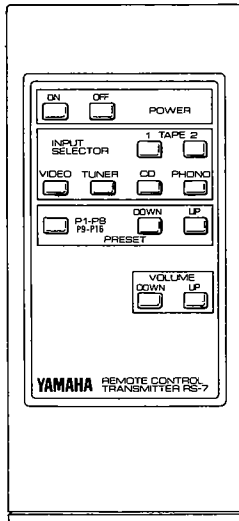
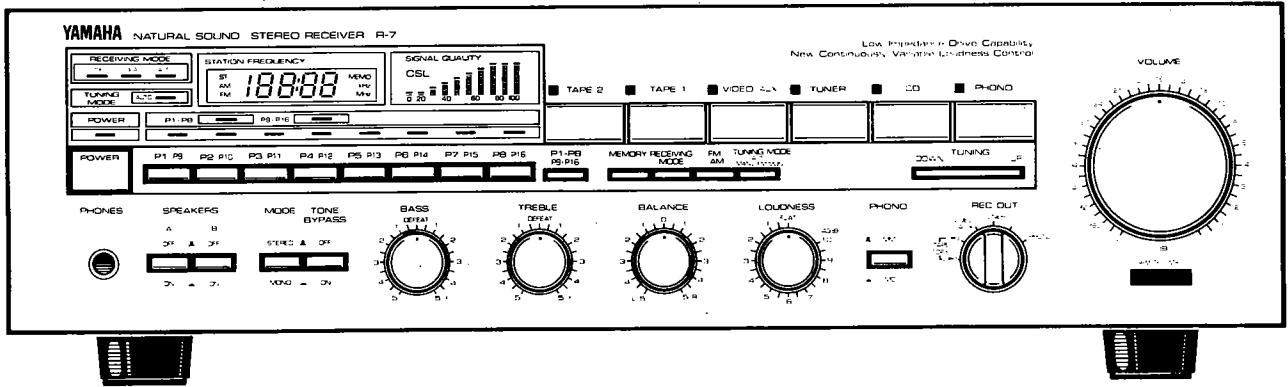


69

# STEREO RECEIVER R-7

## SERVICE MANUAL



### 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 inherent 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, 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 changes in specification 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.

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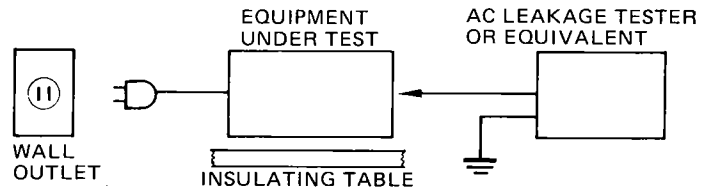
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R-7

## TO SERVICE PERSONNEL

- Critical Components Information.  
Components having special characteristics are marked  $\Delta$  and must be replaced with parts having specifications equal to those originally installed.
- 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 0.15 $\mu$ F
  - Leakage current must not exceed 0.5mA.
  - Be sure to test for leakage with the AC plug in both polarities.



## SPECIFICATIONS

### AUDIO SECTION

<b>Continuous Power Per Channel</b>	
20Hz ~ 20kHz, 0.015% THD, 8 $\Omega$	65W
20Hz ~ 20kHz, 0.03% THD, 6 $\Omega$	75W
1kHz, 0.01% THD, 8 $\Omega$	75W
(IEC Rated Power)	
<b>Dynamic Headroom</b>	
8 $\Omega$	1.8dB
<b>Dynamic Power</b>	
8 $\Omega$	101W
6 $\Omega$	118W
4 $\Omega$	144W
2 $\Omega$	170W
<b>Power Band Width</b>	
0.1% THD, 32.5W, 8 $\Omega$	10Hz ~ 50kHz
<b>Damping Factor</b>	
1kHz, 8 $\Omega$	more than 50
<b>Input Sensitivity/Impedance</b>	
Phono MC	160 $\mu$ V/220 $\Omega$
Phono MM	2.5mV/47k $\Omega$
CD/TAPE/VIDEO	150mV/47k $\Omega$
<b>Input Sensitivity (New IHF)</b>	
Phono MC	20 $\mu$ V
Phono MM	0.31mV
CD/TAPE/VIDEO	18.6mV
<b>Maximum-Input Signal</b>	
0.01% THD, Phono MC	8mV
0.01% THD, Phono MM	110mV
<b>Output Level/Impedance</b>	
REC OUT	150mV/470 $\Omega$
<b>Headphone Jack Rated Output Load/Impedance</b>	
0.015% THD	0.8V/8 $\Omega$
<b>Frequency Response</b>	
20Hz ~ 20kHz, CD/TAPE/VIDEO	$\pm$ 0.5dB
<b>RIAA Equalization Deviation</b>	
30Hz ~ 20kHz, Phono MC RIAA	$\pm$ 0.5dB
20Hz ~ 20kHz, Phono MM RIAA	$\pm$ 0.3dB
<b>Total Harmonic Distortion (20Hz ~ 20kHz)</b>	
Phono MC to Rec Out 3V	0.005%
Phono MM to Rec Out 3V	0.003%
CD/TAPE/VIDEO to SP out 30W/8 $\Omega$	0.015%
<b>Intermodulation Distortion</b>	
CD/TAPE/VIDEO Rated Output/8 $\Omega$	0.01%
<b>Signal to Noise Ratio</b>	
Phono MC (500 $\mu$ V, Input Shorted)	75dB
Phono MM (5mV, Input Shorted)	92dB
CD/TAPE/VIDEO (Input Shorted)	103dB
<b>Signal to Noise Ratio (New IHF)</b>	
Phono MC	75dB
Phono MM	76dB
CD/TAPE/VIDEO	82dB
<b>Residual Noise (IHF-A-Network)</b>	
	140 $\mu$ V
<b>Channel Separation</b>	
Phono MM, 1kHz (Input Shorted, Vol. -20dB)	60dB
CD/TAPE/VIDEO, 1kHz (5.1k $\Omega$ )	60dB
<b>Tone Control Characteristics</b>	
BASS boost/cut	$\pm$ 10dB (at 50Hz)
turnover frequency	350Hz
TREBLE boost/cut	$\pm$ 10dB (at 20kHz)
turnover frequency	3.5kHz
<b>Filter Characteristics</b>	
LOW (Subsonic, built-in)	10Hz, -12dB/oct
<b>Continuous Loudness Control (Level-related equalization)</b>	
Attenuation	40dB (at 1kHz)

### FM SECTION

<b>Tuning Range</b>	87.5MHz ~ 108.0MHz
<b>50dB Quieting Sensitivity (IHF)</b>	
Mono, 75 $\Omega$	1.55 $\mu$ V (15.1dBf)
Stereo, 75 $\Omega$	21 $\mu$ V (37.7dBf)
<b>Usable Sensitivity (IHF Mono)</b>	
1kHz, 100% MOD, 75 $\Omega$	0.8 $\mu$ V (9.3dBf)
<b>Image Response Ratio</b>	
	40dB
<b>IF Response Ratio</b>	
	90dB
<b>Spurious Response Ratio</b>	
	70dB
<b>AM Suppression Ratio</b>	
	55dB
<b>Capture Ratio</b>	
Local	1.2dB
DX	2.5dB
<b>Alternate Channel Selectivity</b>	
DX	85dB
<b>Signal to Noise Ratio</b>	
Mono	85dB
Stereo	81dB
<b>Harmonic Distortion</b>	
Mono 100Hz	0.05%
1kHz	0.05%
6kHz	0.1%
Stereo 100Hz	0.07%
1kHz	0.07%
6kHz	0.15%
<b>Stereo Separation</b>	
Local 50Hz	45dB
1kHz	50dB
10kHz	45dB
<b>Frequency Response</b>	
30Hz to 13kHz	$\pm$ 0.5dB
<b>Output Level/Impedance (Rec Out)</b>	
100% MOD, 1kHz	500mV/2.8k $\Omega$

### AM SECTION

<b>Tuning Range</b>	
510kHz ~ 1620kHz (U)(C)	
510kHz ~ 1620kHz or	
513kHz ~ 1620kHz (R)	
513kHz ~ 1620kHz (A)(B)	
<b>Usable Sensitivity</b>	
	250 $\mu$ V/m
<b>Selectivity</b>	
	24dB
<b>Signal to Noise Ratio</b>	
	50dB
<b>Image Response Ratio</b>	
	40dB
<b>Spurious Response Ratio</b>	
	50dB
<b>Harmonic Distortion (400Hz)</b>	
	0.3%
<b>Output Level/Impedance (Rec Out)</b>	
30% MOD, 400Hz	150mV/2.8k $\Omega$

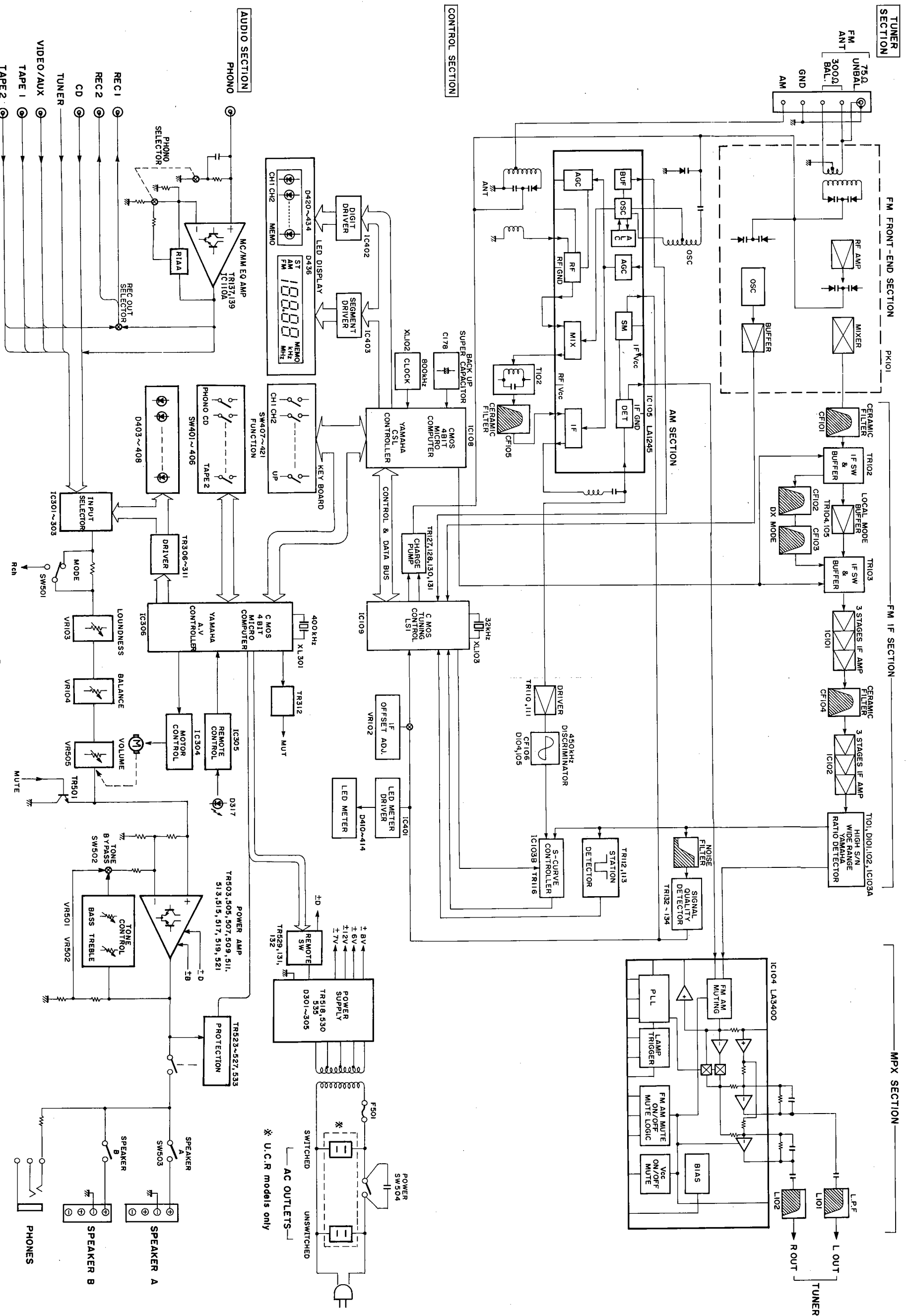
### GENERAL

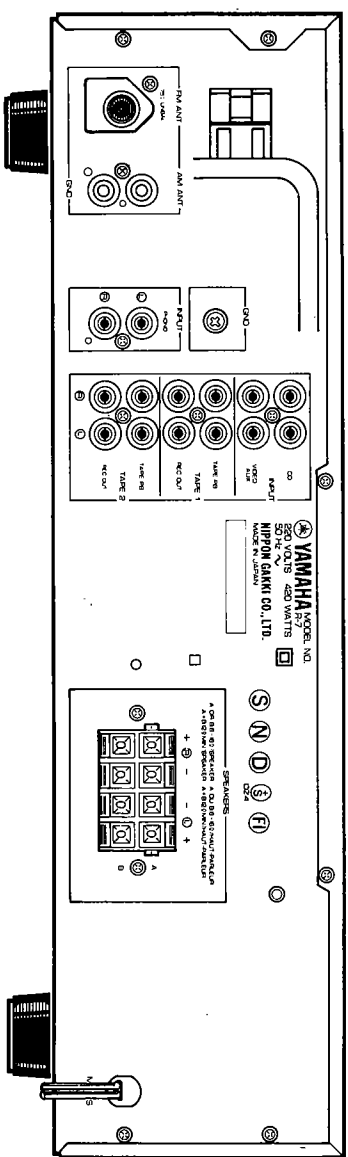
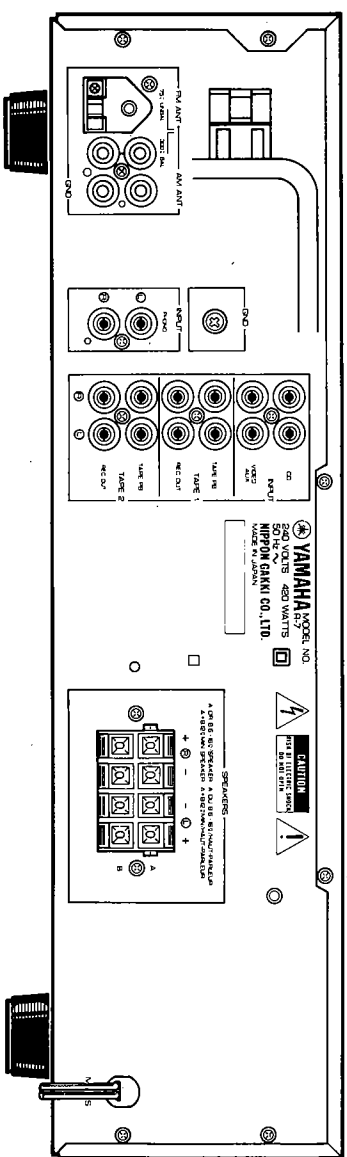
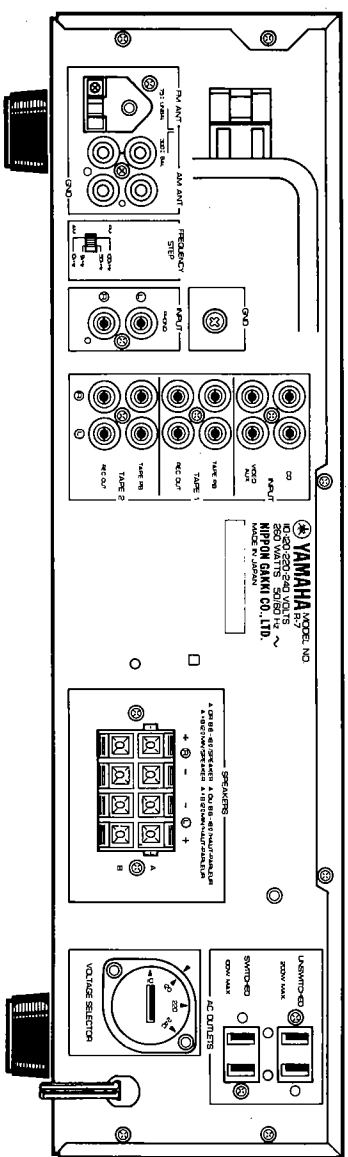
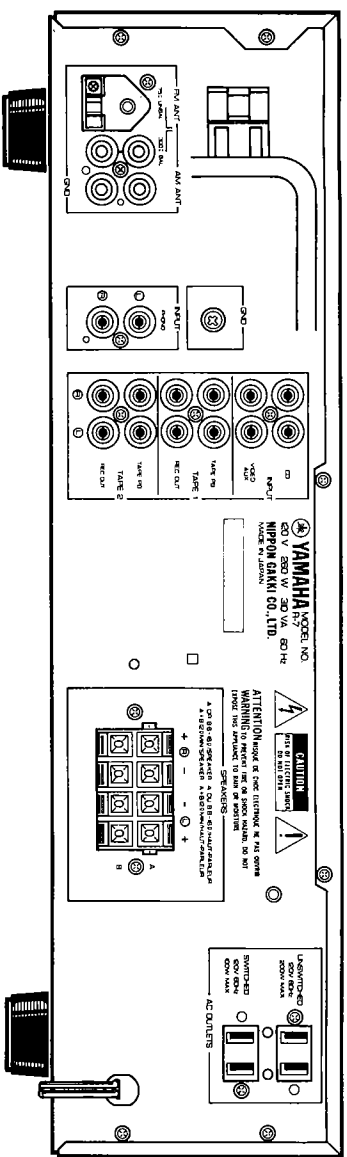
<b>Power Supply</b>	
U.S.A. & Canadian models	120V AC, 60Hz
General model	110V/120V/220V/240V AC, 60/50Hz
Australian & British models	240V AC, 50Hz
<b>Power Consumption</b>	
	260W (U)(C)(R)
	420W (A)(B)
<b>AC Outlet . . . . (U)(C)(R) only</b>	
Switched x 1	100W max.
Unswitched x 1	200W max.
<b>Dimensions (W x H x D)</b>	
	435 x 126 x 289 mm
	(17-1/8" x 4-15/16" x 11-3/8")
<b>Weight</b>	
	6.3 kg (13.8 lbs)

Specifications subject to change without notice.

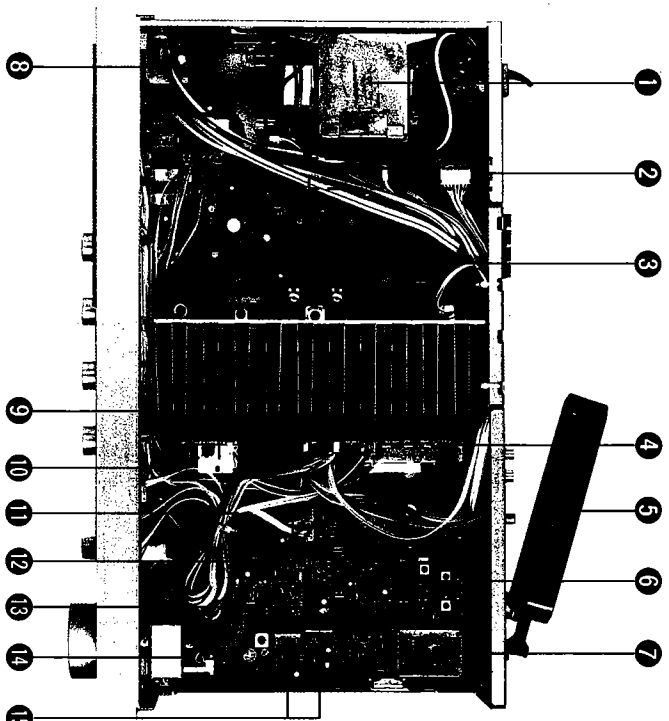
(U) . . . . U.S.A. model	(G) . . . . European model
(C) . . . . Canadian model	(B) . . . . British model
(A) . . . . Australian model	(R) . . . . General model

**BLOCK DIAGRAM**





INTERNAL VIEW



- 1 POWER TRANSFORMER  
U.S.A. model: GA69001  
Canadian model: GA69011  
European model: GA69022  
General model: GA69032
- 2 MAIN CIRCUIT BOARD (2)  
Australian & British models: GA69042
- 3 MAIN CIRCUIT BOARD (1)
- 4 TUNER CIRCUIT BOARD (2)
- 5 AM LOOP ANTENNA
- 6 AM IC: LA1245
- 7 FRONT END PACK
- 8 POWER SWITCH
- 9 MOTOR CONTROL IC: BA6229
- 10 A.V. CONTROLLER IC: iG14780 (LC6505C-696)
- 11 PLL IC: LC7210
- 12 CSL CONTROLLER IC: iG14770 (LC6510C-695)
- 13 TUNER CIRCUIT BOARD (1)
- 14 POTENTIOMETER WITH MOTOR
- 15 IF IC:  $\mu$ PC577H (E, F)

DISASSEMBLY PROCEDURES

1. Removal of Top Cover  
Remove 7 screws ( 1 ) in Fig. 1, and slide the Top Cover back and up.
2. Removal of Front Panel  
Remove 4 screws ( 2 ) and 4 hooks in Fig. 1, and pull the Front Panel forward.
3. Check of Main & Tuner Circuit Board (1) and re-  
placement of parts.
  - a. Remove 13 screws ( 3 ) in Fig. 1.
  - b. Push the Power switch on.
  - c. Remove the Main Chassis as shown in Fig. 2.  
In this condition it is possible for you check the Main and Tuner Circuit Board (1), and replace the parts.

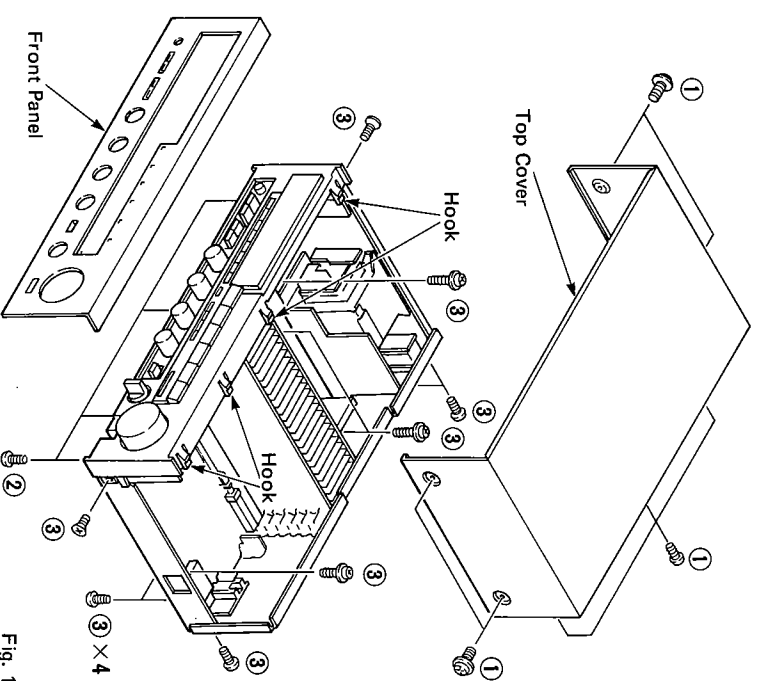


Fig. 1

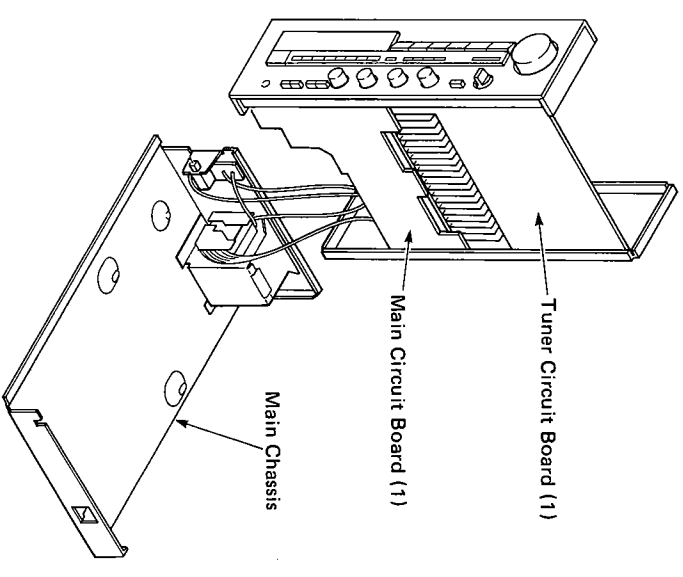


Fig. 2

## ■ 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  
RECEIVING MODE ..... AUTO
- 4) Proceed with the AM section adjustments after having finished the FM section adjustment.
- 5)  $0\text{dB}\mu = 1\mu\text{V}$     Ex:  $60\text{dB}\mu = 1\text{mV}$

### 2. Measuring instruments abbreviation

FM SG : FM signal generator  
 SSG : Stereo signal generator  
 AM SG : AM signal generator  
 DIST. M : Distortion meter  
 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 main circuit.

Test Point	Rating or standard	Remark								
TR301 EMITTER	$+11.9\text{V} \pm 0.5\text{V}$	Make sure that AC line voltage comes within <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Models</th> <th>AC line voltage</th> </tr> </thead> <tbody> <tr> <td>U, C</td> <td><math>120\text{V} \pm 10\%</math></td> </tr> <tr> <td>G</td> <td><math>220\text{V} \pm 10\%</math></td> </tr> <tr> <td>A, B</td> <td><math>240\text{V} \pm 10\%</math></td> </tr> </tbody> </table>	Models	AC line voltage	U, C	$120\text{V} \pm 10\%$	G	$220\text{V} \pm 10\%$	A, B	$240\text{V} \pm 10\%$
Models	AC line voltage									
U, C	$120\text{V} \pm 10\%$									
G	$220\text{V} \pm 10\%$									
A, B	$240\text{V} \pm 10\%$									
D305 Anode	$+5.8\text{V} \pm 0.5\text{V}$									
+7	$+5.5\text{V} \pm 0.5\text{V}$									
TR303 EMITTER	$+6.1\text{V} \pm 0.5\text{V}$									
TR302 EMITTER	$-11.9\text{V} \pm 0.5\text{V}$									
D304 Anode	$-6.1 \pm 0.5\text{V}$									
+B	$+50\text{V} \pm 5\text{V}$									
-B	$-50\text{V} \pm 5\text{V}$									
+18	$+18\text{V} \pm 5\text{V}$									
-18	$-18\text{V} \pm 5\text{V}$									
FB	At FM reception mode $+12\text{V} \pm 1\text{V}$									
	At AM reception mode 0V									
AB	At FM reception mode 0V									
	At AM reception mode $+12\text{V} \pm 1\text{V}$									

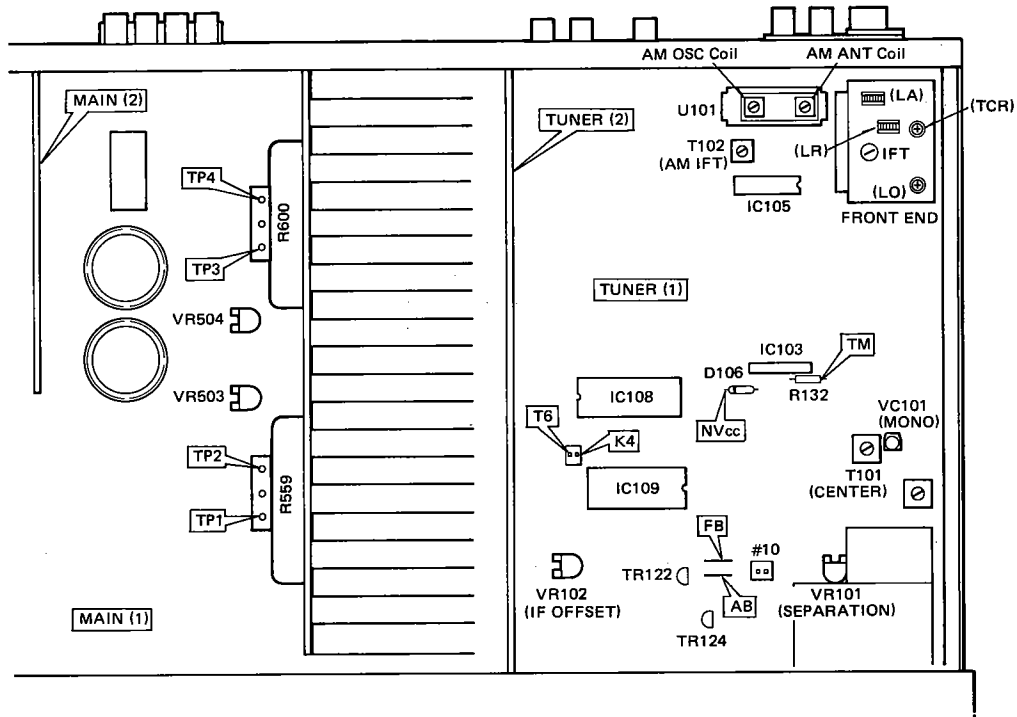
### <AUDIO SECTION>

#### ● Idling Current Adjustment

When replacing the power and drive transistors, adjust idling current. After the power has been turned on, age about 5 minutes in non loaded condition. Adjust VR503 (Lch) and VR504 (Rch) so that the voltage across the terminals of R559 (TP1 - TP2) and R560 (TP3 - TP4) comes to  $11\text{mV} \pm 2\text{mV DC}$ .

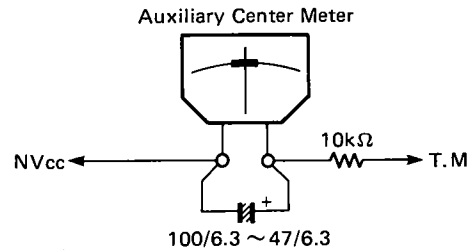
	Test points	Adjustment points	Rating
Lch	Across the terminals of R559 (TP1 - TP2)	VR503	$11\text{mV} \pm 2\text{mV DC}$ .
Rch	Across the terminals of R560 (TP3 - TP4)	VR504	$11\text{mV} \pm 2\text{mV DC}$ .

• TEST POINT



< FM TUNER SECTION >

- Use 19kHz L.P.F. to measure the REC OUT.
- On step 1 and 2 connect the auxiliary center meter (ji00036 or similar) to confirm the best tuned point.
- 100% modulation means that the Frequency Deviation is 75kHz. (R) (U) (C) (A) (B)
- For the G model, Frequency Deviation is 40kHz.
- For the G model, install the Matching Transformer and connect FM SG.



Step	Item to be Adjusted	Connection terminal	Instrument required	Adjustment locations	Adjustment method	Rating or standard	Remarks
1	Discriminator balance	NVcc ~ T.M	Auxiliary center meter	T101 (CENTER)	Adjust the pointer of the auxiliary center meter points to "0" at detuned point.		After the adjustment of step 1 to 5, confirm it again.
2	Confirmation of station center set	300Ω FM ANT	FM SG 98MHz ± 1kHz 70dBμ (75.2dBf) MONO 1kHz 100% MOD	TUNING key →UP or DOWN	Confirm that the auxiliary center meter deflects to "0" when tuned to signal of FM SG.		
		NVcc ~ T.M	Auxiliary center meter				
3	Monaural distortion	300Ω FM ANT	FM SG 98MHz ± 1kHz 70dBμ (75.2dBf) MONO 100Hz 100% MOD	VC101 (MONO)	Reduce distortion to minimum.	Less than -55dB	Reception should be made in LOCAL mode
		REC OUT L, R	DIST. M L.P.F.				
4	Stereo distortion	300Ω FM ANT	FM SG, SSG 98MHz ± 1kHz 70dBμ (75.2dBf) STEREO L, R 1kHz, 100% MOD.	Front end IFT  ST indicator	Same as step 3	Less than -46dB	Confirm that ST indicator lights up. Reception should be made in LOCAL mode.
		REC OUT L, R	DIST. M L.P.F.				
5	Separation	300Ω FM ANT	FM SG, SSG 98MHz ± 1kHz 70dBμ (75.2dBf) STEREO L, R 1kHz, 100% MOD.	VR101 (SEPARATION)	Reduce output level to minimum.	Separation more than 40dB	
		REC OUT L, R	A.C.V.M L.P.F.				

Step	Item to be Adjusted	Connection terminal	Instrument required	Adjustment locations	Adjustment method	Rating or standard	Remarks
6	Confirmation of Full-scale signal quality level	300Ω FM ANT	FM SG, SSG 98MHz ± 1kHz 70dBμ (75.2dBf) STEREO L, R 1kHz, 100% MOD	SIGNAL QUALITY indicator	Confirm that all signal quality indicators light up.		Confirm that all signal quality indicators goes out at detuned point.
7	IF Offset	300Ω FM ANT	FM SG. 98MHz ± 1kHz 70dBμ (75.2dBf) STEREO L, R 1kHz 30% MOD	VR102 (IF OFFSET)  Frequency display	By shorting across terminals K4 and T6, the frequency display shifts 1 digit. Therefore, adjust VR102 until 10kHz digit becomes 9 or 0.		After adjustment open across K4 and T6.
		K4 ~ T6	Short				
8	Confirmation of auto search reception	300Ω FM ANT	FM SG 98MHz ± 1kHz 15dBμ (20.2dBf) MONO 1kHz 100% MOD	TUNING key UP or DOWN	Confirm that auto search reception is possible with the tuning key.		Confirm that muting is performed at auto reception.

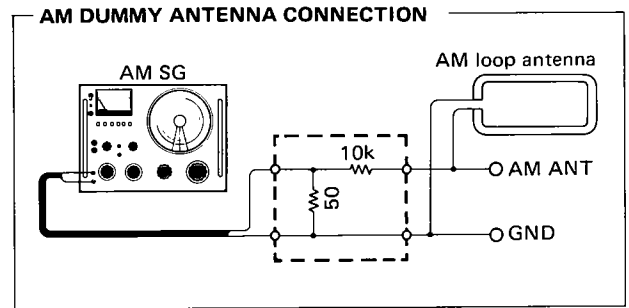
Note: X dBμ = X + 5.2dBμf

- Shorting K4 and T6 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		

< AM TUNER SECTION >

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



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 400Hz, 30% MOD	T102	Adjust T102 to maximize detector output.	
		REC OUT	A.C.V.M.			
2	Confirmation of sensitivity	AM ANT	AM SG AM dummy antenna 630kHz ± 0.1kHz 1080kHz ± 0.1kHz 1440kHz ± 0.1kHz 400Hz, 30% MOD	PRESET STATION key P1/P9 P2/P10 P3/P11	Obtain AM SG output level where distortion become 10%.	Less than 58dBμ
		REC OUT	A.C.V.M. DST. M.			
3	Confirmation Full-scale signal quality level	AM ANT	AM SG. AM dummy antenna 1080kHz ± 0.1kHz 80dBμ 400Hz, 30% MOD	PRESET STATION key P2/P10  SIGNAL QUALITY indicator	Confirm that all signal quality indicators light up.	
4	Confirmation of auto search reception	AM ANT	AM SG AM dummy antenna 1080kHz ± 0.1kHz 60dBμ 400Hz, 30% MOD	TUNING key UP or DOWN		Confirm the auto search reception with the tuning key

## &lt; DIGITAL CONTROL SECTION &gt;

Step	Confirmation item	Connection terminal	Instrument required	Operation key	Confirmation method
1	Preset memory	300Ω FM ANT	FM SG, SSG 98MHz ± 1kHz 70dBμ (75.2 dBf) STEREO, L, R 1kHz, 100% MOD	FUNCTION key TUNING MODE key TUNING key (UP or DOWN) MEMORY key PRESET STATION key	① Receive FM 98MHz by means of auto search. ② Set P1-P8 → P1-P8 indicator lights. ③ Press MEMORY key → MEMORY indicator flashes about 5 seconds. ④ Press P1 → MEMORY indicator goes OFF P1 of PRESET STATION indicator lights.
		AM ANT	AM SG AM dummy antenna 1080kHz ± 0.1kHz 80dBμ 400Hz, 30% MOD	P1-P8/P9-P16	⑤ Receive AM 1080kHz ⑥ Press MEMORY key → MEMORY indicator flashes about 5 seconds. ⑦ Press P2 → MEMORY indicator goes OFF P2 of PRESET STATION indicator lights.
		300Ω FM ANT AM ANT	FM SG, SSG AM SG AM dummy antenna		⑧ Press P1 and P2 and check that content is read out. → P1 and P2 of PRESET STATION indicator lights.
					⑨ Set P9-P16 → P9-P16 indicator flashes. ⑩ Press MEMORY key → MEMORY indicator flashes. ⑪ Press P9 → MEMORY indicator goes OFF. P9-P16 indicator lights. ⑫ Press 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)	Tune to FM 98MHz and AM 1080kHz, and check that when receiving MAN'L/MONO, FM reception become forced mono TUNING MODE indicator → Goes out ST indicator → Goes out
				PRESET STATION key P1. P2	Check that tuning operation stops when tuned while AUTO searching. TUNING MODE indicator → lights up ST indicator → lights up
3	Receiving Mode			PRESET STATION key P1 RECEIVING MODE key	① Press P1 and content is read out (FM) ② Press RECEIVING MODE key → The following 3 states are switched and each indicator lights up. → AUTO → DX → LOCAL
4	Last channel memory			POWER key	① Read out P1. ② Turn OFF POWER Switch. ③ Turn ON POWER Switch after 5 seconds. ④ P1 content should come out. P1 of PRESET STATION indicator lights.

## LSI DATA

### ● IC109: LC7210

This is the CMOS LSI utilized to tune the CSL (Computer Servo Lock) tuning system for FM/AM radio which has realized stable station selection by PLL (Phase Locked Loop) synthesizer, precise automatic station search (applicable to all areas of the world and multiple bands) by SL<sup>2</sup> (Signal Locked Loop) voltage synthesizer, and optimum tuning point reception by AFC operation.

When combined with a prescaler ( $\div 100$ ), this LSI can be controlled by a 4-bit microcomputer in the controller.

The functions are:

- SL<sup>2</sup> auto search-control
- PLL control
- Analog switch for S-curve AFC
- Station-originated frequency counter
- Data generation for FM band IF offset adjustment (5 bits)

Terminal No.	Description	I/O	Function
1	Xin	IN	Oscillation terminals. By connecting Quartz across Xin and Xout, and load capacity across both terminals and Vss, basic clock signal is generated (32kHz).
2	Xout	OUT	
3	Vss	—	Ground terminal
4	DI/DO	IN	Pull-up feature. Input terminal which controls whether data terminal (D <sub>0</sub> ~ <sub>3</sub> ) signal is input mode (DI/DO = 1) or output mode. (DI/DO = 0).
5	STB	IN	Pull-up feature. Determines the timing of internal latch, FF clock pulse and set/reset signal which are determined by control input (C <sub>0</sub> ~ <sub>3</sub> ).
6	D <sub>3</sub>	I/O	I/O terminals. Push-pull output. Transfers (DI/DO = 1) data to internal data bus (4 bits) or outputs the contents of internal data bus.
7	D <sub>2</sub>		
8	D <sub>1</sub>		
9	D <sub>0</sub>		
10	C <sub>3</sub>	IN	Pull-up feature. Input used to create signal which specifies which logic is to be connected with internal data bus.
11	C <sub>2</sub>		
12	C <sub>1</sub>		
13	C <sub>0</sub>		
14	M/L	OUT	Outputs "1" only when received band is AM NC.
15	PLL	OUT	Push-pull. Outputs "1" while PLL operation is made.
16	Sout	OUT	Tri-state. Connected with push-pull output and analog switch. ● PLL mode: Charge pump output can be obtained. ● SEARCH mode: Auto search output can be obtained. ● AFC mode: Conducts to Sin terminal via analog switch. High impedance state in other modes
17	SD	IN	Controls whether reception is made by SL <sup>2</sup> or PLL when FM is received.
18	Sin	IN	Connected with analog switch or comparator input. ● AFC mode: Conducts to Sout terminal via analog switch and makes reception by AFC. ● AUTO SEARCH mode: Discriminates S signal between SH and SL via wind comparator and uses as input which controls search speed limit and stop.
19	AFC	OUT	Outputs "1" in AFC mode. Outputs "0" in other than AFC mode.
20	SMK	IN	Prohibits search stop and speed control by SH and SL in AUTO SEARCH mode ("1"). Controls when "0" is input.
21	F/A	OUT	Band data output terminal. Outputs "1" in FM mode.
22	Ain	IN	AM (FM) local oscillator frequency input terminal. Pull-down transistor is turned on in FM mode.
23	Fin	IN	1/100 dividing output of AM (FM) local oscillator frequency is input. Pull-down transistor is turned off in FM mode in which reception is not made by AFC.
24	VDD	—	Power source +5V
25	A/D	IN	Input used to generate data for compensating the shift of center frequency of FM IF filter.
26	Vref	—	Power source for setting wind comparator level (Sin) and power source for A/D converter ladder network of FM fine.
27	PSC	OUT	Outputs "0" when PLL or counter is operated in FM mode. Outputs "1" in other cases (other than when reception is made in FM mode, and other than in FM mode).
28	LOC	I/O	Detects the locking of CSL operation, connected with CR integration circuit. Judges as LOCK state when "1" is input and as UNLOCK state when "0" is input.

● IC108: CSL Controller V4.0 695 (LC6510C-695)

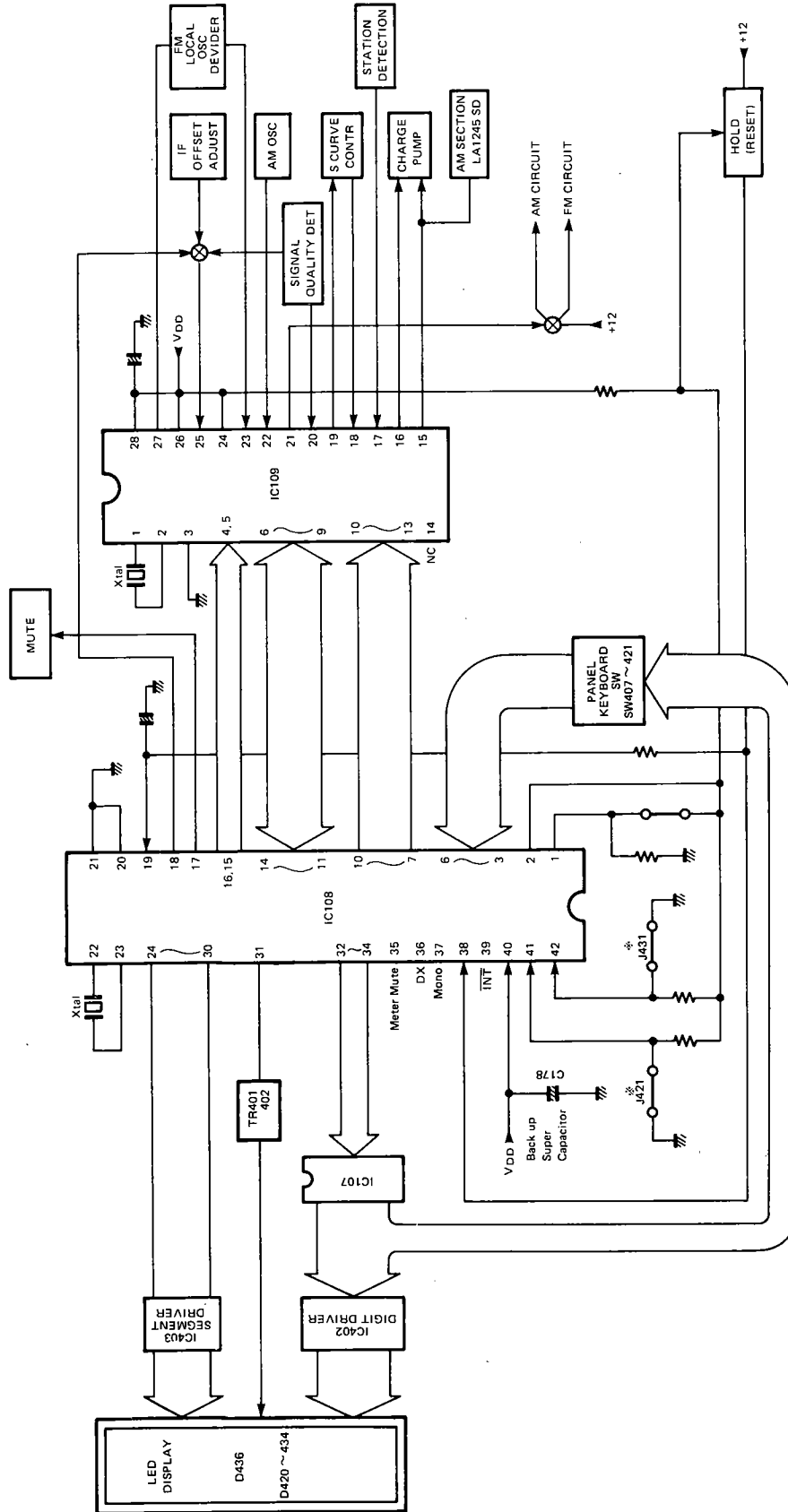
1-chip type 4-bit microcomputer which incorporates 4096 x 8 bit ROM (for programming) and 256 x 4 bit RAM (for data memory)

Terminal No.	Description	I/O	Function	
1	PA2 AWAM9K	IN	Destination symbol. 42 Pin = "1" : U model AM in 10kHz increments.	
2	PA3 REM REQ	IN	Destination symbol. REM REQ = "1" : Remote Control Request	
3	PB <sub>0</sub> K1	IN	Key matrix input. Judges the switches 407 to 421.	
4	PB <sub>1</sub> K2	IN		
5	PB <sub>2</sub> K3	IN		
6	PB <sub>3</sub> K4	IN		
7	PC <sub>0</sub> C0	OUT	Control output. Sepcifies which logic of LC7210 is connected with data bus.	
8	PC <sub>1</sub> C1	OUT		
9	PC <sub>2</sub> C2	OUT		
10	PC <sub>3</sub> C3	OUT		
11	PD <sub>0</sub> D0	I/O	Data bus. Sends and receives data to and from LC7210.	
12	PD <sub>1</sub> D1	I/O		
13	PD <sub>2</sub> D2	I/O		
14	PD <sub>3</sub> D3	I/O		
15	PE <sub>0</sub> STB	OUT	Strobe output.	
16	PE <sub>1</sub> DI/DO	OUT	Specifies the direction of I/O of data bus.	
17	PE <sub>2</sub> MUT	OUT	Muting output. +4.5V (reference value) in MUTING mode.	
18	PE <sub>3</sub> A/D	OUT	Signal Quality/IF Offset select. Signal Quality at "1" IF Offset at "0"	
19	RES	IN	Reset input. +5V in normal condition.	
20	TEST	-		
21	V <sub>ss</sub>	-	Power ground.	
22	OSC1	IN	Terminals for clock oscillating circuit.	
23	OSC2	OUT		
24	PF <sub>0</sub> H	OUT	Display, segment output.	
25	PF <sub>1</sub> G	OUT		h segment.
26	PF <sub>2</sub> F	OUT		g segment.
27	PF <sub>3</sub> E	OUT		f segment.
28	PG <sub>0</sub> D	OUT		e segment.
29	PG <sub>1</sub> C	OUT		d segment.
30	PG <sub>2</sub> B	OUT		c segment.
31	PG <sub>3</sub> A	OUT		b segment.
32	PH <sub>0</sub> TA	OUT	Display, digit output	
33	PH <sub>1</sub> TB	OUT		
34	PH <sub>2</sub> TC	OUT		
35	PH <sub>3</sub> Mute	OUT	Meter Mute Control	
36	PI <sub>0</sub> DX	OUT	DX Mode Control	
37	PI <sub>1</sub> MONO	OUT	Mono Mode Control	
38	HOLD	IN	Hold mode demand input terminal.	
39	INT	-	INTVAL	
40	V <sub>dd</sub>	-	Power source +5V.	
41	PA <sub>0</sub> U	IN	Destination symbol.	
42	PA <sub>1</sub> G	IN		

42 pin	0	1
41 pin	J	U
	G	W

R-7

● Block Diagram of Microcomputer Peripheral Circuit



※Marked

	R	U.C	A	G	B
J421	OPEN	SHORT	OPEN	OPEN	OPEN
J431	OPEN	OPEN	SHORT	SHORT	SHORT

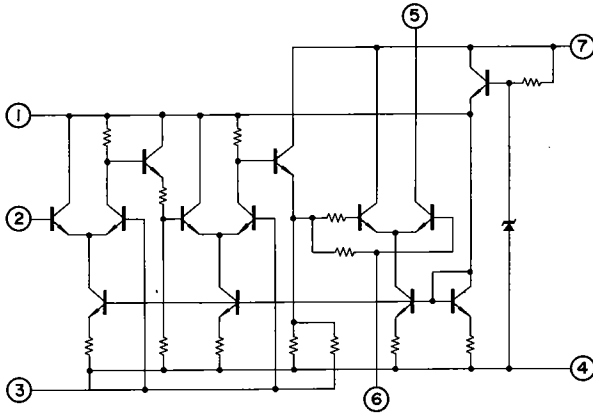
● IC306: A.V Controller V1.0 696 (LC6505C-696)

1-chip type 4-bit microcomputer which incorporates 1024 x 6 bit ROM (for programming) and 64 x 4 bit RAM (for data memory)

Terminal No.	Description	I/O	Function
1	PA <sub>2</sub>	IN	INPUT port A <sub>0</sub> ~ A <sub>3</sub> Input by 4 bit and decision by 1 bit for branch are possible. Also used for HALT mode cancel request input.
2	PA <sub>3</sub>		
3	PB <sub>0</sub>	IN	INPUT port B <sub>0</sub> ~ B <sub>3</sub> Input by 4 bit and decision by 1 bit for branch are possible.
4	PB <sub>1</sub>		
5	PB <sub>2</sub>		
6	PB <sub>3</sub>		
7	PC <sub>0</sub>	IN/ OUT	IN/OUT common port C <sub>0</sub> ~ C <sub>3</sub> When INPUT, input by 4 bit and decision by 1 bit for branch are possible. When OUTPUT, output by 4 bit and set or reset by 1 bit are possible.
8	PC <sub>1</sub>		
9	PC <sub>2</sub>		
10	PC <sub>3</sub>		
11	PC <sub>0</sub>	IN/ OUT	IN/OUT common port D <sub>0</sub> ~ D <sub>3</sub> When INPUT, input by 4 bit and decision by 1 bit for branch are possible. When OUTPUT, output by 4 bit and set or reset by 1 bit are possible.
12	PD <sub>1</sub>		
13	PD <sub>2</sub>		
14	PD <sub>3</sub>		
15	PE <sub>0</sub>	OUT	OUTPUT port E <sub>0</sub> ~ E <sub>3</sub> Output by 4 bit and set or reset by 1 bit are possible. Input of output latch content by 4 bit and decision of output latch by 1 bit for branch are possible.
16	PE <sub>1</sub>		
17	PE <sub>2</sub>		
18	PE <sub>3</sub>		
19	$\overline{\text{RES}}$	IN	Reset input terminal
20	TEST	IN	LSI test terminal usually connected to V <sub>ss</sub> (0V).
21	V <sub>ss</sub>	—	Connected to 0V of power supply.
22	OSC 1	IN	Used by supplying external clock. Also used with OSC2 terminal and C.R. ceramic oscillator when using internal clock oscillation.
23	OSC 2	OUT	Attached to oscillatory circuit for internal clock oscillation.
24	PF <sub>0</sub>	OUT	OUTPUT port F <sub>0</sub> ~ F <sub>3</sub> Output by 4 bit and set or reset by 1 bit are possible. Input of output latch content by 4 bit and decision of output latch by 1 bit for branch are possible.
25	PF <sub>1</sub>		
26	PF <sub>2</sub>		
27	PF <sub>3</sub>		
28	PG <sub>0</sub>	OUT	OUTPUT port G <sub>0</sub> ~ G <sub>3</sub> Output by 4 bit and set or reset by 1 bit are possible. Input of output latch content by 4 bit and decision of output latch by 1 bit for branch are possible.
29	PG <sub>1</sub>		
30	PG <sub>2</sub>		
31	PG <sub>3</sub>		
32	PH <sub>0</sub>	OUT	OUTPUT port H <sub>0</sub> ~ H <sub>3</sub> Output by 4 bit and set or reset by 1 bit are possible. Input to output latch content by 4 bit and decision of output latch by 1 bit for branch are possible.
33	PH <sub>1</sub>		
34	PH <sub>2</sub>		
35	PH <sub>3</sub>		
36	PI <sub>0</sub>	OUT	OUTPUT port I <sub>0</sub> , I <sub>1</sub> Output by 2 bit and set or reset by 1 bit are possible. Input of output latch content by 2 bit and decision of output latch by 1 bit for branch are possible.
37	PI <sub>1</sub>		
38	$\overline{\text{HOLD}}$	IN	HOLD mode request input terminal
39	$\overline{\text{INT}}$	IN	Interrupt request input terminal
40	V <sub>DD</sub>	IN	Power supply terminal usually connected to +5V terminal.
41	PA <sub>0</sub>	IN	INPUT port A <sub>0</sub> ~ A <sub>3</sub> Input by 4 bit and decision by 1 bit branch are possible. Also used for HALT mode cancel request input.
42	PA <sub>1</sub>		

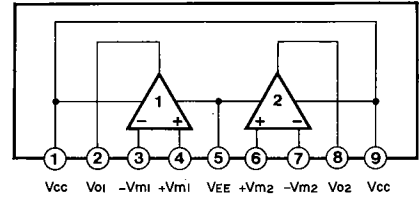
■ IC BLOCK

IC101, 102:  $\mu$ PC577H (E, F)

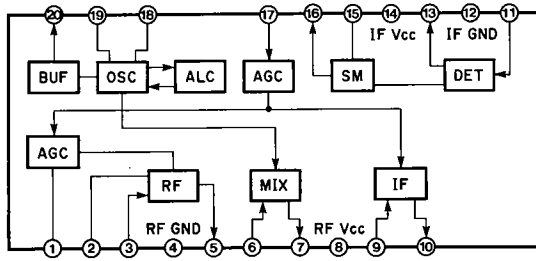


IC103: AN6551, NJM4558S or BA715

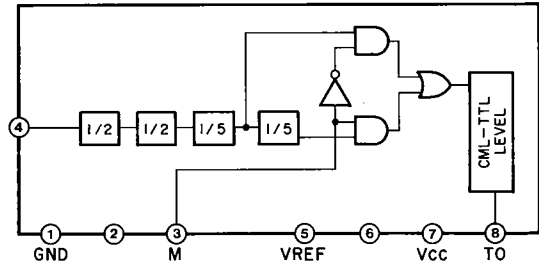
IC110: NJM4560S or BA4561



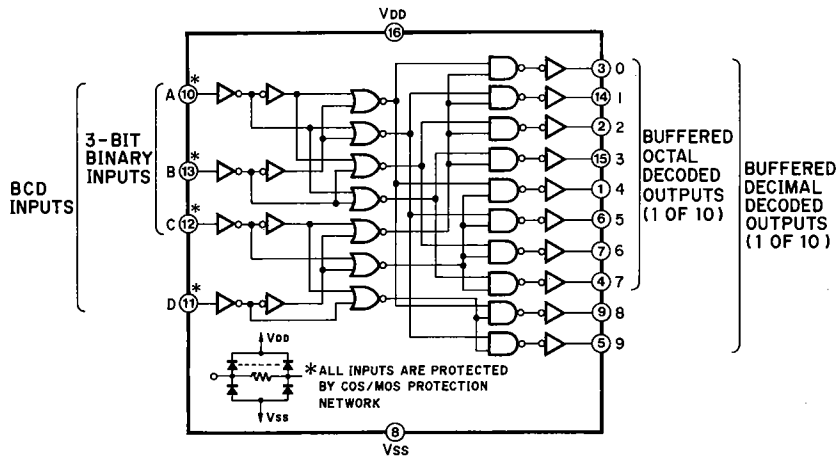
IC105: LA1245



IC106: M54459L



IC107: TC4028BP or BU4028B

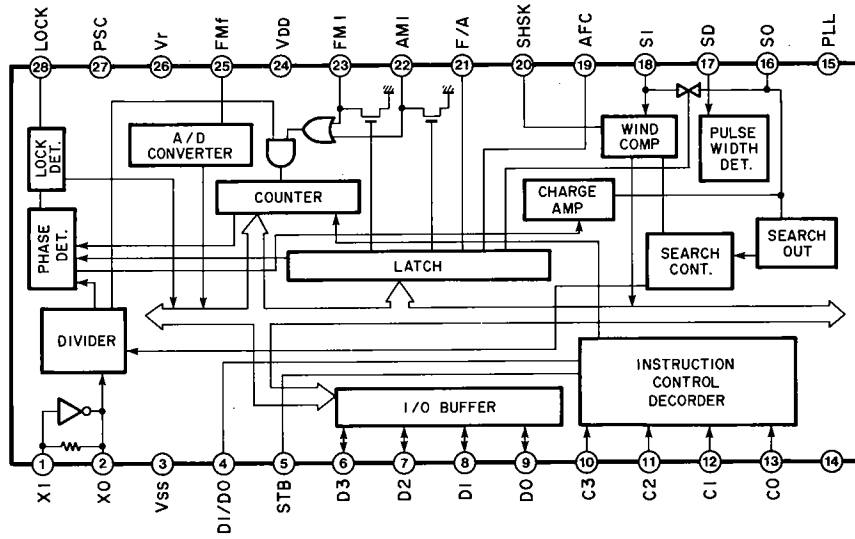


Data Table

D	C	B	A	0	1	2	3	4	5	6	7	8	9
0	0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	1	0	1	0	0	0	0	0	0	0	0
0	0	1	0	0	0	1	0	0	0	0	0	0	0
0	0	1	1	0	0	0	1	0	0	0	0	0	0
0	1	0	0	0	0	0	0	1	0	0	0	0	0
0	1	0	1	0	0	0	0	0	1	0	0	0	0
0	1	1	0	0	0	0	0	0	0	1	0	0	0
0	1	1	1	0	0	0	0	0	0	0	1	0	0
1	0	0	0	0	0	0	0	0	0	0	0	1	0
1	0	0	1	0	0	0	0	0	0	0	0	0	1
1	0	1	0	0	0	0	0	0	0	0	0	0	0
1	0	1	1	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	1	0	0	0	0	0	0	0	0	0	0
1	1	1	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	0	0	0	0	0	0	0	0	0	0

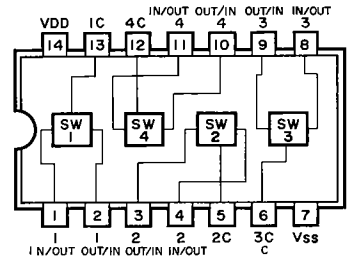
R-7

IC109: LC7210

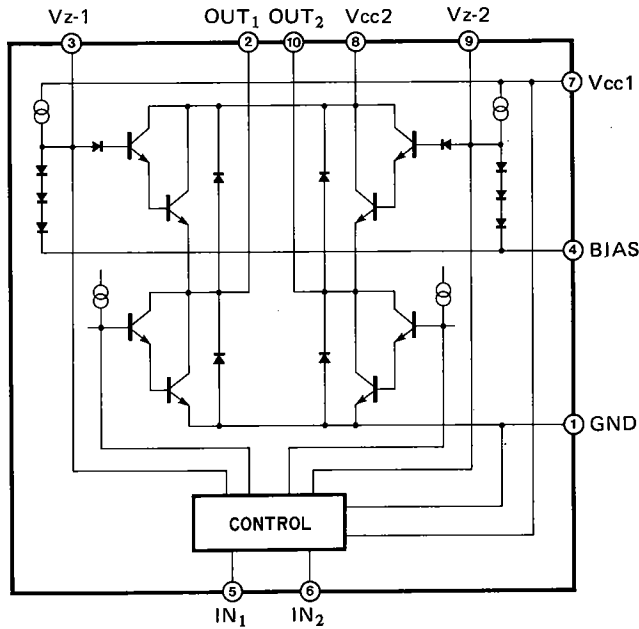


IC301, 302:  $\mu$ PD4066 or LC4066B

IC303: LC4966

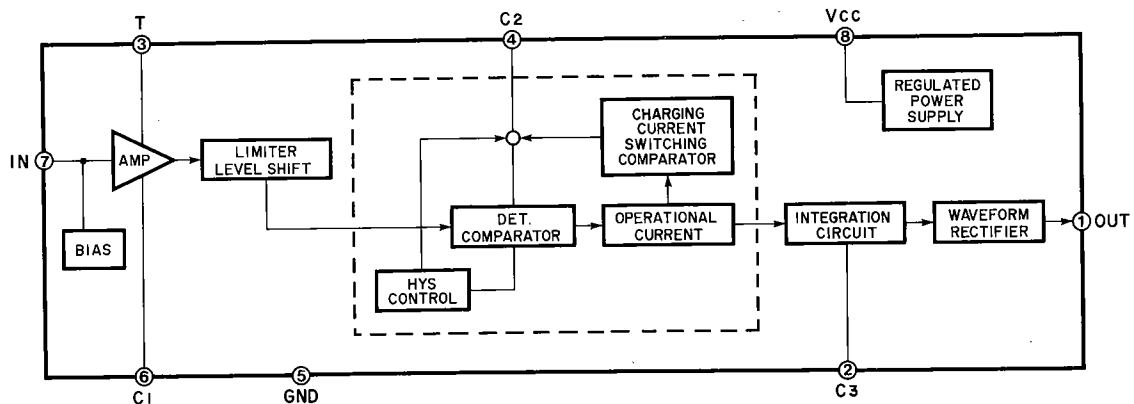


IC304: BA6229

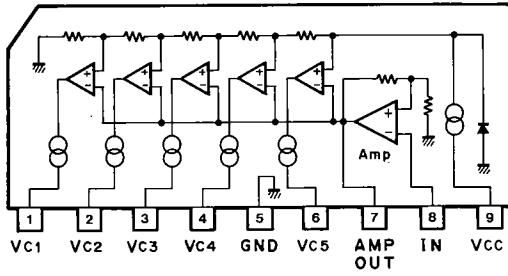


INPUT		OUTPUT		VOLUME
IN1 (5 pin)	IN2 (6 pin)	OUT1 (2 pin)	OUT2 (10 pin)	
L	L	OPEN	OPEN	STOP
H	L	H	L	UP
L	H	L	H	DOWN
H	H	L	L	BRAKE

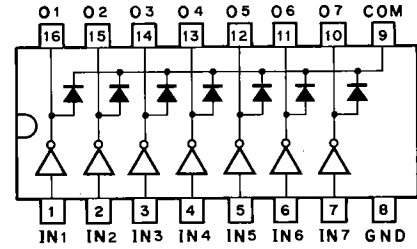
IC305: BA6340



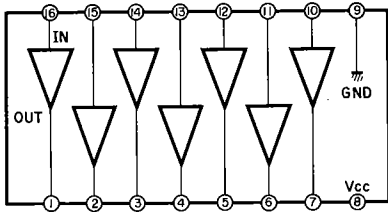
IC401: LB1413



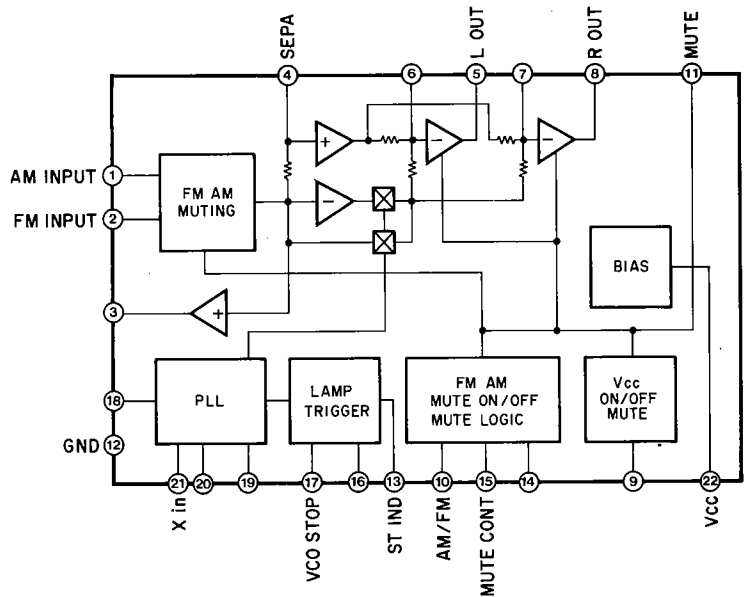
IC402: LB1234



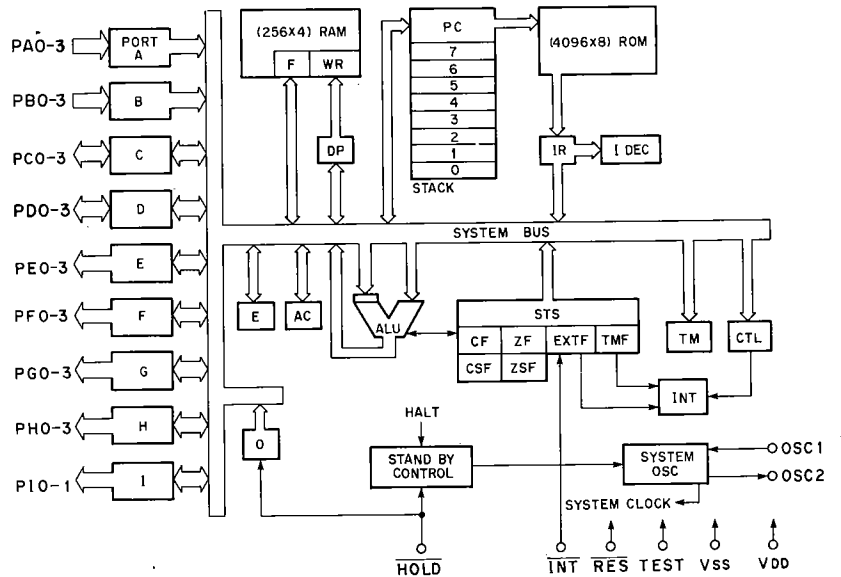
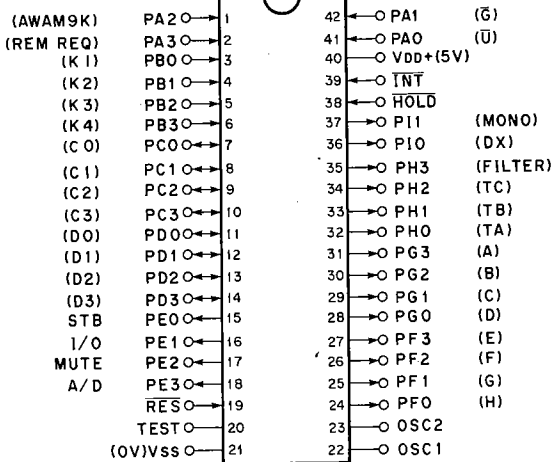
IC403: BA618



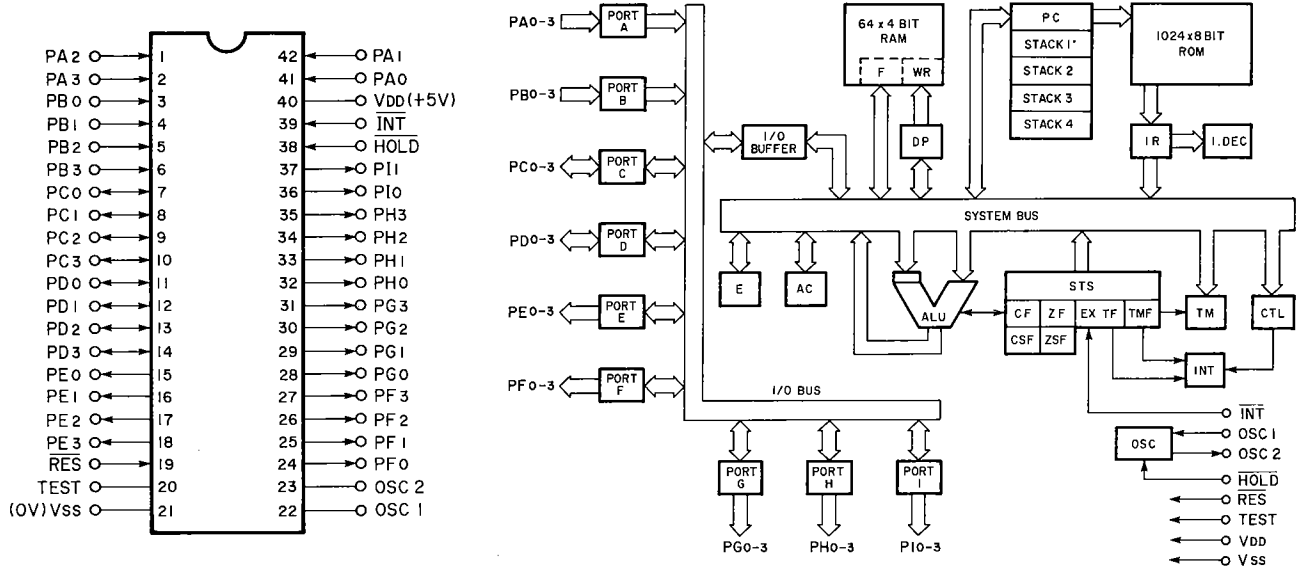
IC104: LA3400



IC108: LC6510C-695



IC306: LC6505C-696



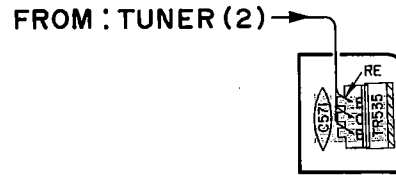
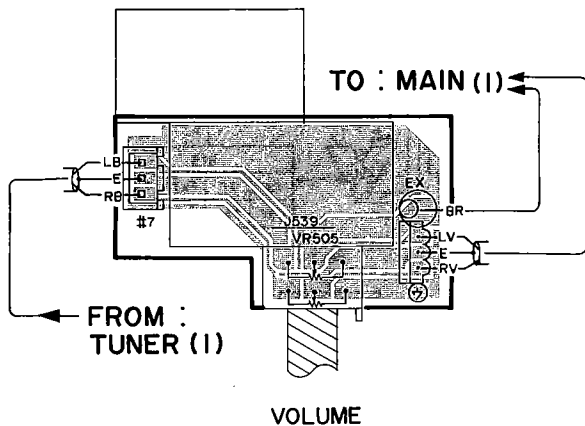
PRINTED CIRCUIT BOARD (Pattern side)

Note: \* marked

	R	U	C	A, B	G
C545 ~ 548	OPEN	OPEN	OPEN	OPEN	4700P
C549 ~ 554	OPEN	OPEN	OPEN	OPEN	0.022
C565	0.01/500	0.01/500	0.01/500	0.01/500	OPEN
C563, 564	OPEN	OPEN	OPEN	OPEN	0.047/100
R575, 576	OPEN	OPEN	OPEN	OPEN	4.7
R603	OPEN	2.2M ½P	2.2M ½P	OPEN	OPEN
J538	OPEN	SHORT	SHORT	OPEN	OPEN
J661	OPEN	OPEN	OPEN	OPEN	SHORT
D516	4D4B41	4D4B41	D5FB20	4D4B41	4D4B41
F501	T7.0A 250V	5A 125V	5A 125V	T3.15A 250V	T3.15A 250V
F502	T3.5A 250V	OPEN	OPEN	OPEN	OPEN

Main Circuit Board (5)

Main Circuit Board (7)



**PRINTED CIRCUIT BOARD (Pattern side)**

U.S.A. & Canadian models

Note) 文字面 : Component side  
 SPEAKERS + (R) - (L) +

Main Circuit Board (1)

Main Circuit Board (2)

TO : TUNER (2)

Main Circuit Board (8)

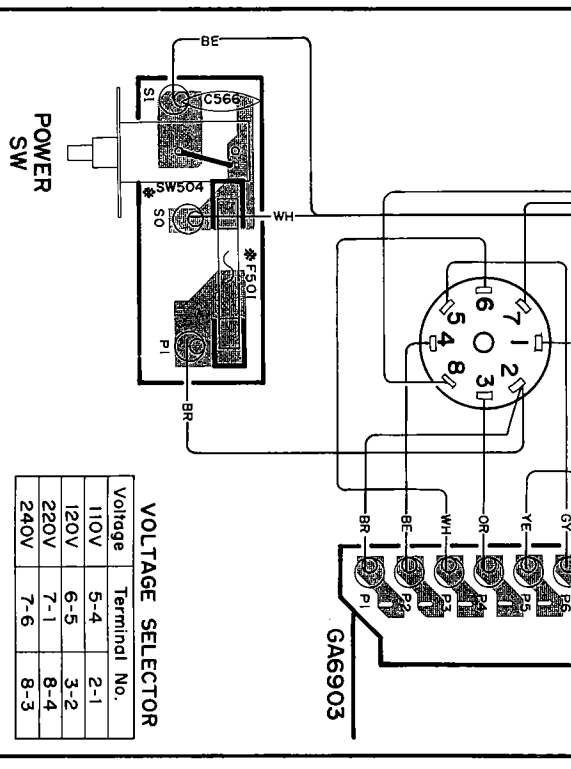
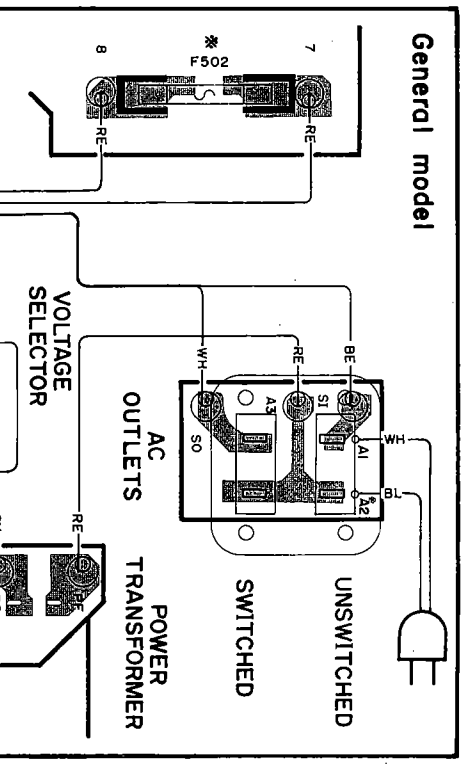
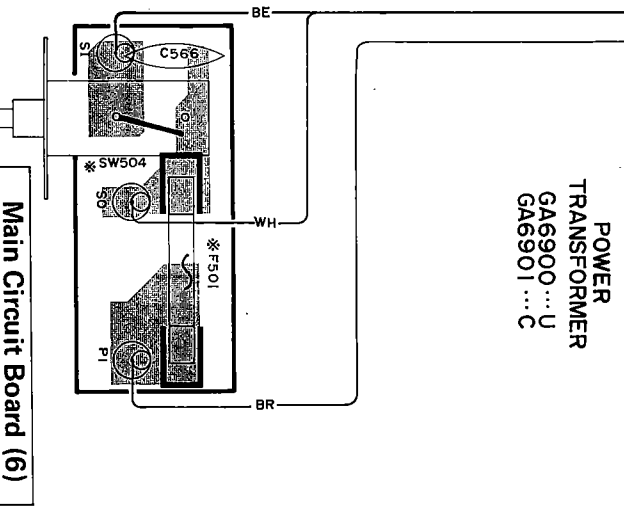
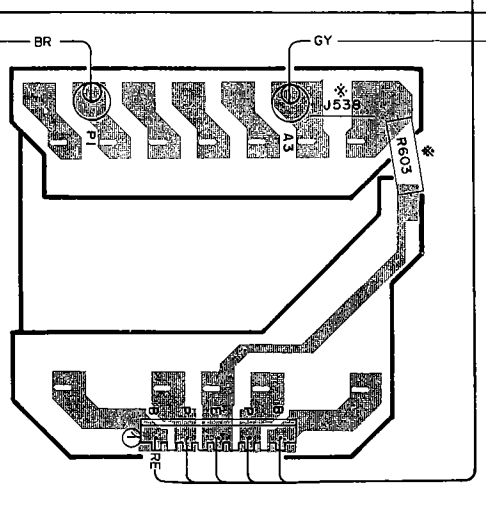
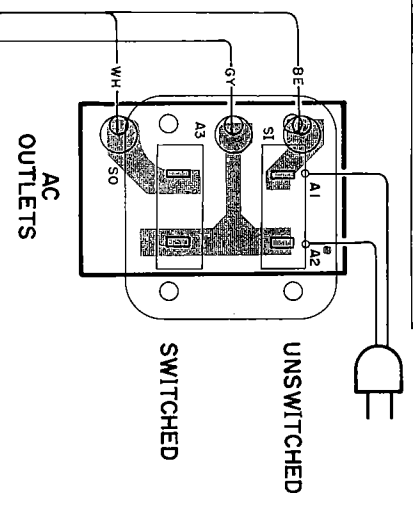
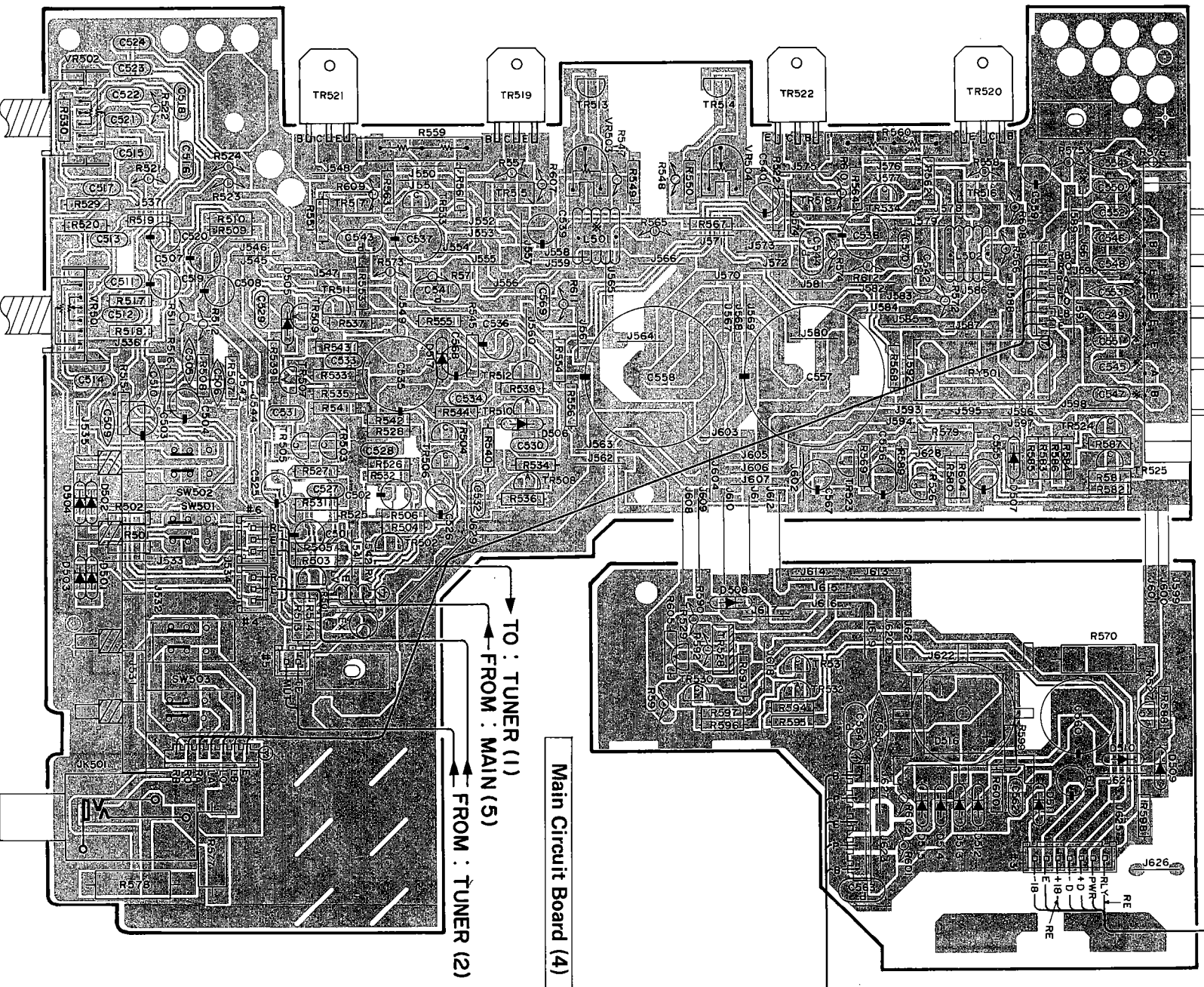
Main Circuit Board (3)

Main Circuit Board (4)

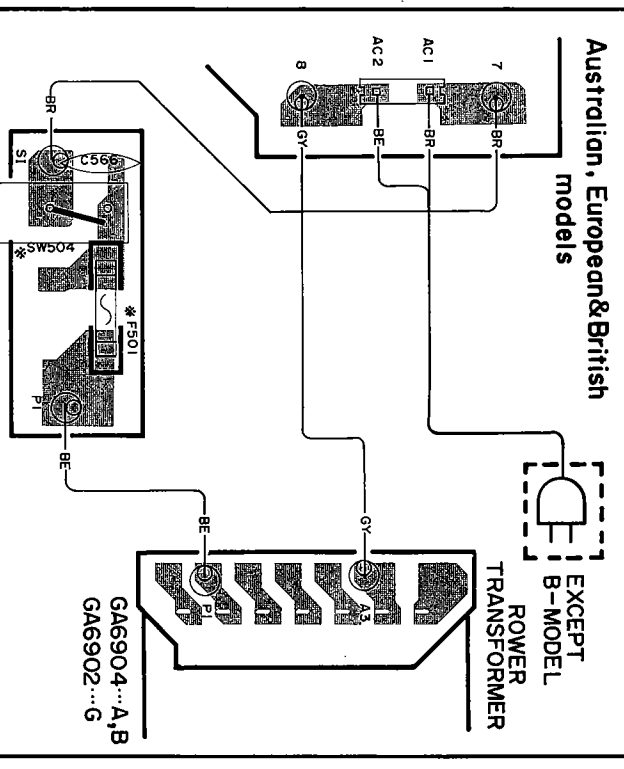
TO : TUNER (1)  
 FROM : MAIN (5)

FROM : TUNER (2)

POWER TRANSFORMER  
 GA6900...U  
 GA6901...C



Voltage	Terminal No.
110V	5-4
120V	6-5
220V	7-1
240V	7-6



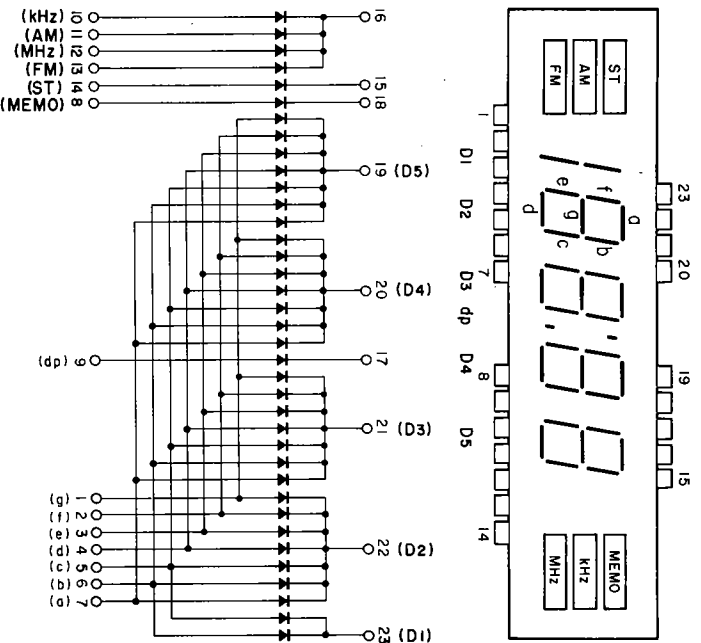
EXCEPT B-MODEL  
 POWER TRANSFORMER  
 GA6904...A,B  
 GA6902...G





**CIRCUIT DATA**

• D436 (Frequency Display)



Pin No.	Function
1	segment "g" Anode
2	segment "f" Anode
3	segment "e" Anode
4	segment "d" Anode
5	segment "c" Anode
6	segment "b" Anode
7	segment "a" Anode
8	"MEMO" Anode
9	decimal point Anode
10	"kHz" Anode
11	"AM" Anode
12	"MHz" Anode
13	"FM" Anode
14	"ST" Anode
15	"ST" Cathode
16	"AM" "FM" "kHz" "MHz" Cathode
17	decimal point Cathode
18	"MEMO" Cathode
19	digit "5" Cathode
20	digit "4" Cathode
21	digit "3" Cathode
22	digit "2" Cathode
23	digit "1" Cathode

• MATRIX OF DISPLAY (D436, D420 ~ 434)

IC107	A	B	C	D	E	F	G	H
IC108	[31 Pin]	[30 Pin]	[29 Pin]	[28 Pin]	[27 Pin]	[26 Pin]	[25 Pin]	[24 Pin]
T6	D5	D5	D5	D5	D5	D5	D5	D5
T5	D4	D4	D4	D4	D4	D4	D4	D4
T4	D3	D3	D3	D3	D3	D3	D3	D3
T3	D2	D2	D2	D2	D2	D2	D2	D2
T2	LOCAL (D424)	D1	D1	AUTO DX (D423)	DX (D422)	AUTO (D421)	P1-8 (D426)	P1-8 (D426)
T1	P-1/9 (D434)	P-2/10 (D433)	P-3/11 (D432)	P-4/12 (D431)	P-5/13 (D430)	P-6/14 (D429)	P-7/15 (D428)	P-8/16 (D427)
T0	MEMO (D420)	CSL	kHz	AM	MHz	FM		

• MATRIX OF INPUT KEY

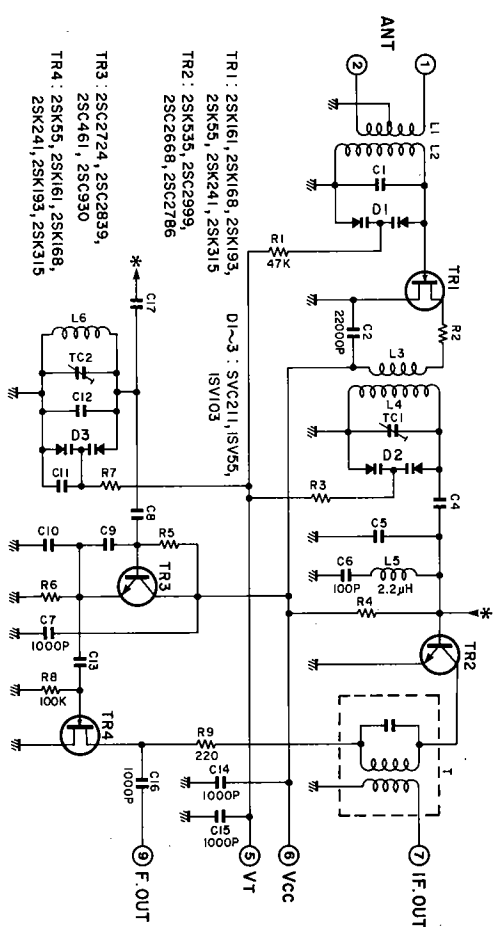
IC107	T1	T2	T3	T4	D5	T6
IC108	[2 Pin]	[15 Pin]	[1 Pin]	[6 Pin]	[7 Pin]	[4 Pin]
K1	P1/9	P5/13		UP	P1-8/ P9-16	
K2	P2/10	P6/14		DOWN	FM/AM	
K3	P3/11	P7/15	AUTO/ MAN'L		RECEIVING MOD	
K4	P4/12	P8/16	MEMORY			TEST (OFFSET)

• IC107 DATA TABLE

INPUT				OUTPUT					
TC	TB	TA	T0	T1	T2	T3	T4	T5	T6
[12 Pin]	[13 Pin]	[10 Pin]	[14 Pin]	[2 Pin]	[15 Pin]	[1 Pin]	[6 Pin]	[7 Pin]	[4 Pin]
0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0
1	0	0	0	0	1	0	0	0	0
0	1	0	0	0	0	1	0	0	0
1	0	1	0	0	0	0	1	0	0
1	1	0	0	0	0	0	0	1	0
1	1	1	0	0	0	0	0	0	1

• FRONT END PACK (PK101)

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



G model (PA00085)

