

SERVICE MANUAL



SERVICE SAFETY PRECAUTIONS (UL)

1. Use exact replacement parts for critical locations marked "⚠"
2. Return lead dress to original position and re-install protective covers.
3. Before returning to customer, test for shock hazard; use either method A or B:
 - A. Leakage test "cold":
 1. Unplug the AC cord; turn power switch ON.
 2. Connect one lead of High Voltage Insulation Tester to both prongs of the AC plug.
 3. Touch other lead to all exposed metal parts.
 4. Impedance measurement must be 0.3-5.0 Megohms.
 - B. Leakage test, "live":
 1. Plug unit directly into the AC outlet; do not use isolation transformer.
 2. Connect one lead of the Leakage Current Tester to earth ground.
 3. Touch other lead to all exposed metal parts.
 4. Leakage measurement must be less than 0.5 milliamps.

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INTEGRATED
AMPLIFIER

310

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SPECIFICATION

POWER AMPLIFIER SECTION

Stereo Mode

CONTINUOUS AVERAGE POWER OUTPUT INTO 8 ohms.....20 W
(Min. power per channel, 20Hz-20kHz, both channels driven,
with no more than rated distortion)
Rated impedance.....4-8 ohm
Rated distortion (THD 20Hz-20kHz).....0.05 %
Clipping power (maximum continuous power per channel).....25 W
IHF dynamic headroom at 8 ohms.....+3 dB
IHF dynamic power 8 ohms.....40 W(17dBW)
4 ohms.....60 W(17.8dBW)
2 ohms.....80 W(18.7dBW)
Slew rate.....>20 V/usec
Damping factor (ref. 8 ohms 50Hz).....>100
Input sensitivity (for rated power into 8 ohms).....1 V
Voltage gain.....x 60(35.6dB)
Frequency response 20Hz-20kHz.....+0.3 dB
at 10Hz/70kHz.....-3 dB
Signal/Noise ratio, A-weighted (Min. vol.. ref. 1W).....100 dB
THD.....<0.05 %
(Total Harmonic Distortion, 20Hz-20kHz, from 250mW to rated output)
SMPTE I.M.<0.05 %
(IM distortion, 60Hz+7kHz, 4:1, from 250mW to rated output)
IHF I.M. (CCIF IM distortion, 19+20kHz at rated output)....<0.05 %

PREAMPLIFIER SECTION

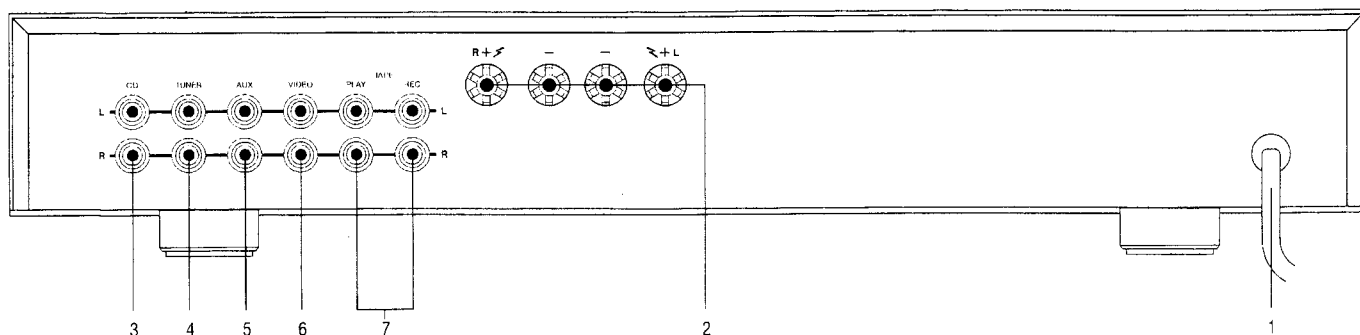
Line Level Inputs (CD, Video, Tuner, Tape, Aux, Portable)
Input impedance (R and C).....80k ohm+220pF
Input sensitivity (ref. rated power).....210 mV
Maximum input signal.....>10 V
Signal/Noise ratio, A-weighted (ref. 1W).....93 dB
(ref. rated power).....106 dB
Frequency response 20Hz-20kHz.....+0.5 dB
Infrasonic filter.....-3 dB at 10Hz
12 dB/octave
Line Level Outputs (Tape, Portable)
Maximum output level.....>5 V
Controls
Treble.....+6 dB at 10kHz
Bass.....+7 dB at 100Hz

PHYSICAL SPECIFICATION

Dimensions in mm (Width x Height x Depth).....435x65x250
Net weight.....5 kg/ 11 lb.
Shipping weight.....6 kg/ 13.2 lb.

REAR PANEL/FRONT PANEL VIEW

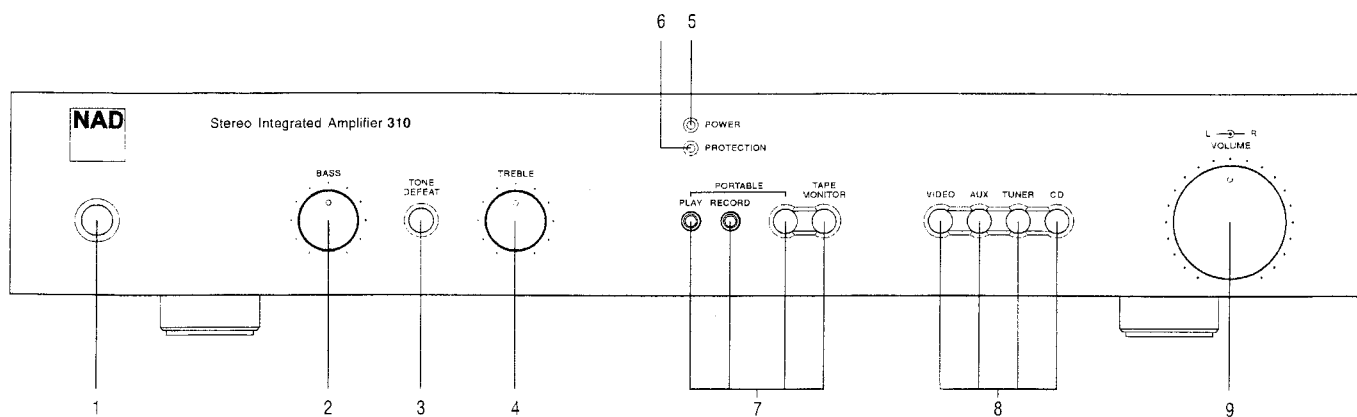
REAR PANEL



- 1. AC LINE CORD
- 2. SPEAKER TERMINALS
- 3. CD INPUT
- 4. TUNER INPUT

- 5. AUX INPUT
- 6. VIDEO SOUND INPUT
- 7. TAPE PLAY/REC

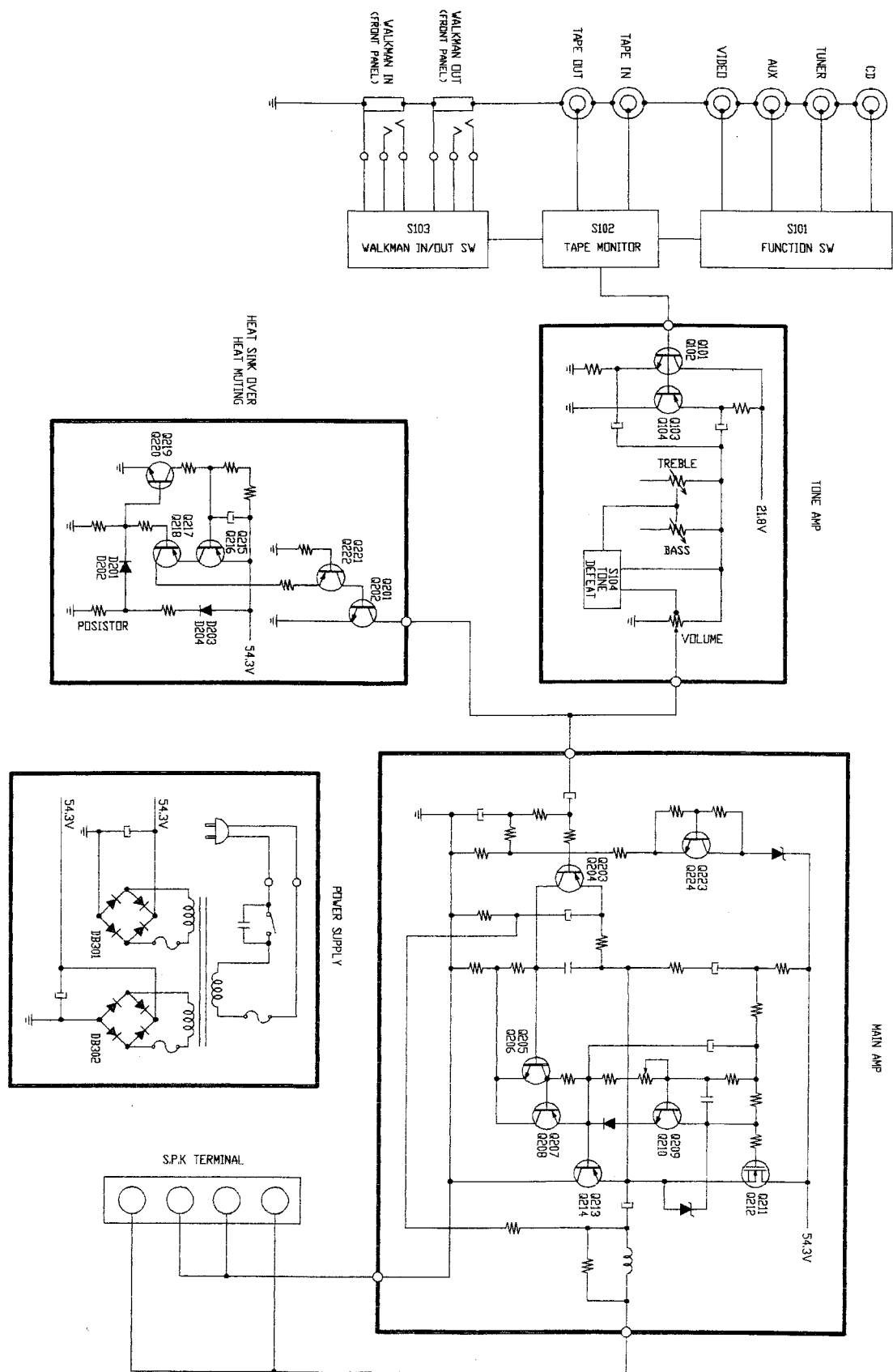
FRONT PANEL



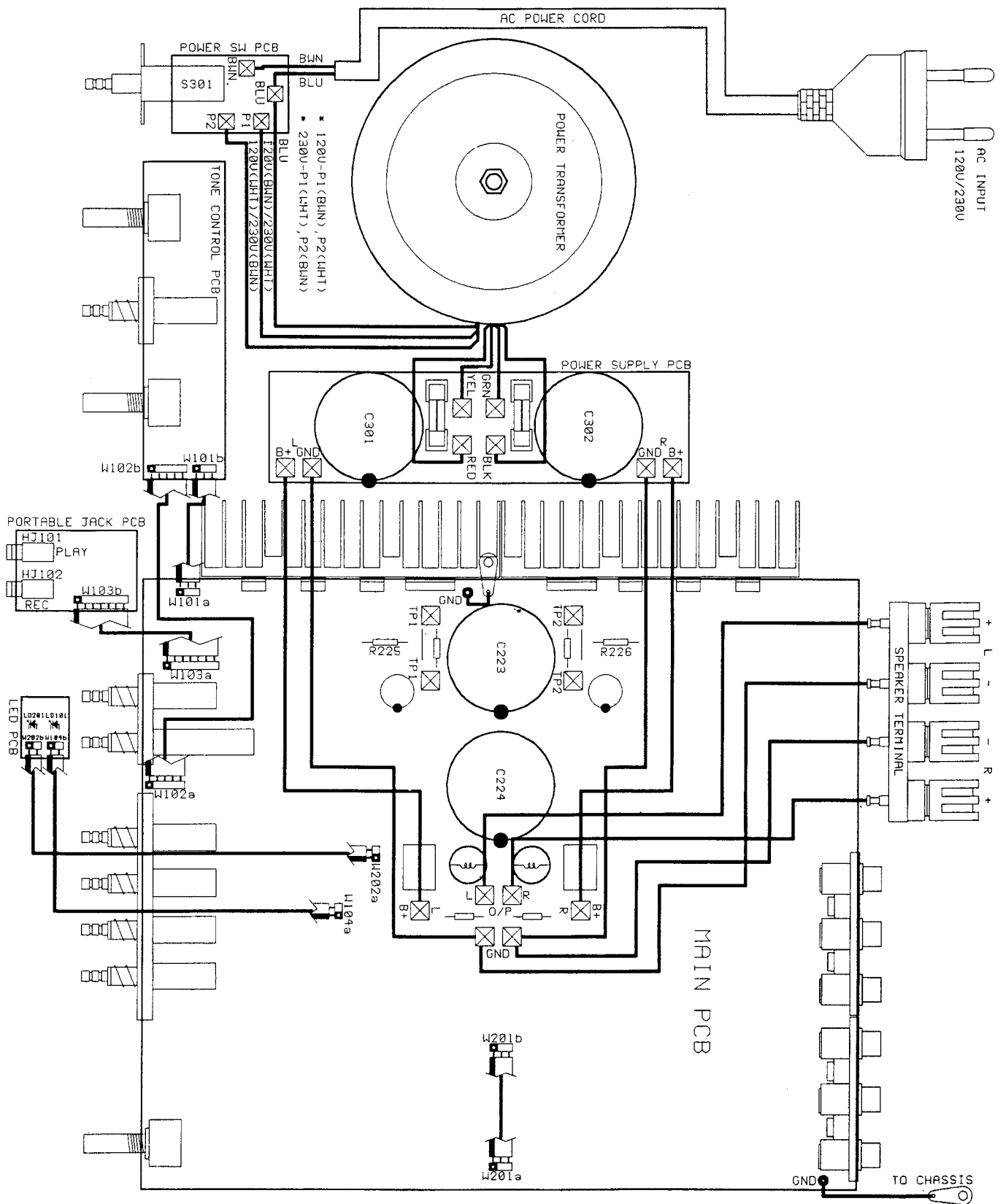
- 1. POWER SWITCH
- 2. BASS CONTROL
- 3. TONE DEFEAT
- 4. TREBLE CONTROL
- 5. POWER INDICATOR

- 6. PROTECTION INDICATOR
- 7. PORTABLE RECORD/PLAY JACKS
- 8. INPUT SELECTORS
(VIDEO,AUX,TUNER,CD)
- 9. VOLUME CONTROL(LEFT/RIGHT)

BLOCK DIAGRAM



WIRING DIAGRAM



DISASSEMBLY INSTRUCTIONS

TOP COVER REMOVAL

1. Remove parts in order of disassembly as numbered.
 - a. ① - ④ Machine screw M4.0x6.0 (See Fig. 1.)
 - b. ⑤ Tapping screw M3.0x8.0 (See Fig. 1.)

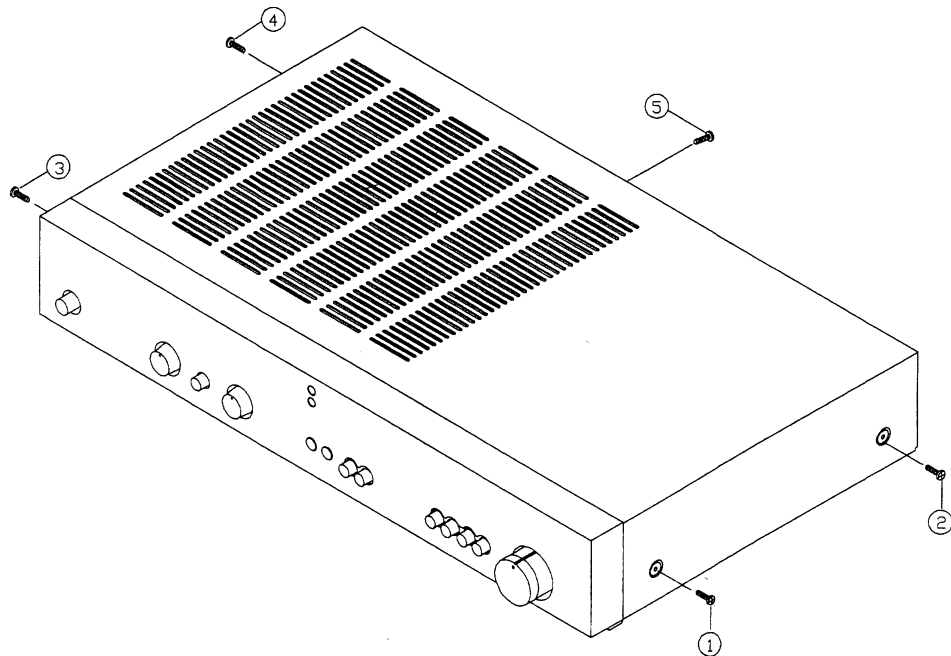


Fig. 1.

2. Pull both sides of TOP COVER outward and turning about 35°(shown as arrow ⑥) then remove as arrow ⑦ show. (See Fig. 2.)

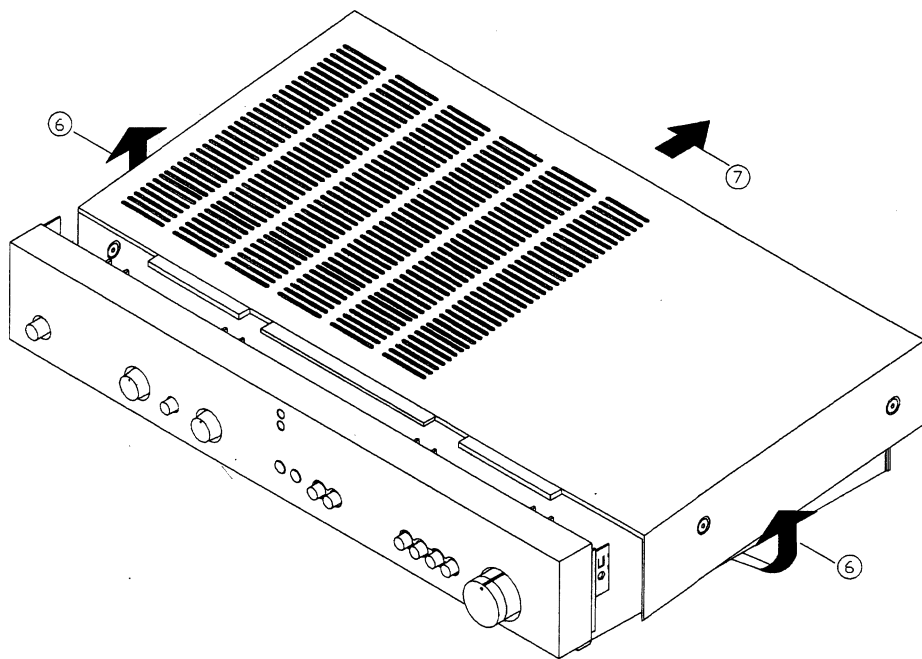
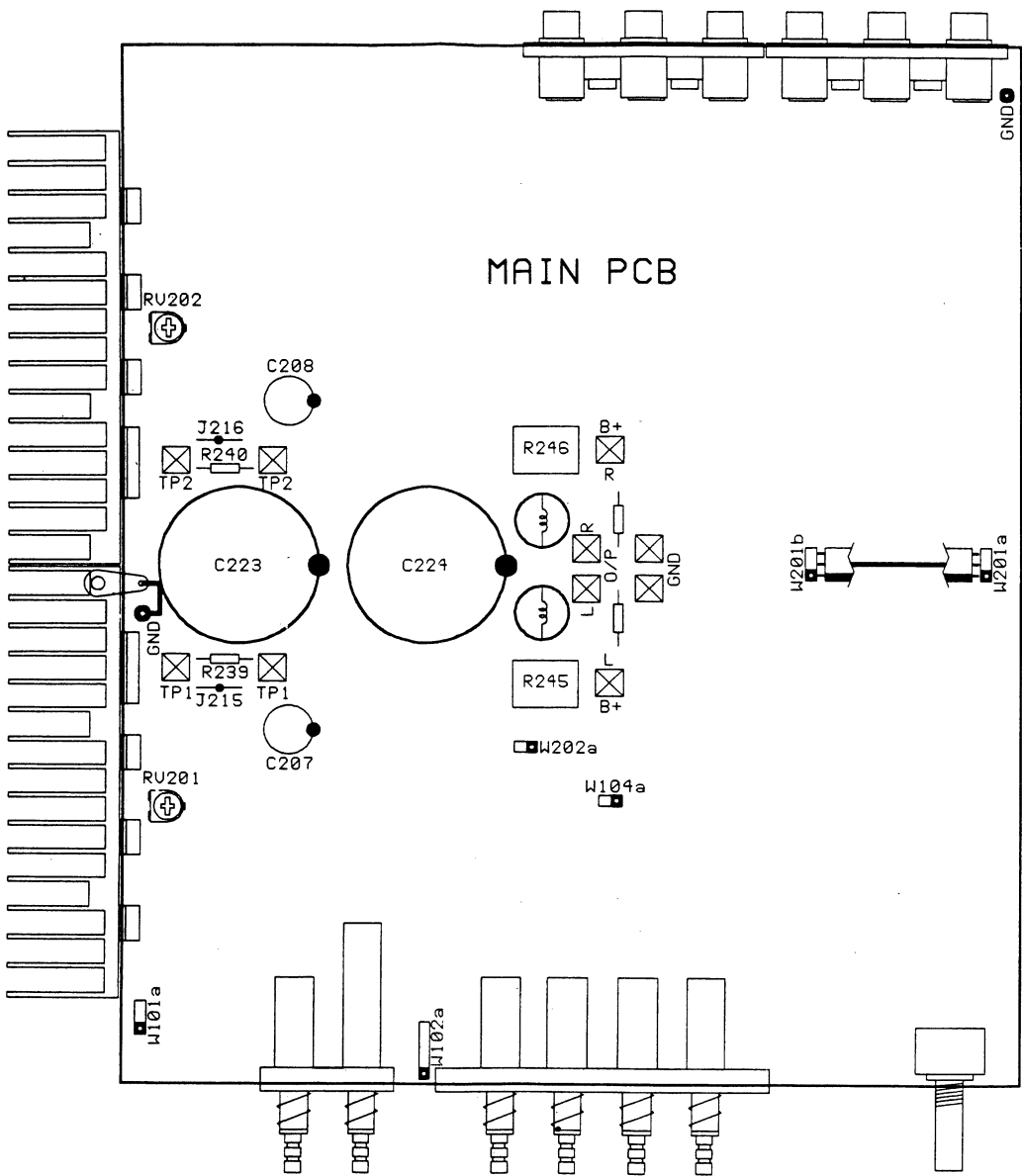


Fig. 2.

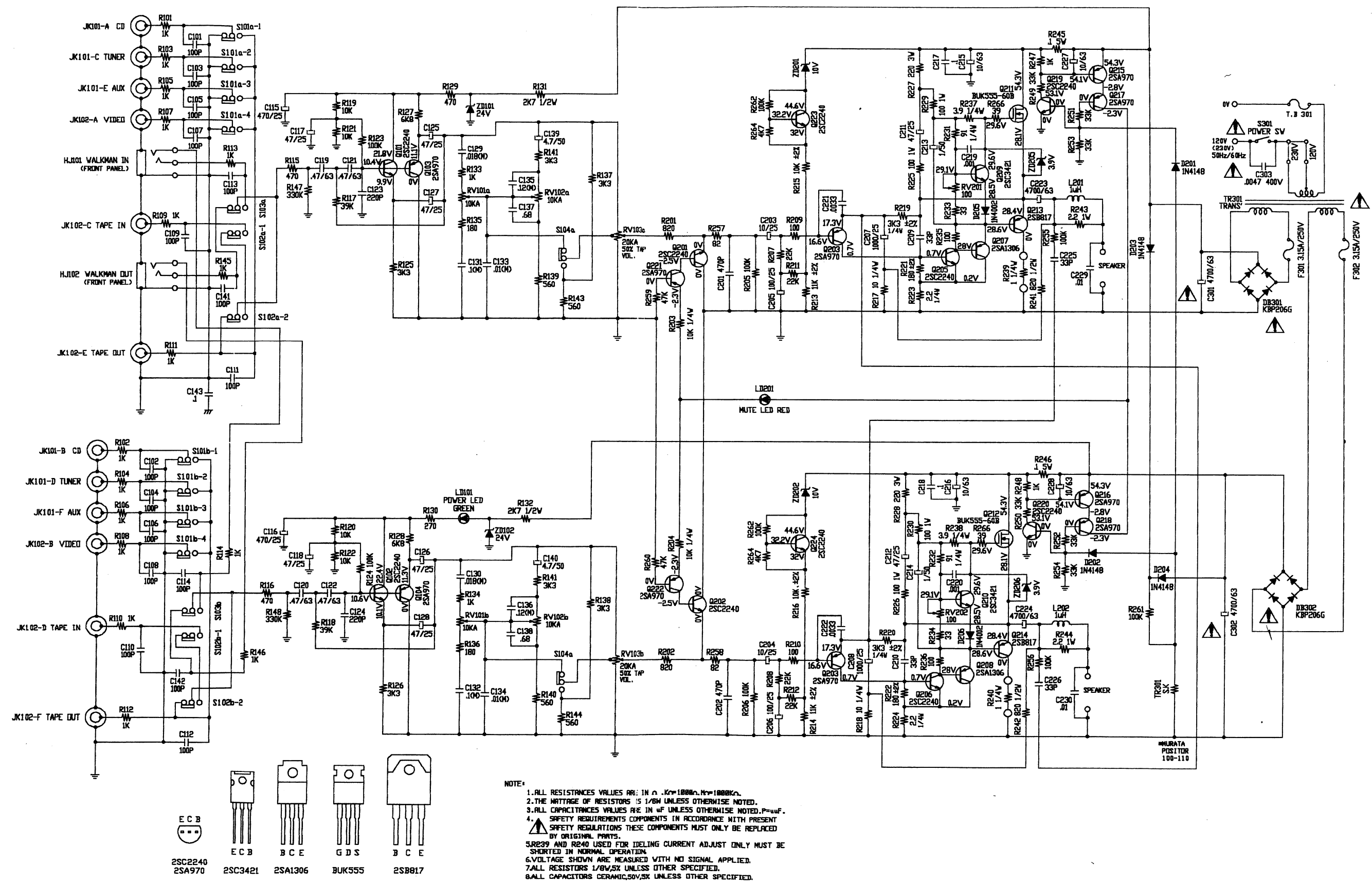
AMPLIFIER ADJUSTMENT



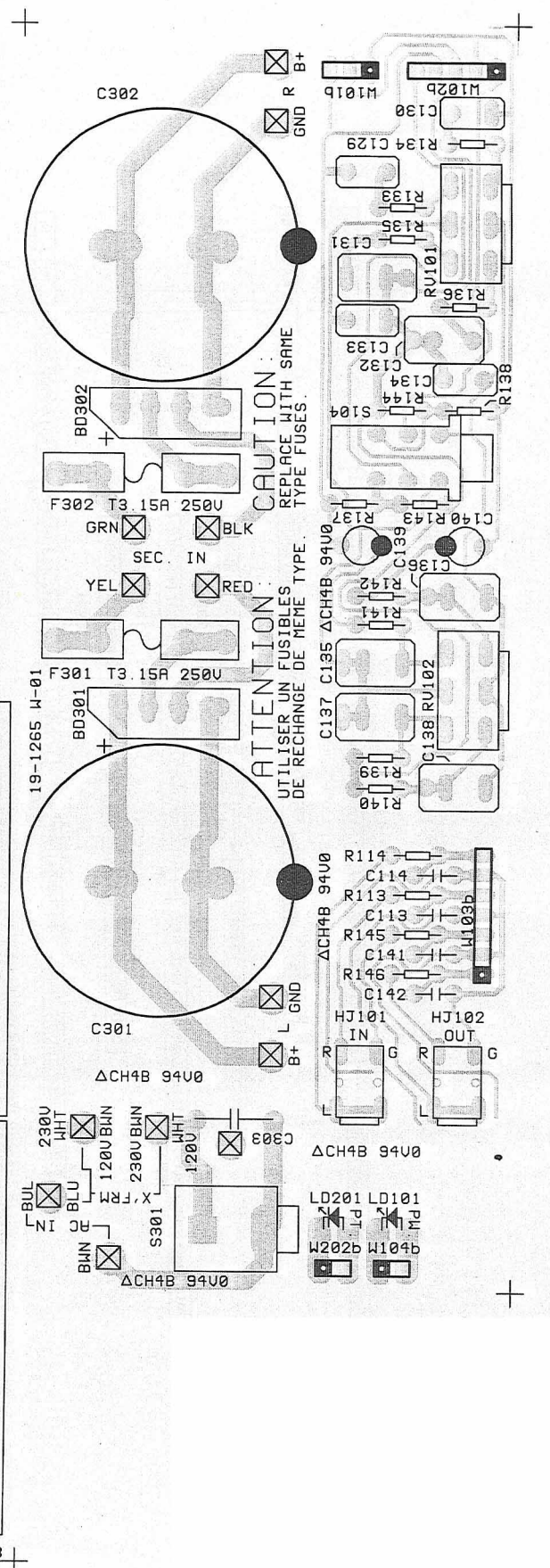
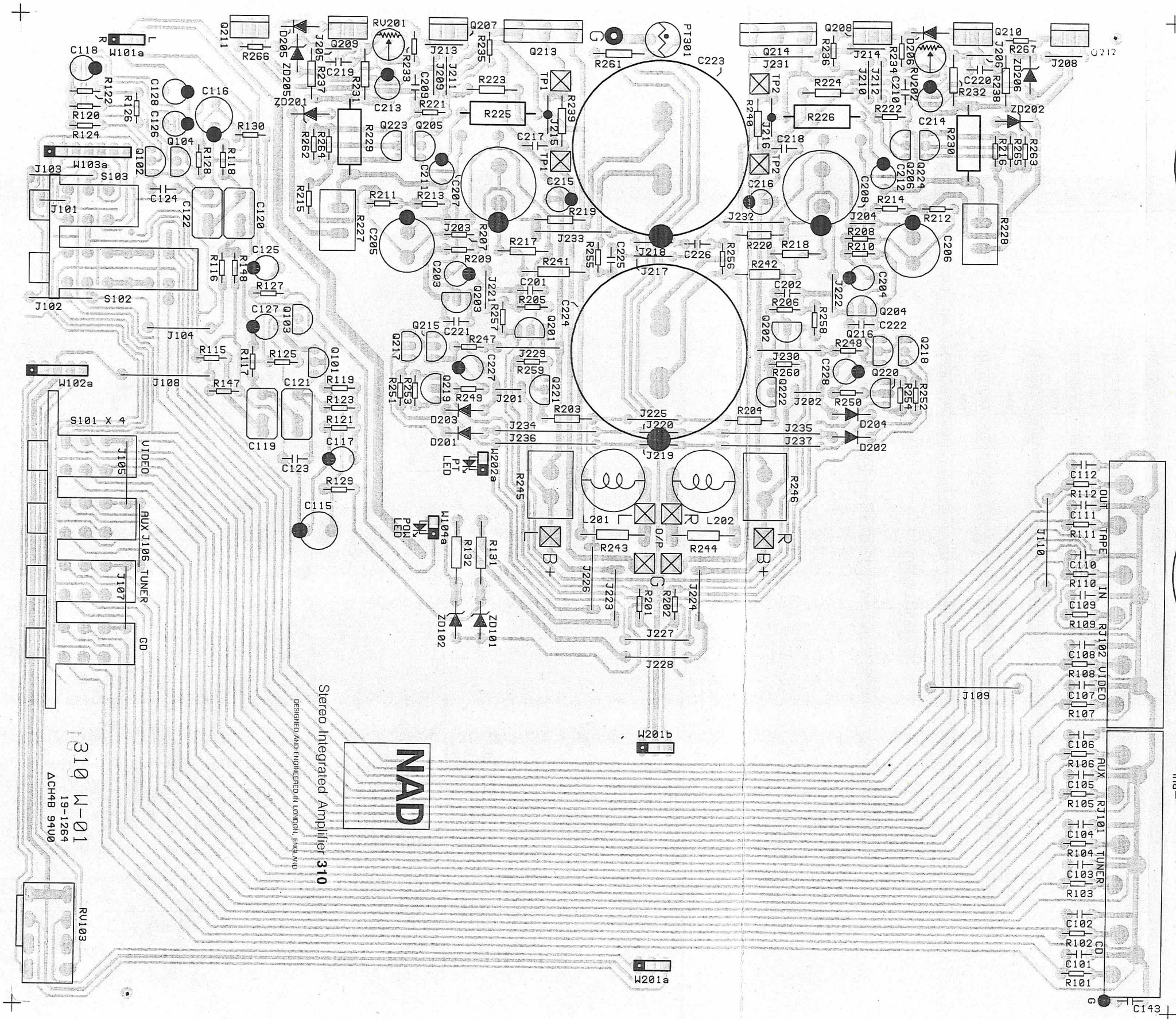
IDLING CURRENT ADJUSTMENT (No load connected)

1. Remove jumper wire J215 and J216 across R239 and R240.
2. Leave power ON for minimum 5 minutes.
3. Connect DC millivoltmeter across TP1 (R239/1 ohm) and adjust RV201 (100 ohm) for 25-35mV reading on meter.
Repeat adjustment with RV202, connecting meter across TP2 (R240/1 ohm).
4. After the alignment is finished, 1 ohm resistor R239/R240 should be shorted by jumper wire J215 and J216.

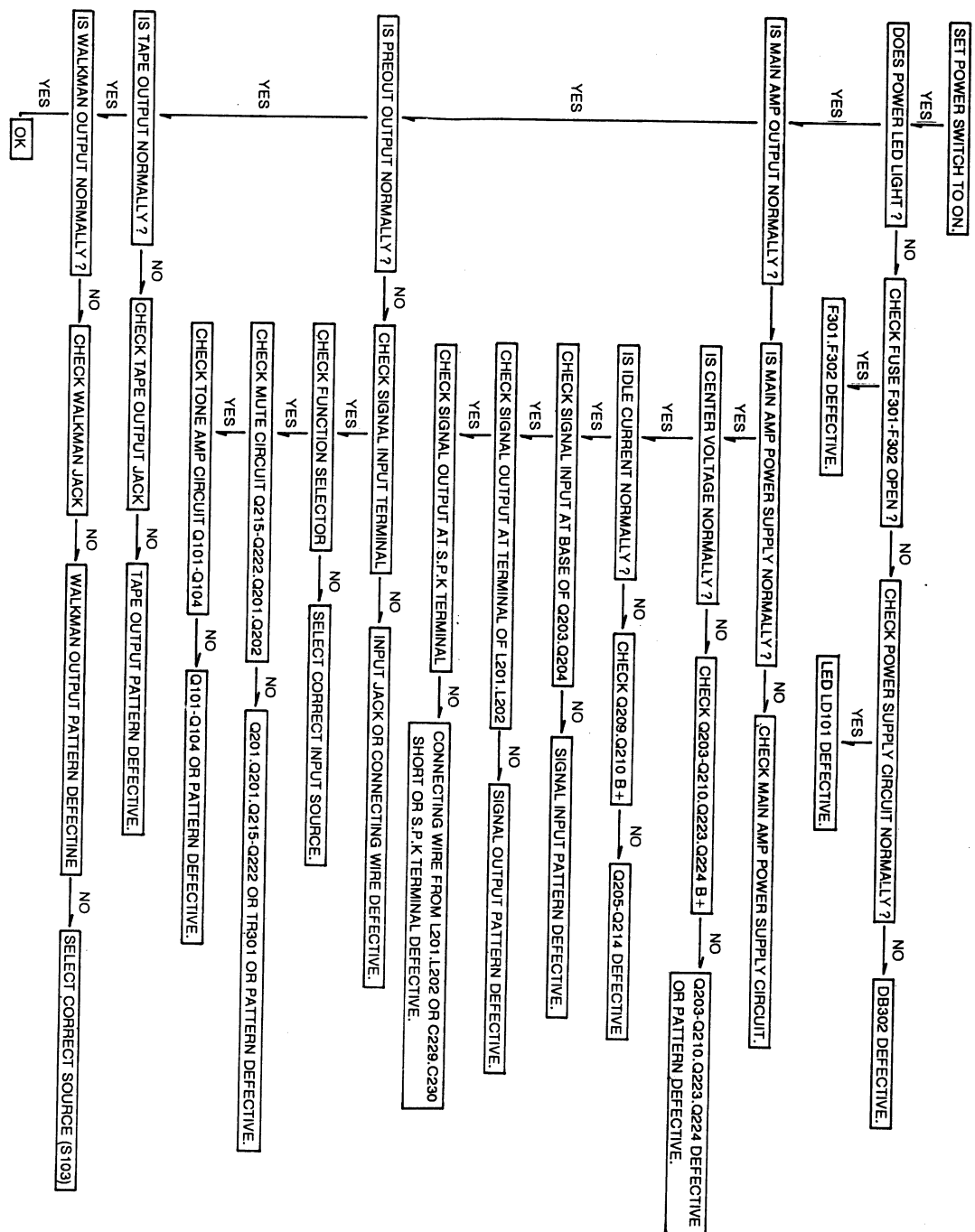
SCHEMATIC DIAGRAM



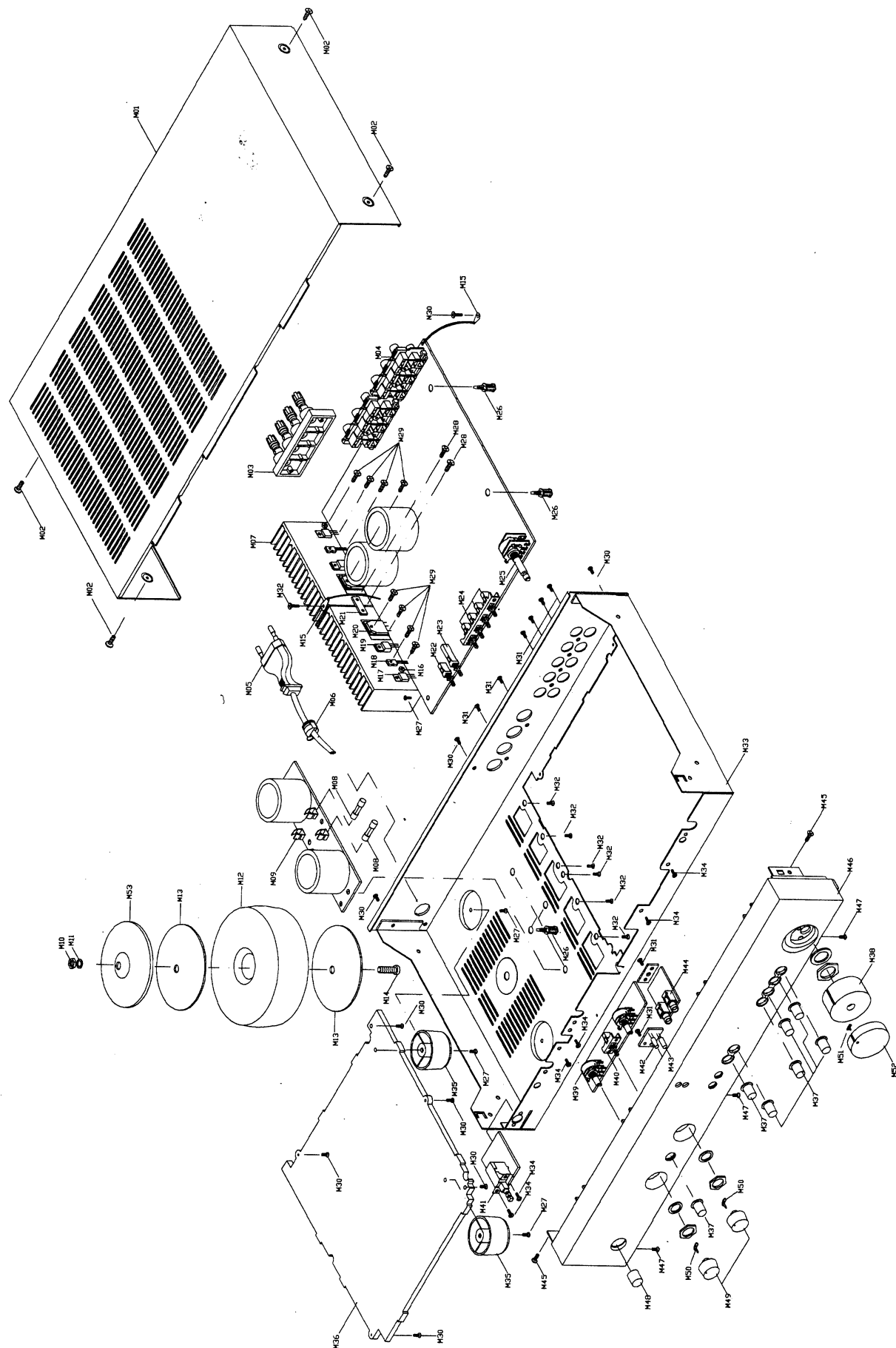
PCB LAYOUT (PARTS SIDE)



TROUBLE SHOOTING GUIDE



EXPLODED VIEW



EXPLODED VIEW PARTS LIST

ITEM	PART NO.	DESCRIPTION	Q'TY
M01	122-00301-002	TOP COVER	1
M02	149-00501-001	SCREW BID M4.0*6 W/T WASHER	4
M03*AH/B1	027-00301-004	SPEAK TERMINAL (W/O CAP)	1
M03*C	027-00301-003	SPEAK TERMINAL (W/T CAP)	1
M05*AH	043-00100-001	AC POWER CORD (UL TYPE)	1
M05*B	043-01250-001	AC POWER CORD (UK TYPE)	1
M05*B1	043-07602-002	AC POWER CORD (SAA TYPE)	1
M05*C	043-04602-001	AC POWER CORD (EU TYPE)	1
M06	055-07150-001	POWER CORD STOPPER (SR-4N-4)	1
M07	111-00301-001	HEAT SINK	2
M09	025-01020-002	FUSE CLIP	4
M10	127-00600-001	NUT	1
M11	125-62120-001	SPRING WASHER	1
M13	125-62150-001	FLAT WASHER	1
M14	131-06035-043	MACHINE SCREW (ø6*35R)	1
M15	125-00030-001	LUG	2
M16	114-00301-001	TRANSISTOR WASHER	2
M21	105-00301-001	POSISTOR BRACKET	1
M26	055-00301-001	PCB SPACER	6
M27	128-03006-W14	TAPPING SCREW (PS 3*6R)	5
M28	128-03008-013	TAPPING SCREW (PS 3*8R)	2
M29	128-03010-013	TAPPING SCREW (PS 3*10R)	8
M30	128-03006-014	TAPPING SCREW (PS 3*6R BLK)	8
M31	130-03010-014	TAPPING SCREW (PS 3*10R BLK)	8
M32	128-03010-033	TAPPING SCREW (PS 3*10R)	7
M33*AH	122-00301-003	BOTTOM CHASSIS (120V)	1
M33*B/B1/C	122-00301-004	BOTTOM CHASSIS (220-240V)	1
M34	131-03006-013	MACHINE SCREW (PM 3*6R)	6
M35	113-00501-001	FOOT	4
M36	122-00301-001	BOTTOM COVER	1
M37	102-00301-004	PUSH KNOB	7
M38	102-00301-001	VOL KNOB (A)	1
M45	128-03006-024	TAPPING SCREW (FS 3*6R)	2
M46	104-00301-001	FRONT PANEL	1
M47	128-03008-034	TAPPING SCREW (PS 3*8R)	3
M48	102-00501-001	POWER KNOB	1
M49	102-00301-003	CONTROL KNOB	2
M50	101-00301-002	POINTER (CONTROL KNOB)	2
M51	101-00301-001	POINTER (VOL KNOB)	1
M52	102-00301-002	VOL KNOB (B)	1
M53	105-00301-002	FIXING ANG.	1

PARTS LIST

NAD-310 PARTS LIST

SYMBOL NO.	REF. NO.	PART NO.	DESCRIPTION	Q'TY

MAIN PCB ASS'Y		(610-00301-001)	NAD-310	1

PC BOARD				
PCB	19-1264	001-A0301-010	MAIN PCB.	1

PRE AMP. BLOCK		(600-00301-001)		
CAPACITORS			WITH COMPONENTS	
C115,C116	010-47702-025	010-47702-025	CAP. EL. 470uFM +/-20% 25V	2
C117,C118	089-47602-025	089-47602-025	CAP. EL. 47uFM +/-20% 25V	2
C119-C122	097-47401-063	097-47401-063	CAP. M.P.E. 0.47uFJ +/-5% 63V	4
C125-C128	089-47602-025	089-47602-025	CAP. EL. 47uFM +/-20% 25V	4
C129,C130	088-18301-050	088-18301-050	CAP. POLY. 0.018uFJ +/-5% 50V	2
C131,C132	088-10401-050	088-10401-050	CAP. POLY. 0.1uFJ +/-5% 50V	2
C133,C134	088-10301-050	088-10301-050	CAP. POLY. 0.01uFJ +/-5% 50V	2
C135,C136	088-12401-050	088-12401-050	CAP. POLY. 0.12uFJ +/-5% 50V	2
C137,C138	097-68401-063	097-68401-063	CAP. M.P.E. 0.68uFJ +/-5% 63V	2
C139,C140	089-47502-050	089-47502-050	CAP. EL. 4.7uFM +/-20% 50V	2
C143	087-10403-050	087-10403-050	CAP. CER. 0.1uFZ +20-80% 50V	1

RESISTORS				
R131,R132	080-00273-002	080-00273-002	RES. METAL OXIDE 2K7 +/-5% 1/2W	2

ZENER DIODES				
ZD101,ZD102	091-00240-005	091-00240-005	DIODE ZENER 24V 1/2W	2

TRANSISTORS				
Q101,Q102	2SC2240-BL	090-02240-002	TR. NPN HF 2SC2240-BL	2
Q103,Q104	2SA970-BL	090-00970-002	TR. PNP HF 2SA970-BL	2

LED				
LD101	LTL-2231A	025-08602-002	LED GREEN POWER	1

RCA JACK				
RJ101,RJ102	RJ-1017-020	027-00301-002	6P RCA JACK	2

VAR.				
RV101,RV102	RK163121A23A	024-00301-001	VR. 10Kx2 TREBLE/BASS	2
RV103	RK1612220056	024-00301-002	VR. 20Kx2 VOLUME	1

SWITCHES				
S101	SPUN41K001	023-00301-002	PUSH SWITCH 2P2Tx4 VID/AUX/TUN/CD	1
S102	SPUN19K601	023-00301-003	PUSH SWITCH 2P4T TAPE MONITOR	1
S103	SPUN19K601	023-00301-004	PUSH SWITCH 2P2T PORTABLE	1
S104	SPUN12K001	023-00301-001	PUSH SWITCH 2P2T TONE DEFEAT	1

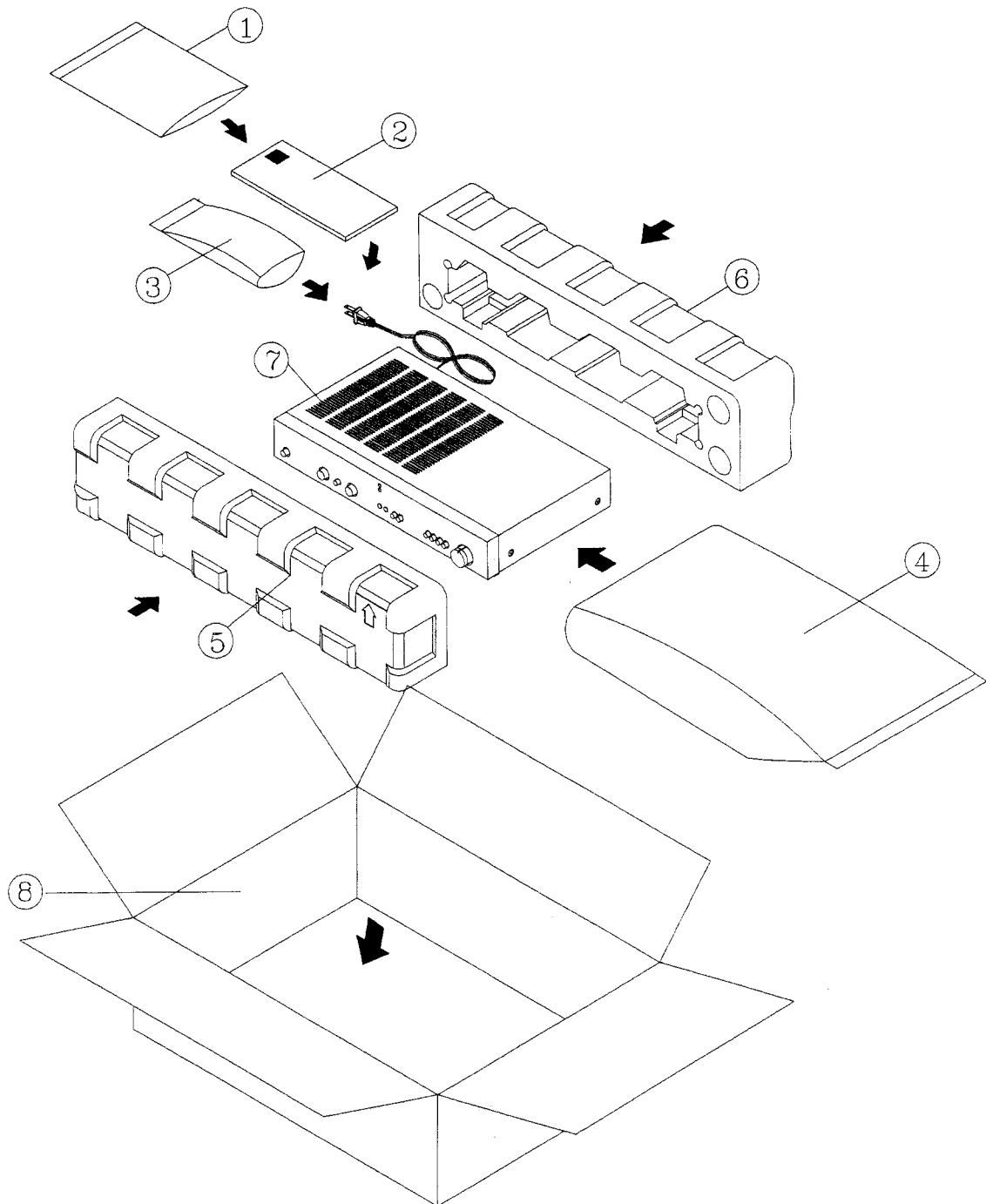
HEADPHONE JACK				
HJ101,HJ102	JY-3530-01-010	027-00301-001	HEADPHONE JACK #3.5	2
=====				
POWER AMP. BLOCK		(600-00301-002)	WITH COMPONENTS	
CAPACITORS				
C202,C204	089-10602-025	089-10602-025	CAP. EL. 10uFM +/-20% 25V	2
C205,C206	089-10702-025	089-10702-025	CAP. EL. 100uFM +/-20% 25V	2
C207,C208	089-10802-025	089-10802-025	CAP. EL. 1000uFM +/-20% 25V	2
C211,C212	089-47602-025	089-47602-025	CAP. EL. 47uFM +/-20% 25V	2
C213,C214	089-10502-050	089-10502-050	CAP. EL. 1.0uFM +/-20% 50V	2
C215,C216	089-10602-063	089-10602-063	CAP. EL. 10uFM +/-20% 63V	2
C217,C218	087-10403-100	087-10403-100	CAP. CER. 0.1uFZ Z 100V	2
C223,C224	010-47802-063	010-47802-063	CAP. EL. 4700uFZ +/-20% 63V	2
C227,C228	089-10602-063	089-10602-063	CAP. EL. 10uFM +/-20% 63V	2
C229,C230	087-10303-050	087-10303-050	CAP. CER. 0.01uFZ Z 50V	2

RESISTORS				
R203,R204	085-52104-004	085-52104-004	RES. CARBON FILM 10K +/-5% 1/4W	2
R217,R218	085-52101-004	085-52101-004	RES. CARBON FILM 10 +/-2% 1/4W	2
R219,R220	085-52333-G04	085-52333-G04	RES. CARBON FILM 3K3 +/-2% 1/4W	2
R221,R222	085-52182-G08	085-52182-G08	RES. CARBON FILM 180 +/-2% 1/8W	2

NAD-310 PARTS LIST

SYMBOL NO.	REF. NO.	PART NO.	DESCRIPTION			Q'TY		
R223,R224	085-52220-004	085-52220-004	RES. CARBON FILM	2R2	+/-5%	1/4W	2	
R225,R226	080-00102-010	080-00102-010	RES. METAL OXIDE FILM	100	+/-5%	1.0W	2	
R227,R228	081-A0222-030	081-A0222-030	RES. CEMENT	220	+/-5%	3.0W	2	
R229,R230	080-00102-010	080-00102-010	RES. METAL OXIDE FILM	100	+/-5%	1.0W	2	
R231,R232	085-52911-004	085-52911-004	RES. CARBON FILM	91	+/-5%	1/4W	2	
R237,R238	085-52390-004	085-52390-004	RES. CARBON FILM	3R9	+/-5%	1/4W	2	
R239,R240	085-52100-004	085-52100-004	RES. CARBON FILM	1.0	+/-5%	1/4W	2	
R241,R242	080-00822-002	080-00822-002	RES. METAL OXIDE FILM	820	+/-5%	1/2W	2	
R243,R244	080-00220-010	080-00220-010	RES. METAL OXIDE FILM	2R2	+/-5%	1.0W	2	
R245,R246	081-A0010-050	081-A0010-050	RES. CEMENT	0.1	+/-5%	5.0W	2	
R261	085-52105-004	085-52105-004	RES. CARBON FILM	100K	+/-5%	1/4W	1	
SEMI. RESISTOR								
RV201,RV202	017-10206-301	017-10206-301	SEMI. RES. CARBON FILM	100 ohm	66 3P F5*5		2	
ZENER DIODES								
ZD201,ZD202	091-00100-005	091-00100-005	DIODE ZENER	10V	RD10EB2		2	
ZD205,ZD206	091-00039-005	091-00039-005	DIODE ZENER	3V9	WT22 3.9A		2	
DIODES								
D201-D204	1N4148	091-04148-01N	DIODE	1N4148				4
D205,D206	1N4002	091-04002-01N	DIODE	1N4002				2
COILS								
L201,L202	019-00117-001	019-00117-001	COIL SPRING	L=1uH	1.0*9.8*11.5T		2	
TRANSISTORS								
Q201,Q202	2SC2240-BL	090-02240-002	TR. NPN HF	2SC2240-BL				2
Q203,Q204	2SA970-BL	090-00970-002	TR. PNP HF	2SA970-BL				2
Q205,Q206	2SC2240-BL	090-02240-002	TR. NPN HF	2SC2240-BL				2
Q207,Q208	2SA1306-Y	021-01306-025	TR. PNP HF	2SA1306-Y				2
Q209,Q210	2SC3421-Y	021-03421-025	TR. NPN HF	2SC3421-Y				2
Q211,Q212	BUK555-60B	021-55560-002	TR. MOSFET	BUK555-60B				2
Q213,Q214	2SB817-E	021-00817-005	TR. PNP HF	2SB817-E				2
Q215-Q218	2SA970-BL	090-00970-002	TR. PNP HF	2SA970-BL				4
Q219,Q220	2SC2240-BL	090-02240-002	TR. NPN HF	2SC2240-BL				2
Q221,Q222	2SA970-BL	090-00970-002	TR. PNP HF	2SA970-BL				2
Q223,Q224	2SC2240-BL	090-02240-002	TR. NPN HF	2SC2240-BL				2
LED								
LD201	LTL-2201AL	025-02685-002	LED	RED	PROTECTION		1	
POSISTOR								
PT301	PTH9M048B471TS	024-00301-003	POSISTOR	PTH9M048B471TS2F333			1	
=====								
POWER SUPPLY BLOCK		(600-00301-003)	WITH COMPONENTS					
CAPACITORS								
C301,C302	010-47802-063	010-47802-063	CAP. EL.	4700uFZ	+/-20%	63V	2	
C303	004-47203-400	004-47203-400	CAP. CER.	4700PF	Z	400V	1	
DIODE RECTIFIER								
BD301,BD302	KBP206G	022-00206-KBP	DIODE RECTIFIER	2A 600V		2		
FUSES								
F301,F302*AH	025-00301-001*AH	025-00301-001	FUSE, UL/CSA 5MT4	T3.15A 250V 5.2*20				2
F301,F302*B1/C	025-01600-010*B1/C	025-01600-010	FUSE, SEMKO	T3.15A 250V 5.2*20				2
SWITCHES								
S301	SDDL1007U-EP	023-00006-002	SWITCH	TV-3	POWER		1	
TRANSFORMER								
TR301	29-2152	048-00301-001	POWER TRANSFORMER	115/230V	696*29		1	

PACKING DIAGRAM



ITEM	PARTS NO.	DESCRIPTION	Q'TY
1.	138-01200-003	PE BAG FOR I.M.	1
2.	134-00301-001	INSTRUCTION MANUAL	1
3.	138-00501-002	PE BAG FOR AC CORD	1
4.	138-00501-001	PE BAG FOR UNIT	1
5.	137-00301-001	POLYFOAM (F)	1
6.	137-00301-002	POLYFOAM (B)	1
7.	ES-310	UNIT	1
8.	141-00301-001	INNER CARTON	1

NOTES:

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INTEGRATED
AMPLIFIER

NAD ELECTRONICS
LONDON