

# ONKYO® SERVICE MANUAL

## Stereo Power Amplifier MODEL M-501



UD	120V AC, 60Hz
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### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  $\Delta$  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

Power Output: 150 watts per channel, min. RMS, at 8 ohms, both channels driven, from 20Hz to 20kHz. with no more than 0.09% THD

Total Harmonic Distortion: 0.09% at 150 watts

IM Distortion: 0.09% at 150 watts

Damping Factor: 60 at 8 ohms

Frequency Response: 5 - 100KHz  $\pm 1$ dB

Sensitivity and Impedance: 1V/50kohms

Signal to Noise Ratio: 100dB (IHFA-202 1 watt output)

## General

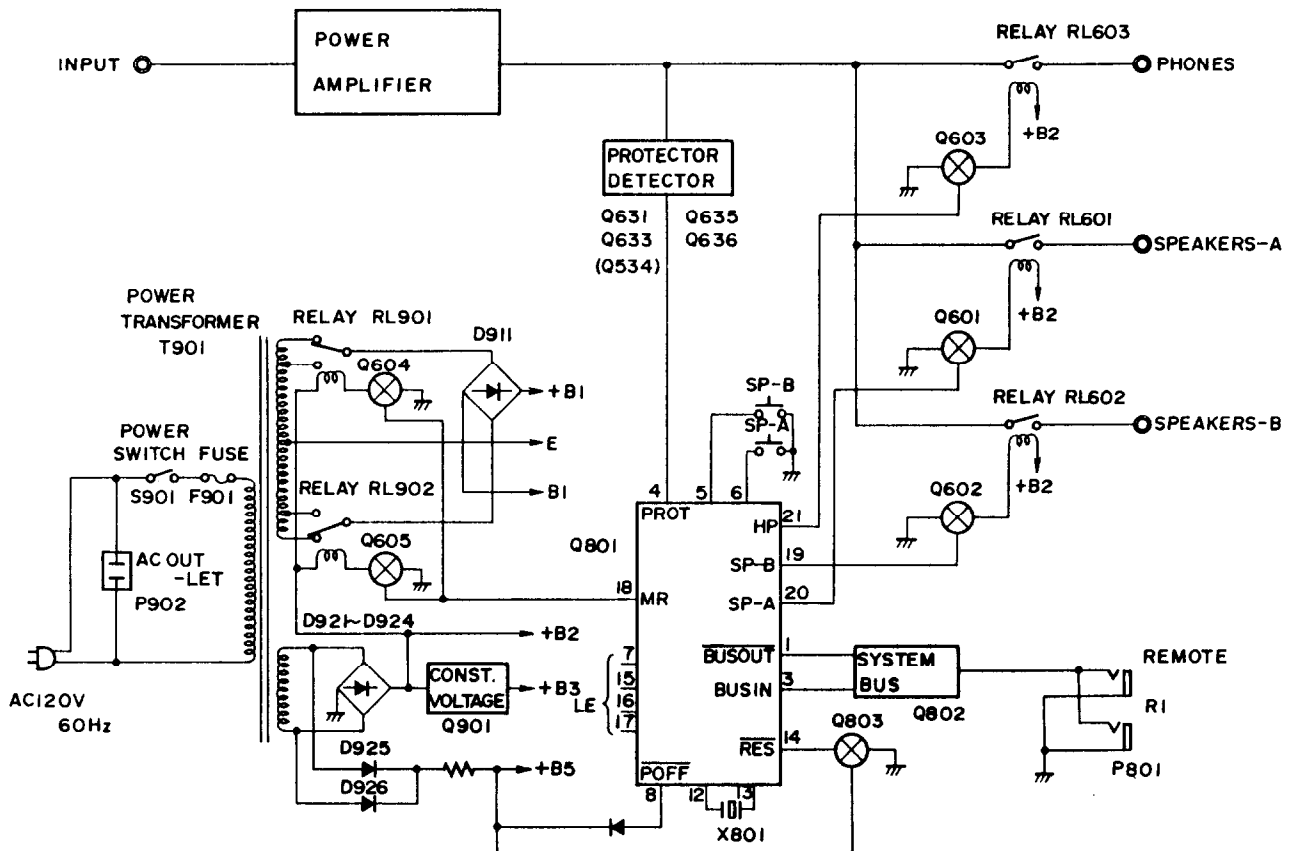
Power Supply: AC120V, 60Hz

Dimensions (W x H x D): 455 x 150 x 350mm  
17-15/16" x 5-7/8" x 13-3/4"

Weight: 10.5kg, 23.1 lbs.

Specifications and features are subject to change without notice.

# BLOCK DIAGRAM



# ADJUSTMENT PROCEDURES

## Adjustments and Checking the Protection Circuitry

### 1. Preparations

- 1) Place the unit on the workbench. (There should be about 15 mm of space between the base plate of the unit and the work surface.)
- 2) Set up the unit as follows.
  - (1) No load
  - (2) No signal
  - (3) Volume turned all the way down
  - (4) Speaker switch OFF
  - (5) Power switch OFF

Note) Check the following points before making adjustments

- (1) The power switch should be OFF.
- (2) The interior of the unit should not be warm.

### 2. Idling current adjustment

- 1) Turn the power switch ON and allow the unit to warm up for about 10 minutes.
    - (1) Adjust R533(R534) so that the voltage at test point VCT-IID on the NAAF-4123 circuit board is  $20\text{mV} \pm 5\text{mV}$ .
- Note) Semi-fixed resistors enclosed in parentheses ( ) are for the right channel.

### 3. Check of operation of protection circuitry

- 1) Check of operation of protection relay
  - (1) Confirm that the relay turns ON approximately 5 seconds after the power switch is turned ON.
  - (2) The relay should turn OFF approximately 0.5 seconds after the power switch is turned OFF.
- 2) Check of DC detection and servo circuitry operation
  - (1) Turn the power on with no load.
  - (2) After the speaker relay turns ON, apply DC+1.5V to the CD input terminals. Confirm that the relay turns OFF.
  - (3) Confirm that operation is the same as (2) above when an input of DC-1.5V is applied.

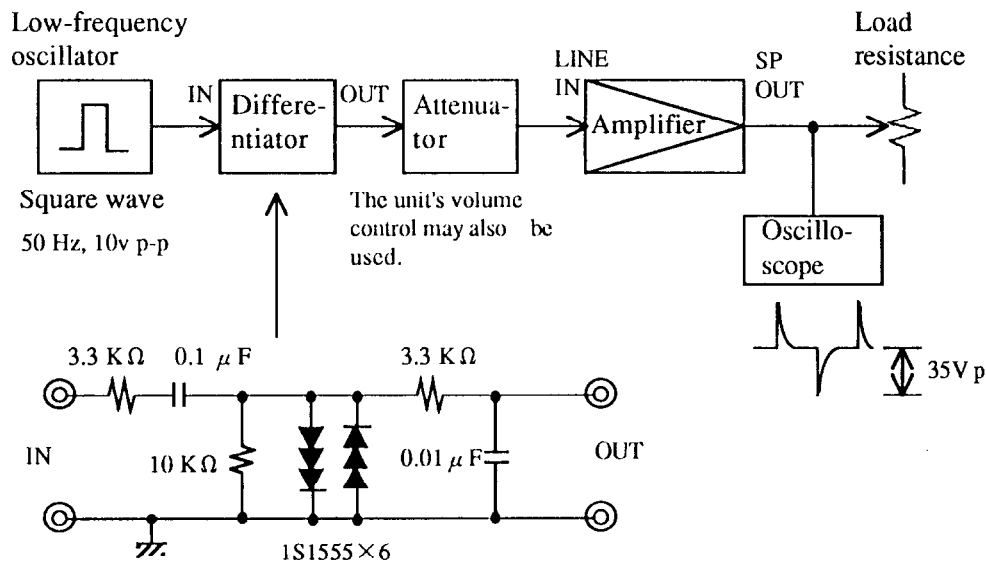
Note) Under no circumstances connect a load or short the speaker terminals when performing the above test.

#### 3) Confirmation of current detection operation.

- (1) In the no-load condition with connections made as shown in the diagram below, input a signal to the set.
- (2) Adjust the input so that the set output is 35V P.
- (3) When a load of 1 ohm is connected to the set, after the speaker relay goes ON-OFF several times, it must hold in the OFF condition.

Note) The period before that relay stays OFF should not last for more than 1 minute.

Relay OFF status can be canceled by switching the power OFF.





# CHASSIS-EXPLODED VIEW PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
A001	27110623	FRONT BRACKET ASS'Y
(A001b)	28324255	KNOB
A004	27141478	BRACKET (F)
A006	27100235A	CHASSIS
A007	27190511	KGLS-16RT, HOLDER
A009	27130648A	BRACKET (PT)
A010	27190607	KGLS-16S, HOLDER
A012	27160276A	HEATSINK
A014	27130650	BRACKET (HE)
A015	27141453	BRACKET (POW)
A018	27121414A	BACK PANEL
A019	27300750	BUSHING (CORD)
A022	27170278A	BOTTOM BOARD
A025	834430080	3TTP+8PBC, TAP-TIGHT SCREW
A026	831130088	3TTW+8B, TAP-TIGHT SCREW
A027	830440089	4TTC+8CBC, TAP-TIGHT SCREW
A028	801433	3SHS8WSW+14BBC, SPECIAL TAP-TIGHT SCREW
A029	82143006	3P+6FNBC, PAN HEAD SCREW
A301	28184476	TOP COVER
A302	834430088	3TTS+8BBC, TAP-TIGHT SCREW
A500	1A257121	FRONT PANEL
(A502)	28125234	END CAP (L)
(A503)	28125235	END CAP (R)
(A504)	28140837	CUSHION
(A506)	28324260A	KNOB ASS'Y (GUIDE)
A515	27175251	BOTTOM LEG ASS'Y
A519	28158036	HANDLE
A520	830440109	4TTC+10CBC, TAP-TIGHT SCREW
Q525, Q526	2202203 or	2SC3855A-O or
Q529, Q530	2202204 or	2SC3855A-Y or
	2202206	2SC3855A-P, TRANSISTOR
Q527, Q528	2202213 or	2SA1491A-O or
Q531, Q532	2202214 or	2SA1491A-Y or
	2202216	2SA1491A-P, TRANSISTOR
▲ T901	2300631	NPT-1099D, POERT TRANSFORMER
▲ P901	253123 or	AS-UC-6#18, POWER SUPPLY CABLE or
	253136 or	AS-UC-6#18, POWER SUPPLY CABLE or
	253140 or	AS-UC-6#18, POWER SUPPLY CABLE or
	253146	AS-UC-6#18, POWER SUPPLY CABLE
▲ F901	252052	7A(ST-6) FUSE
U001	1A257523-1	NAAF-4123-1, MAIN PC BOARD ASS'Y
U002	1A257524-1	NAPS-4124-1, POWER SUPPLY CIRCUIT PC BOARD ASS'Y
U003	1A257525-1	NADG-4125-1, MICROPROCESSOR CIRCUIT PC BOARD ASS'Y
U004	1A257526-1	NAETC-4126-1, PHONES TERMINAL PC BOARD ASS'Y
U005	1A257527-1	NASW-4127-1, FUSE PC BOARD ASS'Y
U006	1A257528-1	NAETC-4128-1, AC OUTLET PC BOARD ASS'Y

NOTE:  
THE COMPONENTS IDENTIFIED BY MARK ▲ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

## PACKING PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
A851	29052166A	MASTER CARTON BOX
A852	29091448B	PAD, LEFT
A853	29091449B	PAD, RIGHT
A855	29100033A	750 × 500mm, POLY-VINYL BAG
A856	282301	SEALING HOOK
A857	29110071	DAMPLON TAPE
A871	261504	PAPER TAPE
A868	29360778	LABEL (FLASH) [N]
<b>ACCESSORY BAG ASS'Y</b>		
A874	29341597	INSTRUCTION MANUAL
A904	29365019A	WARRANTY CARD [N]
A905	29358002J	SERVICE STATION LIST [N]
A875	2010098A	CONNECTION CABLE
A876	2010200	3.5 MINI-PLUG ASS'Y
A870	29100006A	350 × 250mm, POLY-VINYL BAG

NOTE [N]: ONLY U.S.A. MODEL

## PRECAUTIONS

### 1. Replacing the fuses

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

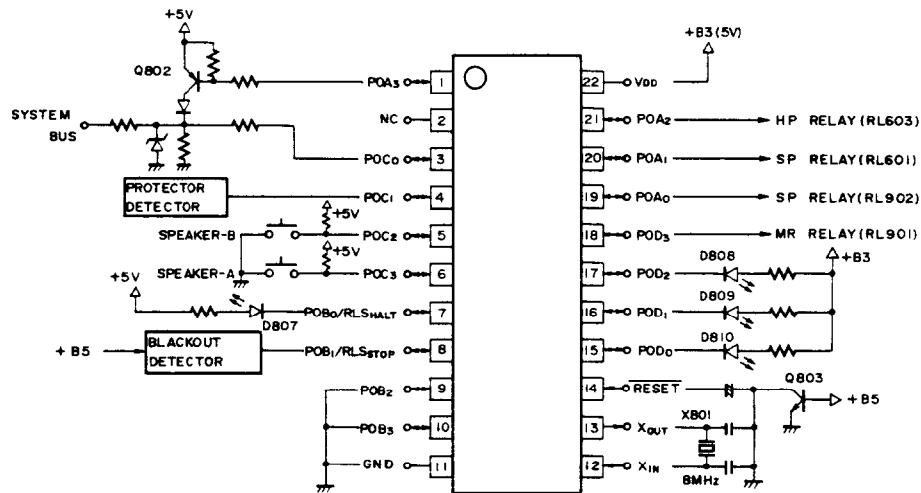
CIRCUIT NO.	PARTS NO.	DESCRIPTION
F901	252052	7A (ST-6), Primary fuse

### 2. Insulation resistance measurement

Connect the insulating-resistance tester between the plug of power supply cable and the terminal GND on the back panel. Specifications; More than 10MΩ at 500V.

# IC BLOCK DIAGRAM AND DESCRIPTIONS

$\mu$ PD17104CS



Pin No.	Pin name	Symbol	Function
1	POA3	$\overline{\text{SYS OUT}}$	Output terminal for System Code. Active "L"
2	NC	—	No connectin.
3	POCO	SYS IN	Input terminal for System Code. Active "H".
4	POC1	PROTECT	Input terminal for detecting Protect Operation. Active "H". However, "H" 100 $\mu$ s or under shall be ignored.
5	POC2	$\overline{\text{SPBKEY}}$	Input terminal for SPEAKER-B Key. When pressed SPEAKER-B Key, turned into "L".
6	POC3	$\overline{\text{SPAKEY}}$	Input terminal for SPEAKER-A Key. When pressed SPEAKER-A Key, turned into "L".
7	POBO/RLS	$\overline{\text{POWER}}$	Output terminal for POWER display. "L" (POWER Display lighted) will be output at any time.
8	POB1/RLS	$\overline{\text{POFF}}$	Input terminal for detecting power suspension. Active "L". However, "L" 100 $\mu$ s or under shall be ignored.
9	POB2	—	Not to be used. "L" will be output at any time.
10	POB3	—	Not to be used. "L" will be output at any time.
11	GND	GND	GND (Ground) Terminal.
12	XIN	XIN	Terminal for connecting with Ceramic Oscillator (8 MHz).
13	XOUT	XOUT	
14	RESET	$\overline{\text{RESET}}$	System reset terminal. "Active "L".
15	PODO	$\overline{\text{SPB}}$	Output terminal for displaying SPEAKER-B. When turned ON; "L" (lighted).
16	POD1	$\overline{\text{SPA}}$	Output terminal for displaying SPEAKER-A. When turned ON; "L" (lighted).
17	POD2	$\overline{\text{PROIND}}$	Output terminal for PROTECT INDICATOR. Usually, will be output just like HPRL output (lighted when HPRL output is "L").
18	POD3	MR	Output terminal for controlling MULTI ROOM. When turned ON; "H".
19	POAO	SPBRL	Output terminal for controlling SPEAKER-B Relay. When turned ON; "H".
20	POA1	SPARL	Output terminal for controlling SPEAKER-A Relay. When turned ON; "H".
21	POA2	HPRL	Output terminal for controlling HEAD PHONE Relay. When turned ON; "H".
22	V <sub>DD</sub>	V <sub>DD</sub>	Power source (+5V) terminal.

# PRINTED CIRCUIT BOARD PARTS LIST

## MAIN PC BOARD (NAAF-4123-1)-PART LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	<b>Transistors</b>	
Q501, Q502	2213676 or 2213677	2SC3067F or 2SC3067G
Q503~Q506	2211455 or 2213074	2SA1015GR or 2SA933R
Q507, Q508	2211732 or 2211733	2SC1845F or 2SC1845E
Q509, Q510 Q513, Q514 Q635, Q636	2211255 or 2211183	2SC1815GR or 2SC1740R
Q511, Q512 Q519, Q520 Q515~Q518 Q633, Q634 Q521, Q522	2211359  2202034 or 2202035	2SA949Y (ONK)  2SD1763AD or 2SD1763AE
Q523, Q524	2202024 or 2202025	2SB1186AD or 2SB1186AE
Q631	2211793 2211792	2SA992E or 2SA992F
	<b>Diodes</b>	
D505~D510 D631	223163 224450513	1SS133 MTZ5.1C, Zener
	<b>Capacitors</b>	
C501, C502 C505, C506 C513, C514 C531, C532 C535~C538 C635 C636	354781009 354742219 393180227 374794734 3500109 354790109 354722219	10 $\mu$ F 50V, Elect. 220 $\mu$ F 16V, Elect. 2.2 $\mu$ F 50V, Elect. (FM) 0.047 $\mu$ F 63V, Film (TF) 220 $\mu$ F 80V, Elect. 1 $\mu$ F 100V, Elect. 220 $\mu$ F 6.3V, Elect.
	<b>Resistors</b>	
R529, R530 R533, R534 R537, R538 R539, R540 R541, R542 R543~R550 R577, R578 R551, R552 R557, R558 R553~R556 R559~R562, R573, R574 R575, R576 R577, R578	442524704 5210062 442521614 442521024 442521014 442520224  441620104  4000080 442520824 442520224	47 $\Omega$ , 1/2W, Metal oxide film N06HR4.7KBD, Semi fixed 160 $\Omega$ , 1/2W, Metal oxide film 1 k $\Omega$ , 1/2W, Metal oxide film 100 $\Omega$ , 1/2W, Metal oxide film 2.2 $\Omega$ , 1/2W, Metal oxide film  1 $\Omega$ , 1W, Metal oxide film  0.47 $\Omega$ , 5W, Metal plate 8.2 $\Omega$ , 1/2W, Metal oxide film 2.2 $\Omega$ , 1/2W, Metal oxide film
	<b>Terminal</b>	
P101	25045307	NPJ-2PDBL166
	<b>Bracket</b>	
	27141059	

## POWER SUPPLY CIRCUIT PC BOARD (NAPS-4124-1)-PART LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	<b>IC</b>	
Q901	222780565JRC	78M56
	<b>Transistors</b>	
Q601~Q605	2211183	2SC1740R

CIRCUIT NO.	PART NO.	DESCRIPTION
	<b>Diodes</b>	
D601~D605 D911 D921~D926 D930	223163 22380044 22380046 224450562	1SS133 RBV-1506 AM01Z MTZ5.6B, Zener
	<b>Coils</b>	
L501, L502	231015	S-0.8C
	<b>Capacitors</b>	
C914, C915 C922 C923 C932	3504236 354762229 354744709 354741009	10000 $\mu$ F 80V, Elect. 2200 $\mu$ F 35V, Elect. 47 $\mu$ F 16V, Elect. 10 $\mu$ F 16V, Elect.
	<b>Resistors</b>	
R581, R582 R921 R922 R923	442520564 442520154 442521614 442521524	5.6 $\Omega$ , 1/2W, Metal oxide film 1.5 $\Omega$ , 1/2W, Metal oxide film 160 $\Omega$ , 1/2W, Metal oxide film 1.5 $\Omega$ k, 1/2W, Metal oxide film
	<b>Relays</b>	
RL601, R602 RL603 RL901, RL902	25065339 25065342 25065435	NRL-2P5A-DC24-046 NRL-1.25A-DC24-048 NRL-1P10A-DC24-072
	<b>SP terminal</b>	
P501	25060159	NTM-8PDMN085
	<b>Stereo jack</b>	
P801	25045330	NPJ-2PDBL-184
	<b>Radiator</b>	
	27160271	RAD-083

## MICROPROCESSOR CIRCUIT PC BOARD (NADG-4125-1)-PART LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	<b>ICs</b>	
Q801	22240430	MPD17104CS-518
	<b>Transistors</b>	
Q802 Q803	2213510 2211183	DTA114ES 2SC1740-R
	<b>Diodes</b>	
D801, D802 D804~D806 D811 D803 D807~D810	223163   224450562 225141	1SS133   MTZ5.6B, Zener SEL2213C, LED
	<b>Ceramic osc.</b>	
X801	3010154	CST8.00MT
	<b>Capacitors</b>	
C801 C803 C804	3020027 354741009 354780109	0.047 F, 5V, Super 10 $\mu$ F 16V, Elect. 1 $\mu$ F 50V, Elect.
	<b>Holders</b>	
	27190825 27190811	(LED) (LED)
	<b>Switch</b>	
S801, S802	25035548	NPS-111-S510



### PHONES TERMINAL PC BOARD (NAETC-4126-1)-PART LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	<b>Resistors</b>	
R583, R584	441623914	390Ω, 1W, Metal oxide film
	<b>Headphone terminal</b>	
P502	25045255	YKB26-5009

### FUSE PC BOARD (NASW-4127-1)-PART LIST

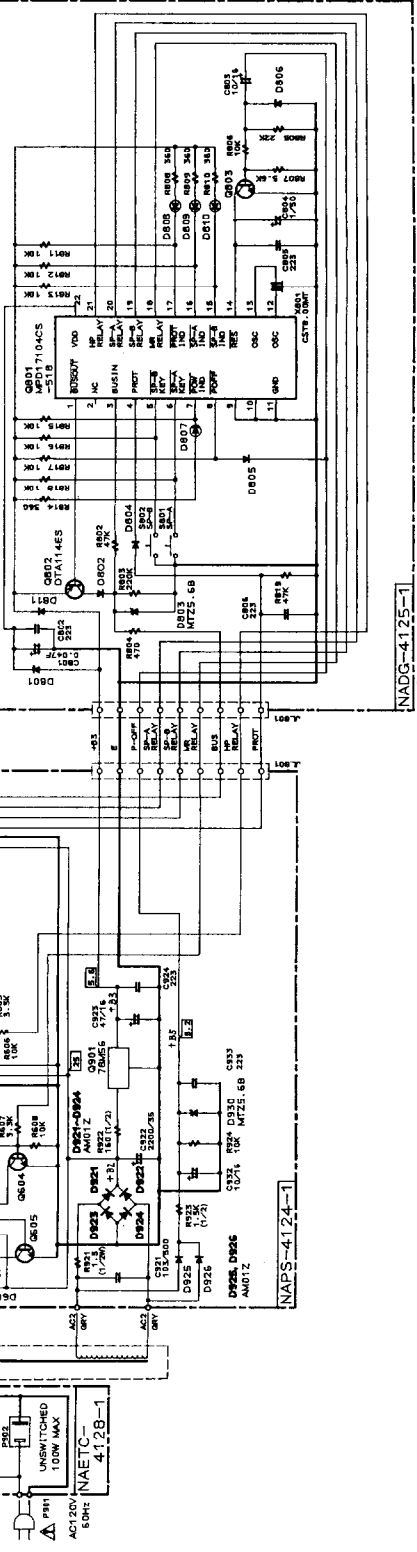
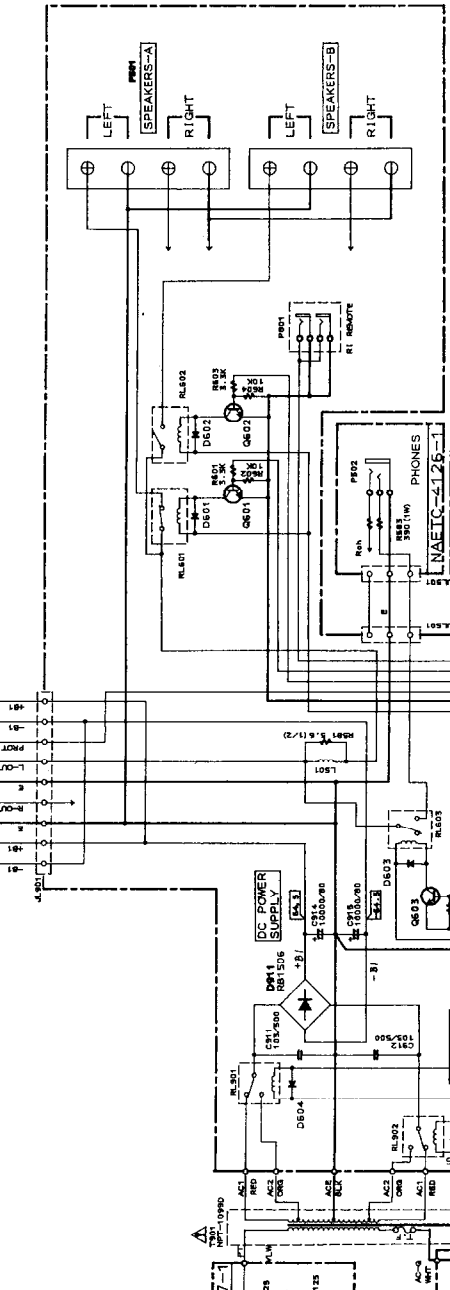
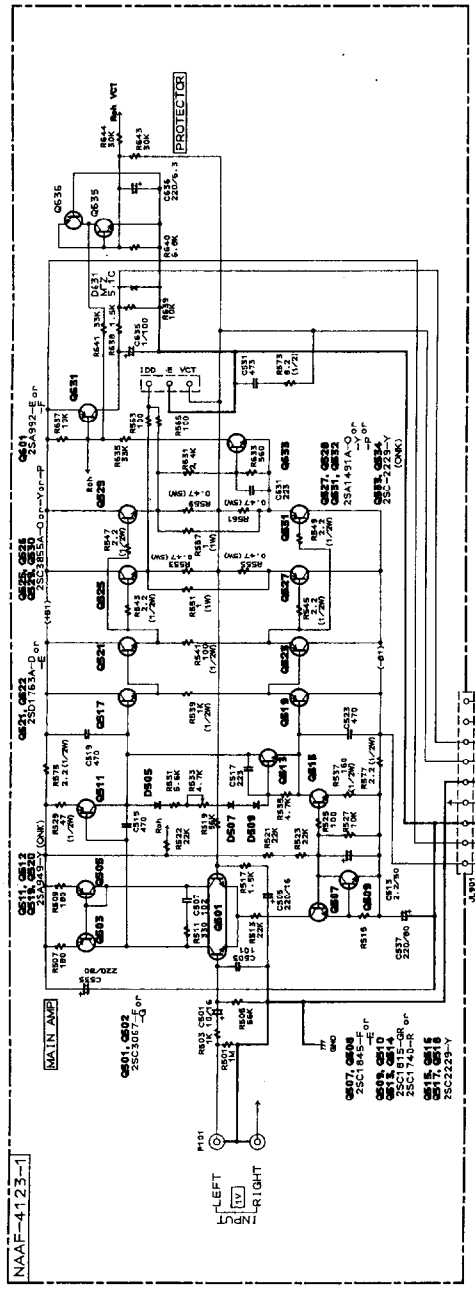
CIRCUIT NO.	PART NO.	DESCRIPTION
	<b>Capacitor</b>	
△ C901	3500065A	0.01μF AC400V/125V, Film (IS)
	<b>Switch</b>	
△ S901	25035550	NPS-111-L512P
	<b>Fuseholder</b>	
△ F901a	250113	S-N5051

### AC OUTLET PC BOARD (NAETC-4128-1)-PART LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	<b>AC outlet</b>	
△ P902	25050535	NSCT-2P358T
	<b>Terminal</b>	
	25060092	NTM-1S33

NOTE:  
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**CHEMATIC DIAGRAM**  
**MODEL M-501**



**NOTE**

- THE COMPONENTS IDENTIFIED BY MARK Δ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
- VOLTAGE MEASUREMENTS ARE IN AC VOLTAGE, UNLESS OTHERWISE NOTED.
- ALL NPN TRANSISTORS ARE EQUIVALENT TO 2N1815-GR UNLESS OTHERWISE NOTED.
- ALL PNP TRANSISTORS ARE EQUIVALENT TO 2N1815-GR UNLESS OTHERWISE NOTED.
- ALL DIODES ARE EQUIVALENT TO 1N5133 UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (C) ARE IN μF/W.
- ALL RESISTORS ARE IN OHMS 1/4 WATT UNLESS OTHERWISE NOTED.
- THE THICK LINES IN PC BOARD ARE THE PRINTING SIDE OF THE PARTS. STAGNANT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

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