

# Service Manual

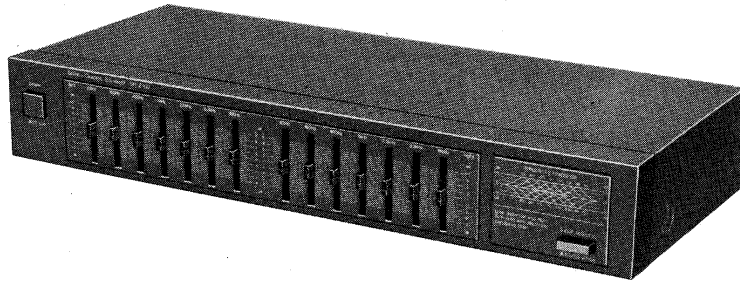
Stereo Graphic Equalizer

Equalizer

## SH-8016

Color

(K) .....Black Type



Area

color	area
(K)	(M).....U.S.A.
(K)	(MC) .....Canada.
(K)	(XL) .....Australia.
(K)	(XA) .....Southeast Asia, Oceania,Afirca. Middle Near East and Central South America.
(K)	(PA) .....Far East PX.
(K)	(PE) .....European Military.

## SPECIFICATIONS

<b>Frequency response</b> (center position)	: 5 Hz~ 100 kHz, -1 dB
<b>Maximum output</b> <b>voltage</b>	: 6 V (1 kHz, THD 0.01%)
<b>Rated output voltage</b>	: 1 V
<b>Rated total harmonic</b> <b>distortion</b>	: 0.005% (20 Hz~ 20 kHz), 0.003% (1 kHz)
<b>Input sensitivity</b>	: 1 V
<b>Signal to noise ratio</b>	: 110 dB (IHF'A)
<b>Maximum input</b> <b>voltage</b>	: 6 V (1 kHz)
<b>Input impedance</b>	: 33 kΩ
<b>Overall gain</b>	: 0±1 dB
<b>Band level controls</b>	: +12 dB~-12dB (7 continuously variable elements per channel)
<b>Center frequencies</b>	: 63 Hz, 160 Hz, 400 Hz, 1 kHz 2.5kHz, 6.3 kHz, 16 kHz

## GENERAL

<b>Power supply</b>	: AC 120 V, 60 Hz (For U.S.A. and Canada) AC 110 V-127 V/ 220 V-240 V, 50 Hz/ 60 Hz (For other areas)
<b>Power consumption</b>	: 7 W
<b>Dimensions</b> (W x H x D)	: 430 x 74.9 x 192.5 mm (16-15/ 16" x 2-15/ 16" x 7-19/ 32")
<b>Weight</b>	: 1.95 kg (4.3 lb.)

Specifications are subject to change without notice  
for further improvement

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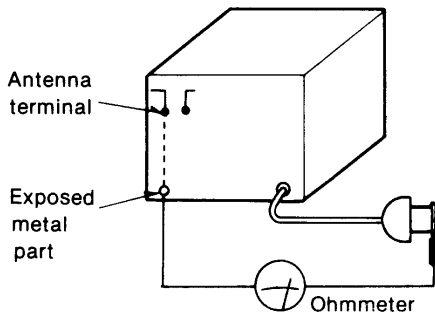
## SAFETY PRECAUTIONS (This "safety precaution" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

### INSULATION RESISTANCE TEST

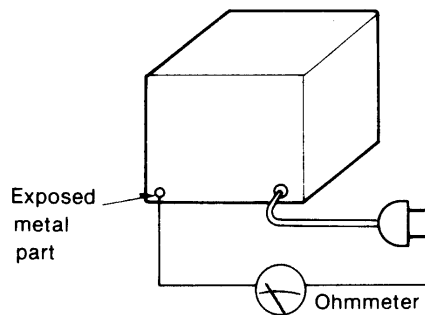
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between  $3M\Omega$  and  $5.2M\Omega$  to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

**Note:** Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance =  $3M\Omega - 5.2M\Omega$

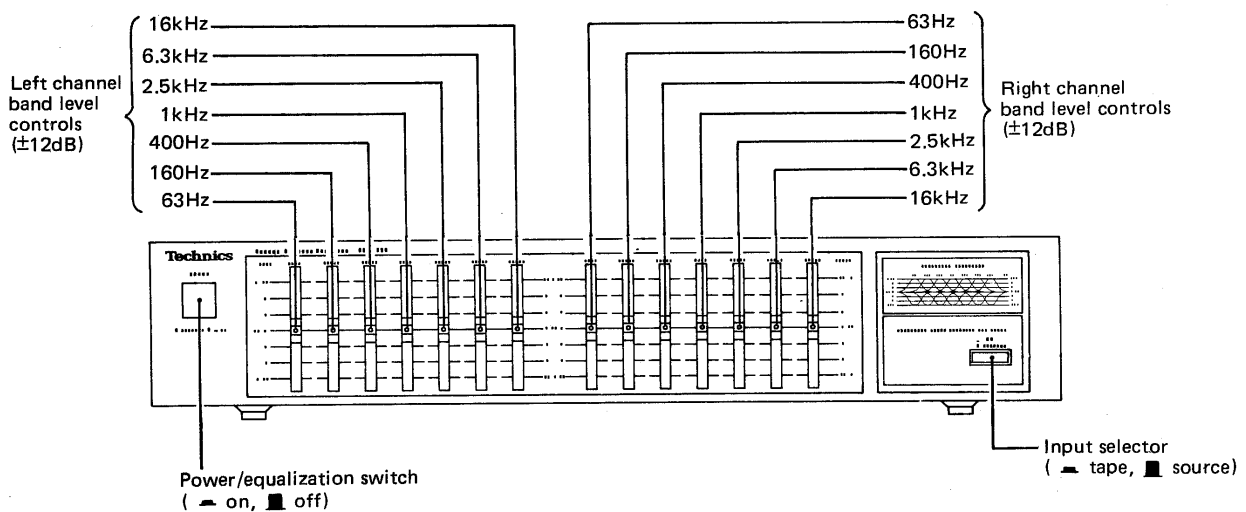


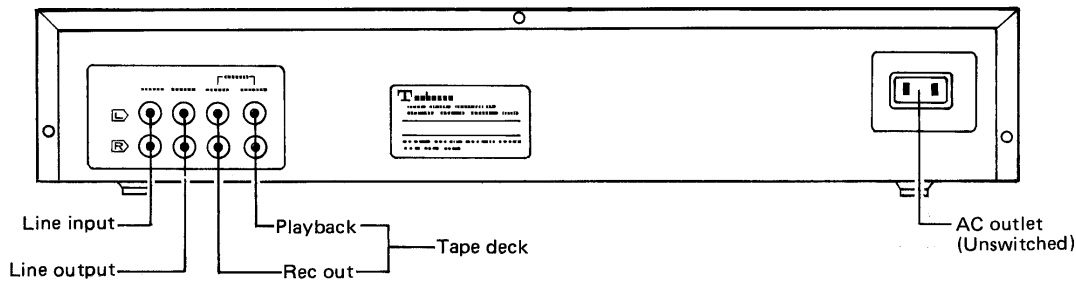
(Fig. B)

Resistance = Approx  $\infty$

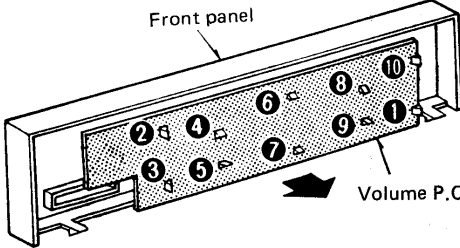
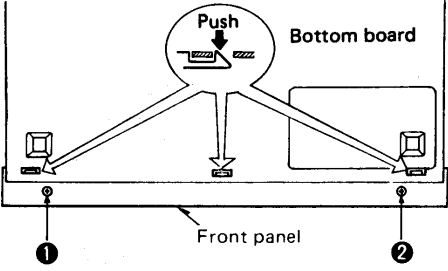
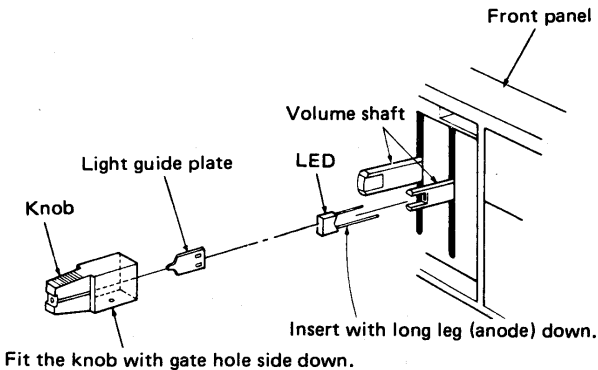
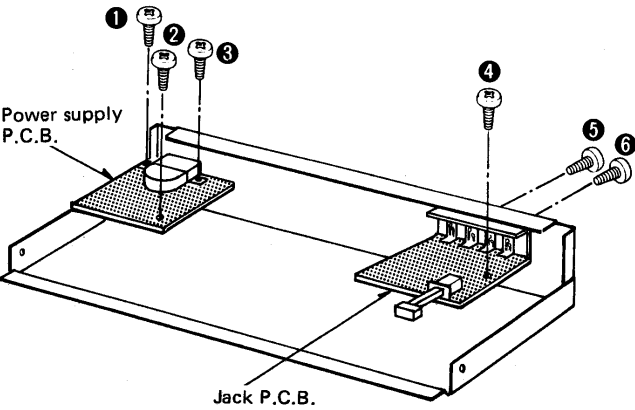
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

## LOCATION OF CONTROLS





## DISASSEMBLY INSTRUCTIONS

Ref. No. 1	How to remove the cabinet	Ref. No. 4	How to remove the volume P.C.B.
Procedure 1	<ul style="list-style-type: none"> <li>Remove the 5 screws.</li> </ul>	Procedure 1 → 2 → 4	<ul style="list-style-type: none"> <li>Push the 10 tabs aside.</li> <li>Remove the volume P.C.B.</li> </ul>
Ref. No. 2	How to remove the front panel	 <p>Front panel Volume P.C.B.</p>	
Procedure 1 → 2	<ul style="list-style-type: none"> <li>Remove the 2 screws (1, 2)</li> <li>The tabs with project (at 3partions) from the front panel are engaged with the bottom board.</li> </ul>  <p>Push Bottom board Front panel</p>		
Ref. No. 3	How to remove the power supply P.C.B. and Jack P.C.B.	<h3>How to fit the volume rod</h3>  <p>Front panel Volume shaft LED Light guide plate Knob</p> <p>Insert with long leg (anode) down. Fit the knob with gate hole side down.</p>	
Procedure 1 → 2 → 3	<ul style="list-style-type: none"> <li>Remove the 3 screws (1 ~ 3) of power supply P.C.B.</li> <li>Remove the 3 screws (4 ~ 6) of Jack P.C.B.</li> </ul>  <p>Power supply P.C.B. Jack P.C.B.</p>		

# RESISTORS & CAPACITORS

## Notes: \* Important safety notice:

Components identified by  $\Delta$  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.

Parts without these indications can be used for all areas.

## Numbering System of Resistor

### Example

ERD	25	F	J	102
Type	Wattage	Shape	Tolerance	Value
ERX	2	AN	J	471
Type	Wattage	Shape	Tolerance	Value
				$47 \times 10^1$ (ohm)

## Numbering System of Capacitor

### Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M		330
Type	Voltage	Peculiarity		Value
				$(33 \times 10^0$ microfarad)

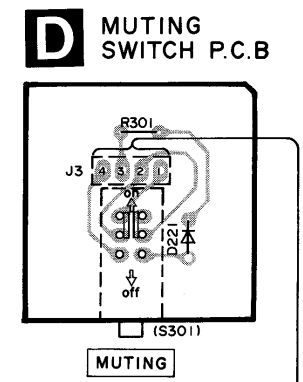
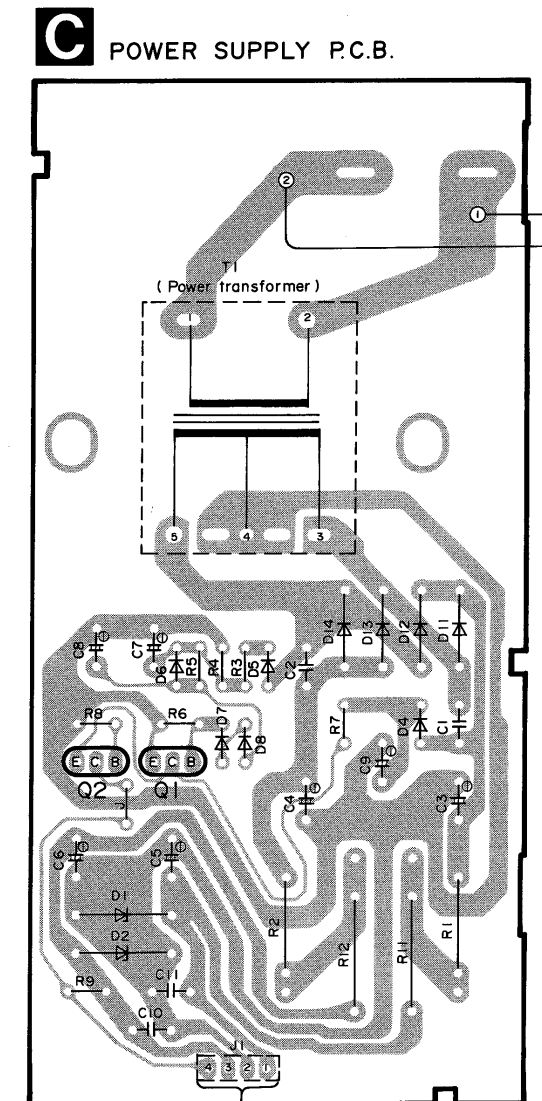
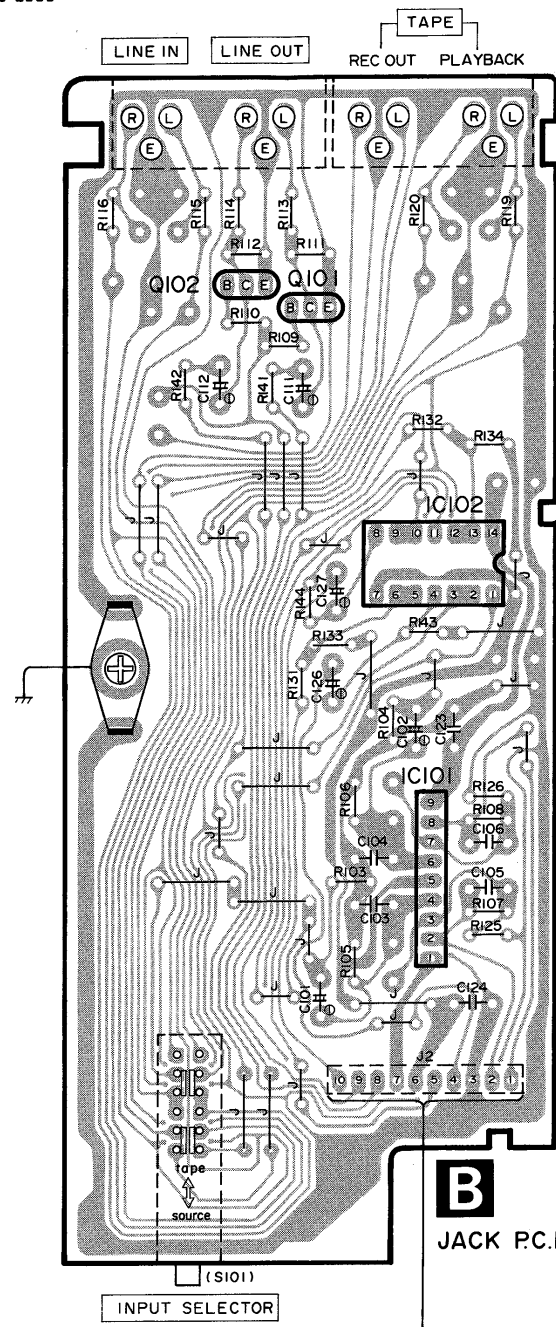
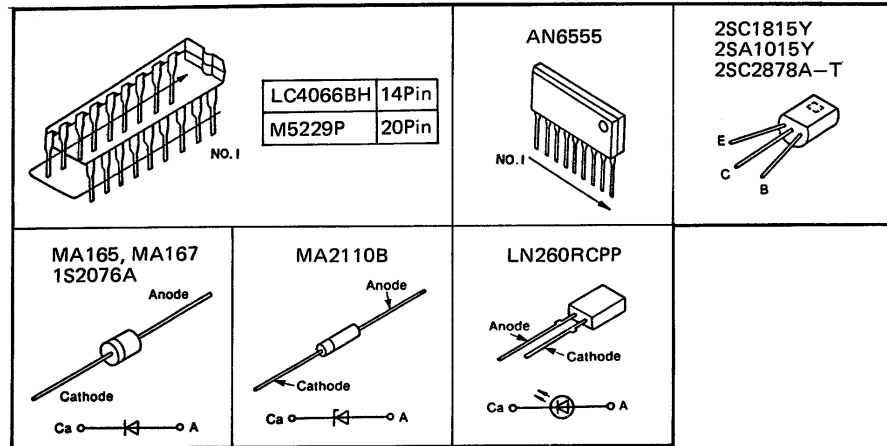
Resistor Type	Wattage	Tolerance
ERD : Carbon	10 : 1/8W	J : $\pm 5\%$
ERG : Metal Oxide	12 : 1/2W	F : $\pm 1\%$
ERX : Metal Film	25 : 1/4W	G : $\pm 2\%$
ERQ : Fuse Type Metal	1A : 1W	K : $\pm 10\%$
ERD [ ] L : Carbon (chip)	18 : 1/8W	
ERD [ ] K : Metal Film (chip)	S2 : 1/4W	
ERC : Solid	S1 : 1/2W	
	2F : 1/4W	
	50 : 1/2W	
	2A : 2W	

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

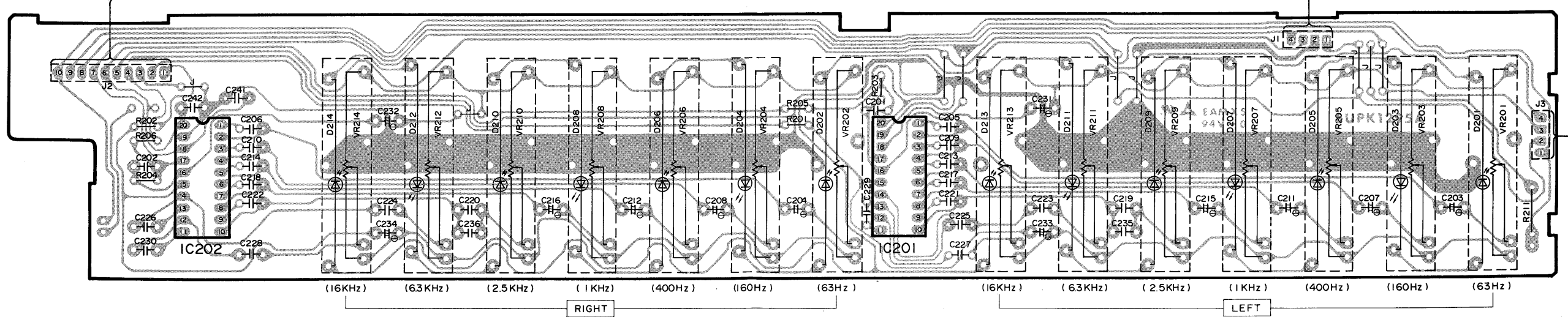
Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code
RESISTORS			R141, R142	ERDS2TJ102	001 152 2346 4	C123, C124 $\Delta$	ECKD1H223PF	001 103 1510 9
R1, R2	ERGIANJ330	001 151 0061 7	R143, R144	ERDS2TJ104	001 152 2348 2	C126, C127	ECEA1HK010	001 120 0341 5
R3	ERDS2TJ222	001 152 2353 5	R145, R146	ERD25FJ102	001 152 0215 2	C201, C202	ECKD1H471KB	001 103 1551 0
R4	ERDS2TJ472	001 152 2362 4	R147, R148	ERD25FJ102	001 152 0215 2	C203, C204	ECEA1HK3R3	001 120 0349 7
R5	ERDS2TJ473	001 152 2363 3	R201, R202	ERDS2TJ272	001 152 2354 4	C205, C206	ECFTD683KXL	001 108 0346 2
R6	ERDS2TJ273	001 152 2436 3	R203, R204	ERDS2TJ272	001 152 2354 4	C207, C208	ECEA1HK010	001 120 0341 5
R7	ERDS2TJ562	001 152 2445 2	R205, R206	ERDS2TJ102	001 152 2346 4	C209, C210	ECFTD0333KXL	001 108 0360 4
R8	ERDS2TJ103	001 152 2347 3	R211	ERDS1FJ681	001 152 2639 4	C211, C212	ECEA1HKR47	001 120 0338 0
R9	ERDS2TJ224	001 152 2433 6	R301	ERDS2TJ183	001 152 2429 2	C213, C214	ECFTD103KXL	001 108 0341 7
R11, R12	ERX2PSK680	001 151 0177 6	CAPACITORS			C215, C216	ECEA1HKR22	001 120 0336 2
R103, R104	ERDS2TJ473	001 152 2363 3	C1, C2	ECKD1H103PF	001 103 1449 7	C217, C218	ECFTD332KXL	001 108 0344 4
R105, R106	ERDS2TJ104	001 152 2348 2	C3, C4	ECEA1EU221	001 120 2838 7	C219, C220	ECFTD0393KXL	001 108 0817 2
R107, R108	ERDS2TJ472	001 152 2362 4	C5, C6	ECEA1CU221	001 120 2833 2	C221, C222	ECFTD182KXL	001 108 0357 9
R109, R110	ERDS2TJ332	001 152 2357 1	C7	ECEA1EK4R7	001 120 0294 5	C223, C224	ECFTD0333KXL	001 108 0360 4
R111, R112	ERDS2TJ104	001 152 2348 2	C8	ECEA0JU101	001 120 2829 8	C225, C226	ECKD1H561KB	001 103 1576 1
R113, R114	ERDS2TJ181	001 152 2428 3	C9	ECEA1EU101	001 120 2837 8	C227, C228	ECFTD123KXL	001 108 0745 1
R115, R116	ERDS2TJ102	001 152 2346 4	C10, C11 $\Delta$	ECKD1H223PF	001 103 1510 9	C229, C230	ECKD1H221KB	001 103 1487 1
R119, R120	ERDS2TJ102	001 152 2346 4	C101, C102	ECEA1EK4R7	001 120 0294 5	C231, C232	ECEA1CK220	001 120 0225 8
R125, R126	ERDS2TJ473	001 152 2363 3	C103, C104	ECCD1H101K	001 103 0341 2	C233, C234	ECEA1CK220	001 120 0225 8
R131, R132	ERDS2TJ103	001 152 2347 3	C105, C106	ECCD1H101K	001 103 0341 2	C235, C236	ECFTD0333KXL	001 108 0360 4
R133, R134	ERDS2TJ104	001 152 2348 2	C111, C112	ECEA1EK4R7	001 120 0294 5	C241, C242 $\Delta$	ECKD1H223PF	001 103 1510 9

# CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

## Terminal Guide of IC's, Transistors and Diodes



### A VOLUME P.C.B.



# SCHEMATIC DIAGRAM

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

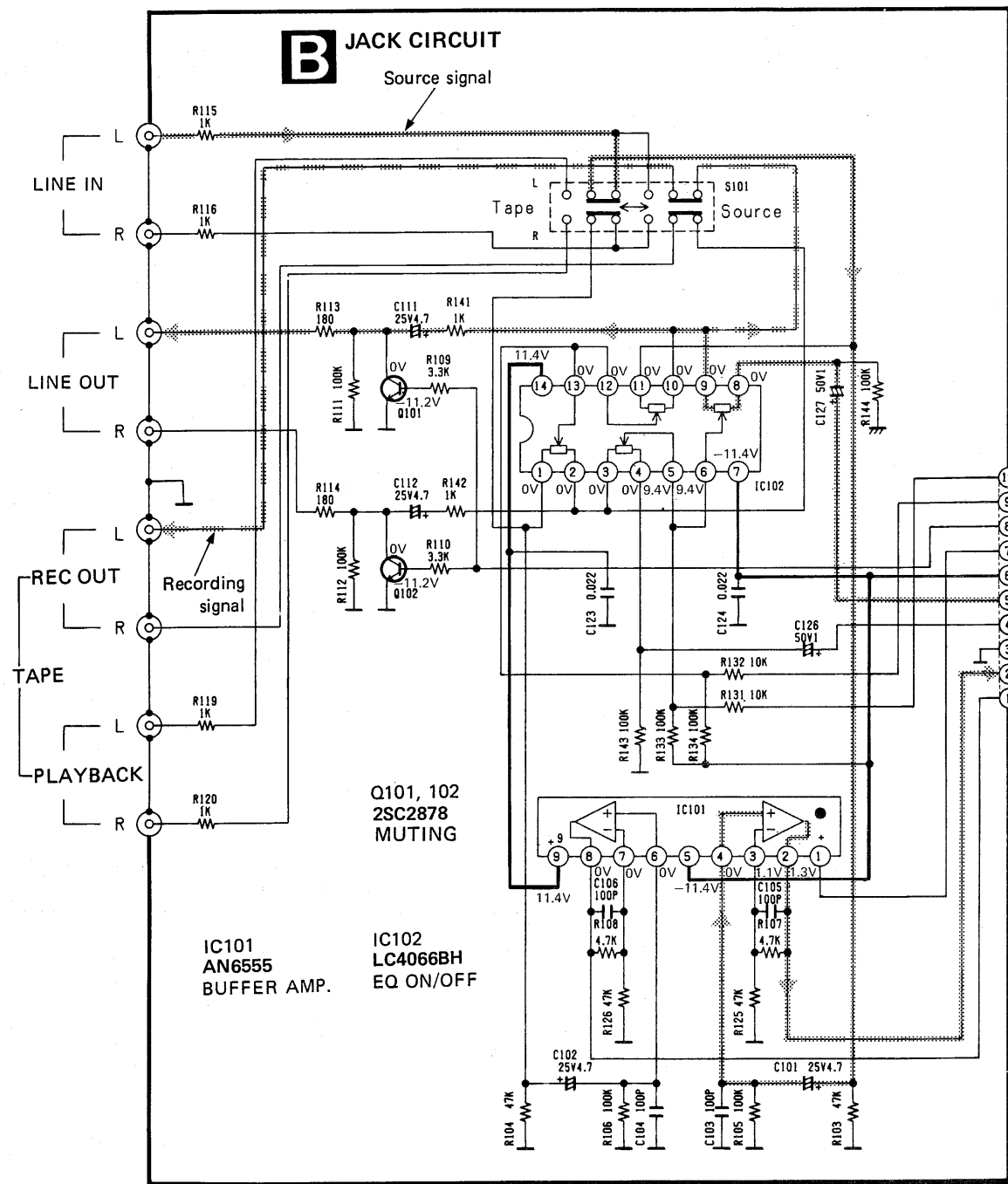
## Note 1

- **S101** : Input selector in "source" position.  
(▲ : tape, ■ : source)
- **S301** : Power switch in "on" position.  
(▲ : on, ■ : off)

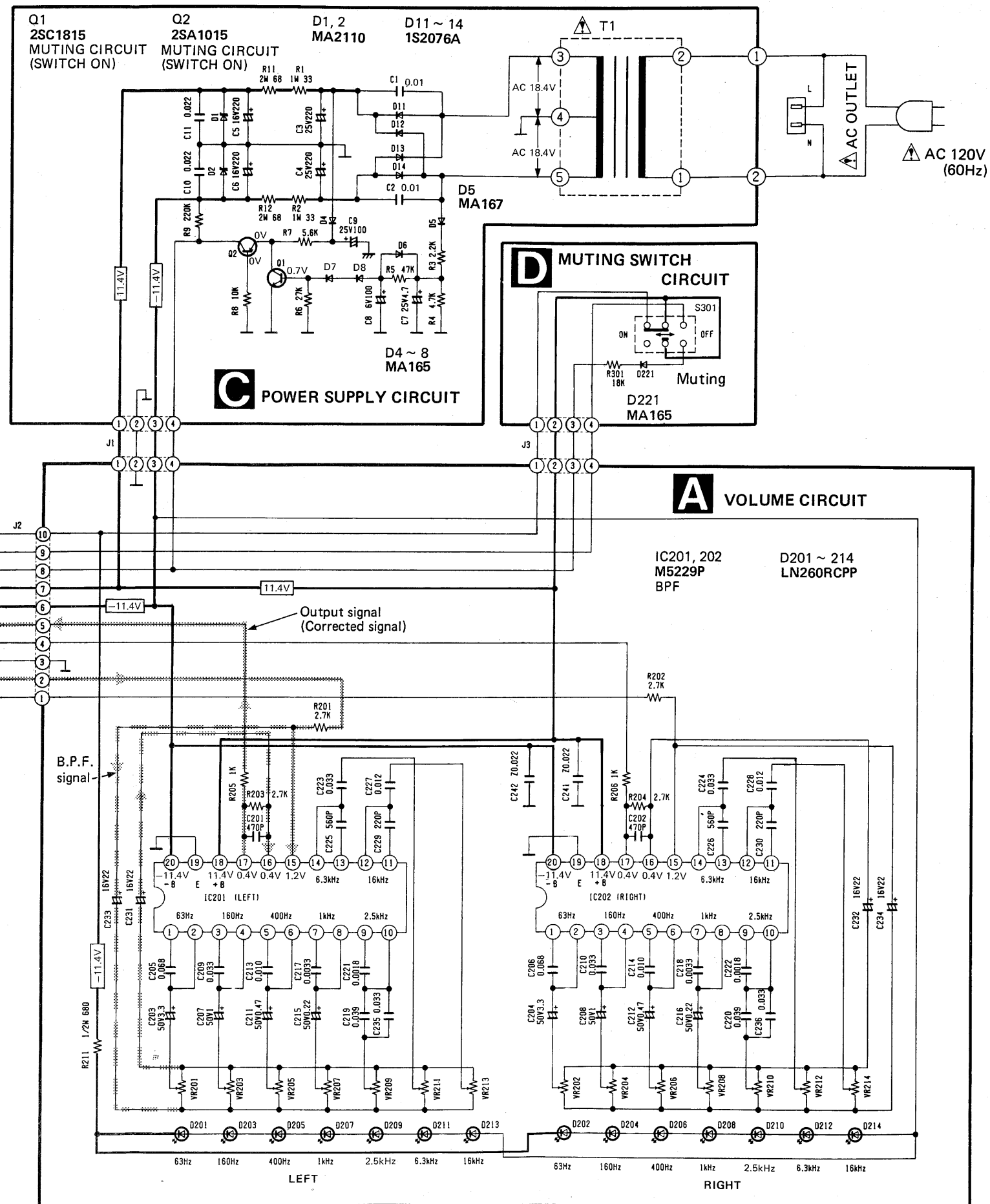
## Note 2

\* 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.  
\* Indicated voltage values are 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 internal impedance of the DC circuit tester.

A  
B  
C  
D  
E  
F



● — Positive and Negative voltage line.



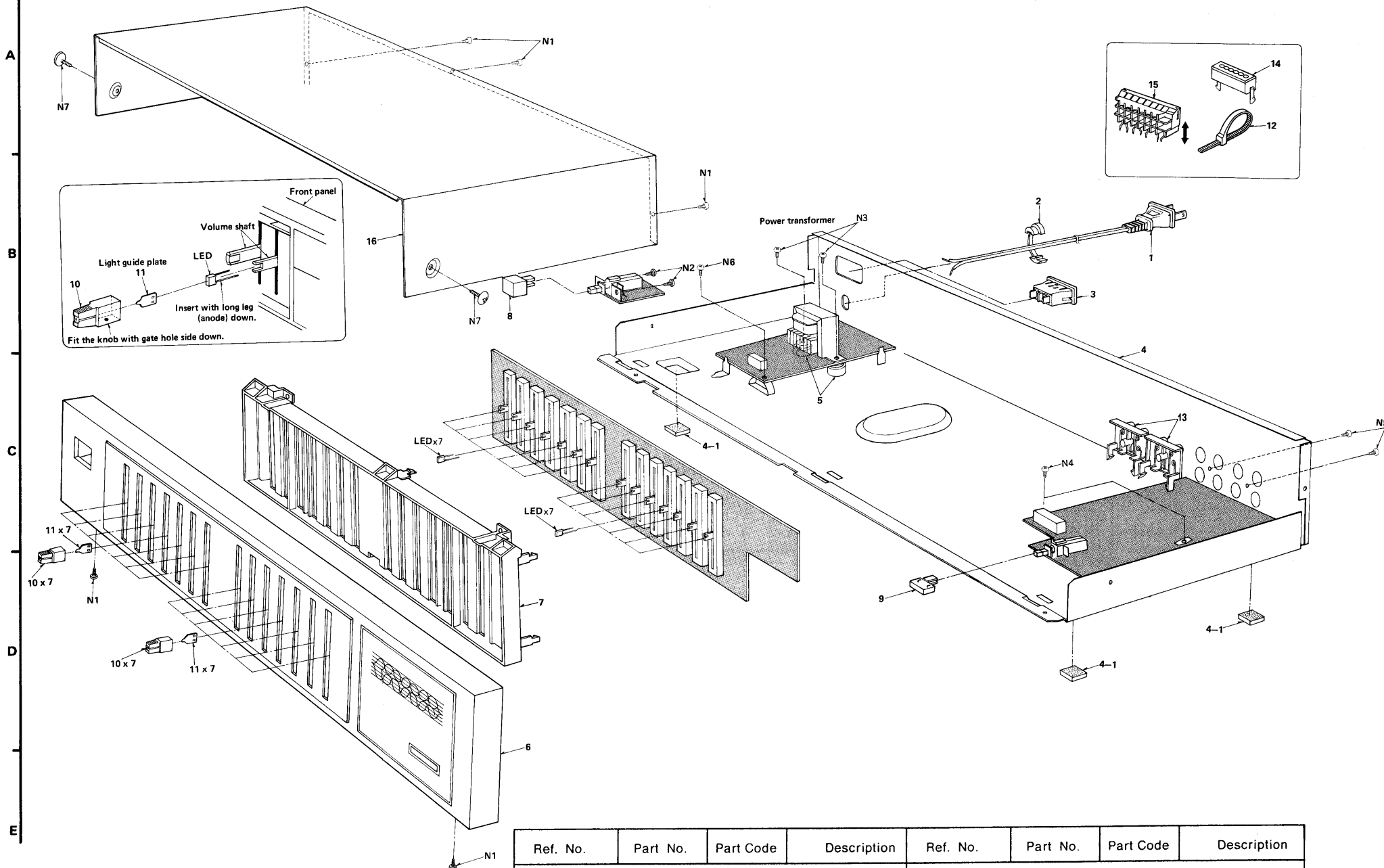
REPLACEMENT PARTS LIST

Notes:

1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice: Components identified by  $\Delta$  mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The parenthesized numbers in the column of description stand for the quantity per set.

Ref. No.	Part No.	Part Code	Description
<b>INTEGRATED CIRCUITS</b>			
IC101	AN6555	001 061 0832 9	I.C.
IC102	LC4066BH	001 060 8401 1	I.C.
IC201, IC202	M5229P	001 061 0195 5	I.C.
<b>TRANSISTORS</b>			
Q1	2SC1815Y	001 030 2916 1	TRANSISTOR
Q2	2SA1015Y	001 030 4043 7	TRANSISTOR
Q101, Q102	2SC2878A-T	001 030 2647 3	TRANSISTOR
<b>DIODES</b>			
D1, D2	MA2110BLF	001 033 0109 7	D1ODE, SI
D4	MA165	001 032 0494 0	D1ODE
D5	MA167	001 032 4142 5	D1ODE
D6, D7	MA165	001 032 0494 0	D1ODE
D8	MA165	001 032 0494 0	D1ODE
D11, D12	SVD1S2076ATD	001 033 0121 1	D1ODE, SI
D13, D14	SVD1S2076ATD	001 033 0121 1	D1ODE, SI
D201, D202	LN260RCPP	001 032 7195 0	D1ODE, GAASP
D203, D204	LN260RCPP	001 032 7195 0	D1ODE, GAASP
D205, D206	LN260RCPP	001 032 7195 0	D1ODE, GAASP
D207, D208	LN260RCPP	001 032 7195 0	D1ODE, GAASP
D209, D210	LN260RCPP	001 032 7195 0	D1ODE, GAASP
D211, D212	LN260RCPP	001 032 7195 0	D1ODE, GAASP
D213, D214	LN260RCPP	001 032 7195 0	D1ODE, GAASP
D221	MA165	001 032 0494 0	D1ODE
<b>VARIABLE RESISTORS</b>			
VR201, VR202	EWANW0J15G15	001 174 9075 8	VARIABLE RESISTOR
VR203, VR204	EWANW0J15G15	001 174 9075 8	VARIABLE RESISTOR
VR205, VR206	EWANW0J15G15	001 174 9075 8	VARIABLE RESISTOR
VR207, VR208	EWANW0J15G15	001 174 9075 8	VARIABLE RESISTOR
VR209, VR210	EWANW0J15G15	001 174 9075 8	VARIABLE RESISTOR
VR211, VR212	EWANW0J15G15	001 174 9075 8	VARIABLE RESISTOR
VR213, VR214	EWANW0J15G15	001 174 9075 8	VARIABLE RESISTOR
<b>COILS AND TRANSFORMERS</b>			
T1 $\Delta$	SLTK511-M	001 202 7914 7	POWER TRANSFORMER
M, MC	SLTK512-W	001 202 7915 6	POWER TRANSFORMER
XL	SLTK513-W	001 202 7916 5	POWER TRANSFORMER
XA, PA, PE			
<b>SWITCHES</b>			
S1 $\Delta$	SSRK19	003 430 2351 2	SWITCH
XA, PA, PE			
S101	SSHK74	003 435 6382 4	PUSH SWITCH
S301	SSHK66	003 435 5633 8	SWITCH
<b>CABINET AND CHASSIS</b>			
1 $\Delta$	RJA52Y	003 490 3914 9	POWER CORD
PA, PE			
1 $\Delta$	SJAG23	003 490 1056 4	POWER CORD
XL			
1 $\Delta$	SJA169-Y	003 490 5319 4	POWER CORD
M, MC			
1 $\Delta$	SJA186	003 490 5442 2	POWER CORD
XA			
2	RHR111	015 645 0221 9	SPACER, POWER CORD
M, MC			
2	SHR127	016 645 0037 9	SPACER, POWER CORD
XA, XL, PA, PE			
3	SJS9221-1	003 400 6043 3	SOCKET
XA, PA, PE			
3 $\Delta$	SJS9223	003 400 6044 2	SOCKET
M, MC			
4	SGPKH8016KM	016 840 7627 6	REAR PANEL
M, MC			
4	SGPKH8016KX	016 840 7830 5	REAR PANEL
XA, PA, PE			
4	SGPKH8016KXL	016 840 7831 4	REAR PANEL
XL			
4-1	SKL293	016 828 0269 8	RUBBER
5	SHE187-K	016 643 1026 8	SPACER

EXPLODED VIEW



Ref. No.	Part No.	Part Code	Description
6	SGYH8016-KM	016 840 7628 5	FRONT PANEL (K)
M, MC			
6	SGYH8016-KX	016 840 7829 8	FRONT PANEL (K)
XA, XL, PA, PE			
7	SGXK122	016 846 3789 5	ORNAMENT
8	SBC666-1	016 702 6076 0	BUTTON
9	SBC938	016 702 7019 5	BUTTON
10	SBWK27	016 700 1626 2	BUTTON
11	SBZK33	016 641 0092 2	GUIDE
12	SHR301	016 645 0044 0	CLAMPER
M, MC			
13	SJF3066N	003 410 8130 1	TERMINAL BOARD
14	SJS5047IDS	003 403 5016 5	CONNECTOR
15	SJT30440LX-V	003 410 6076 8	LUG TERMINAL
15	SJT31040LX-V	003 410 6112 1	LUG TERMINAL
16	SKCK200K39	016 800 3067 6	CABINET BODY

Ref. No.	Part No.	Part Code	Description	Ref. No.	Part No.	Part Code	Description
<b>PACKINGS</b>				XA, XL, PA, PE			
P4	SPPK51	016 978 0528 1	PROTECTION COVER	<b>ACCESSORIES</b>			
P1	SPGK289	016 971 5003 0	PACKING CASE	A1	SJPK2202	003 492 6415 1	CORD
M				XA, XL, PA, PE			
P1	SPGK290	016 971 5016 5	PACKING CASE	A1	SJPK2203-1	003 492 5777 2	CORD
MC				M, MC			
P1	SPGK301	016 971 5082 5	CARTON BOX	A2	SQFK10168	016 983 5243 0	INSTRUCTION BOOK
XA, XL, PA, PE				XA, XL			
P2	SPSK116	016 977 3285 4	PAD	A2	SQFK10169	016 983 5242 1	INSTRUCTION BOOK
M, MC				PA, PE			
P2	SPSK121	016 977 3332 4	PAD	A3 $\Delta$	RJP120ZBS-H	003 402 1437 9	AC PLUG ADAPTOR
XA, XL, PA, PE				XA, PA, PE			
P3	SPSK117	016 977 3286 3	PAD				
M, MC							
P3	SPSK122	016 977 3333 3	PAD				

Ref. No.	Part No.	Part Code	Description	Ref. No.	Part No.	Part Code	Description
<b>SCREWS, WASHERS &amp; NUTS</b>				N4	XTBS3*8CFYR1	005 501 3408 8	TAPPING SCREW
N1	XTB3*8JFZ	005 501 0138 3	SCREW	N5	XTB3*10GFZ	005 501 1119 2	TAPPING SCREW
N2	XTB3*8GFZ	005 501 1595 8	SCREW	N6	XTB3*8J	005 501 1535 0	SCREW
N3	XTW3*20T	005 501 3119 4	SCREW	N7	SNE2095-5	005 500 4884 5	CABINET