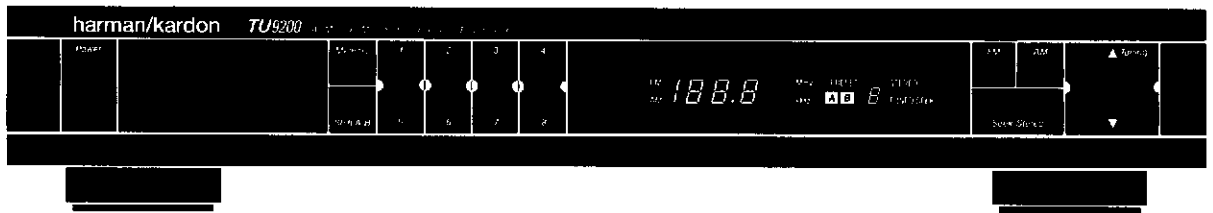


The Harman Kardon Model TU9200 AM/FM STEREO TUNER

Manual 180A

Technical Manual

TU9200



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

- BK: North America area model Black version
- I: International model
- IB: International model Black version
- BB: Australia model Black version

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harman/kardon

Parts and Service Office
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1112-0040A1523 P-089109 2000 Printed in Japan

SPECIFICATIONS

	Nominal	Limit	
● FM SECTION			
Tuning Range	87.5	108.0	MHz
50dB Quieting Sensitivity			
Mono	15.2dBf	≤ 19dBf	
	15.2dBf	≤ 27dBf	I IB BB
Stereo	38dBf	≤ 41dBf	
	38dBf	≤ 50dBf	I IB BB
Usable Sensitivity	11.2dBf	≤ 15dBf	
	11.2dBf	≤ 17dBf	I IB BB
Image Ratio	45dB	≥ 38dB	
IF Rejection	87dB	≥ 70dB	
Spurious Response Rejection	80dB		
Capture Ratio	1.5dB	≤ 2dB	
Alternate Channel Selectivity	77dB	≥ 60dB	
AM Rejection	59dB	≥ 45dB	
Signal to Noise Ratio			
Mono	79dB	≥ 75dB	
	79dB	≥ 68dB	I IB BB
Stereo	73dB	≥ 68dB	
	73dB	≥ 62dB	I IB BB
Total Harmonic Distortion			
Mono	0.18%	≤ 0.4%	
Stereo	0.2%	≤ 0.5%	
Stereo Separation at 1 kHz	50dB	≥ 40dB	
Output Level	750mV	± 1.5dB	
	450mV	± 1.5dB	I IB BB

	Nominal	Limit
● AM SECTION		
Tuning Range		
North America area model	530	1,710kHz
International and Australia models	531	1,602kHz
Usable Sensitivity		
External Antenna	16μV	≤ 33μV
Loop Antenna	400μV/m	≤ 700μV/m
Selectivity	30dB	≥ 25dB
Signal to Noise Ratio	52dB	≥ 47dB
Image Rejection	38dB	≥ 30dB
IF Rejection	58dB	≥ 50dB
● DIMENSION	17-7/16" x 2-11/16" x 14-3/16"	
(W x H x D)	(443 x 68 x 360 mm)	
● WEIGHT	7.3 lbs.	(3.3 kg)
● POWER SUPPLIES		
North America area model	AC 120V	60Hz
International and Australia models	AC 230/240V	50/60Hz
● POWER CONSUMPTION	10W	

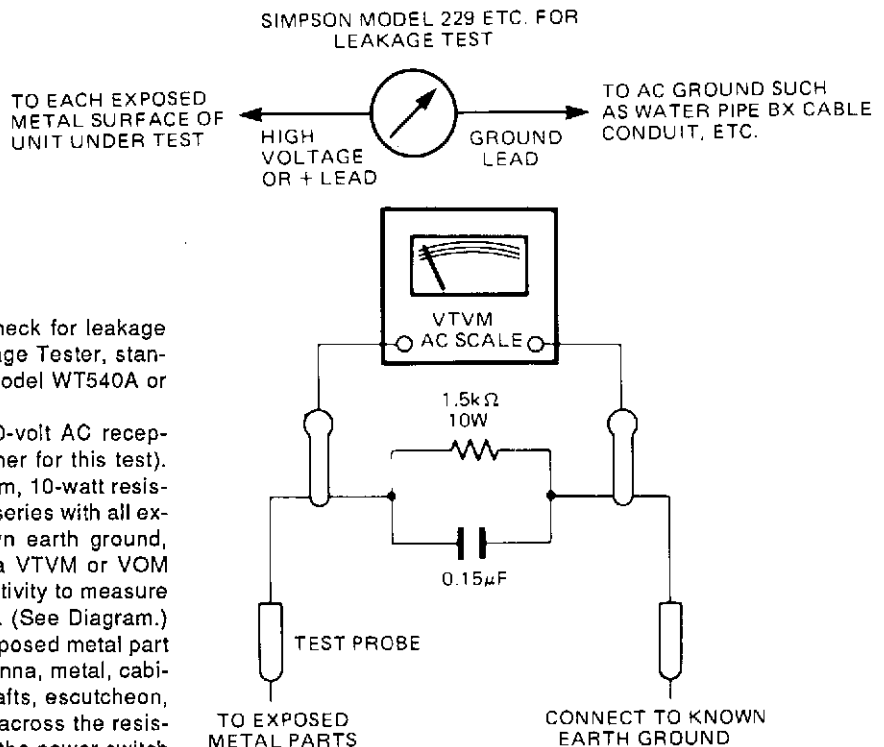
These specifications are service target specs.

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

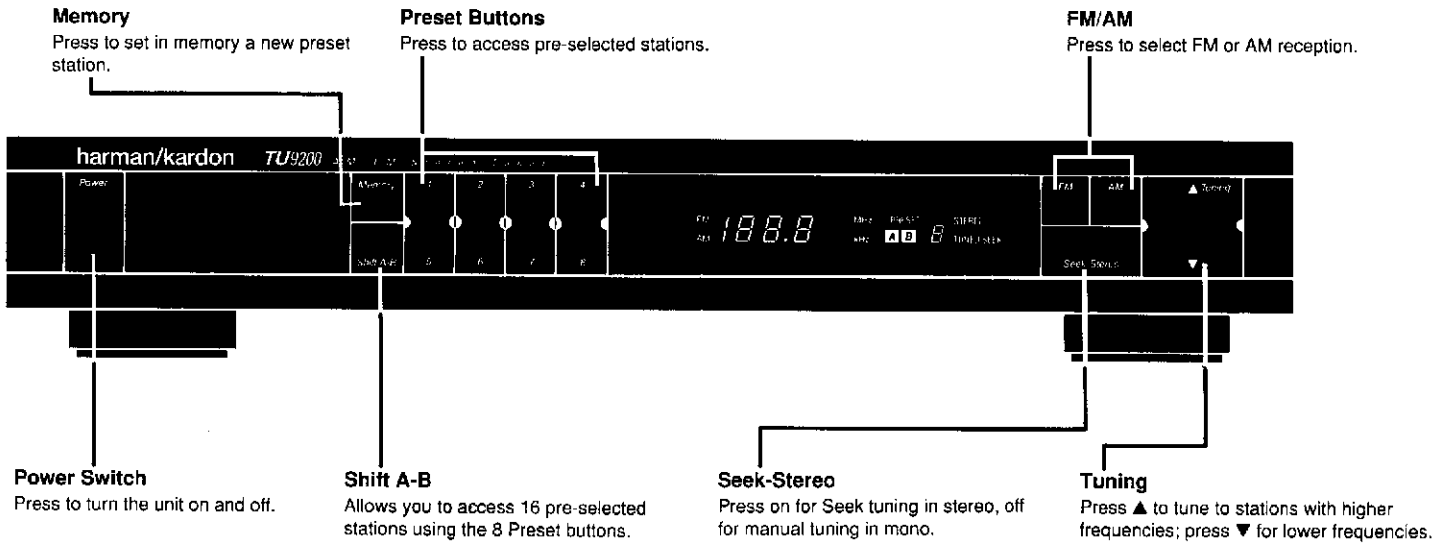
LEAKAGE TEST (FOR SERVICE ENGINEERS IN THE U.S.A.)

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

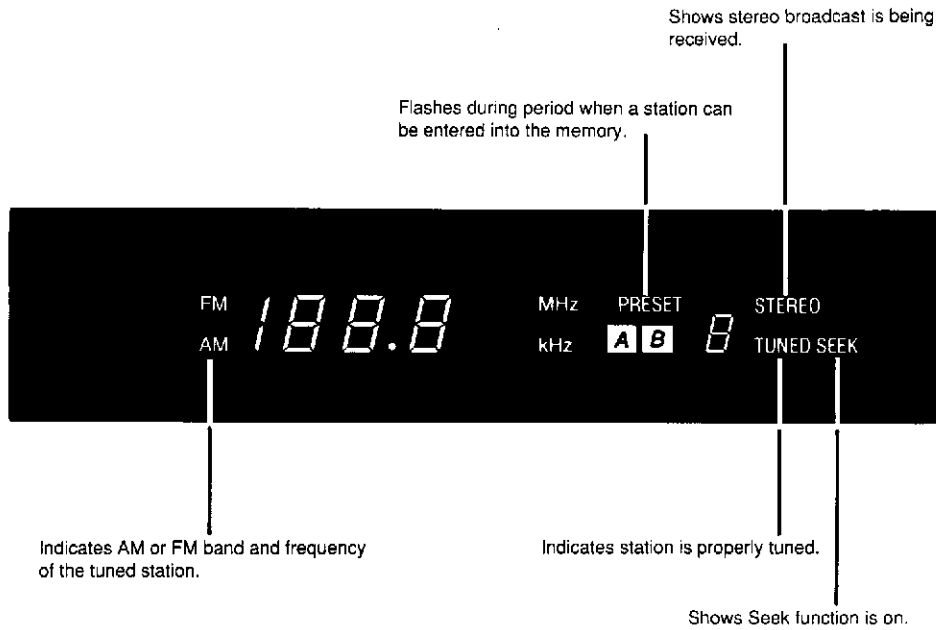
1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the unit.
2. Be sure that any protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers 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.



CONTROLS AND FUNCTIONS



DISPLAYS



DISASSEMBLY PROCEDURES (REFER TO PAGES 9, 10 AND 18)

1 CABINET TOP REMOVAL

Remove 5 screws (A) and then remove the Cabinet Top (127).

2 FRONT PANEL ASS'Y (AA) REMOVAL

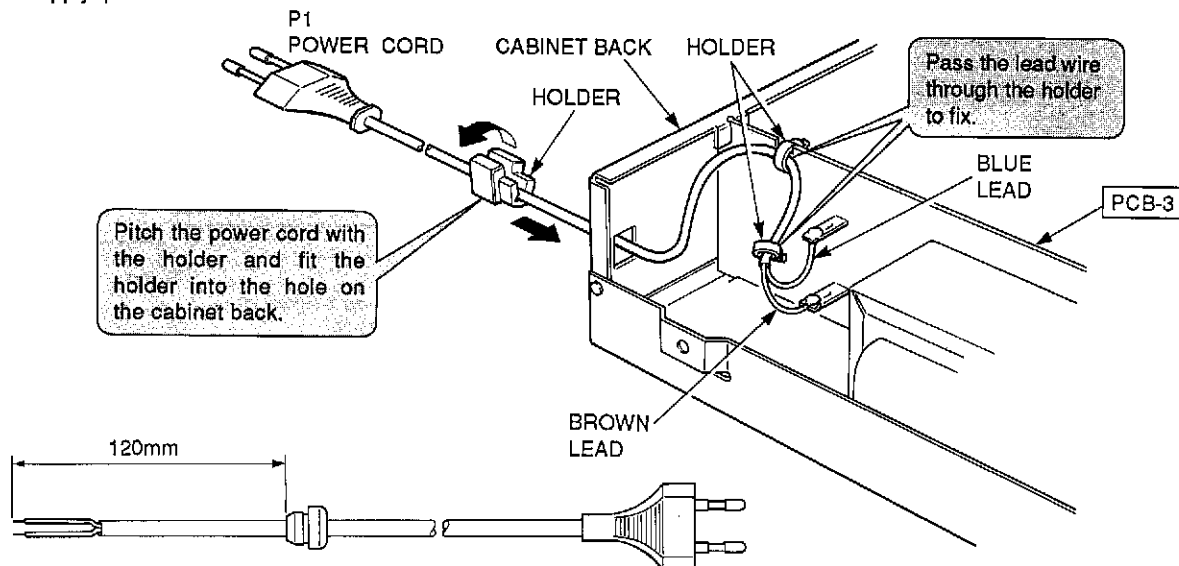
1. Remove the Cabinet Top (127), referring to the previous step 1.
2. Disconnect the jumper lead (JL1) from connector (CN102A) on the Main P. C. Board (PCB-1).
3. Remove 5 screws (B) and then remove the Front Panel Ass'y (AA).

3 MAIN P. C. BOARD (PCB-1) REMOVAL

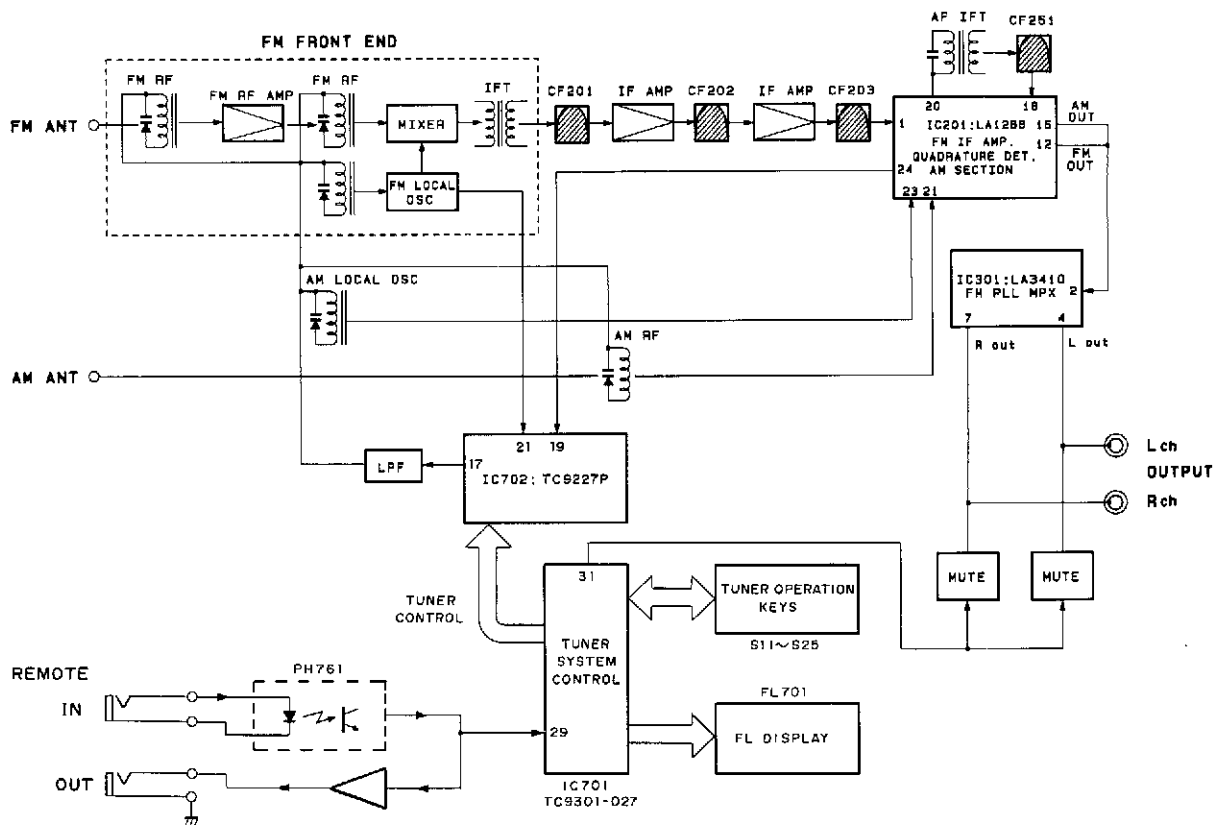
1. Remove the Cabinet Top (127), referring to the previous step 1.
2. Disconnect the jumper lead (JL1) from connector (CN102A) on the Main P. C. Board (PCB-1).
3. Open the lid of connector (CN101) on the Main P. C. Board (PCB-1) and then disconnect the jumper lead (JL2).
4. Remove 8 screws (C and D) and then remove the Main P. C. Board (PCB-1).

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 parts with the standard supply parts.



BLOCK DIAGRAM



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, CF202, Q202 and CF203 and fed to pin 1 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 pin 12 and then input to pin 2 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 pin 4 for the left channel and from pin 7 for the right channel be fed to the amplifier.

■ AM TUNER SECTION

The AM signal which has entered through the antenna is transmitted through the tuning circuit consisting of T251 and TC251 to IC201. In IC201 it undergoes high-frequency amplification, intermediate-frequency amplification local oscillation, intermediate-frequency amplification and detection, and then output from pin 15. This signal is turned ON and OFF at Q703 and Q704 according to the signal from the input selector and fed to pin 2 of IC301.

■ MUTING CIRCUIT

If FM is received out of tuning or in a very weak field intensity, pin 31 of IC701 becomes high level. This is fed to the base of Q706, whose collector then becomes low level and the collector of Q708 high level. As a result, Q301 (L ch) and Q302 (R ch) are conducted to mute the output.

■ SYNTHESIZER SECTION

● FM

The local oscillation output at the front end is fed to pin 21 of IC702. Control output signal if fed from IC701, compared with the divided local oscillation output and output to pin 17. This voltage is level converted at Q701 and Q702, and fed to the front end.

● AM

The local oscillation output is fed from pin 24 of IC201 to pin 19 of IC702. In IC702, Control output signal is fed from IC701, compared with the local oscillation output and output to pin 17. This voltage is level converted at Q701 and Q702, and fed to the AM local oscillation section.

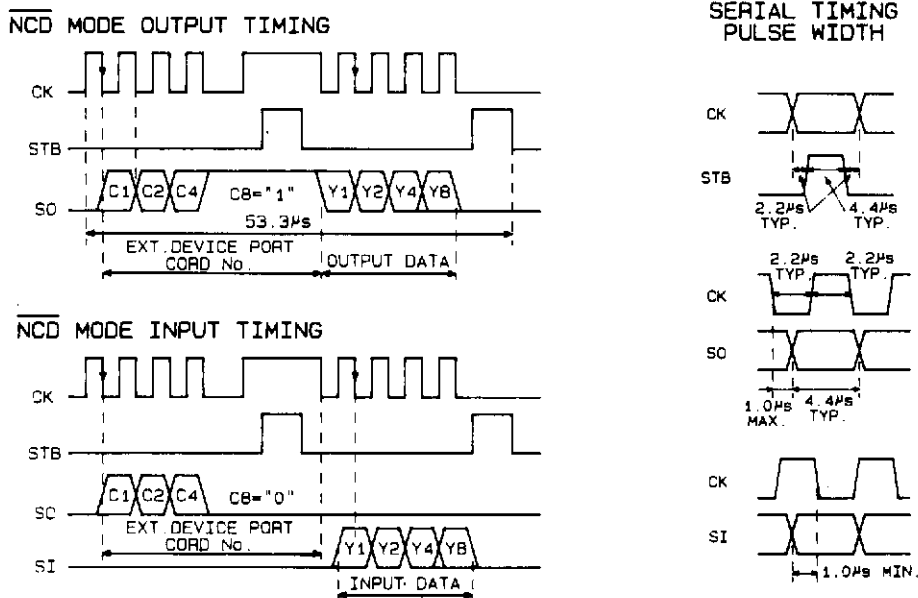
■ INDICATOR SECTION

● Frequency display

The serial data sent out of pins 6 to 20 of IC701, where the data is decoded to provide a signal which turns ON the indicator.

TIMING CHART

Frequency display timing chart of IC701 (TC9301-027)



ALIGNMENT PROCEDURES (REFER TO PAGES 11 and 17)

- Conditions:**
- Make the adjustment at a room temperature of 77°F (25°C).
 - After the Power switch is pushed on, wait for 2 minutes before measuring to be sure of the most stable operation.

■ AM ADJUSTMENT

- Conditions:**
- Set the AM mode by pressing the "AM" button.
 - Standard modulation of the AM Signal Generator is 400Hz at 30%.
 - Set the Seek-Stereo switch to off (put out seek indicator) position.

Step	Alignment	Terminals to be connected	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. (80dBμV input signal) 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 * 1404kHz	1400kHz * 1404kHz	T252	Maximum output level and symmetrical curve on scope.
2	Tracking		1400kHz * 1404kHz	1400kHz * 1404kHz	TC251	Maximum output
3			600kHz * 603kHz	600kHz * 603kHz	T251	Maximum output
4			Repeat steps 2 and 3 for optimum sensitivity.			

* International and Australia models

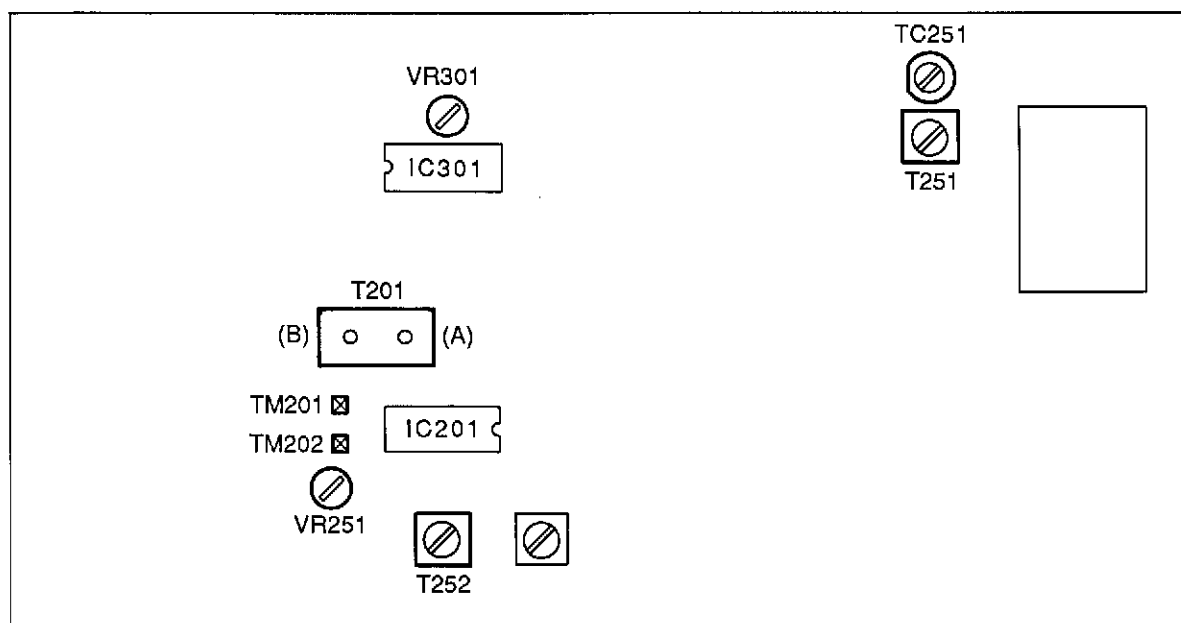
■ FM ADJUSTMENT

- Conditions:**
- Set the FM mode by pressing the "FM" button.
 - Set the Seek-Stereo switch to on (seek indicator lights) position. * International and Australia models

FM Signal Generator	1kHz, 100% modulation 1kHz, 40kHz 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	Terminals to be connected	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 signal] • Connect the Oscilloscope and Distortion meter to the OUTPUT jacks. * In using the center meter, connect it to TM201 and TM202. (Make sure to remove the center meter before adjusting distortion factor.) 	97.9MHz	97.9MHz	T201(A)	Adjust so that the TUNED indicator lights in the same range on both plus (+) and minus (-) sides of 97.9MHz.
2			97.9MHz	97.9MHz	T201(B)	Minimum distortion.
3			Repeat steps 1 and 2 for optimum sensitivity.			
4	Muting level		97.9MHz	97.9MHz	VR251	Adjust VR251 so that the waveform is muted at 35 dBf input.
5	Separation	<ul style="list-style-type: none"> • Connect the Stereo Modulator to FM Signal Generator. Connect the FM Signal Generator to FM 300Ω BAL Antenna terminal through the 300Ω balanced dummy. [1mV (65dBf) input signal] • Connect the VTVM and Oscilloscope to the OUTPUT jacks. 	97.9MHz	97.9MHz	VR301	Adjust so that the left (or right) channel output becomes minimum when only the right (or left) channel of the Stereo Modulator is modulated.

PCB-1



IC TERMINAL FUNCTIONS

■ IC701 (TC9301-027)

Pin No.	Pin Name	I/O	Function
1	GND	—	GND pin
2	K0	I	4-bit key input port
3	K1	I	4-bit key input port
4	K2	I	4-bit key input port
5	K3	I	4-bit key input port
6	D0	O	Digit output
7	D1	O	Digit output
8	D2	O	Digit output
9	D3	O	Digit output
10	D4	O	Digit output
11	D5	O	Digit output
12	D6	O	Digit output
13	a	O	Segment output
14	b	O	Segment output
15	c	O	Segment output
16	d	O	Segment output
17	e	O	Segment output
18	f	O	Segment output
19	g	O	Segment output
20	h	O	Segment output
21	-VFL	I	Negative power terminal (4-bit key input port, digit output, segment output)

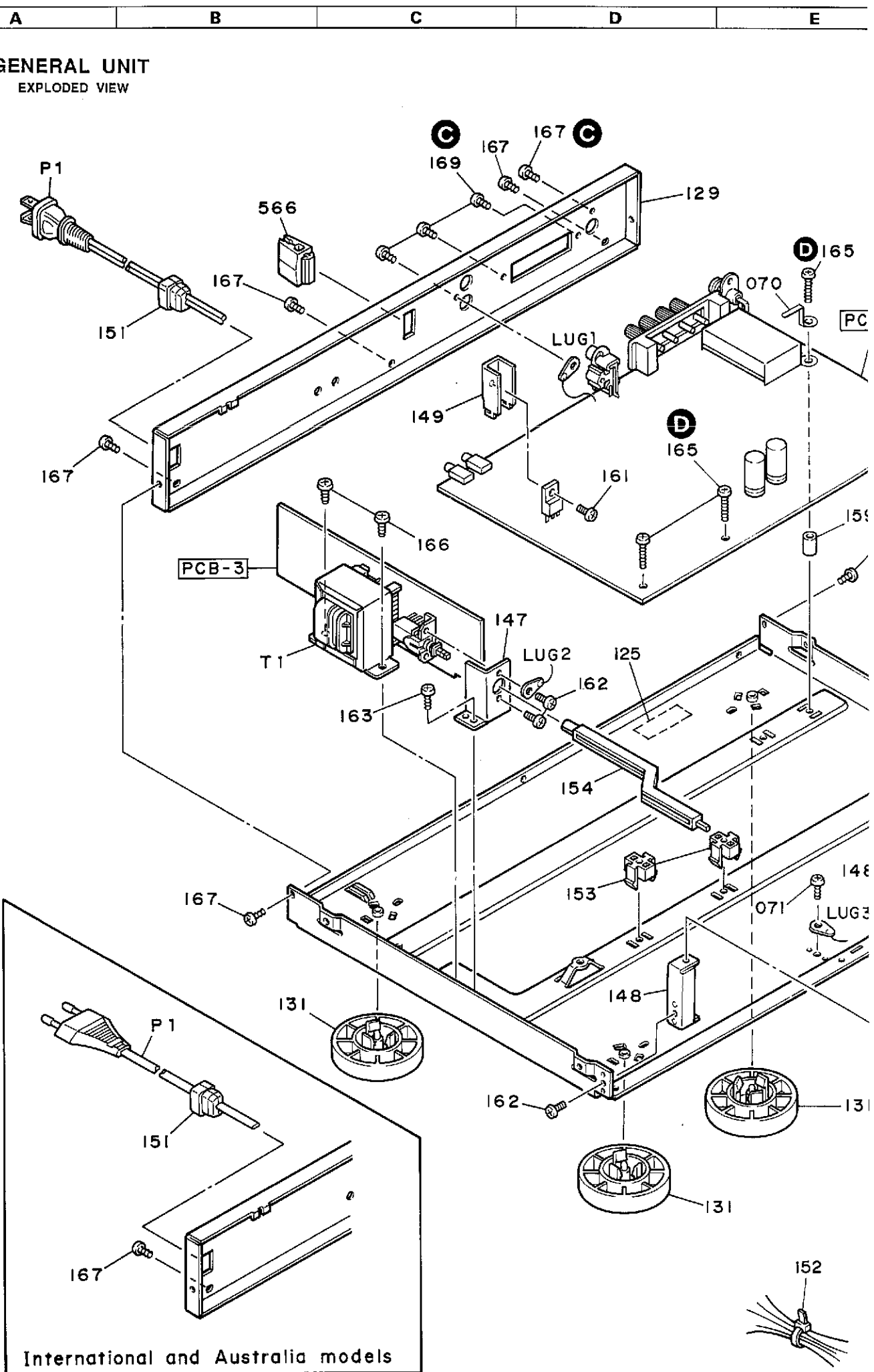
Pin No.	Pin Name	I/O	Function
22	P3-1	I/O	4-bit I/O port (3)
23	P3-2	I/O	4-bit I/O port (3)
24	P3-3	I/O	4-bit I/O port (3)
25	P3-4	I/O	4-bit I/O port (3)
26	P2-1	I/O	4-bit I/O port (2)
27	P2-2	I/O	4-bit I/O port (2)
28	P2-3	I/O	4-bit I/O port (2)
29	P2-4	I/O	4-bit I/O port (2)
30	P1-2	I/O	1-bit I/O port (1)
31	MUTE	O	1-bit muting signal output port
32	TEST	I	Test mode control input terminal
33	STB	O	Serial interface (strobe pulse output)
34	CK	O	Serial interface (serial clock output)
35	SO	O	Serial interface (serial data output)
36	SI	I	Serial interface (serial data input)
37	REF	O	Reference frequency signal output terminal
38	INT	I	Initialize input (system reset signal input terminal)
39	INH	I	Inhibit input (select signal input port of radio mode)
40	XT	—	Connect quartz oscillator
41	XT	—	Connect quartz oscillator
42	VDD	I	Power supply terminal

■ IC702 (TC9227P)

Pin No.	Pin Name	I/O	Function
1	NC	—	Not connected
2	REF	I	Reference frequency input
3	SO	O	Serial I/O port (serial output)
4	SI	I	Serial I/O port (serial input)
5	CK	I	Serial I/O port (clock signal input)
6	STB	I	Serial I/O port (strobe signal input)
7	A-STP	I	Autostop signal input
8	IFIN	I	IF signal input of IF counter detected autostop
9	IN1	I	Input port
10	OT1	O	Output port
11	OT2	O	Output port
12	OT3	O	Output port
13	OT4	O	Output port
14	OT5	O	Output port
15	OT6	O	Output port
16	DO2	O	Phase comparator output
17	DO1	O	Phase comparator output
18	TEST	I	Test mode control input
19	AMIN	I	AM local oscillator (programmable counter input)
20	GND	—	GND pin
21	FMIN	I	FM local oscillator (pre scaler input)
22	VDD	I	5V ± 10% power supply terminal

GENERAL UNIT
EXPLODED VIEW

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International and Australia models

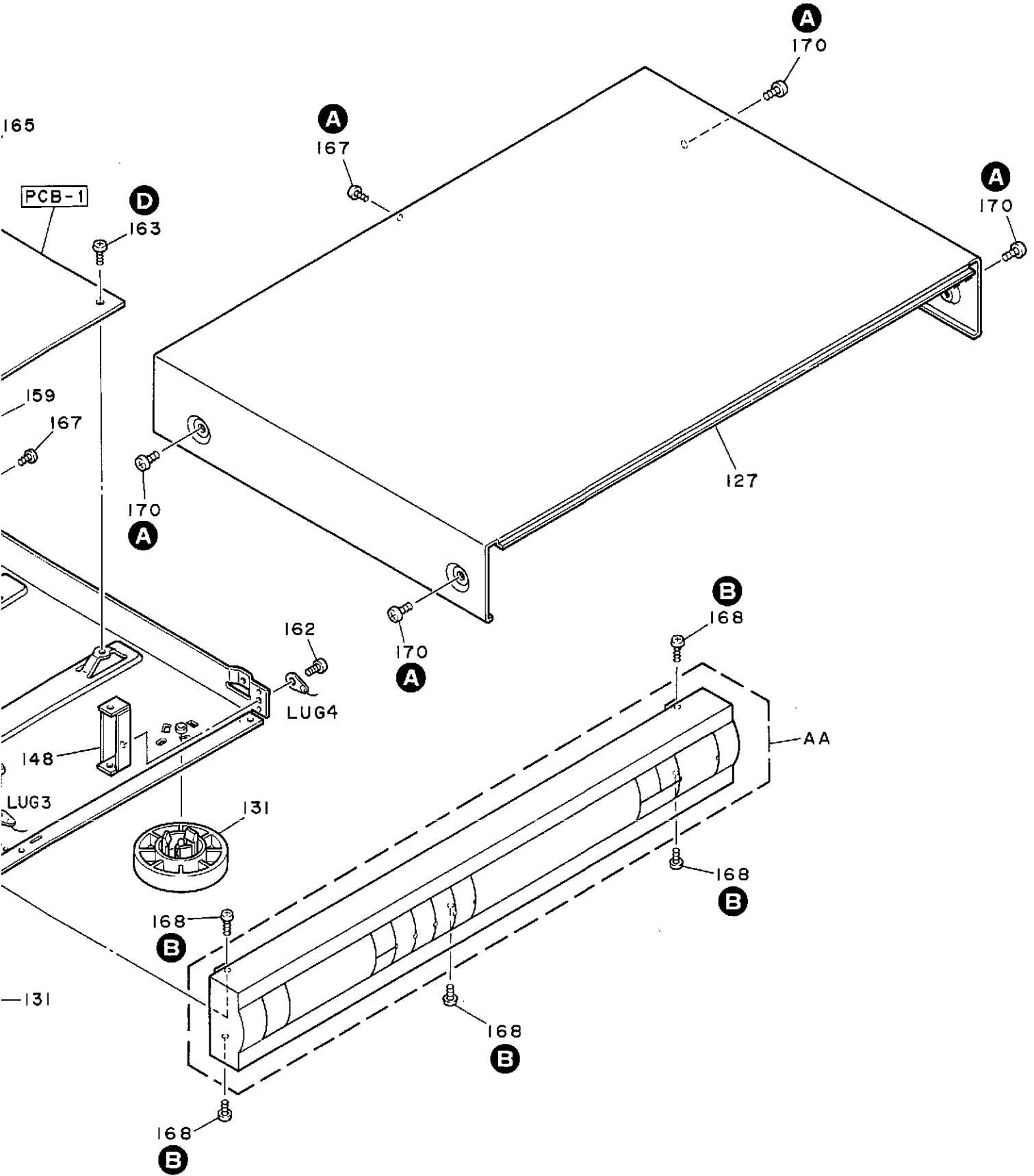
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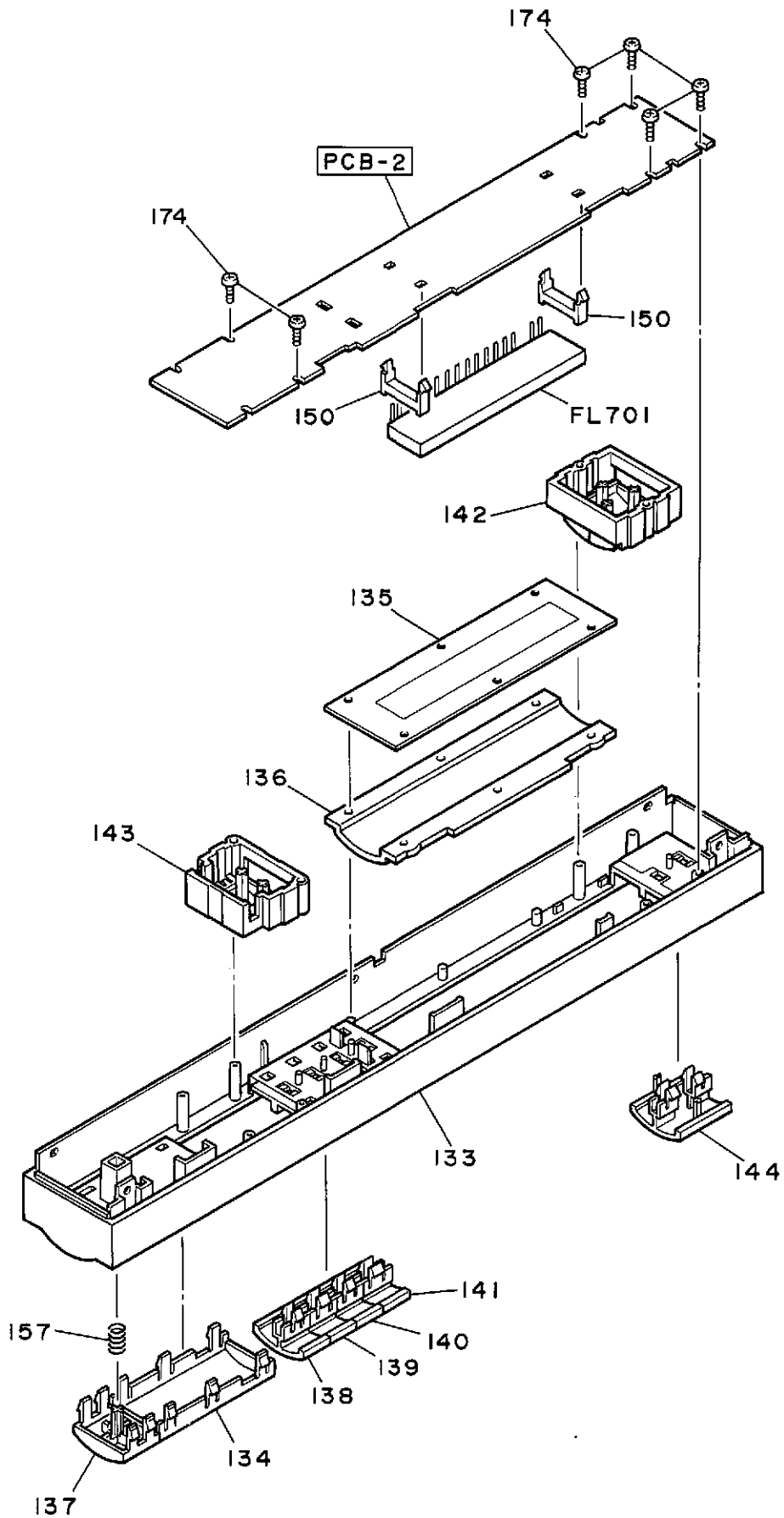
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A B C D E

GENERAL UNIT
EXPLODED VIEW (FRONT PANEL ASS'Y)

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GENERAL UNIT PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
AA	A442-TU9200A	FRONT PANEL ASS'Y I	143	1662-59004	PUSH BUTTON, SHIFT, MEMORY BK IB BB
AA	A442-TU9200B	FRONT PANEL ASS'Y BK IB BB	144	1662-58901	PUSH BUTTON, TUNING I
070	2218-20	BRACKET, FIX I IB BB	144	1662-58902	PUSH BUTTON, TUNING BK IB BB
071	2347-R0130062	SCREW, BND T+ (3x6mm)	146	2219-7975	METAL FITTING, TM7, MAIN PCB GND BK
125	1756-CSA	LABEL, CSA BK	147	2219-8291	METAL FITTING, POWER SW
127	1414-16002	CABINET	148	2219-8292	METAL FITTING, R.L. SIDE (x2)
128	1424-31801	CABI BACK, BOTTOM	149	2222-7230	HEAT SINK, MAIN
129	1424-35501	CABI BACK, REAR BK	150	2240-7386	HOLDER, FL (x2)
129	1424-35502	CABI BACK, REAR I IB BB	151	2240-364	HOLDER, AC CORD
131	1319-03301	LEG (x4)	152	2240-R0101	HOLDER, WIRING (x2)
133	1442-24506	PANEL, FRONT I	153	2360-7018	BOSS, SPE, MAIN (x2)
133	1442-24505	PANEL, FRONT BK IB BB	154	2601-7156	SHAFT, POWER
134	1442-24701	PANEL, DUMMY I	157	2651-2101732	SPRING, POWER
134	1442-24702	PANEL, DUMMY BK IB BB	159	2132-01401	SPACER, MAIN
135	1511-19804	PLATE, FL FILTER	161	2327-R0130082	SCREW, BND + (3x8mm)
136	1532-17504	WINDOW, FRONT	162	2327-R0130062	SCREW, BND + (3x8mm) (x4)
137	1662-52003	PUSH BUTTON, POWER I	163	2347-R0130062	SCREW, BND T+ (3x6mm) (x2)
137	1662-52001	PUSH BUTTON, POWER BK IB BB	165	2347-R0130162	SCREW, BND T+ (3x16mm) (x3)
138	1662-58601	PUSH BUTTON, PRESET 1/5 I	166	2347-R0140062	SCREW, BND T+ (4x6mm) (x2)
138	1662-58605	PUSH BUTTON, PRESET 1/5 BK IB BB	167	2347-R0130064	SCREW, BND T+ (3x6mm) (x7)
139	1662-58602	PUSH BUTTON, PRESET 2/6 I	168	2347-R0130084	SCREW, BND T+ (3x8mm) (x5)
139	1662-58606	PUSH BUTTON, PRESET 2/6 BK IB BB	169	2347-R0130104	SCREW, BND T+ (3x10mm) (x3)
140	1662-58603	PUSH BUTTON, PRESET 3/7 I	170	2347-R0140064	SCREW, BND T+ (4x6mm) (x4)
140	1662-58607	PUSH BUTTON, PRESET 3/7 BK IB BB	174	2347-R0126082	SCREW, BND T+ (2.6x8mm) (x6)
141	1662-58604	PUSH BUTTON, PRESET 4/8 I	566	2240-7208	HOLDER
141	1662-58608	PUSH BUTTON, PRESET 4/8 BK IB BB	△ F1	5732-122030	FUSE (T1.25A) I IB BB
142	1662-62401	PUSH BUTTON, FM/AM, SEEK I	△ P1	4161-71151	CORD W/PLUG BK
142	1662-62402	PUSH BUTTON, FM/AM, SEEK BK IB BB	△ P1	4161-7256	CORD W/PLUG I IB
143	1662-59003	PUSH BUTTON, SHIFT, MEMORY I	△ P1	4161-04100	CORD W/PLUG BB
			△ T1	5584-S7701	XFORMER, POWER BK
				5584-S7702	XFORMER, POWER I IB BB

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P. C. BOARDS

PCB-1 Main P. C. Board

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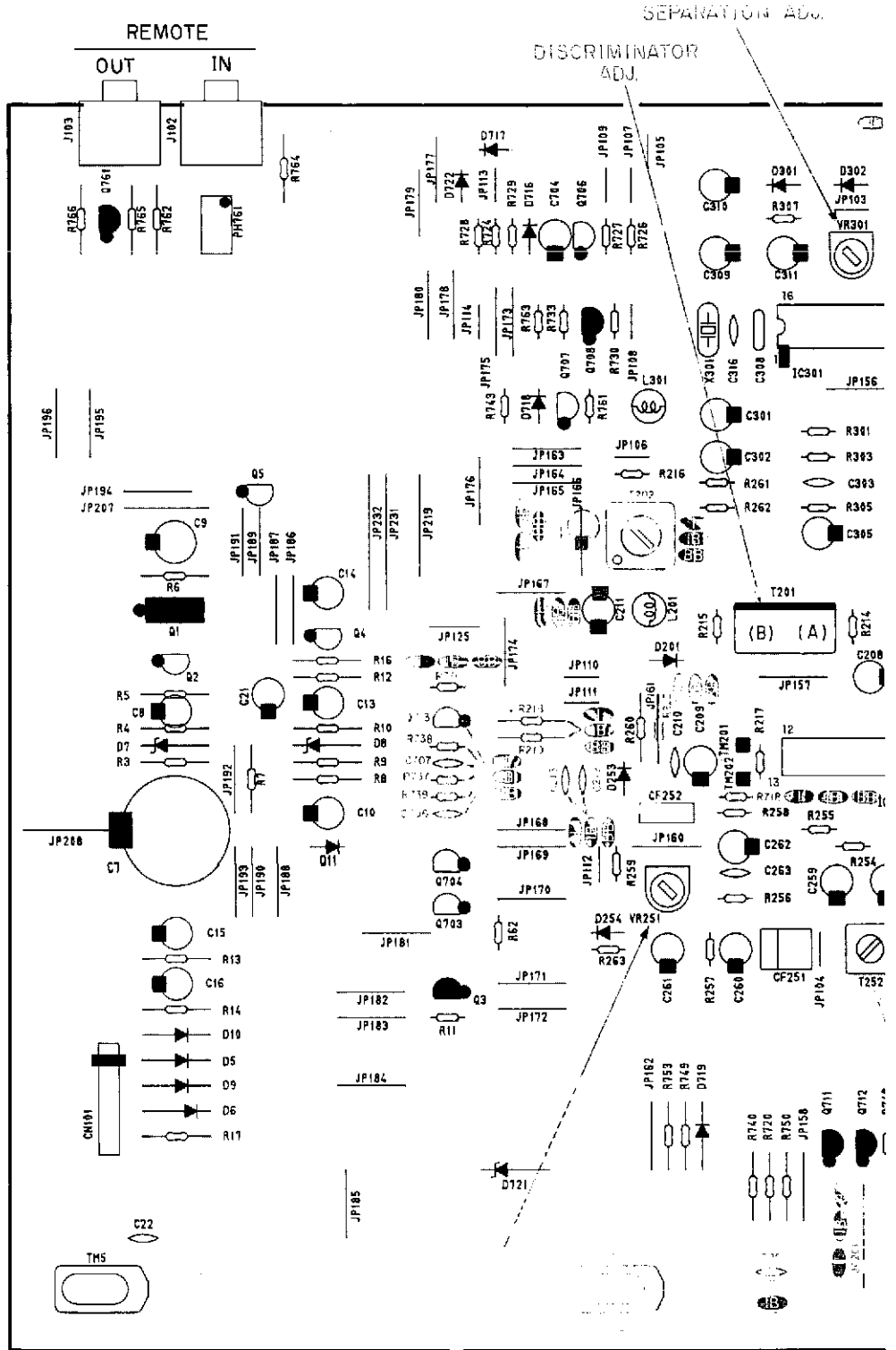
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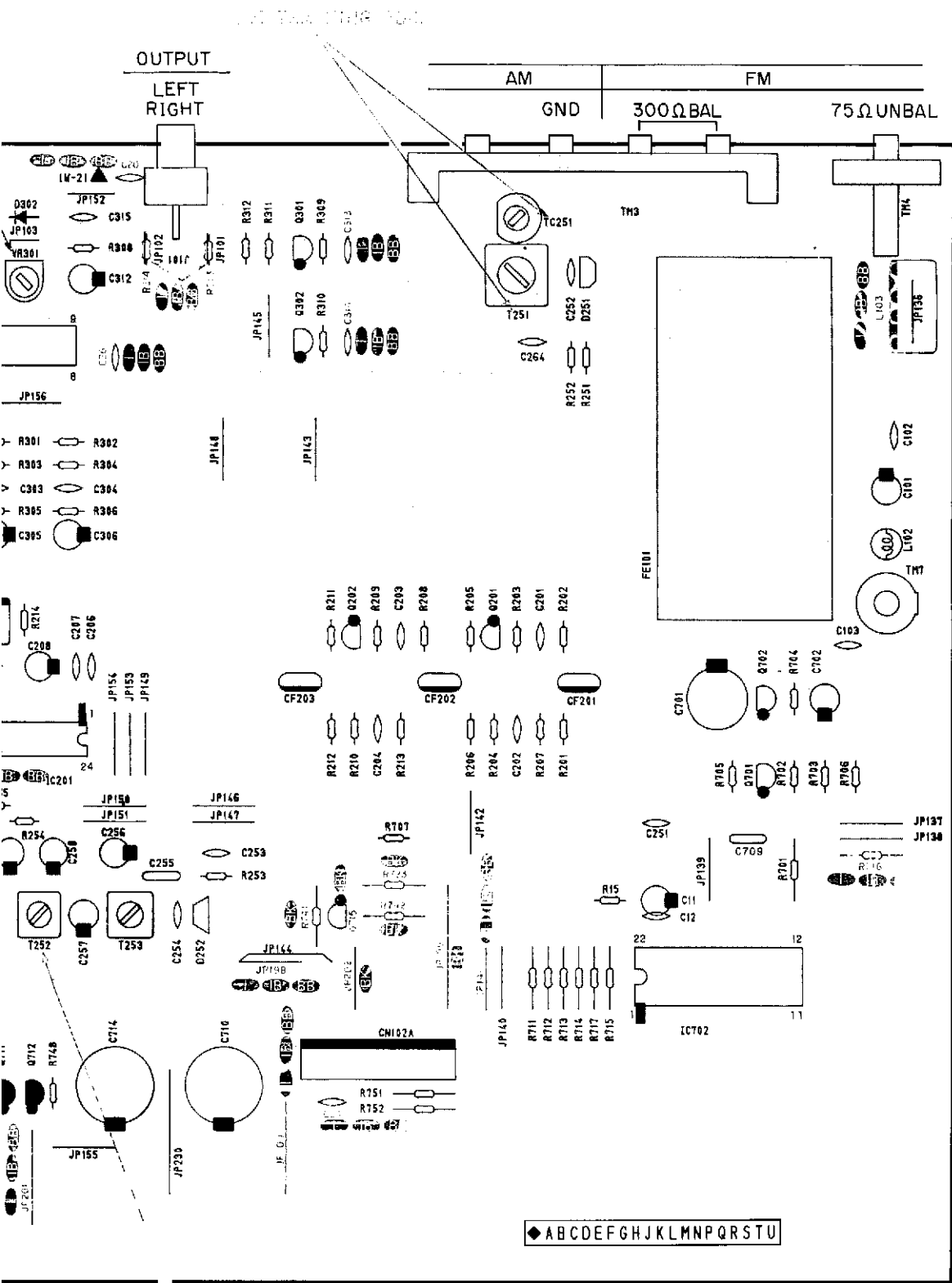
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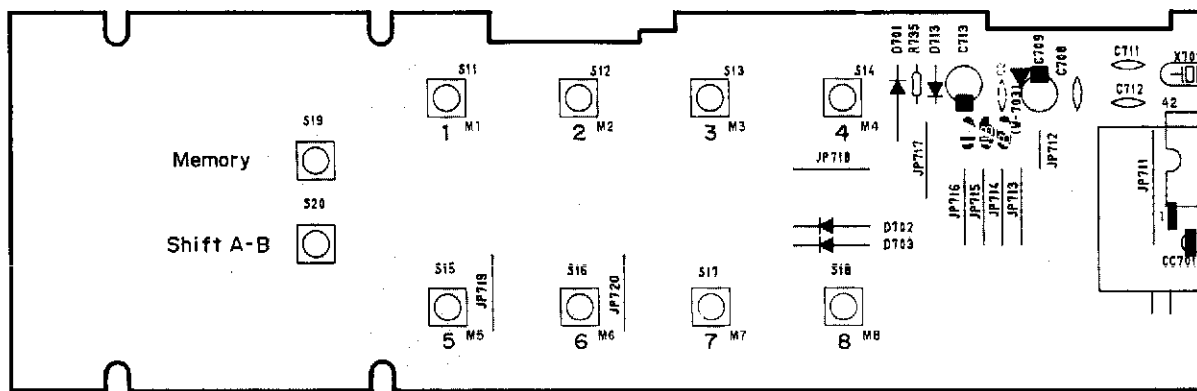
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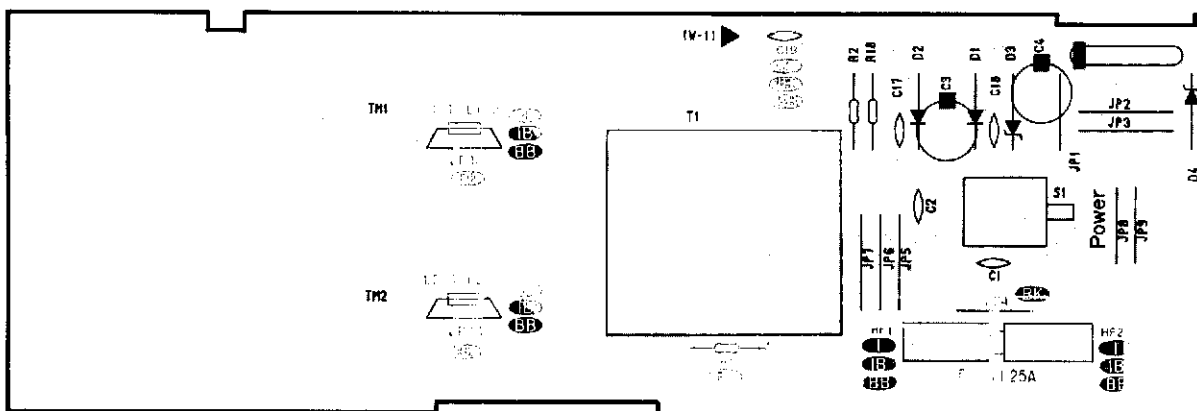
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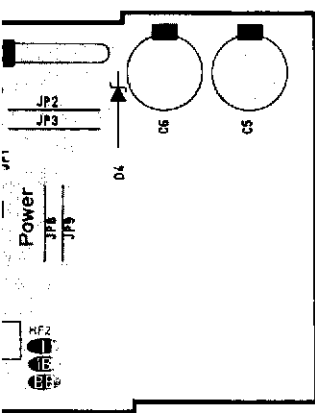
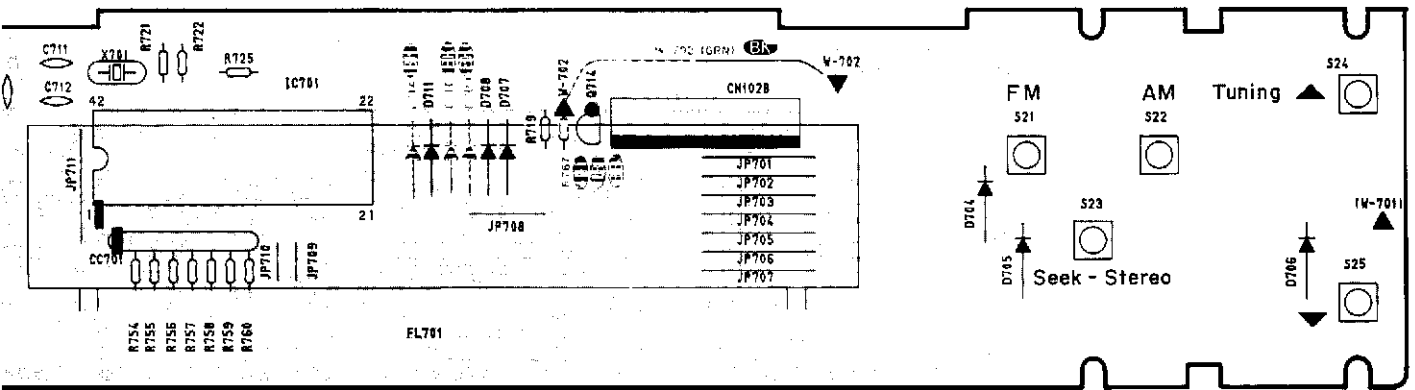
P. C. BOARDS

PCB-2 Front P. C. Board



PCB-3 Power Supply P. C. Board





ELECTRICAL PARTS LIST

Ser.No	Ref. No.	Part No.	Description	Ser.No	Ref. No.	Part No.	Description
PCB-1 MAIN P.C. BOARD							
CAPACITORS							
691	C7	5345-228D045	CAP, MINI ELE 2200 μ 25V	703	R5	5135-101522	RES, CBN 1/2P 100
692	C8	5345-107D041	CAP, MINI ELE 100 μ 25V	702	R6	5135-331522	RES, CBN 1/2P 330
689	C9	5345-476D041	CAP, MINI ELE 47 μ 25V	709 Δ	R7	5102-4R75116	RES, FUSE 4.7
690	C10	5345-106D041	CAP, MINI ELE 10 μ 25V	743 Δ	R8	5102-1014713	RES, FUSE 100
689	C11	5345-476D041	CAP, MINI ELE 47 μ 25V	701	R9	5135-272522	RES, CBN 1/2P 2.7K
695	C12	5361-102K918	CAP, CER 1000p	704	R10	5135-471522	RES, CBN 1/2P 470
689	C13	5345-476D041	CAP, MINI ELE 47 μ 25V	700	R11	5232-272J16P	RES, CBN 1/6P 2.7K
689	C14	5345-476D041	CAP, MINI ELE 47 μ 25V	703	R12	5135-101522	RES, CBN 1/2P 100
690	C15	5345-106D041	CAP, MINI ELE 10 μ 25V	706	R13	5135-332522	RES, CBN 1/2P 3.3K
744	C16	5345-475F041	CAP, MINI ELE 4.7 μ 50V	705	R14	5135-334522	RES, CBN 1/2P 330K
051B	C20	5361-223ZF	CAP, CER .022 μ I IB BB	708	R15	5232-101J16P	RES, CBN 1/6P 100
692	C21	5345-107D041	CAP, MINI ELE 100 μ 25V	703	R16	5135-101522	RES, CBN 1/2P 100
755	C22	5361-223ZF	CAP, CER .022 μ	710	R17	5135-150522	RES, CBN 1/2P 15
065B	C24	5361-103ZF	CAP, CER .01 μ I IB BB	707	R62	5232-102J16P	RES, CBN 1/6P 1K
065B	C25	5361-103ZF	CAP, CER .01 μ I IB BB	548	R201	5232-331J16P	RES, CBN 1/6P 330
065B	C26	5361-103ZF	CAP, CER .01 μ I IB BB	549	R202	5232-391J16P	RES, CBN 1/6P 390
505	C101	5345-476D041	CAP, MINI ELE 47 μ 25V	551	R203	5232-154J16P	RES, CBN 1/6P 150K
507	C102	5361-223Z921	CAP, CER .022 μ	556	R204	5232-220J16P	RES, CBN 1/6P 22 BK
508	C103	5361-150KSL	CAP, CER 15p	556B	R204	5232-180J16P	RES, CBN 1/6P 18 I IB BB
542	C201	5361-223Z921	CAP, CER .022 μ	552	R205	5232-101J16P	RES, CBN 1/6P 100
542	C202	5361-223Z921	CAP, CER .022 μ	549	R206	5232-391J16P	RES, CBN 1/6P 390
542	C203	5361-223Z921	CAP, CER .022 μ	553	R207	5232-102J16P	RES, CBN 1/6P 1K
542	C204	5361-223Z921	CAP, CER .022 μ	549	R208	5232-391J16P	RES, CBN 1/6P 390
542	C206	5361-223Z921	CAP, CER .022 μ	551	R209	5232-154J16P	RES, CBN 1/6P 150K
542	C207	5361-223Z921	CAP, CER .022 μ	556	R210	5232-220J16P	RES, CBN 1/6P 22 BK
543	C208	5345-106F041	CAP, MINI ELE 10 μ 50V	552	R211	5232-101J16P	RES, CBN 1/6P 100
544	C209	5345-105F041	CAP, MINI ELE 1 μ 50V	549	R212	5232-391J16P	RES, CBN 1/6P 390
546	C210	5361-101K918	CAP, CER 100p	553	R213	5232-102J16P	RES, CBN 1/6P 1K
545	C211	5345-226D041	CAP, MINI ELE 22 μ 25V	555	R214	5232-103J16P	RES, CBN 1/6P 10K
063B	C212	5361-223Z921	CAP, CER .022 μ I IB BB	559	R215	5232-332J16P	RES, CBN 1/6P 3.3K
063B	C213	5361-223Z921	CAP, CER .022 μ I IB BB	558	R216	5232-472J16P	RES, CBN 1/6P 4.7K BK
044B	C214	5345-226D041	CAP, MINI ELE 22 μ 25V I IB BB	558B	R216	5232-222J16P	RES, CBN 1/6P 2.2K I IB BB
576	C251	5361-103M920	CAP, CER .01 μ	557	R217	5232-153J16P	RES, CBN 1/6P 15K BK
571	C252	5361-473ZF	CAP, CER .047 μ	557B	R217	5232-223J16P	RES, CBN 1/6P 22K I IB BB
571	C253	5361-473ZF	CAP, CER .047 μ	061B	R218	5135-472522	RES, CBN 1/2P 4.7K I IB BB
573	C254	5361-220JPH	CAP, CER 22p	062B	R219	5135-104522	RES, CBN 1/2P 100K I IB BB
572	C255	5359-4315851	CAP, PPP 430p	045B	R220	5135-222522	RES, CBN 1/2P 2.2K I IB BB
577	C256	5345-106F041	CAP, MINI ELE 10 μ 50V	583	R251	5232-104J16P	RES, CBN 1/6P 100K
577	C257	5345-106F041	CAP, MINI ELE 10 μ 50V	587	R252	5232-471J16P	RES, CBN 1/6P 470
579	C258	5345-475F041	CAP, MINI ELE 4.7 μ 50V	583	R253	5232-104J16P	RES, CBN 1/6P 100K
579	C259	5345-475F041	CAP, MINI ELE 4.7 μ 50V	586	R254	5232-103J16P	RES, CBN 1/6P 10K
578	C260	5345-105F041	CAP, MINI ELE 1 μ 50V	586	R255	5232-103J16P	RES, CBN 1/6P 10K
581	C261	5345-474F041	CAP, MINI ELE .47 μ 50V	584	R256	5232-822J16P	RES, CBN 1/6P 8.2K
580	C262	5345-224F041	CAP, MINI ELE .22 μ 50V	590	R257	5232-223J16P	RES, CBN 1/6P 22K
575	C263	5361-472M919	CAP, CER 4700p	588	R258	5232-820J16P	RES, CBN 1/6P 82
571	C264	5361-473ZF	CAP, CER .047 μ	589	R259	5232-473J16P	RES, CBN 1/6P 47K
599	C301	5345-226D041	CAP, MINI ELE 22 μ 25V	582	R260	5135-123522	RES, CBN 1/2P 12K BK
600	C302	5345-476D041	CAP, MINI ELE 47 μ 25V	582B	R260	5135-153522	RES, CBN 1/2P 15K I IB BB
605	C303	5361-471K918	CAP, CER 470p BK	583	R261	5232-104J16P	RES, CBN 1/6P 100K
605B	C303	5361-271K918	CAP, CER 270p I IB BB	583	R262	5232-104J16P	RES, CBN 1/6P 100K
605	C304	5361-471K918	CAP, CER 470p BK	585	R263	5232-272J16P	RES, CBN 1/6P 2.7K
605B	C304	5361-271K918	CAP, CER 270p I IB BB	613	R301	5232-124J16P	RES, CBN 1/6P 120K BK
604	C305	5345-225F041	CAP, MINI ELE 2.2 μ 50V	613B	R301	5232-154J16P	RES, CBN 1/6P 150K I IB BB
604	C306	5345-225F041	CAP, MINI ELE 2.2 μ 50V	613	R302	5232-124J16P	RES, CBN 1/6P 120K BK
608	C308	5354-473K1HM	CAP, MYL .047 μ	613B	R302	5232-154J16P	RES, CBN 1/6P 150K I IB BB
601	C309	5345-474F0951	CAP, MINI ELE .47 μ 50V	611	R303	5232-164J16P	RES, CBN 1/6P 160K BK
603	C310	5345-106F041	CAP, MINI ELE 10 μ 50V	611B	R303	5232-184J16P	RES, CBN 1/6P 180K I IB BB
602	C311	5345-224F0951	CAP, MINI ELE .22 μ 50V	611	R304	5232-164J16P	RES, CBN 1/6P 160K BK
604	C312	5345-225F041	CAP, MINI ELE 2.2 μ 50V	611B	R304	5232-184J16P	RES, CBN 1/6P 180K I IB BB
064B	C313	5361-331KB	CAP, CER 330p I IB BB	612	R305	5232-182J16P	RES, CBN 1/6P 1.8K
064B	C314	5361-331KB	CAP, CER 330p I IB BB	612	R306	5232-182J16P	RES, CBN 1/6P 1.8K
609	C315	5361-101K918	CAP, CER 100p	615	R307	5232-472J16P	RES, CBN 1/6P 4.7K
606	C316	5361-821K918	CAP, CER 820p	614	R308	5232-103J16P	RES, CBN 1/6P 10K
641	C701	5345-227C041	CAP, MINI ELE 220 μ 16V	614	R309	5232-103J16P	RES, CBN 1/6P 10K
640	C702	5345-684F0951	CAP, MINI ELE .68 μ 50V	614	R310	5232-103J16P	RES, CBN 1/6P 10K
645	C703	5354-473K1HM	CAP, MYL .047 μ	614	R311	5232-103J16P	RES, CBN 1/6P 10K
638	C704	5345-225F041	CAP, MINI ELE 2.2 μ 50V	614	R312	5232-103J16P	RES, CBN 1/6P 10K
063B	C706	5361-223Z921	CAP, CER .022 μ I IB BB	046B	R313	5232-102J16P	RES, CBN 1/6P 1K I IB BB
063B	C707	5361-223Z921	CAP, CER .022 μ I IB BB	046B	R314	5232-102J16P	RES, CBN 1/6P 1K I IB BB
639	C710	5345-228A041	CAP, MINI ELE 2200 μ 6.3V	656	R701	5135-103522	RES, CBN 1/2P 10K
639	C714	5345-228A041	CAP, MINI ELE 2200 μ 6.3V	664	R702	5232-222J16P	RES, CBN 1/6P 2.2K
RESISTORS							
701	R3	5135-272522	RES, CBN 1/2P 2.7K	658	R703	5232-103J16P	RES, CBN 1/6P 10K
704	R4	5135-471522	RES, CBN 1/2P 470	659	R704	5232-473J16P	RES, CBN 1/6P 47K
				662	R705	5232-102J16P	RES, CBN 1/6P 1K
				662	R706	5232-102J16P	RES, CBN 1/6P 1K
				662	R707	5232-102J16P	RES, CBN 1/6P 1K
				654	R711	5135-222522	RES, CBN 1/2P 2.2K
				654	R712	5135-222522	RES, CBN 1/2P 2.2K

Ser.No	Ref. No.	Part No.	Description
654	R713	5135-222522	RES, CBN 1/2P 2.2K
654	R714	5135-222522	RES, CBN 1/2P 2.2K
653	R715	5135-472522	RES, CBN 1/2P 4.7K
062B	R716	5135-104522	RES, CBN 1/2P 100K I IB BB
657	R717	5135-332522	RES, CBN 1/2P 3.3K
059B	R718	5232-103J16P	RES, CBN 1/6P 10K I IB BB
657	R720	5135-332522	RES, CBN 1/2P 3.3K
655	R723	5135-104522	RES, CBN 1/2P 100K BK
660	R724	5232-223J16P	RES, CBN 1/6P 22K
660	R726	5232-223J16P	RES, CBN 1/6P 22K
660	R727	5232-223J16P	RES, CBN 1/6P 22K
660	R728	5232-223J16P	RES, CBN 1/6P 22K
620	R729	5232-104J16P	RES, CBN 1/6P 100K
660	R730	5232-223J16P	RES, CBN 1/6P 22K
616	R733	5232-223J16P	RES, CBN 1/6P 22K
055B	R736	5232-224J16P	RES, CBN 1/6P 220K I IB BB
056B	R737	5232-154J16P	RES, CBN 1/6P 150K I IB BB
057B	R738	5232-102J16P	RES, CBN 1/6P 1K I IB BB
058B	R739	5232-472J16P	RES, CBN 1/6P 4.7K I IB BB
670	R740	5135-562522	RES, CBN 1/2P 5.6K
653	R741	5135-472522	RES, CBN 1/2P 4.7K BK
653	R742	5135-472522	RES, CBN 1/2P 4.7K BK
660	R743	5232-223J16P	RES, CBN 1/6P 22K
663	R748	5232-332J16P	RES, CBN 1/6P 3.3K
652	R749	5135-102522	RES, CBN 1/2P 1K
651	R750	5135-101522	RES, CBN 1/2P 100
655	R751	5135-104522	RES, CBN 1/2P 100K
655	R752	5135-104522	RES, CBN 1/2P 100K
656	R753	5135-103522	RES, CBN 1/2P 10K
663	R761	5232-332J16P	RES, CBN 1/6P 3.3K
677	R762	5135-473522	RES, CBN 1/2P 47K
620	R763	5232-104J16P	RES, CBN 1/6P 100K
679	R764	5135-271522	RES, CBN 1/2P 270
676	R765	5135-102522	RES, CBN 1/2P 1K
678	R766	5135-470522	RES, CBN 1/2P 47

INTEGRATED CIRCUITS

531	IC201	5653-LA1266	IC, LINEAR
591	IC301	5653-LA3410	IC, LINEAR
622	IC702	5654-TC9227P	IC, DIGITAL

TRANSISTORS

681	Q1	5612-1375	XISTOR, PNP A
682	Q2	5613-2320(F)	XISTOR, NPN R
683	Q3	5611-933S(S)	XISTOR, PNP R
684	Q4	5614-667(C)	XISTOR, NPN A
684	Q5	5614-667(C)	XISTOR, NPN A
532	Q201	5613-2058(N)	XISTOR, NPN R
532	Q202	5613-2058(N)	XISTOR, NPN R
592	Q301	5614-1450(T)	XISTOR, NPN A
592	Q302	5614-1450(T)	XISTOR, NPN A
627	Q701	5613-2240(BL)	XISTOR, NPN R
623	Q702	5613-2320(F)	XISTOR, NPN R
626	Q703	5613-C124ES	XISTOR, NPN R
626	Q704	5613-C124ES	XISTOR, NPN R
628	Q706	5613-1740S(S)	XISTOR, NPN R
626	Q707	5613-C124ES	XISTOR, NPN R
624	Q708	5611-933S(S)	XISTOR, PNP R
625	Q711	5611-A124ES	XISTOR, PNP R
625	Q712	5611-A124ES	XISTOR, PNP R
054B	Q713	5613-1740S(S)	XISTOR, NPN R I IB BB
635	Q715	5613-C144ES	XISTOR, NPN R BK
674	Q761	5611-A124ES	XISTOR, PNP R

DIODES

685	D5	5632-S5566B	DIODE, RECT
685	D6	5632-S5566B	DIODE, RECT
687	D7	5635-HZ12C2L	DIODE, ZENER
688	D8	5635-HZ6C2L	DIODE, ZENER
685	D9	5632-S5566B	DIODE, RECT
686	D10	5631-1S2473	DIODE, DET
745	D11	5631-1SS133	DIODE, DET
538	D201	5631-1SS133	DIODE, DET
561	D251	5633-1SV149	DIODE, CAP
561	D252	5633-1SV149	DIODE, CAP
562	D253	5631-1SS133	DIODE, DET
562	D254	5631-1SS133	DIODE, DET
593	D301	5631-1SS133	DIODE, DET
593	D302	5631-1SS133	DIODE, DET
630	D716	5631-1SS133	DIODE, DET
630	D717	5631-1SS133	DIODE, DET

Ser.No	Ref. No.	Part No.	Description
630	D718	5631-1SS133	DIODE, DET
632	D719	5631-1S2473	DIODE, DET
634	D721	5635-HZ7B2L	DIODE, ZENER
630	D722	5631-1SS133	DIODE, DET

COILS

503	L102	5995-2R2J107	COIL W/CORE
050B	L103	5214-78	LC COMPOSITE I IB BB
537	L201	5995-2R2J107	COIL W/CORE
596	L301	5995-2R2J107	COIL W/CORE

TRANSFORMERS

536	T201	5572-10201	DISCRI 7
565	T252	5552-00712	IFT, AM 7

CONTROLS

534	VR251	5101-S0801103	RES, SEMI FIX 10K
595	VR301	5101-S0801104	RES, SEMI FIX 100K

MISCELLANEOUS

535	CF201	5671-7147A	FILTER, CER S BK
535B	CF201	5671-7142A	FILTER, CER S I IB BB
535	CF202	5671-7147A	FILTER, CER S BK
535B	CF202	5671-7142A	FILTER, CER S I IB BB
539	CF203	5671-012A	FILTER, CER S
568	CF251	5671-7137C	FILTER, CER S
567	CF252	5671-0159	FILTER, CER S
735	CN101	4443-060185	CONNECTOR
736	CN102A	4443-05501019	CONNECTOR
501	FE101	6114-00401	FM TUNER BK
501B	FE101	6114-00402	FM TUNER I IB BB
747	J101	4482-0133	PIN JACK, 2P
753	J102	4451-00184	JACK, 1P
753	J103	4451-00184	JACK, 1P
047B	LUG1	4211-4	LUG I IB BB
673	PH761	5624-PC817	PHOTO COUPLR
043B	T202	5214-86	LC COMPOSITE I IB BB
570	T251	5933-S0602	COIL CASE, 10
564	T253	5922-00215	OSC COIL, 7
569	TC251	5371-93	TRIMMER, 1P
726	TM3	4214-164	TERMINAL
727	TM4	4214-166	TERMINAL BK
727B	TM4	4214-167	TERMINAL I IB BB
723	TM5	4214-193	TERMINAL BK
723B	TM5	4214-193	TERMINAL I IB BB
723B	TM6	4214-193	TERMINAL I IB BB
724	TM201	4214-132	TERMINAL
724	TM202	4214-132	TERMINAL
594	X301	5693-CSB456F1	OSC, CER

PCB-2 FRONT P.C. BOARD

CAPACITORS

721	C1	5361-473ZF	CAP, CER .047μ
721	C2	5361-473ZF	CAP, CER .047μ
721	C17	5361-473ZF	CAP, CER .047μ
721	C18	5361-473ZF	CAP, CER .047μ
048B	C19	5361-223ZF	CAP, CER .022μ I IB BB
067B	C23	5361-103ZF	CAP, CER .01μ I IB BB
648	C708	5361-223Z921	CAP, CER .022μ
642	C709	5345-476D041	CAP, MINI ELE 47μ25V
649	C711	5361-300JCH	CAP, CER 30p
649	C712	5361-300JCH	CAP, CER 30p
643	C713	5345-225F041	CAP, MINI ELE 2.2μ50V

RESISTORS

669	R719	5232-104J16P	RES, CBN 1/6P 100K
667	R721	5232-472J16P	RES, CBN 1/6P 4.7K
666	R722	5232-222J16P	RES, CBN 1/6P 2.2K
666	R725	5232-222J16P	RES, CBN 1/6P 2.2K
669	R735	5232-104J16P	RES, CBN 1/6P 100K
665	R754	5232-102J16P	RES, CBN 1/6P 1K
665	R755	5232-102J16P	RES, CBN 1/6P 1K
665	R756	5232-102J16P	RES, CBN 1/6P 1K
665	R757	5232-102J16P	RES, CBN 1/6P 1K
665	R758	5232-102J16P	RES, CBN 1/6P 1K
665	R759	5232-102J16P	RES, CBN 1/6P 1K
665	R760	5232-102J16P	RES, CBN 1/6P 1K
060B	R767	5232-473J16P	RES, CBN 1/6P 47K I IB BB

Ser.No Ref. No. Part No. Description

621 IC701 5654-T9301-27 IC, DIGITAL

TRANSISTOR

629 Q714 5613-C124ES XISTOR, NPN R

DIODES

633 D701 5631-1S2473 DIODE, DET
 633 D702 5631-1S2473 DIODE, DET
 633 D703 5631-1S2473 DIODE, DET
 633 D704 5631-1S2473 DIODE, DET
 633 D705 5631-1S2473 DIODE, DET
 633 D706 5631-1S2473 DIODE, DET
 633 D707 5631-1S2473 DIODE, DET
 633 D708 5631-1S2473 DIODE, DET
 633 D709 5631-1S2473 DIODE, DET (BK)
 633 D710 5631-1S2473 DIODE, DET (BK)
 633 D711 5631-1S2473 DIODE, DET
 631 D713 5631-1SS133 DIODE, DET
 633 D714 5631-1S2473 DIODE, DET (BK)

MISCELLANEOUS

650 CC701 5213-S0207221 C COMPOSITE
 737 CN102B 4443-05401019 CONNECTOR
 711 FL701 5722-057 TUBE DISPLAY
 068B LUG3 4211-4 LUG (I) (IB) (BB)
 068B LUG4 4211-4 LUG (I) (IB) (BB)
 717 S11 4437-01202 SWITCH, PU-TC
 717 S12 4437-01202 SWITCH, PU-TC
 717 S13 4437-01202 SWITCH, PU-TC
 717 S14 4437-01202 SWITCH, PU-TC
 717 S15 4437-01202 SWITCH, PU-TC
 717 S16 4437-01202 SWITCH, PU-TC
 717 S17 4437-01202 SWITCH, PU-TC
 717 S18 4437-01202 SWITCH, PU-TC
 718 S19 4437-01201 SWITCH, PU-TC
 718 S20 4437-01201 SWITCH, PU-TC
 718 S21 4437-01201 SWITCH, PU-TC
 718 S22 4437-01201 SWITCH, PU-TC
 718 S23 4437-01201 SWITCH, PU-TC
 717 S24 4437-01202 SWITCH, PU-TC
 717 S25 4437-01202 SWITCH, PU-TC
 636 X701 5691-00720027 XTAL, OSC

PCB-3 POWER SUPPLY P.C. BOARD

CAPACITORS

693 C3 5345-476F041 CAP, MINI ELE 47μ/50V
 693 C4 5345-476F041 CAP, MINI ELE 47μ/50V
 694 C5 5345-227E041 CAP, MINI ELE 220μ/35V
 694 C6 5345-227E041 CAP, MINI ELE 220μ/35V

RESISTORS

729 Δ R1 5135-335522 RES, CBN 1/2P 3.3M (BK)
 699 R2 5135-121522 RES, CBN 1/2P 120
 730 R18 5135-101522 RES, CBN 1/2P 100

DIODES

696 D1 5632-S5566B DIODE, RECT
 696 D2 5632-S5566B DIODE, RECT
 697 D3 5635-HZ24-2L DIODE, ZENER
 698 D4 5635-HZ5B2 DIODE, ZENER

MISCELLANEOUS

053B Δ F1 5732-122030 FUSE (I) (IB) (BB)
 052B Δ HF1 4472-04501 HOLDER, FUSE (I) (IB) (BB)
 052B Δ HF2 4472-04501 HOLDER, FUSE (I) (IB) (BB)
 732 JL2 4242-R0206141 JUMPER LEAD
 069B L1-1 5597-35502 CORE, BEADS (I) (IB) (BB)
 069B L1-2 5597-35502 CORE, BEADS (I) (IB) (BB)
 069B L2-1 5597-35502 CORE, BEADS (I) (IB) (BB)
 069B L2-2 5597-35502 CORE, BEADS (I) (IB) (BB)
 049B LUG2 4211-4 LUG (I) (IB) (BB)
 719 S1 4431-S1003102 SWITCH, PUSH
 751 Δ T1 5584-S7701 XFORMER, POWER (BK)
 751B T1 5584-S7702 XFORMER, POWER (I) (IB) (BB)
 725 TM1 4214-122 TERMINAL
 725 TM2 4214-122 TERMINAL

Ser.No Ref. No. Part No. Description

CHASSIS MISCELLANEOUS

731 JL1 4242-S0319201 JUMPER LEAD
 749 Δ P1 4161-71151 CORD W/PLUG (BK)
 749B Δ P1 4161-7256 CORD W/PLUG (I) (IB)
 749D Δ P1 4161-04100 CORD W/PLUG (BB)

PACKAGE PARTS LIST

022 1756-03108 LABEL (x2) (I) (IB)
 022 1756-03111 LABEL (x2) (BB)
 023 1111-J30235 OWNER GUIDE, ADDENDUM SHEET (I) (IB)
 023 1111-J30319 OWNER GUIDE, AUSTRALIA ADDENDUM SHEET (BB)
 111 1221-27706 CARTON BOX (I)
 111 1221-27705 CARTON BOX (BK) (IB) (BB)
 113 1222-7363 CUSHION, R
 114 1222-7364 CUSHION, L
 115 1223-R0120055 SOFT SHEET
 116 1241-R0123350 POLYETHY BAG, IB
 117 1241-R0155550 POLYETHY BAG, SET
 118 1111-J30345 OWNER GUIDE (BK)
 118 1111-J30346 OWNER GUIDE, IB (I) (IB)
 119 1241-R0115300 POLYETHY BAG, LOOP ANT
 120 1113-02501 OWNER CARD (BK)
 121 1116-03801 GUARANT CARD (BK)
 122 1119-01201 ATTACH SHEET (BK)
 123 1119-04501 ATTACH SHEET, SERVICE GUIDE (BK)
 713 1397-6 T FEEDER ANT
 714 5911-266 ANT COIL, BC
 750 4161-71184 CORD W/PLUG

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
 CAP, STY : Polystyrene Film
 CAP, SPE : Special
 CAP, TAN : Tantalum

RESISTORS

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

TRANSISTORS

XISTOR : Transistor
 FET : Field Effect Transistor

CONTROLS

RES, V CBN : Variable Carbon Resistor
 RES, SEMI FIX : Semi-fixed Resistor

NOTE



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

A

B

C

D

E

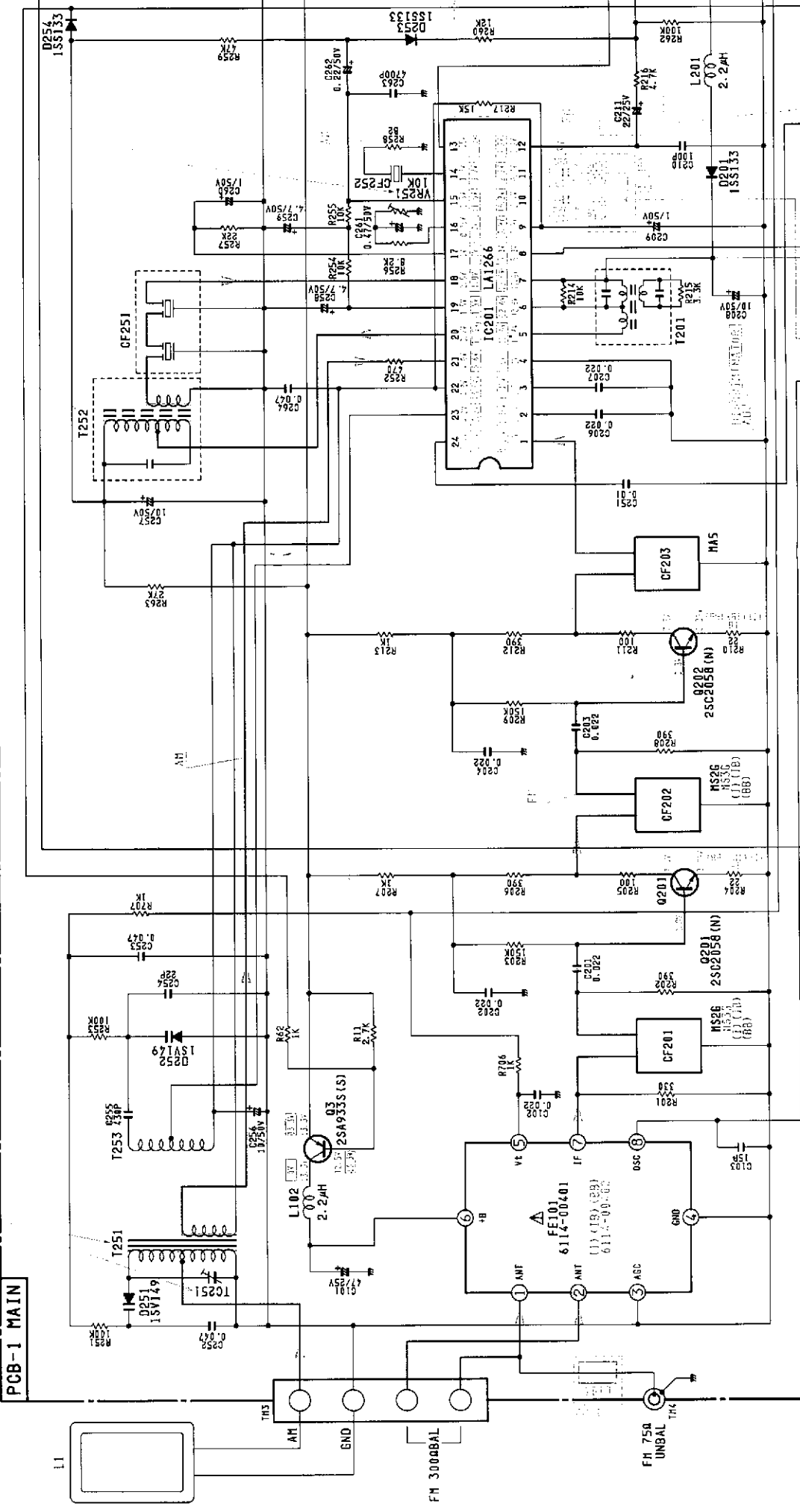
F

G

SCHEMATIC DIAGRAM (2)

AM TRACKING ADJ.

PCB-1 MAIN



1

2

3

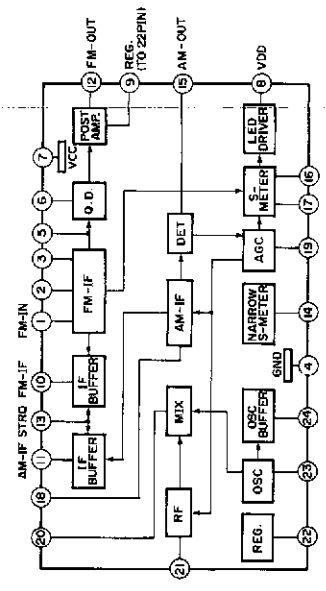
4

5

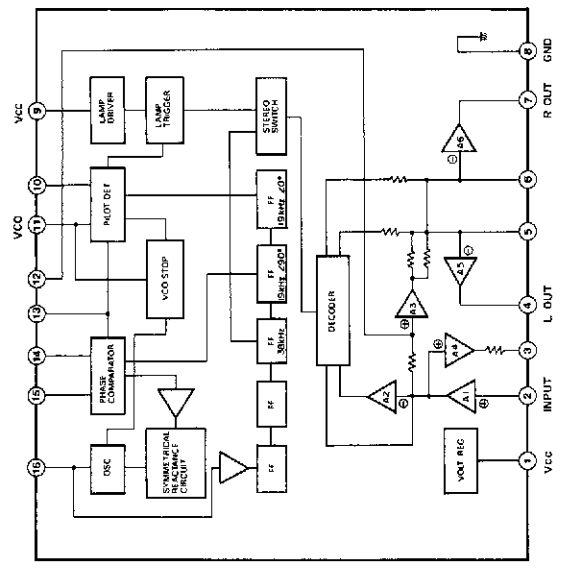
9711.712

H I J K L M N

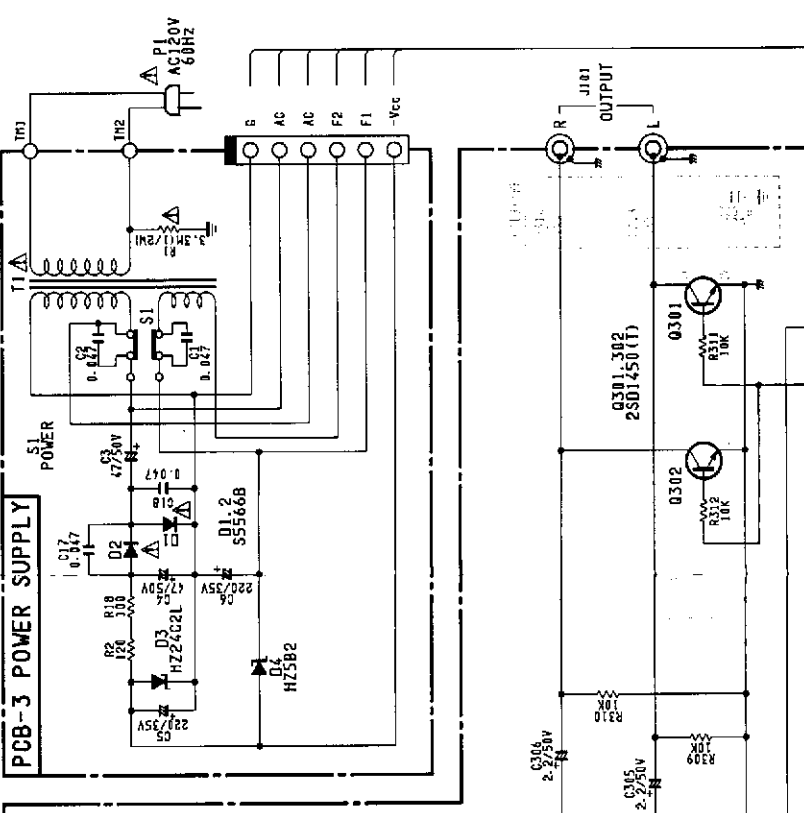
IC201 : LA1266
AM/FM IF AMP. and FM DET.



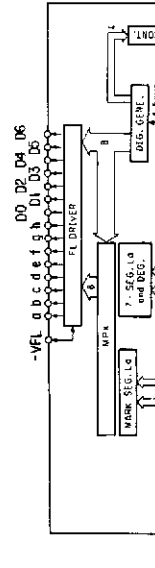
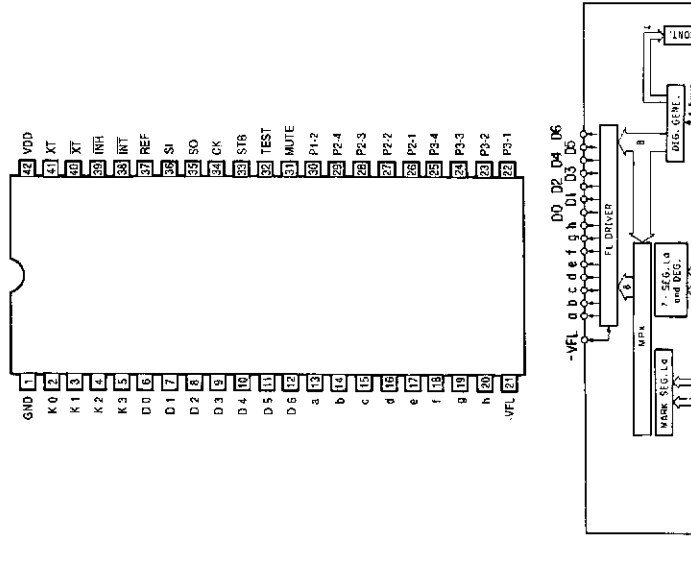
IC301 : LA3410
FM PLL MPX

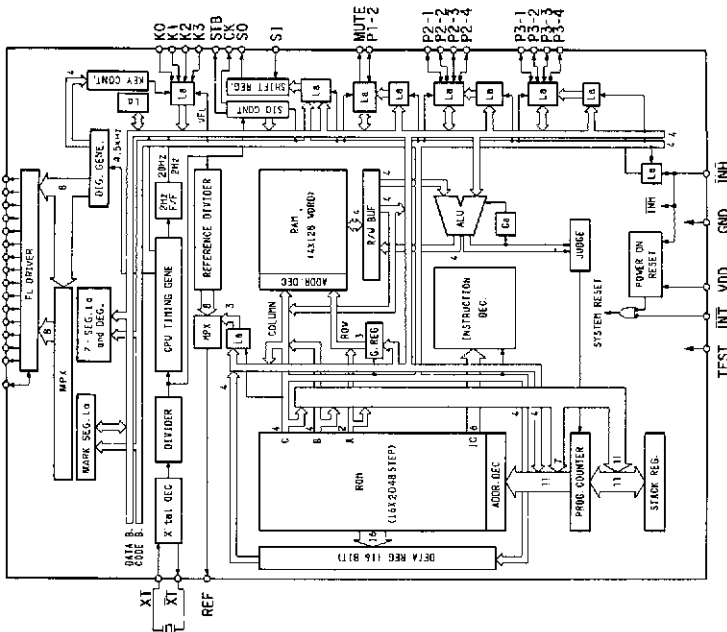


PCB-3 POWER SUPPLY

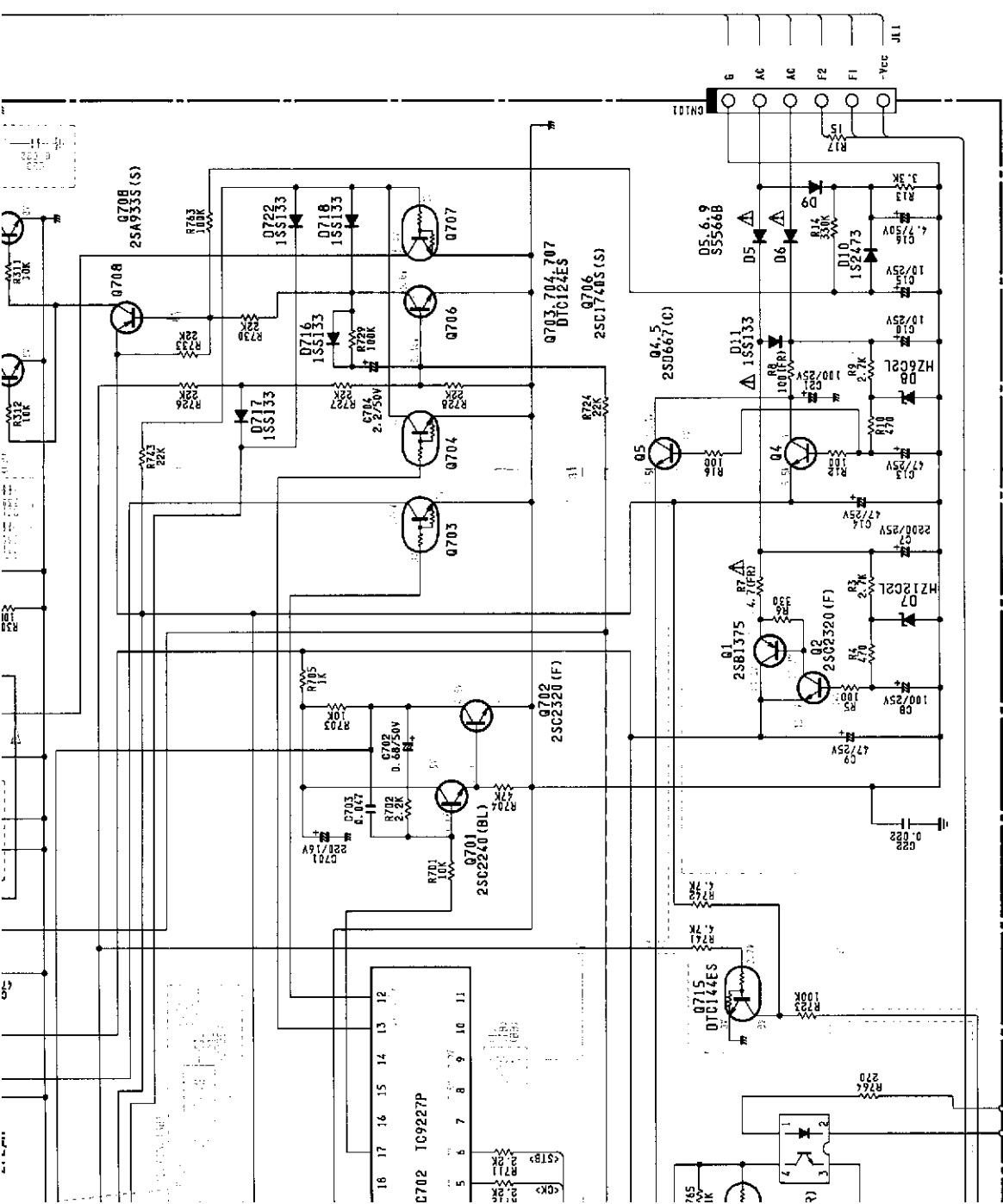
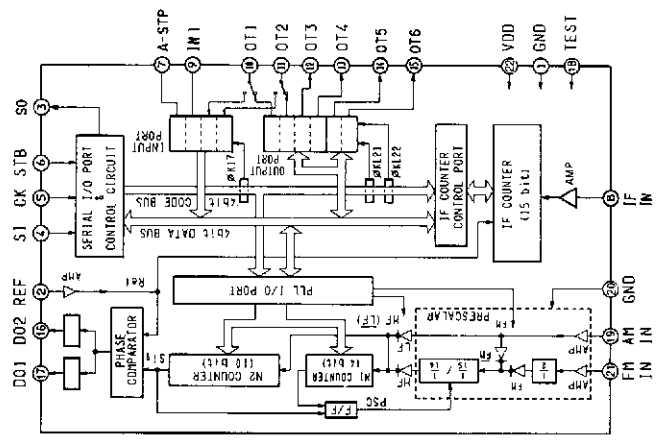


IC701 : TC9301-027
FL DRIVER and PLL CONTROL





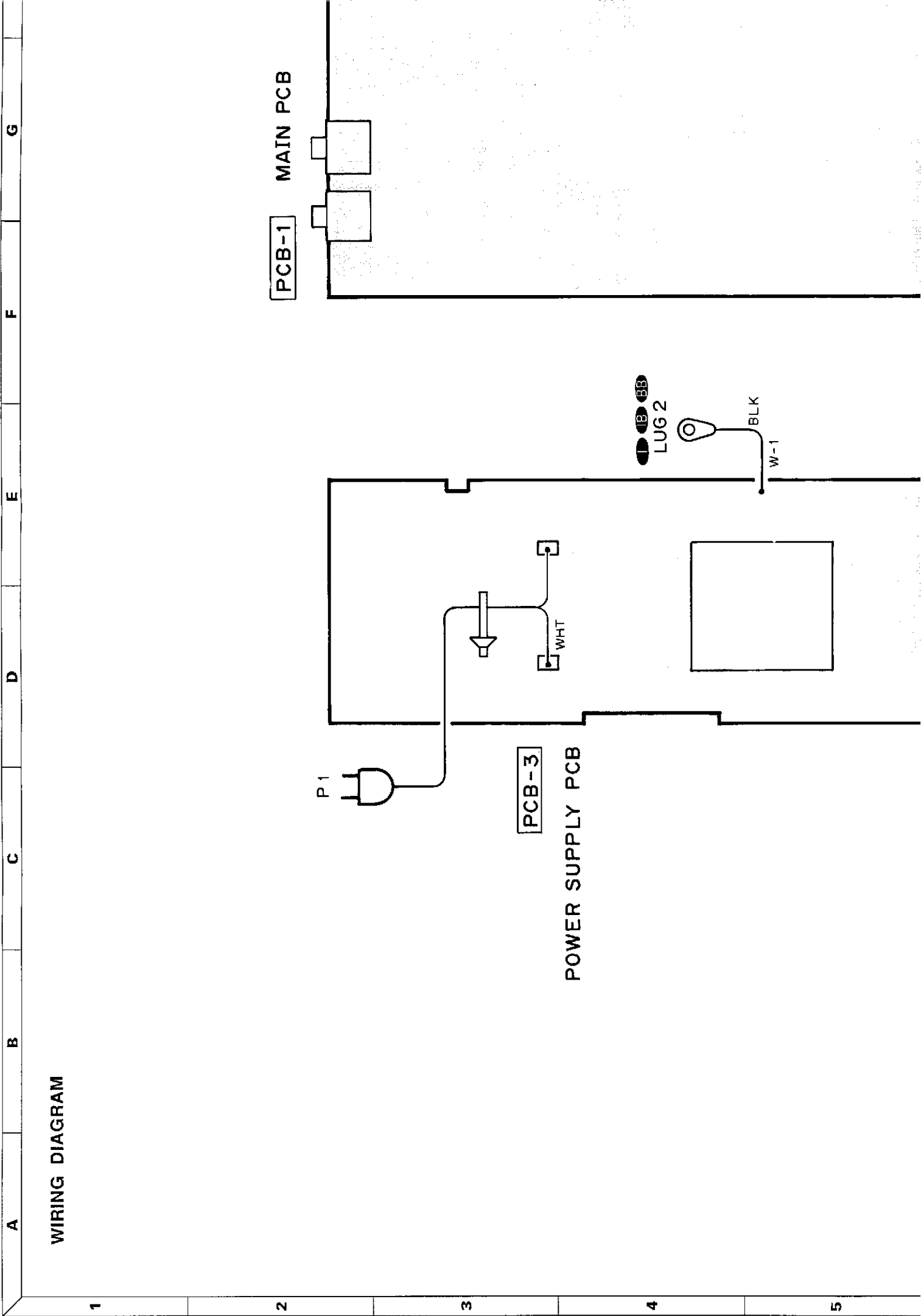
IC702 : TC9227P
PLL SYNTHESIZER



R1	R2
DTC124ES	22K 22K
DTC144ES	47K 47K

R1	R2
DTC124ES	22K 22K

- NOTE:
1. ALL RESISTANCES VALUES ARE IN Ω .
K=1000, M=10000.
 2. THE WATTAGE OF RESISTORS IS 1/2W UNLESS OTHERWISE NOTED.
 3. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. P=PPH.
 4. ... V-DC VOLTAGE AT NO SIGNAL UNLESS OTHERWISE NOTED.
 5. SAFETY REGULATIONS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.



WIRING DIAGRAM

G

F

E

D

C

B

A

1

2

3

4

5

PCB-1 MAIN PCB

PCB-3

POWER SUPPLY PCB

LUG 2

BLK

W-1

WHT

P1

G

H

I

J

K

L

M

N

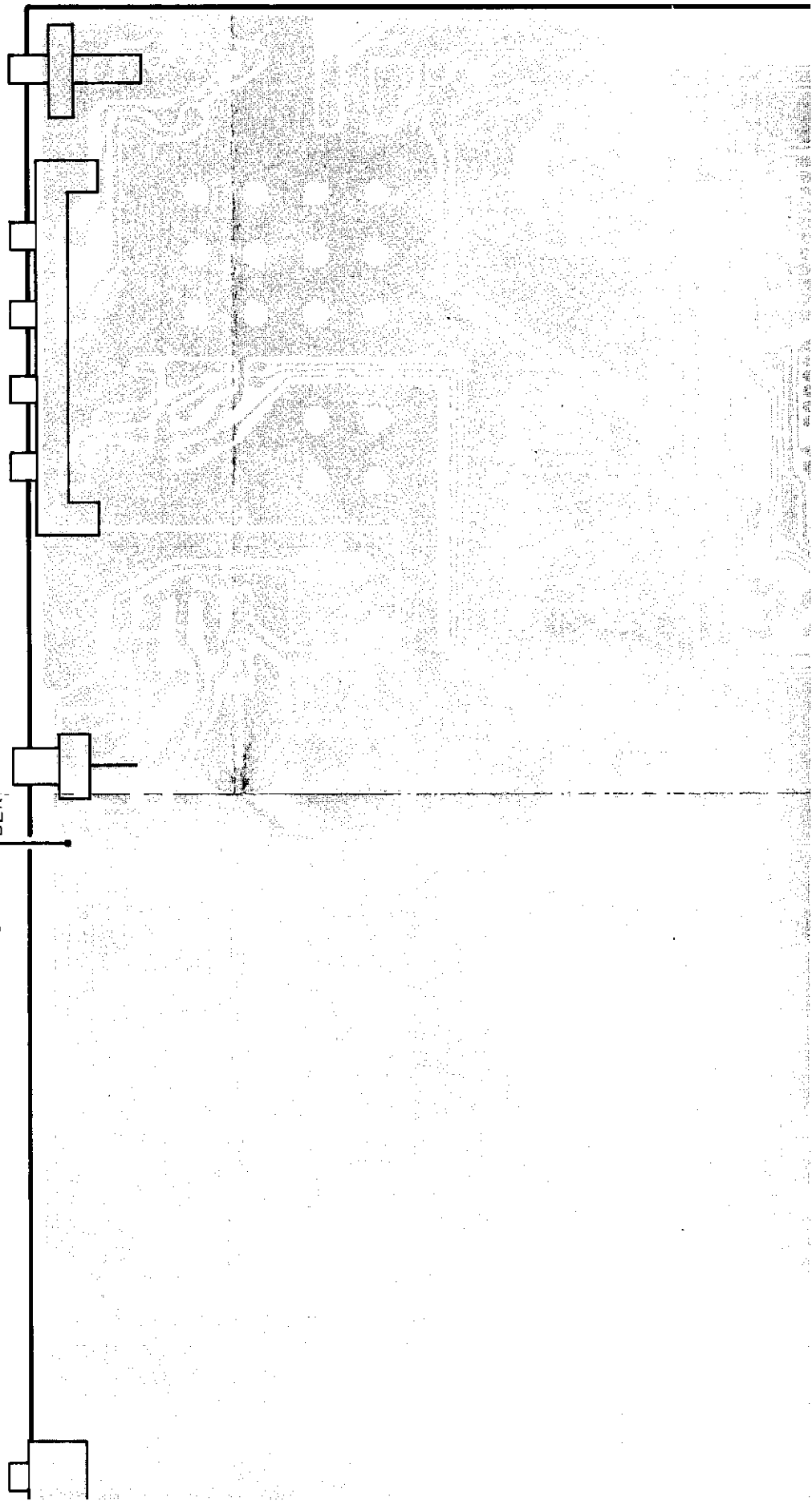
AIN PCB

1 1B 8B

LUG 1

W-2

BLK



WIRE COLOR ABBREVIATIONS

- | | | | |
|-----|-------|--------|-------|
| Red | : RED | Yellow | : YEL |
| ORg | : ORg | Purple | : PUP |
| BLU | : BLU | Pink | : PIK |
| WHT | : WHT | Gray | : GRY |
| GRN | : GRN | Brown | : BRN |
| BLK | : BLK | | |

