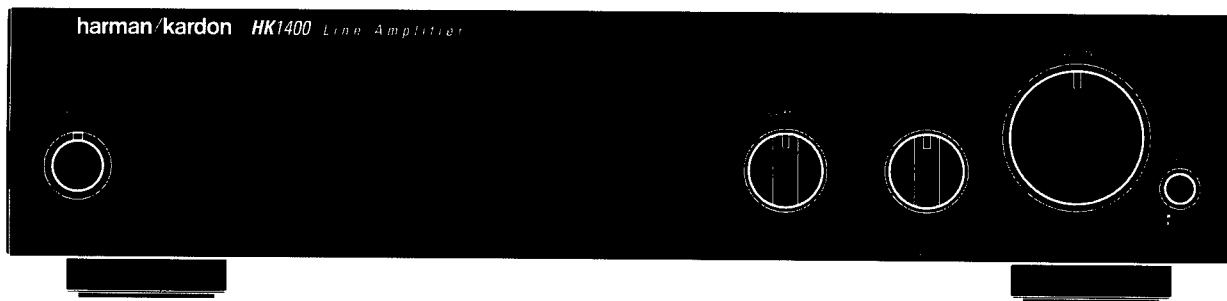


The Harman Kardon Model HK1200/HK1400 STEREO LINE AMPLIFIER

Manual 190A

Technical Manual

HK1200/HK1400



The following marks found in the parts list of this manual identify the models as follows.

- BK** : North America area model Black version
- IB** : International model Black version
- WB** : Asia/Oceania model Black version

CONTENTS

SPECIFICATIONS	2	GENERAL UNIT PARTS LIST	6
LEAKAGE TEST	2	GENERAL UNIT	7
DISASSEMBLY PROCEDURES	3	P. C. BOARDS	8, 15, 16
POWER CORD REPLACEMENT	3	ELECTRICAL PARTS LIST	9, 11, 17
CONTROLS AND FUNCTIONS	4	SCHEMATIC DIAGRAMS	10, 13, 19
ALIGNMENT PROCEDURES	5	WIRING DIAGRAM	14, 20
BLOCK DIAGRAM	5		

harman/kardon

Parts and Service Office
240 Crossways Park West, Woodbury, N.Y. 11797
1112-0530A152 G9310 1500 Printed in Japan

SPECIFICATIONS

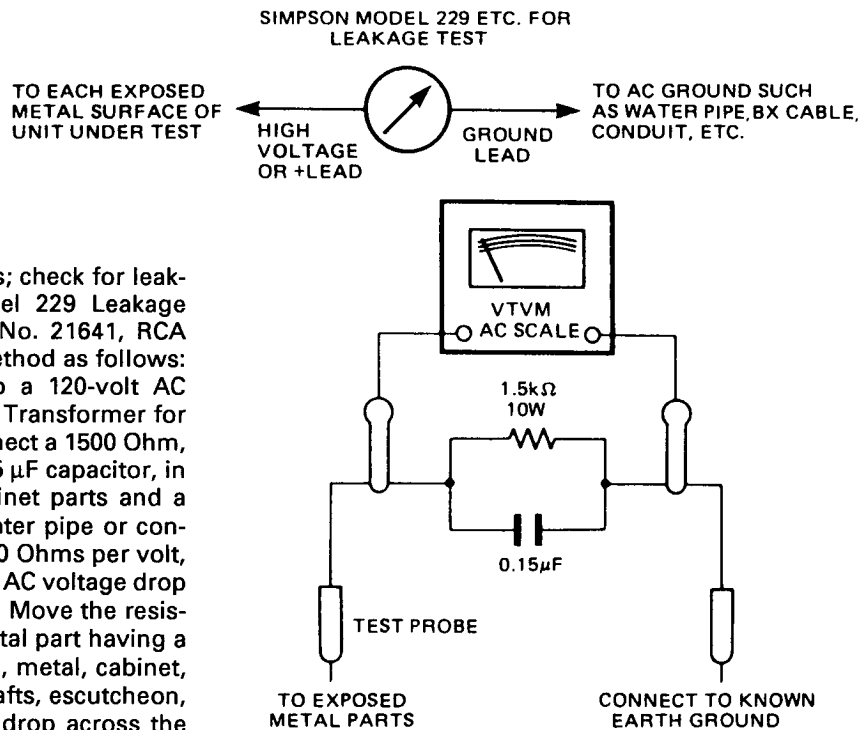
	Nominal	Limit		Nominal	Limit	
RMS Output Power	8 Ω, 1kHz THD 0.1%	33.5W	25W (Model : HK1200)	Channel Separation (at 10kHz)	65 dB	
		48.4W	40W (Model : HK1400)			≥ 55 dB
	4 Ω, 1kHz THD 0.3%	49W	40W (Model : HK1200)		IM Distortion Ratio (at 1W)	0.065% ≤ 0.1% (Model : HK1200)
		75.4W	60W (Model : HK1400)			0.052% ≤ 0.1% (Model : HK1400)
High-instantaneous Current Capability (HCC)		37A	30A (Model : HK1200)	Damping Factor (at 1Hz)	55.7 ≥ 45 (Model : HK1200)	
		43.5A	35A (Model : HK1400)		84.5 ≥ 75 (Model : HK1400)	
Half Power Bandwidth (THD 0.1%)	<10Hz-100kHz	<10Hz-70kHz		DC Output Voltage (at 4Ω)		
Frequency Response (at -3dB down)				L channel	0mV ± 60mV	
	0.1Hz-420kHz	<1Hz- ≥ 350kHz (Model : HK1200)		R channel	0mV ± 60mV	
	0.1Hz-410kHz	<1Hz- ≥ 350kHz (Model : HK1400)		Idling Current (at 8Ω)	75mA 75mA ± 5mA	
Input Sensitivity (at 25W output)	Normal :	135mV	>135mV ± 25mV / 39kΩ ± 5kΩ (Model : HK1200)	Dimensions (W x H x D)	17.4" x 4.1" x 13.7"	
	-10dB :	440mV	>440mV ± 25mV / 39kΩ ± 5kΩ (Model : HK1200)		(443 x 105 x 347 mm)	
	(at 40W output) Normal :	135mV	>135mV ± 25mV / 39kΩ ± 5kΩ (Model : HK1400)	Weight	18.3 lbs. / 8.3 kg (Model : HK1200)	
	(at 40W output) -10dB :	442mV	>442mV ± 25mV / 39kΩ ± 5kΩ (Model : HK1400)		15.0 lbs. / 6.8 kg (Model : HK1400)	
Signal to Noise Ratio		100dB	≥ 90dB (Model : HK1200)	Power Supplies		
		98.5dB	≥ 90dB (Model : HK1400)		North America area model	AC120V, 60 Hz
				International and Asia/Oceania models	AC230/240V, 50/60Hz	
				Power Consumption	110W (Model : HK1200)	
					130W (Model : HK1200)	
					140W (Model : HK1400)	
					160W (Model : HK1400)	

These specifications are service target specs.
 Specifications and components are subject to change without notice.
 Overall performance will be maintained or improved.

LEAKAGE TEST (FOR SERVICE ENGINEERS IN THE U.S.A)

Before returning the unit to the user, perform the following safety checks:

1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the unit.
2. Be sure that any protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc. which were removed for servicing are properly reinstalled.
3. Be sure that no shock hazard exists; check for leakage current using Simpson Model 229 Leakage Tester, standard equipment item No. 21641, RCA Model WT540A or use alternate method as follows: Plug the power cord directly into a 120-volt AC receptacle (do not use an Isolation Transformer for this test). Using two clip leads, connect a 1500 Ohm, 10-watt resistor paralleled by a 0.15 μF capacitor, in series with all exposed metal cabinet parts and a known earth ground, such as a water pipe or conduit. Use a VTVM or VOM with 1000 Ohms per volt, or higher sensitivity to measure the AC voltage drop across the resistor. (See Diagram.) Move the resistor connection to each exposed metal part having a return path to the chassis (antenna, metal, cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor. (This test should be performed with the power switch in both the On and Off positions.) A reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the unit to the owner.



DISASSEMBLY PROCEDURES (REFER TO PAGES 7,14 AND 20)**1 CABINET TOP (AB) REMOVAL**

Remove 6 screws (A) and then remove the Cabinet Top (AB).

2 FRONT PANEL ASS'Y (AA) REMOVAL

1. Remove the Cabinet Top (AB), referring to the previous step 1.
2. Remove 5 screws (B) and then remove the Front Panel Ass'y (AA).

3 PRE AMP P. C. BOARD (PCB-4) REMOVAL

1. Remove the Cabinet Top (AB), referring to the previous step 1.
 2. Remove the Front Panel Ass'y (AA), referring to the previous step 2.
 3. Remove 2 screws (C) and then remove the Rotary Knobs (150) and remove the Push Button (147).
 4. Remove 11 screws (D) and then remove the Pre Amp P. C. Board (PCB-4).
- At this time, unsolder the lead wires connected to the Pre Amp P. C. Board (PCB-4).

4 MAIN P. C. BOARD (PCB-1) REMOVAL

1. Remove the Cabinet Top (AB), referring to the previous step 1.
 2. Remove 5 screws (E) and then remove the Main P. C. Board (PCB-1).
- At this time, unsolder the lead wires connected to the Main P. C. Board (PCB-1).

5 POWER P. C. BOARD (PCB-8) REMOVAL

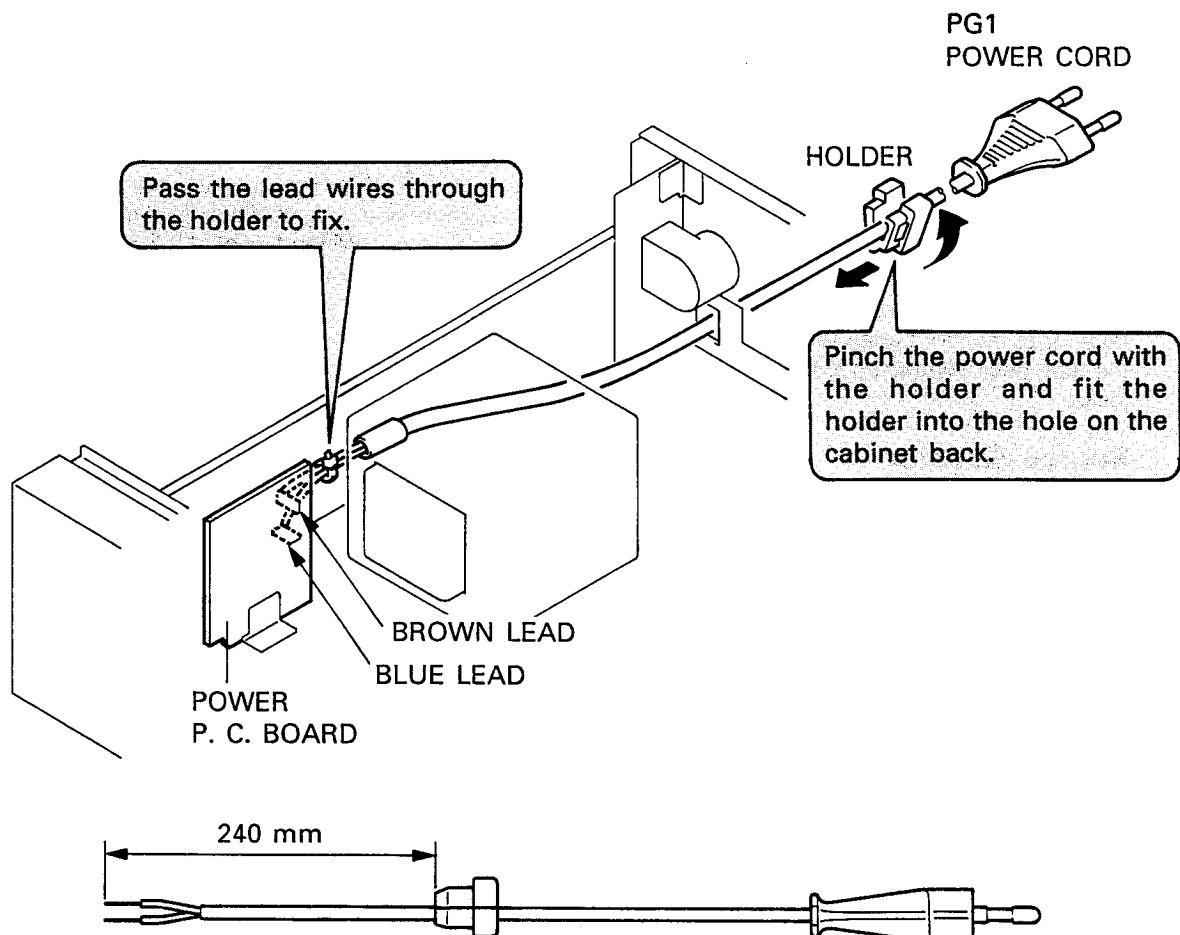
1. Remove the Front Panel Ass'y (AA), referring to the previous step 2.
 2. Remove 3 screws (F) and then remove the Power P. C. Board (PCB-8).
- If necessary unsolder the lead wire.

6 VOLUME P. C. BOARD (PCB-7) REMOVAL

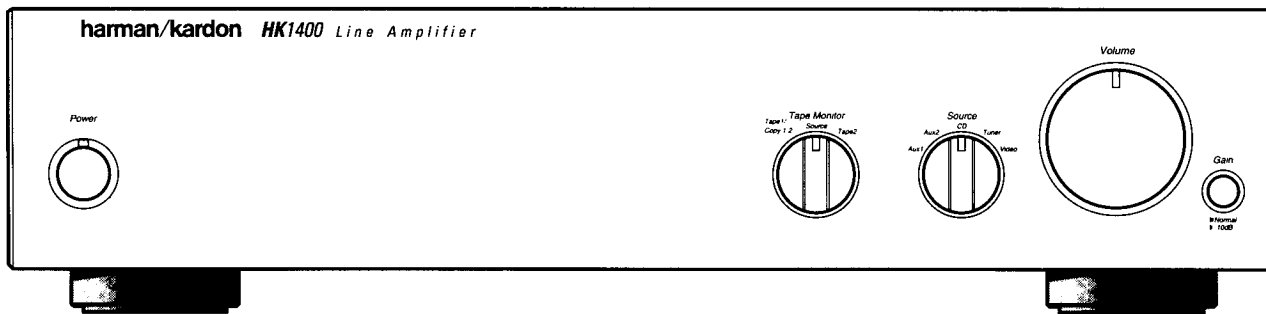
1. Remove the Front Panel Ass'y (AA), referring to the previous step 2.
 2. Pull out the Rotary Knob (149).
 3. Remove hexagon nut (G) and then remove the Volume P. C. Board (PCB-7).
- If necessary unsolder the lead wire.

POWER CORD REPLACEMENT (FOR SERVICE ENGINEERS OTHER THAN NORTH AMERICA)

In order to prevent fire or shock hazard when replacing the power cord, follow the procedure below to replace the parts with the standard supply parts.



CONTROLS AND FUNCTIONS



(NOTE: HK1200 features are the same)

Power Switch

Pressing this switch will turn on the power and the POWER indicator lights up. Press the switch again to turn the power off.

Power Indicator

When the POWER switch is pressed, this indicator lights up in green.

Tape Monitor Selector

This selector is used when playing a tape deck, or monitoring during recording.

Tape 1/Copy 1→2: Select this position to play a tape or to monitor the recording on the tape deck connected to the TAPE 1 jacks. This is also the position to use to copy a tape from Tape 1 to Tape 2.

Source: Select this position to listen to a program source other than a tape.

Tape 2: Select this position to play a tape, or to monitor during recording on the tape deck connected to the TAPE 2 jacks.

Source Selector

This selector is used to select a program source other than a tape.

Aux 1: Select this position to listen to a source connected to the AUX 1 jacks.

Aux 2: Select this position to listen to a source connected to the AUX 2 jacks.

CD: Select this position to listen to a CD player connected to the CD jacks.

Tuner: Select this position to listen to a Tuner connected to the TUNER jacks.

Video: Select this position to listen to the sound of a TV, VCR or Laserdisc player connected to the VIDEO jacks.

Volume Control

This knob controls the sound level. Turning clockwise increases the sound volume, and turning counterclockwise decreases it. Set this control at a minimum level before turning the power on, changing the sound source or changing the GAIN switch to protect the speakers from being damaged by a sudden high level sound.

Gain Switch

The GAIN Switch changes both the input sensitivity (amount of amplification) and the input overload level of the preamplifier circuitry. The "Normal" position provides an input sensitivity that is typical of other high quality integrated amplifiers and preamplifiers. This mode has an input overload level of 2.5 Volts, which is high enough to use with nearly any high fidelity source. The "-10dB" position both decreases the input sensitivity and increases the input overload level by 10dB (approximately 3 times). This allows very strong input signals to be amplified without distortion. It also provides a wider dynamic range. Some listeners may prefer this position for listening to CD players, for example.

ALIGNMENT PROCEDURES (REFER TO PAGES 13,15,16 AND 19)

- **Conditions :**
 - Set the Source selector to the "CD" position.
 - Set the Volume control to minimum.
 - Make the adjustment at a room temperature of 77°F (25°C)

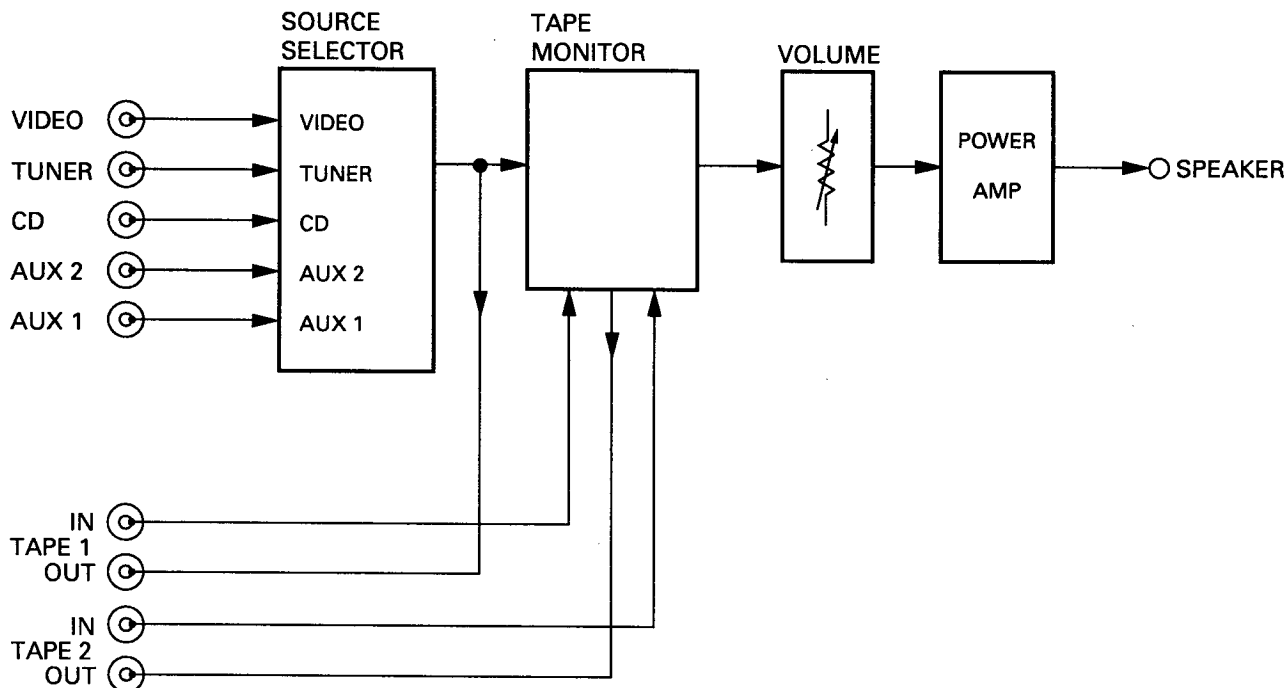
■ DC BALANCE ADJUSTMENT

Step	Connection Equipments	Adjustment	For
1	Connect the Digital Volt Meter to Speaker output.	VR403	0 mV
2	Connect the Digital Volt Meter to Speaker output.	VR404	0 mV

■ IDLING CURRENT ADJUSTMENT

Step	Connection Equipments	Adjustment	For
1	Connect the Digital Volt Meter to TP401 and TP402.	VR401	33 mV
2	Connect the Digital Volt Meter to TP403 and TP404.	VR402	33 mV

BLOCK DIAGRAM



GENERAL UNIT PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
AA	A443-PM1200A	FRONT PANEL ASSEMBLY (HK1200)	173	2219-8405	METAL FITTG, TAPE FUNCTION SWITCH (X2)
AA	A443-PM1400A	FRONT PANEL ASSEMBLY (HK1400)	175	2219-8390	METAL FITTG, POWER IN PCB IB WB
AB	A414-PM1200A	CABINET TOP ASSEMBLY (HK1200)	178	2219-8178	METAL FITTG, GAIN SHAFT
AB	A414-PM1400A	CABINET TOP ASSEMBLY (HK1400)	180	2222-7331	HEAT SINK, MAIN
AC	A424-PM1200B	CABINET BACK ASSEMBLY BK (HK1200)	185	2240-R0101	HOLDER, WIRING (X10)
AC	A424-PM1400B	CABINET BACK ASSEMBLY BK (HK1400)	186	2240-7409	HOLDER, TAPE FUNCTION SHAFT (X2)
AC	A424-PM1200A	CABINET BACK ASSEMBLY IB WB (HK1200)	188	2240-364	HOLDER, AC CORD
AC	A424-PM1400A	CABINET BACK ASSEMBLY IB WB (HK1400)	193	2362-901014	BOSS, THREAD, GND
025	1756-CSA	LABEL, CSA LABEL BK	196	2360-7026	SPECIAL BOSS, LED PCB (X2)
026	1756-05910	LABEL, FUSE CAUTION BK	198	2132-7136	SPACER, HEAT METAL (X4)
118	1756-21914	LABEL, DBP. LABEL IB	201	2224-7120	INSULATOR, HEAT METAL (X2)
131	1414-17401	CABINET TOP	204	2224-7137	INSULATOR, CABINET
133	1424-37701	CABINET BACK, BOTTOM	209	2459-3003511	RIVET, PLASTIC, SHAFT (X4)
134	1424-37604	CABINET BACK, REAR BK (HK1200)	210	2431-0151	FASTENER, BADGE (X2)
134	1424-37601	CABINET BACK, REAR BK (HK1400)	212	2672-7018	LEVER, POWER SHAFT
134	1424-37605	CABINET BACK, REAR IB (HK1200)	214	2601-7069	SHAFT, TAPE FUNCTION SHAFT (X2)
134	1424-37602	CABINET BACK, REAR IB (HK1400)	215	2601-7208	SHAFT, TAPE FUNCTION (X2)
134	1424-37606	CABINET BACK, REAR WB (HK1200)	216	2601-7210	SHAFT, GAIN
134	1424-37603	CABINET BACK, REAR WB (HK1400)	218	2601-7084	SHAFT, GAIN SHAFT
136	1443-14904	FRONT PANEL	220	2651-2101728	SPRING, GAIN
139	1714-02602	NAME PLATE, BADGE	221	2327-R0140102	SCREW, BND+ (4X10 mm) (X4) (HK1200)
141	1562-08202	FRAME, L	221	2347-400827	SCREW, BND T+ (4X8 mm) (X4) BK (HK1400)
142	1562-08302	FRAME, R	221	2327-R0140102	SCREW, BND+ (4X10 mm) (X4) IB WB (HK1400)
144	1732-08801	INDICATOR, POWER LED	223	2440-60	SPECIAL NUT, (X4) (HK1200)
146	1662-66902	PUSH BUTTON, POWER	223	2440-60	SPECIAL NUT, (X4) IB WB (HK1400)
147	1662-67002	PUSH BUTTON, GAIN	224	2401-0373	WASHER, METAL, BIAS PCB (X2)
149	1630-04902	ROTARY KNOB, MAIN	225	2327-R0130062	SCREW, BND+ (3X6 mm) (X4)
150	1632-21502	ROTARY KNOB, TAPE FUNCTION (X2)	226	2327-R0130062	SCREW, BND+ (3X6 mm) (X8)
155	1742-08302	ORNAMENT, POWER	228	2327-R0130082	SCREW, BND+ (3X8 mm)
156	1742-08402	ORNAMENT, GAIN	232	2347-R0130062	SCREW, BND T+ (3X6 mm) (X8) BK
159	1319-05001	LEG, BOTTOM (X4)	232	2347-R0130062	SCREW, BND T+ (3X6 mm) (X9) IB WB
161	2211-7328	CHASSIS, FRONT	234	2347-R0130062	SCREW, BND T+ (3X6 mm) (X30)
162	2111-1389	FELT, TOP COVER (X4)	236	2347-R0130064	SCREW, BND T+ (3X6 mm) (X7)
163	2219-8207	METAL FITTG, BOTTOM CENTER	238	2347-R0130084	SCREW, BND T+ (3X8 mm) (X14) BK
164	2219-8384	METAL FITTG, MAIN HEAT	238	2347-R0130084	SCREW, BND T+ (3X8 mm) (X13) IB WB
165	2219-8385	METAL FITTG, MAIN HEAT	240	2347-R0130102	SCREW, BND T+ (3X10 mm) (X5)
166	2219-8386	METAL FITTG, BOTTOM SIDE	241	2347-R0140064	SCREW, BND T+ (4X6 mm) (X4)
167	2219-8401	METAL FITTG, TRANS	244	2347-R0130082	SCREW, BND T+ (3X8 mm) (X7) (HK1200)
168	2219-8407	METAL FITTG, H.CENTER	244	2347-R0130082	SCREW, BND T+ (3X8 mm) (X8) (HK1400)
169	2219-8403	METAL FITTG, R.SIDE	246	2402-0374	WASHER, PLASTIC, PCB GND
171	2219-8019	METAL FITTG, POWER SWITCH PCB	247	2401-035	WASHER, METAL, POWER TRANSISTOR (X2)
172	2219-8348	METAL FITTG, TAPE FUNCTION SWITCH BOTTOM (X2)	249	2557-301429	SCREW, B SPW+, Q427-Q430 (X4)
			558	2224-7134	INSULATOR, Q427-Q430 (X4)

GENERAL UNIT

EXPLODED VIEW

1

2

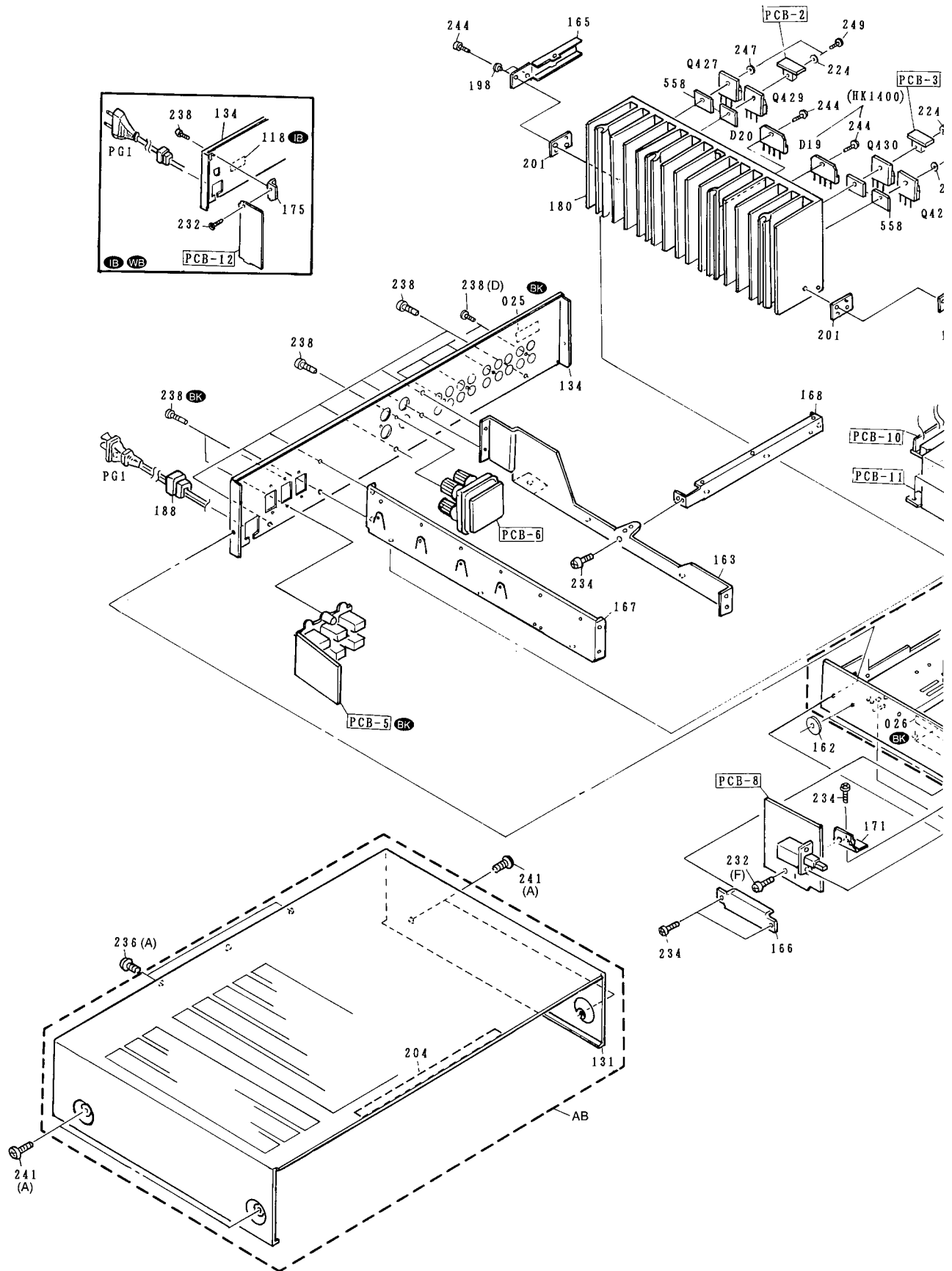
3

4

5

6

7

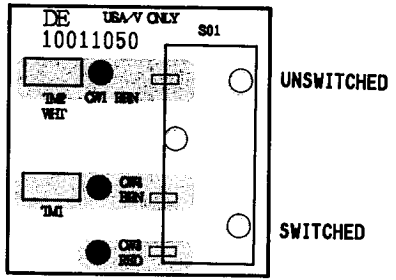


A B C D E

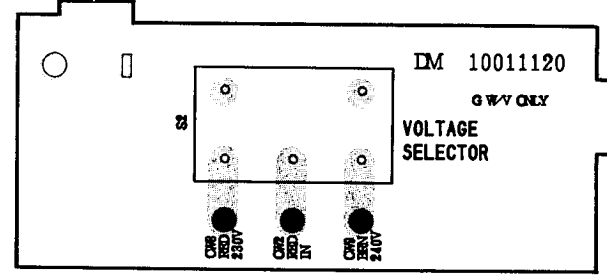
P. C. BOARDS (1)

1

PCB-5 (BK)
AC OUTLET P.C. BOARD



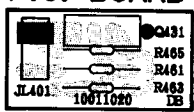
PCB-12 (IB) (WB)
VOLT SELECT P.C. BOARD



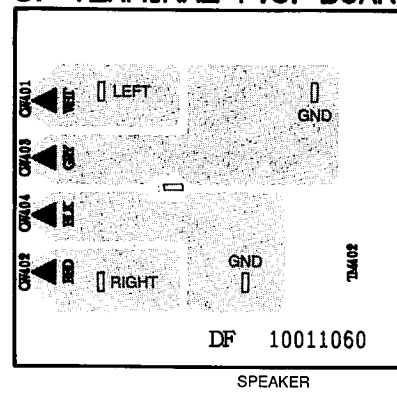
2

3

PCB-2
BIAS (L)
P.C. BOARD

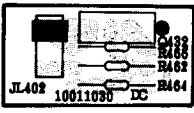


PCB-6
SP TERMINAL P.C. BOARD



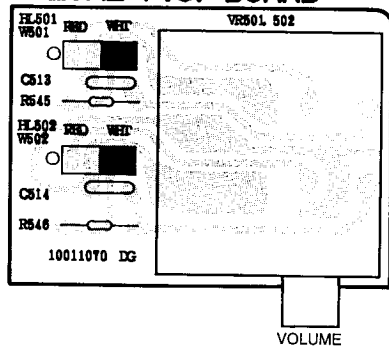
4

PCB-3
BIAS (R)
P.C. BOARD



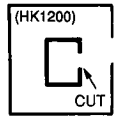
5

PCB-7
VOLUME P.C. BOARD

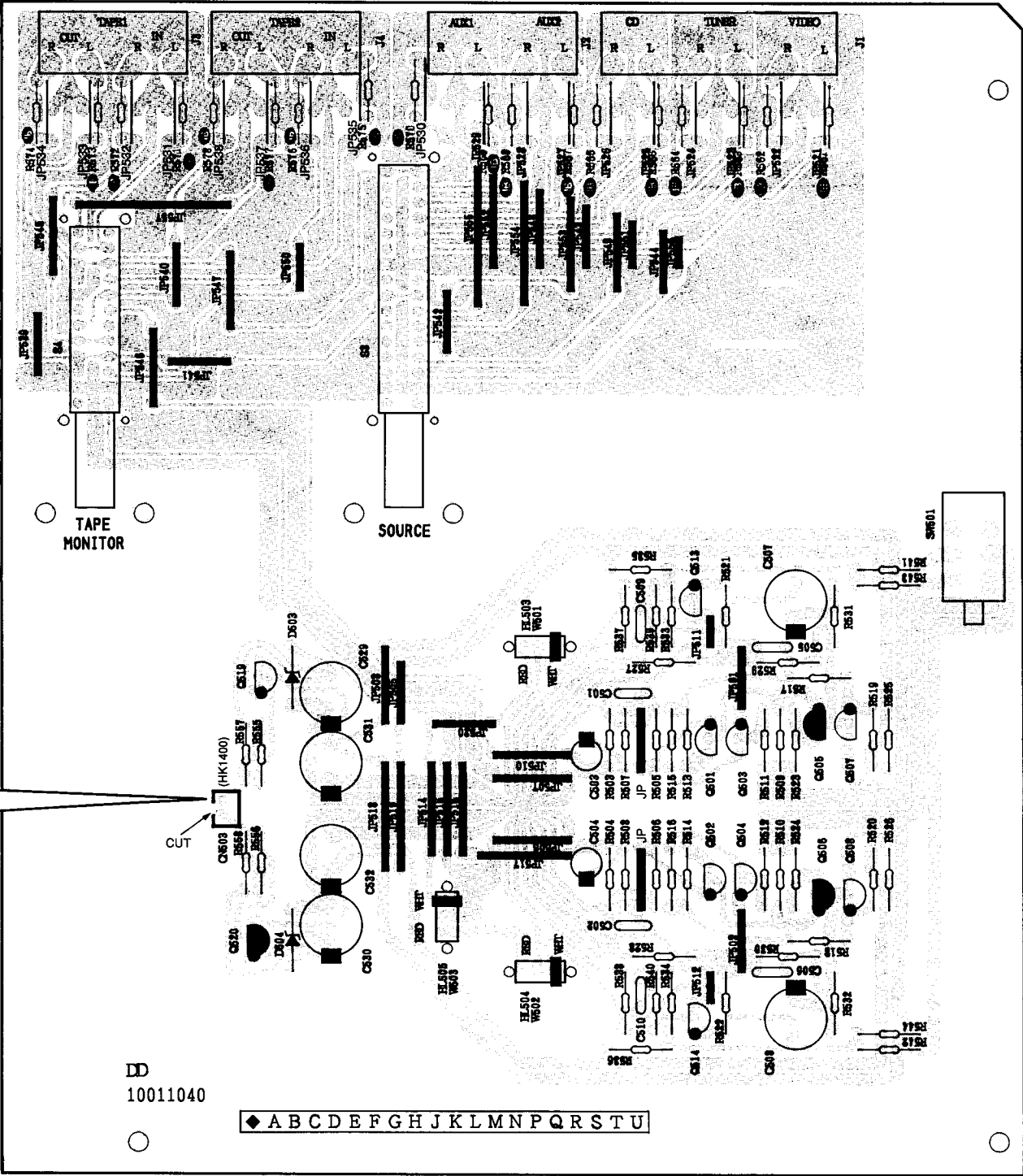


6

7



PCB-4 PRE AMP P.C. BOARD



DD
10011040

◆ A B C D E F G H J K L M N P Q R S T U

ELECTRICAL PARTS LIST

Ser. No.	Ref. No.	Part No.	Description
PCB-2 BIAS (L) P.C. BOARD			
RESISTORS			
592	R461	5130-R030J221	RES,CBN 1/2P 220
593	R463	5130-R030J182	RES,CBN 1/2P 1.8K
594	R465	5130-R030J122	RES,CBN 1/2P 1.2K
TRANSISTOR			
591	Q431	5613-3423(Y)	XISTOR,NPN R
MISCELLANEOUS			
703	JL401	4132-R0202101	CORD,2C

PCB-3 BIAS (R) P.C. BOARD			
RESISTORS			
598	R462	5130-R030J221	RES,CBN 1/2P 220
599	R464	5130-R030J182	RES,CBN 1/2P 1.8K
600	R466	5130-R030J122	RES,CBN 1/2P 1.2K
TRANSISTOR			
597	Q432	5613-3423(Y)	XISTOR,NPN R
MISCELLANEOUS			
704	JL402	4132-R0202101	CORD,2C

PCB-4 PRE AMP P.C. BOARD			
CAPACITORS			
471	C501	5359-6805851	CAP,PPP 68P
471	C502	5359-6805851	CAP,PPP 68P
474	C503	5345-S19BM107	CAP,MINI ELE 100μ/10V
474	C504	5345-S19BM107	CAP,MINI ELE 100μ/10V
472	C505	5353-030934	CAP,MCA 3P
472	C506	5353-030934	CAP,MCA 3P
475	C507	5345-S19DM227	CAP,MINI ELE 220μ/25V
475	C508	5345-S19DM227	CAP,MINI ELE 220μ/25V
509	C509	5354-104593	CAP,MYL .1μ
509	C510	5354-104593	CAP,MYL .1μ
519	C529	5345-227D041	CAP,MINI ELE 220μ/25V
519	C530	5345-227D041	CAP,MINI ELE 220μ/25V
519	C531	5345-227D041	CAP,MINI ELE 220μ/25V
519	C532	5345-227D041	CAP,MINI ELE 220μ/25V

RESISTORS			
485	R503	5130-R030J224	RES,CBN 1/2P 220K
485	R504	5130-R030J224	RES,CBN 1/2P 220K
486	R505	5130-R030J473	RES,CBN 1/2P 47K
486	R506	5130-R030J473	RES,CBN 1/2P 47K
487	R507	5130-R030J331	RES,CBN 1/2P 330
487	R508	5130-R030J331	RES,CBN 1/2P 330
488	R509	5130-R030J272	RES,CBN 1/2P 2.7K
488	R510	5130-R030J272	RES,CBN 1/2P 2.7K
488	R511	5130-R030J272	RES,CBN 1/2P 2.7K
488	R512	5130-R030J272	RES,CBN 1/2P 2.7K
489	R513	5130-R030J221	RES,CBN 1/2P 220
489	R514	5130-R030J221	RES,CBN 1/2P 220
489	R515	5130-R030J221	RES,CBN 1/2P 220
489	R516	5130-R030J221	RES,CBN 1/2P 220
490	R517	5130-R030J562	RES,CBN 1/2P 5.6K
490	R518	5130-R030J562	RES,CBN 1/2P 5.6K
491	R519	5130-R030J122	RES,CBN 1/2P 1.2K
491	R520	5130-R030J122	RES,CBN 1/2P 1.2K
492	R521	5130-R030J392	RES,CBN 1/2P 3.9K
492	R522	5130-R030J392	RES,CBN 1/2P 3.9K
489	R523	5130-R030J221	RES,CBN 1/2P 220
489	R524	5130-R030J221	RES,CBN 1/2P 220
489	R525	5130-R030J221	RES,CBN 1/2P 220
489	R526	5130-R030J221	RES,CBN 1/2P 220
494	R527	5130-R030J393	RES,CBN 1/2P 39K
494	R528	5130-R030J393	RES,CBN 1/2P 39K
495	R529	5130-R030J123	RES,CBN 1/2P 12K
495	R530	5130-R030J123	RES,CBN 1/2P 12K
487	R531	5130-R030J331	RES,CBN 1/2P 330
487	R532	5130-R030J331	RES,CBN 1/2P 330
513	R533	5130-R030J335	RES,CBN 1/2P 3.3M
513	R534	5130-R030J335	RES,CBN 1/2P 3.3M

Ser. No.	Ref. No.	Part No.	Description
512	R535	5130-R030J104	RES,CBN 1/2P 100K
512	R536	5130-R030J104	RES,CBN 1/2P 100K
496	R537	5130-R030J104	RES,CBN 1/2P 100K
496	R538	5130-R030J104	RES,CBN 1/2P 100K
513	R539	5130-R030J335	RES,CBN 1/2P 3.3M
513	R540	5130-R030J335	RES,CBN 1/2P 3.3M
514	R541	5130-R030J393	RES,CBN 1/2P 39K (HK1200)
514	R541	5130-R030J473	RES,CBN 1/2P 47K (HK1400)
514	R542	5130-R030J393	RES,CBN 1/2P 39K (HK1200)
514	R542	5130-R030J473	RES,CBN 1/2P 47K (HK1400)
515	R543	5130-R030J684	RES,CBN 1/2P 680K (HK1200)
515	R543	5130-R030J564	RES,CBN 1/2P 560K (HK1400)
515	R544	5130-R030J684	RES,CBN 1/2P 680K (HK1200)
515	R544	5130-R030J564	RES,CBN 1/2P 560K (HK1400)
521	△ R555	5102-2205116	RES,FUSE 22
521	△ R556	5102-2205116	RES,FUSE 22
522	R557	5130-R030J152	RES,CBN 1/2P 1.5K
522	R558	5130-R030J152	RES,CBN 1/2P 1.5K
497	R561	5130-R030J331	RES,CBN 1/2P 330 IB
497	R562	5130-R030J331	RES,CBN 1/2P 330 IB
497	R563	5130-R030J331	RES,CBN 1/2P 330 IB
497	R564	5130-R030J331	RES,CBN 1/2P 330 IB
497	R565	5130-R030J331	RES,CBN 1/2P 330 IB
497	R566	5130-R030J331	RES,CBN 1/2P 330 IB
497	R567	5130-R030J331	RES,CBN 1/2P 330 IB
497	R568	5130-R030J331	RES,CBN 1/2P 330 IB
497	R569	5130-R030J331	RES,CBN 1/2P 330 IB
497	R570	5130-R030J331	RES,CBN 1/2P 330 IB
497	R571	5130-R030J331	RES,CBN 1/2P 330 IB
497	R572	5130-R030J331	RES,CBN 1/2P 330 IB
497	R573	5130-R030J331	RES,CBN 1/2P 330 IB
497	R574	5130-R030J331	RES,CBN 1/2P 330 IB
497	R575	5130-R030J331	RES,CBN 1/2P 330 IB
497	R576	5130-R030J331	RES,CBN 1/2P 330 IB
497	R577	5130-R030J331	RES,CBN 1/2P 330 IB
497	R578	5130-R030J331	RES,CBN 1/2P 330 IB
TRANSISTORS			
478	Q501	5613-1775(F)	XISTOR,NPN R
478	Q502	5613-1775(F)	XISTOR,NPN R
478	Q503	5613-1775(F)	XISTOR,NPN R
478	Q504	5613-1775(F)	XISTOR,NPN R
479	Q505	5612-646A(C)	XISTOR,PNP A
479	Q506	5612-646A(C)	XISTOR,PNP A
480	Q507	5614-666A(C)	XISTOR,NPN A
480	Q508	5614-666A(C)	XISTOR,NPN A
506	Q513	5616-2SK364BL	FET,N-CH
506	Q514	5616-2SK364BL	FET,N-CH
516	Q519	5614-667A(C)	XISTOR,NPN A
517	Q520	5612-647A(C)	XISTOR,PNP A

DIODES			
518	D503	5635-HZ20-2L	DIODE,ZENER
518	D504	5635-HZ20-2L	DIODE,ZENER
MISCELLANEOUS			
690	CN503	4443-0201140	CONNECTOR
670	J1	4486-18	6P PIN JACK
671	J2	4484-50	4P PIN JACK
671	J3	4484-50	4P PIN JACK
671	J4	4484-50	4P PIN JACK
664	S3	4412-00103045	SWITCH,RO-SL, SOURCE
663	S4	4412-00104043	SWITCH,RO-SL, TAPE MONITOR
660	SW501	4431-S2901102	PUSH SWITCH, GAIN
683		2240-Z031	HOLDER, HL503-HL505 (X3)

PCB-5 AC OUTLET P.C. BOARD			
MISCELLANEOUS			
043A	△ CW1	4163-S5101220	CONNECTOR W/W BK
044A	△ CW3	4163-S5201300	CONNECTOR W/W BK
045A	△ CW4	4163-S5101350	CONNECTOR W/W BK
042A	△ S01	4474-04302	SOCKET, AC OUTLET BK
041A	△ TM1	4214-245	TERMINAL BK
041A	△ TM2	4214-245	TERMINAL BK

Ser. No.	Ref. No.	Part No.	Description
PCB-6 SP TERMINAL P.C. BOARD			
MISCELLANEOUS			
672A	△ TM402	4214-241	TERMINAL, SPEAKER BK WB
672	△ TM402	4214-242	TERMINAL, SPEAKER IB

PCB-7 VOLUME P.C. BOARD			
CAPACITORS			
499	C513	5359-1015851	CAP,PPP 100P
499	C514	5359-1015851	CAP,PPP 100P
RESISTORS			
500	R545	5130-R030J102	RES,CBN 1/2P 1K
500	R546	5130-R030J102	RES,CBN 1/2P 1K
CONTROLS			
661	VR501/ 502	5118-303731	RES,V CBN 40 30K
MISCELLANEOUS			
682		2240-Z031	HOLDER, HL501, HL502 (X2)

PCB-8 POWER P.C. BOARD			
CAPACITORS			
653A	△ C1	5352-S010M103	CAP,MTL .01μ BK
653	△ C1	5352-1030958	CAP,MTL .01μ IB WB
RESISTOR			
654	△ R1	5130-R030J335	RES,CBN 1/2P 3.3M IB WB
MISCELLANEOUS			
691	△ CW2	4163-S5201300	CONNECTOR W/W
692	△ CW4	4163-S5101300	CONNECTOR W/W IB WB (HK1200)
692	△ CW4	4163-S5101160	CONNECTOR W/W IB WB (HK1400)
657A	△ F1	5732-01501252	FUSE, 2.5A 125/250V BK (HK1200)
657	△ F1	5732-01601122	FUSE, T1.25A/T1.25AL 250V IB WB (HK1200)
657A	△ F1	5732-402031	FUSE, 4A 125/250V BK (HK1400)
657	△ F1	5732-01601202	FUSE, T2A/T2AL IB WB (HK1400)
656	△ HF1	4472-04901	FUSE HOLDER, F1
656	△ HF2	4472-04901	FUSE HOLDER, F1
665	△ S1	4433-00401	SWITCH,PU-PW, POWER
686	△ TM3	4214-245	TERMINAL IB WB
686	△ TM4	4214-245	TERMINAL IB WB

PCB-9 LED P.C. BOARD			
CAPACITOR			
667	C26	5345-106C041	CAP,MINI ELE 10μ/16V
RESISTOR			
668	R53	5130-R030J122	RES,CBN 1/2P 1.2K
DIODE			
666	D24	5637-SLR33MC3	LED
MISCELLANEOUS			
689		2240-Z021	HOLDER, HL403

PCB-11 TRANS 2 P.C. BOARD			
CAPACITORS			
652	C2	5354-104593	CAP,MYL .1μ
652	C3	5354-104593	CAP,MYL .1μ

PCB-12 VOLT SELECT P.C. BOARD			
MISCELLANEOUS			
700	△ CW8	4163-S5201200	CONNECTOR W/W IB WB (HK1200)

Ser. No.	Ref. No.	Part No.	Description
700	△ CW8	4163-S5201300	CONNECTOR W/W IB WB (HK1400)
701	△ CW9	4163-S5101200	CONNECTOR W/W IB WB (HK1200)
701	△ CW9	4163-S5101300	CONNECTOR W/W IB WB (HK1400)
676	△ S2	4411-00501102	ROTRY SWITCH, VOLT SELECT IB WB

CHASSIS MISCELLANEOUS			
MISCELLANEOUS			
688	LG1	4211-4	LUG
674A	△ PG1	4161-71151	CORD W/PLUG, AC CORD BK
674	△ PG1	4161-7256	CORD W/PLUG, AC CORD IB WB
659A	△ T1	5584-T3301	XFORMER,POWER BK (HK1200)
659A	△ T1	5584-T3401	XFORMER,POWER BK (HK1400)
659	△ T1	5584-T3302	XFORMER,POWER IB WB (HK1200)
659	△ T1	5584-T3501	XFORMER,POWER IB WB (HK1400)
055	PCB-10	4551-10010100	P.C. BOARD, TRANS 1 P.C. BOARD (HK1200)
056	PCB-10	4551-10011100	P.C. BOARD, TRANS 1 P.C. BOARD (HK1400)

PACKING PARTS LIST			
021A	1113-02501	OWNER CARD, REPLY CARD BK	
022A	1116-03801	GUARANTY CARD, WARRANTY BK	
023A	1119-04501	ATTACH SHEET, SERVICE GUIDE BK	
024A	1119-01201	ATTACH SHEET, UL BK	
109A	1111-1160J152	OWNER'S GUIDE, IB BK WB	
109	1111-1150J152	OWNER'S GUIDE, IB IB	
113	1241-R0123351	POLYETHY BAG, OWNER GUIDE	
116	1756-03108	LABEL, (I) LABEL, CORTON BOX (X2) IB	
116B	1756-03101	LABEL, (W) LABEL, CORTON BOX (X2) WB	
122	1241-R0160601	POLYETHY BAG, SET	
125	1221-28141	CARTON BOX	
126	1222-7390	CUSHION, R	
127	1222-7391	CUSHION, L	
128	1223-R0420055	SOFT SHEET	

ABBREVIATIONS IN PARTS LIST

CAPACITORS	
CAP, MINI ELE	: Electrolytic
CAP, CER	: Ceramic
CAP, PPP	: Polypropylene
CAP, MYL	: Mylar
CAP, MCA	: Mica
	470μ : 470μF
	6800P : 6800pF
	.047μ : 0.047μF

RESISTORS	
RES, CBN	1/6P : Carbon 1/6W
	2.2K : 2.2kΩ
	220 : 220Ω
RES, FUSE	: Fuse
RES, CEM	5P : Cement 5W
RES, MTL	1P : Metal 1W

TRANSISTORS	
XISTOR	: Transistor
FET	: Field Effect Transistor

CONTROLS	
RES, V CBN	: Variable Carbon Resistor
RES, SEMI FIX	: Semi - fixed Resistors

NOTE:
 SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACEMENT PART AS SPECIFIED.

ELECTRICAL PARTS LIST (MODEL : HK1200)

Ser. No.	Ref. No.	Part No.	Description
PCB-1 MAIN P.C. BOARD (HK1200)			
CAPACITORS			
658	△ C20	5341-S28FM109	CAP,ELE 10000µ/43V
658	△ C21	5341-S28FM109	CAP,ELE 10000µ/43V
621	C22	5345-106F041	CAP,MINI ELE 10µ/50V
623	C23	5345-105F041	CAP,MINI ELE 1µ/50V
623	C24	5345-105F041	CAP,MINI ELE 1µ/50V
624	C25	5345-107B041	CAP,MINI ELE 100µ/10V
625	C27	5354-683593	CAP,MYL .068µ
625	C28	5354-683593	CAP,MYL .068µ
626	C29	5345-S25JM105	CAP,MINI ELE 1µ/100V
537	C401	5345-107B041	CAP,MINI ELE 100µ/10V
537	C402	5345-107B041	CAP,MINI ELE 100µ/10V
532A	C405	5353-030934	CAP,MCA 3P BK WB
532	C405	5353-040934	CAP,MCA 4P IB
532A	C406	5353-030934	CAP,MCA 3P BK WB
532	C406	5353-040934	CAP,MCA 4P IB
536	C407	5345-105F041	CAP,MINI ELE 1µ/50V
536	C408	5345-105F041	CAP,MINI ELE 1µ/50V
538	△ C409	5345-337F041	CAP,MINI ELE 330µ/50V
538	△ C410	5345-337F041	CAP,MINI ELE 330µ/50V
538	△ C411	5345-337F041	CAP,MINI ELE 330µ/50V
538	△ C412	5345-337F041	CAP,MINI ELE 330µ/50V
535	C413	5345-106C041	CAP,MINI ELE 10µ/16V
535	C414	5345-106C041	CAP,MINI ELE 10µ/16V
539	C417	5345-106F041	CAP,MINI ELE 10µ/50V
539	C418	5345-106F041	CAP,MINI ELE 10µ/50V
531	C419	5354-104593	CAP,MYL .1µ
531	C420	5354-104593	CAP,MYL .1µ
531	C421	5354-104593	CAP,MYL .1µ
531	C422	5354-104593	CAP,MYL .1µ
534	C423	5359-1025851	CAP,PPP 1000P
534	C424	5359-1025851	CAP,PPP 1000P
533A	C425	5359-4705851	CAP,PPP 47P BK WB
533	C425	5359-6805851	CAP,PPP 68P IB
533A	C426	5359-4705851	CAP,PPP 47P BK WB
533	C426	5359-6805851	CAP,PPP 68P IB
RESISTORS			
634	R27	5130-R010J333	RES,CBN 1/6P 33K
634	R28	5130-R010J333	RES,CBN 1/6P 33K
628	△ R29	5102-6815116	RES,FUSE 680
628	△ R30	5102-6815116	RES,FUSE 680
629	R31	5130-R010J103	RES,CBN 1/6P 10K
630	R32	5130-R010J822	RES,CBN 1/6P 8.2K
631	R33	5130-R010J104	RES,CBN 1/6P 100K
632	R34	5130-R010J472	RES,CBN 1/6P 4.7K
632	R36	5130-R010J472	RES,CBN 1/6P 4.7K
632	R37	5130-R010J472	RES,CBN 1/6P 4.7K
627	R38	5130-R010J683	RES,CBN 1/6P 68K
634	R39	5130-R010J333	RES,CBN 1/6P 33K
636	R41	5130-R010J222	RES,CBN 1/6P 2.2K
627	R43	5130-R010J683	RES,CBN 1/6P 68K
631	R44	5130-R010J104	RES,CBN 1/6P 100K
637	R45	5130-R010J682	RES,CBN 1/6P 6.8K
637	R46	5130-R010J682	RES,CBN 1/6P 6.8K
638	R47	5130-R010J152	RES,CBN 1/6P 1.5K
638	R48	5130-R010J152	RES,CBN 1/6P 1.5K
639	R49	5130-R010J681	RES,CBN 1/6P 680
639	R50	5130-R010J681	RES,CBN 1/6P 680
638	R51	5130-R010J152	RES,CBN 1/6P 1.5K
638	R52	5130-R010J152	RES,CBN 1/6P 1.5K
641	R54	5130-R010J335	RES,CBN 1/6P 3.3M
640	R59	5130-R010J123	RES,CBN 1/6P 12K
640	R60	5130-R010J123	RES,CBN 1/6P 12K
561	R401	5130-R030J333	RES,CBN 1/2P 33K
561	R402	5130-R030J333	RES,CBN 1/2P 33K
562	R403	5130-R030J331	RES,CBN 1/2P 330
562	R404	5130-R030J331	RES,CBN 1/2P 330
563	R405	5130-R030J151	RES,CBN 1/2P 150
563	R406	5130-R030J151	RES,CBN 1/2P 150
563	R407	5130-R030J151	RES,CBN 1/2P 150
563	R408	5130-R030J151	RES,CBN 1/2P 150
561	R409	5130-R030J333	RES,CBN 1/2P 33K
561	R410	5130-R030J333	RES,CBN 1/2P 33K

Ser. No.	Ref. No.	Part No.	Description
565	R411	5130-R030J272	RES,CBN 1/2P 2.7K
565	R412	5130-R030J272	RES,CBN 1/2P 2.7K
565	R413	5130-R030J272	RES,CBN 1/2P 2.7K
565	R414	5130-R030J272	RES,CBN 1/2P 2.7K
576	R415	5130-R030J222	RES,CBN 1/2P 2.2K
576	R416	5130-R030J222	RES,CBN 1/2P 2.2K
583	△ R417	5102-6815116	RES,FUSE 680
583	△ R418	5102-6815116	RES,FUSE 680
567	R419	5130-R030J331	RES,CBN 1/2P 330
567	R420	5130-R030J331	RES,CBN 1/2P 330
568	R421	5130-R030J821	RES,CBN 1/2P 820
568	R422	5130-R030J821	RES,CBN 1/2P 820
569	R423	5130-R030J101	RES,CBN 1/2P 100
569	R424	5130-R030J101	RES,CBN 1/2P 100
572A	R425	5130-R030J331	RES,CBN 1/2P 330 BK WB
572	R425	5130-R030J102	RES,CBN 1/2P 1K IB
572A	R426	5130-R030J331	RES,CBN 1/2P 330 BK WB
572	R426	5130-R030J102	RES,CBN 1/2P 1K IB
573	R427	5130-R030J473	RES,CBN 1/2P 47K
573	R428	5130-R030J473	RES,CBN 1/2P 47K
584	△ R429	5102-1015116	RES,FUSE 100
584	△ R430	5102-1015116	RES,FUSE 100
584	△ R431	5102-1015116	RES,FUSE 100
584	△ R432	5102-1015116	RES,FUSE 100
570	R433	5130-R030J183	RES,CBN 1/2P 18K
570	R434	5130-R030J183	RES,CBN 1/2P 18K
570	R435	5130-R030J183	RES,CBN 1/2P 18K
570	R436	5130-R030J183	RES,CBN 1/2P 18K
574	R437	5130-R030J562	RES,CBN 1/2P 5.6K
574	R438	5130-R030J562	RES,CBN 1/2P 5.6K
571	R439	5130-R030J391	RES,CBN 1/2P 390
571	R440	5130-R030J391	RES,CBN 1/2P 390
585	△ R441	5102-1005116	RES,FUSE 10
585	△ R442	5102-1005116	RES,FUSE 10
585	△ R443	5102-1005116	RES,FUSE 10
585	△ R444	5102-1005116	RES,FUSE 10
589	△ R449	5102-8205116	RES,FUSE 82
589	△ R450	5102-8205116	RES,FUSE 82
579	R451/453	5273-R22672	RES,CEM 3P .22
579	R452/454	5273-R22672	RES,CEM 3P .22
580	R455	5171-100581	RES,MTL 1P 10
580	R456	5171-100581	RES,MTL 1P 10
581	R457	5173-100583	RES,MTL 2P 10
581	R458	5173-100583	RES,MTL 2P 10
582	R459	5174-363381	RES,MTL 1/4P 36K
582	R460	5174-363381	RES,MTL 1/4P 36K
586	△ R471	5102-1015116	RES,FUSE 100
586	△ R472	5102-1015116	RES,FUSE 100
586	△ R473	5102-1015116	RES,FUSE 100
586	△ R474	5102-1015116	RES,FUSE 100
588	△ R475	5102-1505116	RES,FUSE 15
588	△ R476	5102-1505116	RES,FUSE 15
588	△ R477	5102-1505116	RES,FUSE 15
588	△ R478	5102-1505116	RES,FUSE 15
587	△ R479	5102-2R25116	RES,FUSE 2.2
587	△ R480	5102-2R25116	RES,FUSE 2.2
587	△ R481	5102-2R25116	RES,FUSE 2.2
587	△ R482	5102-2R25116	RES,FUSE 2.2
TRANSISTORS			
645	Q11	5613-2240(BL)	XISTOR,NPN R
645	Q12	5613-2240(BL)	XISTOR,NPN R
646	Q13	5611-1309A(R)	XISTOR,PNP R
647	Q14	5613-3311A(R)	XISTOR,NPN R
648	Q15	5613-2320L(F)	XISTOR,NPN R
646	Q16	5611-1309A(R)	XISTOR,PNP R
649	Q19	5611-970(BL)	XISTOR,PNP R
649	Q20	5611-970(BL)	XISTOR,PNP R
645	Q21	5613-2240(BL)	XISTOR,NPN R
547	Q401	5613-1775(F)	XISTOR,NPN R
547	Q402	5613-1775(F)	XISTOR,NPN R
547	Q403	5613-1775(F)	XISTOR,NPN R
547	Q404	5613-1775(F)	XISTOR,NPN R
549	Q405	5612-646A(C)	XISTOR,PNP A
549	Q406	5612-646A(C)	XISTOR,PNP A
548	Q409	5613-2240(BL)	XISTOR,NPN R

<u>Ser. No.</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
548	Q410	5613-2240(BL)	XISTOR,NPN R
560	Q411	5613-2240(BL)	XISTOR,NPN R
548	Q412	5613-2240(BL)	XISTOR,NPN R
549	Q413	5612-646A(C)	XISTOR,PNP A
549	Q414	5612-646A(C)	XISTOR,PNP A
550	Q415	5614-666A(C)	XISTOR,NPN A
550	Q416	5614-666A(C)	XISTOR,NPN A
551	Q417	5613-945(K)	XISTOR,NPN R
551	Q418	5613-945(K)	XISTOR,NPN R
546	Q419	5614-667A(C)	XISTOR,NPN A
552	Q420	5614-667A(C)	XISTOR,NPN A
553	Q421	5612-647A(C)	XISTOR,PNP A
553	Q422	5612-647A(C)	XISTOR,PNP A
553	Q423	5612-647A(C)	XISTOR,PNP A
553	Q424	5612-647A(C)	XISTOR,PNP A
552	Q425	5614-667A(C)	XISTOR,NPN A
552	Q426	5614-667A(C)	XISTOR,NPN A
556	Q427	5613-3181(O)	XISTOR,NPN R
556	Q428	5613-3181(O)	XISTOR,NPN R
557	Q429	5611-1264(O)	XISTOR,PNP R
557	Q430	5611-1264(O)	XISTOR,PNP R
548	Q437	5613-2240(BL)	XISTOR,NPN R
548	Q438	5613-2240(BL)	XISTOR,NPN R

DIODES

651	△ D20	5685-D5SB20	SILICON,BRIG
642	△ D21	5631-1S2471	DIODE,DET
642	△ D22	5631-1S2471	DIODE,DET
643	D23	5635-HZ6B-1L	DIODE,ZENER
644	D25	5631-1SS133	DIODE,DET
644	D26	5631-1SS133	DIODE,DET

CONTROLS

542	VR401	5101-S0801501	RES,SEMI FIX 500
542	VR402	5101-S0801501	RES,SEMI FIX 500
543	VR403	5101-S0801302	RES,SEMI FIX 3K
543	VR404	5101-S0801302	RES,SEMI FIX 3K

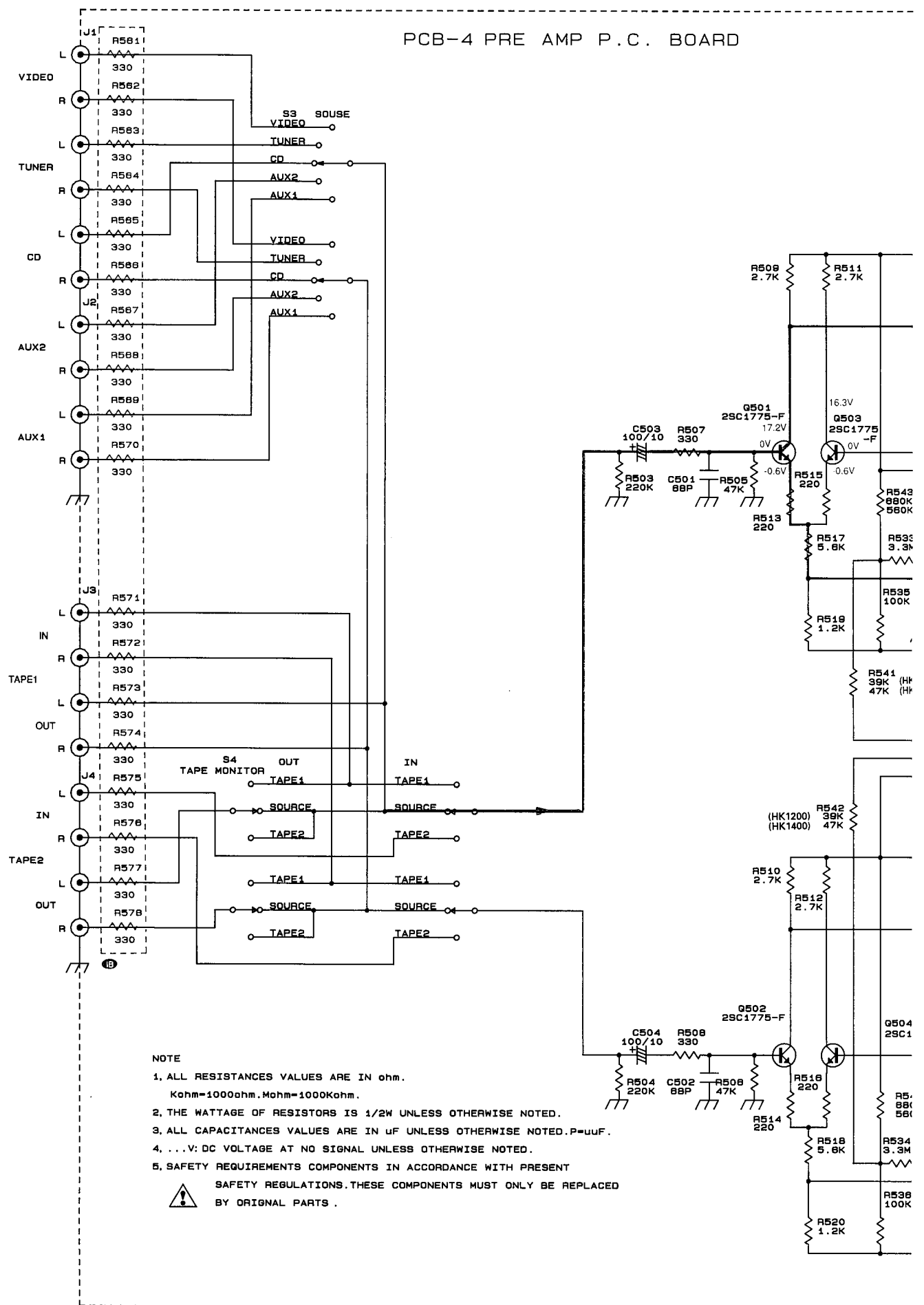
MISCELLANEOUS

693	CW5	4163-0140024	CONNECTOR W/W
694	CW6	4163-0140025	CONNECTOR W/W
695	CW7	4163-0140027	CONNECTOR W/W
699	CW401	4163-0130027	CONNECTOR W/W
697	CW402	4163-0130025	CONNECTOR W/W
698	CW403	4163-0130026	CONNECTOR W/W
696	CW404	4163-0130024	CONNECTOR W/W
702	CW405	4163-R0202121	CONNECTOR W/W
705	JL403	4132-R0202451	CORD,2C
706	JL404	4132-R0202161	CORD,2C
544	L401	5991-7125	SPRING COIL
544	L402	5991-7125	SPRING COIL
685	TM401	4214-11032	TERMINAL

A B C D E

SCHEMATIC DIAGRAM (1)

PCB-4 PRE AMP P.C. BOARD

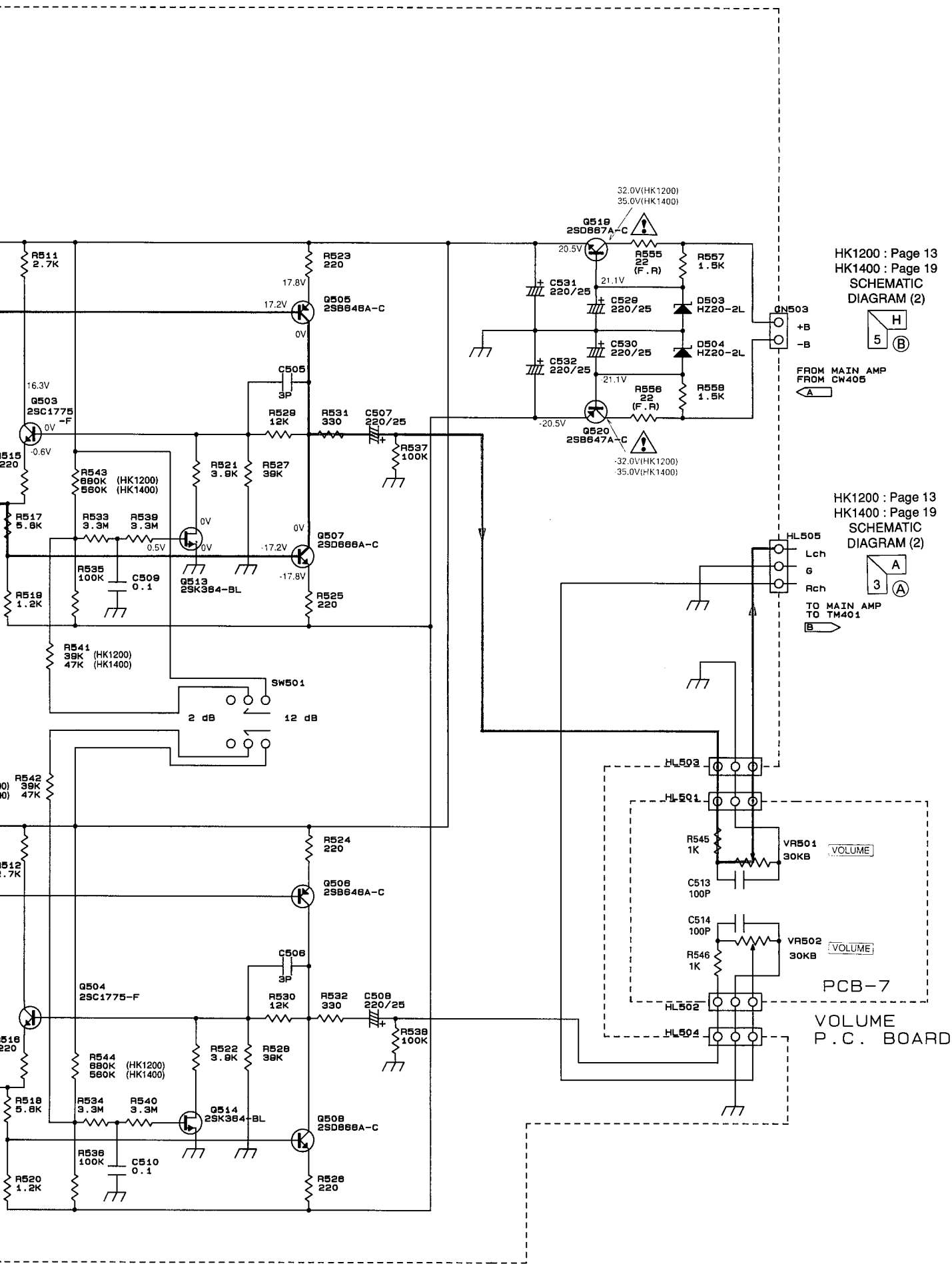


NOTE

1. ALL RESISTANCES VALUES ARE IN ohm.
Kohm=1000ohm. Mohm=1000Kohm.
2. THE WATTAGE OF RESISTORS IS 1/2W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN uF UNLESS OTHERWISE NOTED. P=uuF.
4. ...V: DC VOLTAGE AT NO SIGNAL UNLESS OTHERWISE NOTED.
5. SAFETY REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.



1
2
3
4
5
6
7



HK1200 : Page 13
HK1400 : Page 19
SCHEMATIC
DIAGRAM (2)



FROM MAIN AMP
FROM CW405

HK1200 : Page 13
HK1400 : Page 19
SCHEMATIC
DIAGRAM (2)



TO MAIN AMP
TO TM401

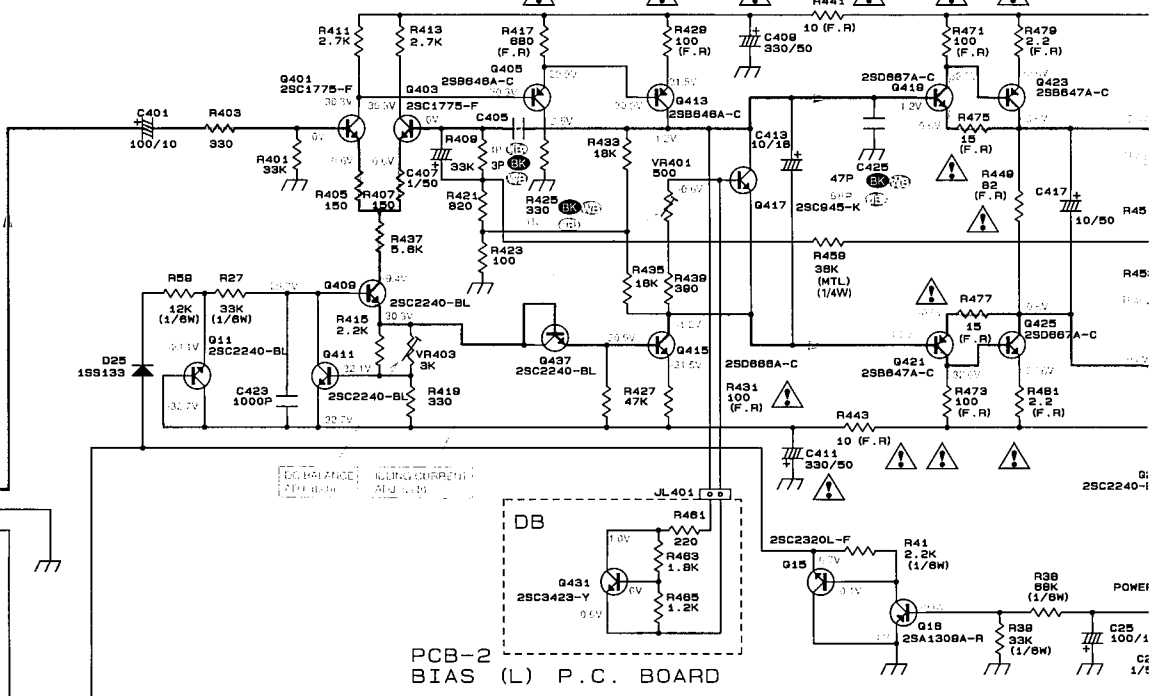
PCB-7
VOLUME
P.C. BOARD

SCHEMATIC DIAGRAM (2) (MODEL : HK1200)

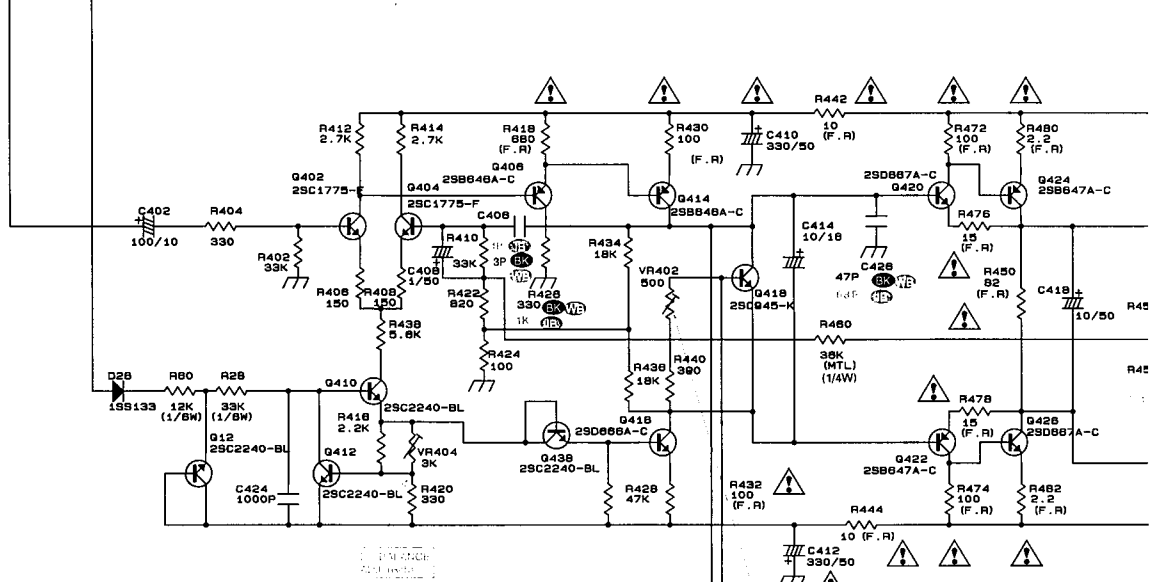
Page 10
SCHEMATIC
DIAGRAM (1)



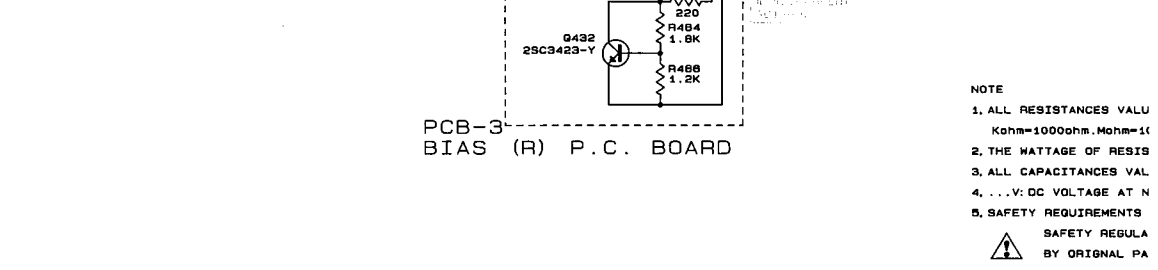
PCB-1 MAIN AMP P.C. BOARD



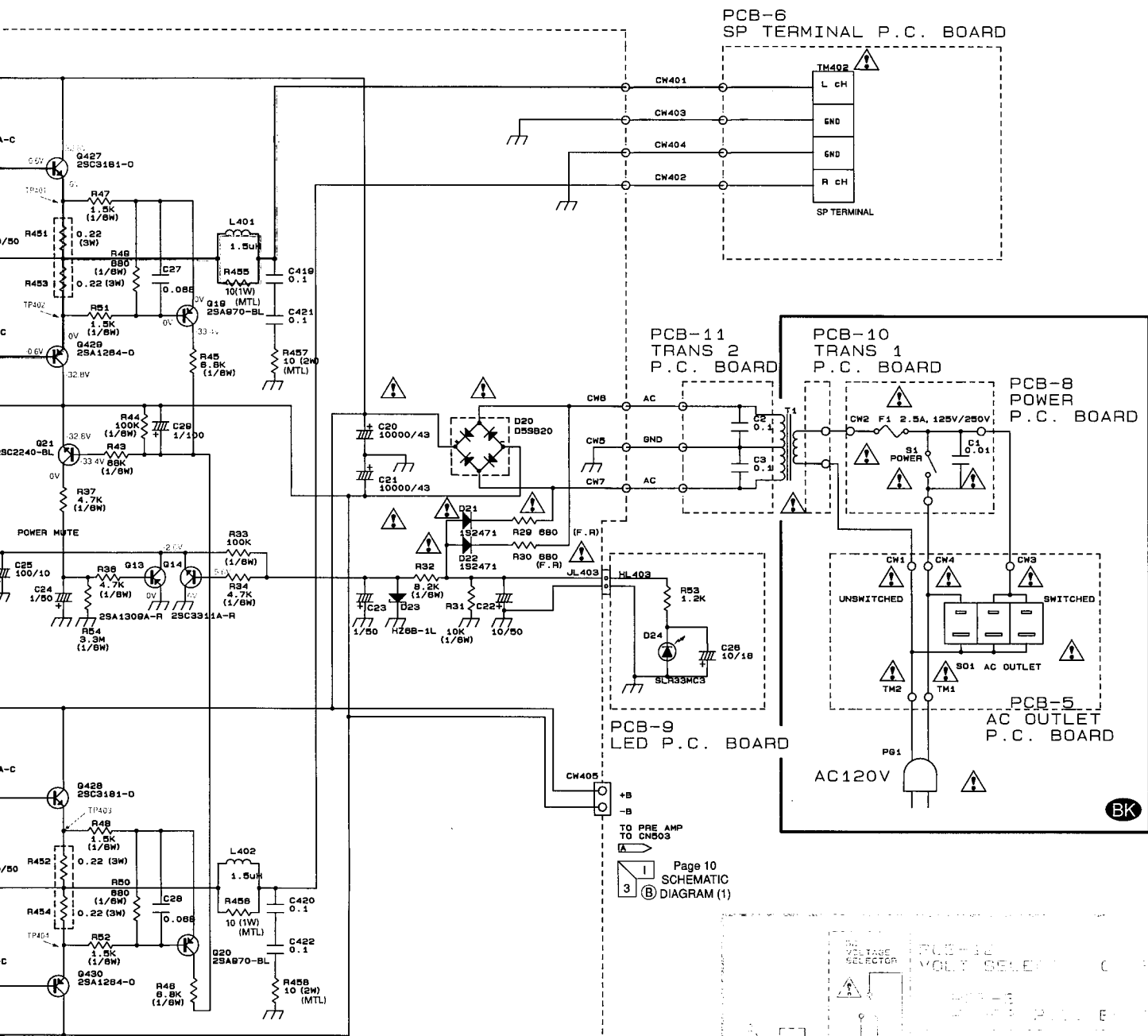
PCB-2 BIAS (L) P.C. BOARD



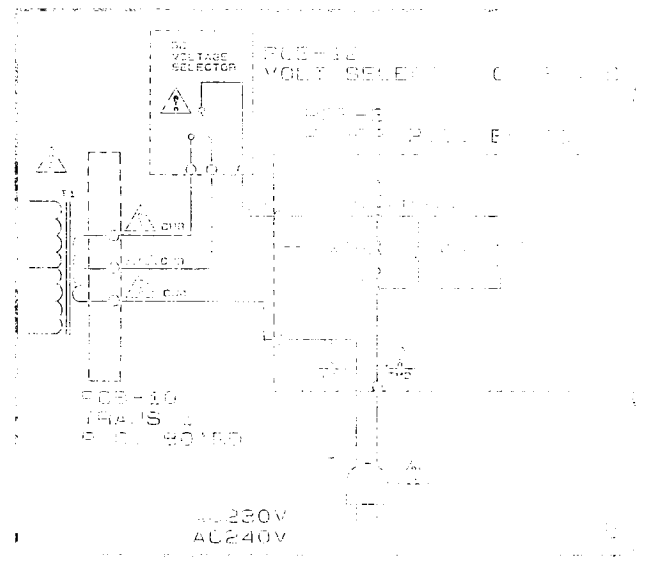
PCB-3 BIAS (R) P.C. BOARD



- NOTE
1. ALL RESISTANCES VALU
Kohm=1000ohm. Mohm=10
 2. THE WATTAGE OF RESIS
 3. ALL CAPACITANCES VAL
 4. . . . V: DC VOLTAGE AT N
 5. SAFETY REQUIREMENTS
SAFETY REGULA
BY ORIGINAL PA



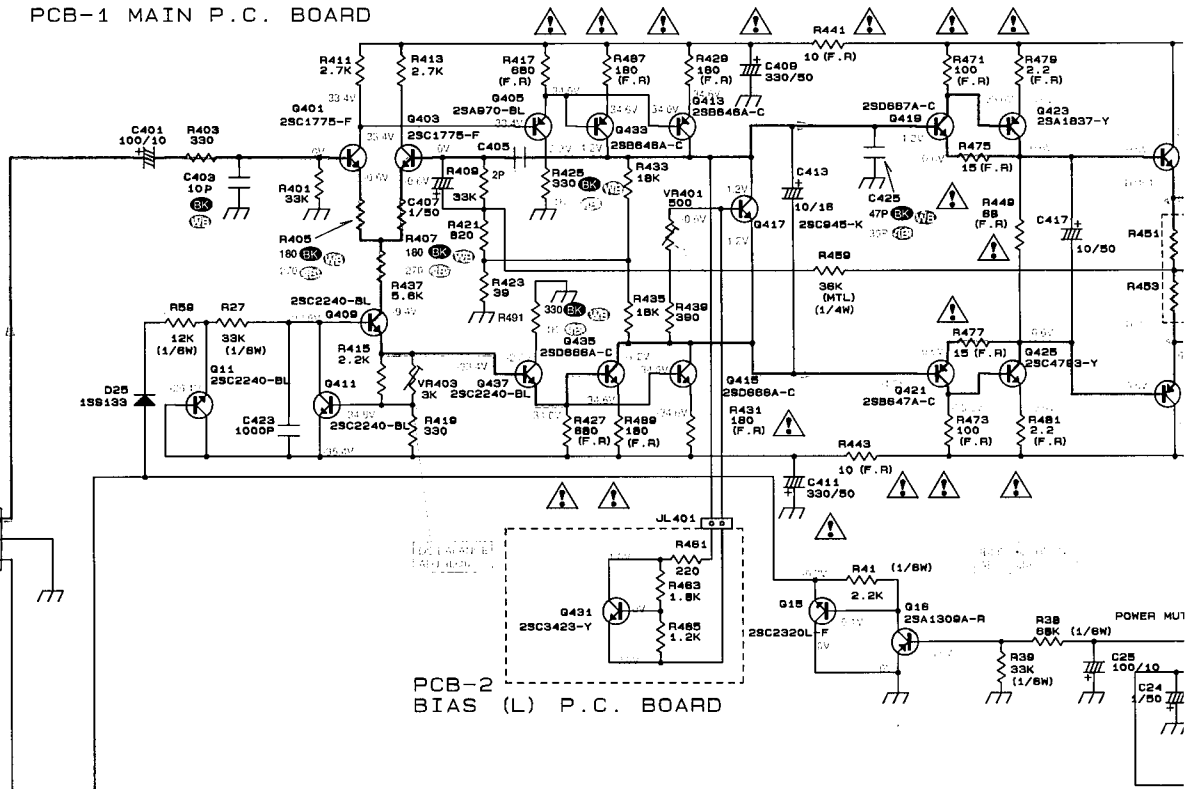
Page 10
 1 SCHEMATIC
 3 (B) DIAGRAM (1)



RESISTOR VALUES ARE IN OHMS.
 CAPACITOR VALUES ARE IN pF UNLESS OTHERWISE NOTED.
 RESISTOR VALUES ARE IN OHMS UNLESS OTHERWISE NOTED. P=POWER.
 CAPACITOR VALUES ARE IN pF UNLESS OTHERWISE NOTED.
 ALL COMPONENTS TO BE REPLACED IN ACCORDANCE WITH PRESENT REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED WITH ORIGINAL PARTS.

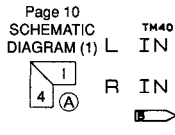
SCHEMATIC DIAGRAM (2) (MODEL : HK1400)

PCB-1 MAIN P.C. BOARD

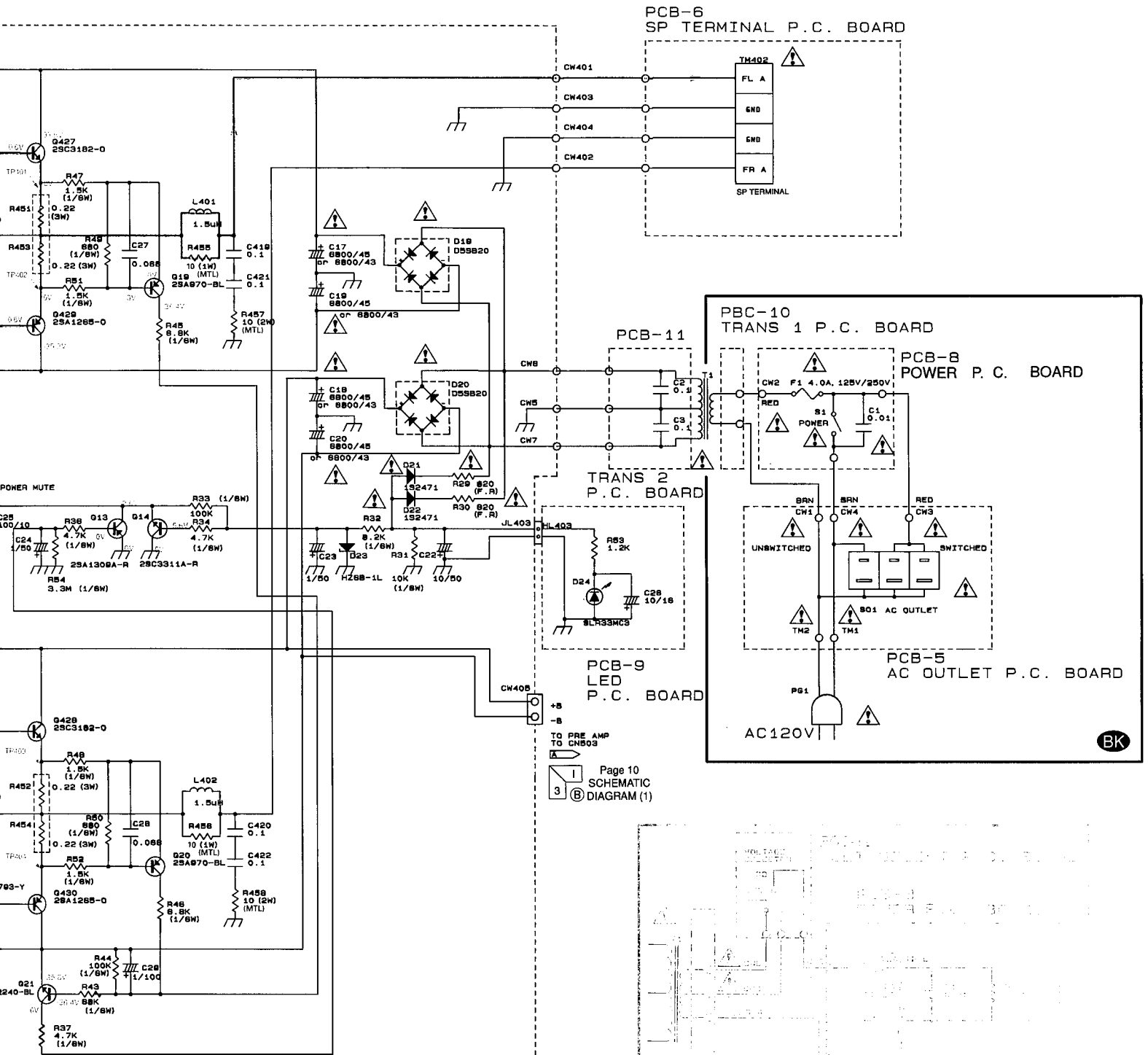


PCB-2 BIAS (L) P.C. BOARD

PCB-3 BIAS (R) P.C. BOARD

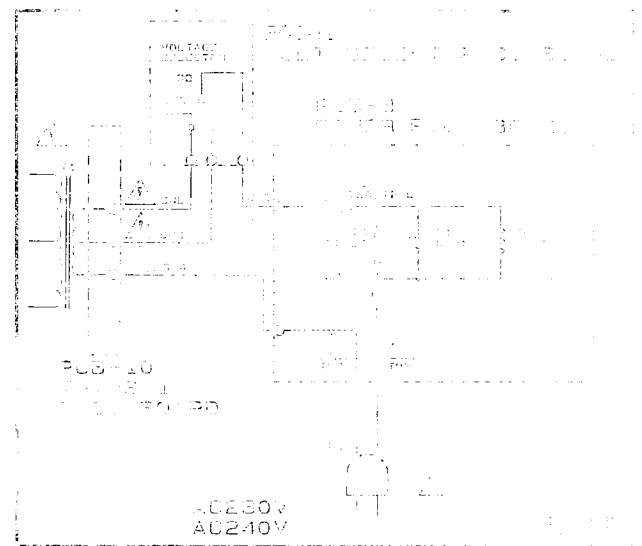


- NOTE
1. ALL RESISTANCES IN Kohm-1000ohm, Moh
 2. THE WATTAGE OF RI
 3. ALL CAPACITANCES
 4. ... V: DC VOLTAGE
 5. SAFETY REQUIREMENT SAFETY RE BY ORIGINAL



RESISTANCE VALUES ARE IN ohms.
 00ohm, Mega=1000kohm.
 AGE OF RESISTORS IS 1/2W UNLESS OTHERWISE NOTED.
 CAPACITANCE VALUES ARE IN uF UNLESS OTHERWISE NOTED. P=uuF.
 VOLTAGE AT NO SIGNAL UNLESS OTHERWISE NOTED.
 REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT
 SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED
 BY ORIGINAL PARTS.

Page 10
 SCHEMATIC
 DIAGRAM (1)



WIRING DIAGRAM (MODEL : HK1200)

1

2

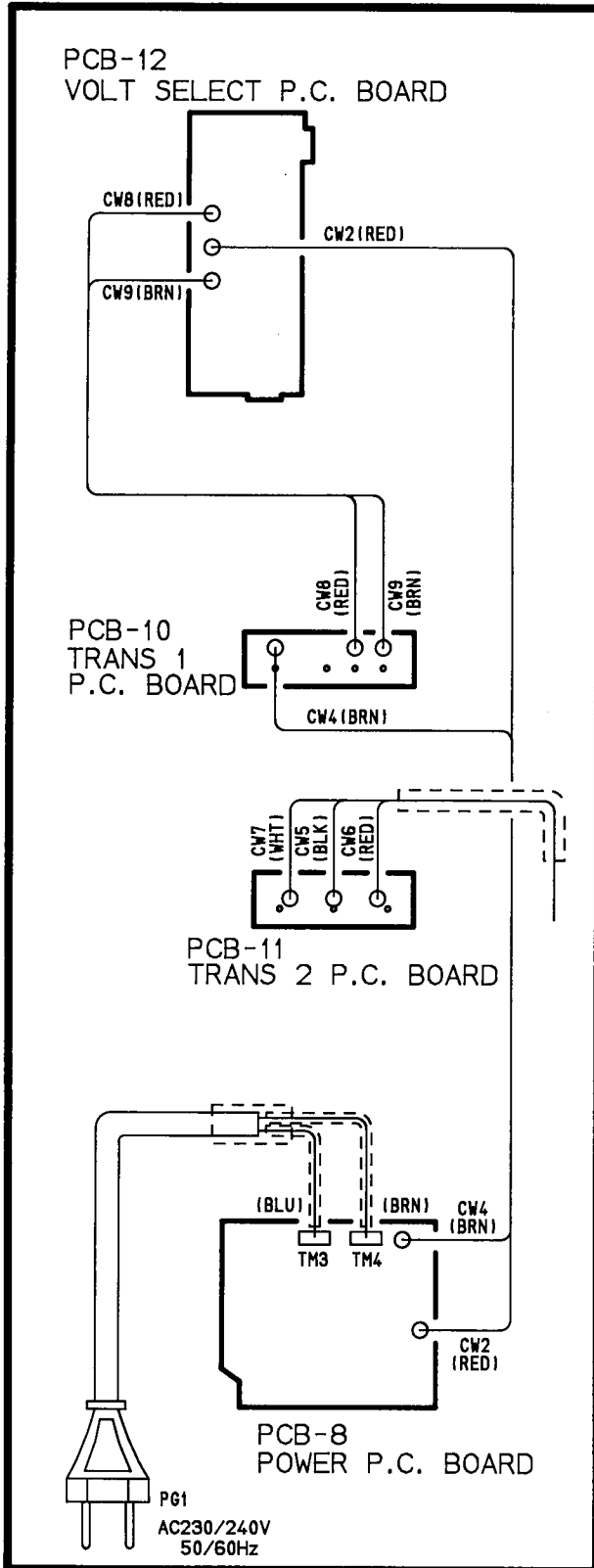
3

4

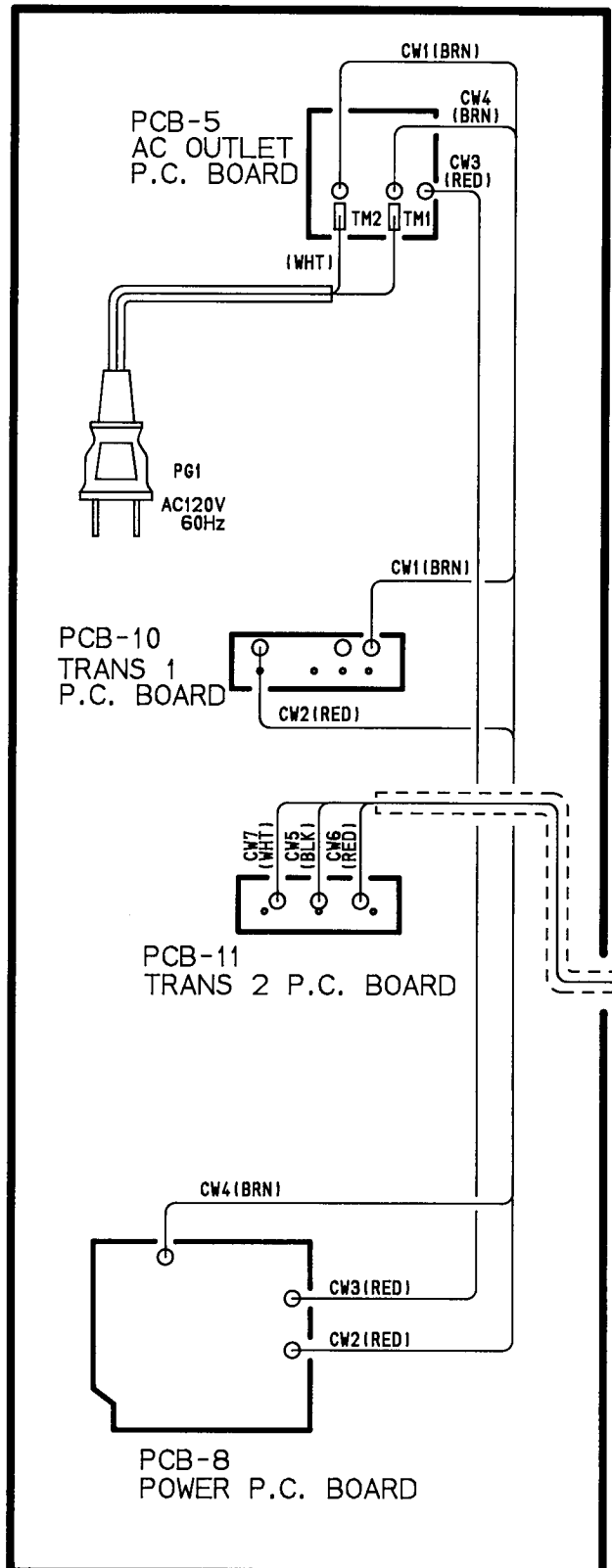
5

6

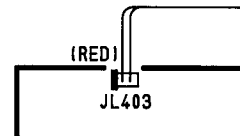
7



IB WB



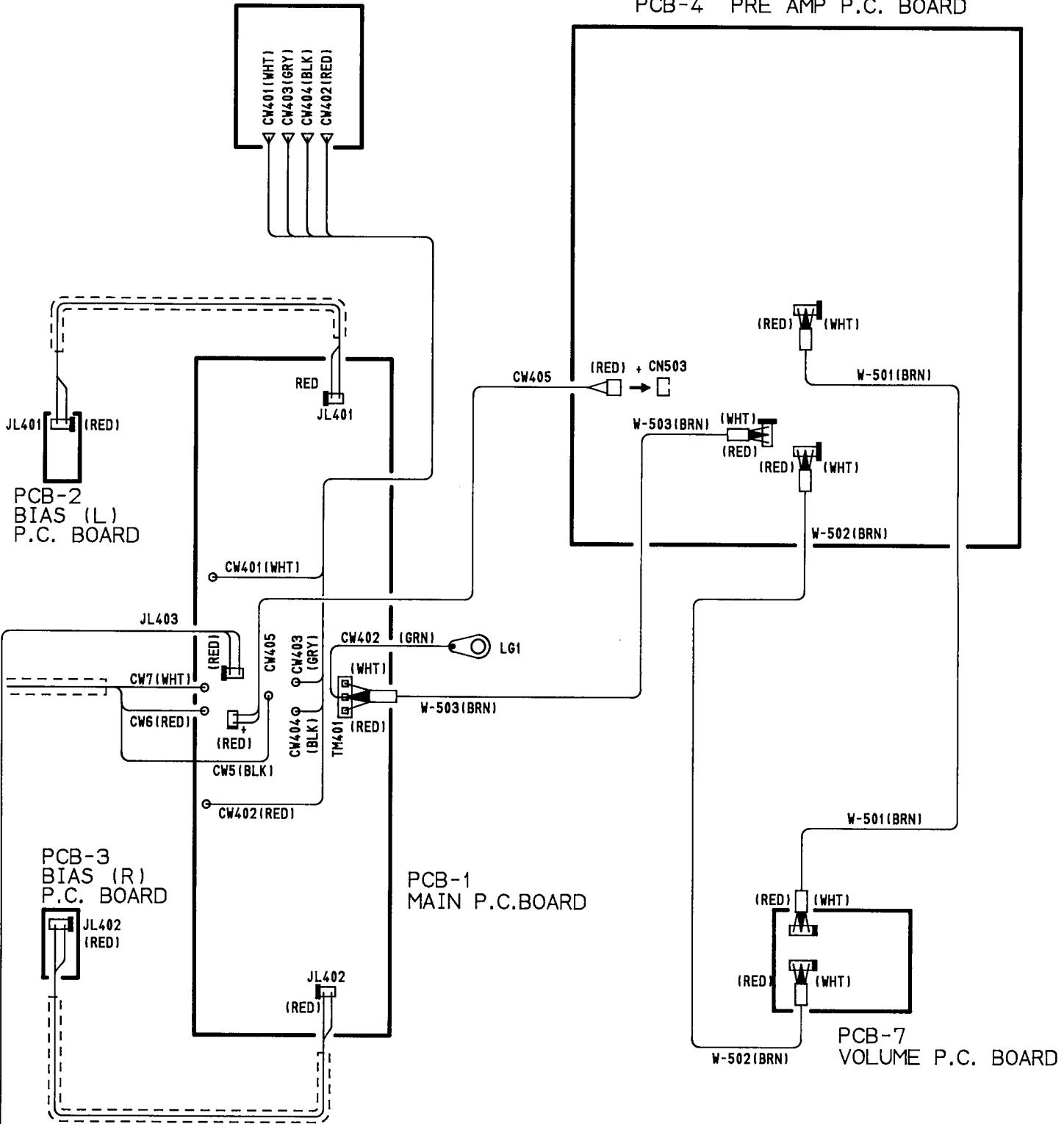
BK



PCB-9 LED P.C. BOARD

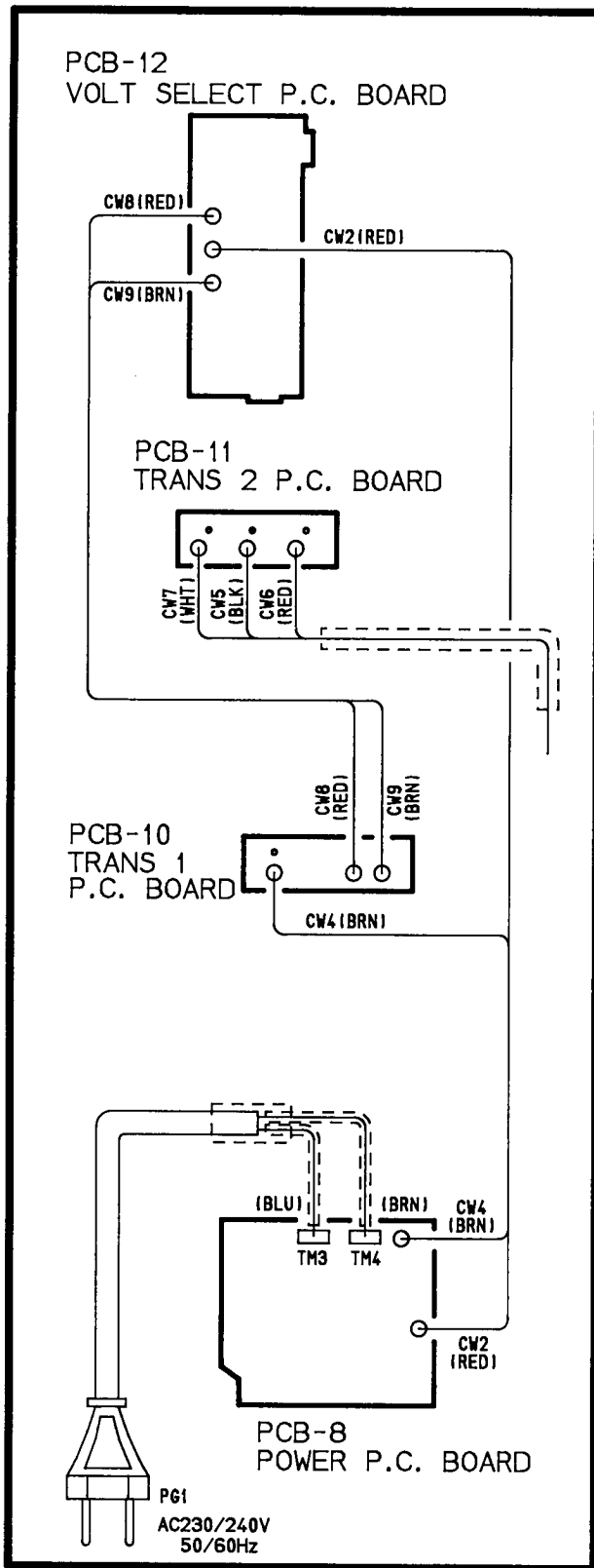
PCB-6 SP TERMINAL P.C. BOARD

PCB-4 PRE AMP P.C. BOARD

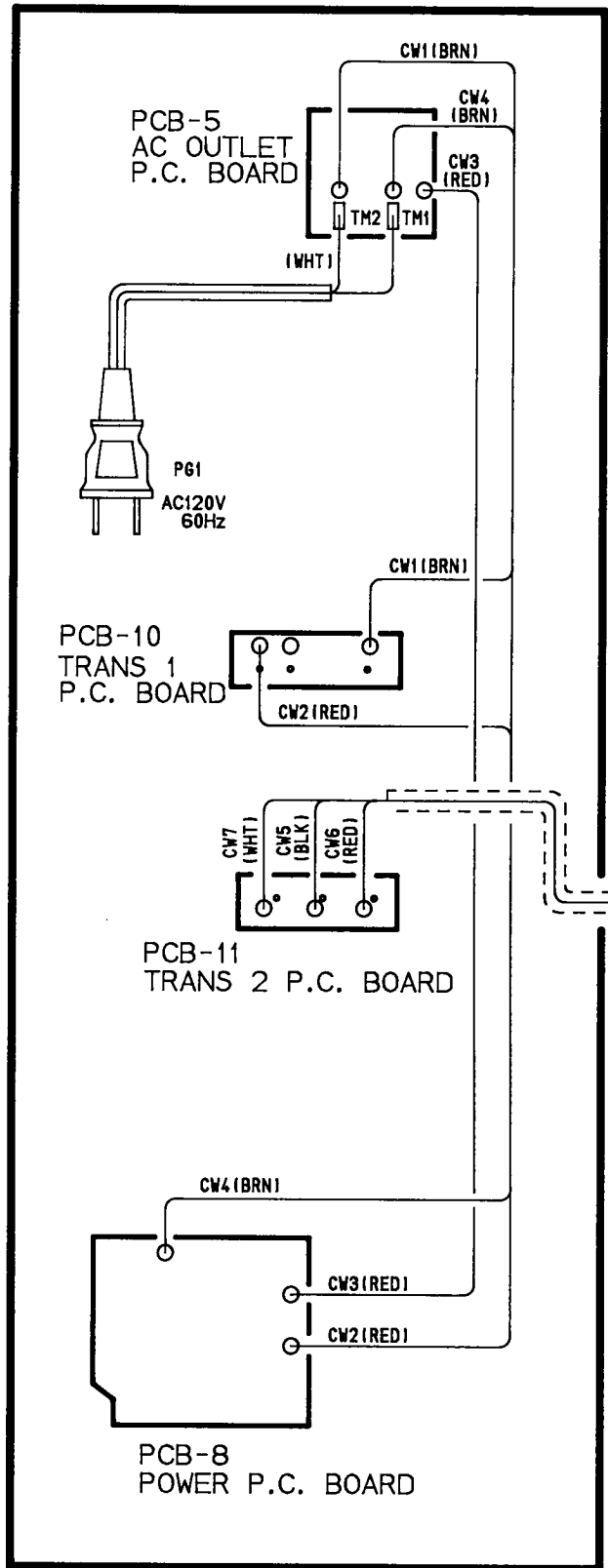


WIRE COLOR ABBREVIATIONS	
RED:Red	WHT:White
BRN:Brown	BLK:Black
BLU:Blue	GRY:Gray

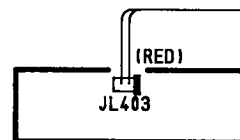
WIRING DIAGRAM (MODEL : HK1400)



IB WB



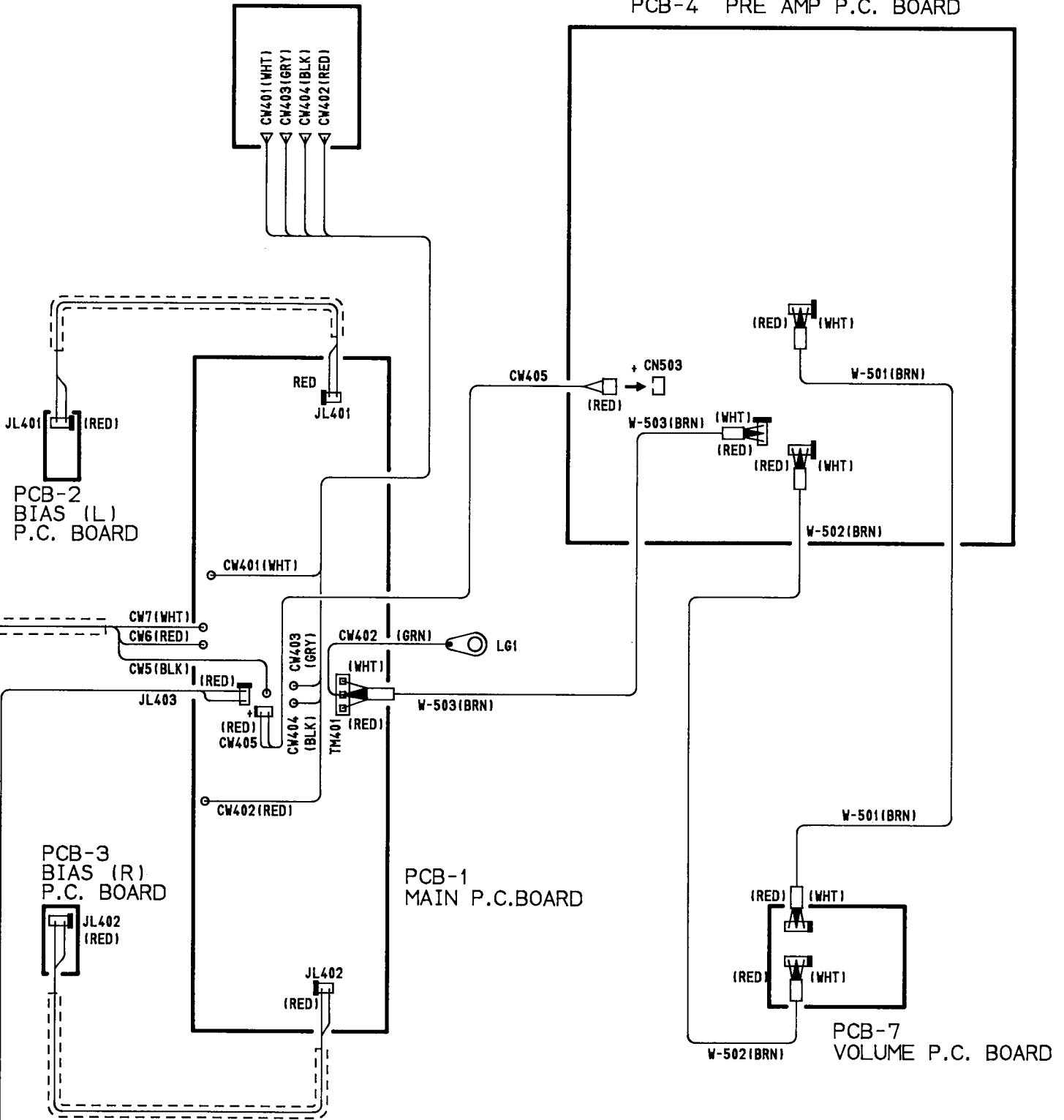
BK



PCB-9 LED P.C. BOARD

PCB-6 SP TERMINAL P.C. BOARD

PCB-4 PRE AMP P.C. BOARD



WIRE COLOR ABBREVIATIONS	
RED:Red	WHT:White
BRN:Brown	BLK:Black
BLU:Blue	GRY:Gray