

DENON

Hi-Fi Component Amplifier

SERVICE MANUAL MODEL PMA-510

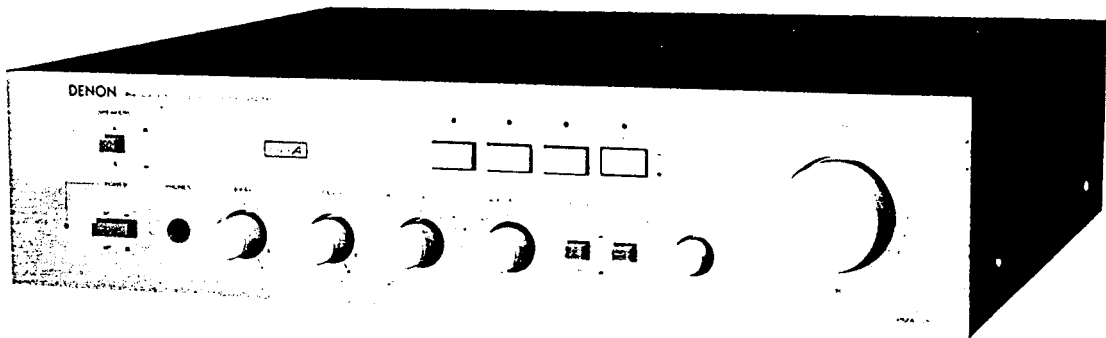


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NIPPON COLUMBIA CO., LTD.

SPECIFICATIONS

POWER AMPLIFIER SECTION

Circuit Type:	All stage direct DC servo circuit
Music Power:	55 W + 55 W (8 ohm Load 1 kHz) 90 W + 90 W (4 ohm Load 1 kHz)
Rated Output Power:	Both channel drive 20 Hz to 20 kHz 50 W + 50 W 1 kHz 50 W + 50 W (8 ohm Load THD 0.003%) 1 kHz 40 W + 40 W (4 ohm Load IEC) (Subject to change by temperature test)
Total Harmonic Wave:	0.009% (20 Hz — 20 kHz at —3 dB rated output)
Intermodulation Distortion:	Below 7 kHz/60 Hz : 1/4 0.004% (at amplitude output equivalent to 25 W)
Output Band Width:	5 Hz — 80 kHz (IHF. T.H.D 0.1%)
Transmission Characteristics:	4 Hz — 150 kHz $\begin{matrix} +0 \text{ dB} \\ -3 \text{ dB} \end{matrix}$ (at 1 W output)
Input Sensitivity:	150 mV
Input Impedance:	40 k ohm
Output Impedance:	0.13 ohm (1 kHz)
Output Terminals:	Speaker: load 4 — 16 ohm Headphone/Stereo headphone

EQUALIZER AMPLIFIER SECTION

Equalizer Amplifier Output: (REC OUT Terminal):	Maximum Output: 10 V (at 50 k ohm load) Rated Output: 150 mV Total harmonic wave distortion: be- low 0.002% (at 1 kHz, 6 V output)
Input Sensitivity/Input Impedance:	PHONO MM 2.5 mV 50 k ohm MC 0.25 mV 100 ohm TUNER 150 mV 40 k ohm AUX TAPE 150 mV 40 k ohm
Minimum Allowable Input:	PHONO MM 160 mV (1 kHz) MC 16 mV (1 kHz)

RIAA Deviation:

PHONO MM	within ± 0.3 dB (20 Hz — 100 kHz)
MC	within ± 0.3 dB (30 Hz — 100 kHz)

OVERALL CHARACTERISTICS

SN Ratio (IHFA Network):	PHONO MM 86 dB (input termi- nals short-circuited)
	MC 67 dB (input termi- nals short-circuited)
TUNER TAPE AUX	104 dB (input termi- nals short-circuited)

Tone Control Adjustable

Range:

BASS	100 Hz ± 8 dB
TREBLE	10 kHz ± 8 dB

Filtering Characteristics:

SUBSONIC 20 Hz, 6 dB/oct

Loudness Characteristics:

Low frequency 100 Hz + 7.5 dB
High frequency 10 kHz + 5.5 dB

OTHERS:

AC Outlet:

not included in systems for European
useSWITCHED x 2, 100 W (Total)
UNSWITCHED x 1, 250 W

Power Source:

Germany and France: AC 220 V,
50 Hz

U.K.: AC 240 V, 50 Hz

U.S.A.: AC 120 V, 60 Hz

Hong Kong: AC 200 V, 50 Hz

Power Consumption:

UL: 130 W

IEC: 395 W at maximum output

Dimensions:

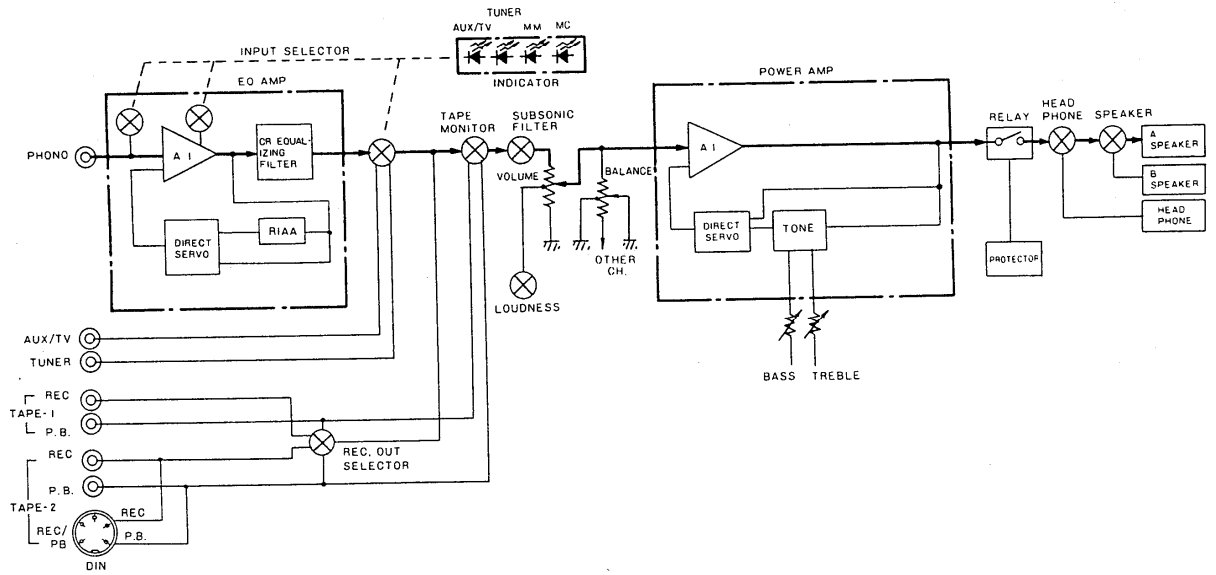
434(W) x 112 (H) x 390 (D) mm
(including rubber feet, control knobs,
and terminals)

Weight:

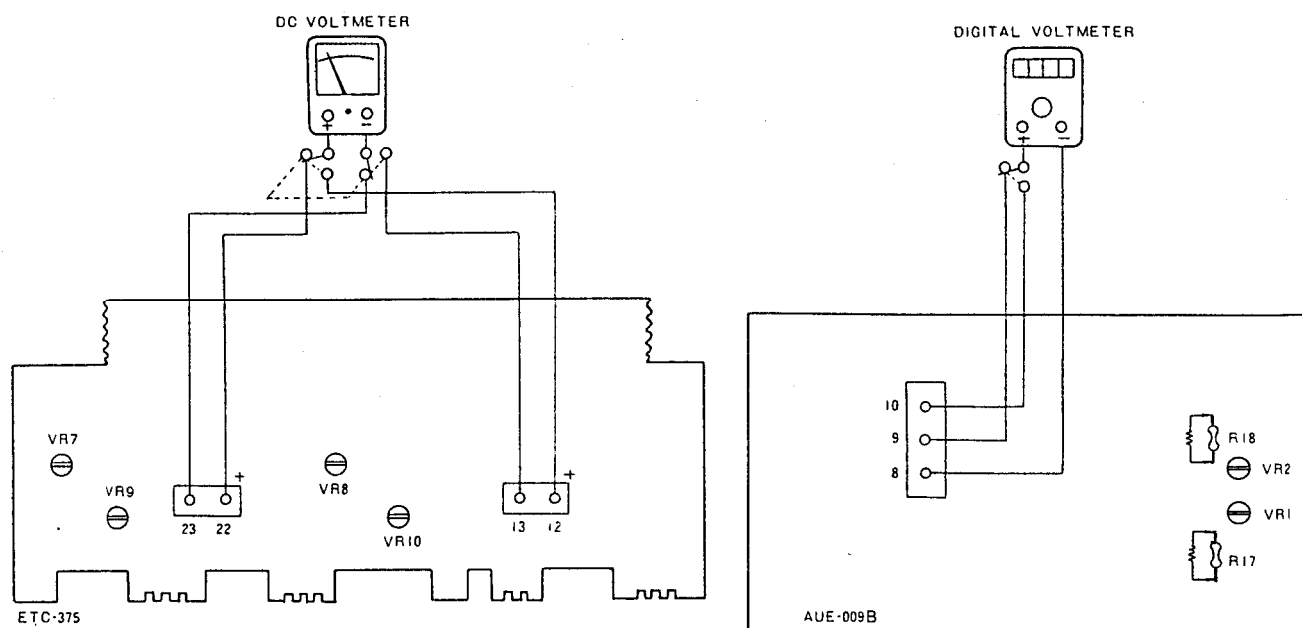
9.2 kg

Design and specifications are subject to change without prior notice.

NOTE: The following codes correspond to the appropriate models.
E2 for Europe, EG for Germany, EF for France, EA for Australia, EK for U.K., EC for Canada, E3 for U.S.A.



METHOD OF ADJUSTMENT



IDLE CURRENT ADJUSTMENT METHOD OF TONE & POWER AMP (ETC-375 PRINTED BOARD)

- Place the unit in normal position, not sideways or tilted. Avoid too much ventilation, since the adjustment must be done where temperature is between 15°C and 30°C.
- Set the switches on the unit as follows:

Power	→ OFF
Volume	→ $-\infty$ dB
Speaker terminals	→ No load (no speaker connected)
- Remove the top cover, and the VR7,8,9 and 10 of the tone & power amp printed board (2220609001) fully counter clockwise.
Connect a DC voltmeter to the test points 12(+), 13(-) or to 22(+), 23(-).
- Plug in the AC cord to power outlet of: Europe 220 V (198~231 V); U.K. and Australia 240 V (216~252 V); Canada and U.S.A. 120 V (180~126 V); and turn the power on.
Immediately (within one minute), turn VR7 and VR8 clockwise and adjust the test point voltage (VTP) to 6 ± 1 mV preliminarily.
- After about two or three minutes of the above preliminary adjustment, adjust VR7 and VR8 so as VTP reads 6 ± 1 mV.
- Adjust VR9 and VR10 so as VTP reads 15 ± 2 mV preliminarily.
- About 4 minutes after the above preliminary adjustment, adjust VR9 and VR10 so as VTP reads 23 ± 2 mV.

ADJUSTMENT OF EQUALIZER (AUE-009B PRINTED BOARD)

- Insert short pins into PHONO input terminals.
- Connect a digital voltmeter (0.01 mV ~ 1 mV DC range must be measurable) into each of REC. out terminals (L & R channels).
- For easier measuring to avoid value fluctuation on the meter, connect a 100 k ohm (1/4W) resistor between the ends of the R17/18 10 M ohms (1/4W) resistor on the printed board.
- Set the FUNCTION switch to "MM" position, and turn the main volume to MIN.

ADJUSTMENT

1. Turn POWER on, and after two minutes warming-up conduct the following adjustments.
2. Adjust VR1 (100 ohms semi-solid volume), so as the L-channel digital voltmeter reads 0.5 mV DC or less.
3. Adjust VR2 (100 ohms semi-solid volume), so as the R-channel digital voltmeter reads 0.5 mV DC or less.

NOTES ON SERVICING REMOTE SWITCH

A. How to remove control wire (TAPE MONITOR, REC OUT SELECTOR). (See Fig. 1)

- (1) Do not handle Adapter pins (2) forcibly.
- (2) Do not pull the wire to detach adapter.
- (3) Procedure to remove.
 - (a) Insert a small sized screwdriver for adjustment into the space between the adapter and the switch (Fig. 1), move the driver up and down slightly, and detach the adapter which is moved upward.
 - (b) If no small sized screwdriver is available, move the adapter upward and detach it.
- (4) Do not apply implement forcibly or the leg may break off.

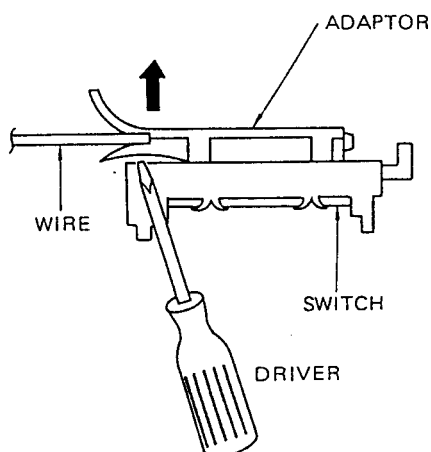


Fig. 1

B. HOW TO INSTALL CONTROL WIRE (See Fig. 2)

- (1) Turn rotary control shaft on front panel side fully counterclockwise.
- (2) Hold adapter on switch side, and move it to switch frame rear.
- (3) Slide the switch in the direction of the control wire with a thin implement.
- (4) Insert the adapter protrusions into the holes on the switch side. Then insert the adapter rods into the specified holes and simultaneously insert the stoppers into the stopper holes until they clocks.
- (5) Turn the control to check.

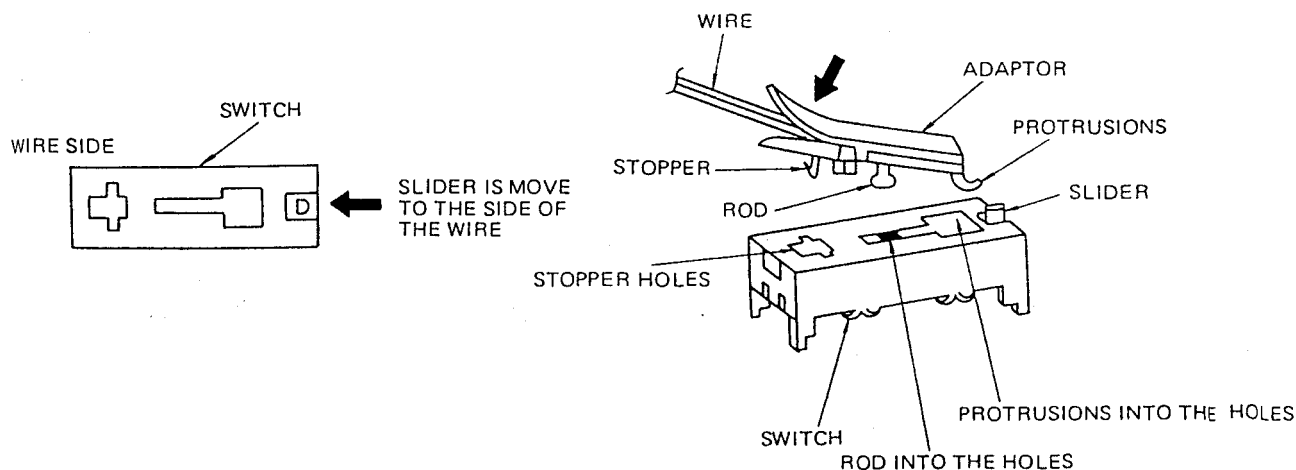
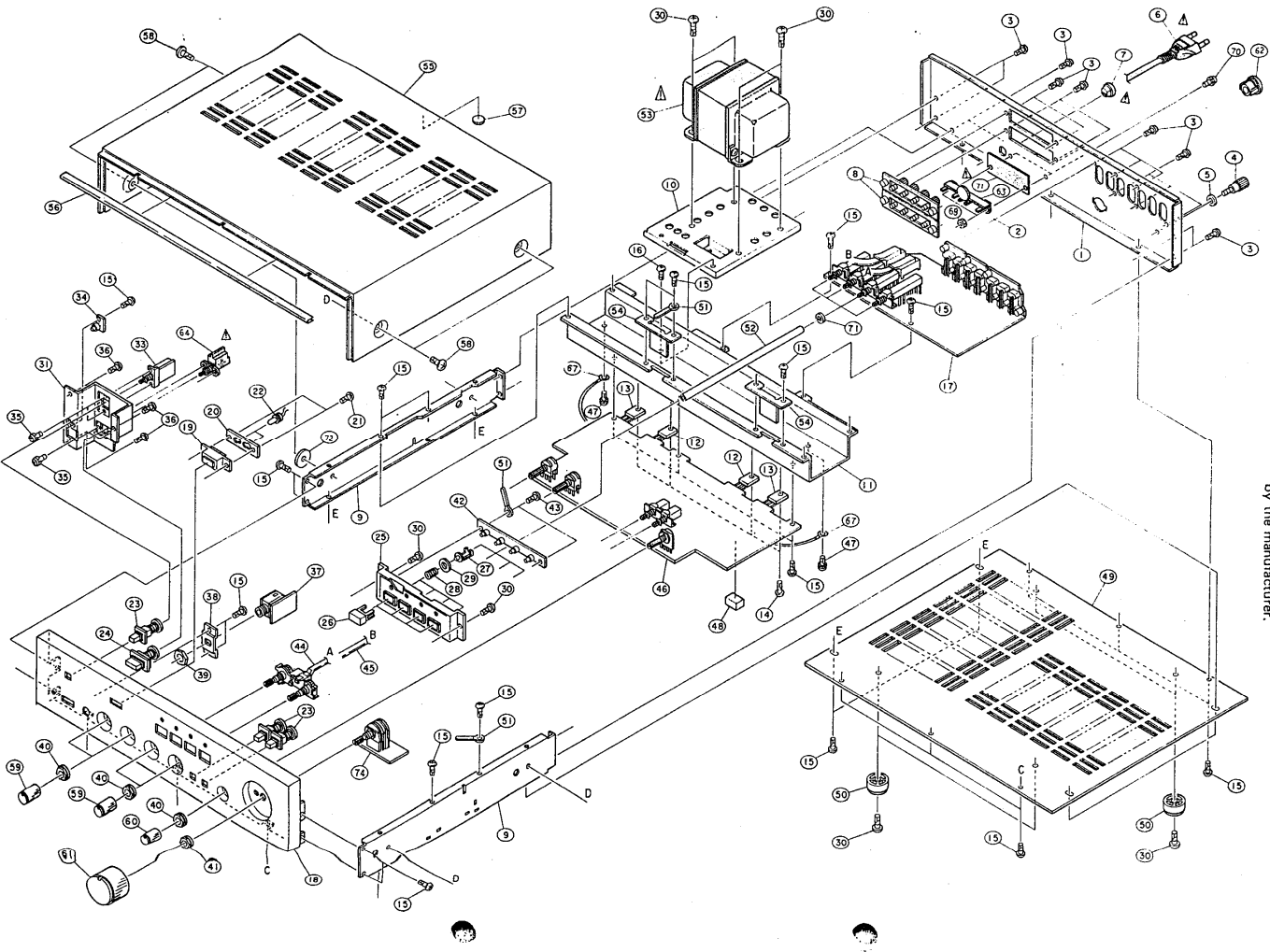


Fig. 2

EXPLODED VIEW OF CHASSIS AND CABINET



▲ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacturer.

EXPLODED VIEW PARTS LIST

⚠ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacturer.

Note: See addendum list below for the parts with asterisk(*) on the Ref. No. and the other parts not included in this list.

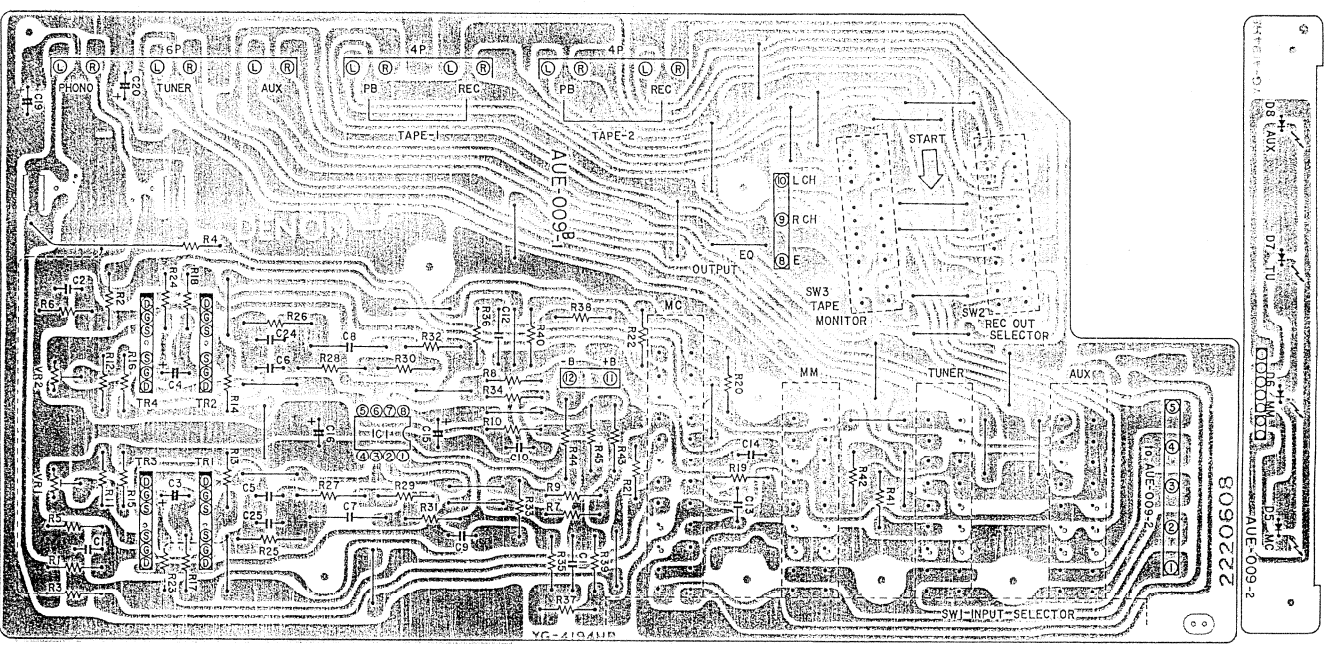
Ref. No.	Part No.	Part Name & Descriptions	Ref. No.	Part No.	Part Name & Descriptions
1	1050342005	BACK PANEL	37	ETC-0375-3	HEADPHONE JACK UNIT
2	—	—	38	4120484007	HEADPHONE BRACKET
3	4770064107	FIXING SCREW	39	—	NUT 12 mm (FOR HEADPHONE)
4	2050071016	EARTH TERMINAL	40	4770181006	SPECIAL NUT φ7
5	4770018001	WASHER	41	4770181019	SPECIAL NUT φ8 (FOR MAIN VOLUME)
⚠*6	2062002031	AC CORD	42	AUE-009B-2	INPUT LED UNIT
⚠*7	4450020005	CORD BUSH	43	4730304014	TAPPING SCREW (1) 3x8
8	2050061110	4P ANT. TERMINAL	44	2120169007	ROTARY REMOTE (A) (3 POSITION)
9	4110216502	SIDE CHASSIS	45	2120170009	ROTARY REMOTE (B) (4 POSITION)
10	4110246006	TRANS CHASSIS	46	ETC-0375-1	TONE CONTROL & POWER AMP UNIT
11	4170122102	POWER RADIATOR	47	4700026018	TAPPING SCREW (2) WITH T. WASHER 3x8
12	2710132020	TRANSISTOR 2SA1103(O)/(Y)	48	4610121016	CUSHION
13	2730234021	TRANSISTOR 2SC2578(O)/(Y)	49	1050325006	BOTTOM COVER
14	4700012022	CROSS PAN SCREW WITHS. WASHER 3x12	50	1048001002	FOOT
15	4730354019	TAPPING SCREW (2) 3x8	51	EP-4772	CORD HOLDER
16	4730355018	TAPPING SCREW (2) 3x10	52	4430241105	CONNECTING SHAFT
17	AUE-009B-1	EQ. AMP UNIT	⚠*53	2335240009	POWER TRANS
18	2662PA005	FRONT PANEL SUB ASS.	54	4120690008	TRANSISTOR HOLD BRACKET
19	1430163008	LENS	55	1020099003	TOP COVER
20	4120705008	LAMP BRACKET	56	1220007057	SPACER
21	4730456014	TAPPING SCREW (2) 4x12	57	1040034006	STOPPER
22	3930048003	PILOT LAMP (PL1,2)	58	4734801005	TAPPING SCREW TRUS (2) 4x8
23	1130196003	PUSH KNOB ASS. (FOR SP. LOUDNESS, SUBSONIC)	59	1120321008	KNOB ASS. (A) (FOR MONITOR' REC OUT, TONE)
24	1130196016	PUSH KNOB ASS. (FOR POWER SWITCH)	60	1120320009	KNOB ASS. (B) (FOR BALANCE)
25	1140047003	PANEL BUSH (A) (FOR INPUT SELECT)	61	1120265119	KNOB (FOR MAIN VOLUME)
26	1130171219	PUSH KNOB ASS.	62	2038084009	5P. CONNECTOR (DIN)
27	1190021008	STOPPER	⚠63	2050089008	7P. W. TERMINAL
28	4630220007	SPRING	⚠64	2124154021	POWER SWITCH
29	1250009009	WASHER	65	2020013004	FUSE HOLDER
30	4730455015	TAPPING SCREW (2) 4x10	⚠66	2061015032	FUSE (2.5A)
31	4120617405	PANEL BRACKET	67	2030184004	EARTH WIRE
32	AUE-009B-3	POWER SWITCH UNIT	68	5130159169	FUSE LABEL
33	ETC-0357-5	SPEAKER SWITCH UNIT	69	4756006008	3 NUT
34	ETC-0357-4	POWER LED UNIT	70	4700042005	CROSS PAN SCREW 3x8 BLACK
35	4700009006	CROSS PAN SCREW WITH S. WASHER 3x6	⚠71	4150088004	INSULATING SHEET
36	4730454016	TAPPING SCREW (2) 4x8	72	1250008110	WASHER
			73	2538003014	CERAMIC CAP 0.0047μF 400V
			74	ETC-0375-2	VOLUME UNIT

ADDENDUM LIST

Ref. No.	Part Name & Descriptions	EK For U.K.	EF For France
⚠*6	AC CORD	2062020000	2062002031
⚠*7	CORD BUSH	MD-2982H	4450020005
⚠53	POWER TRANS	2335245004	2335240009
—	VOLTAGE LABEL	5130362008	—
—	BLIND SHEET	5130348006	—
—	EARTH LABEL	5130140000	—
—	3mm TOOTH WASHER	4753001051	—
—	4mm TOOTH WASHER	4753100004	—
—	CAUTION SHEET	5130364006	—

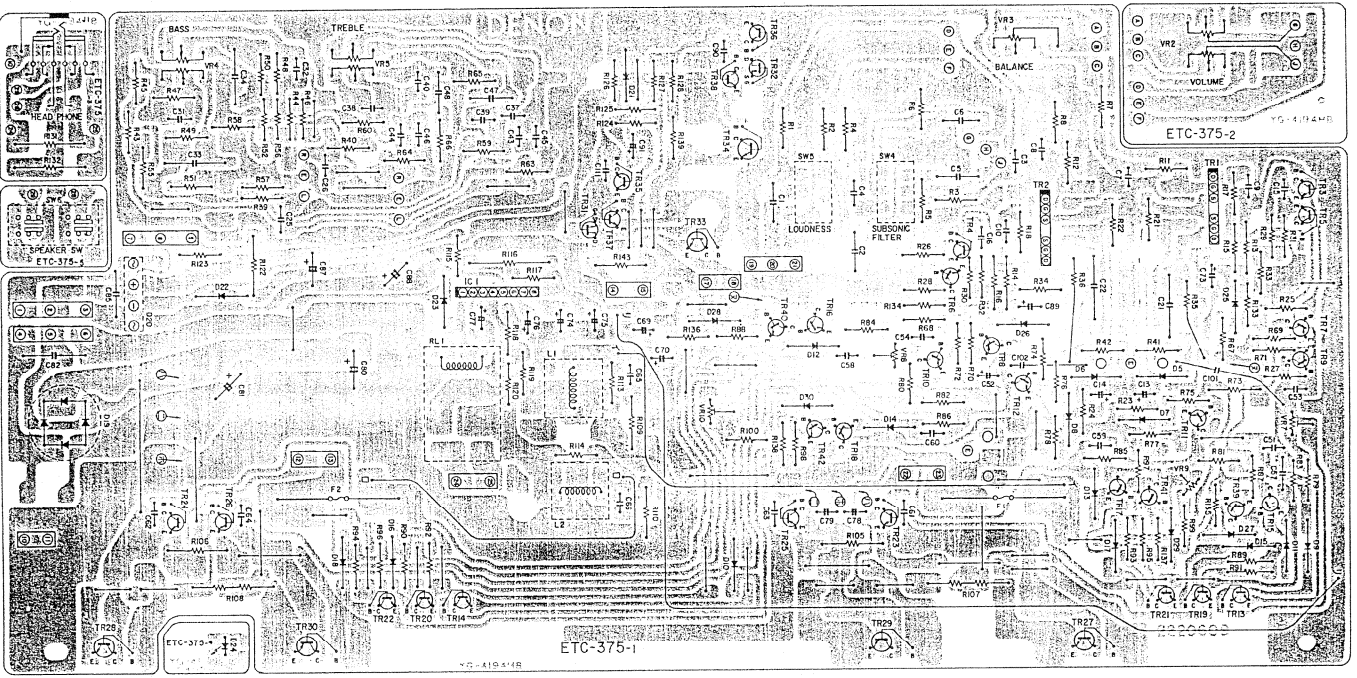
PRINTED CIRCUIT BOARD PATTERNS AND PARTS LIST

AUE-0098 (For E2, EG, EK)



AUE-009B EQ AMP UNIT

Ref. No.	Part No.	Part Name & Descriptions	Ref. No.	Part No.	Part Name & Descriptions
SEMICONDUCTORS			R44	2442013035	910 ohm ±5% 1W FIXED METAL OXIDE FILM
IC01	2650030004	NJM4558D-D INTEGRATED CIRCUIT	R45	2410188002	1.3 k ohm ±5% ½W FIXED CARBON FILM
TR01	2750024017	μPA68H (L) TRANSISTOR	CAPACITORS		
TR02	2750024017	μPA68H (L) TRANSISTOR	C01	2534438900	120pF ±5% 50V FIXED CERAMIC
TR03	2750024017	μPA68H (L) TRANSISTOR	C02	2534438900	120pF ±5% 50V FIXED CERAMIC
TR04	2750024017	μPA68H (L) TRANSISTOR	C03	2541002002	6.8μF ±10% 6.3V FIXED PLASTIC FILM
D05	3939040002	TLG206 LIGHT EMITTING DIODE	C04	2541002002	6.8μF ±10% 6.3V FIXED PLASTIC FILM
D06	3939040002	TLG206 LIGHT EMITTING DIODE	C05	2551214903	0.015μF ±5% 50V FIXED PLASTIC FILM
D07	3939040002	TLG206 LIGHT EMITTING DIODE	C06	2551214903	0.015μF ±5% 50V FIXED PLASTIC FILM
D08	3939040002	TLG206 LIGHT EMITTING DIODE	C07	2554081023	0.056μF ±5% 100V FIXED PLASTIC FILM
RESISTORS			C08	2554081023	0.056μF ±5% 100V FIXED PLASTIC FILM
R01	2412179909	10 ohm ±5% ¼W FIXED CARBON FILM	C09	2534454900	560pF ±5% 50V FIXED CERAMIC
R02	2412179909	10 ohm ±5% ¼W FIXED CARBON FILM	C10	2534454900	560pF ±5% 50V FIXED CERAMIC
R03	2412203901	100 ohm ±5% ¼W FIXED CARBON FILM	C11	2551120055	0.0027μF ±5% 50V FIXED PLASTIC FILM
R04	2412068007	100 ohm ±5% ¼W FIXED CARBON FILM	C12	2551120055	0.0027μF ±5% 50V FIXED PLASTIC FILM
R05	2412268904	51 k ohm ±5% ¼W FIXED CARBON FILM	C13	2551120055	0.0027μF ±5% 50V FIXED PLASTIC FILM
R06	2412268904	51 k ohm ±5% ¼W FIXED CARBON FILM	C14	2551120055	0.0027μF ±5% 50V FIXED PLASTIC FILM
R07	2412246900	6.2 k ohm ±5% ¼W FIXED CARBON FILM	C15	2544113901	4.7μF 35V FIXED ELECTROLYTIC
R08	2412246900	6.2 k ohm ±5% ¼W FIXED CARBON FILM	C16	2544030000	330μF 25V FIXED ELECTROLYTIC
R09	2412246900	6.2 k ohm ±5% ¼W FIXED CARBON FILM	C19	2544118906	0.47μF 50V FIXED ELECTROLYTIC
R10	2412246900	6.2 k ohm ±5% ¼W FIXED CARBON FILM	C20	2544118906	0.47μF 50V FIXED ELECTROLYTIC
R11	2412187904	22 ohm ±5% ¼W FIXED CARBON FILM	C24	2534454900	560pF ±5% 50V FIXED CERAMIC
R12	2412187904	22 ohm ±5% ¼W FIXED CARBON FILM	C25	2534454900	560pF ±5% 50V FIXED CERAMIC
R13	2412239904	3.3 k ohm ±5% ¼W FIXED CARBON FILM	OTHER PARTS		
R14	2412239904	3.3 k ohm ±5% ¼W FIXED CARBON FILM		2220608002	P.W. BOARD
R15	2412239904	3.3 k ohm ±5% ¼W FIXED CARBON FILM		2090042908	JUMPER WIRE USED 15
R16	2412239904	3.3 k ohm ±5% ¼W FIXED CARBON FILM		2090008120	JUMPER (SHORTLEAD) P=10mm USED 14
R17	2420203003	10 M ohm ±10% ¼W FIXED CARBON COMPOSIT		2090008117	JUMPER (SHORTLEAD) P=12.5mm USED 5
R18	2420203003	10 M ohm ±10% ¼W FIXED CARBON COMPOSIT	SW01	2124219005	4P. PUSH SWITCH
R19	2412293908	560 k ohm ±5% ¼W FIXED CARBON FILM	SW02	2124222005	SLIDE SWITCH (4 CIRCUIT, 4 POSITION)
R20	2412293908	560 k ohm ±5% ¼W FIXED CARBON FILM	SW03	2124222005	SLIDE SWITCH (4 CIRCUIT, 4 POSITION)
R21	2412180901	11 ohm ±5% ¼W FIXED CARBON FILM	VR01	EP-5462H1	SOLID VOLUME 100 ohm
R22	2412180901	11 ohm ±5% ¼W FIXED CARBON FILM	VR02	EP-5462H1	SOLID VOLUME 100 ohm
R23	2412068007	100 ohm ±5% ¼W FIXED CARBON FILM		2050087026	2P. TERMINAL P=7.5 mm USED 1
R24	2412203901	100 ohm ±5% ¼W FIXED CARBON FILM		2050087039	3P. TERMINAL P=7.5 mm USED 1
R25	2412032046	4.7 k ohm ±2% ¼W FIXED CARBON FILM		2050087055	5P. TERMINAL P=7.5 mm USED 1
R26	2412032046	4.7 k ohm ±2% ¼W FIXED CARBON FILM		2048021007	4P. CONNECTOR BASE FOR INPUT TAPE
R27	2412018044	56 k ohm ±2% ¼W FIXED CARBON FILM		2040061007	6P. CONNECTOR BASE FOR INPUT PHONE
R28	2412018044	56 k ohm ±2% ¼W FIXED CARBON FILM			
R29	2412215902	330 ohm ±5% ¼W FIXED CARBON FILM			
R30	2412215902	330 ohm ±5% ¼W FIXED CARBON FILM			
R31	2412186905	20 ohm ±5% ¼W FIXED CARBON FILM			
R32	2412186905	20 ohm ±5% ¼W FIXED CARBON FILM			
R33	2412213904	270 ohm ±5% ¼W FIXED CARBON FILM			
R34	2412213904	270 ohm ±5% ¼W FIXED CARBON FILM			
R35	2412210907	200 ohm ±5% ¼W FIXED CARBON FILM			
R36	2412210907	200 ohm ±5% ¼W FIXED CARBON FILM			
R37	2412210907	200 ohm ±5% ¼W FIXED CARBON FILM			
R38	2412210907	200 ohm ±5% ¼W FIXED CARBON FILM			
R39	2412275900	100 k ohm ±5% ¼W FIXED CARBON FILM			
R40	2412275900	100 k ohm ±5% ¼W FIXED CARBON FILM			
R41	2412203901	100 ohm ±5% ¼W FIXED CARBON FILM			
R42	2412203901	100 ohm ±5% ¼W FIXED CARBON FILM			
R43	2410188002	1.3 k ohm ±5% ¼W FIXED CARBON FILM			



ETC-375 PARTS LIST

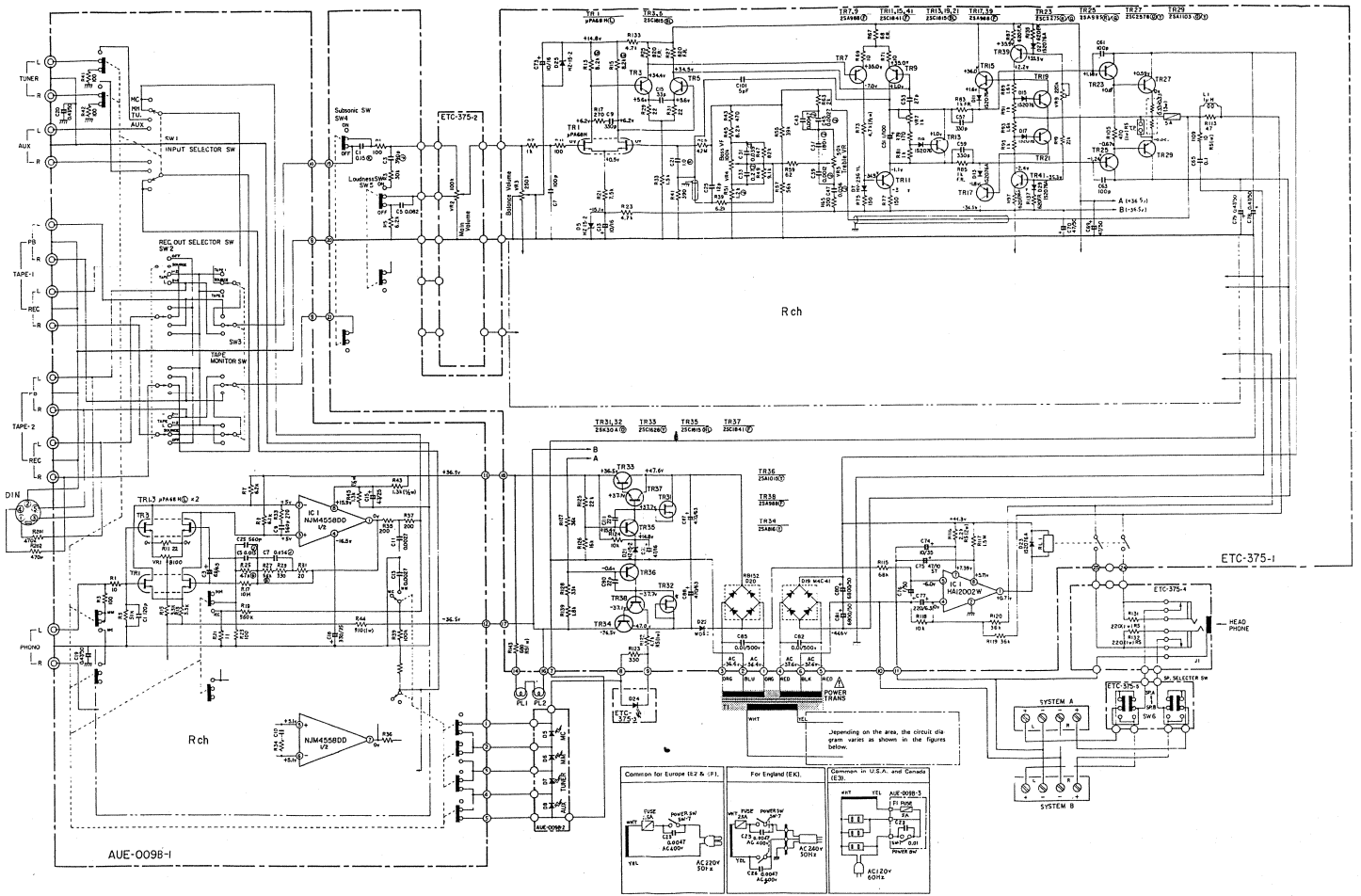
Ref. No.	Part No.	Part Name & Descriptions		Ref. No.	Part No.	Part Name & Descriptions	
SEMICONDUCTORS							
IC01	2630102004	HA12002W	INTEGRATED CIRCUIT	R17	2412213904	270 ohm ±5% ¼W	FIXED CARBON FILM
TR01	2750018010	μPA68H (L)	TRANSISTOR	R18	2412213904	270 ohm ±5% ¼W	FIXED CARBON FILM
TR02	2750018010	μPA68H (L)	TRANSISTOR	R21	2412248908	7.5 k ohm ±5% ¼W	FIXED CARBON FILM
TR03	2730198015	2SC1815 (BL)	TRANSISTOR	R22	2412248908	7.5 k ohm ±5% ¼W	FIXED CARBON FILM
TR04	2730198015	2SC1815 (BL)	TRANSISTOR	R23	2412243903	4.7 k ohm ±5% ¼W	FIXED CARBON FILM
TR05	2730198015	2SC1815 (BL)	TRANSISTOR	R24	2412243903	4.7 k ohm ±5% ¼W	FIXED CARBON FILM
TR06	2730198015	2SC1815 (BL)	TRANSISTOR	R25	2442012065	820 ohm ±5% ½W	FIXED METAL OXIDE FILM
TR07	2710131005	2SA988 (F)	TRANSISTOR	R26	2442012065	820 ohm ±5% ½W	FIXED METAL OXIDE FILM
TR08	2710131005	2SA988 (F)	TRANSISTOR	R27	2442012065	820 ohm ±5% ½W	FIXED METAL OXIDE FILM
TR09	2710131005	2SA988 (F)	TRANSISTOR	R28	2442012065	820 ohm ±5% ½W	FIXED METAL OXIDE FILM
TR10	2710131005	2SA988 (F)	TRANSISTOR	R29	2412187904	22 ohm ±5% ¼W	FIXED CARBON FILM
TR11	2730235004	2SC1841 (F)	TRANSISTOR	R30	2412187904	22 ohm ±5% ¼W	FIXED CARBON FILM
TR12	2730235004	2SC1841 (F)	TRANSISTOR	R31	2412187904	22 ohm ±5% ¼W	FIXED CARBON FILM
TR13	2730198015	2SC1815 (BL)	TRANSISTOR	R32	2412187904	22 ohm ±5% ¼W	FIXED CARBON FILM
TR14	2730198015	2SC1815 (BL)	TRANSISTOR	R33	2412231902	1.5 k ohm ±5% ¼W	FIXED CARBON FILM
TR15	2730235004	2SC1841 (F)	TRANSISTOR	R34	2412231902	1.5 k ohm ±5% ¼W	FIXED CARBON FILM
TR16	2730235004	2SC1841 (F)	TRANSISTOR	R35	2412311000	4.7 M ohm ±5% ¼W	FIXED CARBON FILM
TR17	2710131005	2SA988 (F)	TRANSISTOR	R36	2412311000	4.7 M ohm ±5% ¼W	FIXED CARBON FILM
TR18	2710131005	2SA988 (F)	TRANSISTOR	R39	2412246900	6.2 k ohm ±5% ¼W	FIXED CARBON FILM
TR19	2730198015	2SC1815 (BL)	TRANSISTOR	R40	2412246900	6.2 k ohm ±5% ¼W	FIXED CARBON FILM
TR20	2730198015	2SC1815 (BL)	TRANSISTOR	R41	2412082009	390 ohm ±5% ¼W	FIXED CARBON FILM
TR21	2730198015	2SC1815 (BL)	TRANSISTOR	R42	2412082009	390 ohm ±5% ¼W	FIXED CARBON FILM
TR22	2730198015	2SC1815 (BL)	TRANSISTOR	R43	2412219908	470 ohm ±5% ¼W	FIXED CARBON FILM
TR23	2730226026	2SC2275(Q)/(R)	TRANSISTOR	R44	2412219908	470 ohm ±5% ¼W	FIXED CARBON FILM
TR24	2730226026	2SC2275(Q)/(R)	TRANSISTOR	R45	2412249907	8.2 k ohm ±5% ¼W	FIXED CARBON FILM
TR25	2710123026	2SA985(Q)/(R)	TRANSISTOR	R46	2412249907	8.2 k ohm ±5% ¼W	FIXED CARBON FILM
TR26	2710123026	2SA985(Q)/(R)	TRANSISTOR	R47	2412273902	82 k ohm ±5% ¼W	FIXED CARBON FILM
TR31	2750018010	2SK30A(O)	FIELD EFFECT TRANSISTOR	R48	2412273902	82 k ohm ±5% ¼W	FIXED CARBON FILM
TR32	2750018010	2SK30A(O)	FIELD EFFECT TRANSISTOR	R49	2412250909	9.1 k ohm ±5% ¼W	FIXED CARBON FILM
TR33	2730177007	2SC1626(Y)	TRANSISTOR	R50	2412250909	9.1 k ohm ±5% ¼W	FIXED CARBON FILM
TR34	2710088006	2SA816 (Y)	TRANSISTOR	R51	2412229901	1.2 k ohm ±5% ¼W	FIXED CARBON FILM
TR35	2730198015	2SC1815 (BL)	TRANSISTOR	R52	2412229901	1.2 k ohm ±5% ¼W	FIXED CARBON FILM
TR36	2710102005	2SA1015 (Y)	TRANSISTOR	R55	2412265907	39 k ohm ±5% ¼W	FIXED CARBON FILM
TR37	2730235004	2SC1841 (F)	TRANSISTOR	R56	2412265907	39 k ohm ±5% ¼W	FIXED CARBON FILM
TR38	2710131005	2SA988 (F)	TRANSISTOR	R57	2412269903	56 k ohm ±5% ¼W	FIXED CARBON FILM
TR39	2710131005	2SA988 (F)	TRANSISTOR	R58	2412269903	56 k ohm ±5% ¼W	FIXED CARBON FILM
TR40	2710131005	2SA988 (F)	TRANSISTOR	R59	2412198906	62 ohm ±5% ¼W	FIXED CARBON FILM
TR41	2730235004	2SC1841 (F)	TRANSISTOR	R60	2412198906	62 ohm ±5% ¼W	FIXED CARBON FILM
TR42	2730235004	2SC1841 (F)	TRANSISTOR	R63	2412234909	2 k ohm ±5% ¼W	FIXED CARBON FILM
D05	2760253001	HZ15-2	DIODE	R64	2412234909	2 k ohm ±5% ¼W	FIXED CARBON FILM
D06	2760253001	HZ15-2	DIODE	R65	2412214903	300 ohm ±5% ¼W	FIXED CARBON FILM
D07	2760171028	HV-23G (YL)	DIODE	R66	2412214903	300 ohm ±5% ¼W	FIXED CARBON FILM
D08	2760171028	HV-23G (YL)	DIODE	R67	2442012052	68 ohm ±5% ¼W	FIXED METAL OXIDE FILM
D09	2760049008	1S2076	DIODE	R68	2442012052	68 ohm ±5% ¼W	FIXED METAL OXIDE FILM
D10	276049008	1S2076	DIODE	R69	2412179909	10 ohm ±5% ¼W	FIXED CARBON FILM
D11	2760049011	1S2076A	DIODE	R70	2412179909	10 ohm ±5% ¼W	FIXED CARBON FILM
D12	2760049011	1S2076A	DIODE	R71	2412179909	10 ohm ±5% ¼W	FIXED CARBON FILM
D13	2760049011	1S2076A	DIODE	R72	2412179909	10 ohm ±5% ¼W	FIXED CARBON FILM
D14	2760049011	1S2076A	DIODE	R73	2410201002	4.7 k ohm ±5% ¼W	FIXED CARBON FILM
D15	2760049008	1S2076	DIODE	R74	2410201002	4.7 k ohm ±5% ¼W	FIXED CARBON FILM
D16	2760049008	1S2076	DIODE	R75	2412207907	150 ohm ±5% ¼W	FIXED CARBON FILM
D17	2760049008	1S2076	DIODE	R76	2412207907	150 ohm ±5% ¼W	FIXED CARBON FILM
D18	2760049008	1S2076	DIODE	R77	2412207907	150 ohm ±5% ¼W	FIXED CARBON FILM
D19	2760298008	M4C-41	DIODE	R78	2412207907	150 ohm ±5% ¼W	FIXED CARBON FILM
D20	2760246018	RB-152	DIODE	R79	2412219908	470 ohm ±5% ¼W	FIXED CARBON FILM
D21	2760253001	HZ15-2	DIODE	R80	2412219908	470 ohm ±5% ¼W	FIXED CARBON FILM
D22	2760191008	W03C	DIODE	R81	2412227903	1 k ohm ±5% ¼W	FIXED CARBON FILM
D23	2760049011	1S2076A	DIODE	R82	2412227903	1 k ohm ±5% ¼W	FIXED CARBON FILM
D24	3939032007	TLR206	LIGHT EMITTING DIODE	R83	2442021056	1 k ohm ±5% ½W	FIXED METAL OXIDE FILM
D25	2760253001	HZ15-2	DIODE	R84	2442021056	1 k ohm ±5% ½W	FIXED METAL OXIDE FILM
D26	2760253001	HZ15-2	DIODE	R85	2442021056	1 k ohm ±5% ½W	FIXED METAL OXIDE FILM
D27	2760049011	1S2076A	DIODE	R86	2442021056	1 k ohm ±5% ½W	FIXED METAL OXIDE FILM
D28	2760049011	1S2076A	DIODE	R87	2442021043	620 ohm ±5% ½W	FIXED METAL OXIDE FILM
D29	2760049011	1S2076A	DIODE	R88	2442021043	620 ohm ±5% ½W	FIXED METAL OXIDE FILM
D30	2760049011	1S2076A	DIODE	R89	2412232901	1.6 k ohm ±5% ¼W	FIXED CARBON FILM
RESISTORS				R90	2412232901	1.6 k ohm ±5% ¼W	FIXED CARBON FILM
R01	2412203901	100 ohm ±5% ¼W	FIXED CARBON FILM	R91	2412227903	1 k ohm ±5% ¼W	FIXED CARBON FILM
R02	2412203901	100 ohm ±5% ¼W	FIXED CARBON FILM	R92	2412227903	1 k ohm ±5% ¼W	FIXED CARBON FILM
R03	2412262900	30 k ohm ±5% ¼W	FIXED CARBON FILM	R93	2412232901	1.5 k ohm ±5% ¼W	FIXED CARBON FILM
R04	2412262900	30 k ohm ±5% ¼W	FIXED CARBON FILM	R94	2412232901	1.6 k ohm ±5% ¼W	FIXED CARBON FILM
R05	2412246900	6.2 k ohm ±5% ¼W	FIXED CARBON FILM				
R06	2412246900	6.2 k ohm ±5% ¼W	FIXED CARBON FILM				
R07	2412227903	1 k ohm ±5% ¼W	FIXED CARBON FILM				
R08	2412227903	1 k ohm ±5% ¼W	FIXED CARBON FILM				
R11	2412203901	100 ohm ±5% ¼W	FIXED CARBON FILM				
R12	2412203901	100 ohm ±5% ¼W	FIXED CARBON FILM				
R13	2412035014	8.2 k ohm ±2% ¼W	FIXED CARBON FILM				
R14	2412035014	8.2 k ohm ±2% ¼W	FIXED CARBON FILM				
R15	2412035014	8.2 k ohm ±2% ¼W	FIXED CARBON FILM				
R16	2412035014	8.2 k ohm ±2% ¼W	FIXED CARBON FILM				

(Con.)

Ref. No.	Part No.	Part Name & Descriptions	Ref. No.	Part No.	Part Name & Descriptions
R95	2412227903	1 k ohm ±5% ¼W FIXED CARBON FILM	C43	2551208906	0.0047µF ±5% 50V FIXED PLASTIC FILM
R96	2412227903	1 k ohm ±5% ¼W FIXED CARBON FILM	C44	2551208906	0.0047µF ±5% 50V FIXED PLASTIC FILM
R97	2442021043	620 ohm ±5% ¼W FIXED METAL OXIDE FILM	C45	2551205909	0.0027µF ±5% 50V FIXED PLASTIC FILM
R98	2442021043	620 ohm ±5% ¼W FIXED METAL OXIDE FILM	C46	2551205909	0.0027µF ±5% 50V FIXED PLASTIC FILM
R99	2412259900	22 k ohm ±5% ¼W FIXED CARBON FILM	C47	2551122011	0.056µF ±5% 50V FIXED PLASTIC FILM
R100	2412259900	22 k ohm ±5% ¼W FIXED CARBON FILM	C48	2551122011	0.056µF ±5% 50V FIXED PLASTIC FILM
R105	2440037026	470 ohm ±5% 1W FIXED METAL OXIDE FILM	C51	2544060025	1µF 100V FIXED ELECTROLYTIC
R106	2440037026	470 ohm ±5% 1W FIXED METAL OXIDE FILM	C52	2544060025	1µF 100V FIXED ELECTROLYTIC
R107	2432026016	0.33 ohm ±10% 3.15W FIXED WIRE WOUND	C53	2534480903	27pF ±5% 500V FIXED CERAMIC
R108	2432026016	0.33 ohm ±10% 3.15W FIXED WIRE WOUND	C54	2534480903	27pF ±5% 500V FIXED CERAMIC
R109	2440017020	10 ohm ±5% 1W FIXED METAL OXIDE FILM	C57	2534489001	330pF ±5% 50V FIXED CERAMIC
R110	2440017020	10 ohm ±5% 1W FIXED METAL OXIDE FILM	C58	2534489003	330pF ±5% 50V FIXED CERAMIC
R113	2412195909	47 ohm ±5% ¼W FIXED CARBON FILM	C59	2534489003	330pF ±5% 50V FIXED CERAMIC
R114	2412195909	47 ohm ±5% ¼W FIXED CARBON FILM	C60	2534489003	330pF ±5% 50V FIXED CERAMIC
R115	2412112005	6.8 k ohm ±5% ¼W FIXED CARBON FILM	C61	2531124903	100pF ±10% 500V FIXED CERAMIC
R116	2440102029	2.2 k ohm ±5% 2W FIXED METAL OXIDE FILM	C62	2531124903	100pF ±10% 500V FIXED CERAMIC
R117	2412303908	1.5 M ohm ±5% ¼W FIXED CARBON FILM	C63	2531124903	100pF ±10% 500V FIXED CERAMIC
R118	2412251908	10 k ohm ±5% ¼W FIXED CARBON FILM	C64	2531124903	100pF ±10% 500V FIXED CERAMIC
R119	2412264908	36 k ohm ±5% ¼W FIXED CARBON FILM	C65	2551084007	0.1µF ±10% 50V FIXED PLASTIC FILM
R120	2412264908	36 k ohm ±5% ¼W FIXED CARBON FILM	C66	2551084007	0.1µF ±10% 50V FIXED PLASTIC FILM
R122	2440049027	4.7 k ohm ±5% 1W FIXED METAL OXIDE FILM	C69	2544126901	47µF 50V FIXED ELECTROLYTIC
R123	2412215902	330 ohm ±5% ¼W FIXED CARBON FILM	C70	2544049004	47µF 50V FIXED ELECTROLYTIC
R124	2412251908	10 k ohm ±5% ¼W FIXED CARBON FILM	C73	2544105906	10µF 16V FIXED ELECTROLYTIC
R125	2412259900	22 k ohm ±5% ¼W FIXED CARBON FILM	C74	2544114900	10µF 35V FIXED ELECTROLYTIC
R126	2412256903	16 k ohm ±5% ¼W FIXED CARBON FILM	C75	2549015017	47µF ±20% 10V FIXED ELECTROLYTIC
R127	2412264908	36 k ohm ±5% ¼W FIXED CARBON FILM	C76	2544119905	1µF 50V FIXED ELECTROLYTIC
R128	2412263909	33 k ohm ±5% ¼W FIXED CARBON FILM	C77	2544100901	220µF 6.3V FIXED ELECTROLYTIC
R131	2440033020	220 ohm ±5% 1W FIXED METAL OXIDE FILM	C78	2544118906	0.47µF 50V FIXED ELECTROLYTIC
R132	2440033020	220 ohm ±5% 1W FIXED METAL OXIDE FILM	C79	2544043000	0.47µF 50V FIXED ELECTROLYTIC
R133	2412243903	4.7 k ohm ±5% ¼W FIXED CARBON FILM	C80	2546051003	6800µF 50V FIXED ELECTROLYTIC
R134	2412243903	4.7 k ohm ±5% ¼W FIXED CARBON FILM	C81	2546051003	6800µF 50V FIXED ELECTROLYTIC
R135	2442021043	620 ohm ±5% ¼W FIXED METAL OXIDE FILM	C82	2531053003	0.01µF +100,-0% 500V FIXED CERAMIC
R136	2442021043	620 ohm ±5% ¼W FIXED METAL OXIDE FILM	C85	2531053003	0.01µF +100,-0% 500V FIXED CERAMIC
R137	2442021043	620 ohm ±5% ¼W FIXED METAL OXIDE FILM	C87	2544059094	470µF 63V FIXED ELECTROLYTIC
R138	2442021043	620 ohm ±5% ¼W FIXED METAL OXIDE FILM	C88	2544059094	470µF 63V FIXED ELECTROLYTIC
R139	2412233900	1.8 k ohm ±5% ¼W FIXED CARBON FILM	C89	2544105906	10µF 16V FIXED ELECTROLYTIC
R143	2440096025	680 ohm ±5% 2W FIXED METAL OXIDE FILM	C90	2534420905	22pF 50V FIXED CERAMIC
CAPACITORS			C91	2544108903	47µF 16V FIXED ELECTROLYTIC
C01	2551086005	0.15µF ±10% 50V FIXED PLASTIC FILM	C101	2533598003	5pF ±0.5pF 50V FIXED CERAMIC
C02	2551086005	0.15µF ±10% 50V FIXED PLASTIC FILM	C102	2533598003	5pF ±0.5pF 50V FIXED CERAMIC
C03	2534450904	390pF ±5% 50V FIXED CERAMIC	C111	2534420905	22pF ±5% 50V FIXED CERAMIC
C04	2554450904	390pF ±5% 50V FIXED CERAMIC	OTHER PARTS		
C05	2551083008	0.082µF ±10% 50V FIXED PLASTIC FILM		2220609001	P.W. BOARD
C06	2551083008	0.082µF ±10% 50V FIXED PLASTIC FILM		2090042908	JUMPER WIRE USED 25
C07	2534436902	100pF ±5% 50V FIXED CERAMIC		2090008120	JUMPER WIRE (SHORTLEAD) P=10 mm USED 8
C08	2534436902	100pF ±5% 50V FIXED CERAMIC		2090008104	JUMPER WIRE (SHORTLEAD) P=15 mm USED 4
C09	2534448903	330pF ±5% 50V FIXED CERAMIC		2090008162	JUMPER WIRE (SHORTLEAD) P=20 mm USED 2
C10	2534448903	330pF ±5% 50V FIXED CERAMIC		2050087026	2P. TERMINAL P=7.5 mm USED 6
C13	2544015009	10µF 16V FIXED ELECTROLYTIC		2050087039	3P. TERMINAL P=7.5 mm USED 3
C14	2544015009	10µF 16V FIXED ELECTROLYTIC		2050082034	3P. TERMINAL P=5 mm USED 1
C15	2534424901	33pF ±5% 50V FIXED CERAMIC	VR02	211244000	VARIABLE RESISTOR 100 k ohm FOR VOLUME
C16	2534424901	33pF ±5% 50V FIXED CERAMIC	VR03	2110245009	VARIABLE RESISTOR 250 k ohm FOR BALANCE
C21	2561008060	1µF 100V FIXED METALIZED	VR04	2110246011	VARIABLE RESISTOR 100 k ohm FOR BASS
C22	2561008060	1µF 100V FIXED METALIZED	VR05	2110253004	VARIABLE RESISTOR 50 k ohm FOR TREBLE
C25	2533605006	12pF ±5% 50V FIXED CERAMIC	VR07	EP-5462H7	SOLID VOLUME 1 k ohm
C26	2534414908	12pF ±5% 50V FIXED CERAMIC	VR08	EP-5462H7	SOLID VOLUME 1 k ohm
C31	2551219908	0.039µF ±5% 50V FIXED PLASTIC FILM	VR09	EP-5462H21	SOLID VOLUME 220 k ohm
C32	2551219908	0.039µF ±5% 50V FIXED PLASTIC FILM	VR10	EP-5462H21	SOLID VOLUME 220 k ohm
C33	2551122095	0.27µF ±5% 50V FIXED PLASTIC FILM	SW04	2124220007	2P. PUSH SWITCH S. FIL.
C34	2551122095	0.27µF ±5% 50V FIXED PLASTIC FILM	SW05	2124220007	2P. PUSH SWITCH LOUDNESS
C37	2534442909	180pF ±5% 50V FIXED CERAMIC	SW06	2124221006	1P. PUSH SWITCH FOR SPEAKER
C38	2534442909	180pF ±5% 50V FIXED CERAMIC	F01	EP-713210	FUSE (5A)
C39	2551201903	0.0012µF ±5% 50V FIXED PLASTIC FILM	F02	EP-713210	FUSE (5A)
C40	2551201903	0.0012µF ±5% 50V FIXED PLASTIC FILM		EP-5870	FUSE HOLDER USED 4
			J01	2048011101	HEADPHONE JACK
			L01	2320017001	INDUCTOR 1µH
			L02	2320017001	INDUCTOR 1µH
			RL01	2140037009	RELAY
				4170021009	RADIATOR FOR TR33,34
				4730354019	TAPPING SCREW 3x8
				FEP-1261	JUMPER WIRE USED 2

SCHEMATIC CIRCUIT DIAGRAM (FOR E2, EF)

⚠ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacturer.



DENON

NIPPON COLUMBIA CO., LTD.
No. 14-14, 4-CHOME AKASAKA,
MINATO-KU, TOKYO 107, JAPAN
TEL: 03-584-8111
TLX: JAPANOLA J22591
CABLE: NIPPONCOLUMBIA TOKYO