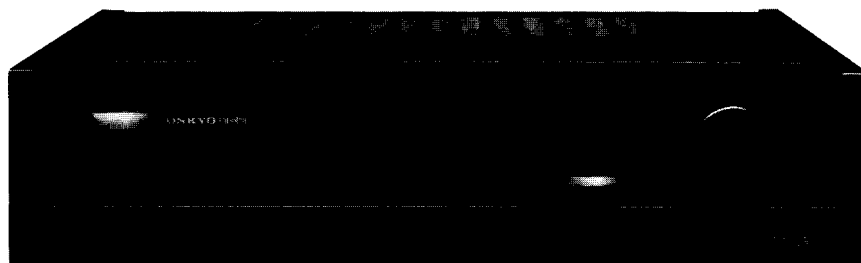


# ONKYO® SERVICE MANUAL

## Super Servo Stereo Preamplifier MODEL P-3099



UD	120V AC, 60Hz
UG	220V AC, 50Hz
UW	120V or 220V AC, 50/60Hz

### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  $\triangle$  ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

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**ONKYO®**  
**AUDIO COMPONENTS**

## SPECIFICATIONS

### Input Sensitivity and

Impedance:	PHONO MC: HIGH MC 2.5mV/100 ohms 130 $\mu$ V/(100/330) ohms
	PHONO MM: 2.5mV/(47kohms/ 100kohms)
	TUNER, TAPE PLAY, CD/AUX: 150mV/47 kohms

### Rated Output and

Impedance:	TAPE REC: 150mV/2.2 kohms (PHONO)
	OUTPUT: 1.5V/220 ohms Max. 13V

RIAA Deviation:  $\pm 0.2$ dB, 20 – 20,000Hz

### Frequency Response

(TUNER, TAPE,  
CD/AUX): +0, –3 dB, 0.8Hz – 170kHz

Phono Overload:	PHONO MM: 380mV RMS at 1 kHz, THD 0.05%
	PHONO MC: 19mV RMS at 1 kHz, THD 0.05%

### Total Harmonic

Distortion:	0.003% at PHONO MM, 3V output 0.005% at PHONO MC, 3V output 0.002% at TUNER, CD/AUX and TAPE, 3V output
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### Intermodulation

Distortion (AUX): 0.004% (70Hz: 7kHz = 4:1)

Signal-to-Noise Ratio:	PHONO MC: 76dB (IHF A-202)
	PHONO MM: 82dB (IHF A-202)
	TUNER: 90dB (IHF A-202)

Tone Control (Vol. –20dB):	BASS: $\pm 8$ dB at 70Hz TREBLE: $\pm 8$ dB at 20kHz
Filters:	HIGH CUT: (TREBLE min.): 6dB/oct, 7 kHz SUBSONIC: 6dB/oct, 15Hz/20Hz
Audio Muting:	–20dB
Inputs:	PHONO 1 & 2, TAPE PLAY 1 & 2, TUNER, CD/AUX
Outputs:	TAPE REC OUT 1 & 2 OUTPUT: 1 (for super servo cable) 2 (for normal cables) AC OUTLET (SWITCHED x 2 UNSWITCHED x 2) (120V model only)
Power Supply:	AC 120V, 60Hz [D model] AC 220V, 50Hz [G model] AC 120V or 220V, 50/60Hz [W model]
Semiconductors:	71 transistors, 52 diodes, 10 FETs, 8 ICs
Dimensions:	480(W) x 127(H) x 415(D)mm 18 5/16" x 5" x 16 11/32"
Weight:	10.5 kg, 23.1 lbs.

Specifications and features are subject to change without notice.

## PRECAUTIONS

### 1. Replacing the fuses

For continued protection against risk fire, replace only with same type and same rating fuse.

CIRCUIT NO.	PARTS NO.	DESCRIPTION
F001	252044	2A(ST-6), Primary fuse (120V model)
F001	252070	1A-SE-EAK, Primary fuse (220V, 120V/220V model)
F002	252044	2A(ST-6), Primary fuse (120V/220V model)

### 2. Replacing the lamp

This unit uses the lamp listed below.

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL801 ~ PL804 PL805	210065B	PL12V 150mA
PL806 ~ PL808	210086	PL14V 60mA–0.9
PL809 ~ PL812	2110085	PL14V 60mA–2.6

### 3. Insulation resistance measurement (Only U.S.A. model)

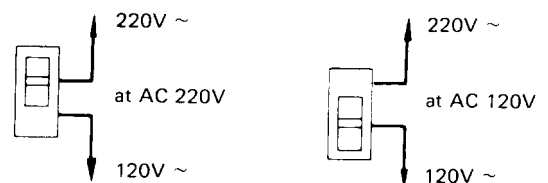
Connect the insulating-resistance tester between the plug

of power supply cable and the terminal GND on the back panel.

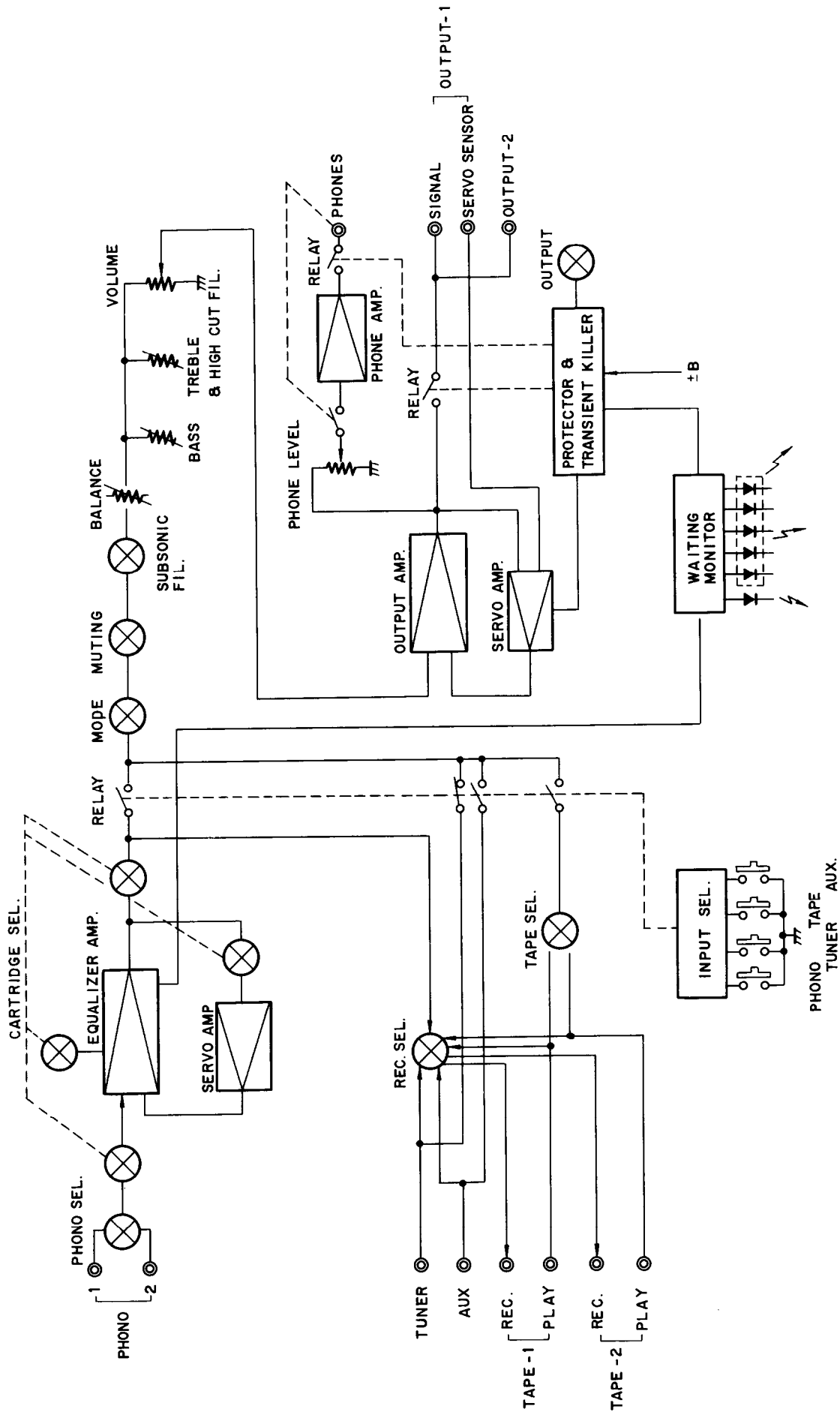
Specifications; More than 10M $\Omega$  at 500V.

### 4. Voltage selector (rear panel)

Worldwide 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 up or down position. Confirm that the switch has been moved all the way to the up or down 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.



# BLOCK DIAGRAM



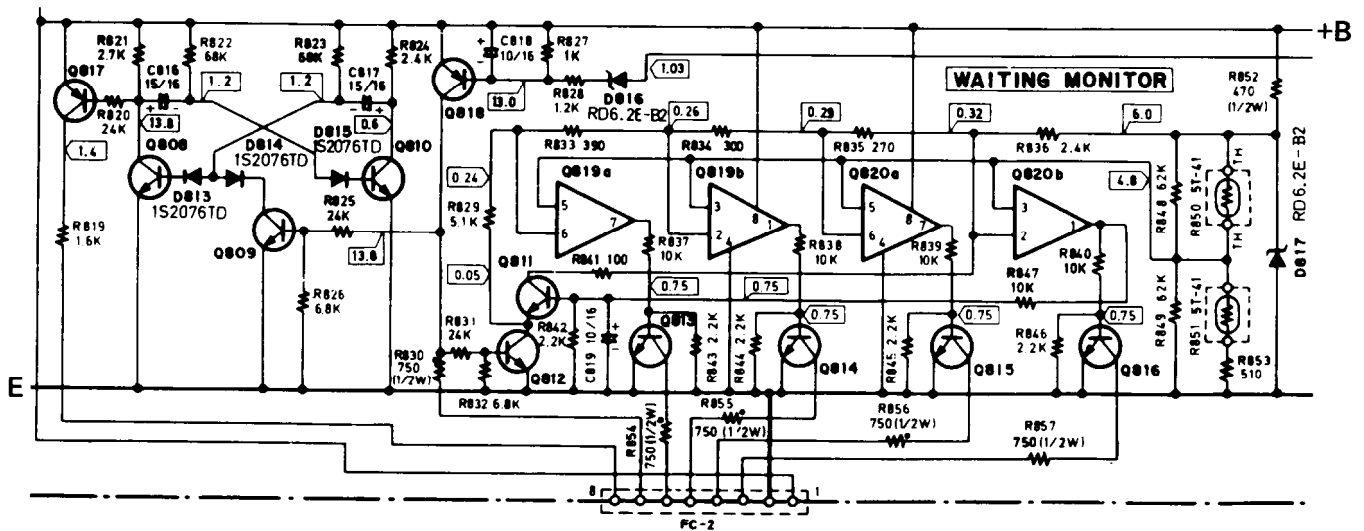
# CIRCUIT DESCRIPTION

## Waiting Monitor

It is a generally accepted fact that the sound quality of amplifiers is better after power has been left on for a while than it is when power is first switched on. The reason for this is that the operating points and characteristics of transistors, capacitor and other circuit components change according to the ambient temperature. This change in sound quality is unavoidable no matter how carefully an amplifier is designed. To obtain optimum sound quality, an amplifier should, therefore, be first left on for a few minutes so that the operating characteristics of internal parts are stabilized. However, the length of time needed differs depending on factors such as the amplifier's design and the room temperature. The waiting monitor on this unit is provided to show the user when the circuitry is ready to provide optimum sound quality. For the best sonic results, the unit should not be used until the entire waiting monitor is lit.

This monitor functions in the following manner. When power is switched on, LED D812 is caused to flash on and off by the signal that comes via Q817 from the astable multivibrator consisting of Q808 and Q810. The interval during which the LED flashes on and off is the transient killer time, no sound is heard from the speakers. After about six seconds, the transient circuit operates and Q818 is switched on to stop the multivibrator, switch off D812 and switch on one LED of D811 to start the waiting monitor.

The number of D811 LEDs lit increases as the difference between the temperature of the radiator and the inside of the unit increases. These temperatures are detected by thermistors R850 and R851. When the last LED of D811 lights, Q811 operates to drop to voltage at pin 2 of Q820. This causes the LEDs of D811 to be locked in the illuminated mode.



## Purpose of the Super Servo Cable

In ordinary separate pre and power amplifiers, the two amplifiers are connected using phono cables. Since the preamp does not handle the large currents that the power amp does, it is possible to hold degradations in sound quality caused by internally generated impedances to a low level. However, due to impedances that exist in the phono cables connecting the pre and power amps, contact resistances in the jacks and impedances in the internal wiring, crosstalk is introduced by the pre-power amp connection. This results in a loss of sonic resolution and

realism.

By using the Super Servo cables, differences in potential between the pre and power amps can be detected and cancelled out by a feedback loop. This creates a situation that is the same as if the ground lines of both amps were directly linked. The Super Servo cable, which has a negative servo sensor line, is included with each Onkyo pre-amplifier using this system. To take advantage of this ground voltage equalizing function, the pre and power amps must be connected using this cable.

## ADJUSTMENTS

### 1. Preparations

Place the unit in the standard horizontal position, confirm that the heat vents are not blocked and leave the power on for at least ten minutes (no input signal) before performing the following adjustments.

### 2. Equalizer Amp and Center Voltage Adjustment and Check

- (1) Connect a high sensitivity DC electronic voltmeter to the REC or OUT terminal of panel NAEQ-970 (or NAEQ-970a). Set the recording selector to the PHONO position.
- (2) Adjust the semi-fixed resistor R231 (R232) so that the voltmeter reading is  $0 \pm 220 \mu\text{V}$ . (When checking, no readjustment is needed if the reading is  $0 \pm 1 \text{ mV}$ .)

### 3. Protection Circuit Operation Check

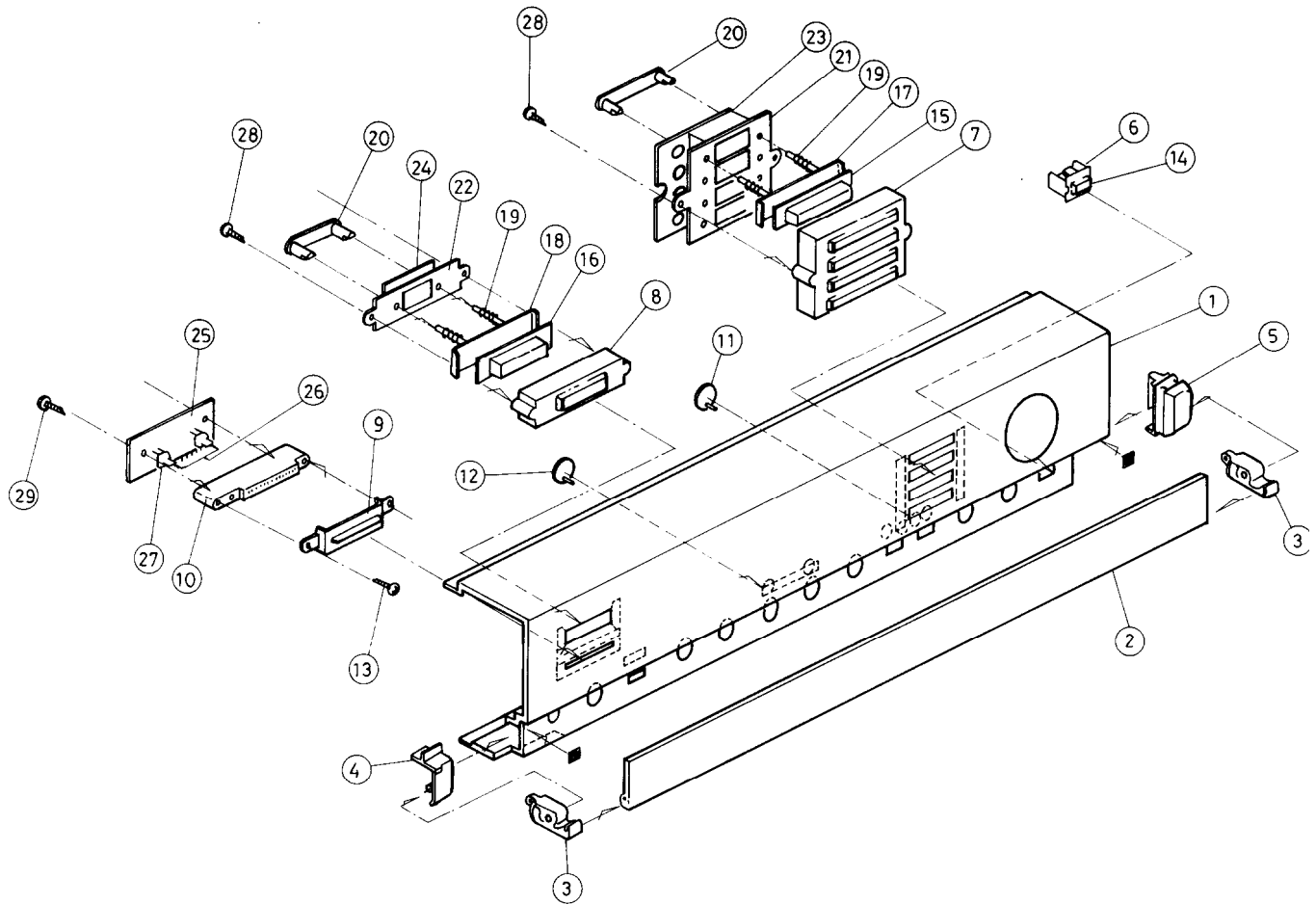
- (1) Immediately after power is switched on by the power switch, the orange LED should flash on and off. This LED should go out after about 6 seconds and green LED on the left edge should light. Finally, confirm all of the green LEDs are lit after about 10 to 15 seconds.

When power is switched off, the relays should be switched off for an instant and all LEDs go out.

- (2) When the muting switch is set to on ( $-20\text{dB}$ ) and a DC +3V signal is sent to the AUX inputs, confirm that the relays are switched on in the normal manner when power is switched on.

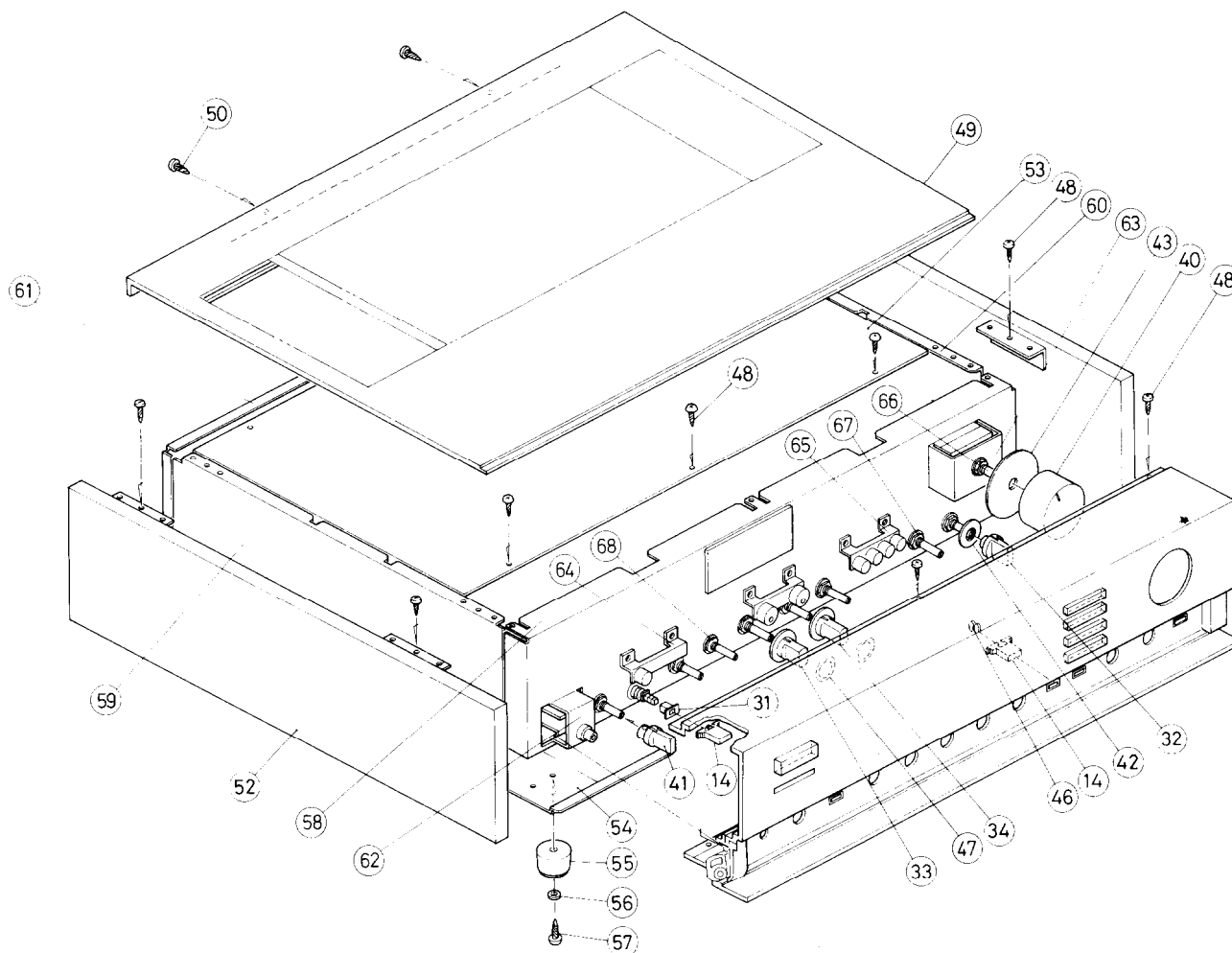
Next, confirm that the relays are switched off for an instant when muting is switched from on to off. Apply a DC  $-3\text{V}$  signal to the AUX inputs and confirm that the relays are switched on in the normal manner.

## EXPLODED VIEW



## PARTS LIST

REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
1	17868121	Front panel ass'y	16	28320473	Knob, power
	(Include 2 to 8, 11 and 12)		17	27220015A	Slider, selector
2	27210332	Front panel S	18	27220014A	Slider, power
2	28135106	Model plate	19	27180049	Spring G
3	27300400A	Bearing L	20	27220016	Slide B
3	27300399A	Bearing R	21	27190089	Holder, selector
4	28125082	End cap L	22	27190088	Holder, power
5	28125083	End cap R	23	12791578	NAPL-978, Lamp pc board ass'y
6	27267083	Guide, push	24	12791580	NAPL-980, Lamp pc board ass'y
7	27267081	Guide, selector	25	12791579	NADIS-979, Display pc board ass'y
8	27267080	Guide, power	26	225063	SLP-252B, LED (D811, D822)
9	27190090	Holder, LED	27	225064	SLP-451B, LED
10	27267082	Guide, LED	28	834130102	3STS+10BQ, Tapping screw
11	28198546	Facet ass'y A	29	831130082	3STS+8BQ, Tapping screw
12	28198537	Facet B			
13	834130102	3STS+10BQ, Tapping screw			
14	28320479	Knob, push			
15	28320474	Knob, selector			



REF. NO.	PARTS NO.	DESCRIPTION
31	27190091	Holder, push
32	28320475	Knob, balance
33	28320477	Knob, bass
34	28320478	Knob, treble
40	28320505	Knob, volume
41	28320476	Knob, headphone
42	28140312	Cushion
43	28140206	Cushion
46	27180049	Spring G
47	28140316	Cushion
48	834430062	3STS+6BQ(BC), Tapping screw
49	28184097A	Top cover
50	834230108	3TTS+10BQ(BC), Tapping screw
51	28185145	Side panel ass'y R
52	28185143	Side panel ass'y L
(51, 52)	28185144	Side panel
(51, 52)	27140434A	Bracket
(51, 52)	85113110	Screw
53	27150124	Shielded plate
54	27170091A	Bottom board
55	27175020	Leg

REF. NO.	PARTS NO.	DESCRIPTION
56	87613008	W3 x 8F, Washer
57	834130208	3TTS+20BQ, Tapping screw
58	27110118	Front bracket
59	27115076	Side bracket L
60	27115077	Side bracket R
61	27120737	Back panel [D]
	27120717A	Back panel [G]
	27120773	Back panel [W]
62	27140426	Bracket, head phone
63	27140428	Bracket, Volume
64	27140429A	Bracket, Lamp A
65	27140430A	Bracket, Lamp B
66	5104111	N40DG100KT30M, Variable resistor
67	25030177	NRSM-105-20ZV, Remote switch, operation section
68	25030178	NRSM-106-25ZV, Remote switch, operation section

**NOTE**

- [D]: Only 120V model
- [G]: Only 220V model
- [W]: Only 120/220V model

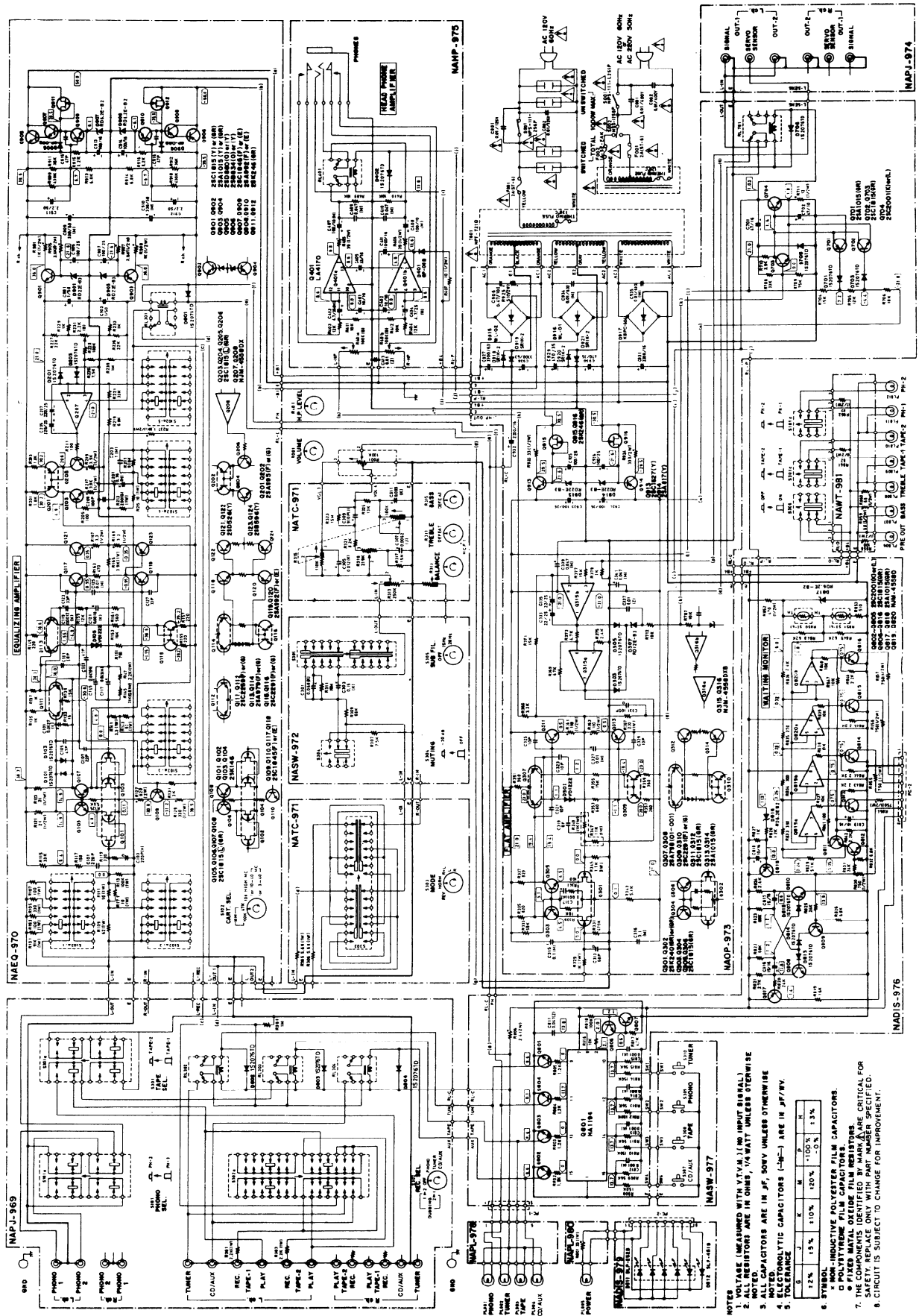
## PARTS LIST

SYMBOL NO.	PART NO.	DESCRIPTION	REF. NO.	SYMBOL NO.	PART NO.	DESCRIPTION	REF. NO.
A1	27110118	Front bracket	58	A602	27175020	Leg	55
A2	27190063	Holder		A603	834130208	3TTS+20B, Tapping screw	57
A3	27140426	Bracket, headphone		A605	87613008	W3 x 8F, Washer	56
A4	27140428	Bracket, volume		A801	28320505	Knob, volume	40
A5	27140429A	Bracket, lamp A		A802	28320473	Knob, power	16
A6	27140430A	Bracket, lamp B		A803	28320474	Knob, selector	15
A7	28330037	Cap		A804	28320475	Knob, balance	32
A13	27115076	Side bracket L	59	A805	28320476	Knob, headphone	41
A14	27115077	Side bracket R	60	A806	28320477	Knob, bass	33
A15	27130227	Bracket CF		A807	28320478	Knob, treble	34
A16	27130228	Bracket CR		A808	28320479	Knob, push	14
A17	27130229	Bracket TR		C001, $\Delta$	3500065A	0.01 $\mu$ F, AC400V/ 125V, Capacitor IS	
A18	27130230	Bracket CE		C002		Cover, capacitor	
A19	27140431	Bracket L, pcb		C001a	27300080		
A20	27140432	Bracket R, pcb		F001 $\Delta$	252044	2A(ST-6), Fuse [D] [W]	
A27	28140315	Cushion		$\Delta$	252070	1A-SE-EAK, Fuse [G] [W]	
A28	27150124	Shielded plate	53	F001a $\Delta$	250100A	SN2056#03, Fuse holder [D]	
A31	27300380	Damper ass'y		$\Delta$	25050050	H0438A, Fuse holder [W]	
(A31a)	24610440	Cylinder		$\Delta$	25065096	NPF-073, Fuse holder [G] [W]	
(A31b)	24610450	Piston		F001b	29360398	T1A/250V, Fuse Label [G] [W]	
A37	27260041	Shaft		$\Delta$	29360435	2A, Fuse label [W]	
A41	27120737	Back panel [D]		P001 $\Delta$	25050073	NSCT-4P21, AC outlet [D]	
	27120717A	Back panel [G]		P002 $\Delta$	253100	AS-UC-4, Power supply cable [D]	
	27120773	Back panel [W]		$\Delta$	253127 or	AS-CEE, Power supply cable or	
A42	27190063	TCBS-8N, Holder		$\Delta$	253129	AS-CEE, Power supply	
A47	270280	SR-4K-4, Strainrelief				supply	
A51	27300168	Terminal, speaker				cable [G] [W]	
A350	27864121	Front panel ass'y	1			NSAS-5P039, Socket	
(A351)	27210589	Front panel S	2	P3 $\Delta$	25108005	NSAS-8P040, Socket	
(A352)	28135106	Model plate	2	R001	5104111	Lug Terminal [G] [W]	
(A353)	27300399A	Bearing R	3			N40DG100KT30M, Variable resistor	
(A354)	27300400A	Bearing L	3	S001 $\Delta$	25035290	NPS-111-L256P, Power switch [D]	
(A355)	28125082	End cap L	4	$\Delta$	25035289	NPS-111-L255P, Power switch [G] [W]	
(A356)	28125083	End cap R	5	$\Delta$		NSS-1258P, Slide switch [W]	
(A357)	28140206	Cushion	43	S002 $\Delta$	25065123	NPS-122-L191, Remote switch,	
(A358)	28140312	Cushion	42			operation section	
(A359)	27267080A	Guid, power	8	S101c	25035227	Remote switch, wire section	
(A360)	27267081A	Guid, selector	7			NRS-104-20ZV, Remote switch,	
(A361)	27267083	Guid, push	6	S102c	25030177	operation section	
A362	27190090	Holder, LED	9			Remote switch, wire section	
A363	27190091	Holder, push	31	S302c	25030178	NRS-106-25ZV, Remote switch,	
A364	27220014A	Slider, power	18			operation section	
A365	27220015A	Slider, selector	17	S302b	25065143	Remote switch, wire section	
A366	27220016	Slider, B	20			NPS-122-L73, Push switch	
(A367)	28198537	Facet B	12	S306	25035108	NPT-721D, Power transformer [W]	
A368	27180049	Spring G	19 46	T001 $\Delta$	230557		
A369	28140314	Cushion					
A370	28140296	Cushion					
(A371)	28198546	Facet A	11				
A373	28140316	Cushion	47				
A374	834430068	3TTS+6B(BC), Tapping screw	48				
A376	27180037	Spring C					
A381	28184097A	Top cover	49				
A382	27270059	Spacer					
A383	28140204	Cushion					
A384	834230108	3TTS+10B(BC), Tapping screw	50				
A390	28185239	Side panel ass'y L	52				
(A390a)	28185241	Side panel					
(A390b)	27140434A	Bracket L					
(A390c)	85113110	M3. 1+10F, Wood screw					
A391	28185240	Side panel ass'y R	51				
(A391a)	28185144	Side panel					
(A391b)	27140434A	Bracket L					
(A391c)	85113110	M3. 1+10F, Wood screw					
A601	27170091A	Bottom board	54				



# SCHEMATIC DIAGRAM

(120V Model, 120V/220V Model)



- NOTES**
1. VOLTAGE (MEASURED WITH VTVM) (NO INPUT SIGNAL)
  2. ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE SPECIFIED
  3. ALL CAPACITORS ARE IN  $\mu$ F, 50V UNLESS OTHERWISE SPECIFIED
  4. POLYESTER FILM CAPACITORS
  5. TOLERANCE: ELECTROLYTIC CAPACITORS (—) ARE IN  $\mu$ F/5V
  6. SYMBOL:
 

G	Z	K	M	P	N	X
12%	15%	10%	100%	100%	10%	13%
  7. NON-INDUCTIVE POLYESTER FILM CAPACITORS
  8. POLYESTER FILM CAPACITORS
  9. THE COMPONENTS IDENTIFIED BY MARKER NUMBERS ARE CRITICAL FOR PROPER OPERATION
  10. SAFETY: REPLACE ONLY WITH PART NUMBER SPECIFIED
  11. CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT

SYMBOL NO.	PART NO.	DESCRIPTION	REF. NO.
	△ 230635	NPT-721G, Power transformer [G]	
	△ 2300008	NPT-721DG, Power transformer [W]	
U1	12791565	NAPI-969, Source input and rec. output terminal pc board ass'y [D] [W]	
	17864569A	NAPI-969a, Source input and REC. output terminal pc board ass'y [G]	
U2	12791570	NEQ-970, Equalizer amplifier pc board ass'y [D] [W]	
	17864570A	NAEQ-970a, Equalizer amplifier pc board ass'y [G]	
U3	12791571	NATC-971, Tone control circuit pc board ass'y	
U4	12791572	NASW-972, Muting/subsonic filter switch pc board ass'y	
U5	12791573	NAOP-973, Flat amplifier pc board ass'y [D] [W]	
	17864573A	NAOP-973a, Flat amplifier pc board ass'y [G]	
U6	12791574	NAPI-974, Output terminal pc board ass'y [D] [W]	
	17864574A	NAPI-974a, Output terminal pc board ass'y [G]	
U7	12791575	NAHP-975, Headphone amplifier pc board ass'y	
U8	12791576	NADIS-976, Waiting monitor pc board ass'y	
U9	12791577	NASW-977, Input selector pc board ass'y	
U10	12791578	NAPL-978, Source selector lamp pc board ass'y	23
U11	12791579	NADIS-979, Waiting lamp pc board ass'y	25
U12	12791580	NAPL-980, Power lamp pc board ass'y	24
U13	12791581	NAWT-981, Indicator lamp terminal pc board ass'y	

## NOTE

- (D) : Only 120V model  
(G) : Only 220V model  
(W) : Only 120V/220V model

NOTE: THE COMPONENTS IDENTIFIED BY MARK △  
ARE CRITICAL FOR RISK OF FIRE AND ELEC-  
TRIC SHOCK . REPLACE ONLY WITH PARTS  
NUMBER SPECIFIED.

# PRINTED CIRCUIT BOARD—PARTS LIST

## SOURCE INPUT AND RECORDING OUTPUT TERMINAL PC BOARD (NAPJ-969, NAPJ-969a)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
D802~D804	223145	1S2076TD
R301~R304	441622224	2.2 k $\Omega$ , 1W, Metal oxide film
L591~L594	230904	B-20L-44 [G]
L501, L502	231030	NCH-1070 [G]
S101a, S301a	25065111	NSS-4257, Phono/Tape
S302a	25065079	NSS-4643, Rec. relaias
RL302~RL304	25065145	NRL-2PO. 3ADC9-01
	25045065	NPJ-4PDBL32

## EQUALIZER AMPLIFIER PC BOARD (NAEQ-970, NAEQ-970a)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Q101~Q104	2211530	2SK146, F.E.T
Q105~Q108	2211895	2SC1815 L (GR)
Q109, Q110	2211732 or 2211733	2SC1845(F) or 2SC1845(E)
Q111, Q112	2211371 or 2211372	2SC2259(0-001) or 2SC2259(0-002)
Q113, Q114	2211585 or 2211586	2SA979(F) or 2SA979(G)
Q115, Q116	2211445 or 2211446	2SC2291(F) or 2SC2291(G)
Q117, Q118	2211732 or 2211733	2SC1845(F) or 2SC1845(E)
Q119, Q120	2211792 or 2211793	2SA992(F) or 2SA992(E)
Q121, Q122	2200744	2SD526(Y)
Q123, Q124	2200413	2SB596(Y)
Q201, Q202	2211515 or 2211516	2SA995(F) or 2SA995(G)
Q203~Q206	2211895	2SC1815 L (GR)
Q901, Q902	2211254 or 2211255	2SC1815(Y) or 2SC1815(GR)
Q903, Q904	2211454 or 2211455	2SA1015(Y) or 2SA1015(GR)
Q905	2201073 or 2201074	2SD880(O) or 2SD880(Y)
Q906	2201243 or 2201244	2SB834(O) or 2SB834(Y)
Q907, Q909	2211732 or 2211733	2SC1845(F) or 2SC1845(E)
Q908, Q910	2211792 or 2211793	2SA992(F) or 2SA992(E)
Q911, Q912	2211945	2SK246(GR), F.E.T
Q207, Q208	222502	NJM4558DX
D101~D104	223145	1S2076TD
D105, D106	4000068	VD1222
D201~D204	223145	1S2076TD
D801	223145	1S2076TD
D901~D904	2239753	RD22E-B3
D905, D906	223848	GP08B
D907, D908	2239492	RD6. 2E-B2
C103, C104	372122214	220 pF, 50V, Styrene
C109, C110	39122725	2700 pF, 50V, DEW
C115, C116	379224731	0.047 $\mu$ F, 50V, DEW

C117, C118	379224331	0.043 $\mu$ F, 50V, DEW
C119, C120	379121225	1200 pF, 50V, DEW
C121, C122	379121824	1800 pF, 50V, DEW
C125, C126	379121037	0.01 $\mu$ F, 50V, DEW
C201, C202	379223641	0.36 $\mu$ F, 50V, DEW
C203, C204	379221057	1 $\mu$ F, 50V, DEW
C205~C208	352752219	220 $\mu$ F, 25V, Elect.
C209, C210	372121004	100 pF, 50V, Styrene
C533~C536	379123325	3300 pF, 50V, DEW [G]
C901~C904	352780109	1 $\mu$ F, 50V, Elect.
C905~C908	352751019	100 $\mu$ F, 25V, Elect.
C909, C910	391083317	330 $\mu$ F, 50V, Elect.
C911, C912	352780229	2.2 $\mu$ F, 50V, Elect.
C913, C914	352741019	100 $\mu$ F, 16V, Elect.
R101, R102	441629134	91k $\Omega$ , 1W, Metal oxide film
R103, R104	441621014	100 $\Omega$ , 1W, Metal oxide film
R105, R106	441622214	220 $\Omega$ , 1W, Metal oxide film
R107, R108	441621014	100 $\Omega$ , 1W, Metal oxide film
R111, R112, R810	441621004	10 $\Omega$ , 1W, Metal oxide film
R113, R114	441621044	100k $\Omega$ , 1W, Metal oxide film
R121~R124	441522024KF	2k $\Omega$ , 1/2W, Metal oxide film
R217, R128	441728214KF	820 $\Omega$ 2W, Metal oxide film
R129, R130	441523314	330 $\Omega$ , 1/2W, Metal oxide film
R141, R142	441620334	3.3k $\Omega$ , 1W, Metal oxide film
R145, R146	441623333	33k $\Omega$ , 1W, Metal oxide film
R147, R148	441622224	2.2k $\Omega$ , 1W, Metal oxide film
R165, R166	441623924	3.9k $\Omega$ , 1W, Metal oxide film
R167~R170	441520334KF	3.3 $\Omega$ , 1/2W, Metal oxide film
R171, R172	441621004	10 $\Omega$ , 1W, Metal oxide film [D]
R207~R210	441523924	3.9k $\Omega$ , 1/2W, Metal oxide film
R213, R124	441622013	200 $\Omega$ , 1W, Metal oxide film
R215, R216	441621004	10 $\Omega$ , 1W, Metal oxide film
R231, R232	5225070	N10HR2. 2KBDM, Semi-fixed
R237, R238	441521824	1.8k $\Omega$ , Metal oxide film
R850	4000074-1	ST-41(ONK), Thermistor
R901~R904	441521024KF	1k $\Omega$ , 1/2W, Metal oxide film
R905~R908	441523624KF	3.6k $\Omega$ , 1/2W, Metal oxide film
S102a	25065101	NSS-10652, Cartridge
RL301	25065145	NRL-2PO. 3ADC9-01
	25060031B	P-2
	25060034A	P-4
	27160086	P-1
	27160087	P-2
	27160079	
	27300152	
	223018	AC316, Accessory, Transistor
	223019	AC229, Accessory, Transistor
	27140815	Bracket, Transistor

### TONE CONTROL CIRCUIT PC BOARD (NATC-971)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>Capacitors</b>		
C305, C306	379121235	0.012 $\mu$ F, 50V, DEW
C307, C308	379126244	6200 pF, 50V, DEW
C309, C310	374129114	910 pF, 50V, DEW
C311, C312	379123335	0.033 $\mu$ F, 50V, DEW
<b>Variable Resistors</b>		
R305, R306	441625624	5.6k $\Omega$ , 1W, Metal oxide film
R313	5104110	N27DGLC250KMN25M, Balance
R315	5104108	N27DQL11C110k180k25M, Bass control
R319	5104109	N27DGL11C219K25M, Treble control
<b>Switch</b>		
S303	25030175	NRSM-145-25ZV, Mode

### MUTING/SUBSONIC FILTER CIRCUIT PC BOARD (NATC-972)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>Capacitors</b>		
C301, C302	379226835	0.068 $\mu$ F, 50V, DEW
C303, C304	379221545	0.15 $\mu$ F, 50V, DEW
<b>Switches</b>		
S304	25035316	NPS-122-L280, Muting
S305	25030176	NRSM-143-25ZV, Subsonic

### FLAT AMPLIFIER CIRCUIT PC BOARD (NAOP-973, NAOP-973a)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>Transistors</b>		
Q301, Q302	2211915 or 2211916	2SK240(GR) or 2SK240(BL), F.E.T
Q303~Q306	2211255	2SC1815(GR)
Q307, Q308	2211140	2SA798(0-001)
Q309, Q310	2211445 or 2211446	2SC2291(F) or 2SC2291(G)
Q311, Q312	2211255	2SC1815(GR)
Q313, Q314	2211455	2SA1015(GR)
Q701	2211455	2SA1015(GR)
Q702, Q703	2211255	2SC1815(GR)
Q704	2211771 or 2211772	2SC2001(K) or 2SC2001(L)
Q913	2211414	2SC1627(Y)
Q914	2211424	2SA817(Y)
Q915, Q916	2211945	2SK246(GR)
<b>ICs</b>		
Q315, Q316	222585	NJM-4558DXB
<b>Diodes</b>		
D301, D302	4000068	VD1222
D303~D306	223145	1S2076TD
D307, D308	2239633	RD12E-B3
D701, D703	223145	1S2076TD
D705, D706	223145	1S2076TD
D913, D914	2239753	RD22E-B3
D915	223867	WL02
D916	223862	WL01
D917	223875	KBPC604
D918~D921	223804	SR1K-2
<b>Capacitors</b>		
C313, C314	372126805	68 pF, 50V, Styrene
C315, C316	379121047	0.1 $\mu$ F, 50V, DEW
C317, C318	379121035	0.01 $\mu$ F, 50V, DEW
C327, C328	379121037	0.01 $\mu$ F, 50V, DEW
C331, C332	372121014	100pF, 50V, Styrene
C333~C336	352752209	22 $\mu$ F, 25V, Elect.
C339~C342	379124737	0.047 $\mu$ F, 50V, DEW
C591	379121025	1000 pF, 50V, DEW [G]

C701	352744709	47 $\mu$ F, 16V, Elect.
C702	352734709	47 $\mu$ F, 6.3V, Elect.
C923, C924	352754719	470 $\mu$ F, 25V, Elect.
C925, C926	352751019	100 $\mu$ F, 25V, Elect.
C927, C928	3504150	3,300 $\mu$ F, 63V, Elect.
C929, C930	352764719	470 $\mu$ F, 35V, Elect.
C931, C932	352742229	2,200 $\mu$ F, 16V, Elect.
C934, C935	384171037	0.01 $\mu$ F, 630V, DT
C937	379134747	0.47 $\mu$ F, 100V, DEW
<b>Resistors</b>		
R329, R330	441621024	1k $\Omega$ , 1W, Metal oxide film
R345, R346	441621124	1.1k $\Omega$ , 1W, Metal oxide film
R347~R350	441621134	11k $\Omega$ , 1W, Metal oxide film
R361~R364	441521014KF	100 $\Omega$ , 1/2W, Metal oxide film
R367, R368	441622214	220 $\Omega$ , 1W, Metal oxide film
R711	441521204KF	12 $\Omega$ , 1/2W, Metal oxide film
R923, R924	441523304KF	33 $\Omega$ , 1/2W, Metal oxide film
R926	441525104	51 $\Omega$ , 1/2W, Metal oxide film
<b>Relay</b>		
RL701	25065139	NRL-2PO. 3ADC12-05
<b>Casises</b>		
	27300342	A
	27300343	B
	27300152	
<b>Buss</b>		
	25060031B	P-2
	25060032B	P-3

### OUTPUT TERMINAL PC BOARD (NAPJ-974, NAPJ-974a)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>Terminals</b>		
	25045065	NPJ-4PDBL32
	25045080	NPJ-2PDBL40

### HEADPHONE AMPLIFIER PC BOARD (NAHP-975)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>ICs</b>		
Q401	222543	LA4170
<b>Diodes</b>		
D401	223848	GP08B
D402	223145	1S2076TD
<b>Capacitors</b>		
C401, C402	352731009	10 $\mu$ F, 10V, Elect.
C403, C404	392850477	4.7 $\mu$ F, 25V, Elect.
C405	352743309	33 $\mu$ F, 16V, Elect.
C407, C408	392851017	100 $\mu$ F, 25V, Elect.
C409, C410	379124737	0.047 $\mu$ F, 50V, DEW
C411	3504156	1,000 $\mu$ F, 16V, Elect.
<b>Resistors</b>		
R401	5148055	N16RGM100KB25M, Variable, Headphone level resistor
R405, R406	441523904	39 $\Omega$ , 1/2W, Metal oxide film
R407	441521004KF	10 $\Omega$ , 1/2W, Metal oxide film
<b>Relay</b>		
RL401	25065139	NRL-2PO. 3ADC12-05, Relay
<b>Jack</b>		
	25045079	M-1658-MA, Stereo headphone jack

### WAITING MONITOR INDICATOR CIRCUIT PC BOARD (NADIS-976)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>ICs</b>		
Q801	222685	TC9135P
Q819, Q820	222465	NJM-4558D

<b>Transistors</b>		
Q802~Q805	2211771 or	2SC2001(K) or
	2211772	2SC2001(L)
Q806~Q816	2211255	2SC1815(GR)
Q817, Q818	2211455	2SA1015(GR)
Q822~Q825	2212600	DTA124ES
<b>Diodes</b>		
D813~D815	223145	1S2076TD
D816, D817	2239492	RD6. 2E-B2
D818	223145	1S2076TD
<b>Capacitors</b>		
C816, C817	352741509	15 $\mu$ F, 16V, Elect.
C818, C819	352741009	10 $\mu$ F, 16V, Elect.
C820	352780109	1 $\mu$ F, 50V, Elect.
<b>Resistors</b>		
R806	441722404KF	24 $\Omega$ , 2W, Metal oxide film
R830	441527514KF	750 $\Omega$ , 1/2W, Metal oxide film
R851	4000074-1	5T-41(ONK), Thermistor
R852	441524714KF	470 $\Omega$ , 1/2W, Metal oxide film
R854~R857	441527514KF	750 $\Omega$ , 1/2W, Metal oxide film
<b>Plugs</b>		
	25065055	NPLG-5P11
	25065070	NPLG-8P15

**INPUT SELECTOR PC BOARD (NASW-977)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
S307~S310	25035156	NPS-111-S120, Aux/Tape/Phono/Tuner selector switch

**SOURCE SELECTOR LAMP PC BOARD (NAPL-978)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL801~PL804	210065B	PL12V150mA, Lamp
	2000156	NSAS-5P039, Socket
	27190089	Holder, selector

**WAITING MONITOR LAMP PC BOARD (NAPL-979)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
D811	225063	SLP-252B, L.E.D.
D812	225064	SLP-451B, L.E.D.
	2000157	NSAS-8P040, Socket
	27267082	Guide

**POWER LAMP PC BOARD (NAPL-980)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL805	210065B	PL12V, 150mA, Lamp
R801	441623304	33 $\Omega$ , 1W, Metal oxide film resistor
	27190088	Holder, power

**INDICATOR LAMP TERMINAL PC BOARD (NAWT-981)**

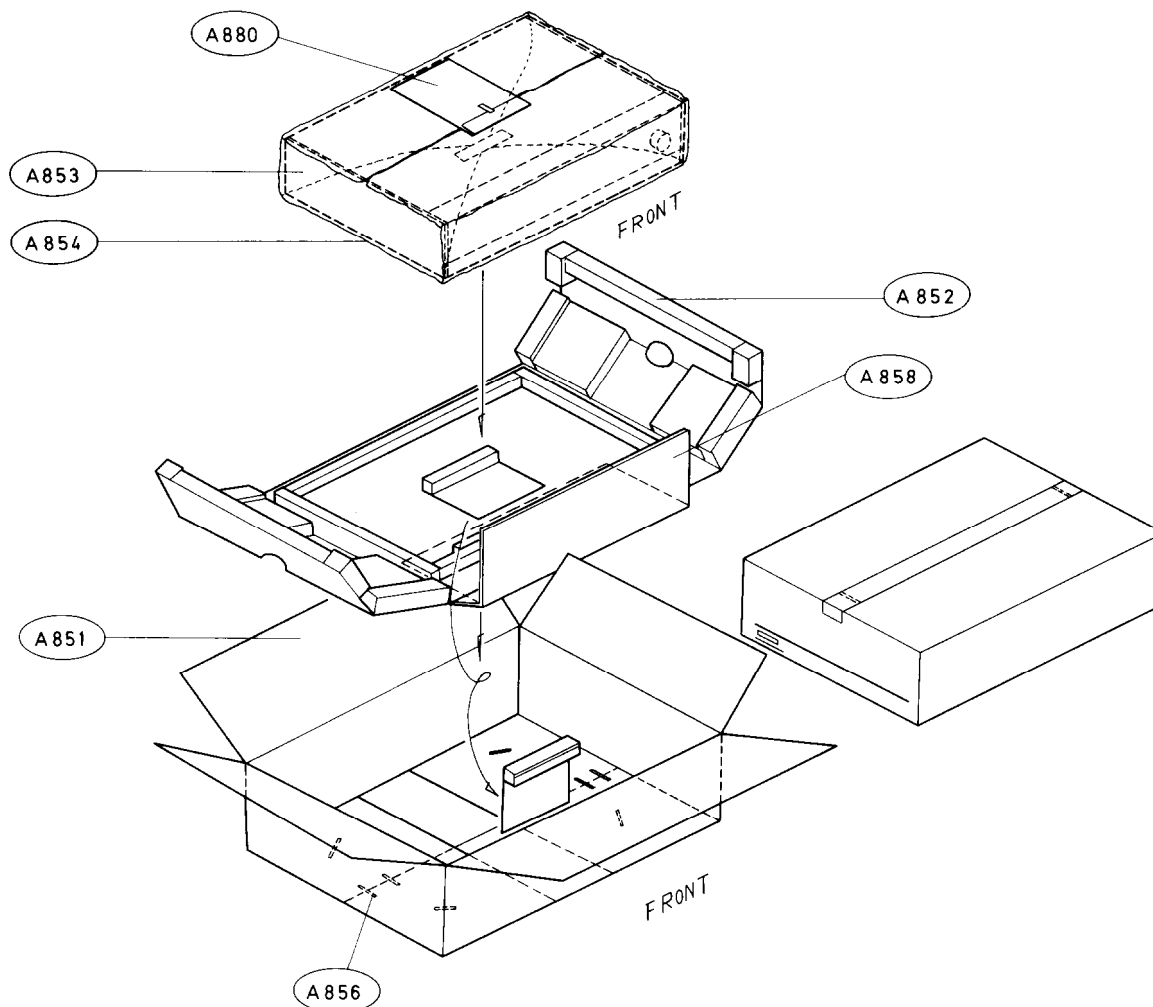
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	<b>Lamps</b>	
PL806~PL808	210086	PL14V60mA W-0.9
PL809~PL812	2110085	PL14V60mA W-2.6
	<b>Resistors</b>	
R858	441521014KF	100 $\Omega$ , 1/2W, Metal oxide film
R859, R860	441526804KF	68 $\Omega$ , 1/2W, Metal oxide film
R861, R862	441528204KF	82 $\Omega$ , 1/2W, Metal oxide film

## NOTE

[D] : Only 120V model

[G] : Only 220V model

# PACKING PROCEDURES

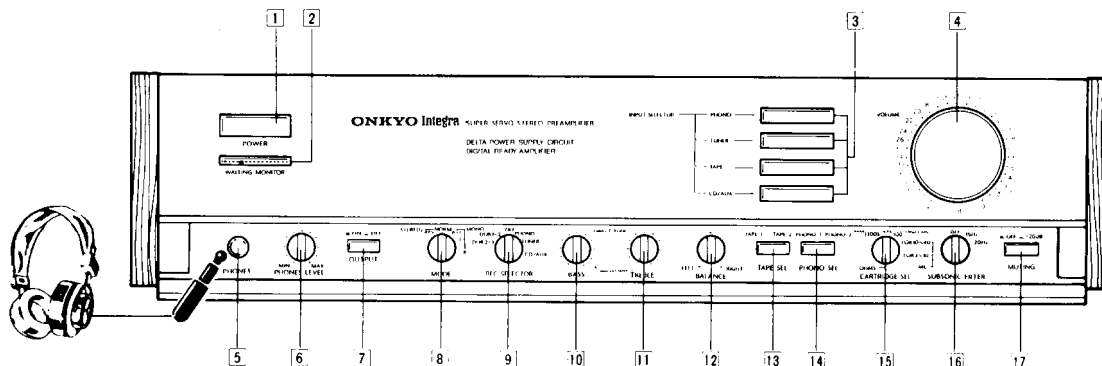


REF. NO.	PART NO.	DESCRIPTION
A851	29051124	Master carton box
A852	29090648	Pad
A853	29095394	Protection sheet
A854	29100038	950 × 720mm, Poly-vinyl bag
A856	282301	Sealing hook
A858	29095165	Sheet F
A880	Accessory bag ass'y	
	29340898	Instruction manual [D] [G] [W]
	29340930	Instruction manual [G] [W]
	2010068	Connection cable
	2910000	250 × 350mm, Poly-vinyl bag for accessory
	25055040	CV-K-2, Conversion plug [W]

## NOTE

- [D]: Only 120V model
- [G]: Only 220V model
- [W]: Only 120V/220V model

# FRONT PANEL FACILITIES



## 1 Power Switch

Press to turn power on. The switch is illuminated in a gentle blue and the waiting monitor 2 flashes on and off with an orange light to show that the transient killer is operating. No sound is heard during this time.

## 2 Waiting Monitor

This monitor shows the status of the P-3099 as it warms up to the normal operating temperature. Operation is possible when the waiting monitor changes from orange to green a few moments after the power has been turned on. However, optimum operating status is not reached until all of the waiting monitor lamps have come on. Note that no sound is heard while the monitor is flashing on and off (orange color) because the transient killer is operating.

**Note:** The P-3099 has protective circuitry that detects DC voltages and excessive currents. The waiting monitor also flashes on and off (orange color) when this circuitry has been activated.

## 3 Input Selector Switches

Use these switches to select the audio source. The pressed switch lights blue to show which source has been selected. The TUNER switch is always activated when power is first turned on.

**PHONO:** For listening to phonograph records. Note that it is also necessary to set the cartridge selector 15 and phono selector 14 to the proper positions.

**TUNER:** Press this switch to listen to the tuner.

**TAPE:** Press this switch to listen to one of the tape decks. The tape selector 13 must also be set to the position corresponding to the tape deck you want to use.

**CD/AUX:** Press this switch to listen to the component connected to the rear panel CD/AUX terminals.

## 4 Volume Control

The volume control is marked in decibels so output voltage and headphone volume can be read off directly

in dB. The volume control is linked to the tone control circuitry.

## 5 Headphones Jack

Insert a standard stereo headphones plug into this jack and adjust the volume using the volume control 4 and the headphone level control 6.

## 6 Headphone Level Control

The P-3099 incorporates a separate headphone amplifier so the headphone volume can be raised and lowered by this control without affecting the volume level of the speakers set by the volume control 4.

## Setting Headphones Volume

The headphones volume can be changed by both the volume control 4 and the headphone level control 6. Because headphone efficiency varies from model to model, you should first set the headphone level control 6 so that the headphones volume is the same as the level at which you would normally listen to music from the speakers. Perform all further volume adjustments using the volume control 4.

## 7 Output Switch

Depress this switch to the OFF (—) position to turn off the output from the rear panel output terminals. The orange indicator above the switch lights to show when the OFF mode has been selected. This switch should normally be left in the ON (■) position. Use the off position when you want to listen using only the headphones.

## 8 Mode Selector

**REV:** Left and right channel signals are reversed.

**NORM:** Use this position for normal stereo reproduction.

**R+L:** Right and left channel signals are mixed, and the same composite signal is sent to

both speakers. This mode is used for monaural listening and to check left and right balance.

L, R: In the L setting, the left channel input signal is sent to both output terminals. In the R setting, the right channel input signal is sent to both output terminals.

## 9 Recording Source Selector

2 ▲ 1 Use for tape dubbing. For details, refer  
1 ▲ 2 to the section on tape dubbing.  
OFF: Leave in this position when not performing tape recording or dubbing.  
PHONO: For recording from the turntable.  
TUNER: For recording from the tuner  
CD/AUX: For recording from the audio source connected to the rear panel CD/AUX input terminals.

## 10 Bass Control

Turn to the right of the center 0 mark to emphasize bass and turn to the left to attenuate bass according to the listening room acoustics. The lamp above the bass control shows the operational status.

## 11 Treble Control

Turn to the right of the center 0 mark to emphasize treble and turn to the left to attenuate treble according to the listening room acoustics. When the treble control is turned all the way to the left (-10), it operates as a 7 kHz high cut filter. Use this position when you want to suppress annoying high frequency noise such as static and tape hiss. The lamp above the treble control shows the operational status.

## 12 Balance Control

The sound image is shifted to the right when turned right and to the left when turned left. The left and right output levels are equal when set to the center position.

## 13 Tape Selector

This selector switches between the TAPE-1 and TAPE-2 input terminals on the rear panel. In the OUT (■) position, the deck connected to the TAPE-1 terminals is heard. In the IN (—) position, the deck connected to the TAPE-2 terminals is heard. The lamp above this selector shows which position has been selected.

## 14 Phono Selector

This selector switches between the PHONO-1 and PHONO-2 input terminals on the rear panel. In the OUT (■) position, the turntable connected to the PHONO-1 terminals is heard. In the IN (—) position, the turntable connected to the PHONO-2 terminals is heard. The lamp above this selector shows which position has been selected.

## 15 Cartridge Selector

Switch this selector to match the type of phono cartridge being used. Because a sudden increase in volume level may occur when switching this selector, always turn the volume control all the way down before switching to a different position.

MM: When using an MM type cartridge, switch to either of the MM positions depending on the cartridge impedance. If the impedance is not specified, switch to the 47 kohms position.

HIGH MC: Some MC cartridges produce an output voltage of about the same level as MM cartridges. This position is recommended when using such cartridges.

MC: When using an MC type cartridge, switch to either of the MC positions depending on the cartridge impedance. Use the setting that covers the cartridge impedance (3 – 10 ohms, 10 – 40 ohms) or is closest to it. However, if a step-up transformer is used, switch to either of the MM positions.

## 16 Subsonic Filter Switch

Use this switch to suppress unwanted low frequencies generated by record warps and motor rumble. Frequencies below 15 Hz are cut when set to the 15 Hz position while frequencies below 20 Hz are cut when set to the 20 Hz position. However since both of these positions insert a capacitor in the signal path, the effect of the Super Servo system will be reduced. It is therefore recommended that the OFF position be used as much as possible to ensure optimum sound quality.

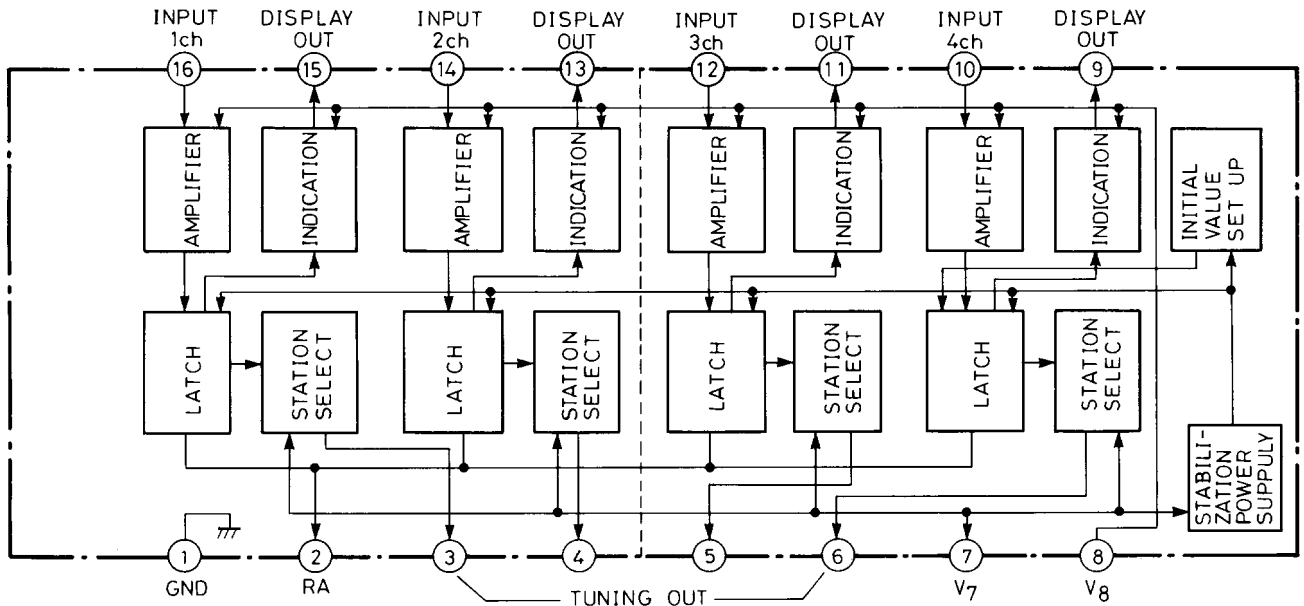
## 17 Muting Switch

When this switch is depressed to the -20dB position (—), the output level is reduced to 1/10th of the level set by the volume control. This muting function is convenient for temporary reduction of volume level and to eliminate unpleasant noises generated. When, for example, the stylus is lowered onto a record.

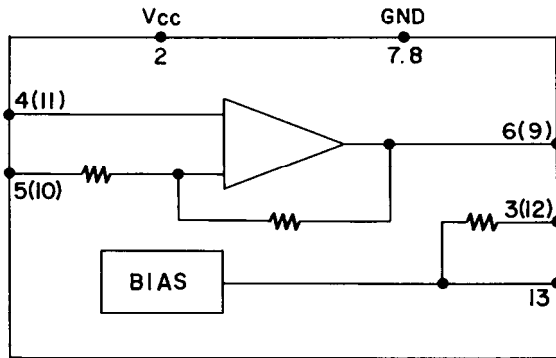


# IC BLOCK DIAGRAM

## HA1194

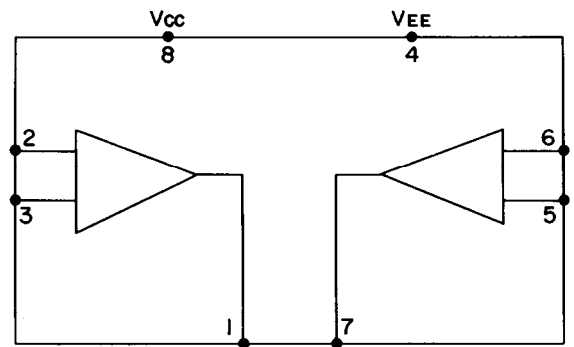


## LA-4170



(ONE CHANNEL SHOWN)

## NJM-4558



# SYSTEM CONNECTIONS

