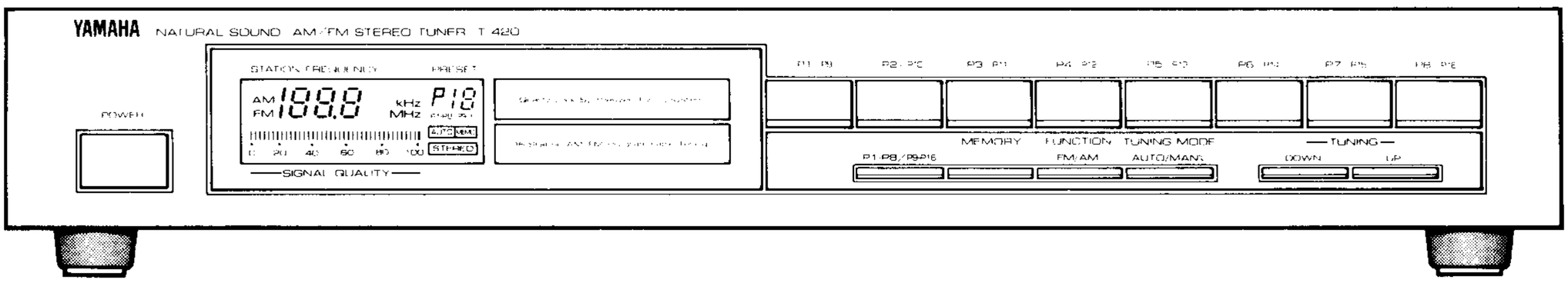
AM/FM STEREO TUNER

T-420

SERVICE MANUAL



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IMPORTANT NOTICE

This manual has been provided for the use of authorized Yamaha Retailers and their service personnel. It has been assumed that basic service procedures inherant to the industry, and more specifically Yamaha Products, are already known and understood by the users, and have therefore not been restated.

WARNING: Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components and failure of the product to perform as specified. For these reasons, we advise all Yamaha product owners that all service required should be performed by an authorized Yamaha Retailer or the appointed service representative.

IMPORTANT: The presentation or sale of this manual to any individual or firm does not constitute authorization, certification or recognition of any applicable technical capabilities, or establish a principle-agent relationship of any form.

The data provided is believed to be accurate and applicable to the unit(s) indicated on the cover. The research, engineering, and service departments of Yamaha are continually striving to improve Yamaha products. Modifications are, therefore, inevitable and specifications are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

WARNING: Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground buss in the unit (heavy gauge black wires connect to this buss).

IMPORTANT: Turn the unit OFF during disassembly and parts replacement. Recheck all work before you apply power to the unit.

■ CONTENTS

100014

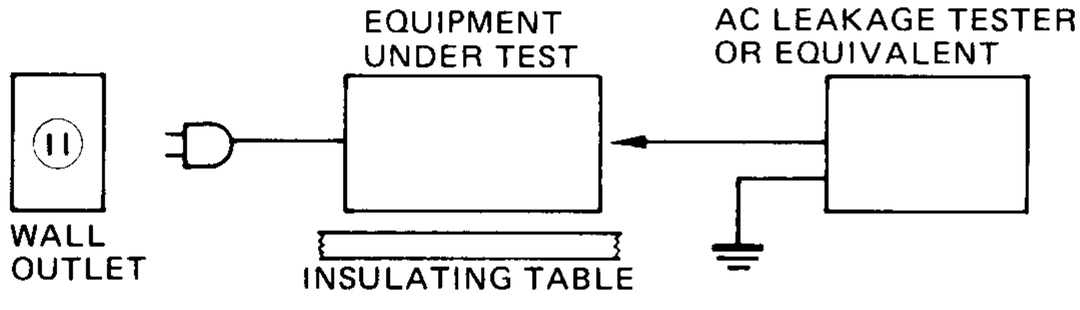
SINCE 1887 YAMAHA
NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN
2.75K-093 Printed in Japan '86.1

■TO SERVICE PERSONNEL

1. Critical Components Information.
   Components having special characteristics are marked ⚠ and must be replaced with parts having specifications equal to those originally installed.

2. Leakage Current Measurement (For 120V Model Only).
   When service has been completed, it is imperative that you verify that all exposed conductive surfaces are properly insulated from supply circuits.

- Meter impedance should be equivalent to 1500 ohm shunted by 0.15μF.
- Leakage current must not exceed 0.5mA.
- Be sure to test for leakage with the AC plug in both polarities.



● POLARIZATION

This tuner product is equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature.

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■SPECIFICATIONS

■FM SECTION

Tuning Range	87.5 to 108.0MHz (G)(A)(B) 87.5 to 107.9MHz (U)(C) 87.5 to 108.0MHz or 87.5 to 107.9MHz (R)
50dB Quieting Sensitivity	
Mono, 75Ω	1.6μV (15.3dBf)
Stereo, 75Ω	21μV (37.7dBf)
Usable Sensitivity	
30dB S/N Quieting 75Ω	0.8μV (9.3dBf) (U)(C)(A)(B)(R)
Usalbe Sensitivity (DIN)	
Mono (S/N 26dB), 75Ω	1.4μV (G)
Stereo (S/N 46dB), 75Ω	30μV (G)
Image Response Ratio	40dB (U)(C)(A)(B)(R) 75dB (G)
IF Response Ratio	90dB (U)(C)(A)(B)(R) 75dB (G)
Spurious Response Ratio	70dB
AM Suppression Ratio	55dB
Capture Ratio	1.5dB
Alternate Channel Selectivity	85dB (U)(C)(A)(B)(R)
Selectivity (two Signals)	
40kHz DEV. ±300kHz	70dB (G)
Signal to Noise Ratio	
Mono	82dB (U)(C)(A)(B)(R)
Stereo	76dB (U)(C)(A)(B)(R)
Signal to Noise Ratio (DIN-Weighted)	
40kHz DEV. Mono	75dB (G)
Stereo	70dB (G)
Harmonic Distortion	
Mono	1kHz 0.1%
Stereo	1kHz 0.2%
G model (40kHz DEV.)	
Mono	1kHz 0.1%
Stereo	1kHz 0.2%
Stereo Separation	1kHz 40dB
Frequency Response	
30Hz to 13kHz	0 ± 0.5dB (G)
30Hz to 15kHz	0 ± 0.5dB (U)(C)(A)(B)(R)

■AM SECTION

Tuning Range	530 to 1610kHz (U)(C) 531 to 1611kHz (A)(B)(G) 530 to 1610kHz or 531 to 1611kHz (R)
Usable Sensitivity	300μV/m
Selectivity	24dB
Signal to Noise Ratio	50dB
Image Response Ratio	40dB
Spurious Response Ratio	50dB
Harmonic Distortion 400Hz	0.3%

■AUDIO SECTION

Output Level/Impedance	
FM 100% MOD 1kHz	500mV/2.2kΩ (U)(C)(A)(B)(R)
FM 40kHz DEV. 1kHz	400mV/3.3kΩ (G)
AM 30% MOD 400Hz	150mV/2.2kΩ (U)(C)(A)(B)(R)
AM 30% MOD 400Hz	150mV/3.3kΩ (G)

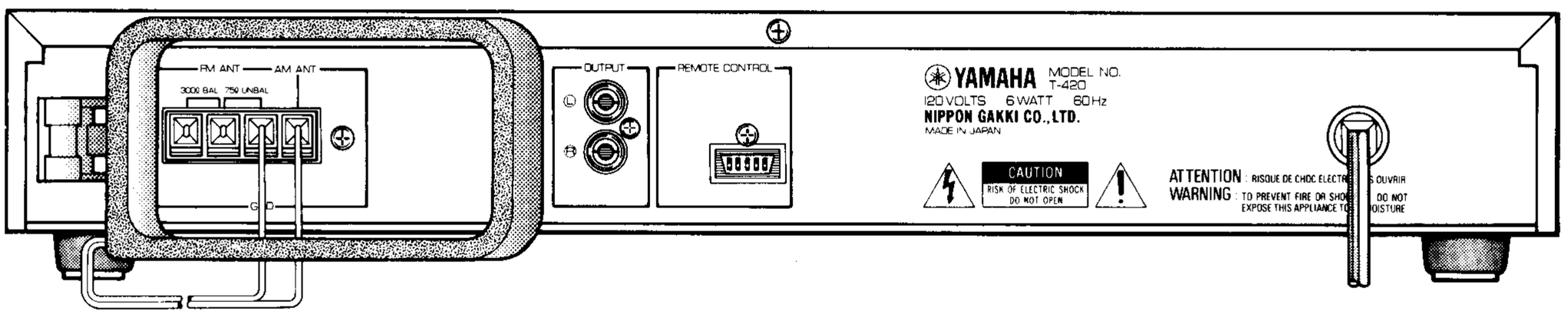
■GENERAL

Power Supply	
U.S. & Canadian models	120V AC, 60Hz
European model	220V AC, 50Hz
British & Australian models	240V AC, 50Hz
Other model	110 – 130V AC/220 – 240V AC, 50/60Hz
Power Consumption	7W (A)(G)(B) 6W (U)(C)(R)
Dimensions (W x H x D)	435 x 72.5 x 236.5 (17-1/8 x 2-7/8 x 9-1/4")
Weight	2.3 kg (5 lbs. 1 oz)

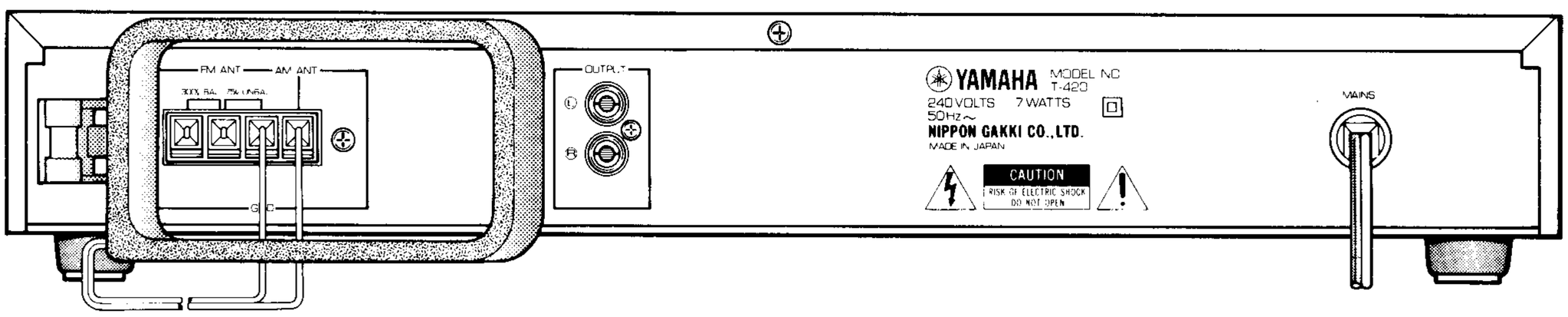
(U) ..... U.S.A. model
(C) ..... Canadian model
(A) ..... Australian model
(G) ..... European model
(B) ..... British model
(R) ..... Other model

■ REAR PANELS

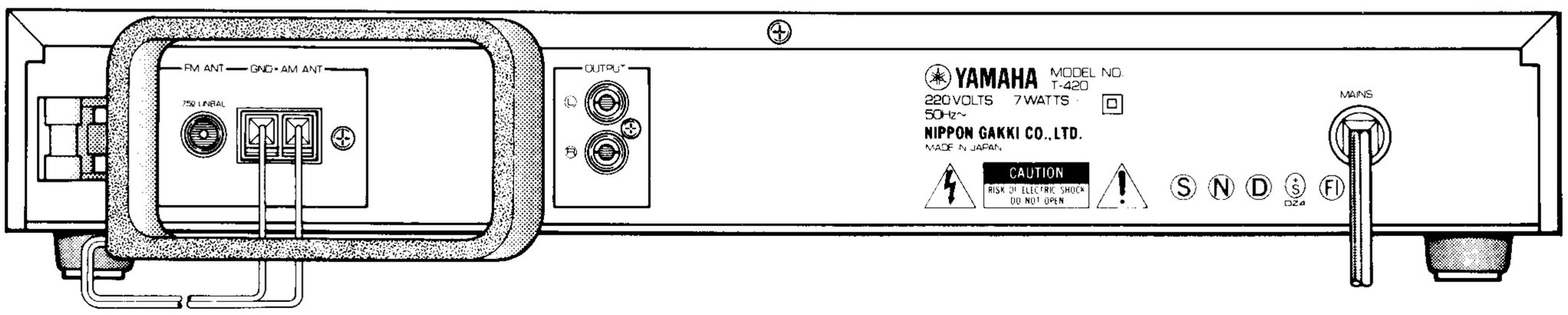
▼ U.S.A. & Canadian models



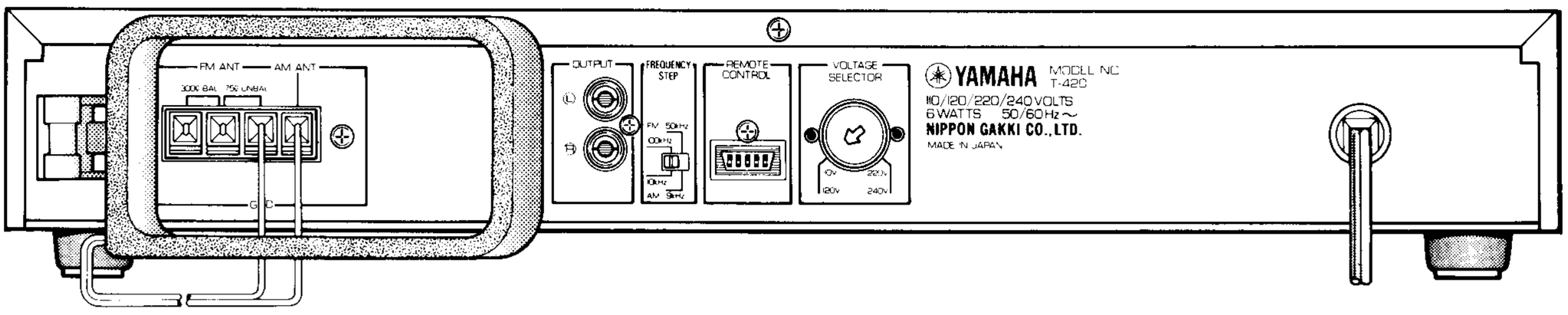
▼ British & Australian models



▼ European model



▼ Other model



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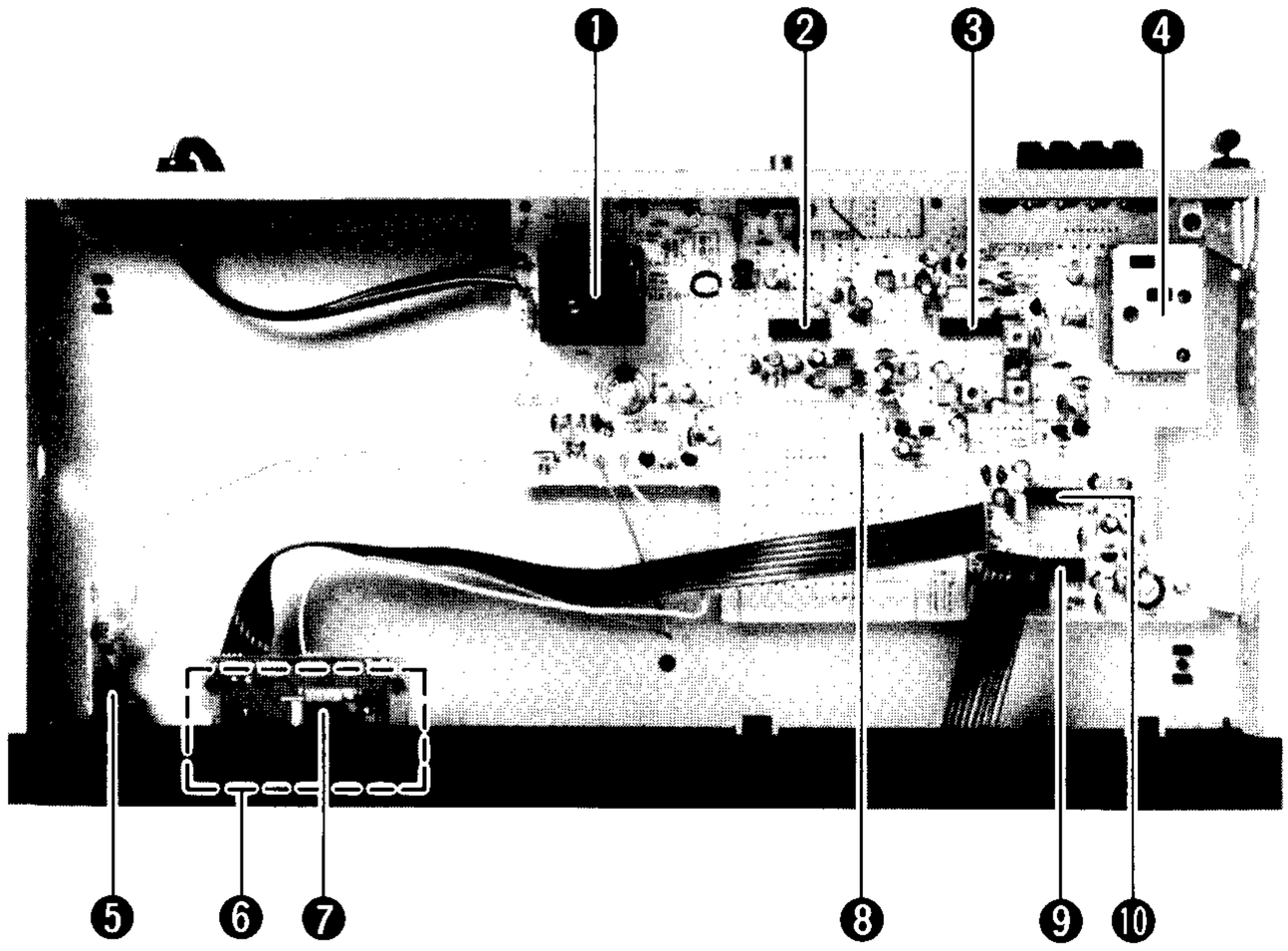
■ INTERNAL VIEW



❶ POWER TRANSFORMER
U, C models: GA693100
R, A, G, B models: GA693200
❷ MPX IC: LA3401
❸ IF IC: LA1265
❹ FRONT END PACK
❺ POWER SWITCH
❻ DISPLAY UNIT
❼ LCD DRIVER: LC7580
❽ TUNER CIRCUIT BOARD (1)
❾ 4 BIT CPU: LC6523C-779
❿ PLL IC: LM7001

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■ DISASSEMBLY PROCEDURES

1. Removal of Top Cover
Remove 5 screws (①) in Fig. 1, and slide the Top Cover back.
2. Removal of Front Panel
Remove 4 screws (②) and 3 hooks in Fig. 1, and pull the Front Panel forward.

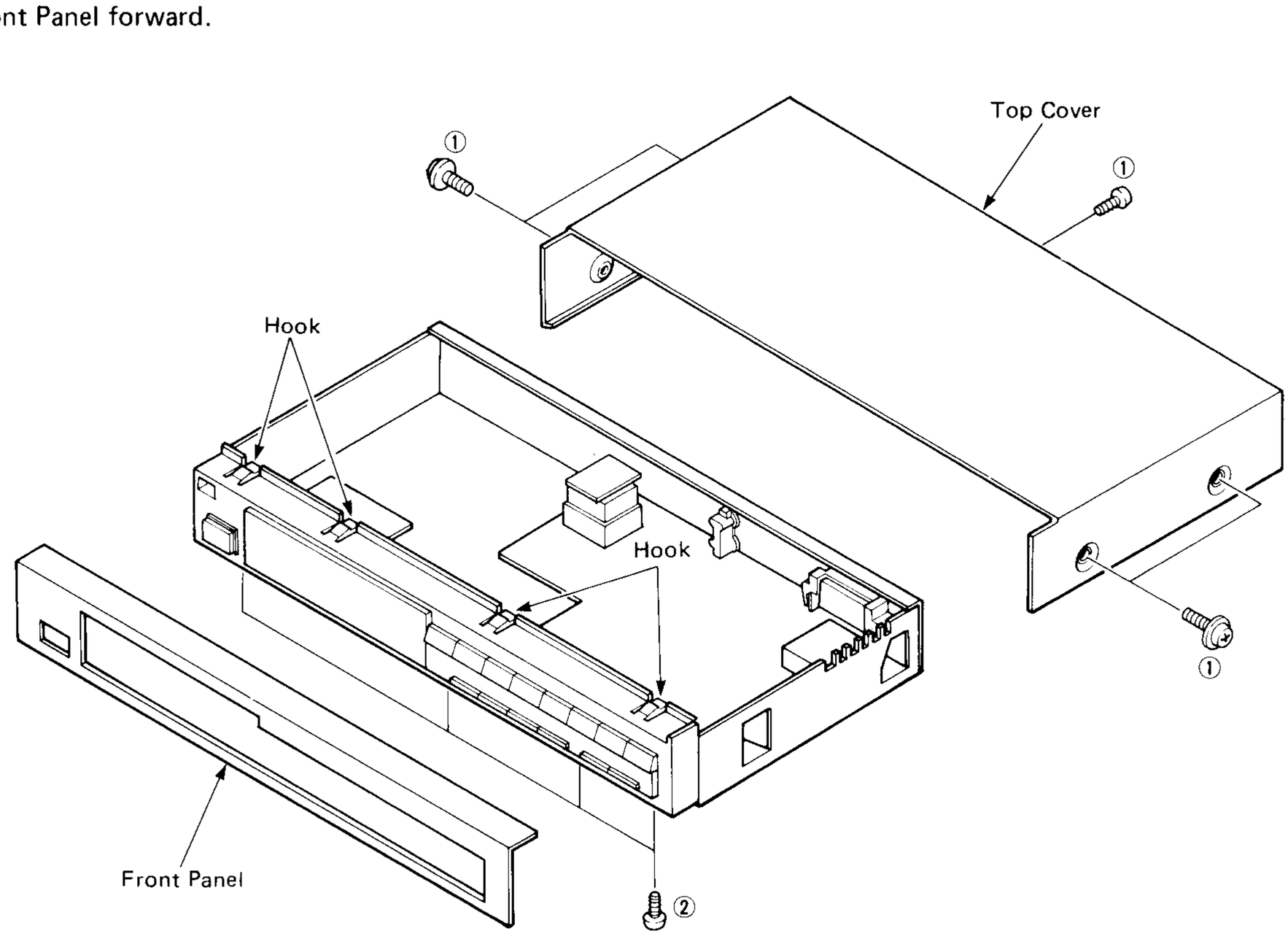


Fig. 1

■ ADJUSTMENTS

1. Before adjustment

1) After the power switch is pushed on, wait for 5 minutes before measuring, to be sure of the most stable operation.
2) Adjust the OSC coil and IFT with a nonferrous screw driver.
3) Set the switches to the following positions.
   TUNING MODE ..... AUTO
4) Proceed with the AM section adjustments after having finished the FM section adjustment.
5) 0dBμ = 1μV Ex: 60dBμ = 1mV

2. Measuring instruments abbreviation

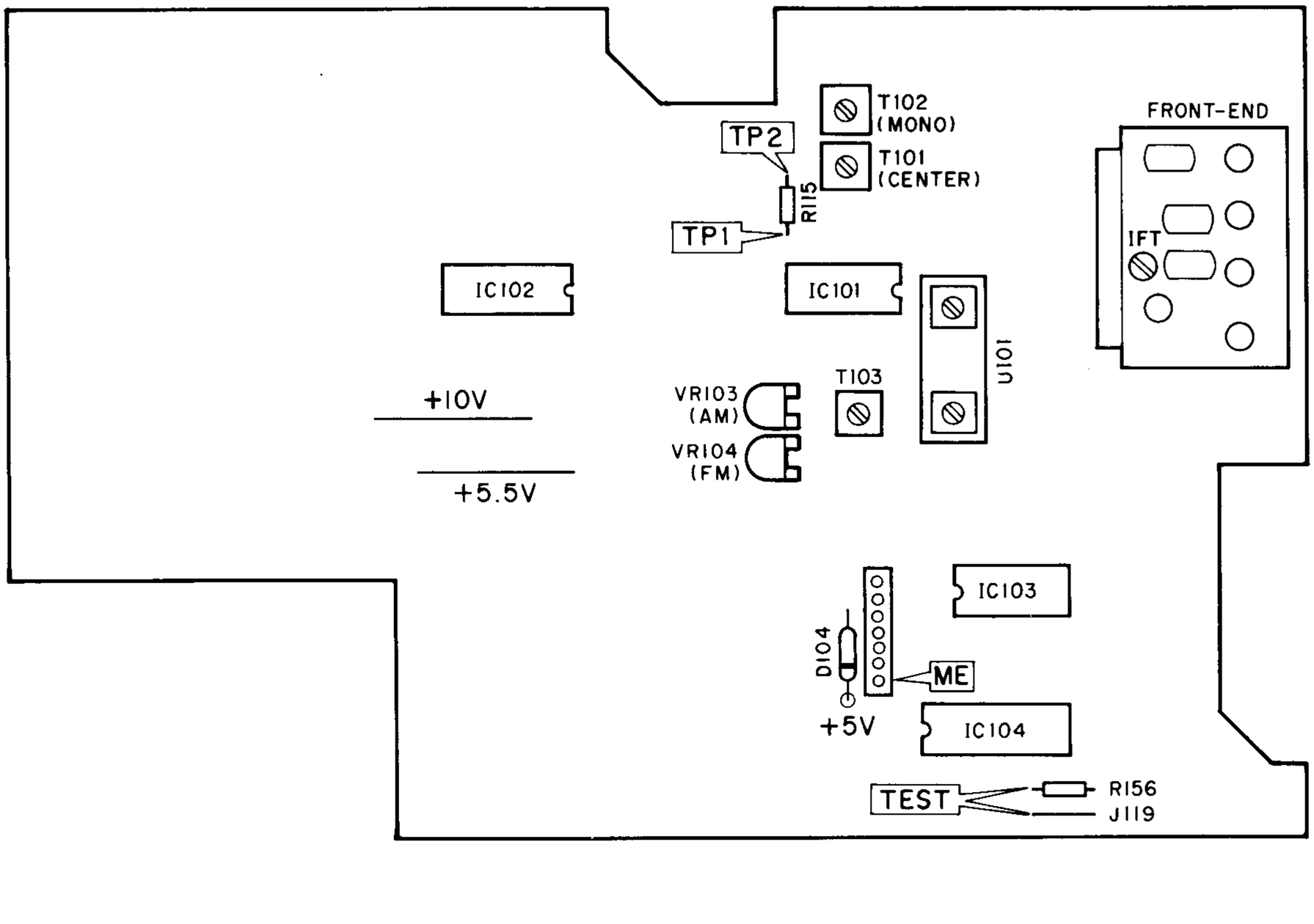
FM SG : FM signal generator
SSG : Stereo signal generator
AM SG : AM signal generator
DIST. M : Distortion meter
FC : Frequency counter
A C V M : AC voltmeter
D C V M : DC voltmeter

< POWER SUPPLY CHECK >

Check that the following voltages are obtained respectively across each test point and ground on tuner circuit.

Test Point	Rating or standard	Remark
+10V	+10V ± 0.5V	Make sure that AC line voltage comes within: Models U, C — 120V ± 10%; G — 220V ± 10%; A, B — 240V ± 10%
+5.5V	+5.5V ± 0.5V	
+5V	+5V ± 0.25V	

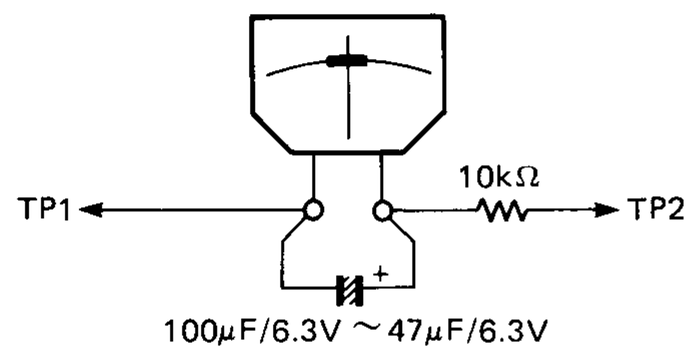
• TEST POINTS



< FM TUNER SECTION >

- Use 19kHz L.P.F. to measure the output.
- On step 1 and 8 connect the auxiliary center meter (ji00036 or similar) to confirm the best tuned point.
- 100% modulation means that the Frequency Deviation is 75kHz.

Auxiliary Center Meter



- Shorting TEST (R156 and J119 Before Fig. TEST POINT) while set at FM will result in automatic memory of each preset from P1/P9 to P9/P16 as given in the right table. This is convenient when making an adjustment.

P1/P9	P2/P10	P3/P11	P4/P12	P5/P13
AM 630kHz	AM 1080kHz	AM 1440kHz	FM 87.5MHz	FM 95.1MHz

P6/P14	P7/P15	P8/P16
FM 98.1MHz	FM 101.5MHz	FM 108.0MHz (A, B, G, R)
		FM 107.9MHz (U, C)

Step	Item to be Adjusted	Connection terminal	Instrument required	Adjustment locations	Adjustment method	Rating or standard	Remarks
1	Discriminator balance	75Ω FM ANT	FM SG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD]	T101 (CENTER)	Adjust so that the pointer of the auxiliary center meter points to 0 when tuned to signal of FM SG.	0V ≦ ±50mV (DCVM)	
		TP1 ~ TP2	Auxiliary center meter or DCVM				
2	Monaural distortion	75Ω FM ANT	FM SG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 100Hz 100% MOD]	T102 (MONO)	Reduce distortion to minimum.		
		OUTPUT L, R	DIST. M L.P.F.				
3	Stereo distortion	75Ω FM ANT	FM SG, SSG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz, 100% MOD]	IFT in Front-end	Same as step 2	Less than −33dB	Confirm that stereo indicator lights up.
		OUTPUT L, R	DIST. M L.P.F.				
4	Confirmation of monaural distortion	75Ω FM ANT	FM SG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD]			Less than −41dB	
		OUTPUT L, R	DIST. M L.P.F.				
5	Confirmation of sensitivity	75Ω FM ANT	FM SG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD]		Lower FM SG output level so that S/N becomes 30dB	Less than 4dBμ (15.2 dBf, 1.58μV/75Ω) [G model only Less than 6dBμ (17.3 dBf, 2μV/75Ω)]	
		OUTPUT L, R	ACVM L.P.F.				
6	Confirmation of separation	75Ω FM ANT	FM SG SSG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz 100% MOD]			Less than 28dB	
		OUTPUT L, R	ACVM L.P.F.				

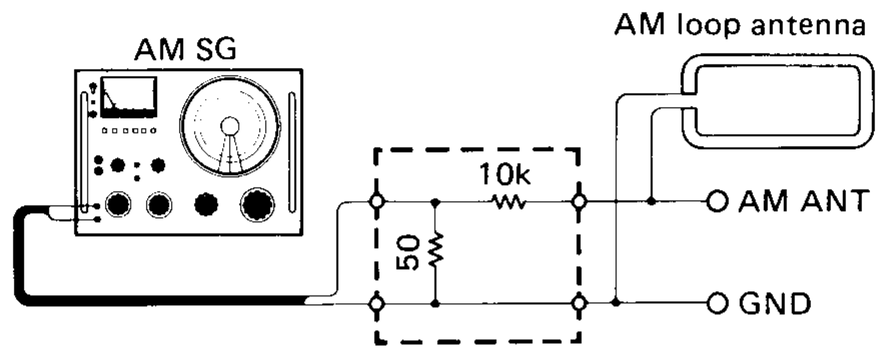
Step	Item to be Adjusted	Connection terminal	Instrument required	Adjustment locations	Adjustment method	Rating or standard	Remarks
7	Confirmation of discriminator balance	75Ω FM ANT	FM SG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD]		Confirm that the auxiliary center meter deflects to 0 when tuned to signal of FM SG.	0V≦±50mV (DCVM)	
		TP1 ~ TP2	Auxiliary center meter or DCVM				
8	Full-scale signal quality level	75Ω FM ANT	FM SG, SSG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz, 100% MOD]	VR104 (FM)	2.6V ± 0.1V		Confirm that all signal quality indicators goes out at detuned point.
		75Ω ME ~ GND	DCVM				
9	Confirmation of auto seach reception	300Ω FM ANT	FM SG [98.1MHz ± 1kHz 26dBμ (37.3dBf, 20μV/75Ω) MONO 1kHz 100% MOD]			Confirm that auto search reception is possible with the tuning key.	Confirm that muting is performed at auto reception.

Note: X dBμ = x +5.2dBμf

< AM TUNER SECTION >

- Connect the AM loop antenna to the AM ANT terminals.
- Connect the AM dummy antenna for adjustment.

AM DUMMY ANTENNA CONNECTION



Step	Item to be Adjusted	Connection terminal	Instrument required	Adjustment locations	Adjustment method	Rating or standard
1	AM IFT	AM ANT	AM SG AM dummy antenna [630kHz ± 0.1kHz 50dBμ (61.2dBf, 316μV/ 75Ω) 400Hz, 30% MOD]	T103	Adjust T103 to maximize detector output.	
		OUTPUT	ACVM			
2	Confirmation of sensitivity	AM ANT	AM SG AM dummy antenna [630kHz ± 0.1kHz 1080kHz ± 0.1kHz 1440kHz ± 0.1kHz 400Hz, 30% MOD]		Obtain AM SG output level where distortion become 10%.	Less than 60dBμ (71.2dBf, 1mV/ 75Ω)
		OUTPUT	DIST. M.			
3	Full-scale signal quality level	AM ANT	AM SG. AM dummy antenna [1080kHz ± 0.1kHz 80dBμ (91.2dBf, 10mV/75Ω) 400Hz, 30% MOD]	VR103 (AM)	2.6V ± 0.1V	Confirm that all signal quality indicators goes out at detuned point.
		ME ~ GND	DCVM			
4	Confirmation of auto search reception	AM ANT	AM SG AM dummy antenna [1080kHz ± 0.1kHz 65dBμ (76.3dBf, 1.78mV/75Ω) 400Hz, 30% MOD]		Confirm the auto search reception with the tuning key	Confirm that muting is performed at auto reception.

< DIGITAL CONTROL SECTION >

Step	Confirmation item	Connection terminal	Instrument required	Operation key	Confirmation method
1	Preset memory	75Ω FM ANT	FM SG, SSG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO, L, R 1kHz, 100% MOD]	FUNCTION key TUNING MODE key TUNING key (UP or DOWN) MEMORY key PRESET STATION key	①Receive FM 98.1MHz by means of auto search. ②Set P1-P8 → P1-P8 indicator lights. ③Press MEMORY key → MEMORY indicator flashes about 5 seconds. ④Press P1 → MEMORY indicator goes OFF P1 of PRESET STATION indicator lights.
		AM ANT	AM SG AM dummy antenna [1080kHz ± 0.1kHz 80dBμ (91.2dBf, 10mV/75Ω) 400Hz, 30% MOD]	P1-P8/P9-P16	⑤Receive AM 1080kHz ⑥Press MEMORY key → MEMORY indicator flashes about 5 seconds. ⑦Press P2 → MEMORY indicator goes OFF P2 of PRESET STATION indicator lights.
		75Ω FM ANT AM ANT	FM SG, SSG AM SG AM dummy antenna		⑧Press P1 and P2 and check that content is read out. → P1 and P2 of PRESET STATION indicator lights. ⑨Set P9-P16 → P9-P16 indicator flashes. ⑩Press MEMORY key → MEMORY indicator flashes. ⑫Press P9 → MEMORY indicator goes OFF. P9-P16 indicator lights. P9 indicator lights. ⑬Press P9 and check that content is read out.
2	Tuning mode	Same as step 1	Same as step 1	FUNCTION key TUNING MODE key TUNING key (UP or DOWN) PRESET STATION key P1. P2	Tune to FM 98.1MHz and AM 1080kHz, and check that when receiving MAN'L/MONO, FM reception become forced mono AUTO indicator → Goes out STEREO indicator → Goes out
3	Last channel memory			POWER key	①Read out P1. ②Turn OFF POWER key. ③Turn ON POWER key after 5 seconds. ④P1 content should come on. P1 of PRESET STATION indicator lights.

■μ-COM DATA

- **IC104: LC6523C-779**

1-chip type 4-bit microcomputer which incorporates 2048 x 8 bit ROM (for programming) and 128 x 4 bit RAM (for data memory)

Terminal No.	Discription	I/O	Function
1	PE_3	OUT	Muting out. MUTE ON → "H"
2	VDD	IN	+5V
3	PF_0/SI	OUT	Key scan out. D1 D2 D3 D4 (Refer to table 1)
4	PF_1/SO		
5	$PF_2/\overline{SCK}$		
6	$PF_3/\overline{INT}$		
7	PG_0	IN	Key scan input. K1 K2 K3 K4 (Refer to table 1)
8	PG_1		
9	PG_2		
10	PG_3		
11	PA_0	IN	Control signal input. REM0 REM1 (Refer to table 2)
12	PA_1		
13	PA_2	IN	Detection input for power down "L" → Back up mode
14	PA_3	IN	TEST terminal ("H" in normal condition) TEST terminal is "L" while set will result in automatic memory of specific frequency.
15	OSC_2	OUT	Terminal for clock oscillating circuit.
16	OSC_1	IN	
17	TEST	IN	Gnd
18	Vss	IN	Gnd
19	$\overline{RES}$	IN	Reset input. "L" in reset mode.
20	PC_0	OUT	Control data output. (LM7001, LC7580)
21	PC_1	OUT	Forwarding clock of data.
22	PC_2	OUT	Forwarding select of data. LM7001 ACTIVE → "H" LC7580 ACTIVE → "H"
23	PC_3		
24	PD_0	IN	Destination symbol.
25	PD_1		
26	PD_2		
27	PD_3	OUT	Muting output for display.
28	PE_0	IN	Prohibit search stop. "L" in stop mode.
29	PE_1	IN	Destination MONO/STEREO. "L" in stereo mode.
30	PE_2	OUT	Compulsion mono mode control. Compulsion mono → "H"

● KEY MATRIX

OUTPUT / INPUT	D1 (Pin 3)	D2 (Pin 4)	D3 (Pin 5)	D4 (Pin 6)
K1 (Pin 7)	FM/AM (SW101)	UP (SW103)	P1/P9 (SW107)	P5/P13 (SW111)
K2 (Pin 8)	AUTO/MAN'L (SW102)	DOWN (SW104)	P2/P10 (SW108)	P6/P14 (SW112)
K3 (Pin 9)		P1-8/P9-16 (SW105)	P3/P11 (SW109)	P7/P15 (SW113)
K4 (Pin 10)		MEMORY (SW106)	P4/P12 (SW110)	P8/P16 (SW114)

Table 1

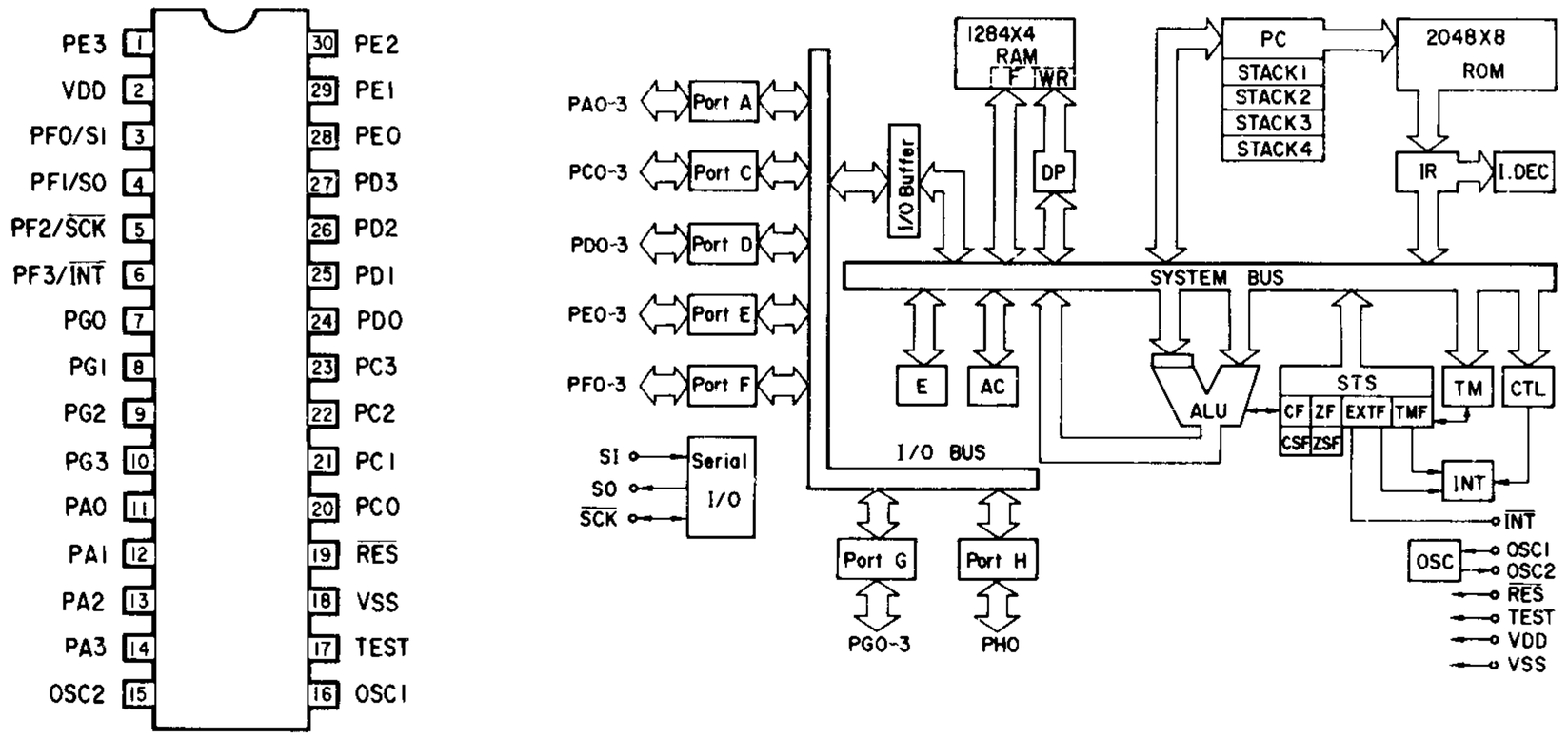
● REMOTO CONTROL SIGNAL

REM 0 (Pin 11)	REM 1 (Pin 12)	CONTROL
L	H	PRESET UP
H	L	PRESET DOWN
H	H	P1-P8/P9-P16

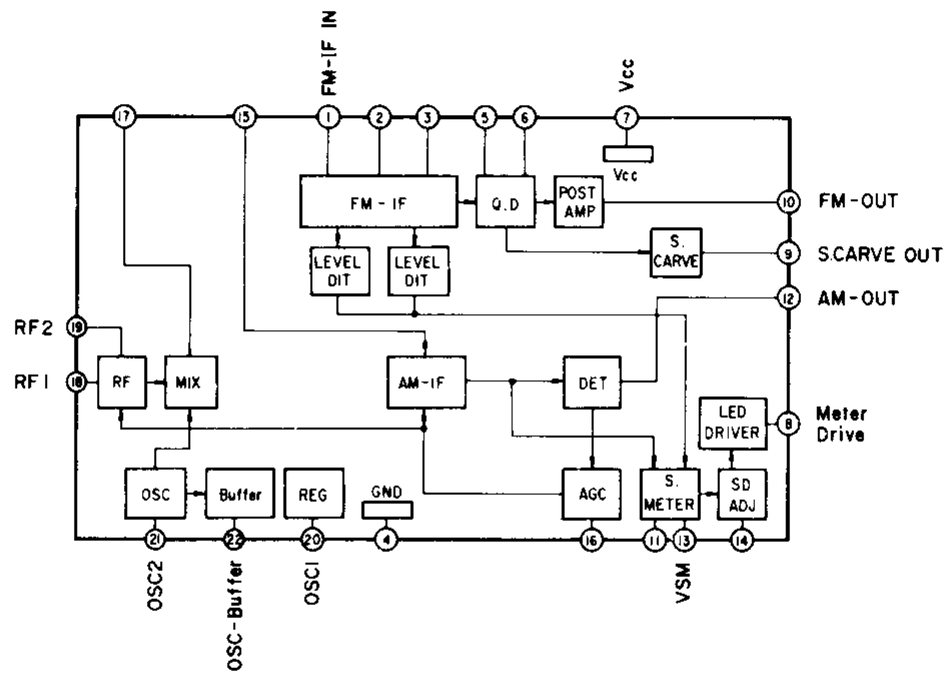
Table 2

■ IC BLOCK CIRCUIT DATA

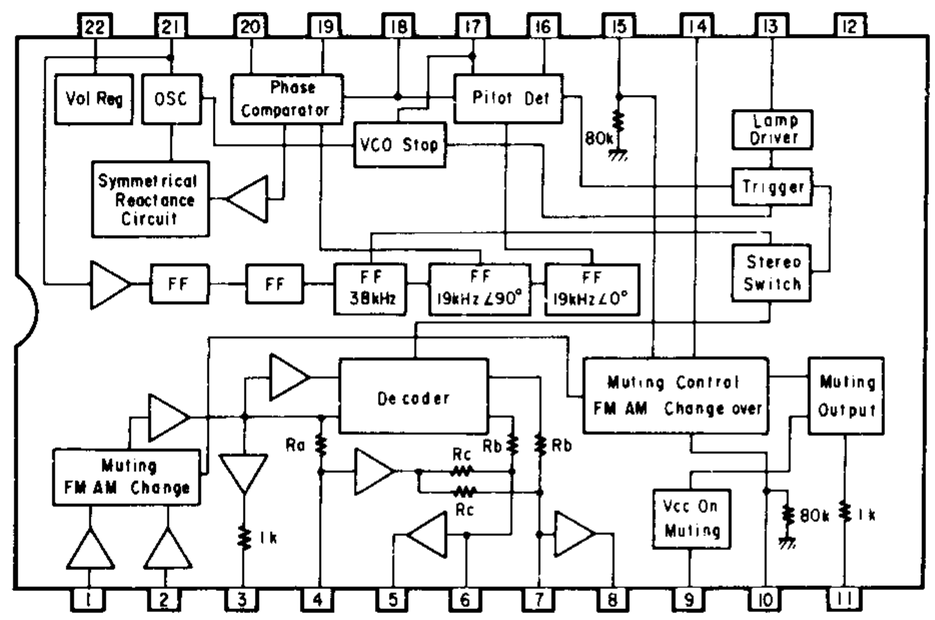
IC104: LC6523C-779



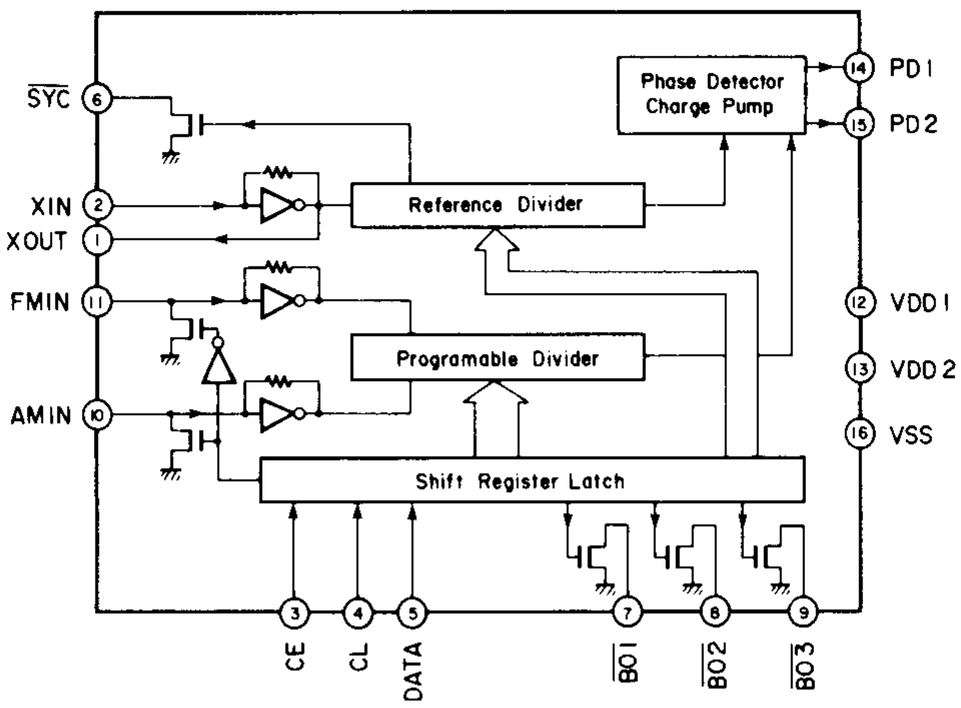
IC101: LA1265



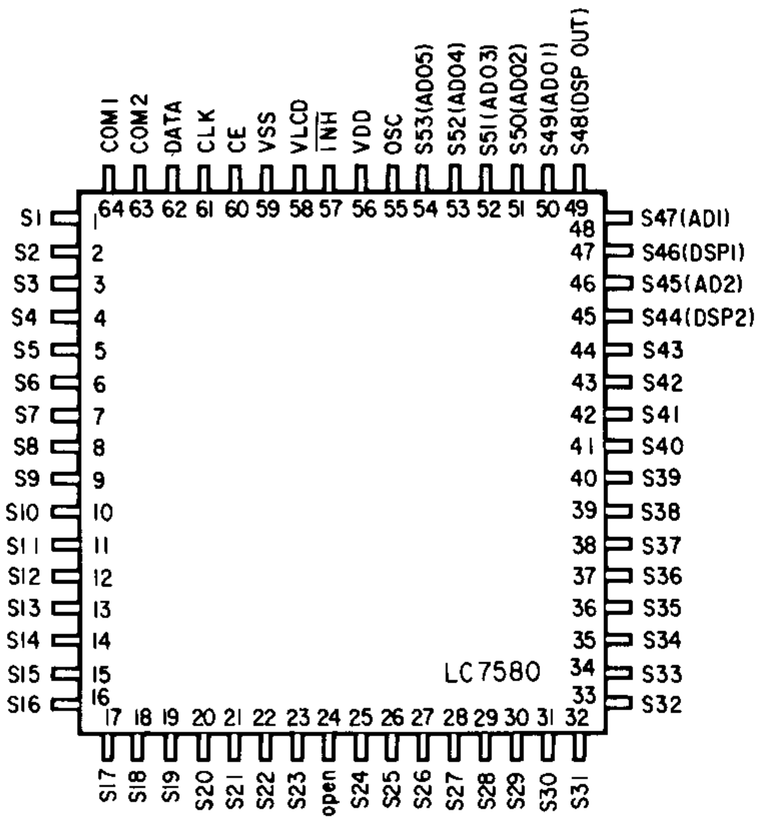
IC102: LA3401

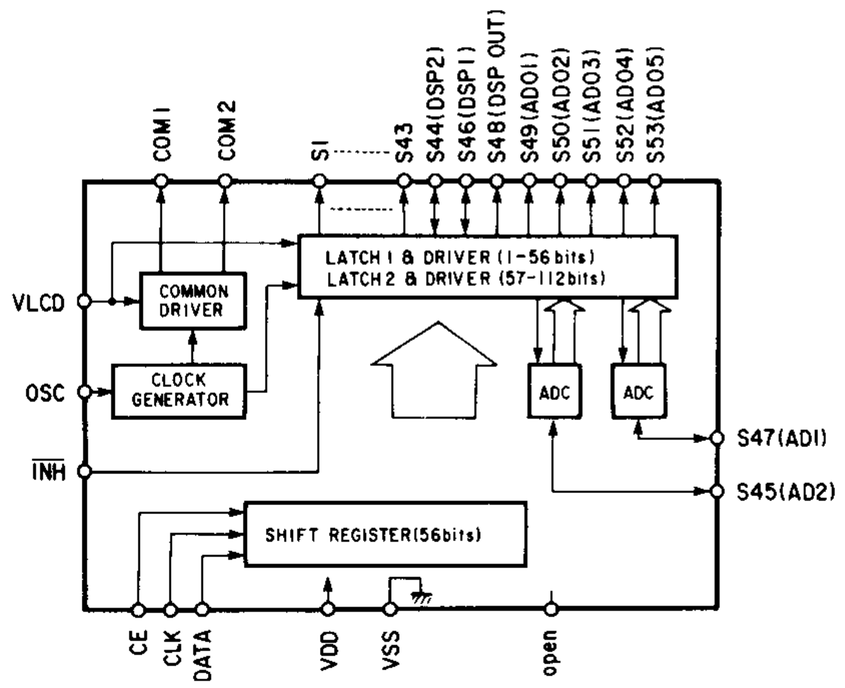


IC103: LM7001

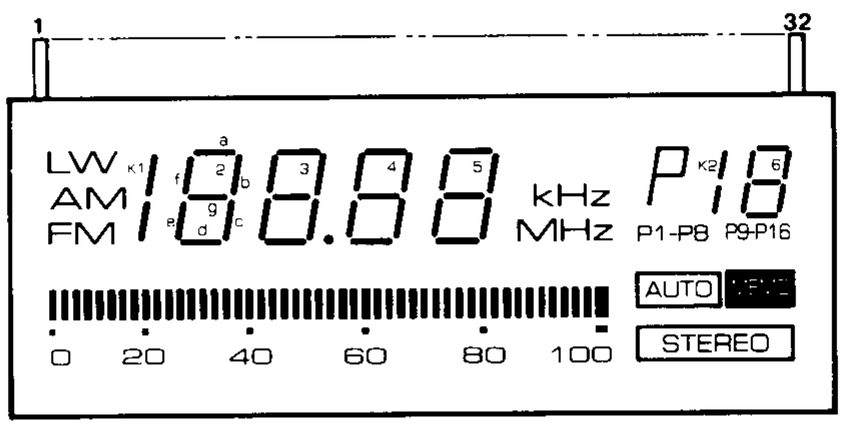


IC301: LC7580



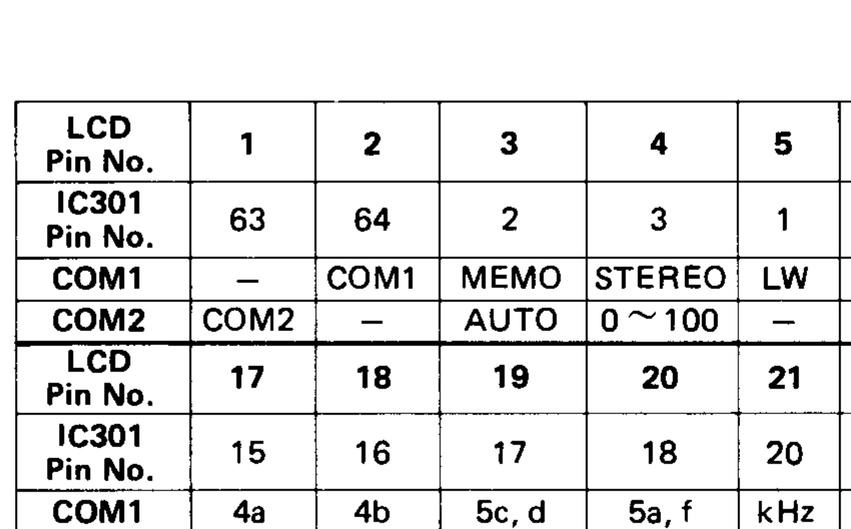


LCD9422P

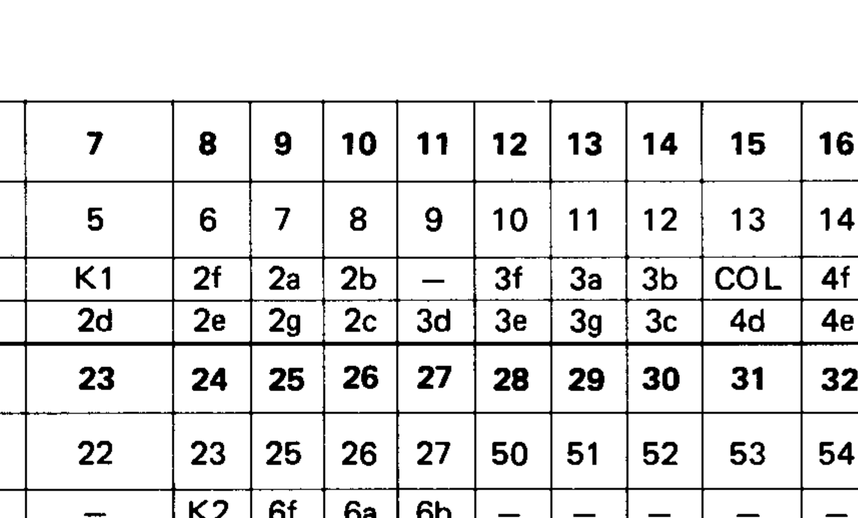


LCD Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC301 Pin No.	63	64	2	3	1	4	5	6	7	8	9	10	11	12	13	14
COM1	–	COM1	MEMO	STEREO	LW	AM	K1	2f	2a	2b	–	3f	3a	3b	COL	4f
COM2	COM2	–	AUTO	0～100	–	FM	2d	2e	2g	2c	3d	3e	3g	3c	4d	4e
LCD Pin No.	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**
IC301 Pin No.	15	16	17	18	20	21	22	23	25	26	27	50	51	52	53	54
COM1	4a	4b	5c, d	5a, f	kHz	P	–	K2	6f	6a	6b	–	–	–	–	–
COM2	4g	4c	5b, e	5g	MHz	P1-P8	P9-P16	6d	6e	6g	6c	M1	M2	M3	M4	M5

SEGMENT

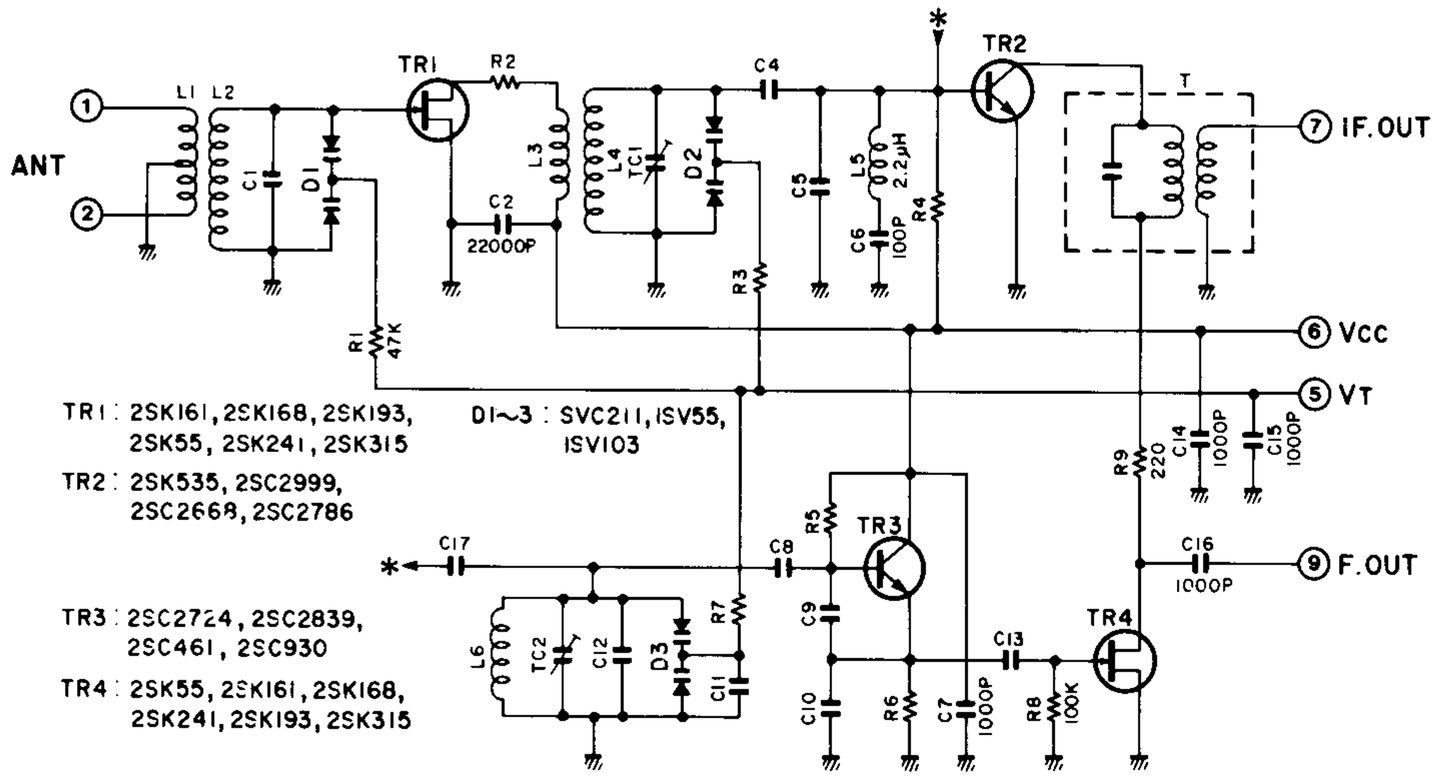


COMMON



• FRONT END PACK (PK101)

R, U, C, A, B models (PA00081)



TR1 : 2SK161, 2SK168, 2SK193, 2SK55, 2SK241, 2SK315

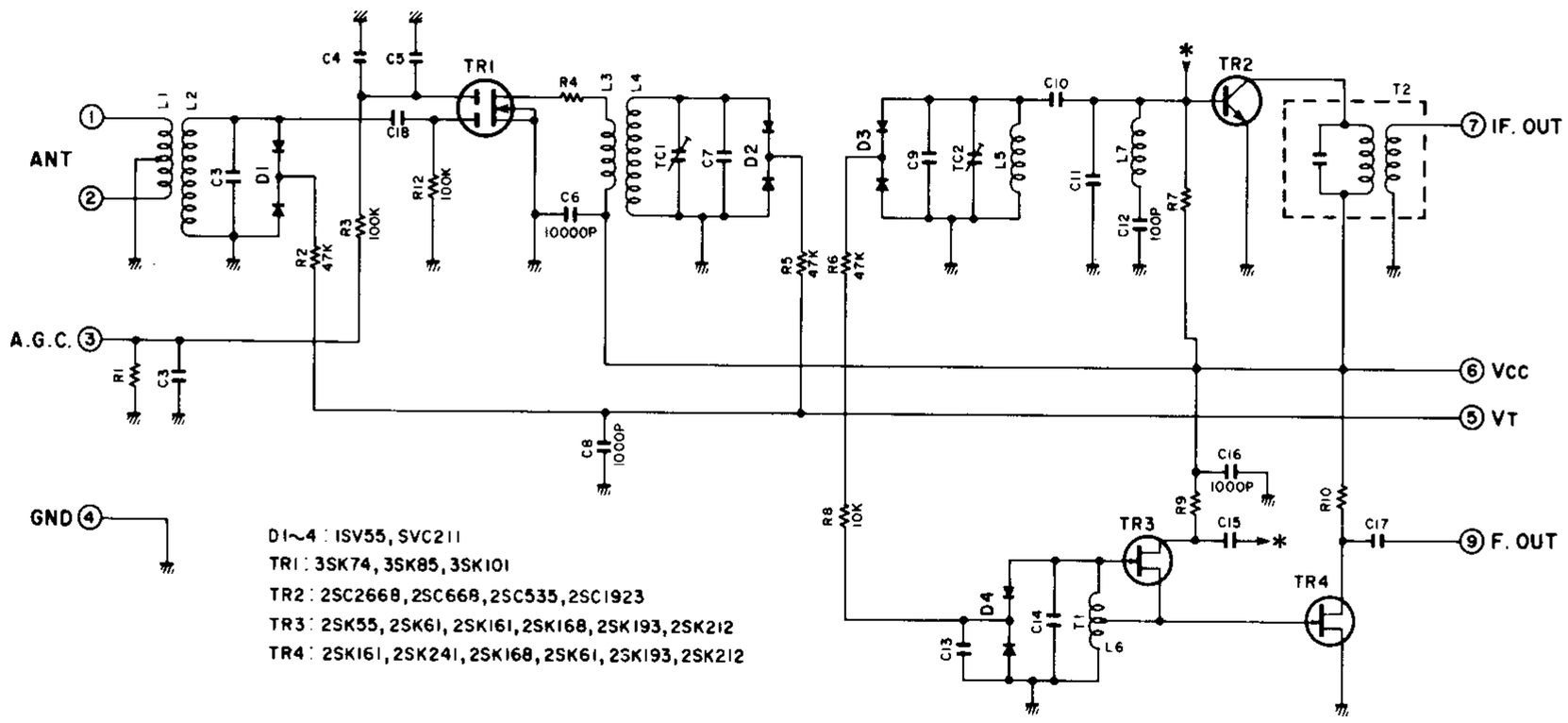
TR2 : 2SK535, 2SC2999, 2SC2668, 2SC2786

TR3 : 2SC2724, 2SC2839, 2SC461, 2SC930

TR4 : 2SK55, 2SK161, 2SK168, 2SK241, 2SK193, 2SK315

D1~3 : SVC211, ISV55, ISV103

G model (VA76190)



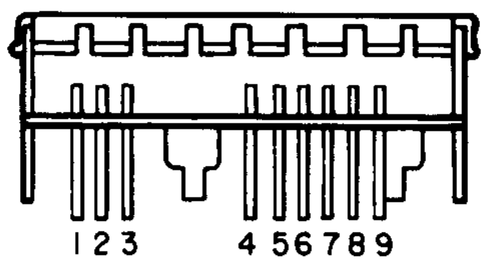
D1~4 : ISV55, SVC211

TR1 : 3SK74, 3SK85, 3SK101

TR2 : 2SC2668, 2SC668, 2SC535, 2SC1923

TR3 : 2SK55, 2SK61, 2SK161, 2SK168, 2SK193, 2SK212

TR4 : 2SK161, 2SK241, 2SK168, 2SK61, 2SK193, 2SK212



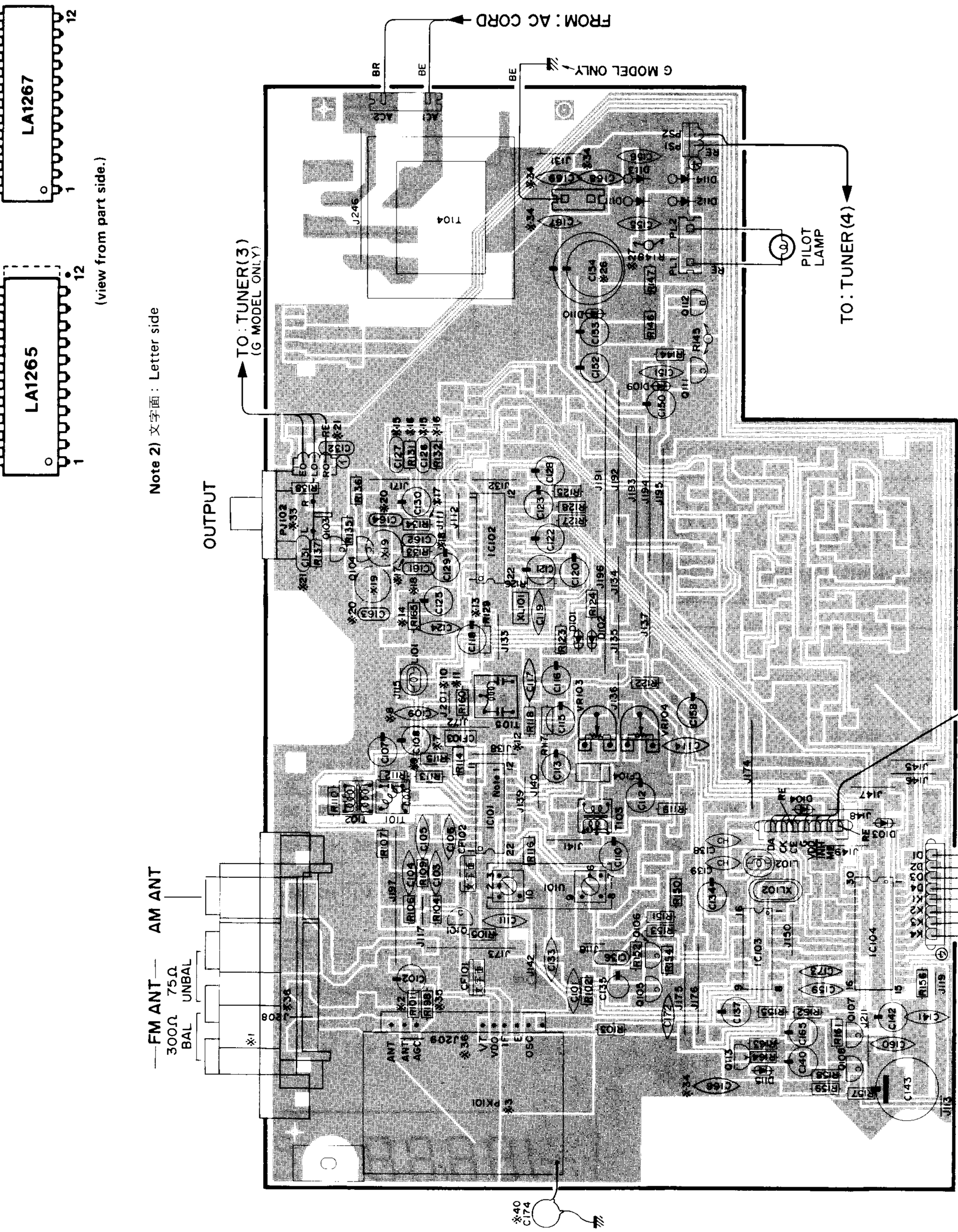
Pin No.	Name
1	ANT.
2	ANT.
3	A.G.C.
4	GND
5	VT (1.5 ~ 3V)
6	Vcc (12V)
7	IF OUT
8	GND
9	F OUT

■ PRINTED CIRCUIT BOARD (Pattern side)

Tuner Circuit Board (1) (U, C, R models)

Note 1) LA1265 or LA1267 is usable for IC101. When replacing it, use case for pin positions arranged as follows.

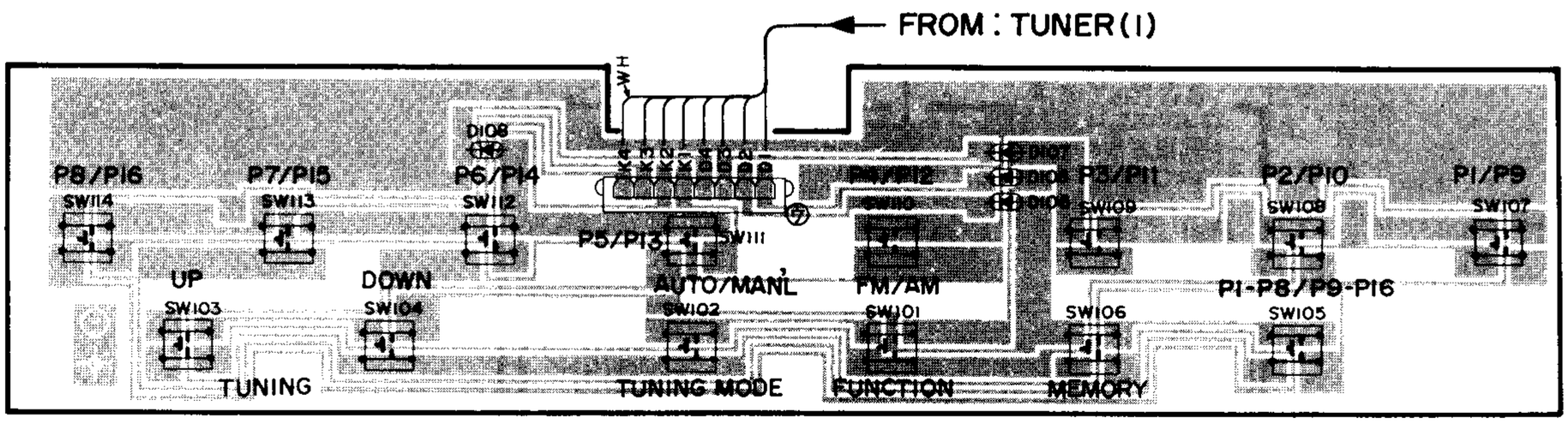
Tuner Circuit Board (1) (A, B, G models)



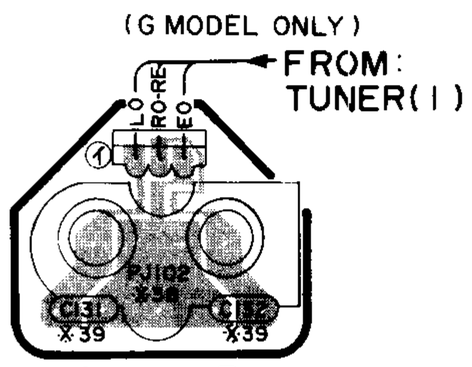
Note) * marked

		R	U, C	A, B	G
1	Antenna Terminal	VA84590	VA84590	VA84590	LA00580
2	R101	OPEN	OPEN	OPEN	470k
3	PK101	PA00081	PA00081	PA00081	VA76190
7	C108	1/50	3.3/50	1/50	1/50
8	C109	100P	100P	100P	OPEN
9	R115	47k	18k	47k	47k
10	J201	SHORT	SHORT	SHORT	OPEN
11	R160	OPEN	OPEN	OPEN	4.7k
12	T105	OPEN	OPEN	OPEN	GE20053
13	R129	10k	10k	10k	22k
14	R165	33k	33k	33k	18k
15	C126, 127	1200P	1200P	Ⓟ750P/100	Ⓟ390P/100
16	R131, 132	6.3k	6.2k	6.2k	120k
17	R133, 134	2.2k	2.2k	2.2k	3.3k
18	C161, 162	OPEN	OPEN	OPEN	2700P
19	L103, 104	Jamper	Jamper	Jamper	GE90185
20	C163, 164	OPEN	OPEN	OPEN	1000P
21	C131, 132	1500P	1500P	1500P	OPEN
22	J221	OPEN	SHORT	OPEN	OPEN
23	J211	OPEN	OPEN	SHORT	SHORT
24	J231	SHORT	OPEN	OPEN	OPEN
25	SW118	VA94530	OPEN	OPEN	OPEN
26	C154	1000/25	1000/16	1000/25	1000/16
27	R148	22	10	27	15
28	T104	GA69320	GA69310	GA69320	GA69320
29	R149	OPEN	1/2P 2.2M	OPEN	OPEN
30	SW119	LA00581	OPEN	OPEN	OPEN
31	J246	OPEN	SHORT	SHORT	SHORT
32	J241	SHORT	OPEN	OPEN	OPEN
33	PJ102	LB20227	LB20227	LB20227	OPEN
34	C166 ~ 169,172,173	OPEN	OPEN	OPEN	0.01
35	R198	OPEN	OPEN	OPEN	47k
36	J208, 209	OPEN	OPEN	OPEN	SHORT
38	PJ102	OPEN	OPEN	OPEN	VB29900
39	C131, 132	OPEN	OPEN	OPEN	3900P
40	C174	OPEN	OPEN	OPEN	0.01

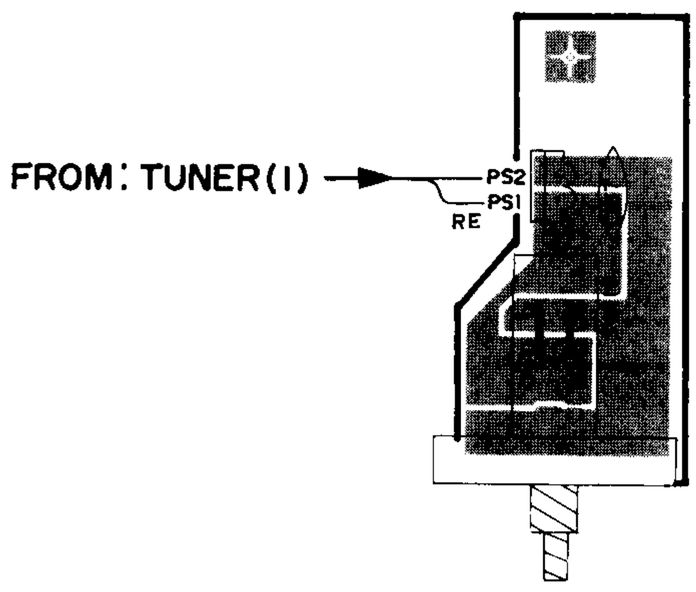
Tuner Circuit Board (2)



Tuner Circuit Board (3)

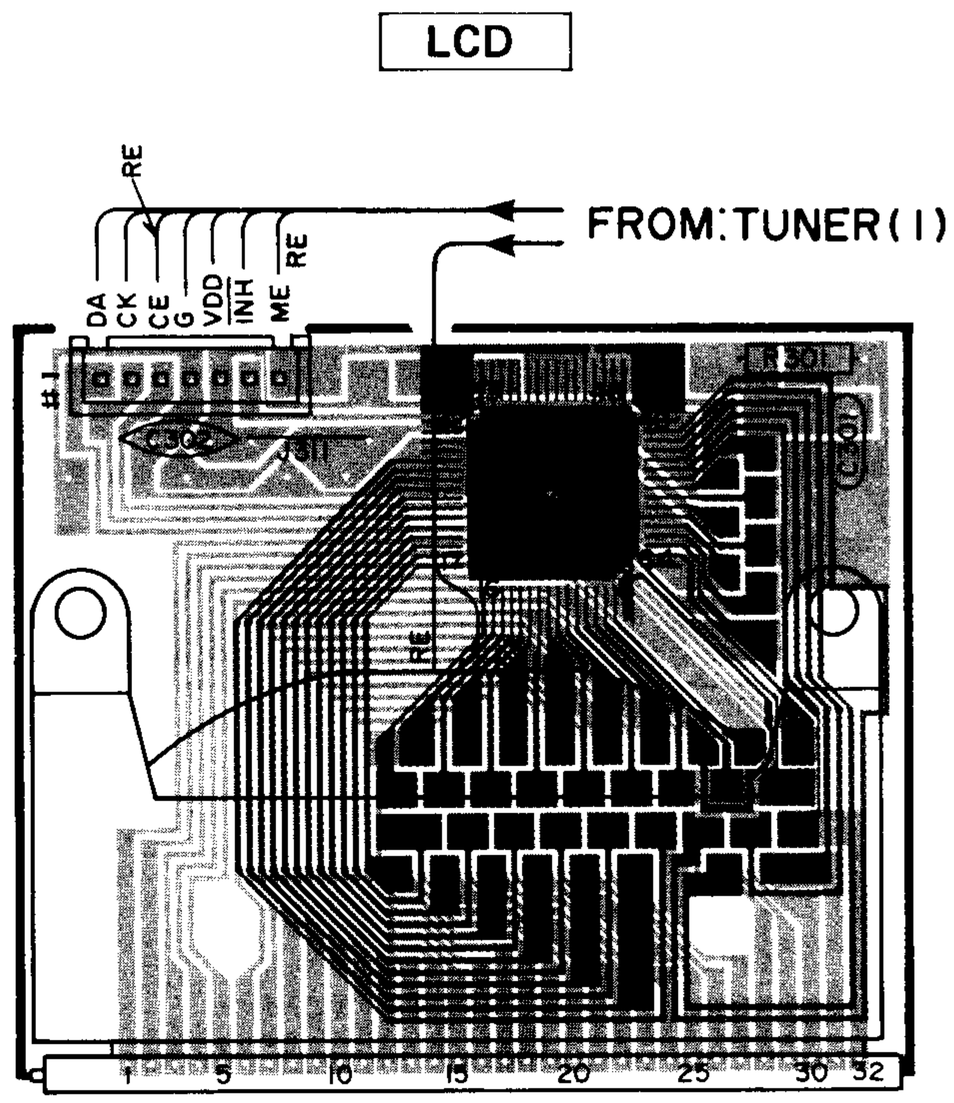


Tuner Circuit Board (4)



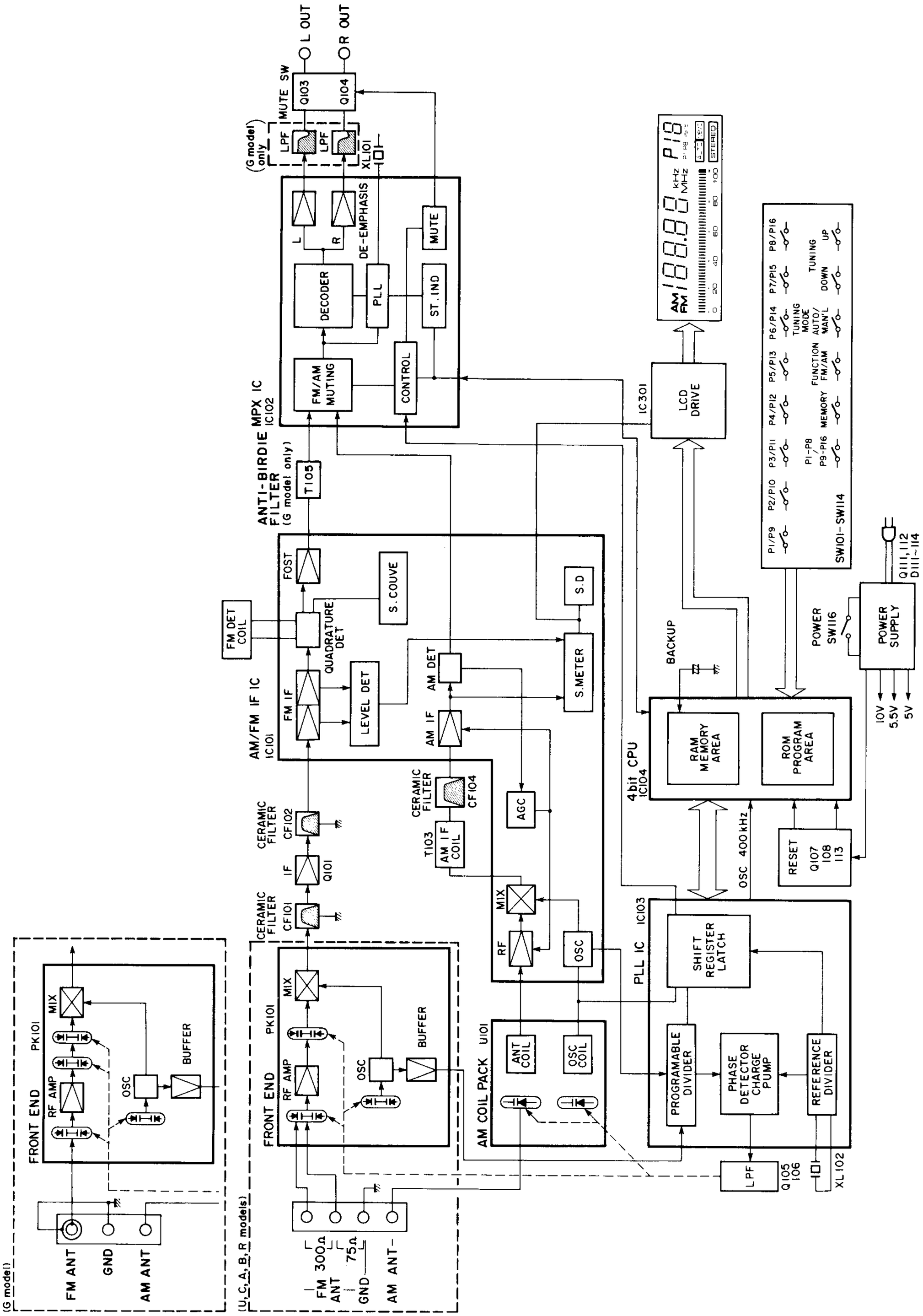
T-420

■ PRINTED CIRCUIT BOARD(Pattern side)



■ WIRING

■ BLOCK DIAGRAM



■ SCHEMATIC DIAGRAM

E F G H

TUNER (1)

•This schemat
As the follo
so refer to

G model

TUNER (3)
(G model only)
*33
PJ102
LO
EO
RO
C131 *21
C132 *21

U,C,A,B,R models
*33 PJ102

ADJ.

SIGNAL LEVEL ADJ. (FM)

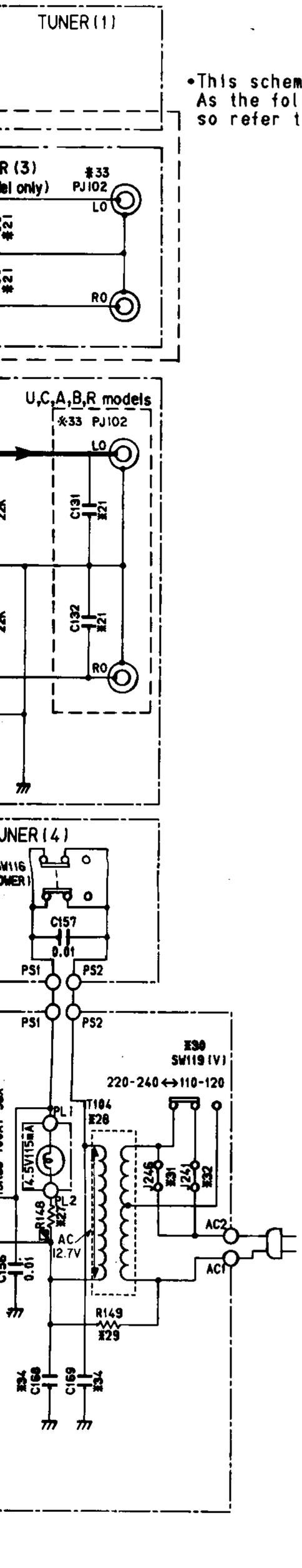
SIGNAL LEVEL ADJ. (AM)

TUNER (4)
SW116 (POWER)
PS1 PS2

*30
SW119 (V)
220-240↔110-120

TUNER (2)

10KHz.100KHz
9KHz.50KHz
SW118 (F) *25

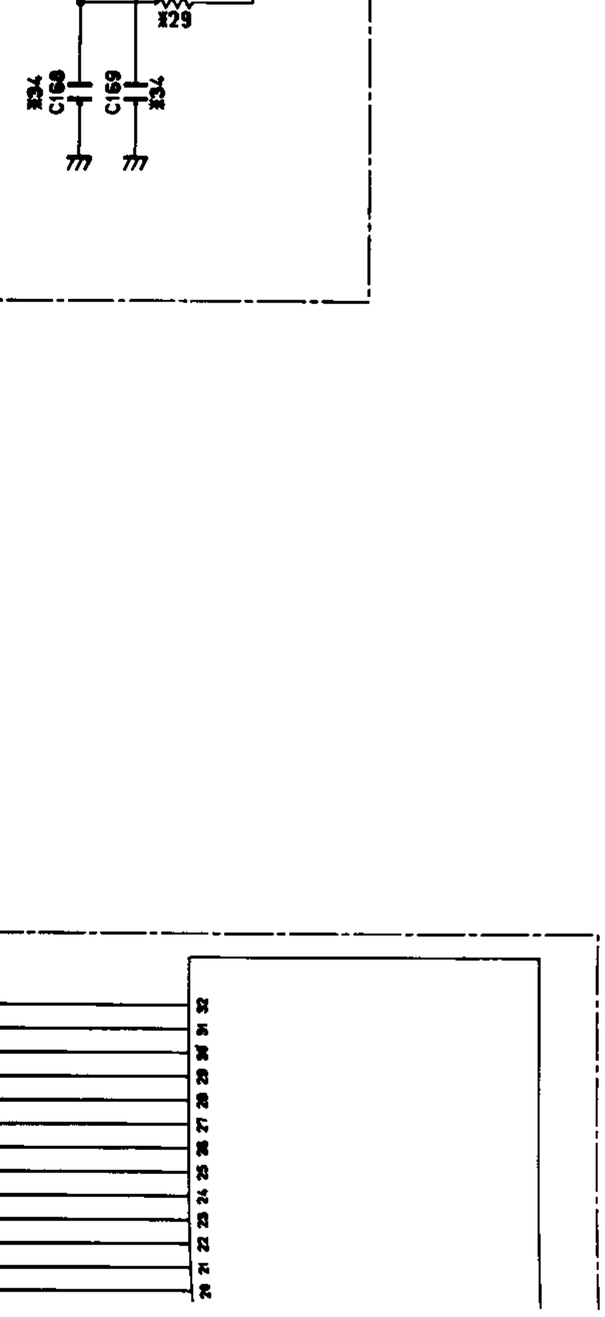


•This schematic diagram is for U.S.A and Canadian models. As the following parts and values differ from each model, so refer to the corresponding column.

•NOTICE
(U) ..... U.S.A model
(C) ..... Canadian model
(A) ..... Australian model
(G) ..... European model
(B) ..... British model
(R) ..... Other model

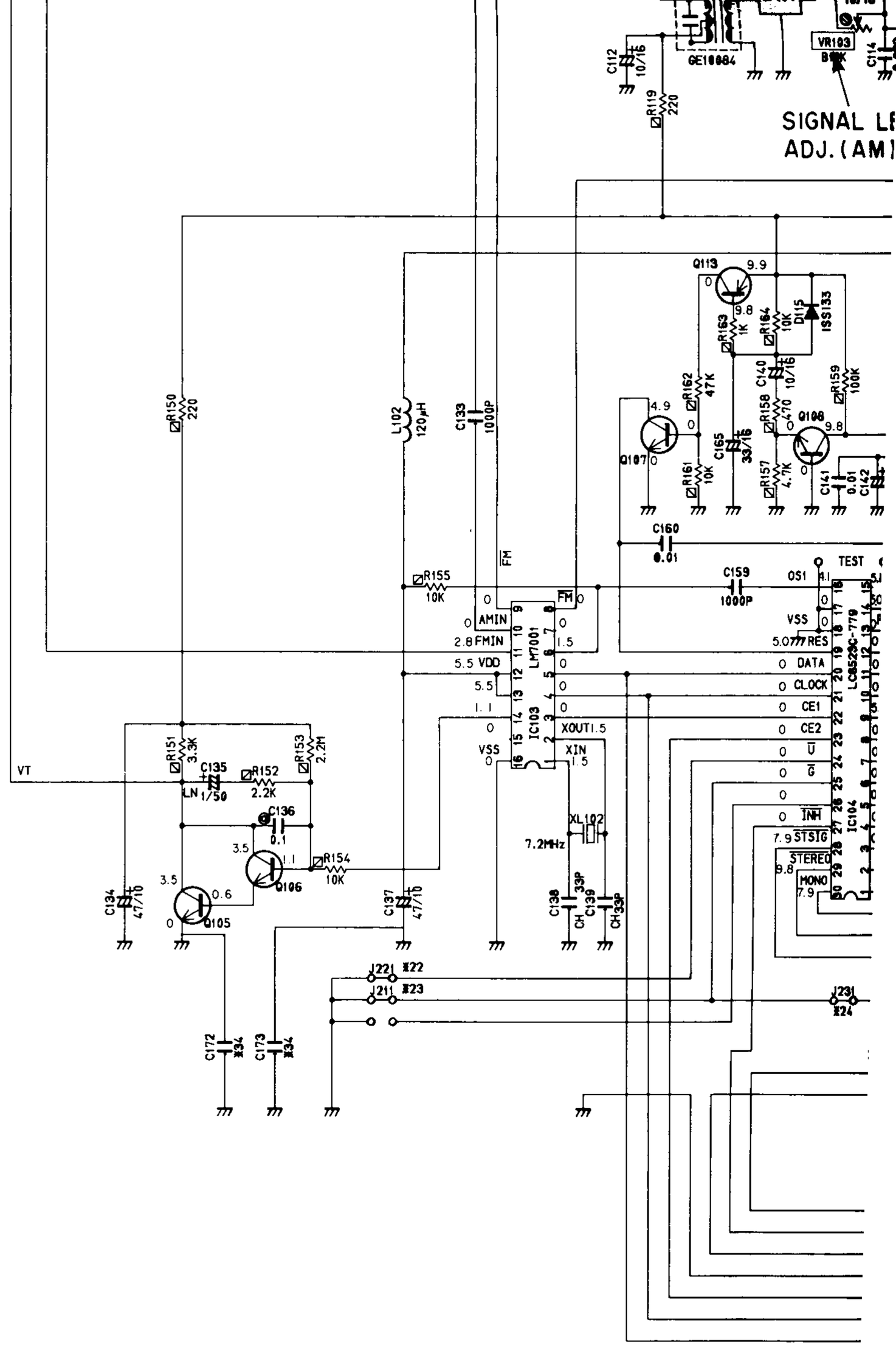
Note) * marked

		R	U, C	A, B	G
*1		VA64590	→	→	LB00580
*2	R101	OPEN	→	→	470K
*3	PK101	PA00081	→	→	VA76190
*4					
*5					
*6					
*7	C108	1/50	3.3/50	1/50	→
*8	C109	100P	→	→	OPEN
*9	R115	47K	18K	47K	→
*10	J201	SHORT	→	→	OPEN
*11	R160	OPEN	→	→	4.7K
*12	T105	OPEN	→	→	GE20053
*13	R129	10K	→	→	22K
*14	R165	33K	→	→	18K
*15	C126.127	●1200P	→	Ⓟ750P/100	Ⓟ 390P/100
*16	R131.132	62K	→	→	120K
*17	R133.134	2.2K	→	→	3.3K
*18	C161.162	OPEN	→	→	●2700P
*19	L103.104	SHORT	→	→	GE90185
*20	C163.164	OPEN	→	→	●1000P
*21	C131.132	●1500P	→	→	●3900P
*22	J221	OPEN	SHORT	OPEN	→
*23	J211	OPEN	→	SHORT	→
*24	J231	SHORT	OPEN	→	→
*25	SW118	VA94530	OPEN	→	→
*26	C154	1000/25	1000/16	1000/25	1000/16
*27	R148	◪ 22	◪ 10	◪ 27	◪ 15
*28	T104	GA6932	GA6931	GA6932	→
*29	R149	OPEN	1/2P2.2M	OPEN	→
*30	SW119	LA00581	OPEN	→	→
*31	J246	OPEN	SHORT	→	→
*32	J241	SHORT	OPEN	→	→
*33	PJ102	LB20227	→	→	VB29900
*34	C166~169 C172.173	OPEN	→	→	0.01
*35	R198	OPEN	→	→	47K
*36	J208~210	OPEN	→	→	SHORT
*40	C174	OPEN	→	→	0.01



RESISTOR

REMARKS	PARTS NAME
NO MARK	CARBON FILM RESISTOR
◪	CARBON FILM RESISTOR (1/6W)
△	METAL OXIDE FILM RESISTOR
▲	METAL FILM RESISTOR
⊠	METAL PLATE RESISTOR
◪	FIRE PROOF CARBON FILM RESISTOR
□	SEMENT MOLDED RESISTOR
⊘	SEMI VARIABLE RESISTOR



(A,B,G m

PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICS.

2SA1115 (E, F) 2SA1310 (R, S, T) 2SC1815 (Y) 2SC2603 (E, F) 2SC3312 (R, S, T) 2SC2060 2SC535 (A, B, C) 2SC1923 (R, O, Y) 2SD400 	1SS133 MTZ6.2C MTZ11A 1SR35-100AT 	LM7001 	LA1265 LA3401 	LC6523C-779

SIGNAL LEVEL
ADJ. (AM)

VR104 B50K

VR103 B10K

CF104

C113 10/16

C114 0.022

R122 10K

FM

R125 47K

+10V

+5.5V

2SC1815(Y) Q111

2SD400 or 2SC2060 Q112

R145 120

C167 ※34

+13.5V

1SS133 D104

C150 10/16

C151 0.01

R144 2.2K

C152 10/16

D109 MTZ6.2C

C153 100/16

R146 330

R147 470

D110 MTZ11A

C154 ※26

C155 0.01

D111

D112 1SR35-100AT-93X

D113 1SR35-100AT-93X

D114 1SR35-100AT-93X

C156 0.01

PS1 PS2

C157 0.01

PS1 PS2

※30 SW119(V) 220-240↔110-120

T104 ※28

PL1 4.5V/115mA

PL2

R148 ※27

AC 12.7V

AC2

AC1

J246 ※31

J241 ※32

R149 ※29

※34 C168

C169 ※34

1SS133 D103

C140 10/16

R159 100K

R158 470

R157 4.7K

Q108

C141 0.01

C142 10/16

C143

47000/5.5

C158 3.3/50

C159 1000P

TEST

OSI

VSS

RES

DATA

CLOCK

CE1

CE2

U

G

INH

STSIG

STEREO

MONO

BU

MUTE

R156 PD 47K

IC104 LC6523C-779

J231 ※24

10KHz.100KHz

SW118(F) ※25

9KHz.50KHz

+5V

FM/AM AUTO/MAN'L UP DOWN P1-P8/P9-P16 MEMORY P1/P9 P2/P10 P3/P11 P4/P12 P5/P13 P6/P14 P7/P15 P8/P16

K4 K3 K2 K1 D4 D3 D2 D1

D105 D106 D107 D108 1SS133

SW101 SW102 SW103 SW104 SW105 SW106 SW107 SW108 SW109 SW110 SW111 SW112 SW113 SW114

TUNER(2)

C301 680P/100

R301 47K

C302 0.01

ME INH VDD G CE CK DA

IC301 LC7580

LCD9422P

(A,B,G models)

(U,C,R models)

R166 4.7K R167 4.7K

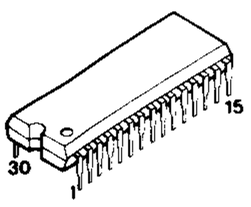
R168 100K

R169 100K

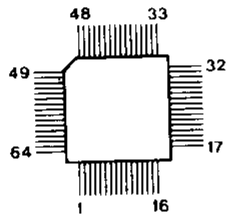
RM0 RM1

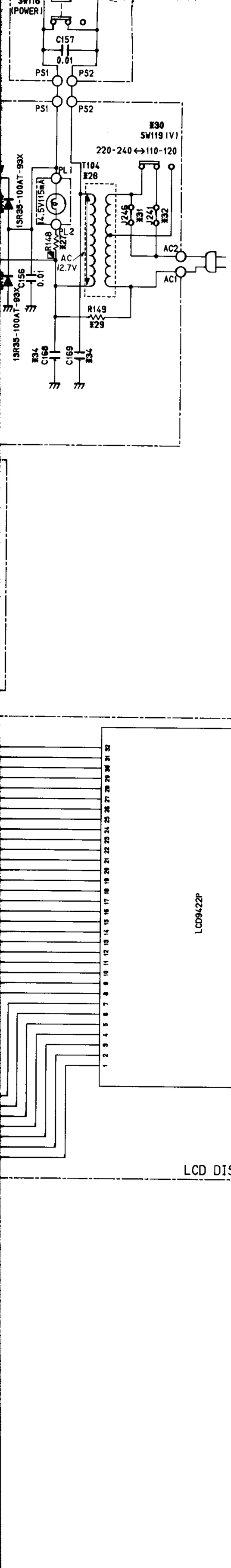
LCD

LC6523C-779



LC7580





※24	J231	SHORT	OPEN	→	→
※25	SW118	VA94530	OPEN	→	→
※26	C154	1000/25	1000/16	1000/25	1000/16
※27	R148	◪ 22	◪ 10	◪ 27	◪ 15
※28	T104	GA6932	GA6931	GA6932	→
※29	R149	OPEN	1/2P2.2M	OPEN	→
※30	SW119	LA00581	OPEN	→	→
※31	J246	OPEN	SHORT	→	→
※32	J241	SHORT	OPEN	→	→
※33	PJ102	LB20227	→	→	VB29900
※34	C166~169 C172.173	OPEN	→	→	0.01
※35	R198	OPEN	→	→	47K
※36	J208~210	OPEN	→	→	SHORT
※40	C174	OPEN	→	→	0.01

RESISTOR

REMARKS	PARTS NAME
NO MARK	CARBON FILM RESISTOR
◪	CARBON FILM RESISTOR (1/6W)
△	METAL OXIDE FILM RESISTOR
▲	METAL FILM RESISTOR
⊠	METAL PLATE RESISTOR
◪	FIRE PROOF CARBON FILM RESISTOR
□	SEMENT MOLDED RESISTOR
⊘	SEMI VARIABLE RESISTOR

CAPACITOR

REMARKS	PARTS NAME	
NO MARK	ELECTROLYTIC CAPACITOR	⧺
NO MARK	CERAMIC CAPACITOR	⊣⊢
◎	POLYESTEL FILM CAPACITOR	
○	POLYSTYRENE FILM CAPACITOR	
◐	MICA CAPACITOR	
Ⓟ	POLYPROPYLENE FILM CAPACITOR	
●	SEMICONDUCTIVE CERAMIC CAPACITOR	

UNLESS OTHERWISE SPECIFIED :

PNP TRANSISTORS ARE 2SA1115(E.F) or 2SA1310(R.S.T)
NPN TRANSISTORS ARE 2SC2603(E.F) or 2SC3312(R.S.T)

- *All voltages measured with a 10MΩ/DC electric volt meter.*
- *Components having special characteristics are marked ⚠ and must be replaced with parts having specifications equal to those originally installed.*

PARTS LIST

■WARNING
Components having special characteristics are marked ⚠ and must be replaced with parts having specifications equal to those originally installed.

■ELECTRICAL PARTS

	Ref. No.	Part No.	Description		部品名	Remarks	Common Model	Markets	ランク	
※		***NA 08 97 30***	***Tuner Circuit Board***		チューナーシート		T-30	R		
※		***NA 08 97 40***	〃		〃		T-30	U,C		
※		***NA 08 98 10***	〃		〃		T-28	A,B		
※		***NA 08 98 20***	〃		〃		T-28	G		
		FG 21 13 30	Ceramic Cap.	33pF 50V	セラコン	C138,139				
		FG 21 21 00	〃	100pF 50V	〃	C109		R,U,A,C,B		
		FG 21 24 70	〃	470pF 50V	〃	C124				
		FG 21 31 00	〃	1000pF 50V	〃	C133,159				
		FG 24 41 00	〃	0.01μF 50V	〃	C103～106,111,141,151,155～157,160				
		FG 24 41 00	〃	0.01μF 50V	〃	C166～169,172～174		G		
		FG 24 42 20	〃	0.022μF 50V	〃	C101,114				
		FG 24 44 70	〃	0.047μF 50V	〃	C117,119				
		FZ 00 64 00	Electrolytic Cap.	47000μF 5.5V	スーパーキャパシタ	C143				
		UT 45 23 90	Polypropylene Film Cap.	390pF 100V	ポリプロコン	C126,127		G		
		UT 45 27 50	〃	750pF 50V	〃	〃		A,B		
		FA 15 31 20	Mylar Cap.	1200pF 50V	マイラーコン	〃		R,U,C		
		FA 15 31 00	〃	1000pF 50V	〃	C163,164		G		
		FA 15 31 50	〃	1500pF 50V	〃	C131,132		R,U,C,A,B		
		FA 15 33 90	〃	3900pF 50V	〃	〃		G		
		FA 15 32 70	〃	2700pF 50V	〃	C161,162		G		
		FA 15 51 00	〃	0.1μF 50V	〃	C136				
		Ui 22 74 70	Electrolytic Cap.	47μF 10V	ケミコン	C134,137				
		Ui 23 71 00	〃	10μF 16V	〃	C102,107,110,112,113,125,128,140,142,150,152				
		UJ 13 73 30	〃	33μF 16V	〃	C165				
		UJ 13 81 00	〃	100μF 16V	〃	C153				
		Ui 24 64 70	〃	4.7μF 25V	〃	C115				
		Ui 26 54 70	〃	0.47μF 50V	〃	C121				
		Ui 36 61 00	〃	1μF 50V	〃	C120,122,123,129,130				
		UJ 46 63 30	〃	3.3μF 50V	〃	C108		U,C		
		Ui 36 61 00	〃	1μF 50V	〃	〃		R,A,G,B		
		UJ 46 63 30	〃	3.3μF 50V	〃	C116,118,158				
		FZ 00 47 20	〃	1000μF 16V	〃	C154		U,G,C		
		UW 94 91 00	〃	1000μF 25V	〃	〃		R,A,B		
		UL 46 61 00	〃	1μF 50V	〃	C135				
※		GA 69 31 00	Power Transformer		電源トランス	T104		U,C		⚠
※		GA 69 32 00	〃		〃	〃		R,A,G,B		⚠
※		GE 10 08 40	AM IFT Coil	450KHz	AM IFTコイル	T103				
※		VB 41 92 00	FM DET Coil	QU-7	FM検波コイル	T101				
※		VB 41 93 00	〃	QU-7	〃	T102				
		GE 20 05 30	Anti-birdie Filter	114KHz	アンチバーディーフィルター	T105		G		
		GE 90 18 50	Inductor	39mH	固定インダクター	L103,104		G		
※		GE 90 19 80	RF Inductor	120μH	RFインダクター	L101,102				
		GG 00 05 50	AM Ceramic Filter	BFU450C4N	AMセラミックフィルター	CF103				
		GG 00 06 60	〃	SFU450B9	〃	CF104				
		GG 00 05 60	FM Ceramic Filter	SFE10.7MS3GHY-A	FMセラミックフィルター	CF101,102				
※		GG 00 07 50	Ceramic Resonator	CSB456F11	セラミック振動子	XL101				
		QU 00 38 00	Quartz Crystal Unit	7.2MHz	水晶振動子	XL102				
		HG 30 92 20	Carbon Resistor	2.2MΩ 1/2P	カーボン抵抗	R149		U,C		

※New Parts（新規部品）

	Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets	ランク
		HV 45 41 00	Flame Proof Carbon Resistor 10Ω 1/4W	不燃化カーボン抵抗	R148		U,C	
		HV 45 41 50	〃 15Ω 1/4W	〃	〃		G	
		HV 45 42 20	〃 22Ω 1/4W	〃	〃		R	
		HV 45 42 70	〃 27Ω 1/4W	〃	〃		A,B	
		HV 45 51 20	〃 120Ω 1/4W	〃	R145			
		HT 37 03 90	Pre-Set Potentiometer B20kΩ	半 固 定 抵 抗	VR103			
		HT 37 04 10	〃 B50kΩ	〃	VR104			
		iA 11 15 10	Transistor 2SA1115 (E,F)	トランジスタ	Q113 } Inter-changeable			
		iX 60 31 70	〃 2SA1310 (R,S,T)	〃	〃 }			
		iC 18 15 20	〃 2SC1815 (Y)	〃	Q111			
		iC 26 03 10	〃 2SC2603 (E,F)	〃	Q103～108 } Inter-changeable			
		iX 60 31 80	〃 2SC3312 (R,S,T)	〃	〃 }			
		iC 20 60 00	〃 2SC2060	〃	Q112 } Inter-changeable			
		iD 04 00 10	〃 2SD400	〃	〃 }			
		iC 05 35 40	〃 2SC535 (A,B,C)	〃	Q101			
		iF 00 34 50	Diode 1SS133	ダイオード	D101～108,115			
		iF 00 84 80	〃 ISR35-100AT	〃	D111～114			
		iF 00 88 20	Zener Diode MTZ11A	ツェナーダイオード	D110			
		iF 01 07 50	〃 MTZ6.2C	〃	D109			
※		iG 15 80 00	IC LC6523C-779	IC	IC104			
※		iG 15 81 00	〃 LA3401	〃	IC102			
※		iG 15 82 00	〃 LA1265	〃	IC101			
※		iG 15 84 00	〃 LM7001	〃	IC103			
※		VA 94 53 00	Slide Switch	スライドスイッチ	SW118		R	
		KA 80 36 90	Push Switch	プッシュスイッチ	SW116			
		KA 90 63 80	Switch 5M EVQ-QRB-04M	ライトタッチスイッチ	SW101～114			
※		LA 00 58 10	Voltage Selector	電圧切換器	SW119		R	
※		VB 29 90 00	Pin Jack 2P	ピンジャック	PJ102		G	
		LB 20 22 70	〃 2P	〃	〃		R,U,A,C,B	
※		NA 08 85 60	AM Coil Pack	AM電子同調コイルパック	U101			
		PA 00 08 10	Front End Pack FE343U	フロントエンドパック	PK101		R,U,A,C,B	
※		VA 76 19 00	〃 TFFC2U100X	〃	〃		G	
		LA 00 20 00	Lapping Terminal P=7.5 2P i-Type	i型ラッピング端子板				
		LA 00 38 70	〃 P=10 2P WTM-Type	WTM型ラッピング端子板				
※		VA 84 59 00	Antenna Terminal 4P	アンテナ端子台			R,U,A,C,B	
※		LA 00 58 00	〃	アンテナ端子			G	
※		LB 50 07 10	Socket 5P Remote Signal	STコネクタソケット			R,U,C	
※		VA 72 58 00	Holder Cable 8P	パラレルケーブルホルダー				
		BB 06 83 70	Ground Metal	アース金具				
		BB 06 62 90	Ground Washer	アースワッシャー			G	

⚠

※New Parts（新規部品）

	Ref. No.	Part No.	Description	部品名	Remarks	Common Model	Markets	ランク
※		***NA 09 00 70***	***LCD Circuit Board***	LCD表示シート		T-30		
		FG 24 41 00	Ceramic Cap.	0.01μF 50V	セラコン	C302		
		UT 45 26 80	Polypropylene Film Cap.	680pF 100V	ポリプロコン	C301		
		HJ 35 74 70	Carbon Resistor	47kΩ 1/4W	カーボン抵抗	R301		
		iG 15 79 00	IC	LC7580	IC	IC301		
		JN 10 00 90	Display Unit	LCD9422P	LCD表示器	Inter-changeable		
		JN 10 01 00	〃	〃	〃			
		VA 71 92 00	Reflector		リフレクター			
		VB 05 10 00	Sheet D		シート D			
		CB 60 56 20	Plastic Rivet		プラスチックリベット			
		LB 91 80 70	Base Pin	7P i-Type	i型XHベースピン			

※New Parts（新規部品）

■ EXPLODED VIEW

Note)
The buttons ⑤ and ⑥ are welded to the sub chassis. For the button replacement, heat the welded part by using a soldering iron to remove it and use the following screw as shown in the figure (where marked with ※) to install it.

(Part No.: EX600200
Cup Screw
2 x 6 FCM3-Bℓ)

■MECHANISM PARTS

	Ref. No.	Part No.	Description		部品名	Remarks	Common Model	Markets	ランク	
※	1	VA 77 15 00	Front Panel		フロントパネル	Black				
※	〃	VB 00 54 00	〃		〃	Silver				
	2	CB 63 51 10	Button	Power	ボタン	Black				
	〃	CB 63 51 00	〃	〃	〃	Silver				
	3	AA 61 78 80	Spring		バネ					
	4	NA 08 97 30	Tuner Circuit Board		チューナーシート		T-30	R		
	〃	NA 08 97 40	〃		〃		T-30	U,C		
	〃	NA 08 98 10	〃		〃		T-28	A,B		
	〃	NA 08 98 20	〃		〃		T-28	G		
	5	VA 71 89 00	Button	4P	ボタン	Black				
※	〃	VB 00 59 00	〃	4P	〃	Silver				
	6	VA 71 90 00	〃	2P	〃	Black				
※	〃	VB 00 60 00	〃	2P	〃	Silver				
	7	NA 09 00 70	LCD Circuit Board		LCD表示シート		T-30			
※	8	VA 73 96 00	Lamp	115mA 14.5V	ランプ					
	9	CB 62 01 90	Cord Stopper	CM-22B	コードストッパー			R,A,G,B		
	〃	CB 62 02 00	〃	CM-22C	〃			U,C		
	10	MG 00 16 30	Power Cord	6A 250V 2m	電源コード			R		⚠
	〃	MG 00 22 20	〃	10A 125V 1.98m	〃			U,C		⚠
	〃	MG 00 09 20	〃	7.5A 250V 2.5m	〃	Inter-changeable		A		⚠
	〃	MG 00 14 90	〃	7.5A 250V 2.5m	〃			A		⚠
※	〃	MG 00 23 10	〃	7.5A 250V 2m	〃			A		⚠
	〃	MG 00 09 60	〃	2.5A 250V 2m	〃	Inter-changeable		G		⚠
	〃	MG 00 16 20	〃	2.5A 250V 2m	〃			G		⚠
※	〃	MG 00 23 20	〃	2.5A 250V 2m	〃			G		⚠
	〃	MG 00 18 60	〃	2.5A 250V 2m	〃			B		⚠
	11	VB 27 31 00	Damper		ダンパー					
※	12	VA 95 98 00	Chassis		シャーシー					
※	13	VA 96 00 00	Rear Panel		リアパネル			R		
※	〃	VA 96 02 00	〃		〃			U,C		
※	〃	VA 96 03 00	〃		〃			G		
※	〃	VA 96 04 00	〃		〃			A,B		
※	14	VA 77 16 00	Top Cover		トップカバー	Black				
※	〃	VB 00 56 00	〃		〃	Silver				
	15	CB 63 07 50	Lamp Cap.		ランプキャップ		M-80			
	16	CB 61 03 90	Leg		トランレッグ					
	17	CB 60 74 70	Antenna Holder		アンテナホルダー		T-6a			
	18	VA 77 29 00	Support		基板サポート					
	19	ED 33 00 66	Binding Head Screw	3×6 FCRM3-Bl	バインド小ネジ	PACK				
	20	Ei 33 00 86	Binding Head Tapping Screw	3×8 FCRM3-Bl	バインドタッピングネジ	PACK				
	21	EV 43 00 36	Toothed Lock Washer	φ3 ZMC2-Y	歯付座金	PACK				
	22	ED 33 01 06	Binding Head Tapping Screw	3×10FCRM3-Bl	バインドタッピングネジ	PACK				
	23	EV 20 30 36	Flat Washer	φ3 FCRM3-Bl	平座金	PACK				
	24	EK 96 60 70	BW Head Tapping Screw	4×8 ZMC2-Bl	BWヘッドタッピングネジ	Black				
	〃	EK 13 50 20	〃	4×8 FNM3-3g	〃	Silver				
	25	Ei 23 01 26	Binding Head Tapping Screw	3×12 FCRM3-3g	バインドタッピングネジ	PACK		G		
	26	CB 60 56 20	Plastic Rivet		プラスチックリベット					
	27	CB 60 92 60	〃		〃			R		
	28	VB 27 29 00	Cushion A		クッション A					
	29	VB 27 30 00	〃 B		〃 B					
		CB 06 92 50	Binding Tie	BK-1	インシュロックタイ					

※New Parts（新規部品）

Ref. No.	Part No.	Description		部品名	Remarks	Common Model	Markets	ランク
		Accessories		付属品				
	Mi 06 44 00	FMQ-matching Antenna	FM	FMQマッチアンテナ				
	Mi 08 87 90	Pin Plug Cord	1m	出力コード				
	Mi 08 29 10	Loop Antenna	AM	ループアンテナ				
	LB 60 59 30	Matching Transformer	FM(300Ω→75Ω)	整合器			G,B	

※New Parts（新規部品）

T-420

YAMAHA