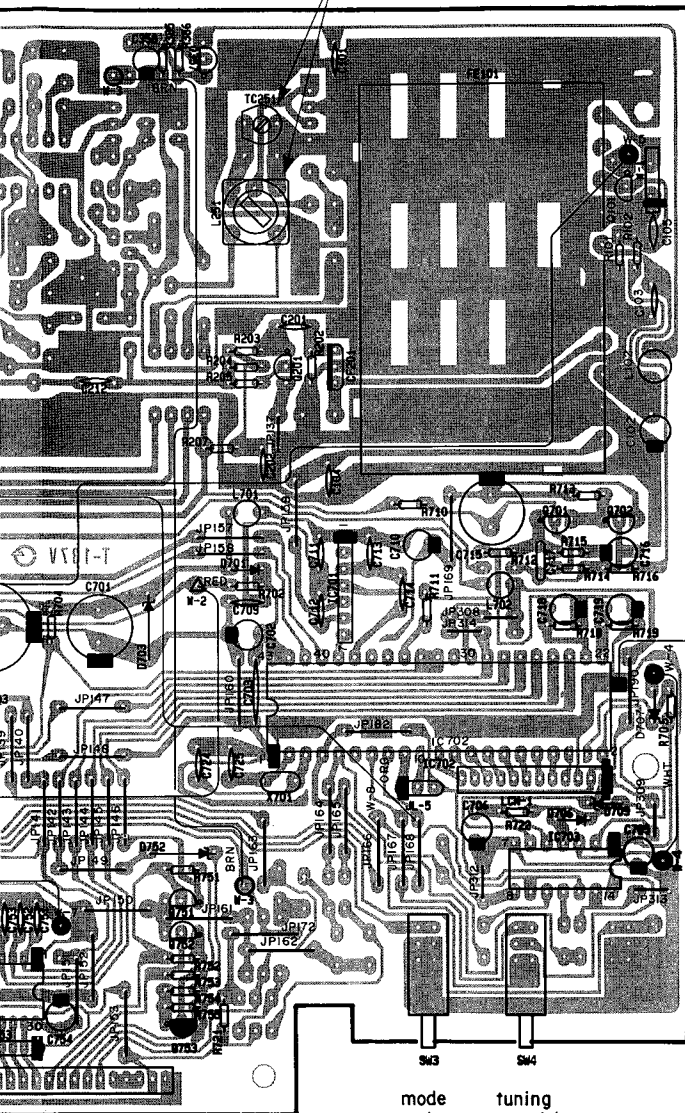


PCB-6 Antenna

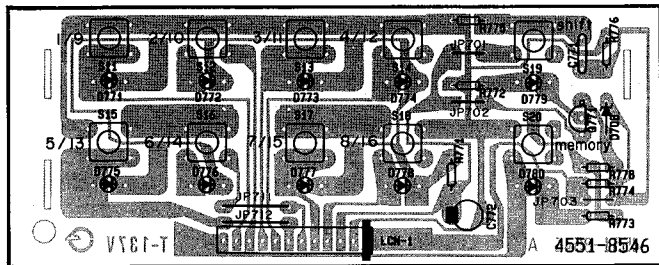


FM ADJ.

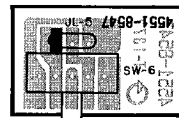
AM TRACKING ADJ.



PCB-2 Preset Switches P. C. Board



PCB-3 Tuning Switch P. C. Board

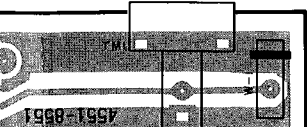


down up TUNING

LUG 2
C53

Antenna Terminal P. C. Board

FM ANTENNA
75 Ω UNBAL

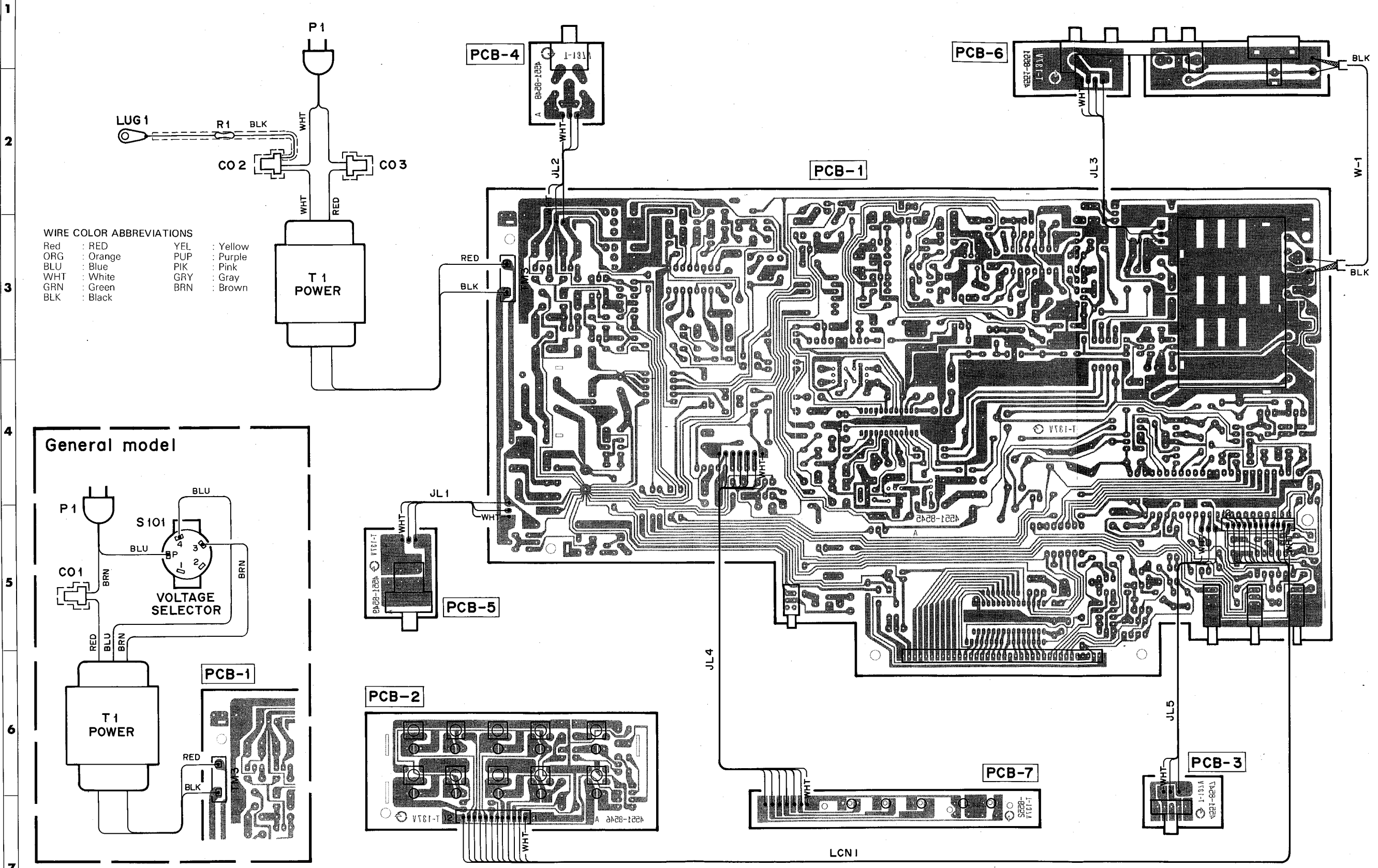


PCB-7 Indicators P. C. Board

SIGNAL STRENGTH TUNED
min 1 2 3 4 5 max

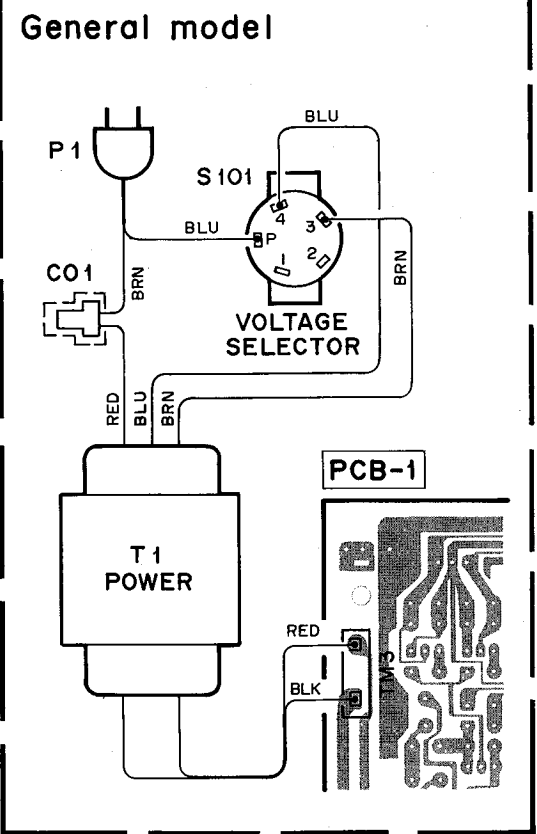


WIRING DIAGRAM



WIRE COLOR ABBREVIATIONS

Red	: RED	YEL	: Yellow
ORG	: Orange	PUP	: Purple
BLU	: Blue	PIK	: Pink
WHT	: White	GRY	: Gray
GRN	: Green	BRN	: Brown
BLK	: Black		

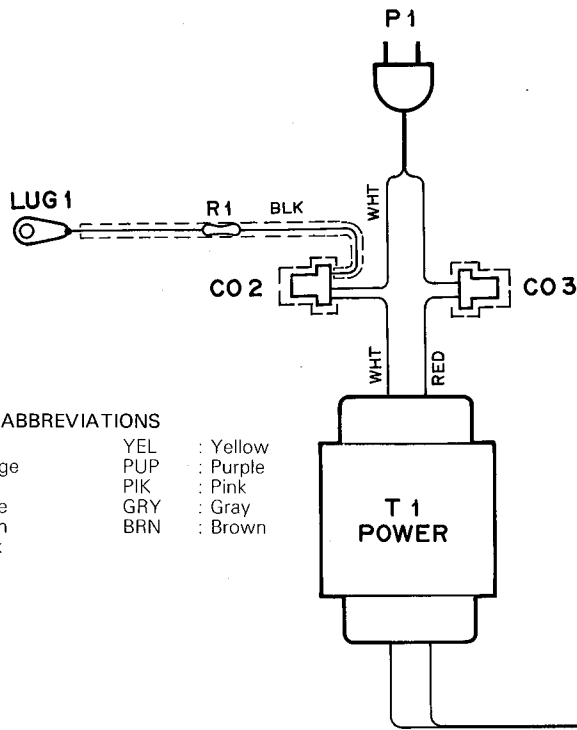


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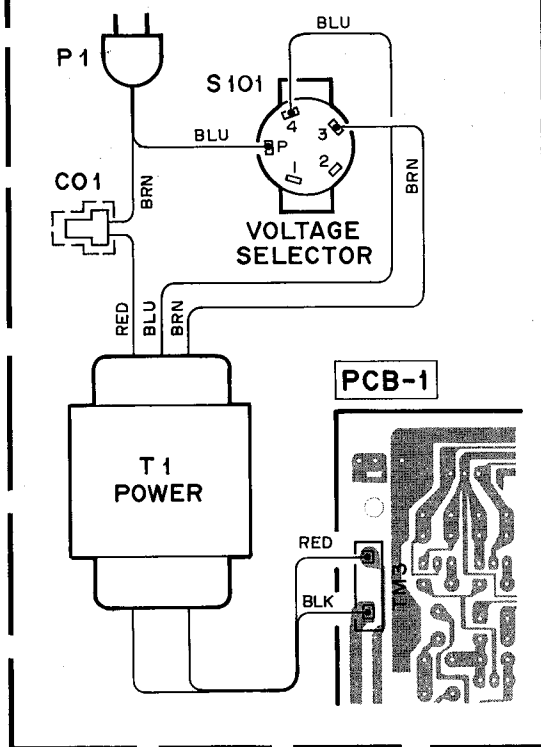
WIRING DIAGRAM

WIRE COLOR ABBREVIATIONS

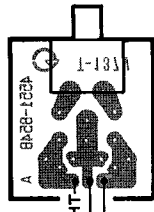
Red	: RED	YEL	: Yellow
ORG	: Orange	PUP	: Purple
BLU	: Blue	PIK	: Pink
WHT	: White	GRY	: Gray
GRN	: Green	BRN	: Brown
BLK	: Black		



General model



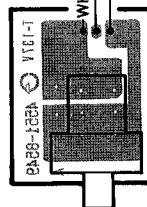
PCB-4



RED

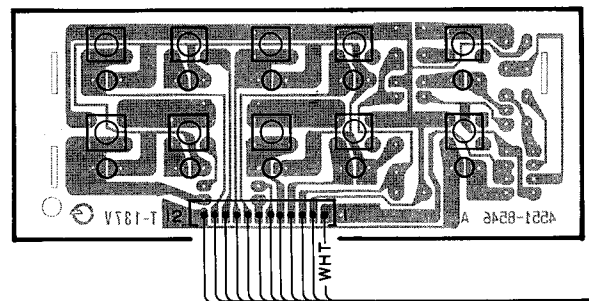
BLK

JL1



PCB-5

PCB-2



JL4

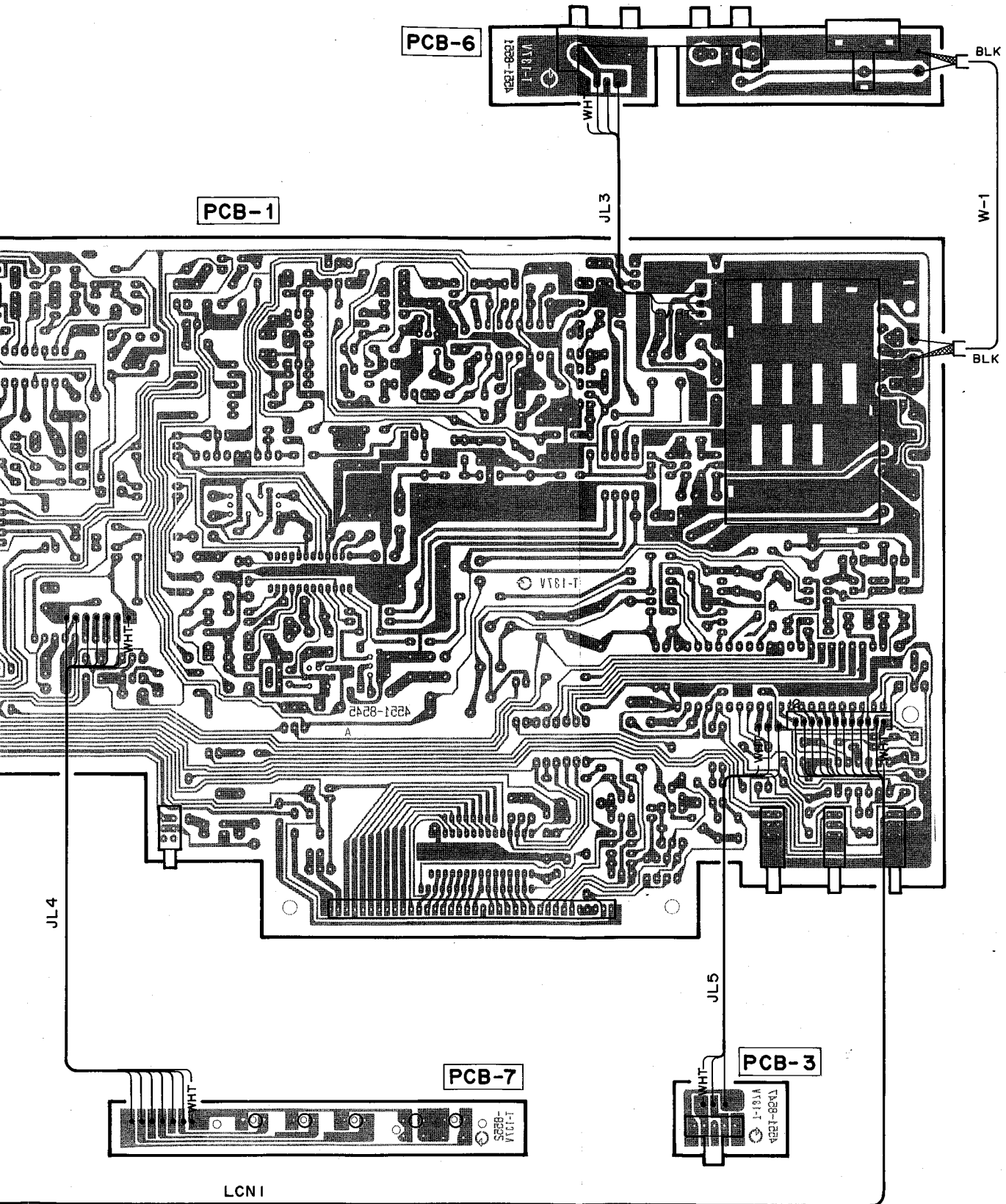
F

G

H

I

J



JL4

PCB-1

PCB-6

PCB-7

PCB-3

LCN I

W-1

JL3

JL5

BLK

W-1

BLK

ELECTRICAL PARTS LIST

Ser. No.	Ref. No.	Part No.	Description	Ser. No.	Ref. No.	Part No.	Description	Ser. No.	Ref. No.	Part No.	Description	Ser. No.	Ref. No.	Part No.	Description
PCB-1 MAIN P. C. BOARD															
CAPACITORS															
786	C1	5361-473ZF	CAP, CER .047μ	697	C705	5345-225F041	CAP, MINI ELE 2.2μ/50V	642B	R305	5232-154J16P	RES, CBN 1/6P 150K	754	R755	5232-473J16P	RES, CBN 1/6P 47K
786	C2	5361-473ZF	CAP, CER .047μ	697	C706	5345-225F041	CAP, MINI ELE 2.2μ/50V	642	R306	5232-124J16P	RES, CBN 1/6P 120K	757	R756	5232-103J16P	RES, CBN 1/6P 10K
786	C3	5361-473ZF	CAP, CER .047μ	700	C707	5345-105F041	CAP, MINI ELE 1μ/50V	642B	R306	5232-154J16P	RES, CBN 1/6P 150K	758	R757	5232-472J16P	RES, CBN 1/6P 4.7K
779	C4	5345-228D041	CAP, MINI ELE 2200μ/25V	700	C708	5345-105F041	CAP, MINI ELE 1μ/50V	644	R307	5232-332J16P	RES, CBN 1/6P 3.3K	758	R758	5232-472J16P	RES, CBN 1/6P 4.7K
780	C5	5345-476C041	CAP, MINI ELE 47μ/16V	704	C709	5361-103ZF	CAP, CER .01μ	644	R308	5232-332J16P	RES, CBN 1/6P 3.3K	INTEGRATED CIRCUITS			
780	C6	5345-476C041	CAP, MINI ELE 47μ/16V	695	C710	5345-476B041	CAP, MINI ELE 47μ/10V	645	R309	5232-103J16P	RES, CBN 1/6P 10K	531	IC201	5653-LA1266	IC, LINEAR
784	C7	5345-106D041	CAP, MINI ELE 10μ/25V	702	C711	5361-223ZF	CAP, CER .022μ	648	R310	5232-472J16P	RES, CBN 1/6P 4.7K	621	IC301	5653-LA3410	IC, LINEAR
782	C8	5345-475D041	CAP, MINI ELE 4.7μ/25V	710	C712	5361-222KB	CAP, CER 2200p	645	R341	5232-103J16P	RES, CBN 1/6P 10K	651	IC351	5652-BA6124	IC, MONO
783	C9	5345-107D041	CAP, MINI ELE 100μ/25V	703	C713	5361-220KSL	CAP, CER 22p	645	R342	5232-103J16P	RES, CBN 1/6P 10K	681	IC701	5654-TD6104P	IC, DIGITAL
784	C10	5345-106D041	CAP, MINI ELE 10μ/25V	704	C714	5361-103ZF	CAP, CER .01μ	645	R344	5232-103J16P	RES, CBN 1/6P 10K	682	IC702	5654-TC9147BP	IC, DIGITAL
784	C11	5345-106D041	CAP, MINI ELE 10μ/25V	696	C715	5345-227C041	CAP, MINI ELE 220μ/16V	662	R351	5232-473J16P	RES, CBN 1/6P 47K	683	IC703	5654-TC4001BP	IC, DIGITAL
042B	C53	5361-223ZF	CAP, CER .022μ	698	C716	5345-334F0951	CAP, MINI ELE .33μ/50V	662	R352	5232-473J16P	RES, CBN 1/6P 47K	741	IC751	5654-TD6301AN	IC, DIGITAL
042B	C54	5361-223ZF	CAP, CER .022μ	708	C717	5354-473K1HM	CAP, MINI ELE .047μ	662	R353	5232-473J16P	RES, CBN 1/6P 47K	RESISTORS			
508	C101	5361-473ZF	CAP, CER .047μ	697	C718	5345-225F041	CAP, MINI ELE 2.2μ/50V	663	R354	5232-103J16P	RES, CBN 1/6P 10K	771	Q1	5614-1666(R)	XISTOR, NPN A
505	C102	5345-476C041	CAP, MINI ELE 47μ/16V	697	C719	5345-225F041	CAP, MINI ELE 2.2μ/50V	663	R355	5232-103J16P	RES, CBN 1/6P 10K	772	Q2	5611-1115(F)or(E)	XISTOR, PNP R
507	C103	5361-223ZF	CAP, CER .022μ	699	C722	5345-474F041	CAP, MINI ELE .47μ/50V	664	R356	5232-223J16P	RES, CBN 1/6P 22K	772	Q3	5611-1115(F)or(E)	XISTOR, PNP R
509	C104	5361-150KSL	CAP, CER 15p	699	C723	5345-474F041	CAP, MINI ELE .47μ/50V	662	R357	5232-473J16P	RES, CBN 1/6P 47K	772	Q4	5611-1115(F)or(E)	XISTOR, PNP R
054B	C105	5361-473ZF	CAP, CER .047μ	705	C724	5361-470JCH	CAP, CER 47p	672	R358	5232-473J16P	RES, CBN 1/6P 47K	052B	Q101	5613-2603(F)or(E)	XISTOR, NPN R
542	C201	5361-223ZF	CAP, CER .022μ	705	C725	5361-470JCH	CAP, CER 47p	662	R359	5232-473J16P	RES, CBN 1/6P 47K	532	Q201	5613-2058(N)	XISTOR, NPN R
542	C202	5361-223ZF	CAP, CER .022μ	699	C726	5345-474F041	CAP, MINI ELE .47μ/50V	662	R360	5232-473J16P	RES, CBN 1/6P 47K	622	Q301	5613-2878(B)	XISTOR, NPN R
543	C205	5361-103ZF	CAP, CER .01μ	702	C727	5361-223ZF	CAP, CER .022μ	672	R361	5232-473J16P	RES, CBN 1/6P 47K	622	Q302	5613-2878(B)	XISTOR, NPN R
542	C206	5361-223ZF	CAP, CER .022μ	704	C728	5361-103ZF	CAP, CER .01μ	673	R362	5232-100J16P	RES, CBN 1/6P 10	654	Q351	5613-2603(F)or(E)	XISTOR, NPN R
542	C207	5361-223ZF	CAP, CER .022μ	752	C751	5361-472KB	CAP, CER 4700p	675	R369	5232-563J16P	RES, CBN 1/6P 56K	654	Q352	5613-2603(F)or(E)	XISTOR, NPN R
539	C208	5345-106C041	CAP, MINI ELE 10μ/16V	752	C752	5361-472KB	CAP, CER 4700p	663	R371	5232-103J16P	RES, CBN 1/6P 10K	654	Q353	5613-2603(F)or(E)	XISTOR, NPN R
544	C209	5361-101KB	CAP, CER 100p	752	C753	5361-472KB	CAP, CER 4700p	668	R377	5232-153J16P	RES, CBN 1/6P 15K	654	Q357	5613-2603(F)or(E)	XISTOR, NPN R
544B	C209	5361-271KB	CAP, CER 270p	750	C754	5345-106C041	CAP, MINI ELE 10μ/16V	665	R379	5232-472J16P	RES, CBN 1/6P 4.7K	689	Q701	5613-2240(BL)	XISTOR, NPN R
539	C210	5345-106C041	CAP, MINI ELE 10μ/16V	RESISTORS				667	R385	5232-183J16P	RES, CBN 1/6P 18K	685	Q702	5613-2603(F)	XISTOR, NPN R
540	C211	5345-105F041	CAP, MINI ELE 1μ/50V	788	R2	5171-820593	RES, MTL 1 82	669	R386	5232-222J16P	RES, CBN 1/6P 2.2K	685B	Q702	5613-2603(F)or(E)	XISTOR, NPN R
542	C212	5361-223ZF	CAP, CER .022μ	793	ΔR3	5102-2R25116F	RES, FUSE 2.2	711	R701	5171-151593	RES, MTL 1 150	685C	Q702	5613-2603(F)	XISTOR, NPN R
542	C213	5361-223ZF	CAP, CER .022μ	791	R4	5232-101J16P	RES, CBN 1/6P 100	713	R702	5232-471J16P	RES, CBN 1/6P 470	685	Q703	5613-2603(F)	XISTOR, NPN R
577	C251	5361-473ZF	CAP, CER .047μ	790	R5	5232-223J16P	RES, CBN 1/6P 22K	714	R703	5232-103J16P	RES, CBN 1/6P 10K	685	Q704	5613-2603(F)	XISTOR, NPN R
580	C252	5361-220JPH	CAP, CER 22p	789	R6	5232-682J16P	RES, CBN 1/6P 6.8K	721	R704	5232-223J16P	RES, CBN 1/6P 22K	747	Q751	5613-RN1203	XISTOR, NPN R
577	C253	5361-473ZF	CAP, CER .047μ	795	R7	5232-822J16P	RES, CBN 1/6P 8.2K	721B	R704	5232-223J16P	RES, CBN 1/6P 22K	746	Q752	5613-2603(F)or(E)	XISTOR, NPN R
572	C254	5345-106C041	CAP, MINI ELE 10μ/16V	796	R8	5232-473J16P	RES, CBN 1/6P 47K	720	R705	5232-104J16P	RES, CBN 1/6P 100K	748	Q753	5611-1115(F)or(E)	XISTOR, PNP R
578	C255	5361-103ZF	CAP, CER .01μ	787	R9	5232-152J16P	RES, CBN 1/6P 1.5K	720B	R705	5232-104J16P	RES, CBN 1/6P 100K	747	Q754	5613-RN1203	XISTOR, NPN R
575	C257	5359-4715851	CAP, PPP 470p	794	R10	5232-102J16P	RES, CBN 1/6P 1K	721	R706	5232-223J16P	RES, CBN 1/6P 22K	DIODES			
571	C258	5345-475D041	CAP, MINI ELE 4.7μ/25V	050B	R101	5232-473J16P	RES, CBN 1/6P 47K	721	R707	5232-223J16P	RES, CBN 1/6P 22K	774	D1	5632-S5277B-6	DIODE, RECT
571	C259	5345-475D041	CAP, MINI ELE 4.7μ/25V	051B	R102	5232-104J16P	RES, CBN 1/6P 100K	721	R708	5232-223J16P	RES, CBN 1/6P 22K	774	D2	5632-S5277B-6	DIODE, RECT
572	C260	5345-106C041	CAP, MINI ELE 10μ/16V	051B	R103	5232-104J16P	RES, CBN 1/6P 100K	721	R709	5232-223J16P	RES, CBN 1/6P 22K	774	D3	5632-S5277B-6	DIODE, RECT
573	C261	5345-105F041	CAP, MINI ELE 1μ/50V	545	R201	5232-391J16P	RES, CBN 1/6P 390	712	R710	5232-102J16P	RES, CBN 1/6P 1K	774	D4	5632-S5277B-6	DIODE, RECT
572	C262	5345-106C041	CAP, MINI ELE 10μ/16V	546	R202	5232-331J16P	RES, CBN 1/6P 330	712B	R710	5232-102J16P	RES, CBN 1/6P 1K	774	D5	5632-S5277B-6	DIODE, RECT
579	C263	5361-472KB	CAP, CER 4700p	547	R203	5232-154J16P	RES, CBN 1/6P 150K	714	R711	5232-103J16P	RES, CBN 1/6P 10K	774	D6	5632-S5277B-6	DIODE, RECT
574	C264	5345-224D041	CAP, MINI ELE .22μ/25V	545	R204	5232-391J16P	RES, CBN 1/6P 390	712	R712	5232-102J16P	RES, CBN 1/6P 1K	776	D7	5635-HZ15-1L	DIODE, ZENER
630	C301	5345-476C041	CAP, MINI ELE 47μ/16V	548	R205	5232-101J16P	RES, CBN 1/6P 100	712B	R712	5232-102J16P	RES, CBN 1/6P 1K	775	D8	5631-ISS133	DIODE, DET
629	C302	5345-226C0952	CAP, MINI ELE 22μ/16V	551	R207	5232-102J16P	RES, CBN 1/6P 1K	716	R713	5232-473J16P	RES, CBN 1/6P 47K	775	D9	5631-ISS133	DIODE, DET
640	C304	5354-473K1HM	CAP, MYL .047μ	555	R211	5232-222J16P	RES, CBN 1/6P 2.2K	714	R714	5232-103J16P	RES, CBN 1/6P 10K	774	D10	5632-S5277B-6	DIODE, RECT
637	C305	5361-471KB	CAP, CER 470p	552	R212	5232-680J16P	RES, CBN 1/6P 68	712	R716	5232-102J16P	RES, CBN 1/6P 1K	775	D12	5631-ISS133	DIODE, DET
637B	C305	5361-271KB	CAP, CER 270p	553	R213	5232-562J16P	RES, CBN 1/6P 5.6K	712B	R716	5232-102J16P	RES, CBN 1/6P 1K	533	D205	5631-ISS133	DIODE, DET
637	C306	5361-471KB	CAP, CER 470p	554	R215	5232-223J16P	RES, CBN 1/6P 22K	717	R718	5232-273J16P	RES, CBN 1/6P 27K	561	D251	5633-ISV149	DIODE, CAP
637B	C306	5361-271KB	CAP, CER 270p (G)(GB)	646	R230	5232-472J16P	RES, CBN 1/6P 4.7K	718	R719	5232-333J16P	RES, CBN 1/6P 33K	561	D252	5633-ISV149	DIODE, CAP
631	C307	5345-225F041	CAP, MINI ELE 2.2μ/50V	646B	R230	5232-472J16P	RES, CBN 1/6P 4.7K	722	R720	5232-472J16P	RES, CBN 1/6P 4.7K	562	D253	5631-ISS133	DIODE, DET
631	C308	5345-225F041	CAP, MINI ELE 2.2μ/50V	581	R251	5232-104J16P	RES, CBN 1/6P 100K	723	R721	5232-222J16P	RES, CBN 1/6P 2.2K	562	D254	5631-ISS133	DIODE, DET
631	C309	5345-225F041	CAP, MINI ELE 2.2μ/50V	583	R252	5232-471J16P	RES, CBN 1/6P 470	720	R722	5232-104J16P	RES, CBN 1/6P 100K	623	D301	5631-ISS133	DIODE, DET
633	C310	5345-224F0952	CAP, MINI ELE .22μ/50V	581	R253	5232-104J16P	RES, CBN 1/6P 100K	720B	R722	5232-104J16P	RES, CBN 1/6P 100K	657	D351	5631-ISS133	DIODE, DET
634	C311	5345-106C041	CAP, MINI ELE 10μ/16V	584	R254	5232-103J16P	RES, CBN 1/6P 10K	720	R723	5232-104J16P	RES, CBN 1/6P 100K	657B	D351	5631-ISS133	DIODE, DET
632	C312	5345-474F0952	CAP, MINI ELE .47μ/50V	584	R255	5232-103J16P	RES, CBN 1/6P 10K	720	R724	5232-104J16P	RES, CBN 1/6P 100K	657	D352	5631-ISS133	DIODE, DET
639	C313	5361-101KB	CAP, CER 100p	587	R256	5232-820J16P	RES, CBN 1/6P 82	720	R726	5232-104J16P	RES, CBN 1/6P 100K	657B	D352	5631-ISS133	DIODE, DET
636	C341	5361-472KB	CAP, CER 4700p	588	R257	5232-223J1									

Ser. No.	Ref. No.	Part No.	Description
688	D707	5631-ISS133	DIODE, DET UA BK
688B	D707	5631-ISS133	DIODE, DET G GB
734	D709	5635-RD4R7EB2	DIODE, ZENER
742	D751	5631-ISS133	DIODE, DET
743	D752	5635-HZ11A2L	DIODE, ZENER
COILS			
503	L102	5995-2R2J107	COIL W/CORE
537	L201	5995-2R2J107	COIL W/CORE
570	L251	5933-00101	COIL CASE, 1 UA BK
564	L253	5922-00215	OSC COIL, 7 UA BK
627	L301	5995-2R2J107	COIL W/CORE
691	L701	5995-2R2J107	COIL W/CORE
691	L702	5995-2R2J107	COIL W/CORE
TRANSFORMERS			
536	T201	5572-10101	DISCRI 7
565	T251	5552-00712	IFT, AM 7 UA BK
CONTROLS			
053B	VR101	5101-5030193750K	RES, SEMI FIX G GB
626	VR301	5101-10401937100K	RES, SEMI FIX
534	VR351	5101-5030193750K	RES, SEMI FIX
MISCELLANEOUS			
814	S2	4431-S0602102	SWITCH, PUSH UA BK
815	S3	4431-S0601102	SWITCH, PUSH
815	S4	4431-S0601102	SWITCH, PUSH
690	X701	5691-00720022	XTAL, OSC
535	CF201	5671-7120A	FILTER, CER S UA BK
535B	CF201	5673-718A	FILTER ASST G GB
535	CF202	5671-7120A	FILTER, CER S UA BK
535B	CF202	5673-718A	FILTER ASST G GB
567	CF251	5671-0159	FILTER, CER S UA BK
568	CF252	5671-7137C	FILTER, CER S UA BK
625	CX301	5693-CSB456F1	OSC, CER
501	FE101	6114-00101	FM TUNER UA BK
501B	FE101	6114-00201	FM TUNER G GB
801	FL751	5722-14	TUBE DISPLAY
744	RC751	5212-473J0703	R COMPOSITE
744	RC752	5212-473J0703	R COMPOSITE
744	RC753	5212-473J0703	R COMPOSITE
569	TC251	5371-93	TRIMMER, IP UA BK
823	TM3	4214-11033	TERMINAL
831	LCN1	4163-01101012	CONNECTR W/W
044B	LPF302	5214-86	LC COMPOSITE G GB

PCB-2 PRESET SWITCHES P. C. BOARD

CAPACITORS			
726	C771	5361-102KB	CAP, CER 1000p
727	C772	5345-106C041	CAP, MINI ELE 10μ/16V
RESISTORS			
728	R771	5232-221J16P	RES, CBN 1/6P 220
728	R772	5232-221J16P	RES, CBN 1/6P 220
728	R773	5232-221J16P	RES, CBN 1/6P 220
730	R774	5232-472J16P	RES, CBN 1/6P 4.7K
736	R775	5232-223J16P	RES, CBN 1/6P 22K
736	R776	5232-223J16P	RES, CBN 1/6P 22K
730	R778	5232-472J16P	RES, CBN 1/6P 4.7K

Ser. No.	Ref. No.	Part No.	Description
TRANSISTORS			
724	Q771	5613-2240(BL)	XISTOR, NPN R
DIODES			
725	D708	5635-RD4R7EB2	DIODE, ZENER
809	D771	5637-GL5NG40	LED
809	D772	5637-GL5NG40	LED
809	D773	5637-GL5NG40	LED
809	D774	5637-GL5NG40	LED
809	D775	5637-GL5NG40	LED
809	D776	5637-GL5NG40	LED
809	D777	5637-GL5NG40	LED
809	D778	5637-GL5NG40	LED
809	D779	5637-GL5NG40	LED
809	D780	5637-GL5NG40	LED
MISCELLANEOUS			
813	S11	4431-A017169	SWITCH, PUSH
813	S12	4431-A017169	SWITCH, PUSH
813	S13	4431-A017169	SWITCH, PUSH
813	S14	4431-A017169	SWITCH, PUSH
813	S15	4431-A017169	SWITCH, PUSH
813	S16	4431-A017169	SWITCH, PUSH
813	S17	4431-A017169	SWITCH, PUSH
813	S18	4431-A017169	SWITCH, PUSH
813	S19	4431-A017169	SWITCH, PUSH
813	S20	4431-A017169	SWITCH, PUSH

PCB-3 TUNING SWITCH P. C. BOARD

816	S6	4411-1027110	SWITCH, ROTARY
837	JL5	4242-R0103201	JUMPER LEAD

PCB-4 OUTPUT JACK P. C. BOARD

CAPACITORS			
041B	C55	5361-223ZF	CAP, CER .022μ G GB
049B	C61	5361-101KB	CAP, CER 100p G GB
049B	C62	5361-101KB	CAP, CER 100p G GB
RESISTORS			
048B	R61	5232-102J16P	RES, CBN 1/6P 1K G GB
048B	R62	5232-102J16P	RES, CBN 1/6P 1K G GB
MISCELLANEOUS			
827	J1	4482-0133	PIN JACK, 2P
834	JL2	4242-R0103201	JUMPER LEAD

PCB-5 POWER SWITCH P. C. BOARD

812	△S1	4431-A02725	SWITCH, PUSH
833	JL1	4242-R0103201	JUMPER LEAD

PCB-6 ANTENNA TERMINAL P. C. BOARD

511	L101	5943-00136	COIL BBN, 10 UA BK
835	JL3	4242-R0104201	JUMPER LEAD
820	TM1	4214-166	TERMINAL UA BK
820B	TM1	4214-167	TERMINAL G GB
821	TM2	4214-164	TERMINAL UA BK

Ser. No.	Ref. No.	Part No.	Description
PCB-7 INDICATORS P. C. BOARD			
RESISTORS			
670	R380	5232-122J16P	RES, CBN 1/6P 1.2K
670	R381	5232-122J16P	RES, CBN 1/6P 1.2K
671	R382	5232-681J16P	RES, CBN 1/6P 680
DIODES			
810	D367	5637-TLGI2I	LED
810	D368	5637-TLGI2I	LED
810	D369	5637-TLGI2I	LED
810	D370	5637-TLGI2I	LED
MISCELLANEOUS			
836	JL4	4242-R010718I	JUMPER LEAD

ABBREVIATIONS IN PARTS LIST

CAPACITORS

CAP, MINI ELE : Electrolytic
 CAP, CER : Ceramic
 CAP, PPP : Polypropylene
 CAP, MYL : Mylar
 CAP, MCA : Mica
 CAP, MINI BP : Bipolar
 CAP, ELE BP : Electrolytic Bipolar
 470 μ : 470 μ F
 6800p : 6800pF
 .047 μ : 0.047 μ F

RESISTORS

RES, CBN 1/6P : Carbon 1/6W
 RES, FUSE : Fuse
 RES, CEM 5P : Cement 5W
 RES, MTL 1P : Metal 1W
 2.2K : 2.2k Ω
 220 : 220 Ω

TRANSISTORS

XISTOR : Transistor
 FET : Field Effect Transistor

CONTROLS

RES, V CBN : Variable Carbon Resistor

NOTE



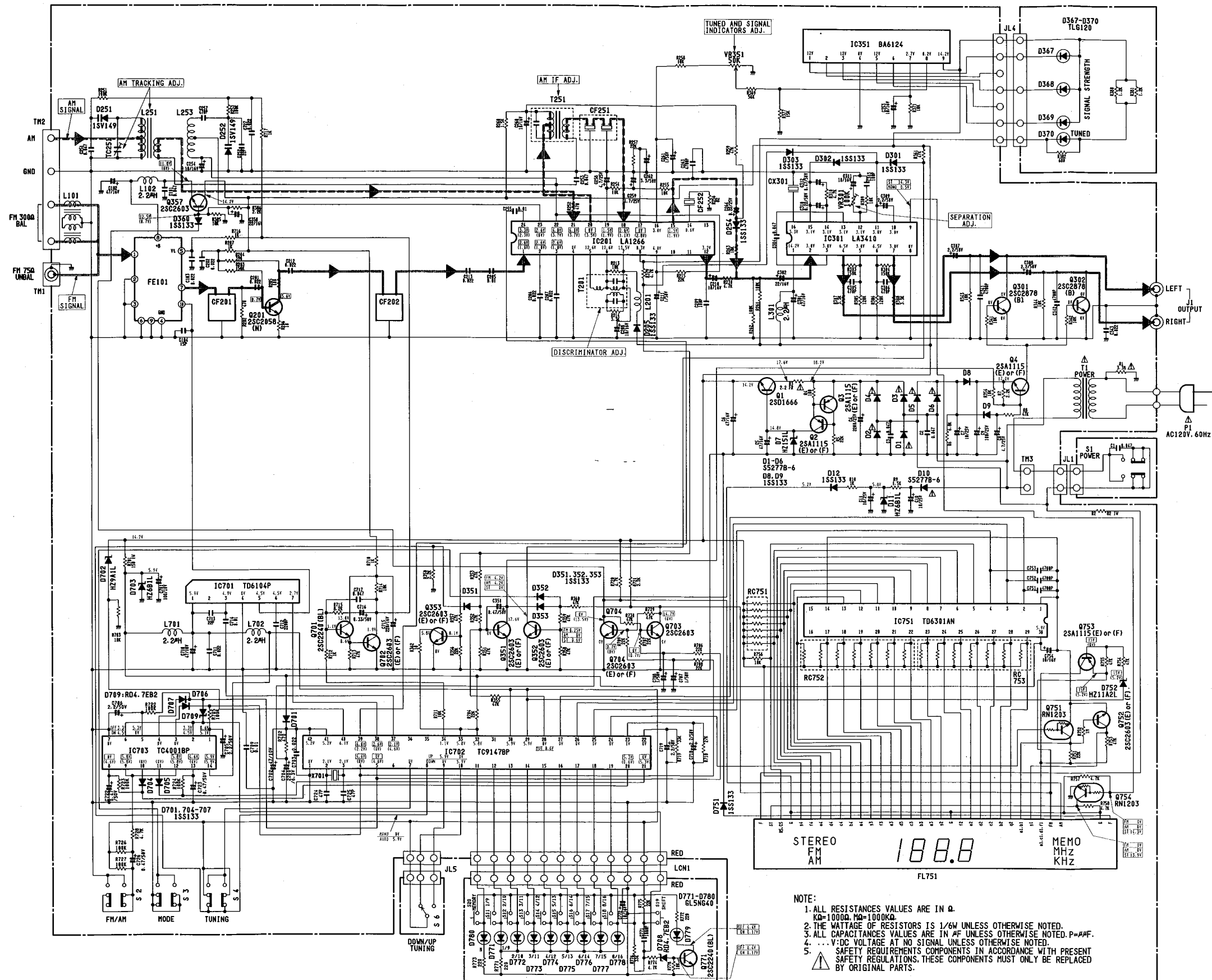
SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACEMENT PART AS SPECIFIED.

CHASSIS MISCELLANEOUS

792	Δ R1	5135-335J50P	RES, CBN 1/2P 3.3M	UA BK
563		5911-235	AM LOOP ANT	UA BK
803		4161-71184	CORD W/PLUG, CONNECT	
804	Δ P1	4161-71147	CORD W/PLUG	UA BK
804B	Δ P1	4161-7256	CORD W/PLUG	G GB
805		1397-6	T FEEDER ANT	UA BK
805B		1397-10	T FEEDER ANT	G GB
807	Δ T1	5584-701562	XFORMER, POWER	UA BK
807B	Δ T1	5584-702562	XFORMER, POWER	G GB
818	LUG1	4211-4	LUG	UA BK
825	Δ CO2	4443-0101100	CONNECTOR	
825	Δ CO3	4443-0101100	CONNECTOR	
043B	LUG2	4211-4	LUG	G GB
043B	LUG3	4211-4	LUG	G GB
045B	Δ S101	4411-102729	ROTARY SWITCH	G GB
046B	Δ CO1	4443-712	CONNECTOR	G GB
113		1222-7227	CUSHION	
114		1222-7224	CUSHION	

Ser. No.	Ref. No.	Part No.	Description	
PACKAGE PARTS LIST				
021B		1756-07901	LABEL, 220V/50Hz	G GB
022B		1756-03108	LABEL	G GB
026B		1119-0135	ATTACH SHEET, FTZ	G GB
111		1221-837147	CARTON BOX	UA G
111A		1221-857147	CARTON BOX	BK GB
113		1222-7227	CUSHIO	
114		1222-7224	CUSHIO	
116		1223-R0120055	SOFT SHEET	
117		1241-R0123350	POLYETHYLENE BAG	
118		1241-R0155500	POLYETHYLENE BAG	
119		1241-R0115300	POLYETHYLENE BAG	
120		1111-J30275	OWNER GUIDE	UA BK
120B		1111-J30276	OWNER GUIDE	G GB
121		1111-J90195	OWNER GUIDE	UA BK
121B		1111-J30235	OWNER GUIDE, ADDENDUM SHEET	G GB
122		1113-717004	OWNER CARD	UA BK
123		1119-047	ATTACH SHEET	UA BK

SCHEMATIC DIAGRAM



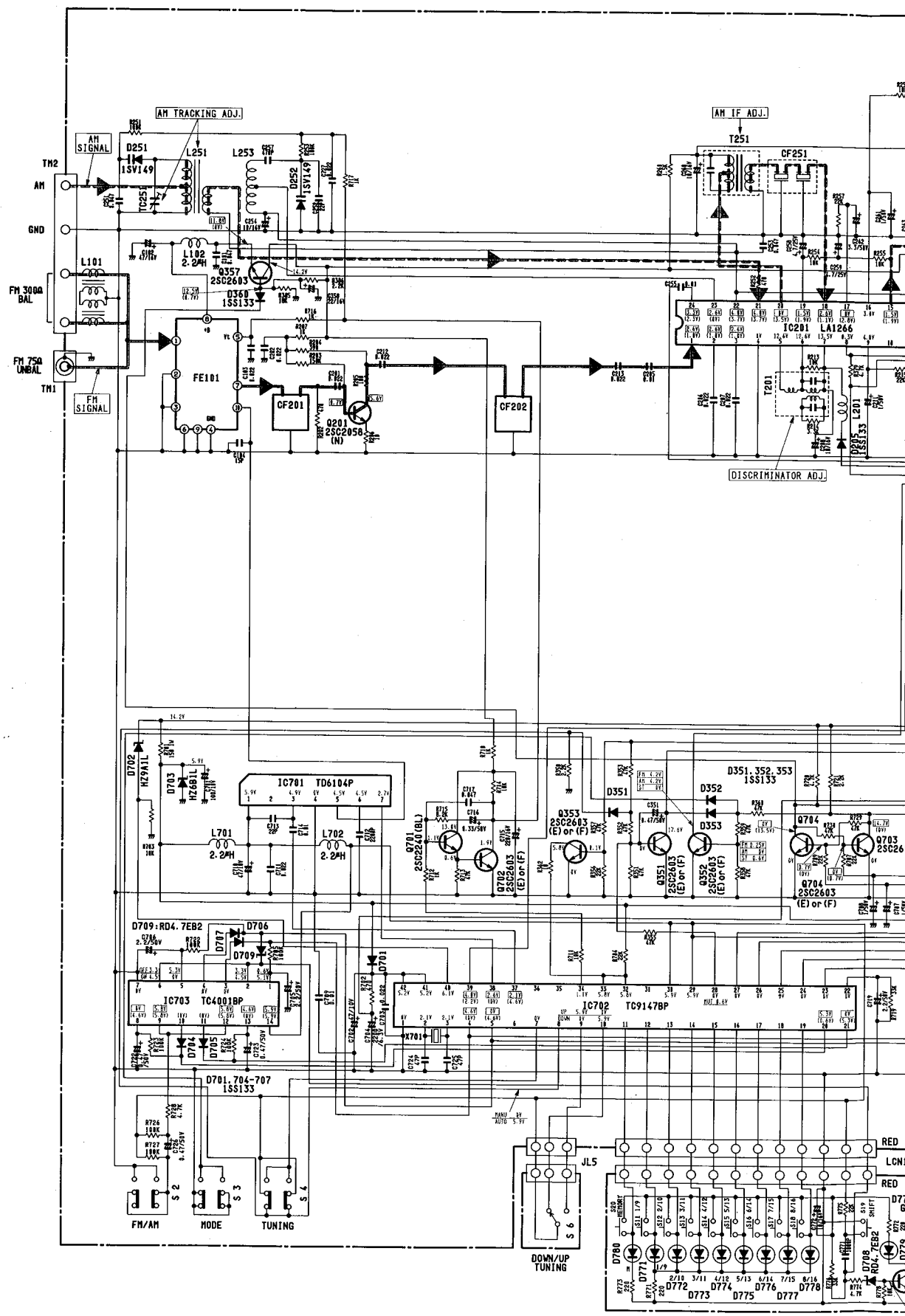
NOTE:

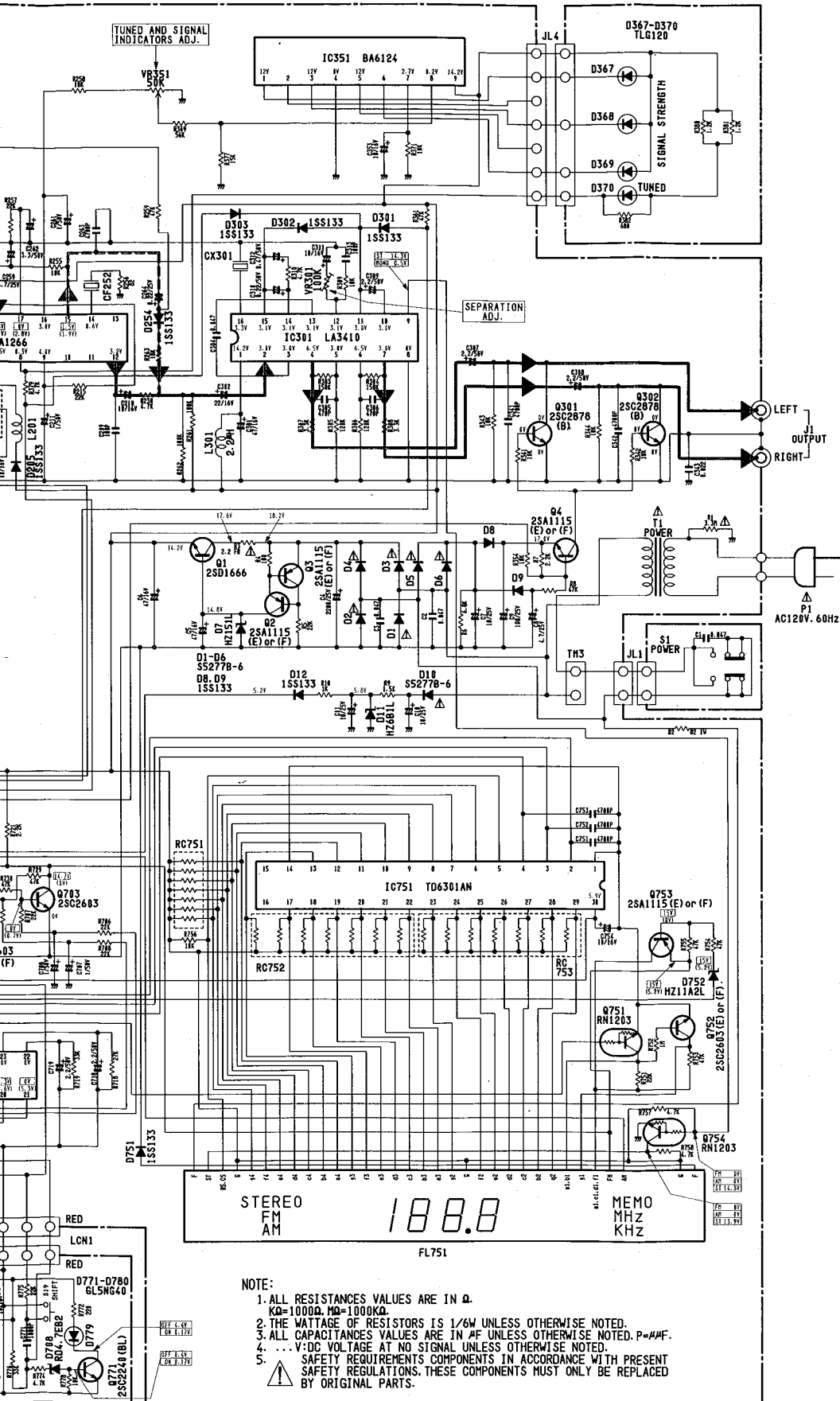
1. ALL RESISTANCES VALUES ARE IN Ω .
K=1000, M=1000K.
2. THE WATTAGE OF RESISTORS IS 1/6W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN μ F UNLESS OTHERWISE NOTED. P=PF.
4. ...V:DC VOLTAGE AT NO SIGNAL UNLESS OTHERWISE NOTED.
5. SAFETY REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS, THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

SCHEMATIC DIAGRAM

1
 2
 3
 4
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 6
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A B C D E





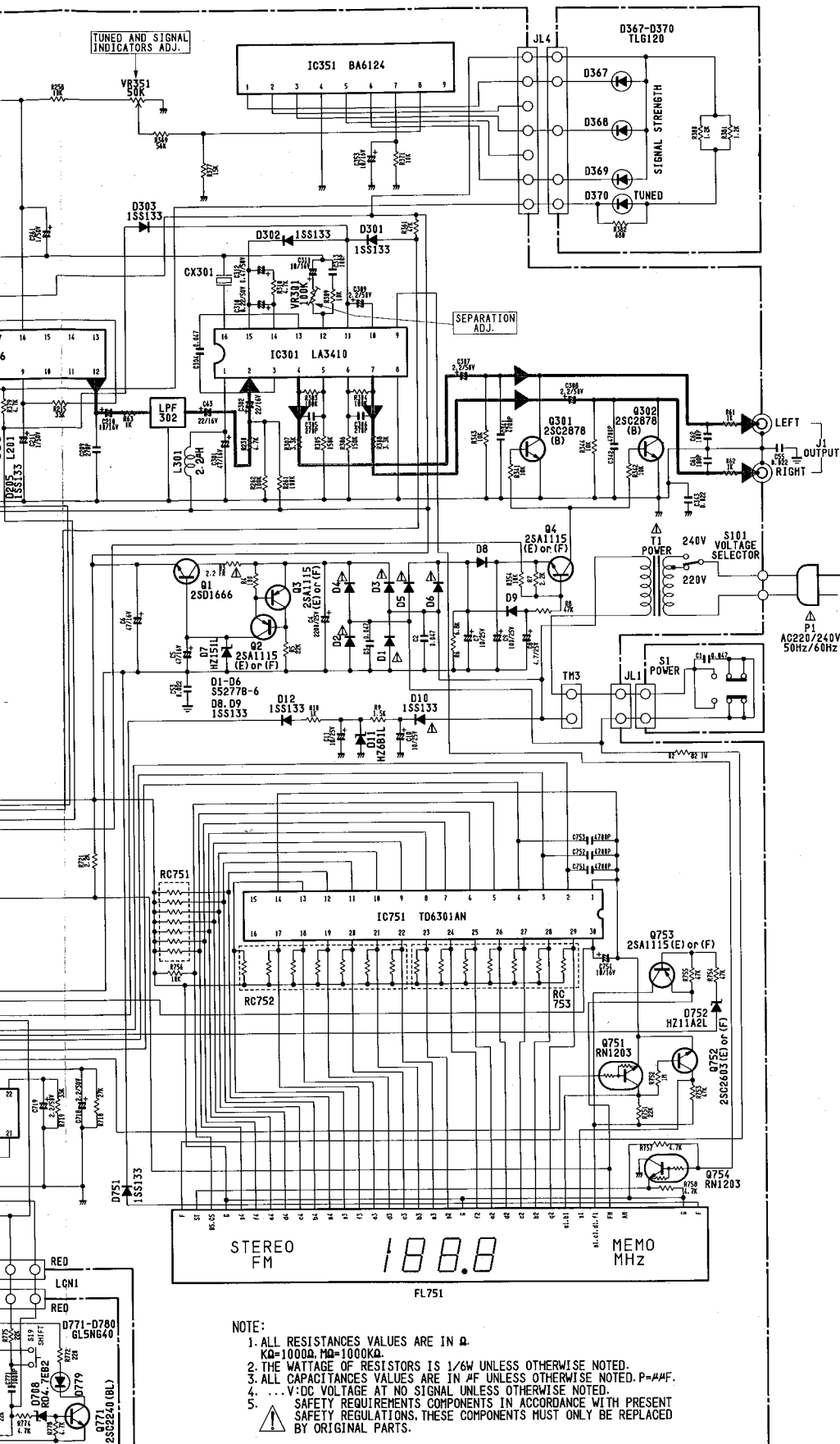
F

G

H

I

J



NOTE:

1. ALL RESISTANCES VALUES ARE IN Ω .
K Ω =1000 Ω , M Ω =1000K Ω .
2. THE WATTAGE OF RESISTORS IS 1/6W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN μ F UNLESS OTHERWISE NOTED. P= μ MF.
4. ...V:DC VOLTAGE AT NO SIGNAL UNLESS OTHERWISE NOTED.
5. SAFETY REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.