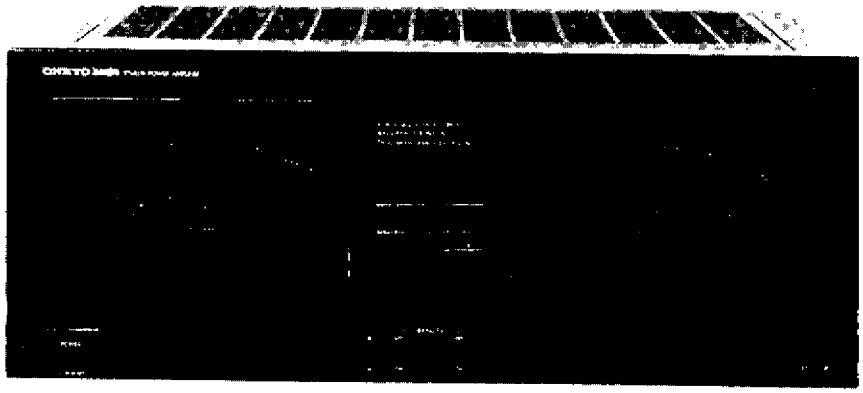
SERIAL NO. OM3243

ONKYO SERVICE MANUAL

Stereo Power Amplifier

MODEL M-504



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

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK △ 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:	165 watts per channel, min. RMS, at 8 ohms, both channels driven, from 20 Hz to 20 kHz, with no more than 0.003% total harmonic distortion. 165 watts per channel, into 8 ohms at 1 kHz, 0.003% THD
Total harmonic distortion:	0.003% at rated power 0.003% at 1 watt output
Intermodulation distortion:	0.003% at rated power 0.003% at 1 watt output
Frequency response:	+0, −1.5 dB at 1 Hz – 100 kHz
Input sensitivity:	1 V
Input impedance:	20 kohms
Damping factor:	140 (8 ohms, 1 kHz)
S/N ratio:	120 dB (IHFA, Shorted)
Outputs:	SPEAKERS 1 & 2, AC OUTLET (UNSWITCHED × 1)
Inputs:	INPUT
Power supply:	AC 120V and 220V Switchable, 50/60 Hz
Dimensions:	465(W) x 185(H) x 422(D) mm 18-5/16" x 7-5/16" x 16-5/8"
Weight:	22.5 kg, (49.5 lbs.)

Specifications and features are subject to change without notice.

PRECAUTIONS

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

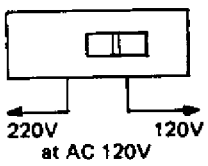
CIRCUIT NO.	PART NO.	DESCRIPTION
F801, F802	252051	6A (ST–6), Primary fuse
F803, F804	252076	3.15A–SE–EAK, Primary fuse (Worldwide model)
F702	252044	2A (ST–6), Secondary fuse

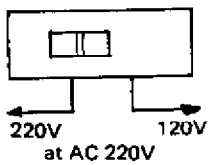
2. **Replacing the lamp**
   This unit uses the lamp listed below.

CIRCUIT NO.	PART NO.	DESCRIPTION
PL881, PL882 PL883, PL884	210191	PL14V 150mA

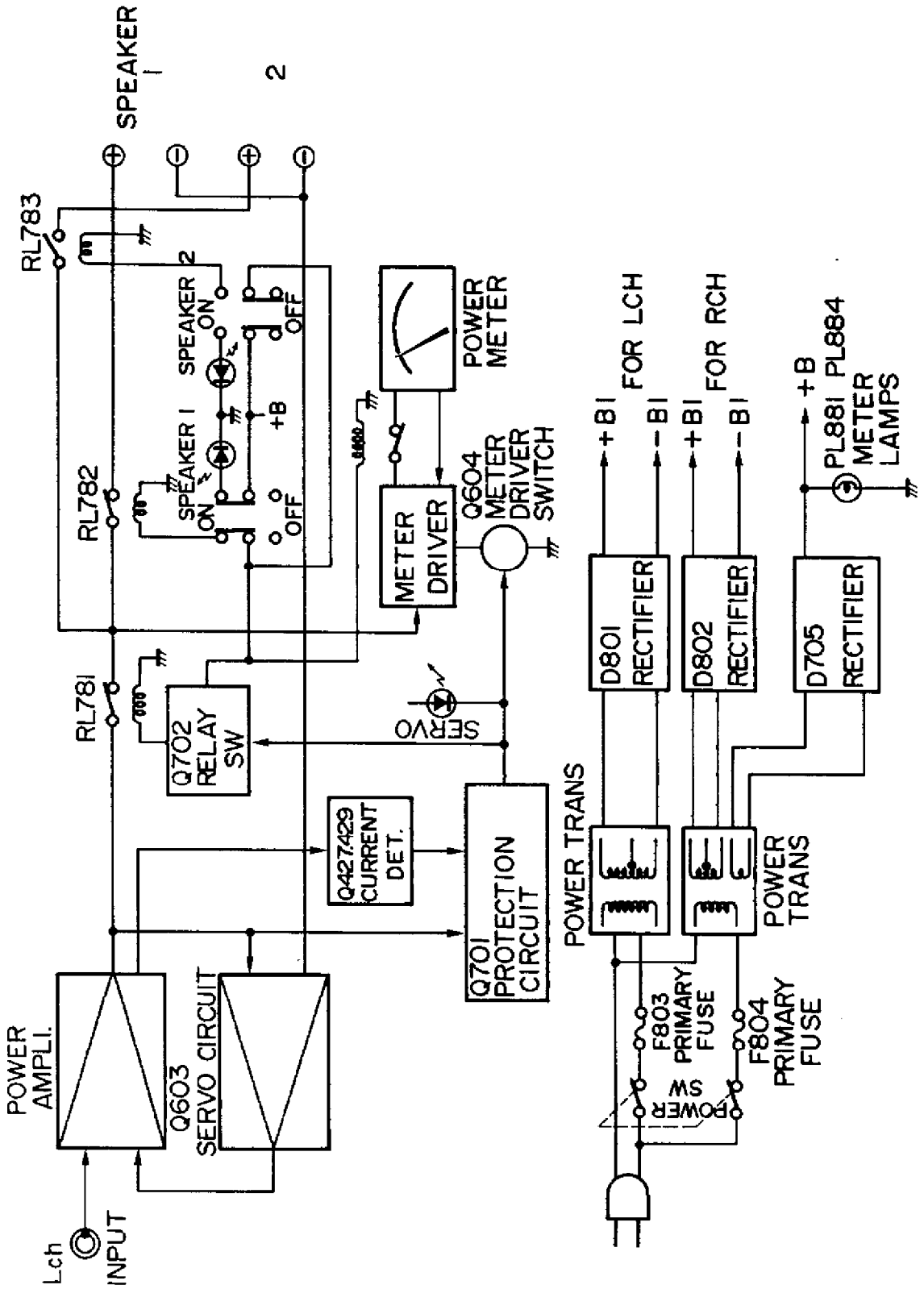
3. **Insulation resistance mesurement (Only U.S.A. model)**
   Connect the insulating-resistance tester between the plug of power supply cable and the terminal GND on the back panel.
   Specifications; More than 10 MΩ at 500V.

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.

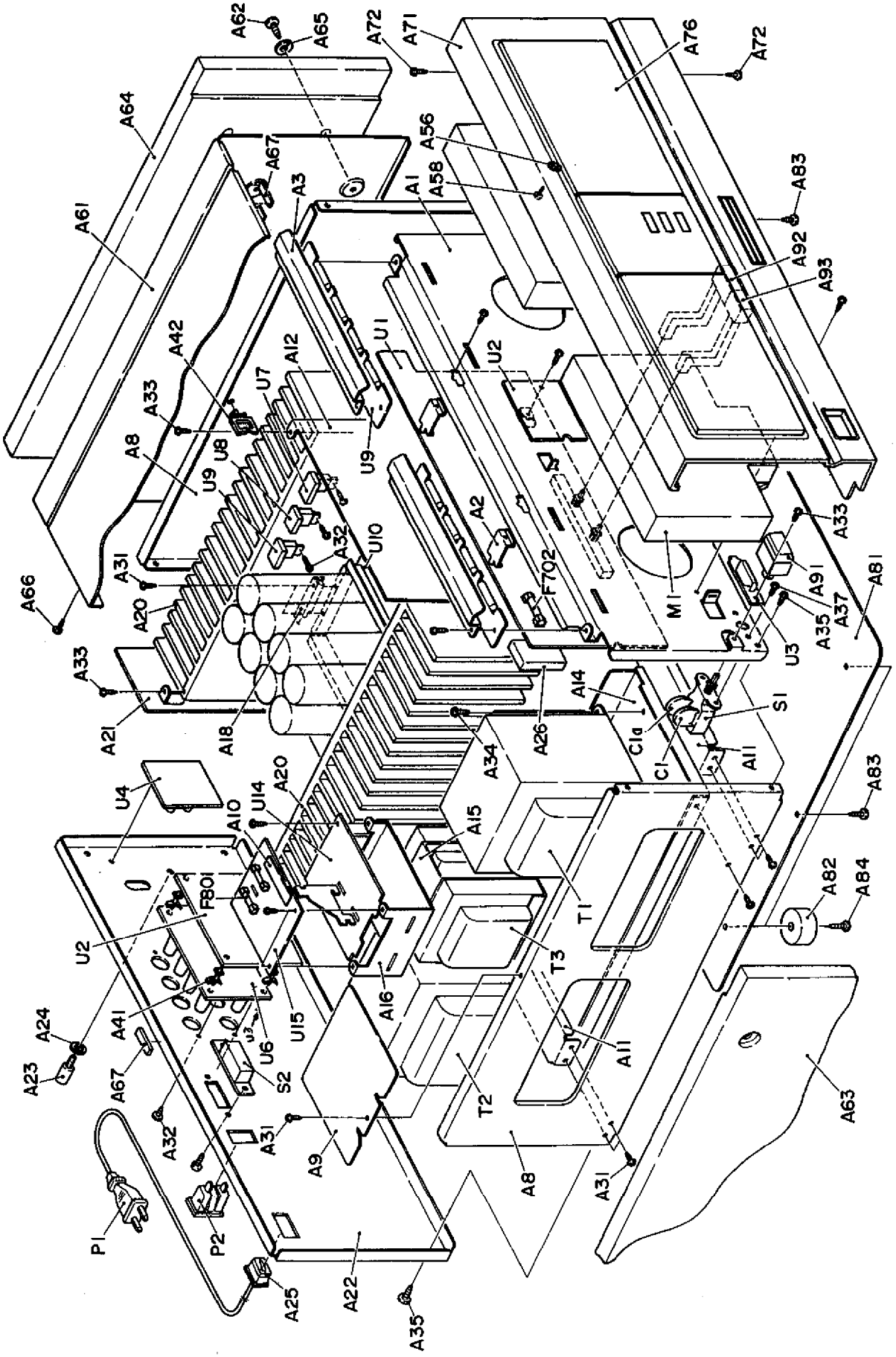




BLOCK DIAGRAM



EXPLODED VIEW



PARTS LIST

REF NO.	PART NO.	DESCRIPTION
A1	27110285B	Front bracket
A2	27141064	Bracket FPC
A3	27141065A	Bracket,Lamp
A8	27115204A	Side bracket
A9	28175129	Insulating plate
A10	29360626-1	Label
A11	27130427	Bracket
A12	27150224	Shielded plate
A14	27130428A	Bracket PT
A15	27130429	Bracket PHT
A16	27141067	Bracket PC
A18	27141068	Bracket HE
A20	27160195	Radiator
A21	27150215B	Shielded plate
A22	27120905	Back panel <D>
	27120909	Back panel <W>
A23	25060041	3 × 14mm, Ground terminal
A24	87644010	W4 × 10F(BC), Washer
A25	27300750	⚠Strainrelief
A26	28140676	11 × 50 × 30mm, Cushion
A31	834430068	3TTS+6B(BC),Tapping screw
A32	834430108	3TTS+10B(BC),Tapping screw
A33	831430080	3TTW+8B(BC),Tapping screw
A34	830440089	4TTC+8C(BC),Tapping screw
A35	838440089	4TTB+8C(BC),Tapping screw
A36	830440109	4TTC+10C(BC),Tapping screw
A37	82143006	3P+6FN(BC),Pan head screw
A40	27190009	Holder
A41	27190480	Holder
A42	27300243	WS-2WS, Wire holder
A43	27190458	WLS-06-0, Holder
A45	870065	11×26×1.6,Cushion
A56	87313006	M-3B,Toothed washer
A58	801230	3STS+8BQ(BC),Tapping screw
A60	27190011	KGLS-6NS,Holder
A61	28184319B	Top cover
A62	836440303	4STV+30FN(BC),Special screw
A63	28185257	Side panel (L)
A64	28185259	Side panel (R)
A65	870086	4 × 12BS(BC), Special washer
A66	838440089	4TTB + 8C(BC), Tapping screw
A67	28140020	4 × 10 × 40mm, Cushion
A71	17788121	Front panel ass'y
A71a	28191351B	Clear plate
A71b	27190451	Holder, Glass
A71c	833430080	3TTP+8P(BC), Tapping screw
A72	834430068	3TTS+6B(BC),Tapping screw

REF NO.	PART NO.	DESCRIPTION
A81	27170226-1A	Bottom board
A82	280889B	Leg
A83	831430088	3TTW +8B(BC), Tapping screw
A84	831430168	3TTW + 16B(BC), Tapping screw
A91	28322541	Knob,power
A92	28322722	Knob, push R
A93	28322723	Knob, push L
C1	3500065A	0.01μF, AC400V, Capacitor IS
C1a	27300601	SB-1925, Cover (Capacitor)
F702	252044	⚠2A(ST-6),Secondary fuse
F801,F802	252051	⚠6A(ST-6),Primary fuse
F803,F804	252076	⚠3.15A-SE-EAK,Primary fuse
M1	243148	NIND-2000S-148,Meter
P1	253122	⚠AS-UC-<W>6,Power supply cord
P2	25050290	⚠NSCT-2P118T,AC outlet
Q449,Q450	2201653,	2SC3856(O),
Q457,Q458	2201655 or	2SC3856(P) or
	2201654	2SC3856(Y), Transistor
Q451,Q452	2201663,	2SA1492(O),
Q459,Q460	2201665 or	2SA1492(P) or
	2201664	2SA1492(Y), Transistor
S1	25035381	⚠NPS-121-L345P, Power switch
S2	25065195	⚠NSS-1288P, Voltage selector switch <W>
	834430108	3TTS+10B(BC), Tapping screw
T1	2300154	⚠NPT-940D, Power transformer <D>
T1	2300156	⚠NPT-940DG, Power transformer <W>
T2	2300149	⚠NPT-938D, Power transformer <D>
T2	2300151	⚠NPT-938DG, Power transformer <W>
T3	231116	NCH-3159, Choke coil

REF NO.	PART NO.	DESCRIPTION
U1	17788506-1	NAMA-2806-1, Main and meter amplifier pc board ass'y
U2	17788510-1	NAOP-2810-1, Relay circuit pc board ass'y
U3	17788511-1	NAST-2811-1, Speaker terminal pc board ass'y
U4	17788512-1	NAPJ-2812-1, Input terminal pc board ass'y
U5	17788514-1	NAPL-2814-1, Meter lamp pc board ass'y
U6	17788516-1	NAPA-2816-1, Power amplifier pc board ass'y
U7	17788517-1	NACC-2817-1, Thermal detector pc board ass'y
U8	17788518-1	NADA-2818-1, Driver pc board ass'y
U9	17788519-1	NADA-2819-1, Driver pc board ass'y
U10	17788520-1	NARC-2820-1, Rectifier circuit pc board ass'y
U11	17788521-1	NAFU-2821-1, Fuse terminal pc board ass'y
	17780521-1B	NAFU-2821-1B, Fuse terminal pc board ass'y <W>
U12	17788523-1	NADIS-2823-1, Servo indicator pc board ass'y
U13	17788524-1	NADIS-2824-1, Power indicator pc board ass'y

28191531

NOTE: <D>:Only 120V model
<W>:Only Worldwide model

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

ADJUSTMENT PROCEDURES

1. Preparation

(1) Leave the unit in a normal condition parallel to the work bench, maintaining a clearance of 15mm from the bottom for air circulation.
(2) When making the adjustment, there must be no breeze blowing from the outside.

2. Zero adjustment of meter

(1) Turn power OFF.
(2) Make the adjustment with the zero adjustment screw on the meter to set the meter needle to zero.

Caution: Do not make the adjustment immediately after turning off the power.

3. Adjustment of idling current

(1) Turn ON the power switch, and leave the unit as if for about 5 minutes.
(2) Adjust the semi-fixed resistor R423 (R424) so that the voltage between the terminals V_{CT} and I_{ID} of the printed circuit board NAPA-2816 is 15mV.

4. Meter circuit offset adjustment

(1) Turn ON the power switch, and leave the unit as is for about 15 minutes.
(2) Adjust the semi-fixed resistor R645 (R646) of the printed circuit board NAMA-2806 so that the meter needle is at zero.

5. Meter circuit level adjustment

(1) Input the 1kHz signal from the CR oscillator so that the amplifier output is 40V.
(2) Adjust the semi-fixed resistor R613 (R614) of the printed circuit board NAMA-2806 so that the meter needle is at 0dB.

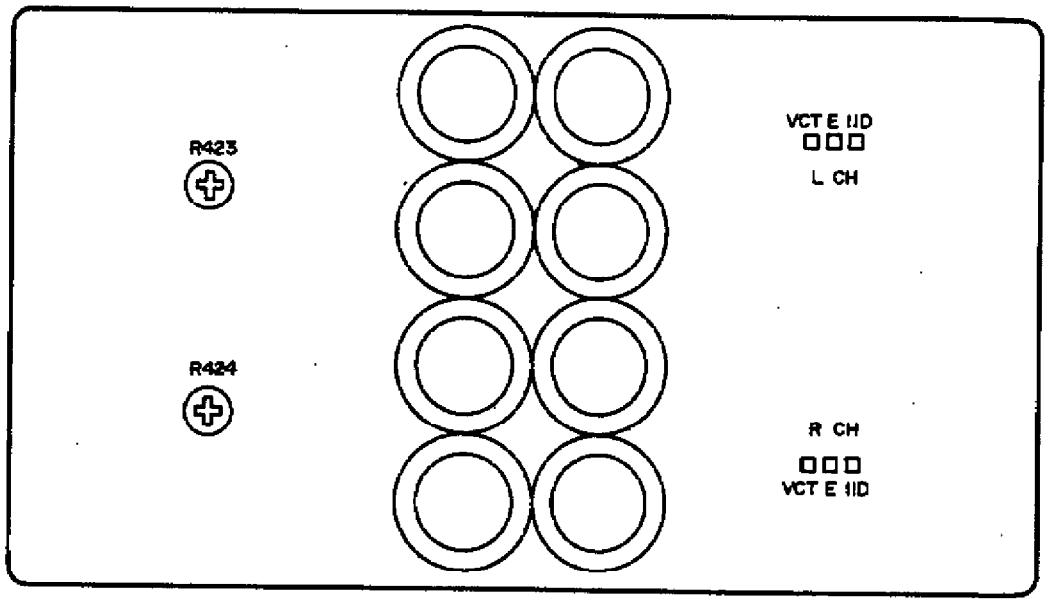
Caution: The adjustment must be made while inputting the signal to a each single channel of the L and R channels.

6. Check of direct current detection circuit of protection circuit

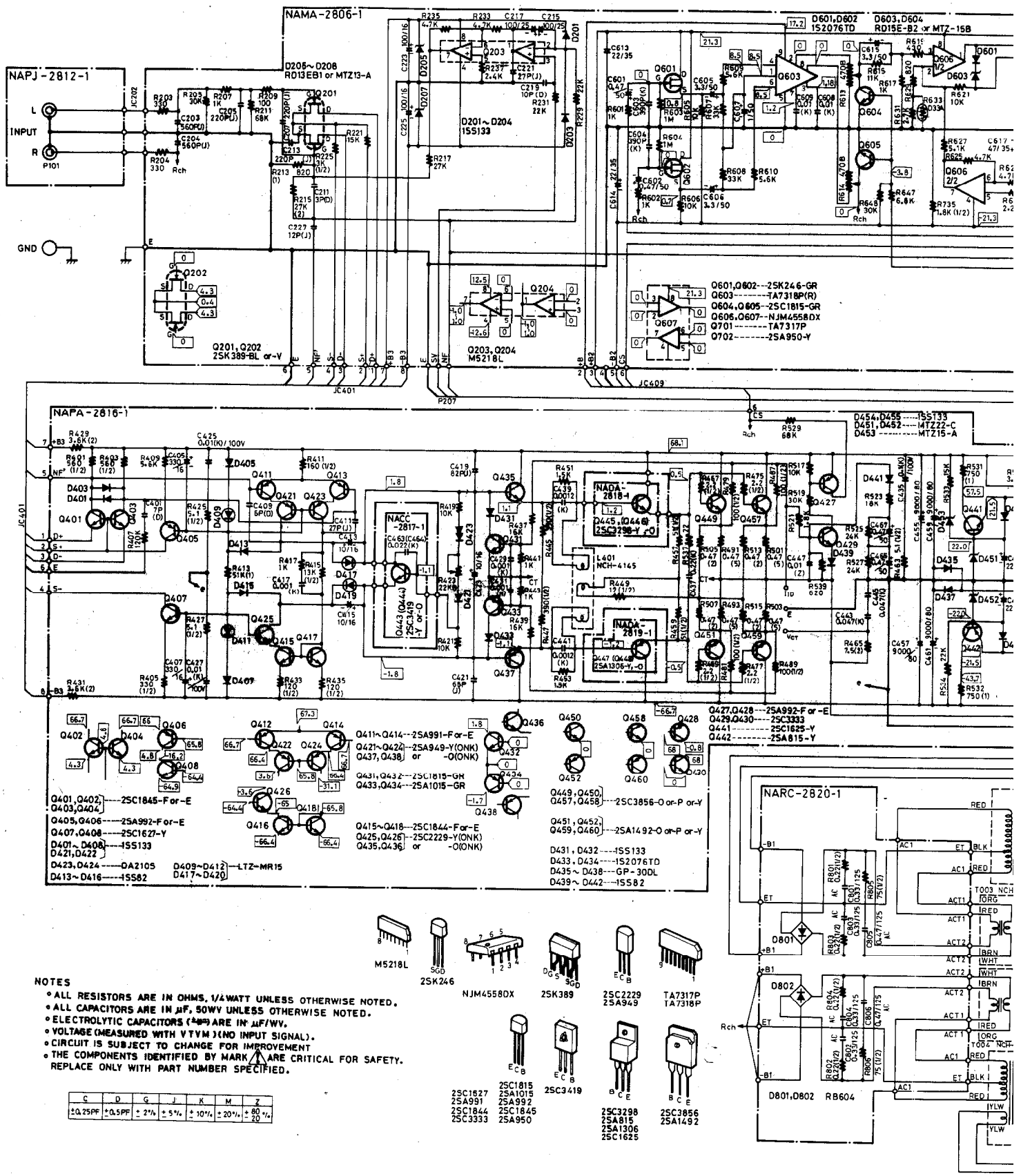
(1) With no load, when 1V DC is input, the speaker relay operates, the SERVO OPERATION LED goes out.
(2) Make the same check with −1V DC.

Caution: During this test, there should be absolutely no load connected and the speaker terminals must not be shorted.

Note: When the protection circuit operates due to an abnormality in the circuit, after several seconds, the protection circuit holds. Also, even after the cause of the abnormality is eliminated, the circuit is held as is. To cancel, turn the power OFF for several minutes.



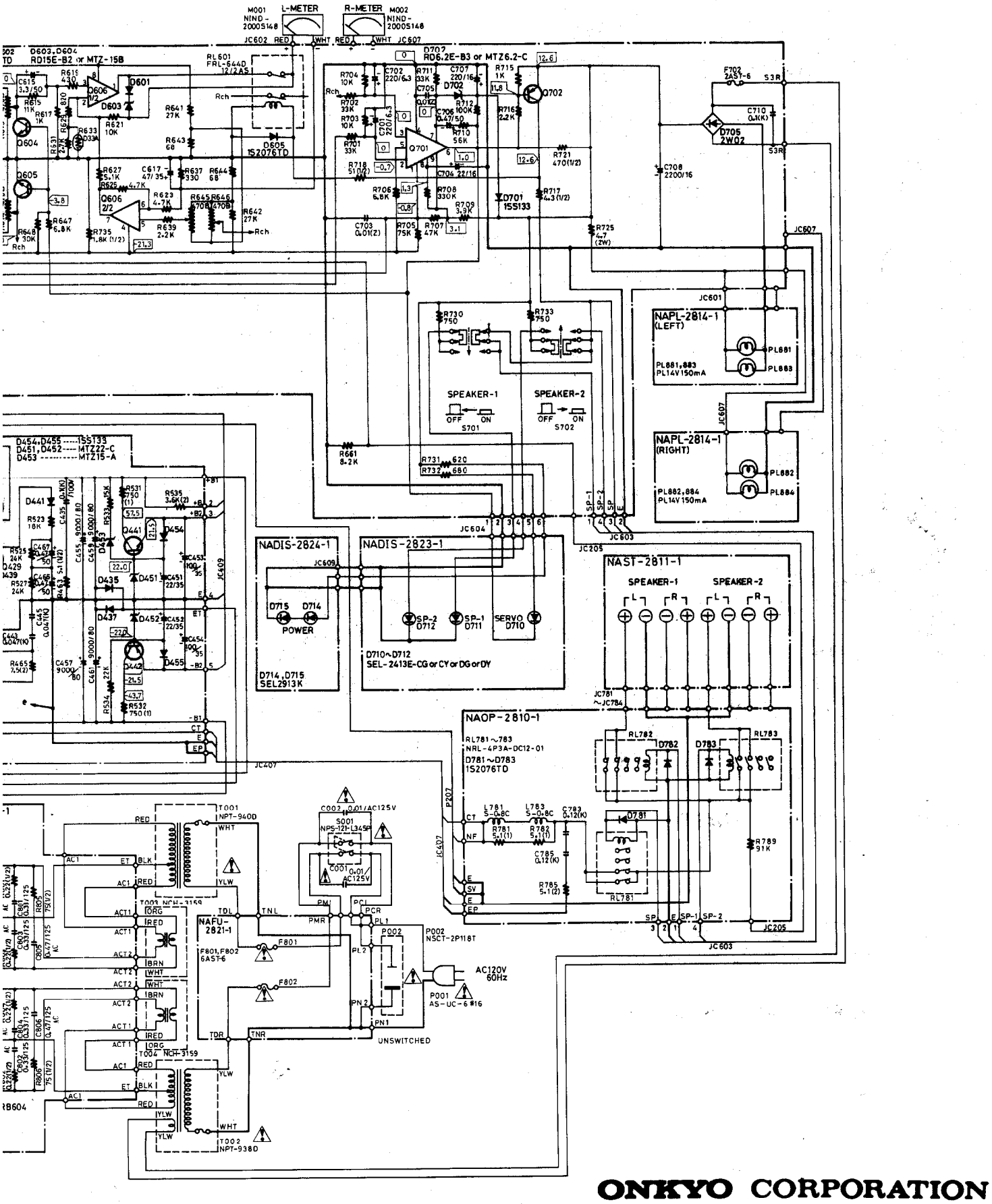
SCHEMATIC DIAGRAM (120V Model)



NOTES

- ALL RESISTORS ARE IN OHMS, 1/4WATT UNLESS OTHERWISE NOTED.
- ALL CAPACITORS ARE IN μF, 50WV UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (▲) ARE IN μF/WV.
- VOLTAGE (MEASURED WITH VTVM)(NO INPUT SIGNAL).
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT
- THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.

C	D	G	J	K	M	Z
±0.25PF	±0.5PF	± 2%	± 5%	± 10%	± 20%	+ 80 % - 20 %



ONKYO CORPORATION

PRINTED CIRCUIT BOARD-PARTS LIST

MAIN AND METER AMPLIFIER PC BOARD (NAMA-2806-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q201,Q202	2212806 or 2212807	2SK389(BL) or 2SK389(V)
Q601,Q602	2211945	2SK246(GR)
Q604,Q605	2211255	2SC1815(GR)
Q702	2211504	2SA950(Y)
	ICs	
Q203,Q204	222652	M5218L
Q603	222529	TA7318P(R)
Q606,Q607	222502	NJM4558DX
Q701	222584	TA7317P
	Diodes	
D201~D204	223163	1SS133
D205~D208	2239651 or 2243241	RD13E-B1 or MTZ13-A
D601,D602	223145	1S2076TD
D603,D604	2239672 or 2243252	RD15E-B2 or MTZ-15B
D605	223145	1S2076TD
D701	223163	1SS133
D702	2239493 or 2243163	RD6.2E-B3 or MTZ6.2-C
D705	223868	2W02
	Capacitors	
C203,C204	372125614	560pF, 50V, Styrene
C205~C208	372122214	220pF, 50V, Styrene
C215~C218	391251017	100 μF, 25V, Elect. (MUSE)
C223~C226	354741019	100 μF, 16V, Elect.
C601,C602	354784799	0.47μ, 50V, Elect.
C605,C606	354780339	3.3 μF, 50V, Elect.
C607	354780109	1 μF, 50V, Elect.
C608,C609	379121035	0.01μF, 50V, Film (DEW)
C613,C614	354762209	22μF, 35V, Elect.
C615,C616	354780339	3.3 μF, 50V, Elect.
C617,C618	354764709	47μF, 35V, Elect.
C701,C702	354722219	220 μF, 6.3V, Elect.
C704	354742209	22μF, 16V, Elect.
C706	354784799	0.47μF, 50V, Elect.
C707	354742219	220 μF, 16V, Elect.
C708	354742229	2200μF, 16V, Elect.
C710	379121045	0.1 μF, 50V, Film (DEW)
	Resistors	
R213,R214	441628214	820 Ω,1W, Metal oxide film
R215,R216	441722734	27 kΩ, 2W, Metal oxide film
R225,R226	442523024	3kΩ, 1/2W, Metal oxide film
R613,R614	5221023	N10HR470BEM, Semi-fixed
R633,R634	4000028	D33A, Thermistor
R645,R646	5221023	N10HR470BEM, Semi-fixed
R717	442520434	4.3 Ω, 1/2W, Metal oxide film
R718	442525104	51Ω, 1/2W, Metal oxide film
R721	442524714	470 Ω, 1/2W, Metal oxide film
R725	441720474	4.7 Ω, 2W, Metal oxide film
R735	442521824	1.8kΩ, 1/2W, Metal oxide film
	Switches	
S701,S702	25035544	NPS-222-L506
	Relay	
RL601	25065048	FRL-644D-12/2AS
	Fuse	
F702	252044	⚠2A(ST-6)
	Fuse holders	
F702a	250113	⚠S-N5051
	Sockets	
P202	2000553	NSAS-6P509
P207,P208	2000549	NSAS-8P505
P601,P607	25050282	NSCT-5P110
P602,P604	25050283	NSCT-6P111
P603	25050281	NSCT-4P109
P605,P606	25050285	NSCT-8P113
P703	2000550	NSAS-6P506.Socket ass'y

RELAY CIRCUIT PC BOARD (NAOP-2810-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D781~D783	223145	1S2076TD
	Coils	
L781~L784	231015	S-0.8C
	Capacitors	
C783~C786	379121245	0.12μF, 50V, Film (DEW)
	Resistors	
R781~R784	441620514	5.1 Ω, 1W, Metal oxide film
R785,R786	441720514	5.1 Ω, 2W, Metal oxide film
	Relaies	
RL781 ~RL783	25065036	NRL-4P3A-DC12-01
	Sockets	
P781,P782	25050273	NSCT-9P101
P784	25050268	NSCT-4P96

SPEAKER TERMINAL PC BOARD (NAST-2811-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Terminals	
P791,P792	25060109	NTM-4PDMN43,Speaker

INPUT TERMINAL PC BOARD (NAPJ-2812-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Terminal	
P101	25045071	NPJ-2PDBL35

METER LAMP PC BOARD (NAPL-2814-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Lamps	
PL881 ~PL884	210191A	PL14V150mA (Green)

POWER AMPLIFIER PC BOARD (NAPA-2816-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q401~Q404	2211732 or	2SC1845(F) or
	2211733	2SC1845(E)
Q405,Q406	2211792 or	2SA992(F) or
	2211793	2SA992(E)
Q407,Q408	2211414	2SC1627(Y)
Q411~Q414	2211782 or	2SA991(F) or
	2211783	2SA991(E)
Q415~Q418	2211902 or	2SC1844(F) or
	2211903	2SC1844(E)
Q421~Q424	2211359 or	2SA949-Y(ONK) or
	2211358	2SA949-O(ONK)
Q425,Q426	2211639 or	2SC2229-Y(ONK) or
	2211638	2SC2229-O(ONK)
Q427,Q428	2211792 or	2SA992(F) or
	2211793	2SA992(E)
Q429,Q430	2212560	2SC3333
Q431,Q432	2211255	2SC1815(GR)
Q433,Q434	2211455	2SA1015(GR)
Q435,Q436	2211639 or	2SC2229-Y(ONK) or
	2211638	2SC2229-O(ONK)
Q437,Q438	2211359 or	2SA949-Y(ONK) or
	2211358	2SA949-O(ONK)
Q441	2200394	2SC1625(Y)
Q442	2200404	2SA815(Y)
Q449,Q450	2201653,	2SC3856(O),
Q457,Q458	2201655 or	2SC3856(P) or
	2201654	2SC3856(Y)
Q451,Q452	2201663,	2SA1492(O),
Q459,Q460	2201665 or	2SA1492(P) or
	2201664	2SA1492(Y)
	Diodes	
D401~D408	223163	1SS133
D409~D412	225218	LTZ-MR15, LED
D413~D416	223162	1SS82
D417~D420	225218	LTZ-MR15, LED
D421,D422	223163	1SS133
D423,D424	223168	DA210S
D431,D432	223163	1SS133
D433,D434	223145	1S2076TD
D435~D438	223863	GP-30DL
D439~D442	223162	1SS82
D451,D452	2243293	MTZ22-C
D453	2243251	MTZ15-A
D454,D455	223163	1SS133
	Coils	
L401,L402	231098A	NCH-4145
	Capacitors	
C405~C408	354723319	330 μF, 6.3V, Elect.
C413~C416	391241007	10μF, 16V, Elect. (MUSE)
C417,C418	379121025	0.001 μF, 50V, Film (DEW)
C423,C424	391241007	10μF, 16V, Elect. (MUSE)
C425~C428	379131035	0.01μF, 100V, Film (DEW)
C435,C436	379131045	0.1 μF, 100V, Film (DEW)
C437,C438	379122245	0.22μF, 50V, Film (DEW)
C443~C446	379124735	0.047 μF, 50V, Film (DEW)
C451,C452	354762209	22μF, 35V, Elect.
C453,C454	354761019	100 μF, 35V, Elect.
C455~C462	3504219	9000μF, 80V, Elect.
C465~C468	354784799	0.47μF, 50V, Elect.
	Resistors	
R401~R404	442525614	560 Ω, 1/2W, Metal oxide film
R405,R406	442523314	330 Ω, 1/2W, Metal oxide film
R411,R412	442521614	160 Ω, 1/2W, Metal oxide film
R413,R414	441625134	51 kΩ, 1W, Metal oxide film
R415,R416	442521334	13 kΩ, 1/2W, Metal oxide film
R423,R424	5225076	N10HR22KBDM, Semi-fixed
R425~R428	442520514	5.1 Ω, 1/2W, Metal oxide film
R429~R432	441723624	3.6kΩ, 2W, Metal oxide film
R433~R436	442521214	120 Ω, 1/2W, Metal oxide film
R445~R448	442523914	390 Ω, 1/2W, Metal oxide film
R449,R450	442521204	12Ω, 1/2W, Metal oxide film
R457~R460	442525104	51Ω, 1/2W, Metal oxide film
R463,R464	442520514	5.1 Ω, 1/2W, Metal oxide film
R465,R466	441720754	7.5 Ω, 2W, Metal oxide film
R467~R470	442520224	2.2 Ω, 1/2W, Metal oxide film
R475~R478	442520224	2.2 Ω, 1/2W, Metal oxide film
R479~R482	442521014	100 Ω, 1/2W, Metal oxide film
R487~R490	442521014	100 Ω, 1/2W, Metal oxide film
R491~R494	4000080	0.47Ω, 5W, Metal plate
R501~R504	4000080	0.47Ω, 5W, Metal plate
R505~R508	4000063	0.47Ω, 2W, Metal plate
R513~R516	4000063	0.47Ω, 2W, Metal plate
R531,R532	441627514	750 Ω, 1W, Metal oxide film
R535	441723624	3.6kΩ, 2W, Metal oxide film
	Sockets	
JC403,JC404	25050267	NSCT-3P95
JC405,JC406,JC409	25050270	NSCT-6P98
	Bracket	
	27130430	Bracket (KE)
	Buss	
	27300826	Buss(S)
	27300827	Buss(C)

THERMAL DETECTOR PC BOARD (NACC-2817-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistor	
Q403(Q444)	2212864 or	2SC3419(Y) or
	2212863	2SC3419(O)
	Capacitor	
C463(C464)	379122235	0.022 μF, 50V, Film (DEW)

DRIVER PC BOARD (NADA-2818-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistor	
Q445(Q446)	2201644 or	2SC3298(Y) or
	2201643	2SC3298(O)

DRIVER PC BOARD (NADA-2819-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistor	
Q447(Q448)	2201634 or	2SA1306(Y) or
	2201633	2SA1306(O)

RECTIFIER CIRCUIT PC BOARD (NARC-2820-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D801,D802	22380008	RB604
	Capacitors	
C801~C804	375103345	0.33μF, 125V, Film (ME)
C805,C806	375104745	0.47μF, 125V, Film (ME)
	Resistors	
R801~R804	442522294	0.22Ω, 1/2W, Metal oxide film
R805,R806	442527504	75Ω, 1/2W, Metal oxide film

FUSE TERMINAL PC BOARD (NAFU-2821-1/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Fuseholders	
F801a,F802a	250113	⚠S-N5051
F803a,F804a	25050065	⚠YSH403T <W>
	Terminals	
P801,P802	25060092	NTM-1S33
	Fuses	
F801,F802	252051	⚠6A(ST-6)
F803,F804	252076	⚠3.15A-SE-EAK <W>

SERVO INDICATOR PC BOARD(NADIS-2823-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	LEDs	
D710~D712	225137CG, 225137CY, 225137DG or 225137DY	SEL-2413E-CG, SEL-2413E-CY, SEL-2413E-DG or SEL-2413E-DY
	Holder	
	27190495	Speaker

POWER INDICATOR PC BOARD(NADIS-2824-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
D714,D715	225142	SEL2913K,LED
	27190454	Holder

NOTE: <W>:Only Worldwide model

ONKYO CORPORATION
International Division: No 24 Mori Bldg., 23-5, 3-chome, Nishi-Shinbashi, Minato-ku, Tokyo, Japan
Telex: 2423551 ONKYO J. Phone: 03-432-6981
ONKYO U.S.A. CORPORATION
200 Williams Drive, Ramsey, N.J. 07446 Tel. 201-825-7950

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