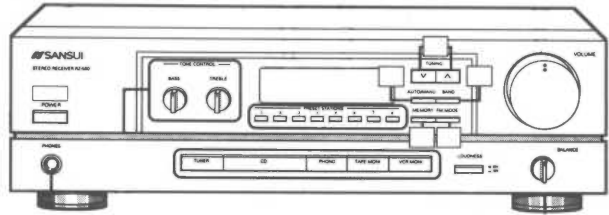


## RZ-590

### STEREO RECEIVER



#### CAUTION

1. Parts identified by the  $\triangle$  symbol on the schematic diagram and the parts list are critical for safety. Use only replacement parts that have critical characteristics recommended by the manufacturer.
2. Make leakage-current or resistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the appliance to the customer.

#### NOTICE

1. The symbols UL, CSA, EU, FTZ, SS, XX <EXPORT> on the parts list and the schematic diagram mean followings respectively.

UL.....Manufactured for U.S.A. market.  
(Underwriters Laboratories approved model)

CSA.....Manufactured for Canadian market

EU.....Manufactured for European market

FTZ.....Manufactured for German market

SS.....Manufactured for Saudi Arabian market

XX.....Standard Version.

<EXPORT>

NON MARK....Common Parts.

2. Some printed circuit boards are not supplied assembled. To separate these in this service manual, the stock numbers are not indicated for these boards. However, stock numbers for individual parts are indicated.

3. Since some capacitors and resistors are omitted from parts lists in this service manual, refer to the Common Parts List for capacitors and resistors, which was issued on October 1991.

4. Abbreviations in this service manual are as follows:

#### Abbreviations List

C.R.	:Carbon Resistor
S.R.	:Solid Resistor
N.I.R.	:Non-Inflammable resistor.
C.C.	:Ceramic Capacitor
E.C.	:Electrolytic Capacitor
E.L.	:Low Leak Electrolytic Capacitor
V.R.	:Variable Resistor

## Specifications

#### Tuner Section

Tuning range.....AM: 530 kHz/1720 kHz  
FM: 87.5 MHz/108 MHz

Intermediate frequency.....AM: 450 kHz  
FM: 10.7 MHz

#### Amplifier Section

Total harmonic distortion at (1 kHz).....0.2%

Signal-to-noise ratio.....95dB

#### Power output

Min RMS. both channels driven, from 40 Hz to 20 kHz with no more than 1% total harmonic distortion. 40 watts per channel into 8 ohms.

Power requirements.....AC 120V/220V/240V  
For USA and Canada.....AC 120V/60Hz

Power consumption.....600 watts 410VA

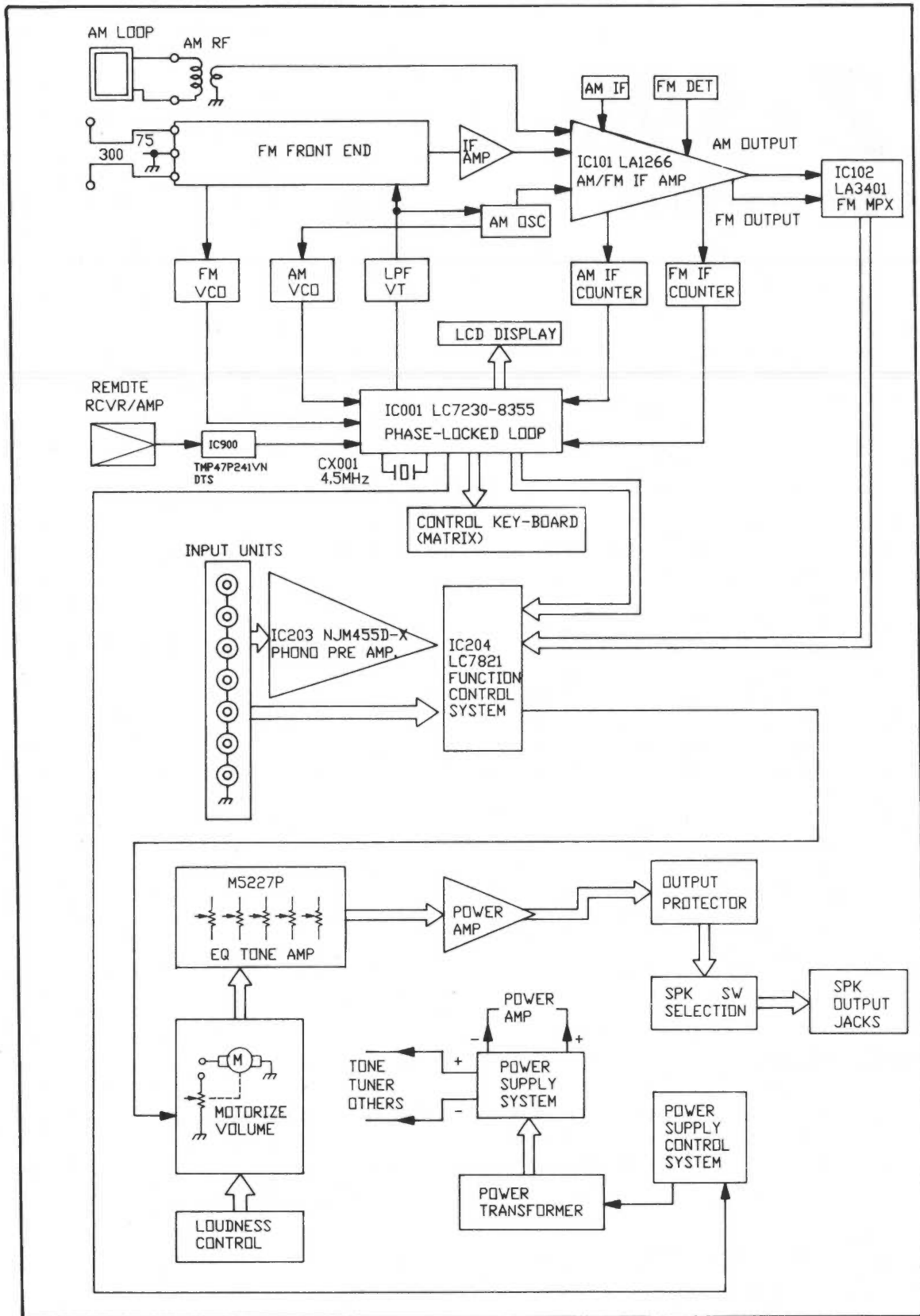
Dimensions.....430 mm (16-15/16") W  
100 mm (4") H  
300 mm (12") D

Weight.....12.1 kgs (26.7 lbs)

Design and specifications subject to changes without notice for improvements.

Due to local laws and regulations, this unit sold in some areas are not equipped with variable voltage selectors.

# 1. BLOCK DIAGRAM



## 2. ADJUSTMENTS (See Fig. 2-2 Adjustment points on page 5)

### Adjustment Conditions

#### EQUIPMENT REQUIRED

1. AM Signal generator
2. FM Signal generator
3. DC meter
4. Oscilloscope (2-channel)
5. VTVM
6. Distortion meter
7. Attenuator

#### AM/FM:

1. Signal input must be as low as possible to avoid saturation of the RF circuitry.
2. Balance and tone control, at mechanical center.
3. AM standard signal: 400Hz, 30% modulation at 1 MHz.
4. FM standard signal: 1 kHz, 75 kHz deviation at 98 MHz.

#### AMPLIFIER:

1. Volume control to minimum position, of 2V output as specified.
2. Balance and tone controls, at mechanical center.
3. Connect 8 ohm load across speaker jack.

#### TUNER ADJUSTMENT PROCEDURES

##### 1. AM IF ALIGNMENT

1. AM IF sweep generator connected to a standard radiating loop.
2. IF signal input from L101 ant. terminals.
3. Oscilloscope connected to TP7 and TP5 (GND).
4. Adjust T101, waveform as shown in Fig. 2-1.

##### 2. FM IF ALIGNMENT

1. FM signal generator connected to Ext. Ant. terminals.
2. Frequency setting to 87.5MHz.
3. DC meter connected to TP6 and TP5 (GND).
4. Adjust T102, to get 0.0V on DC meter.

##### 3. AM RF ALIGNMENT

1. AM signal generator connected to a standard radiating loop.
2. Signal generator frequency set to 530 kHz.
3. Frequency setting to lowest frequency.
4. DC meter connected across TP1 and TP2 (GND).
5. Adjust L102, to get 1.2V  $\pm$  0.05V on DC meter.
6. Signal generator frequency set to 1720kHz.
7. Frequency setting to highest frequency.
8. Adjust TC102, to get 9V  $\pm$  0.05V on DC meter.
9. Repeat adjustments as necessary to minimize tracking error.

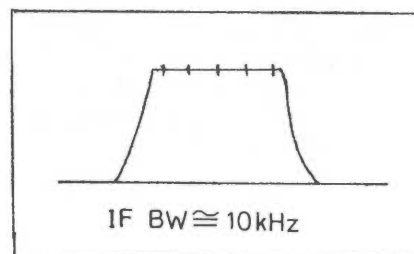


Fig. 2-1

4. AM SENSITIVITY ALIGNMENT

1. AM signal generator connected to a standard radiating loop.
2. Signal generator set to 600 kHz.
3. Frequency setting to 600 kHz.
4. VTVM across speaker load.
5. Adjust L101 for maximum output.
6. Signal generator set to 1400 kHz.
7. Frequency setting to 1400 kHz.
8. Adjust TC101 for maximum output.
9. Repeat adjustments as necessary to minimize tracking error.

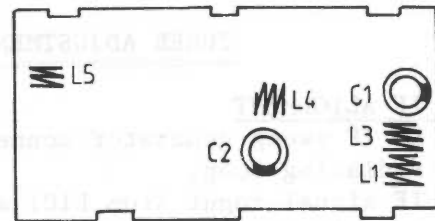
5. FM RF ALIGNMENT

1. FM signal generator connected to ext.ant. terminal.
2. Signal generator frequency set to 87.9 MHz.
3. Frequency setting to 87.9MHz.
4. DC meter connected to TP1 & TP2 ⊖ .
5. Adjust L5, to get 1.7V+/-0.5V on DC meter.
6. Signal generator frequency set to 107.9MHz.
7. Frequency setting to 107.9 MHz.
8. Check VT=8V+/-0.5V.
9. Repeat adjustments as necessary to minimize tracking error.

6. FM SENSITIVITY ALIGNMENT

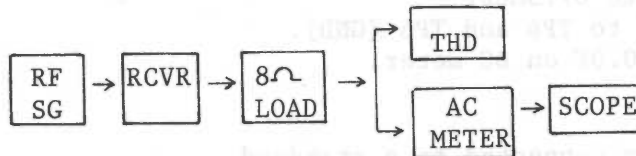
1. FM signal generator connected to Ext. ant. terminal.
2. Signal generator set to 90 MHz.
3. Frequency setting to 90 MHz.
4. VTVM across speaker load.
5. Adjust (L1 & L3 & L4) for maximum output.
6. Signal generator set to 106 MHz.
7. Frequency setting to 106 MHz.
8. Adjust C1 & C2 for maximum output.
9. Repeat adjustments as necessary to minimize tracking error.

FM FRONT END PCB



7. FM T.H.D. ADJUSTMENT

1. The instruments system block connected as follows:



2. FM signal generator set at 98.1MHz/75 kHz dev.with 1 kHz modulation and 1 mV output. Connect generator to ext. antenna terminal of receiver.
3. Set receiver to FM band and adjust vol. control to get 2V(500mW W/8 ohm load) output at speaker terminal.
4. Connect DC meter across TP3 and TP4.
5. Adjust T102 to get 0V on DC meter.
6. Adjust T103 to get min. THD (1%).
7. Repeat Item 6 to get minimum THD at 0V across TP3/TP4.

8. FM AUTO TUNING SENSITIVITY ADJUSTMENT

(FM MODE SET TO AUTO, AUTO/MANU SET TO AUTOSCAN)

1. FM signal generator connected to Ext.Ant.terminals.
2. Signal generator set to 98 MHz, 26 dB.
3. Adjust SFR102, to lock at 26 dB.

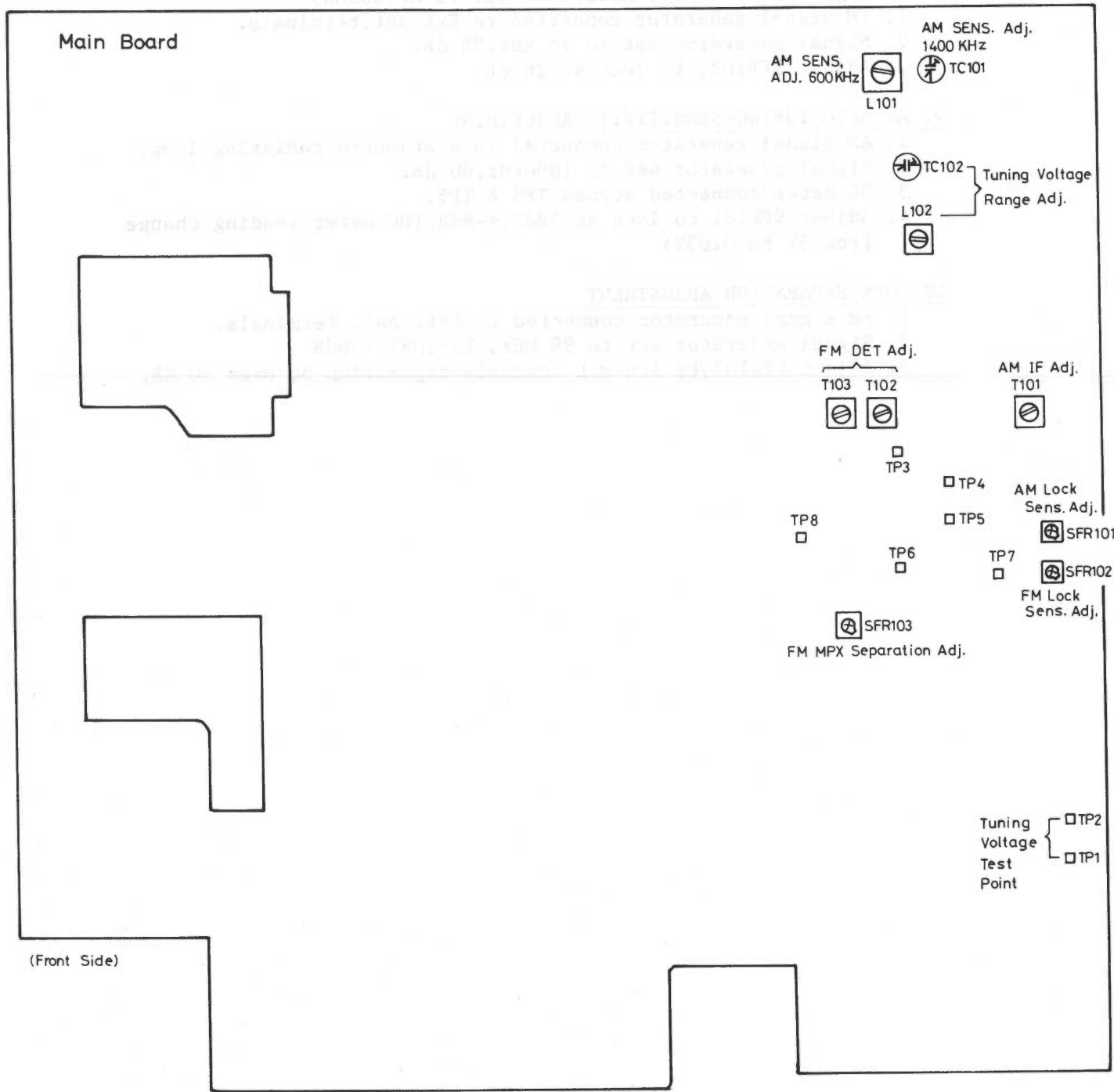
9. AM AUTO TUNING-SENSITIVITY ADJUSTMENT

1. AM signal generator connected to a standard radiating loop.
2. Signal generator set to 1000kHz, 60 dB.
3. DC meter connected across TP8 & TP5.
4. Adjust SFR101 to lock at 58dB,  $\pm 8$ dB. (DC meter reading change from 5V to 0.03V)

10. MPX SEPARATION ADJUSTMENT

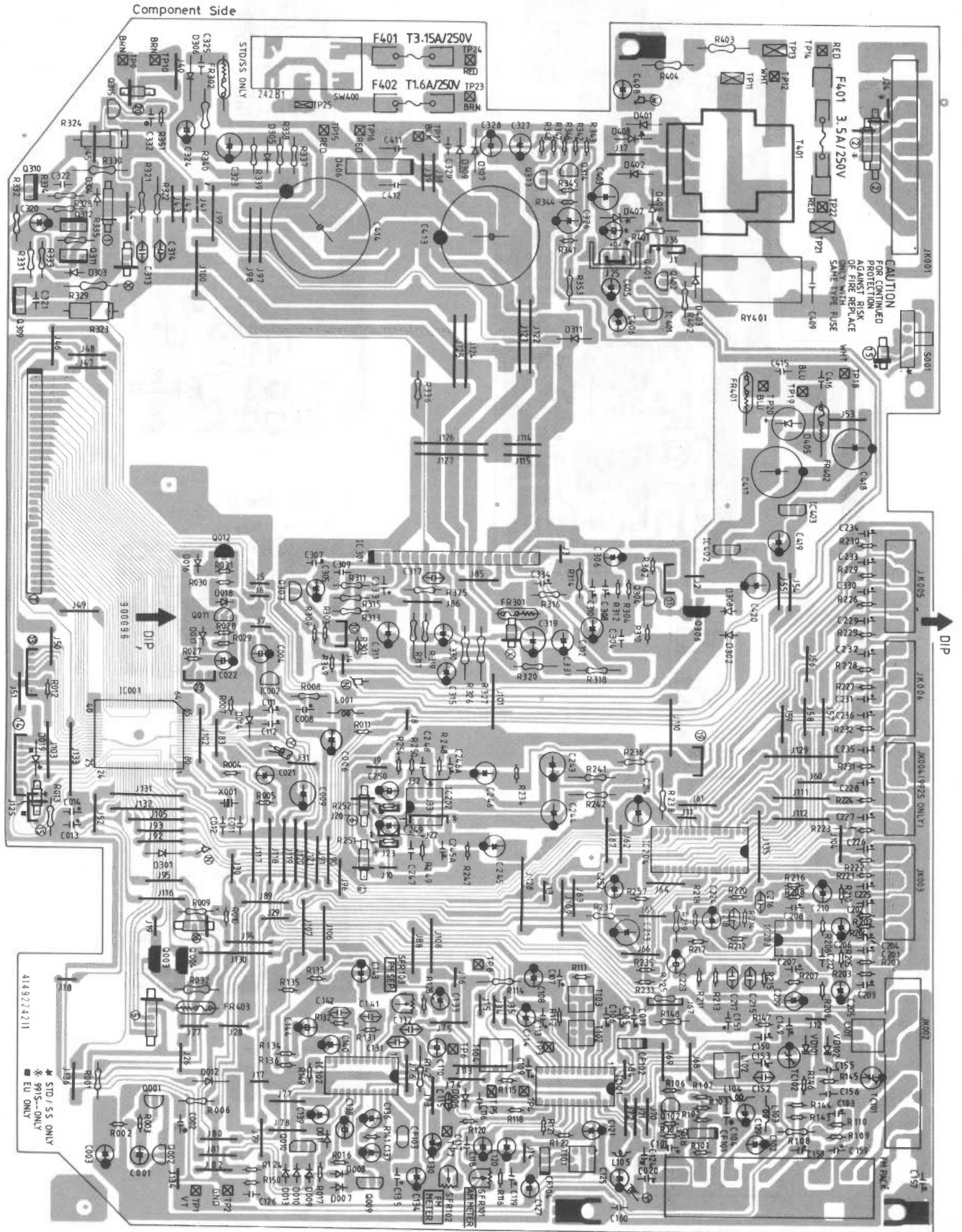
1. FM signal generator connected to Ext. Ant. terminals.
2. Signal generator set to 98 MHz, Ext.DEV.=60dB
3. Adjust SFR103, to let R/L channels separation be over 30 dB.

Fig. 2-2 Adjustment points on main Board



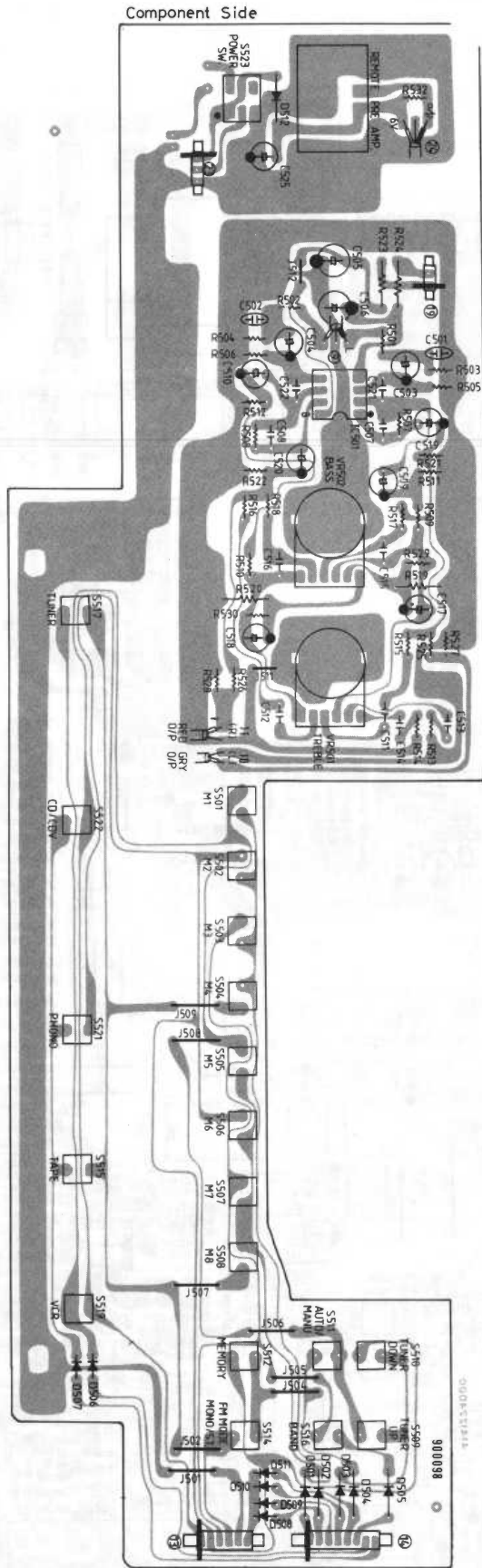
# 3. PARTS LOCATION ON BOARD

## 3-1. Main Board

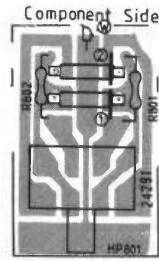




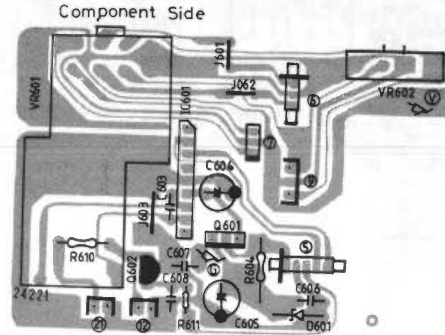
3-2. Front Board



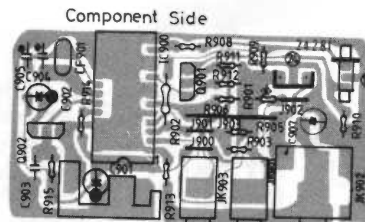
3-3. Headphone Jack Board



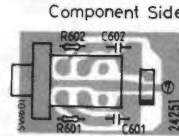
3-4. Volume Resistor Board



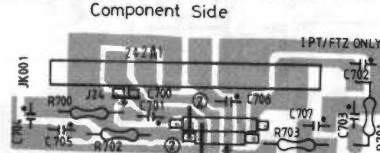
3-5. DTS Board



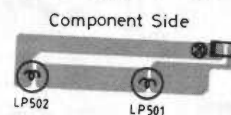
3-6. Loudness Board



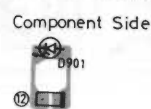
3-7. Speaker Terminal Board



3-8. Lamp Board



3-9. LED Board





## 4. PARTS LIST OF BOARD

### 4-1. LED Board (Part No. C049224230)

Ref. No.	Part No.	Description
● Diode D901	4120620482	LED EL2041T/P8 RED

### 4-2. LCD Display Board (Part No. C049224240)

Ref. No.	Part No.	Description
● LCD LCD001	4110440192	LCD display UTNH-H021 ENX

### 4-3. Lamp Board (Part No. C049224270)

Ref. No.	Part No.	Description
● LAMP LP501,502	4702020016	Pilot lamp 12V/60mA

### 4-4. FM Front End Board (Part No. C141222210)

Ref. No.	Part No.	Description
● IC IC1	415201186N	LA1186N
● Transistor Q1	41065192AY	FET 2SK192AY
Q2	410521674L	2SC1674L
C1,2	5010100045	Trimmer 10P
● Diode D1-3	41201SV103 or 4120400550	1SV103 1SV55
● Coil T1	4340200920	FM IFT TWS-358-412
L1	4291745035	Spring coil 0.7x4.5Qx3.5T
L3	4291740045	Spring coil 0.7x4Qx4.5T
L4	4291740035	Spring coil 0.7x4Qx3.5T
L5	4291040035	Spring coil 0.55x4Qx3.5T

### 4-5. Front Board (Part No. C142224110)

Ref. No.	Part No.	Description
● IC IC501,502	415904558D	NJM4558D
● Transistor Q503,504	410521841E	2SC1841E
D501-505	4120141480	1N4148
D506-511	4121901760	1SS176
D512	4120141480	1N4148
S501-512	4400000160	Tact switch SKHVBL3720-CB
S514-517	4400000160	Tact switch SKHVBL3720-CB
S519	4400000160	Tact switch SKHVBL3720-CB
S521,522	4400000160	Tact switch SKHVBL3720-CB
S523	4430206415	Push switch SEA12MC001-CP
VR501,502	5020215218	VR 100KBx2 RK16K123A003-CP
Remotecon sensor	7148101001	Remote preamp assembly

### 4-6. Main Board (Part No. C149224214)

Ref. No.	Part No.	Description
● Transistor Q001,002	410020945P,Q	2SC945P,Q
Q003,004	4104101145	DTA114ES
Q009,010	4104201445	DTC144ES
Q011	410020945P,Q	2SC945P,Q
Q012	410000733P,Q	2SA733P,Q
Q102	410021675L	2SC1675L
Q303,304	410022878A	2SC2878A
Q306	4104101445	DTA144ES
Q309-311	410001209S	2SA1209-S
Q312	410022911S	2SC2911S
Q313-315	410020945P,Q	2SC945P,Q
Q401	410030313E	2SD313E (STD only)
Q402	410022060R	2SC2060R
X001	410090450M	x'tal 4.5MHz

4-6. Main Board (Continue)

Ref. No.	Part No.	Description
● IC		
IC001	4152723055	LC7230-8355
IC002	4159781050	NJM78L05
	or 4157780053	MC78L05CT
IC101	4152012660	LA1266
IC102	4152034010	LA3401
IC202	415904558D	NJM4558D
IC203	415904558X	NJM4558D-X
IC204	4152078210	LC7821
IC301	4152041610	STK4161-2
IC401	4159780060	NJM78L06
IC402	4157078153	MC7815CT
IC403	4157079153	MC7915CT
● Diode		
D006-011	4120901760	1SS176
D013	4120901760	1SS176
D012,014	4120141480	1N4148
D016-018	4120901760	1SS176
D019	4120141480	1N4148
D301,305	4120141480	1N4148
D302-304	4120901760	1SS176
D306,307	413810400	1N4002L
D308	4120901760	1SS176
D309	4138104002	1N4002L
D311	4120141480	1N4148
D401-403	4121901420	1SS142
D405	4138150020	B20SL
D406	41300GBL02	GBL02
D407	4121901420	1SS142,T-77 (CSA)
D407	4121521305	RD13EB2,Zener
	or 4121531305	RD13EB3,Zener
D408,409	4120901420	1SS142
VD101,102	412020149B	1SV149B
	or 413000321S	SVC321SPA
tC101,102	5010100045	Trimmer ceramic 10P
	or 5010100055	Trimmer ceramic 10P
	or 5010110025	Trimmer ceramic 10P
cF101,102	4160200003	SFE10.7MA5,RED
cF103	4160500161	Resonator CSB456F11
cF104	4160500135	Ceramic F. SFU450B
sFR101	5226104177	100Kx S.V.R.
sFR102	5226204177	200Kx S.V.R.
sFR103	5226104177	100Kx S.V.R.
RY401	4390000019	Relay OMIT-SS-112DM
L001	4325047192	47uH Peaking coil
L101	4300102770	AM ant coil TWS-358-638
L102	4330101570	AM OSC coil TWS-358-644
L103,104	4325022092	22uH Peaking coil
L105	4329222311	Inductance 22mH

4-6. Main Board (Continue)

Ref. No.	Part No.	Description
T101	4340101240	AM IFT R22-E792
T102	4340201300	FM DET (A) TWS-358-636
T103	4340201310	FM DET (B) TWS-358-637
T401	420A359214	Back up trans. EI-35 (M)
	4208281214	Back up trans. EI-28 (M) (CSA)
JK001	4560008077	8P Speaker terminal
JK002	4560004086	4P ant. terminal
		CJ-9020-02-04
JK003	4500800250	4P RCA JACK RJ-1018-010
JK004	4500800353	4P RCA JACK RJ-1018-090
JK005	4500800250	4P RCA JACK RJ-1018-010
JK006	4500800250	4P RCA JACK RJ-1018-010
R032	4050268052	68 ohm, 1/2W
R114	4050210152	100 ohm, 1/2W
R142	4050210152	100 ohm, 1/2W
R237,238	4050210152	100 ohm, 1/2W
R241,242	4050210152	100 ohm, 1/2W
R317-320	4050233252	3.3K ohm, 1/2W
R321,322	4050247952	4.7 ohm, 1/2W
R323,324	4092010852	1 ohm, 2W,Metal
R326,327	4050215252	1.5K ohm, 1/2W Metal
R329,330	4050212152	120 ohm, 1/2W Metal
R340	4171033255	3.3K ohm, 1W Metal
R401	4271018255	1.8K ohm, 1W Metal (STD)
fR301	4180210157	100 ohm, 1/2W
fR302	4180247957	4.7 ohm, 1/2W
fR401,402	4180210957	1 ohm, 1/2W
fR403	4180433057	Fuse R. 1/4W 33
C002	7307110315	.01uF 16V C.C.
C008	7307110315	.01uF 16V C.C.
C013,014	7308622345	.022uF 25V C.C.
C019	7307110315	.01uF 16V C.C.
C020	7306510115	100P 50V C.C.
C101	7308622345	.022uF 25V C.C.
C103-107	7308622345	.022uF 25V C.C.
C109	7306510115	100P 50V C.C.
C111,112	7306510215	1000P 50V C.C.
C113	7308622345	.022uF 25V C.C.
C119	7308622345	.022uF 25V C.C.
C124,126	7308622345	.022uF 25V C.C.
C135	7308622345	.022uF 25V C.C.
C150	7308622345	.022uF 25V C.C.
C153	7306939055	39P 50V C.C.
C157	7306647345	.047uF 50V C.C.
C158	7308622345	.022uF 25V C.C.
C159	7308622345	.022uF 25V C.C.
C160	7308622345	.022uF 25V C.C.
C201,202	7306510115	100P 50V C.C.
C203,204	7306533115	330P 50V C.C.
C207,208	7306510115	100P 50V C.C.
C307,308	7306582115	820P 50V C.C.
C309,310	7306522115	220P 50V C.C.

**4-6. Main Board (Continue)**

Ref. No.	Part No.	Description
C332	7308622345	.022uF 25V C.C.
C333,334	7306947915	4.7P 50V C.C.
C409	5106472141	4700pF/AC400V,Spark "L"
C413,414	515547250	4700pF/50V
C417	5154102235	1000pF/35V
S001	4410102136 7160228001	Slide SW HTSS-12F23G6 FM front end FE-337-A07

**4-7. VR Board (Part No. C149224220)**

Ref. No.	Part No.	Description
● IC		
IC601	4159062080	BA6208
Q601	410030882P,Q	2SD882P,Q
Q602	410000952L,K	2SA952L,K
D601	4122520475 or 4122530475	RD4.7EB2,Zener RD4.7EB3,Zener
vR601	5025254180	VR 50KBX2 RK16312MS019
vR602	5020115219	VR 100KW RK163111E370
R604	4050233159	330 ohm, 1/2W
C606	730862234A	.022uF,25V

**4-8. Loudness Board  
(Part No. C149224250)**

Ref. No.	Part No.	Description
● Switches		
SW601	4430202578	Push SW spun12A201-CP

Ref. No.	Part No.	Description
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**4-9. DTS Board (Part No. C149224280)**

Ref. No.	Part No.	Description
● IC		
IC900	4153C24104	TMP47C241N-J504
cF901	4161200197	Resonator CSA 4.19MG
JK901	4500100240	Mic jack JY-3510
JK902	4500800287	IP RCA jack 0501015
JK903	4500100240	Mic jack JY-3510
● Transistor		
Q901	41092143ZS	DTC143ZS
Q902	41092143ES	DTC143ES
C903	7308622345	.022uF 25V C.C.
C904,905	7306933055	33P 50V C.C.

**4-10. Volume Selector Board  
(Part No. C1492242B1)**

Ref. No.	Part No.	Description
● Switch		
SW400	4420000149	Volume selector switch HXW0254-01-110
F401,402	4692000034	Fuse holder PFC5000-0202T

**4-11. H/P jack Board (Part No. C049224290)**

Ref. No.	Part No.	Description
HP801	4500500260	H/P jack JY-6311-01-070C
R801,802	4050222159	220 ohm, 1/2W

**5. MAIN PARTS REPLACEMENT**

**5-1. Mechanism Ass'y**

- 1) Remove 8 screws (M53a),and remove the top cap (M54).
- 2) Remove 9 screws (M13b),and remove front PCB (M23).
- 3) Remove 2 screws (M13C), to remove the Loudness PCB (M26).
- 4) Remove 1 screw (M13d) & 3 screws (M2f). & 1 screw (M47e),to remove main PCB (M37).
- 5) Remove 1 screw (M13g) & 1 screw (M2h), to remove DTS PCB (M60).
- 6) Remove 2 screws (M13g), to remove volume selector PCB (M56).

## 6. PARTS LIST OF CABINET

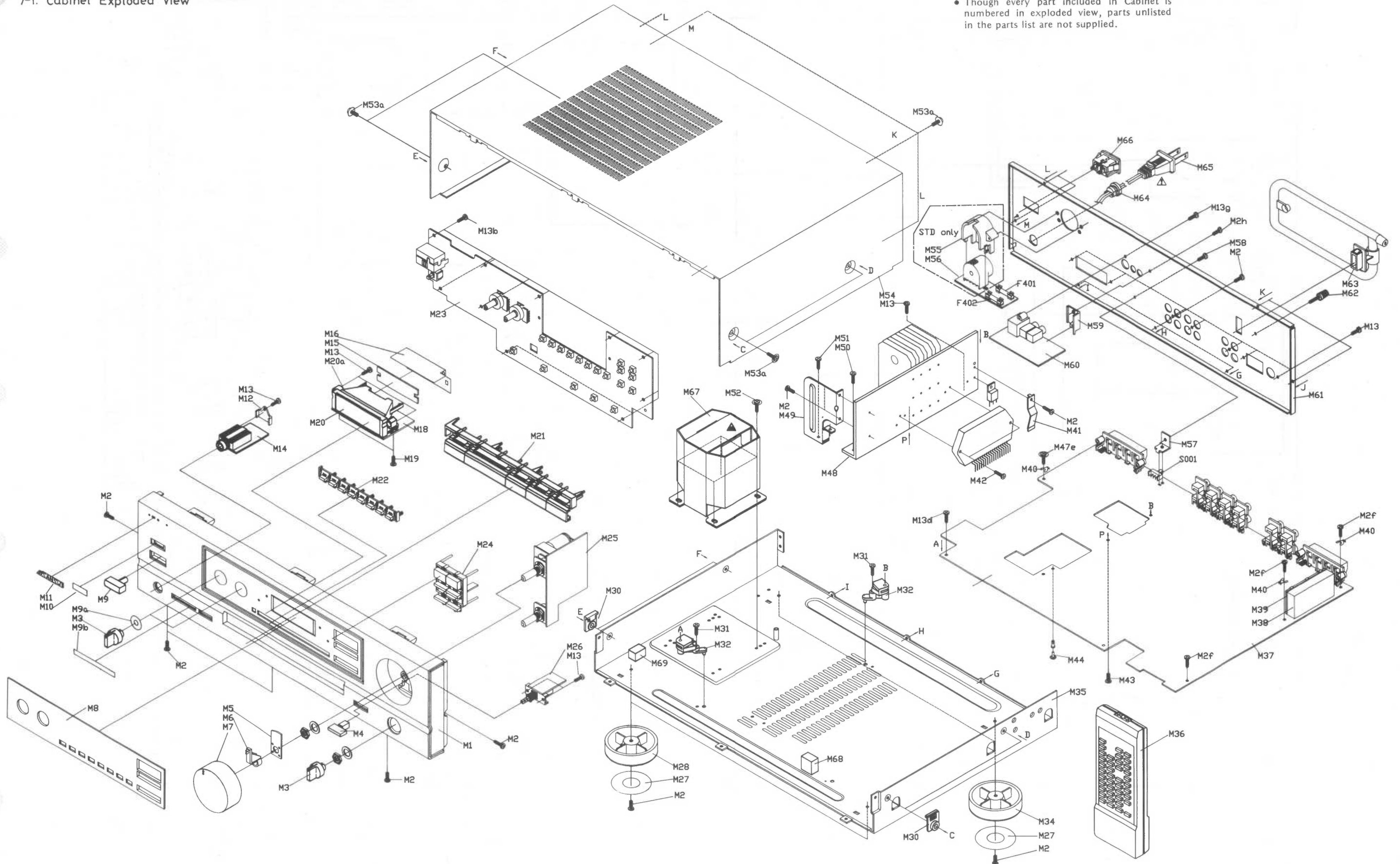
### 6-1. Cabinet

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
M1	JS85078100	R2770 Front panel	M37	C149224212	Main PCB assembly
M3	JS85078700	R2770 Tone knob	M38	2007079955	Shield cover
M4	1009079920	Push button	M39	-----	FM front end PCB assembly
M5	-----	LED PCB assembly	M40	2005079551	Earth washer
M6	100507991S	Volume Indicator	M41	200907992D	Transistor IC. holder
M7	100506127T	Volume knob	M44	2000000150	P-rivet 3x6.5
M8	JS85078800	R2780 Display window	M45	201004145D	Heat sink
M9	1006079955	Power knob	M49	200707992D	Heat sink bracket
M9a	JS85080400	R2770 knob ring	M54	JS85079200	R2770 Bonnet
M9b	JS85079100	E-R2770 overlay	M55	201105127A	Voltage cover (STD only)
M10	JS85079000	R2770 Remocon filter	M56	-----	Volume selector PCB assembly (STD only)
M11	JS05051200	Logo type badge H5 G	M57	2020071218	Back board bracket
M12	2007075907	Phone jack holder	M59	2001079955	Fixing plate
M14	-----	Speaker switch	M60	-----	DTS PCB assembly
M15	-----	PCB assembly	M61	101107991S	Rear panel
M18	-----	Lamp PCB assembly		100107991S	Rear panel (CSA)
		LCD display		101407991S	Rear panel (STD/SS)
		PCB assembly		1020079920	GND knob 3Q
M20	2017077500	Display plate	M62	1035068801	Antenna holder
M20A	2003079910	Display chassis	M64	4580200006	Cord stopper SR-4N-6 (BLK)
M21	JS85078400	R2770 Selector knob	⚠ M65	4630212065	AC cord UL/CSA 7F BLK STP2
M22	JS85078500	R2770 Preset knob	⚠ M65	463131L070	AC cord UL/CSA 7F BLK STP2 (STD)
M23	C142224010	Front PCB assembly	⚠ M65	463021L065	AC cord 6.5F BLK-2 (STD/SS)
M24	JS85078600	R2770 Tuning knob	⚠ M66	4570100510	AC outlet HJC-030A1 (P)
M25	-----	VR PCB assembly	⚠ M67	420B769131	Power trans. EI-76 (F)
M26	-----	Loudness PCB assembly	⚠ M67	420A761175	Power trans. EI-76 (B)
M27	JS27593800	Foot sheet (20)	⚠ F401	5267315060	Fuse semk T3.15A/250V (UL)
M28	JS85047300	55 Foot B	⚠ F402	5267160060	Fuse semk T1.6A/250V
M29	2002001006	Sponge			
M30	JS85080500	R2770 Bonnet washer			
M32	200707991D	PCB holder			
M33	200107991S	Sponge			
M34	JS85047200	55 Foot A			
M35	201017991D	Bottom board			
M36	7159919001	Remote transmitter			

# 7. EXPLODED VIEW OF CABINET

7-1. Cabinet Exploded View

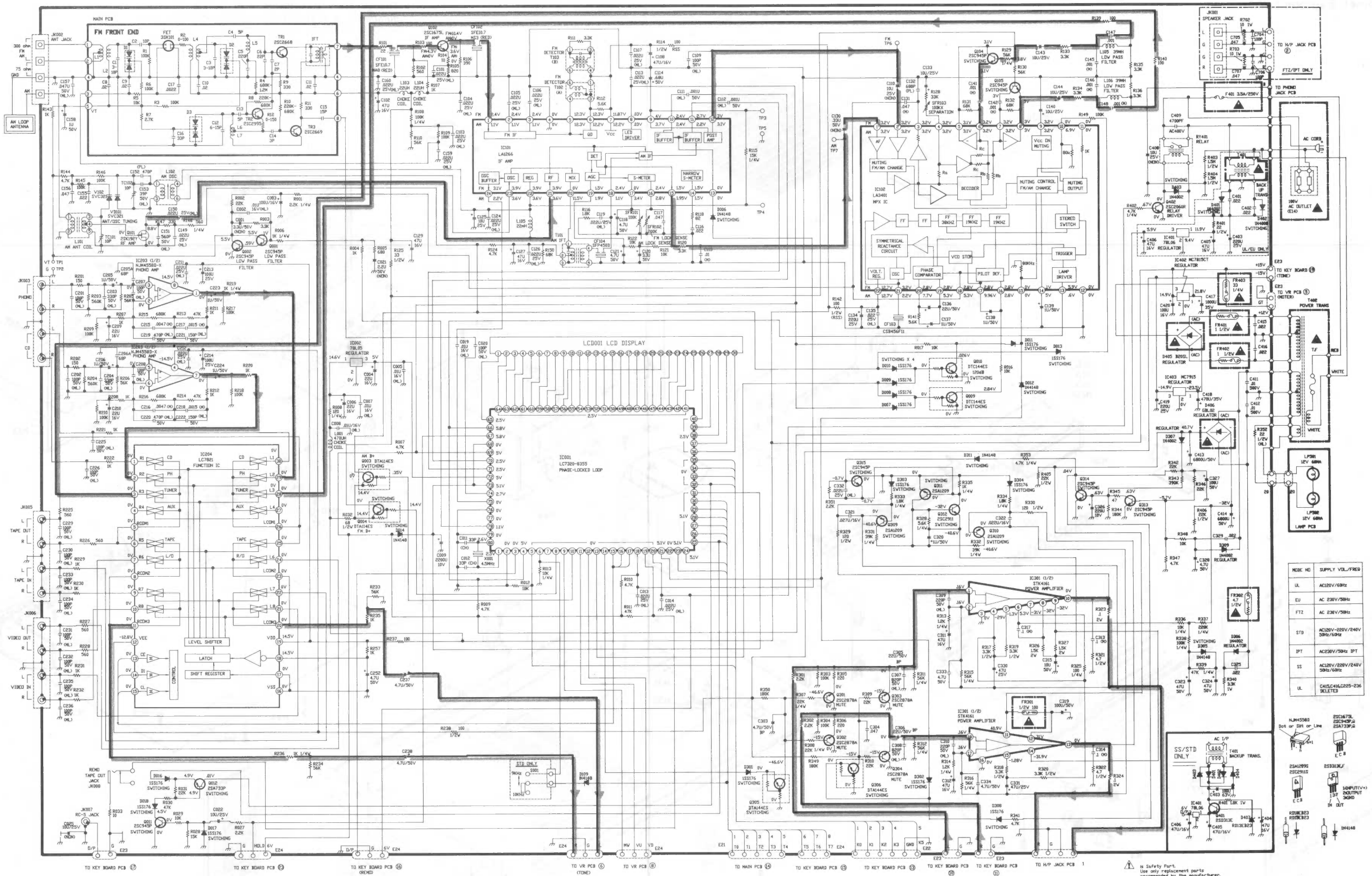
• Though every part included in Cabinet is numbered in exploded view, parts unlisted in the parts list are not supplied.





# 8. SCHEMATIC DIAGRAM 8-1. RZ-590 (Main Section)

- Design and specifications subject to change without notice for improvement.
- La présentation et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
- Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.

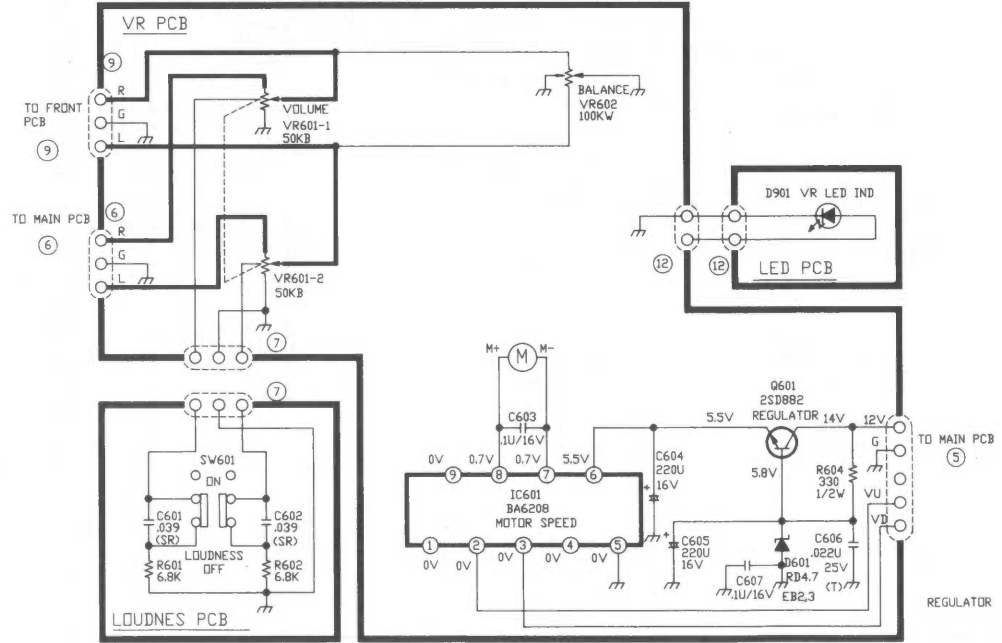
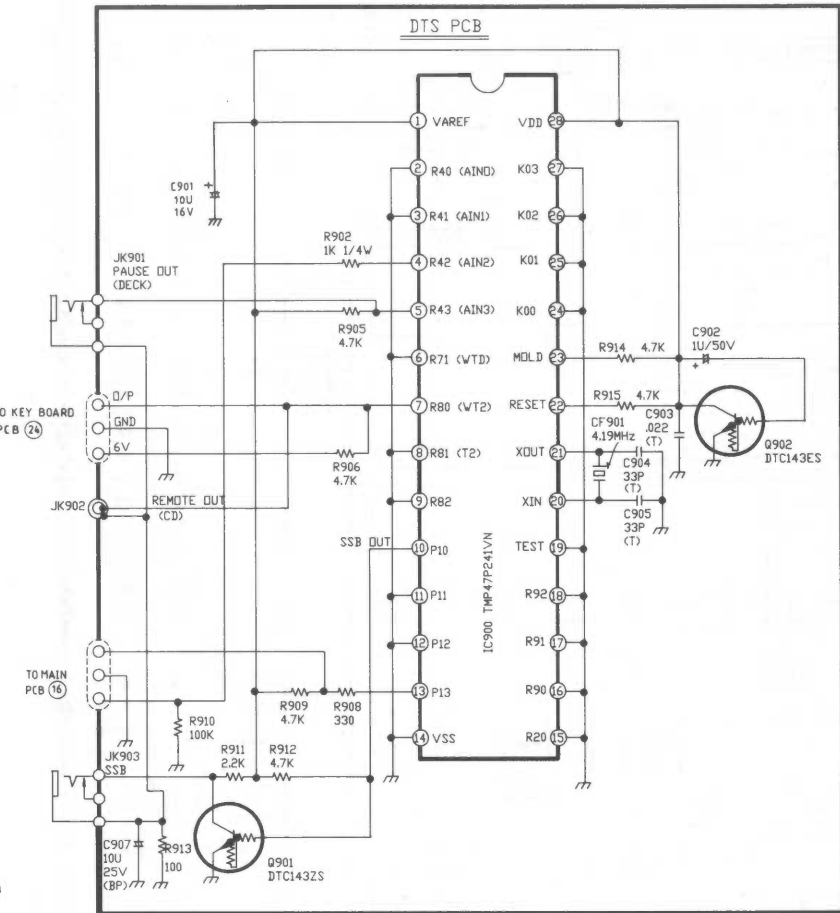
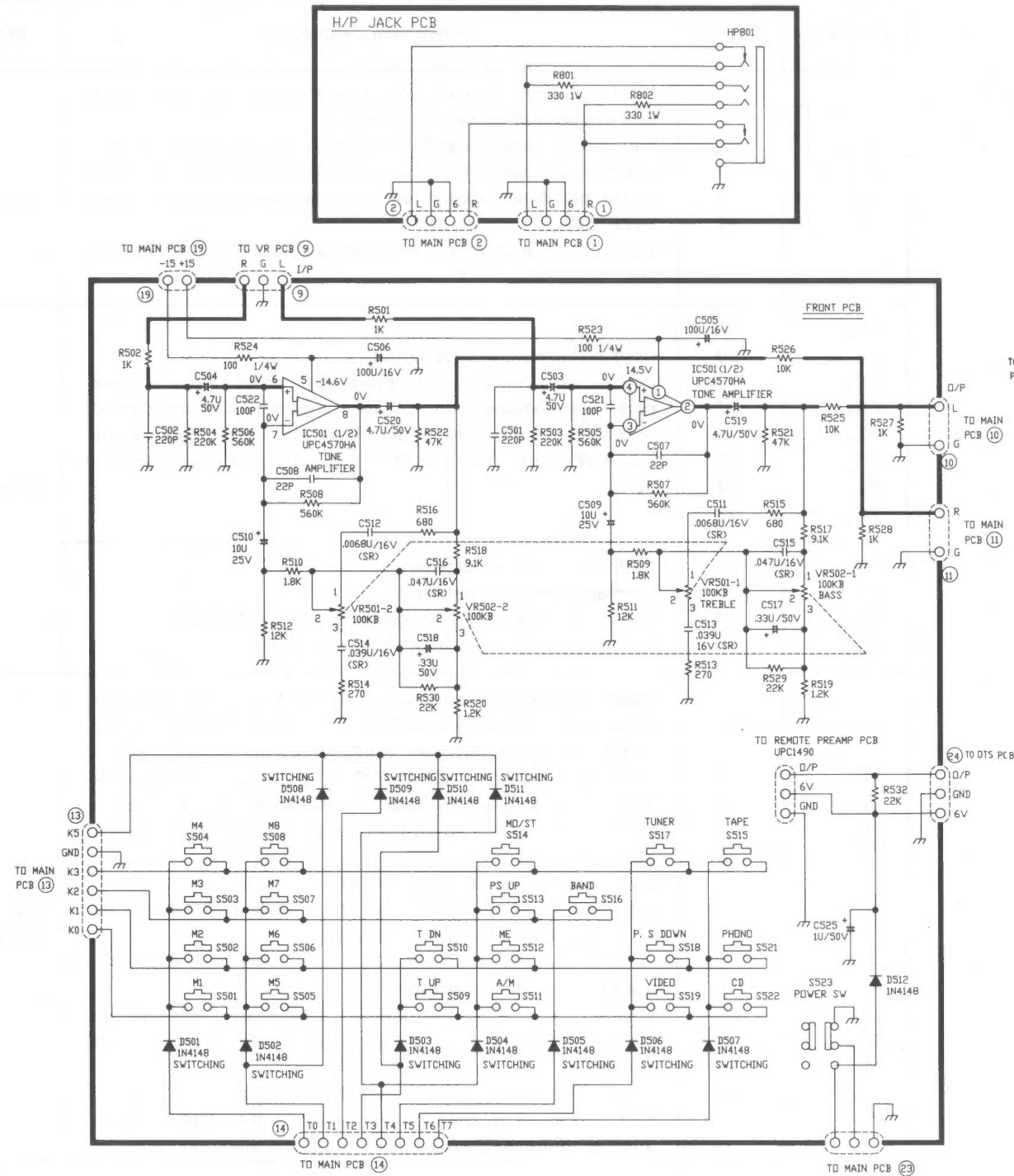


REF ID	SUPPLY VOL./FREQ
UL	AC120V/60Hz
EJ	AC 230V/50Hz
FTZ	AC 230V/50Hz
STD	AC120V-220V/240V 50Hz/60Hz
IFT	AC220V/50Hz IPT
SS	AC120V/220V/240V 50Hz/60Hz
UL	CA15CA16CA225-236 RELIEFS

**RESISTORS**  
 Are in ohms, 1/6 Watts, 5% Tolerance  
 Unless Otherwise Noted, see RM on CAPACITORS  
 Are in uF, Unless Otherwise Noted, Pol  
**ELECTROLYTIC CAPACITORS**  
 Capacitance (uF/VOL.TV)  
 Each DC Voltage shows the nominal value in volts during recording.

**SYMBOL**  
 C101 Stylized Capacitor  
 OEL Main Layer Ceramic Capacitor  
 C301 Same Conductor Capacitor  
 DO Nylon Film Capacitor  
 OPL Polypropylene Film Capacitor  
 OPI Non-Polar Capacitor

8-2. RZ-590 (Front Section)



**⚠ Safety Part.**  
Use only replacement parts recommended by the manufacturer.

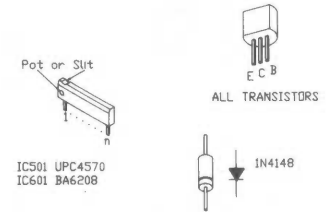
**RESISTORS**  
Are in ohms, 1/6 Watts, ±5% Tolerance  
Unless Otherwise Noted, k=ohm, M=ohm

**CAPACITORS**  
Are in uF, Unless Otherwise Noted, PipF

**ELECTROLYTIC CAPACITORS**  
Capacitance (uF)/VOLT(V)  
Each D.C Voltage shows the nominal value in volts during recording.

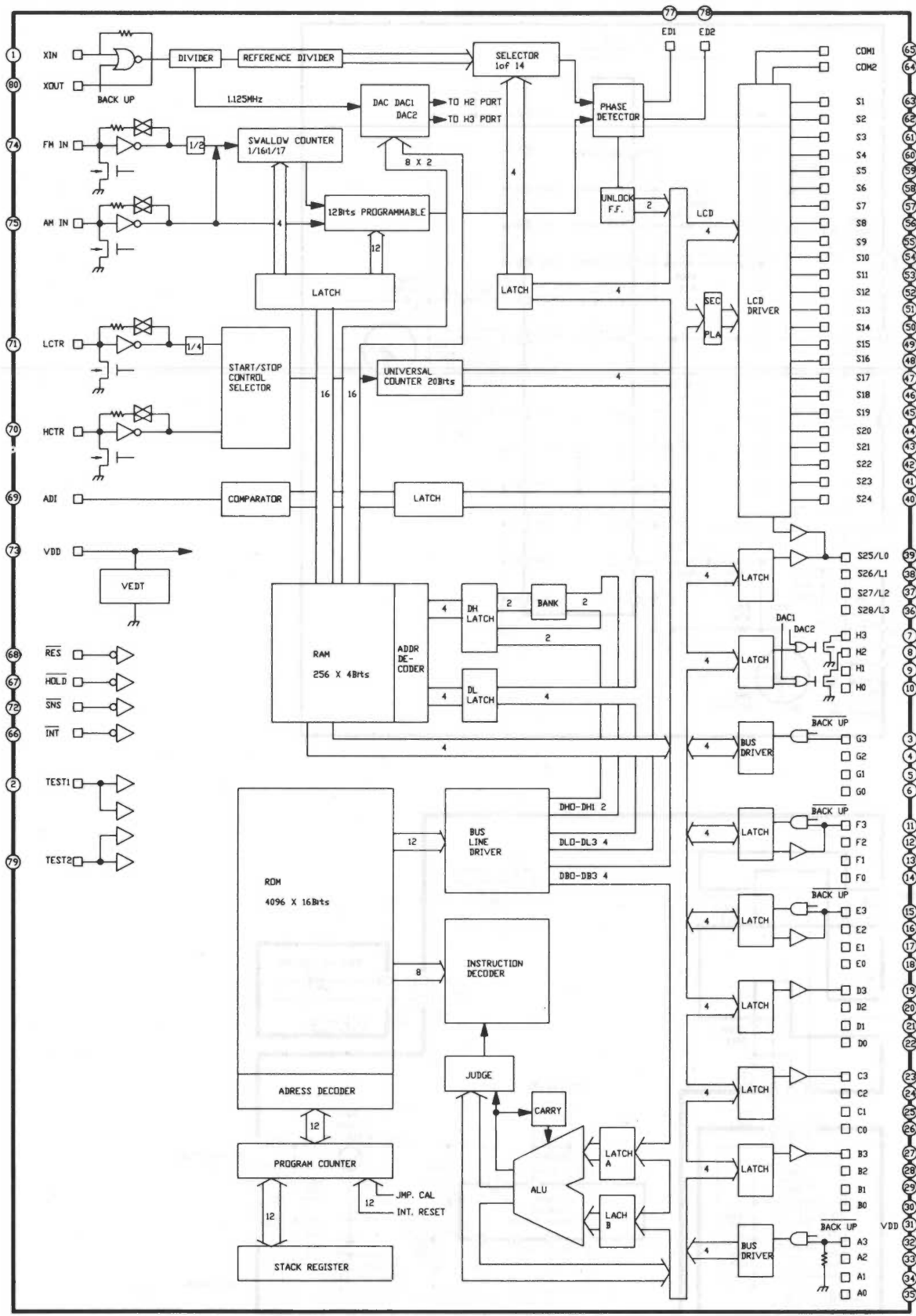
**SYMBOL**  
(SC) Styrol Capacitor  
(ML) Multi Layer Ceramic Capacitor  
(SR) Semi Conductor Capacitor  
(M) Mylar Film Capacitor  
(PL) Polypropylen Film Capacitor  
(NP) Non-Polar Capacitor

S501-S508=MEMORY PRESET STATION SWITCH.  
S509=TUNING UP SWITCH.  
S510=TUNING DOWN SWITCH.  
S511=AUTO/MANUAL SWITCH.  
S512=MEMORY SWITCH.  
S514=MONO/STEREO SWITCH.  
S515=TAPE SWITCH.  
S516=BAND SWITCH.  
S517=TUNER SWITCH.  
S519=VCR SWITCH.  
S521=PHONO SWITCH.  
S522=MEMORY SWITCH.  
S523=POWER SWITCH.  
SV601=LOUDNESS





### 9. INTERIOR BLOCK DIAGRAM OF IC (IC001 LC7230-3558)



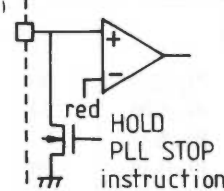
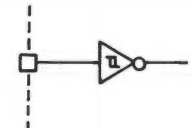
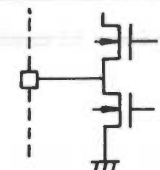
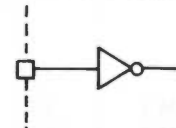
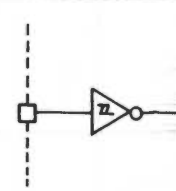
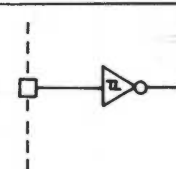
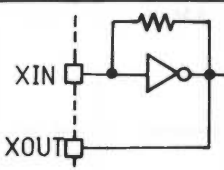
### FUNCTIONAL EXPLANATION OF SYNTHESIZER IC001 TERMINALS

Pin Name	Pin No.	Functional Description	I/O	I/O Circuit Type
PA <sub>0</sub> PA <sub>1</sub> PA <sub>2</sub> PA <sub>3</sub>	35 34 33 32	Used exclusively for data input. Low threshold type. These port pins can be used for key data entry. Pull-down resistance can be selected by the user option. In this selection, all four port pins are controlled at one time. That is, the pull-down resistor cannot be selected for each port pin individually. Input to the port pins is inhibited during the BACKUP mode ON.	Input	
PB <sub>0</sub> PB <sub>1</sub> PB <sub>2</sub> PB <sub>3</sub> PC <sub>0</sub> PC <sub>1</sub> PC <sub>2</sub> PC <sub>3</sub>	30 29 28 27 26 25 24 23	Used exclusively for data output. Can be used for key scan timing signal output because these ports are composed of CMOS transistors with unbalanced impedance. Enter into output high impedance state at the BACKUP mode. Placed in "L" level state at the reset ( $\overline{RES} = "L"$ ).	Output	
PD <sub>0</sub> PD <sub>1</sub> PD <sub>2</sub> PD <sub>3</sub>	22 21 20 19	Used exclusively for data output. Normally CMOS output type. Enter into output high impedance state at the BACKUP mode. Placed in the "L" level state at the reset ( $\overline{RES} = "L"$ ).		
PE <sub>0</sub> PE <sub>1</sub> PE <sub>2</sub> PE <sub>3</sub>	18 17 16 15	Used for data input and output. The port is set to the input mode once the input instruction (IN, TPT, or TPF) is executed in the application program while set to the output mode if the output instruction (OUT, SPB, RPB) is used. The operation mode, once selected by such an instruction, can be effective until an instruction of different type is used in application program. Set to the input mode at the reset ( $\overline{RES} = "L"$ ). Set to the input mode at the BACKUP mode. In this case, note that data input to this port is inhibited.	Input/Output	
PF <sub>0</sub> PF <sub>1</sub> PF <sub>2</sub> PF <sub>3</sub>	14 13 12 11	Used for data input and output. This port is controlled by the FPC instruction. Each port pin can be set to the input mode or the output mode by that instruction. Set to the input mode at the reset ( $\overline{RES} = "L"$ ). This port is set to the input mode at the BACKUP mode. In this case, note that data input to this port is inhibited.		
PG <sub>0</sub> PG <sub>1</sub> PG <sub>2</sub> PG <sub>3</sub>	6 5 4 3	Used exclusively for data input. Data input to the port is inhibited at the BACKUP mode.	Input	
PH <sub>0</sub> PH <sub>1</sub> PH <sub>2</sub> PH <sub>3</sub>	10 9 8 7	Used exclusively for data output. This port can be used for frequency band power source selection because this port has Nch open drain output circuitry at a high withstand voltage level. Port pins H <sub>2</sub> and H <sub>3</sub> can be also used as the DAC <sub>1</sub> and DAC <sub>2</sub> outputs, respectively. Enter into high impedance state at the reset ( $\overline{RES} = "L"$ ) and the BACKUP mode.	Output	

## FUNCTIONAL EXPLANATION OF SYNTHESIZER IC001 TERMINALS (Continued)

Pin Name	Pin No.	Functional Description	I/O	I/O Circuit Type
PI <sub>0</sub> /S25 PI <sub>1</sub> /S26 PI <sub>2</sub> /S27 PI <sub>3</sub> /S28	39 38 37 36	Used exclusively for data output. This port has CMOS type output circuitry and can be selected as LCD driver output ports. The port operation mode can be selected by the SS or RS instruction. The output mode cannot be selected by such an instruction in bit units. This port is set to the LCD driver output mode at the reset ( $\overline{\text{RES}} = "L"$ ) and at the power supply. In this case, the segment display is forced into the OFF state. This port is fixed to the "L" level at the BACKUP mode.	Output	
S1 to S24	63 to 40	Used for driving segments. That is, these ports are used as the LCD output drivers. The frame frequency for segment output is 100 Hz. The lighting format is 1/2 duty and 1/2 bias. The segment display is forced into the OFF state at the reset ( $\overline{\text{RES}} = "L"$ ) and power supply. This port is set to the "L" level at the BACKUP mode.	Output	
COM 1 COM 2	65 64	Used for LCD drive common signal output. The lighting format is 1/2 duty and 1/2 bias. Normal output at the reset ( $\overline{\text{RES}} = "L"$ ) and power supply. These ports are set to the "L" level at the BACKUP mode.	Output	
FM IN	74	Used for FM VCO input (local oscillation). Note that the VCO means Voltage-Controlled Oscillation. Input through capacitor coupling is required. The input frequency range is between 10 MHz and 130 MHz.	Input	
AM IN	75	Used for AM VCO input (local oscillation). Note that the VCO means Voltage-Controlled Oscillation. Input through capacitor coupling is required. Frequency bands can be selected by CW1 of the PLL instruction. Hi (2 to 40 MHz) → SW Lo (0.5 to 10 MHz) → LW, AM		
HCTR	70	Used for universal counter input. Input through capacitor coupling is required. The input frequency range is between 0.4 MHz and 12 MHz. This port can be used for counting FM IF and AM IF.	Input	
LCTR	71	Used for universal counter input. Input through capacitor coupling is required when the input frequency range is between 100 kHz and 500 kHz. Input through capacitor coupling is not required when the input frequency range is between 1 Hz and 20 kHz. This port can be used for counting AM IF.		

FUNCTIONAL EXPLANATION OF SYNTHESIZER IC001 TERMINALS (Continued)

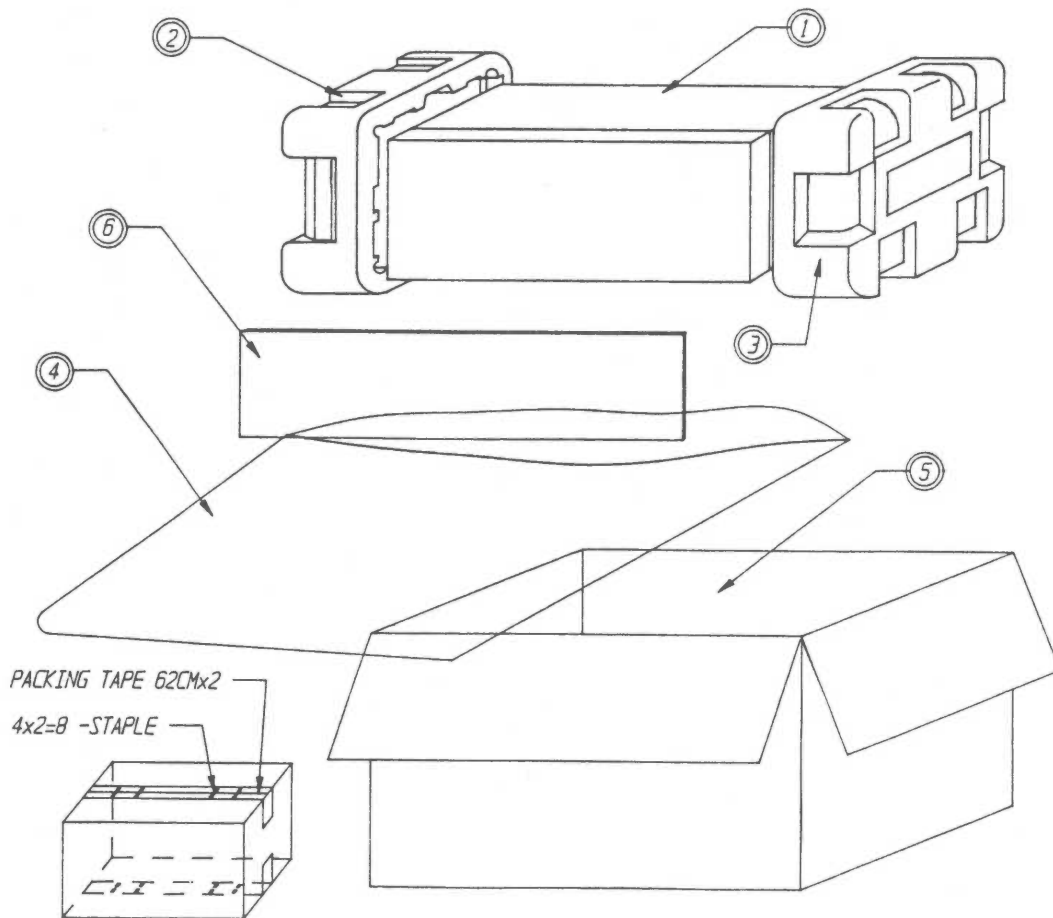
Pin Name	Pin No.	Functional Description	I/O	I/O Circuit Type
ADI	69	Used for AD converter input. The AD converter is composed of a 6-bit sequential comparator requiring a conversion time of 1.28 milliseconds. Full-scale data (3FH): $V_{DD} \times 63/96$ .	Input	
INT	66	Used for interrupt request signal input. Interrupt request becomes active if falling signal edge is detected at the port with the INTEN flag already set. Note that this flag is set by the SS instruction..	Input	
EO <sub>1</sub> EO <sub>2</sub>	77 78	Used for phase comparison error output. Note that the reference signal frequency and programmable divider output signal frequency are compared in their phase On-chip charge pump available. The EO <sub>1</sub> and the EO <sub>2</sub> have the same circuit type.	Output	
SNS	72	Used at the BACKUP mode for power failure signal input. This port can be used as a normal input port.	Input	
HOLD	67	Used for HOLD mode request signal input. The HOLD mode becomes active if the HOLD pin logic changes to "L" with the HOLDEN flag already ON. Note that this flag is set by the SS instruction. The withstand voltage level of this port is "high" in order that the port can be used together with a power switch.	Input	
RES	68	Used for the system reset request input. The power up "L" level reset request signal must be applied to this port for more than 75 milliseconds. The reset "L" level start request signal must be applied to this port for more than five fundamental clock cycles.	Input	
XIN XOUT	1 80	These two pins are used for X'tal oscillation frequency (4.5 MHz) input and output. On-Chip feedback resistor available.	Input/ output	
TEST 1 TEST 2	2 79	These two pins are used for LST test signal input. They should be open-circuited or connected with the VSS pin.		
VDD VSS	31,73 76	Power source.		

## 10. PACKING LIST

Ref. No.	Part No.	Description
1		RZ-590 (SET)
2	900307991S	SNOW BOX L
3	900207991S	SNOW BOX R
4	901507995S	SOFT SHEET
5	9906006041	POLY BAG
6	9001207991S	MASTER CARTON

## 11. ACCESSORY LIST

Ref. No.	Part No.	Description
	9080019350	INSTRUCTION BOOK
	9902304046	POLY BAG (1/B) 23x40





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