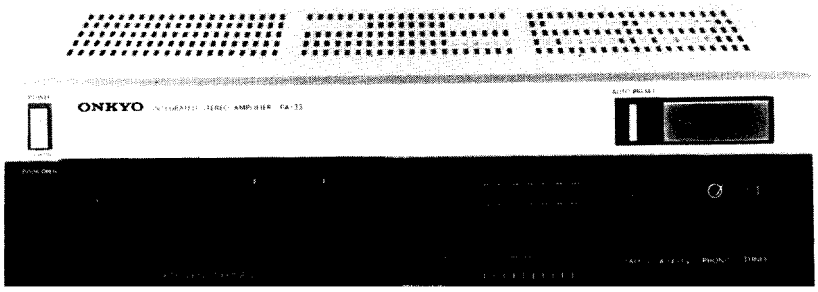
SERIAL NO. 3138

ONKYO® SERVICE MANUAL

INTEGRATED
STEREO AMPLIFIER
MODEL PA-33



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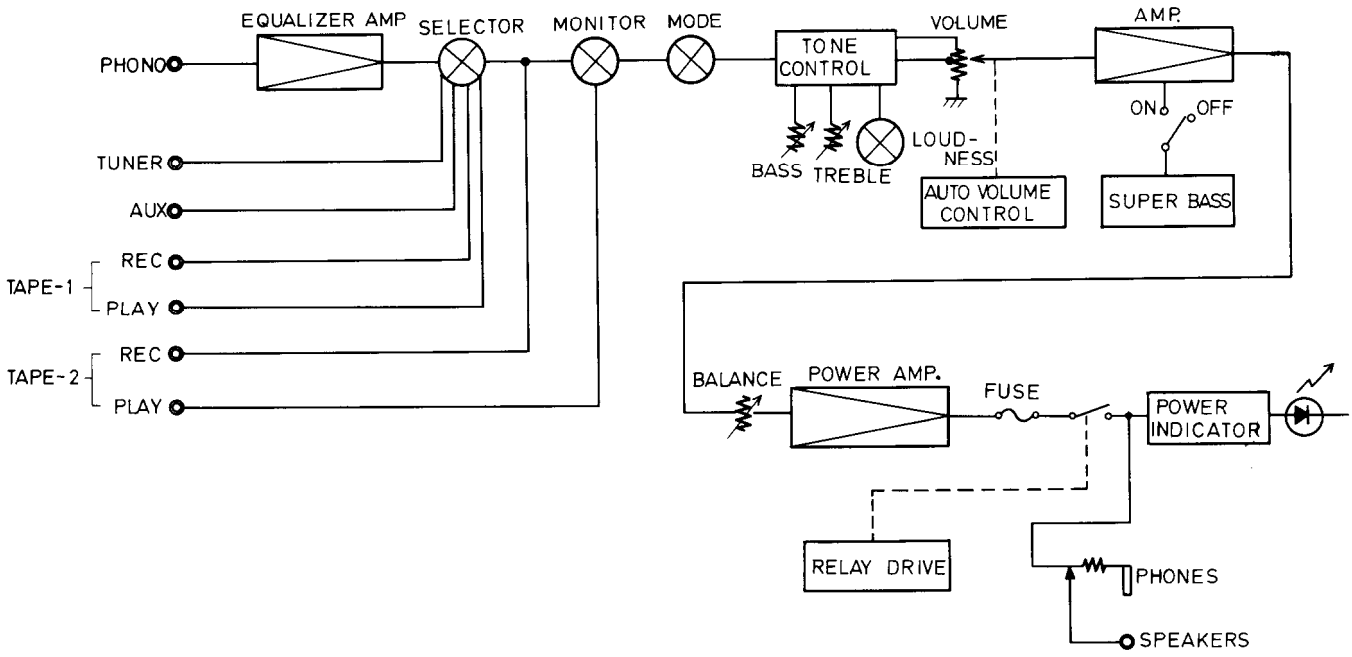
ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

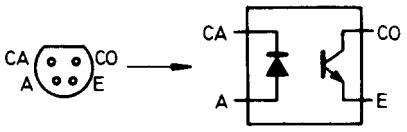
Power Output:	30 watts per channel, min. RMS at 8 ohms, both channels driven, from 40 Hz to 20 kHz, with no more than 0.08% THD.
Total Harmonic Distortion:	0.08% at rated power
IM Distortion:	0.08% at rated power
Damping Factor:	40 at 8 ohms.
Frequency Response:	15 – 30,000 Hz ±1 dB
Sensitivity and Impedance:	Phono: 2.5 mV/50 kohms AUX/Tuner: 150 mV/50 kohms Tape Play: 150 mV/50 kohms Tape Rec.: 150 mV/3.5 kohms (phono)
Phono Overload:	150 mV RMS at 1 kHz, 0.08% THD.
Bass Control:	±8 dB at 100 Hz
Treble Control:	±8 dB at 10,000 Hz
Signal to Noise Ratio:	Phono: 75 dB (IHA A–202, 5 mV input, 1 watt output) Tuner & Tape: 80 dB (IHF A–202, 0.5V input, 1 watt output)
Loudness:	+6 dB at 70 Hz +4 dB at 10 kHz
Super Bass:	+4 dB at 70 Hz
GENERAL	
Semiconductors:	8 ICs, 13 transistors, 23 diodes, 18 LEDs
Dimensions:	330(W) x 101(H) x 240(D) mm 13" x 4" x 9–1/2"
Weight:	5.4 kgs, 11.9 lbs.
Power Supply:	AC120V60Hz(D model) AC220V50Hz(G model) AC240V50Hz(Q model) AC120V/220V 60/50Hz(W model)

Specifications and features are subject to change without notice.

BLOCK DIAGRAM



NJL5141EB–C/D



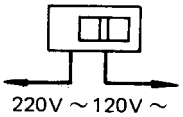
NOTE:
A . . . . . Red wire
CA . . . . . Black wire
E . . . . . Blue wire
CO . . . . . Orange wire

PRECAUTIONS

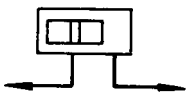
1. **Replacing the fuses**
For continued protection against fire hazard, replace only with same type and same rating fuse.

CIRCUIT NO.	PARTS NO.	DESCRIPTION	REMARKS
F901	252049	4A(ST–6), AC fuse	120V model
F501, F601	252059	4A(SS–2), Speaker protection fuse	120V model
F901	252074	2A–SE–EAK, AC fuse	220V model
F501, F601	252076	3.15A–SE–EAK, Speaker protection fuse	220V model
F901	252014	4A–T, AC fuse	120V/220V model
F902	252074	2A–SE–EAK, AC fuse	120V/220V model
F501, F601	252014	4A–T, Speaker protection fuse	120V/220V model
F901	252002	2A–T, AC fuse	240V model
F501, F601	252014	4A–T, Speaker protection fuse	240V model

2. **Voltage Selector (rear panel)**
Some models are equipped with a voltage selector to conform with local power supplies. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on. Voltage is changed by sliding the groove in the switch with a screwdriver or similar instrument to the right or left position. Confirm that the switch has been moved all the way to the right or left before turning the power switch on. If there is no voltage selector switch on the unit you have purchased, it can only be used in areas where the power supply voltage is the same as that of the unit.

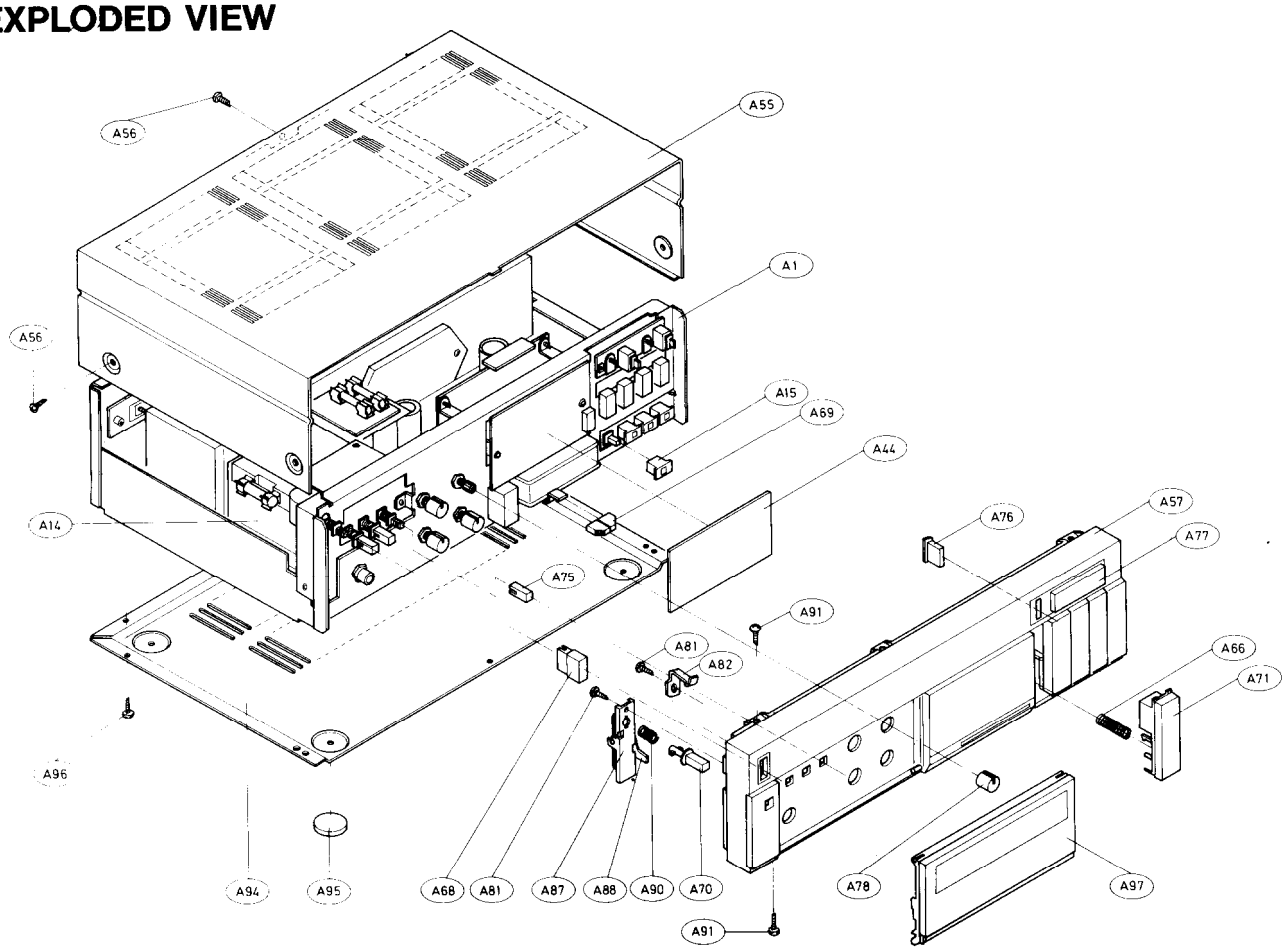


at AC 120V



at AC 220V

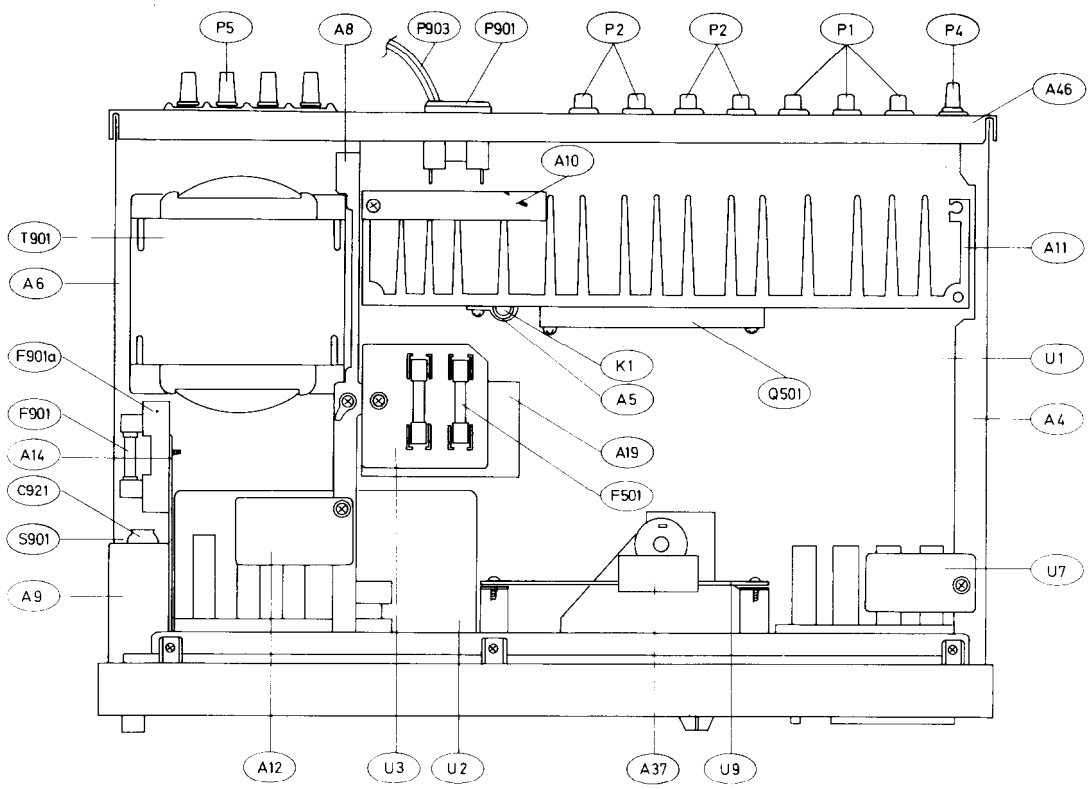
EXPLODED VIEW



REF.NO.	PARTS NO.	DESCRIPTION
A1	27110160C	Front bracket
A4	27115102A	Side bracket, right
A5	270281	Holder, thermal switch
A6	27130318A	Side bracket, left
A7	27130319	Bracket, power transformer
A8	27130290A	Bracket, center
A9	28175058	Insulator plate, power switch
A10	28175059A	Insulator plate, heatsink (D)
A11	27160115	Heatsink
A12	28175063	Insulator plate, loudness
A14	27150141–1A	Shielded plate, AC fuse
A15	27190123A	Holder, push switch
A16	28175062	Insulator plate, top cover
A19	28175060	Insulator plate, speaker fuse
A37	28140195	Cushion
A44	28130139A	Dial plate
A46	27120429A	Back panel (D)
	27120430A	Back panel (G)
	27120431A	Back panel (W)
	27120432A	Back panel (Q)
A47	270280	SR–4K–4, Strainrelief (D/G/W)
	27300349	SR–6W–1, Strainrelief (Q)
A55	28184136	Top cover
A56	834430068	3TTS+6B(BC), Tapping screw
A57	12408121	Front panel ass'y
A66	27180121	Spring
A68	28320732	Knob, power
A69	28320718	Knob, slide
A71	12708902	Knob ass'y, AUX.
A72	12708903	Knob ass'y, Phono

REF.NO.	PARTS NO.	DESCRIPTION
A73	12709903A	Knob ass'y, Tape
A74	12708905	Knob ass'y, Tuner
A75	28320738	Knob, push switch
A76	28320739	Knob, Auto preset
A77	28320740	Knob, Volume
A78	28320731	Knob, Tone
A81	833130080	3TTP+8P, Tapping screw
A82	27180126B	Spring
A87	27140624	Bracket
A88	27140625A	Bracket
A83	27180113	Spring
A90	27180021	Spring
A91	834130068	3TTS+6B, Tapping screw
A94	27170119B	Bottom board
A95	27175028	Leg
A96	831130068	3TTW+6B, Tapping screw
A97	12708901	Door ass'y
C901, C902	3500065A	0.01μF, 400V, Capacitor IS
C901a,C902a	27300080	8116U09, Cover, capacitor
Q501, Q601	222020	STK–463, IC
Q411	226009 or	NJL5141EB–C or
	226010	NJL5141EB–D, Photo reflector
T901	230637	NPT–766D, Power transformer (D)
	230638	NPT–766G, Power transformer (G)
	230639	NPT–766DG, Power transformer (W)
	230640	NPT–766Q, Power transformer (Q)
F901	252049	4A (ST–6), AC fuse (D)
	252074	2A–SE–EAK, AC fuse (G)

COMPONENT LOCATION



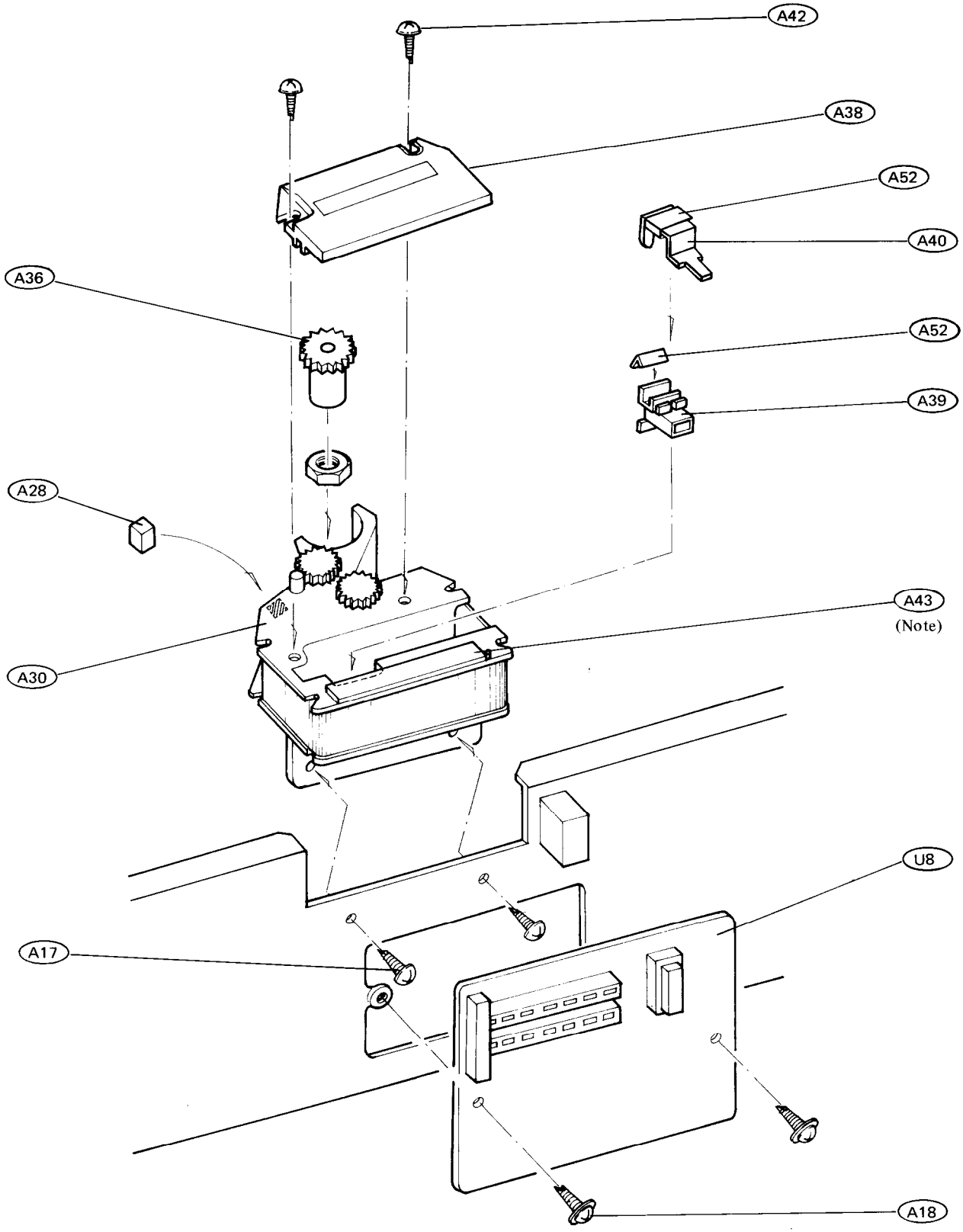
REF. NO.	PARTS NO.	DESCRIPTION
F901	252014	4A–T, AC fuse (W)
	252002	2A–T, AC fuse (Q)
F901a	25050050	H0438A, Fuse holder (D/W/Q)
	25065096	NPF–073, Fuse holder (G)
F902	252074	2A–SE–EAK, AC fuse (W)
F902a	25065096	NPF–073, Fuse holder (W)
F501, F601	252059	4A (SS–2), Speaker protection fuse (D)
	252076	3.15A–SE–EAK, Speaker protection fuse (G)
	252014	4A–T, Speaker protection fuse (W/G)
K1	25065211 or 25065127	17AM028A–250 or 1P–105A–100, Thermal switch
S901	25035321	NPS–111–L285P, power switch (D)
	25035322	NPS–111–L286P, power switch (G/W)
	25035337	NPS–121–L301P, power switch (Q)
S902	25065123	NSS–1258P, Voltage selector switch (W)
S8	25030224	NRS–122–15U, Mode switch
P1	25045029	NPJ–6PRBL07, Phono/Tuner/AUX. terminal
P2, P3	25045025	NPS–4PRBL03, Tape–1, 2, terminal
P4	25060044	Ground terminal
P5	25060038	NTM–4PRMN09, Speaker terminal
P901, P902	25050046	NSCT–2P15, AC output (D)
P903	253112	AS–UC–4 #18, Power supply cable (D)

REF.NO.	PARTS NO.	DESCRIPTION
P903	253083	AS–CEE, Power supply cable (G/W)
	253077	3SH1NUQA, Power supply cable (Q)
U1	12408556	NAAF–1456, Equalizer amplifier and tone pc board (D/W/Q)
	12414556A	NAAF–1456a, Equalizer amplifier and tone pc board (G)
U2	12408557	NATC–1457, Tone control pc board
U3	12408558	NAFU–1458, Speaker fuse pc board (D)
	12414558A	NAFU–1458a, Speaker fuse pc board (G)
	12410558B	NAFU–1458b, Speaker fuse pc board (W/G)
U4	12408559	NAPL–1459, Lamp pc board
U5	12408560	NALED–1460, Selector indicator pc board
U6	12408560A	NALED–1460a, Selector indicator pc board
U7	12408561	NAWT–1461, Terminal pc board
U8	12709593	NADIS–1293, Output indicator drive pc board
U9	12709594	NAVR–1294, Auto volume circuit pc board
U10	12709595	NASW–1295, Auto volume switch pc board

NOTE
D: Only 120V model
G: Only 220V model
W: Only 120V/220V model
Q: Only Australia model

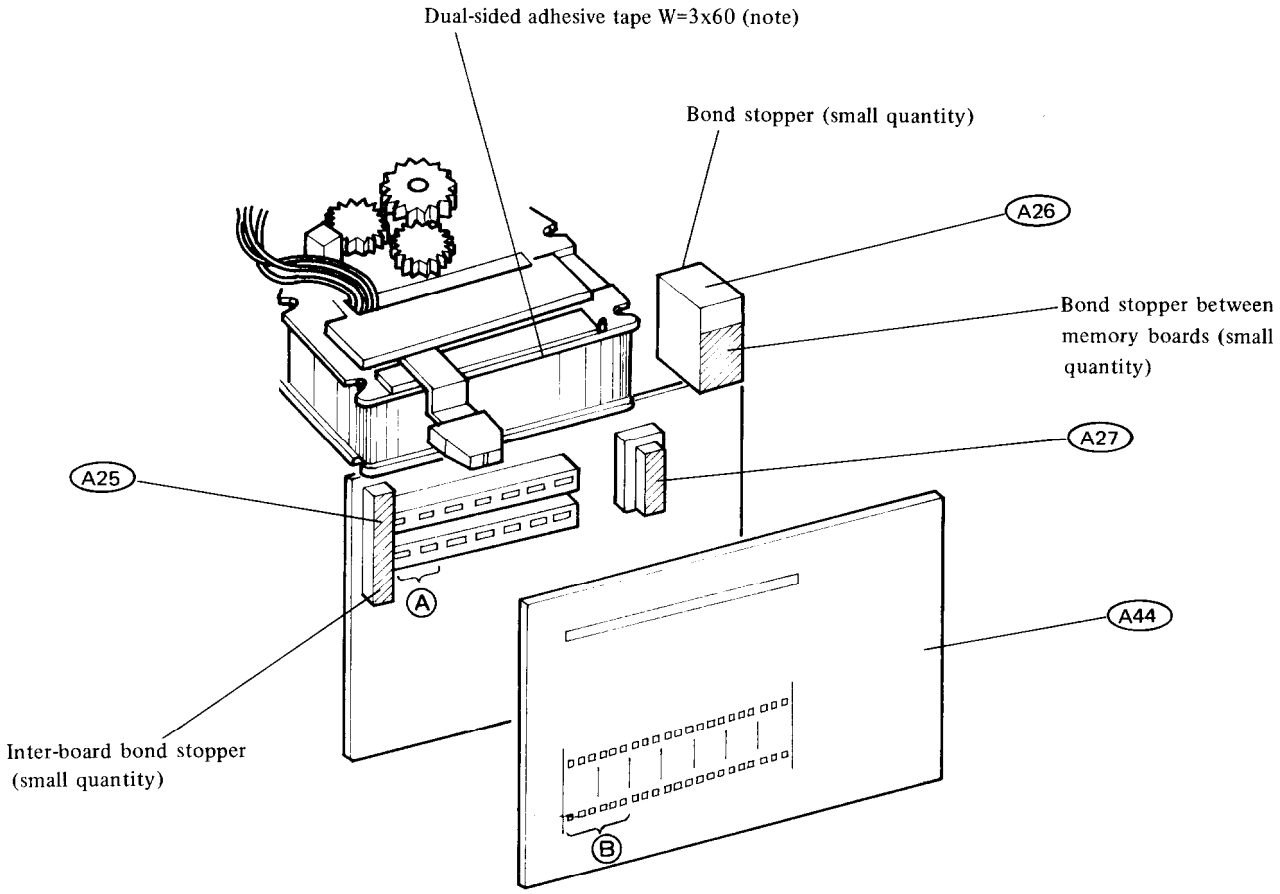
EXPLODED VIEW OF VOLUME CONTROL AND INDICATOR SECTION

(as seen from base plate)



Note : Cushion adhered to align with front panel of main case.

MEMORY BOARD MOUNTING SECTION (as seen from base plate)



Note: When aligning memory boards during position alignment, the indicator LEDs light up for about 4 seconds when the power is switched on. With the boards properly aligned, join then together using (A) and (B) in the above diagram as reference points to ensure that no LED is missed.
Note that small quantities of bond stopper are applied to the cushions. This stopper must NOT be allowed to come in contact with the silk print section of the memory boards.

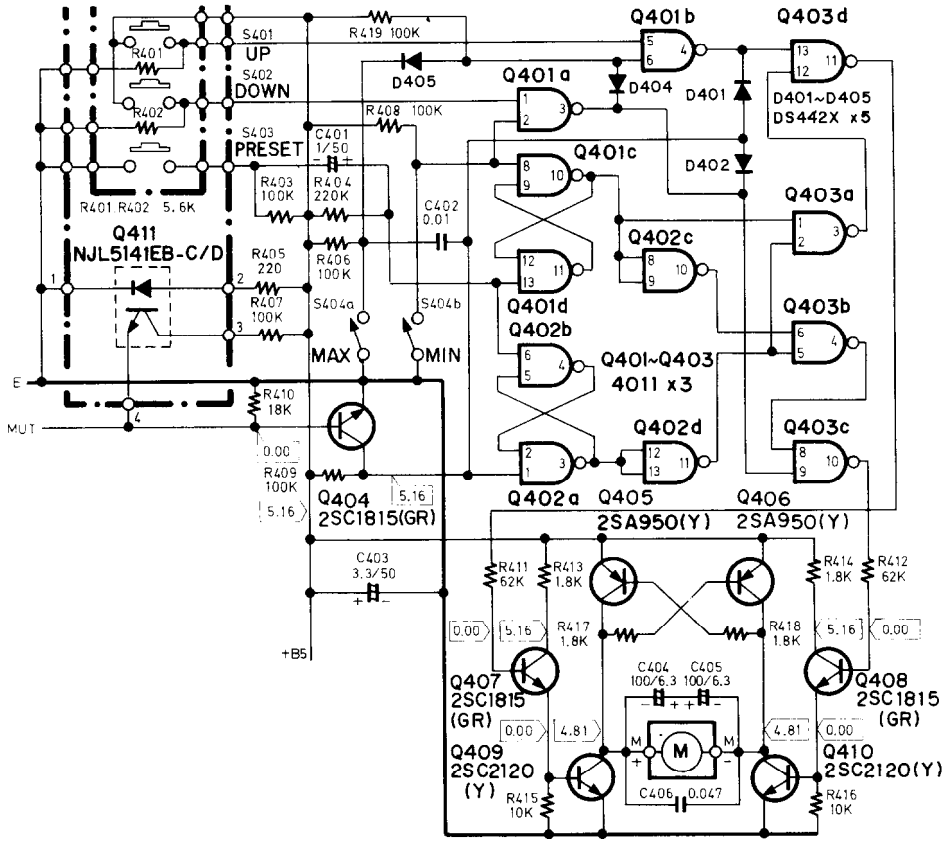
Note: The dual-sided adhesive tape is applied around the "ribs" of the main case.
Make sure there is no bulging in the movable film.

PARTS LIST

REF.NO.	PARTS NO.	DESCRIPTION
A17	834130068	3TTB+6B, Tapping screw
A18	831130068	3TTW+6B, Tapping screw
A25	28140401	7x20x8mm, Cushion
A26	28140402	14x20x12mm, Cushion
A27	28140403	3.5x20x5mm, Cushion
A28	28140407	9x8x8mm, Cushion
A30	29105113	Case ass'y
A36	27300473	Gear, Volume
A38	27300470A	Rail, lever
A39	27190142B	Holder, sensor
A40	27260083	Shaft, lever
A42	834130082	3STS+8BQ, Tapping screw
A43	28140410	0.5x45x5mm, Cushion (note)
A44	28130139A	Dial plate
A52	262004	Special tape
U8	12709593	NADIS–1293, Pc board ass'y

OPERATION DESCRIPTION

Volume logic control circuit



1. **Initialized State**

When the power switch is switched from OFF to ON, the initial voltage applied to the collector of Q952 in the relay circuit is +13V. This voltage is thus applied to the base of Q404, resulting in this transistor being turned on. Pin 1 of Q402 is consequently locked to "L", and output pin 3 of the R–S flip-flop Q402a/Q402b is locked to "H". Hence, with pin 11 of Q402 at "L", this voltage is applied to input pin 5 of Q403, resulting in output pin 8 becoming "H". On the other hand, with pin 1 of Q401 at "L", pin 3 is at "H", resulting in input pin 9 of Q403 being switched to "H" and pin 10 to "L", thereby turning Q408 and Q410 both off. A voltage of +5V is thus applied to the (–) terminal of the motor.

Since pin 5 of Q401 is "L" in the initialized state, pin 4 is "H", and pin 13 of Q403 is also "H". Pin 12 is also switched to "H" since pin 2 of Q403 is "L". Pin 11 of Q403 is thus at "L", thereby turning Q407 and Q409 off, and resulting in a voltage of +5V being applied to the (+) terminal of the motor. The motor thus remains stationary.

2. **UP switch turned on**

When the UP switch is then turned on, pin 5 of Q401 becomes "H", resulting in pin 4 becoming "L", followed by input pin 13 of Q403 also becoming "L" and pin 11 becoming "H". Q407 and Q409 are thus both turned on, thereby starting the motor to increase the volume level.

3. **DOWN switch turned on**

If the DOWN switch is turned on, pin 1 of Q401 becomes "H" and pin 3 "L", resulting in pin 9 of Q403 becoming "L" and pin 10 "H". Consequently, Q408 and Q410 are both turned on, thereby starting the motor to decrease the volume level.

4. **AUTO PRESET Operation**

The AUTO PRESET function adjusts the volume automatically to the specified volume level set in advance by the PRESET LEVEL control.

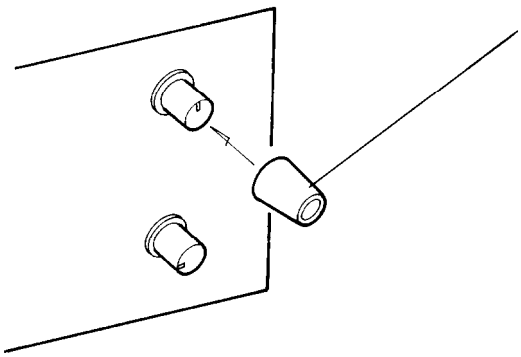
When the AUTO PRESET control is switched on after setting the desired volume level by the PRESET LEVEL control, negative pulses determined by the C401/R404 time constant circuit are applied to pin 6 of Q402. Output pin 3 of flip-flop Q402a/Q402b is switched to "L", resulting in pin 11 of Q402 and pin 5 of Q403 both becoming "H". And since output pin 10 of flip-flop Q401c/Q401d also becomes "L", pin 6 of Q403 becomes "H". As a result, pin 4 becomes "L" and pin 10 "H", thereby turning Q408 and Q410 on. The motor is thus started up to decrease the volume level.

If the volume is decreased to minimum level without an input being applied to sensor Q411, control switch S404b is activated, resulting in pin 8 of Q401 becoming "L", output pin 10 "H", and pin 1 of Q403 also "H".

Pin 3 is thus switched to "L" and pin 11 to "H", turning Q407 and Q409 on to reverse the motor and increase the volume level.

When sensor Q411 detects the rotating film reflector ribbon during the above operation, Q404 is turned on, resulting in pin 3 of Q402 becoming "H", pin 11 "L", and pins 5 and 2 of Q403 both "L". The circuit is consequently reset and the motor stops. Playback then starts at that volume level. Note that the circuit is designed to decrease the volume first, i.e. DOWN priority.

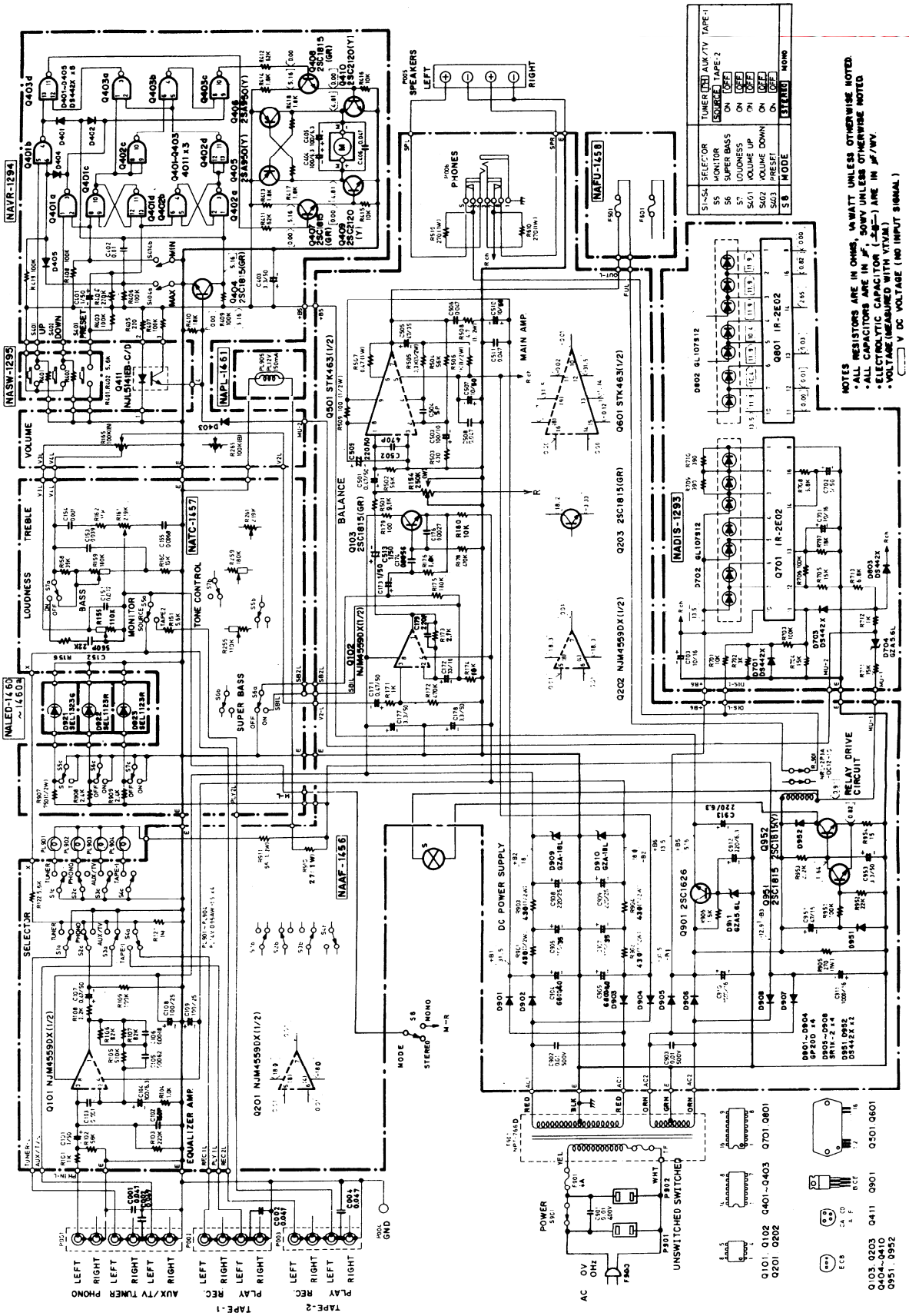
Note: Removal of control knobs



Small control knobs such as TONE may be difficult to remove. If so, use rubber material to prevent slipping and facilitate easier removal. In the example shown in the accompanying diagram, the rubber covering of a large alligator clip is used.

ONKYO CORPORATION

SCHEMATIC DIAGRAM



PRINTED CIRCUIT BOARD-PARTS LIST

MAIN, EQUALIZER AMPLIFIER AND TONE PC BOARD (NAAF–1456)–PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q101, Q102	222534	NJM4559DX
Q201, Q202		
Q501, Q601	222020	STK463
	Transistors	
Q103, Q203	2211895	2SC1815GR–L
Q951		
Q901	2200664	2SC1626Y
Q952	2211254	2SC1815Y
	Diodes	
D901–D904	223845F	GP20DL
D905–D908	223804	SR1K–2
D909–D911	224095	GZA5.6L
D951, D952	223133	DS442X
	Lamps	
PL901–PL904	210084	14V, 0.06A
	Capacitors	
C101, C173	352780109	1μF, 50V, Elect.
C201, C273		
C107, C171	352784799	0.47μF, 50V, Elect.
C207, C271		
C501, C601		
C108, C109	352751019	100μF, 25V Elect.
C172, C272	352743309	33μF, 16V, Elect.
C177, C178, C953		
	352780339	3.3μF, 50V, Elect.
C204	352721019	100μF, 6.3V, Elect.
C503, C603	352731019	100μF, 10V, Elect.
C505, C605	352764709	47μF, 35V, Elect.
C507, C510, C607		
	352781009	10μF, 50V, Elect.
C509	352782219	220μF, 50V, Elect.
C904, C905	3504171	6800μF, 40V, Elect.
C906, C907	352761019	100μF, 35V, Elect.
C908, C909	352752219	220μF, 25V, Elect.
C910, C911	3504156	1000μF, 16V, Elect.
C912, C913	352722219	220μF, 6.3V, Elect.
C951	352744709	47μF, 16V, Elect.
	Resistors	
R154	5146026	N16RLC250KW15, Variable, Balance control
R505, R605	441523324	3.3KΩ, 1/2W, Metal oxide film
R506, R606	441521024	1KΩ, 1/2W, Metal oxide film
R507, R607	441624794	0.47Ω, 1W, Metal oxide film
R508, R608	441520474	4.7Ω, 1/2W, Metal oxide film
R509	441521014	100Ω, 1/2W, Metal oxide film
R510,R610,R905		
	441622714	270Ω, 1W, Metal oxide film
R901, R902	441524314	430Ω, 1/2W, Metal oxide film
R903, R904	442524314	430Ω, 1/2W, Metal oxide film
R910	441622704	27Ω, 1W, Metal oxide film
R911	441525604	56Ω, 1/2W, Metal oxide film
	Relay	
RL901	25065194	NRL–2P3A–DC12–10, Speaker
	Switches	
S1–S4	25035292	NPS–442–L258, Selector
	Headphone jack	
P006	25045107	HLJ0318–01–040

TONE CONTROL PC BOARD (NATC–1457)–PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Resistors	
R155, R159	5104114–1	N16RQM110K180K15, Variable
R255, R259		Bass control
R161, R261	5148059–1	N16RGM219K15, Variable, Treble control
R907	441527514	750Ω, 1/2W, Metal oxide film
	Switches	
S5–S7	25035293	NPS–342–L259, Monitor/ Super bass/Loudness

SPEAKER FUSE PC BOARD (NAFU–1458)–PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	250113	SN5051, Fuse holder (D/W/Q)
	25050065	YSH403T, Fuse holder (G)

LAMP PC BOARD (NAPL–1459)–PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL905	210038	12V, 150mA, Lamp

SELECTOR INDICATOR PC BOARD (NALED–1460)–PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	225087	SEL1323G, LED

SELECTOR INDICATOR PC BOARD (NALED–1460a)–PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	225086	SEL1123R, LED

OUTPUT INDICATOR DRIVE PC BOARD (NADIS–1293)–PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q701, Q801	222623	IR–2E02
	Diodes	
D701, D703	223133	DS–442X
D801, D803		
D702, D802	225105	GL107S12, LED array
D704	224095	GZA5.6L
	Capacitors	
C701,C703,C801		
	352741009	10μF, 16V, Elect.
C702, C802	352780109	1μF, 50V, Elect.

AUTO VOLUME CIRCUIT PC BOARD (NAVR–1294)–PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q401–Q403	222840111 or 222513	4011B or TC4011BP
	Transistors	
Q404,Q407,Q408		
	2211255	2SC1815GR
Q405, Q406	2211504	2SA950Y
Q409, Q410	2211164	2SC2120Y

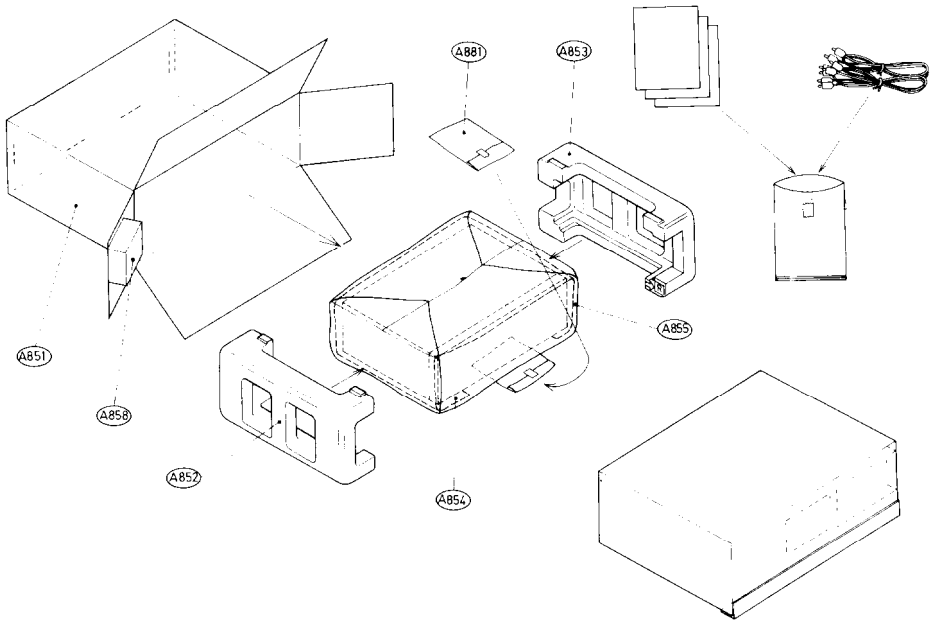
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Diodes	
D401–D405	223133	DS442X
	Capacitors	
C401	352780109	1μF, 50V, Elect.
C403	352780339	3.3μF, 50V, Elect.
C404, C405	352721019	100μF, 6.3V, Elect.
	Resistors	
R165,R265	5104134	N16RTMS100KBTP15, variable, Volume control

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Cover	
	28184138	Cover, motor

AUTO VOLUME SWITCH PC BOARD (NASW–1295)–PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
S401, S402	25035156	NPS–111–S120, Up/Down switch
S403	25035275	NPS–111–S239, Preset switch

PACKING PROCEDURES



SYMBOL NO.	PARTS NO.	DESCRIPTION
A851	29050583	Master carton box
A852	29090666	Pad, left
A853	29090667	Pad, right
A854	29100064	400x600mm, Poly bag
A855	282301	Sealing hook
A856	260012	W=50mm, Damplon tape
A857	29095114–1	Protection sheet
A858	29090679	Pad
	29360612	Label (U)
	29360566	Label C (U)

SYMBOL NO.	PARTS NO.	DESCRIPTION
A881	Accessary bag ass'y	
	29340632	Instruction manual (D/U)
	29340633	Instruction manual (G/W/Q/V)
	293650064	Warranty card (U)
	29365005–3	Warranty card (V)
	29358002	Service station list (U)
	25055040	CV–K–2, Conversion plug (W)
	29100006	350x250mm, Poly bag

NOTE

(U): Only U.S.A. model
(V): Only West Germany
(D): Only 120V model
(G): Only 220V model
(W): Only 120V/220V model
(Q): Only 240V model

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