



# SERVICE MANUAL

# 1020B

INTEGRATED STEREO AMPLIFIERS

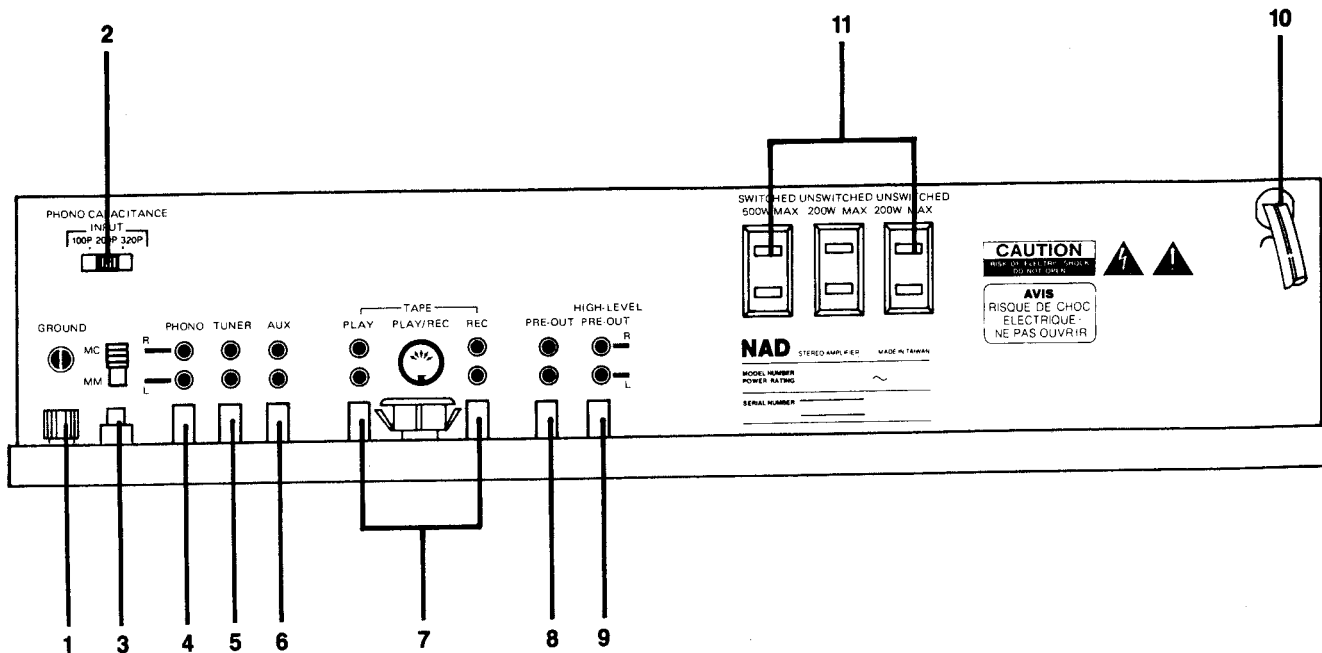
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- ENGLISH**
1. Ground
  2. Phono Capacitance Selector
  3. MM/MC Phono Selector
  4. Phono
  5. Tuner
  6. Auxiliary Input
  7. Tape Rec/Play
  8. Pre Out
  9. Hi-Level Pre Out
  10. AC Line Cord
  11. AC Convenience Outlets

- FRANÇAIS**
1. Masse
  2. Sélecteur de charge pour entrée tourne-disques
  3. Sélecteur Bobine mobile/Aimant mobile
  4. Tourne-disques
  5. Tuner
  6. Auxiliaire
  7. Enregistreur - enregistrement-lecture
  8. Sortie préampli
  9. Sortie préampli haut niveau
  10. Cordon secteur
  11. Sorties secteur

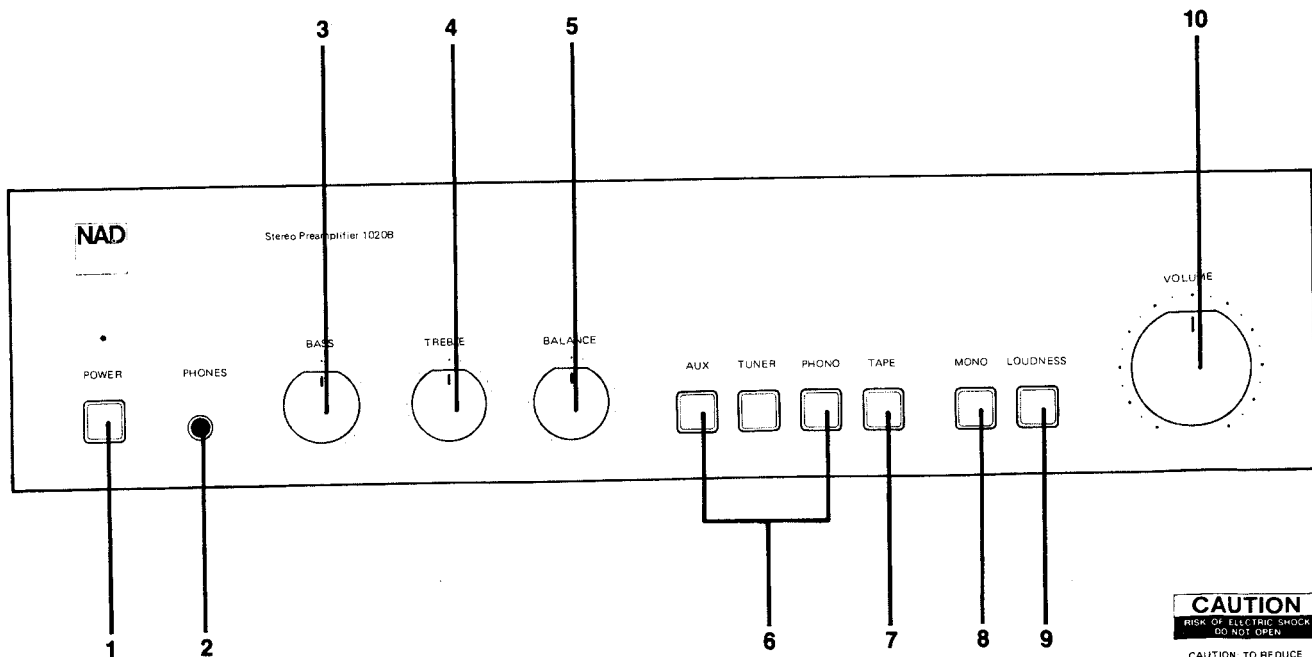
- DEUTSCH**
1. Masseanschluss
  2. Plattenspieler-kapazitäts-Wählschalter
  3. MM/MC Schalter
  4. Plattenspieler-Anschluss
  5. Rundfunk-Empfangsteil
  6. Zusatzeingang
  7. Bandgerät Aufnahme/Wiedergabe
  8. Vorverstärker-Ausgang
  9. Hochpegeliger Ausgang
  10. Netzanschlusskabel



- ENGLISH**
1. Power
  2. Phones
  3. Bass
  4. Treble
  5. Balance
  6. Aux/Tuner/Phono Selectors
  7. Tape
  8. Mono
  9. Loudness
  10. Volume

- FRANÇAIS**
1. Secteur
  2. Casque
  3. Graves
  4. Aigus
  5. Balance
  6. Sélecteur auxiliaire: radio-tourne-disques
  7. Enregistreur
  8. Mono
  9. Correction physiologique
  10. Volume

- DEUTSCH**
1. Netz
  2. Kopfhörer-Anschluss
  3. Bassregler
  4. Höhenregler
  5. Balance
  6. Zusatzgerät, Radio, Plattenspieler
  7. Tonbandschalter
  8. Monoschalter
  9. Gehörichichtige Lautstärkenregelung
  10. Lautstärkenregler



**CAUTION**  
RISK OF ELECTRIC SHOCK  
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



## SPECIFICATIONS

### PHONO INPUT

Input impedance, MM and MC	R	47 Kohm
	C	100,200, or 320 pF
Input Sensitivity for 0.5V out	MM	1.25mV
	MC	90 $\mu$ V
for 2V out	MM	5mV
	MC	360 $\mu$ V

Signal-to-Noise Ratio with cartridge connected, A-weighted	MM	75 dB re 5 mV in
	MC	72 dB re 0.5 mV in

Input Overload at 20 Hz/1KHz/20 KHz	MM	20/200/1800 mV
	MC	1.5/15/135 mV

RIAA Accuracy, MM and MC		+0.5 dB
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### HIGH-LEVEL INPUTS (TUNER, AUX, TAPE)

Input Impedance		20 Kohm 220 pF
Input Sensitivity	for 0.6 volt out	80 mV
	for 2 volts out	320 mV
Signal-to-Noise ratio, A-weighted		94 dB re 0.5 volt out 106 dB re 2 volts out
Input Overload		> 25 V
Frequency Response		20 Hz-20 KHz $\pm$ 0.5 dB
Infrasonic Filter		.3 dB at 20 Hz 12 dB/octave

### TAPE OUTPUTS

Output impedance	Phono	1.5 Kohm
	High Level	Source Z + 1 Kohm
Nominal Level		320 mV
Output Impedance		68 Kohm
Nominal Level	Open circuit	100 mV
	Short-circuit	1.5 $\mu$ A

### LINE OUTPUT

Output Impedance		600 ohm
Rated Output		2 volts
Rated Distortion (THD and IM)		0.02%
Maximum Output	50 Kohm load	15 volts
	800 ohm load	5 volts

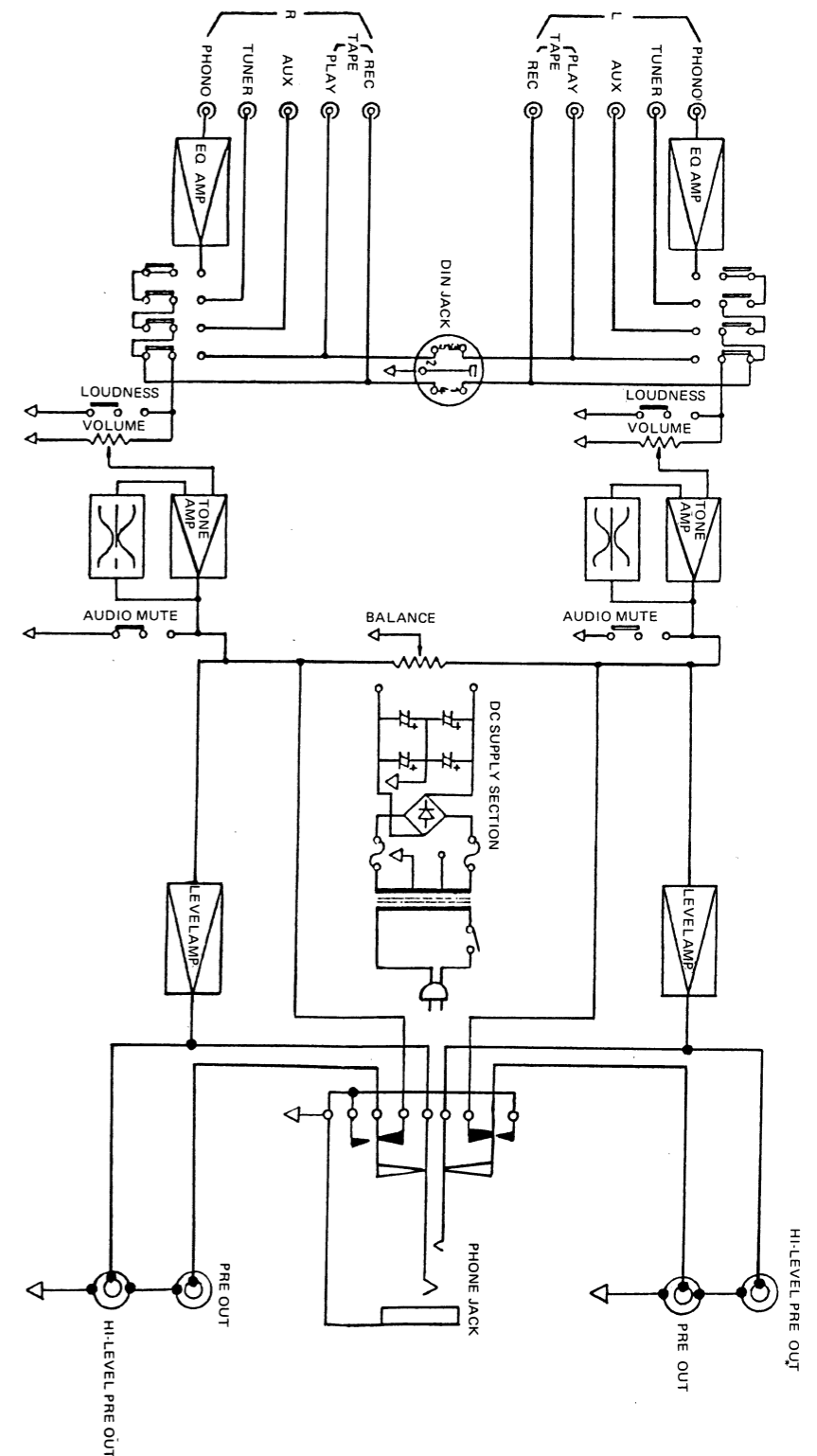
### HEADPHONE AND HIGH-LEVEL OUTPUTS

Output Impedance		150 ohm will drive all headphone impedances.
Maximum Output Level		15 volts into 50 Kohm
		5 volts into 600 ohm
		250 mV into 8 ohm

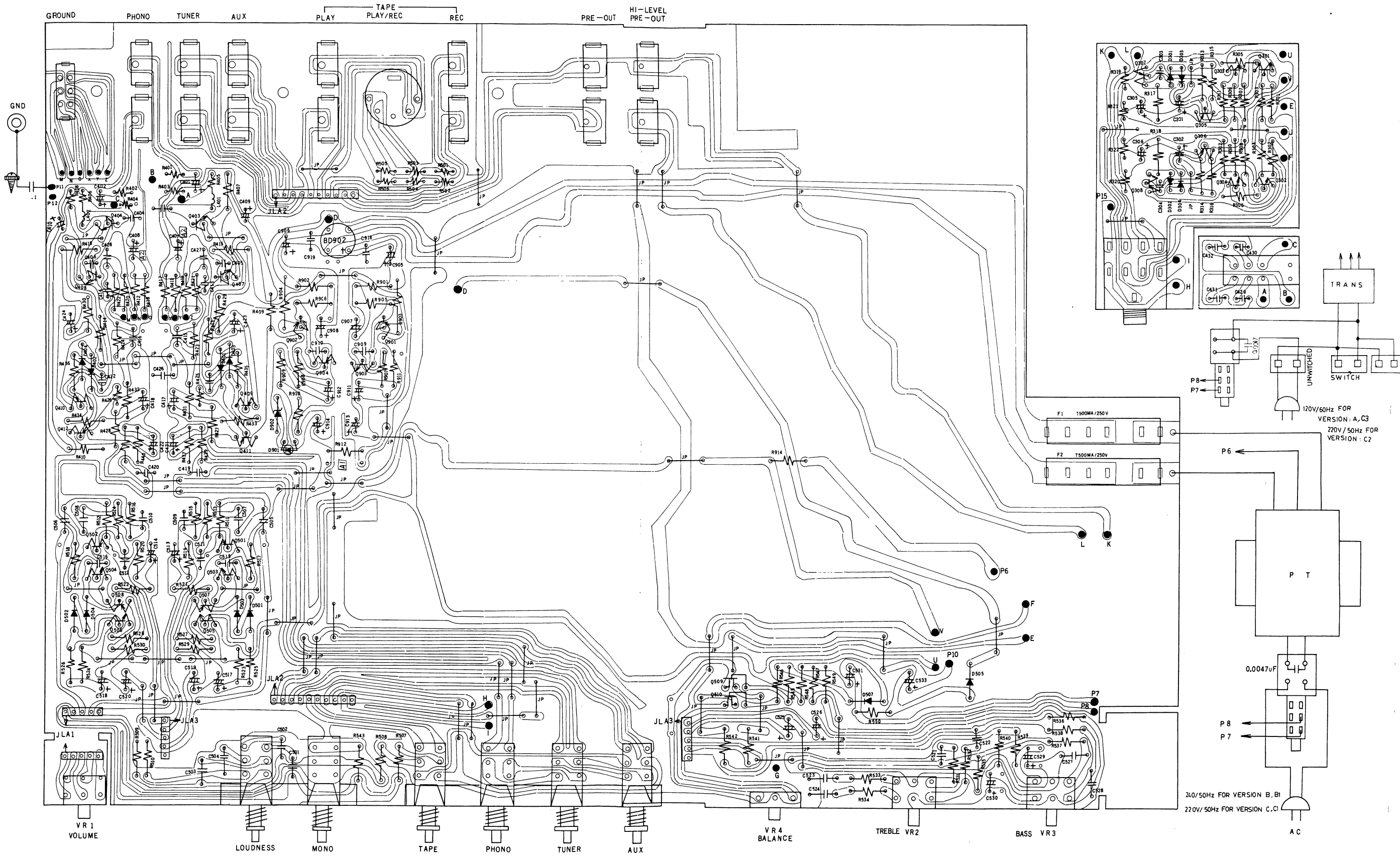
### PHYSICAL SPECIFICATIONS

Height	9.6 cm (3.8 in)
Width	42 cm (16.5 in)
Depth	24 cm (9.5 in)
Net Weight	3.75 Kg (8.3 lbs.)
Shipping Weight	4.8 kg (10.10 lbs.)
Power Consumption	50-60 Hz, 110-240 VAC. 5 watts

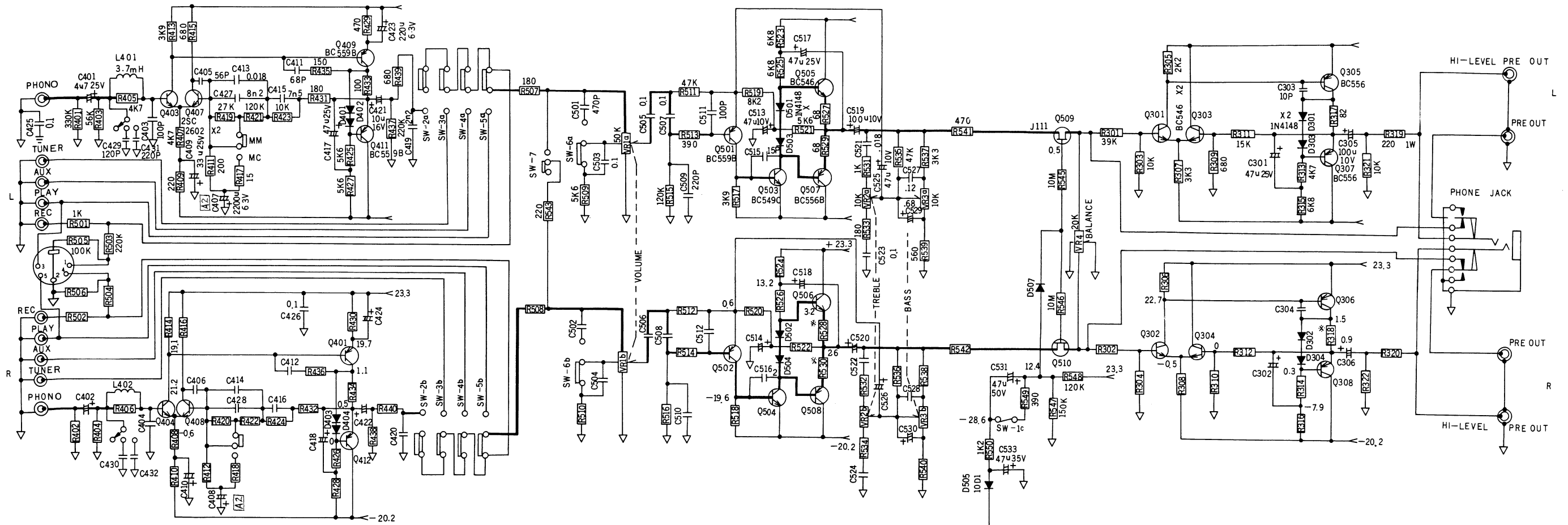
## BLOCK DIAGRAM



# PCB PARTS LOCATION



# SCHEMATIC DIAGRAM



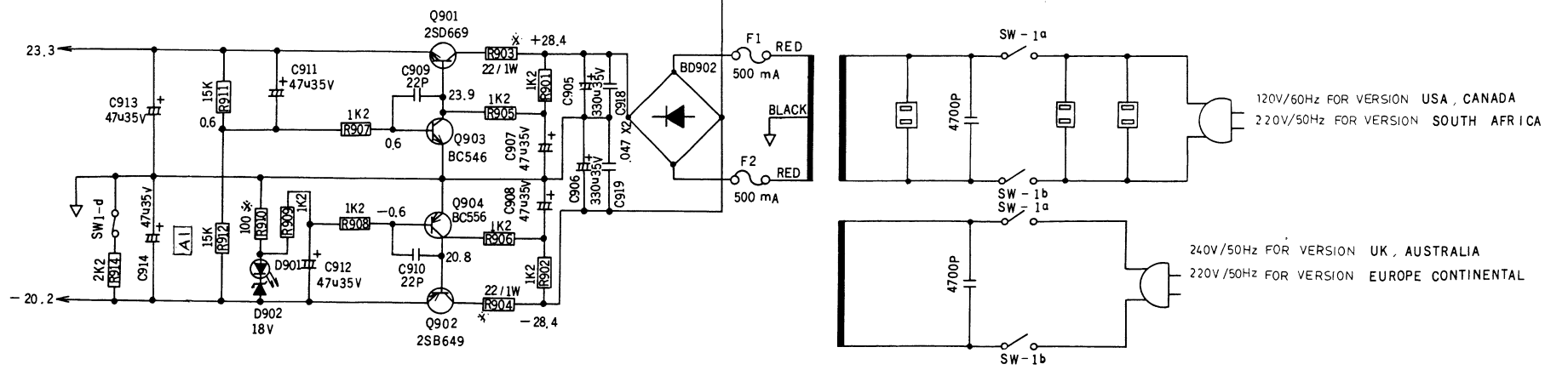
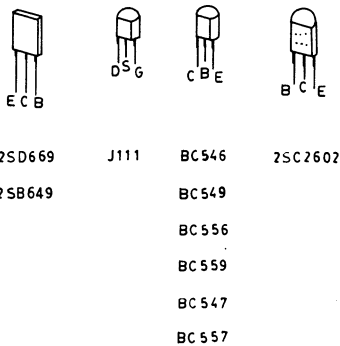
**NOTES 1**

- 1 RESISTORS ARE CARBONFILM 1/4W 5% UNLESS OTHERWISE SPECIFIED IN DRAWING.
- 2 CAPACITANCE IN  $\mu$ F UNLESS OTHERWISE SPECIFIED IN DRAWING.
- 3 X INDICATE RESISTORS RAISED FROM PCB WITH CERAMIC TUBES.
- 4 DC VOLTAGES SHOWN WITH NO SIGNAL OR LOAD APPLIED.
- 5 SWITCHES DRAWN IN OFF/OUT POSITIONS.
- 6 ALL SW ARE AT OFF POSITION.

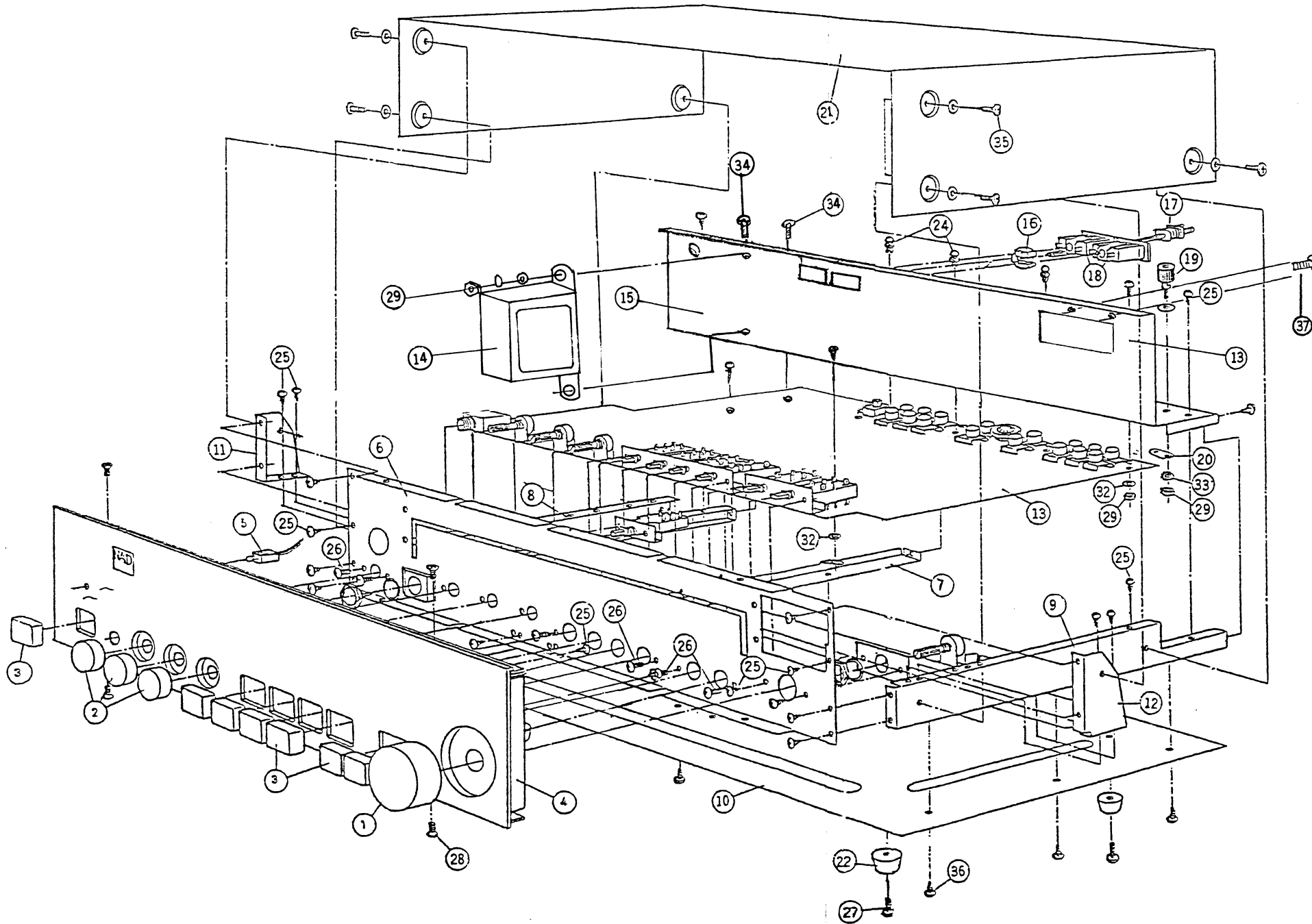
**NOTES 2**

- 1 SW-1 a.b.c.d : POWER SW.
- 2 SW-2 a.b. : PHONO SW.
- 3 SW-3 a.b. : TUNER SW.
- 4 SW-4 a.b. : AUX SW
- 5 SW-5 a.b. : TAPE MONITOR SW.
- 6 SW-6 a.b. : LOUDNESS SW.
- 7 SW-7 : MONO

**NOTES 3**



# 1020 ASSEMBLY DIAGRAM



Item	Parts NO.	Name	Q'ty
1	70449500016	Knob Volume	1
2	70449490011	Knob Tonecontrols/Balance	3
3	70449480015	Knob Push	7
4	70016671019	Frontpanel	1
5	45400250013	Connector Power LED	1
6	56025592018	Front subchassis	1
7	54935180019	Conter support	1
8	54935351019	Sidechassis Left	1
9	54935140017	Sidechassis Right	1
10	71025710014	Bottomcover	1
11	54345370014	Subchassis Bracket Left	1
12	54345360019	Subchassis Bracket Right	2
13	24125230038	Main PCB complete	1
14	3500022066	Power transformer	1
15	70016682029	Rear Panel	1
16	45500010014	Bushing strain relief	1
17	40845130028	AC Cord	1
18	45100380019	AC Outlet	2
19	53146880011	Grounding screw	1
20	685300000000	Washer Lug	1
21	71015310013	Cabinett	1
22	76545230011	Foot Rubber	4
23	673400110034	CAN NOT FIND ON DRAWING	3
24	67240011032	Plastic rivet	3
25	666120300831	Screw-Tap BGR+3x8	8
26	650060300607	Screw-M PF+3x6	8
27	650070401004	Screw-M PG+4x10	4
28	651070300504	SCREW-M FG+3x5	4
29	670113060251	Nut Hex	8
30	67045050016	CAN NOT FIND ON DRAWING	1
31	670223055249	CAN NOT FIND ON DRAWING	4
32	680303080051	Fiber Washer 3x8x0.5	1
33	681300000002	Lock Washer	1
34	656070300803	SCREW-M BG+3x8	4
35	652075400800	SCREW-M/W TG+4x8	6
36	666080300803	SCREW-T BH+3x6	8
37	656070260300	SCREW-M BG+26x3	2



1020B PARTS LIST

SYMBOL NO.	PART NO.	DESCRIPTION	REF
R301, R302	1003936231	Carbon res 39K $\pm$ 5% 1/4W	
R303, R304	1001036233	Carbon res 10% $\pm$ 5% 1/4W	
R305, R306	1002226239	Carbon res 2.2K $\pm$ 5% 1/4W	
R307, R308	1003326235	Carbon res 3.3K $\pm$ 5% 1/4W	
R309, R310	1006816237	Carbon res 680 $\pm$ 5% 1/4W	
R311, R312	1001536231	Carbon res 15K $\pm$ 5% 1/4W	
R313, R314	1004726232	Carbon res 4.7K $\pm$ 5% 1/4W	
R315, R316	1006826231	Carbon res 6.8K $\pm$ 5% 1/4W	
R317, R318	1008206211	Carbon res 82 $\pm$ 5% 1/4W	
R319, R320	1002216412	Carbon res 220 $\pm$ 5% 1/4W	
R321, R322	1001036226	Carbon res 10K $\pm$ 5% 1/4W	
R401, R402	1003346227	Carbon res 330K $\pm$ 5% 1/4W	
R403, R404	1005636229	Carbon res 56K $\pm$ 5% 1/4W	
R405, R406, R408	1004726225	Carbon res 4.7K $\pm$ 5% 1/4W	
R407	1004726232	Carbon res 4.7K $\pm$ 5% 1/4W	
R409, R410	1002216234	Carbon res 220 $\pm$ 5% 1/4W	
R411, R412	1002016237	Carbon res 200 $\pm$ 5% 1/4W	
R413, R414	1003926237	Carbon res 3.9K $\pm$ 5% 1/4W	
R415, R416	1006816237	Carbon res 680 $\pm$ 5% 1/4W	
R417, R418	1001506238	Carbon res 15 $\pm$ 5% 1/4W	
R419, R420	1002735236	Carbon res 27K $\pm$ 2% 1/4W	
R421, R422	1001245230	Carbon res 120K $\pm$ 2% 1/4W	
R423, R424	1001035238	Carbon res 10K $\pm$ 2% 1/4W	
R425, R426	1005626224	Carbon res 5.6K $\pm$ 5% 1/4W	
R427, R428	1005626231	Carbon res 5.6K $\pm$ 5% 1/4W	
R429, R430	1004716238	Carbon res 470 $\pm$ 5% 1/4W	
R431, R432	1001816233	Carbon res 180 $\pm$ 5% 1/4W	
R433, R434	1001016234	Carbon res 100 $\pm$ 5% 1/4W	
R435, R436	1001516232	Carbon res 150 $\pm$ 5% 1/4W	
R437, R438	1002246238	Carbon res 220K $\pm$ 5% 1/4W	
R439, R440	1006816237	Carbon res 680 $\pm$ 5% 1/4W	
R501, R502	1001026221	Carbon res 1K $\pm$ 5% 1/4W	
R503, R504	1002246221	Carbon res 220K $\pm$ 5% 1/4W	
R505, R506	1001046221	Carbon res 100K $\pm$ 5% 1/4W	
R507, R508	1001816233	Carbon res 180 $\pm$ 5% 1/4W	
R509, R510	1005626231	Carbon res 5.6K $\pm$ 5% 1/4W	
R511, R512	1004736237	Carbon res 47K $\pm$ 5% 1/4W	
R513, R514	1003916232	Carbon res 390 $\pm$ 5% 1/4W	
R515, R516	1001246235	Carbon res 120K $\pm$ 5% 1/4W	
R517, R518	1003926237	Carbon res 3.9K $\pm$ 5% 1/4W	

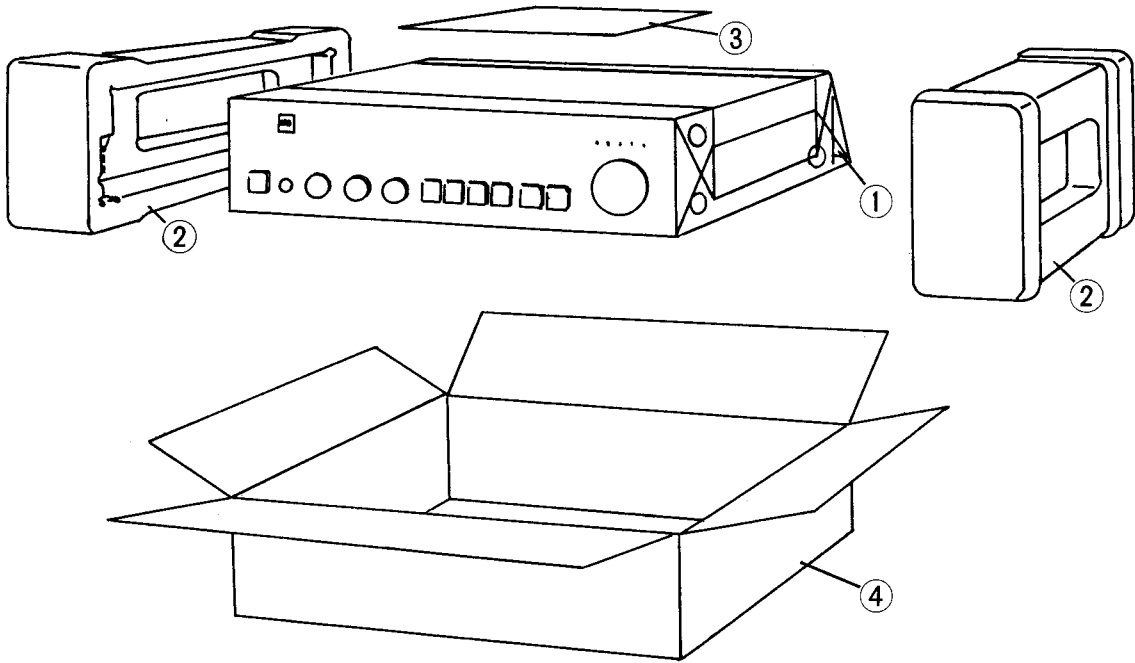
SYMBOL NO.	PART NO.	DESCRIPTION	REF
R519, R520	1008226235	Carbon res 8.2K $\pm$ 5% 1/4W	
R521, R522	1005626231	Carbon res 5.6K $\pm$ 5% 1/4W	
R523, R524	1006826231	Carbon res 6.8K $\pm$ 5% 1/4W	
R525, R526	1006826231	Carbon res 6.8K $\pm$ 5% 1/4W	
R527, R528	1006806232	Carbon res 68 $\pm$ 5% 1/4W	
R528, R530	1006806232	Carbon res 68 $\pm$ 5% 1/4W	
R531, R532	1001026239	Carbon res 1K $\pm$ 5% 1/4W	
R533, R534	1001816233	Carbon res 180 $\pm$ 5% 1/4W	
R535, R536	1004736237	Carbon res 47K $\pm$ 5% 1/4W	
R537, R538	1003326235	Carbon res 3.3K $\pm$ 5% 1/4W	
R539, R540	1005616237	Carbon res 560 $\pm$ 5% 1/4W	
R541, R542	1004716238	Carbon res 470 $\pm$ 5% 1/4W	
R545, R546	1001066237	Carbon res 10 M $\pm$ 5% 1/4W	
R547	1001546236	Carbon res 150K $\pm$ 5% 1/4W	
R548	1001246235	Carbon res 120K $\pm$ 5% 1/4W	
R549	1003916232	Carbon res 390 $\pm$ 5% 1/4W	
R550	1001226236	Carbon res 1.2K $\pm$ 5% 1/4W	
R901, R902	1001226236	Carbon res 1.2K $\pm$ 5% 1/4W	
R903, R904	1002206418	Carbon res 22 $\pm$ 5% 1W	
R905, R906	1001226236	Carbon res 1.2K $\pm$ 5% 1/4W	
R907, R908, R909	1001226236	Carbon res 1.2K $\pm$ 5% 1/4W	
R910	1001016234	Carbon res 100 $\pm$ 5% 1/4W	
R911, R912	1001536231	Carbon res 15K $\pm$ 5% 1/4W	
R913	1001546236	Carbon res 150K $\pm$ 5% 1/4W	
R914	1002226239	Carbon res 2.2K $\pm$ 5% 1/4W	
C301, C302	160476250146	Elec. Capa. 47 $\mu$ F $\pm$ 50-10% 25V	
C303, C304	166100647026	Ceramic Capa. 10pF $\pm$ 0.5pF 50WV	
C305, C306	160107100121	Elec. Capa. 100 $\mu$ F $\pm$ 50-10% 10V	
C401, C402	160475500601	Elec. Capa. 4.7 $\mu$ F $\pm$ 75-10% 50V	
C403, C404	166101647021	Ceramic Capa. 100pF $\pm$ 10% 50WV	
C404, C406	166560647029	Ceramic Capa. 56pF $\pm$ 10% 50WV	
C407, C408	160228063603	Elec. Capa. 2200 $\mu$ F $\pm$ 50-10% 6.3V	
C409, C410	160336250603	Elec. Capa. 33 $\mu$ F $\pm$ 50-10% 25V	
C411, C412	166680647029	Ceramic Capa. 68pF $\pm$ 10% 50WV	
C413, C414	162183524	Mylar Capa. 0.018 $\mu$ F $\pm$ 5% 50WV	
C415, C416	162752525	Mylar Capa. 0.0075 $\mu$ F $\pm$ 5% 50WV	
C417, C418	160476250601	Elec. Capa. 47 $\mu$ F $\pm$ 50-10% 25V	
C419, C420	162222521	Mylar Capa. 0.0022 $\mu$ F $\pm$ 5% 50WV	
C421, C422	160106160608	Elec. Capa. 10 $\mu$ F $\pm$ 50-10% 16V	

SYMBOL NO.	PART NO.	DESCRIPTION		REF
C423, C424	160227100604	Elec.	Capa.	220 $\mu$ F+50-10% 10V
C425, C426	167104800021	Ceramic	Capa.	0.1 $\mu$ F+80-20% 50WV
C427, C428	162822527	Mylar	Capa.	0.0082 $\mu$ F $\pm$ 5% 50WV
C429, C430	166121647028	Ceramic	Capa.	120pF $\pm$ 10% 50WV
C431, C432	166221647021	Ceramic	Capa.	220pF $\pm$ 10% 50WV
C501, C502	166471547029	Ceramic	Capa.	470pF $\pm$ 5% 50WV
C503, C504	162104520	Mylar	Capa.	0.1 $\mu$ F $\pm$ 5% 50WV
C505, C506	162104520	Mylar	Capa.	0.1 $\mu$ F $\pm$ 5% 50WV
C507, C508	162104520	Mylar	Capa.	0.1 $\mu$ F $\pm$ 5% 50WV
C509, C510	166221647021	Ceramic	Capa.	220pF $\pm$ 10% 50WV
C511, C512	166101647021	Ceramic	Capa.	100pF $\pm$ 10% 50WV
C513, C514	160476100503	Elec.	Capa.	47 $\mu$ F+50-10% 10V
C515, C516	166150647024	Ceramic	Capa.	15pF $\pm$ 10% 50WV
C517, C518	160476250601	Elec.	Capa.	47 $\mu$ F+50-10% 25V
C519, C520	160107100604	Elec.	Capa.	100 $\mu$ F+50-10% 10V
C521, C522	162183524	Mylar	Capa.	0.018 $\mu$ F $\pm$ 5% 50WV
C523, C524	162104520019	Mylar	Capa.	0.1 $\mu$ F $\pm$ 5% 50WV
C525, C526	160476100603	Elec.	Capa.	47 $\mu$ F+50-10% 10V
C527, C528	162124527	Mylar	Capa.	0.12 $\mu$ F $\pm$ 5% 50WV
C529, C530	160684500697	Elec.	Capa.	0.68 $\mu$ F+75-10% 50V
C531	160476500605	Elec.	Capa.	47 $\mu$ F+50-10% 50V
C533	160476350606	Elec.	Capa.	47 $\mu$ F+50-10% 35V
C905, C906	160337350602	Elec.	Capa.	330 $\mu$ F+50-10% 35V
C907, C908	160476350606	Elec.	Capa.	47 $\mu$ F+50-10% 35V
C909, C910	166220647026	Ceramic	Capa.	22pF $\pm$ 10% 50WV
C911, C912	160475500601	Elec.	Capa.	4.7 $\mu$ F+50-10% 50V
C913, C914	160476350606	Elec.	Capa.	47 $\mu$ F+50-10% 35V
C918, C919	167473800020	Ceramic	Capa.	0.047 $\mu$ F+80-20% 50WV
Q301, Q302	260180546021 260180546011	Transistor	BC546B or BC546A	
Q303, Q304	260180546021 260180546011	Transistor	BC546B or BC546A	
Q305, Q306	260180556027	Transistor	BC556B	
Q307, Q308	260180556027	Transistor	BC556B	
Q403, Q404	260032602075	Transistor	2SC2602G	
Q407, Q408	260032602075	Transistor	2SC2602G	
Q409, Q410	260180556027	Transistor	BC556B	
Q411, Q412				
Q501, Q502	260180559029 260180556027	Transistor Transistor	BC559B or BC556B	

SYMBOL NO.	PART NO.	DESCRIPTION	REF
Q503, Q504	260180549031	Transistor BC549C	
Q505, Q506	260180546011	Transistor BC546A or	
	260180546021	BC546B	
Q507, Q508	260180556027	Transistor BC556B	
Q509, Q510	262000001112	FET E(J) 111	
Q901	260040669032	Transistor 2SD669C	
	260040669041	2SD669D	
	260040669598	2SD669AC	
	260040669604	2SD669AD	
Q903	260020649032	Transistor 2SB649C	
	260020649041	2SB649D	
	260020649598	2SB649AC	
	260020649604	2SB649AD	
Q903	260180546011	Transistor BC546A or	
	260180546021	BC546B	
Q904	260180556027	Transistor BC556B	
D301, D302	270041480007	Diode 1N4148	
D303, D304	270041480007	Diode 1N4148	
D401-D404	270041480007	Diode 1N4148	
D501-D504,	270041480007	Diode 1N4148	
D507	270041480007	Diode 1N4148	
D901	26301302042	LED Red 3 $\phi$	
BD902	272200221515	Diode Bridge 1.5A/200V	
	272240216		
D902	273000180428	DZ 18BM or	
	273000180526	DZ 18BH	

SCCELLANEOUS	
Slide SW	43100200019
Push SW	43200160019
Push SW	43200180010
VR 50KBx2	12000210014
VR 10KCx2	12000190013
VR 20KWx1	12000200019
Rca Jack	45100340017
Din Jack	45100330011 or 45100331018
H/Phone Jack	45100450017
Slide SW	43150892011

# PACKING DIAGRAM



Ref. No.	Partsnuber	Description	Q'ty
1	83145970014	Polyester bag	1
2	82525610019	Styrofoam support	2
3	871001020018	Instruction manual	1
4	80046340044	Single carton	1