ORDER NO. SD82032134C8

Service Manual

FM/AM Stereo Receiver

SA-104

[EX],[EH],[XA],[XL]

SA-104 (K)

[EX],[EH]

* The cabinet, front panel and knob are available in black color and silver types.
* The black type model is provided with (K) in the service Manual.

Areas

* [EX] is available in Switzerland and Scandinavia.
* [EH] is available in Holland.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XL] is available in Australia.

Specifications (Specifications are subject to change without notice for further improvement.)

(DIN 45 500)

■ AMPLIFIER SECTION

40 Hz~20 kHz continuous power output	
both channels driven	2 × 20W (4Ω)
	2 × 20W (8Ω)
40 Hz~16 kHz continuous power output	
both channels driven	2 × 20W (4Ω)
	2 × 20W (8Ω)
1 kHz continuous power output	
both channels driven	2 × 24W (4Ω)
	2 × 22W (8Ω)
Total harmonic distortion	
rated power at 40 Hz~20 kHz	0.08% (4Ω)
	0.04% (8Ω)
rated power at 40 Hz~16 kHz	0.08% (4Ω)
	0.04% (8Ω)
rated power at 1 kHz	0.04% (4Ω)
	0.04% (8Ω)
half power at 1 kHz	0.009% (8Ω)
−26 dB power at 1 kHz	0.1% (4Ω)
50 mW power at 1 kHz	0.12% (4Ω)
Intermodulation distortion	
rated power at 250 Hz: 8 kHz=4:1, 4Ω	0.08%
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.04%
Power bandwidth	
both channels driven, −3 dB	10 Hz~30 kHz (4Ω)
Damping factor	15 (4Ω), 30 (8Ω)
Input sensitivity and impedance	
PHONO	2.5 mV/47kΩ
AUX	150 mV/22kΩ
TAPE	150 mV/22 kΩ
TAPE REC/PLAY	180 mV/22kΩ
PHONO maximum input voltage (1 kHz, RMS)	150 mV
S/N	
rated power (4Ω)	
PHONO	70 dB (IHF, A: 73 dB)
AUX, TAPE	88 dB (IHF, A: 95 dB)
−26 dB power (4Ω)	
PHONO	64 dB
AUX, TAPE	66 dB
50 mW power (4Ω)	
PHONO	62 dB
AUX, TAPE	62 dB
PHONO	RIAA standard curve ±0.8 dB (30 Hz~15 kHz)
AUX, TAPE	7 Hz~70 kHz (−3 dB)
Tone controls	
BASS	50 Hz, +10 dB~ −10 dB
TREBLE	20 kHz, +10 dB~ −10 dB
Loudness control (volume at −30 dB)	50 Hz, +9 dB
Output voltage and impedance	
TAPE, REC OUT	150 mV
TAPE REC/PLAY	30 mV/82kΩ
Channel balance, AUX 250 Hz~6,300 Hz	±1 dB
Channel separation, AUX 1 kHz	55 dB
Headphones output level and impedance	210 mV/330Ω
Load impedance	
MAIN or REMOTE	4Ω~16Ω
MAIN and REMOTE	8Ω~16Ω

■ FM TUNER SECTION

Frequency range	87.5~108 MHz
Sensitivity	
S/N 30 dB	1.9 μV (300Ω), 1.3 μV (75Ω)
S/N 26 dB	1.7 μV (300Ω), 1.2 μV (75Ω)
S/N 20 dB	1.5 μV (300Ω), 0.9 μV (75Ω)
IHF usable sensitivity	1.9 μV (IHF '58)
IHF 46 dB stereo quieting sensitivity	22 μV/75Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	60 dB (77 dB, IHF)
STEREO	58 dB (70 dB, IHF)

Technics

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

Frequency response	20 Hz~15 kHz, +1 dB~ −2 dB
Alternate channel selectivity	60 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	55 dB
IF rejection at 98 MHz	70 dB
Spurious response rejection at 98 MHz	80 dB
AM suppression	50 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	−35 dB (−35 dB, IHF)
38 kHz	−50 dB (−50 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	±1.5 dB
Limiting point	1.2 μV
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	300Ω (balanced) 75Ω (unbalanced)

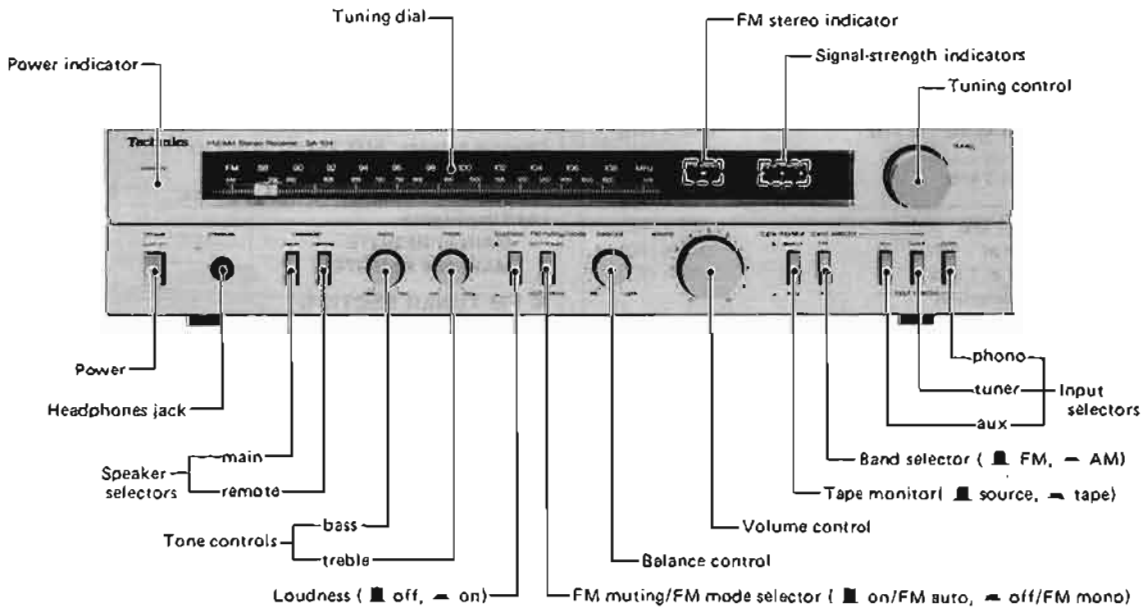
Frequency range	525~1605 kHz
Sensitivity (S/N 20 dB)	30 μV, 300 μV/m
Selectivity	27 dB
Image rejection at 1,000 kHz	45 dB
IF rejection at 1,000 kHz	55 dB

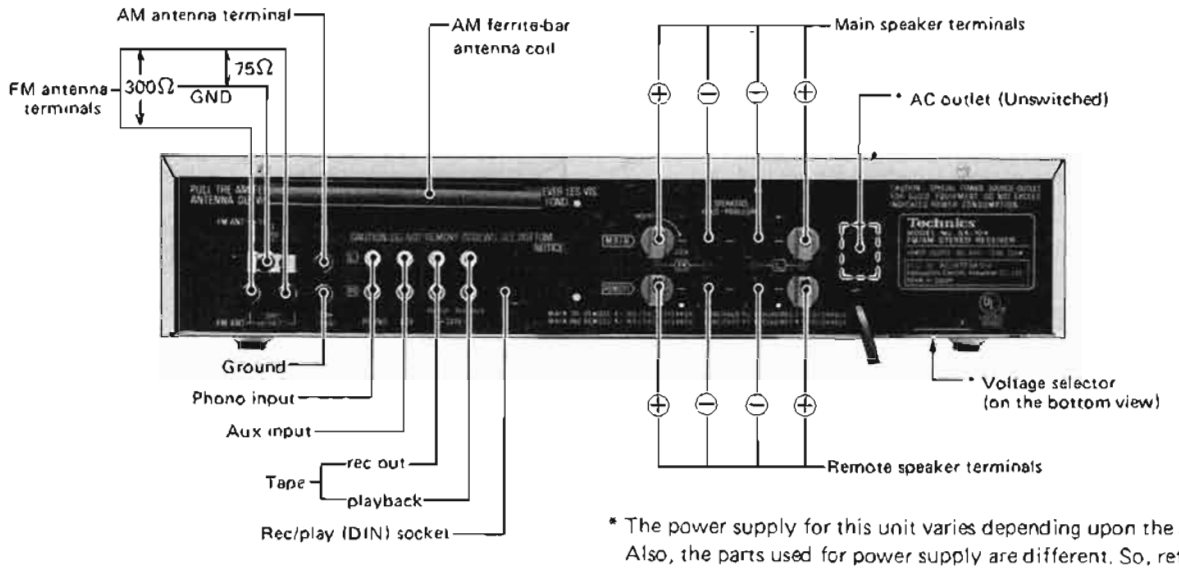
■ GENERAL

Power consumption	210W
Power supply	AC 50 Hz/60 Hz, 240V (For United Kingdom and Australia) AC 50Hz/60Hz, 220V (For continental Europe) AC 50 Hz/60 Hz, 110V/120V/220V/240V (For others)
Dimensions (W×H×D)	430 × 97 × 260 mm (16-15/16" × 3-13/16" × 10-1/4")
Weight	5.4 kg (11.9 lb.)

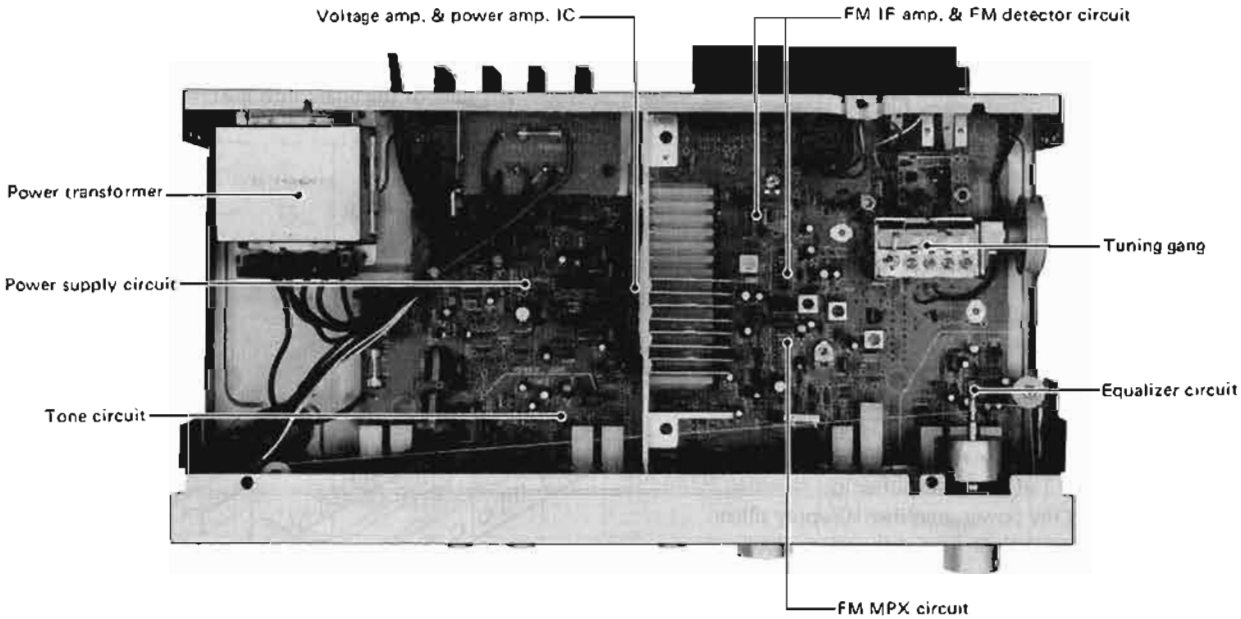
■ CONTENTS

■ LOCATION OF CONTROLS





* The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.
* (XA) area is provided with voltage selector and AC outlet.
* Phono input capacitance is about 150pF.



■ BEFORE REPAIR AND ADJUSTMENT

Turn off the power supply and short-circuit both ends of power supply condensers (C701, C702, 4700μF) at resistance (about 10Ω, 5W) in order to discharge the charged voltage. Avoid short-circuit with a screwdriver or the like, otherwise the transistors or diodes may break down.

Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a voltage regulator to make sure that the current consumed is free of abnormality. The current consumed at 60Hz/50Hz in no-signal mode is 110V: (120 ~ 300mA), 120V: (100 ~ 240mA), 220V (50 ~ 150mA), 240V: (40 ~ 120mA).

■ DISASSEMBLY INSTRUCTIONS

- How to remove the cabinet

1. Remove the 6 setscrews (Fig. 1: ❶ ~ ❻) of the cabinet.

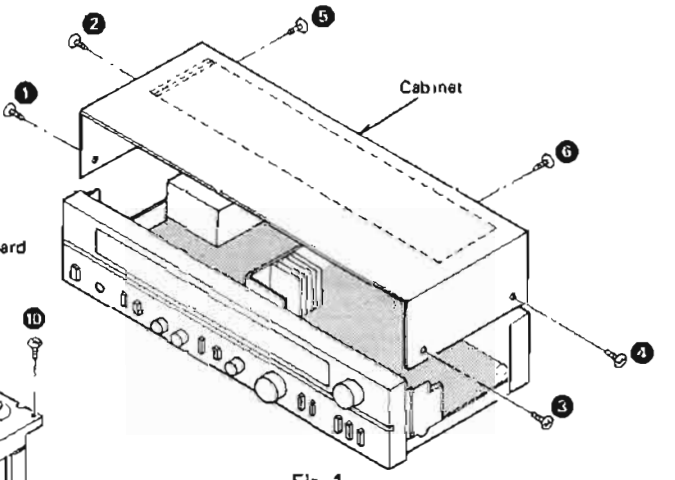


Fig. 1

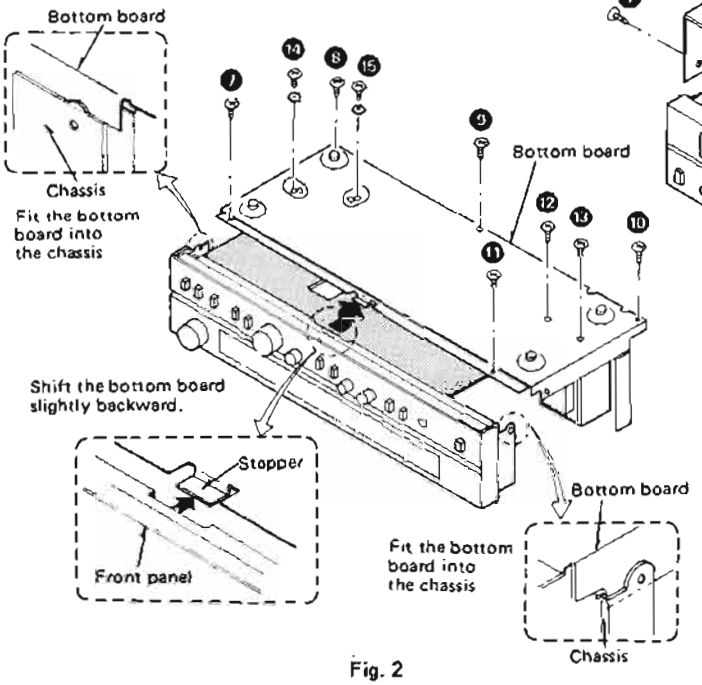


Fig. 2

- How to remove the bottom board

1. Remove the cabiret.
2. Remove the 9 setscrews (Fig. 2: ❼ ~ ⓯) of the bottom board.
3. Remove the bottom board as shown in Fig. 2.
4. When attaching the bottom board, fit the right and left sides of the board into the chassis.

- How to remove the front panel

1. Remove the cabinet.
2. Remove the 4 setscrews (Fig. 3: ⓰ ~ ⓳) of the front panel.

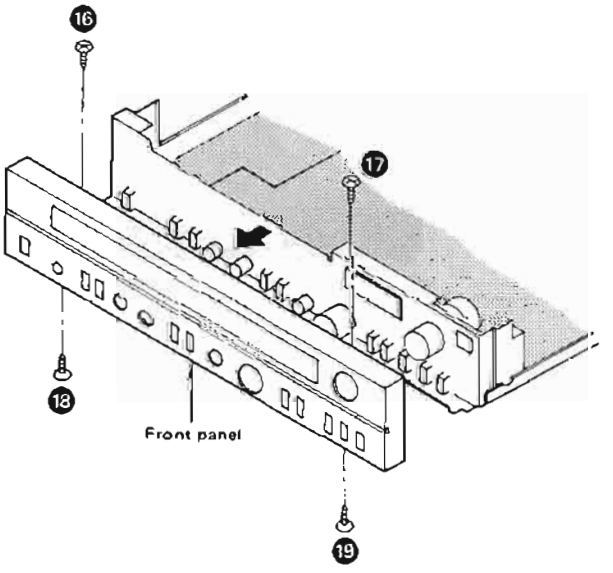


Fig. 3

- How to remove the power amplifier IC.

1. Remove the cabinet and bottom board.
2. Unsolder the power amplifier IC. (Fig. 4)
3. IC can be detached by removing the 2 setscrews. (Fig. 5: ⓴ , ㉑) of power amplifier IC.
4. When mounting the power amplifier IC, apply silicon compound (or equivalent heat diffuser) to the back of power amplifier IC.

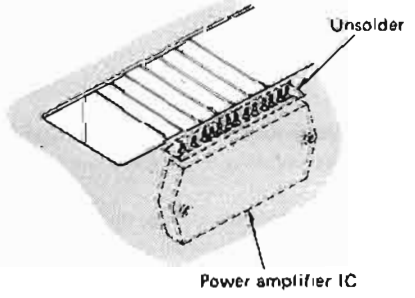


Fig. 4

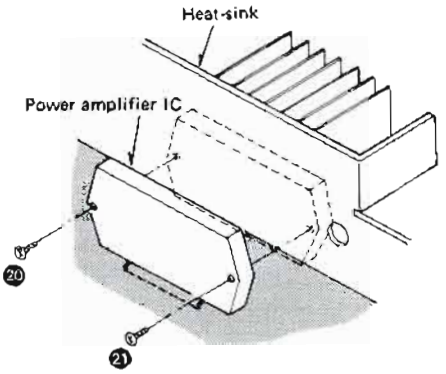


Fig. 5

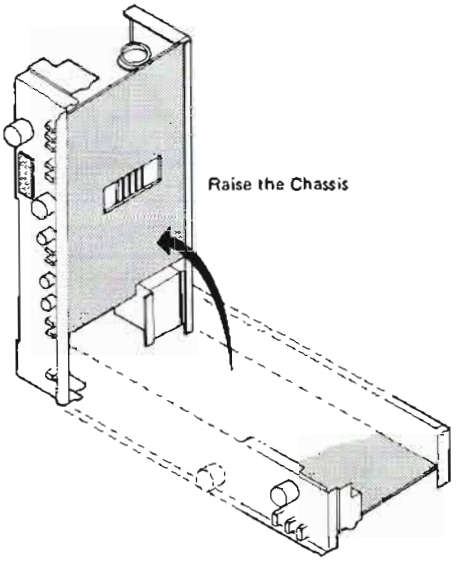


Fig. 6

- **How to check the printed circuit board**

1. Remove the cabinet and bottom board.
2. Raise the chassis as shown in Fig. 6.

Note) Measure the voltage on the basis of the earth line of the printed circuit board.

- **How to replace the pilot lamp (Fig. 7)**

1. The pilot lamp can be removed by pulling it out of the cover.
2. When inserting the pilot lamp, be sure to insert it with the blue lamp down.

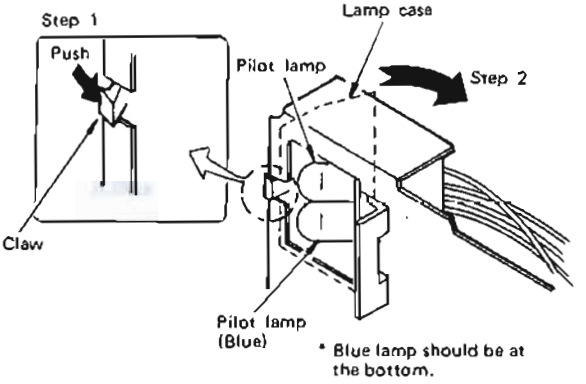


Fig. 7

■ DIAL CORD INSTALLATION GUIDE

* For threading a fresh cord, proceed as follows. (Fig. 8)
  1. Prepare a fresh cord more than 180cm (70-15/16") in length.
  2. Bring the variable capacitor into a state where the drum is completely turned to the right (maximum capacity and lowest frequency for the variable capacitor.)
  3. Direct the cord in the order from 1 to 7.
  4. Stretch the cord in such a tension as the spring length is elongated by 1.5 times that of the original state.
  5. Fix the knot of the cord with the adhesive.

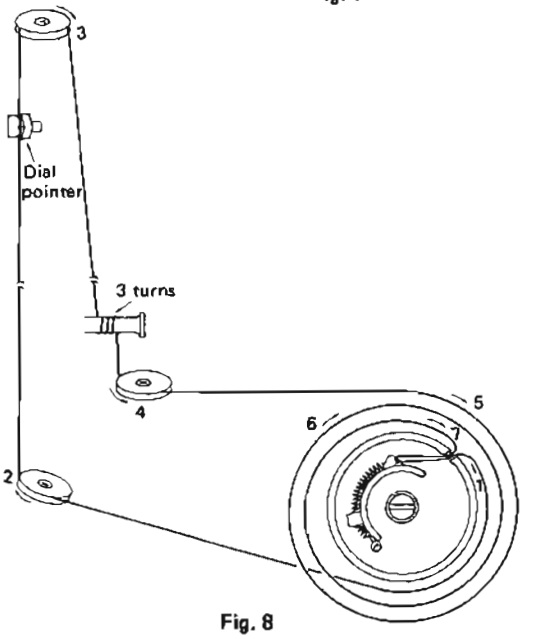


Fig. 8

■ TECHNICAL GUIDE

1. Muting (shock noise prevention) with power switch ON.

- When power is turned "on", ⊖B is applied to the base of Q701 through R713 and R709, turning Q701 ON.
- As Q701 turns ON, Q702 turns OFF and −B of IC601 is cut off. (state of muting)
- Two or 3 sec. later, ⊕B is applied from D702 to the base of Q701, turning Q701 OFF and Q702 ON, and then −B is applied to IC601 causing muting to be discontinued.

2. Muting (shock noise prevention) with power switch OFF.

- When power is turned "off", the level of ⊕B from D702 drops fast but the voltage of ⊖B becomes negative at the base of Q701 due to the large capacity condenser (C702) connected, thus cutting off −B of IC601 in the same way as power is turned "on".

3. Operation of the protection circuit with speaker terminal short-circuited.

- Q601 is usually OFF. When the speaker terminal is short-circuited to ground, a large amount of current flows to the power amplifier IC601 causing a voltage to be generated at R615, and then Q601 turns ON.
- When Q601 turns ON, the base voltage of Q703 rises causing both Q703 and Q704 to turn ON. (hold circuit)
- As Q704 is ON, the emitter voltage of Q704 drops causing the base voltage of Q701 to decrease as well.
- Thus, Q702 turns OFF in the same way as in muting operation and −B of IC601 is cut off.

Note: If this protection circuit works for muting operation, set the power switch to "on" about 30 seconds after turning it "off" even when the power amplifier and the load are free of abnormality, otherwise normal operation cannot be restored. This protection circuit using a hold circuit is employed in SA-103, SA-222, etc.

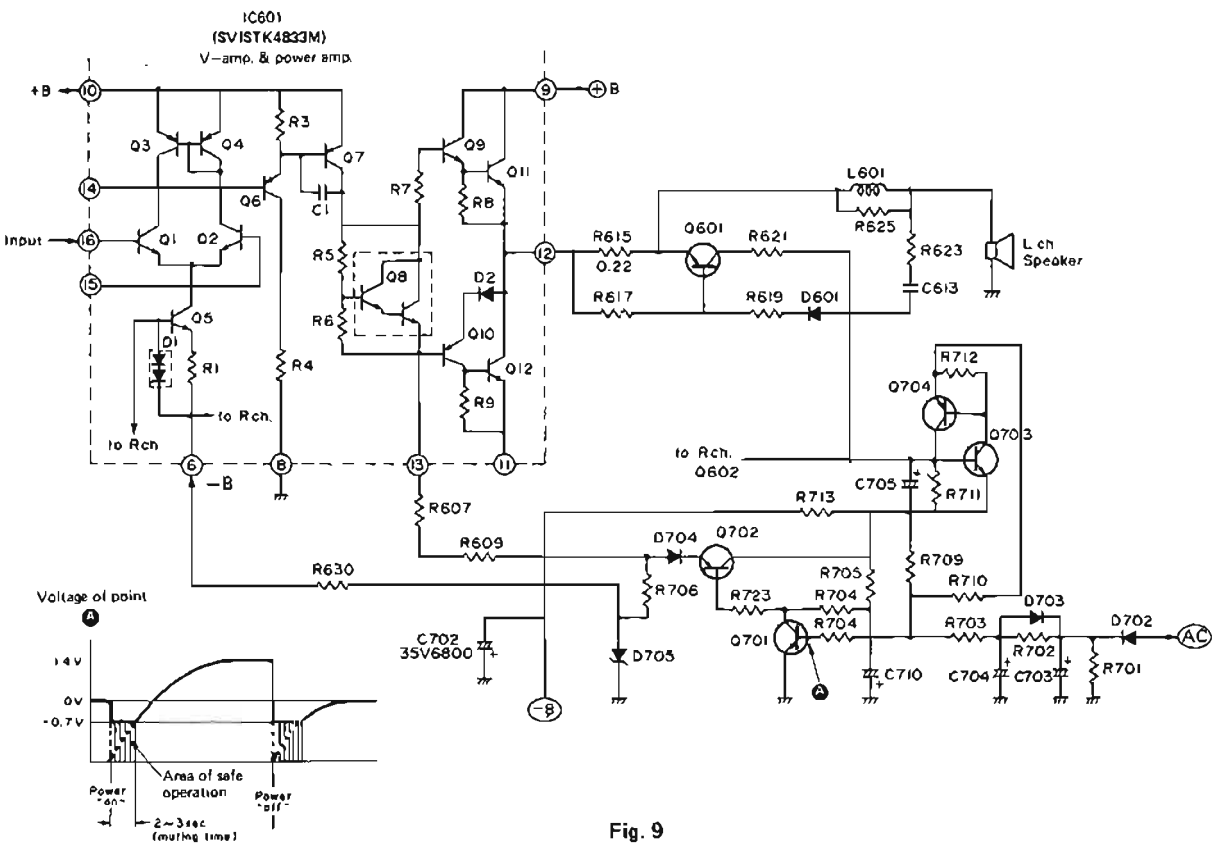


Fig. 9

■ MEASUREMENTS AND ADJUSTMENTS

AM ADJUSTMENT

• Setting and Equipment use

1. AC and DC electronic voltmeters (VTVM).
2. AM signal generator (AM-SG).
3. Oscilloscope.
4. Maintain line voltage at rated voltage.
5. Output of signal generator should be no higher than necessary to obtain an output reading.
6. Pull the AM ferrite-bar antenna (L201) outward.
7. Use a non-metal screwdriver for the adjustment.

Step No.	AM/FM SIGNAL GENERATOR CONNECTION	AM/FM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	08-E05-01	**AM-RF ADJUSTMENT**				
1	Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Weak input).	600kHz (30% Mod. with 400Hz)	600kHz	Connect AC VTVM or scope to "SPEAKER" terminals.	L202 (AM OSC Coil) L201 (AM ANT Coil)	1. Adjust for maximum output. 2. Adjust L201 by moving coil bobbin along ferrite core.
2		1500kHz (30% Mod. with 400Hz)	1500kHz	Connect AC VTVM or scope to "SPEAKER" terminals.	CT202 (AM OSC Trimmer) CT201 (AM ANT Trimmer)	1. Adjust for maximum output. 2. Repeat steps (1) and (2).

FM ADJUSTMENT

• Equipment used

1. FM signal generator (FM-SG).
2. Stereo modulator (or separation meter).
3. Oscilloscope.
4. AC and DC electronic voltmeters (VTVM).
5. Frequency counter (19kHz and 108MHz measurable).
6. FM 300Ω dummy antenna.

• Preparation of FM signal generator (FM-SG).

1. Connect stereo modulator to FM-SG.
2. Apply SG output to antenna terminal of the set through 300Ω FM dummy antenna.
3. The standard input of the set is 60dB (1mV), 400Hz 100% modulation (Because of using dummy antenna, SG output must be 12dB plus (IHF). That is, when input is 60dB, SG output is to be 72dB).

• Setting

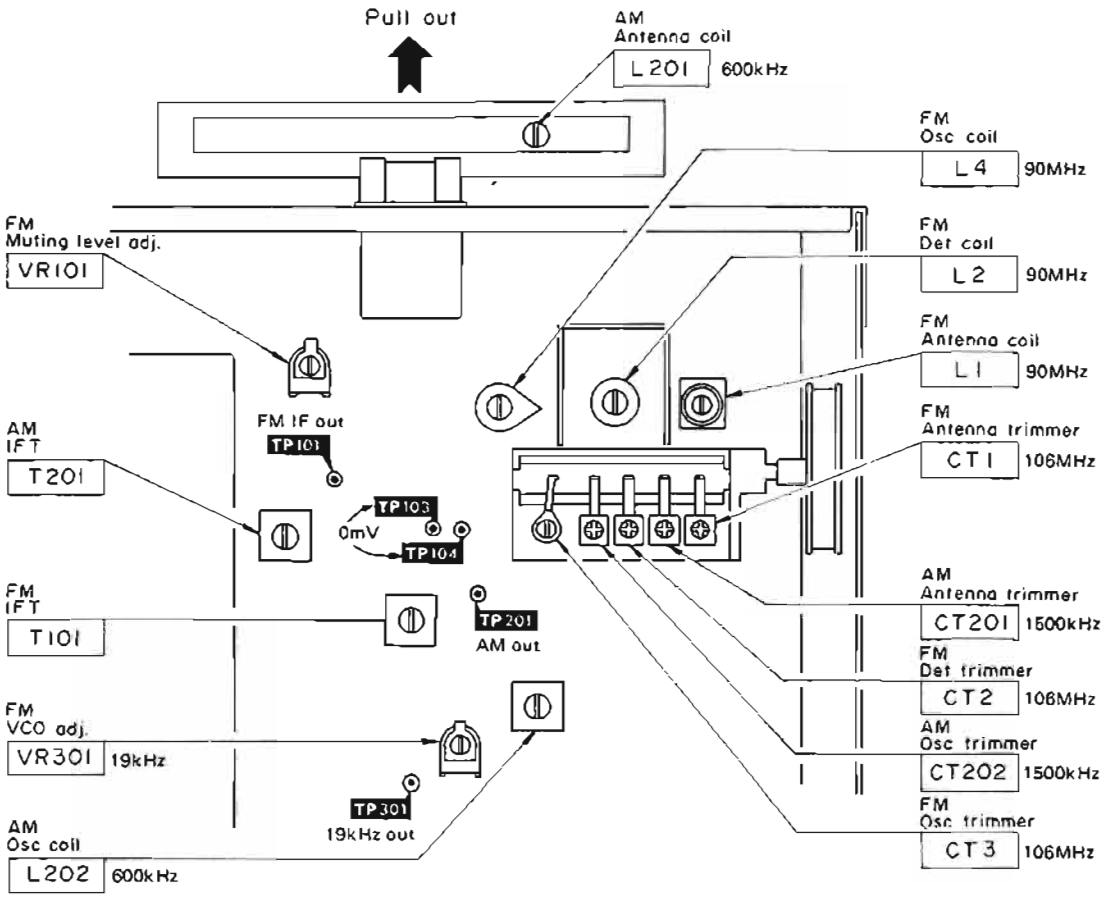
1. Band selector.....FM.
2. FM muting/mode switch.....off/mono.

Step No.	CONNECTION	FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	FM-IF ADJUSTMENT					
3	——	No Signal	Point of noninterference.	Connect DC VTVM between TP103 and TP104 terminal through choke coil. (Refer to Fig. 10)	T101 (Discri. IFT)	1. FM muting/mode switch to "on/FM auto" position. 2. Adjust T101 core so that voltage measured in signal mode is 0mV in 300mV range.
	FM-RF ADJUSTMENT					
4	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna.	90MHz (100% Mod. with 400Hz) Weak input.	90MHz	Connect scope to "SPEAKER" terminal.	L4 (OSC Coil) L1 (ANT Coil) L2 (RF DET Coil)	1. Add weak input so that noise is included in the output wave form. 2. Make the adjustment so that the output wave form is vertically symmetrical. (Fig. 11). 3. Repeat the steps (4) and (5) until the frequency correctly matches the dial scale.
5		106MHz (100% Mod. with 400Hz) weak input.	106MHz	Connect scope to "SPEAKER" terminal.	CT3 (OSC Trimmer) CT2 (ANT Trimmer) CT1 (RF DET Trimmer)	
	FM MUTING LEVEL ADJUSTMENT					
6	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna. Apply 21dB to tuner.	100MHz (100% Mod. with 400Hz)	100MHz	Connect AC VTVM or scope to "SPEAKER" terminals.	VR101 (Muting level)	1. Set the FM muting/mode to "on/auto". 2. Adjust so that output can be obtained.

FM MPX V.C.O. ADJUSTMENT

Step No.	USING A FREQUENCY COUNTER	USING ALTERNATE SYSTEM
7	1. 100MHz 60dB Non-modulated mono signal applied to set. 2. FM muting/mode switch to "on/FM auto". 3. Connect frequency counter to TP301 through resistor (100kΩ). 4. Adjust VR301 to 19kHz±30Hz.	1. Apply a stereo signal to the set or receive a stereo broad cast. 2. Adjust VR301 and fix the sliding contact of VR301 in the middle of the stereo indicator ON-range. (See Fig. 12.)

• Adjustment points



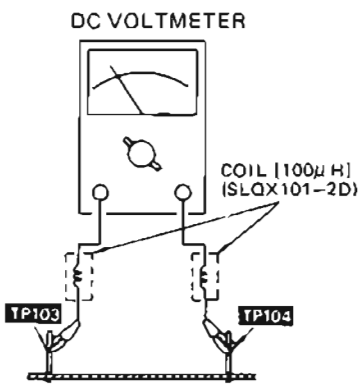
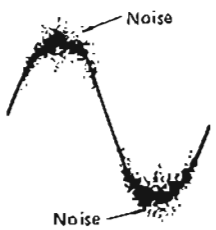
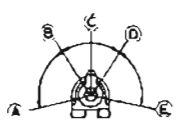


Fig. 10
(Abb. 10)



AF output wave form

Fig. 11
(Abb. 11)



VR301

A – B, D – E : Stereo OFF.
B – D : Stereo ON. (indicator ON).
C : Pilot circuit adjusting point. (in the middle of B – D).

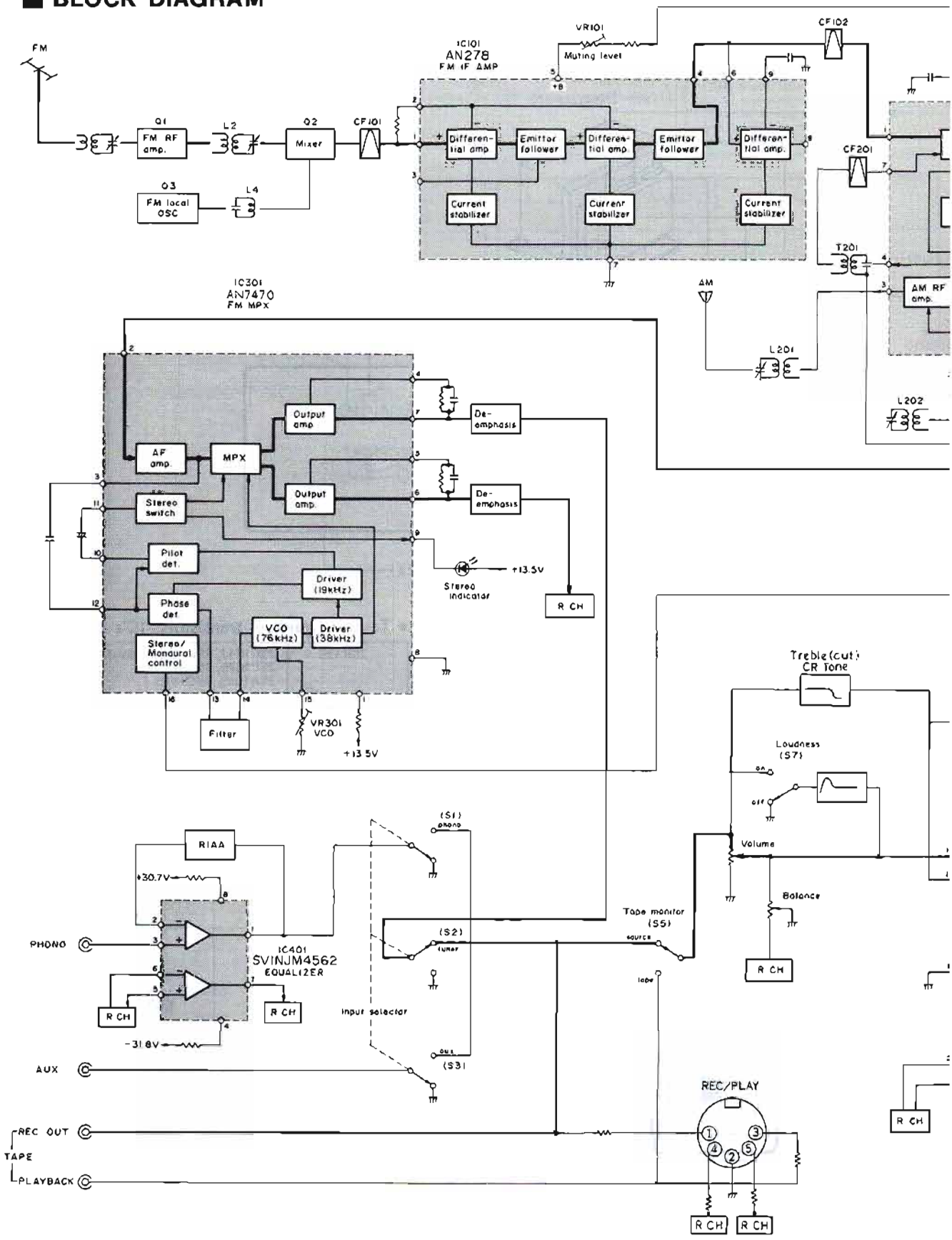
Fig. 12
(Abb. 12)

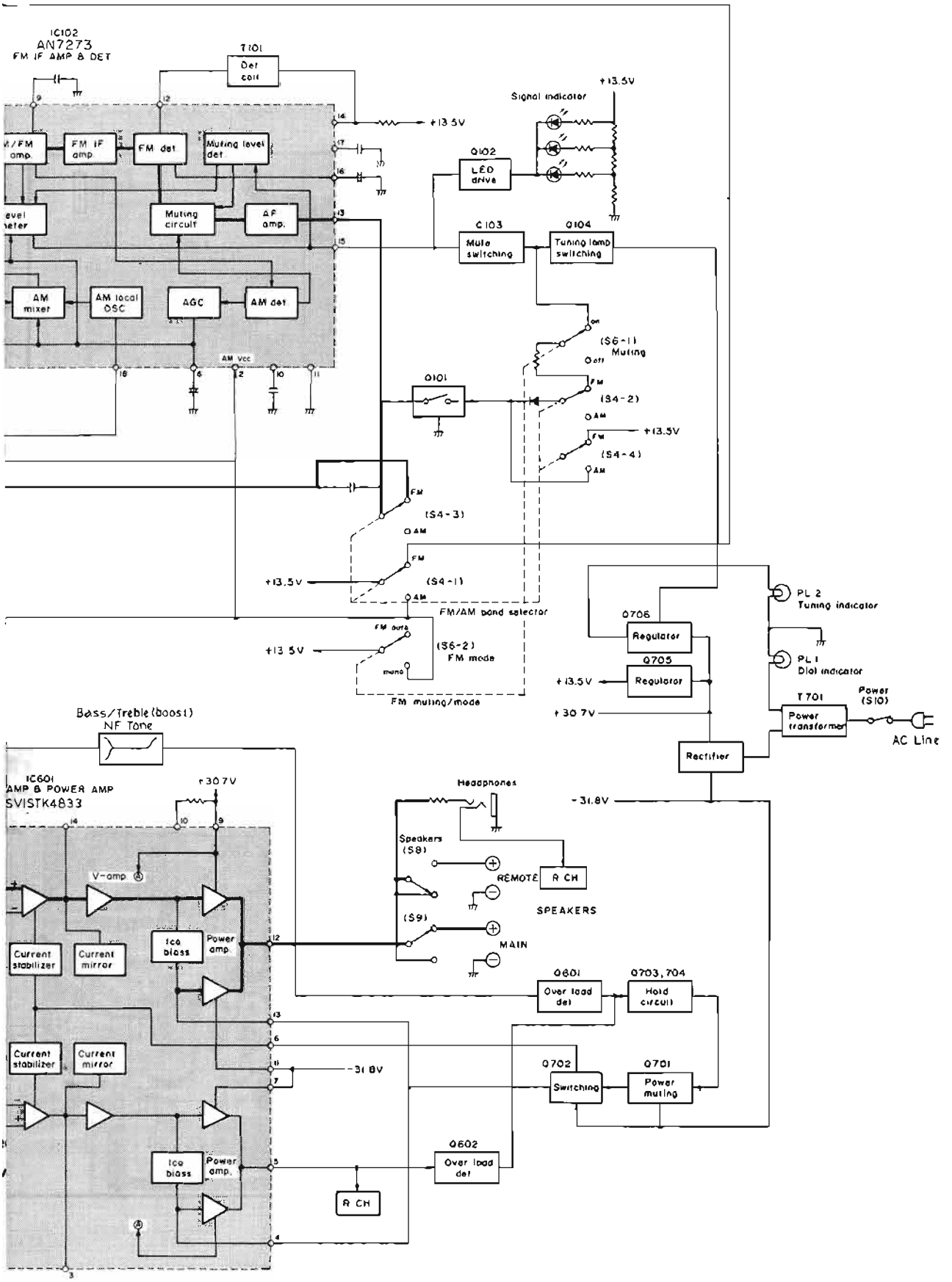
• Check point

Overload detection circuit

① Connect 8Ω load to "main" speaker terminal and 5W 0.33Ω resistance to "remote" speaker terminal.
② Apply 1kHz 100mV signal to "TUNER" terminal.
③ Make the sound volume maximum.
④ With speaker selector set at main and remote, make sure that relay in the set is OFF and no output is delivered.

■ BLOCK DIAGRAM




IC102
AN7273
FM IF AMP & DET
T101
Det coil
+13.5V
Signal indicator
Q102
LED drive
FM IF amp
FM det
Muting level det
Muting circuit
AF amp.
C103
Mute switching
Q104
Tuning lamp switching
AM mixer
AM local OSC
AGC
AM det
AM Vcc
Q101
(S6-1) Muting
(S4-2)
(S4-4)
(S4-3)
(S4-1)
FM/AM band selector
FM auto
mono
(S6-2) FM mode
FM muting/mode
Q706
Regulator
Q705
Regulator
+30.7V
PL 2
Tuning indicator
PL 1
Dial indicator
T701
Power transformer
Power (S10)
AC Line
Rectifier
-31.8V
Bass/Treble (boost)
NF Tone
IC601
AMP & POWER AMP
SVISTK4833
V-amp.
Current stabilizer
Current mirror
Icq bias
Power amp.
Headphones
Speakers (S8)
REMOTE
R CH
SPEAKERS
(S9)
MAIN
Q601
Over load det
Q703, 704
Hold circuit
Q702
Switching
Q701
Power muting
Q602
Over load det
-31.8V

■ REPLACEMENT PARTS LIST ..... Electrical Parts

Notes:
1. Parts numbers are indicated on most mechanical parts. Please this part number for parts orders.
2. 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.
3. Bracketed indicators in Ref. No. columns specify the area.
   Parts without these indications can be used for all areas.
4. The "S" mark is service standerd parts and may differ from production parts.

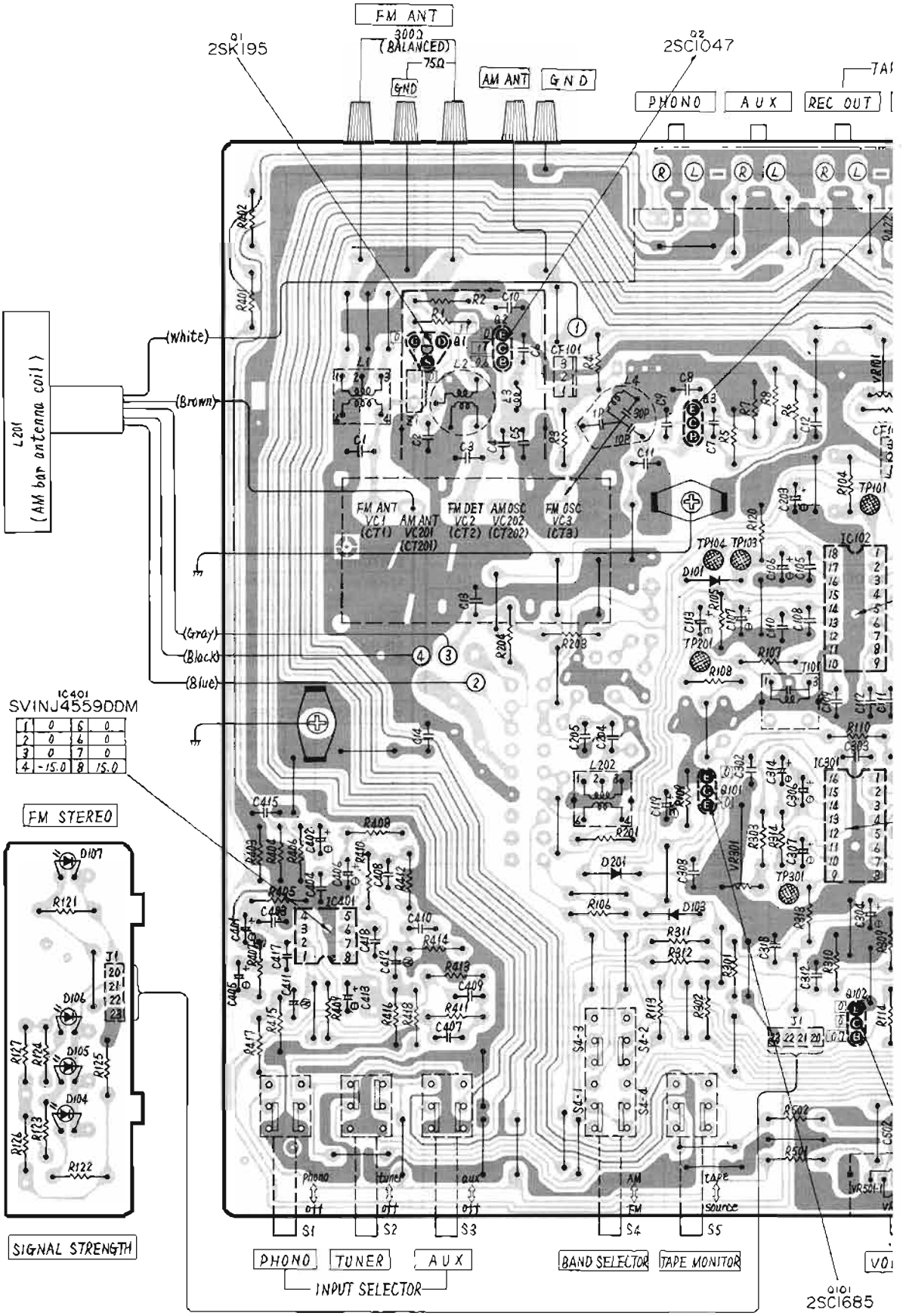
Areas
- [EX] is available in Switzerland and Scandinavia.
- [EH] is available in Holland.
- [XA] is availalble in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- [XL] is available in Australia.

Ref. No.		Part No.	Part Name & Description
INTEGRATED CIRCUITS			
IC101		AN278	IC, FM IF Amplifier
IC102		AN7273	IC, AM Converter, FM-IF Amplifier
IC301		SVIUPC1161C3	IC, FM Stereo Decorder (MPX)
IC401		SVINJ4559DDM	IC, Equalizer Amplifier
IC601		SVISTK4833M	IC, Power Amplifier
TRANSISTORS			
Q1		2SK195-H2	Transistor, FM RF Amplifier
Q2	S	2SC1047-C	Transistor, FM Mixer
Q3	S	2SC1675-L	Transistor, FM Local Oscillator
Q101 ~ 104	S	2SC1685-S	Transistor, Switching
Q601, 602		2SA992-E	Transistor, Over Load Detector
Q701, 702		2SA1015-Y	Transistor, Switching
Q703		2SC1815-Y	Transistor, Hold
Q704		2SA1015-Y	Transistor, Hold
Q705, 706		2SD880-Y	Transistor, Ripple Filter
DIODES			
D101		MA27W-A	Diode, Switching
D103	S	MA162A	Diode, Switching
D104 ~ 106		LN446YP	Light Emitting Diode Signal Strength Indicator
D107		LN846RP	Light Emitting Diode, Signal Strength & Stereo Indicator
D108	S	Z0A90	Diode, Switching
D201	S	MA162A	Diode, Switching
D601, 602	S	MA162A	Diode, Switching
D701	⚠	SVDS4VB20	Diode, Rectifier
D702	S⚠	SVDSR1K2	Diode, Rectifier
D703, 704	S	MA162A	Diode, Switching
D705	S	RVDRD6R2EB	Diode, 6.2V Zener
D706, 707		MA2150B	Diode, 15V Zener
D708		MA1110	Diode, 11V Zener
COILS and TRANSFORMERS			
L1		SLA4N15	Coil, FM Antenna
L2		SLD4P69-P	Coil, FM Detector
L3		SLQ5A77-Q	Coil, Choke
L4		SLO4P107-P	Coil, FM Oscillator
L201		SLF2C45	Coil, AM Antenna
L202		SLO2C1-P	Coil, AM Oscillator
L301 [EX, EH] only		SLM1C61-P	Coil, Low Pass Filter
L601, 602		SLQY15G-30	Coil, Choke
T101		SLI4C533-Z	Transformer, FM Detector
T201		SLI2C139-M	Transformer, FM IFT (1st)
T701 [EX, EH]	⚠ MSA	SLT5M203	Transformer, Power Source (Made in Singapore)
T701 [XA]	⚠ JPN	SLT5M207	Transformer, Power Source (Made in Japan)
T701 [XL]	⚠ JPN	SLT5M209	Transformer, Power Source (Made in Japan)
COMPONENT COMBINATIONS			
Z1		EXRP150K104C	Component Combination, 100kΩ & 15pF
Z301, 302		EXRP181K473C	Component Combination, 47kΩ & 180pF
Z601, 602		ECQJ0517	Component Combination, 10Ω & 0.047μF
Z701, 702		SXRFS203ZSM	Component Combination, 0.01μF x 2

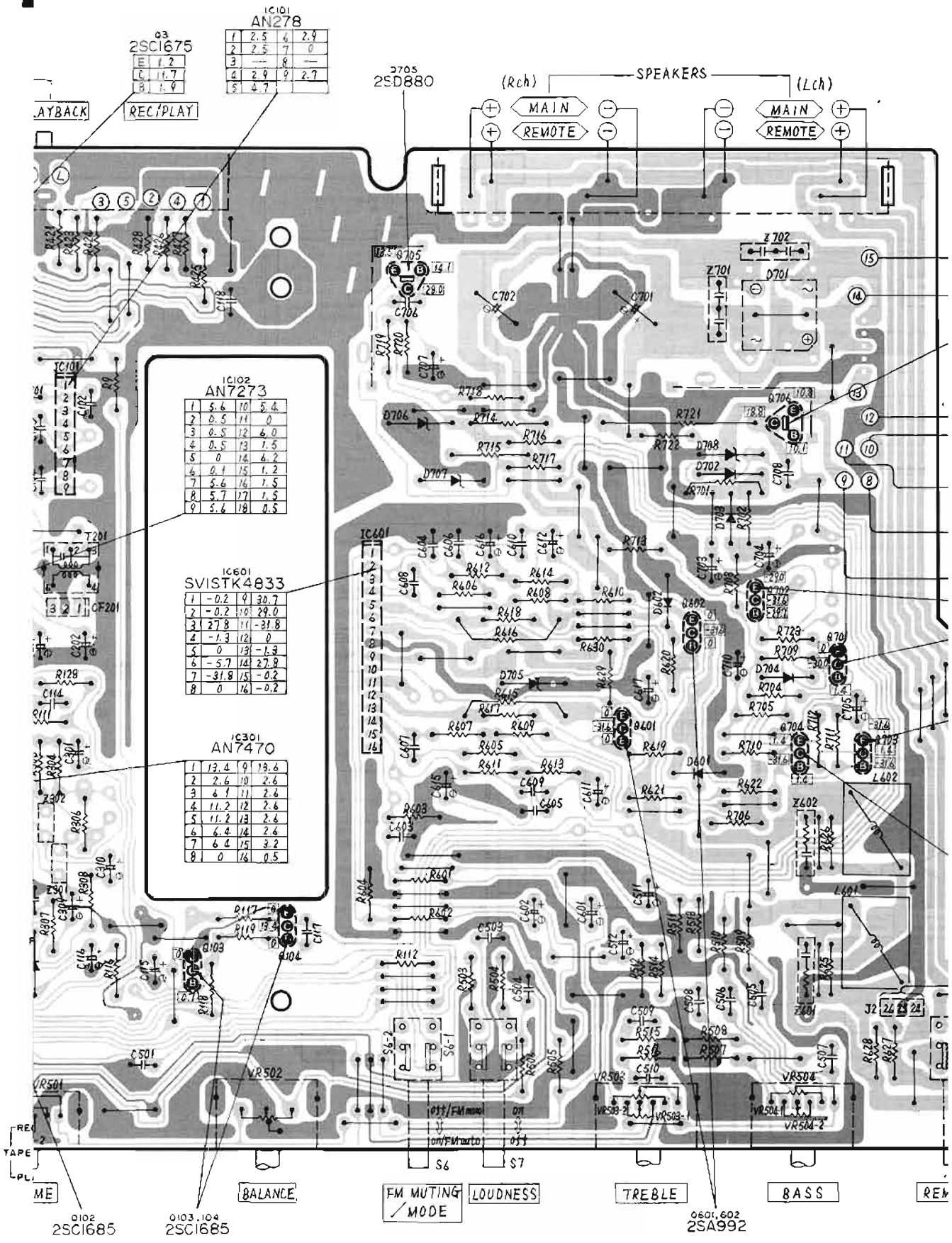
Ref. No.		Part No.	Part Name & Description
CERAMIC FILTERS			
CF101, 102		SVFE107MS2-A	Ceramic Filter, 10.7MHz
		SVFE107MS2-B	Ceramic Filter, 10.67MHz (use pair ranks as same as CF101, 102)
		SVFE107MS2-C	Ceramic Filter, 10.73MHz
		SVFE107MS2-D	Ceramic Filter, 10.64MHz
		SVFE107MS2-E	Ceramic Filter, 10.76MHz
CF201		SVFSFU450B	Ceramic Filter, AM-IF 450kHz
FUSE			
F1 [EX,EH,XL]	⚠	XBA2C08TRO	Fuse, 0.8A(250V)
F1 [XA]	⚠	XBA2C16TRO	Fuse, 1.6A(250V)
F2	⚠	XBA2C03TRO	Fuse, 0.3A(250V)
LAMP			
PL1, 2	⚠	SWL119	Lamp, 12V 0.22A
SWITCHES			
S1 ~ 5		SSH543	Switch, Input Selector, Band Selector & Tape Monitor
S6, 7		SSH2015	Switch, FM Muting/FM Mode & Loudness
S8, 9		SSH2017	Switch, Main Speaker & Remote Speaker
S10 [EX, XA]	⚠	ESB822S	Switch, Power Source
S10 [EH, XL]	⚠	ESB906I9S	Switch, Power Source
S11 (XA) only	⚠	ESE37219	Switch, Voltage Adjuster
VARIABLE RESISTORS			
VR101		EVNK4AA00B33	Muting Level Adjustment, 3kΩ (B)
VR301	S	EVTS3MA00B53	PLL VCO Adjustment, 5kΩ (B)
VR501		EWCXTA000B15	Volume Control, 100kΩ (B)
VR502		EWH51AF20G15	Balance Control, 100kΩ (G)
VR503		EWCS5AF20012	Treble Control
VR504		EWCSWAF20C15	Bass Control, 100kΩ (C)
VARIABLE CAPACITOR			
VC1, 2, 3 201, 202 (CT1, 2, 3 201, 202)		ECV5MD34X71G	Tuning Gang, FM & AM (with Trimmer)
RESISTORS			
R1	S	ERD25FJ220	Carbon, 1/4W, 22Ω, ±5%
R2	S	ERD25FJ221	Carbon, 1/4W, 220Ω, ±5%
R3	S	ERD25TJ564	Carbon, 1/4W, 560kΩ, ±5%
R4	S	ERD25FJ391	Carbon, 1/4W, 390Ω, ±5%
R5	S	ERD25FJ103	Carbon, 1/4W, 10kΩ, ±5%
R6	S	ERD25TJ473	Carbon, 1/4W, 47kΩ, ±5%
R7 [EX, EH]	S	ERD25FJ102	Carbon, 1/4W, 1kΩ, ±5%
R7 [XA, XL]	S	ERD25FJ681	Carbon, 1/4W, 680Ω, ±5%
R8	S	ERD25FJ331	Carbon, 1/4W, 330Ω, ±5%
R9	S	ERD25FJB20	Carbon, 1/4W, 82Ω, ±5%
R101	S	ERD25FJ331	Carbon, 1/4W, 330Ω, ±5%
R102, 104	S	ERD25FJ471	Carbon, 1/4W, 470Ω, ±5%
R105	S	ERD25FJ681	Carbon, 1/4W, 680Ω, ±5%
R106	S	ERD25FJ331	Carbon, 1/4W, 330Ω, ±5%
R107	S	ERD25FJ122	Carbon, 1/4W, 1.2kΩ, ±5%
R108	S	ERD25TJ153	Carbon, 1/4W, 15kΩ, ±5%
R109	S	ERD25TJ104	Carbon, 1/4W, 100kΩ, ±5%

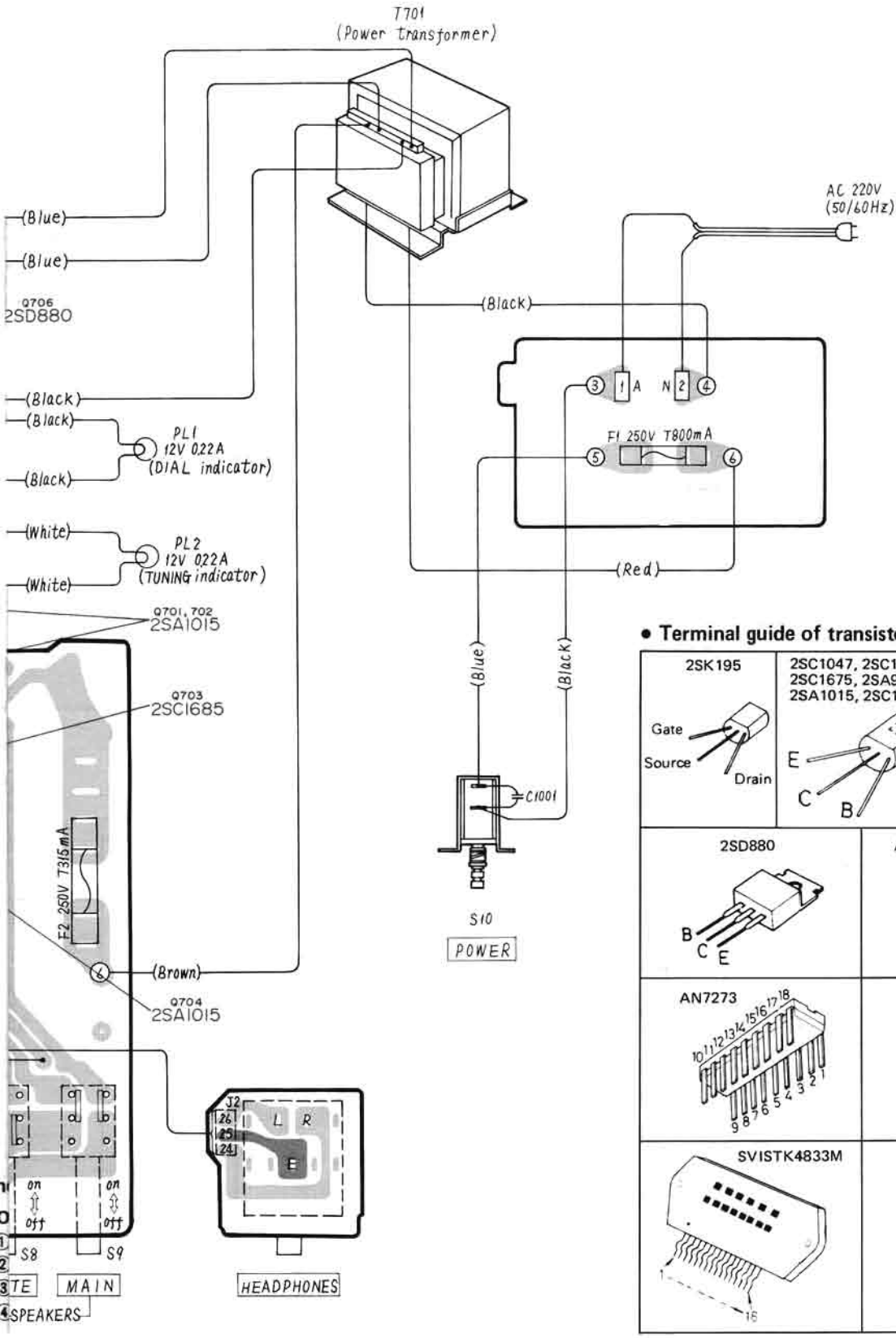
Continued on page 19.

■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

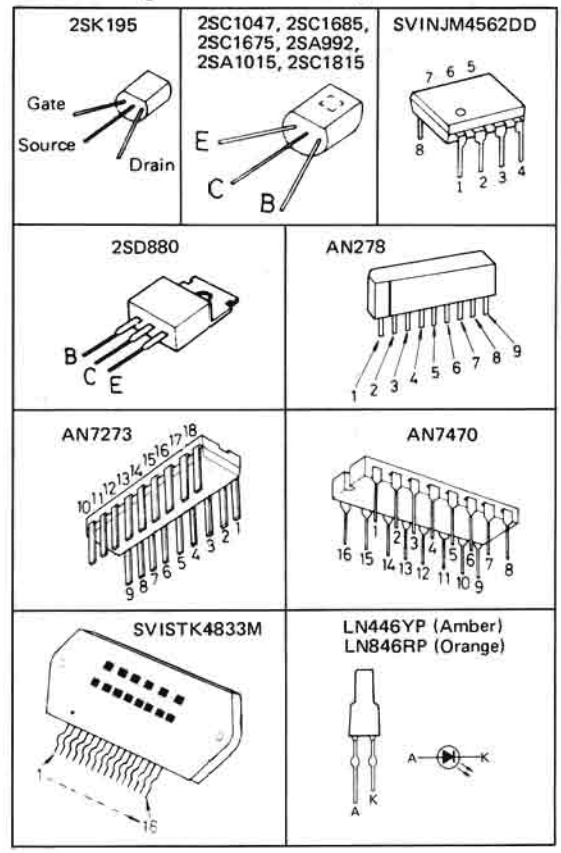


Ground (Earth) lines



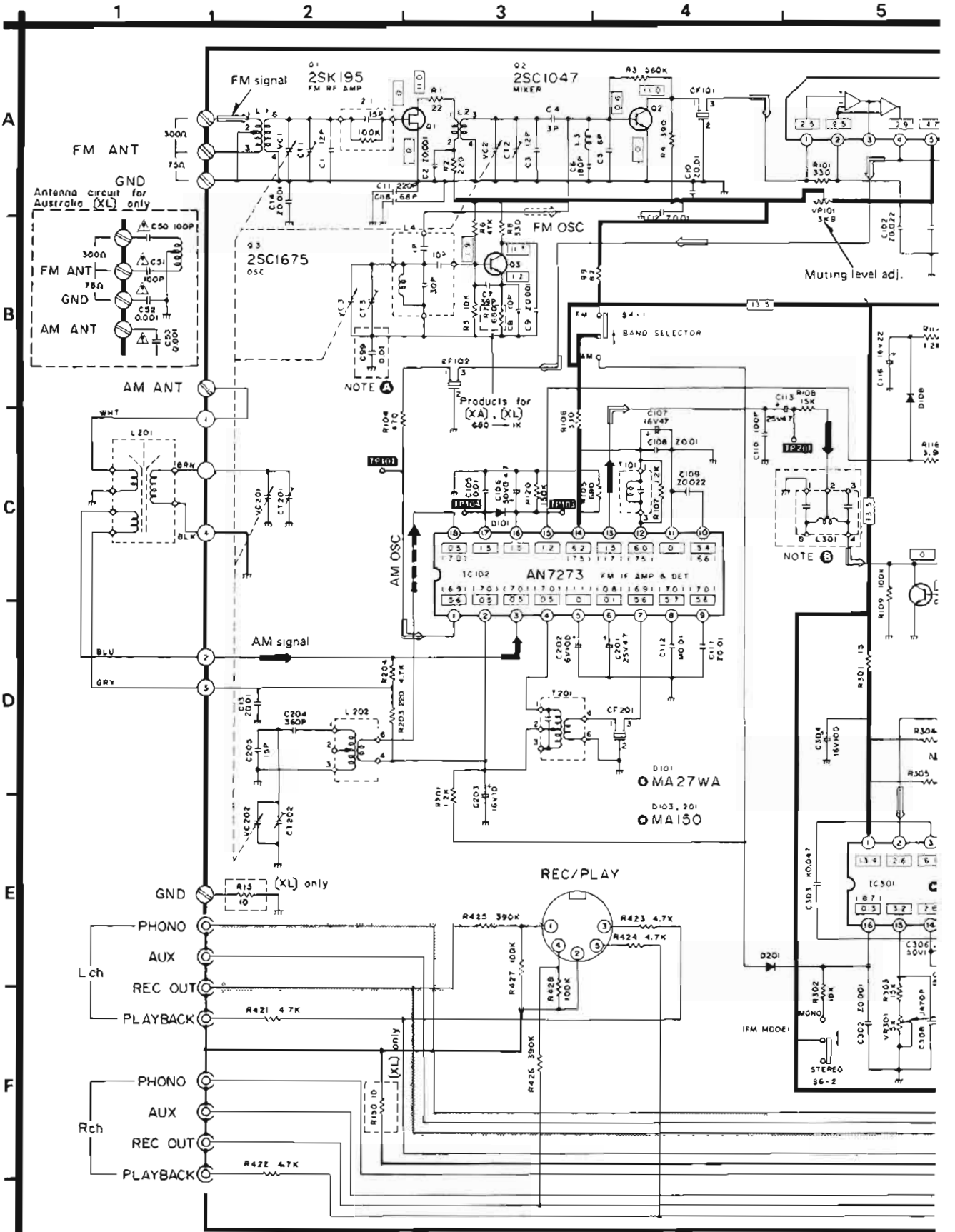


• **Terminal guide of transistors, IC's and diodes**

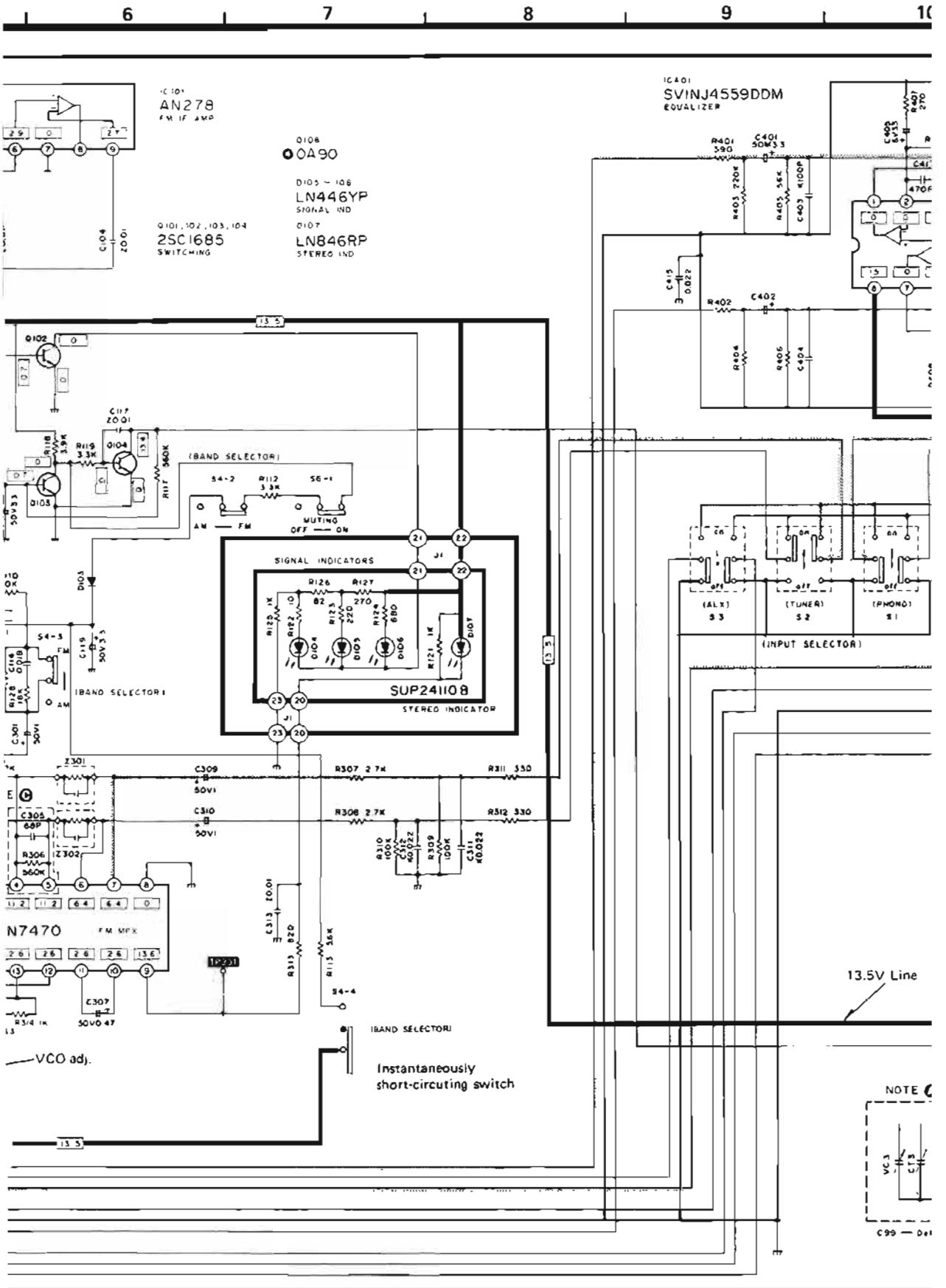


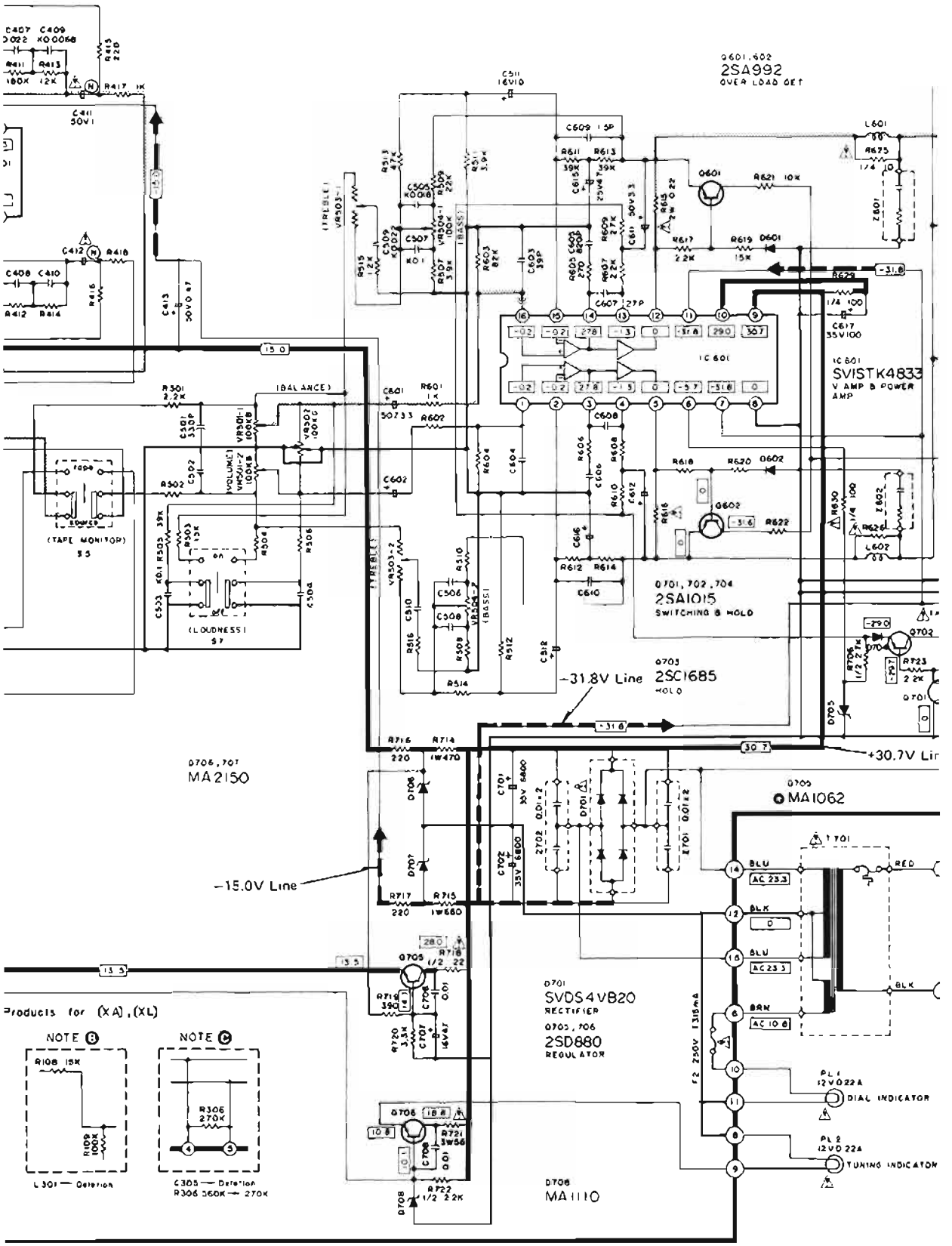
SCHEMATIC DIAGRAM

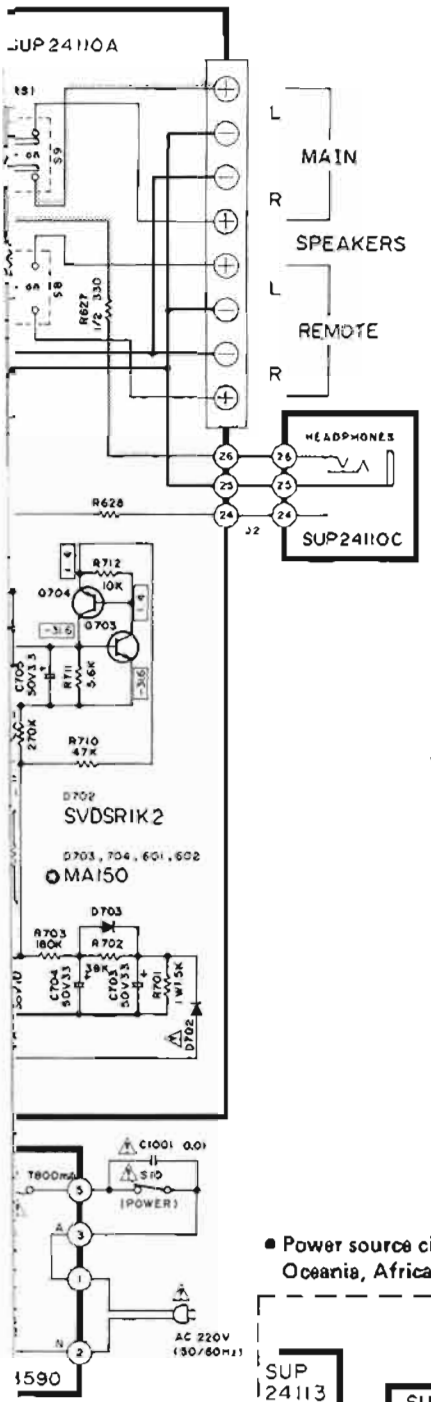
(This schematic diagram may be modified at any time with the development of new t



nology.)


6
7
8
9
IC101
AN278
FM IF AMP
D108
0A90
D105 ~ 108
LN446YP
SIGNAL IND
Q101, 102, 103, 104
2SC1685
SWITCHING
D107
LN846RP
STEREO IND
IC401
SVINJ4559DDM
EQUALIZER
(BAND SELECTOR)
SIGNAL INDICATORS
SUP24I108
STEREO INDICATOR
(INPUT SELECTOR)
(ALX)
(TUNER)
(PHONO)
N7470
FM MPX
13.5V Line
VCO adj.
Instantaneously
short-circuiting switch
NOTE


Q601,602
2SA992
OVER LOAD DET
IC 601
SVIST K4833
V AMP & POWER AMP
Q701, 702, 704
2SA1015
SWITCHING & HOLD
Q703
2SC1685
HOLD
-31.8V Line
+30.7V Line
-15.0V Line
Q706, 707
MA2150
Q705
MA1062
Q701
SVDS4VB20
RECTIFIER
Q705, 706
2SD880
REGULATOR
Q708
MA1110
T701
DIAL INDICATOR
TUNING INDICATOR
(TAPE MONITOR)
(LOUDNESS)
(BALANCE)
(VOLUME)
(TREBLE)
(BASS)
Products for (XA), (XL)
NOTE B
R108 15K
R109 100K
L301 — Deletion
NOTE C
R306 270K
C305 — Deletion
R306 360K → 270K

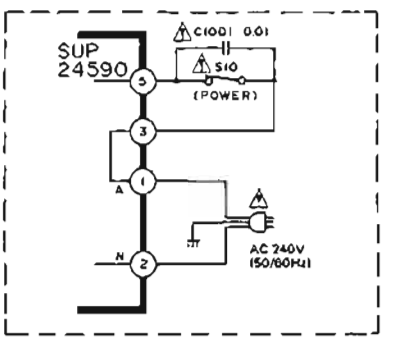


Notes:

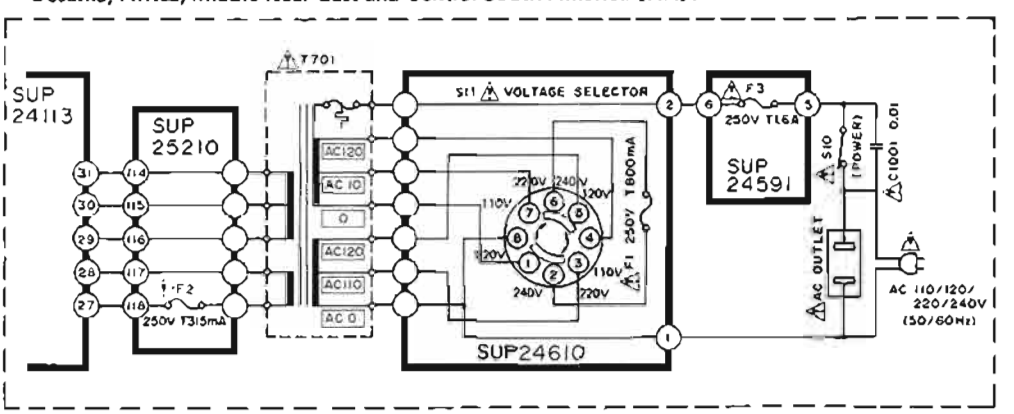
- The part No. of transistors, IC and diodes mentioned in schematic diagram stand for production Part No.
  Regarding the Part No. without ○ mark, the production Part No. are different from the replacement Part No.
  Therefore, when placing an order for replacement parts, please use the Part No. in the replacement parts list.

1. S1 ~ S3 : Input selector switch in "tuner" position.
   phono (S1) ⟶ tuner (S2) ⟶ aux (S3)
2. S4-1 ~ S4-4 : Band selector switch in "FM" position.
   FM ⟷ AM
3. S5 : Tape monitor switch in "source" position.
   source ⟷ tape
4. S6-1, S6-2 : FM muting/mode switch in "on/FM auto" position.
   on/FM auto ⟷ off/FM mono
5. S7 : Loudness switch in "off" position.
   off ⟷ on
6. S8 : Main speaker switch in "on" position.
   off ⟷ on
7. S9 : Remote speaker switch in "off" position.
   off ⟷ on
8. S10 : Power source switch in "on" position.
9. S11 (XA only) : Voltage selector switch in "240V" position.
   110V ⟷ 120V ⟷ 220V ⟷ 240V
10. Indicated voltage values are the standard values for the unit measured by the DC electron 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 [ ] standard for DC voltage in FM signal reception mode.
    * Figures in ( ) standard for DC voltage in AM signal reception mode.
11. ⟹ FM signal lines. ➡ AM signal lines.
    ⟹ AF signal lines. ▬ Positive voltage lines.
12. 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.

● Power source circuit for Australia [XL].



● Power source circuit for Southeast Asia, Oceania, Africa, Middle Near East and Central South America [XA].



Continued from page 11.

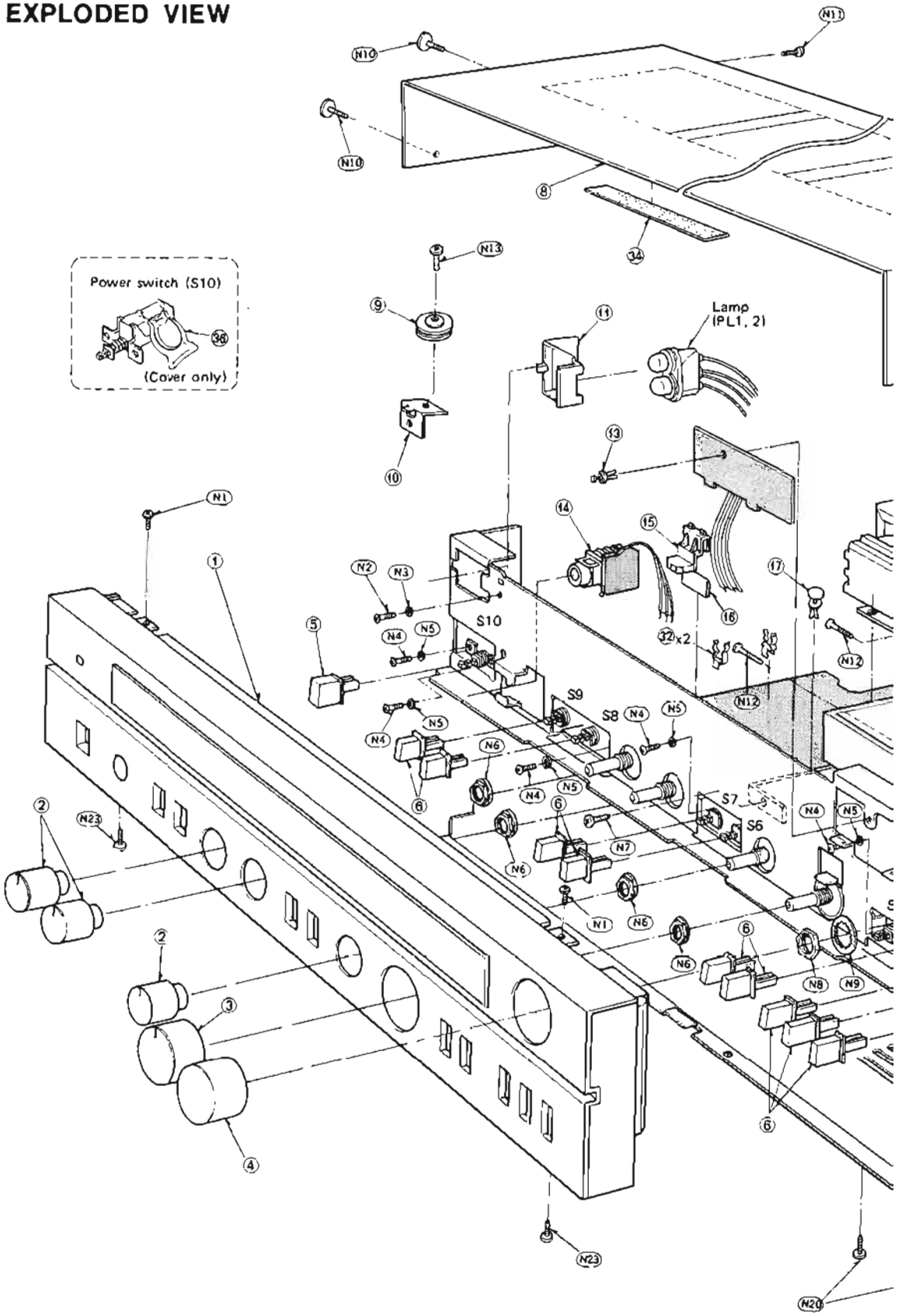
Ref. No.		Part No.	Part Name & Description			
R110	S	ERD25FJ103	Carbon,	1/4W,	10kΩ,	±5%
R111	S	ERD25TJ104	Carbon,	1/4W	100kΩ,	±5%
R112	S	ERD25FJ332	Carbon,	1/4W,	3.3kΩ	±5%
R113	S	ERD25FJ562	Carbon,	1/4W,	5.6kΩ,	±5%
R114	S	ERD25FJ122	Carbon,	1/4W,	1.2kΩ	±5%
R116	S	ERD25FJ392	Carbon	1/4W,	3.9kΩ	±5%
R117	S	ERD25TJ564	Carbon,	1/4W,	560kΩ,	±5%
R118	S	ERD25FJ392	Carbon	1/4W	3.9kΩ	±5%
R119	S	ERD25FJ332	Carbon,	1/4W,	3.3kΩ,	±5%
R120	S	ERD25TJ154	Carbon,	1/4W,	150kΩ,	±5%
R121	S	ERD25FJ102	Carbon,	1/4W,	1kΩ,	±5%
R122	S	ERD25FJ100	Carbon,	1/4W,	10Ω,	±5%
R123	S	ERD25FJ271	Carbon	1/4W,	270Ω,	±5%
R124	S	ERD25FJ681	Carbon,	1/4W	680Ω,	±5%
R125	S	ERD25FJ102	Carbon,	1/4W	1kΩ,	±5%
R126	S	ERD25FJ820	Carbon,	1/4W,	82Ω,	±5%
R127	S	ERD25FJ221	Carbon,	1/4W,	220Ω	±5%
R128	S	ERD25TJ183	Carbon,	1/4W,	18kΩ,	±5%
R150, 151 [XL] only	S	ERD25FJ100	Carbon,	1/4W,	10Ω,	±5%
R201	S	ERD25FJ122	Carbon,	1/4W,	1.2kΩ,	±5%
R203	S	ERD25FJ221	Carbon	1/4W,	220Ω,	±5%
R204	S	ERD25FJ472	Carbon,	1/4W,	4.7kΩ,	±5%
R301	S	ERD25FJ150	Carbon,	1/4W	15Ω,	±5%
R302	S	ERD25FJ103	Carbon,	1/4W,	10kΩ	±5%
R303	S	ERD25TJ153	Carbon,	1/4W,	15kΩ,	±5%
R304, 305	S	ERD25TJ223	Carbon,	1/4W,	22kΩ	±5%
R306 [EX, EH]	S	ERD25TJ564	Carbon,	1/4W,	560kΩ,	±5%
R306 [XA, XL]	S	ERD25TJ274	Carbon,	1/4W,	270kΩ,	±5%
R307, 308	S	ERD25FJ272	Carbon,	1/4W	2.7kΩ,	±5%
R309, 310	S	ERD25TJ104	Carbon,	1/4W,	100kΩ,	±5%
R311, 312	S	ERD25FJ331	Carbon,	1/4W,	330Ω,	±5%
R313	S	ERD25FJ821	Carbon,	1/4W,	820Ω,	±5%
R314	S	ERD25FJ102	Carbon,	1/4W,	1kΩ	±5%
R401, 402	S	ERD25FJ391	Carbon,	1/4W,	390Ω,	±5%
R403, 404	S	ERD25TJ224	Carbon	1/4W,	220kΩ,	±5%
R405, 406	S	ERD25TJ563	Carbon,	1/4W,	56kΩ,	±5%
R407, 408	S	ERD25FJ271	Carbon,	1/4W,	270Ω,	±5%
R409, 410	S	ERD25FJ680	Carbon	1/4W,	68Ω,	±5%
R411, 412	S	ERD25TJ184	Carbon,	1/4W,	100kΩ,	±5%
R413, 414	S	ERD25TJ123	Carbon,	1/4W,	12kΩ,	±5%
R415, 416	S	ERD25TJ224	Carbon	1/4W,	220kΩ,	±5%
R417, 418	S	ERD25FJ102	Carbon,	1/4W,	1kΩ	±5%
R421, 422	S	ERD25FJ472	Carbon,	1/4W,	4.7kΩ,	±5%
R423, 424	S	ERD25FJ472	Carbon,	1/4W,	4.7kΩ,	±5%
R425, 426	S	ERD25TJ394	Carbon,	1/4W,	390kΩ,	±5%
R501, 502	S	ERD25FJ222	Carbon	1/4W,	2.2kΩ,	±5%
R503, 504	S	ERD25TJ153	Carbon,	1/4W,	15kΩ,	±5%
R505, 506	S	ERD25TJ393	Carbon,	1/4W,	39kΩ,	±5%
R507, 508	S	ERD25FJ392	Carbon	1/4W,	3.9kΩ	±5%
R509, 510	S	ERD25TJ223	Carbon,	1/4W,	22kΩ,	±5%
R511, 512	S	ERD25FJ392	Carbon	1/4W,	3.9kΩ,	±5%
R513, 514	S	ERD25TJ473	Carbon,	1/4W,	47kΩ,	±5%
R515, 516	S	ERD25FJ122	Carbon	1/4W,	1.2kΩ,	±5%
R601, 602	S	ERD25FJ102	Carbon,	1/4W,	1kΩ,	±5%
R603, 604	S	ERD25TJ823	Carbon,	1/4W,	82kΩ,	±5%
R605, 606	S	ERD25FJ271	Carbon,	1/4W,	270Ω,	±5%
R607, 608	S	ERD25FJ222	Carbon,	1/4W	2.2kΩ,	±5%
R609, 610	S	ERD25FJ272	Carbon	1/4W	2.7kΩ,	±5%
R611, 612	S	ERD25TJ393	Carbon,	1/4W	39kΩ,	±5%
R613, 614	S	ERD25TJ393	Carbon,	1/4W,	39kΩ,	±5%
R615, 616	Δ	ERX2ANJR22	Metl Film,	2W,	0.22Ω,	±5%
R617, 618	S	ERD25FJ222	Carbon,	1/4W,	2.2kΩ,	±5%
R619, 620	S	ERD25TJ153	Carbon	1/4W,	15kΩ	±5%
R621, 622	S	ERD25FJ103	Carbon,	1/4W,	10kΩ,	±5%
R625, 626	S Δ	ERD25FJ100	Carbon,	1/4W,	10Ω,	±5%
R627, 628	Δ	ERDS1FJ331	Carbon,	1/2W,	330Ω,	±5%
R629, 630	S Δ	ERD25FJ101	Carbon,	1/4W,	100Ω	±5%
R701	S	ERG1ANJ152	Metal Oxide,	1W,	1.5kΩ,	±5%
R702	S	ERD25TJ393	Carbon,	1/4W,	39kΩ,	±5%
R703	S	ERD25TJ184	Carbon,	1/4W,	180kΩ,	±5%
R704, 705	S	ERD25FJ103	Carbon,	1/4W	10kΩ,	±5%
R706	Δ	ERDS1FJ272	Carbon,	1/2W,	2.7kΩ,	±5%
R709	S	ERD25TJ274	Carbon,	1/4W,	270kΩ,	±5%
R710	S	ERD25TJ473	Carbon,	1/4W,	47kΩ,	±5%
R711	S	ERD25FJ562	Carbon,	1/4W	5.6kΩ,	±5%
R712	S	ERD25FJ103	Carbon	1/4W,	10kΩ,	±5%
R713	S Δ	ERD25FJ220	Carbon,	1/4W,	22Ω,	±5%
R714	S	ERG1ANJ471	Metal Oxide,	1W	470Ω,	±5%
R715	S	ERG1ANJ681	Metal Oxide,	1W,	680Ω,	±5%
R716, 717	S	ERD25FJ221	Carbon,	1/4W,	220Ω,	±5%
R718	Δ	ERDS1FJ220	Carbon,	1/2W,	22Ω,	±5%
R719	S	ERD25FJ391	Carbon,	1/4W	390Ω,	±5%

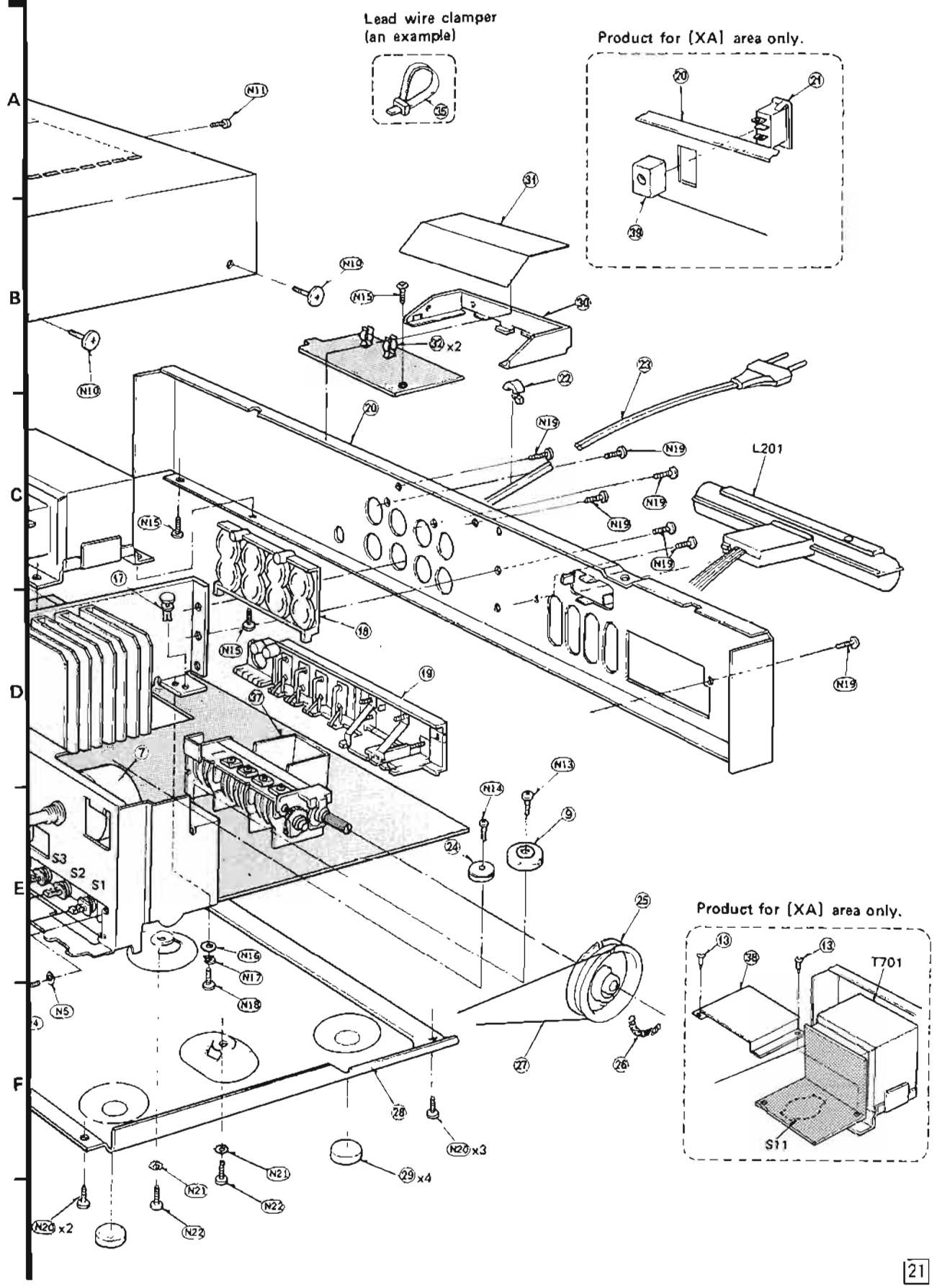
Ref No		Part No	Part Name & Description			
R720	S	ERD25FJ332	Carbon,	1/4W,	3.3kΩ,	±5
R721	Δ	ERG3ANJ560	Metal Oxide	3W	56Ω,	±5
R722	Δ	ERDS1FJ222	Carbon,	1/2W,	2.2kΩ,	±5
R723	S	ERD25FJ222	Carbon,	1/4W	2.2kΩ,	±5

CAPACITORS

C1	S	ECCD1H120KC	Ceramic,	50V,	12pF,	±1
C2	S	ECKD1H102ZF	Ceramic,	50V,	0.001μF,	±8
C3	S	ECCD1H120KC	Ceramic,	50V,	12pF	±1
C4	S	ECCD1H030CC	Ceramic,	50V,	3pF,	±0
C5	S	ECCD1H060CC	Ceramic,	50V,	6pF,	±0
C6	S	ECCD1H181K	Ceramic,	50V,	180pF,	±1
C7	S	ECCD1H390KC	Ceramic,	50V,	39pF,	±1
C8	S	ECCD1H100KC	Ceramic,	50V,	10pF,	±1
C9	S	ECKD1H102ZF	Ceramic,	50V,	0.001μF,	±8
C10	S	ECKD1H103ZF	Ceramic,	50V,	0.01μF,	±8
C11	S	ECKD1H221KE	Ceramic,	50V,	220pF,	±1
C12 ~ 14	S	ECKD1H103ZF	Ceramic,	50V,	0.01μF,	±8
C50, 51 [XL] only	Δ	ECKDHS101MB	Ceramic,	400VAC,	100pF,	±2
C52, 53 [XL] only	Δ	ECKDHS102MD	Ceramic,	400VAC,	0.001μF,	±2
C99 [EX, EH] only	S	ECKD1H103ZF	Ceramic,	50V,	0.01μF,	±8
C102	S	ECKD1H223ZF	Ceramic	50V,	0.022μF	±8
C103 ~ 105	S	ECKD1H103ZF	Ceramic,	50V	0.01μF,	±8
C106	S	ECEA50ZR47	Electrolytic,	50V,	0.47μF	
C107	S	ECEA1ES470	Electrolytic,	25V,	47μF	
C108	S	ECKD1H103ZF	Ceramic,	50V	0.01μF,	±8
C109	S	ECKD1H223ZF	Ceramic,	50V,	0.022μF,	±8
C110	S	ECCD1H101K	Ceramic,	50V,	100pF,	±1
C111	S	ECKD1H103ZF	Ceramic,	50V,	0.01μF,	±8
C112	S	ECKD1H103M0	Ceramic,	50V,	0.01μF,	±2
C113	S	ECEA25Z4R7	Electrolytic,	25V,	4.7μF	
C114	S	ECQM1H183JZ	Polyester,	50V	0.018μF,	±5
C115	S	ECEA50Z3R3	Electrolytic,	50V,	3.3μF	
C116	S	ECEA1ES220	Electrolytic,	25V,	22μF	
C117	S	ECKD1H103ZF	Ceramic,	50V,	0.01μF,	±8
C118	S	ECCD1H680K	Ceramic,	50V,	68pF	±1
C119	S	ECEA50Z3R3	Electrolytic,	50V,	3.3μF	
C201	S	ECEA25Z4R7	Electrolytic,	25V,	4.7μF	
C202	S	ECEA1AS101	Electrolytic,	10V	100μF	
C203	S	ECEA1HS100	Electrolytic,	50V	10μF	
C204		ECQP1361JZ	Polyester,	125V,	360pF,	±5
C205	S	ECCD1H150KC	Ceramic,	50V,	15pF,	±1
C301	S	ECEA50Z1	Electrolytic,	50V,	1μF	
C302	S	ECKD1H102ZF	Ceramic,	50V	0.001μF,	±8
C303	S	ECQM1H473JZ	Polyester,	50V,	0.047μF,	±5
C304	S	ECEA1ES101	Electrolytic,	25V,	100μF	
C305 [EX, EH] only	S	ECCD1H680K	Ceramic,	50V,	68pF,	±
C306	S	ECEA50Z1	Electrolytic,	50V,	1μF	
C307	S	ECEA50ZR47	Electrolytic,	50V,	0.47μF	
C308		ECQP1471JZ	Polyester,	125V,	470pF,	±1
C309, 310	S	ECEA50Z1	Electrolytic,	50V,	1μF	
C311, 312	S	ECQM1H223JZ	Polyester,	50V	0.022μF,	±5
C313	S	ECKD1H103ZF	Ceramic	50V,	0.01μF,	±1
C314	S	ECEA50Z3R3	Electrolytic,	50V,	3.3μF	
C401, 402	S	ECEA50M3R3A	Electrolytic,	50V,	3.3μF	
C403, 404	S	ECCD1H101K	Ceramic,	50V,	100pF,	±
C405, 406	S	ECEA1CS330	Electrolytic,	16V,	33μF	
C407, 408	S	ECQM1H223JZ	Polyester	50V,	0.022μF	±
C409, 410	S	ECQM1H682JZ	Polyester,	50V,	0.0068μF,	±
C411, 412	Δ	ECEA1HN010S	Non Polar Electrolytic,		50V 1μF	
C413	S	ECEA50ZR47	Electrolytic,	50V,	0.47μF	
C415	S	ECKD1H223ZF	Ceramic,	50V	0.022μF,	±
C417, 418	S	ECKD1H471KB	Ceramic,	50V,	470pF,	±
C501, 502	S	ECKD1H331KB	Ceramic,	50V,	330pF,	±
C503, 504	S	ECQM1H104JZ	Polyester,	50V,	0.1μF,	±
C505, 506	S	ECQM1H183JZ	Polyester,	50V	0.018μF	±
C507, 508	S	ECQM1H104JZ	Polyester,	50V	0.1μF,	±
C509, 510	S	ECQM1H223JZ	Polyester,	50V,	0.022μF	±
C511, 512	S	ECEA1HS100	Electrolytic,	50V,	10μF	
C601, 602	S	ECEA50Z3R3	Electrolytic,	50V,	3.3μF	
C603, 604	S	ECCD1H390K	Ceramic	50V,	39pF,	±
C605, 606	S	ECKD1H821KB	Ceramic,	50V,	820pF,	±
C607, 608	S	ECCD1H270K	Ceramic,	50V,	27pF,	±
C609, 610	S	ECCD1H1R5CC	Ceramic,	50V,	1.5pF	±
C611, 612	S	ECEA50Z3R3	Electrolytic,	50V,	3.3μF	
C615, 616	S	ECEA25Z4R7	Electrolytic	25V,	4.7μF	
C617	S	ECEA1VS101	Electrolytic,	35V,	100μF	
C701, 702		ECETS1VV472U	Electrolytic,	35V	4700μF	
C703, 704	S	ECEA1JS330	Electrolytic,	63V	33μF	
C705	S	ECEA50Z3R3	Electrolytic,	50V,	3.3μF	
C706	S	ECKD1H103ZF	Ceramic,	50V,	0.01μF,	±
C707	S	ECEA1ES470	Electrolytic,	25V,	47μF	
C708	S	ECKD1H103ZF	Ceramic,	50V,	0.01μF,	±
C710	S	ECEA1HS100	Electrolytic	50V,	10μF	
C1001	Δ	ECKDKC103PF	Ceramic,	250VAC,	0.01μF	

■ EXPLODED VIEW




Lead wire clamper
(an example)
Product for [XA] area only.
Product for [XA] area only.
L201
T701
S11
S1
S2
S3
A
B
C
D
E
F

■ REPLACEMENT PARTS LIST .... Cabinet & Chassis Parts

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. 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.
3. [K] -marked parts are used for black only, while ○- marked parts are for silver type only.
4. Parts other than [K] -and ○-marked are used for both black and silver types.
5. The "S" mark is service standard parts and may differ from production parts.
6. Bracked indications in Ref. No. columns specify the area.
Parts without these indications can be used for all areas.

Black type model No. : SA-104 (K)

Areas

- [EX] is available in Switzerland and Scandinavia.
- [EH] is available in Holland.
- [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- [XL] is available in Australia.

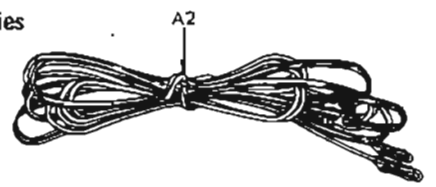
Ref. No.		Part No.	Part Name & Description
CABINET and CHASSIS PARTS			
1	○ JPN	SYWA104M	Front Panel Ass'y (Silver) (Made in Japan)
1	[K] MSA	SYWA104KEX	Front Panel Ass'y (Black) (Made in Singapore)
2		SBN1103	Knob, Bass, Treble & Balance
3		SBN1105	Knob, Volume
4		SBN1107	Knob, Tuning
5		SBC337-1	Button, Power
6		SBC339	Button, Speakers, Loudness, FM muting /mode, Tape Monitor, Band Selector & Input Selector
7		SDT8095-1	Shaft, Tuning
8	○	SKC890S1	Cabinet (Silver)
8	[K]	SKC890B1	Cabinet (Black)
9		RDR8-1	Pulley, Dial
10		SUR143	Bracket, Pully
11		SMP325	Bracket, Lamp
13		SHR401-1	Latch, LED P.C.B & Cover
14		SJJ69-1	Jack, Headphone
15		SDP1167	Pointer, Dial
16		SHP59	Slider, Pointer
17		SHR411	Latch, Heat-sink
18		SJF4815	Terminal, Speakers
19		SJF8035-1N	Terminal, Input & Antenna
19 [XL] only		SJF8035-3N	Terminal, Input & Antenna
20 [EX, EH]	MSA	SGP2910-1A	Rear Panel (Made in Singapore)
20 [XA]	JPN	SGP2910-3A	Rear Panel (Made in Japan)
20 [XL]	JPN	SGP2910-4A	Rear Panel (Made in Japan)
21 [XA] only	△	SJS9221	Socket, AC Outlet
22		SHR127	Bushing, AC Cord
22 [XL] only		SHR131	Bushing, AC Cord
23	S △	SJA88	AC Cord, Power Source
23	S △	QFC1207M	AC Cord, Power Source
24		SDR3	Pulley, Dial
25		SDD38-1	Drum, Variable Capacitor
26		SDSA4121	Spring, Drum
27		SD7051-2	Cord, Dial (1.8m)
28		SYUA104EX	Bottom Board, W/Feet
28 [XA] only		SYUA104XA	Bottom Board, W/Feet
29		SKL245-2	Foot, Set
30		SMN1823	Bracket, Fuse PCB
31		SMX435	Cover, AC Outlet
32		SJT347	Clip, Fuse
34		SHS6111-1	Fiber, Cabinet
35		SHR301	Clamper, Lead Wire
36		SMXA65	Cover, Line Capacitor
37		SMC469-2	Cover, Shield
38 [XA] only		SMX611	Cover, Voltage Adjuster PCB
39 [XA] only		SMX13-1	Cover, AC Outlet

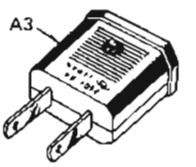
Ref. No.		Part No.	Part Name & Description
SCREWS, NUTS and WASHERS			
N1	S	XTS3+8BFZ	Screw, Front Panel, ⊕ 3x8
N2	S	XSN3+6SFZ	Screw, Pulley Bracket, ⊕ 3x6
N3	S	XWA3BFZ	Washer, Pulley Bracket, ϕ3
N4	S	XSN3+6S	Screw, Switches, ⊕ 3x6
N5	S	XWA3B	Washer, Switches, ϕ3
N6		SNE4021-1	Nut, Variable Resistors, M8
N7		XTB3+8BFZ1	Screw, Heat Sink, ⊕ 3x8
N8	S	XNS11	Nut, Tuning Shaft, M11
N9	S	XWD118	Washer, Tuning Shaft, ϕ11
N10	○	SNE2095-2	Screw, Cabinet
N10	[K]	SNE2095-3	Screw
N11	S ○	XTB3+8BFN	Screw, Cabinet, ⊕ 3x8
N11	S [K]	XTB3+8BFZ	Screw, Cabinet, ⊕ 3x8
N12	S	XTB3+16BFZ	Screw, Power IC, ⊕ 3x16
N13		SHD3X1F-1	Screw, Pulley
N14		SHD3X21F-1	Screw, Pulley
N15	S	XTB3+8BFZ	Screw, Power Transformer ⊕ 3x8
N16	S	XWG3EBFN	Washer, Heat-sink, ϕ3
N17	S	XWA3BFN	Washer, Heat-sink, ϕ3
N18	S	XTB3+10BFN	Screw, Heat-sink, ⊕ 3x10
N19		XTBS3+8BFZ1	Screw, Rear Panel, ⊕ 3x8
N20	S	XTB3+8BFN	Screw, Bottom Board, ⊕ 3x8
N21	S	XWC3B	Washer, Bottom Board, ϕ3
N22	S	XSN3+8S	Screw, Bottom Board, ⊕ 3x8
N23		XTBS3+8BFZ1	Screw, Front Panel, ⊕ 3x8
PACKING PARTS			
P1 [EX, EH]	MSA	SPG3791	Carton Box, (Made in Singapore)
P1 [XA]	JPN	SPG3793	Carton Box, (Made in Japan)
P1 [XL]	JPN	SPG3795	Carton Box, (Made in Japan)
P2 [EX, EH]	○	SGK1411	Label, (Silver Type) only
P3		SPS3515	Pad, Left Side
P3 [XL] only		SPS3515-1	Pad, Left Side
P4		SPS3517	Pad, Right Side
P4 [XL] only		SPS3517-1	Pad, Right Side
P5		SPP699	Polyethylene Bag
ACCESSORIES			
A1 [EX, EH]		SQF11187	Instructions Book, Printed Matter
A1 [XA]		SQF11189	Instructions Book, Printed Matter
A1 [XL]		SQF11193	Instructions Book, Printed Matter
A2		SSA267	Cord, FM Indoor Antenna
A3 [XA] only	△	SJP5213-1	Plug Adaptor, Power Source
A4 [XA] only	△	SJP5215	Plug Adaptor, Power Source

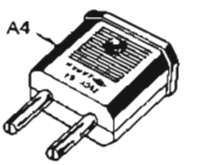
• We have a two production country for this model.
One of a made by Japan and other one is made by Singapore.
The made by Singapore unit was we has different parts number.

JPN: Made in Japan
MSA: Made in Singapore

• Accessories







Printed in Japan
82034600 ® TK