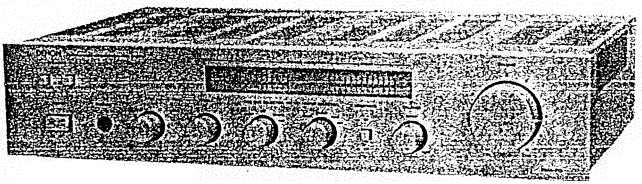
DENON

Hi-Fi Pre-Main Amplifier

SERVICE MANUAL
MODEL PMA-710

SOLID STATE
PRE MAIN AMPLIFIER



CONTENTS

NIPPON COLUMBIA CO., LTD.

SPECIFICATIONS

POWER AMPLIFIER SECTION

Rated Output Power:	Both channel drive 20 Hz to 20 kHz 35 W + 35 W (8 ohm Load) (IHF) 1 kHz (8 ohm Load) 42 W + 42 W (DIN) 1 kHz (8 ohm Load) 40 W + 40 W (IEC) (Subject to change by temperature test)
Total Harmonic Distortion:	0.03% (20 Hz – 20 kHz at – 3 dB rated output 8 ohm Load) (IHF) 0.05% (20 Hz – 20 kHz at rated output 8 ohm Load) (U.S.A.)
Intermodulation Distortion:	Below 7 kHz / 60 Hz : 1/4 0.01% (at amplitude output equivalent to rated output)
Output Band Width:	10 Hz – 40 kHz (IHF THD 0.1%)
Transmission Characteristics:	5 Hz – 150 kHz $^{+0}_{-3}$ dB (at 1 W output)
Input Sensitivity:	150 mV
Input Impedance:	30 k ohm
Output Impedance:	0.16 ohm (1 kHz)
Output Terminals:	Speaker: A and B Load 8 – 16 ohm Headphone/Stereo headphone (600 mV/8 ohm)

EQUALIZER AMPLIFIER SECTION

Equalizer Amplifier Output:	Maximum Output: 10 V (at 47 k ohm Load) Rated Output: 150 mV Total harmonic wave distortion: below 0.01% (at 1 kHz, 8 V output)

Input Sensitivy/ Input Impedance:	PHONO	2.5 mV	47 k ohm
	TUNER	150 mV	30 k ohm
	AUX, TAPE	150 mV	30 k ohm
RIAA Deviation:	PHONO	within ±0.5 dB (20 Hz – 100 kHz)	

OVERALL CHARACTERISTICS

SN Ratio (IHFA Network):	PHONO	72 dB (input terminals short-circuited for 2.5 mV input)
	TUNER, TAPE, AUX:	96 dB (input terminals short-circuited)
Tone Control Adjustable Range:	BASS	100 Hz ± 10 dB
	TREBLE	10 kHz ± 10 dB
Loudness Characteristics:	Low frequency	100 Hz + 8 dB
	High frequency	10 kHz + 6 dB
AC OUTLET: (For U.S.A., Canada and Hong Kong, Singapore)	SWITCHED 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 (Multiple)	
POWER CONSUMPTION:	70 W (U.S.A.); 180 W (IEC); 70 W (Hong Kong); 200 W (U.K.) 145 VA (Canada)	
DIMENSIONS:	434 mm (w) x 97 mm (H) x 286 mm (D) (including rubber feet, control knobs, and terminals)	
WEIGHT:	6.5 kg	

Design and specifications are subject to change without prior notice.

NOTE: The following codes correspond to the appropriate models.
E2 for Europe, EF for France, EG for Germany, EK for U.K., E3 for U.S.A., and E1 for Hong Kong, Singapore.
This Service Manual is prepared based on E2.

BLOCK DIAGRAM

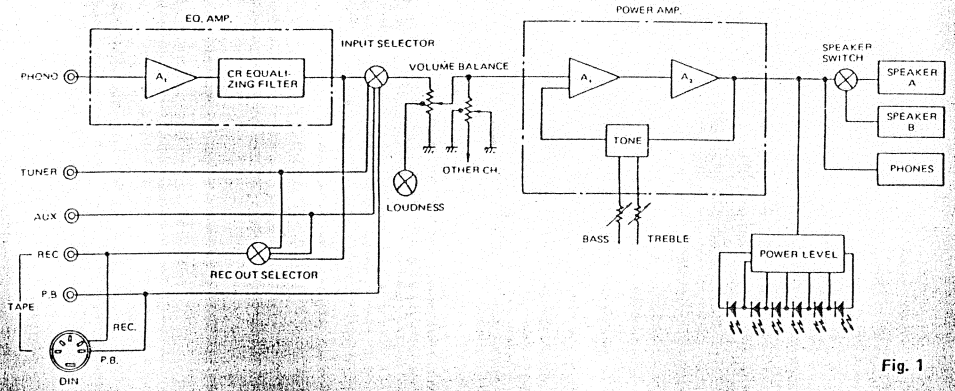
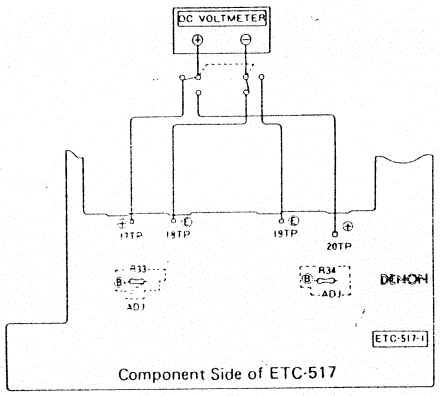


Fig. 1

METHOD OF ADJUSTMENTS



Component Side of ETC-517

Fig. 2

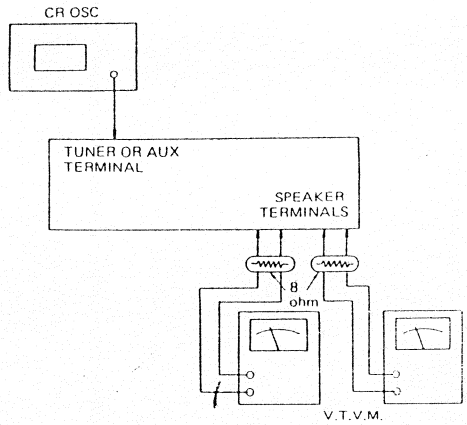


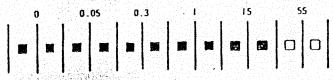
Fig. 3

IDLE CURRENT ADJUSTMENT (Fig. 2)

1. Keep the unit away from direct wind blown by an air-conditioner and an electric fan, and keep the unit under normal conditions. Adjust the range of ambient temperature to 15 – 30°C.
2. Set the following switches as follows:
   - POWER (power switch) to off
   - VOLUME (VOLUME CONTROL) to 0 (↶)
   - SPEAKERS (speaker terminal) to no load (speakers disconnected)
3. Remove the top cover and connect a DC digital voltmeter to the test points of ETC-517 (power and control units) (between the positive terminal 17 and the negative terminal 18, and between the positive 20 and the negative terminal 19).
4. Connect the power source cord to an AC outlet and turn on the power switch; read the measured value after 3 minutes or when the measured value is within a tolerance of 6.6 mV ~ 90 mV (DC), adjust the idling current manually as follows.
   (1) Connect a 4.7 ohm resistor to resistors R33 and 34 which are surrounded by the broken line on the printed circuit board.
   (2) When the voltmeter reads 6.6 mV (DC) or less under the condition of item (1), disconnect the 4.7 ohm from resistors R33 and R34.

POWER LEVEL METER ADJUSTMENT (Fig. 3)

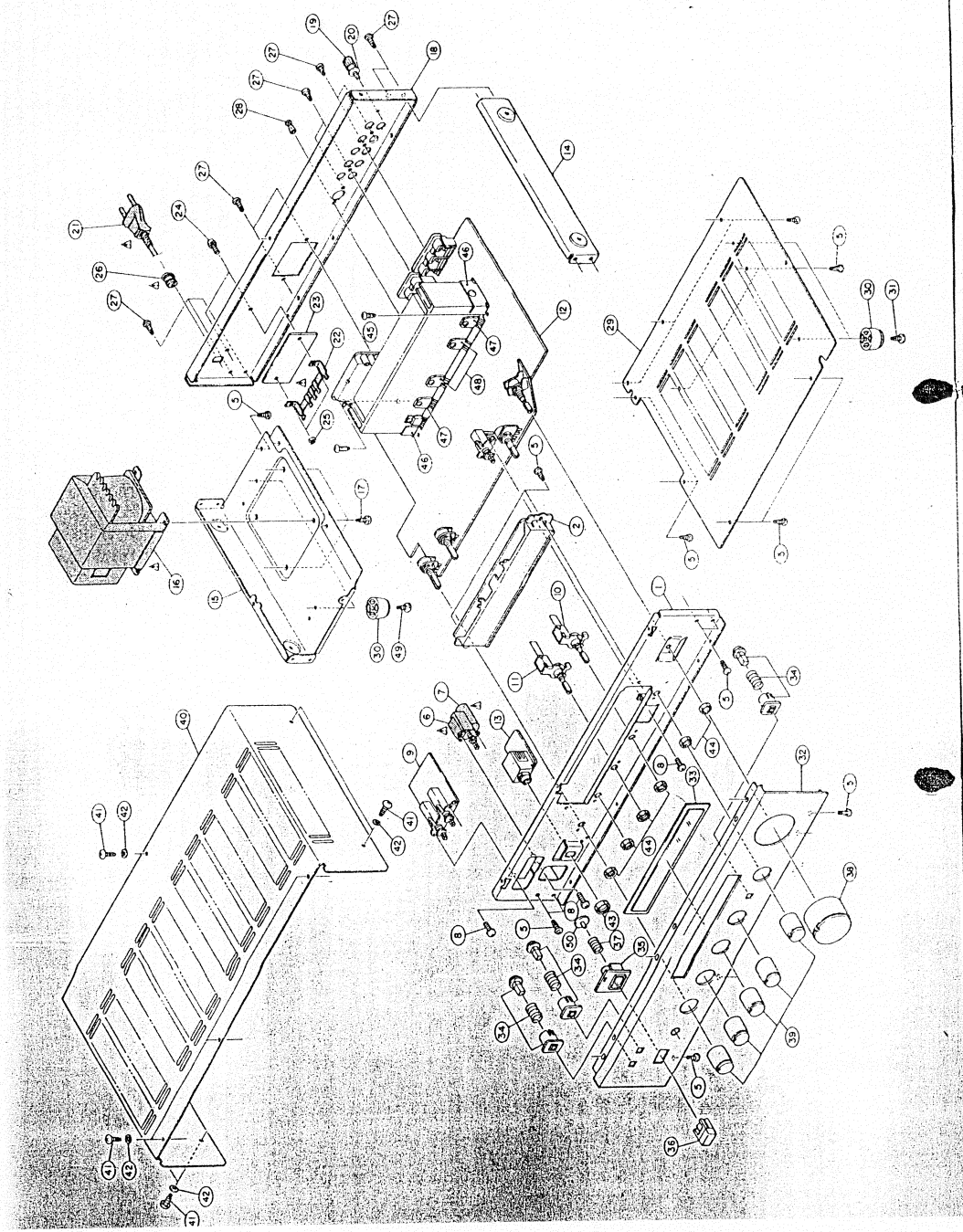
(1) Keep the unit away from wind blown from an air conditioner or an electric fan and set it to the normal operating mode. The ambient temperature of the tuner is 15 to 30°C.
(2) Set the switches as follows:
   - Turn off the power switch.
   - Turn the volume control counterclockwise to the end.
   - Connect a load of 8 ohms to the speaker terminals.
(3) Connect an oscillator to an input jack (AUX) and set the input selector switch to "AUX". Connect an electronic voltmeter to the speaker terminals.
(4) Connect the power cord to the power source and turn on the power switch. Set the volume to maximum and adjust the attenuation of the oscillator (1 kHz), so that the voltmeter reads 8 V.
(5) Turn semi-fixed volume VR3 in the unit so that the fifth LED (15 W), from the left, of the power level meter starts to light.
(6) Turn semi-fixed volume VR4 so that the fifth LED (15 W) from the right starts to light.



(7) Turn the volume first counterclockwise to the end and then turn it clockwise gradually so that the fifth LED of the power level meter starts to light and the electronic voltmeter at this time reads 8 ± 1 V.

EXPLODED VIEW OF CABINET AND CHASSIS

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



EXPLODED VIEW OF PARTS LIST

NOTE: 1. See addendum list below for the Parts with asterisk (*) on the Ref. No. and the other Parts not included in this list.
2. This list is prepared based on E2.

Ref. No.	Part No.	Part Name & Descriptions
1	4110353009	FRONT CHASSIS ASS'Y
2	1460503201	METER COVER
3	3939164014	LED SLP-267B-03 (GREEN)
*4	ETC0517-2	LED INDICATOR UNIT
5	4730354019	TAPPING SCREW (2)3×8
⚠ 6	2124154021	POWER SWITCH
⚠ 7	2568023035	METALIZED CAPACITOR (0.047μF 250V)
8	4700009006	CROSS PAN SCREW WITH S. WASHER 3×6
*9	ETC0517-3	SPEAKER SWITCH UNIT
10	2120170012	ROTARY REMOTE (A) ℓ=310mm
11	2120170025	ROTARY REMOTE (B) ℓ=400mm
*12	ETC0517	POWER & CONTROL UNIT
*13	ETC0517-4	HEADPHONE UNIT
14	4121082000	SIDE CHASSIS
15	4121083106	TRANS CHASSIS
⚠ 16	2335356003	POWER TRANS
17	4734454012	TAPPING SCREW (TRUS) 4×8
*18	1050484002	BACK PANEL
19	2050071016	TERMINAL ASS'Y
20	4770018001	WASHER (P-8)
⚠ 21	2062002031	AC CORD
⚠ *22	2050089008	7P.W.TERMINAL
*23	4150088004	INSULATING SHEET
*24	4700042005	CROSS PAN SCREW WITH S. WASHER 3×8 (BLACK)
*25	4756006008	NUT φ3
⚠ 26	2445020005	CORD BUSH
27	4730354035	TAPPING SCREW (2)3×8
28	4770096007	PUSH RIVET
29	1050485001	BOTTOM COVER
30	1048001002	FOOT
31	4730455031	TAPPING SCREW (2)4×10 (BLACK)
32	1440996003	FRONT PANEL
33	1430257008	WINDOW PLATE
34	1130306107	PUSH KNOB (LOUD) ASS'Y
35	1460501009	PANEL BUSH (POWER)
36	1130171222	PUSH KNOB ASS'Y
37	4630220007	SPRING
38	1120265216	KNOB
39	1120321008	KNOB ASS'Y (A)
40	1020111127	TOP COVER
41	4770052038	FIXING SCREW
42	4410367009	WASHER
43	–	NUT φ12 (SPARE)
44	–	NUT φ7 (SPARE)
45	4170175007	POWER RADIATOR (ETC-517)
46	4121079000	RADIATOR BRACKET (ETC-517)
47	2730237031	TRANSISTOR 2SC2577(O/Y) (ETC-517)
48	2710136039	TRANSISTOR 2SA1102(G/Y) (ETC-517)
49	4730454016	TAPPING SCREW (2)4×8
50	1190014002	STOPPER
		PACKING & ACCESSORIES (not included EXPLODED VIEW)
a	5050075006	CABINET COVER
b	5030330004	CUSHION
c	5010729062	CARTON CASE
d	5111018009	INST. MANUAL

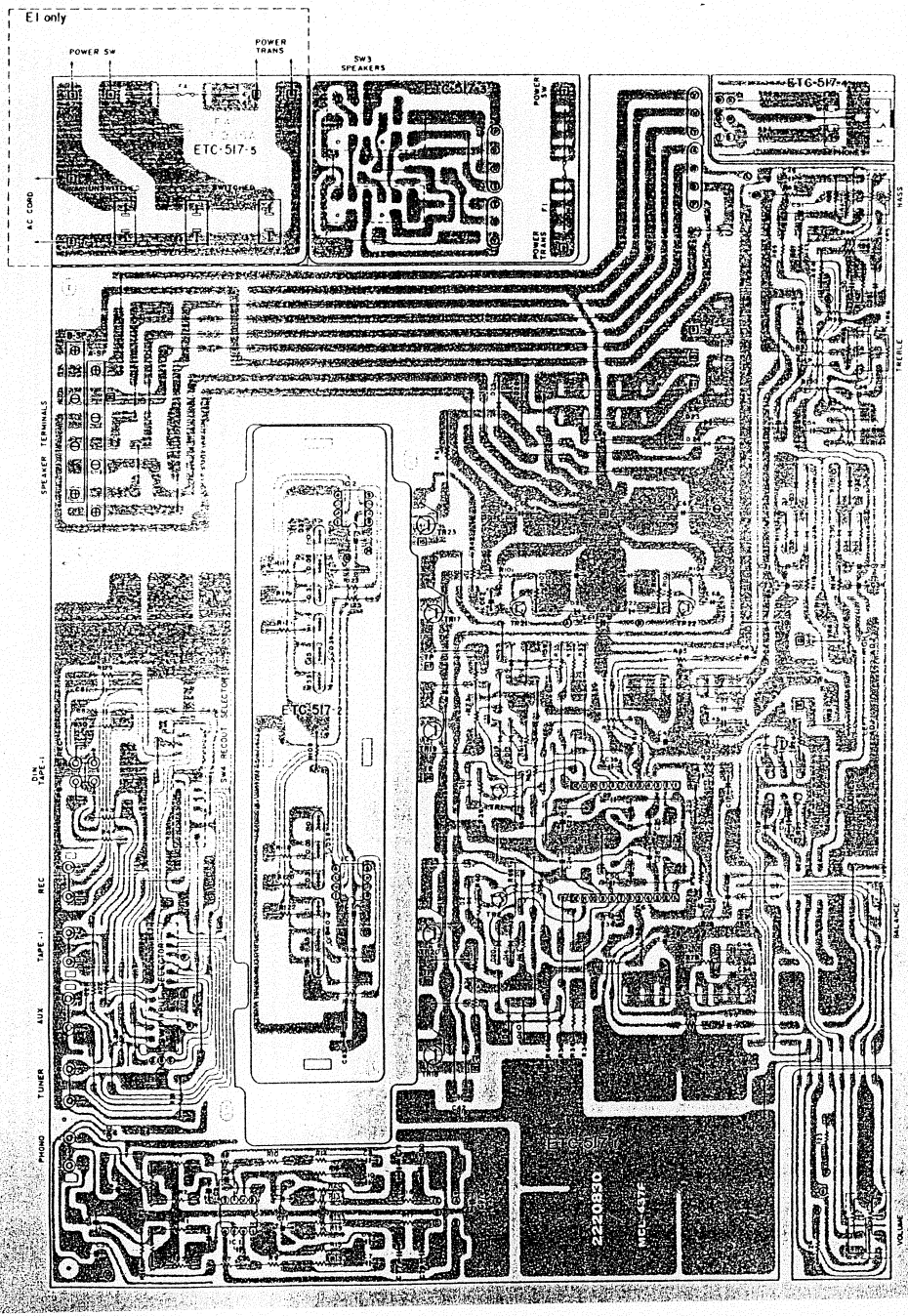
ADDENDUM LIST

Ref. No.	Part Name & Descriptions	Part No. EG for Germany	EK for U.K.	E3 for U.S.A.	E1 for Hong Kong, Singapore
		ETC0517-2	ETC0517B-2		ETC0517D-2
4	LED INDICATOR UNIT	2124154021	2124154021		2124154021
⚠ 6	POWER SWITCH	2568023035	2568023035		2568023035
⚠ 7	CAPACITOR	(0.047μF 250V)	(0.047μF 250V)		(0.047μF 250V)
		ETC0517-3	ETC0517B-3		ETC0517D-3
9	SPEAKER SWITCH UNIT	ETC0517	ETC0157B		ETC0517D
12	POWER & CONTROL UNIT	ETC0517-4	ETC0517B-4		ETC0517D-4
13	HEADPHONE UNIT	2335356003	2335364008		2335363009
⚠ 16	POWER TRANS	1050484002	1050484002		1050491008
18	BACK PANEL	2062002031	2062020000		2006031026
⚠ 21	AC CORD	2050089008	2050089008		–
⚠ 22	7P.W.TERMINAL	4150088004	4150088004		–
23	INSULATING SHEET	4700042005	4700042005		–
24	CROSS PAN SCREW WITH S. WASHER 3×8 (BLACK)	4756006008	4756006008		–
25	NUT φ3	2445020005	MD-2982H		MD-3802
⚠ 26	BUSHING	–	–		2120186006
⚠ 42	VOLTAGE SELECTOR SWITCH	–	–		ETC0517D-5
⚠ 43	AC OUTLET UNIT	–	–		4711303034
44	CROSS PAN SCREW 3×6 (BLACK)	–	4753001051		–
45	TOOTH WASHER φ3	–	5130140000		–
46	EARTH LABEL	–	2030176151		–
47	WIRE ASS'Y	–	5130362008		–
48	VOLTAGE LABEL	–	5130348006		–
49	BLIND SHEET	–	5130346006		–
50	CAUTION SHEET	–	4753100004		–
51	TOOTH WASHER				
	PACKING & ACCESSORIES (not included EXPLODED VIEW)				
e	CAUTION SHEET	–	5130364006	–	–
f	IMPORTANT LABEL	–	5130372001	–	–
g	GUARANTEE CARD	–	5150230000	–	–

PMA-710

PRINTED WIRING BOARD PATTERNS AND PARTS LIST

ETC-517, B, D POWER & CONTROL UNIT



POWER & CONTROL UNIT

ETC-517 for E2, 517B for E.K

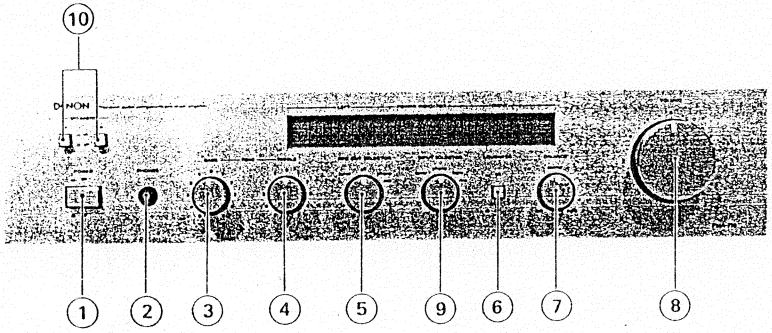
Ref. No.	Part No.	Part Name & Descriptions
		SEMICONDUCTORS
IC01	2650030004	NJM4558D-D INTEGRATED CIRCUIT
IC02	2630098008	TL489CP INTEGRATED CIRCUIT
IC03	2630098008	TL489CP INTEGRATED CIRCUIT
IC05	2630206007	μPC1225H INTEGRATED CIRCUIT
IC06	2630206007	μPC1225H INTEGRATED CIRCUIT
TR01	2730198015	2SC1815 (BL) TRANSISTOR
TR02	2730198015	2SC1815 (BL) TRANSISTOR
TR17	2730237031	2SC2577 (O/Y) TRANSISTOR
TR18	2730237031	2SC2577 (O/Y) TRANSISTOR
TR19	2710136039	2SA1102 (O/Y) TRANSISTOR
TR20	2710136039	2SA1102 (O/Y) TRANSISTOR
TR21	2730111050	2SC1213A (C) TRANSISTOR
TR22	2710040073	2SA673A (D)/(C) TRANSISTOR
TR23	2740065002	2SD880 (Y) TRANSISTOR
D01	2760049008	1S2076 DIODE
D02	2760049008	1S2076 DIODE
D05	2760049008	1S2076 DIODE
D06	2760049008	1S2076 DIODE
D09	2760049008	1S2076 DIODE
D10	2760049008	1S2076 DIODE
D13	2760049008	1S2076 DIODE
D14	2760049008	1S2076 DIODE
D19	2760049008	1S2076 DIODE
D20	2760049008	1S2076 DIODE
D21	2760249002	HZ18-2 DIODE
D22	2760249002	HZ18-2 DIODE
D23	2760232006	V08C DIODE
D24	2760232006	V08C DIODE
D25	2760232006	V08C DIODE
D26	2760232006	V08C DIODE
D31	2760049008	1S2076 DIODE
D32	2760049008	1S2076 DIODE
D33	2760299036	HZ-3B-2 DIODE
D34	2760299036	HZ-3B-2 DIODE
D35	2760049008	1S2076 DIODE
D36	2760049008	1S2076 DIODE
		RESISTORS (not included ±5%, ¼W, Carbon Film Type)
VR01	2110251006	VARIABLE RESISTOR 100 k ohm (MAIN)
VR02	2110245009	VARIABLE RESISTOR 250 k ohm (BALANCE)
VR03	2116000028	SEMI FIXED RESISTOR 100 k ohm
VR04	2116000028	SEMI FIXED RESISTOR 100 k ohm
VR05	2110246011	VARIABLE RESISTOR 100 k ohm (BASS)
VR06	2110246011	VARIABLE RESISTOR 100 k ohm (TREBLE)
R41	2440084024	68 ohm ±5% 2W METAL OXIDE FILM
R55	2440049027	4.7 k ohm ±5% 1W METAL OXIDE FILM
R56	2440049027	4.7 k ohm ±5% 1W METAL OXIDE FILM
R65	2440049027	4.7 k ohm ±5% 1W METAL OXIDE FILM
R66	2440049027	4.7 k ohm ±5% 1W METAL OXIDE FILM
R95	2432033012	0.33/0.33 ohm 10% 2W WIRE WOUND
R96	2432033012	0.33/0.33 ohm 10% 2W WIRE WOUND
R77	2410137008	10 ohm ±5% ½W CARBON FILM
R78	2410137008	10 ohm ±5% ½W CARBON FILM
R97	2440033020	220 ohm ±5% 1W METAL OXIDE FILM
R98	2440033020	220 ohm ±5% 1W METAL OXIDE FILM
R101	2412313037	220 ohm ±2% ¼W CARBON FILM (FUSIBLE)
R104	2412313040	390 ohm ±2% ¼W CARBON FILM (FUSIBLE)
		CAPACITORS (not included Ceramic 50V Type)
C01	2544147003	2.2μF 50V ELECTROLYTIC
C02	2544147003	2.2μF 50V ELECTROLYTIC
C05	2544127007	220μF 6.3V ELECTROLYTIC
C06	2544127007	220μF 6.3V ELECTROLYTIC
C07	2551121067	0.022μF ±5% 50V PLASTIC FILM
C08	2551121067	0.022μF ±5% 50V PLASTIC FILM
C09	2551121009	0.0068μF ±5% 50V PLASTIC FILM
C10	2551121009	0.0068μF ±5% 50V PLASTIC FILM
C11	2544146004	1μF 50V ELECTROLYTIC

Ref. No.	Part No.	Part Name & Descriptions
C12	2544146004	1μF 50V ELECTROLYTIC
C15	2551122008	0.047μF 50V PLASTIC FILM
C16	2551122008	0.047μF 50V PLASTIC FILM
C17	2544146004	1μF 50V ELECTROLYTIC
C18	2544145005	0.47μF 50V ELECTROLYTIC
C21	2544146004	1μF 50V ELECTROLYTIC
C22	2544146004	1μF 50V ELECTROLYTIC
C23	2544146004	1μF 50V ELECTROLYTIC
C24	2544146004	1μF 50V ELECTROLYTIC
C37	2544145005	0.47μF 50V ELECTROLYTIC
C38	2544145005	0.47μF 50V ELECTROLYTIC
C39	2544145005	0.47μF 50V ELECTROLYTIC
C42	2544060025	1μF 100V ELECTROLYTIC
C45	2551122008	0.047μF ±5% 50V PLASTIC FILM
C46	2551122008	0.047μF ±5% 50V PLASTIC FILM
C47	2544130007	100μF 10V ELECTROLYTIC
C48	2544130007	100μF 10V ELECTROLYTIC
C49	2551121083	0.033μF ±5% 50V PLASTIC FILM
C50	2551121083	0.033μF ±5% 50V PLASTIC FILM
C51	2551085006	0.12μF ±10% 50V PLASTIC FILM
C52	2551085006	0.12μF ±10% 50V PLASTIC FILM
C53	2551120013	0.0012μF ±5% 50V PLASTIC FILM
C54	2551120013	0.0012μF ±5% 50V PLASTIC FILM
C55	2551120097	0.0056μF ±5% 50V PLASTIC FILM
C56	2551120097	0.0056μF ±5% 50V PLASTIC FILM
C59	2544146004	1μF 50V ELECTROLYTIC
C60	2544146004	1μF 50V ELECTROLYTIC
C61	2551122008	0.047μF ±5% 50V PLASTIC FILM
C62	2544139008	100μF 25V ELECTROLYTIC
C63	2544139008	100μF 25V ELECTROLYTIC
C64	2544050006	100μF 50V ELECTROLYTIC
C65	2544050006	100μF 50V ELECTROLYTIC
C66	2546061006	5600μF ±20% 50V ELECTROLYTIC
C67	2546061006	5600μF ±20% 50V ELECTROLYTIC
C71	2544145005	0.47μF 50V ELECTROLYTIC
C72	2544145005	0.47μF 50V ELECTROLYTIC
C73	2551121067	0.022μF ±5% 50V PLASTIC FILM
C74	2551121067	0.022μF ±5% 50V PLASTIC FILM
C77	2551120055	0.0027μF ±5% 50V PLASTIC FILM
C78	2551120055	0.0027μF ±5% 50V PLASTIC FILM
C79	2551120055	0.0027μF ±5% 50V PLASTIC FILM
C80	2551120055	0.0027μF ±5% 50V PLASTIC FILM
C83	2544113901	4.7μF 35V ELECTROLYTIC
C87	2544151002	22μF 50V ELECTROLYTIC
C88	2544151002	22μF 50V ELECTROLYTIC
C91	2544151002	22μF 50V ELECTROLYTIC
C92	2544151002	22μF 50V ELECTROLYTIC
		OTHER PARTS
	2220830003	P.W. BOARD
	2090047903	0.6 JUMPER WIRE USED 118
	2050134908	TERMINAL PIN USED 21
	2090008133	JUMPER P=7.5mm USED 1
	2050152003	6P CONNECTOR BASE
	2050150005	4P CONNECTOR BASE
	2050151004	8P PUSH TERMINAL
	2048047007	HEADPHONE JACK
	2048059008	DIN JACK (5P)
	2020014003	FUSE CLIP USED 6
F01	2061015058	FUSE 1.6A
F02	2061015074	FUSE 3.15A
F03	2061015074	FUSE 3.15A
SW01	2124222005	SLIDE SW (4-4) REMOTE
SW02	2124363003	1P PUSH SWITCH
SW03	2124364002	2P PUSH SWITCH
SW04	2124222005	SLIDE SW (4-4) REMOTE
	4170175007	POWER RADIATOR
	4121079000	RADIATOR BRACKET
	4730354019	TAPPING SCREW (2)3x8
	4700012022	CROSS PAN SCREW WITH S. W,S.W. 3x12
	4150171005	WASHER (AC316A)
	4150052001	INSULATING SHEET (AC-229)
	4170171001	RADIATOR

ETC-517D PARTS LIST for E1

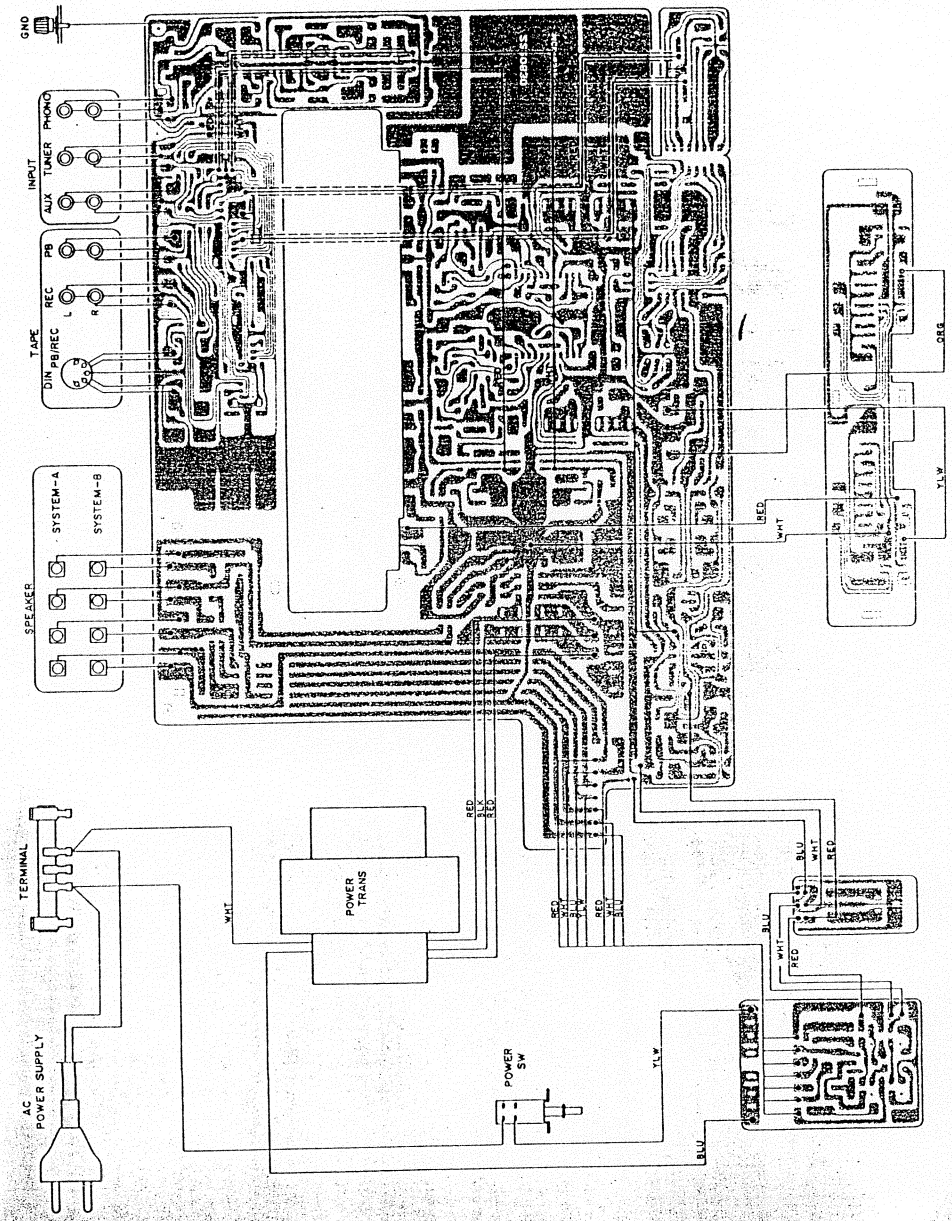
Ref. No.	Part No.	Part Name & Descriptions	
	EP-5667H1	TERMINAL (WRAPPING PIN) USED	(ADD)
	EP-5870	FUSE HOLDER	(ADD)
	2061025080	FUSE TLC 315A	(ADD)
	2033909008	AC OUTLET	(ADD)
	5130159143	FUSE LABEL	(ADD)

DESIGNATION AND FUNCTIONS OF FRONT PANEL CONTROLS

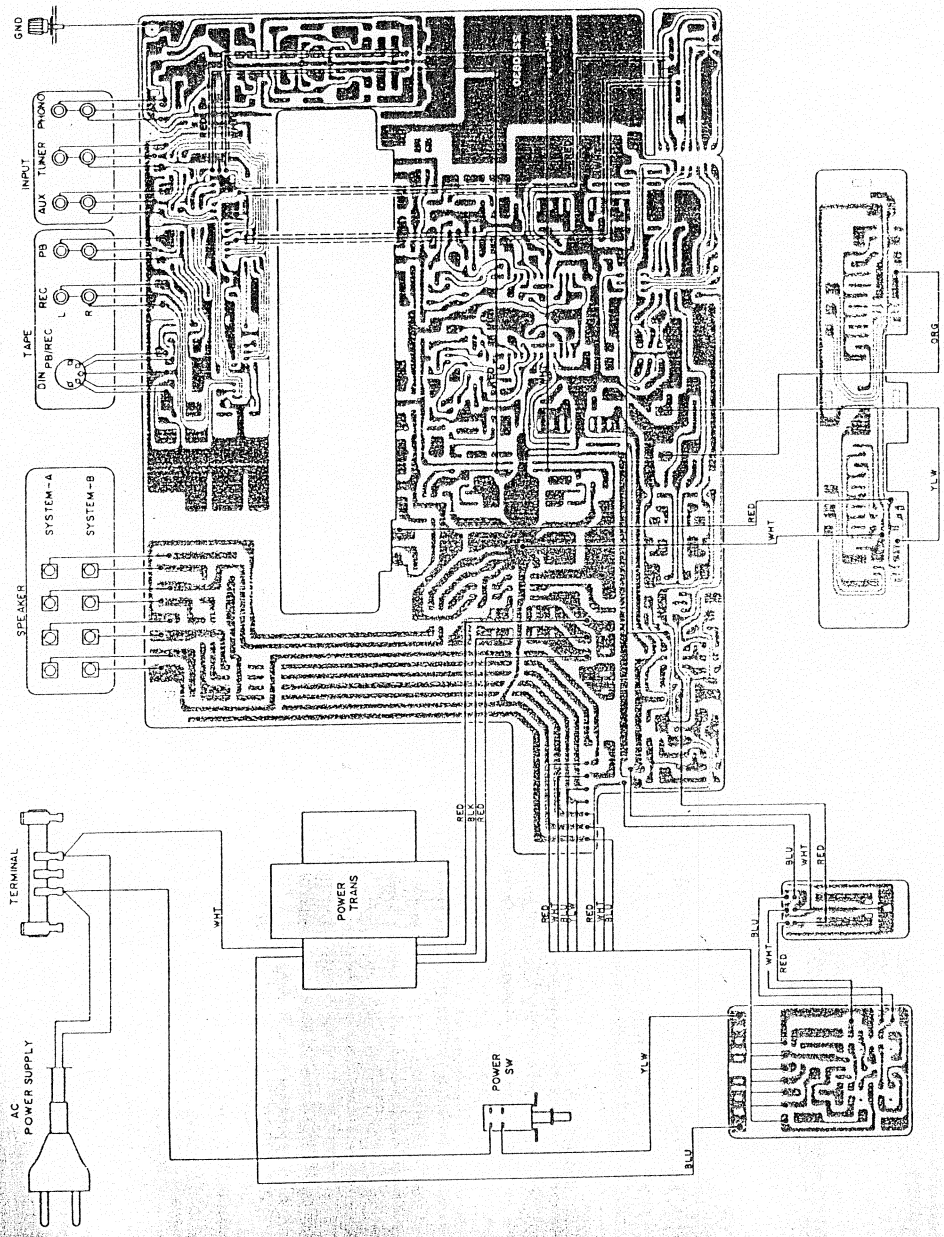


① POWER (Power On-Off Switch)
② Phones (Headphone Jack)
③ BASS (Bass Control)
④ TREBLE (Treble Control)
⑤ RECOUT SELECTOR (REC OUT Selector Switch)
⑥ LOUDNESS (Loudness Switch)
⑦ BALANCE (Balance Control)
⑧ VOLUME (Volume Control)
⑨ INPUT CHANGE-OVER SWITCH
⑩ SPEAKERS (Speaker Changeover Switch)

CONNECTION DIAGRAM



CONNECTION DIAGRAM



DENON

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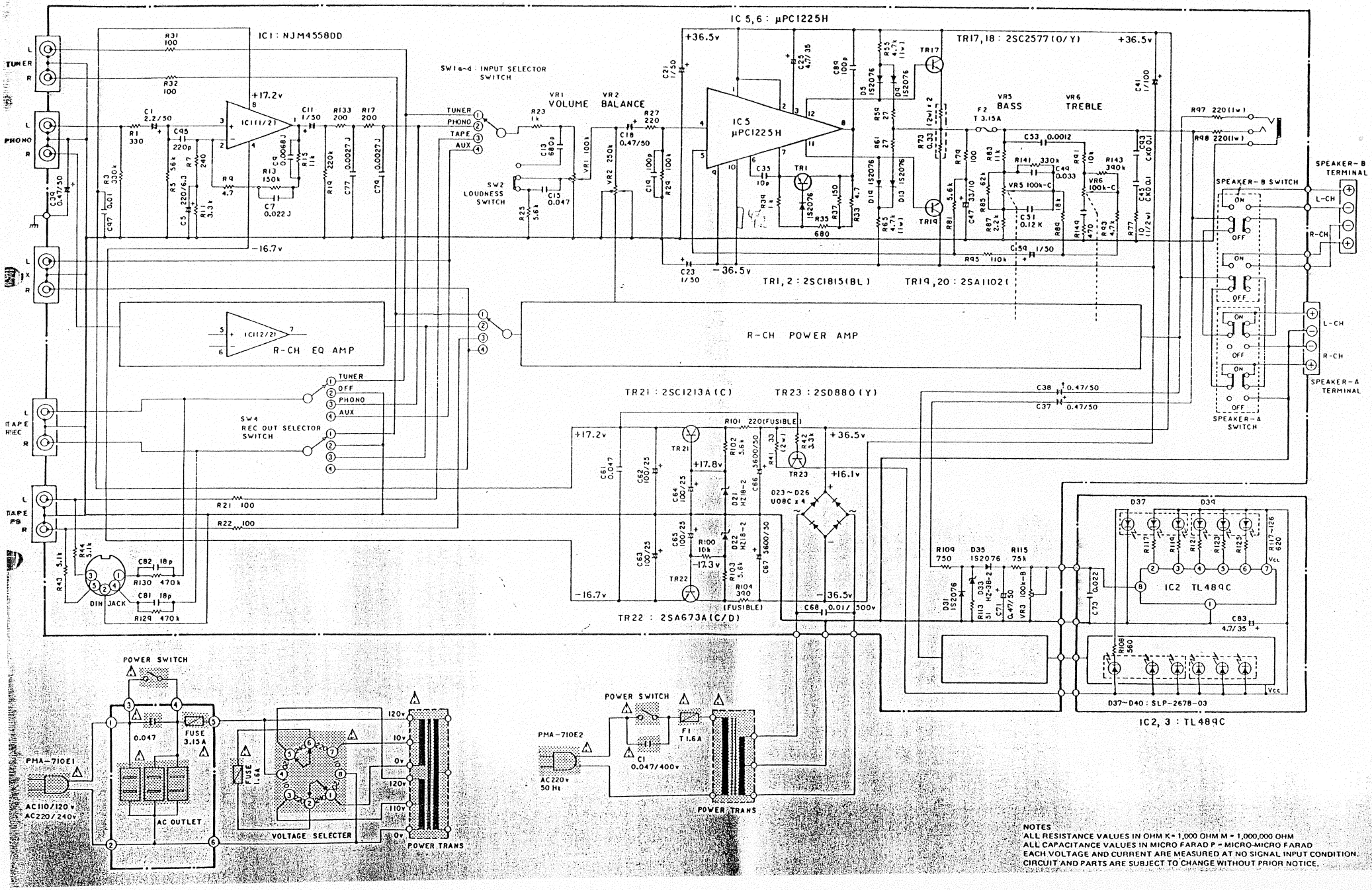
Printed in Jan

WIRING DIAGRAM

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



NOTES
ALL RESISTANCE VALUES IN OHM K = 1,000 OHM M = 1,000,000 OHM
ALL CAPACITANCE VALUES IN MICRO FARAD P = MICRO-MICRO FARAD
EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.