

KENWOOD
HI/FI STEREO COMPONENTS

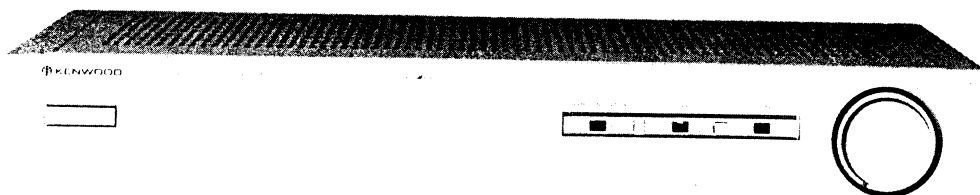
SERVICE MANUAL

KA-80

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

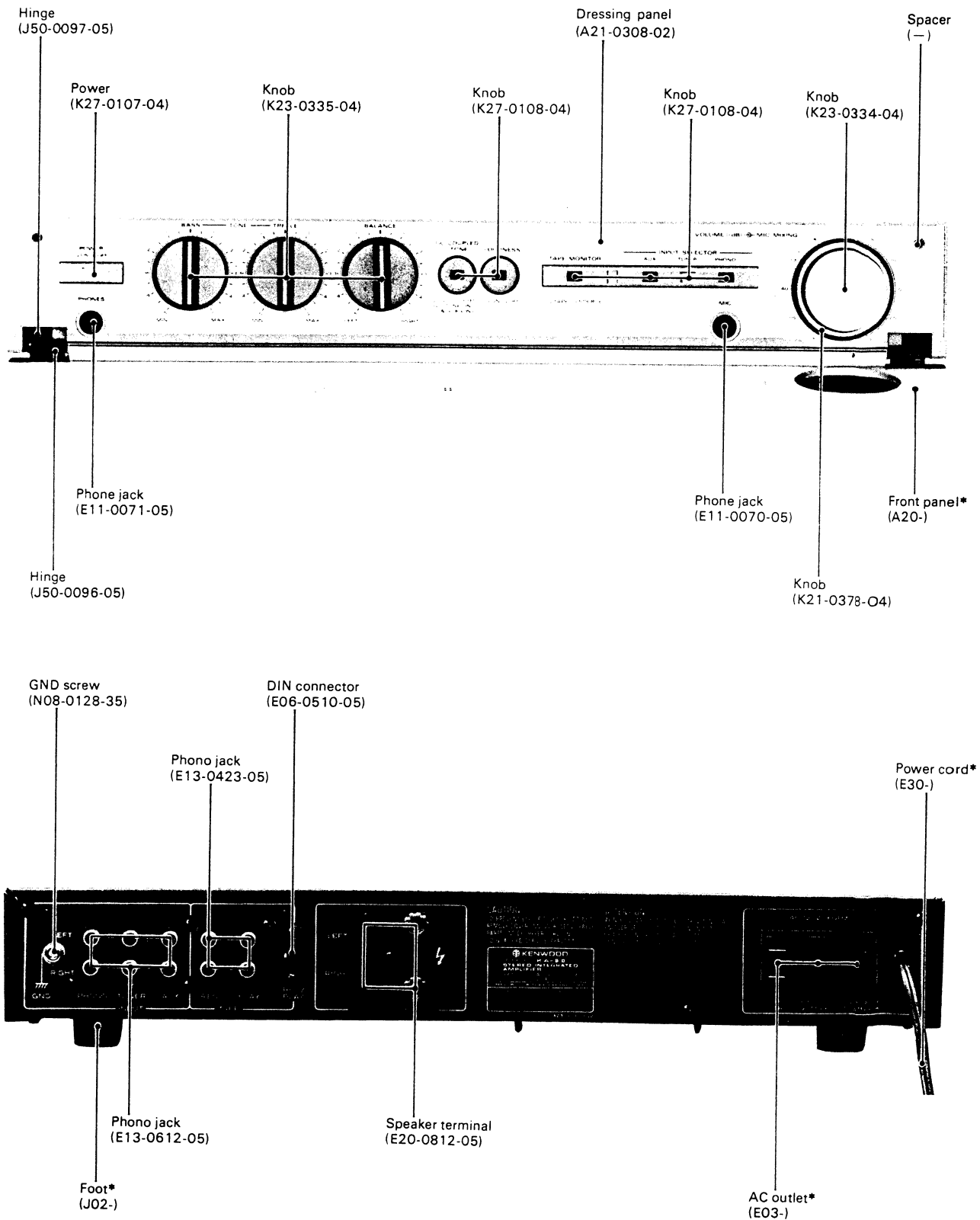
Un article sur réglages est écrit en trois langues, Anglais, Français et Allemand.

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



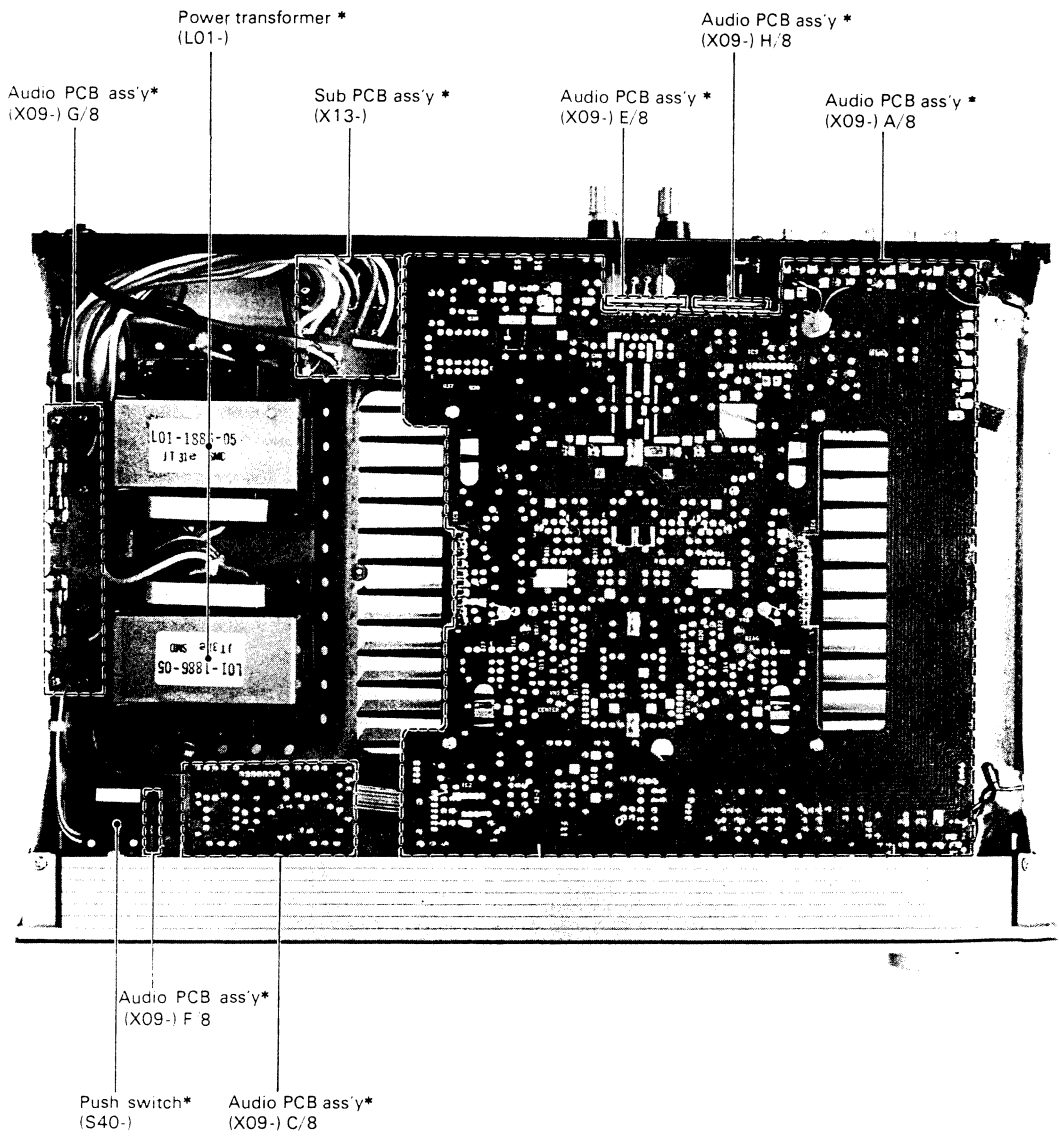
HIGH SPEED DC STEREO INTEGRATED AMPLIFIER

EXTERNAL VIEW



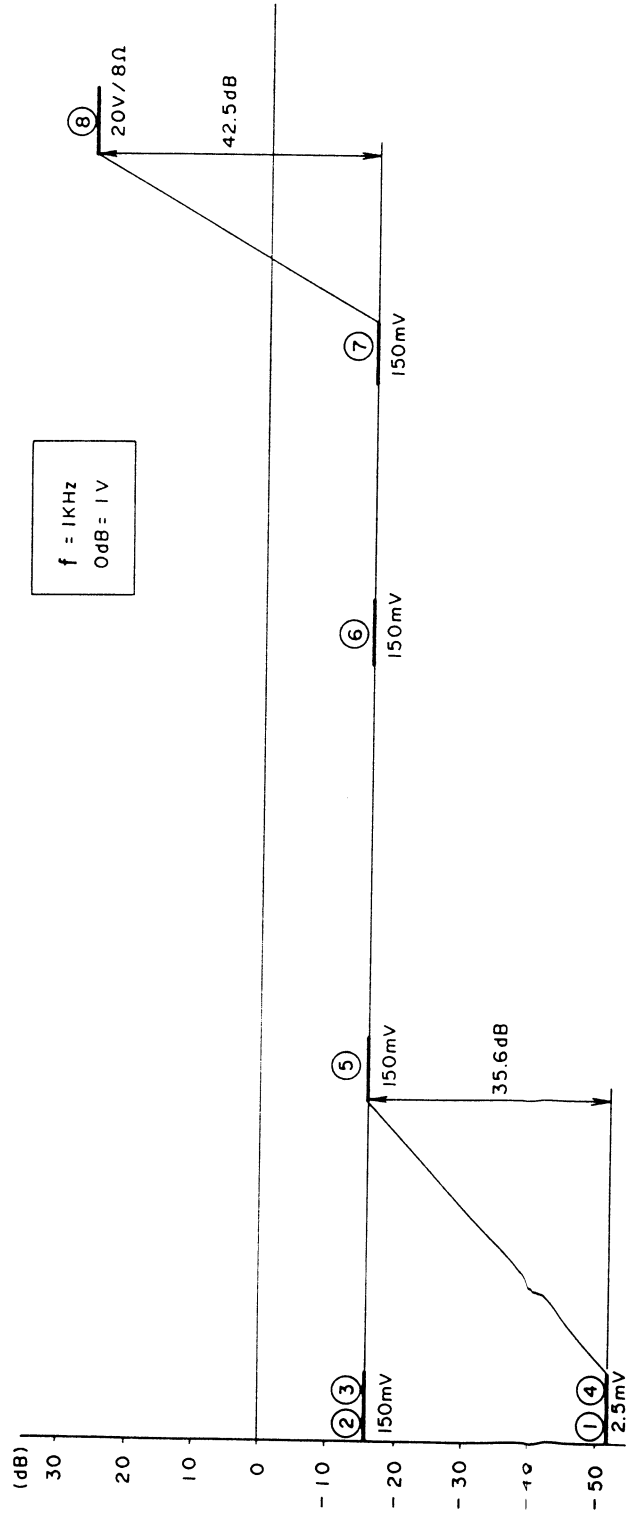
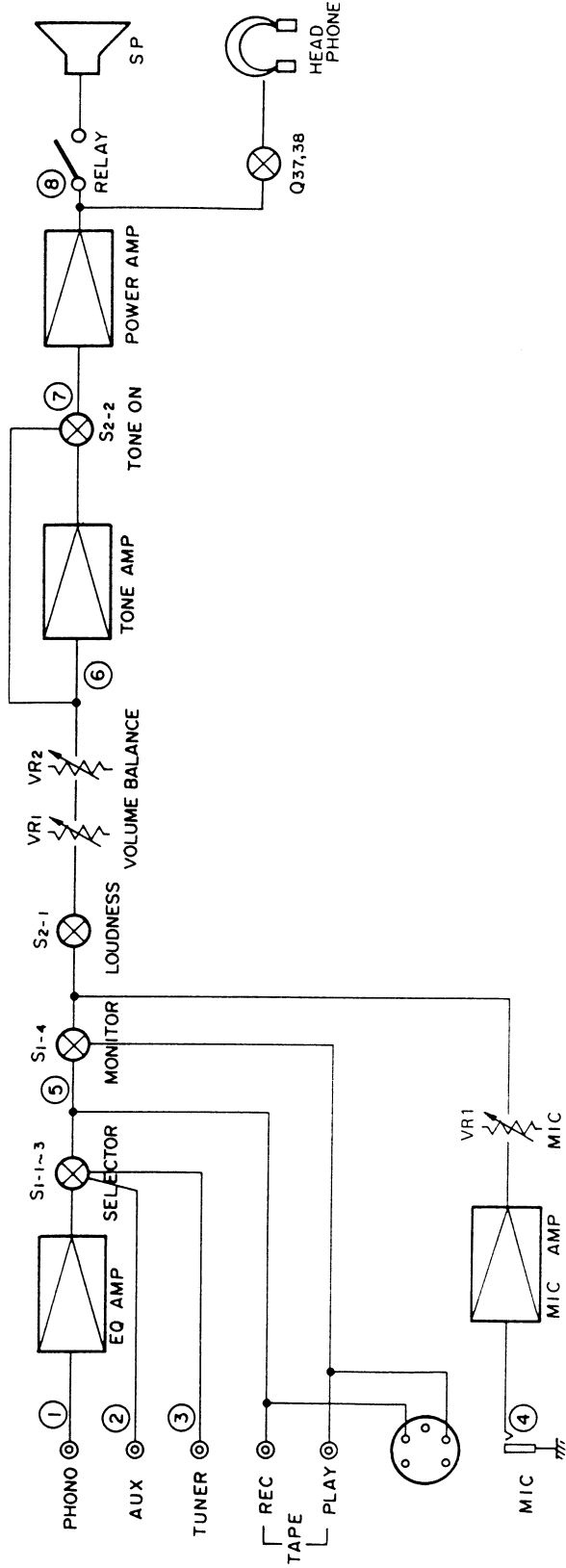
* Refer to Parts List.

INTERNAL VIEW



* Refer to Parts List.

BLOCK AND LEVEL DIAGRAMS



CIRCUIT DESCRIPTION

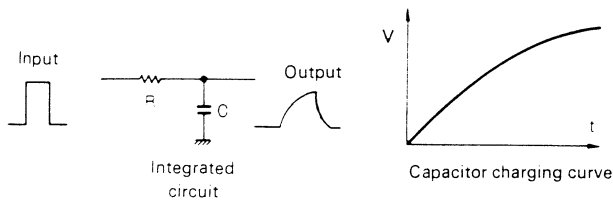
The amplifier should just amplify the signal as it was input and drive the loudspeaker. However, the amplifier has a time lag with certain amount of time constant, resulting in a different waveforms at the input and output terminals. In order to obtain the output waveform which is identical with that of the input, the response of the amplifier should be speeded up. That is, the signal rise time is made small and the slew rate is made large.

Increase of amplification stages and extension of band width in the amplifier tend to cause an oscillation in the high frequency range. To prevent the oscillation the phase characteristics is modified using capacitors at several places in the circuit. (Capacitance is also created by the layout and the wiring of component parts.)

However, the capacitance adversely affects the speedup of the circuit, resulting in a further deformation of the output waveform. Therefore, the phase compensating capacitance must be as small as possible.

HIGH SPEED Circuit and Phase Compensation

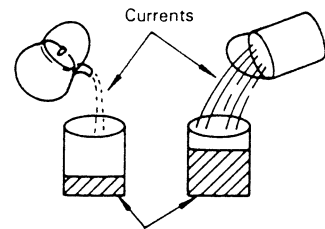
Because of the frequency characteristics of the amplifier itself, as mentioned previously, the signal amplitude decreases as the frequency goes higher. A well designed amplifier shows a frequency characteristics which does not change regardless of the output voltage, and it is similar to the characteristics of a single stage RC integrated circuit.



When a sharp-edged pulse as shown in the above figure is applied to the integrated circuit, the rises voltage across the capacitor C cannot change instantaneously, and the output voltage rises gradually as C is charged.

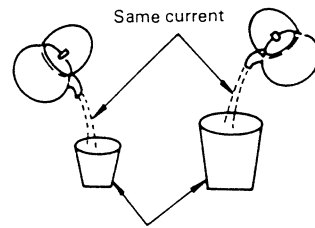
This C corresponding to the total capacitance of the amplifier determines the cutoff frequency, and it is also influential for the rise time of the signal. (It is also required to make resistance R small.) The phase compensating capacitor which relates to the slew rate is assumed to be included in the C.

In order to speed up the output response, it is necessary to minimize the charging time (i.e. small time constant) by reducing the capacitance and/or resistance.



Same capacitance

Large current makes the filling time short.



Capacitors

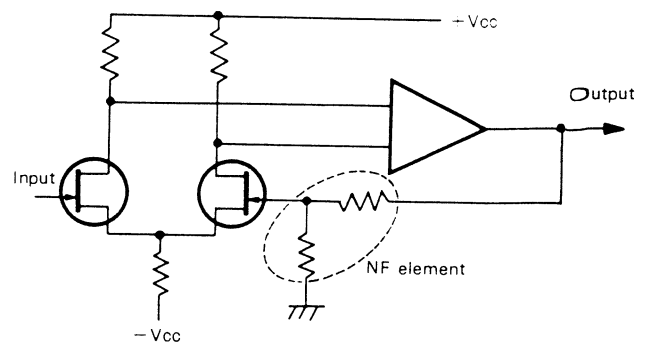
Small capacitance makes the filling time short.

For words "slew rate" and "rise time", see L-05M Service Manual.

In model KA-80, the negative feedback is used in both the voltage amplification stage and the current amplification stage separately to speed up the amplifier response. This makes the phase compensating capacitor small and thus the circuit time constant becomes small, resulting in a short rise time and a large slew rate.

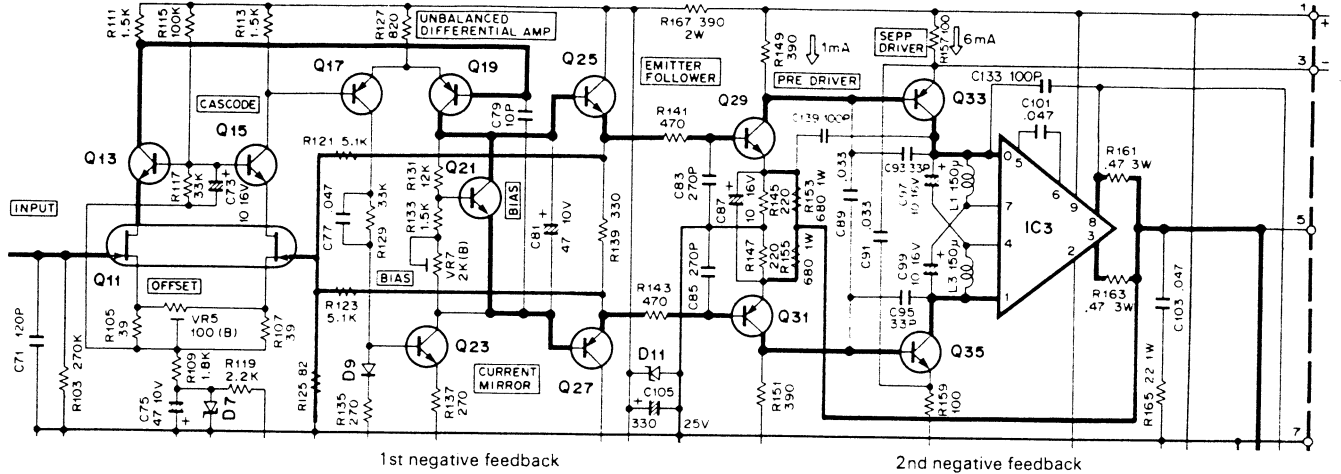
Dual Negative Feedback

In model KA-80, a negative feedback signal from the loudspeaker terminal is applied to the emitters of the pre-driver transistors and another feedback signals from their bases to the gate of the FET in the input differential amplifier.



Conventional negative feedback

CIRCUIT DESCRIPTION



Negative feedback in model KA-80

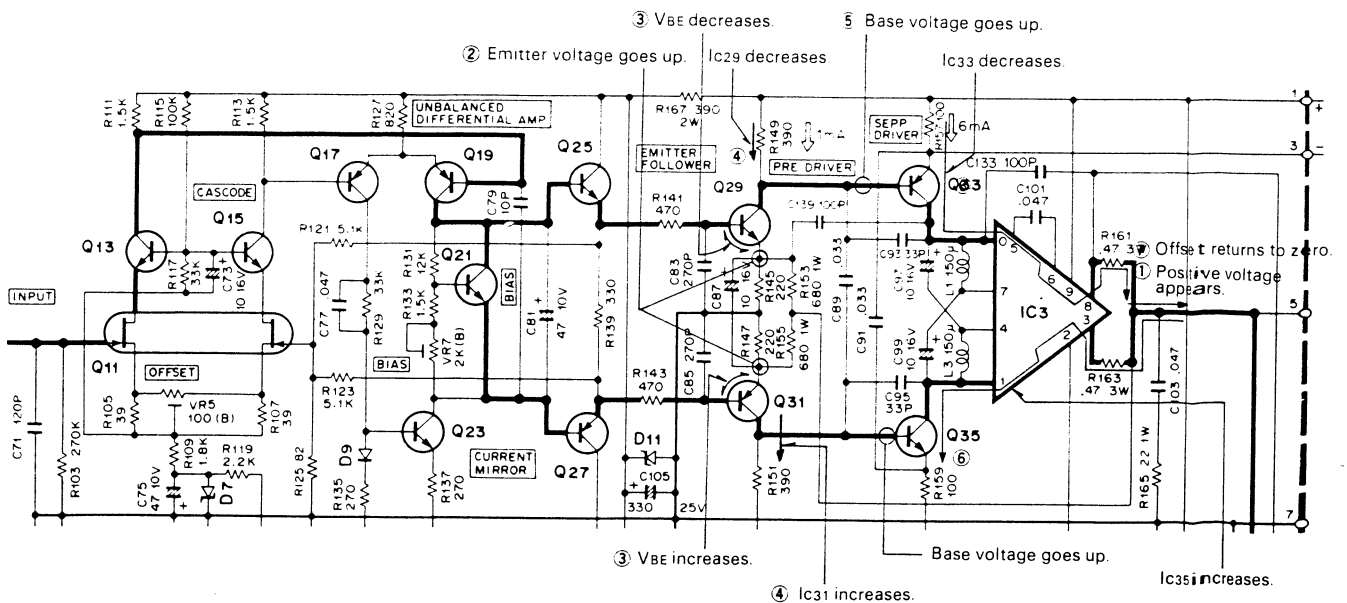
Let's see how the offset voltage at the output terminal can be maintained at zero level.

Assume that a positive voltage appears at the output terminal (1). This voltage is divided by the resistors and applied to the emitters of predrivers Q29 and Q31 (2). The base voltage of the Q29 and Q31 is constant, since it is supplied from the stabilized DC amplifier of the previous stage (comprising Q13, Q15, Q17, Q19, Q21, Q23, Q25, and Q27).

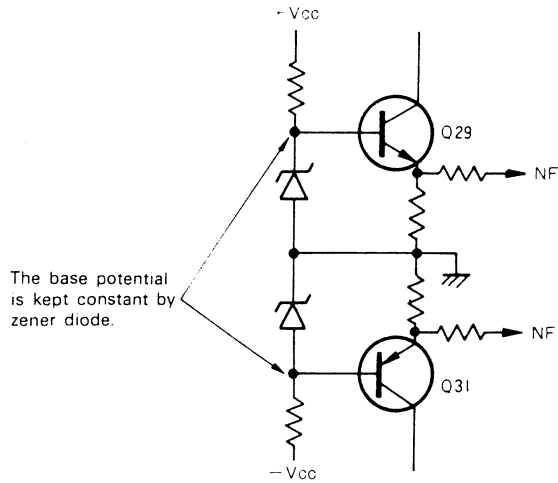
The voltage applied to the emitters of Q29 and Q31 cause to

lower the V_{BE} of Q29 (3), then the collector current of Q29 decreases (4) and the current of the positive complementary circuit also decreases (6).

On the other hand, the V_{BE} of Q31 increases (3), and the current of the negative complementary circuit also increases (6). Therefore, an increase of the negative current cancels the positive voltage on the output terminal, thus maintaining a zero offset (7).



CIRCUIT DESCRIPTION

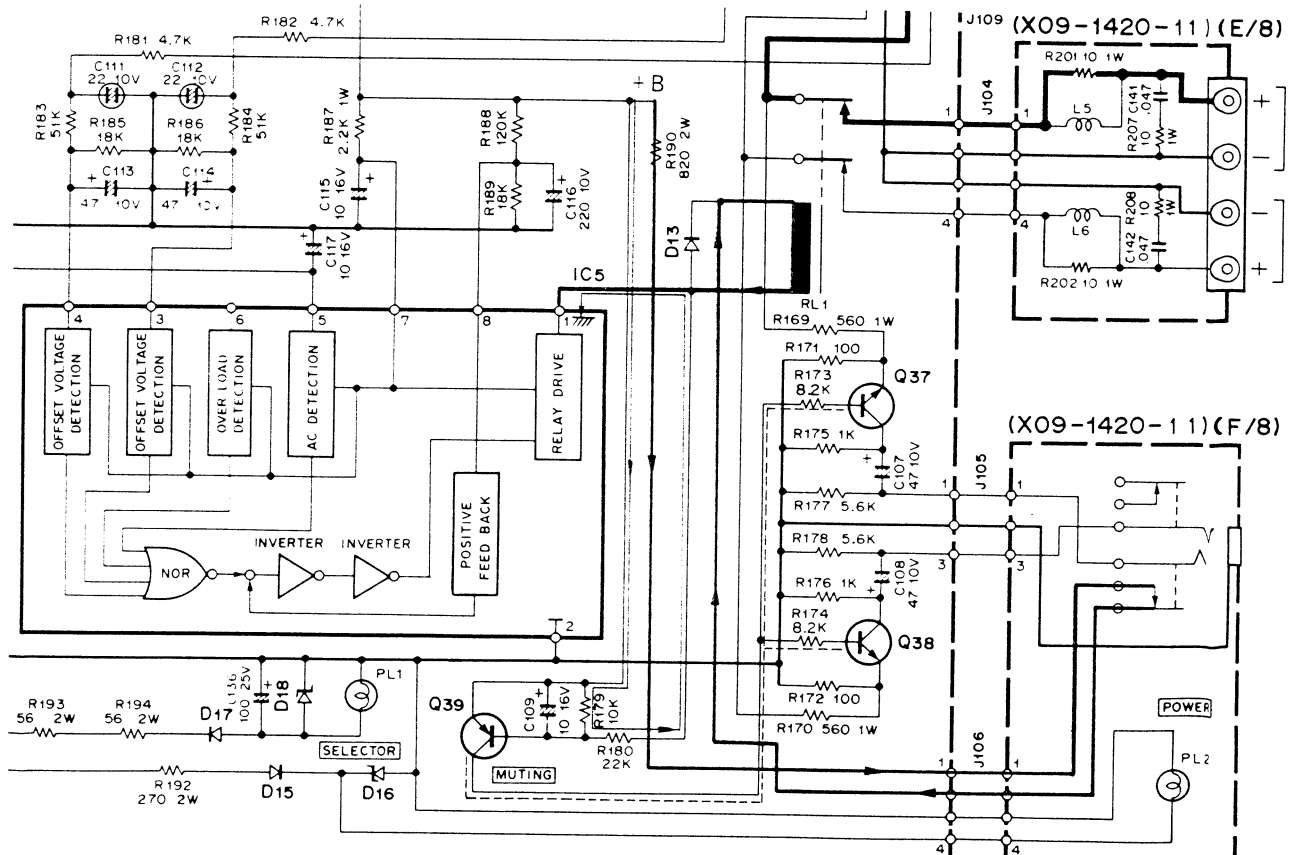


The base potential is kept constant by zener diode.

The bases of Q29 and Q31 are fixed.

Headphone Muting Circuit

Transistors Q37, Q38, and Q39 form a circuit to prevent the power-ON switching noise to let out from the headphone. The circuit consists of a time lag circuit using Q39 and transistor switches Q37 and Q38.



ADJUSTMENT/RÉGLAGES/ABGLEICH

POWER AMP OFFSET VOLTAGE ADJUSTMENT

1. Connect the DC voltmeter between the positive and negative speaker terminals.
2. Adjust the trimming pot VR5 (VR6) for a 0V reading of the DC voltmeter.

RÉGLAGE DE LA TENSION DE DECALAGE (OFFSET)

1. Brancher le voltmètre de c.c. aux bornes de sortie + et -.
2. Régler le potentiomètre ajustable VR5 (VR6) pour que la tension de sortie soit nulle.

OFFSET-SPANNUNG DER ENDVERSTÄRKER

1. Den Gleichspannungsmesser zwischen den Lautsprecherklemmen + und - der endverstärker anschließen.
2. Die Regelstange durch das Unterplattenloch einführen und den halbeingebetteten Widerstand VR5 (VR6) so regulieren, daß die Gleichspannungsmesser-Ablesung 0V ist.

BIAS CURRENT ADJUSTMENT

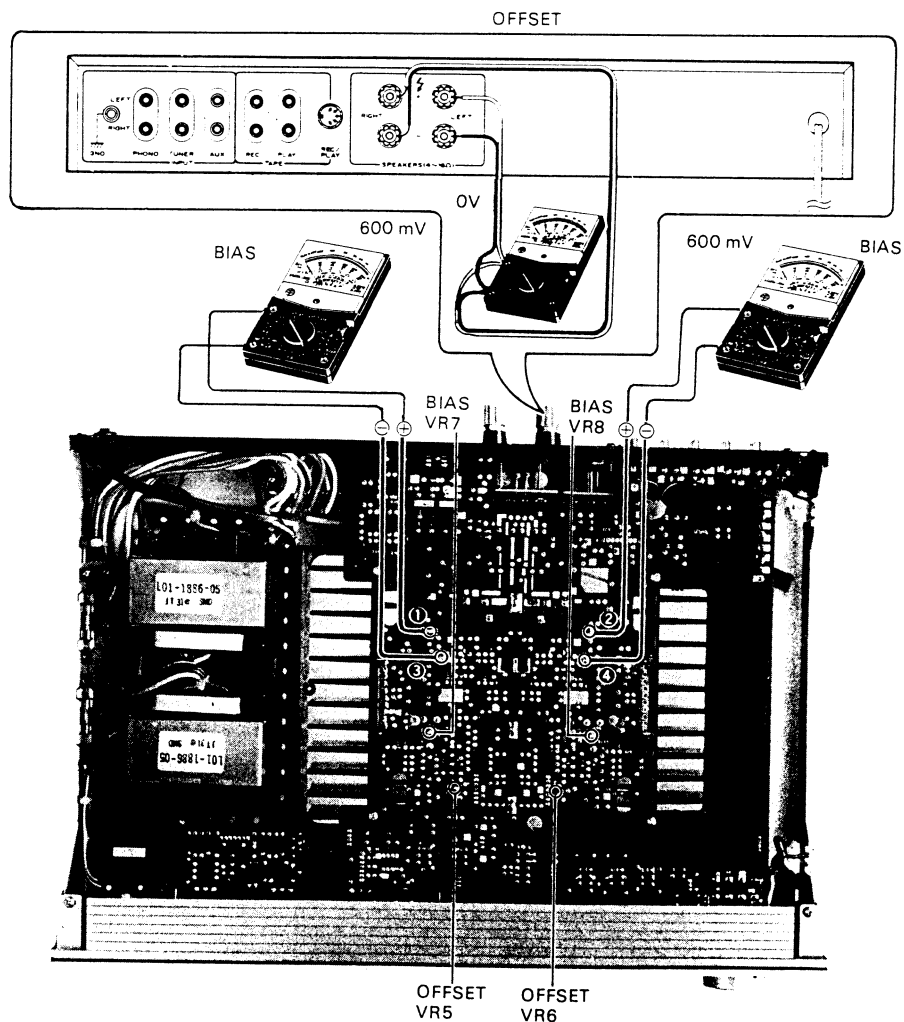
1. Turn the volume control knob fully counter clockwise.
2. Connect the DC voltmeter between the adjusting points ❶ and ❸ (❷ and ❹) of power amp pc board ass'y (X09-1420-11).
3. Adjust the BIAS CURRENT trimming pot VR7 (VR8), for a 600 mV reading of the voltmeter.

RÉGLAGE DU COURANT DE POLARISATION

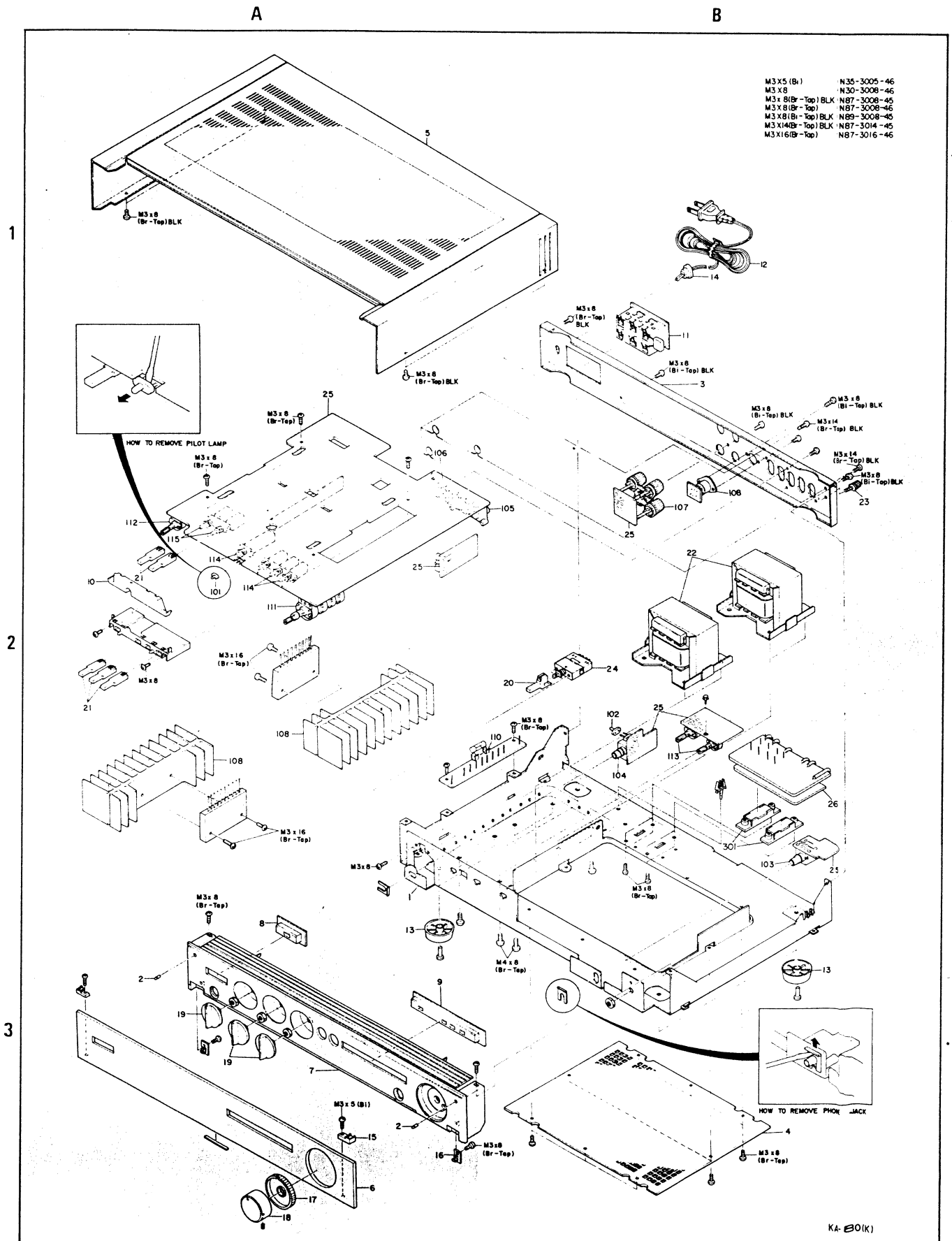
1. Tourner le bouton de commande de volume à fond dans le sens invers de celui des aiguilles d'une montre.
2. Brancher le voltmètre de c.c. aux points d'alignement ❶ et ❸ (❷ et ❹), sur la plaque circuit imprimé d'ampli de puissance (X09-1420-11).
3. Réguler le potentiomètre ajustable VR7 (VR8) de façon à ce que le voltmètre de c.c. indique 600 mV.

LEERLAUFS

1. Den Lautstärkereger (VOLUME) drehen um die Leistungsverstärker-Aufnahme auf Null zu reduzieren.
2. Den Gleichspannungsmesser zwischen der Regulierungs-Punkte ❶ und ❸ (❷ und ❹) der endverstärker anschließen.
3. Den halbeingebetteten Widerstand VR7 (VR8) der Leistungsverstärker so regulieren, daß die Gleichspannungsmesser-Ablesung 600 mV ist.



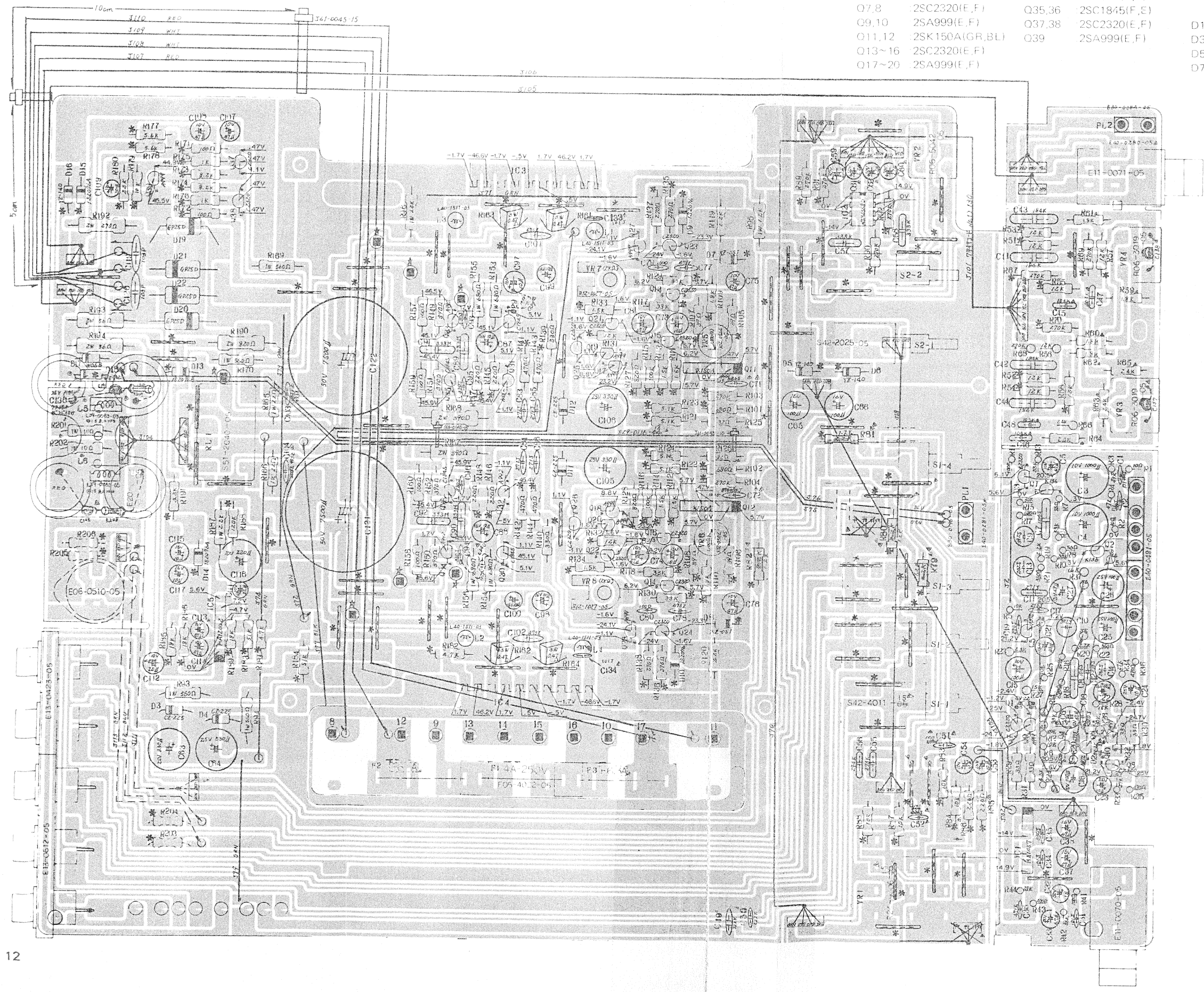
EXPLODED VIEW



KA-80(K)

PC BOARD

AUDIO (X09-142x-xx) COMPONENT SIDE

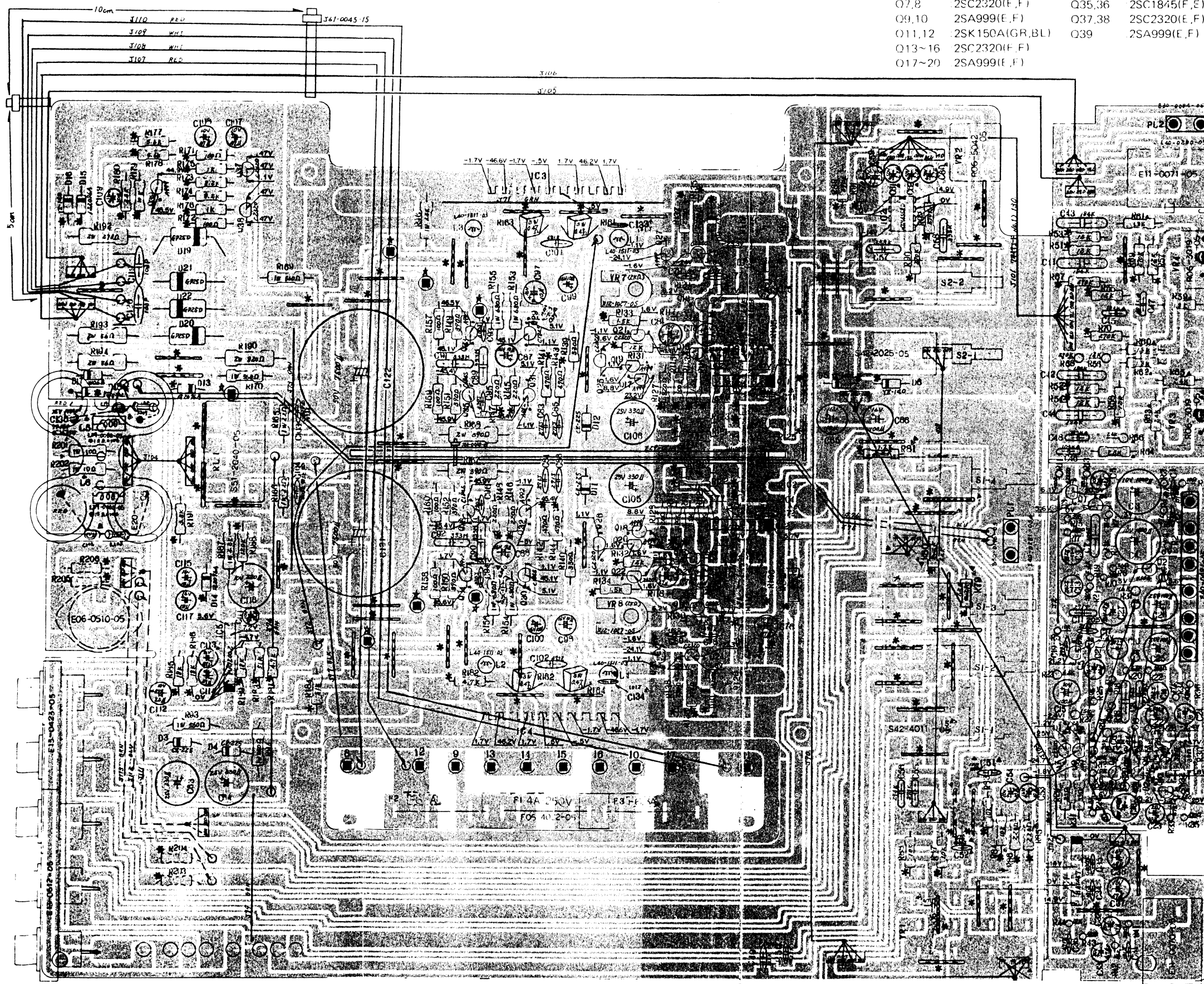


- | | | | | | | | |
|--------|------------------|--------|---------------|-------|--------------|--------|-----------------|
| Q1,2 | :2SK163(K,L,M) | Q21~26 | :2SC2320(E,F) | IC1 | :HA1457 | D9,10 | :1S2076,1S1555 |
| | :2SK136(P,Q,R) | Q27,28 | :2SA999(E,F) | IC2 | :NJM4558D(A) | D11,12 | :CZ-225 |
| Q3,4 | :2SC2320(E,F) | Q29,30 | :2SC1845(F,E) | IC3,4 | :STK-0060*1 | D13~15 | :1S2076A |
| Q5,6 | :2SA872 | Q31~34 | :2SA992(F,E) | IC5 | :HA12002 | D16 | :YZ-140 |
| Q7,8 | :2SC2320(E,F) | Q35,36 | :2SC1845(F,E) | | | D17 | :W06B |
| Q9,10 | :2SA999(E,F) | Q37,38 | :2SC2320(E,F) | D1,2 | :SV-22 | D18 | :WZ-162 |
| Q11,12 | :2SK150A(IGR,BL) | Q39 | :2SA999(E,F) | D3,4 | :CZ-225 | D19~22 | :GP25D, U05C(S) |
| Q13~16 | :2SC2320(E,F) | | | D5,6 | :YZ-140 | | |
| Q17~20 | :2SA999(E,F) | | | D7,8 | :XZ-051 | | |

Q · IC	VR · S
	VR2
Q37, IC3	
Q39, IC2	
Q38	
Q27,23	VR4
Q13	VR7
Q33,29,21	
Q15	VR5
Q25	
Q19	
Q17,11	
Q35,31	VR3
Q3, 1	
Q36,32, Q12	
Q18	
Q26, Q20	VR6
Q16, Q2	
Q34,30, Q22	
Q14	VR8
IC5	
Q28,24, Q5	
IC4	
Q7,9,10	
Q4,6	
Q8	
IC1	
	VR1

PC BOARD

AUDIO (X09-142x-xx) COMPONENT SIDE

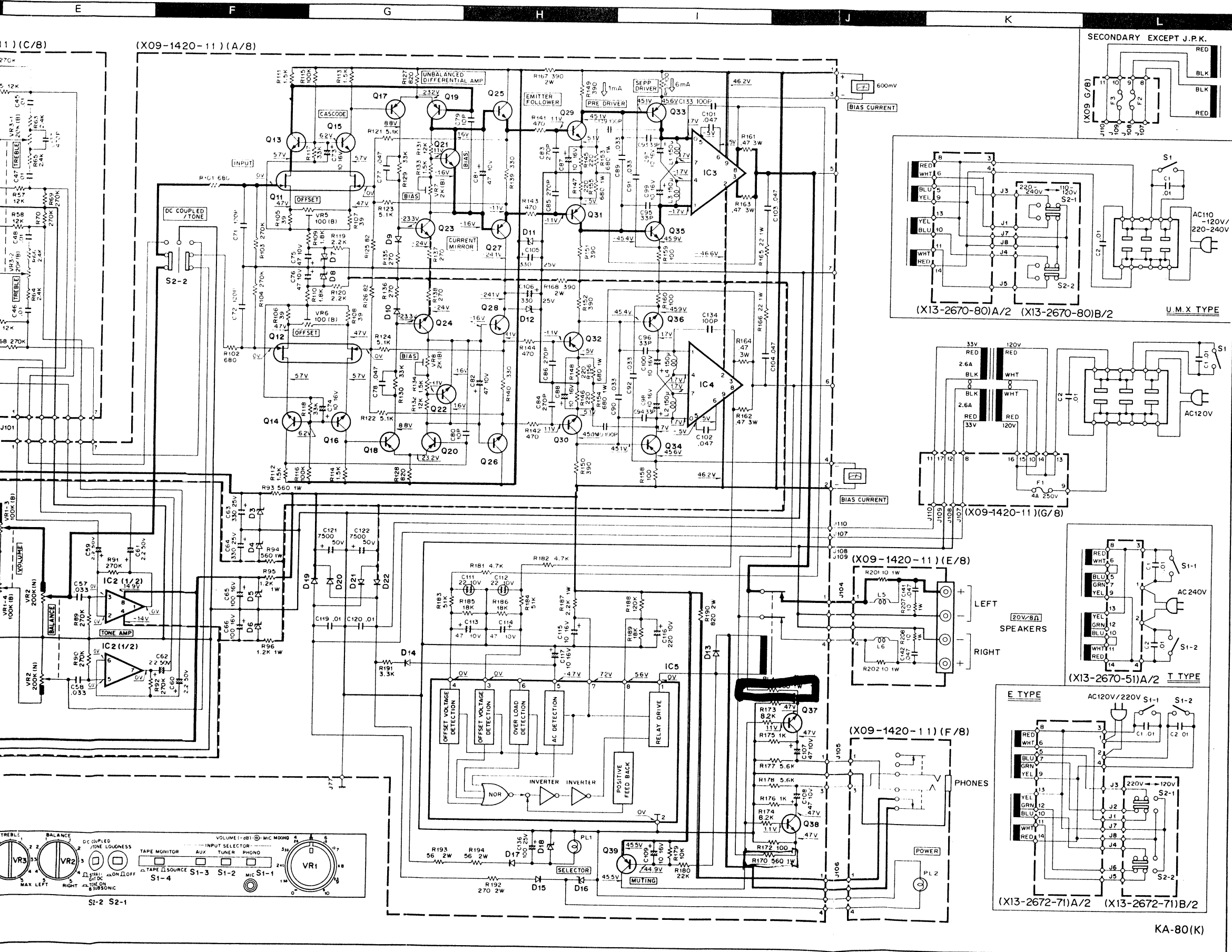


- | | | | | | | | |
|--------|----------------|--------|--------------|-------|-------------|--------|----------------|
| Q1,2 | 2SK163(K,L,M) | Q21~26 | 2SC2320(E,F) | IC1 | HA1457 | D9,10 | 1S2076,1S1555 |
| | 2SK136(P,Q,R) | Q27,28 | 2SA999(E,F) | IC2 | NJM4558D(A) | D11,12 | CZ-225 |
| Q3,4 | 2SC2320(F,F) | Q29,30 | 2SC1845(F,E) | IC3,4 | STK-0060*1 | D13~15 | 1S2076A |
| Q5,6 | 2SA872 | Q31~34 | 2SA992(F,E) | IC5 | HA12002 | D16 | YZ-140 |
| Q7,8 | 2SC2320(F,F) | Q35,36 | 2SC1845(F,E) | | | D17 | W06B |
| Q9,10 | 2SA999(E,F) | Q37,38 | 2SC2320(E,F) | D1,2 | SV-22 | D18 | WZ-162 |
| Q11,12 | 2SK150A(GR,BL) | Q39 | 2SA999(E,F) | D3,4 | CZ-225 | D19~22 | GP25D, U05C(S) |
| Q13~16 | 2SC2320(F,F) | | | D5,6 | YZ-140 | | |
| Q17~20 | 2SA999(E,F) | | | D7,8 | XZ-051 | | |

Q · IC	VR · S
	VR2
Q37, IC3	
Q39, IC2	
Q38	
Q27,23	VR4
Q13	VR7
Q33,29,21	
Q15	VR5
Q25	
Q19	
Q17,11	
Q35,31	VR3
Q3, 1	
Q36,32, Q12	
Q18	
Q26, Q20	VR6
Q16, Q2	
Q34,30, Q22	
Q14	VR8
IC5	
Q28,24, Q5	
IC4	
Q7,9,10	
Q4,6	
Q8	
IC1	
	VR1

HIGH SPEED DC STEREO INTEGRATED AMPLIFIER

KA-80



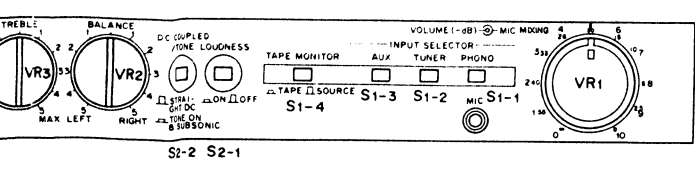
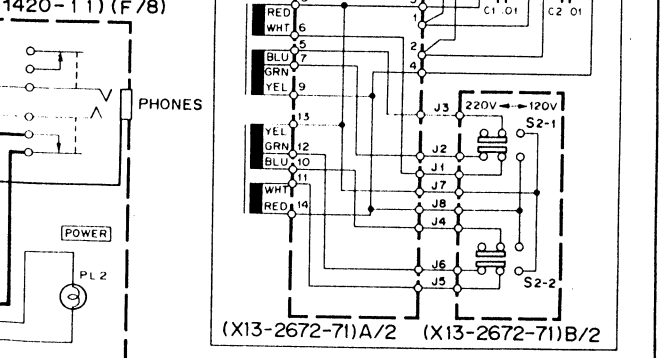
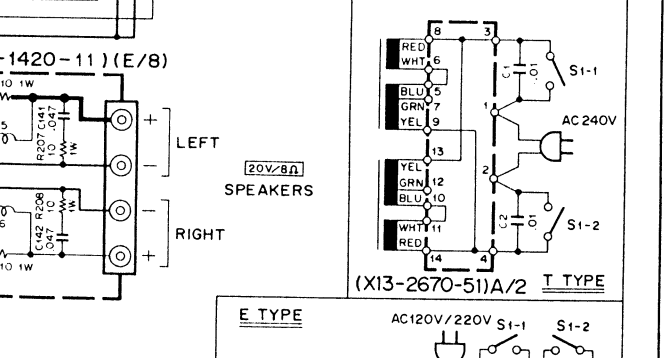
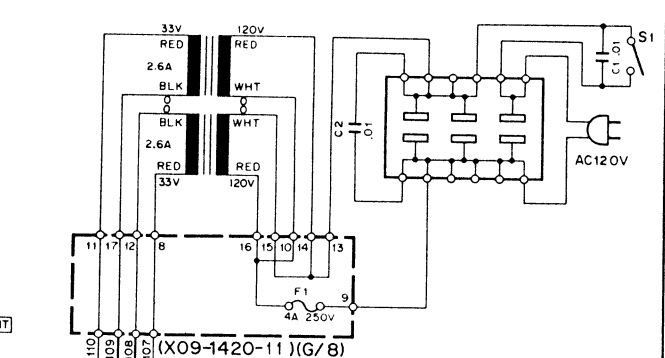
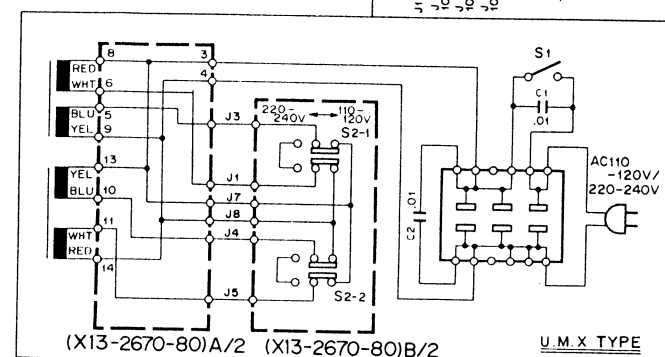
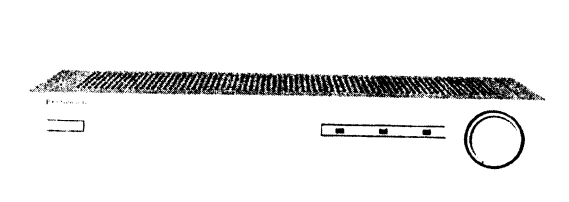
SPECIFICATIONS

- Power output**
48 watts per channel minimum RMS, both channels driven, at 8 ohms from 20Hz to 20,000Hz with no more than 0.02% total harmonic distortion.
 Both Channels Driven 50 + 50 watts 8 ohms at 1,000 Hz
 55 + 55 watts 4 ohms at 1,000 Hz
- Total Harmonic Distortion**
 (20 Hz to 20,000 Hz)
 AUX input to SPEAKER output 0.02% at rated power into 8 ohms
 0.015% at 1/2 rated power into 8 ohms
- PHONO input to SPEAKER output** 0.02% at rated power with VOLUME -20 dB
- Intermodulation Distortion** 0.0065% at rated power into 8 ohms (60 Hz : 7 kHz = 4 : 1)
- Damping Factor** 120, DC -20,000 Hz into 8 ohms
- Transient Response**
 Rise Time 0.8 μs
 Slew Rate ±150 V/μs
- Power Bandwidth** 5 Hz to 40,000 Hz at 0.05% T.H.D.
- Frequency Response**
 (DC COUPLED at ON) DC to 450 kHz, -3 dB
 (DC COUPLED at OFF) 18 Hz to 100 kHz, -3 dB
- Speaker Impedance** Accept 4 ohms to 16 ohms
- Input Sensitivity/Impedance**
 Phono 2.5 mV/50 kohms
 Tuner, AUX, Tape 150 mV/50 kohms
- Signal to Noise Ratio (IHF, A)**
 Phono 86 dB for 2.5 mV input
 92 dB for 5.0 mV input
 98 dB for 10 mV input
 106 dB for 150 mV input
 Phono Maximum Input Level 230 mV (RMS), T.H.D. 0.02% at 1,000 Hz
- Output Level/Impedance**
 Tape REC (Pin) 150 mV/220 ohms
 (DIN) 30 mV/75 kohms
- Phono Frequency Response** RIAA standard curve ±0.3 dB (20 Hz to 20,000 Hz)
- Tone Control**
 Bass ±10 dB at 100 Hz
 Treble ±10 dB at 10 kHz
- Loudness Control** +9 dB at 100 Hz (at -30 dB VOLUME Level)
- Subsonic Filter** 18 Hz/6 dB

GENERAL

- Power Requirement** 60 Hz 120V (U.S.A. & Canada Model) or 50/60 Hz 110-120V/220-240V, switchable
- Power Consumption** 450 watts at full power
- A.C. Outlet** Switched 2, Unswitched 1
- Dimensions** W 440 mm (17-5/16")
 H 78 mm (3-1/16")
 D 330 mm (13")
- Weight (Net)** 7.9 kg (17.4 lbs)

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



PARTS LIST

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名 / 規格	Re- marks 備考
TOTAL			
1 3A	-	MAIN CHASSIS	
2 3A	-	SPACER	
3 1B	-	REAR PANEL	
4 3R	-	BOTTOM PLATE	
5 1A	A01-0361-02	METALLIC CABINET	* P
6 3A	A20-1527-02	FRONT PANEL	MX
6 3A	A20-1527-02	FRONT PANEL	UE
6 3A	A20-1527-02	FRONT PANEL	K
6 3A	A20-1527-02	FRONT PANEL	
6 3A	A20-1528-02	FRONT PANEL	* T
7 3A	A21-0308-02	DRESSING PANEL	
8 3A	E07-0288-04	ESCUTCHEON	*
9 3A	E07-0289-04	ESCUTCHEON	*
-	B46-0055-20	WARRANTY CARD	P
-	B46-0060-00	WARRANTY CARD	T
-	B46-0061-20	WARRANTY CARD	K
-	B46-0062-20	WARRANTY CARD	U
-	B46-0063-00	WARRANTY CARD	U
-	B46-0064-10	WARRANTY CARD	X
-	B50-3045-00	INSTRUCTION MANUAL	* P
-	B50-3045-00	INSTRUCTION MANUAL	MX
-	B50-3046-00	INSTRUCTION MANUAL	KU
-	B50-3047-00	INSTRUCTION MANUAL	T
-	B50-3060-00	INSTRUCTION MANUAL	E
-	B59-0018-00	SERVICE STATIONS' LIST	
10 2A	B19-0208-03	LIGHT ACRYL BOARD	*
C1 ,2	C54-3310-39	CERAMIC 0.01UF P	ET
C1 ,2	C91-0023-05	CERAMIC 0.01UF AC250V	UM
C1 ,2	C91-0023-05	CERAMIC 0.01UF AC250V	X
C1 ,2	C91-0079-05	CERAMIC 0.01UF AC125V	KP
C3 ,4	C55-1722-38	CERAMIC 0.022UF Z	
C5	C24-1747-41	ELECTRO 0.47UF 50WV	
11 1B	E03-0007-05	AC OUTLET	KU
11 1B	E03-0007-05	AC OUTLET	MX
11 1B	E03-0009-05	AC OUTLET	P
12 1B	E30-0181-05	POWER CORD	KP
12 1B	E30-0185-05	POWER CORD	X
12 1B	E30-0459-05	POWER CORD	E
12 1B	E30-0515-05	POWER CORD	UM
12 1B	E30-0602-05	POWER CORD	T
-	H01-3065-04	CARTON BOX	* P
-	H01-3066-04	CARTON BOX	UM
-	H01-3066-04	CARTON BOX	XK
-	H01-3067-04	CARTON BOX	E
-	H01-3086-04	CARTON BOX	T
-	H10-1538-03	POLYSTYRENE FIXTURE	
-	H25-0078-04	BAG	
-	H25-0179-04	BAG	
13 3B	J02-0088-05	FOOT	K
13 3B	J02-0089-05	FOOT	PU
13 3B	J02-0089-05	FOOT	MX
13 3B	J02-0089-05	FOOT	ET
14 1B	J41-0024-15	BUSHING	XT
14 1B	J41-0033-05	BUSHING	UM
14 1B	J41-0033-05	BUSHING	E
14 1B	J41-0033-05	BUSHING	KP
15 3A	J50-0096-05	HINGE	*
16 3A	J50-0097-05	HINGE	*

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名 / 規格	Re- marks 備考
17 3A	K21-0378-04	KNOB(MIC)	*
18 3A	K23-0334-04	KNOB(VOLUME)	*
19 3A	K23-0335-04	KNOB(TONE,BALANCE)	
20 2B	K27-0107-04	KNOB(POWER)	
21 2A	K27-0108-04	KNOB(PUSHBUTTON)	
22 2B	L01-1881-05	POWER TRANSFORMER	* K
22 2B	L01-1885-05	POWER TRANSFORMER	UM
22 2B	L01-1885-05	POWER TRANSFORMER	X
22 2B	L01-1886-05	POWER TRANSFORMER	ET
22 2B	L01-1888-05	POWER TRANSFORMER	P
23 2B	N08-0128-35	GND SCREW	
S1	S40-1010-05	PUSH SWITCH FIG24	UM
S1	S40-1010-05	PUSH SWITCH FIG24	X
S1	S40-1011-05	PUSH SWITCH FIG24	K
S1	S40-2085-05	PUSH SWITCH FIG24	P
S1	S40-2099-05	PUSH SWITCH FIG24	ET
25 1A	X09-1420-11	AUDIO AMP PCB ASSY	* K
25 1A	X09-1420-11	AUDIO AMP PCB ASSY	P
25 1A	X09-1420-81	AUDIO AMP PCB ASSY	UM
25 1A	X09-1420-81	AUDIO AMP PCB ASSY	X
25 1A	X09-1422-71	AUDIO AMP PCB ASSY	ET
26 2B	X13-2670-51	SUB PCB ASSY	* T
26 2B	X13-2670-80	SUB PCB ASSY	UM
26 2B	X13-2670-80	SUB PCB ASSY	X
26 2B	X13-2672-71	SUB PCB ASSY	E
AUDIO (X09-142x-xx)			
PL1 101	B30-0196-05	LAMP(12V,100MA)	
PL2 102	B30-0084-05	LAMP(8V,50MA)	
C1 ,2	C71-1715-15	CERAMIC 150PF J	
C3 ,4	C24-1010-81	ELECTRO 1000UF 16V	
C5 ,6	C24-1047-61	ELECTRO 47UF 16V	
C7 ,8	C46-1710-45	MYLAR 0.1UF J	
C9 ,10	C47-1739-25	POLYSTY 3900PF J	
C11 ,12	C46-1727-35	MYLAR 0.027UF J	
C13 ,14	C47-1724-25	POLYSTY 2400P J	
C15 ,16	C24-1010-71	ELECTRO 100UF 16V	
C17 ,20	C71-1727-05	CERAMIC 27PF J	
C21 ,22	C24-1233-61	ELECTRO 33UF 16V	
C23 ,24	C25-1410-67	LL-ELEC 10UF 25V	
C25 ,26	C24-1410-71	ELECTRO 100UF 25V	
C27	C24-1247-61	ELECTRO 47UF 16V	
C31	C71-1710-15	CERAMIC 100PF J	
C32	C24-1710-51	ELECTRO 1UF 50V	
C33	C24-1447-51	ELECTRO 4.7UF 25V	
C34	C71-1710-15	CERAMIC 100PF J	
C35	C71-1733-05	CERAMIC 33PF J	
C36	C52-1747-16	CERAMIC 470PF K	
C37 ,38	C24-1247-61	ELECTRO 47UF 16V	
C41 ,44	C46-1718-46	MYLAR 0.18UF K	
C45 ,48	C46-1710-36	MYLAR 0.01UF K	
C49 ,50	C52-1722-26	CERAMIC 0.0022UF K	
C51 ,52	C71-1710-15	CERAMIC 100PF J	
C53 ,54	C24-1210-61	ELECTRO 10UF 16V	
C55 ,56	C46-1727-36	MYLAR 0.027UF K	
C57 ,58	C46-1733-36	MYLAR 0.033UF K	
C59 ,62	C24-1722-51	ELECTRO 2.2UF 50V	
C63 ,64	C24-1433-71	ELECTRO 330UF 25V	
C65 ,66	C24-1210-71	ELECTRO 100UF 16V	
C71 ,72	C71-1712-15	CERAMIC 120PF J	
C73 ,74	C24-1210-61	ELECTRO 10UF 16V	
C75 ,76	C24-1047-61	ELECTRO 47UF 16V	

Refer to exploded view on P10.

PARTS LIST

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名 / 規格	Re- marks 備考	Ref. No. 参照番号	Parts No. 部品番号	Description 部品名 / 規格	Re- marks 備考
C77 ,78	C55-1747-38	CERAMIC 0.047UF Z		VR1 111	R24-9006-15	POT. (VOLUME, MIC)	*
C79 ,80	C71-1710-02	CERAMIC 10PF D		VR2 112	R06-5042-05	POT. (BALANCE)	
C81 ,82	C24-1047-61	ELECTRO 47UF 10WV		VR3 ,4	R06-3019-05	POT. (TONE) FIG113	
C83 -86	C71-1727-15	CERAMIC 270PF J		VR5 ,6	R12-0502-05	TRIMMING POT, 100 OFFSET	
C87 ,88	C24-1210-61	ELECTRO 10UF 16WV		VR7 ,8	R12-1027-05	TRIMMING POT, 2K BIAS	
C89 -92	C46-2033-37	MYLAR 0.033UF M		RL1	S51-2040-05	RELAY	
C93 -96	C71-1733-05	CERAMIC 33PF J		S1	S42-4011-15	PUSH SWITCH FIG114	
C97 -100	C24-1210-61	ELECTRO 10UF 16WV		S2	S42-2025-05	PUSH SWITCH FIG115	
C101-104	C55-1747-38	CERAMIC 0.047UF Z		D1 ,2	V11-2200-10	SV-22	
C105,106	C24-1433-71	ELECTRO 330UF 25WV		D3 ,4	V11-4103-20	CZ-225	
C107,108	C24-1047-61	ELECTRO 47UF 10WV		D5 ,6	V11-0254-05	YZ-140	
C109	C24-1210-61	ELECTRO 10UF 16WV		D7 ,8	V11-4103-60	XZ-051	
C111,112	C26-1022-67	NP-ELEC 22UF 10WV		D9 ,10	V11-0271-05	1S2076/1S1555	
C113,114	C24-1047-61	ELECTRO 47UF 10WV		D11 ,12	V11-4103-20	CZ-225	
C115	C24-1210-61	ELECTRO 10UF 16WV		D13 -15	V11-0273-05	1S2076A	
C116	C24-1022-71	ELECTRO 220UF 10WV		D16	V11-0254-05	YZ-140	
C117	C24-1210-61	ELECTRO 10UF 16WV		D17	V11-0295-05	W068	
C119,120	C54-2710-39	CERAMIC 0.01UF P		D18	V11-4106-80	WZ-162	
C121,122	C90-0417-05	ELECTRO 7500UF 50WV		D19 -22	V11-0465-05	GP250/U05C(S)	
C133,134	C71-1710-15	CERAMIC 100PF J		IC1	V30-0264-10	HA1457	
C135	C24-1710-51	ELECTRO 1UF 50WV		IC2	V30-0248-10	NJM4558D(A)	
C136	C24-1410-71	ELECTRO 100UF 25WV		IC3 ,4	V30-0435-10	STK-0060*1	*
C137,138	C52-1747-16	CERAMIC 470PF K		IC5	V30-0291-10	HA12002	
C139,140	C71-1710-15	CERAMIC 100PF J		Q1 ,2	V09-0144-30	2SK163(K,L,M)	
C141,142	C55-1747-38	CERAMIC 0.047UF Z		Q1 ,2	V09-0149-40	2SK136(P,Q,R)	
103 3B	E11-0070-05	PHCNE JACK(MIC)		Q3 ,4	V03-2320-10	2SC2320(E,F)	
104 2B	E11-0071-05	PHCNE JACK(PHCNES)		Q5 ,6	V01-0198-05	2SA872	
105 2B	E13-0423-05	PHCNO JACK(4P)		Q7 ,8	V03-2320-10	2SC2320(E,F)	
106 2A	E13-0612-05	PHCNO JACK(6P)		Q9 ,10	V01-0999-10	2SA999(E,F)	
107 2B	E20-0812-05	SPEAKER TERMINAL		Q11 ,12	V09-0137-50	2SK150A(GR,BL)	
108 2B	E06-0510-05	DIN CONNECTOR		Q13 -16	V03-2320-10	2SC2320(E,F)	
F1 ,2	F05-4021-05	FUSE(4A) X09-1420-11		Q17 -20	V01-0999-10	2SA999(E,F)	
F1 ,2	F05-4022-05	FUSE(4A) X09-1420-11		Q21 -26	V03-2320-10	2SC2320(E,F)	
F1 ,2	F05-6021-05	FUSE(6A) X09-1420-81		Q27 ,28	V01-0999-10	2SA999(E,F)	
F1 ,2	F05-6322-05	FUSE(6,3A) X09-1422-71		Q29 ,30	V03-1845-10	2SC1845(F,E)	
110 2B	J13-0041-05	FUSE HOLDER X09-1420-11		Q31 -34	V01-0992-10	2SA992(F,E)	
110 2B	J13-0041-05	FUSE HOLDER X09-1421-01		Q35 ,36	V03-1845-10	2SC1845(F,E)	
110 2B	J13-0055-05	FUSE HOLDER X09-1420-81		Q37 ,38	V03-2320-10	2SC2320(E,F)	
110 2B	J13-0055-05	FUSE HOLDER X09-1422-71		Q39	V01-0999-10	2SA999(E,F) FIG116	
L1 -4	L40-1511-03	INDUCTOR		SUB (X13-267x-xx)			
L5 ,6	L39-0085-05	CGIL		S2	S31-2050-05	SLIDE SWITCH Fig. 301	
R29 -32	R43-1233-05	FL-PROOF RD33 J 2E					
R93 ,94	R47-5456-15	FL-PROOF RS560 J 3A					
R95 ,96	R47-5412-25	FL-PROOF RS1,2K J 3A					
R119,120	R43-1222-25	FL-PROOF RD2,2K J 2E					
R139,140	R43-1233-15	FL-PROOF RS330 J 2E					
R141-144	R43-1247-15	FL-PROOF RD470 J 2E					
R145-148	R43-1222-15	FL-PROOF RD220 J 2E					
R149-152	R43-1239-15	FL-PROOF RS390 J 2E					
R153-156	R47-5468-15	FL-PROOF RS680 J 3A					
R157-160	R43-1210-15	FL-PROOF RD100 J 2E					
R161-164	R92-0203-05	FL-PROOF RS0.47 K 3F					
R165,166	R47-5422-05	FL-PROOF RS22 J 3A					
R167,168	R47-5539-15	FL-PROOF RS390 J 30					
R169,170	R47-5456-15	FL-PROOF RS560 J 3A					
R187	R47-5422-25	FL-PROOF RS2,2K J 3A					
R190	R47-5582-15	FL-PROOF RS820 J 30					
R192	R47-5527-15	FL-PROOF RS270 J 30					
R193,194	R47-5556-05	FL-PROOF RS56 J 30					
R201,202	R47-5410-05	FL-PROOF RS10 J 3A					
R207,208	R47-5410-05	FL-PROOF RS10 J 3A					

INSTRUCTION FOR PARTS LIST

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名 / 規格	Re- marks 備考
② ① 18 1A	A01-0608-12	METALLIC CABINET	• ③
19 2A	A20-1979-11	FRONT PANEL ASSY	• K ④
19 2A	A20-1979-11	FRONT PANEL ASSY	PM
19 2A	A20-1979-11	FRONT PANEL ASSY	SU
19 2A	A20-1979-11	FRONT PANEL ASSY	Xw
⑤	R221	FL-PROOF RD330 J 2H	• ⑥
R222	R43-1368-15	FL-PROOF RD680 J 2H	•
VR1 ,2	R12-3301-05	TRIMMING POT, 20K(B)	•
VR3 ,4	R19-4305-05	POTENTIOMETER (OUTPUT)	•
VR5 ,6	R12-2302-05	TRIMMING POT, 5K(B)	•

- ① Exploded view drawing No.
- ② Position in exploded view.
- ③ Symbol of new parts.
- ④ Area to which parts are shipped. Example: A20-1979-11 is the parts No. of FRONT PANEL ASS'Y for the "K" type products (for USA).
When this column is blank, it means that the same type of parts (same parts No.) are used for the products shipped to all areas.
- ⑤ Reference No. in schematic diagram.
- ⑥ Abbreviation of "Flame proof metal oxide film resistor". All capacitors and resistors are listed using abbreviations.
- ⑦ Abbreviations

* 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)

- ⑧ Resistors RD (carbon composition resistors) are not listed in the parts list. For values, refer to the schematic diagram

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