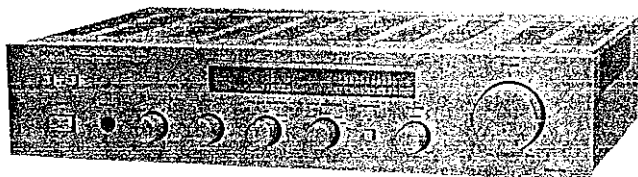


DENON

Hi-Fi Pre-Main Amplifier

SERVICE MANUAL MODEL PMA-710

SOLID STATE
PRE MAIN AMPLIFIER



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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 tempera- ture 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)
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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

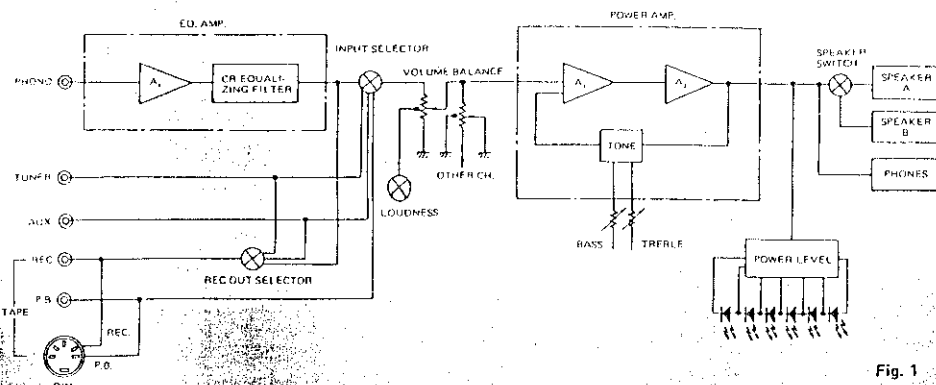


Fig. 1

Input Sensitivity/

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 (IHF Network):	PHONO 72 dB (input termi- nals 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:	SWITCHED x 2, 100 W (Total) UNSWITCHED x 1, 250 W

(For U.S.A., Canada and
Hong Kong, Singapore)

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 termi-
nals)

WEIGHT:

6.5 kg

METHOD OF ADJUSTMENTS

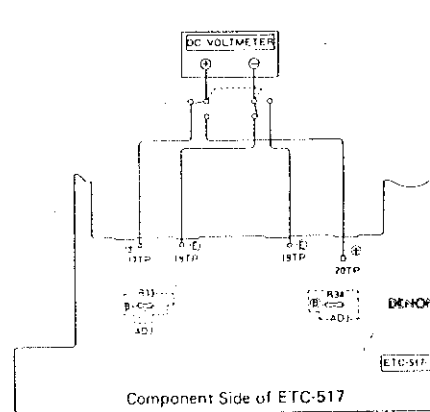


Fig. 2

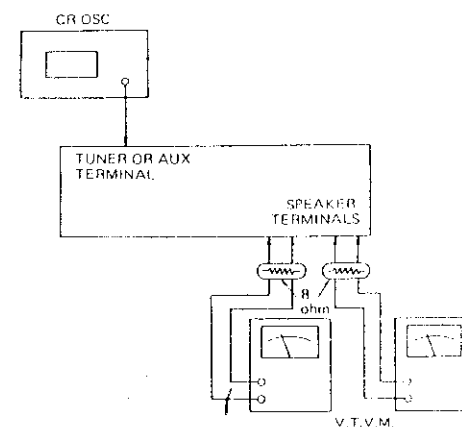


Fig. 3

IDLE CURRENT ADJUSTMENT (Fig. 2)

- 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.
- Set the following switches as follows:
 - POWER (power switch) to off
 - VOLUME (VOLUME CONTROL) to 0 (0)
 - SPEAKERS (speaker terminal) to no load (speakers disconnected)
- 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).
- 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 \sim 90 mV (DC), adjust the idling current manually as follows.
 - Connect a 4.7 ohm resistor to resistors R33 and 34 which are surrounded by the broken line on the printed circuit board.
 - 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)

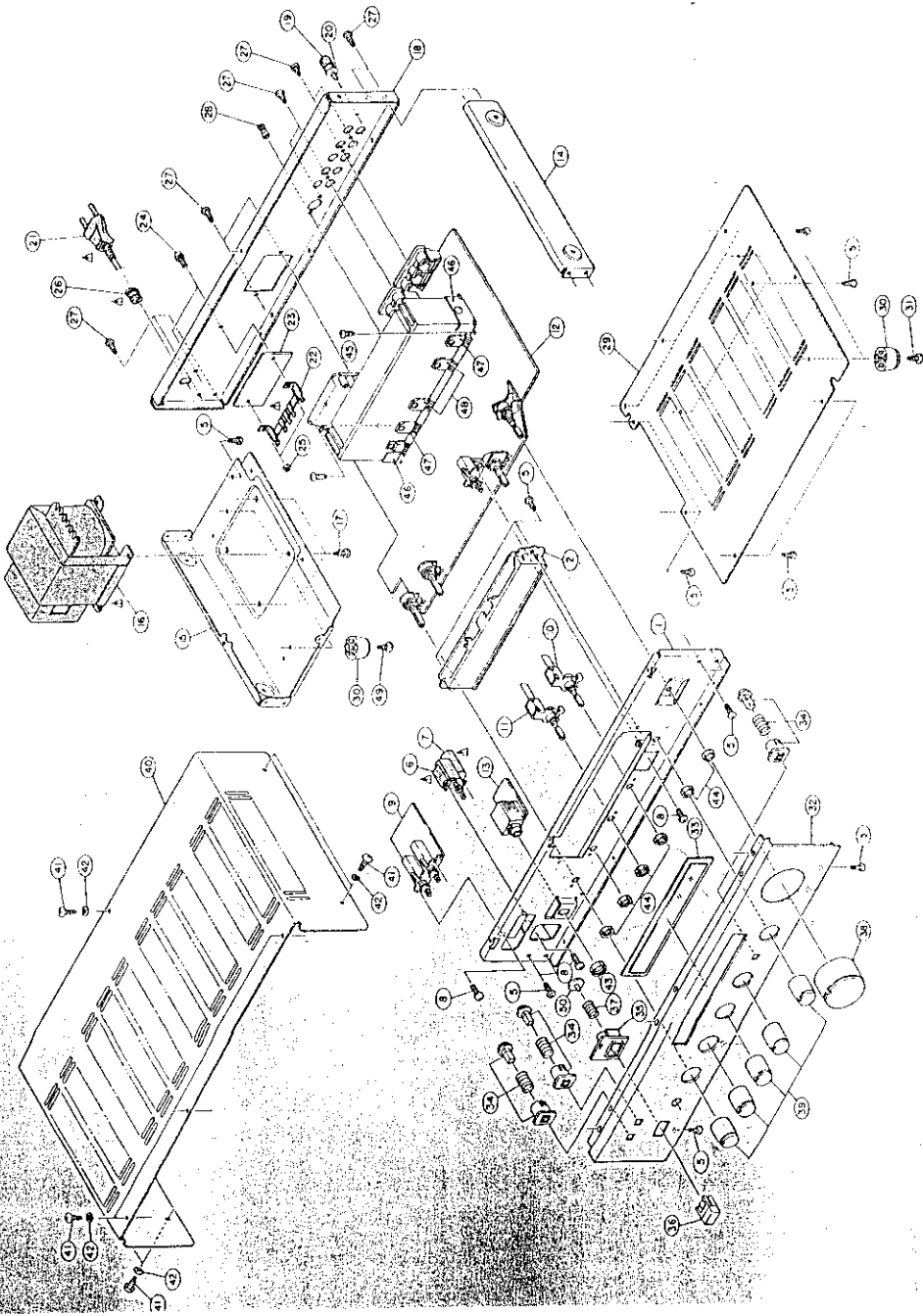
- Keep the unit away from wind blown from an air conditioner or an electric fan and set it to the normal operating mode. The ambient temperature of the tuner is 15 to 30°C.
- Set the switches as follows:
 - Turn off the power switch.
 - Turn the volume control counterclockwise to the end.
 - Connect a load of 8 ohms to the speaker terminals.
- Connect an oscillator to an input jack (AUX) and set the input selector switch to "AUX". Connect an electronic voltmeter to the speaker terminals.
- 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.
- 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.
- Turn semi-fixed volume VR4 so that the fifth LED (15 W) from the right starts to light.



- 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 \pm 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.

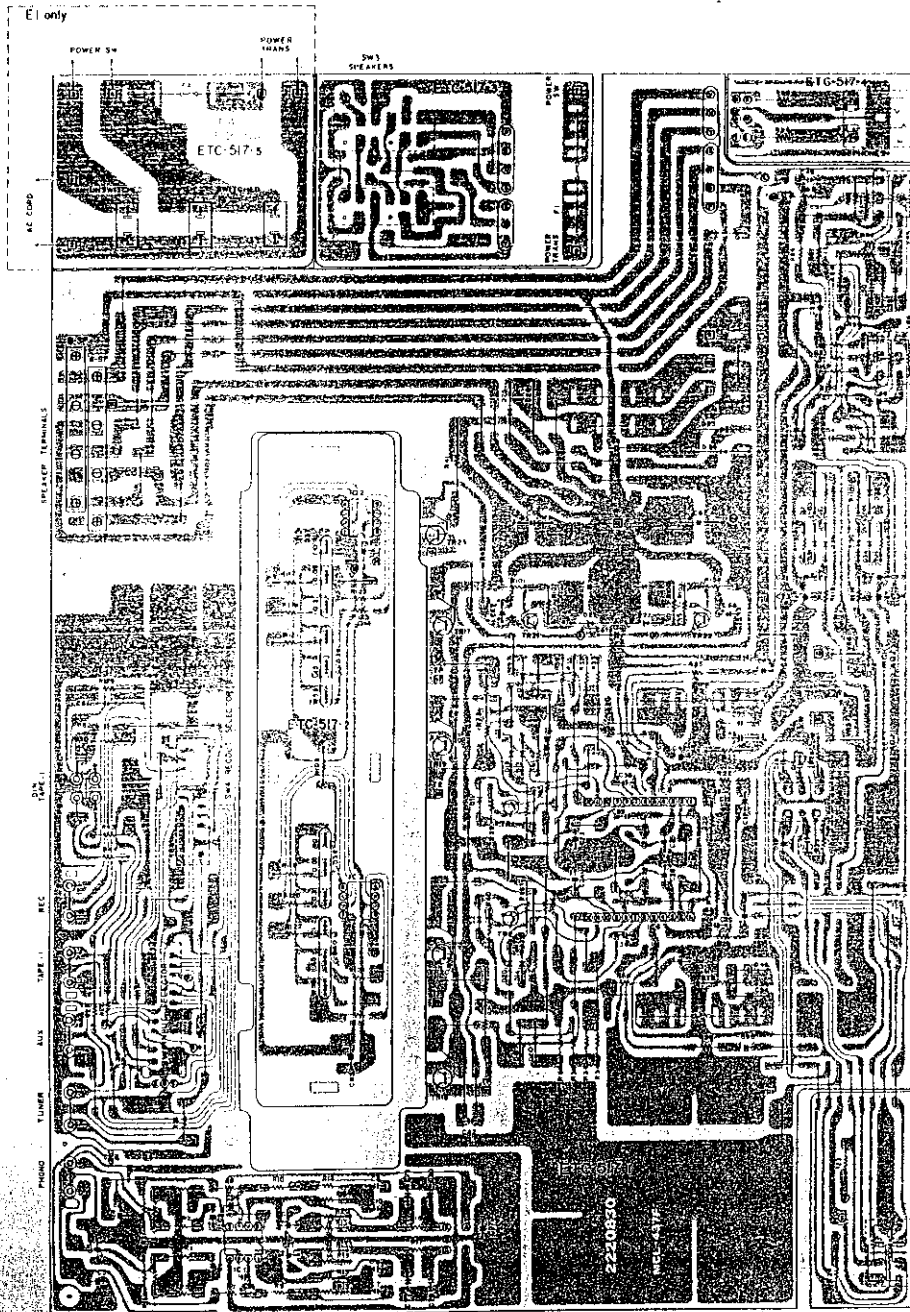
Ref. No.	Part No.	Part Name & Descriptions	Ref. No.	Part No.	Part Name & Descriptions
1	4110353009	FRONT CHASSIS ASS'Y	31	4730455031	TAPPING SCREW (24x10 (BLACK)
2	1460503201	METER COVER	32	1440996003	FRONT PANEL
3	3939164014	LED SLP-267B-03 (GREEN)	33	1430257008	WINDOW PLATE
4	ETC0517-2	LED INDICATOR UNIT	34	1130306107	PUSH KNOB (LOUD) ASS'Y
5	4730354019	TAPPING SCREW (213x8	35	1460501009	PANEL BUSH (POWER)
6	4730354021	POWER SWITCH	36	1130171222	PUSH KNOB ASS'Y
7	4768023035	CAPACITOR (0.047UF 250V)	37	4630220007	SPRING
8	4700009006	CROSS PAN SCREW WITH S. WASHER 3x6	38	1120265216	KNOB
9	ETC0517-3	SPEAKER SWITCH UNIT	39	1120321008	KNOB ASS'Y (A)
10	2120170012	ROTARY REMOTE (A) 8x310mm	40	1020111127	TOP COVER
11	2120170025	ROTARY REMOTE (B) 8x400mm	41	4770052038	FIXING SCREW
12	ETC0517	POWER & CONTROL UNIT	42	4410367009	WASHER
13	ETC0517-4	HEADPHONE UNIT	43	-	NUT #12 (SPARE)
14	4121082000	SIDE CHASSIS	44	-	NUT #7 (SPARE)
15	4121083105	TRANS CHASSIS	45	4170175007	POWER RADIATOR (ETC-517)
16	4335356004	POWER TRANS	46	4121079000	RADIATOR BRACKET (ETC-517)
17	4734454012	TAPPING SCREW (TRUS) 4x8	47	2730237031	TRANSISTOR 2SC2577(O/Y) (ETC-517)
18	1050484002	BACK PANEL	48	2710136039	TRANSISTOR 2SA1102(G/Y) (ETC-517)
19	2050071016	TERMINAL ASS'Y	49	4730454016	TAPPING SCREW (214x8
20	4770018001	WASHER (P-87)	50	1190014002	STOPPER
21	4067002081	ACCORD	PACKING & ACCESSORIES (not included EXPLODED VIEW)		
22	2050088008	WIRE TERMINAL			
23	4150088004	INSULATING SHEET	a	5050075006	CABINET COVER
24	4700042005	CROSS PAN SCREW WITH S. WASHER 3x8 (BLACK)	b	5030330004	CUSHION
25	4756006008	NUT #3	c	5010729062	CARTON CASE
26	4350020005	CORD BUSH	d	5111018009	INST. MANUAL
27	4730354035	TAPPING SCREW (213x8			
28	4770096007	PUSH RIVET			
29	1050485001	BOTTOM COVER			
30	1048001002	FOOT			

ADDENDUM LIST

Ref. No.	Part Name & Descriptions	EG for Germany	EK for U.K.	Part No. E3 for U.S.A.	E1 for Hong Kong, Singapore
4	LED INDICATOR UNIT	ETC0517-2	ETC0517B-2		ETC0517D-2
6	POWER SWITCH	2124154021	2124154021		2124154021
7	CAPACITOR (0.047UF 250V)	2568023035	2568023035		2568023035
9	SPEAKER SWITCH UNIT	ETC0517-3	ETC0517B-3		ETC0517D-3
12	POWER & CONTROL UNIT	ETC0517	ETC0517B-4		ETC0517D-4
13	HEADPHONE UNIT	ETC0517-4	ETC0517B-4		ETC0517D-4
16	POWER TRANS	4335356004	4335356004		4335356004
18	BACK PANEL	1050484002	1050484002		1050491008
21	ACCORD	4067002081	4067002081		4067002081
22	WIRE TERMINAL	2050088008	2050088008		2050088008
23	INSULATING SHEET	4150088004	4150088004		
24	CROSS PAN SCREW WITH S. WASHER 3x8 (BLACK)	4700042005	4700042005		
25	NUT #3	4756006008	4756006008		
26	CORD BUSH	4350020005	4350020005		
44	VOLTAGE SELECTOR SWITCH				
45	CROSS PAN SCREW 3x6 (BLACK)				
44	TOOTH WASHER #3		4753001051		
45	EARTH LABEL		5130140000		
46	WIRE ASS'Y		2030176151		
47	VOLTAGE LABEL		5130362008		
48	BLIND SHEET		5130348006		
49	CAUTION SHEET		5130346006		
50	TOOTH WASHER		4753100004		
PACKING & ACCESSORIES (not included EXPLODED VIEW)					
6	CAUTION SHEET		5130364006		
7	IMPORTANT LABEL		5130372001		
9	GUARANTEE CARD		5150230000		

PRINTED WIRING BOARD PATTERNS AND PARTS LIST

ETC-517, B, D POWER & CONTROL UNIT



POWER & CONTROL UNIT

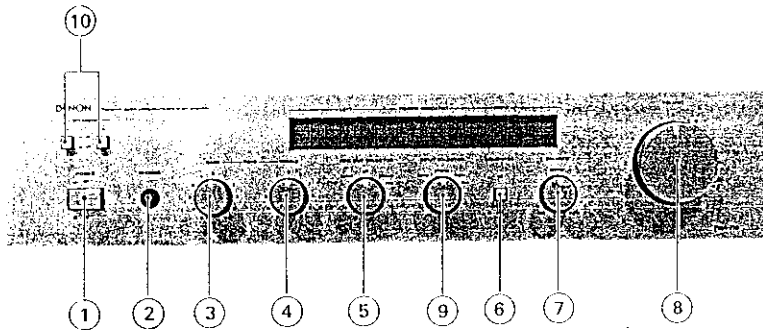
ETC-517 for E2, 517B for E.K

Ref. No.	Part No.	Part Name & Descriptions	Ref. No.	Part No.	Part Name & Descriptions
SEMICONDUCTORS					
IC01	2650030004	NJM4558D-D INTEGRATED CIRCUIT	C12	2544146004	1µF 50V ELECTROLYTIC
IC02	2630098008	TL489CP INTEGRATED CIRCUIT	C15	2551122008	0.047µF 50V PLASTIC FILM
IC03	2630098008	TL489CP INTEGRATED CIRCUIT	C16	2551122008	0.047µF 50V PLASTIC FILM
IC05	2630206007	µPC1225H INTEGRATED CIRCUIT	C17	2544146004	1µF 50V ELECTROLYTIC
IC06	2630206007	µPC1225H INTEGRATED CIRCUIT	C18	2544145005	0.47µF 50V ELECTROLYTIC
TR01	2730198015	2SC1815 (BL) TRANSISTOR	C21	2544146004	1µF 50V ELECTROLYTIC
TR02	2730198015	2SC1815 (BL) TRANSISTOR	C22	2544146004	1µF 50V ELECTROLYTIC
TR17	2730237031	2SC2577 (O/Y) TRANSISTOR	C23	2544146004	1µF 50V ELECTROLYTIC
TR18	2730237031	2SC2577 (O/Y) TRANSISTOR	C24	2544146004	1µF 50V ELECTROLYTIC
TR19	2710136039	2SA1102 (O/Y) TRANSISTOR	C37	2544145005	0.47µF 50V ELECTROLYTIC
TR20	2710136039	2SA1102 (O/Y) TRANSISTOR	C38	2544145005	0.47µF 50V ELECTROLYTIC
TR21	2730111050	2SC1213A (CI) TRANSISTOR	C39	2544145005	0.47µF 50V ELECTROLYTIC
TR22	2710040073	2SA673A (D/J)(C) TRANSISTOR	C42	2544060025	1µF 100V ELECTROLYTIC
TR23	2740065002	2SD080 (Y) TRANSISTOR	C45	2551122008	0.047µF 15% 50V PLASTIC FILM
D01	2760049008	1S2076 DIODE	C46	2551122008	0.047µF 15% 50V PLASTIC FILM
D02	2760049008	1S2076 DIODE	C47	2544130007	100µF 10V ELECTROLYTIC
D05	2760049008	1S2076 DIODE	C48	2544130007	100µF 10V ELECTROLYTIC
D06	2760049008	1S2076 DIODE	C49	2551121083	0.033µF 15% 50V PLASTIC FILM
D09	2760049008	1S2076 DIODE	C50	2551121083	0.033µF 15% 50V PLASTIC FILM
D10	2760049008	1S2076 DIODE	C51	2551085006	0.12µF 110% 50V PLASTIC FILM
D13	2760049008	1S2076 DIODE	C52	2551085006	0.12µF 110% 50V PLASTIC FILM
D14	2760049008	1S2076 DIODE	C53	2551120013	0.0012µF 15% 50V PLASTIC FILM
D20	2760049008	1S2076 DIODE	C54	2551120013	0.0012µF 15% 50V PLASTIC FILM
D21	2760249002	HZ18-2 DIODE	C55	2551120097	0.0056µF 15% 50V PLASTIC FILM
D22	2760249002	HZ18-2 DIODE	C56	2551120097	0.0056µF 15% 50V PLASTIC FILM
D23	2760232006	V08C DIODE	C59	2544146004	1µF 50V ELECTROLYTIC
D24	2760232006	V08C DIODE	C60	2544146004	1µF 50V ELECTROLYTIC
D25	2760232006	V08C DIODE	C61	2551122008	0.047µF 15% 50V PLASTIC FILM
D26	2760232006	V08C DIODE	C62	2544139008	100µF 25V ELECTROLYTIC
D31	2760049008	1S2076 DIODE	C63	2544139008	100µF 25V ELECTROLYTIC
D32	2760049008	1S2076 DIODE	C64	2544050006	100µF 50V ELECTROLYTIC
D33	2760239038	HZ3B-2 DIODE	C65	2544050006	100µF 50V ELECTROLYTIC
D34	2760239038	HZ3B-2 DIODE	C66	2546061006	5600µF ±20% 50V ELECTROLYTIC
D35	2760049008	1S2076 DIODE	C67	2546061006	5600µF ±20% 50V ELECTROLYTIC
D36	2760049008	1S2076 DIODE	C71	2544145005	0.47µF 50V ELECTROLYTIC
RESISTORS (not included ±5%, ¼W Carbon Film Type)					
VR01	2110251006	VARIABLE RESISTOR 100 k ohm (MAIN)	C72	2544145005	0.47µF 50V ELECTROLYTIC
VR02	2110245009	VARIABLE RESISTOR 250 k ohm (BALANCE)	C73	2551121067	0.022µF 15% 50V PLASTIC FILM
VR03	2116000028	SEMI FIXED RESISTOR 100 k ohm	C74	2551121067	0.022µF 15% 50V PLASTIC FILM
VR04	2116000028	SEMI FIXED RESISTOR 100 k ohm	C77	2551120055	0.0027µF 15% 50V PLASTIC FILM
VR05	2110246011	VARIABLE RESISTOR 100 k ohm (BASS)	C78	2551120055	0.0027µF 15% 50V PLASTIC FILM
VR06	2110246011	VARIABLE RESISTOR 100 k ohm (TREBLE)	C79	2551120055	0.0027µF 15% 50V PLASTIC FILM
R41	2440084024	68 ohm ±5% 2W METAL OXIDE FILM	C80	2551120055	0.0027µF 15% 50V PLASTIC FILM
R55	2440049027	4.7 k ohm ±5% 1W METAL OXIDE FILM	C92	2544113901	4.7µF 35V ELECTROLYTIC
R56	2440049027	4.7 k ohm ±5% 1W METAL OXIDE FILM	C87	2544151002	22µF 50V ELECTROLYTIC
R65	2440049027	4.7 k ohm ±5% 1W METAL OXIDE FILM	C88	2544151002	22µF 50V ELECTROLYTIC
R66	2440049027	4.7 k ohm ±5% 1W METAL OXIDE FILM	C91	2544151002	22µF 50V ELECTROLYTIC
R77	2410137008	10 ohm ±5% ¼W CARBON FILM	C92	2544151002	22µF 50V ELECTROLYTIC
R78	2410137008	10 ohm ±5% ¼W CARBON FILM	OTHER PARTS		
R97	2440033020	220 ohm ±5% 1W METAL OXIDE FILM	2220830003	P.W. BOARD	
R98	2440033020	220 ohm ±5% 1W METAL OXIDE FILM	2090047903	0.6 JUMPER WIRE USED 118	
R101	2412313037	220 ohm ±2% ¼W CARBON FILM (FUSIBLE)	2050134908	TERMINAL PIN USED 21	
CAPACITORS (not included Ceramic 50V Type)					
C01	2544147003	2.2µF 50V ELECTROLYTIC	2090008133	JUMPER P=7.5mm USED 1	
C02	2544147003	2.2µF 50V ELECTROLYTIC	2050150003	6P CONNECTOR BASE	
C05	2544127007	220µF 6.3V ELECTROLYTIC	2050150005	4P CONNECTOR BASE	
C06	2544127007	220µF 6.3V ELECTROLYTIC	2050151004	8P PUSH TERMINAL	
C07	2551121067	0.022µF 15% 50V PLASTIC FILM	2048047007	HEADPHONE JACK	
C08	2551121067	0.022µF 15% 50V PLASTIC FILM	2048059008	DIN JACK (5P)	
C09	2551121009	0.0056µF 15% 50V PLASTIC FILM	2020014003	FUSE CLIP USED 6	
C10	2551121009	0.0056µF 15% 50V PLASTIC FILM	F01	2061015058	FUSE 1.6A
C11	2544146004	1µF 50V ELECTROLYTIC	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 1/2x8
				4700012022	CROSS PANI SCREW WITH S.W.S.W. 3x12
				4150171005	WASHER (AC316A)
				4150052001	INSULATING SHEET (AC-229)
				4170171001	RADIATOR

ETC-517D PARTS LIST for E1

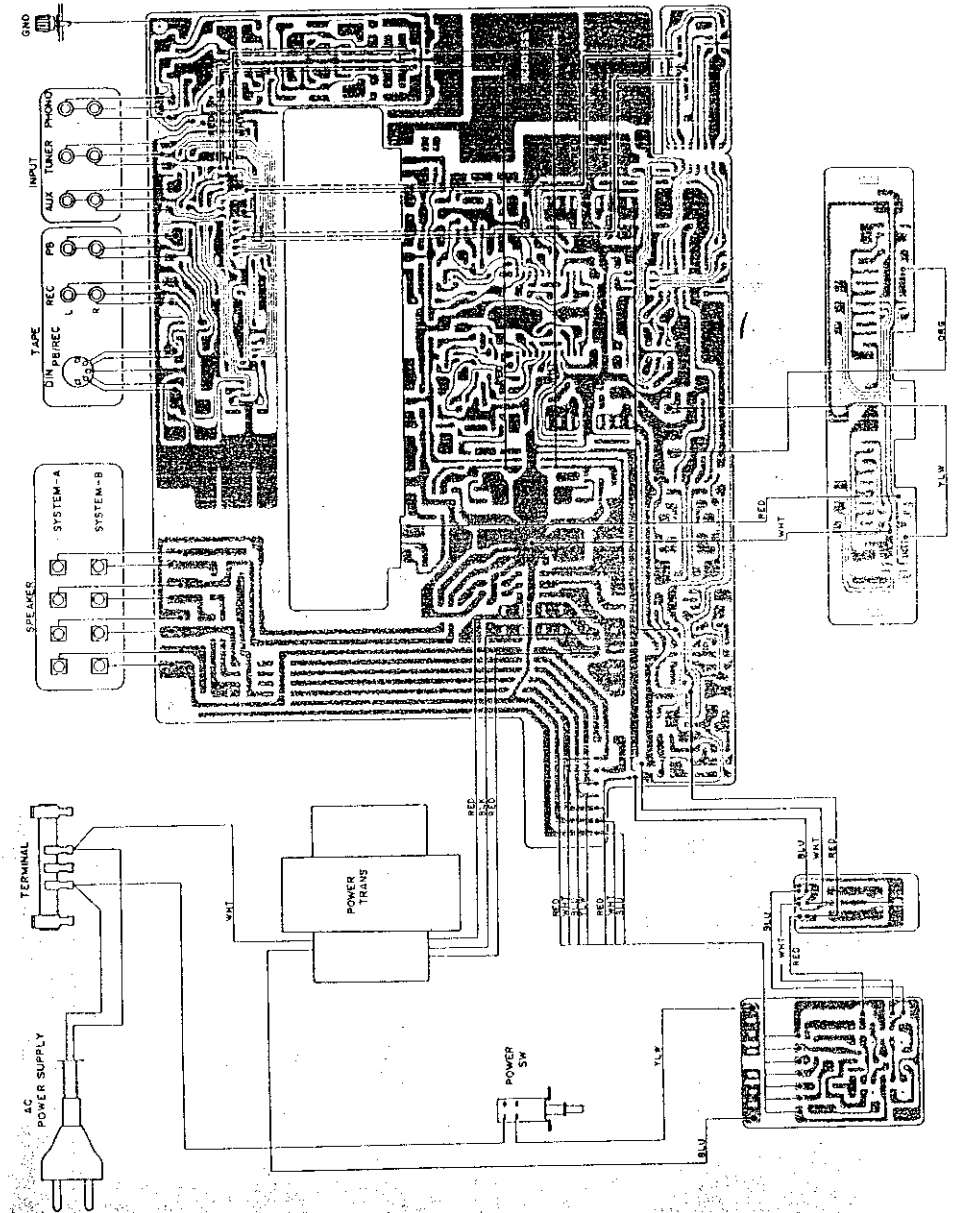
Ref. No.	Part No.	Part Name & Descriptions
	EP-5667111	TERMINAL (WRAPPING PIN) USED (ADD)
	EP-5870	FUSE HOLDER (ADD)
	2061025080	FUSE TLC 315A (ADD)
	2033909008	AC OUTLET (ADD)
	5130159143	FUSE LABEL (ADD)

DESIGNATION AND FUNCTIONS OF FRONT PANEL CONTROLS

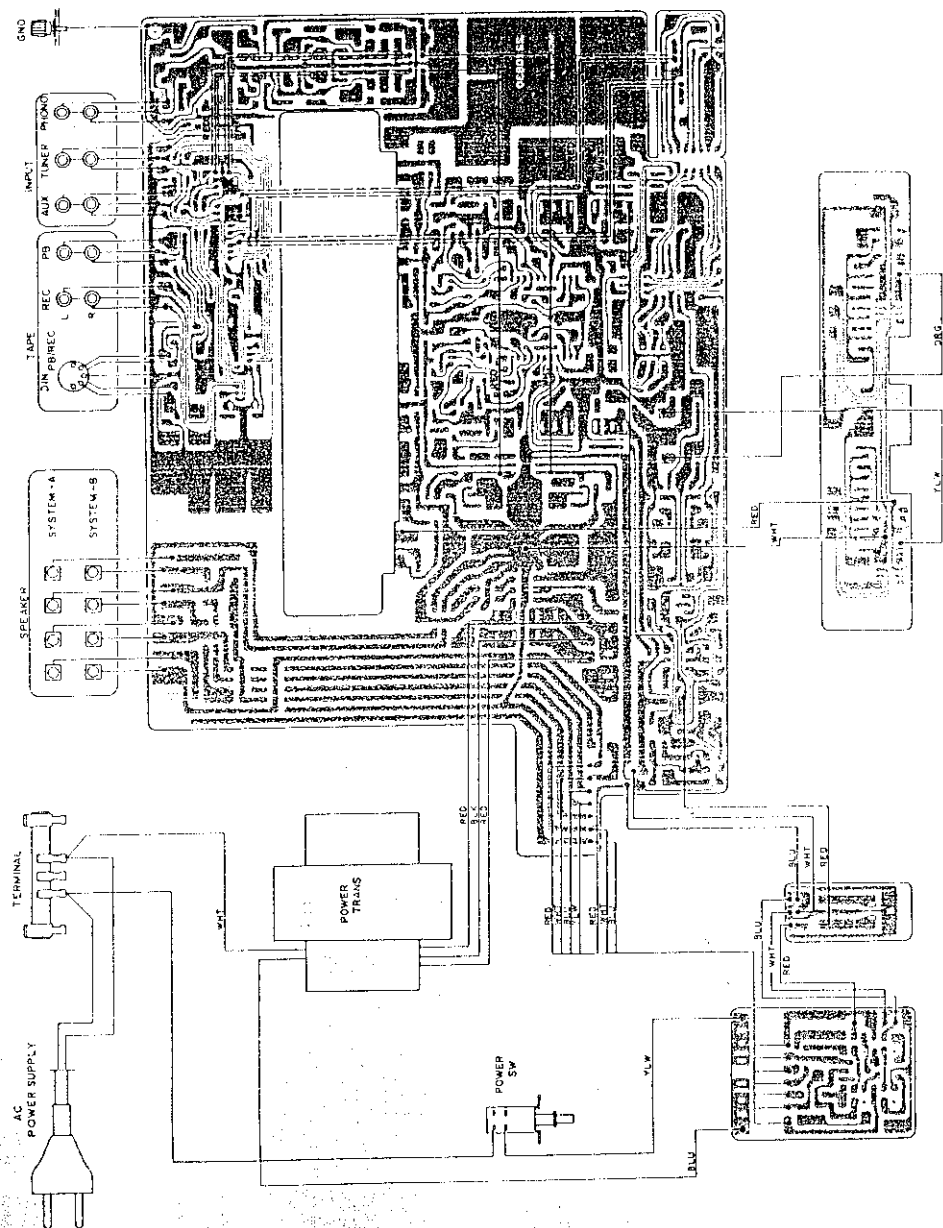


- ① POWER (Power On-Off Switch)
- ② PHONES (Headphone Jack)
- ③ BASS (Bass Control)
- ④ TREBLE (Treble Control)
- ⑤ RECUT SELECTOR (REC OUT Selector Switch)
- ⑥ LOUDNESS (Loudness Switch)
- ⑦ BALANCE (Balance Control)
- ⑧ VOLUME (Volume Control)
- ⑨ INPUT CHANGE-OVER SWITCH
- ⑩ SPEAKERS (Speaker Changeover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

CONNECTION DIAGRAM



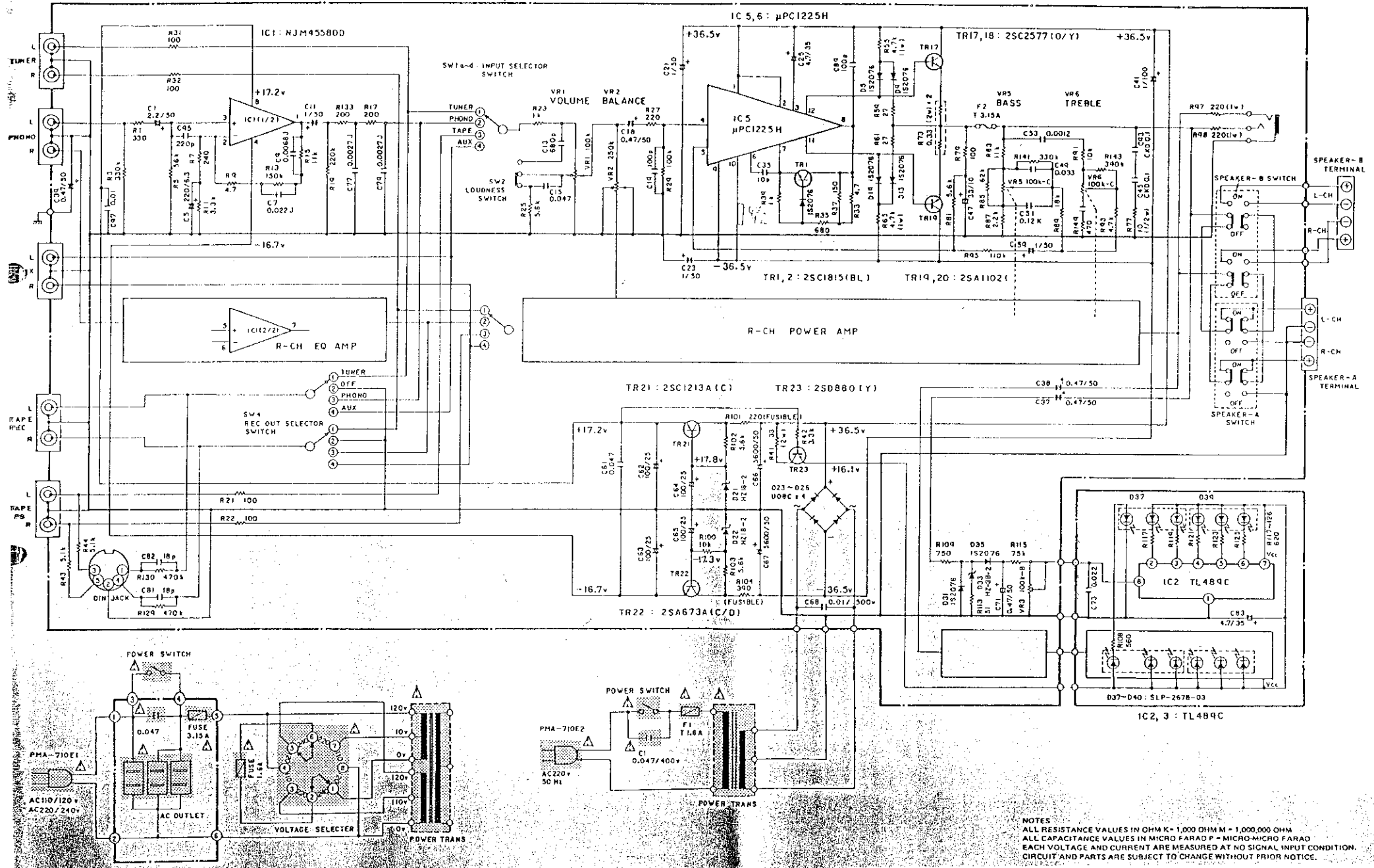
CONNECTION DIAGRAM



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

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.