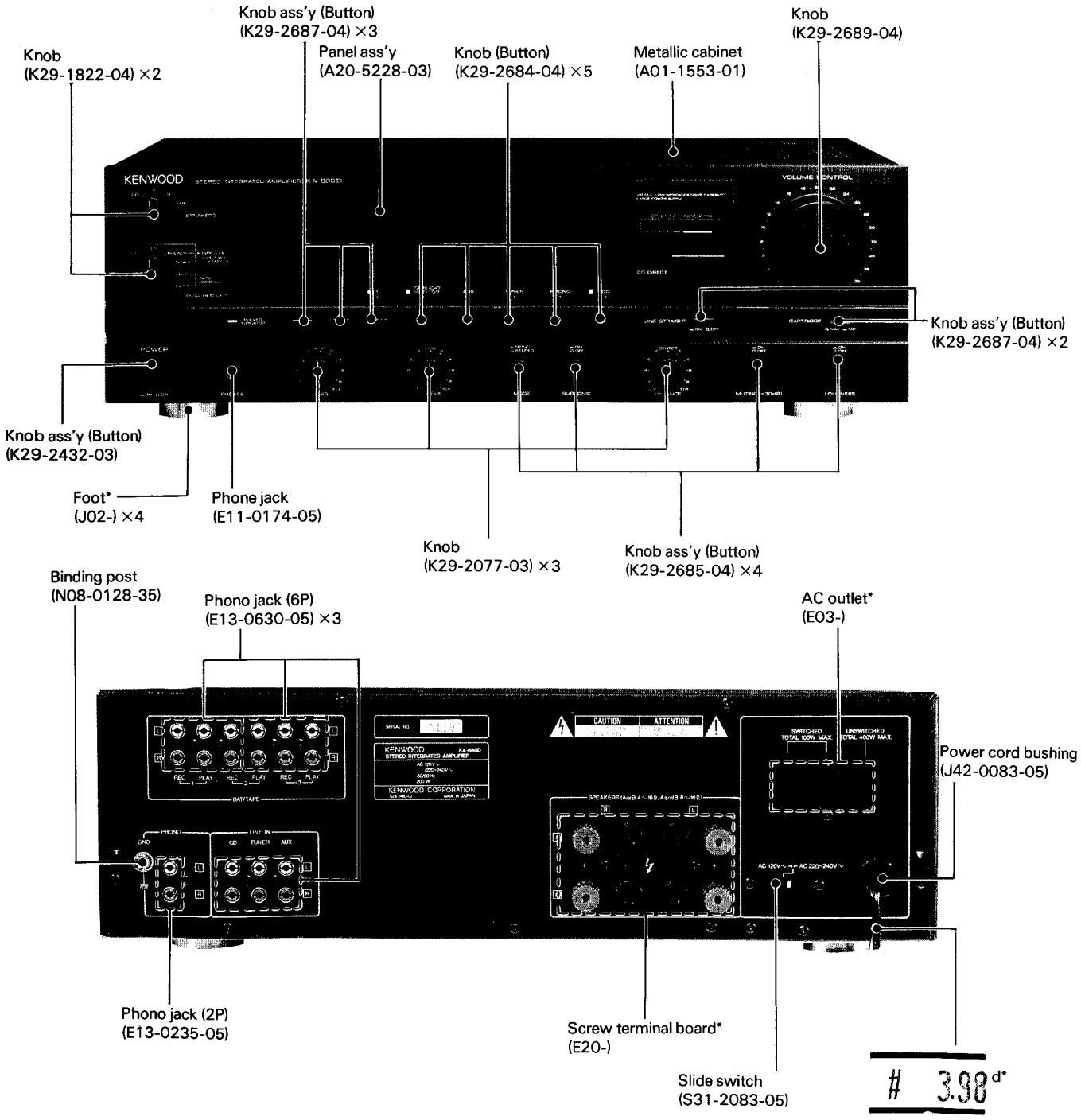
STEREO INTEGRATED AMPLIFIER

KA-880D

SERVICE MANUAL

KENWOOD

B51-3186-00(B) 2289



3.98d*

* Refer to parts list on page 26.

KA-880D

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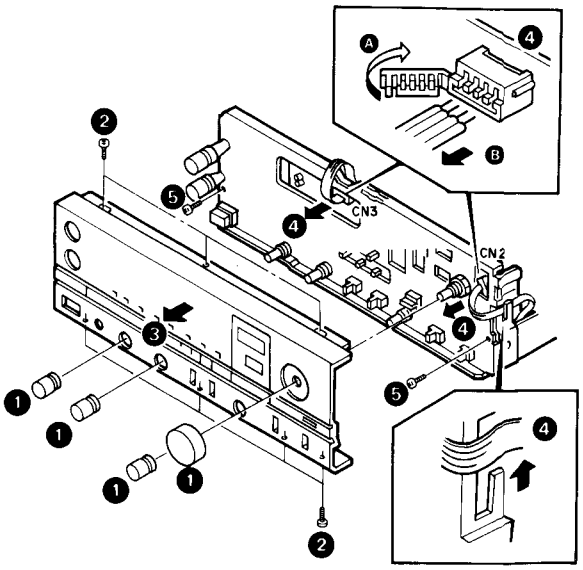
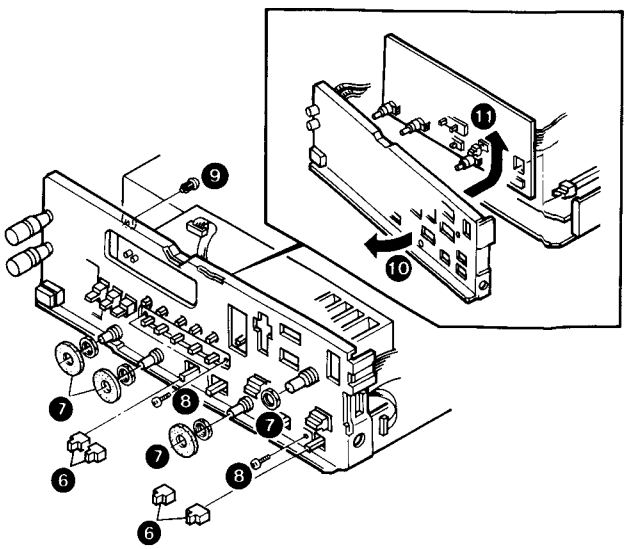
DISASSEMBLY FOR REPAIR

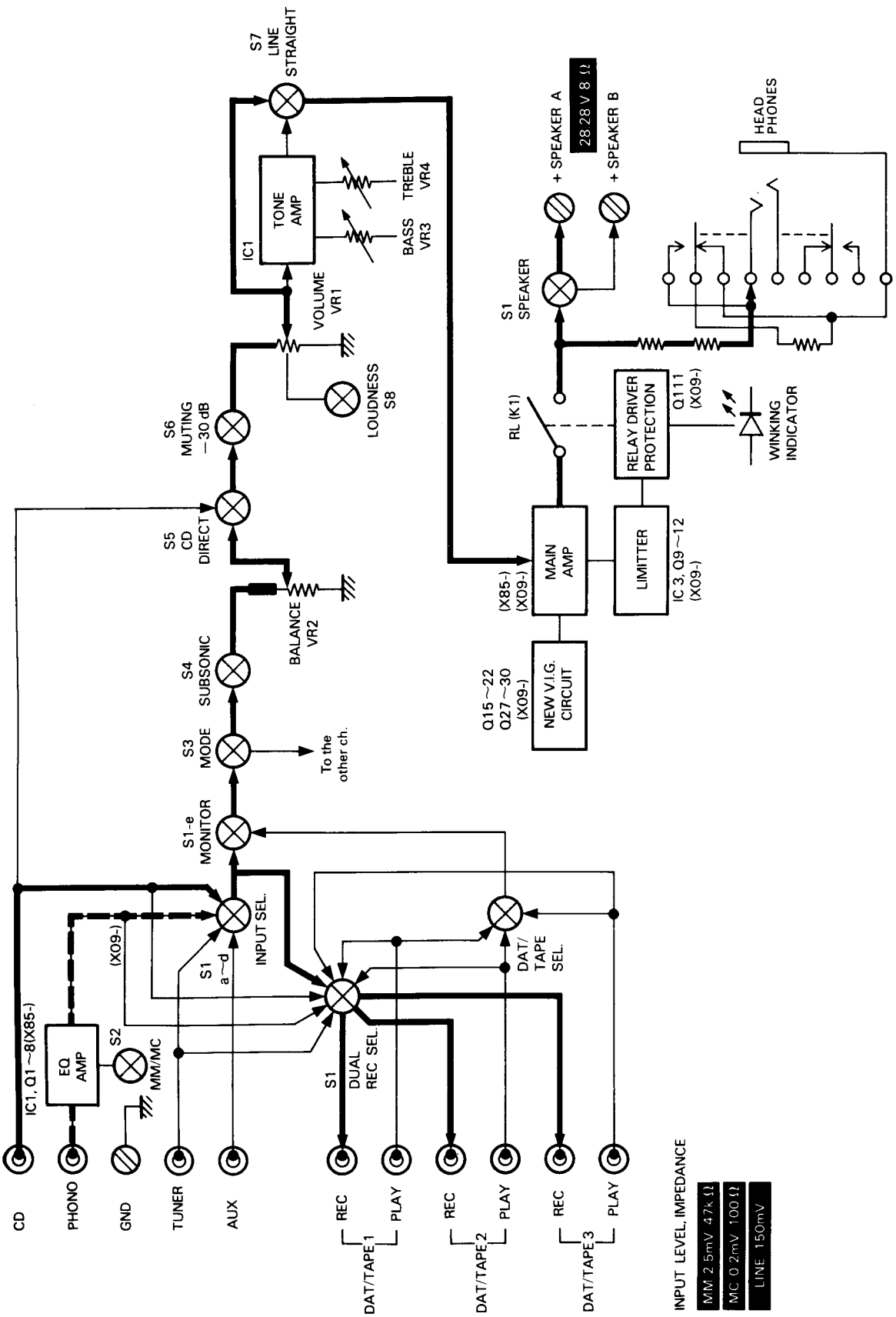
1. Remove the metallic cabinet before performing the following operations.
2. Pull out the 4 knobs of the BASS, TREBLE, BALANCE and VOLUME CONTROL from the shafts (❶).
3. Remove the 7 screws (upper side: 3, lower side: 4) fixing the front panel to the sub panel (❷).
4. Remove the front panel in the direction of the arrow (❸).
5. Remove the cords from connectors CN2 and CN3 on the Tone Unit (X11-2390-00) as shown in the diagram (❹).
6. Remove the 2 screws fixing the sub panel to the chassis (❺).



7. Pull out the 4 buttons of the MODE, SUBSONIC, MUTING and LOUDNESS from the shafts (❻).
8. Remove the shield and hex. nuts from the BASS, TREBLE, BALANCE and VOLUME CONTROL (❼).
9. Remove the 3 screws fixing the sub panel to the Tone Unit (X11-) (❽).
10. Remove the push rivet fixing the Tone Unit (X11-) to the sub panel (❾).
11. Remove the sub panel in the direction of the arrow (❿).
12. Remove the Tone Unit (X11-) from the sub panel in the direction of the arrow (⓫).



BLOCK LEVEL DIAGRAM



CIRCUIT DESCRIPTION

Function of components

AUDIO UNIT (X09-2430-11)

Component	Use/Function	Operation/Condition/Interchangeability
Q1~4	Final transistor at High side	
Q5~8	Final transistor at Low side	
Q9~12	For protection	Current limiter. Limits the current to the final transistor when an overload condition occurs.
Q13, 14	For temperature compensation	Bias circuit. Compensates for the temperature of the final transistor.
Q15~22 Q27~30	For the VIG circuit	Consists of the cascode boot-strap circuit. The Cascode circuit is connected to the constant current circuit by Q15 to Q18 and to base ground by Q27 to Q30.
Q23, 24	For the driver	
Q25, 26	For the driver	
Q31, 32	For the driver	
Q33, 34	For the driver	
Q101, 102	For constant current to the EQ power supply section	Supplies a 2 to 6 mA current to the EQ power supply. An FET, having an Idss of 2—6 mA, can be used as a replacement part.
Q103, 104	For the EQ power supply	
Q105, 106	For the shock noise countermeasure of the EQ power supply	
Q107, 108	For constant current to the EQ power supply	
Q109, 110	For the class-A power supply	
Q111	For protection	Transmits the operation signal of the current limiters consisting of Q9 and Q10, to the protection IC (IC3).
Q112, 113	For blinking indicators	LED lights to indicate power, if the set is functioning correctly, when power is turned ON, the LED blinks until the amplifier is functioning correctly (for approx. 5 seconds). When the protection circuit functions due to the occurrence of an abnormal phenomenon in the power amplifier section the LED also blinks.
IC1, 2	For selection of the DLD circuit	Low/High select circuit for the DLD circuit.
IC3	For protection	μPC1237H.
D1, 2	For temperature compensation	
D3~6	For the VIG circuit	
D7~10	For the VIG circuit	
D11~14	For the power supply to the Low side of the DLD	
D15~18	For protection	
D51, 52	For the power supply to the tone control circuit; constant voltage	
D53, 54	For the EQ power supply; constant voltage	
D55	For the EQ power supply	
D56, 57	For the static electricity countermeasure	
D58	For the LED power supply	W06B.
D59, 60	For protection	
D61, 62	For the class-A power supply	
D63, 64	For the class-A power supply	
D65	For blinking indicators	
D66	For the power supply to the High side	
D67	For the power supply to the Low side	
D68	LED for the power indicator	

TONE UNIT (X11-2390-00)

Component	Use/Function	Operation/Condition/Interchangeability
IC1	For the tone control circuit	Function for the ±6.2 V power supply, to which the Zener effect is applied by X09.

CIRCUIT DESCRIPTION

New VIG DLD circuit

1. Features

As the successor model to the KA-1100D, the KA-880D retains the rich array of functions available on the KA-1100D, making the KA-880D the perfect amplifier for a sophisticated model like the KA-880SD. The KA-880D incorporates new technology appropriate for an up-market integrated amplifier, such as;

1. A new VIG DLD (Dynamic Linear Drivel circuit
2. A dual REC OUT switch

2. A New VIG DLD Circuit (X09-2430-11)

Refer to the KA-990V new-product data for an explanation of the principle on which VIG operates.

The configuration of the VIG circuit incorporated in the current KA-990V is depicted in Fig. 1.

In addition to preventing the influx of undesirable power source components (such as ripples) into the Q1 driver transistor, the VIG circuit also applies a bootstrap to the output as shown in Fig 1 Ⓐ. The output from the VIG then follows the output from the amplifier in a constant voltage shift pattern. The input signal is no longer absorbed by the power source according to the potential which exists between the input and the power, and high-frequency characteristics and distortion rates are improved.

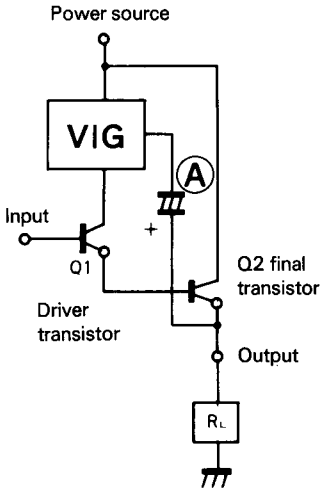


Figure 1 Configuration of a Conventional VIG Circuit

As a result, the voltage across the output of Q1 (the emitter) and the power source (the collector) is held constant whether or not there is a signal (see Fig. 2).

This insertion of a VIG circuit in the intial stage of a Darlington connection circuit means that undesirable power source components do not undergo current amplification at Q2, the final transistor. In other words, large-capacity power sources free of ripples become the norm.

Upon further investigation, however, doubts arose concerning operation of the Q2 driver transistor at the above-mentioned constant voltage. That is, the voltage across the transistor base and emitter could be thought of as normally about 0.6 volts, but the final transistor voltage shifted between 0.6 to about 2.0 volts in keeping with the output current (see Fig. 3). In the conventional configuration depicted in Fig. 1, this shift caused the voltage applied to the driver transistor Q1 to shift as well. It became clear that with the conventional configuration undesirable power source components were suppressed, but this in turn produced new voltage shift components.

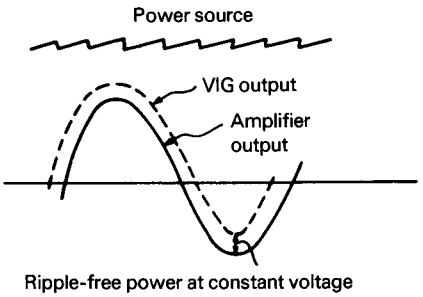


Figure 2 VIG Output and Amplifier Output

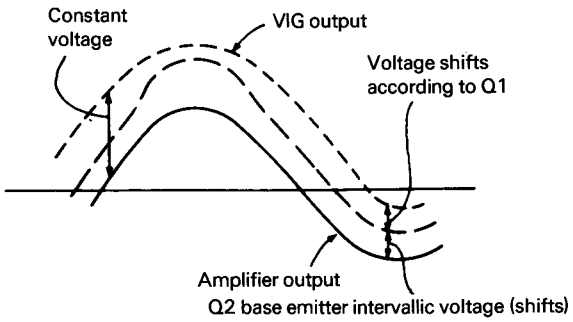


Figure 3 VB-E and VIG Output

CIRCUIT DESCRIPTION

The new VIG circuit applies a bootstrap to the Q2 final transistor base as shown in Fig. 4. In addition, a buffer has been inserted so that any undesirable power source components which may leak through the bootstrap do not undergo current amplification at Q2.
With this configuration, the new VIG circuit permits capacities to be utilized to the fullest extent.
Undesirable power source components can be suppressed, as can the shift component produced by operation of the circuit itself, for effectiveness 25 times greater than that of conventional circuit configurations. This permits Q1 to operate at an ideal constant voltage and allows only very pure signals to be input to the final transistor, making possible "cleaner" overall amplification.

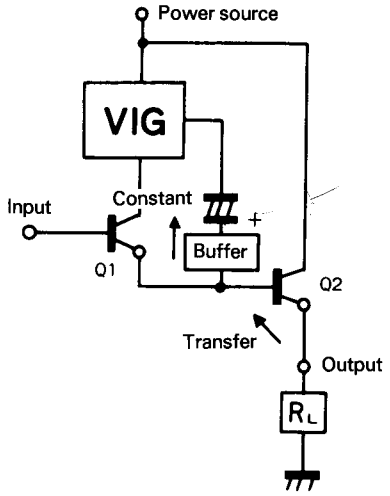


Figure 4 Configuration of the New VIG Circuit

3. Effects of the New VIG Circuit

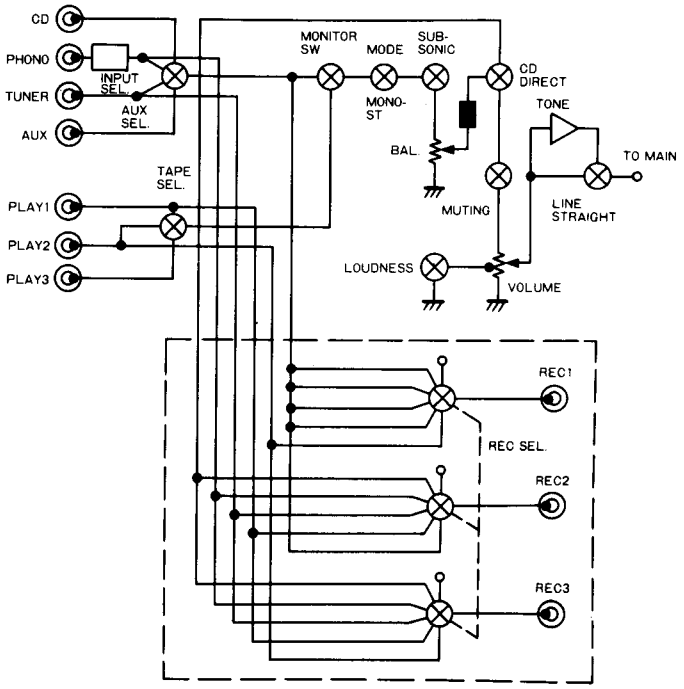
1. Effects on the amplifier of ripples and signal components caused by the power source, as well as the cross modulation distortion to which they give rise, are drastically reduced for clear, sharp audio.
2. Power can be boosted accordingly (over 10 times conventional levels) for brilliant audio.
3. Improves raw effects at the pre-negative feedback voltage amplification stage for broad band, low-distortion sound.
4. Reduces dynamic crosstalk and other power source-induced interference.

4. Dual REC OUT Switch (X13-5632-71)

REC 1, 2, 3 output the signals indicated in the chart at right.
REC 1 functions as the source selector, while REC 2 and REC 3 functions as the REC selector.
During tape dubbing, the source signal is output at the playback TAPE REC-OUT.

POSITION	REC1	REC2	REC3
OFF	OFF	OFF	OFF
CD →2, 3	SOURCE	CD	CD
PHONO →2, 3	SOURCE	PHONO	PHONO
TUNER →2, 3	SOURCE	TUNER	TUNER
TAPE 1 →2, 3	SOURCE	PLAY1	PLAY1
TAPE 2 →1, 3	PLAY2	SOURCE	PLAY2

Note: Signal selected by the SOURCE INPUT SEL.



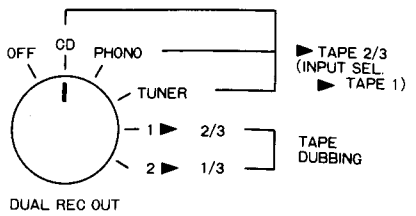
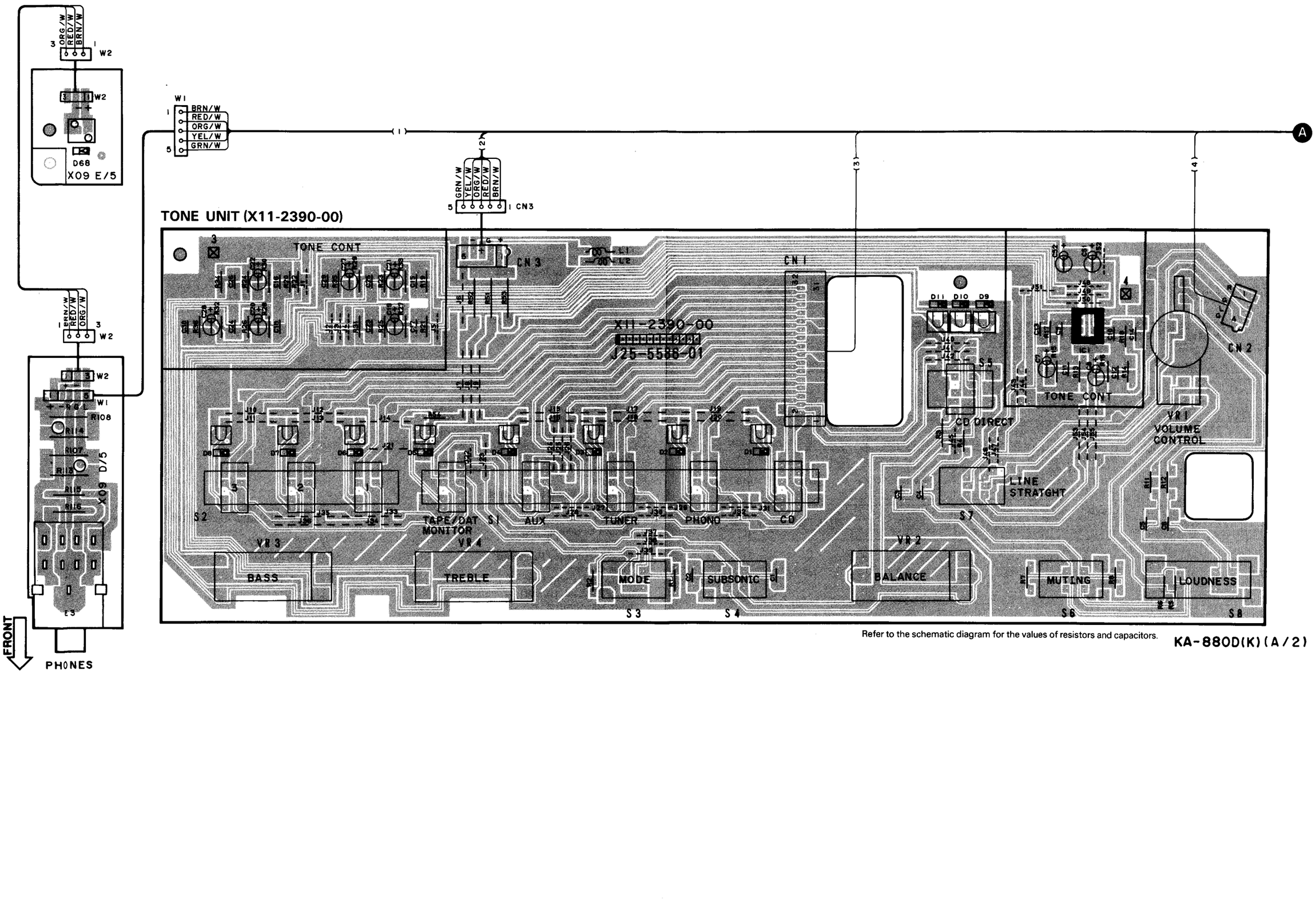


Figure 5

PC BOARD (COMPONENT SIDE)



Refer to the schematic diagram for the values of resistors and capacitors.

KA-880D(K)(A/2)

CIRCUIT DESCRIPTION

Headphone circuit (X09-2430-11)

In the headphone circuit, the following points are different from the conventional circuit used with headphones having a higher impedance.

1) The constants are determined using a standard phone jack with switch, so that the output impedance of the headphones is 120 ohms. When the phone jack is inserted, R115 is placed between HOT and GND. (See Fig. 7)
2) When the phone jack is not inserted, the R115 circuit located between HOT and GND, is open. (See Fig. 8)

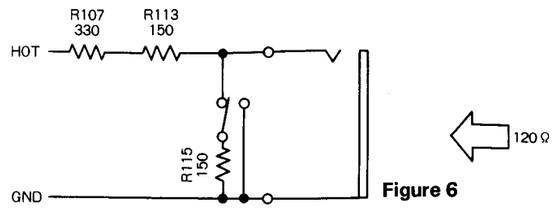


Figure 6

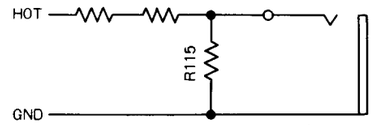


Figure 7

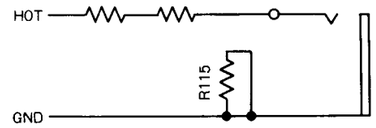


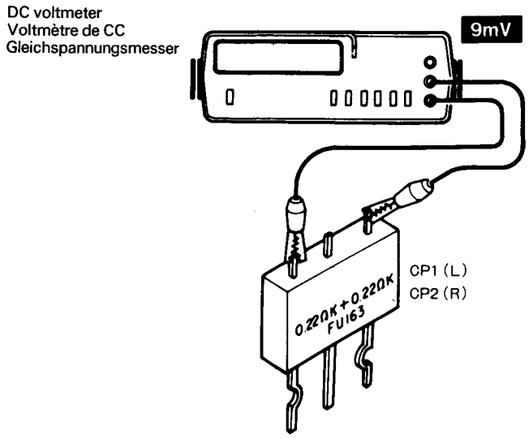
Figure 8

ADJUSTMENT/REGLAGE/ABGLEICH

No.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	AMPLIFIER SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
1	IDLE CURRENT	–	Connect a DC voltmeter across CP1 (L) CP2 (R)	VOLUME: 0	VR1 (L) VR2 (R)	9mV	(a)

N°	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DE L'AMPLIFICATEUR	POINS L'ALIGNEMENT	ALIGNER POUR	FIG.
1	COURANT DE POLARISATION	–	Connecter un voltmètre de CC sur CP1 (G) CP2 (D)	VOLUME: 0	VR1 (G) VR2 (D)	9mV	(a)

NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	VERSTÄRKER EINSTELLUNG	ABGLEICH-PUNKTE	ABGLEICHEN FÜR	ABB.
1	LEERLAUFSTROM	–	Einen Gleichspannungs-messer über CP1 (L) CP2 (R) anschließen.	VOLUME: 0	VR1 (L) VR2 (R)	9mV	(a)



(a)

SPECIFICATIONS

Power Output

100 watts per channel minimum RMS, both channels driven at 8 ohms from 20 Hz to 20,000 Hz with no more than 0.008% total harmonic distortion

Maximum Continuous Power Output (DIN) 1 kHz at 4 ohms	145 W
Maximum Continuous Power Output (DIN) 1 kHz at 8 ohms	120 W
Maximum Continuous Power Output (IEC/NF) from 63 Hz to 12,500 Hz 0.7%	
Total Harmonic Distortion at 8 ohms	120 W + 120 W
Dynamic Power	165 W per channel at 8 ohms 235 W per channel at 4 ohms 265 W per channel at 2 ohms

Total Harmonic Distortion	
AUX input to SPEAKER output (20 Hz-20,000 Hz)	: 0.008% at 100 W into 8 ohms
Intermodulation Distortion (60 Hz:7 kHz = 4:1)	: 0.008% at 100 W into 8 ohms
Damping Factor	: 1,000 (50 Hz into 8 ohms)
Power Bandwidth	: 10 Hz to 45 kHz at 0.04% T.H.D.
Frequency Response	: 5 Hz to 100 kHz/ + 0 dB, − 3 dB
Input Sensitivity/Impedance	
PHONO (MM)	: 2.5 mV/ 47 kohms
PHONO (MC)	: 0.2 mV/100 ohms
TUNER/AUX/TAPE	: 150 mV/ 47 kohms
Signal to Noise Ratio (IHF-A)	
PHONO (MM)	: 86 dB (2.5 mV)
PHONO (MC)	: 67 dB (250 μV)
TUNER/AUX/TAPE	: 108 dB
Signal to Noise Ratio Unweighted: 50 mW (DIN)	
PHONO (MM)	: 58 dB
PHONO (MC)	: 58 dB
TAPE/AUX/TUNER	: 59 dB
Channel Separation (at 1,000 Hz) (DIN)	
PHONO (Terminated with 2.2 kohms)	: 67 dB
AUX (Terminated with 47 kohms + 250 pF)	: 56 dB
Phono Input Capacity (DIN)	
(MM)	: 320 pF
(MC)	: 320 pF
Phono Maximum Input Level	
(MM)	: 200 mV, (RMS) T.H.D. 0.008% at 1 kHz
(MC)	: 15 mV, (RMS) T.H.D. 0.008% at 1 kHz
Output Level/Impedance	
TAPE REC	: 150 mV/330 ohms
Phono Frequency Response	: RIAA standard curve ±0.3 dB (20 Hz to 20 kHz)
Tone Control	
BASS (at 100 Hz)	: ±10 dB
TREBLE (at 10 kHz)	: ±10 dB
Loudness Control (at − 30 dB Volume Level)	: 9 dB at 100 Hz
Subsonic Filter (at − 3 dB)	: 6 dB/Oct. at 18 Hz

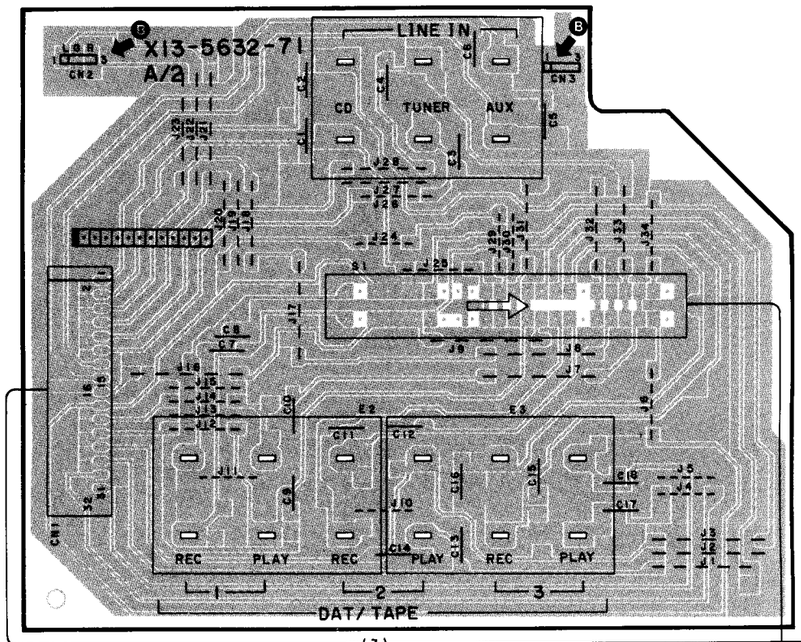
GENERAL

Power Requirements	: 120 V, 60 Hz.....U.S.A. and Canada Model 220 V, 50 Hz .....European Model 240 V, 50 Hz.....U.K. Model 120/220-240 V, 50/60 Hz switchable.....Other Countries
Power Consumption	: 5.5 A at rated output power into 8 ohms (U.S.A. and Canada Model) 200 W at rated output power into 8 ohms (Other Countries)
Dimensions	: W 440 mm (17-5/16″) H 144 mm (5-11/16″) D 343 mm (13-1/2″)
Weight (Net)	: 10.0 kg (22.0 lb)

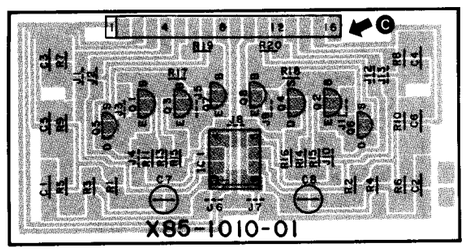
(IHF'66)

Note:
We follow a policy of continuous advancements in development. For this reason specifications may be changed without notice.

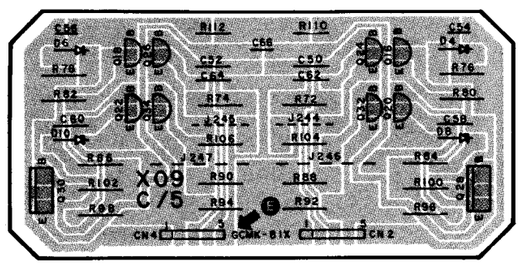
SUB-CIRCUIT UNIT (X13-5632-71)

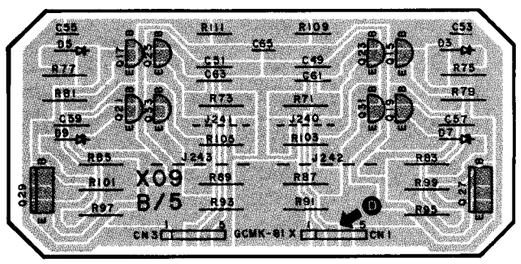


PREAMPLIFIER UNIT (X85-1010-01)



AUDIO UNIT (X09-2430-11)





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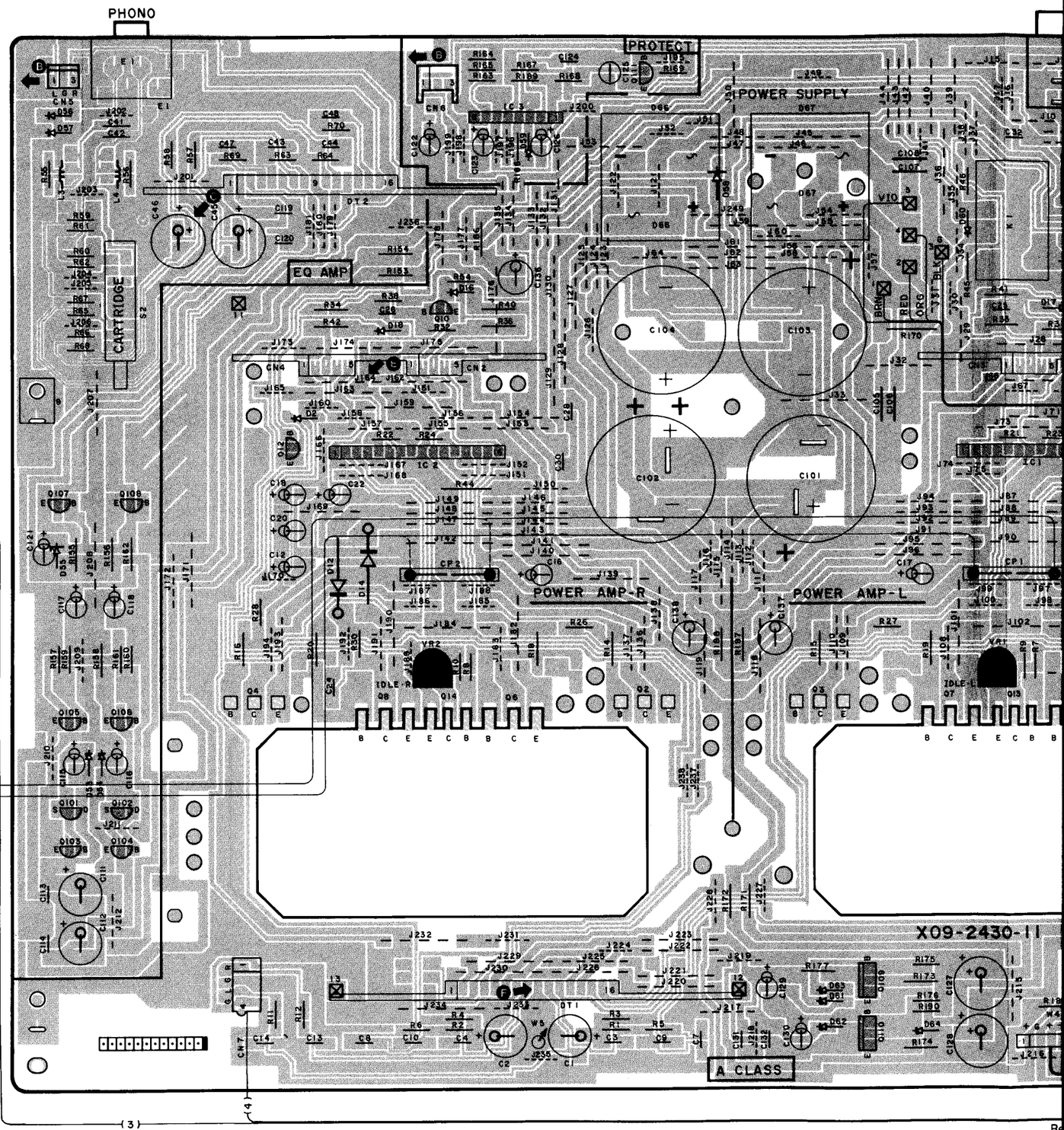
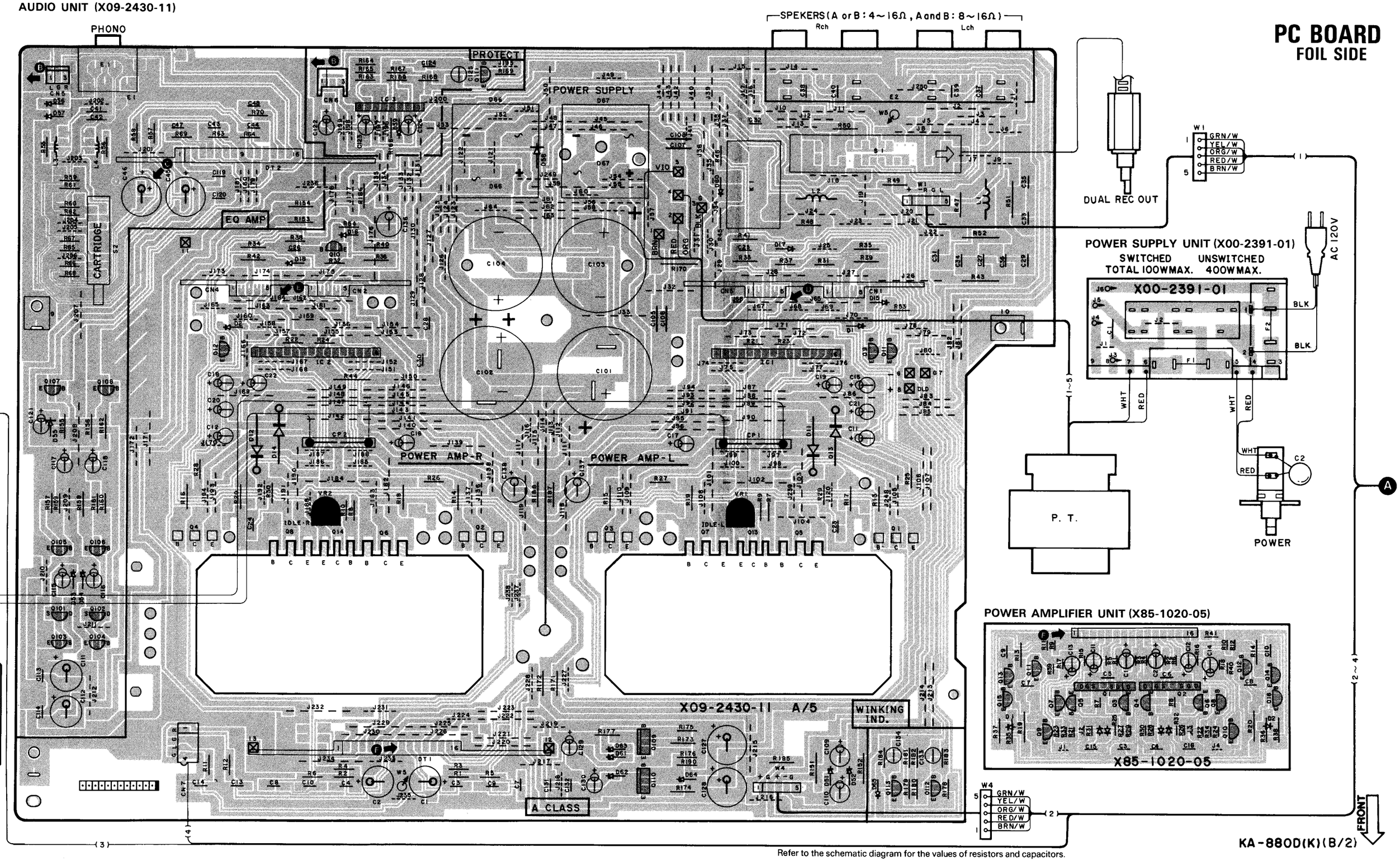


SPEKERS

(a) 9 mV

DC voltmeter

AUDIO UNIT (X09-2430-11)



Refer to the schematic diagram for the values of resistors and capacitors.

PC BOARD
FOIL SIDE

SPEKERS (A or B: 4 ~ 16Ω , A and B: 8 ~ 16Ω)
Lch Rch

PHONO

AUDIO UNIT (X09-2430-11)

DUAL REC OUT

AC 120V

POWER SUPPLY UNIT (X00-2391-01)

UNSWITCHED 400W MAX. SWITCHED TOTAL 100W MAX.

X00-2391-01

GRN/W
YEL/W
ORG/W
RED/W
BRN/W

POWER

P. T.

POWER AMPLIFIER UNIT (X85-1020-05)

X85-1020-05

X09-2430-11 A/5

POWER SUPPLY
PROTECT
EQ AMP
CARTRIDGE
POWER AMP-L
POWER AMP-R
WINKING IND.
A CLASS
IDLE L
IDLE R
VR1
VR2
CP1
CP2
IC1
IC2
IC3
CN1
CN2
CN3
CN4
CN6
CN7
DT1
DT2
W1
W4
W5
J25-5587-01

FRONT

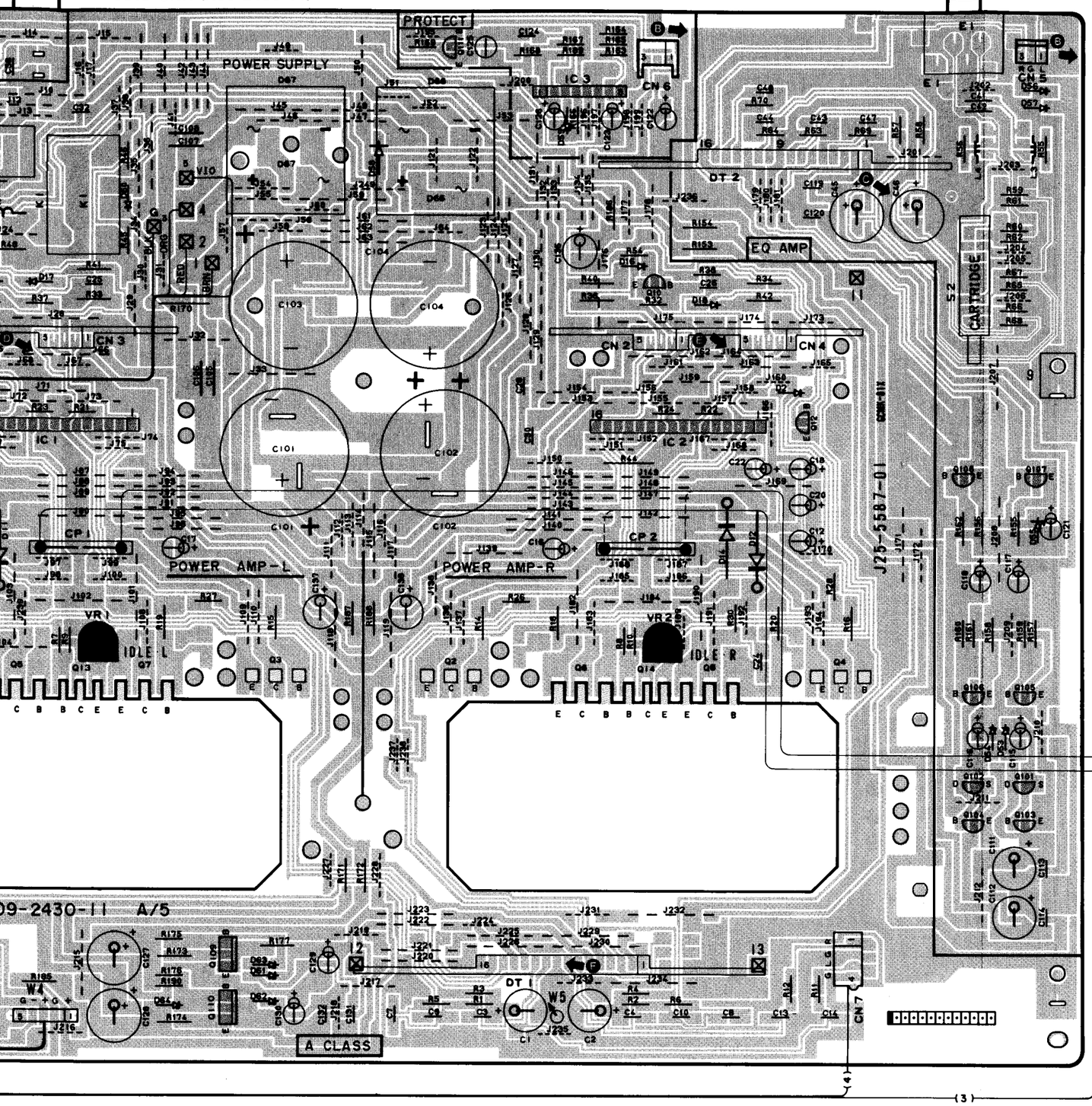
PC BOARD
COMPONENT SIDE

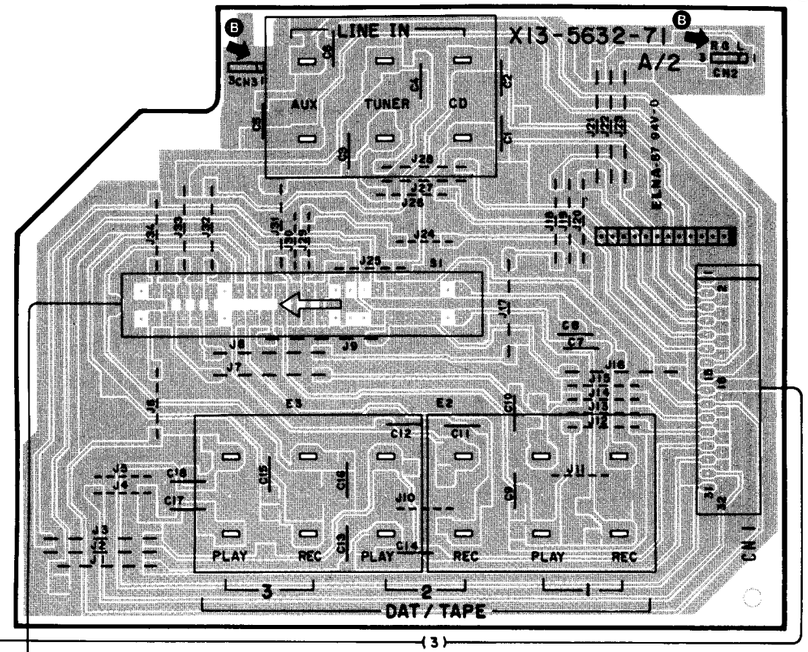
~16Ω)

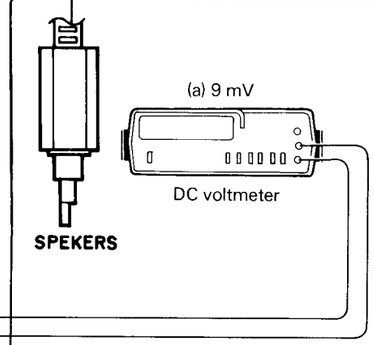
AUDIO UNIT (X09-2430-11)

PHONO

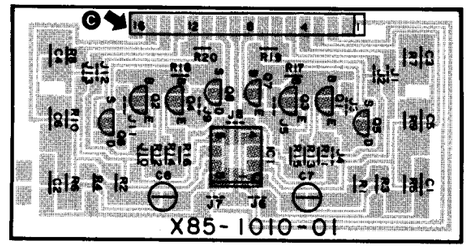
SUB-CIRCUIT UNIT (X13-5632-71)







PREAMPLIFIER UNIT (X85-1010-01)



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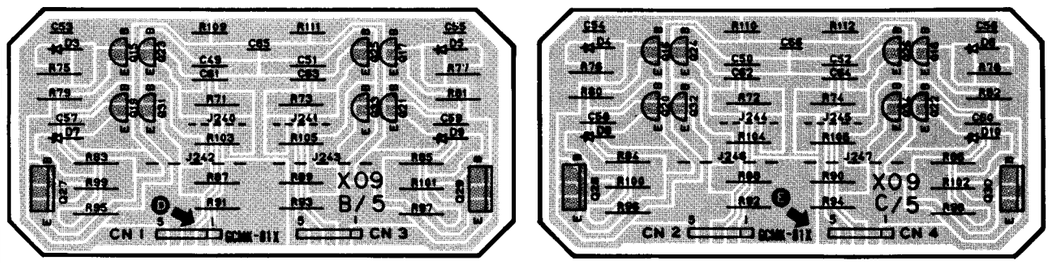
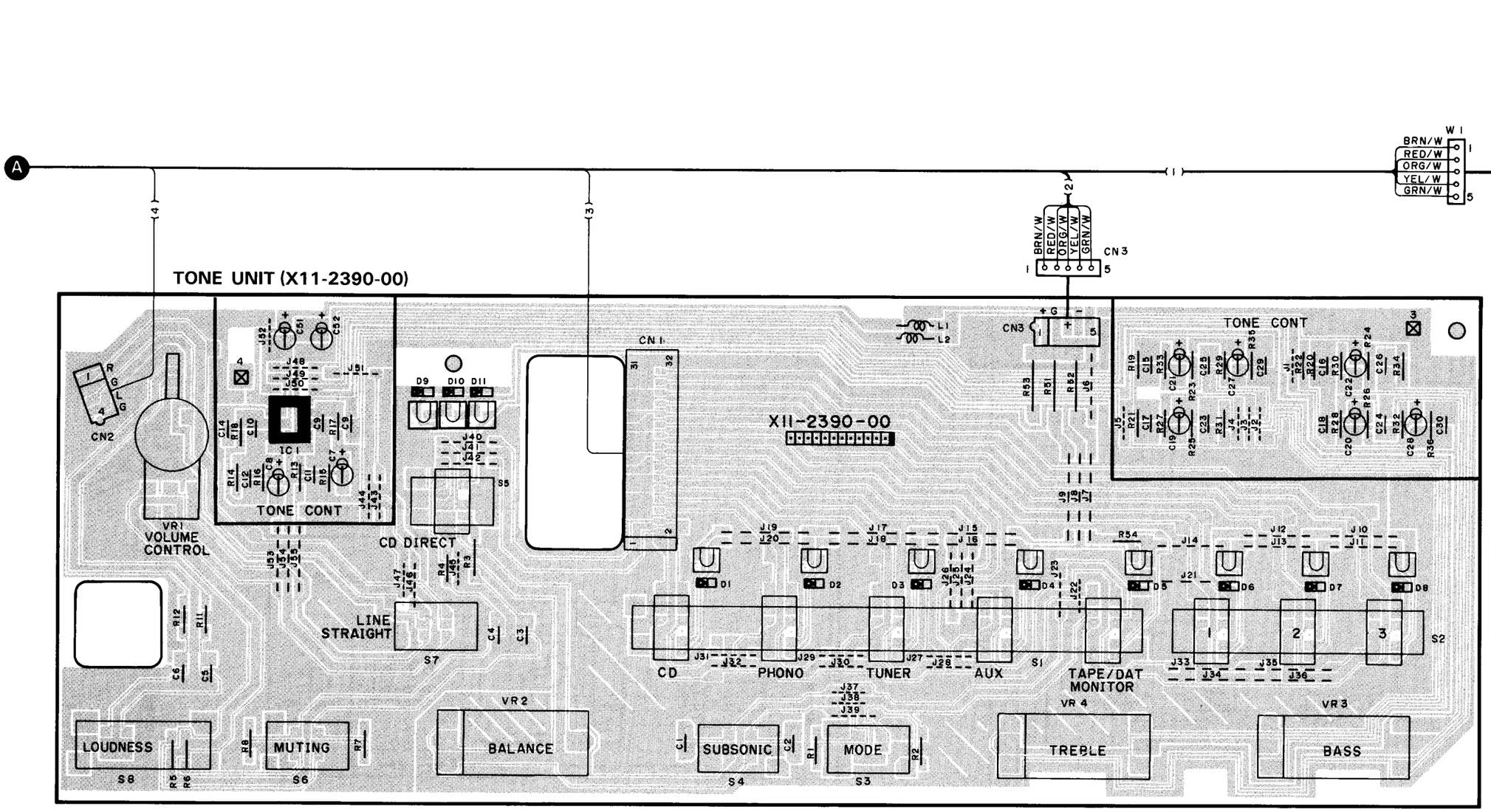


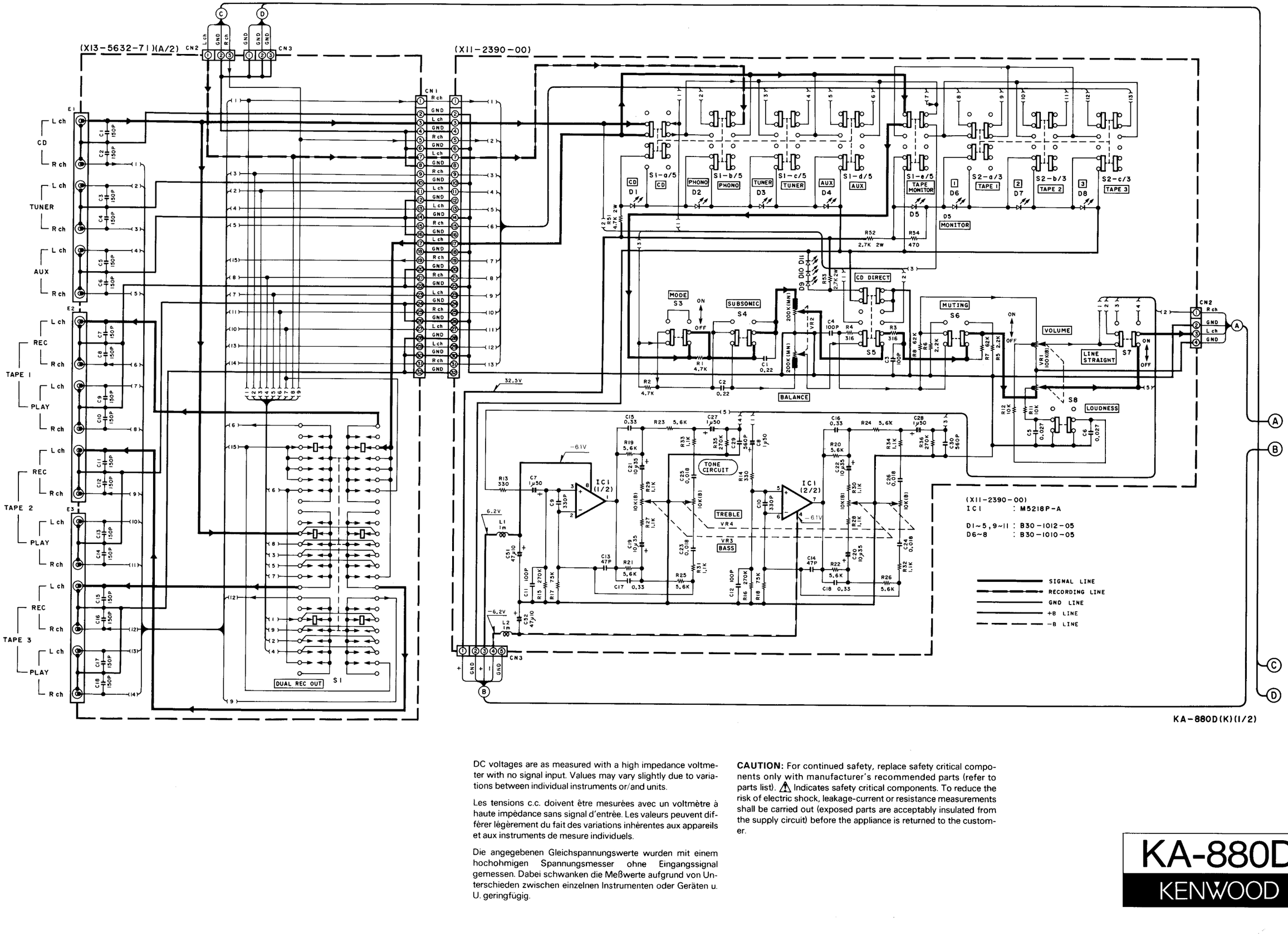
Refer to the schematic diagram for the values of resistors and capacitors.

PC BOARD (FOIL SIDE)



Refer to the schematic diagram for the values of resistors and capacitors.

KA-880D(K)(A/2)



DC voltages are as measured with a high impedance voltmeter with no signal input. Values may vary slightly due to variations between individual instruments or/and units.

Les tensions c.c. doivent être mesurées avec un voltmètre à haute impédance sans signal d'entrée. Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels.

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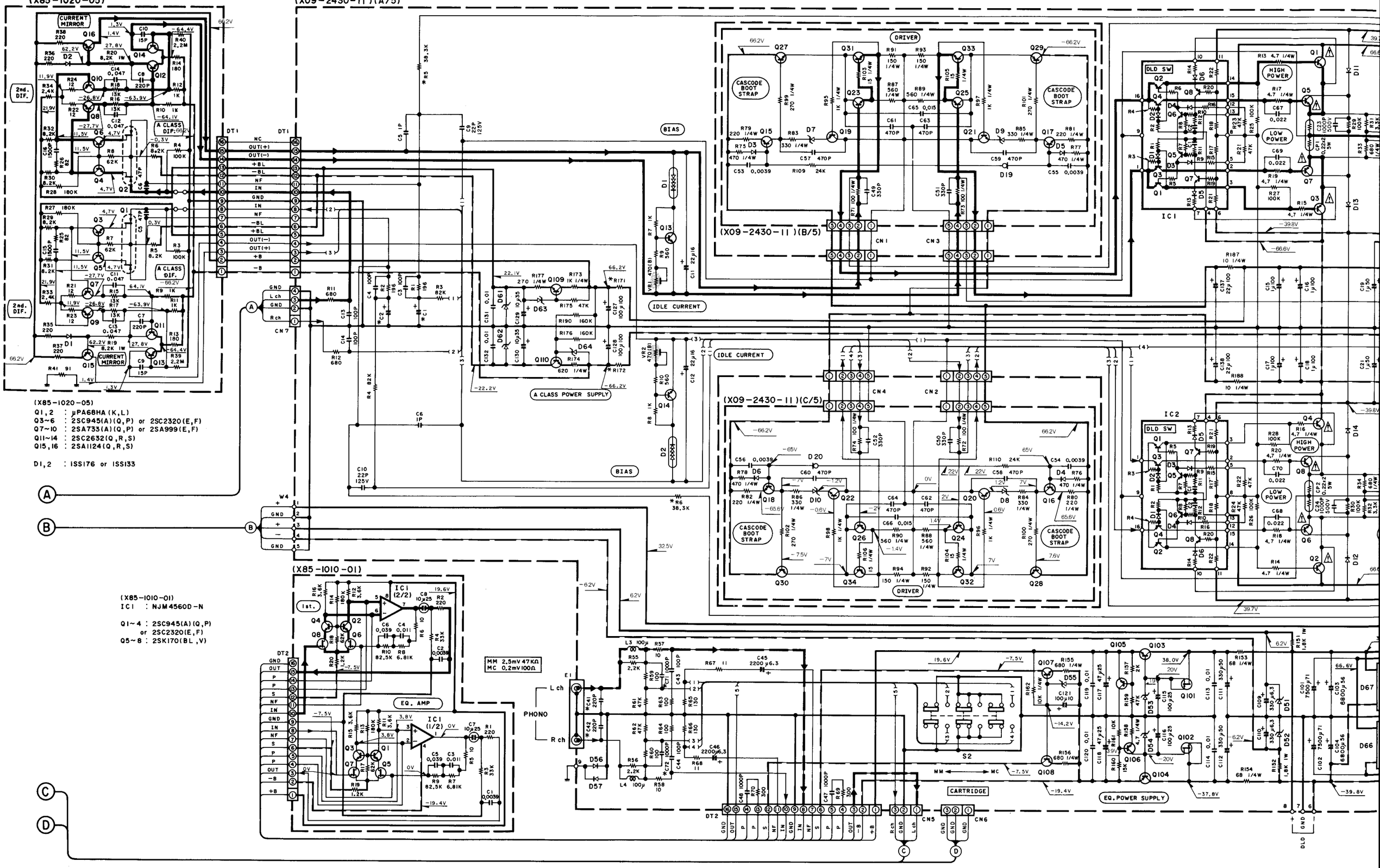
KA-880D

KENWOOD

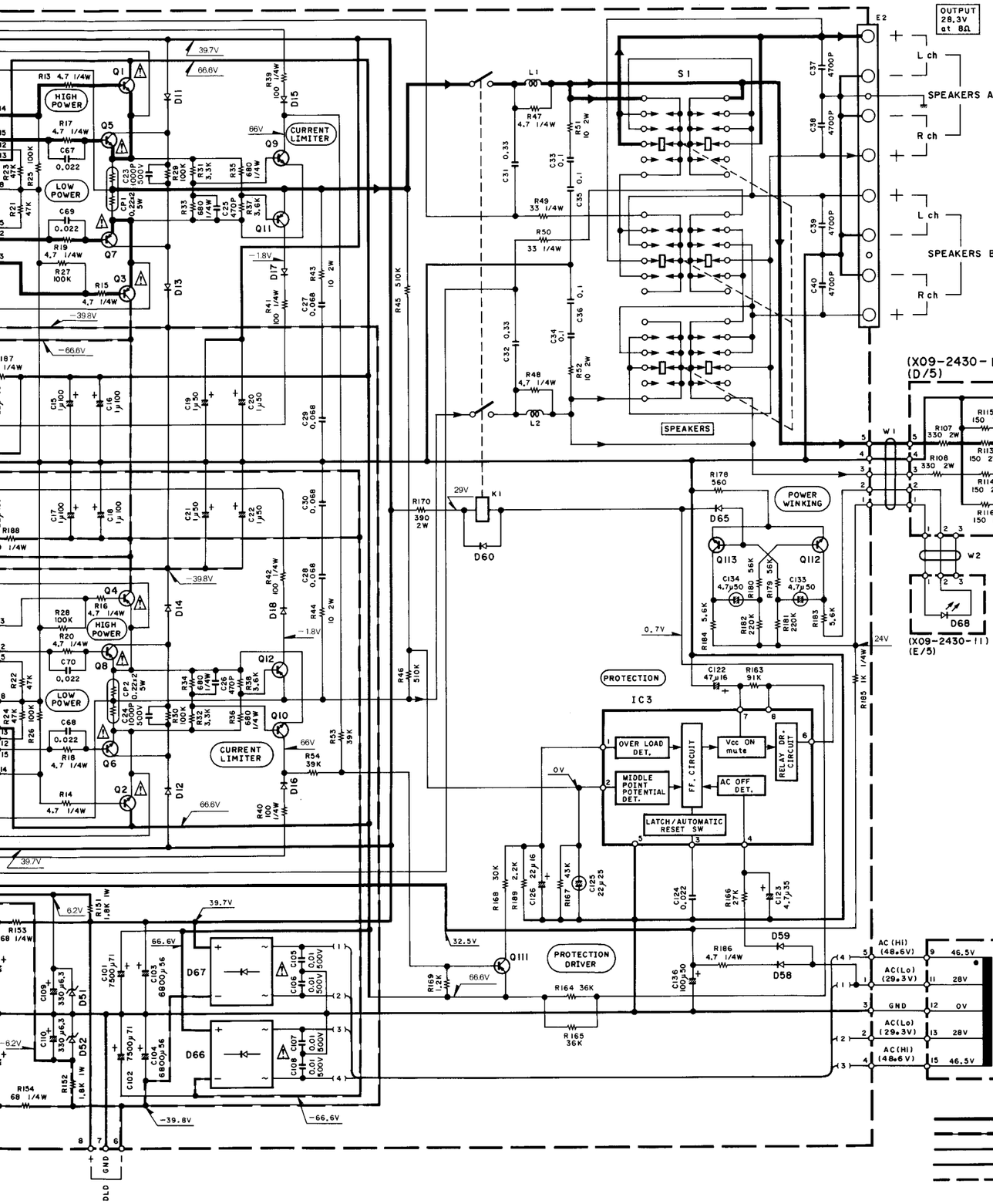


(X85-1020-05)
Q1,2 : μPA68HA(K,L)
Q3~6 : 2SC945(A)(Q,P) or 2SC2320(E,F)
Q7~10 : 2SA733(A)(Q,P) or 2SA999(E,F)
Q11~14 : 2SC2632(Q,R,S)
Q15,16 : 2SA1124(Q,R,S)

D1,2 : ISS176 or ISS133

(X85-1010-01)
IC1 : NJM4560D-N

Q1~4 : 2SC945(A)(Q,P)
or 2SC2320(E,F)
Q5~8 : 2SK170(BL,V)



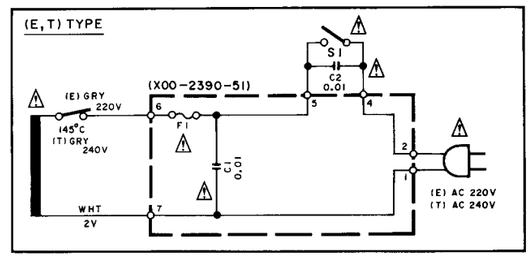
(X09-2430-11)

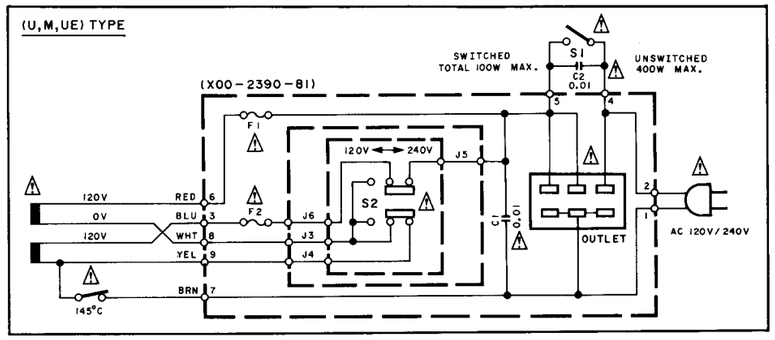
IC1,2	: TA2030
IC3	: μPC1237HA
Q1,2	: 2SD1718*5
Q3,4	: 2SB1163*5
Q5,6	: 2SC3854*5
Q7,8	: 2SA1490*5
Q9,10	: 2SC2631(R,S)
Q11,12	: 2SA1123(R,S)
Q13,14	: 2SC3419(Y)
Q15,16,111	: 2SA992(F,E)
Q17,18	: 2SC1845(F,E)
Q19,20,25,26	: 2SA733(A)(Q,P)
Q21~24	: 2SC945(A)(Q,P)
Q27,28	: 2SC3944(R,S)
Q29,30	: 2SA1535(R,S)
Q31,32	: 2SC3940A(R,S)
Q33,34	: 2SA1534A(R,S)
Q101,102	: 2SK105(H) or 2SK301(Q)
Q103	: 2SD882(Q,P)
Q104	: 2SB772(Q,P)
Q105,106	: 2SA733(A)(Q,P) or 2SA999(E,F)
Q107,108,112,113	: 2SC945(A)(Q,P) or 2SC2320(E,F)
Q109,110	: 2SC2167

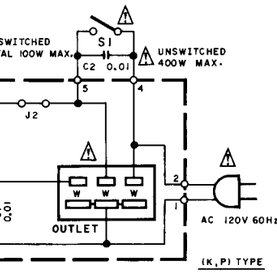
D1,2	: MA27Q(A)
D3~6,15~18,56,57	: ISS133 or ISS176
D7~10,55,63,64	: RD5.1JS(B2) or HZS5.1S(B2)
D11~14	: RU4Z
D19,20	: E-202
D51,52	: RD6.2ES(B) or HZS6.2N(B)
D53,54	: RD20JS(B) or HZS20S(B)
D58	: DSM1A1
D59,60,65	: ISS131 or ISS178
D61,62	: RD22JS(B) or HZS22S(B)
D66,67	: D5FB20*1
D68	: B30-1012-05

(X09-243)

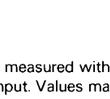
DESTINATION	No.	C1,2	C41,42	C71,72	R5,6	R171,172
K,P,U,M,UE	0~11	1000μ6.3	NO	NO	1/6W	10 1/4W
T	0~51	330μ16	NO	NO	1/4W	3.9 1/4W
E	2~71	330μ16	YES	YES	1/4W	3.9 1/4W



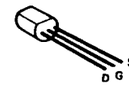




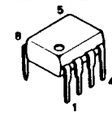
2SA1123
2SA1124
2SA1534A
2SA733(A)
2SA992
2SA999
2SC1845
2SC2320
2SC2631
2SC2632
2SC3940A
2SC945(A)



2SK105
2SK170
2SK301



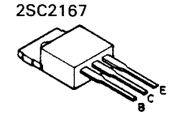
NJM4560D-N



2SB772
2SD882

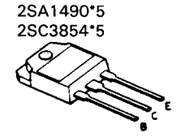
M5218P-A

2SC2167

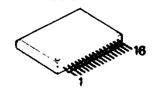


UPC1237HA

2SA1490*5
2SC3854*5

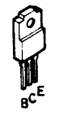


TA2030



2SC3419

2SA1535
2SC3944



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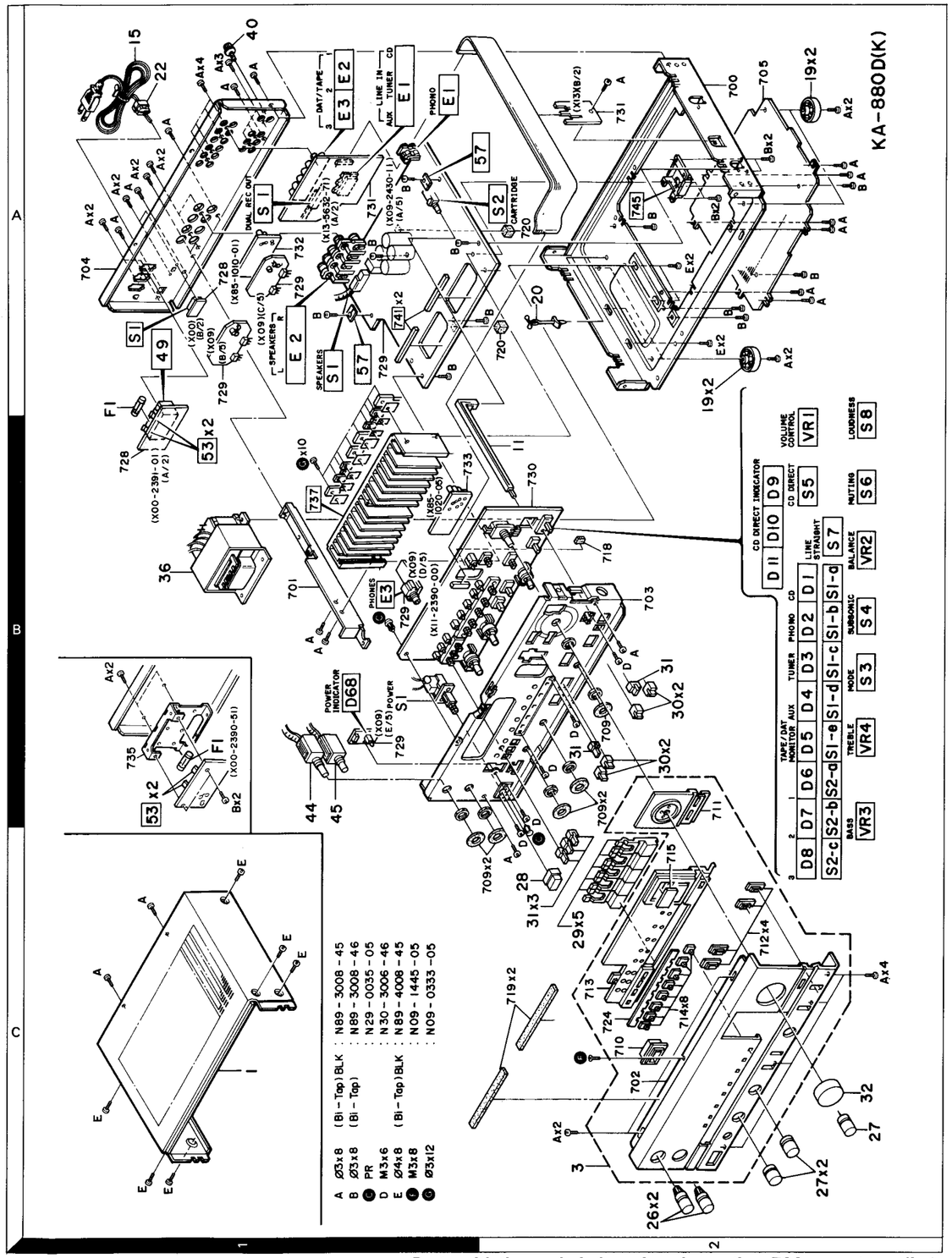
KA-880D(K)(2/2)

KA-880D
KENWOOD

EXPLODED VIEW



Parts with the exploded numbers larger than 700 are not supplied.

PARTS LIST

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			KA-880D			
1	1A	*	A01-1553-01	METALLIC CABINET		
3	2A	*	A20-5228-03	PANEL ASSY		
-			B46-0092-03	WARRANTY CARD	K	
-			B46-0094-03	WARRANTY CARD	UUE	
-			B46-0095-03	WARRANTY CARD	UUE	
-			B46-0121-03	WARRANTY CARD	P	
-			B46-0122-13	WARRANTY CARD	E	
-			B46-0143-03	WARRANTY CARD	T	
-		*	B50-6732-00	INSTRUCTION MANUAL(ENGLISH)		
-		*	B50-6733-00	INSTRUCTION MANUAL(FRENCH)	PME	
-		*	B50-6734-00	INSTRUCTION MANUAL(SPANISH)	M	
-		*	B50-6735-00	INSTRUCTION MANUAL(ARABIC)	M	
-		*	B50-6736-00	INSTRUCTION MANUAL(G,D,I)	E	
-			B58-0223-04	CAUTION CARD (PRE-SET 120V)	U	
-			B58-0269-04	CAUTION CARD	K	
-			B58-0513-04	CAUTION CARD (PRESET220-240)	UE	
-			B58-0803-03	CAUTION CARD	E	
-			B59-0092-00	SERVICE DIRECTORY	UUE	
⚠ C2			C91-0023-05	CERAMIC 0.01UF AC250V	UMUE	
⚠ C2			C91-0647-05	CERAMIC 0.01UF P	KPTE	
11	2B		D21-1104-03	EXTENSION SHAFT		
⚠ 15	1C		E30-0459-05	AC POWER CORD	E	
⚠ 15	1C		E30-0812-05	AC POWER CORD	UMUE	
⚠ 15	1C		E30-0978-05	AC POWER CORD	KP	
⚠ 15	1C		E30-1416-05	AC POWER CORD	T	
⚠ F1	1C		F05-3022-05	FUSE (250V 3A)	UMUE	
⚠ F1	1C		F05-3121-05	FUSE (SEMKO) (250V T3.15A)	TE	
⚠ F1	1C		F05-6027-05	FUSE (UL) (250V 6A)	KP	
-		*	H01-7519-04	ITEM CARTON CASE		
-		*	H10-3416-02	POLYSTYRENE FOAMED FIXTURE		
-		*	H10-3417-02	POLYSTYRENE FOAMED FIXTURE		
-			H25-0225-04	PROTECTION BAG (850X450X0.03)		
-			H25-0232-04	PROTECTION BAG (235X350X0.03)		
19	2C		J02-0127-05	FOOT	KP	
19	2C		J02-0156-05	FOOT (Ø40X12.5)	UMUETE	
20	2C	*	J11-0096-05	WIRE CLAMPER		
⚠ 22	1C		J42-0083-05	POWER CORD BUSHING		
-			J61-0307-05	WIRE BAND		
26	2A		K29-1822-04	KNOB (SPEAKERS,DUAL REC OUT)		
27	2A		K29-2077-03	KNOB (BASS,TREBLE,BALANCE)		
28	2A		K29-2432-03	KNOB ASSY(BUTTON)POWER		
29	2A	*	K29-2684-04	KNOB (BUTTON)INPUT		
30	2B	*	K29-2685-04	KNOB ASSY(BTN)MO,SUBS,MUTE,LO		
31	2A	*	K29-2687-04	KNOB ASSY(BUTTON)1-3,LINE		
32	2A	*	K29-2689-04	KNOB (VOLUME CONTROL)		
⚠ 36	1B	*	L01-7801-05	POWER TRANSFORMER	KP	
⚠ 36	1B	*	L01-7802-05	POWER TRANSFORMER	T	
⚠ 36	1B	*	L01-7804-05	POWER TRANSFORMER	UMUE	
⚠ 36	1B	*	L01-7807-05	POWER TRANSFORMER	E	

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40	1C		N08-0128-35	BINDING P⊗ST (GND)		
C	2A,1B		N29-0035-05	PUSH RIVET (3.5X5.5)		
F	2A		N09-1445-05	SET SCREW (M3X8)PANEL		
44	1B	＊	S90-0102-05	REM⊗TE WIRE (SPEAKERS)		
45	1B	＊	S90-0103-05	REM⊗TE WIRE (SELECT⊗R)		
⚠ -			S59-1083-05	THERMAL SWITCH	UMUETE	
⚠ -			S59-1084-05	THERMAL SWITCH	KP	
⚠ S1	1B		S40-1073-05	PUSH SWITCH (P⊗WER)	UMUETE	
S1	1B		S40-1094-05	PUSH SWITCH (P⊗WER TYPE)	KP	
POWER SUPPLY UNIT (X00-2391-01)						
⚠ C1			C91-0023-05	CERAMIC 0.01UF AC250V	UMUE	
⚠ C1			C91-0647-05	CERAMIC 0.01UF P	KPTE	
⚠ 49	1C	＊	E03-0077-05	AC ⊗UTLET	UMUE	
⚠ 49	1C	＊	E03-0078-05	AC ⊗UTLET	KP	
53	1B		J13-0041-05	FUSE CLIP	KPUMUE	
53	1B		J13-0054-05	FUSE CLIP	TE	
⚠ S1	1C		S31-2083-05	SLIDE SWITCH (P⊗WER TYPE)	UMUE	
AUDIO UNIT (X09-2430-11)						
D68	1B		B30-1012-05	LED(SLP-981C-50)P⊗WER IND.		
C1 ,2			CE04KW0J102M	ELECTR⊗ 1000UF 6.3WV	KPUMUE	
C1 ,2			CE04KW1C331M	ELECTR⊗ 330UF 16WV	TE	
C3 ,4			CQ09FS1H101JZS	P⊗LYSTY 100PF J		
C5 ,6			CC45FSL1H010C	CERAMIC 1.0PF C		
C9 ,10			C91-0170-05	P⊗LYSTY 22PF K		
C11 ,12			CE04KW1C220M	ELECTR⊗ 22UF 16WV		
C13 ,14			CQ09FS1H101JZS	P⊗LYSTY 100PF J		
C15 -18			CE04KW2A010M	ELECTR⊗ 1.0UF 100WV		
C19 -22			CE04KW1H010M	ELECTR⊗ 1.0UF 50WV		
C23 ,24			CK45FB2H102K	CERAMIC 1000PF K		
C25 ,26			CK45FB1H471K	CERAMIC 470PF K		
C27 -30			CF92FV1H683J	MF 0.068UF J		
C31 ,32			CF92FV1H334J	MF 0.33UF J		
C33 -36			CF92FV1H104J	MF 0.10UF J		
C37 -40			CK45FF1H472Z	CERAMIC 4700PF Z		
C41 ,42			C91-0749-05	CERAMIC 220PF K	E	
C43 ,44			CC45FSL1H101J	CERAMIC 100PF J		
C45 ,46			CE04KW0J222M	ELECTR⊗ 2200UF 6.3WV		
C47 ,48			CK45FB1H102K	CERAMIC 1000PF K		
C49 -52			C91-0751-05	CERAMIC 330PF K		
C53 -56			CF92FV1H392J	MF 3900PF J		
C57 -64			C91-0753-05	CHIP C 470PF K		
C65 ,66			CF92FV1H153J	MF 0.015UF J		
C67 -70			CF92FV1H223J	MF 0.022UF J		
C71 ,72			CK45FB1H102K	CERAMIC 1000PF K	E	
C101,102		＊	C90-1498-05	ELECTR⊗ 7500UF 71WV	KPUMUE	
C101,102		＊	C90-1513-05	ELECTR⊗ 7500UF 71WV	TE	
C103,104		＊	C90-1497-05	ELECTR⊗ 6800UF 56WV	KPUMUE	
C103,104		＊	C90-1512-05	ELECTR⊗ 6800UF 56WV	TE	
C105-108			CK45FE2H103P	CERAMIC 0.010UF P		
C109,110			CE04KW0J331M	ELECTR⊗ 330UF 6.3WV		
C111,112			CE04KW1H331M	ELECTR⊗ 330UF 50WV		

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C113,114			CF92FV1H103J	MF 0.010UF J		
C115,116			CE04KW1E101M	ELECTR⊗ 100UF 25WV		
C117,118			CE04KW1E470M	ELECTR⊗ 47UF 25WV		
C119,120			CF92FV1H103J	MF 0.010UF J		
C121			CE04KW1A101M	ELECTR⊗ 100UF 10WV		
C122			CE04KW1C470M	ELECTR⊗ 47UF 16WV		
C123			CE04KW1V4R7M	ELECTR⊗ 4.7UF 35WV		
C124			CF92FV1H223J	MF 0.022UF J		
C125			C90-1353-05	NP-ELEC 10UF 25WV		
C126			CE04KW1C220M	ELECTR⊗ 22UF 16WV		
C127,128			CE04KW2A101M	ELECTR⊗ 100UF 100WV		
C129,130			CE04KW1V100M	ELECTR⊗ 10UF 35WV		
C131,132			CF92FV1H103J	MF 0.010UF J		
C133,134			C90-1335-05	NP-ELEC 4.7UF 50WV		
C136			CE04KW1H101M	ELECTR⊗ 100UF 50WV		
C137,138			CE04KW2A220M	ELECTR⊗ 22UF 100WV		
57	1C		E23-0149-05	TERMINAL		
E1	1C		E13-0235-05	PH⊗N⊗ JACK (2P)		
E2	1C	＊	E20-0828-05	SCREW TERMINAL B⊗ARD	KPUMUE	
E2	1C	＊	E20-0828-05	SCREW TERMINAL B⊗ARD	E	
E2	1C	＊	E20-0829-05	SCREW TERMINAL B⊗ARD	T	
E3	1B	＊	E11-0174-05	PH⊗NE JACK		
L1 ,2			L39-0080-15	PHASE-C⊗MPENSATI⊗N C⊗IL		
L3 ,4			L40-1011-47	SMALL FIXED IND⊗CT⊗R(100UH,K)		
G	1B		N09-0333-05	TAPPING SCREW (/3X12)TR		
CP1 ,2			R90-0187-05	MULTI-C⊗MP 0.22X2 K 5W		
R1 ,2		＊	RN14BK2C1960F	RN 196.0 F 1/6W		
R5 ,6			RN14BK2C3832F	RN 38.3K F 1/6W	KPUMUE	
R5 ,6			RN14BK2E3832FTS	RN 38.3K F 1/4W	TE	
R13 -20			RD14AB2E4R7JTS	FL-PR⊗⊗F RD 4.7 J 1/4W		
R33 -36			RD14AB2E681JTS	FL-PR⊗⊗F RD 680 J 1/4W		
R39 -42			RD14AB2E101JTS	FL-PR⊗⊗F RD 100 J 1/4W		
R43 ,44			RS14DB3D100JTE	FL-PR⊗⊗F RS 10 J 2W		
R47 ,48			RD14AB2E4R7JTS	FL-PR⊗⊗F RD 4.7 J 1/4W		
R49 ,50			RD14AB2E330JTS	FL-PR⊗⊗F RD 33 J 1/4W		
R51 ,52			RS14DB3D100JTE	FL-PR⊗⊗F RS 10 J 2W		
R71 -74			RD14AB2E101JTS	FL-PR⊗⊗F RD 100 J 1/4W		
R75 -78			RD14AB2E471JTS	FL-PR⊗⊗F RD 470 J 1/4W		
R79 -82			RD14AB2E221JTS	FL-PR⊗⊗F RD 220 J 1/4W		
R83 -86			RD14AB2E331JTS	FL-PR⊗⊗F RD 330 J 1/4W		
R87 -90			RD14AB2E561JTS	FL-PR⊗⊗F RD 560 J 1/4W		
R91 -94		＊	RD14AB2E151JTS	FL-PR⊗⊗F RD 150 J 1/4W		
R95 -98			RD14AB2E102JTS	FL-PR⊗⊗F RD 1.0K J 1/4W		
R99 -102			RD14AB2E271JTS	FL-PR⊗⊗F RD 270 J 1/4W		
R103-106		＊	RD14AB2E150JTS	FL-PR⊗⊗F RD 15 J 1/4W		
R107,108			RS14DB3D331JTE	FL-PR⊗⊗F RS 330 J 2W		
R113,114			RS14DB3D151JTE	FL-PR⊗⊗F RS 150 J 2W		
R115,116		＊	RS14DB3A151JTE	FL-PR⊗⊗F RS 150 J 1W		
R151,152			RS14DB3A182JTE	FL-PR⊗⊗F RS 1.8K J 1W		
R153,154			RD14AB2E680JTS	FL-PR⊗⊗F RD 68 J 1/4W		
R155,156			RD14AB2E681JTS	FL-PR⊗⊗F RD 680 J 1/4W		
R158			RD14AB2E4R7JTS	FL-PR⊗⊗F RD 4.7 J 1/4W		

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PARTS LIST

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R162			RD14AB2E103JTS	FL-PROOF RD 10K J 1/4W		
R170			RS14DB3D391JTE	FL-PROOF RS 390 J 2W		
R171,172			RD14AB2E100JTS	FL-PROOF RD 10 J 1/4W	KPUMUE	
R171,172		*	RD14AB2E3R9JTS	FL-PROOF RD 3.9 J 1/4W	TE	
R173			RD14AB2E102JTS	FL-PROOF RD 1.0K J 1/4W		
R174		*	RD14AB2E621JTS	FL-PROOF RD 620 J 1/4W		
R177			RD14AB2E271JTS	FL-PROOF RD 270 J 1/4W		
R185			RD14AB2E102JTS	FL-PROOF RD 1.0K J 1/4W		
R186			RD14AB2E4R7JTS	FL-PROOF RD 4.7 J 1/4W		
R187,188			RD14AB2E100JTS	FL-PROOF RD 10 J 1/4W		
VR1 ,2			R12-0094-05	TRIMMING POT.(470)IDLE CURR		
K1			S51-2045-05	MAGNETIC RELAY		
S1	1C		S90-0062-05	SLIDE SWITCH (SPEAKERS)		
S2	2C	*	S40-6033-05	PUSH SWITCH (CARTRIDGE)		
D1 ,2			MA27Q(A)	VARISTOR		
D3 -6			1SS133	DIODE		
D3 -6			1SS176	DIODE		
D7 -10			HZS5.1S(B2)	ZENER DIODE		
D7 -10			RD5.1JS(B2)	ZENER DIODE		
D11 -14			RU4Z	DIODE		
D15 -18			1SS133	DIODE		
D15 -18			1SS176	DIODE		
D19 ,20			E-202	CONSTANT CURRENT DIODE		
D51 ,52		*	HZS6.2N(B)	ZENER DIODE		
D51 ,52		*	RD6.2ES(B)	ZENER DIODE		
D53 ,54			HZS20S(B)	ZENER DIODE		
D53 ,54			RD20JS(B)	ZENER DIODE		
D55			HZS5.1S(B2)	ZENER DIODE		
D55			RD5.1JS(B2)	ZENER DIODE		
D56 ,57			1SS133	DIODE		
D56 ,57			1SS176	DIODE		
D58			DSM1A1	DIODE		
D59 ,60			1SS131	DIODE		
D59 ,60			1SS178	DIODE		
D61 ,62		*	HZS22S(B)	ZENER DIODE		
D61 ,62			RD22JS(B)	ZENER DIODE		
D63 ,64			HZS5.1S(B2)	ZENER DIODE		
D63 ,64			RD5.1JS(B2)	ZENER DIODE		
D65			1SS131	DIODE		
D65			1SS178	DIODE		
D66 ,67			D5FB20*1	DIODE		
IC1 ,2			TA2030	IC(LO/HI SWITCHING)		
IC3			UPC1237HA	IC(POWER AMP)		
Q1 ,2		*	2SD1718*5	TRANSISTOR		
Q3 ,4		*	2SB1163*5	TRANSISTOR		
Q5 ,6			2SC3854*5	TRANSISTOR		
Q7 ,8			2SA1490*5	TRANSISTOR		
Q9 ,10		*	2SC2631(R,S)	TRANSISTOR		
Q11 ,12		*	2SA1123(R,S)	TRANSISTOR		
Q13 ,14			2SC3419(Y)	TRANSISTOR		
Q15 ,16			2SA992(F,E)	TRANSISTOR		
Q17 ,18			2SC1845(F,E)	TRANSISTOR		
Q19 ,20			2SA733(A)(Q,P)	TRANSISTOR		
Q21 -24			2SC945(A)(Q,P)	TRANSISTOR		

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Q25 ,26			2SA733(A)(Q,P)	TRANSISTOR		
Q27 ,28			2SC3944(R,S)	TRANSISTOR		
Q29 ,30			2SA1535(R,S)	TRANSISTOR		
Q31 ,32			2SC3940A(R,S)	TRANSISTOR		
Q33 ,34			2SA1534A(R,S)	TRANSISTOR		
Q101,102			2SK105(H)	FET		
Q101,102			2SK301(Q)	FET		
Q103			2SD882(Q,P)	TRANSISTOR		
Q104			2SB772(Q,P)	TRANSISTOR		
Q105,106			2SA733(A)(Q,P)	TRANSISTOR		
Q105,106			2SA999(E,F)	TRANSISTOR		
Q107,108			2SC2320(E,F)	TRANSISTOR		
Q107,108			2SC945(A)(Q,P)	TRANSISTOR		
Q109,110			2SC2167	TRANSISTOR		
Q111			2SA992(F,E)	TRANSISTOR		
Q112,113			2SC2320(E,F)	TRANSISTOR		
Q112,113			2SC945(A)(Q,P)	TRANSISTOR		
TONE UNIT (X11-2390-00)						
D1 -5	2B		B30-1012-05	LED(SLP-981C-50) CD,PHONO,ETC		
D6 -8	2A,2B		B30-1010-05	LED(SLP-281F-50U)1-3		
D9 -11	2B		B30-1012-05	LED(SLP-981C-50) CD DIRECT IND		.
C1 ,2			CF92FV1H224J	MF 0.22UF J		
C3 ,4			CQ09FS1H101JZS	POLYSTY 100PF J		
C5 ,6			CF92FV1H273J	MF 0.027UF J		
C7 ,8			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C9 ,10			CC45FSL1H331J	CERAMIC 330PF J		
C11 ,12			CQ09FS1H101JZS	POLYSTY 100PF J		
C13 ,14			CC45FSL1H470J	CERAMIC 47PF J		
C15 -18			CF92FV1H334J	MF 0.33UF J		
C19 -22			CE04KW1V100M	ELECTRO 10UF 35WV		
C23 -26			CF92FV1H183J	MF 0.018UF J		
C27 ,28			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C29 ,30			CK45FB1H561K	CERAMIC 560PF K		
C51 ,52			CE04KW1A470M	ELECTRO 47UF 10WV		
L1 ,2			L40-1021-14	SMALL FIXED INDUCTOR(1.0MH,K)		
R3 ,4		*	RN14BK2C3160F	RN 316.0 F 1/6W		
R51		*	RS14KB3D472JTE	FL-PROOF RS 4.7K J 2W		
R52 ,53		*	RS14KB3D272JTE	FL-PROOF RS 2.7K J 2W		
VR1	2B		R06-5152-05	POTENTIOMETER(100KB)VOL CONT		
VR2	2B	*	R06-5161-05	POTENTIOMETER(200K)BALANCE		
VR3 ,4	2B	*	R06-3053-05	POTENTIOMETER(10KB)BASS,TREBLE		
S1	2B	*	S42-5050-05	MULTIPLE PUSH SWITCH(CD,TUN)		
S2	2A,2B	*	S42-3106-05	MULTIPLE PUSH SWITCH(1-3)		
S3 ,4	2B		S40-2351-05	PUSH SWITCH(MODE,SUBSONIC)		
S5	2B		S40-4062-05	PUSH SWITCH(CD DIRECT)		
S6 ,7	2B		S40-2351-05	PUSH SWITCH(MITE,LINE STRAIGHT		
S8	2B	*	S40-2361-05	PUSH SWITCH(LOUDNESS)		
IC1			M5218P-A	IC(OP AMP X2)		
SUB-CIRCUIT UNIT (X13-5632-71)						
C1 -18			C91-0747-05	CERAMIC 150PF K		

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E1 -3	1C	*	E13-0630-05	PHONO JACK (DAT/TAPE,LINE)		
S1	1C		S90-0078-05	SLIDE SWITCH (DUAL REC OUT)		
PREAMPLIFIER UNIT (X85-1010-01)						
C1 ,2			CF92FV1H392J	MF 3900PF J		
C3 ,4			CF92FV1H113J	MF 0.011UF J		
C5 ,6			CF92FV1H393J	MF 0.039UF J		
C7 ,8			CE04HW1E100MEL	NP-ELEC 10UF 25WV		
R7 ,8		*	RN14BK2C6811FTS	RN 6.81K F 1/6W		
R9 ,10		*	RN14BK2C8252FTS	RN 82.5K F 1/6W		
IC1			NJM4560D-N	IC(OP AMP X2)		
Q1 -4			2SC2320(E,F)	TRANSISTOR		
Q1 -4			2SC945(A)(Q,P)	TRANSISTOR		
Q5 -8			2SK170(BL)	FET		
Q5 -8			2SK170(V)	FET		
POWER AMPLIFIER UNIT (X85-1020-05)						
C5 ,6			CC45FSL1H470J	CERAMIC 47PF J		
C7 ,8			CC45FSL1H221J	CERAMIC 220PF J		
C9 ,10			CC45FSL1H150J	CERAMIC 15PF J		
C11 -14			CK45FF1H473Z	CERAMIC 0.047UF Z		
C15 ,16			CK45FB1H152K	CERAMIC 1500PF K		
R13 ,14			RD14AB2E181JTS	FL-PROOF RD 180 J 1/4W		
R19 ,20		*	RS14DB3A822JTE	FL-PROOF RS 8.2K J 1W		
R35 -38			RD14AB2E221JTS	FL-PROOF RD 220 J 1/4W		
D1 ,2			1SS133	DIODE		
D1 ,2			1SS176	DIODE		
Q1 ,2			UPA68HA(K,L)	DUAL FET		
Q3 -6			2SC2320(E,F)	TRANSISTOR		
Q3 -6			2SC945(A)(Q,P)	TRANSISTOR		
Q7 -10			2SA733(A)(Q,P)	TRANSISTOR		
Q7 -10			2SA999(E,F)	TRANSISTOR		
Q11 -14			2SC2632(Q,R,S)	TRANSISTOR		
Q15 ,16			2SA1124(Q,R,S)	TRANSISTOR		

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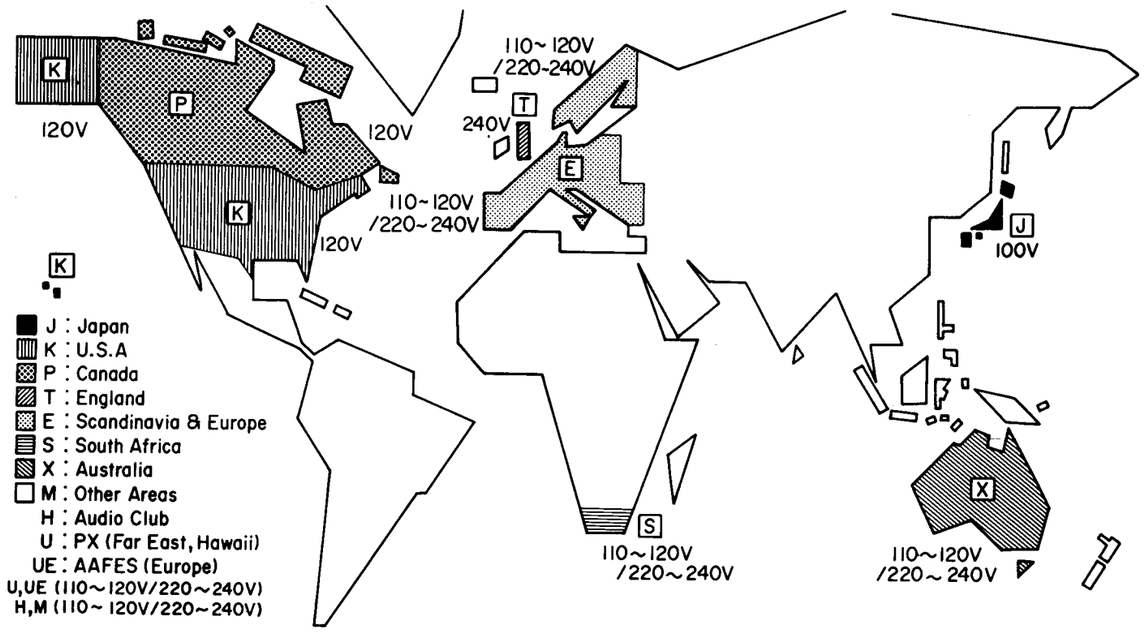
WORLD MAP & AREA CORD



Note:

Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on, the U.S. (K) 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.

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