

Service Manual

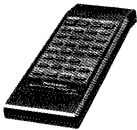
Tuner

QUARTZ Synthesizer
LW/MW/FM Stereo Tuner

ST-X933L

Color

(K) Black Type



Area

Country Code	Area	Color
(E)	Continental Europe	(K)
(EB)	Great Britain	(K)
(GC)	Saudi Arabia	(K)
(GN)	New Zealand	(K)

SPECIFICATIONS

(DIN 45 500)

■ FM TUNER SECTION

Frequency range	87.50~108.00 MHz (0.05 MHz-steps)
Sensitivity	1.5 μ V (IHF, usable)
S/N 30 dB	1.3 μ V (75 Ω)
S/N 26 dB	1.2 μ V (75 Ω)
S/N 20 dB	0.9 μ V (75 Ω)
IHF 46 dB stereo quieting sensitivity	28 μ V / 75 Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	70 dB (78 dB,IHF)
STEREO	65 dB (71 dB,IHF)
Frequency response	20 Hz ~ 15 kHz, +0.5 dB ~ -1.5 dB
Alternate channel selectivity	
$\pm$ 400 kHz	65 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	46 dB
IF rejection at 98 MHz	70 dB
Spurious response rejection at 98 MHz	70 dB
AM suppression	55 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	-30 dB (-35 dB,IHF)
38 kHz	-45 dB (-50 dB,IHF)
Channel balance (250 Hz ~ 6,300 Hz)	$\pm$ 1.5 dB
Limiting point	1.2 μ V
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	75 Ω (unbalanced)

■ AM TUNER SECTION

Frequency range	
MW	522 kHz ~ 1611 kHz (9 kHz-steps) 530 kHz ~ 1620 kHz (10 kHz-steps)
LW	155 kHz ~ 353 kHz (9 kHz-steps) 153 kHz ~ 351 kHz (-2 kHz shift)
Sensitivity (S/N 20 dB)	
MW	20 μ V,300 μ V/m
LW	50 μ V
Selectivity ($\pm$ 9 kHz)	
MW (at 999 kHz)	55 dB
LW (at 254 kHz)	55 dB
Image rejection	
MW (at 999 kHz)	40 dB
LW (at 254 kHz)	40 dB
IF rejection	
MW (at 999 kHz)	60 dB
LW (at 254 kHz)	60 dB

■ GENERAL

Output voltage	0.3V (0.6V,IHF)
Power consumption	9W
Power supply	
For Great Britain	AC 50 Hz/60 Hz,240V
For continental Europe	AC 50 Hz/60 Hz,220V
For others	AC 50 Hz/60 Hz,110V/127V/220V/240V
Dimensions (W x H x D)	360 x 64.5 x 288 mm (14-3/16" x 2-17/32" x 11-11/32")
Weight	2.0 kg (4.4 lb.)

Notes:
Specifications are subject to change without notice.
Weight and dimensions are approximate.

Technics

Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan

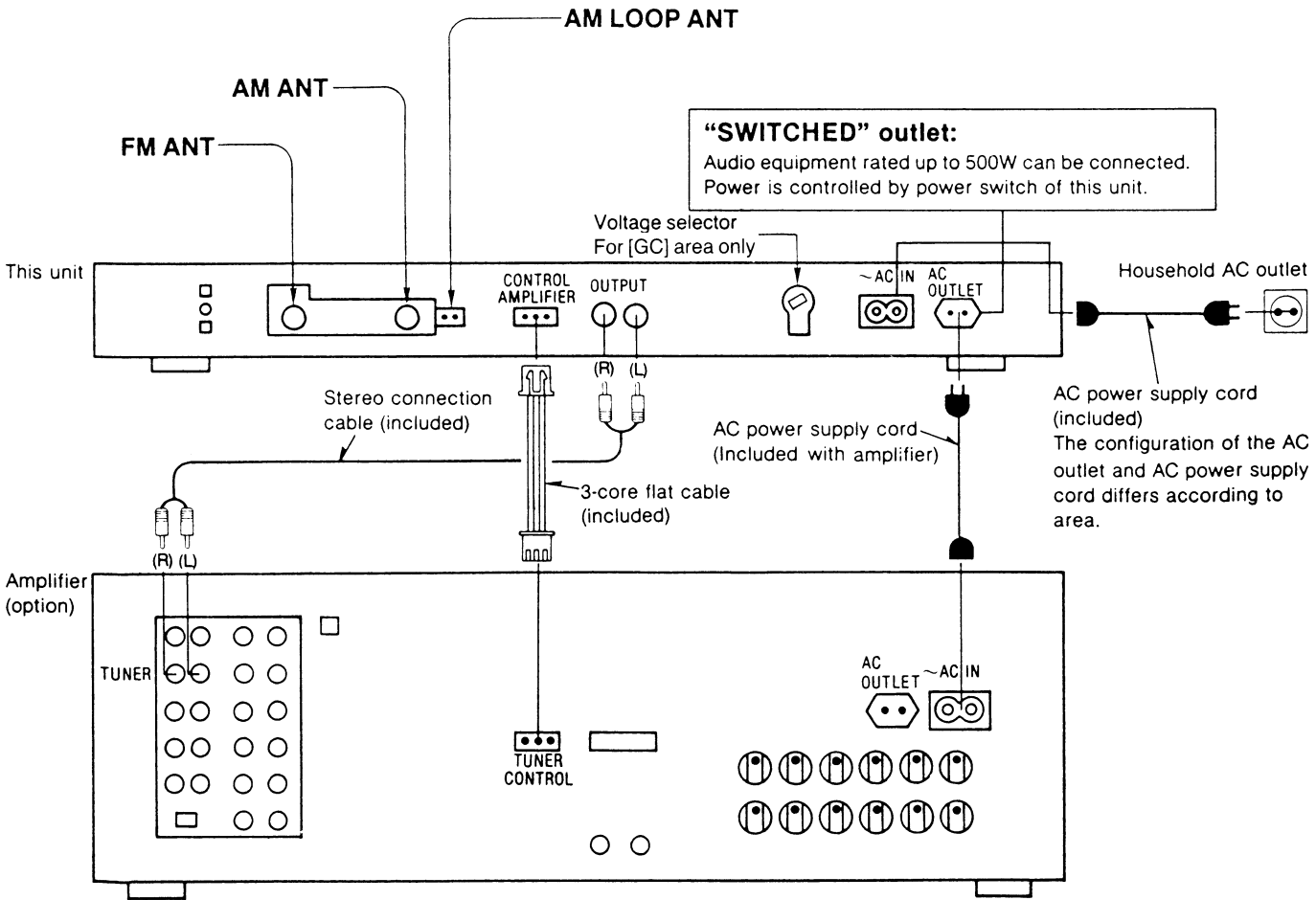
CONTENTS

	Page		Page
ACCESSORIES	2	TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES	14
CONNECTIONS	2	CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM	15~17
LOCATION OF CONTROLS	3	DESCRIPTION OF FL PANEL	17
DISASSEMBLY INSTRUCTIONS	3, 4	RESISTORS AND CAPACITORS	18~20
MEASUREMENTS AND ADJUSTMENTS	5, 6	REPLACEMENT PARTS LIST	20~22
FUNCTIONS OF IC TERMINALS	7	EXPLODED VIEW	23, 24
BLOCK DIAGRAM	8, 9		
SCHEMATIC DIAGRAM	10~13		

ACCESSORIES

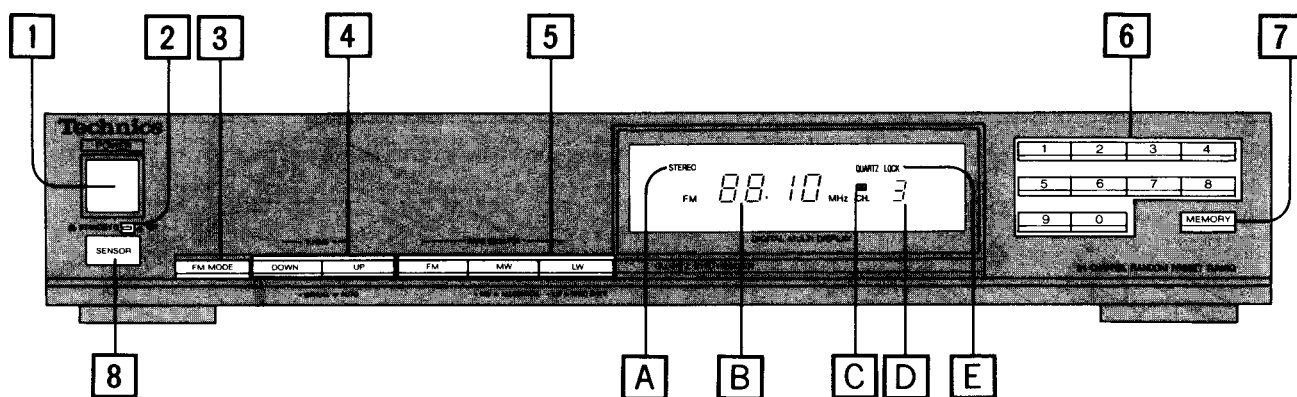
- Stereo connection cable (SJPK2203-1) 1
- FM indoor antenna 1
 - For [GC, GN] areas only (SSA269M)
 - For others areas (SSA270M)
- AM loop antenna (SPB1162T) 1
- AM antenna holders (SMA233-1M) 1
 - (SMA231M)
- Screws (XTB3+10AFZ) 2
- 3-core flat cable (SWKTX930E) 1
- AC plug adaptor (RJP9215 for [GC] area only) 1
- AC power supply cord 1
 - For [GN] area only (SJA173)
 - For [GC] area only (RJA0004)
 - For [E] area only (SFDAC05E03)
 - For [EB] area only (SJA193)
- Remote-control transmitter 1
 - For [GN] area only (EUR64776)
 - For other areas (EUR64754)
- Attachment plug (SJP9009 for [EB] area only) 1
- Batteries (R03) 2

CONNECTIONS



LOCATION OF CONTROLS

Tuner section

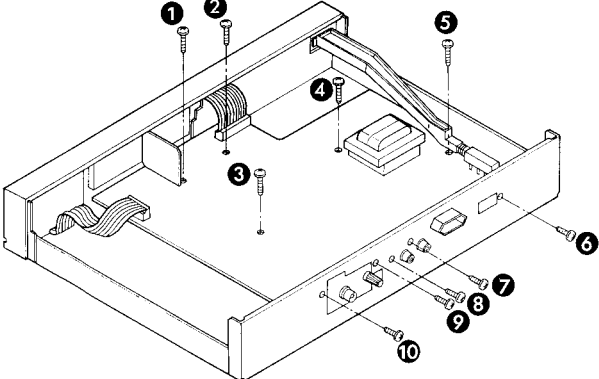
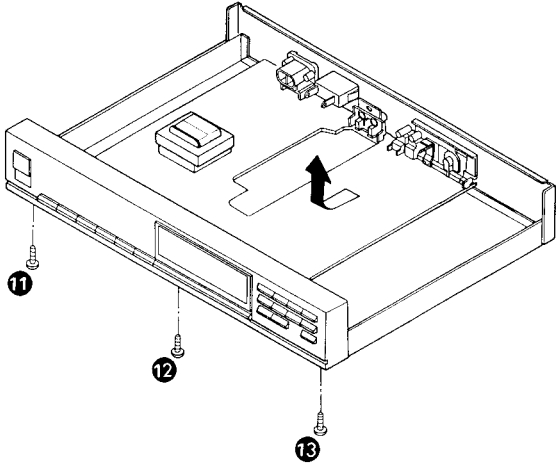
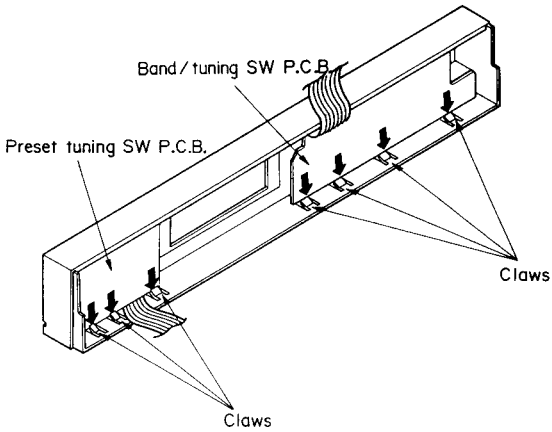
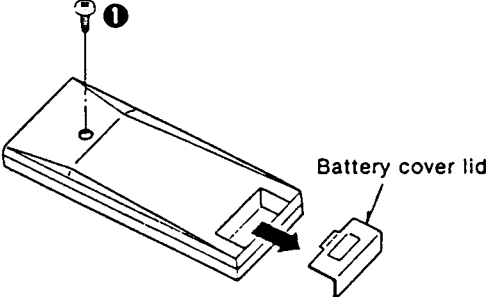
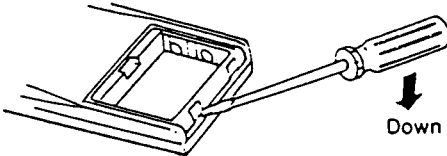


- 1 Power "STANDBY /ON" switch (POWER "STANDBY /ON")
- 2 "STANDBY " indicator
- 3 FM mode selector (FM MODE)
- 4 Tuning buttons (TUNING)
- 5 Band selectors (BAND SELECTOR)
- 6 Preset-tuning buttons (1-0)
(24 CHANNEL RANDOM PRESET TUNING)

- 7 Memory button (MEMORY)
- 8 Remote-control signal receptor (SENSOR)
- A FM stereo indicator (STEREO)
- B Digital frequency display
- C Memory indicator (M)
- D Channel display
- E Quartz-lock indicator (QUARTZ LOCK)

DISASSEMBLY INSTRUCTIONS

Ref. No. 1	Removal of the cabinet	
Procedure 1	Remove the 4 screws (1~4).	
Ref. No. 2	Removal of the front panel	1. Remove the power switch knob by pushing it from behind the front panel. 2. Remove the flat cable (J901, J902). 3. Remove the 3 screws (1~3). 4. Remove the front panel in the direction of the arrow.
Procedure 1→2		
Removal of the flat cable Pull out the flat cable while pressing the connector 		

Ref. No. 3	Removal of the main P.C.B.	2. Remove the 3 screws (11~13). 3. Slightly pull the front panel toward you and remove the main P.C.B.
Procedure 1→3	1. Remove the 10 screws (1~10).	
		
Ref. No. 4	Removal of the preset tuning SW P.C.B. and band/tuning SW P.C.B.	
Procedure 1→2→4	1. Push the 3 claws and remove the preset tuning SW P.C.B. 2. Push the 4 claws and band/tuning SW P.C.B.	
		
Ref. No. 5	Removal of the remote control	
Procedure 5	1. Remove the battery cover lid. 2. Remove the one screw (1).	3. Insert a screwdriver blade between the upper and lower covers inside the battery compartment and them slowly loosen the bottom cover.
		

MEASUREMENTS AND ADJUSTMENTS

FM ADJUSTMENT

Control positions and equipment used

- FM signal generator(FM-SG)
- Stereo modulator
- Distortion analyser
- DC electronic voltmeter(EVM)
- Frequency counter
- Choke coil(100 μ H)
- Resistor(100k Ω)

Note: For Z202(AM-IFT), Z251(AM ANT and OSC coil), L321 (L.P.F) and L 322(L.P.F), they are supplied as adjusted parts. So, do not turn the cores of the parts.

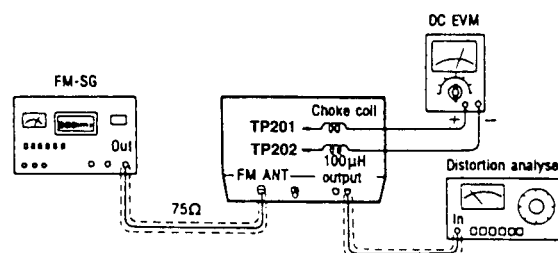
FM MONO DISTORTION ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "FM" mode.
3. Set the radio frequency display and signal generator to 100.10MHz.
4. Adjust the core of T201 so that the voltage measured in signal mode is 0mV(0 $\pm$ 20mV) in 300mV range.
5. Adjust T202 so that the distortion factor of L-CH is minimized.
6. Repeat steps 4 and 5.
7. Make sure that the distortion factors of L-CH and R-CH are nearly the same and minimum.

Note: The adjusting screwdriver used should be made of resin.

FM SIGNAL GENERATOR CONDITION

Modulation100%
Modulation frequency1kHz
Output level66dB



MPX VCO ADJUSTMENT

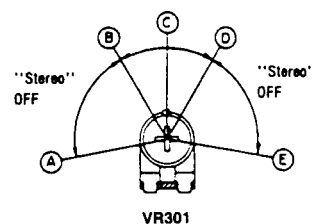
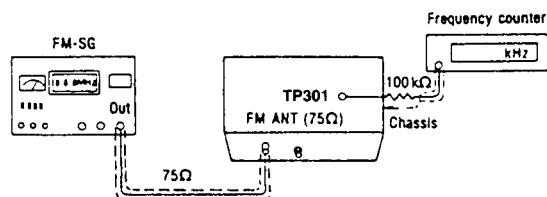
1. Test equipment connection is shown in figure.
2. Set the unit to "on/auto" position.
3. Set the radio frequency display and signal generator to 100.10MHz.
4. Adjust VR301 for 19kHz $\pm$ 30Hz on frequency counter reading.

USING ALTERNATE SYSTEM

1. Receive the stereo broadcast.
2. Adjust VR301 until stereo indicator lights up. Fix the arm of VR301 as shown in figure.

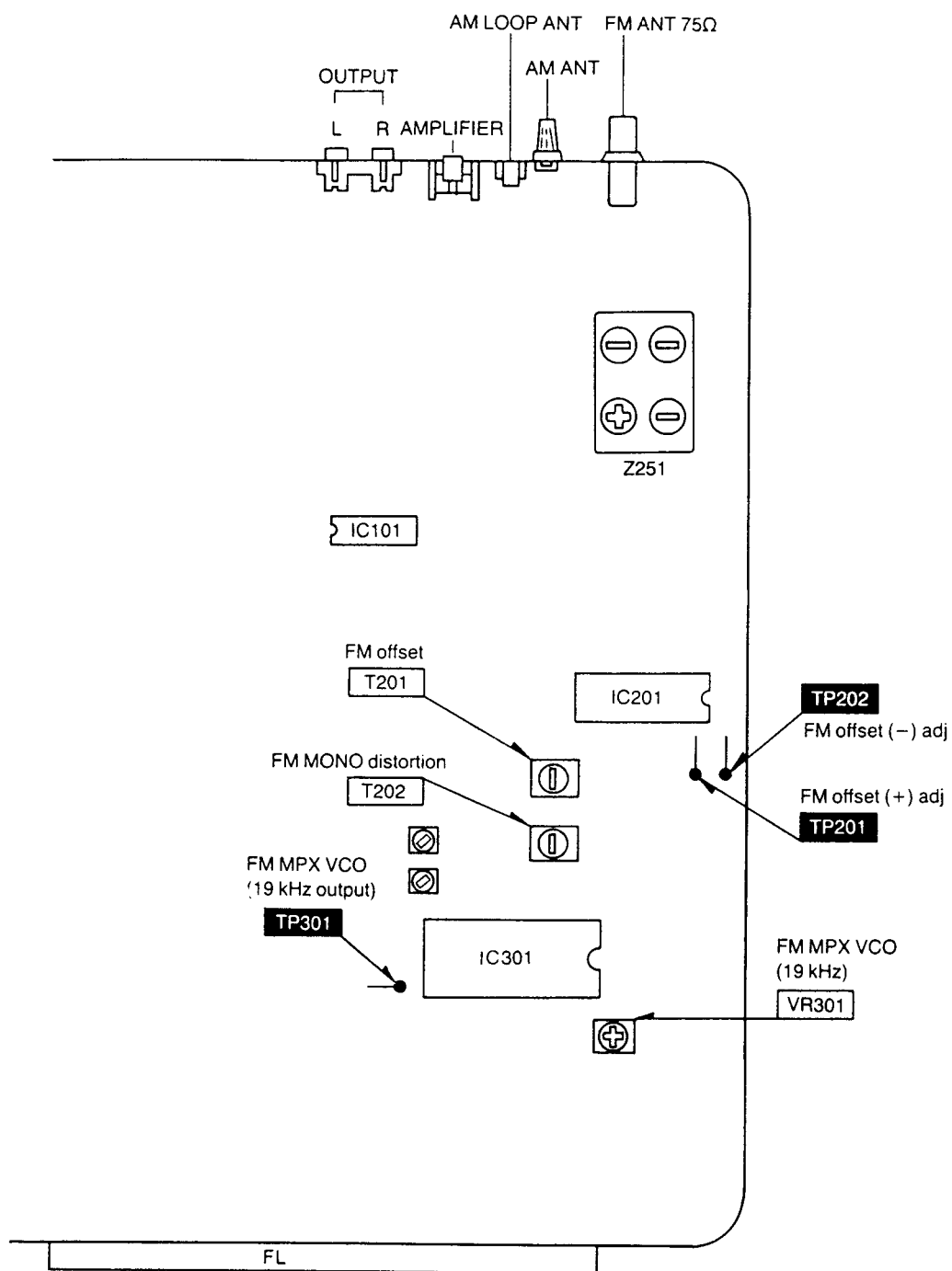
FM SIGNAL GENERATOR CONDITION

Modulation100%
Modulation frequency0kHz
Output level66dB



- ①—②..... "Stereo" OFF position
- ③—④..... "Stereo" ON position (Indicator lighting)
- ⑤..... Adjust point of pilot circuit

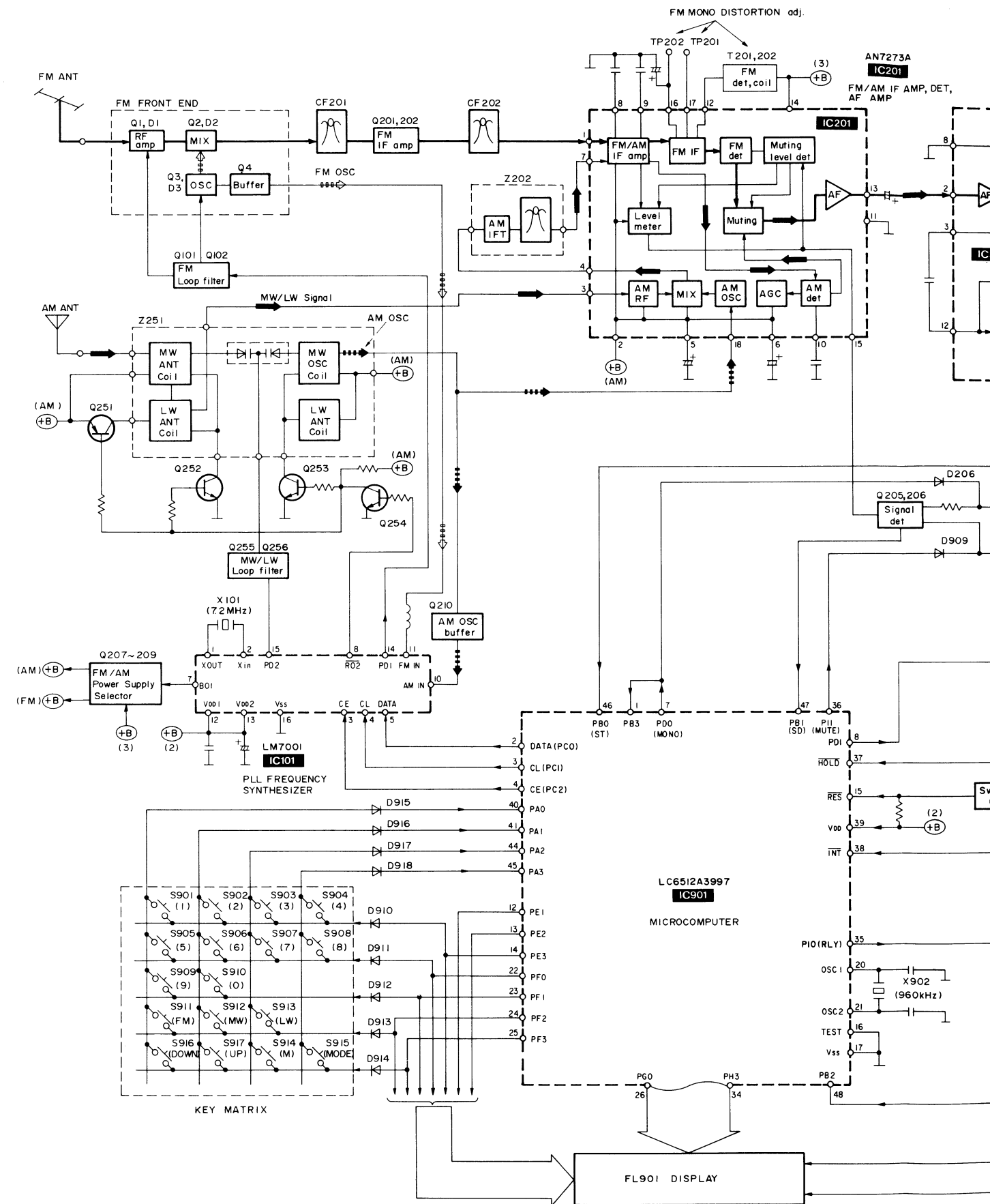
•ADJUSTMENT POINTS



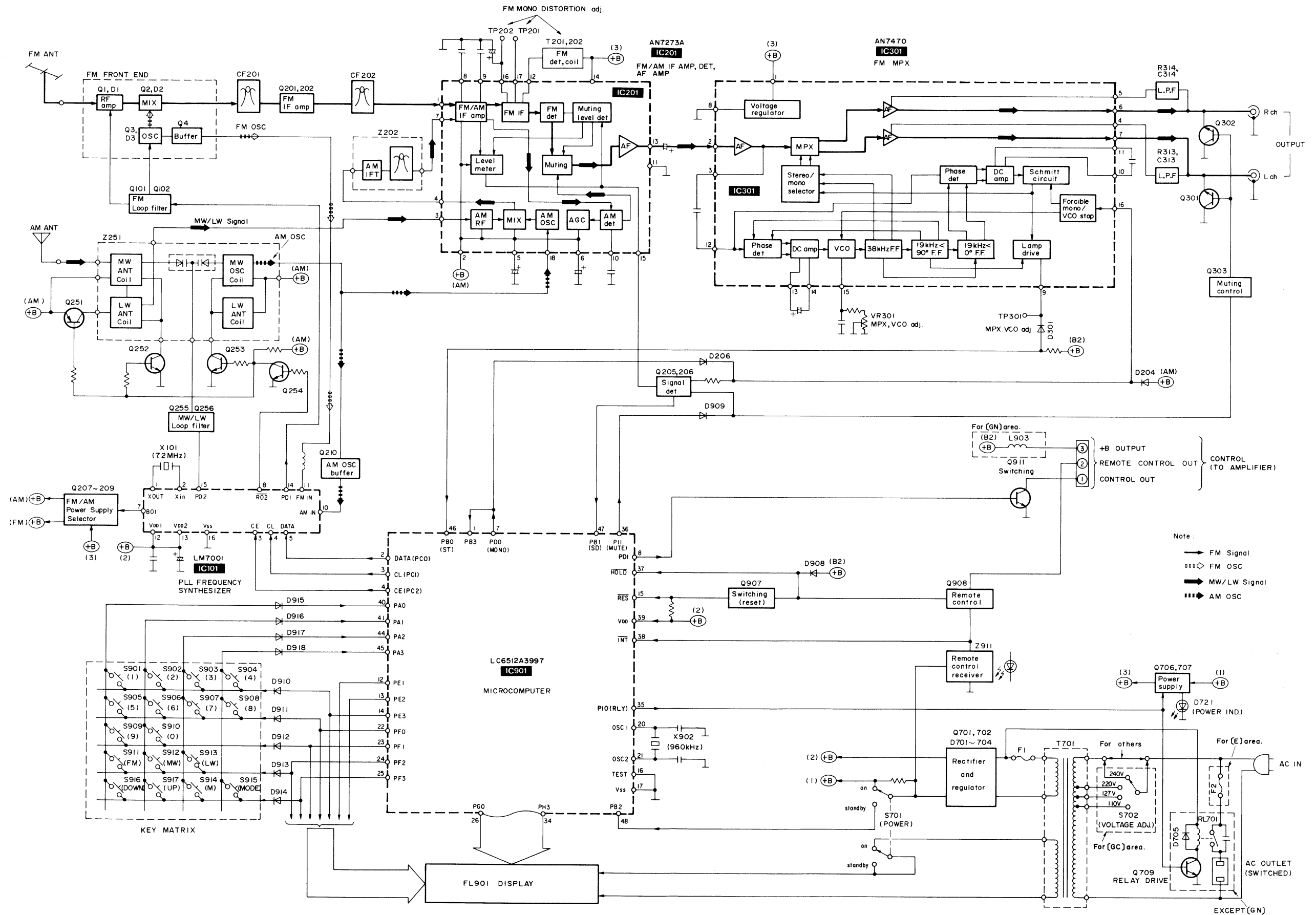
■ FUNCTIONS OF IC TERMINALS (IC901: LC6512A3997)

PIN NO.	IN/OUT	MARK	DESCRIPTION OF TERMINAL
1	INPUT	PB3	Computer drive terminal.
2	OUTPUT	DATA	Data output $t > \frac{8}{f_{XOSC}}$ CL DATA CE f_{XOSC}: Crystal OSC D0~D13: Divided frequency data R0~R2: Reference frequency data
3		CL	
4		CE	
5	—	PC3	Not used in this unit.
6	—	NC	Not used in this unit.
7	OUTPUT	PD0	Auto/mono changeover terminal. (auto → 0V, mono → 5V)
8	OUTPUT	PD1	Computer drive terminal.
9	—	PD2	Not used in this unit.
10		PD3	
11		PE0	
12 14 22 25	OUTPUT	PE1 PE3 PF0 PF3	Digital signal terminal for display. Terminal for key return signal to external key matrix.
15		RES	
16		TEST	
17		V _{SS}	
18	—	NC	Not used in this unit.
19			
20	INPUT	OSC1	Connecting terminal for crystal oscillator.
21	OUTPUT	OSC2	
26 29 31 34	OUTPUT	PG0 PG3 PH0 PH3	Segment signal terminal for display.
30		NC	
35	OUTPUT	P10	Control signal terminal for relay (RLY701).
36	OUTPUT	P11	Muting signal terminal. (Muting → High level)
37	INPUT	HOLD	Terminal for power failure detection.
38	INPUT	INT	Terminal for remote control cord.
39	INPUT	V _{DD}	Power supply terminal of device. Voltage of 5V is supplied during operation of device.
40	INPUT	PA0 PA3	Terminal for key return signal to external key matrix.
41			
44			
45			
42 43	—	NC	Not used in this unit.
46	INPUT	PB0	Stereo signal terminal.
47		PB2	SD signal terminal.
48			Tuner select terminal. (Ground connection)

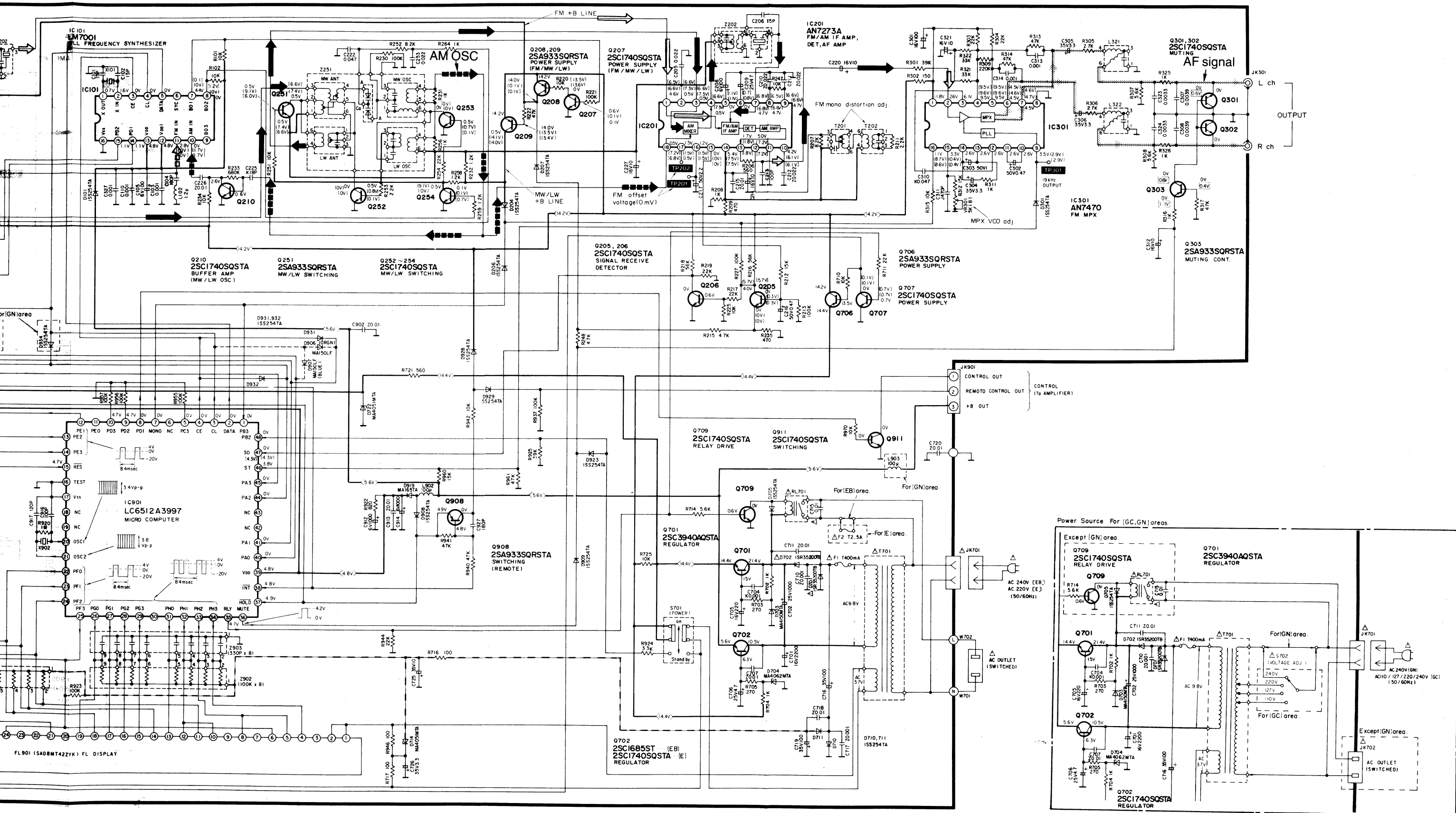
■ BLOCK DIAGRAM



BLOCK DIAGRAM

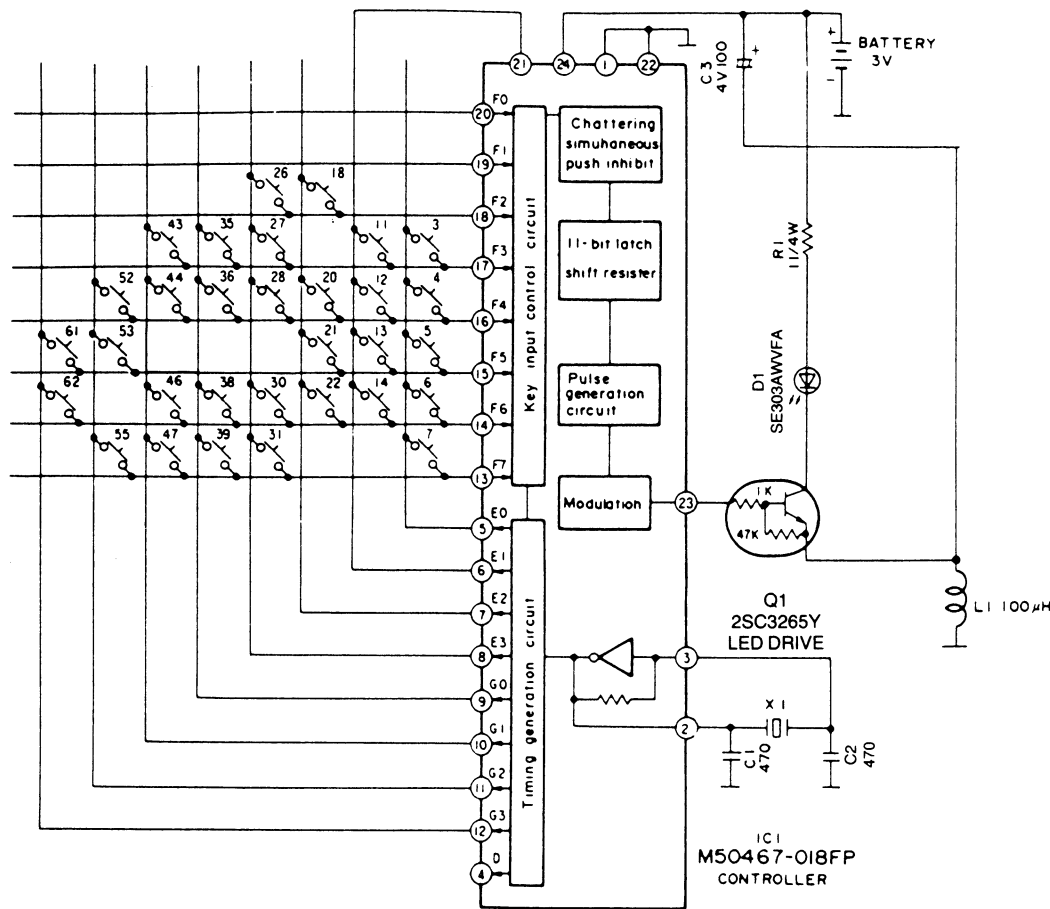




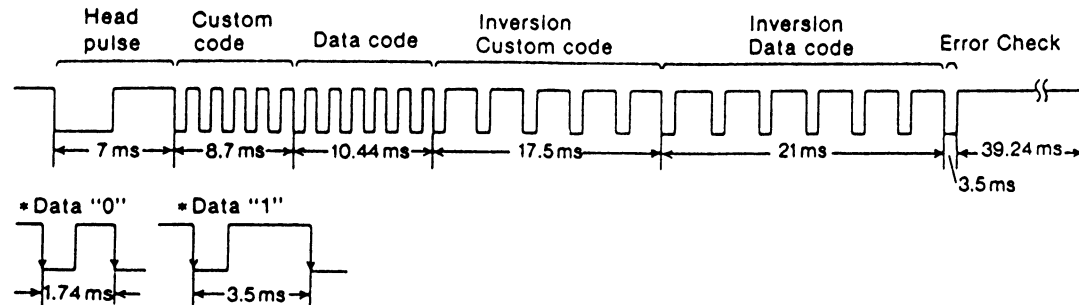


• Remote control unit

Note: Key No. 7 is for EUR64754 only.



• Remote control data code



Key No.	Function	Custom code	Data code	Key No.	Function	Custom code	Data code
3	Auto rec mute	01001	000111	30	Tuner 8	01001	010111
4	Deck play ◀	01001	001001	31	Tuner 1	01001	010000
5	Vol. up	01001	100100	35	CD • skip/search	01100	000010
6	Tuner 5	01001	010100	36	Pause	01001	000110
7	Power ON/OFF	01001	100000	38	Tuner 9	01001	011000
11	CD play/pause	01100	001010	39	Tuner 2	01001	010001
12	Deck play ▶	01001	001010	43	CD • skip/search	01100	000011
13	Vol. Down	01001	100101	44	Deck stop	01001	000000
14	Tuner 6	01001	010101	46	Tuner 0	01001	011001
18	Turntable start	01001	001100	47	Tuner 3	01001	010010
20	Deck ◀◀	01001	000010	52	Rec	01001	001000
21	Muting	01001	100111	53	Deck A/B	01001	000100
22	Tuner 7	01001	010110	55	Tuner 4	01001	010011
26	Turntable stop	01001	001101	61	EQ • OF/FLAT	01001	110000
27	CD stop	01100	000000	62	EQ Preset	01001	110010
28	Deck ▶▶	01001	000011				

■ SCHEMATIC DIAGRAM (Parts list on pages 18~21)

(This schematic diagram may be modified at any time with the development of new technology.)

Note 1:

- S701 : Power source switch in "on" position.
- S702 : Voltage selector switch in "240 V" position.
(110 V ↔ 127 V ↔ 220 V ↔ 240 V)
For (GC) area only
- S901~S910 : Preset tuning switch.
[S901: CH1, S902: CH2, S903: CH3, S904: CH4,
S905: CH5, S906: CH6, S907: CH7, S908: CH8,
S909: CH9, S910: CH0]
- S911 : FM select switch.
- S912 : MW select switch.
- S913 : LW select switch.
- S914 : Memory set switch.
- S915 : FM mode switch.
- S916 : Tuning (down) switch.
[down: tuning to lower frequency]
- S917 : Tuning (up) switch.
[up: tuning to higher frequency]

• Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

* Figures in () stand for DC voltage in MW signal reception mode.

* Figures in [] stand for DC voltage in LW signal reception mode.

- Positive voltage lines
- FM OSC
- AM OSC
- AF signal lines
- FM signal
- AM signal

Important safety notice

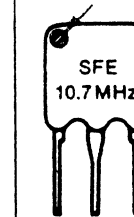
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

Note 2:

• Use of ceramic filters in pairs

The ceramic filters (CF201, CF202) for FM-IF circuit are available in three ranks. For this circuit, be sure to use the ceramics of the same rank in a pair.
At repairing and replacement, pay close attention to the diodes (D906, D907) for use as different diodes must be used depending on each rank of the ceramic filters.

Color marking
(Red, Black or White)



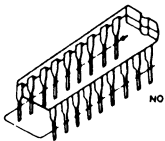
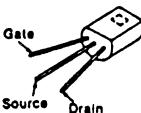
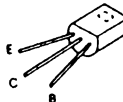
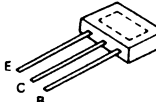
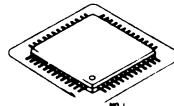
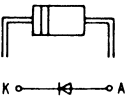
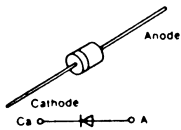
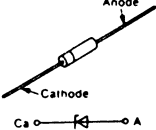
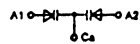
RANK (Color)	D906	D907	CENTER FREQUENCY
Orange	○	×	10.72 MHz
Red	×	×	10.70 MHz
Blue	×	○	10.67 MHz

Note: ○ mark: Diode is used.
× mark: Diode is not used.

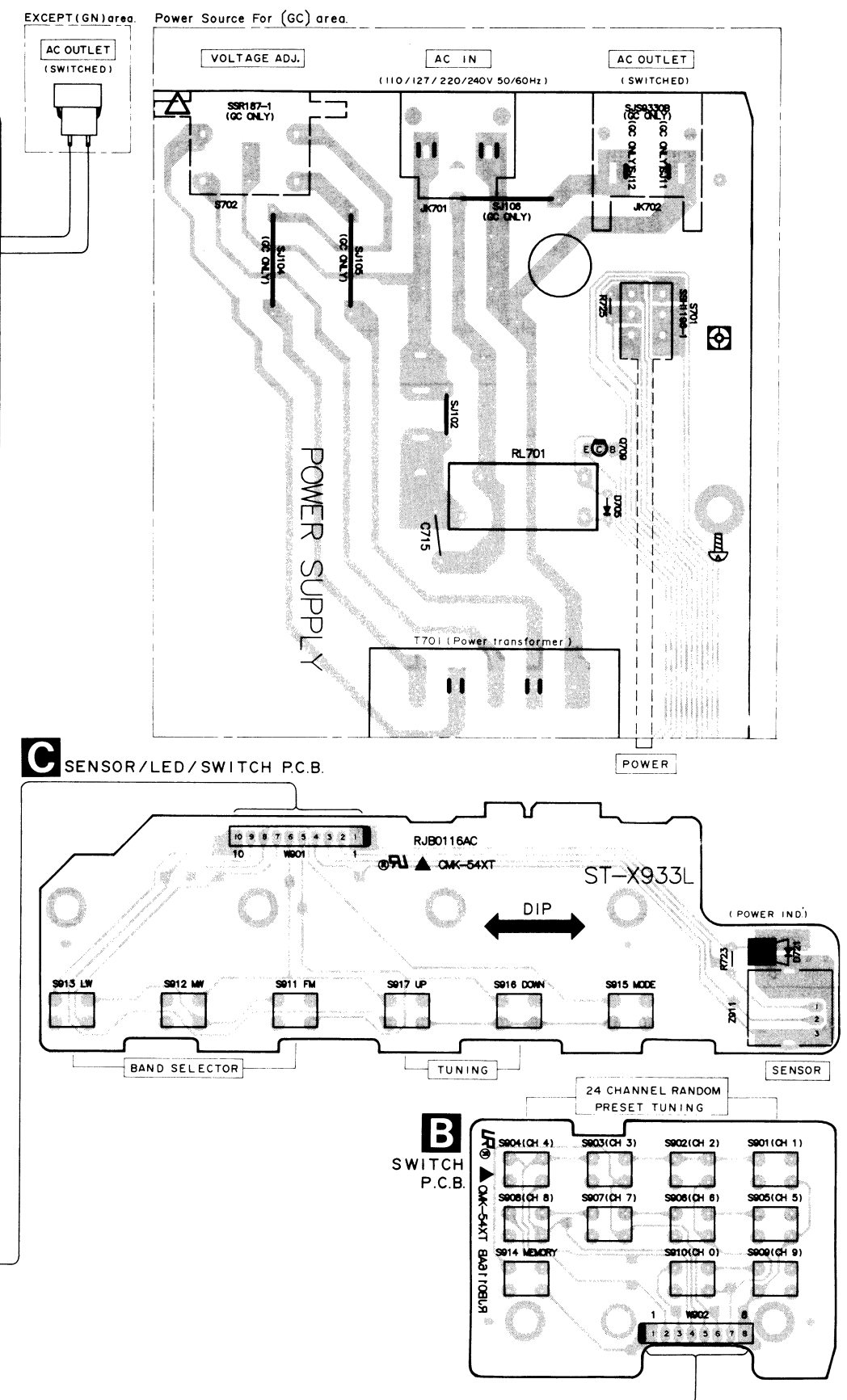
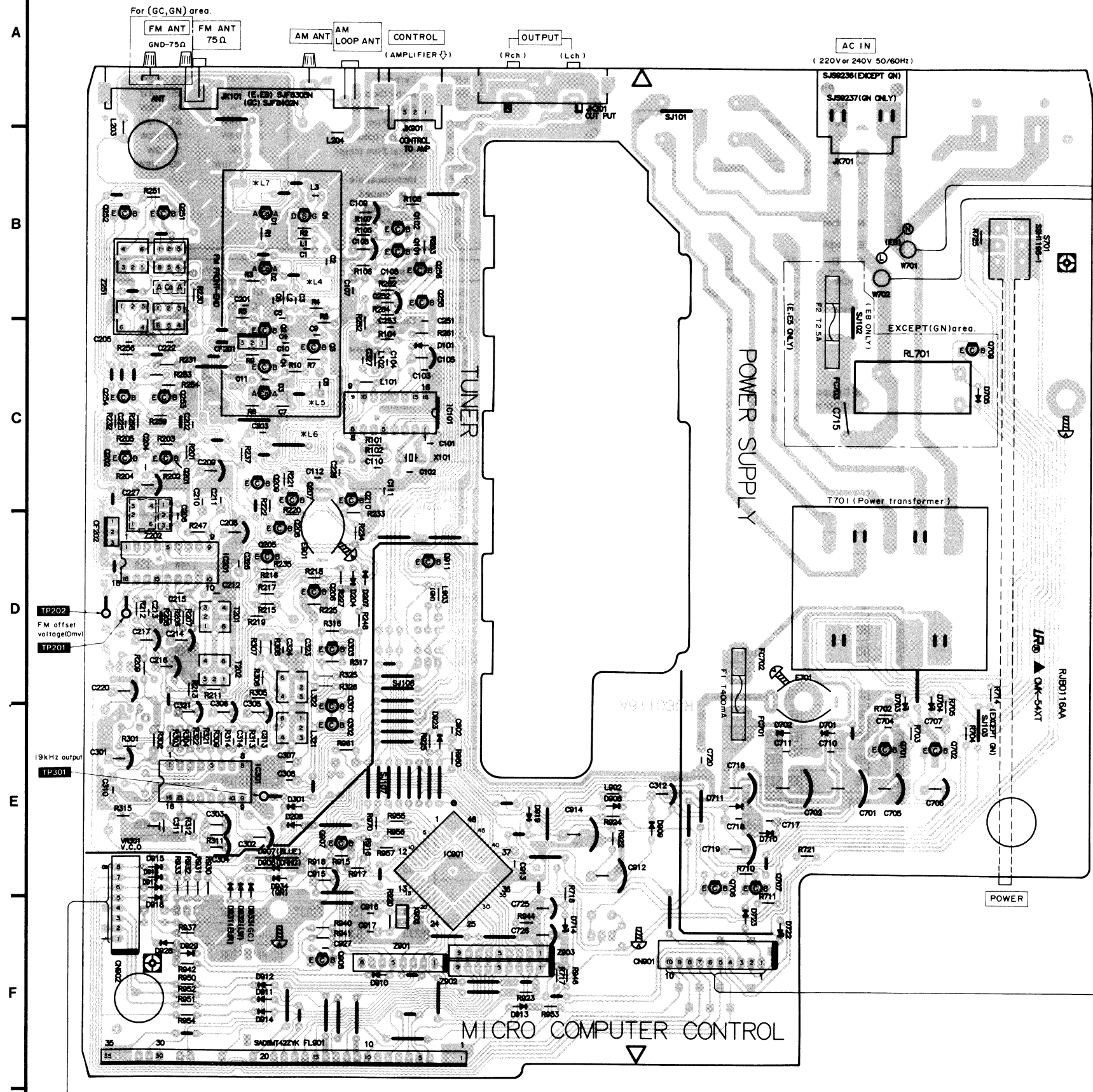
* Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.
* Cover the parts boxes made of plastics with aluminum coil.
* Ground the soldering iron.
* Put a conductive mat on the work table.
* Do not touch the legs of IC or LSI with the fingers directly.

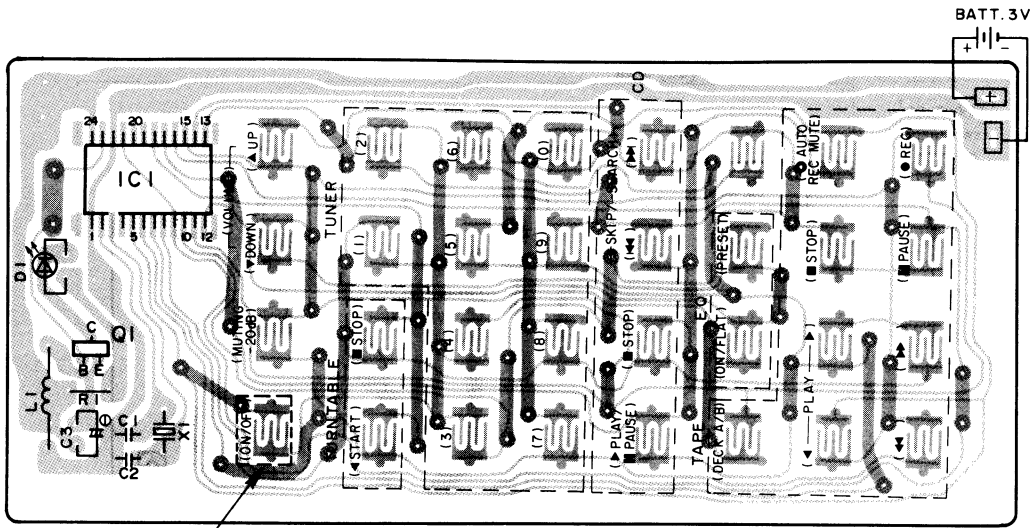
■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

 NO. 1	<table border="1"><tr><td>AN7470</td><td>16 Pin</td></tr><tr><td>LM7001</td><td>16 Pin</td></tr><tr><td>AN7273A</td><td>18 Pin</td></tr></table>	AN7470	16 Pin	LM7001	16 Pin	AN7273A	18 Pin	2SK544F-AC 	 2SC3940A-Q 2SC2787L 2SC2786M 2SC1675FLIL2 2SC1685ST	2SC2603EFG 2SC1740SQ 2SA933SQR 
AN7470	16 Pin									
LM7001	16 Pin									
AN7273A	18 Pin									
 NO. 1	LC6512A3997 48 pin	ISR35200 	MA165, 1SS254 	 MA4051M, MA4062M, MA4150M						
SVC211SPA-AL  Anode 1 Cathode Anode 2 										

CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (Parts list on pages 18~21)



Remote control unit



EUR64754 only

RESISTORS AND CAPACITORS

Notes : * Important safety notice : Components identified by Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts. * Bracketed indications in Remarks columns specify the area. (Refer to the first page for area.) Parts without these indications can be used for all areas.

Numbering System For Resistors

Example:

ERD	25	F	J	102
Type	Wattage (1/4W)	Shape	Tolerance	Value (1K Ω)
ERX	2	AN	J	471
Type	Wattage (2W)	Shape	Tolerance	Value (470 Ω)

Numbering System For Capacitors

Example:

ECKD	1H	102	Z	F
Type	Voltage (50V)	Value (0.001 μ F)	Tolerance	Unique
ECEA	50	M	330	
Type	Voltage (50V)	Characteristics	Value (33 μ F)	

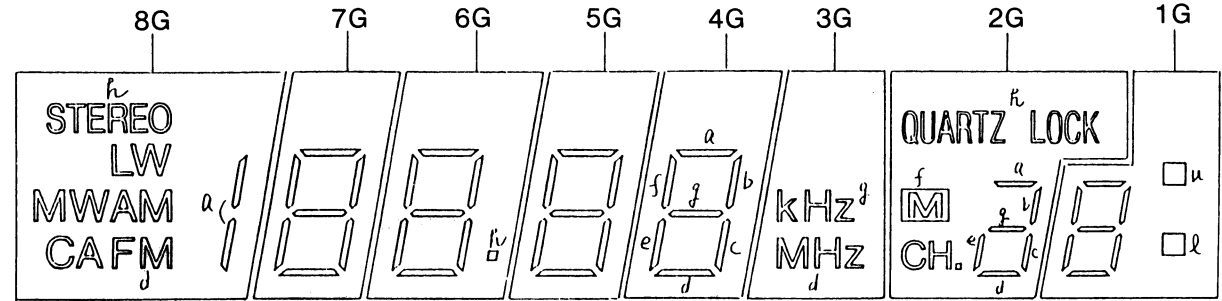
- Capacity values are in microfarads (μ F) unless specified otherwise, P = Pico-farads (pF) F = Farads (F).
- Resistance values are in ohms (Ω), unless specified otherwise, 1K = 1,000 Ω , 1M = 1,000k Ω

Resistor Type	Wattage		Tolerance
ERD : Carbon	10 : 1/8W	12 : 1/2W	J : $\pm$ 5%
ERG : Metal Oxide	14 : 1/4W	25 : 1/4W	F : $\pm$ 1%
ERQ : Fuse Type Metal	1A : 1W	18 : 1/8W	G : $\pm$ 2%
ERX : Metal Film	S2 : 1/4W	S1 : 1/2W	J : $\pm$ 5%
ERD L : Carbon (chip)	2F : 1/4W	50 : 1/2W	K : $\pm$ 10%
ERO K : Metal Film (chip)	2A : 2W	3A : 3W	M : $\pm$ 20%
ERC : Solid	6G : 1/10W	8G : 1/8W	
ERF : Incombustible Box-Shaped			
ERM : Wire-Wound			
RRJ : Chip Resistor			
ERJ : Chip Resistor			

Capacitor Type	Voltage		Tolerance
ECE : Electrolytic	0J : 6.3V	1A : 10V	K : $\pm$ 10%
ECCD : Ceramic	1C : 16V	1E : 25V	M : $\pm$ 20%
ECKD : Ceramic Capacitor	1H : 50V	1V : 35V	Z : $\pm$ 80 %
ECQM : Polyester	50 : 50V	05 : 50V	J : $\pm$ 5%
ECQP : Polypropylene	2H : 500V	2A : 100V	G : $\pm$ 2%
ECG : Ceramic	1 : 100V	1J : 63V	F : $\pm$ 1%
ECEA N : Non Polar Electrolytic	KC : 400V AC		C : $\pm$ 0.25pF
QCU : Ceramic (Chip Type)	KC : 125V AC (UL)		D : $\pm$ 0.5pF
ECUX : Ceramic (Chip Type)			
ECF : Semiconductor			
EECW : Liquid electrolyte double layer capacitor			

DESCRIPTION OF FL PANEL

GRID ASSIGNMENT



Note: The grid of 3G and 8G are used for external connection.

PIN CONNECTION

PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
CONNECTION	F 1	F 1	N P	h	f	8 G	A M	M W	C A	L W	7 G	c	a	6 G	e	d	g	5 G	b	N P	4 G	N P	N P	3 G	N P	N P	C H	2 G	N P	u	1 G	e	N P	F 2	F 2

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		RESISTORS					
R1	ERDS2TJ104T	C. RESISTOR 1/4W 100K		R211	ERDS2TJ222T	C. RESISTOR 1/4W 2.2K	
R2	ERDS2TJ470T	C. RESISTOR 1/4W 47		R212	ERDS2TJ153T	C. RESISTOR 1/4W 15K	
R3	ERDS2TJ104T	C. RESISTOR 1/4W 100K		R213	ERDS2TJ104T	C. RESISTOR 1/4W 100K	
R4	ERDS2TJ824T	C. RESISTOR 1/4W 820K		R215	ERDS2TJ472T	C. RESISTOR 1/4W 4.7K	
R5	ERDS2TJ391T	C. RESISTOR 1/4W 390		R216	ERDS2TJ563T	C. RESISTOR 1/4W 56K	
R6	ERDS2TJ272T	C. RESISTOR 1/4W 2.7K		R217	ERDS2TJ223T	C. RESISTOR 1/4W 22K	
R7	ERDS2TJ684T	C. RESISTOR 1/4W 680K		R218	ERDS2TJ563T	C. RESISTOR 1/4W 56K	
R8	ERDS2TJ122T	C. RESISTOR 1/4W 1.2K		R219	ERDS2TJ223T	C. RESISTOR 1/4W 22K	
R9	ERDS2TJ224T	C. RESISTOR 1/4W 220K		R220	ERDS2TJ103T	C. RESISTOR 1/4W 10K	
R10	ERDS2TJ391T	C. RESISTOR 1/4W 390		R221	ERDS2TJ104T	C. RESISTOR 1/4W 100K	
R101, 102	ERDS2TJ103T	C. RESISTOR 1/4W 10K		R222	ERDS2TJ473T	C. RESISTOR 1/4W 47K	
R104	ERDS2TJ102T	C. RESISTOR 1/4W 1K		R225	ERDS2TJ103T	C. RESISTOR 1/4W 10K	
R105	ERDS2TJ561T	C. RESISTOR 1/4W 560		R227	ERDS2TJ104T	C. RESISTOR 1/4W 100K	
R106	ERDS2TJ562T	C. RESISTOR 1/4W 5.6K		R230	ERDS2TJ104T	C. RESISTOR 1/4W 100K	
R107	ERDS2TJ103T	C. RESISTOR 1/4W 10K		R231	ERDS2TJ102T	C. RESISTOR 1/4W 1K	
R108	ERDS2TJ391T	C. RESISTOR 1/4W 390		R232	ERDS2TJ122T	C. RESISTOR 1/4W 1.2K	
R201	ERDS2TJ102T	C. RESISTOR 1/4W 1K		R233	ERDS2TJ684T	C. RESISTOR 1/4W 680K	
R202	ERDS2TJ824T	C. RESISTOR 1/4W 820K		R234	ERDS2TJ103T	C. RESISTOR 1/4W 10K	
R203	ERDS2TJ122T	C. RESISTOR 1/4W 1.2K		R235	ERDS2TJ471T	C. RESISTOR 1/4W 470	
R204	ERDS2TJ824T	C. RESISTOR 1/4W 820K		R237	ERDS2TJ151T	C. RESISTOR 1/4W 150	
R205	ERDS2TJ391T	C. RESISTOR 1/4W 390		R247	ERDS2TJ103T	C. RESISTOR 1/4W 10K	
R206	ERDS2TJ561T	C. RESISTOR 1/4W 560		R248	ERDS2TJ472T	C. RESISTOR 1/4W 4.7K	
R207	ERDS2TJ822T	C. RESISTOR 1/4W 8.2K		R251	ERDS2TJ103T	C. RESISTOR 1/4W 10K	
R208	ERDS2TJ102T	C. RESISTOR 1/4W 1K		R252	ERDS2TJ822T	C. RESISTOR 1/4W 8.2K	
R209	ERDS2TJ471T	C. RESISTOR 1/4W 470		R253	ERDS2TJ222T	C. RESISTOR 1/4W 2.2K	
				R254	ERDS2TJ223T	C. RESISTOR 1/4W 22K	
				R256	ERDS2TJ102T	C. RESISTOR 1/4W 1K	
				R258, 259	ERDS2TJ122T	C. RESISTOR 1/4W 1.2K	

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
R261	ERDS2TJ102T	C. RESISTOR 1/4W 1K		C1	ECBT1H102KB5	C. CAPACITOR 50V 0.001U	
R262	ERDS2TJ332T	C. RESISTOR 1/4W 3.3K		C2~4	RCBS1H3R3KCY	C. CAPACITOR 50V 3.3P	
R263	ERDS2TJ153T	C. RESISTOR 1/4W 15K		C5	RCBS1H180JCY	C. CAPACITOR 50V 18P	
R264	ERDS2TJ102T	C. RESISTOR 1/4W 1K		C6	RCBS1H181KBY	C. CAPACITOR 50V 180P	
R301	ERDS2TJ393T	C. RESISTOR 1/4W 39K		C7	RCBS1H1R2MCMY	C. CAPACITOR 50V 1.2P	
R302	ERDS2TJ151T	C. RESISTOR 1/4W 150		C8	ECCT1H060CC	C. CAPACITOR 50V 6P	
R303, 304	ERDS2TJ223T	C. RESISTOR 1/4W 22K		C9	ECBT1H102KB5	C. CAPACITOR 50V 0.001U	
R305, 306	ERDS2TJ272T	C. RESISTOR 1/4W 2.7K		C10	RCBS1H3R3KCY	C. CAPACITOR 50V 3.3P	
R307, 308	ERDS2TJ562T	C. RESISTOR 1/4W 5.6K		C11	RCBS1H180JCY	C. CAPACITOR 50V 18P	
R309	ERDS2TJ224T	C. RESISTOR 1/4W 220K		C101, 102	RCBS1H150JCY	C. CAPACITOR 50V 15P	
R311	ERDS2TJ102T	C. RESISTOR 1/4W 1K		C103	ECBT1H102KB5	C. CAPACITOR 50V 0.001U	
R312	ERDS2TJ153T	C. RESISTOR 1/4W 15K		C104	RCBS1H181KBY	C. CAPACITOR 50V 180P	
R313, 314	ERDS2TJ473T	C. RESISTOR 1/4W 47K		C105	ECEAJU101B	E. CAPACITOR 6.3V 100U	
R315	ERDS2TJ103T	C. RESISTOR 1/4W 10K		C106, 107	ECKT1H103ZF	C. CAPACITOR 50V 0.01U	
R316	ERDS2TJ102T	C. RESISTOR 1/4W 1K		C108	ECEA25M4R7RB	E. CAPACITOR 25V 4.7U	
R317	ERDS2TJ473T	C. RESISTOR 1/4W 47K		C109	ECEAJU330B	E. CAPACITOR 16V 33U	
R321, 322	ERDS2TJ333T	C. RESISTOR 1/4W 33K		C110	ECBT1H102KB5	C. CAPACITOR 50V 0.001U	
R325, 326	ERDS2TJ102T	C. RESISTOR 1/4W 1K		C111, 112	ECKT1H103ZF	C. CAPACITOR 50V 0.01U	
R702	ERDS2TJ102T	C. RESISTOR 1/4W 1K		C201~203	ECKT1H103ZF	C. CAPACITOR 50V 0.01U	
R703	ERDS2TJ271T	C. RESISTOR 1/4W 270		C204	ECBT1H102KB5	C. CAPACITOR 50V 0.001U	
R704	ERDS2TJ102T	C. RESISTOR 1/4W 1K		C205	ECBT1E223ZF5	C. CAPACITOR 25V 0.022U	
R705	ERDS2TJ271T	C. RESISTOR 1/4W 270		C206	RCBS1H150JCY	C. CAPACITOR 50V 15P	
R710	ERDS2TJ103T	C. RESISTOR 1/4W 10K		C208	ECEAJU101B	E. CAPACITOR 6.3V 100U	
R711	ERDS2TJ223T	C. RESISTOR 1/4W 22K		C209	ECEA1EK4R7B	E. CAPACITOR 25V 4.7U	
R714	ERDS2TJ562T	C. RESISTOR 1/4W 5.6K	<E, EB, GC>	C210, 211	ECKT1H223ZF	C. CAPACITOR 50V 0.022U	
R716, 717	ERDS2TJ101T	C. RESISTOR 1/4W 100		C212	ECBT1E223ZF5	C. CAPACITOR 25V 0.022U	
R721	ERDS2TJ561T	C. RESISTOR 1/4W 560		C213	ECCT1H101K	C. CAPACITOR 50V 100P	
R723	ERDS2TJ271T	C. RESISTOR 1/4W 270		C214	ECEA1CK100B	E. CAPACITOR 16V 10U	
R725	ERDS2TJ103T	C. RESISTOR 1/4W 10K		C215	ECBT1E103ZF5	C. CAPACITOR 25V 0.01U	
R915	ERDS2TJ821T	C. RESISTOR 1/4W 820		C216	ECEA1HKR47B	E. CAPACITOR 50V 0.47U	
R916	ERDS2TJ272T	C. RESISTOR 1/4W 2.7K		C217	ECEA1HK2R2B	E. CAPACITOR 50V 2.2U	
R917	ERDS2TJ103T	C. RESISTOR 1/4W 10K		C220	ECEA1CK100B	E. CAPACITOR 16V 10U	
R918	ERDS2TJ224T	C. RESISTOR 1/4W 220K		C222	ECFTD473KXL	S. CAPACITOR 25V 0.047U	
R920	ERDS2TJ105T	C. RESISTOR 1/4W 1M		C225	RCBS1H180JCY	C. CAPACITOR 50V 18P	
R922	ERDS2TJ821T	C. RESISTOR 1/4W 820		C226	ECKT1H103ZF	C. CAPACITOR 50V 0.01U	
R923	ERDS2TJ104T	C. RESISTOR 1/4W 100K		C227	ECEA1CK100B	E. CAPACITOR 16V 10U	
R924	ERDS2TJ332T	C. RESISTOR 1/4W 3.3K		C251	ECKT1H223ZF	C. CAPACITOR 50V 0.022U	
R925	ERDS2TJ393T	C. RESISTOR 1/4W 39K		C252	ECEA1HK010B	E. CAPACITOR 50V 1U	
R930~933	ERDS2TJ104T	C. RESISTOR 1/4W 100K		C253	ECKT1H223ZF	C. CAPACITOR 50V 0.022U	
R937	ERDS2TJ104T	C. RESISTOR 1/4W 100K		C301	ECEAJU101B	E. CAPACITOR 16V 100U	
R940, 941	ERDS2TJ473T	C. RESISTOR 1/4W 47K		C302	ECEA1HKR47B	E. CAPACITOR 50V 0.47U	
R942	ERDS2TJ103T	C. RESISTOR 1/4W 10K		C303	ECEA1HK010B	E. CAPACITOR 50V 1U	
R944	ERDS2TJ223T	C. RESISTOR 1/4W 22K		C304~306	ECEA1VK3R3B	E. CAPACITOR 35V 3.3U	
R946	ERDS2TJ101T	C. RESISTOR 1/4W 100		C307, 308	ECFTD392KXL	S. CAPACITOR 25V0.0039U	
R950~954	ERDS2TJ563T	C. RESISTOR 1/4W 56K		C310	ECFTD473KXL	S. CAPACITOR 25V 0.047U	
R955~957	ERDS2TJ104T	C. RESISTOR 1/4W 100K		C311	ECQP1471J23	P. CAPACITOR 100V 470P	
R960	ERDS2TJ153T	C. RESISTOR 1/4W 15K		C312	ECEA1CK100B	E. CAPACITOR 16V 10U	
R961	ERDS2TJ473T	C. RESISTOR 1/4W 47K		C313, 314	ECBT1H102KB5	C. CAPACITOR 50V 0.001U	
R970	ERDS2TJ103T	C. RESISTOR 1/4W 10K		C321	ECEA1CK100B	E. CAPACITOR 16V 10U	
				C323, 324	ECFTD332KXL	S. CAPACITOR 25V0.0033U	
		CAPACITORS		C326	ECKT1H103ZF	C. CAPACITOR 50V 0.01U	
				C327	ECBT1H102KB5	C. CAPACITOR 50V 0.001U	

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
C701	ECEA1CU222E	E. CAPACITOR 16V 2200U		C719	ECEA1VU101B	E. CAPACITOR 35V 100U	
C702	ECEA1EU102E	E. CAPACITOR 25V 1000U		C720	ECKT1H103ZF	C. CAPACITOR 50V 0.01U	
C704	ECBT1H102KB5	C. CAPACITOR 50V 0.001U		C725	ECEA1VK100B	E. CAPACITOR 35V 10U	
C705	ECEA1CU221B	E. CAPACITOR 16V 220U		C726	ECEA1VK3R3B	E. CAPACITOR 35V 3.3U	
C706	ECEA1EK4R7B	E. CAPACITOR 25V 4.7U		C902	ECKT1H103ZF	C. CAPACITOR 50V 0.01U	
C707	ECKT1H103ZF	C. CAPACITOR 50V 0.01U		C912	ECEAJU102B	E. CAPACITOR 6.3V 1000U	
C710	ECKT2H102ZF	C. CAPACITOR 500V 0.001U		C913	ECKT1H103ZF	C. CAPACITOR 50V 0.01U	
C711	ECKT1H103ZF	C. CAPACITOR 50V 0.01U		C914	ECEAJU102B	E. CAPACITOR 6.3V 1000U	
C715	ECKWKC103PF2	C. CAPACITOR 400V 0.01U	△ <E, EB, GC>	C915	ECEA1HKR22B	E. CAPACITOR 50V 0.22U	
C716	ECEA1VU101B	E. CAPACITOR 35V 100U		C916	ECCT1H101K	C. CAPACITOR 50V 100P	
C717	ECKT2H102ZF	C. CAPACITOR 500V 0.001U		C917	ECCT1H121K	C. CAPACITOR 50V 120P	
C718	ECKT1H103ZF	C. CAPACITOR 50V 0.01U		C927	RCBS1H181KBY	C. CAPACITOR 50V 180P	

REPLACEMENT PARTS LIST

Notes: ●Important safety notice:
Components identified by △ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
●Bracketed indications in Remarks columns specify the area. (Refer to the first page for area.)
Parts without these indications can be used for all areas.
●Remote Control Ass'y:
Supply period for three years from termination of production.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
				Q907	2SC1740SQSTA	TRANSISTOR	
		INTEGRATED CIRCUITS		Q908	2SA933SQRSTA	TRANSISTOR	
				Q911	2SC1740SQSTA	TRANSISTOR	
IC101	LM7001	IC, PLL FREQUENCY				DIODES	
IC201	AN7273A	IC, FM/AM IF AMP.					
IC301	AN7470	IC, FM MPX VCO ADJ.					
IC901	LC6512A3997	IC, MICRO COMPUTER		D1~3	SVC211SPA-AL	DIODE	
				D101	1SS254TA	DIODE	
		TRANSISTORS		D204	1SS254TA	DIODE	
				D206, 207	1SS254TA	DIODE	
Q1	2SK544F-AC	TRANSISTOR		D301	1SS254TA	DIODE	
Q2	2SC2786MTA	TRANSISTOR		D701, 702	1SR35200TB	DIODE	△
Q3, 4	2SC1675FL1L2	TRANSISTOR		D703	MA4150MTA	DIODE	
Q101, 102	2SC2603EFGTA	TRANSISTOR		D704	MA4062MTA	DIODE	
Q201, 202	2SC2787LTA	TRANSISTOR		D705	1SS254TA	DIODE	<E, EB, GC>
Q205~207	2SC1740SQSTA	TRANSISTOR		D710, 711	1SS254TA	DIODE	
Q208, 209	2SA933SQRSTA	TRANSISTOR		D714	MA4051MTA	DIODE	
Q210	2SC1740SQSTA	TRANSISTOR		D721	LN873RP-LS	DIODE	
Q251	2SA933SQRSTA	TRANSISTOR		D722	MA4051MTA	DIODE	
Q252~256	2SC1740SQSTA	TRANSISTOR		D723	1SS254TA	DIODE	
Q301, 302	2SC1740SQSTA	TRANSISTOR		D908~918	1SS254TA	DIODE	
Q303	2SA933SQRSTA	TRANSISTOR		D919	MA165TA	DIODE	
Q701	2SC3940AQSTA	TRANSISTOR		D923	1SS254TA	DIODE	
Q702	2SC1740SQSTA	TRANSISTOR	<E, GC, GN>	D928, 929	1SS254TA	DIODE	
Q702	2SC1685	TRANSISTOR	<EB>	D931, 932	1SS254TA	DIODE	
Q706	2SA933SQRSTA	TRANSISTOR		D933	1SS254TA	DIODE	<GC>
Q707	2SC1740SQSTA	TRANSISTOR		D934	1SS254TA	DIODE	<GN>
Q709	2SC1740SQSTA	TRANSISTOR	<E, EB, GC>				

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		VARIABLE RESISTORS		S901~917	EVQQB005R	PUSH SWITCHES	
						JACKS	
VR301	EVNDXAA00B53	V. R FM MPX VCO ADJ.					
		COMPONENT COMBINATIONS		JK101	SJF8305N	TERMINAL BOARD (ANT)	<E, EB>
				JK101	SJF8402N	TERMINAL BOARD (ANT)	<GC, GN>
Z202	SL172101-T	AF IF TRANSFORMER		JK301	SJFD4	TERMINAL BOARD (OUTPUT)	
Z251	SLA6Z1-T	MW/LW ANTENA		JK701	SJS9236	AC INLET	△ <E, EB, GC>
Z901	EXBF8E104J	COMPONENT COMBINATION		JK701	SJS9237	AC INLET	△ <GN>
Z902	EXBF9E104J	COMPONENT COMBINATION		JK702	SJS9225	AC OUTLET	△ <E>
Z903	EXFP8331MW	COMPONENT COMBINATION		JK702	SJS9330B	AC OUTLET	△ <GC>
Z911	A1QH3029HO	REMOTE SENSOR		JK702	SJS9332B	AC OUTLET	△ <EB>
				JK901	RJS1A0203-OM	CONNECTOR (3P)	
		COILS		CN901	SJT31043-V	CONNECTOR (10P)	
				CN902	SJT30843-V	CONNECTOR (8P)	
L1, 2	RLQZP1R2KT-Y	COIL					
L3	RLQY15S5-0	COIL				FUSES	
L101	RLQZPR22KT-Y	COIL					
L102	RLQZP1R2KT-Y	COIL		F1	XBA2C04TB0	FUSE, 0.4A 250V	△
L203, 204	ELEPKR22MA	COIL		F2	XBA2C25TB0	FUSE, 2.5A 250V	△ <E>
L321, 322	SLM1B9-P	COIL					
L902	RLQZP101KT-Y	COIL				RELAY	
L903	RLQZP101KT-Y	COIL	<GN>	RL701	SSY138	RELAY	△ <E, EB, GC>
		TRANSFORMERS					
T201	RL14B002-Z	TRANSFORMER					
T202	RL14B003-Z	TRANSFORMER					
T701	SLT5K259-K	POWER TRANSFORMER	△ <E>				
T701	SLT5K260-K	POWER TRANSFORMER	△ <GN, EB>				
T701	SLT5K261-K	POWER TRANSFORMER	△ <GC>				
		FILTERS					
CF201	RLFETNGM02LB	CERAMIC FILTER	BLUE				
CF201	RLFETNGM02LC	CERAMIC FILTER	ORANGE				
CF202	RLFETNGM02LB	CERAMIC FILTER	BLUE				
CF202	RLFETNGM02LC	CERAMIC FILTER	ORANGE				
		OSCILLATORS					
X101	SVQ49U722T-S	OSCILLATOR					
X902	EFOA960KM4A	OSCILLATOR					
		DISPLAY TUBE					
FL901	SAD8MT42ZYK	DISPLAY TUBE					
		SWITCHES					
S701	SSH1196-1	POWER	△				
S702	SSR187-1	VOLTAGE SELECTOR	△ <GC>				

Ref.No.	Part No.	Part Name & Description	Remarks	Ref.No.	Part No.	Part Name & Description	Remarks
						PACKING MATERIAL	
		CABINET PARTS					
				P1	RPG0170	PACKING CASE	<E, GC, GN>
1	SGP7355A	REAR PANEL	<E>	P1	RPG0279	PACKING CASE	<EB>
1	SGP7357A	REAR PANEL	<GC>	P2	SPS5169	PAD	<E, GC, GN>
1	SGP7358A	REAR PANEL	<GN>	P2	RPN0171	PAD	<EB>
1	SGP7359A	REAR PANEL	<EB>	P3	SPS5170	PAD	<E, GC, GN>
2	SKU11651-4	BOTTOM BOARD		P4	SPS5073	PAD	<E, GC, GN>
3	RYP0072	FRONT PANEL		P4	SPS5303	PAD	<EB>
4	SHE181	HOLDER		P5	SPP740	PROTECTION COVER	
8	SUS772	SPRING	<GN>				
9	SBC666-1	POWER BUTTON				ACCESSORIES	
10	SUB267	POWER SWITCH ROD					
11	SHR9862	HOLDER		A1	SFDAC05E03	POWER CORD	△ <E>
12	SBC1029A	BUTTON, TUNING/SELECT		A1	SJA193	POWER CORD	△ <EB>
13	SJT390	FUSE HOLDER		A1	SJA173	POWER CORD	△ <GN>
15	SBC989D	BUTTON, PRESET		A1	RJA0004	POWER CORD	△ <GC>
16	SBC989E	BUTTON, PRESET		A2	SSA269M	FM ANTENA	<GC, GN>
17	SBZ9104	BUTTON, PRESET/MEMORY		A2	SSA270M	FM ANTENA	<E, EB>
19	SKL307	FOOT		A3	RQF0136	INSTRUCTIONS MANUAL	<E>
20	SNE2129-1	SCREW		A3	RQF0270	INSTRUCTIONS MANUAL	<EB>
22	XTBS3+8JFZ1	SCREW		A3	RQF0137	INSTRUCTIONS MANUAL	<GC>
23	XTB3+8G	SCREW		A3	RQF0138	INSTRUCTIONS MANUAL	<GN>
24	XTB3+20J	SCREW		A4	SJPK2203-1	CORD	
25	SKC2061K16	CABINET		A5	SJP9215	AC PLUG ADAPTOR	△ <GC>
26	RMZ0016	SHIELD PLATE	<EB>	A6	SPB1162T	AM LOOP ANTENA	
28	SJS9330A	AC OUTLET COVER	<GC>	A7-1	SMA233-1M	HOLDER	
28	SJS9332A	AC OUTLET COVER	<EB>	A7-2	SMA231M	HOLDER	
				A7-3	XTB3+10AFZ	SCREW	
				A8	SWKTX930E	LEAD WIRE	
		REMOTE CONTROLLER		A9	SJP9009	ATTACHMENT PLUG	<EB>
				A101	EUR64754	REMOTE CONTROLLER	<E, EB, GC>
				A101	EUR64776	REMOTE CONTROLLER	<GN>
IC1	M50467018FP	I. C. SIGNAL CONTROL					
Q1	2SC3265Y	TRANSISTOR					
D1	SE303AWVFA	L. E. D.					
L1	ELEA101JA	COIL					
X1	CSB420PB6	OSILLATOR					
R1	ERD25TLJ1R0U	C. RESISTOR 1/4W 1.0					
C1, 2	ECUV1H471KCG	C. CAPACITOR 50V 470P					
C3	ECEA0GK101	E. CAPACITOR 4V 100U					
101	UR64VCS566	UPPER CABINET	<E, EG, GC>				
101	UR64VCS859	UPPER CABINET	<GN>				
102	UR64CS803A	LOWER CABINET					
103	UR64EC804	BATTERY COVER					
104	UR64CT805D	RUBBER SWITCH	<E, EG, GC>				
104	UR64CT805M	RUBBER SWITCH	<GN>				
105	UR52SB327	SMOKE PLATE					
106	UR64TD374	BATTERY TERMINAL (+/-)					
107	UR64TD808	BATTERY TERMINAL (+)					
108	UR64TD809	BATTERY TERMINAL (-)					

●REMOTE CONTROL UNIT (Parts list on page 22)

