

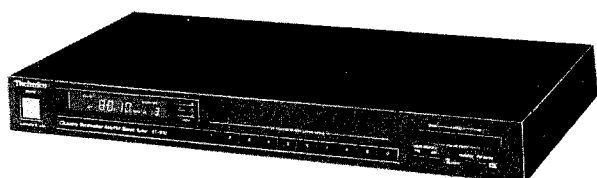
Service Manual

QUARTZ Synthesizer
AM/FM Stereo Tuner

Tuner
ST-600

Color

(S) Silver Type
(K) Black Type



Area

Color	Area
(S)(K)	(EX) Continental Europe.
(S)(K)	(Ei) Italy.
(S)(K)	(EG) F.R. Germany.
(S)(K)	(EH) Holland.
(S)(K)	(XL) Australia.
(S)(K)	(XA) Asia, Latin America, Middle Near East, Africa and Oceania.
(K)	(XB) Saudi Arabia.

SPECIFICATIONS

(DIN 45 500)

■ FM TUNER SECTION

Frequency range	87.50 ~ 108.00 MHz (50 kHz-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 (70 dB, IHF)
Frequency response	20 Hz ~ 15 kHz, +0.5 dB ~ -1.5 dB
Alternate channel selectivity	
normal $\pm$ 400 kHz	65 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	40 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	531 kHz ~ 1602 kHz (9 kHz-steps)
(For Saudi Arabia)	530 kHz ~ 1600 kHz (10 kHz-steps)
(For others)	522 kHz ~ 1611 kHz (9 kHz-steps)
	530 kHz ~ 1620 kHz (10 kHz-steps)
Sensitivity (S/N 20 dB)	20 μ V, 300 μ V/m
Selectivity at 999 kHz ($\pm$ 9 kHz)	50 dB
Image rejection at 999 kHz	40 dB
IF rejection at 999 kHz	60 dB

■ GENERAL

Output voltage	0.3V (0.6V, IHF)
Power consumption	9W
Power supply	
For Australia	AC 50 Hz/60 Hz, 240V
For continental Europe	AC 50 Hz/60 Hz, 220V
For others	AC 50 Hz/60 Hz, 110V/117V/220V/240V
Dimensions (W x H x D)	430 x 53 x 220 mm (16-15/16" x 2-2/12" x 8-21/32")
Weight	2.0 kg (4.4 lb.)

Notes:

- Specifications are subject to change without notice.
Weight and dimensions are approximate.
- Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Technics

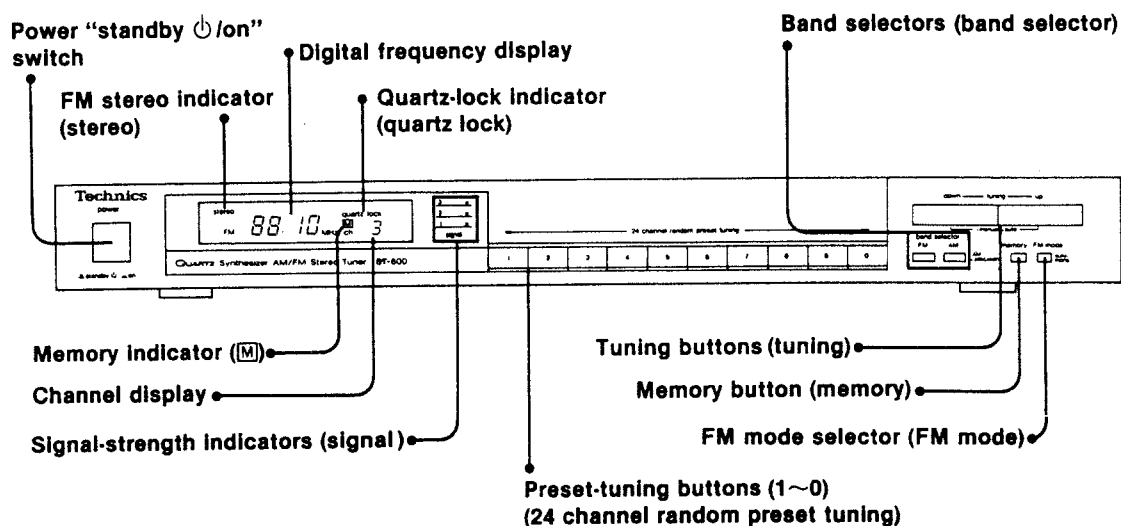
Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

CONTENTS

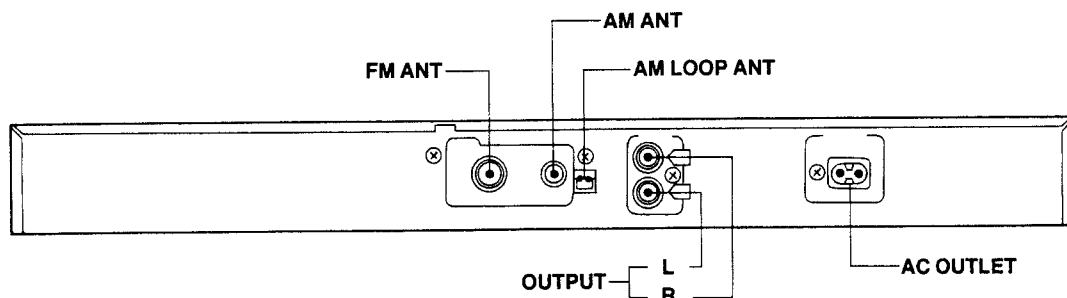
	Page		Page
LOCATION OF CONTROLS	2	CIRCUIT BOARDS AND WIRING	
ACCESSORIES	2	CONNECTION DIAGRAM	11
DISASSEMBLY INSTRUCTIONS	3	TERMINAL GUIDE OF IC'S,	
MEASUREMENTS AND ADJUSTMENTS	4	TRANSISTORS AND DIODES	12
RESISTORS & CAPACITORS	6	SCHEMATIC DIAGRAM	13
DESCRIPTION OF FL PANEL	7	EXPLODED VIEW	16
FUNCTION OF TERMINAL (IC901: LC6512A3377)	8	REPLACEMENT PARTS LIST	17
BLOCK DIAGRAM	9		

LOCATION OF CONTROLS

Front panel

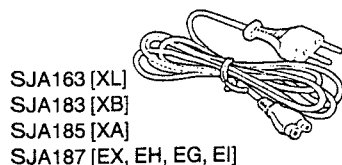


Rear panel



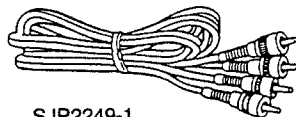
ACCESSORIES

- AC power supply cord..... 1



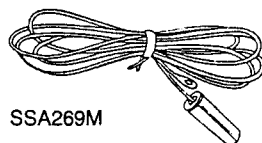
SJA163 [XL]
SJA183 [XB]
SJA185 [XA]
SJA187 [EX, EH, EG, EI]

- Stereo connection cable..... 1



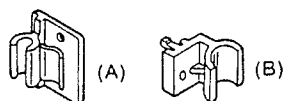
SJP2249-1

- FM indoor antenna..... 1



SSA269M

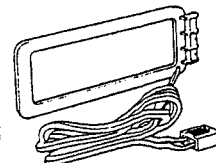
- AM antenna holders..... 2



SMA231M

SMA233-1M

- AM loop antenna 1



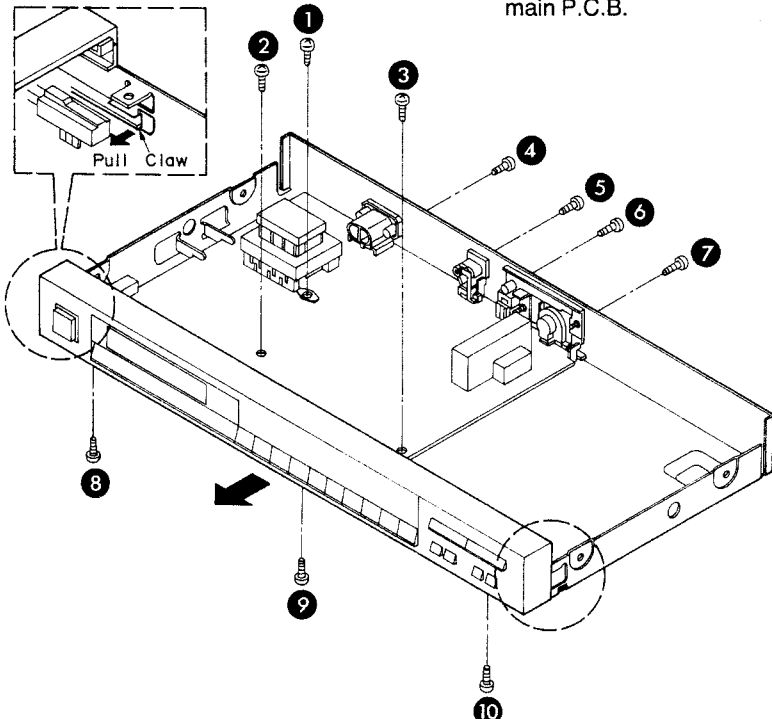
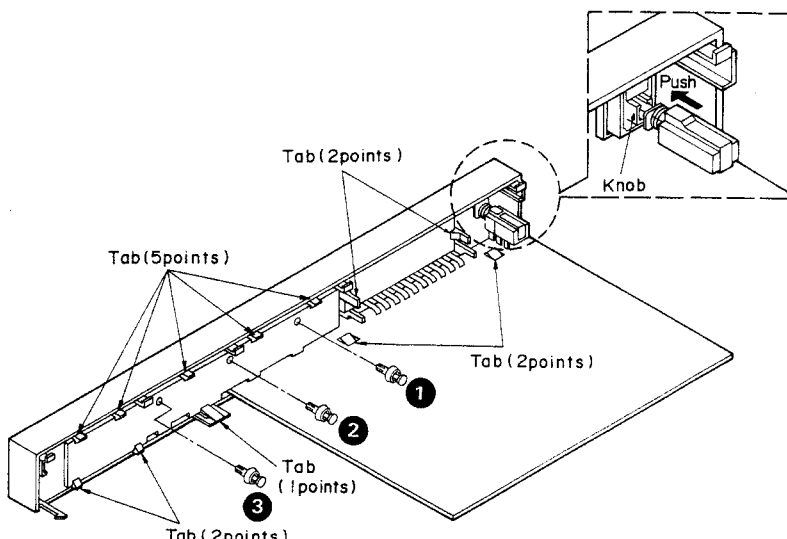
SPB1139-1

- Screws 2



XTN3+10AFZ

■ DISASSEMBLY INSTRUCTIONS

Ref. No. 1	How to remove the cabinet	
Procedure 1	● Remove the 4 screws.	
Ref. No. 2	How to remove the main P.C.B.	1. Remove the 10 screws (①~⑩). 2. Remove the 2 claws. 3. Slightly pull the front panel toward you and remove the main P.C.B.
Procedure 1→2		
Ref. No. 3	How to remove the front panel	1. Remove the power switch knob. 2. Remove the 3 nylon rivets (①~③). 3. Remove the 12 tabs.
Procedure 1→2→3		

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), Z201(AM ANT and OSC coil), Z321(FM ANT coil), L321 (L.P.F), L322(L.P.F) and L324(L.P.F), they are supplied as adjusted parts. So, do not turn the cores of the parts.

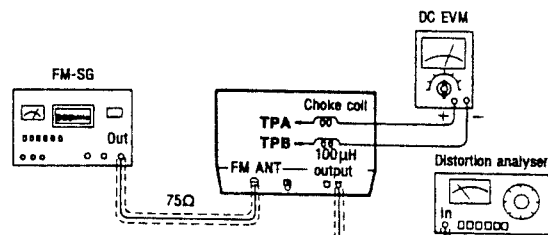
FM MONO DISTORTION ADJUSTMENT

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



TPA = TP201, TPB = TP202

MPX VCO ADJUSTMENT

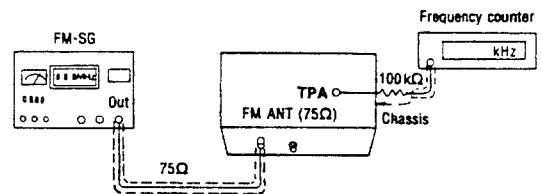
1. Test equipment connection is shown in figure.
2. Set the unit to "on/auto" position.
3. Set the radio dial and signal generator to 100.10MHz.
4. Adjust VR301 for 19kHz $\pm$ 30Hz on frequency counter reading.

USING ALTERNATE SYSTEM

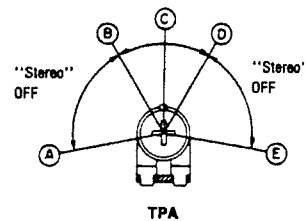
1. Receive the stereo broadcast.
2. Adjust VR301 until stereo indicator lights up. Fix the arm of VR301 as shown in figure.

FM SIGNAL GENERATOR CONDITION

Modulation100%
Modulation frequency0kHz
Output level66dB



TPA = TP301



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

TPA = VR301

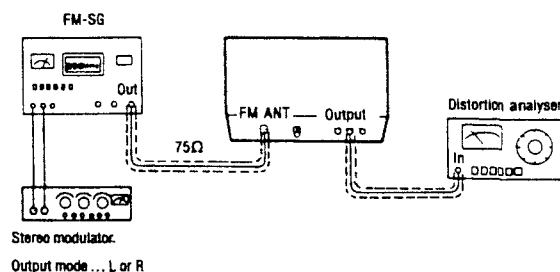
FM STEREO DISTORTION ADJUSTMENT (EG) and (EI) only

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 **T1** so that the distortion factor of L-CH is minimized.
5. Make sure that the distortion factors of L-CH and R-CH are nearly the same and minimum.

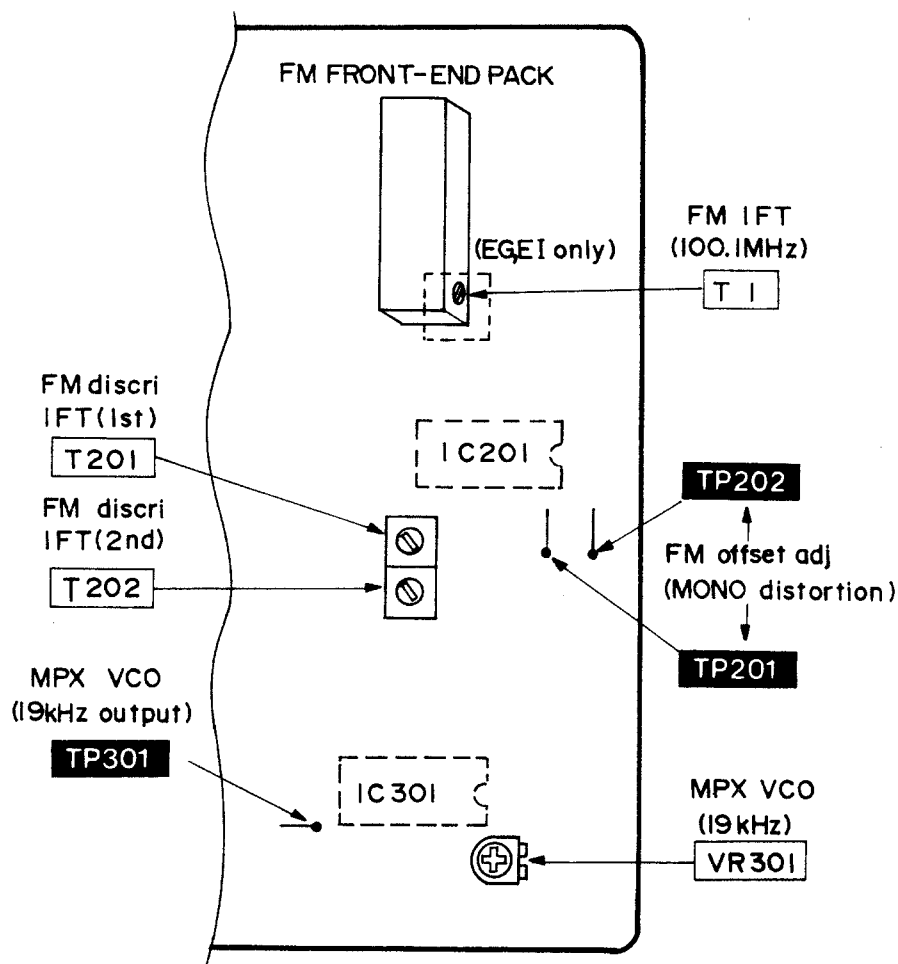
Note: The adjusting screwdriver used should be made of resin.

FM SIGNAL GENERATOR CONDITION

Modulation "L" mode or "R" mode 90%,
Pilot 10%
Modulation frequency 1kHz (Pilot 19kHz)
Output level 66dB



● Adjustment Points



RESISTORS & CAPACITORS

Notes : * Important safety notice :

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

* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)

Parts without these indications can be used for all areas.

Numbering System of Resistor

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 of Capacitor

Example:

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

● Capacity are in microfarads (μ F) unless specified otherwise, P = Pico-farads (pF) F = Farads (F).

● Resistance 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			

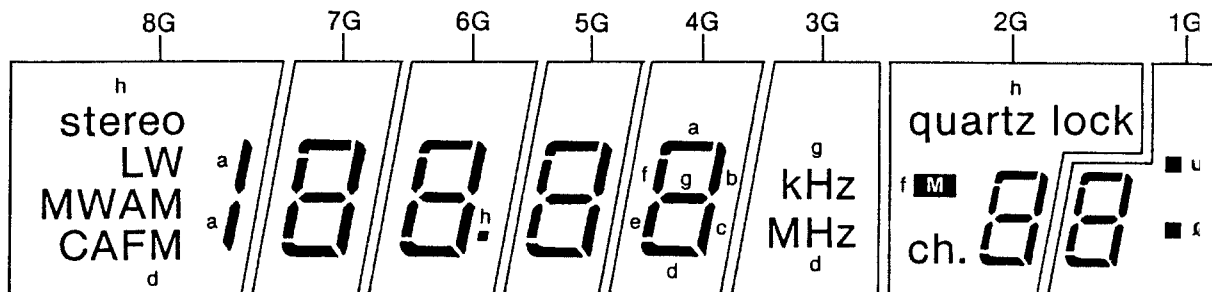
Capacitor Type		Voltage		Tolerance
ECE	: Electrolytic	0J : 6.3V	1A : 10V	K : $\pm 10\%$
ECCD	: Ceramic	1C : 16V	1E : 25V	M : $\pm 20\%$
ECKD	: Ceramic Capacitor	1H : 50V	1V : 35V	Z : +80 % -20
ECQM	: Polyester	50 : 50V	05 : 50V	J : $\pm 5\%$
ECOP	: Polypropylene	2H : 500V	2A : 100V	G : $\pm 2\%$
ECG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

Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.
RESISTORS (VALUE, WATTAGE)			R231	ERDS2TJ102	1K 1/4	R313	ERDS2TJ473	47K 1/4
R101	ERDS2TJ103	10K 1/4	R232	ERDS2TJ122	1.2K 1/4	R314	ERDS2TJ473	47K 1/4
R102	ERDS2TJ103	10K 1/4	R233	ERDS2TJ684	680K 1/4	R315	ERDS2TJ103	10K 1/4
R104	ERDS2TJ102	1K 1/4	R234	ERDS2TJ103	10K 1/4	R316	ERDS2TJ102	1K 1/4
R105	ERDS2TJ561	560 1/4	R235	ERDS2TJ471	470 1/4	R317	ERDS2TJ473	47K 1/4
R106	ERDS2TJ562	5.6K 1/4	R237	ERDS2TJ151	150 1/4	R321	ERDS2TJ153	15K 1/4
R107	ERDS2TJ103	10K 1/4	(EX, EH, XA)			(EG, E1)		
R108	ERDS2TJ151	150 1/4	(XL, XB)			R322	ERDS2TJ153	15K 1/4
R201	ERDS2TJ332	3.3K 1/4	R240	ERDS2TJ152	1.5K 1/4	(EG, E1)		
R202	ERDS2TJ824	820K 1/4	(EG, E1)			R325	ERDS2TJ102	1K 1/4
R203	ERDS2TJ122	1.2K 1/4	R247	ERDS2TJ103	10K 1/4	(EG, E1)		
R204	ERDS2TJ474	470K 1/4	R301	ERDS2TJ393	39K 1/4	R326	ERDS2TJ102	1K 1/4
(EG, E1)			R302	ERDS2TJ151	150 1/4	(EG, E1)		
R204	ERDS2TJ824	820K 1/4	R303	ERDS2TJ223	22K 1/4	R327	ERDS2TJ183	18K 1/4
(EX, EH, XA)			R304	ERDS2TJ223	22K 1/4	(EG, E1)		
(XL, XB)			R305	ERDS2TJ272	2.7K 1/4	R402	ERDS2TJ221	220 1/4
R205	ERDS2TJ221	220 1/4	(EG, E1)			R403	ERDS2TJ181	180 1/4
(EG, E1)			R305	ERDS2TJ332	3.3K 1/4	R404	ERDS2TJ151	150 1/4
R205	ERDS2TJ391	390 1/4	(EX, EH, XA)			R405	ERDS2TJ122	1.2K 1/4
(EX, EH, XL)			(XL, XB)			R406	ERDS2TJ561	560 1/4
(XB, XA)			R306	ERDS2TJ272	2.7K 1/4	R408	ERDS2TJ182	1.8K 1/4
R206	ERDS2TJ561	560 1/4	(EG, E1)			R409	ERDS2TJ563	56K 1/4
R207	ERDS2TJ822	8.2K 1/4	R306	ERDS2TJ332	3.3K 1/4	R702	ERDS2TJ102	1K 1/4
R208	ERDS2TJ102	1K 1/4	(EX, EH, XA)			R703	ERDS2TJ221	220 1/4
R209	ERDS2TJ471	470 1/4	(XL, XB)			R704	ERDS2TJ102	1K 1/4
R211	ERDS2TJ222	2.2K 1/4	R307	ERDS2TJ104	100K 1/4	R710	ERDS2TJ103	10K 1/4
R212	ERDS2TJ153	15K 1/4	(EX, EH, XA)			R711	ERDS2TJ104	100K 1/4
R213	ERDS2TJ104	100K 1/4	(XL, XB)			R716	ERDS2TJ101	100 1/4
R214	ERDS2TJ824	820K 1/4	R307	ERDS2TJ562	5.6K 1/4	R717	ERDS2TJ101	100 1/4
R215	ERDS2TJ822	8.2K 1/4	(E1, EG)			R725	ERDS2TJ103	10K 1/4
R216	ERDS2TJ563	56K 1/4	R308	ERDS2TJ104	100K 1/4	R901	ERDS2TJ103	10K 1/4
R217	ERDS2TJ223	22K 1/4	(EX, EH, XA)			R902	ERDS2TJ103	10K 1/4
R218	ERDS2TJ123	12K 1/4	(XL, XB)			R903	ERDS2TJ103	10K 1/4
R219	ERDS2TJ562	5.6K 1/4	R308	ERDS2TJ562	5.6K 1/4	R915	ERDS2TJ821	820 1/4
R220	ERDS2TJ103	10K 1/4	(E1, EG)			R916	ERDS2TJ272	2.7K 1/4
R221	ERDS2TJ104	100K 1/4	R309	ERDS2TJ104	100K 1/4	R917	ERDS2TJ103	10K 1/4
R222	ERDS2TJ473	47K 1/4	(EG, E1)			R918	ERDS2TJ224	220K 1/4
R227	ERDS2TJ104	100K 1/4	R309	ERDS2TJ224	220K 1/4	R922	ERDS2TJ681	680 1/4
R228	ERDS2TJ123	12K 1/4	(EX, EH, XA)			R923	ERDS2TJ104	100K 1/4
R229	ERDS2TJ102	1K 1/4	(XL, XB)			R924	ERDS2TJ392	3.9K 1/4
R230	ERDS2TJ104	100K 1/4	R311	ERDS2TJ102	1K 1/4	R925	ERDS2TJ473	47K 1/4
			R312	ERDS2TJ153	15K 1/4	R930	ERDS2TJ104	100K 1/4

Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.
R931	ERDS2TJ104	100K 1/4	C220	ECEA1CKS100	10 16	C323	ECFTD332KXL	0.0033 25
R932	ERDS2TJ104	100K 1/4	C222	ECFTD473KXL	0.047 25	(EG, E1)		
R933	ERDS2TJ104	100K 1/4	C225	RCBS1H180JCY	18P 50	C324	ECFTD332KXL	0.0033 25
R946	ERDS2TJ101	100 1/4	C226	ECKD1H103PF	0.01 50	(EG, E1)		
R950	ERDS2TJ683	68K 1/4	C227	ECEA1CKS100	10 16	C325	ECCD1H330KC	33P 50
R951	ERDS2TJ683	68K 1/4	C230	RCBC1H471KBY	470P 50	(EG, E1)		
R952	ERDS2TJ683	68K 1/4	(E1, EG)			C326	ECKD1H103PF	0.01 50
R953	ERDS2TJ683	68K 1/4	C301	ECEA1CU101	100 16	(EG, E1)		
R954	ERDS2TJ683	68K 1/4	C302	ECEA1HKR47	0.47 50	C327	ECBT1H102KB5	0.001 50
R960	ERDS2TJ103	10K 1/4	C303	ECEA1HK010	1 50	(EG, E1)		
R961	ERDS2TJ273	27K 1/4	C304	ECEA1VK3R3	3.3 35	C401	ECEA1VK3R3	3.3 35
CAPACITORS(VALUE,VOLTAGE)			C305	ECEA1VK3R3	3.3 35	C701	ECEA1CU222	2200 16
C101	RCBS1H150JCY	15P 50	C306	ECEA1VK3R3	3.3 35	(EG, E1)		
C102	RCBS1H150JCY	15P 50	C307	ECFTD153KXL	0.015 25	C701	ECEA1EU102	1000 25
C103	ECBT1H102KB5	0.001 50	(EX, EH, XA)			(EX, EH, XA)		
C104	RCBS1H181KBY	180P 50	(XL, XB)			(XL, XB)		
C105	ECEA0JU101	100 6.3	C307	ECFTD392KXL	0.0039 25	C702	ECEA1EU102	1000 25
C106	ECKD1H103PF	0.01 50	(EG, E1)			C704	ECKD1H103PF	0.01 50
C107	ECKD1H103PF	0.01 50	C308	ECFTD153KXL	0.015 25	(EX, EH, XA)		
C108	ECEA25M4R7	4.7 25	(EX, EH, XA)			(XL, XB)		
C109	ECEA1CU330	33 16	(XL, XB)			C705	ECEA1CU221	220 16
C110	ECBT1H102KB5	0.001 50	C308	ECFTD392KXL	0.0039 25	C707	ECKD1H103PF	0.01 50
C201	ECKD1H103PF	0.01 50	(EG, E1)			C710	ECKD2H102ZF	0.001 500
C202	ECKD1H103PF	0.01 50	C310	ECFTD473KXL	0.047 25	C711	ECKD1H103PF	0.01 50
C204	RCBC1H470JLY	47P 50	C311	ECQP1471JZ	470P 125	C716	ECEA1VU101	100 35
C205	ECKD1H223PF	0.022 50	C312	ECEA1CKS100	10 16	C717	ECKD2H102ZF	0.001 500
C206	RCBS1H150JCY	15P 50	C313	ECBT1H102KB5	0.001 50	C718	ECKD1H103PF	0.01 50
C208	ECEA0JU101	100 6.3	(EG, E1)			C719	ECEA1VU101	100 35
C209	ECEA1EK4R7	4.7 25	C313	RCBS1H181KBY	180P 50	C720	ECKD1H103PF	0.01 50
C210	ECKD1H223PF	0.022 50	(EX, EH, XA)			(EG, E1)		
C211	ECKD1H223PF	0.022 50	(XL, XB)			C725	ECEA1VK100B	10 35
C212	ECKD1H223PF	0.022 50	C314	ECBT1H102KB5	0.001 50	C726	ECEA1VK3R3	3.3 35
C213	RCBC1H101KBY	100P 50	(EG, E1)			C902	ECKD1H103PF	0.01 50
C214	ECEA1CKS100	10 16	C314	RCBS1H181KBY	180P 50	C912	ECEA0JS102	1000 6.3
C215	ECKD1H103PF	0.01 50	(EX, EH, XA)			C913	ECKD1H103PF	0.01 50
C216	ECEA1CKS100	10 16	(XL, XB)			C914	ECEA0JS102	1000 6.3
C217	ECEA1HK010	1 50	C321	ECEA1CKS100	10 16	C915	ECEA1HKR22	0.22 50
			(EG, E1)			C916	RCBC1H101KBY	100P 50
						C917	RCBS1H121KBY	120P 50

DESCRIPTION OF FL PANEL

GRID ASSIGNMENT



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

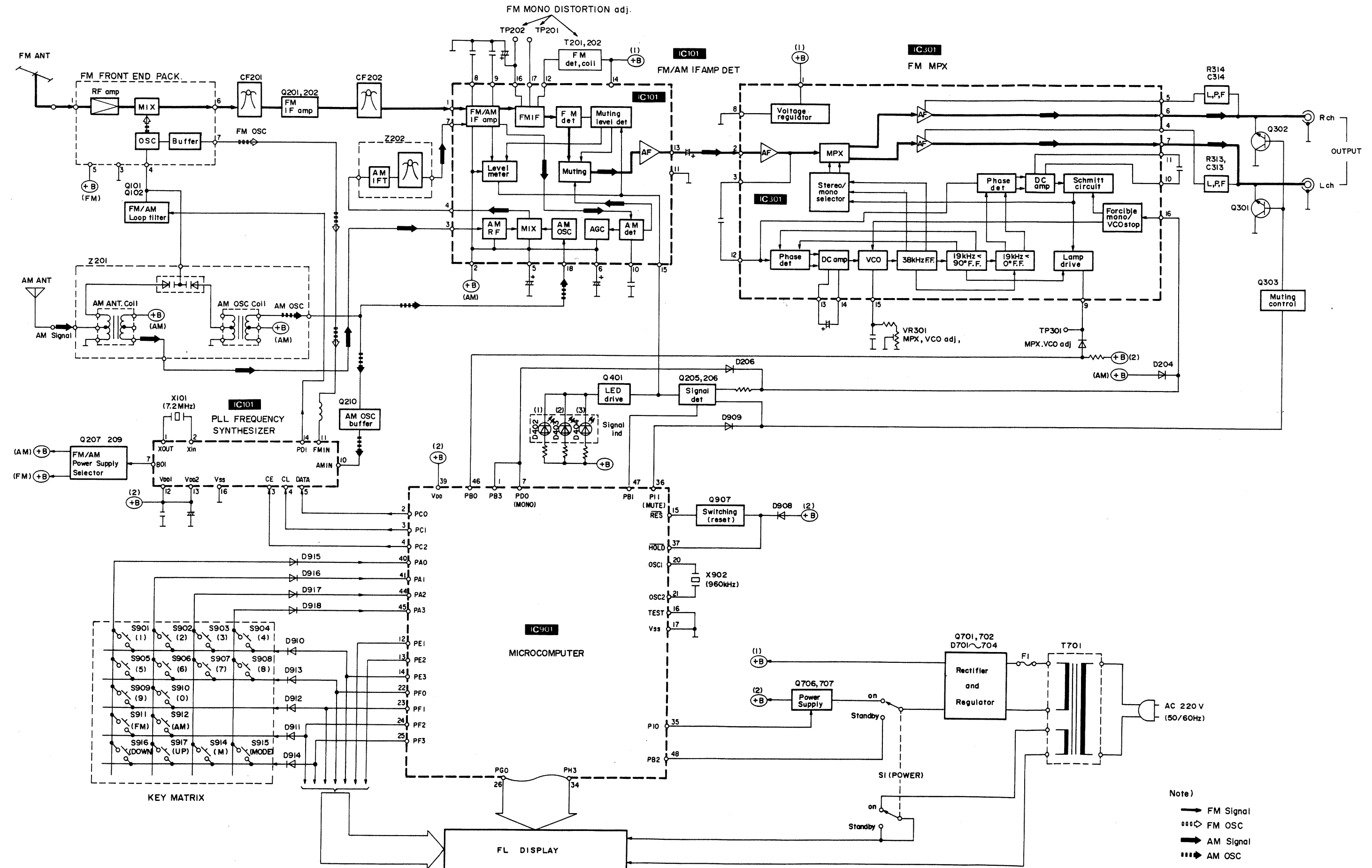
PIN CONNECTION

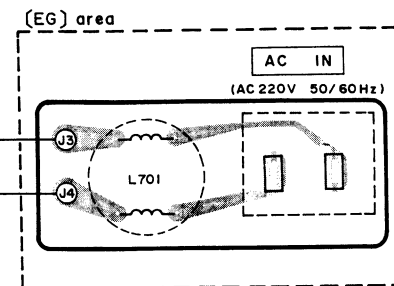
PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CONNECTION	F1	F1	NP	h	f	8G	AM	MW	CA	LW	7G	c	a	6G	e	d	g	5G
PIN NO.	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
CONNECTION	b	NP	4G	NP	NP	3G	NP	NP	ch	2G	NP	u	1G	l	NP	F2	F2	

FUNCTION OF TERMINAL (IC901: LC6512A3377)

PIN NO.	IN/OUT	MARK	DESCRIPTION OF TERMINAL
1	INPUT	PB3	Computer drive terminal.
2	OUTPUT	DATA	Data output $t > \frac{8}{f_{XOSC}}$ 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	INPUT	RES	Reset terminal.
16	—	TEST	Ground terminal.
17		V _{SS}	
18	—	NC	Not used in this unit.
19		NC	
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	Not used in this unit.
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		PB2	Tuner select terminal. (Ground connection)

■ BLOCK DIAGRAM





NO. 1	AN7470	16 Pin
	LM7001	16 Pin
	AN7273A	18 Pin

NO. 1	LC6512A3377	48 pin
--------------	-------------	--------

2SC2603EFG, 2SC3940A-Q	2SC2787L, SC3311A-Q 2SA1309Q
KV1260Z A1 Cathode A2 O Ca	MA165, MA162A 1SR35200A 1SS254 MA156 MA150 Cathode A Ca O
Anode Cathode A Ca O	MA4051M, MA4062M, MA4110M, MA4150M

UN4113 R1 = 47 K R2 = 47 K	
---	--



SCHEMATIC DIAGRAM

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

Note 1:

- S1 : Power source switch in "on" position.
- S2 : Voltage selector in "240 V" position.
(for [XA] and [XB] areas 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: CH10]
- S911 : FM select switch.
- S912 : AM select switch.
- S914 : Memory set switch. (manual ↔ auto memory)
- 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. (): AM voltage

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

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.

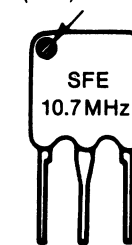
Note 2:

• 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)

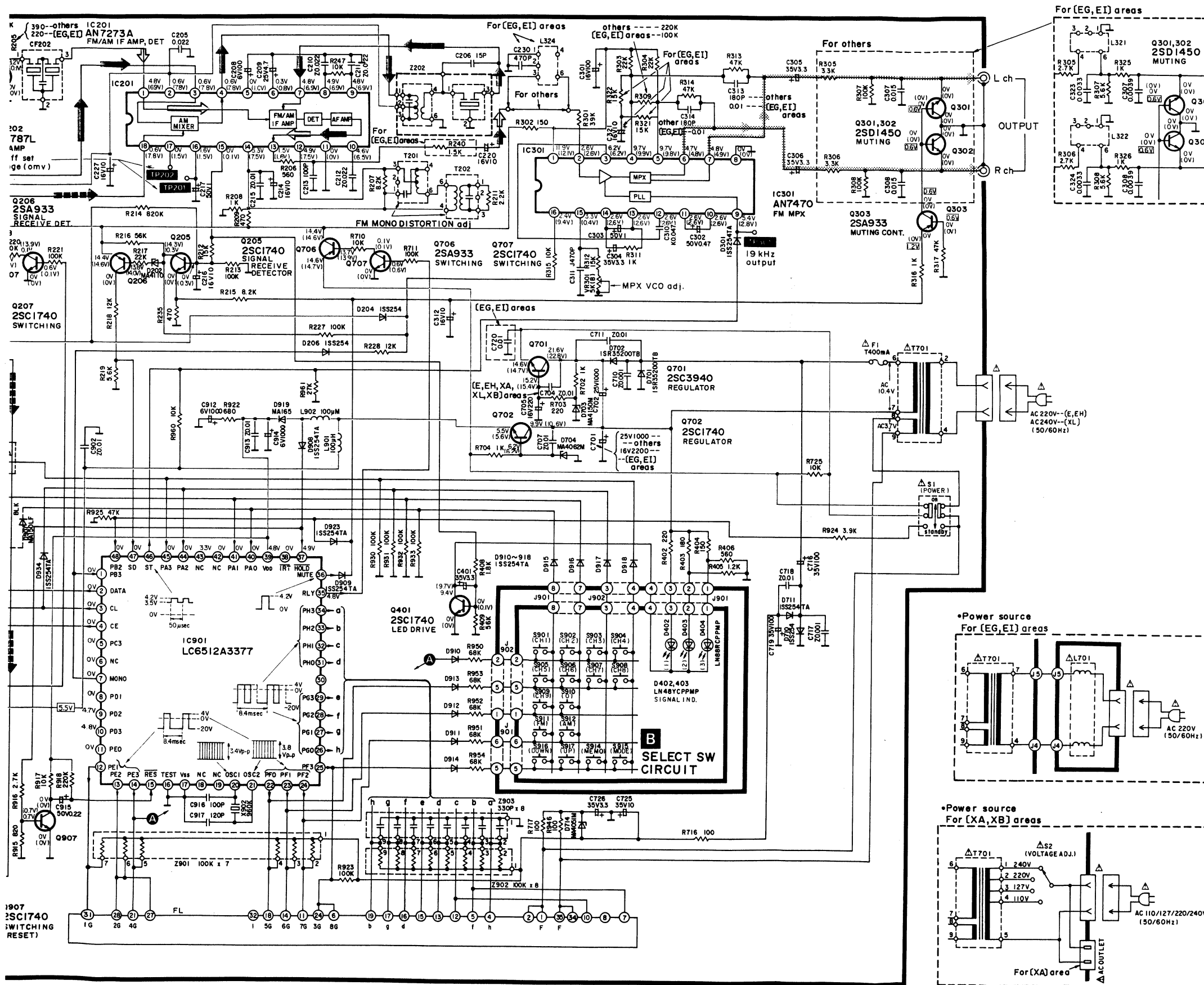


RANK (Color)	D906	D907	CENTER FREQUENCY
White	○	×	10.65 MHz
Red	×	×	10.70 MHz
Black	×	○	10.76 MHz

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

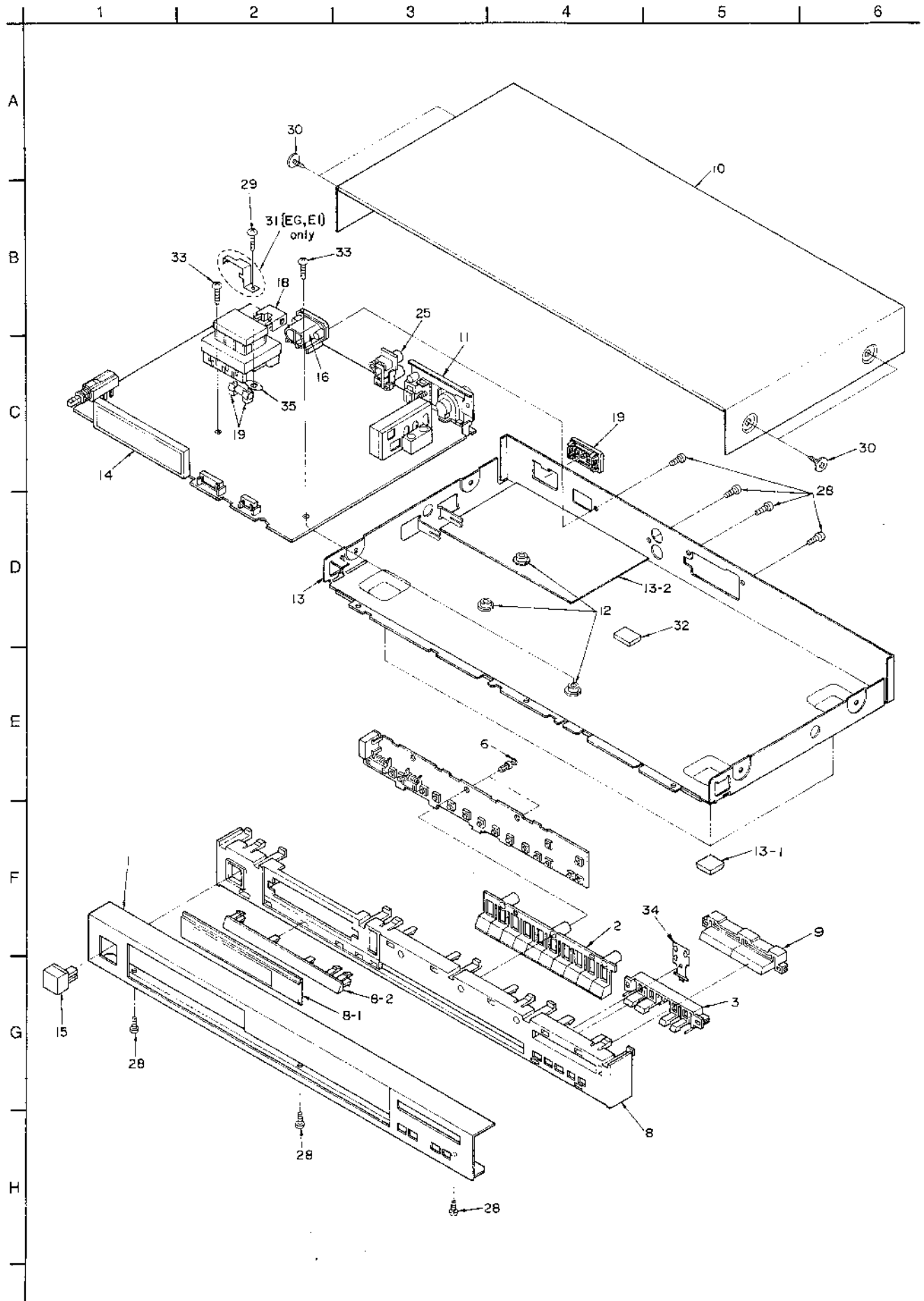
* Caution!

- 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.



ST-600

EXPLODED VIEW



REPLACEMENT PARTS LIST

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 Ref. No. columns specify the area. (Refer to the first page for area.)

Parts without these indications can be used for all areas.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
INTEGRATED CIRCUITS			(EG, E1)		
IC101	LM7001	I.C. PLL FREQUENCY	L322	SLM1B9-P	MPX COIL
IC201	AN7273B	I.C. FM AM IF AMP	(EG, E1)		
IC301	SV1UPC1161C3	I.C. FM MPX	L324	SLM1B10-M	COIL
IC901	LC8512A3377	I.C. MICRO COMPUTER	(EG, E1)		
TRANSISTORS			L325	RLQZPR47KT-Y	CHOKE COIL
Q101	2SC1740SQ	TRANSISTOR	(EG, E1)		
Q102	2SC1740SQ	TRANSISTOR	L701	SLQZ650MH49	CHOKE COIL
Q201	2SC2787L	TRANSISTOR	(EG, E1)		
Q202	2SC2787L	TRANSISTOR	L901	ELEXT101KA9	COIL
Q205	2SC1740SQ	TRANSISTOR	L902	ELEXT101KA9	COIL
Q206	2SA933SQ-R	TRANSISTOR	T201	SL148511-Z	I.F. TRANSFORMER
Q207	2SC1740SQ	TRANSISTOR	T202	SL148513-Z	I.F. TRANSFORMER
Q208	2SA933SQ-R	TRANSISTOR	T701 Δ	SLT5K244-S	POWER TRANSFORMER
Q209	2SA933SQ-R	TRANSISTOR	(XL)		
Q210	2SC1740SQ	TRANSISTOR	T701 Δ	SLT5K245-S	POWER TRANSFORMER
Q301	2SD1330R	TRANSISTOR	(XA, XB)		
Q302	2SD1330R	TRANSISTOR	T701 Δ	SLT5K246-S	POWER TRANSFORMER
Q303	2SA933SQ-R	TRANSISTOR	(EX, EH, EG)		
Q401	2SC1740SQ	TRANSISTOR	(E1)		
Q701	2SC3940AQSTA	TRANSISTOR	COMPONENT COMBINATIONS		
Q702	2SC1740SQ	TRANSISTOR	Z201	SLA221-T	COIL
Q706	2SA933SQ-R	TRANSISTOR	Z202	SL172101-T	FREQUENCY TRANSFORMER
Q707	2SC1740SQ	TRANSISTOR	Z321	SLA4Z13-Z	ANTENNA COIL
Q907	2SC1740SQ	TRANSISTOR	(EG, E1)		
DIODES			Z901	EXBF8E104J	COMBINATION COMPONENT
D101	MA165	DIODE	Z902	EXBF9E104J	COMBINATION COMPONENT
D202	MA4110M	DIODE	Z903	EXFP8331MW	COMBINATION COMPONENT
D204	MA165	DIODE	FILTERS		
D206	MA165	DIODE	CF201	SVFE107MS8-Q	CERAMIC FILTER
D301	MA165	DIODE	(EX, EH, XA)		
D402	LN48YCPPMP	L.E.D	(XL, XB)		
D403	LN48YCPPMP	L.E.D	CF202	SVFE107MS8-Q	CERAMIC FILTER
D404	LN88RCPMP	L.E.D	(EX, EH, XA)		
D701 Δ	SV01SR35200A	RECTIFIER	(XL, XB)		
D702 Δ	SV01SR35200A	RECTIFIER	OSCILLATORS		
D703	MA4150M	DIODE	X101	SVQ49U722-S	CRYSTAL OSCILLATOR
D704	MA4062-M	DIODE	X902	EF0A960K04A	CERAMIC FILTER
D710	MA165	DIODE	DISPLAYS		
D711	MA165	DIODE	FL	SAD6MT10ZYK	DISPLAY TUBE
D714	MA4051-M	DIODE	FRONT PACKS		
D906	MA162A	DIODE	FE	SNVFE337G01	TUNER
D907	MA162A	DIODE	(E1, EG)		
D908	MA165	DIODE	FE1	SNVFE203E01	TUNER
D909	MA165	DIODE	(EX, EH, XA)		
D910	MA165	DIODE	(XL, XB)		
D911	MA165	DIODE	FUSES		
D912	MA165	DIODE	F1 Δ	XBA2C04TB0	FUSE, T0.4A250V
D913	MA165	DIODE	SWITCHES		
D914	MA165	DIODE	S1	SSH1196-1	SW. POWER
D915	MA165	DIODE	S701 Δ	SSR187-1	SW. VOLTAGE SELECTOR
D916	MA165	DIODE	(XA, XB)		
D917	MA165	DIODE	S901	SSG13	SW. CH1
D918	MA165	DIODE	S902	SSG13	SW. CH2
D919	MA165	DIODE	S903	SSG13	SW. CH3
D923	MA165	DIODE	S904	SSG13	SW. CH4
D931	MA165	DIODE	S905	SSG13	SW. CH5
D933	MA165	DIODE	S906	SSG13	SW. CH6
(XB)			S907	SSG13	SW. CH7
D934	MA165	DIODE	S908	SSG13	SW. CH8
VARIABLE RESISTORS			S909	SSG13	SW. CH9
VR301	EYN04AA00B53	MPX VCO	S910	SSG13	SW. CH0
COILS AND TRANSFORMERS			S911	SSG13	SW. FM
L101	RLQZPR47KT-Y	CHOKE COIL	S912	SSG13	SW. AM
L102	RLQZP1R2KT-Y	CHOKE COIL	S914	SSG13	SW. MEMORY SET
L203	ELEPK1R0MA	COIL	S915	SSG13	SW. FM MODE
L204	ELEPK1R0MA	COIL	S916	SSG13	SW. TUNING(DOWN)
L321	SLM1B9-P	MPX COIL	S917	SSG13	SW. TUNING(UP)

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
CABINET AND CHASSIS			13	SGPT600-XA	BOTTOM BOARD
1	⊗	SGWT600-KE	FRONT PANEL	(XA)	
1	⊗	SGWT600-SE	FRONT PANEL	13	SGPT600-XB
2	⊗	SBC1005	BUTTON	(XB)	BOTTOM BOARD
2	⊗	SBC1005-1	BUTTON	13	SGPT600-XL
3	⊗	SBC943-4	BUTTON	(XL)	BOTTOM BOARD
3	⊗	SBC943-6	BUTTON	13-1	SKL297-1
6		SHR415	LOCK PIN	13-2	SMX342
8	⊗	SGXT600-KE	PANEL	14	LN031441P
8	⊗	SGXT600-SE	PANEL	15	⊗
8-1	⊗	SGU594A	SHIELD PLATE	15	⊗
8-1	⊗	SGU594B	SHIELD PLATE	15	⊗
8-2	⊗	SGX9042A	ORNAMENT	16	△
8-2	⊗	SGX9042-1A	ORNAMENT	(EG, E1)	
9	⊗	SBC1006	BUTTON	16	△
9	⊗	SBC1006-1	BUTTON	(EX, EH, XA)	
10	⊗	SKC1331BB	CABINET	(XL, XB)	
10	⊗	SKC1331S	CABINET	17	SJS9231A
11		SJF8305N	TERMINAL PLATE	(EG, E1)	
(EX, EH, EG)				18	SJS9330B
(E1)				(XA)	
11	SJF8402N	TERMINAL PLATE	19	SJS9330A	OUTLET COVER
(XA, XL, XB)			19	SJT347	FUSE HOLDER
12	SHE170-1	SPACER	25	SJF3250	TERMINAL BOARD
13	SGPT600-EG	BOTTOM BOARD	26	SHR9865	HOLDER
(EG)			28	XTBS3*8JFZ1	SCREW
13	SGPT600-EH	BOTTOM BOARD	29	XTBS3*12F1	SCREW
(EH)			30	⊗	SNE2129-3
13	SGPT600-E1	BOTTOM BOARD	30	⊗	SNE2129-2
(E1)			31	SUS867	SPRING
13	SGPT600-EK	BOTTOM BOARD	(EG, E1)		
(EX)			32	SHG1613	RUBBER PARTS
			33	⊗	XTBS3*12F
			34	SUS883	COIL SPRING
			35	SNE55	BRACKET

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
PACKING MATERIAL			ACCESSORIES		
P1 {EX, EH, XA} {EG, XB}	SPG6190	PACKING CASE	A1 {XA, XB}	RJP120ZBS-H	AC PLUG ADAPTOR
P1 {E1}	SPG6193	PACKING CASE	A2 A3 {XA, XL, XB}	SJP2249-1 SSA269M	OUTPUT CORD FM ANTENNA
P1 {EX, EH, XA} {EG}	SPG6191	PACKING CASE	A3 {EX, EH, EG} {E1}	SSA270M	FM ANTENNA
P1 {XL}	SPG6192	PACKING CASE	A4 A5 A6 {EX, EH}	SPF15 SPB1139-1 SQF13139	PROTECTION BAG AM LOOP ANTENNA INSTRUCTION BOOK
P2 {EX, EH, XA} {EG, E1, XB}	SPS4584	CUSHION PAD	A6 {XA}	SQF13140	INSTRUCTION BOOK
P2 {XL}	SPS4584-2	PAD	A6 {EG}	SQF13141	INSTRUCTION BOOK
P3 {EX, EH, XA} {EG, E1, XB}	SPS4585	PAD	A6 {XL}	SQF13142	INSTRUCTION BOOK
P3 {XL}	SPS4585-1	PAD	A6 {XB}	SQF13143	INSTRUCTION BOOK
P4	SPS4552	PAD	A6 {E1}	SQF13178	INSTRUCTION BOOK

DEUTSCH

■ MESSUNGEN UND JUSTIERUNGEN

UKW JUSTIERUNGEN

Einstellungen der Bedienelemente und zu verwendende Geräte.

- UKW-Messender(UKW-MS)
- Stereo-Modulator
- Verzerrungs-Analysator
- Elektronische Gleichstrom-Voltmeter(EVM)
- Frequenzzähler
- Drosselspule(100µH)
- Widerstand(100kΩ)

Anmerkung: Für Z201, Z202, Z321, L321, L322 und L324 werden bereits justierte Ersatzteile geliefert. Die Kerne dieser Teile daher nicht drehen.

UKW-MONO-VERZERRUNGS-JUSTIERUNG

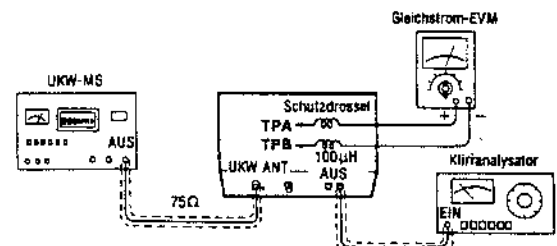
1. Der Testaufbau ist in der Abbildung gezeigt.
2. Stellen Sie die Einheit auf "FM(UKW)" Betrieb.
3. Die Radiofrequenzanzeige und den Messender auf 100.10MHz einstellen.
4. Den Kern von T201 so justieren, daß die im Signalzustand gemessene Spannung 0mV ($0 \pm 20\text{mV}$) im 300mV-Bereich beträgt.
5. T202 so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
6. Schritte 4 und 5 einige Male wiederholen.
7. Versichern Sie sich, daß die Verzerrungsfaktoren von Kanal L und Kanal R annähernd gleich sind und auf ein Minimum gehalten sind.

Anmerkung:

Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

ZUSTAND DES UKW-MESSENDERS

Modulation100%
Modulationsfrequenz1kHz
Ausgangspegel66dB



TPA = TP201, TPB = TP202

MPX-SGO-JUSTIERUNG

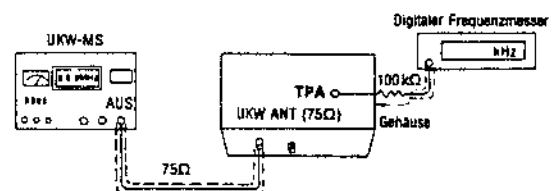
1. Der Testaufbau ist in der Abbildung gezeigt.
2. Den UKW-Betriebsart-Wahlhalter in die "on/auto" Position stellen.
3. Radio und Meßsender auf 100.10MHz einstellen.
4. VR301 auf 19kHz $\pm$ 30Hz auf der Frequenzzähleranzeige justieren.

● VERWENDUNG EINES ALTERNATIVSYSTEMS

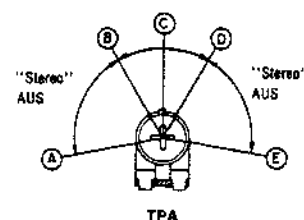
1. Stereosignal vom Meßsender eingeben oder eine Stereo-Sendung empfangen.
2. VR301 justieren, bis die Stereo-Anzeige aufleuchtet. Den Arm von VR301 mit Lack sichern, wie in der Abbildung gezeigt.

ZUSTAND DES UKW-MESSENDERS

Modulation100%
Modulationsfrequenz0kHz
Ausgangspegel66dB



TPA = TP301



- A ~ B, D ~ E "Stereo" AUS Stellung
- B ~ D "Stereo" EIN Stellung (Anzeigebeleuchtung)
- C Einstellpunkt des pilotschaltkreis'

TPA = VR301

UKW STEREO KLIRRFAKTOR-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Stellen Sie die Einheit auf "FM(UKW)" Betrieb.
3. Die Radiofrequenzanzeige und den Messender auf **100.10MHz** einstellen.
4. T1 so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
5. Überprüfen, daß die Verzerrungsfaktoren des linken und rechten Kanals fast gleich sind.

Anmerkung:

Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

ZUSTAND DES UKW-MESSENDERS

Modulation "L" oder "R" Betriebsart
90%, Pilot signal 10%
Modulationsfrequenz 1kHz (Pilot 19kHz)
Ausgangspegel 66dB

