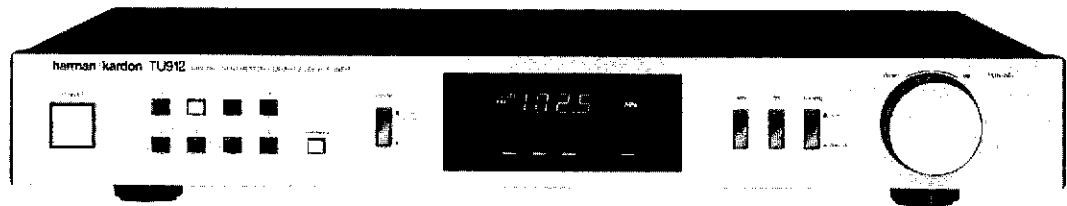


The Harman Kardon Model TU912

Manual 105A

DIGITAL SYNTHESIZED QUARTZ-LOCK TUNER

Technical Manual



TU912

harman/kardon

240 Crossways Park West, Woodbury, N.Y. 11797
1112-3152105A9 P-088606 1850 Printed in Japan

SPECIFICATIONS

	Nominal	Limit
• FM SECTION		
Tuning Range	87.5 ~ 108.0MHz	
50dB Quieting Sensitivity		
Mono	15.2(21)dBf \leq 19(25)dBf	
Stereo	38(44)dBf \leq 41(47)dBf	
Usable Sensitivity	11(12)dBf \leq 15(16)dBf	
Image Ratio	41dB \geq 36dB	
IF Rejection	90dB \geq 75dB	
Spurious Response Rejection	77dB \geq 60dB	
Capture Ratio	1.4dB \leq 2dB	
Alternate Channel Selectivity	58(65)dB \geq 50(55)dB	
AM Rejection	57dB \geq 45dB	
Signal to Noise Ratio		
Mono	82(76)dB \geq 75(70)dB	
Stereo	74(68)dB \geq 70(64)dB	
Total Harmonic Distortion		
Mono	0.07% \leq 0.3%	
Stereo	0.08% \leq 0.4%	
Stereo Separation at 1kHz	49(45)dB \geq 40(35)dB	
Output Level/Impedance (Stereo)	750(360)mV/2.2k Ω	

• AM SECTION

Tuning Range	520 ~ 1,710kHz
Usable Sensitivity	
External Antenna	11 μ V \leq 20 μ V
Loop Antenna	210 μ V/m
Selectivity	39dB \geq 33dB
Signal to Noise Ratio	53dB \geq 48dB
Image Rejection	40dB \geq 30dB
IF Rejection	64dB \geq 50dB

• DIMENSIONS (W x H x D)	17-7/16" x 2-11/16" x 14-3/16" (443 x 68 x 360 mm)
• WEIGHT	7.3 lbs. (3.3kg)
• POWER SUPPLIES	
for U.S.A. model	AC 120V, 60Hz
for General model	AC 220/240V, 50/60Hz
• POWER CONSUMPTION	14W

The figures in the parentheses () in the FM section are specifications for the General model.

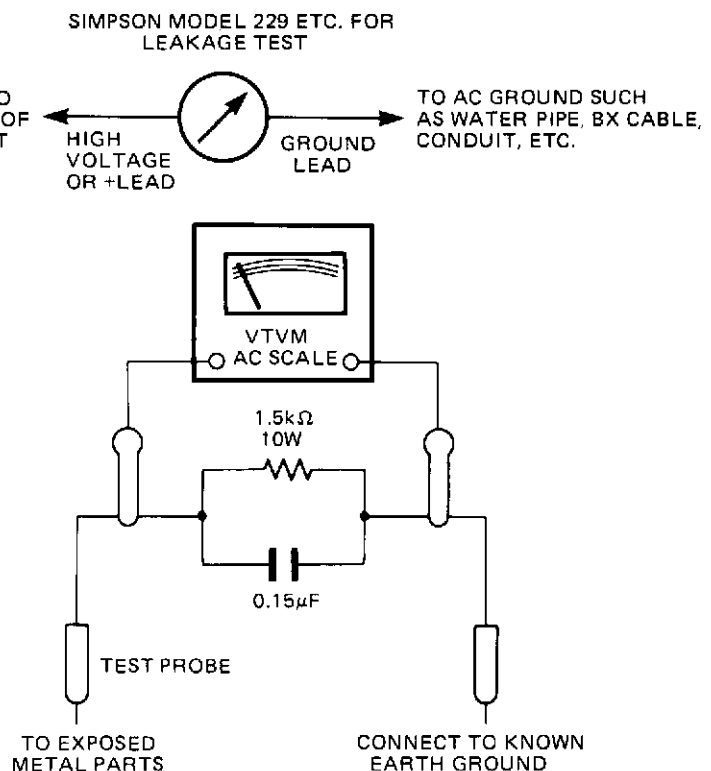
This specification is the target of servicing. But, there is a case that the specification is not applicable to the measurement condition and instrument.

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 cover 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 μ F 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.



CIRCUIT DESCRIPTION

■ FM TUNER SECTION

The FM signal which has entered through the antenna is high-frequency amplified in Q101 at the front end, mixed with the output of the local oscillators Q103 and Q104 in Q102 and converted into the 10.7MHz intermediate frequency.

The 10.7MHz signal is amplified in the intermediate-frequency amplifying section which consists of Q201, CF201 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 10 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 and transmitted through the low pass filters LPF301 (R ch) and LPF302 (L ch) to the amplifier.

■ AM TUNER SECTION

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, local oscillation, intermediate-frequency amplification and detection, and then output from 12 pin. This signal is turned ON and OFF according to the signal from the input selector at Q252 and fed to 2 pin of IC301.

■ MUTING CIRCUIT

If FM is received out of tuning or in a very weak field intensity, 8 pin of IC201 becomes high level. This is fed to the base of Q351, whose collector then becomes low level and the collector of Q352 high level. As a result, Q355 (L ch) and Q356 (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 and output to 34 pin. This voltage is level converted at Q701, Q702 and Q703, and fed to the varicap diode at the front end.

● AM

The local oscillation output is fed from 22 pin of IC201 to 39 pin of IC702. 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 output of 24 to 27 pins of the PLL synthesizer IC702 is fed to the frequency indicating driver IC703. The indicator tube is turned ON by the output decoded in IC703.

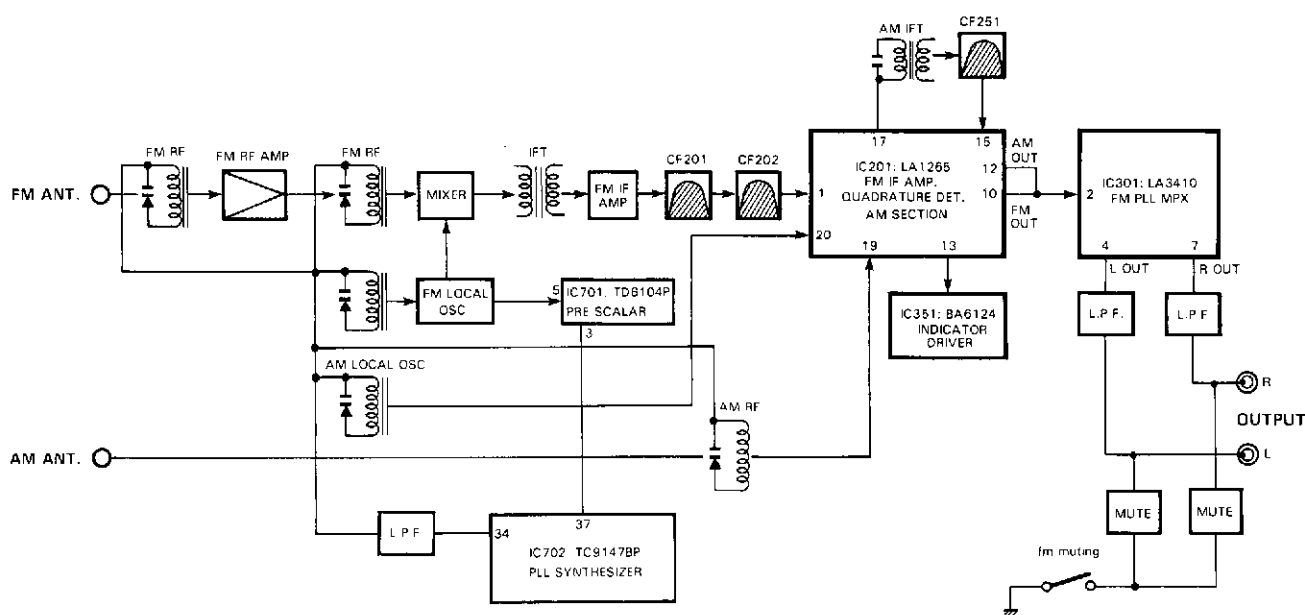
● Signal strength

The voltage corresponding to the signal level is output from 13 pin of IC201 and input into 8 pin of the level comparator IC351. D721, D722 and D723 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 D724 connected there turns ON.

BLOCK DIAGRAM



DISASSEMBLY PROCEDURES (REFER TO PAGES 5 AND 12)

① CABINET TOP (131) REMOVAL

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

② CABINET BOTTOM (132) REMOVAL

Remove 4 screws **B** and then remove the Cabinet Bottom (132).

③ FRONT PANEL ASSEMBLY (101) REMOVAL

1. Remove the Cabinet Top (131), referring to the previous step ①.
2. Remove 7 screws **C** and then remove the Front Panel Assembly (101).

④ MAIN P. C. BOARD (PCB-1) REMOVAL

1. Remove the Cabinet Top (131), referring to the previous step ①.
2. Open the lid of connectors (CN1, CN2, CN4, CN6 and CN401) on the Main P. C. Board (PCB-1) and then disconnect the lead wires.
3. Disconnect the connector (CN5) from the connector (JL5) on the Station Display P. C. Board (PCB-2).

4. Open the lid of connector (CN3) on the Function P. C. Board (PCB-6) and then disconnect the lead wires.

5. Remove 2 screws **D** and then remove the Bracket (183) from the Holder (196).

6. Remove 4 screws **E** and then remove the Main P. C. Board (PCB-1).

⑤ STATION DISPLAY P. C. BOARD (PCB-2) REMOVAL

1. Remove the Front Panel Assembly (101), referring to the previous step ③.
2. Open the lid of connector (CN7) on the Station Display P. C. Board (PCB-2) and then disconnect the lead wires.
3. Disconnect the connector (JL5) from the connector (CN5) on the Main P. C. Board (PCB-1).
4. Open the lid of connector (CN401) on the Main P. C. Board (PCB-1) and then disconnect the lead wires.
5. Remove 2 screws **F** and then remove the Station Display P. C. Board (PCB-2) with the LED Display Assembly (D901), Window (142) and Bracket (180).
6. Remove 2 screws **G** and then remove the Bracket (180) with the LED Display Assembly (D901) and Window (142) from the Station Display P. C. Board (PCB-2).

GENERAL UNIT PARTS LIST

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
101	A443-TU912A	Front Panel Ass'y U G	194	2240-7120	Holder
101	A443-TU912B	Front Panel Ass'y BK GB	195	2240-364	Bushing
102	A630-TU912A	Knob Ass'y, Tuning U G	196	2240-7280	Holder
102	A630-TU912B	Knob Ass'y, Tuning BK GB	208	2672-7018	Lever
103	A662-TU912A	Push Button Ass'y, Mode, AM, FM, Tuning U G	224	2401-035	Washer
103	A662-TU912B	Push Button Ass'y, Mode, AM, FM, Tuning BK GB	226	2111-11160	Feit
131	1414-02201	Cabinet Top	228	2327-300629	Screw (3×6mm)
132	1424-13801	Cabinet Bottom	229	2327-301029	Screw (3×10mm)
133	1424-18701	Cabinet Back U BK	230	2347-300626	Screw (3×6mm)
133	1424-18801	Cabinet Back G GB	232	2347-301426	Screw (3×14mm)
137	1319-0139	Foot	233	2347-300646	Screw (3×6mm)
142	1531-09401	Window	234	2347-400646	Screw (4×6mm)
156	1660-00401	Push Button, Power U G	235	2347-301046	Screw (3×10mm)
156	1660-00403	Push Button, Power BK GB	237	2347-300827	Screw (3×8mm)
157	1662-26701	Push Button, Preset, Memory	251	2132-7116	Spacer G GB
172	2132-01401	Spacer	252	2347-301226	Screw (3×12mm)
173	2211-7278	Chassis	253	2132-7136	Spacer G GB
178	2219-7981	Bracket L BK	254	2402-0374	Washer G GB
178	2219-8000	Bracket G GB	495	2240-7218	Holder, Antenna
179	2219-7982	Bracket	1111-J30239	Owner Guide U	
180	2219-8001	Bracket	1111-J30240	Owner Guide G	
181	2219-8101	Bracket	1222-7224	Packing Cushion	
182	2219-8102	Bracket	1221-807147	Packing Box	
183	2219-8103	Bracket			
184	2219-8104	Bracket			
185	2219-7984	Bracket			
186	2219-8128	Bracket			
187	2222-7081	Heat Sink			
190	2240-7265	Holder			

* Part with the following marks are used only in the models intended for particular markets:

U : U.S.A. model

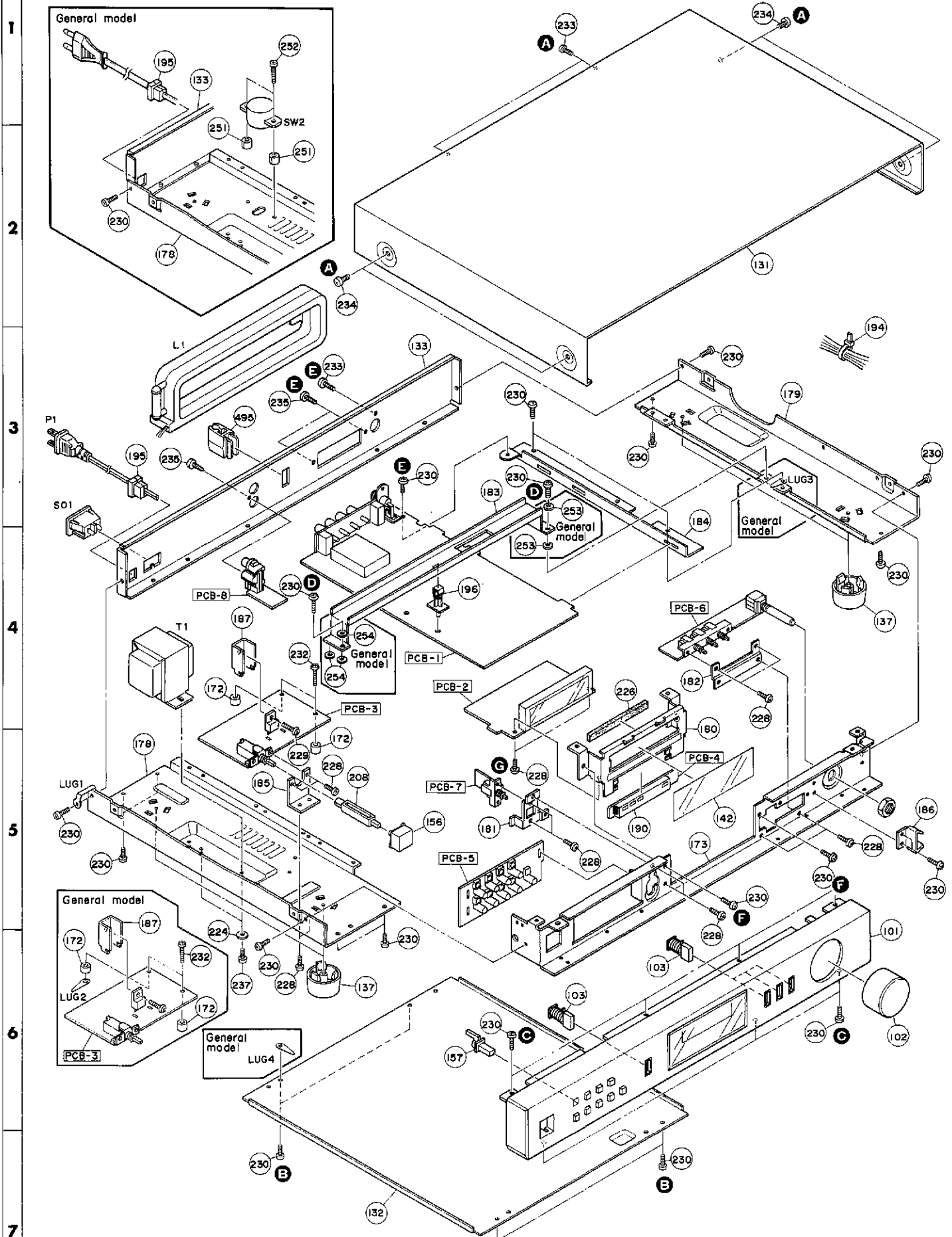
BK : U.S.A. model Black Version

G : General model

GB : General model Black Version

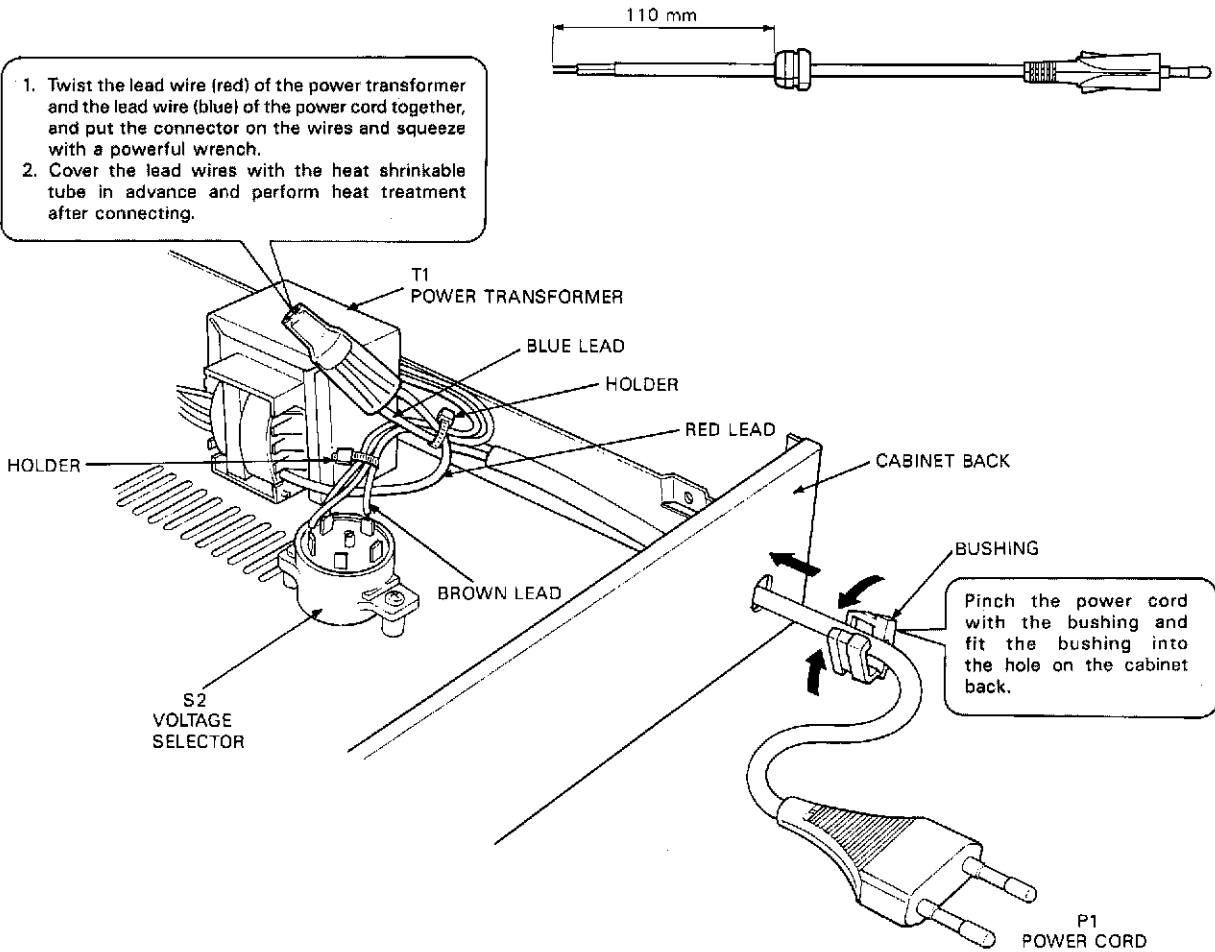
A B C D E

GENERAL UNIT EXPLODED VIEW



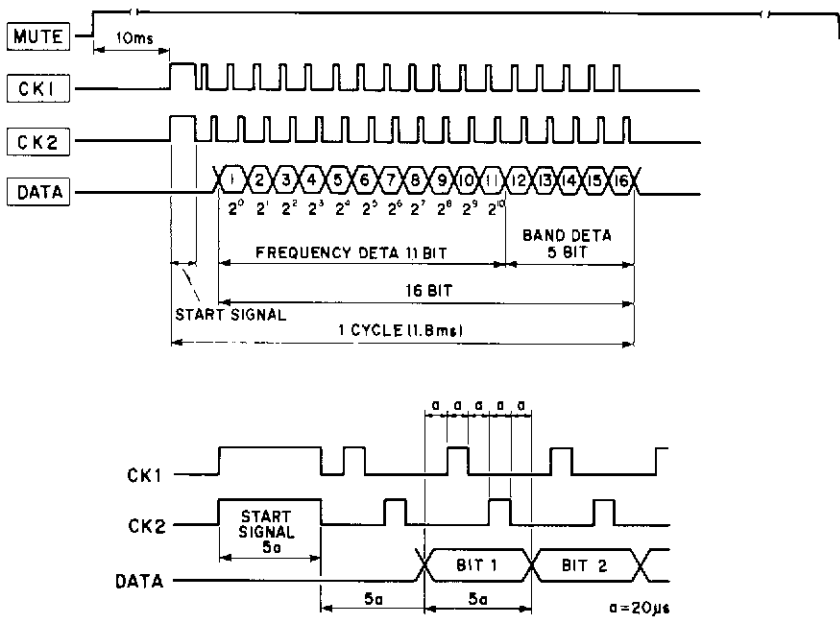
POWER CORD REPLACEMENT (FOR SERVICE ENGINEERS OTHER THAN NORTH AMERICA)

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.



TIMING CHART

Frequency display timing chart of IC702 (TC9147BP)



ALIGNMENT PROCEDURES (REFER TO PAGES 13 and 14)

■ STANDARD FREQUENCY CHECK

Conditions: ● Press the "fm" switch.

Step	Connection Equipments	Station Display	For
1	● Connect the Frequency Counter to TP2 (+) and ground.	98.3MHz	109MHz ± 2kHz

■ AM ADJUSTMENT

Conditions: ● Press the "am" switch.

- 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	Tuning voltage	● Connect the DC Volt Meter to TP1 (+) and ground (-).		1710kHz	TC252	8V ± 0.5V
2	IF	● 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.
3	Tracking		1400kHz	1400kHz	TC251	Maximum output
4			600kHz	600kHz	L251	Maximum output
5			Repeat steps 3 and 4 for optimum sensitivity.			
6	Tuned indicator		1000kHz	1000kHz		

■ FM ADJUSTMENT

Conditions: ● After the POWER switch is pushed on, wait for 5 minutes before adjusting so that the most stable operation is obtained.

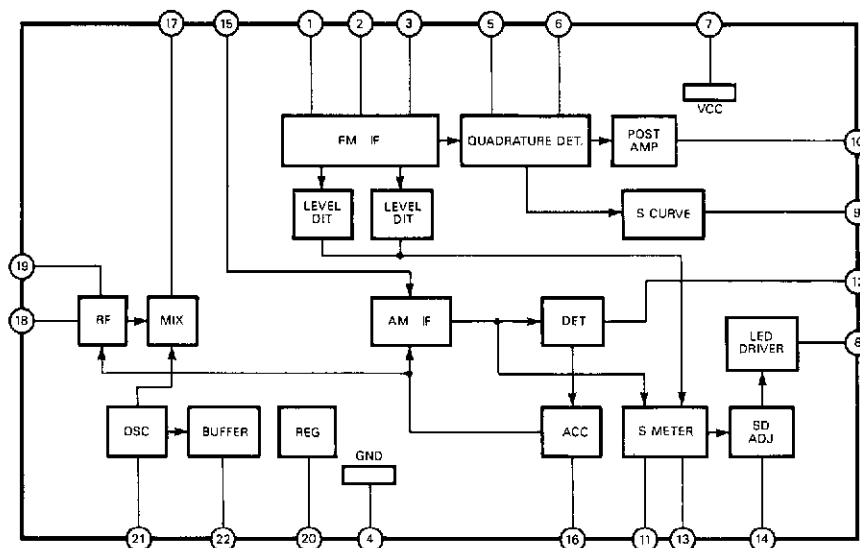
- Press the "fm" switch.
- Press the "mode" switch to the "mono" (button in) position.

	U.S.A. model	General model
FM Signal Generator	1kHz, 100% modulation	1kHz, 53% modulation
Stereo Modulator	L + R = 45.5%, L - R = 45.5%, 19kHz = 9%	L + R = 22.5%, L - R = 22.5%, 19kHz = 8%

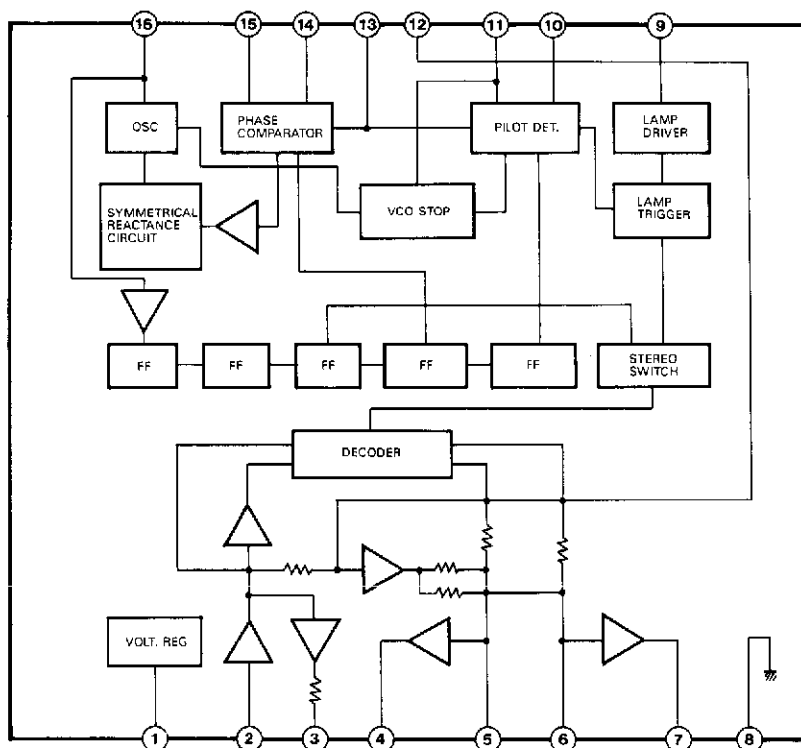
Step	Alignment	Connection Equipments	Measurement Frequency	Station Display	Adjustment	For
1	Discriminator	● Connect the FM Signal Generator to FM 300 Ω BAL Antenna terminals through the 300 Ω balanced dummy. ● Connect the Distortion meter and Oscilloscope to the OUTPUT jacks.	98.1MHz ± 30 ~ 40kHz	98.1MHz	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	VR201	Adjust so that the TUNED indicator lights at 20 μ V input.
5	Signal indicator				VR202	Adjust so that the three SIGNAL STRENGTH indicator lights at 50 μ V input.
6	Separation	● Connect the Stereo Modulator to FM Signal Generator. Connect FM Signal Generator to FM 300 Ω BAL Antenna terminals through the 300 Ω balanced dummy. ● Connect the VTVM and Oscilloscope to the OUTPUT jacks.	98.1MHz		VR301	Adjust so that the right channel output becomes minimum when only the left channel of the Stereo Modulator modulated.
					VR301	Adjust so that the left channel output becomes minimum when only the right channel of the Stereo Modulator modulated.

IC BLOCK DIAGRAM

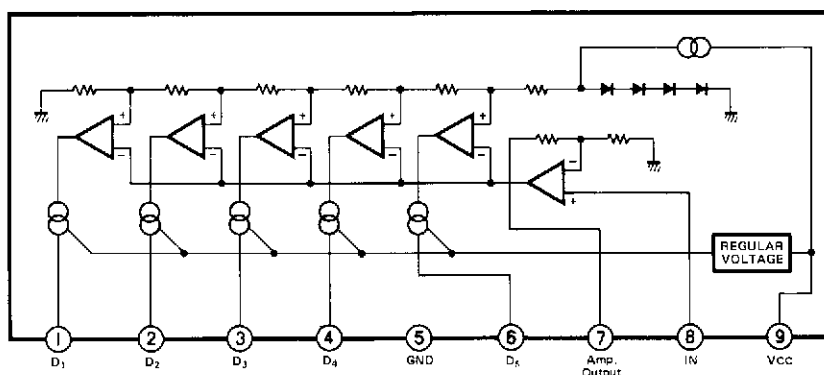
IC201: LA1265



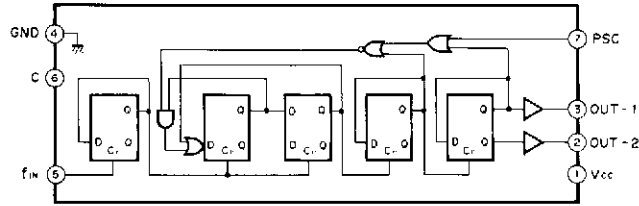
IC301: LA3410



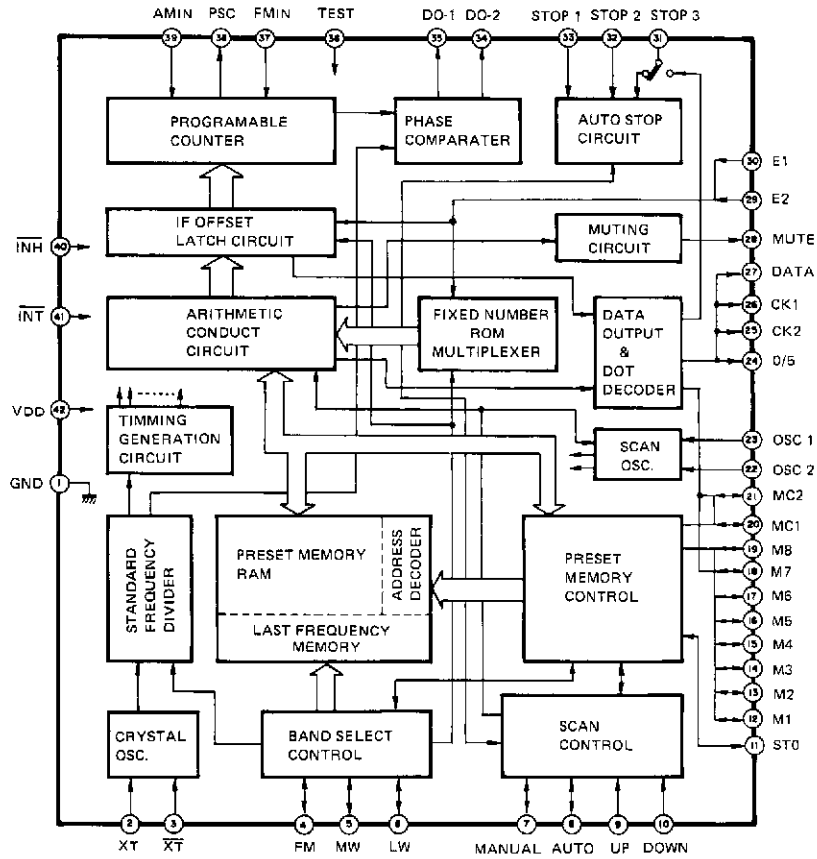
IC351: BA6124



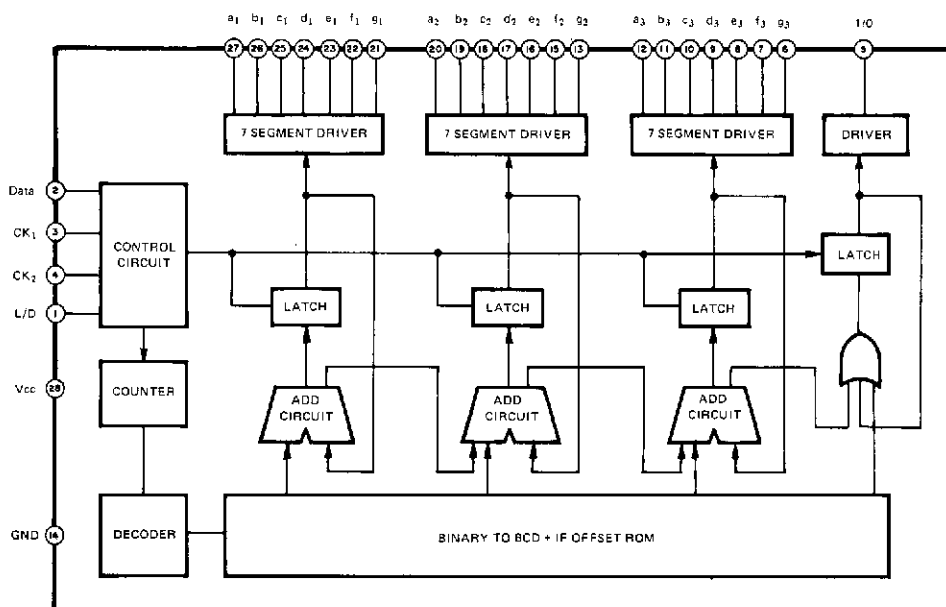
IC701: TD6104P



IC702: TC9147BP



IC703: TD6301AP



ELECTRICAL PARTS LIST


Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
CHASSIS MISCELLANEOUS			TC252	5371-93	Trimmer Capacitor
△	PI	4161-71147	INTEGRATED CIRCUIT		
△	PI	4161-7256	IC201	5653-LA1265	LA1265
△	TI	5584-701477	IC301	5653-LA3410	LA3410
△	TI	5584-702478	IC351	5652-BA6124	BA6124
△	SO1	4474-164	IC701	5654-TD6104P	TD6104P
△	CO1	4443-712	IC702	5654-TC9147BP	TC9147BP
△	S2	4411-102729	TRANSISTORS		
		Rotary Switch, Voltage Selector	Q121	5613-2603(E)	2SC2603(E)or(F)
LUG1	4211-4	Lug Terminal	Q122	5611-1115(E)	2SA1115(E)or(F)
LUG2	4211-4	Lug Terminal	Q201	5613-380(R)	2SC380(R)
LUG3	4211-4	Lug Terminal	Q251	5613-RN1203	RN1203
LUG4	4211-4	Lug Terminal	Q252	5615-2SJ103(G)	F.E.T., 2SJ103(G)
	5911-244	AM Loop Antenna	Q351	5613-2603(E)	2SC2603(E)or(F)
	4161-71184	Connection Cord (Accessory)	Q352	5611-1115(E)	2SA1115(E)or(F)
PCB-1 MAIN P.C.BOARD			Q353	5611-1115(E)	2SA1115(E)or(F)
RESISTORS			Q354	5611-1115(E)	2SA1115(E)or(F)
△	R211	5102-1014713	Q355	5613-2878(B)	2SC2878(B)
△	R373	5102-4R74713	Q356	5613-2878(B)	2SC2878(B)
△	R764	5102-2204713	Q357	5613-RN1203	RN1203
			Q701	5616-2SK117(Y)	F.E.T., 2SK117(Y)
			Q702	5613-2240(BL)	2SC2240(BL)or(GR)
			Q703	5611-1115(E)	2SA1115(E)or(F)
			Q704	5613-RN1203	RN1203
			Q705	5613-RN1203	RN1203
			Q710	5613-2603(E)	2SC2603(E)or(F)
			DIODES		
			D121	5631-1S2473	1S2473
			D122	5631-1S2473	1S2473
			D251	5633-1SV149	1SV149
			D252	5633-1SV149	1SV149
			D351	5631-1S2473	1S2473
			D352	5631-1S2473	1S2473
			D353	5631-1S2473	1S2473
			D354	5631-1S2473	1S2473
			D355	5631-1S2473	1S2473
			D356	5631-1S2473	1S2473
			D357	5631-1S2473	1S2473
			D358	5631-1S2473	1S2473
			D359	5631-1S2473	1S2473
			D701	5635-HZ7B2L	ZD, HZ7B2L
			D702	5631-1S2473	1S2473
			D703	5631-1S2473	1S2473
			D704	5635-HZ6B1L	ZD, HZ6B1L
			D705	5631-1S2473	1S2473
			D706	5631-1S2473	1S2473
			D707	5631-1S2473	1S2473
			D725	5635-HZ11A2L	ZD, HZ11A2L
			COILS		
			L106	5995-701090	
			L201	5995-2R2M82	2.2μH
			L202	5995-2R2M82	2.2μH
			L203	5995-2R2M82	2.2μH
			L251	5933-70328	
			L252	5922-00112	
			L701	5995-2R2269	2.2μH
			TRANSFORMERS		
			T201	5572-00103	
			T251	5552-70114	
			MISCELLANEOUS		
			TU1	6114-7133	FM Tuner Ass'y
			CF201	5671-7120A	Ceramic Filter
			CF201	5673-718A	Ceramic Filter
			CF202	5671-7120A	Ceramic Filter
			CF202	5673-718A	Ceramic Filter
			CF251	5671-7138F	Ceramic Filter

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
CF252	5671-7137C	Ceramic Filter	D5	5635-HZ15L	ZD, HZ15L
CF301	5693-CSB456F1	Ceramic Filter	D6	5635-HZ6A2L	ZD, HZ6A2L
LPF301	5214-87	LC Components	D7	5635-HZ6A2L	ZD, HZ6A2L
LPF302	5214-87	LC Components	D8	5631-IS2473	IS2473
LPF201	5214-36	LC Components	D9	5631-IS2473	IS2473
LPF202	5214-78	LC Components	D10	5631-IS2473	IS2473
TE101	4214-164	Terminal			
TE101	4214-167	Terminal			
TE102	4214-166	Terminal	△ S1	4431-A02725	Push Switch, Power
X701	5691-00720022	Crystal, Osc.	CN8	4443-030185	Connector, 3 Pos.
CN1	4443-050185	Connector, 5 Pos.			
CN2	4443-050185	Connector, 5 Pos.			
CN4	4443-100185	Connector, 10 Pos.			
CN5	4443-077114	Connector, 7 Pos.			
CN6	4443-030185	Connector, 3 Pos.			
CN404	4443-090185	Connector, 9 Pos.			
PCB-2 STATION DISPLAY P.C.BOARD			MISCELLANEOUS		
CAPACITORS			PCB-4 LED P.C.BOARD		
C721	5345-476C041	47 μ F/16V, EC	D721	5637-TLG121	L.E.D., TLG121, Green, Signal Strength 1
INTEGRATED CIRCUIT			D722	5637-TLG121	L.E.D., TLG121, Green, Signal Strength 2
IC703	5654-TD6301AP	TD6301AP	D723	5637-TLG121	L.E.D., TLG121, Green, Signal Strength 3
TRANSISTORS			D724	5637-TLG121	L.E.D., TLG121, Green, Tuned
Q706	5613-2603(E)	2SC2603(E)or(F)	PCB-5 PRESET MEMORY SWITCHES P.C.BOARD		
Q707	5613-RN1203	RN1203	DIODES		
Q708	5613-RN1203	RN1203	D711	5637-GL5NG6	L.E.D., GL5NG6, Green, Memory
Q709	5611-1115(E)	2SA1115(E)or(F)	D712	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 1
DIODES			D713	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 2
D709	5635-HZ11A2L	ZD, HZ11A2L	D714	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 3
MISCELLANEOUS			D715	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 4
DSP1	5722-14	Frequency Display, FIP7F8S	D716	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 5
RC701	5212-3	R Components	D717	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 6
RC702	5212-3	R Components	D718	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 7
RC703	5212-3	R Components	D719	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 8
CN7	4443-040185	Connector, 4 Pos.	MISCELLANEOUS		
LCN5	4163-72296	CLW, 7 Pos.	S701	4431-A017169	Push Switch, Preset Memory 1
PCB-3 POWER SWITCH P.C.BOARD			S702	4431-A017169	Push Switch, Preset Memory 2
RESISTORS			S703	4431-A017169	Push Switch, Preset Memory 3
R2	5102-2R25116	2.2 Ω , 1/2W, FR	S704	4431-A017169	Push Switch, Preset Memory 4
R18	5171-121581	120 Ω , 1W, MR	S705	4431-A017169	Push Switch, Preset Memory 5
R19	5171-121581	120 Ω , 1W, MR	S706	4431-A017169	Push Switch, Preset Memory 6
CAPACITORS			S707	4431-A017169	Push Switch, Preset Memory 7
C1	5345-108C041	1000 μ F/16V, EC	S708	4431-A017169	Push Switch, Preset Memory 8
C2	5345-337C041	330 μ F/16V, EC	S709	4431-A017169	Push Switch, Memory
C3	5345-228D045	2200 μ F/25V, EC	PCB-6 FUNCTION P.C.BOARD		
C8	5345-106C041	10 μ F/16V, EC	S301	4431-03067164	Push Switch, AM
C9	5345-106D041	10 μ F/25V, EC	S302	4431-03067164	Push Switch, FM
C10	5345-226C041	22 μ F/16V, EC	S303	4431-03067164	Push Switch, Auto/Manual
C11	5345-106C041	10 μ F/16V, EC	S304	4411-1027110	Rotary Switch, Tuning
C12	5345-476D041	47 μ F/25V, EC	CN9	4443-050185	Connector, 5 Pos.
TRANSISTORS			CN10	4443-040185	Connector, 4 Pos.
Q1	5611-1305(Y)	2SA1305(Y)			
Q2	5613-2603(E)	2SC2603(E)or(R)			
Q3	5613-2603(E)	2SC2603(E)or(R)			
Q4	5611-1115(E)	2SA1115(E)or(R)			
Q5	5613-2603(E)	2SC2603(E)or(R)			
DIODES					
△ D1	5632-S5566B	S5566B			
△ D2	5632-S5566B	S5566B			
△ D3	5632-S5566B	S5566B			
△ D4	5632-S5566B	S5566B			





<u>Ref.No.</u>	<u>Part No.</u>	<u>Description</u>
PCB-7 MUTING P.C.BOARD		
S305	4431-A027235	Push Switch, Mode
PCB-8 OUTPUT P.C.BOARD		
J1/J2	4482-0133	2 Pin Jack, Output

KEY TO ABBREVIATIONS

ER : Fuse Resistor
 MR : Metal Resistor
 CR : Cement Resistor
 CAR: Carbon Resistor
 EC : Electrolytic Capacitor
 PC : Polypropylene Capacitor
 MC : Mica Capacitor
 CC : Ceramic Capacitor
 MPC: Metalized Polyester Capacitor
 ZD : Zener Diode
 CLW: Connector with Lead Wire

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

* Part with the following marks are used only in the models intended for particular markets:

-  : U.S.A. model
-  : U.S.A. model Black Version
-  : General model
-  : General model Black Version

WIRING DIAGRAM

1

2

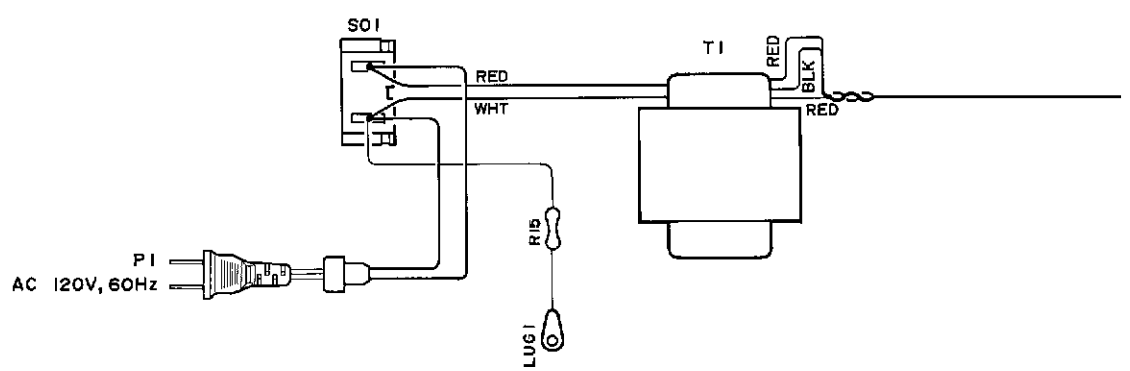
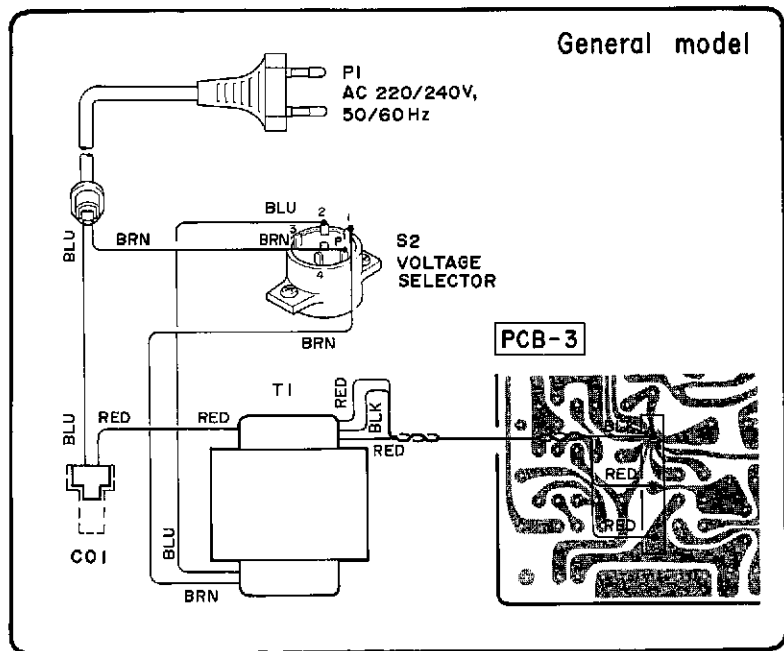
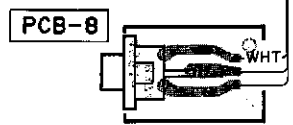
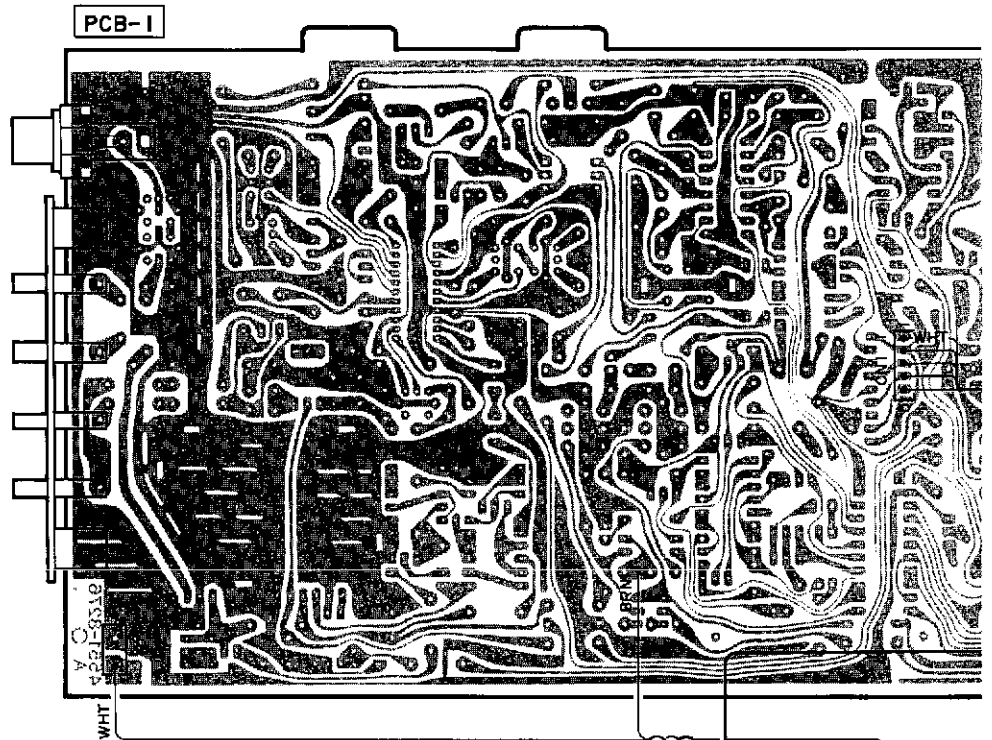
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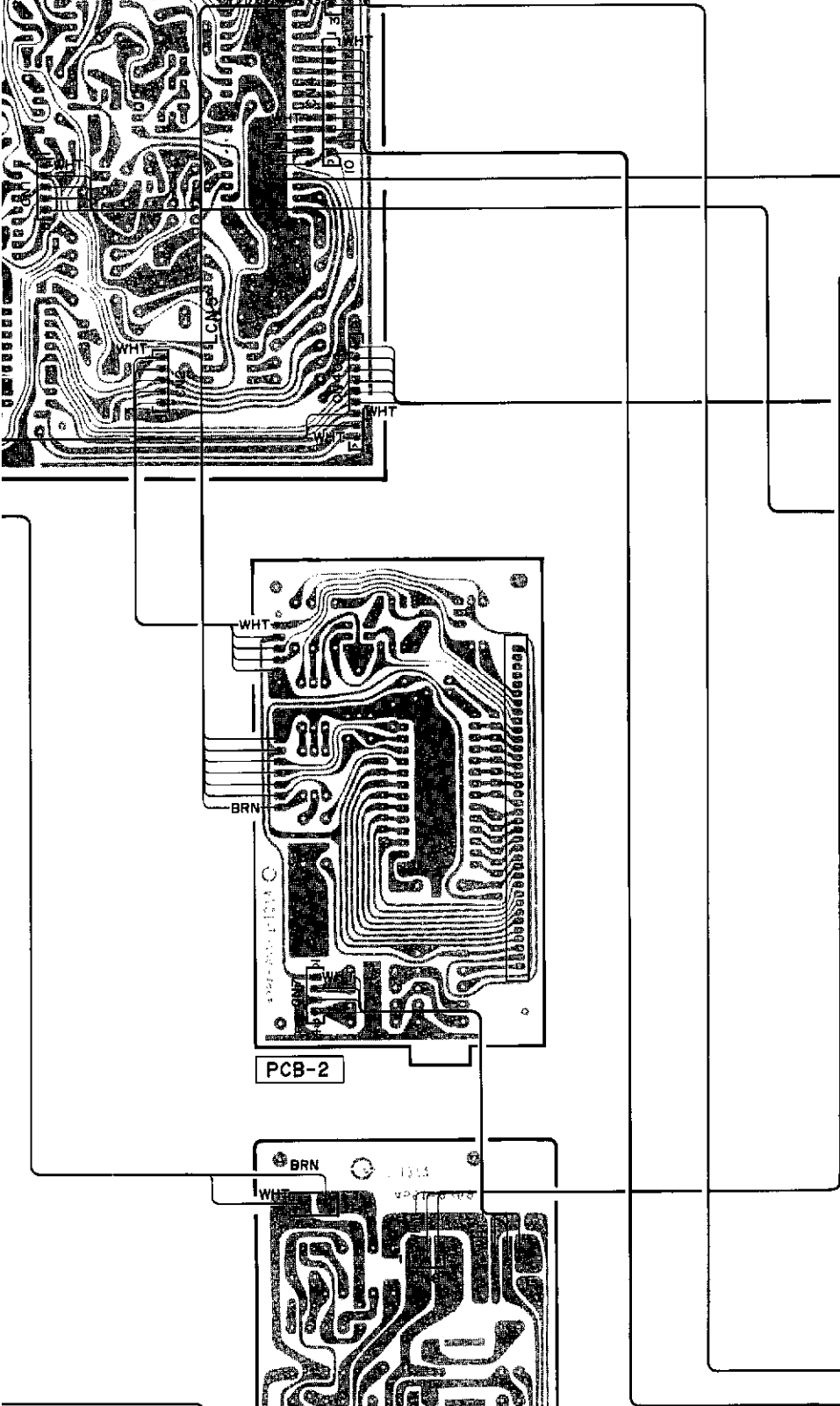
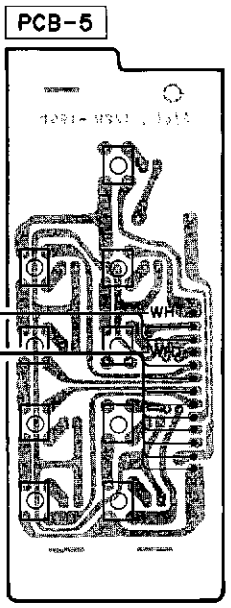
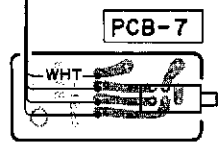
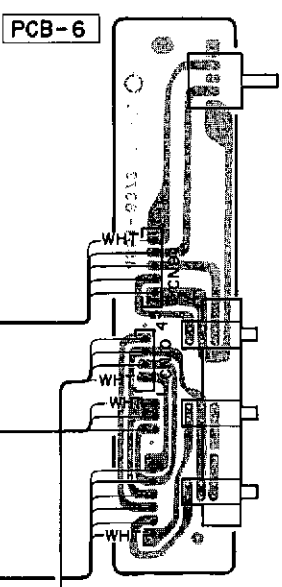
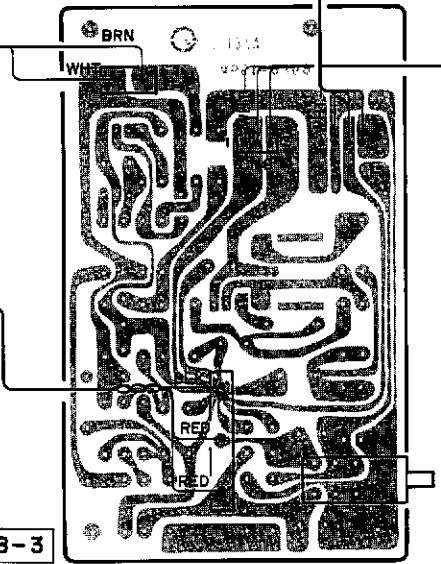
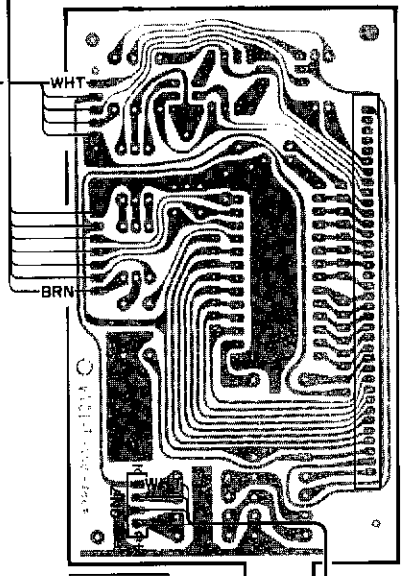
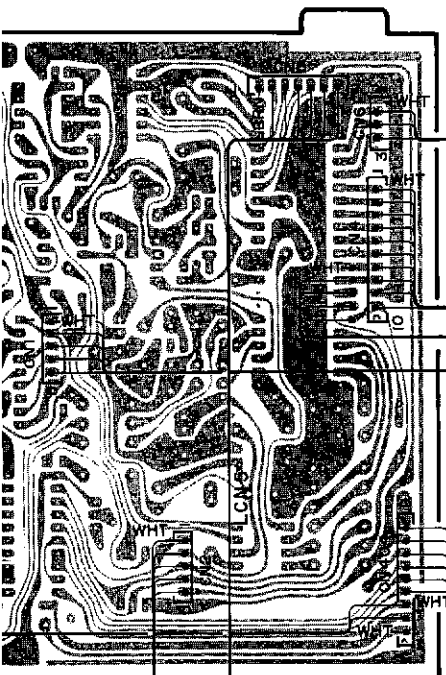
4

5

6

7





A

B

C

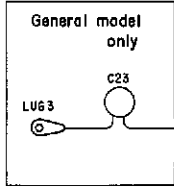
D

E

P. C. BOARDS

1

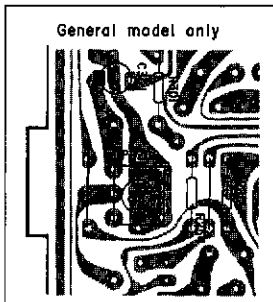
PCB-1 Main P. C. Board



2

SEPARATION ADJ.

3



4

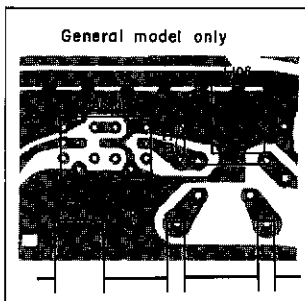
DISCRIMINATOR ADJ.

5

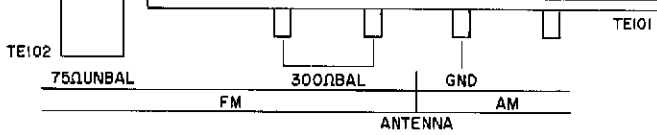
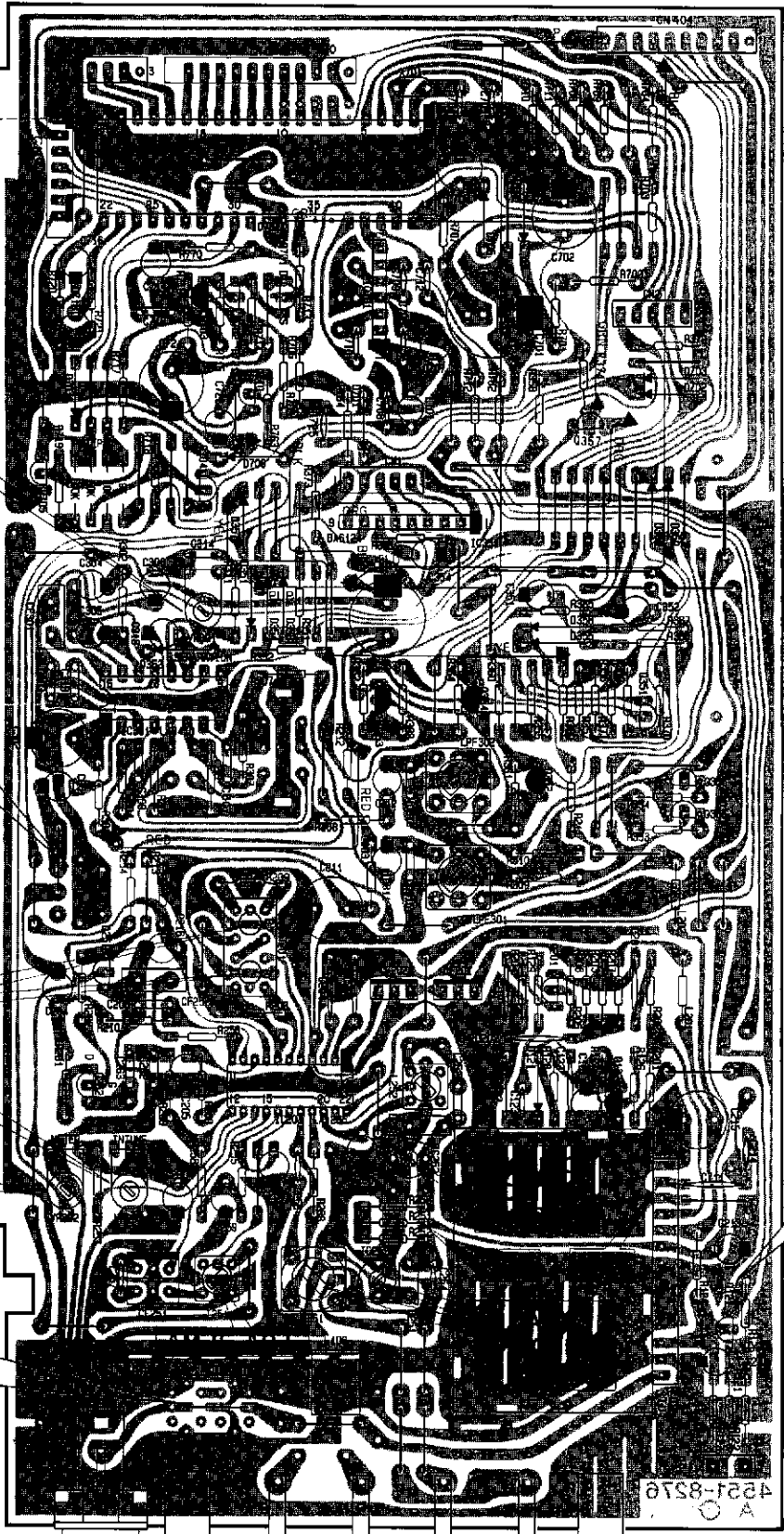
TUNED INDICATOR ADJ.

SIGNAL INDICATOR ADJ.

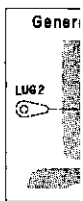
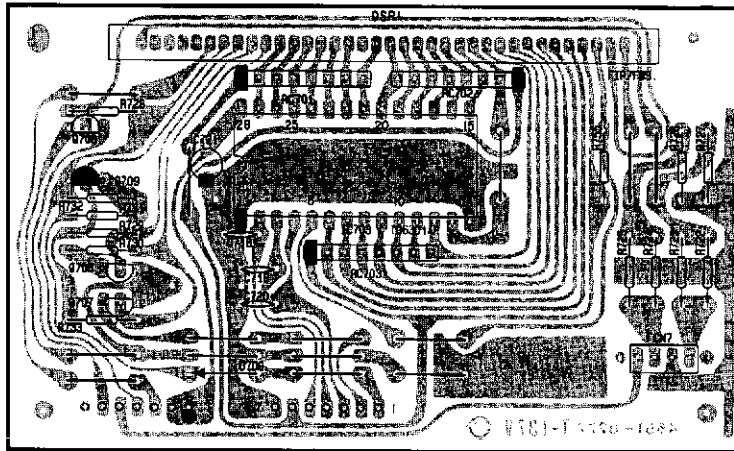
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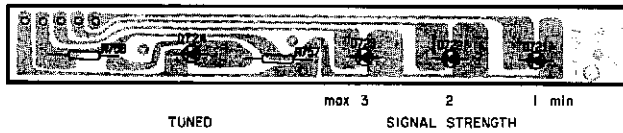
7



PCB-2 Station Display P. C. Board

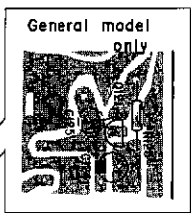
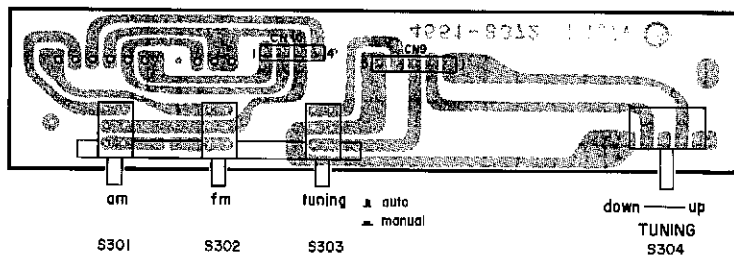


PCB-4 LED P. C. Board



PCB

PCB-6 Function P. C. Board



PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICs.

<p>2SC2240 2SC2878 2SC2603</p> <p>E C B</p>	<p>2SC2603 2SA1115 RN1203</p> <p>B C E</p>	<p>2SC380</p> <p>E C B</p>	<p>2SA1305</p> <p>B C E</p>	<p>2SJ103</p> <p>S G D</p>	<p>2SK117</p> <p>D G S</p>	<p>1SV149</p>	<p>1S2473 S5566B HZ762L HZ6B1L HZ11A2L HZ15L HZ6A2L</p> <p>Anode Cathode DiODE</p>
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J

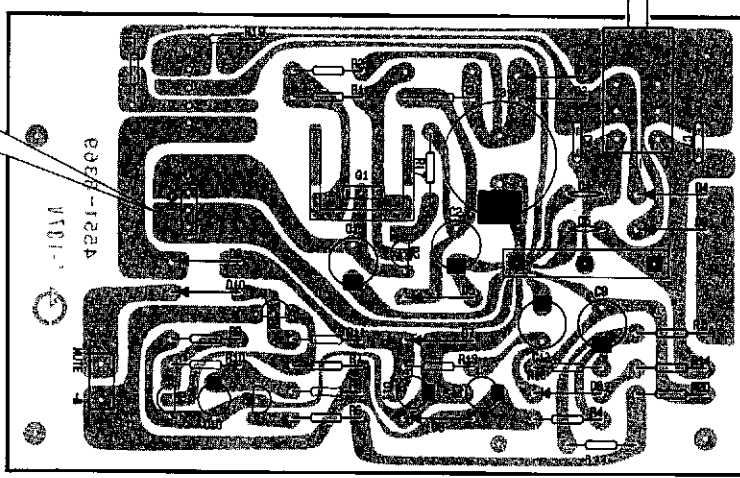
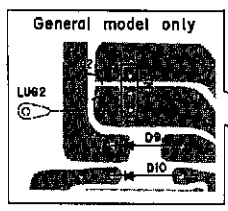
K

L

M

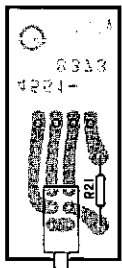
N

PCB-3 Power Switch P. C. Board



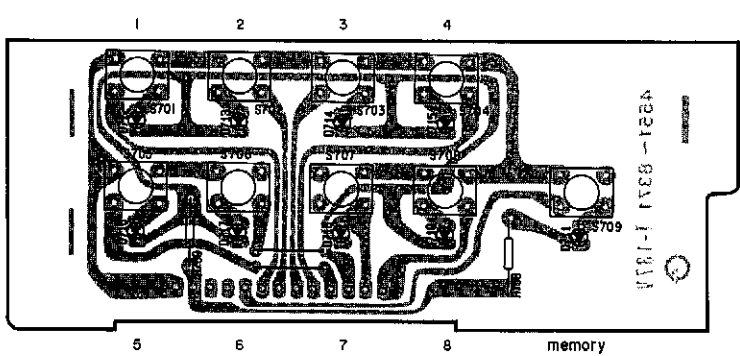
PCB-7

Muting P. C. Board



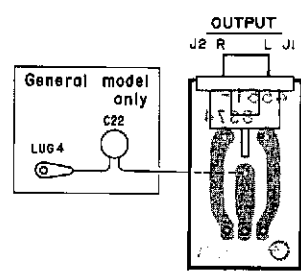
mode 1 stereo/
muting
S305 - mono

PCB-5 Preset Memory Switches P. C. Board



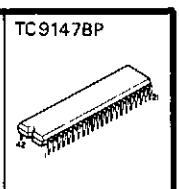
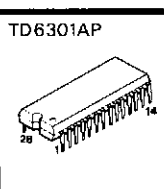
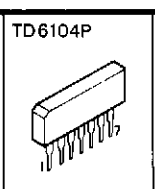
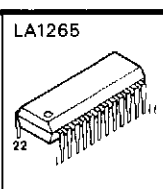
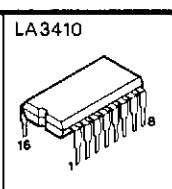
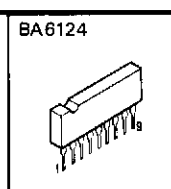
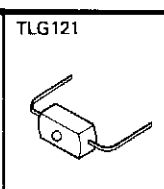
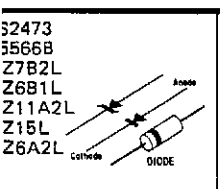
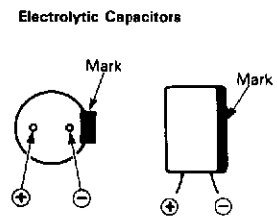
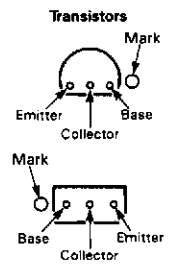
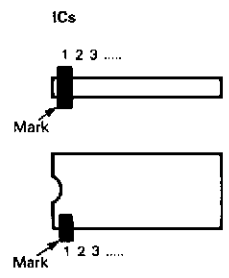
PCB-8

Output P. C. Board

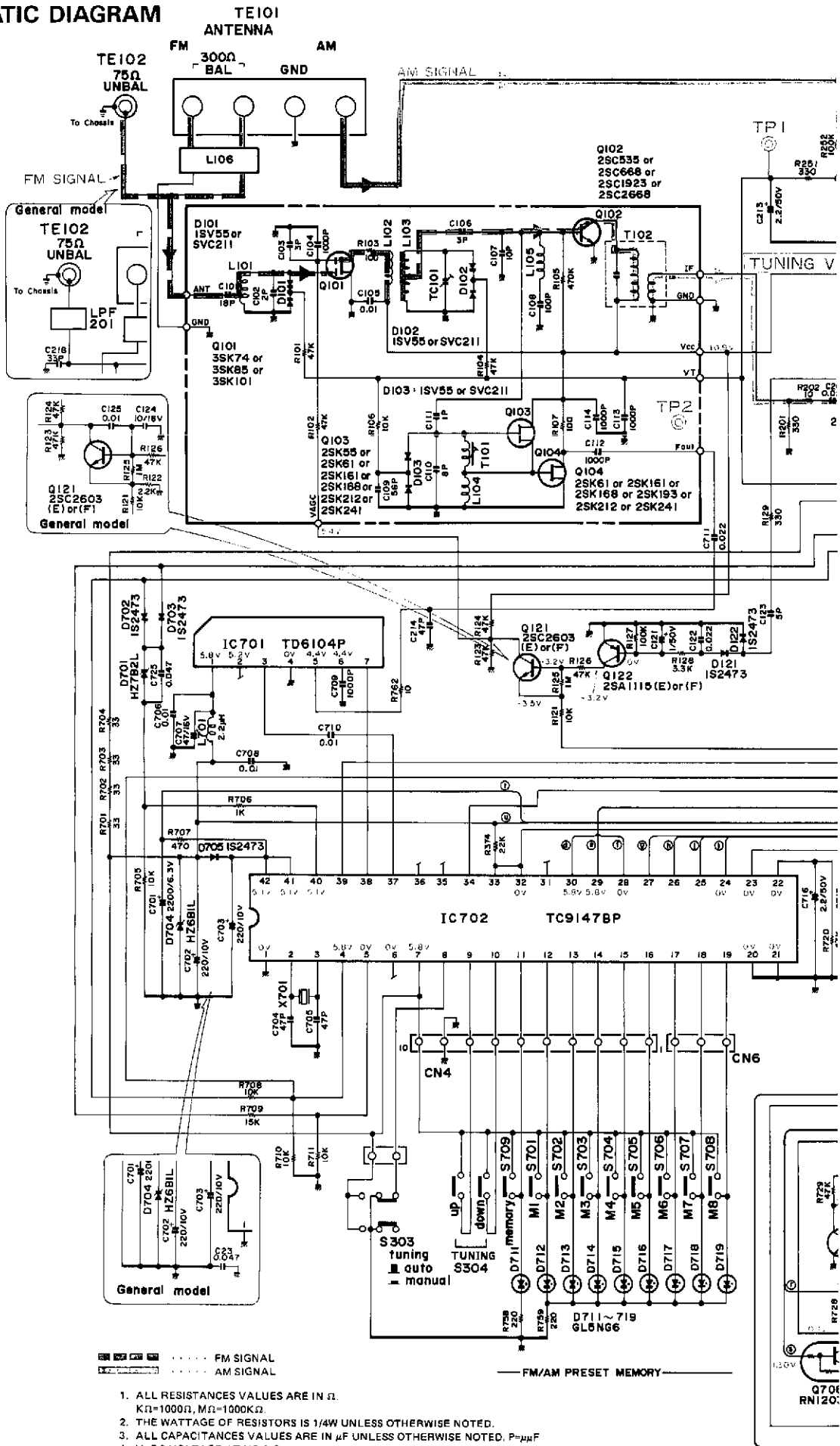


NOTE:

In the figures of the P. C. Boards, a mark is provided on the base side of the transistor.



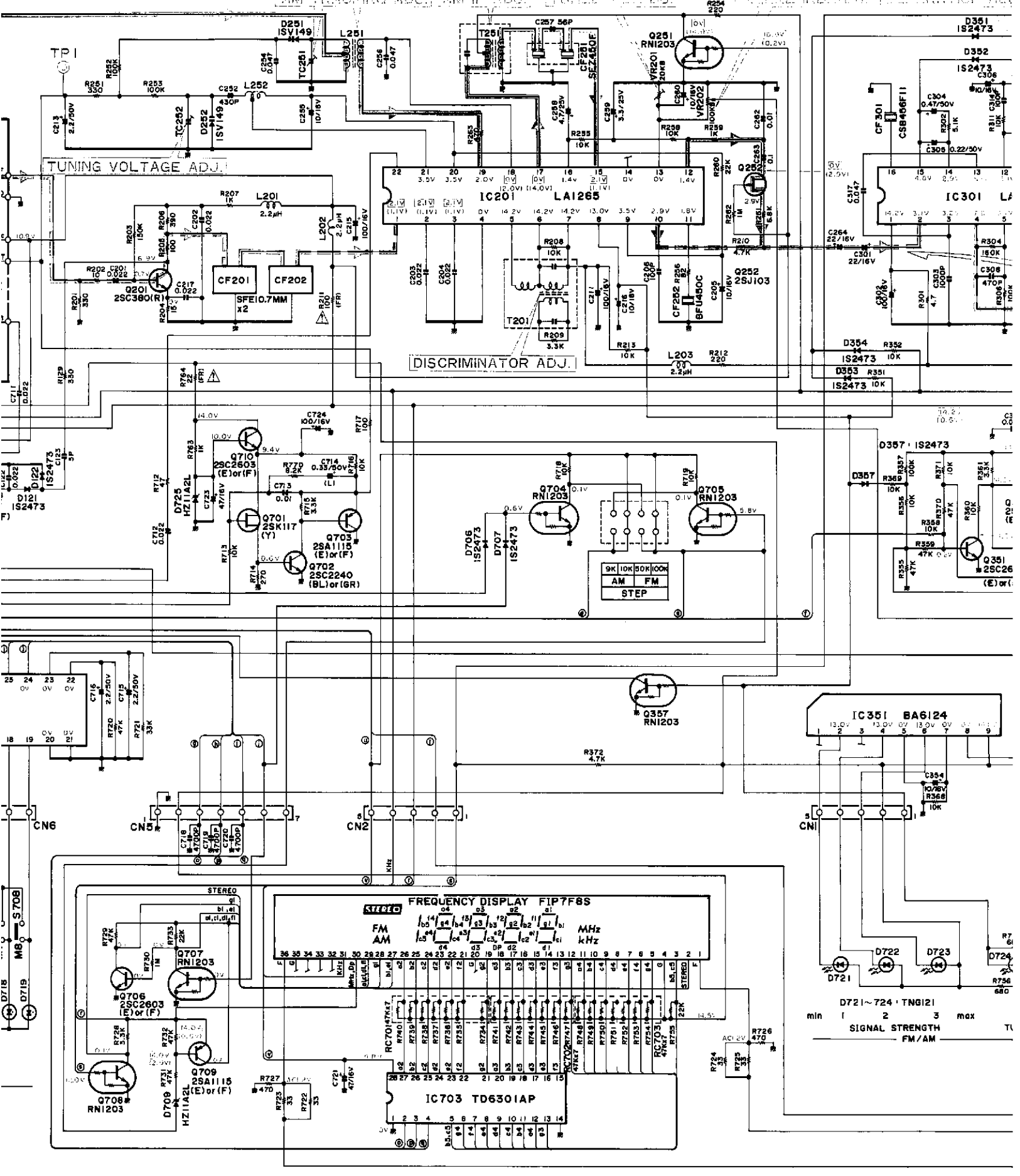
SCHEMATIC DIAGRAM



FM SIGNAL
 AM SIGNAL

1. ALL RESISTANCE VALUES ARE IN Ω.
KΩ=1000Ω, MΩ=1000KΩ.
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCE VALUES ARE IN μF UNLESS OTHERWISE NOTED. P=μF
4. V: DC VOLTAGE AT NO SIGNAL
V FM POSITION
V AM POSITION
5. SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS, THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS

AM TRACKING ADJ. AM IF ADJ. FM IF ADJ. FM TRACKING ADJ. FM TRACKING INDICATOR SEPARATION ADJ.



TUNING VOLTAGE ADJ.

DISCRIMINATOR ADJ.

FREQUENCY DISPLAY FIPT7F8

SIGNAL STRENGTH FM/AM

RATION ADJ.]

