KENWOOD®

HI/FI STEREO COMPONENTS

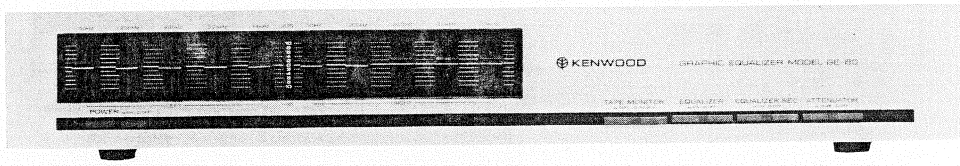
SERVICE MANUAL

GE-80/PM-80/RA-80

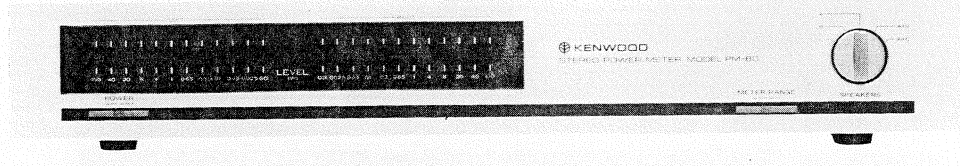
An item of adjustment is written in three languages — English, French and German.

Un article sur réglages est écrit en trois langues, Anglais, Français et Allemand.

Ein Artikel der Abgleich wird auf drei Sprachen, Englische, Französisch und Deutsch geschrieben.



GE-80



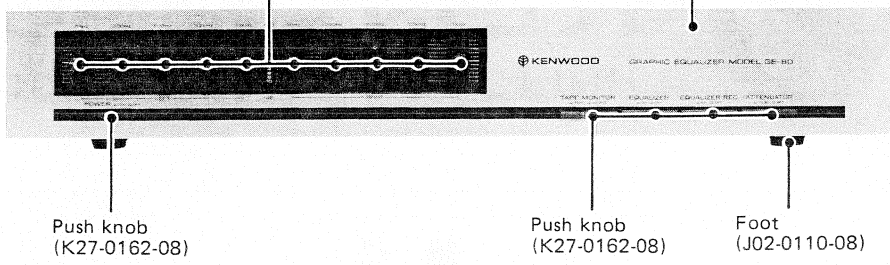
PM-80

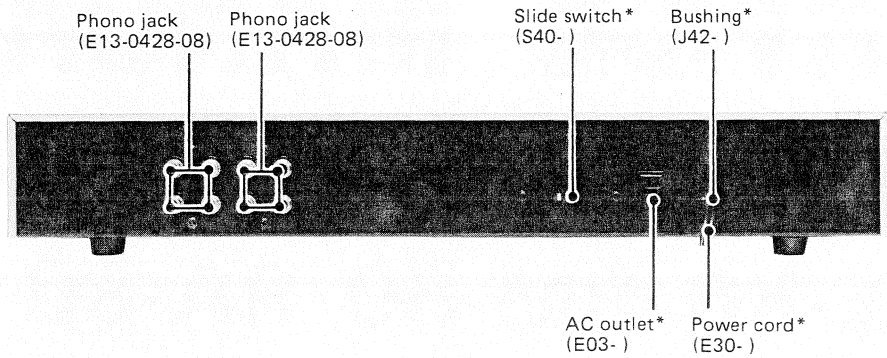
RA-80

GRAPHIC EQUALIZER / STEREO POWER METER / REVERBERATION AMPLIFIER

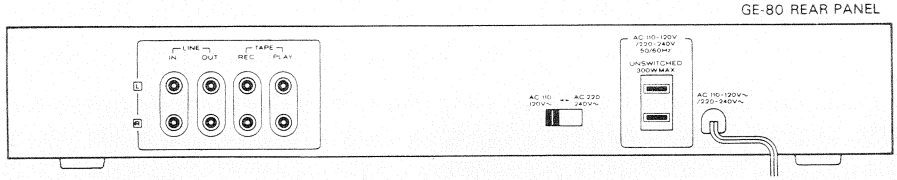
284

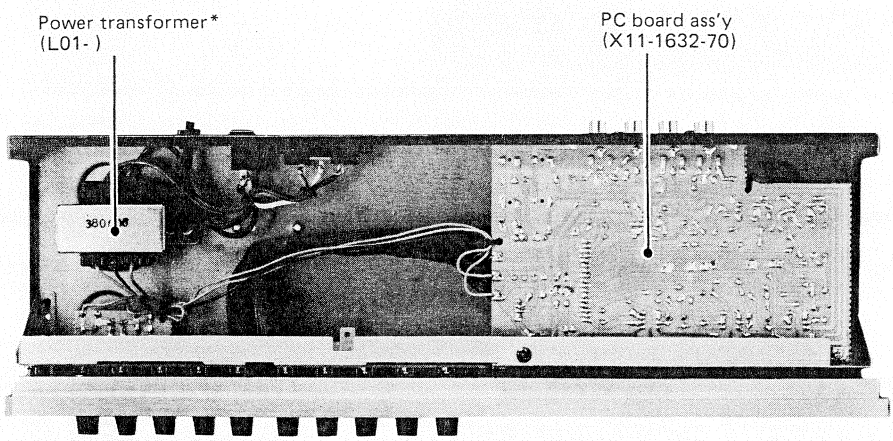
GE-80 EXTERNAL & INTERNAL VIEWS





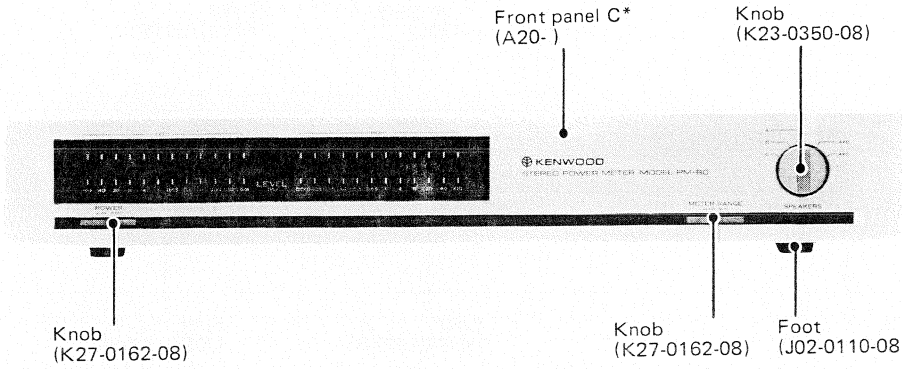
GE-80 REAR PANEL

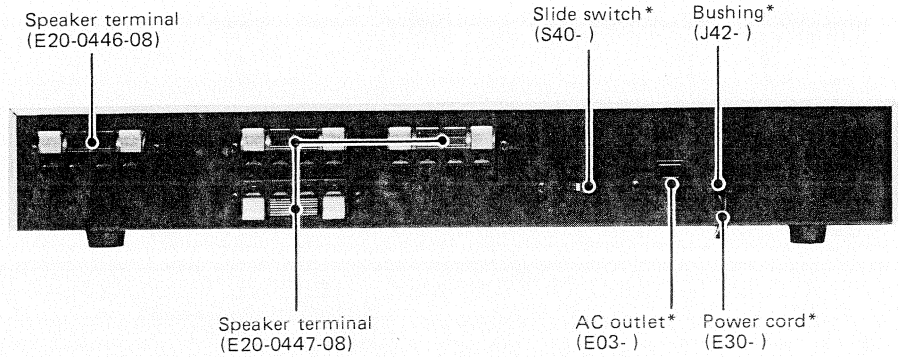




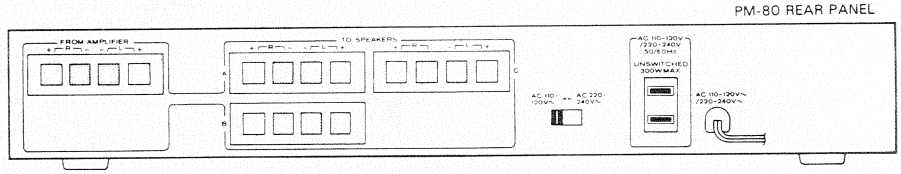
* Refer to Parts List.

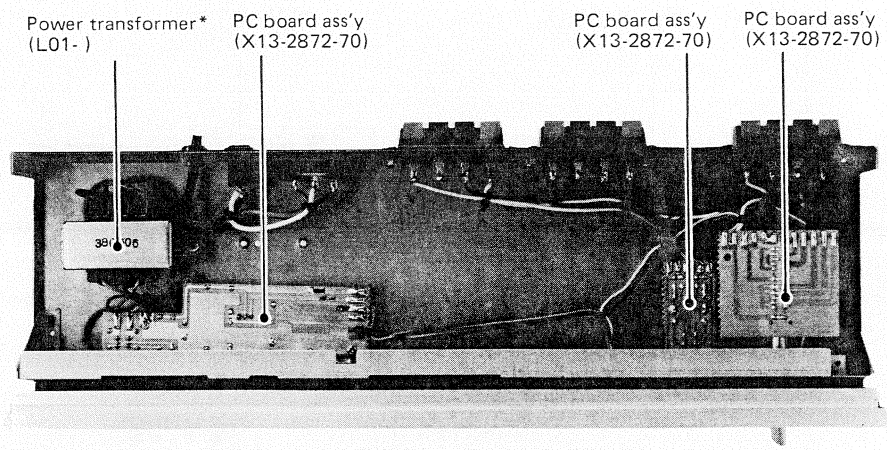
PM-80 EXTERNAL & INTERNAL VIEWS





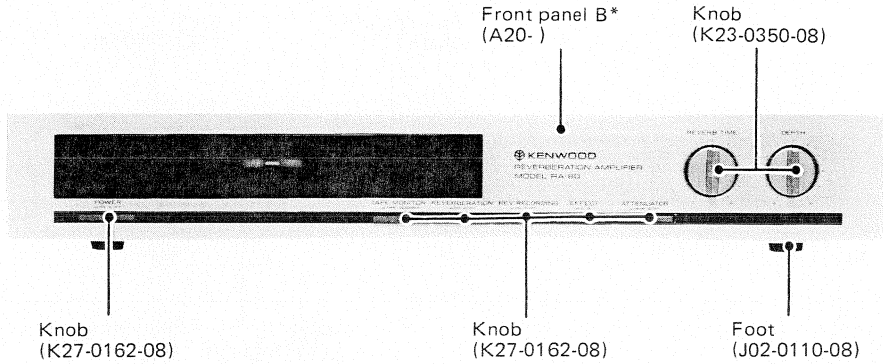
PM-80 REAR PANEL

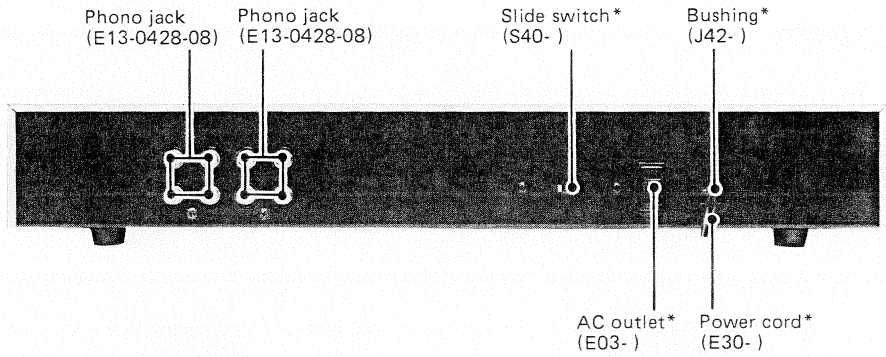


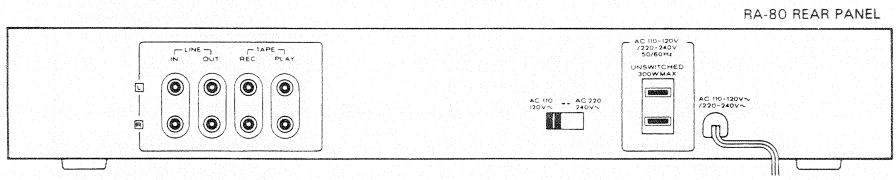


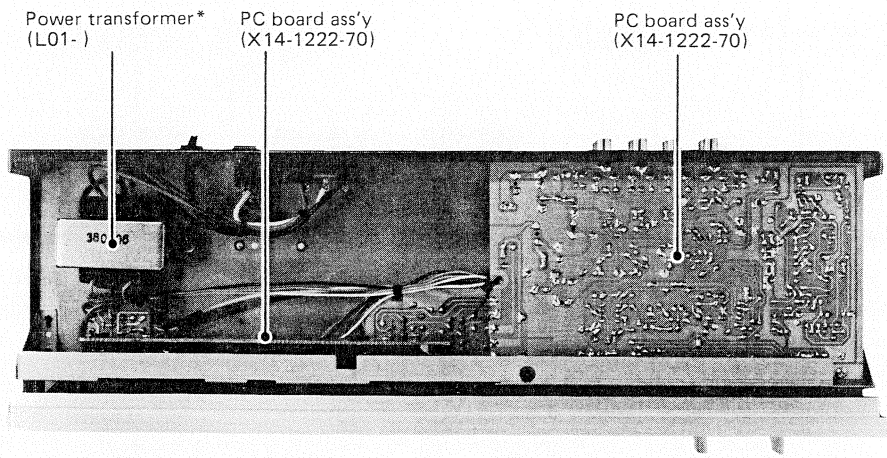
* Refer to Parts List.

RA-80 EXTERNAL & INTERNAL VIEWS





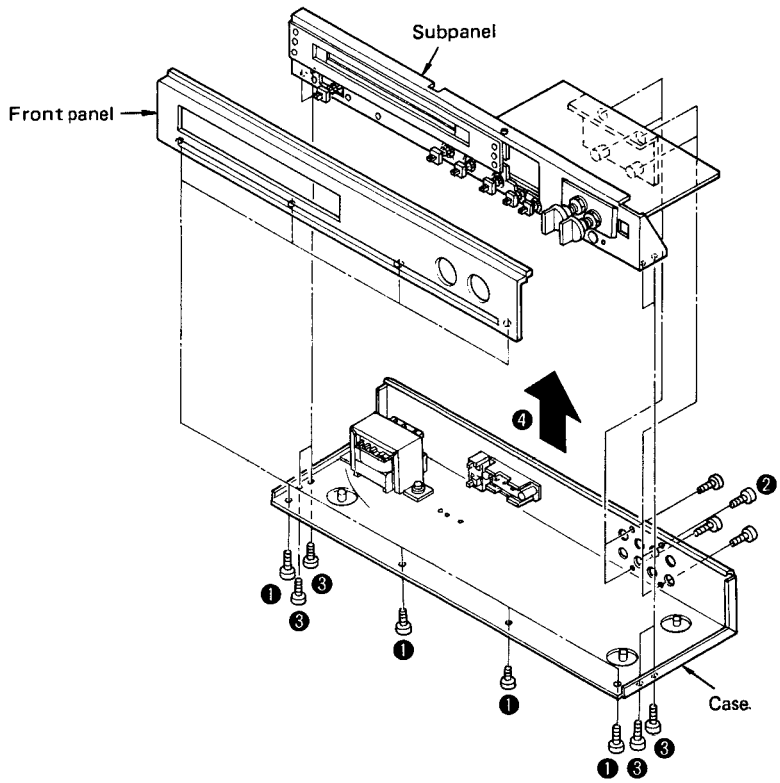




* Refer to Parts List.

DISASSEMBLY FOR REPAIR

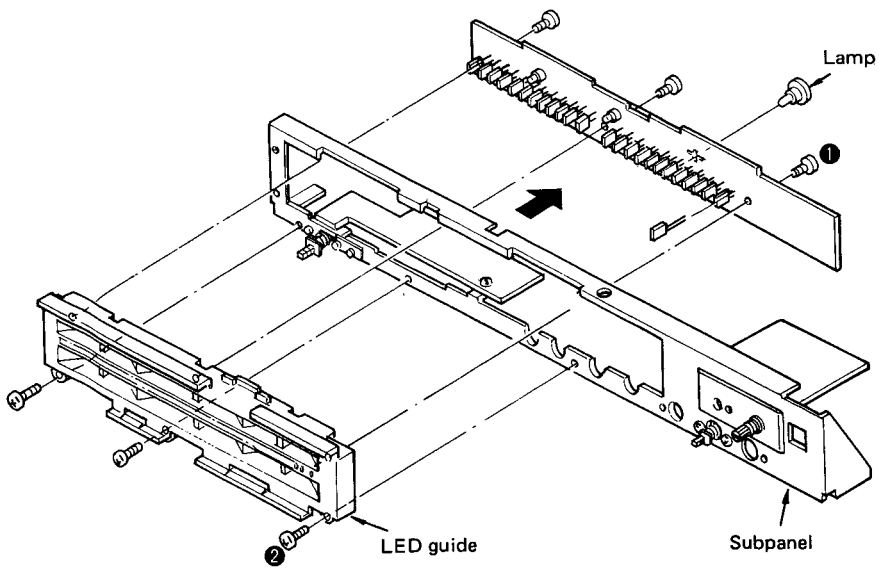
GE-80, RA-80 PCB ASS'Y DETACHMENT



❶ Remove the screws from the front panel.
❷ Remove the screws from the phono jacks.
❸ Remove the screws from the case.
❹ Separate the subpanel ass'y from the case.

Note: Illustration is in case of the RA-80.

PM-80 PCB ASS'Y DETACHMENT

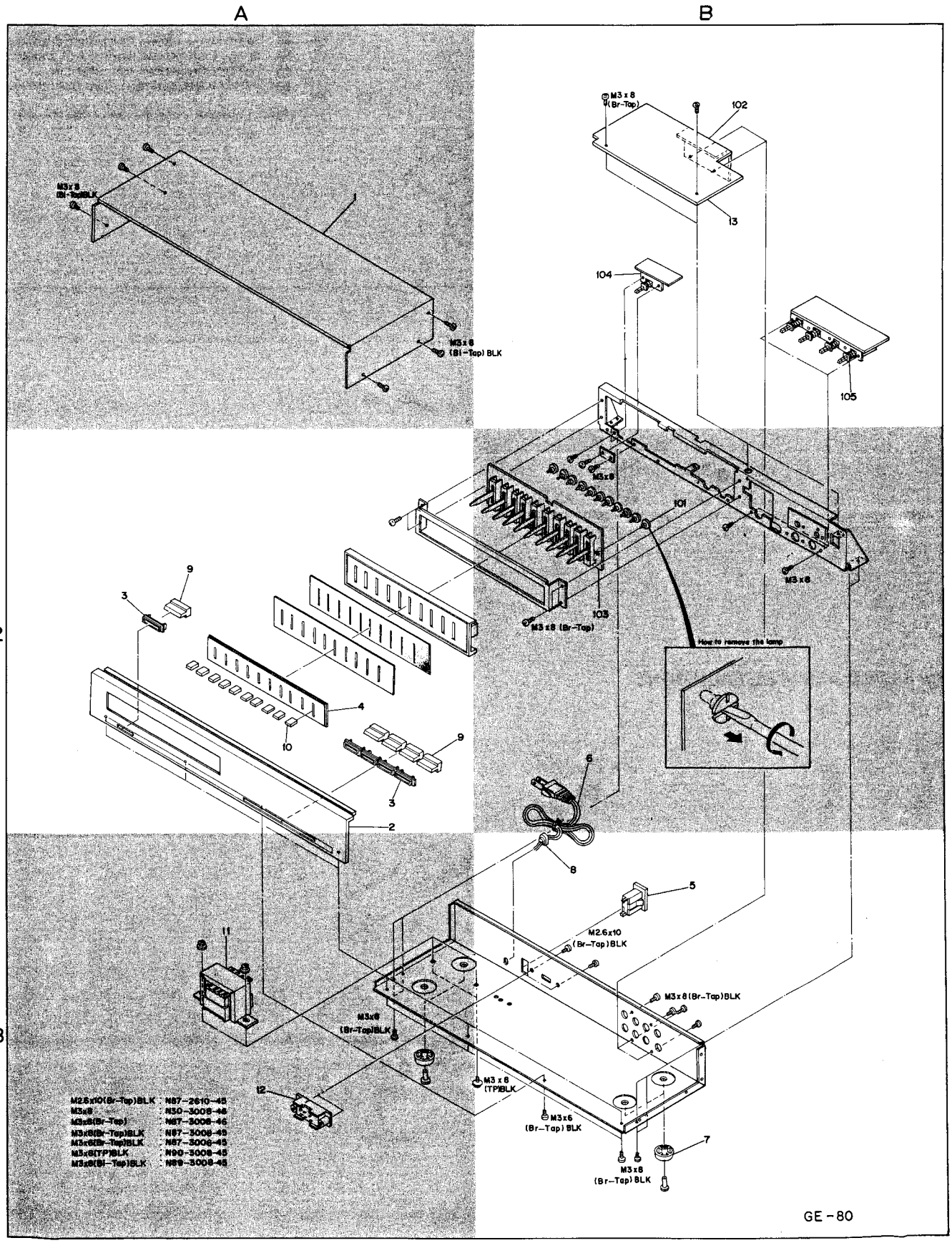


❶ When replacing LEDs on the PC board, remove the screws from the PC board.

❷ When replacing LED's guide, remove the screws from the subpanel.

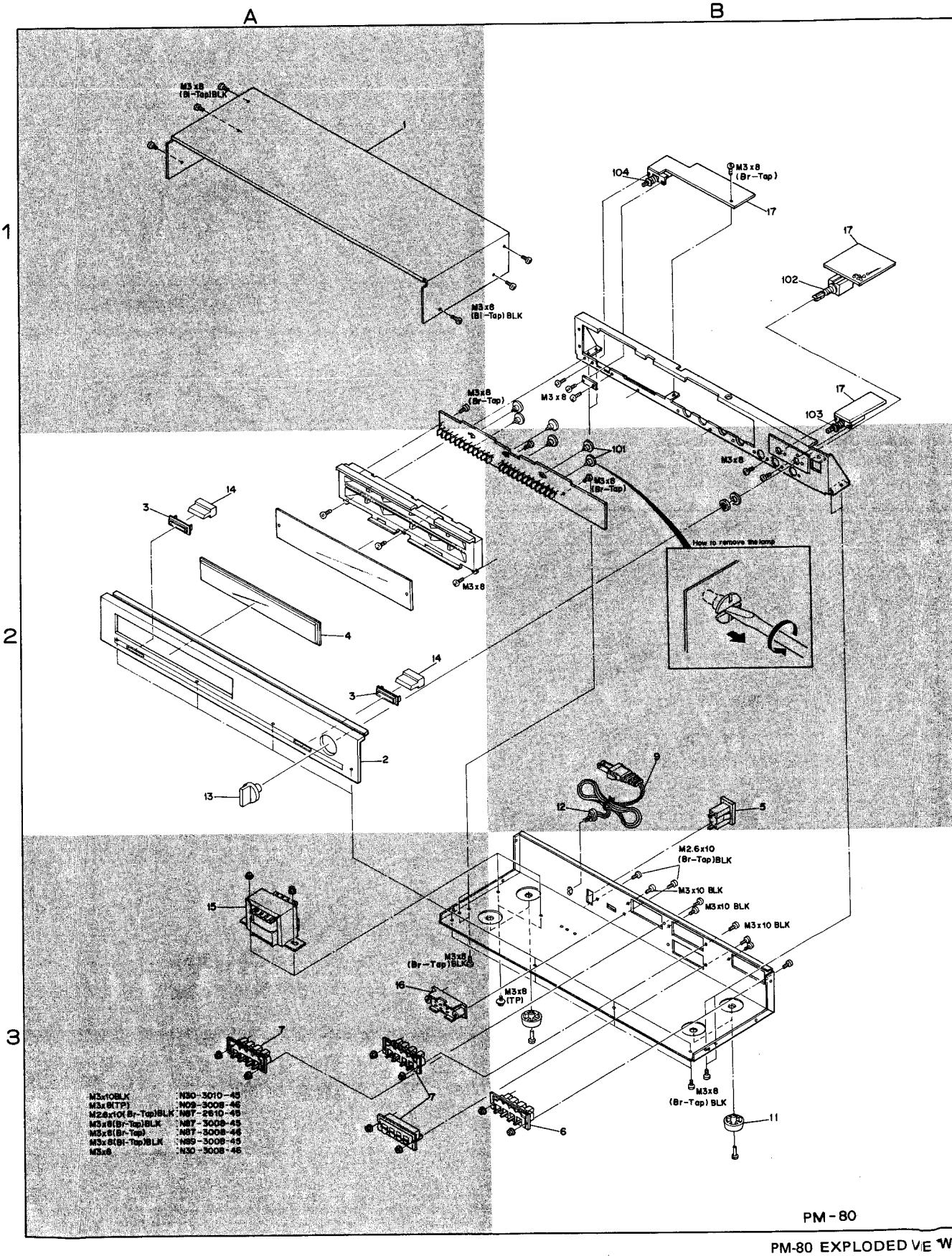
GE-80 EXPLODED VIEW

See Parts List on page 14.



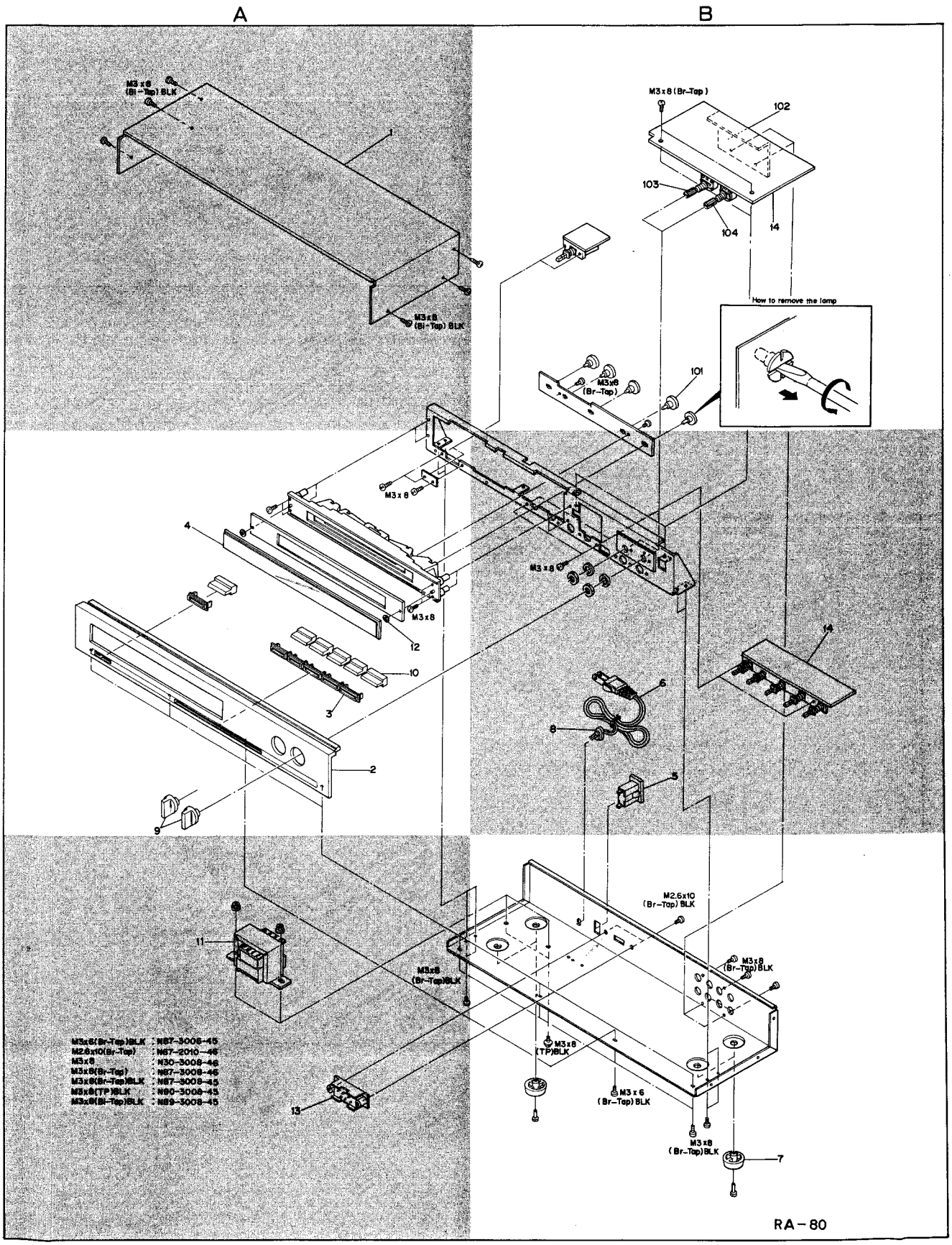
PM-80 EXPLODED VIEW

See Parts List on page 14.

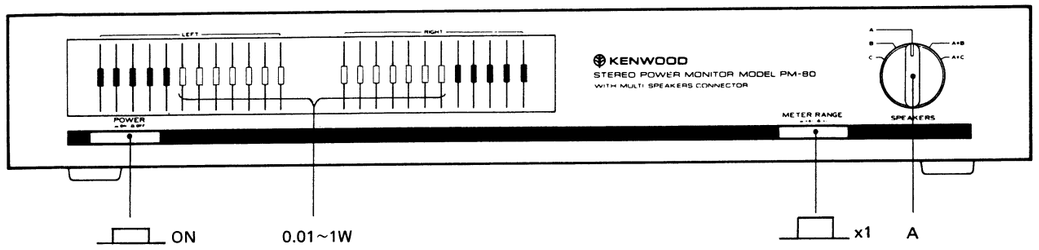


RA-80 EXPLODED VIEW

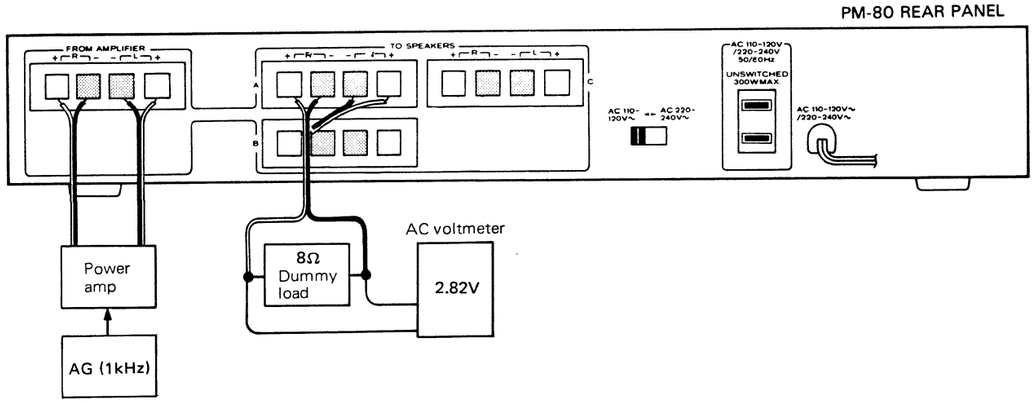
See Parts List on page 15.



PM-80 ADJUSTMENT/RÉGLAGES/ABGLEICH



PM-80 REAR PANEL



TEST INSTRUMENTS	APPAREILLAGE	PRÜFINSTRUMENTE
Power amp	Ampli	Leistungsverstärker
Audio generator	Générateur audio fréquences	NF-Signalgenerator
AC voltmeter	Voltmètre CA	Wechselspannungsmesser
Dummy load	Fausse charge (resistance)	Belastungsnachbildung

POWER METER LEVEL ADJUSTMENT

1. Connect an AG (via a power amp) and a dummy load to "FROM AMPLIFIER" and "TO SPEAKERS" terminals respectively.
2. Connect an AC voltmeter across the dummy load.
3. Set the AG to 1kHz and its output for a 2.82V reading of the AC voltmeter.
4. Adjust the trimming pot. VR1 (VR21) for 1W reading of the power meter.

RÉGLAGE DU LED MÈTRE

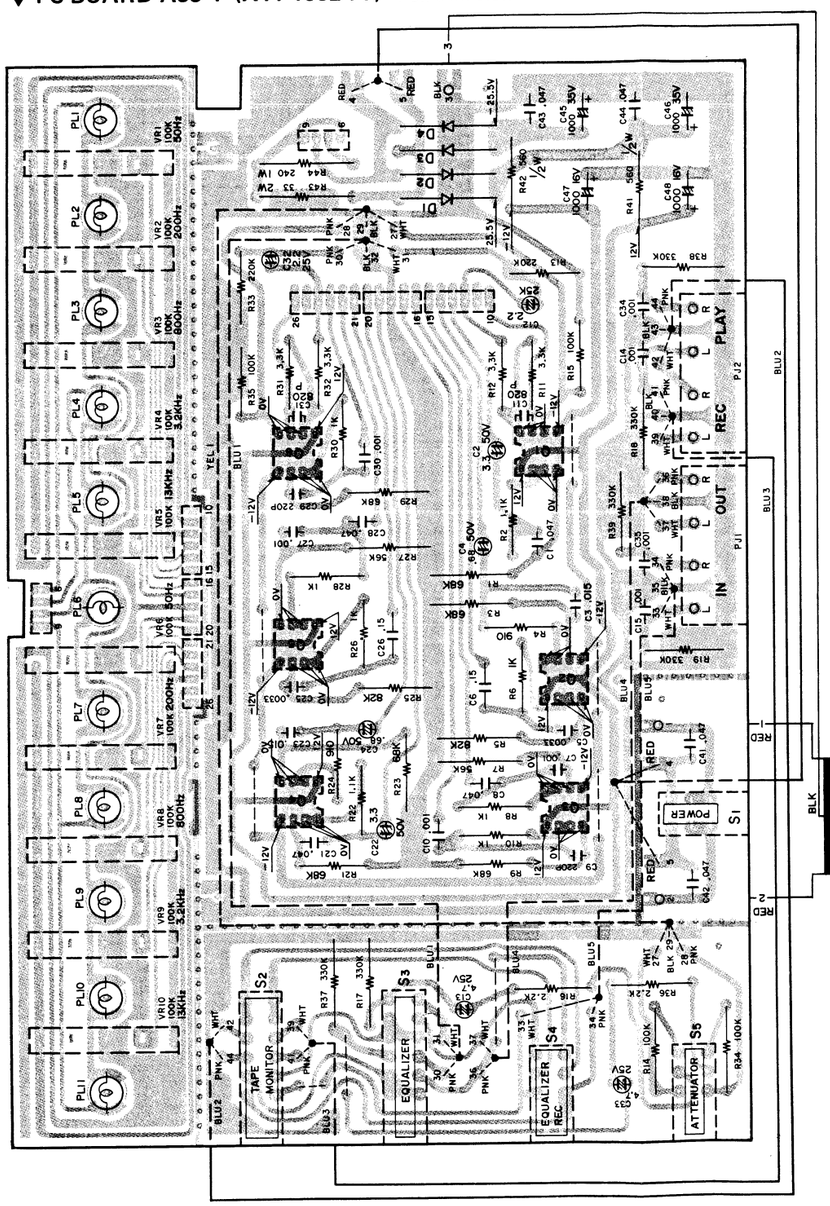
1. Relier un AG (par un ampli) sur les prises "FROM AMPLIFIER" et une fausse charge (resistance) sur les bornes de "TO SPEAKERS".
2. Relier un voltmètre de C.A. aux deux extrémités de la resistance (ou aux borne de sortie + et -).
3. Régler le potentiomètre ajustable VR1 (VR21) en sorte que le LED's mètre indique 1W lorsque le voltmètre indique 2.82V/8Ω.

ABGLEICH DER LEISTUNGSMESSER (POWER METER)

1. Einen AG (via eine Leistungsverstärker) an die "FROM AMPLIFIER" und eine Belastungsnachbildung (8Ω, 10W oder mehr) an die "TO SPEAKERS" anschließen.
2. Einen Wechselspannungsmesser über die Belastungsnachbildung anschließen.
3. Den AG auf 1kHz einstellen.
4. Die Lautstärkeregler (und/order den AG-Ausgang) so einstellen, daß die Wechselspannungsmesser-Ablesung 2,82V ist.
5. Das Trimm-Potentiometer VR1 (VR21) so einstellen, daß die Leistungsmesser-Ablesung 1W ist.

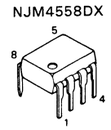
GE-80 PC BOARD

▼ PC BOARD ASS'Y (X11-1632-70) Foil side view



Q1~6: NJM4558DX
D1~4: 1SR35-100

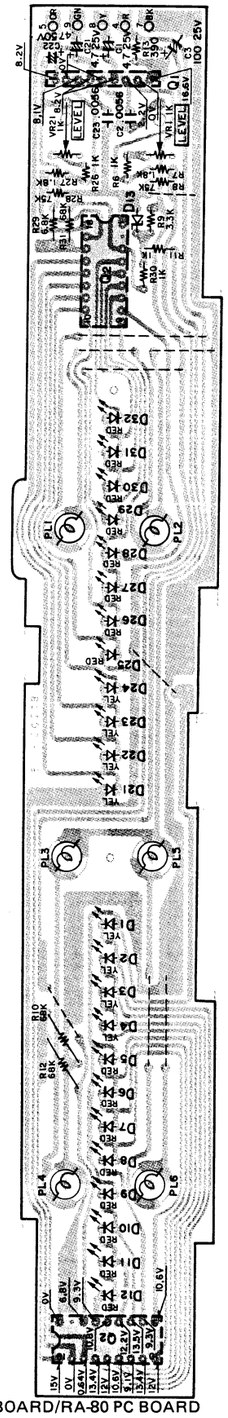
NJM4558DX

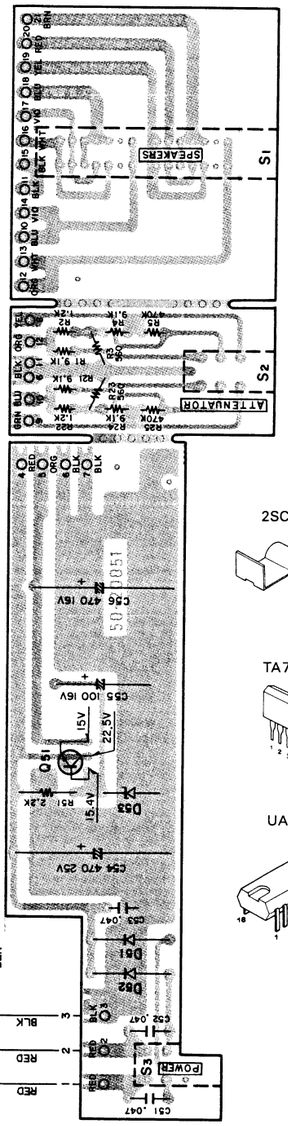


GE-80,PM-80,RA-80 GE-80,PM-80,RA-80

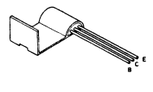
PM-80 PC BOARD

▼PC BOARD ASS'Y (X13-2872-70) Foil side view

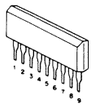




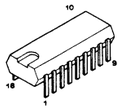
2SC2655(Y)



TA7318P-1



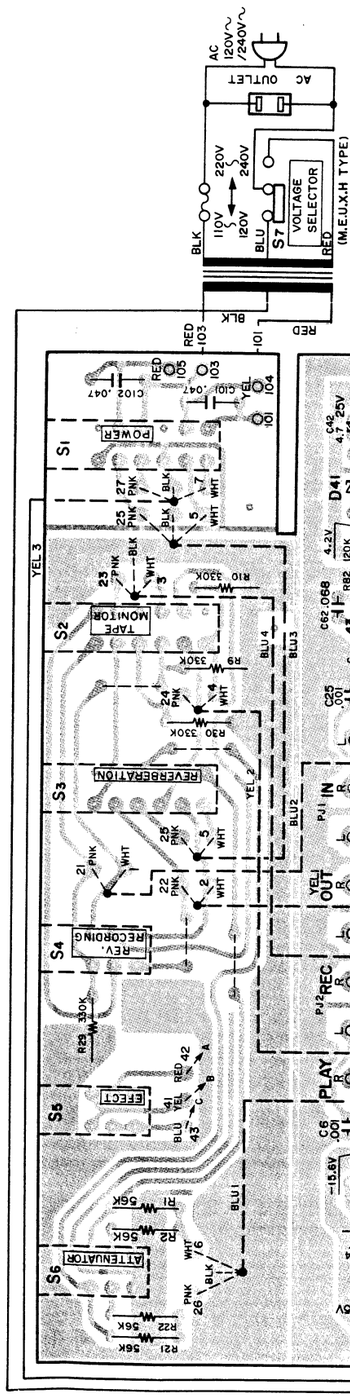
UAA-180



Q1	:	TA7318P-1
Q2, 21	:	UAA-180
Q51	:	2SC2655 (Y)
D13	:	HZ7A-1
D51, 52	:	1SR35-100 (100V, 1A)
D53	:	HZ16-1

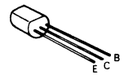
RA-80 PC BOARD

▼PC BOARD ASS'Y (X14-1222-70) Foil side view



Q1~3	:	NJM4558DX
Q6~11	:	2SC536 (F)
Q12	:	2SA1015 (GR)
Q13, 14	:	2SC1815 (GR)
Q15, 16	:	2SC2655 (Y)
Q17, 18	:	CX-766
Q101	:	2SC2120 (Y)
Q102	:	2SA950 (Y)
D41, 42	:	HZ3A-1
D43, 44	:	1S188AM or 1N60 or 1K60
D101~104	:	1SR35-100
D105~107	:	HZ16-1

2SA950(Y)
2SA1015(GR)
2SC536(F)
2SC1815(GR)
2SC2120(Y)



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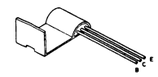
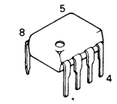
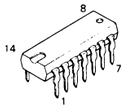


NJM4558DX



CX-766



KENWOOD®

GRAPHIC EQUALIZER

GE-80

SPECIFICATIONS

Equalizer characteristic	
Variable range	±10dB (L & R independently adjustable)
Center frequencies	50Hz, 200Hz, 800Hz, 3.2kHz, 13kHz
Attenuation	−6dB at 1kHz
Frequency response	10Hz−60kHz +0dB, −1dB
Harmonic distortion	Less than 0.006% (20Hz−20kHz, all controls flat, output 1V)
Maximum output	5V (1kHz, THD 0.01%, PL 47kohms)
S/N ratio	110dB (Short-circuited IHF-A network)
Input impedance	47kohms
Gain	0dB ±10dB
Power consumption	12W
Dimensions	440(W)×74(H)×160(D)mm
Weight	2.7kg (net), 3.1kg (gross)

Kenwood follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

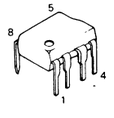
Kenwood strebt ständige Verbesserungen in der Entwicklung an. Daher bleiben Änderungen der technischen Daten jederzeit vorbehalten.

Kenwood poursuit une politique de progrès constants en ce qui concerne le développement. Pour cette raison, les spécifications sont sujettes à modifications sans préavis.

S1 : POWER ON ← OFF
S2 : TAPE MONITOR TAPE ← SOURCE
S3 : EQUALIZER ON ← OFF
S4 : EQUALIZER REC ON ← OFF
S5 : ATTENUATOR −6dB ← OFF
S6 : VOLTAGE SELECTOR 240V ↔ 120V

Q1~6 : NJM4558DX
D1~4 : ISR35-100

NJM4558DX



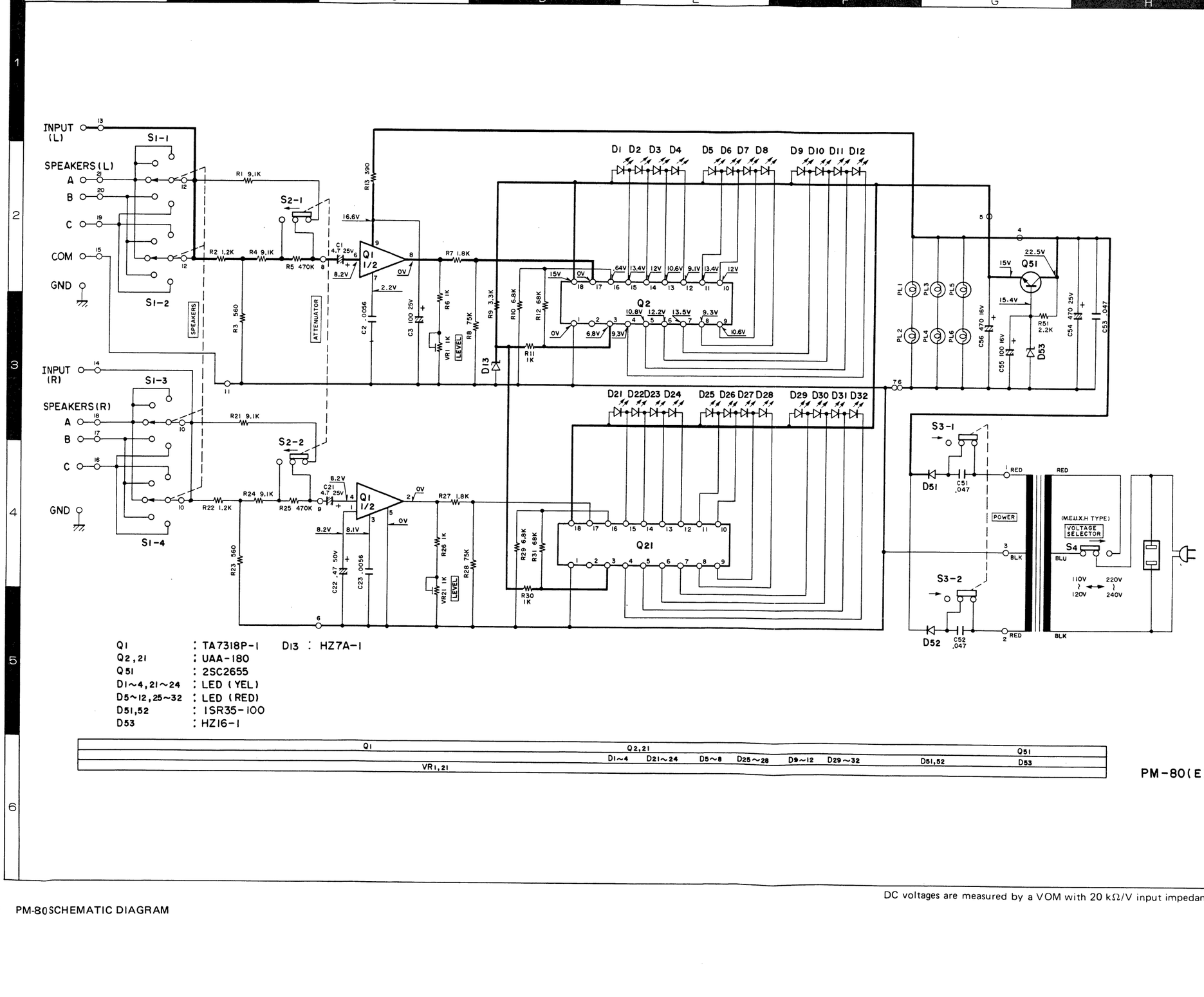
GE-80(E)

DC voltages are measured by a VOM with 20 kΩ/V input impedance.

KENWOOD®

STEREO POWER METER

PM-80



Q1 : TA7318P-1 D13 : HZ7A-1
Q2,21 : UAA-180
Q51 : 2SC2655
D1~4,21~24 : LED (YEL)
D5~12,25~32 : LED (RED)
D51,52 : ISR35-100
D53 : HZ16-1

PM-80(E)

DC voltages are measured by a VOM with 20 kΩ/V input impedance.

SPECIFICATIONS

Power meter indication range ..... 0.001 – 10W (×0.1)
0.01 – 100W (×1)
Power meter accuracy ..... ±1dB (×0.1)
±1dB (×1)
Frequency response ..... 20Hz – 20kHz, ±1dB
Response time 7msec. (1kHz)
Speaker switch ..... Selects any of 3 sets of speaker systems, A, B, C plus A+B and A+C
Power consumption 13W
Dimensions ..... 440(W)×74(H)×160(D) mm
Weight ..... 2.7kg (net), 3.1kg (gross)

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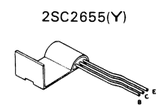
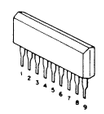
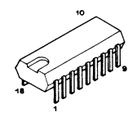
2SC2655(Y)

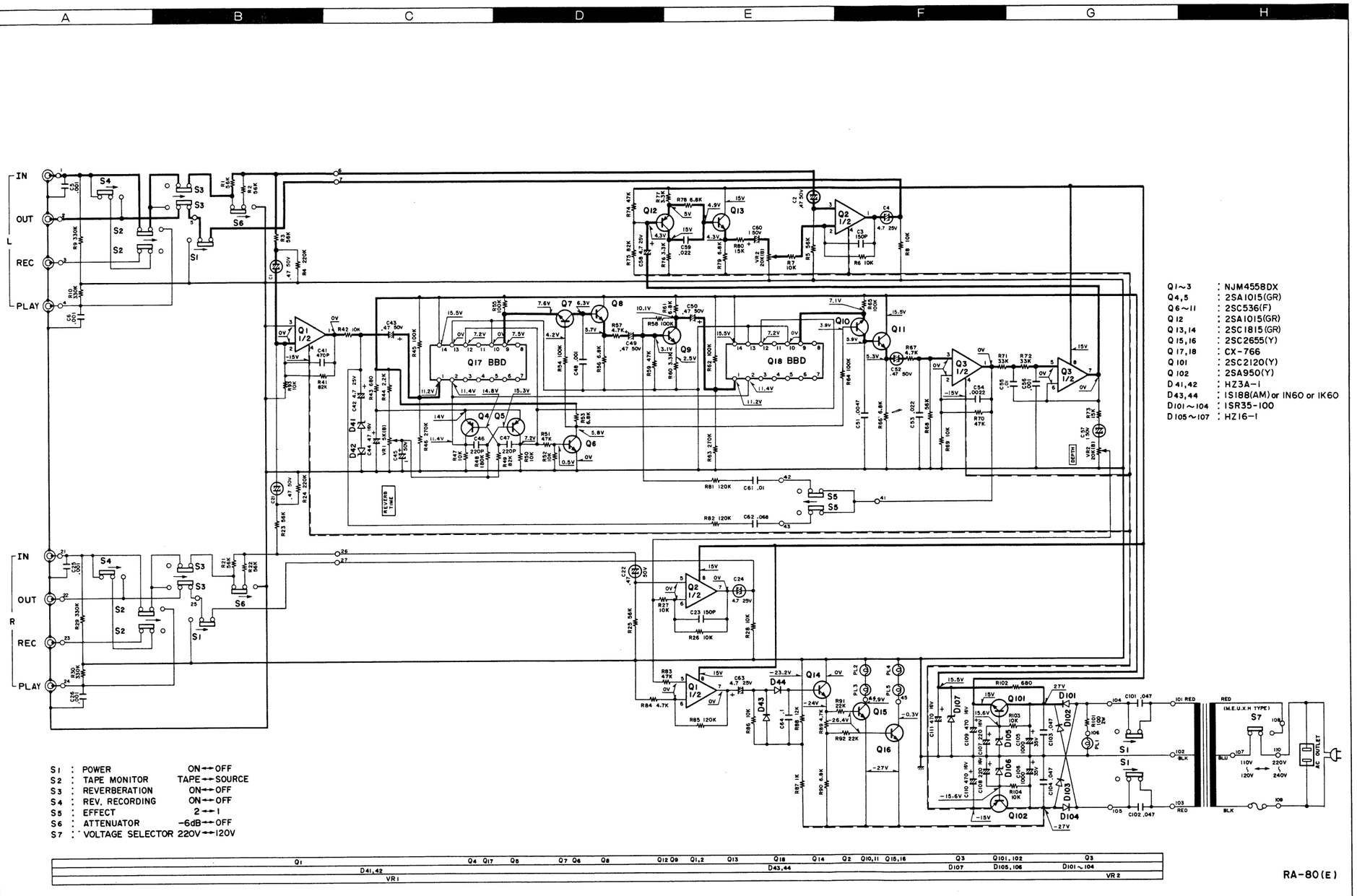


TA7318P-1



UAA-180





Q1~3 : NJM4558DX
Q4,5 : 2SA1015(GR)
Q6~11 : 2SC536(F)
Q12 : 2SA1015(GR)
Q13,14 : 2SC1815(GR)
Q15,16 : 2SC2655(Y)
Q17,18 : CX-766
Q101 : 2SC2120(Y)
Q102 : 2SA950(Y)
D41,42 : HZ3A-1
D43,44 : 1S188(AM) or IN60 or IK60
D101~104 : 1SR35-100
D105~107 : HZ16-1

RA-80(E)

DC voltages are measured by a VOM with 20 kΩ/V input impedance.

SPECIFICATIONS

Reverberation time
- **Effect 1** ..... 0–2.5 sec.
- **Effect 2** ..... 30–80 msec.

Frequency response ..... 15 Hz–60 kHz, +0 dB, –1 dB
Harmonic distortion ..... Less than 0.008% (20 Hz–20 kHz, output 1 V)
S/N ratio ..... 100 dB (Short-circuited IHF-A network)
Input impedance ..... 47 kohms
Attenuation ..... –6 dB at 1 kHz
Power consumption ..... 12 W
Dimensions ..... 440(W) × 74(H) × 160(D) mm
Weight ..... 2.7 kg (net), 3.1 kg (gross)

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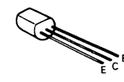
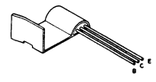
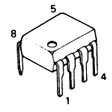
2SA950(Y)
2SA1015(GR)
2SC536(F)
2SC1815(GR)
2SC2120(Y)



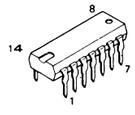
2SC2655



NJM4558DX



CX-766



GE-80,PM-80,RA-80 GE-80,PM-80,RA-80

PARTS LIST

Note:
Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on,'the Europe (E) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

Region	Code
U.S.A.	K
Canada	P
PX(Far East)	U
PX(Europe)	UE
Australia	X
Europe	E
England	T
South Africa	S
Other Areas	M
Audio Club	H

There is no plan for producing units of P and S types.

* Abbreviations of capacitors (Parts No. with initial letter "C")

ELECTRO	Electrolytic capacitor
LL-ELEC	Low leak electrolytic capacitor
NP-ELEC	Non-pole electrolytic capacitor
MICA	Mica capacitor
POLYSTY	Polystyrene capacitor
MYLAR	Mylar capacitor
CERAMIC	Ceramic capacitor
TANTAL	Tantalum capacitor
MF	Metallized film capacitor
OIL	Oil capacitor

The unit "UF" is used in lieu of "μF"

* Abbreviations of resistors (Parts No. with initial letters "R").

RC	Carbon composition resistor	
RD	Carbon film resistor	
FL-PROOF RD	Flame-proof carbon film resistor	
RW	Wire wound power resistor	
FL-PROOF RS	Flame-proof metal oxide film resistor	
RN	Metal film resistor	
2B	Rated wattage	1/8W
2E	Rated wattage	1/4W
2H	Rated wattage	1/2W
3A	Rated wattage	1W
3D	Rated wattage	2W
3F	Rated wattage	3W
3G	Rated wattage	4W
3H	Rated wattage	5W

All resistor values are indicated with the unit (Ω) omitted.

* Abbreviations common to capacitors and resistors.

C	±0.25pF (Used for capacitors only)
D	±0.5pF (Used for capacitors only)
F	±1%
G	±2%
J	±5%
K	±10%
M	±20%
Z	+80%, −20% (Used for capacitors only)
P	+100%, −0% (Used for capacitors only)

Resistors RD (carbon composition resistors) are not listed in the parts list. For values, refer to the schematic diagram.

GE-80 PARTS LIST

☆ : New parts

Ref. No.	Parts No.	Description		Remarks
TOTAL (GE-80)				
1 1A	A01-0386-08	Cabinet		
2 2A	A20-1685-08	Front panel A	E	☆
2 2B	A20-1690-08	Front panel A	K,M,U,X,H	☆
2 2B	A20-1691-08	Front panel A	T	☆
3 2A	B07-0342-08	Knob guide x5		☆
4 2A	B11-0010-08	Filter A		☆
—	B50-3165-00	Instruction manual	UE,K,U,M,H,X	☆
—	B50-3166-00	Instruction manual	T	☆
—	B50-3167-00	Instruction manual (French)	E,M,X	☆
—	B50-3168-00	Instruction manual (Germany)	E	☆
—	B50-3169-00	Instruction manual (Dutch)	E	☆
—	B50-3170-00	Instruction manual (Swedish)	E	☆
5 3B	E03-0029-08	AC outlet	E	☆
5 3B	E03-0032-08	AC outlet	K	☆
5 3B	E03-0033-08	AC outlet	M,U,H	☆
—	E30-0652-08	Audio cord		☆
6 2B	E30-0651-08	Power cord	E	☆
6 2B	E30-0658-08	Power cord	M,U,H	☆
6 2B	E30-0659-08	Power cord	K	☆
6 2B	E30-0660-08	Power cord	T	☆
6 2B	E30-0661-08	Power cord	X	☆
—	H01-3183-08	Carton case	E	☆
—	H01-3200-08	Carton case	K,M,U,X,H	☆
—	H10-1554-08	Packing L		☆
—	H10-1555-08	Packing R		☆
—	H20-0461-08	Protection bag		☆
7 3B	J02-0110-08	Foot x4		☆
8 3B	J42-0088-08	Bushing	E,T	☆
8 3B	J42-0089-08	Bushing	U,M,H	☆
8 3B	J42-0090-08	Bushing	K	☆
8 3B	J42-0091-08	Bushing	X	☆
9 2A	K27-0162-08	Push knob x5		☆
10 2A	K27-0163-08	GE knob x10		☆
11 3A	L01-2124-08	Power transformer	K	☆
11 3A	L01-2126-08	Power transformer	M,E,T,U,X,H	☆
12 3A	S40-1026-08	Slide switch	M,E,U,X,H	
13 1B	X11-1632-70	PC board ass'y		☆

PCB ASS'Y (X11-1632-70)

101 2B	B30-0245-08	Lamp (0.05A)			☆
C1, 21	C46-1747-35	Mylar	0.047μF	K	
C2, 22	C26-1733-57	NP-Electrolytic	3.3μF	50WV	
C3, 23	C46-1715-35	Mylar	0.015μF	K	
C4, 24	C26-1768-47	NP-Electrolytic	0.68μF	50WV	
C5, 25	C46-1733-25	Mylar	0.0033μF	K	
C6, 26	C46-1715-46	Mylar	0.15μF	K	
C7, 27	C46-1710-26	Mylar	0.001μF	K	
C8, 28	C46-1747-35	Mylar	0.047μF	K	

PARTS LIST

Ref. No.	Parts No.	Description			Remarks
C9, 29	C47-1722-15	Polystyrene	220pF	J	
C10,30	C46-1710-26	Mylar	0.001μF	K	
C11, 31	C52-1710-26	Ceramic	0.001μF	K	
C12, 32	C26-1722-57	NP-Electrolytic	2.2μF	50WV	
C13, 33	C26-1447-57	NP-Electrolytic	4.7μF	25WV	
C14, 15	C52-1710-26	Ceramic	0.001μF	K	
C34, 35	C52-1710-26	Ceramic	0.001μF	K	
C41, 42	C53-1747-37	Ceramic	0.047μF	M	
C43,44	C55-1747-38	Ceramic	0.047μF	Z	
C45, 46	C24-6510-71	Electrolytic	100μF	35WV	
C47, 48	C24-1210-81	Electrolytic	1000μF	16WV	
102 1B	E13-0428-08	Phono jack (4P) x2			☆
R41, 42	R40-8356-15	FL-proof RC	560Ω	J 2H	
R43	R47-5533-05	FL-proof RS	33Ω	J 3D	
R44	R47-5424-05	FL-proof RS	240Ω	J 3A	
VR1~10	R13-5025-08	Slide pot	100kΩ(B)	Fig. 103	☆
S1	S40-4014-08	Pushbutton switch (POWER)		Fig. 104	☆
S2~5	S42-4014-08	4 keys pushbutton switch		Fig. 105	☆
Q1~6	V30-1020-26	IC	NJM4558DX		
D1~4	V11-5101-50	Diode	1SR35-100		☆

PM-80 PARTS LIST

Ref. No.	Parts No.	Description		Remarks
TOTAL (PM-80)				
1 1A	A01-0386-08	Cabinet		
2 2A	A20-1684-08	Front panel C	E	☆
2 2A	A20-1694-08	Front panel C	K,M,U,X,H	☆
2 2A	A20-1695-08	Front panel C	T	☆
3 2A	B07-0342-08	Knob guide x2		
4 2A	B11-0009-08	Filter B		☆
—	B50-3165-00	Instruction manual	UE,K,U,M,H,X	
—	B50-3166-00	Instruction manual	T	
—	B50-3167-00	Instruction manual (French)	E,M,X	
—	B50-3168-00	Instruction manual (Germany)	E	
—	B50-3169-00	Instruction manual (Dutch)	E	
—	B50-3170-00	Instruction manual (Swedish)	E	
5 2B	E03-0029-08	AC outlet	E	
5 2B	E03-0032-08	AC outlet	K	
5 2B	E03-0033-08	AC outlet	M,U,H	
6 3B	E20-0446-08	Speaker terminal		☆
7 3A	E20-0447-08	Speaker terminal x3		☆
—	E30-0650-08	Speaker cord ass'y	M,E,T,U,X,H	☆
—	E30-0677-08	Speaker cord ass'y	K	☆
9 2B	E30-0651-08	Power cord	E	
9 2B	E30-0658-08	Power cord	M,U,H	
9 2B	E30-0659-08	Power cord	K	
9 2B	E30-0660-08	Power cord	T	
9 2B	E30-0661-08	Power cord	X	

Ref. No.	Parts No.	Description		Remarks
—	H01-3184-08	Carton case	E	☆
—	H01-3204-08	Carton case	K,M,U,X,H	☆
—	H10-1554-08	Packing L		
—	H10-1555-08	Packing R		
—	H20-0461-08	Protection bag		
11 3B	J02-0110-08	Foot x4		
12 2B	J42-0088-08	Bushing	E,T	
12 2B	J42-0089-08	Bushing	U,M,H	
12 2B	J42-0090-08	Bushing	K	
12 2B	J42-0091-08	Bushing	X	
13 2A	K23-0350-08	Knob (rotary)		
14 2A	K27-0162-08	Knob (push) x2		
15 3A	L01-2124-08	Power transformer	K	
15 3A	L01-2126-08	Power transformer	M,E,T,U,X,H	
16 3A	S40-1026-08	Slide switch	M,E,U,X,H	☆
17 1B	X13-2872-70	PC board ass'y		☆

PCB ASS'Y (X13-2872-70)

101 1B, 2B	B30-0244-08	Lamp (0.1A)			
D1~4	B30-0247-08	LED PY5531K (YEL)			
D21~24	B30-0247-08	LED PY5531K (YEL)			
D5~12	B30-0246-08	LED PR5531K (RED)			
D25~32	B30-0246-08	LED PR5531K (RED)			
C1	C24-1447-51	Electrolytic	4.7μF	25WV	
C2	C46-1756-24	Mylar	0.0056μF	G	
C3	C24-1410-71	Electrolytic	100μF	25WV	
C21	C24-1447-51	Electrolytic	4.7μF	25WV	
C22	C24-1447-41	Electrolytic	0.47μF	25WV	
C23	C46-1756-24	Mylar	0.0056μF	G	
C51, 52	C53-1747-37	Ceramic	0.047μF	M	
C53	C55-1747-38	Ceramic	0.047μF	Z	
C54	C24-1447-71	Electrolytic	470μF	25WV	
C55	C24-1210-71	Electrolytic	100μF	16WV	
C56	C24-1247-71	Electrolytic	470μF	16WV	
VR1, 21	R12-1049-08	Trimming pot	1kΩ (B)		
S1	S29-1128-08	Rotary-Slide switch		Fig. 102	☆
S2	S40-1028-08	Pushbutton switch		Fig. 103	☆
S3	S40-1029-01	Pushbutton switch		Fig. 104	☆
Q1	V30-0292-10	IC	TA7318P-1		
Q2, 21	V30-0502-10	IC	UAA-180		☆
Q51	V03-2655-10	Transistor	2SC2655 (Y)		
D13	V11-2104-20	Zener diode	HZ7A-1		☆
D51, 52	V11-5101-50	Diode	1SR35-100 (100V, 1A)		
D53	V11-2104-30	Zener diode	HZ16-1		

PARTS LIST

RA-80 PARTS LIST

Ref. No.	Parts No.	Description		Remarks
TOTAL (RA-80)				
1 1A	A01-0386-08	Cabinet		
2 2A	A20-1683-08	Front panel B	E	
2 2A	A20-1692-08	Front panel B	K,M,U,X,H	
2 2A	A20-1693-08	Front panel B	T	
3 2A	B07-0342-08	Knob guide x6		
4 2A	B11-0008-08	Filter B		
–	B50-3165-00	Instruction manual	UE,K,U,M,H,X	
–	B50-3166-00	Instruction manual	T	
–	B50-3167-00	Instruction manual (French)	E,M,X	
–	B50-3168-00	Instruction manual (Germany)	E	
–	B50-3169-00	Instruction manual (Dutch)	E	
–	B50-3170-00	Instruction manual (Swedish)	E	
5 2B	E03-0029-08	AC outlet	E	
5 2B	E03-0032-08	AC outlet	K	
5 2B	E03-0033-08	AC outlet	M,U,H	
–	E30-0652-08	Audio cord	M,T,U,X,H	
–	E30-0669-08	Audio cord	K	
6 2B	E30-0651-08	Power cord	E	
6 2B	E30-0658-08	Power cord	M,U,H	
6 2B	E30-0659-08	Power cord	K	
6 2B	E30-0660-08	Power cord	T	
6 2B	E30-0661-08	Power cord	X	
–	H01-3182-08	Carton case	E	☆
–	H01-3202-08	Carton case	K,M,U,X,H	☆
–	H10-1554-08	Packing L		
–	H10-1555-08	Packing R		
–	H20-0461-08	Protection bag		
7 3B	J02-0110-08	Foot x4		
8 2B	J42-0088-08	Bushing	E,T	
8 2B	J42-0089-08	Bushing	U,M,H	
8 2B	J42-0090-08	Bushing	K	
8 2B	J42-0091-08	Bushing	X	
9 2A	K23-0350-08	Knob (rotary) x2		
10 2A	K27-0162-08	Knob (push) x6		
11 3A	L01-2124-08	Power transformer	K	
11 3A	L01-2126-08	Power transformer	M,E,T,U,X,H	
12 2A	N29-0052-08	CS ring x2		☆
13 3A	S40-1026-08	Slide switch	M,E,U,X,H	
14 1B, 2B	X14-1222-70	PC board ass'y		☆

Ref. No.	Parts No.	Description			Remarks
PCB ASS'Y (X14-1220-70, 2-70)					
101 1B	B30-0244-08	Lamp (0.1A)			☆
C1, 2	C26-1747-47	NP-electrolytic	0.47μF	50WV	
C21, 22	C26-1747-47	NP-electrolytic	0.47μF	50WV	
C3, 23	C71-1747-16	Ceramic	470pF	K	
C4, 24	C26-1747-57	NP-electrolytic	4.7μF	50WV	
C5, 6	C52-1710-26	Ceramic	0.001μF	K	
C25, 26	C52-1710-26	Ceramic	0.001μF	K	
C41	C71-1747-16	Ceramic	470pF	J	
C42	C24-1447-51	Electrolytic	4.7μF	25WV	
C43	C24-1747-41	Electrolytic	0.47μF	50WV	
C44	C24-1247-61	Electrolytic	47μF	16WV	
C45	C24-1710-51	Electrolytic	1μF	50WV	
C46, 47	C47-1722-15	Polystyrene	220pF	J	
C48	C46-1710-26	Mylar	0.001μF	K	
C49, 50	C24-1747-41	Electrolytic	0.47μF	50WV	
C51	C46-1747-25	Mylar	0.0047μF	J	
C52	C26-1747-47	NP-electrolytic	0.47μF	50WV	
C53, 54	C46-1722-35	Mylar	0.022μF	J	
C55	C46-1710-35	Mylar	0.01μF	J	
C56	C46-1710-26	Mylar	0.001μF	K	
C57	C26-1710-57	NP-electrolytic	1μF	50WV	
C58	C24-1447-51	Electrolytic	4.7μF	25WV	
C59	C46-1722-35	Mylar	0.022μF	J	
C60	C24-1710-51	Electrolytic	1μF	50WV	
C61	C46-1710-35	Mylar	0.01μF	J	
C62	C46-1768-35	Mylar	0.068μF	J	
C63	C24-1447-51	Electrolytic	4.7μF	25WV	
C101~104	C53-1747-37	Ceramic	0.047μF	M	
C105,106	C24-6510-81	Electrolytic	1000μF	35WV	
C107,108	C24-1222-71	Electrolytic	220μF	16WV	
C109~111	C24-1247-71	Electrolytic	470μF	16WV	
102 1B	E13-0428-08	Phono jack (4P) x2			
R101	R47-5410-15	FL-proof RS	100Ω	J 3D	
VR1	R01-2014-08	Potentiometer	5kΩ (B)	**Fig. 103**	☆
VR2	R06-3021-08	Potentiometer	20kΩ (B)	**Fig. 104**	☆
S1	S40-1027-08	Pushbutton switch (POWER)			☆
S2~6	S42-5018-08	5 keys pushbutton switch			☆
Q1~3	V30-1020-26	IC	NJM4558DX		
Q6~11	V03-0339-05	Transistor	2SC536 (F)		
Q12	V01-1015-20	Transistor	2SA1015 (GR)		☆
Q13, 14	V03-1815-10	Transistor	2SC1815 (GR)		
Q15, 16	V03-2655-10	Transistor	2SC2655 (Y)		☆
Q17, 18	V30-0501-10	IC	CX-766		☆
Q101	V03-2120-00	Transistor	2SC2120 (Y)		
Q102	V01-0950-00	Transistor	2SA950 (Y)		☆
D41, 42	V11-2104-10	Zener diode	HZ3A-1		☆
D43, 44	V11-9990-05	Diode	1S188AM or		
	V11-0051-05		1N60 or		☆
	V11-9725-05		1K60		☆
D101~104	V11-5101-50	Diode	1SR35-100		☆
D105~107	V11-2104-30	Zener diode	HZ16-1		☆