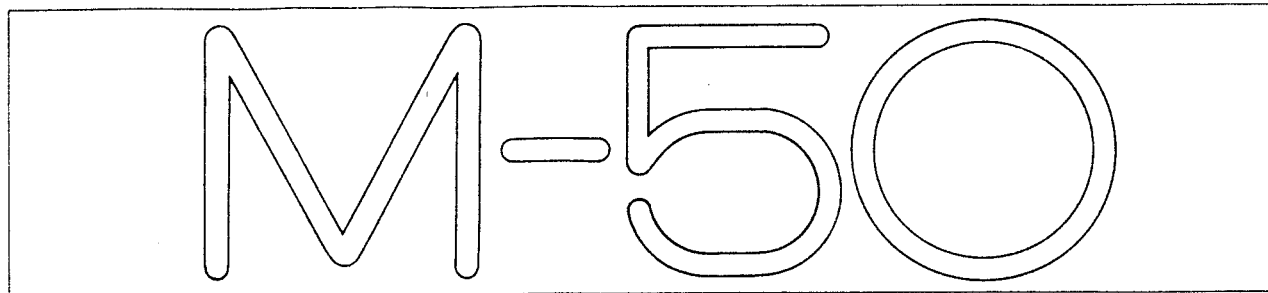




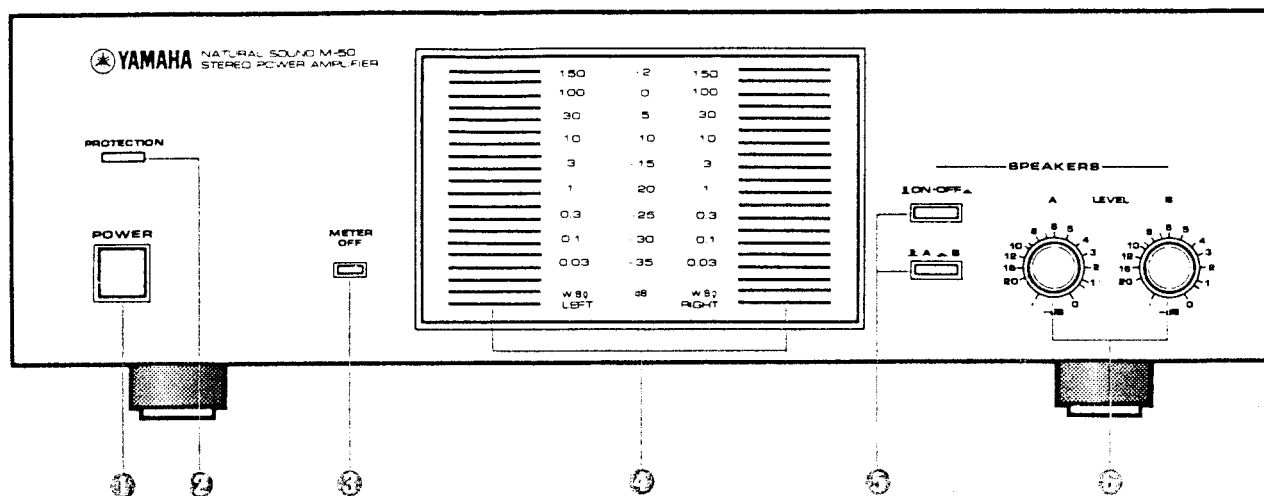
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STEREO POWER AMPLIFIER



SERVICE MANUAL

FRONT PANEL



- ① POWER SWITCH
- ② PROTECTION INDICATOR
- ③ METER OFF SWITCH

- ④ PEAK POWER INDICATORS
- ⑤ SPEAKER SELECTION SWITCHES
- ⑥ SPEAKER LEVEL CONTROL

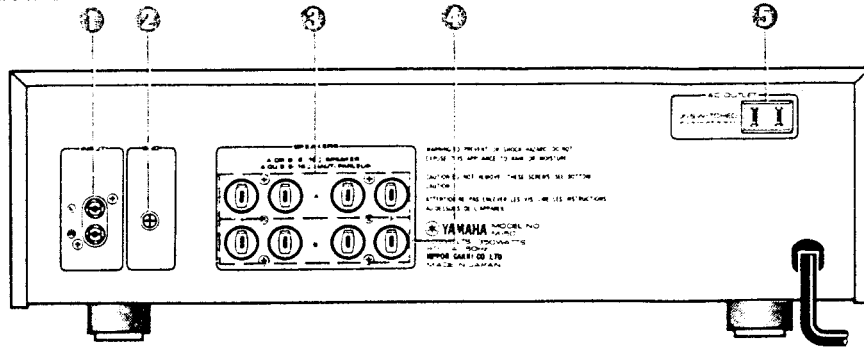
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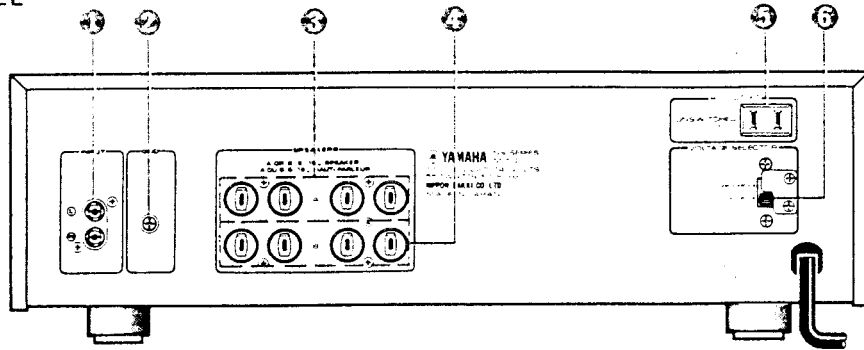
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REAR PANELS

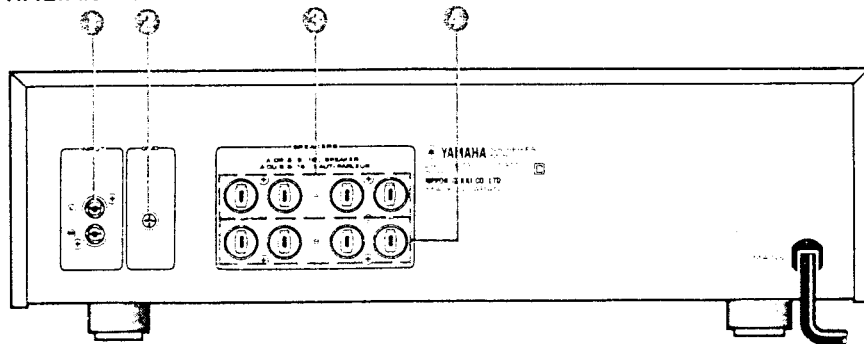
▼ U.S. & CANADIAN MODELS



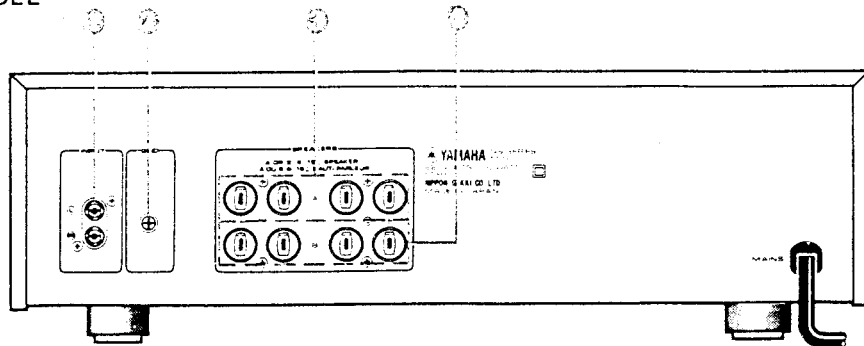
▼ GENERAL MODEL



▼ BRITISH & AUSTRALIAN MODELS



▼ EUROPEAN MODEL

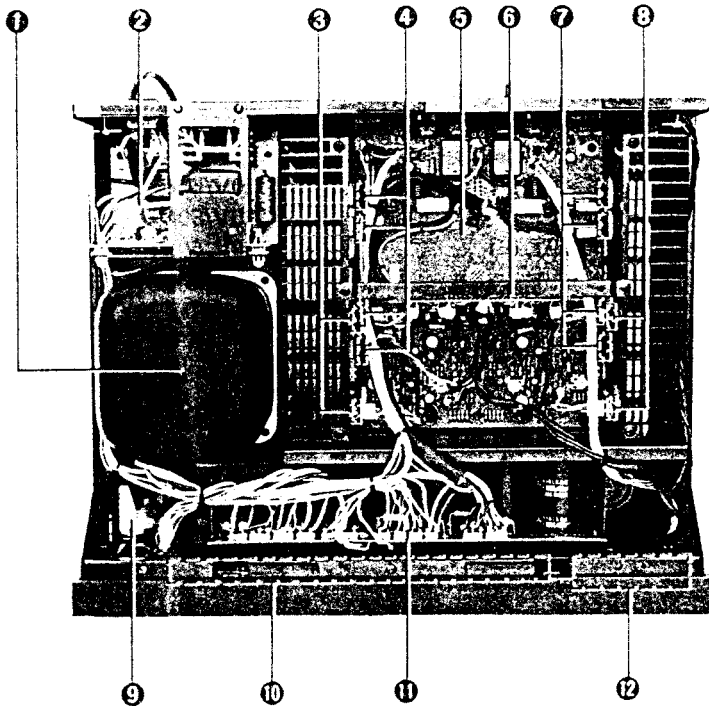


- ① INPUT TERMINAL
- ② GND TERMINAL
- ③ SPEAKER TERMINAL A
- ④ SPEAKER TERMINAL B

- ⑤ AC OUTLET
- ⑥ VOLTAGE SELECTOR

INTERNAL VIEW

TOP VIEW



① POWER TRANSFORMER

U.S. model : GA64810
 Canadian model : GA64820
 European model : GA64830
 British & Australian models : GA64840
 General model : GA64850

② CONTROL CIRCUIT BOARD

③ DRIVE TRANSISTOR (Lch)

2SA968

2SC2238

④ POWER TRANSISTOR (Lch)

2SA1146 (iA11460)

2SC2706 (iC27060)

⑤ MAIN CIRCUIT BOARD (NA07758)

⑥ PREDRIVE CIRCUIT BOARD

⑦ POWER TRANSISTOR (Rch)

2SA1146 (iA11460)

2SC2706 (iC27060)

⑧ DRIVE TRANSISTOR (Rch)

2SA968

2SC2238

⑨ POWER SWITCH

⑩ METER CIRCUIT BOARD

⑪ ELECTROLYTIC CAP, CIRCUIT BOARD

⑫ PJ & VR CIRCUIT BOARD

U.S., Canadian & General Models: NA07918

European, British & Australian Models: NA07967

DISASSEMBLY PROCEDURES

1. Top cover removal

Remove screws ① and ② from the both left and right sides and screw ③ in Fig. 1. Slide cover away from the front panel, remove the top cover by lifting.

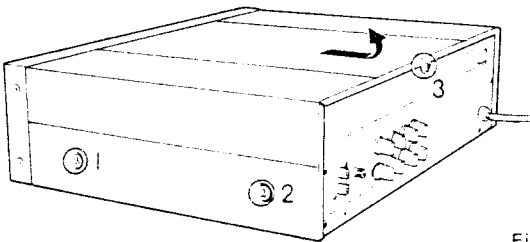


Fig. 1

2. Bottom cover removal

Remove screws ① through ⑨ in Fig. 2 and then remove the bottom cover.

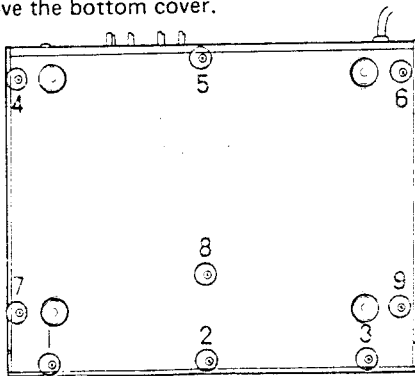


Fig. 2

3. Front panel removal

- a. Remove the SPEAKER LEVEL knobs.
- b. Remove screws ① through ③ in Fig. 3 and screws ① through ③ in Fig. 2, the front panel may be lifted out forward gently. When is performed, the illumination lamp of the power switch must be disconnected.

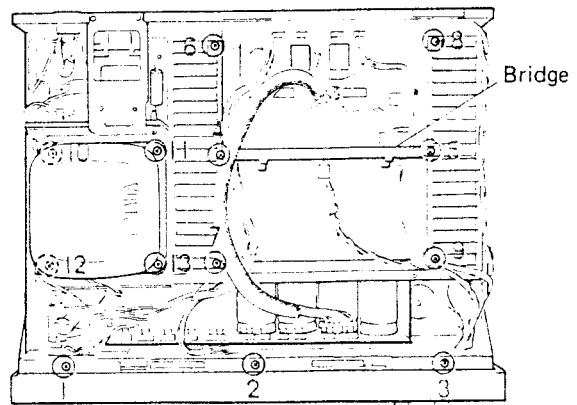


Fig. 3

■ SPECIFICATIONS

Minimum RMS Output Power	
(8 Ω , 20Hz to 20kHz, 0.002% THD)	
(R), (U), (C)	120W + 120W
(G), (A), (B)	110W + 110W
4Ω Clipping Power (1kHz)	200W + 200W
Total Harmonic Distortion	
(8 Ω 1/2 Rated Power)	
20Hz	0.0005%
1kHz	0.0005%
20kHz	0.001%
50kHz	0.004%
100kHz	0.01%
IM Distortion Ratio	
(8 Ω , 1/2 rated power, 50Hz + 7kHz)	0.002%
Power Bandwidth	
(8 Ω 1/2 Rated Power 0.1% THD)	10Hz to 100kHz
Damping Factor	
(8 Ω 1kHz)	200
Frequency Response	
(8 Ω)	DC to 100kHz, -0.5dB
Input Sensitivity/Impedance	
(8 Ω Rated Power)	
(R), (U), (C)	1.1V/25k Ω
(G), (A), (B)	1.05V/25k Ω
Signal to Noise Ratio	
(IHF A Network, 8 Ω , Input Shorted)	
(R), (U), (C)	122dB
(G), (A), (B)	121dB

Channel Separation (Input Shorted)	
20Hz	100dB
1kHz	95dB
20kHz	70dB
Slew Rate	200V/ μ s
Power Supply	
(U), (C)	120V/60Hz
(G)	220V/50Hz
(A), (B)	240V/50Hz
(R)	110, 120, 220, 240V/ 50/60Hz
Power Consumption	
(U), (C)	350W/800VA
(G), (A), (B)	550W
(R)	200W
Dimensions (W x H x D)	435 x 380 x 133mm (17-1/8x14-15/16x5-1/4)"
Weight	11.8kg (26 lbs, 0.2 oz)

(U) U.S.A. model
 (C) Canadian model
 (R) General model
 (G) European model
 (B) British model
 (A) Australian model

Specifications subject to change without notice.

■ PARTS LIST

Ref. No.	Part No.	Description	部品名	Remarks	Common Model	Markets
1	iA 09 68:00	Transistor	トランジスタ	TR133, 134		
"	iC 22 38:00	"	"	TR131, 132		
2	iA 11 46:00	"	"	TR137, 138 TR141, 142		
"	iC 27 06:00	"	"	TR135, 136 TR139, 140		
* 3	BA 08 28:50	Heat Sink	放熱板			
4	CB 07 28:80	Isolation Bush	絶縁ブッシュ			
5	iL 00 02:70	Mica Base	マイカベース			
6	iL 00 04:60	"	"			
* 7	GA 64 80:00	Power Transformer	電源トランス			J
"	GA 64 81:00	"	"			U
"	GA 64 82:00	"	"			C
"	GA 64 83:00	"	"			G
"	GA 64 84:00	"	"			A, B
"	GA 64 85:00	"	"			R
8	KA 40 07:40	Slide Switch	スライドスイッチ			"
9	LB 20 13:00	Fuse Holder	ヒューズホルダー			"
10	AA 60 75:70	CS Holder	C Sホルダー		M-70	
11	BA 08 10:90	Cover, Transformer	トランスカバー		M-70	
12	CB 09 99:10	Rubber, Antivibration	防振ゴム		A-760	
13	CB 09 98:30	P.C. Support	P Cサポート		M-70	
14	CB 60 42:70	Isolation Plate	絶縁板		M-70	
15	CB 60 50:90	Bush	リードブッシュ		M-70	
16	CB 60 51:00	Cover Packing	カバーパッキング		M-70	
17	CB 60 41:00	"	"		A-1060	J, R, A, G, B
"	CB 60 53:80	"	"			U, C
18	CB 08 01:00	Tape	粘着テープ			
19	AA 60 96:20	Plate	プレート		A-1060	
20	CB 60 71:90	Damper Tape	ダンパーテープ		A-1060	
* 21	NA 07 75:60	Main Circuit Board	メインシート			J
"	NA 07 75:80	"	"			R, U, A, G, C, B
* 22	NA 07 76:60	Electrolytic Cap Circuit Board	ケミコンシート			J
"	NA 07 76:70	"	"			U, C
"	NA 07 76:80	"	"			A, G, B
"	NA 07 95:20	"	"			R
* 23	NA 07 77:40	Control Circuit Board	制御シート			J
"	NA 07 77:50	"	"			R
"	NA 07 77:60	"	"			U, C
"	NA 07 77:70	"	"			A, G, B
24	CB 80 68:50	Cord Stopper	コードストッパー			J
"	CB 07 27:50	"	"			R, U, A, G, C, B
25	KB 00 13:00	Fuse	ヒューズ	T7.0A 250V		R
26	LB 20 18:10	AC Socket (Single)	A Cアウトレット			J, R, U
"	LB 20 20:70	"	"			C
* 27	MG 00 12:20	Power Cord	電源コード	15A 125V 2m		J
"	MG 00 07:80	"	"	6A 250V 2m		R
"	MG 00 13:60	"	"	13A 125V 2m		U, C
"	MG 00 09:10	"	"	6A 250V 2m		G
"	MG 00 09:20	"	"	7.5A 250V 2.5m		A
"	MG 00 10:00	"	"	6A 300/500V 2m		B
* 28	NA 07 78:70	Pre Drive Circuit Board	ブリドライブシート			J
"	NA 07 78:80	"	"			R, A, G, B
"	NA 07 78:90	"	"			U, C
* 29	AA 60 82:30	Rear Panel	リアパネル			J

⊕ New Parts (新規部品)

Ref. No.	Part No.	Description	部品名	Remarks	Common Model	Markets
* 29	AA 60 82:40	Rear Panel	リアパネル			R
"	AA 60 82:50	"	"			U, C
"	AA 60 82:60	"	"			G
"	AA 60 82:70	"	"			A, B
30	CB 09 26:80	P.C. Support	P Cサポート			
31	CB 60 14:40	Switch Guard	V Sストッパー			R
32	AA 60 97:40	Metal Fitting, Protection	保護金具			A, G, B
33	CB 09 04:40	Rubber, Antivibration	防振ゴム			
34	CB 06 88:80	Plastic Rivet	プラスチックリベット			
35	CB 09 12:90	P.C. Board Holder	基板ホルダー			
36	CB 60 74:30	Cushion, Antivibration	防振クッション			
37	AA 60 75:10	Top Cover	トップカバー		M-70	
38	AA 60 75:30	Bottom Cover	ボトムカバー		M-70	
39	CB 07 94:90	Leg	脚			
40	CB 60 73:40	Rubber, Antivibration	防振ゴム			
* 41	NA 07 50:60	PJ & VR Circuit Board	P J & V Rシート			J
"	NA 07 91:80	"	"			R, U, C
"	NA 07 96:70	"	"			A, G, B
42	ED 33 01:20	Bind Head Screw	3x12 ZMC2-Bℓ	バインド小ネジ		
43	EH 02 60:80	Cums Head Screw Sp Washer	M2.6x8 ZMC2-Y	セムスナベ小ネジ (ダブルセムス)	(Sems Type)	
44	EV 30 33:00	Spring Washer	M3 FCM3-Bℓ	スプリングワッシャー		
45	EN 33 00:10	Bind Head Tapping Screw	3x8 FCM3-Bℓ	バインドタッピンネジ(2種)		
46	EZ 00 14:00	Ground Terminal Screw	3x13.5 MFMIII	アース端子ネジ		
* 47	EV 20 84:00	Plain Washer	φ4	平座金		J
48	EV 20 33:00	"	M3 FCM3-Bℓ	"		
49	EN 33 00:20	Bind Head Tapping Screw	3x6 FCM3-Bℓ	バインドタッピンネジ(2種)		
* 50	EG 34 09:70	Pan Head Screw	M4x97 FCM3-Bℓ	ナベ小ネジ		
51	EV 20 34:00	Plain Washer	M4 FCM3-Bℓ	平座金		
52	EV 41 30:39	Toothed Lock Washer	M3 FCM3-Bℓ	内歯形歯付座金		
53	EV 90 13:60	Sems Plain Washer	φ3.6xφ10x10.8 FCM3-3g	セムス平座金		
54	ED 33 00:60	Bind Head Tapping Screw	M3x6 FCM3-Bℓ	バインド小ネジ		R, A, G, B
55	EN 33 01:00	Bind Head Tapping Screw	3x16 ZMC2-Bℓ	バインドタッピンネジ(2種)		
56	AA 60 82:10	Make Up Screw	ZMC2-Bℓ	化粧ネジ	M-70	
57	AA 60 38:50	Screw		段付ネジ	A-760	
58	BA 07 95:30	Heat Sink	放熱板			
	CB 06 92:50	Binding Tie	インシュロックタイ			

⊕ New Parts (新規部品)

■ PARTS LIST (CIRCUIT BOARD)

Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
*	NA 07:50:60	PJ & VR Circuit Board	P J & V R シート		J	
*	NA 07:91:80	"	"		R,U,C	
*	NA 07:96:70	"	"		A,G,B	
* C401,402	FT 55:24:70	Polypropylene Film Cap.	470pF 50V	ポリプロピレンフィルムコン		
* P401,402	HJ 35:53:30	Carbon Resistor	330Ω RD25	カーボン抵抗		
* VR401, VR402	HS 41:10:10	Variable Resistor	B50kΩ x 2	可変抵抗器		
* SW401	KA 90:22:40	Push Switch with Cam	2 point 4 circuit	カム付プッシュスイッチ		
* PJ401	LB 20:19:80	Pin Jack with Edge	2P L Type	2Pピンジャックエッジ付		
*	NA 07:74:70	Meter Circuit Board	メーターシート		J	
*	NA 07:74:80	"	"		R,A,G,B	
*	NA 07:74:90	"	"		U,C	
* C501,502	UW 86:62:20	Electrolytic Cap.	2.2μF 50V	ケミコン		
* C5C3	UW 96:54:70	"	0.47μF 50V	"		
* C504,505	UA 25:41:50	Mylar Cap.	0.015μF 50V	マイラーコン		
* C513	UW 86:61:00	Electrolytic Cap.	1μF 50V	ケミコン		
* R501,502	HJ 35:81:00	Carbon Resistor	100kΩ RD25	カーボン抵抗		
* R503,504	HJ 35:81:50	"	150kΩ "	"		
* R505,506	HK 35:73:00	"	30kΩ "	"	J	
	HJ 35:72:70	"	27kΩ "	"	R,U,A,G,C,B	
* R507	HL 32:62:20	Metal Oxide Film Resistor	2.2kΩ 2P	酸化金抵抗		
* R509,510	HJ 35:61:20	Carbon Resistor	1.2kΩ RD25	カーボン抵抗		
* R511,512	HJ 35:71:00	"	10kΩ "	"		
* R513	HJ 35:62:70	"	2.7kΩ "	"		
* R515,516	HJ 35:51:00	"	100Ω "	"		
* R517~538	HJ 35:61:00	"	1kΩ "	"		
* R539,540	HJ 35:71:00	"	10kΩ "	"		
* R541,542	HJ 35:51:00	"	100Ω "	"		
* R543~563	HJ 35:61:00	"	1kΩ "	"		
* R565,566	HJ 35:71:00	"	10kΩ "	"		
* R567	HJ 35:76:80	"	68kΩ "	"		
* R568	HJ 35:72:70	"	27kΩ "	"		
* R569	HJ 35:63:30	"	3.3kΩ "	"		
* VR501, VR502	HT 37:00:40	Semi Variable	B500Ω	半固定抵抗	Inter-changeable	
	HT 77:00:20	"	"	"		
* TR501	iC 18:15:70	Transistor	2SC1815 (O,Y)	トランジスタ		
* D501	iF 00:14:70	Zener Diode	RD6.2EB2	ツェナーダイオード		
* D503~542	iF 00:32:20	LED (Orange)	SLR-34DW	L E D	M-70	
* D546	iH 00:07:20	Diode	W03B	ダイオード		
* IC501	iG 03:07:00	IC	TA7318P	i C		
* IC503~IC505	iG 03:06:00	"	TA7612AP	"		
* SW501	KA 90:22:30	Push Switch with Cam	2 circuit	カム付プッシュスイッチ		
	LA 00:21:10	Wrapping Terminal	P=5 2P (i Type)	i型ラッピング端子板		
	LA 00:21:20	"	P=5 3P (i Type)	"		
* CB 60:33:30	LED Reflector			LEDリフレクター		
* CB 07:41:30	Adhesive Tape			ダブルタックテープ		
*	NA 07:75:60	Main Circuit Board	メインシート		J	
*	NA 07:75:80	"	"		R,U,A,G,C,B	
* C101,102	UA 25:41:00	Mylar Cap.	0.01μF 50V	マイラーコン		
* " FC 34:51:00	"	"	0.1μF 50V	"	J	
* C102,104	FG 41:31:00	Ceramic Cap.	0.001μF 50V	セラコン	R,U,A,G,C,B	
" UA 25:31:00	Polypropylene Film Cap.	0.001μF 50V	ポリプロピレンフィルムコン		J	

* New Parts (新規部品)

Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
* C105~108	UM 02:81:00	Electrolytic Cap.	100μF 6.3V	ケミコン		J
" UW 81:81:00	"	"	100μF 6.3V	"		R,U,A,G,C,B
* C109~112	UM 05:64:70	"	4.7μF 25V	"		J
" UW 84:71:00	"	"	10μF 25V	"		R,U,A,G,C,B
* C115~118	FG 41:22:20	Ceramic Cap.	220pF 50V	セラコン		R,U,A,G,C,B
" FT 51:22:20	Polypropylene Film Cap.	220pF 50V	ポリプロピレンフィルムコン			J
* C119~122	FG 44:42:20	Ceramic Cap.	0.022μF 50V	セラコン		R,U,A,G,C,B
" UA 25:42:20	Mylar Cap.	0.022μF 50V	マイラーコン			J
* C123,124	UA 25:44:70	"	0.047μF 50V	"		J
* C125~128	UW 88:72:20	Electrolytic Cap.	22μF 80V	ケミコン		R,U,A,G,C,B
" FV 69:72:20	"	"	22μF 100V	プラスチックケミコン		J
* C129~132	FC 02:41:00	Mylar Cap.	0.01μF 100V	マイラーコン		
* C133,134	FC 25:51:00	Metallized Mylar Cap.	0.1μF 250V	M M コン		
* C135~138	UA 25:51:00	Mylar Cap.	0.1μF 50V	マイラーコン		
* C139~142	UA 25:42:20	"	0.022μF 50V	"		
* C143	UM 04:73:30	Electrolytic Cap.	33μF 16V	ケミコン		J
" FM 50:73:30	"	"	33μF 16V	Z コン		R,U,A,G,C,B
* C144	FG 44:42:20	Ceramic Cap.	0.022μF 50V	セラコン		
* C145	UW 81:81:00	Electrolytic Cap.	100μF 6.3V	ケミコン		
* L101,102	GD 90:03:70	Coil	1.5μH	空芯コイル		
* R101,102	HJ 35:46:80	Carbon Resistor	68Ω RD25	カーボン抵抗		
* R103~106	HJ 35:44:70	"	47Ω "	"		
* R107~114	HJ 35:54:70	"	470Ω "	"		
* R115~122	HJ 35:58:20	"	820Ω "	"		
* R123~130	HJ 35:48:20	"	82Ω "	"		
* R131~134	HJ 35:62:20	"	2.2kΩ "	"		
* R135~142	HJ 35:73:90	"	39kΩ "	"		
* R143~146	HJ 35:63:30	"	3.3kΩ "	"		
* R147,148	HJ 35:66:80	"	6.8kΩ "	"		
* R149,150	HJ 35:65:60	"	5.6kΩ "	"		
* R151,152	HJ 35:62:20	"	2.2kΩ "	"		
* R153~156	HJ 35:62:70	"	2.7kΩ "	"		
* R157,158	HJ 35:81:00	"	100kΩ "	"		
* R159~162	HJ 35:81:20	"	120kΩ "	"		
* R163~166	HJ 35:64:70	"	4.7kΩ "	"		
* R167~170	HJ 35:51:50	"	150Ω "	"		
* R171~174	HV 35:42:20	Flame Proof Carbon Resistor	22Ω RDF25SF	不燃化カーボン抵抗		
* R175~178	HV 35:61:20	"	1.2kΩ "	"		
* R179,180	HV 35:63:90	"	3.9kΩ "	"		
* R181~184	HV 35:34:70	"	4.7Ω "	"		
* R185,186	HV 35:48:20	"	82Ω "	"		
* R187~190	HV 35:34:70	"	4.7Ω "	"		
* R191~194	HV 35:45:60	"	56Ω "	"		
* R195~202	HZ 00:21:60	Metal Plate Resistor	0.33Ω 3P	金属板抵抗		
* R203~206	HV 35:34:70	Flame Proof Carbon Resistor	4.7Ω RDF25SF	不燃化カーボン抵抗		
* R207,208	HV 35:41:00	"	10Ω "	"		
* R209,210	HZ 00:22:60	Metal Plate Resistor	0.1Ω 5P	金属板抵抗		
* R211,212	HL 81:41:00	Metal Oxide Film Resistor	10Ω 1P	酸化金抵抗		
* R213,214	HZ 00:21:50	Cement Molded Resistor	10Ω 5P	セメント抵抗		
* R215,216	HJ 35:34:70	Carbon Resistor	4.7Ω RD25	カーボン抵抗		
* R217,218	HJ 35:41:00	"	10Ω "	"		
* R219	HJ 35:65:60	"	5.6kΩ "	"		
* R220	HJ 35:73:90	"	39kΩ "	"		

* New Parts (新規部品)

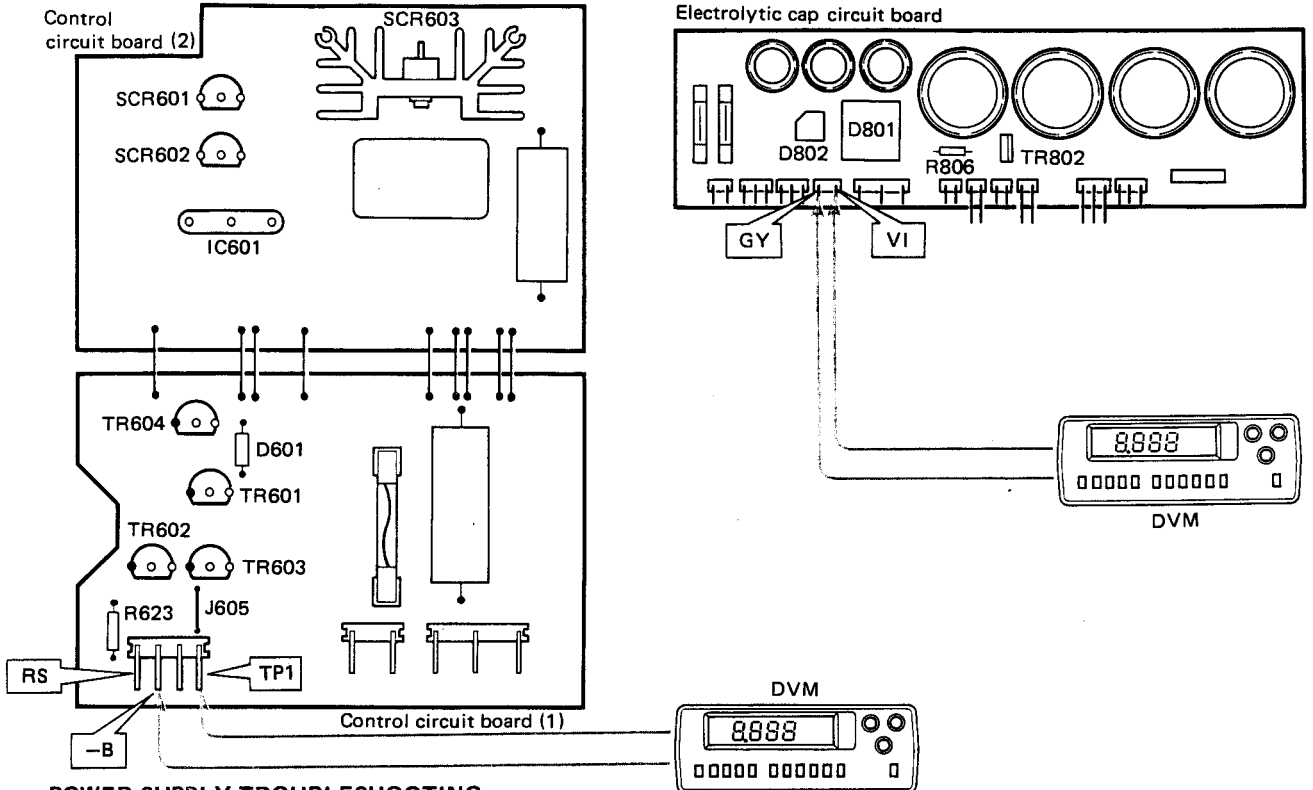
● Precautions in adjusting the control circuit board

Note 1) Since the AC mains is connected directly to the control circuit board be particularly careful against electric shock.

Note 2) Always check voltages by measuring the voltage between the reference measuring point and check point.

Note 3) Use floating inputs for wave form measuring purposes. If the oscilloscope body is grounded the measuring circuit will be in danger of being short circuit. In this case, however, do not touch the oscilloscope body by hand since the voltage applied to the oscilloscope could possibly result in an electric shock.

CHECK POINTS



POWER SUPPLY TROUBLESHOOTING

■ To Confirm Proper Operation of Control Circuit Board (1):

- 1) Short between terminal TP1 and J605 with a jumper on control circuit board (1).
- 2) Connect a DVM across terminals GY and VI on the electric cap. circuit board.
- 3) Connect the unit to a Variac (Slide Transformer) and adjust mains voltage from 0V to *120V AC (U.C models) while monitoring the DVM. At 50V AC (U.C models) input to the unit, the DVM should read 0.45V AC and at 120V AC (U.C models) input it will read 5.5V AC/at 220V AC (R.G.B.A. models) input it will read 15.4V AC.
 - A. If the DVM reads 0V AC the most likely problem is an open SCR, Triac, or a short in the amplifier circuitry.
 - B. If the DVM reads the same as (or is proportional to) the AC input voltage, the most likely problem is a shorted SCR, Triac, or Control IC.

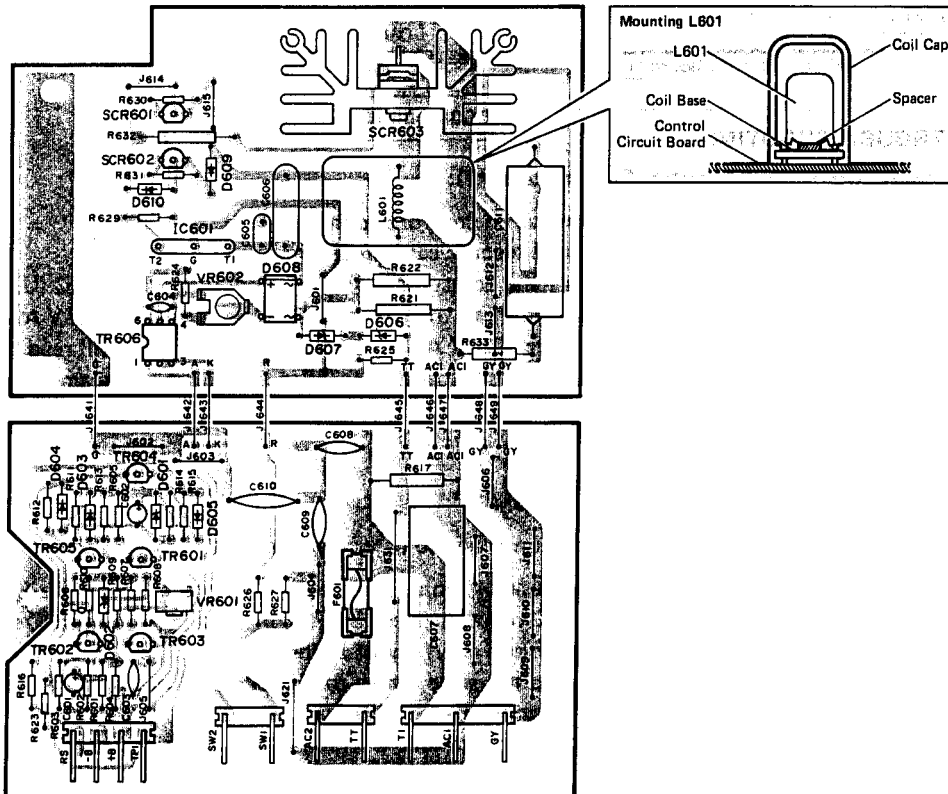
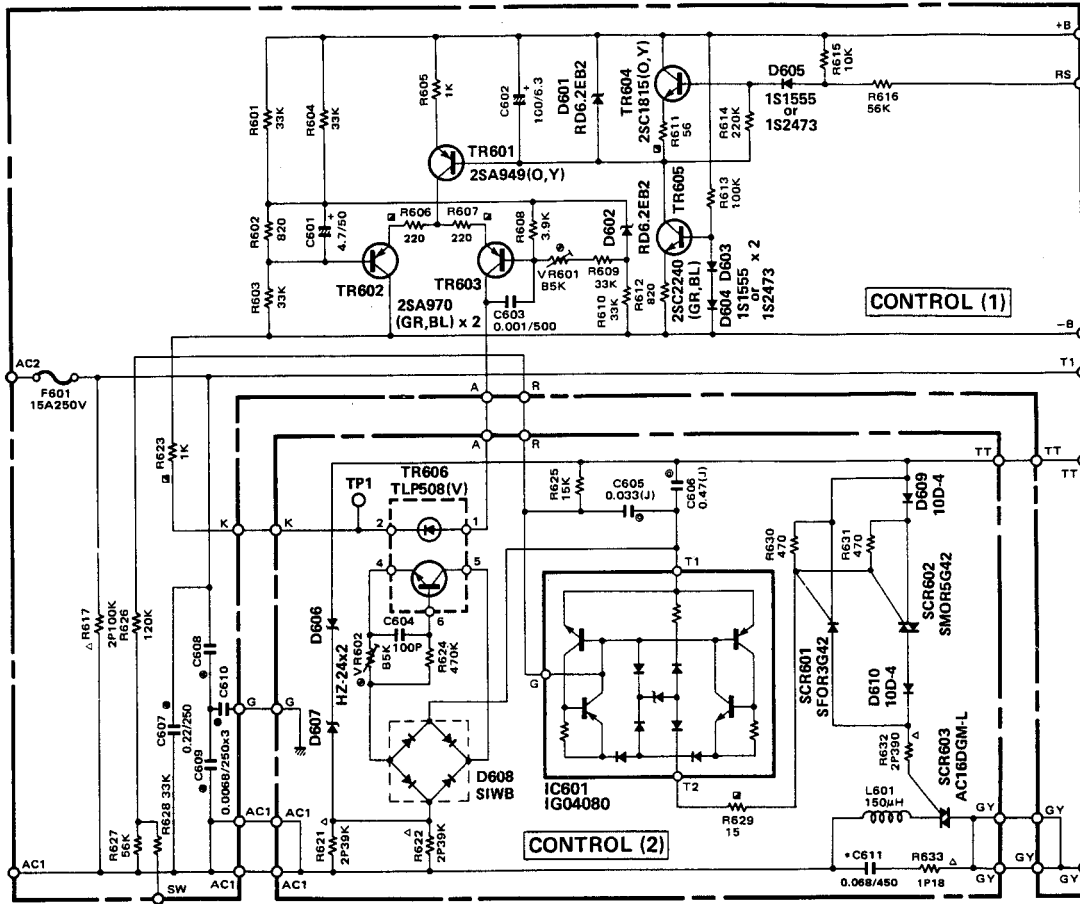
■ To Confirm Proper Operation of Control Circuit Board (2):

(This should be done only after Circuit (1) has been confirmed to be working properly).

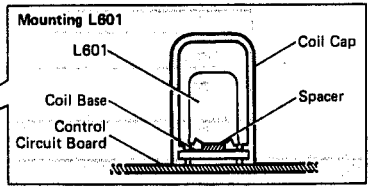
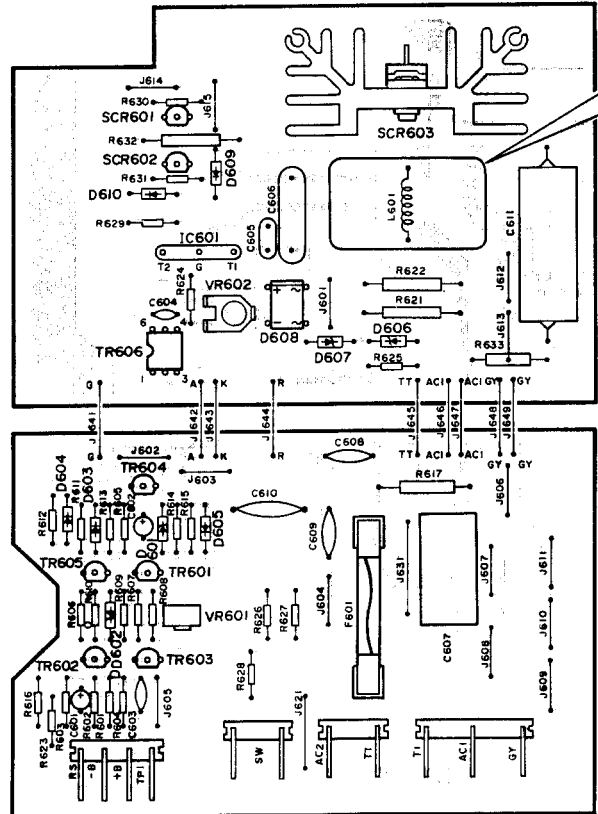
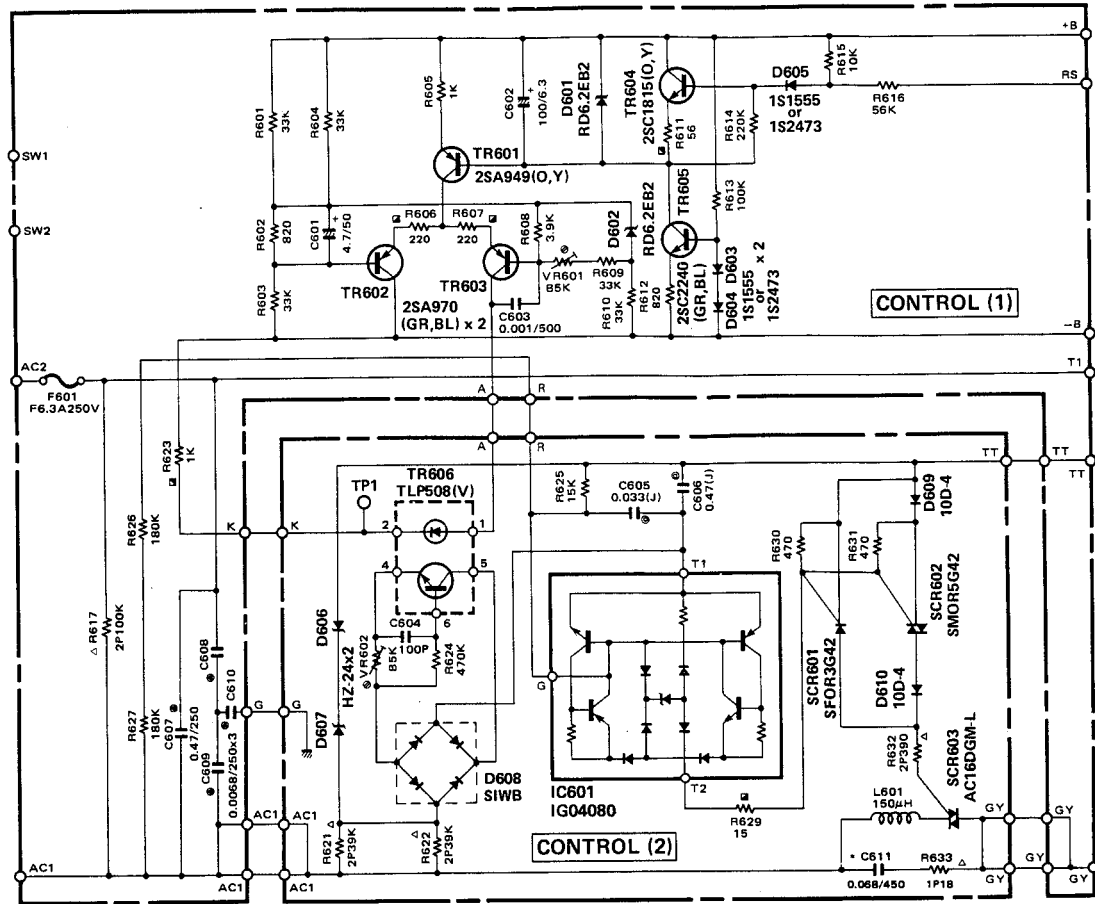
- 1) Connect DVM across R623 and set to DCV. This resistor can be monitored at test point TP1 and -B.
- 2) Adjust the Variac from 50V AC to *120V AC (U.C models). The DVM should read 1.0V ±0.1V DC at *120V AC (U.C models)/2.0V ±0.1V at 220V AC (Ⓢ . Ⓣ models only), input to the unit.
 - A. If the voltage across R623 is high (or remains the same) when the Variac is adjusted from 50 to *120V AC, this indicates a shorted component (check transistors TR601, 602 & 603).
 - B. If there is 0V DC across R623, check the "reset" terminal (marked RS). This point should measure 0V DC for normal operation. If RS is at 0V DC, check TR601, TR604 and D601 first. If RS is not 0V DC, check TR802.

* R,A,G,B models 220V AC

■ CONTROL C. BOARD / SCHEMATIC DIAGRAM (General model)



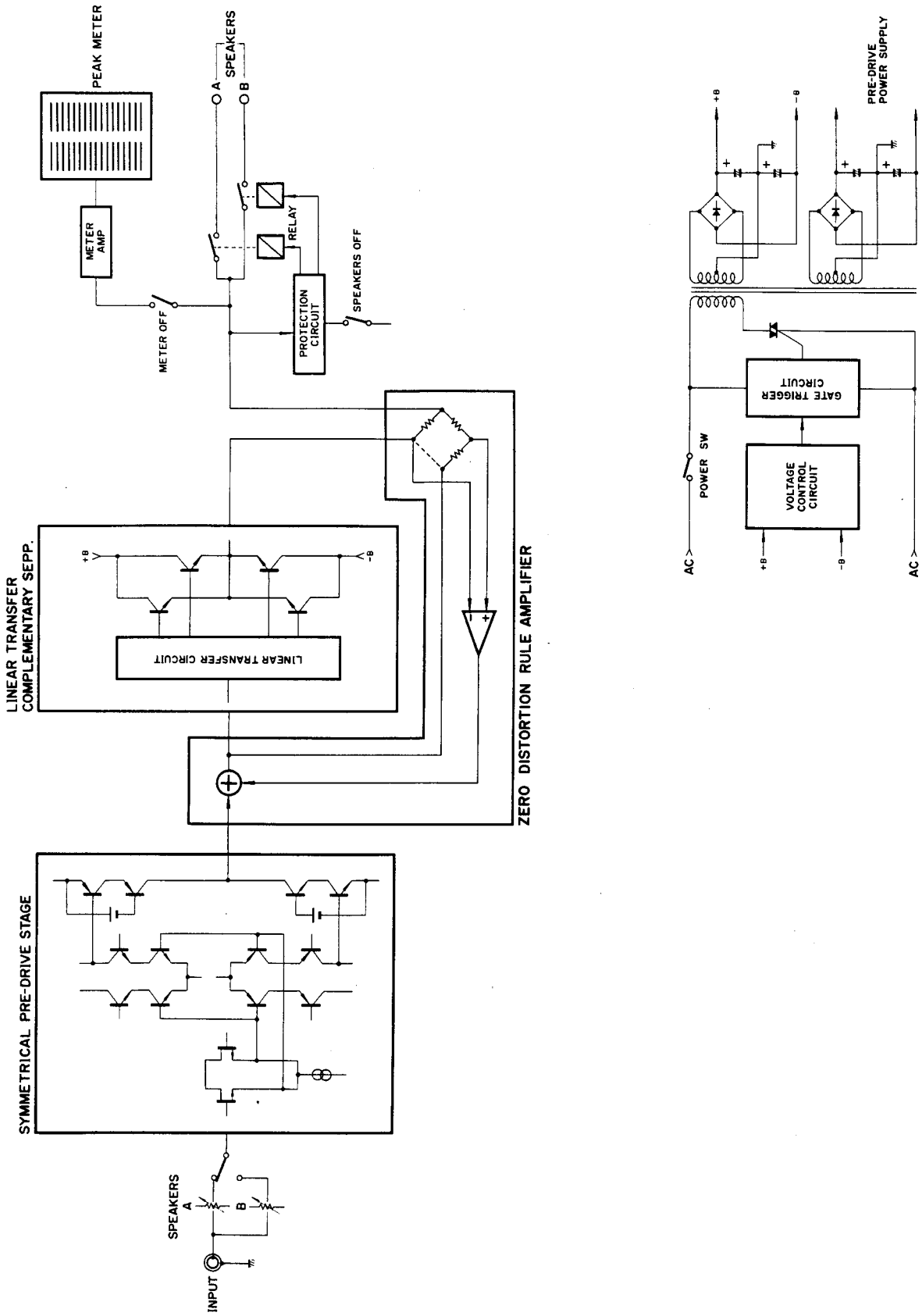
CONTROL C. BOARD / SCHEMATIC DIAGRAM (British, Australian and European models)



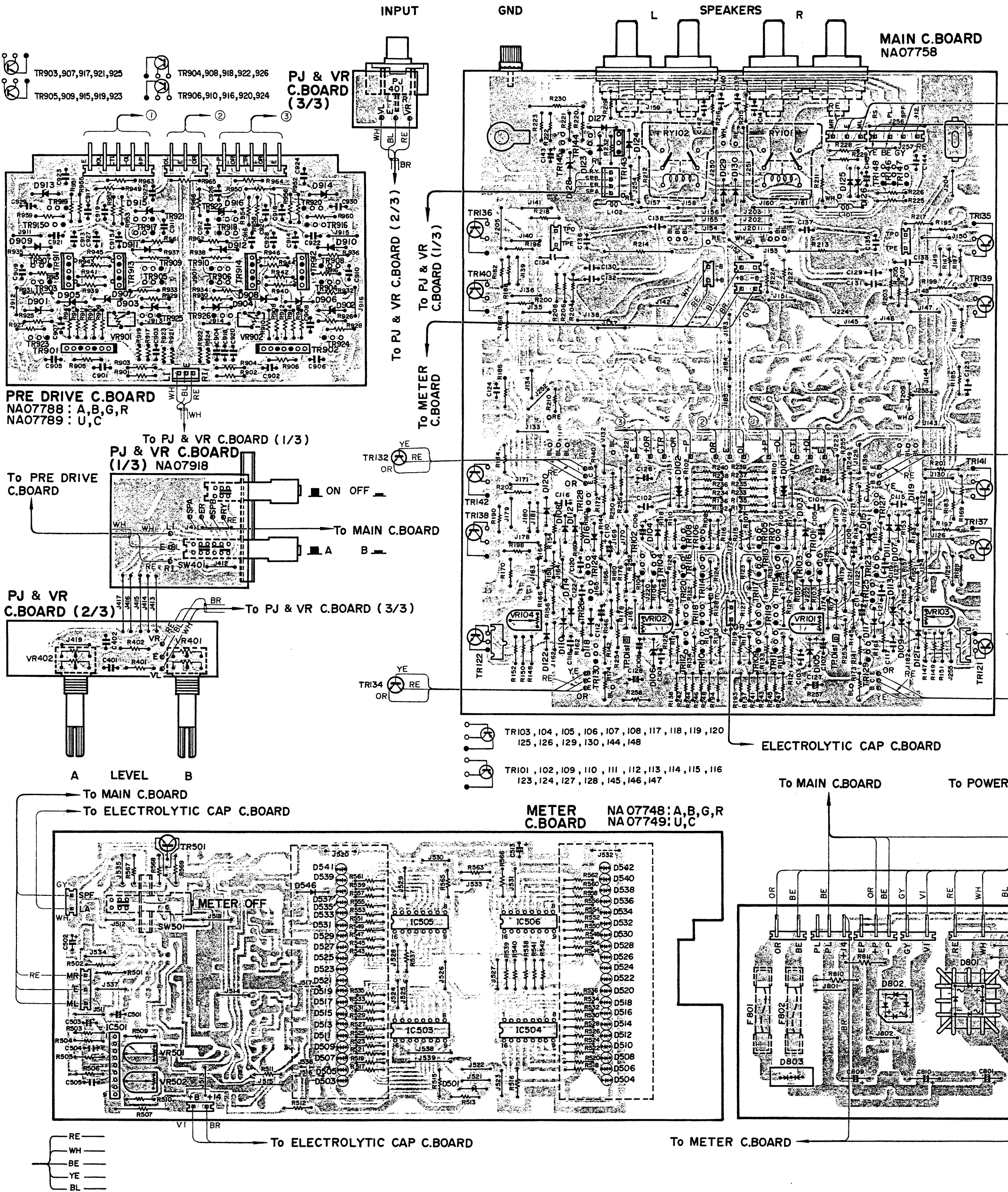
NOTE: (F) , (D) models only

C602	47/6.3	UW917470
R606,607	180	HJ355180
R609	15k	HJ357150
R612	1k	HJ356100
TR606	4N35	iK000350

BLOCK DIAGRAM



PRINTED CIRCUIT BOARD(Pattern Side)



- TR903, 907, 917, 921, 925
- TR904, 908, 918, 922, 926
- TR905, 909, 915, 919, 923
- TR906, 910, 916, 920, 924

PRE DRIVE C. BOARD
 NA07788 : A, B, G, R
 NA07789 : U, C

PJ & VR C. BOARD (2/3)

To PJ & VR C. BOARD (1/3)
PJ & VR C. BOARD (1/3) NA07918

METER C. BOARD NA07748: A, B, G, R
 NA07749: U, C

ELECTROLYTIC CAP C. BOARD

- TR103, 104, 105, 106, 107, 108, 117, 118, 119, 120, 125, 126, 129, 130, 144, 148
- TR101, 102, 109, 110, 111, 112, 113, 114, 115, 116, 123, 124, 127, 128, 145, 146, 147

A LEVEL B

To MAIN C. BOARD
 To ELECTROLYTIC CAP C. BOARD

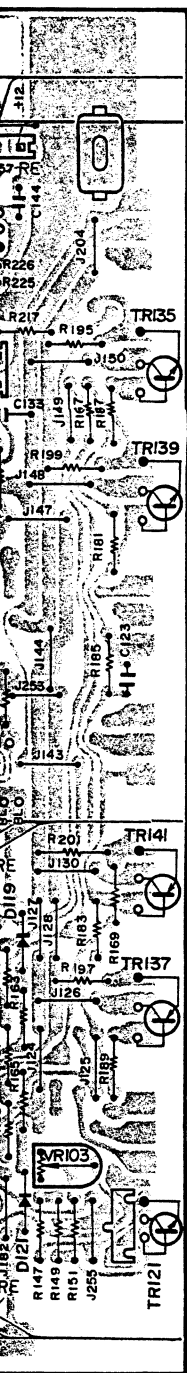
To MAIN C. BOARD To POWER

To ELECTROLYTIC CAP C. BOARD

To METER C. BOARD

- RE
- WH
- BE
- YE
- BL

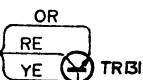
CONTROL C. BOARD
NA07758



To ELECTROLYTIC
CAP C. BOARD

To METER C. BOARD

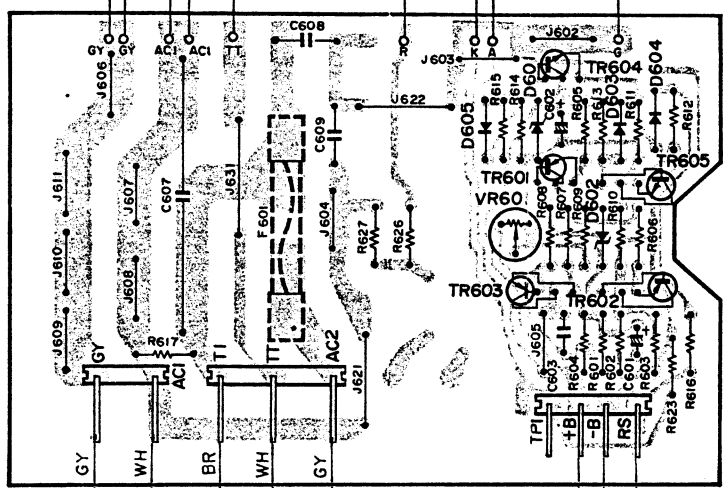
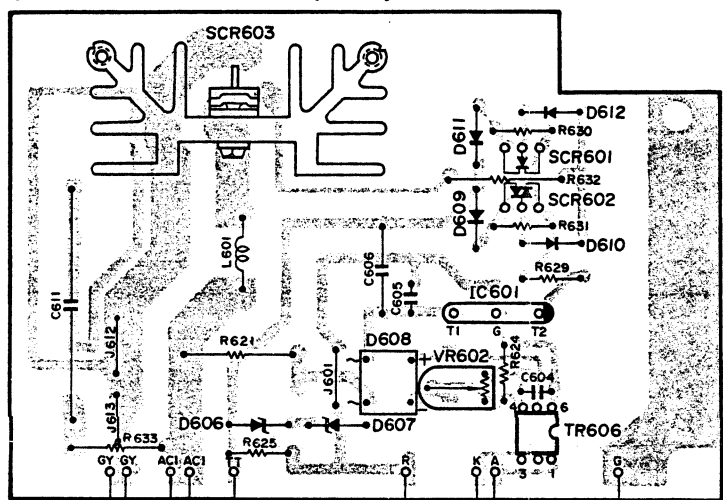
CONTROL
C. BOARD (1/2)
NA07776: U, C



To POWER SW



CONTROL C. BOARD (2/2)



To POWER TRANSFORMER

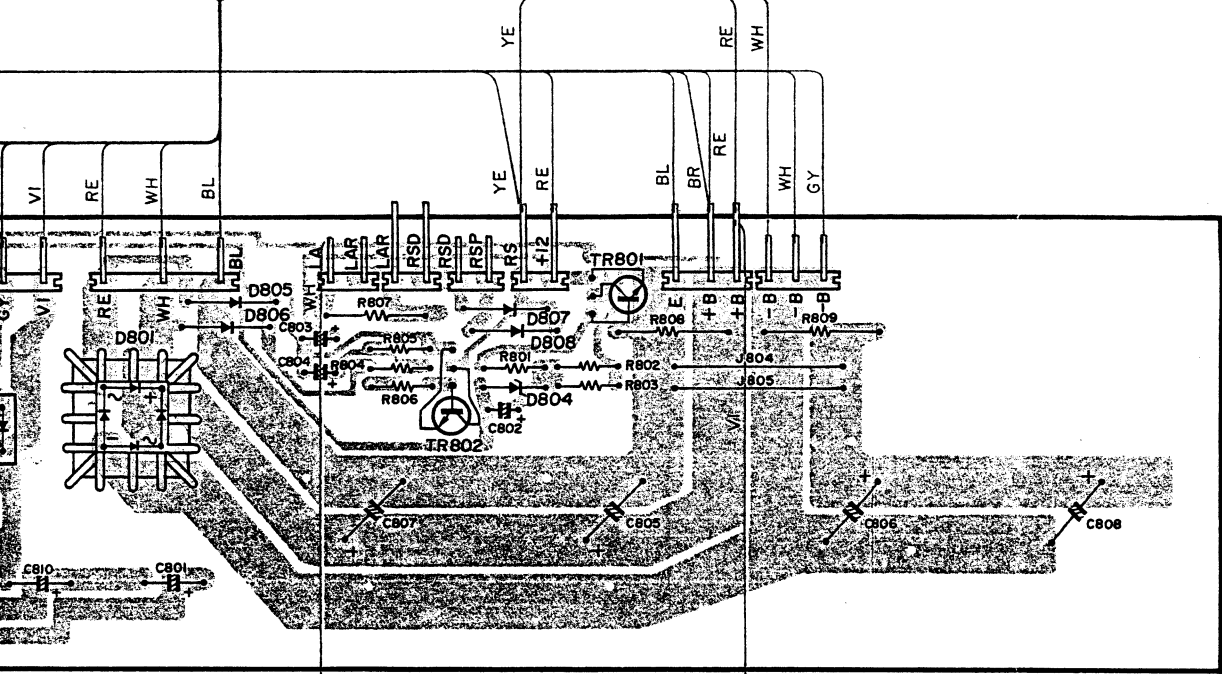
To ELECTROLYTIC
CAP C. BOARD

To UNSWITCHED

To CONTROL C. BOARD (1/2)

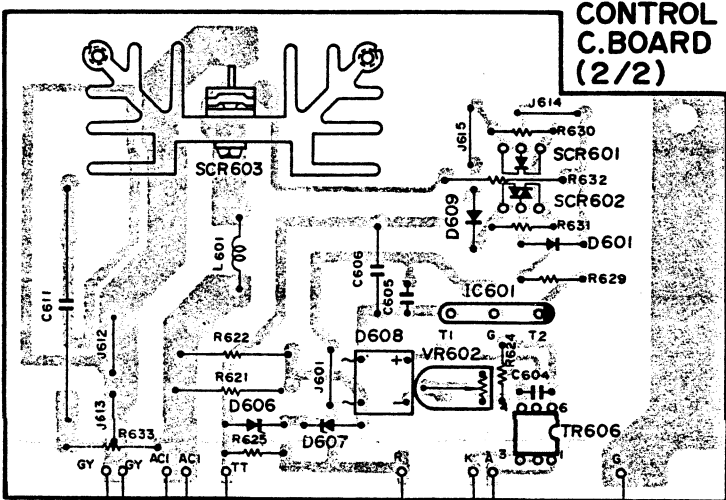
To POWER TRANSFORMER

BOARD

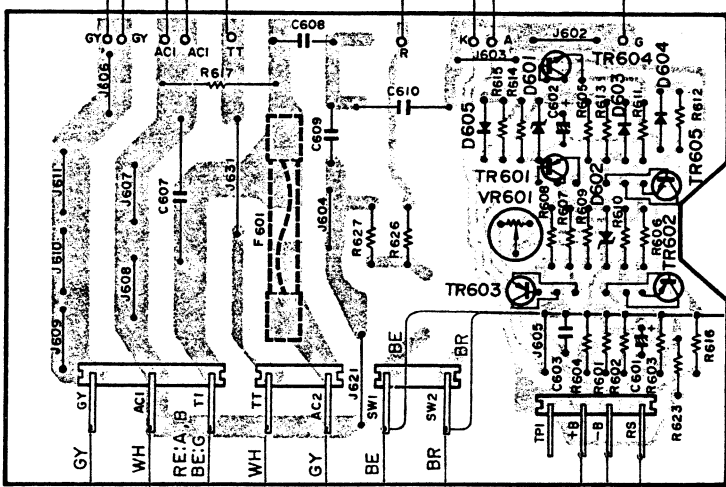


ELECTROLYTIC CAP C. BOARD
NA07766: R
NA07767: U, C
NA07768: A, B, G

A, B, G-MODELS



CONTROL
C. BOARD
(2/2)



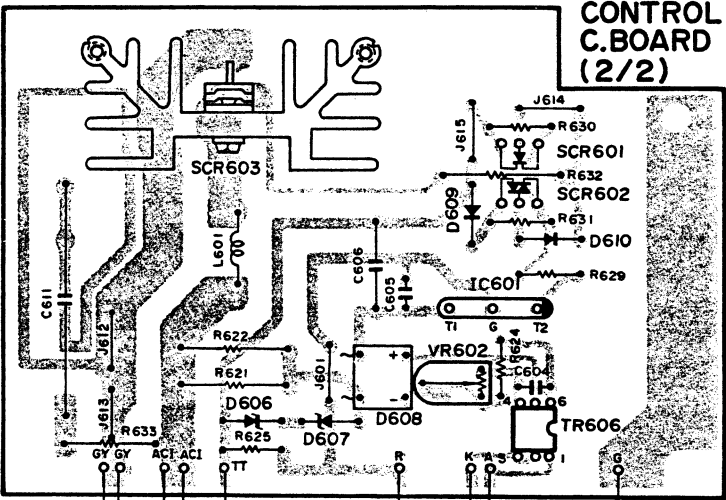
To POWER
TRANSFORMER

To POWER
SW

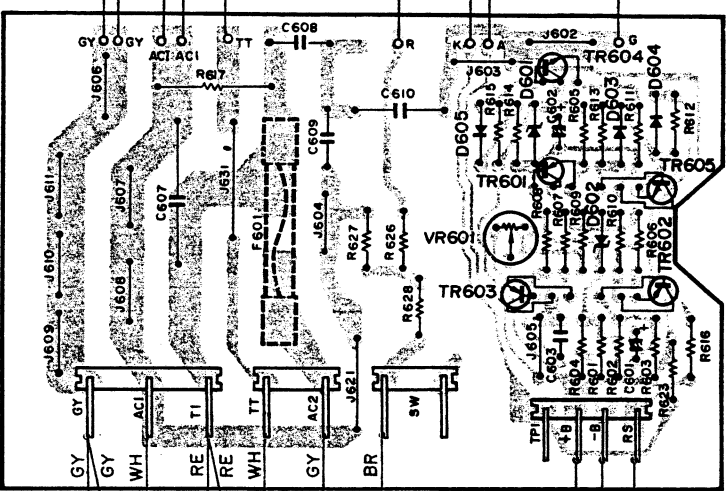
To ELECTROLYTIC
CAP C. BOARD

To AC CORD

R-MODEL



CONTROL
C. BOARD
(2/2)



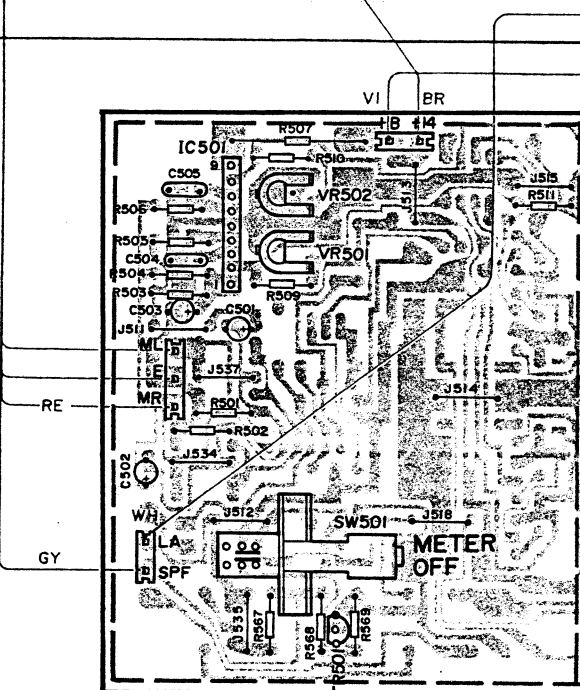
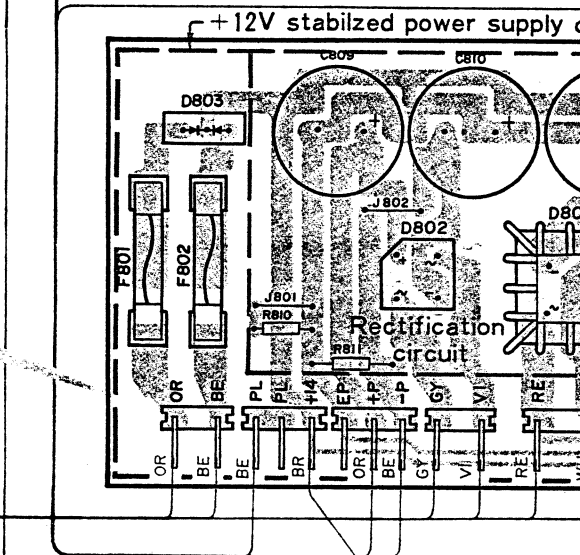
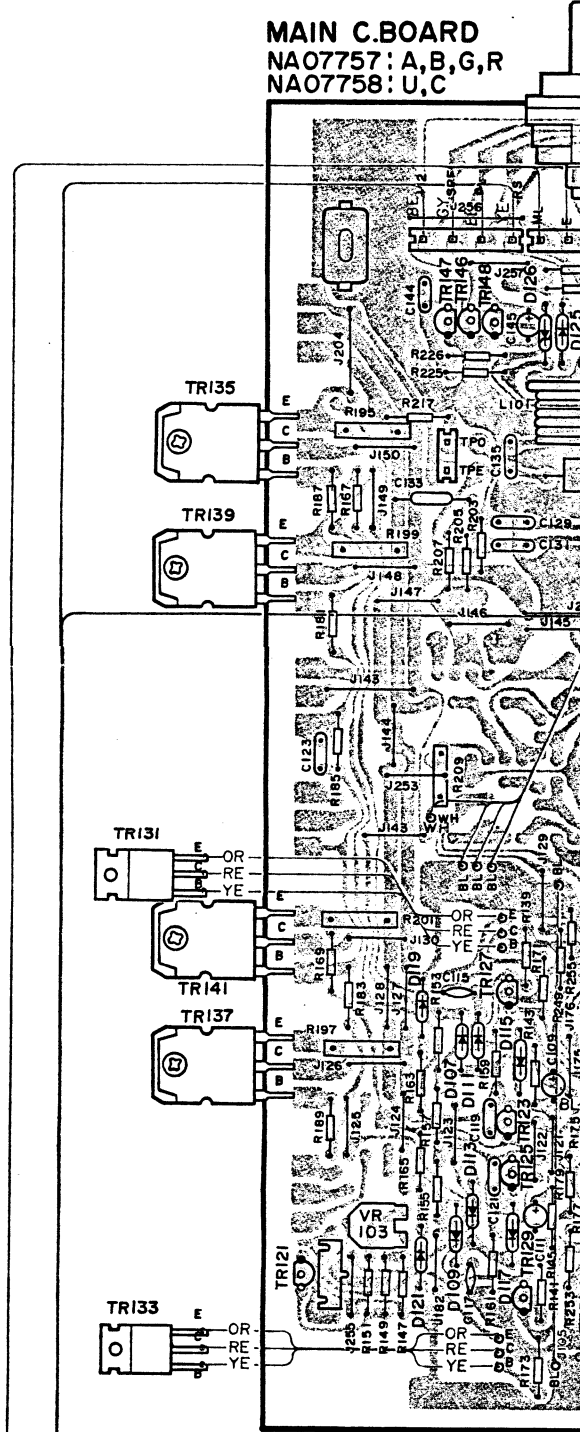
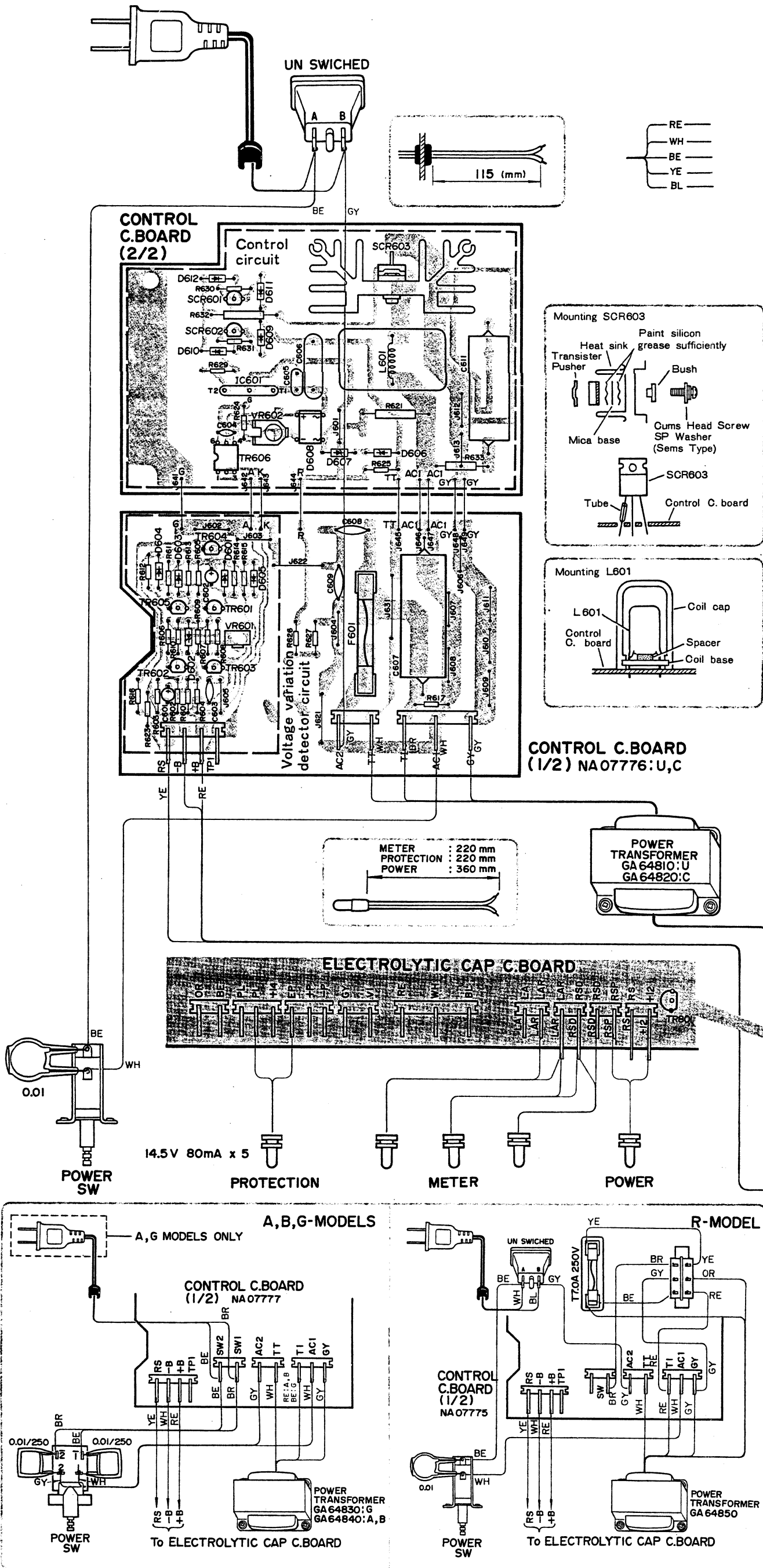
To POWER
TRANSFORMER

To VOLTAGE
SELECTOR SW

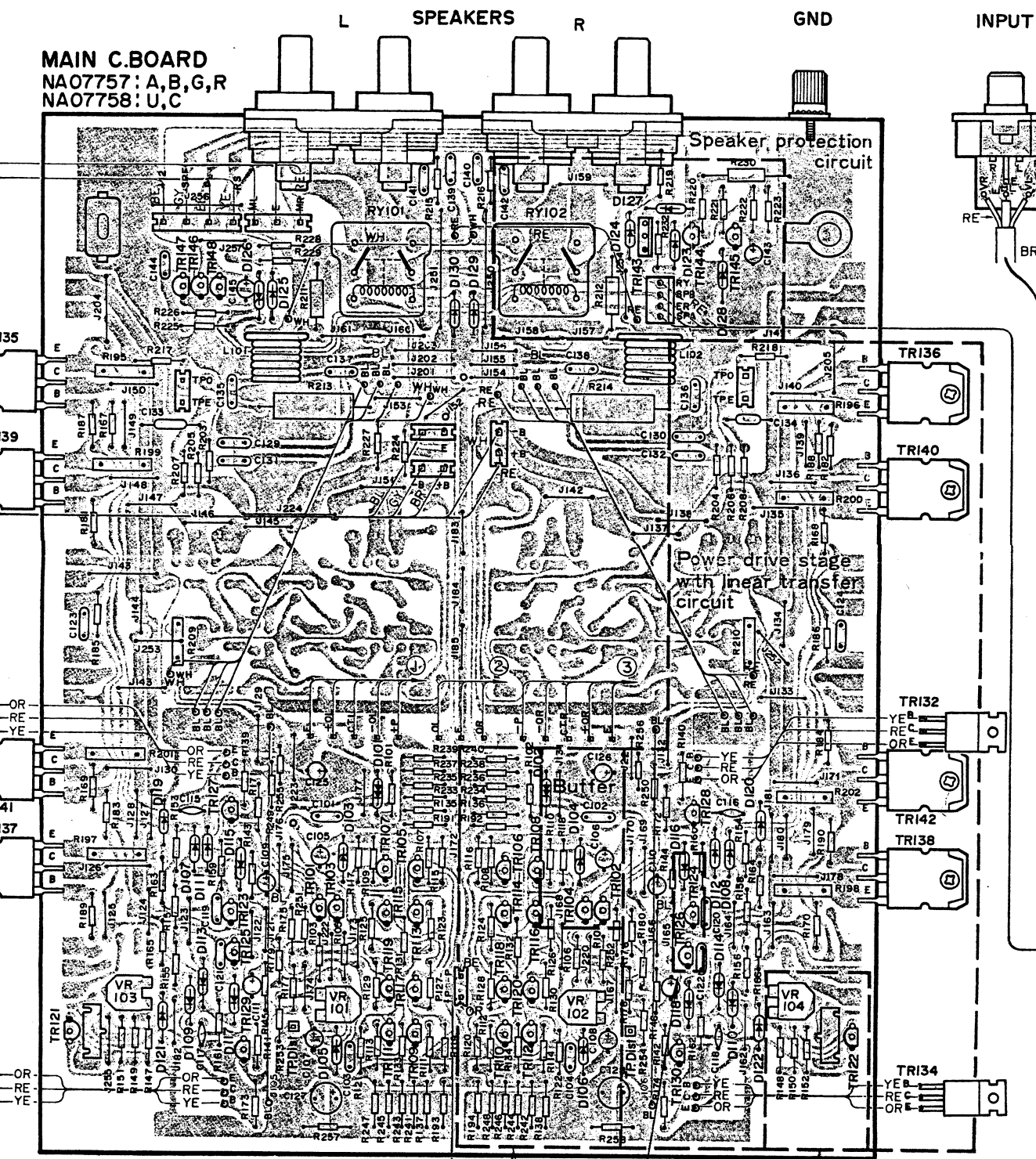
To ELECTROLYTIC
CAP C. BOARD

To POWER SW

WIRING DIAGRAM (Parts Side)

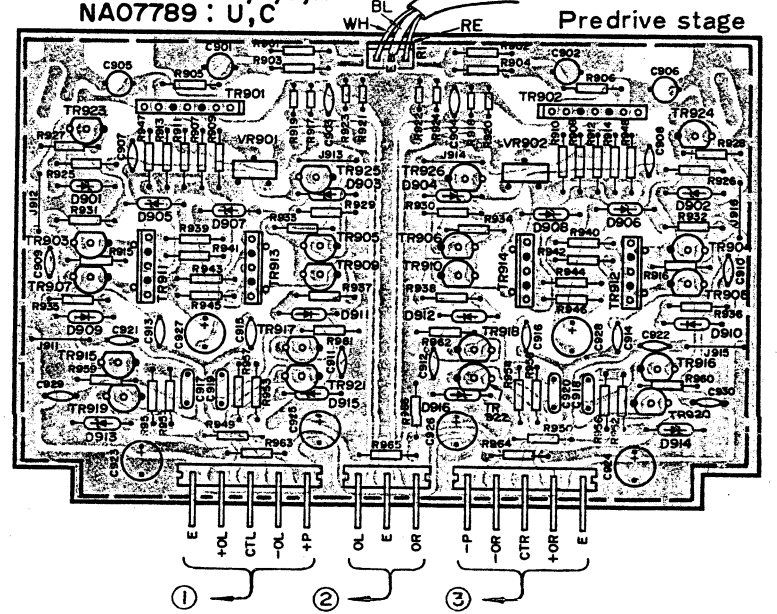


MAIN C.BOARD
NA07757: A,B,G,R
NA07758: U,C



PJ & VR C.BOARD (3/3)

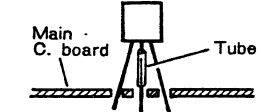
PRE DRIVE C.BOARD
NA07788: A,B,G,R
NA07789: U,C



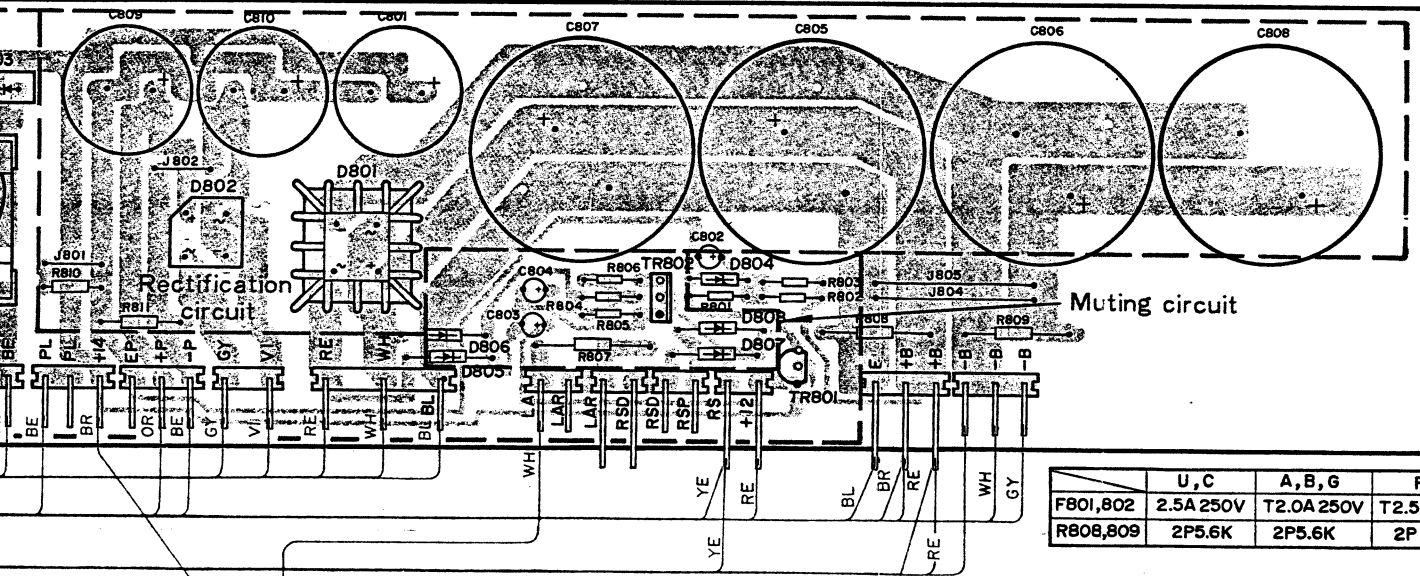
TRANSISTOR FET
ECB DGSNCSD
BENCEB TR901, 902
TR911~914

NO.	R	U.C	A.G.B
C921, 922	68P/500	100P/500	68P/500
C929, 930	33P/500	OPEN	33P/500

Mounting TR121,122



+12V stabilized power supply circuit Zero distortion circuit PC limiter Temperature compensation circuit



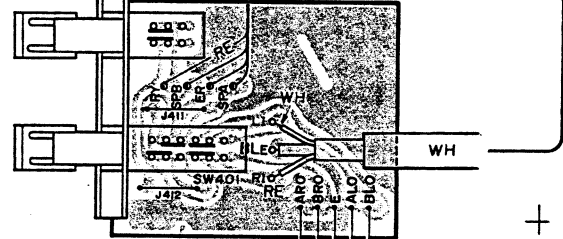
ELECTROLYTIC CAP C.BOARD
NA 07766: R
NA 07767: U,C
NA 07768: A,B,G

	U,C	A,B,G	R
F801,802	2.5A 250V	T2.0A 250V	T2.5A 250V
R808,809	2P5.6K	2P5.6K	2P18K

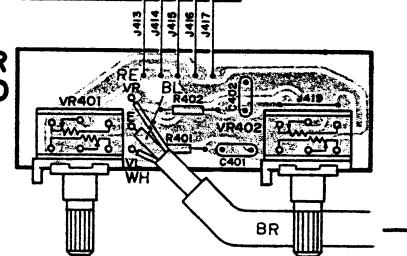
ON OFF

A B

PJ & VR C.BOARD (1/3) NA07918

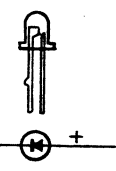


PJ & VR C.BOARD (2/3)

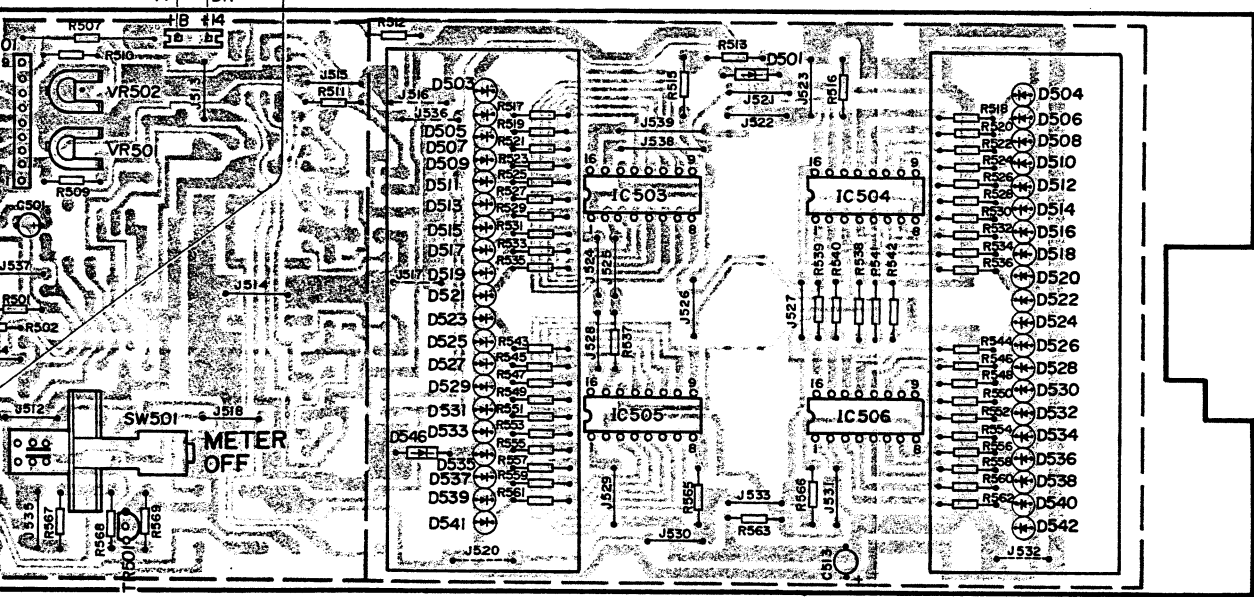


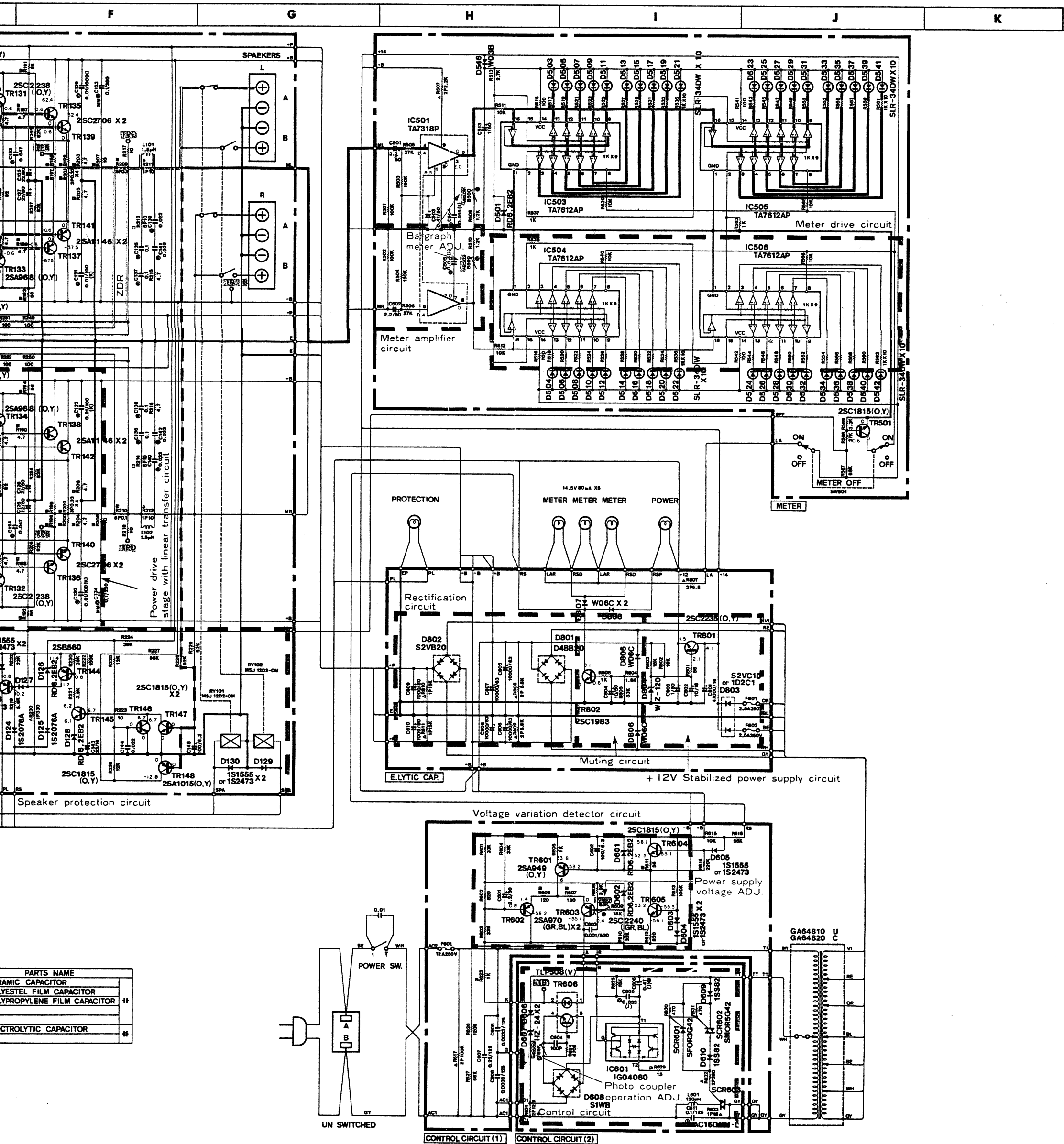
A LEVEL B

The polarity of LED.

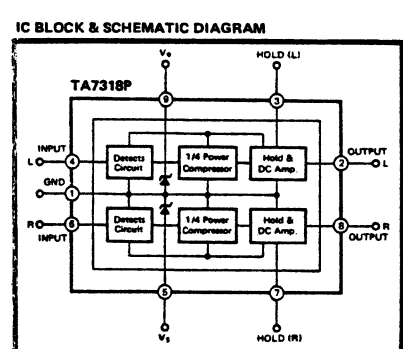
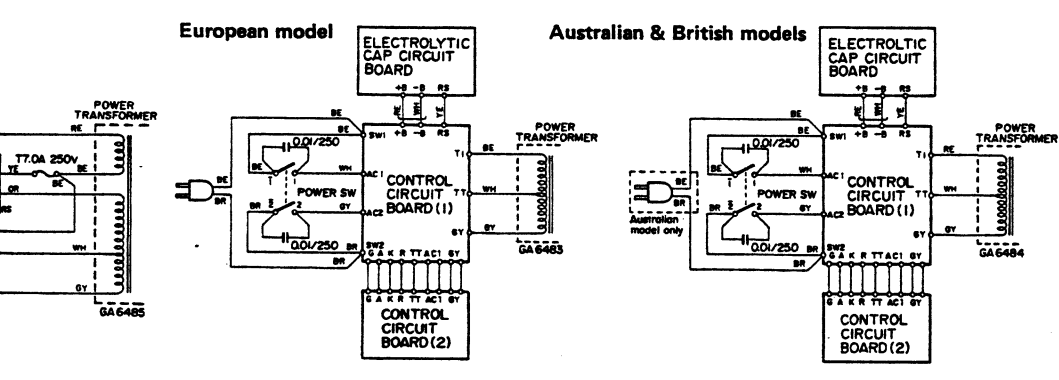


METER C.BOARD
NA 07748: A,B,G,R
NA 07749: U,C





PARTS NAME	
□	CERAMIC CAPACITOR
▭	MYSTEL FILM CAPACITOR
▭	POLYPROPYLENE FILM CAPACITOR
⊛	ELECTROLYTIC CAPACITOR



- Note 1) When measuring control circuit board wave forms, voltages are applied very readily to the oscilloscope body etc. For this reason do not touch oscilloscope and other related objects during these measurements. It is also necessary to check that the oscilloscope body is not connected to ground in any way.
- Note 2) Always check voltages by measuring the voltage between reference measuring point and check points.
- Note 3) Do not touch E (emitter) of TR802 in the electrolytic cap. circuit board error amplifier circuit with the multimeter electrode since this will increase the noise and heat generated by the transformer.

PARTS LIST

M-50 STEREO POWER AMPLIFIER

■ CONTENTS

EXPLODED VIEW	1
PARTS LIST (FRONT PANEL)	2
EXPLODED VIEW	3
PARTS LIST (REAR PANEL)	4
PARTS LIST (CIRCUIT BOARD)	6 ~ 12

U : U.S.A. model
C : Canadian model
A : Australian model
G : European model
B : British model
R : General model

SINCE 1887

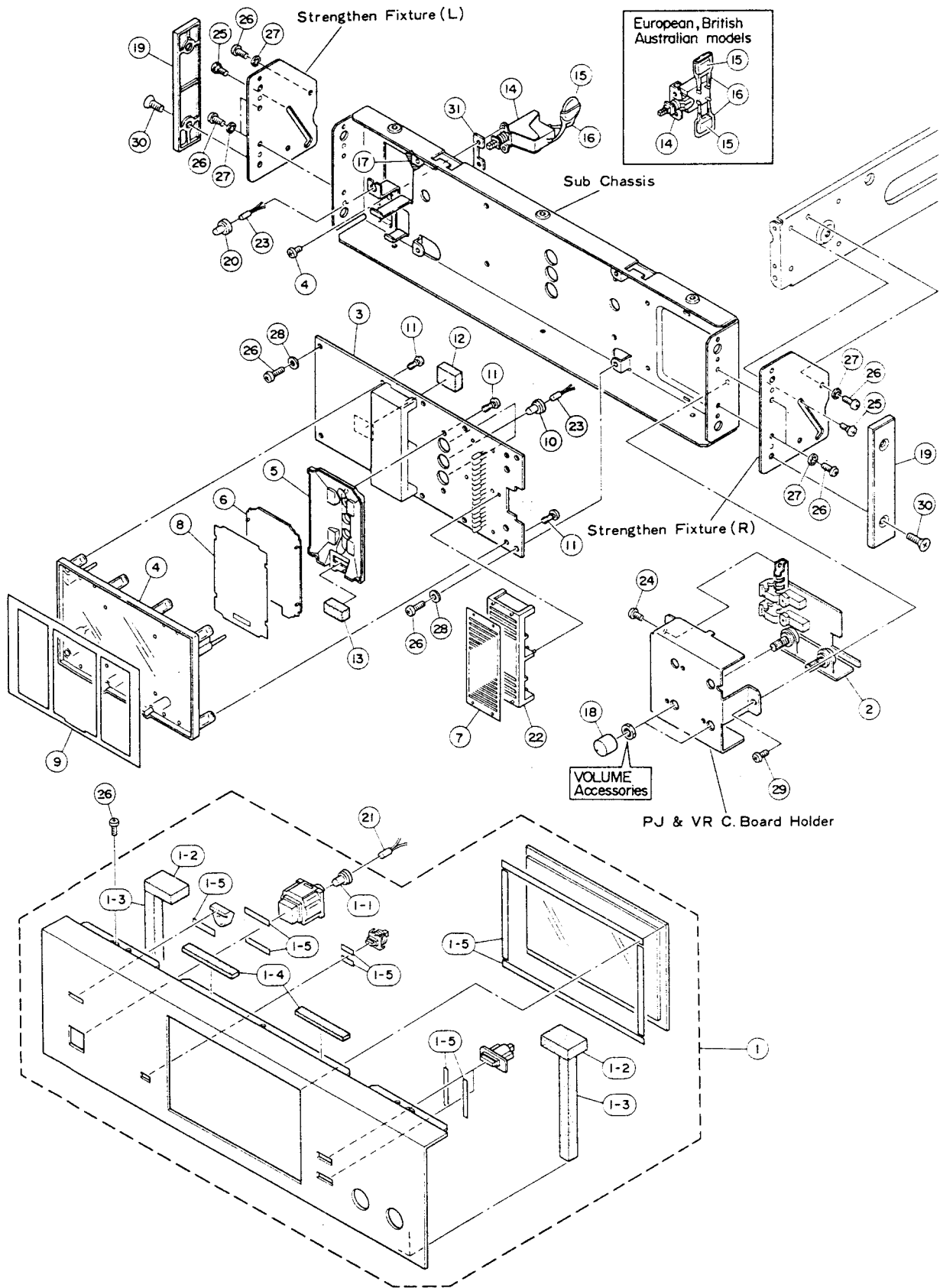


YAMAHA

NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN

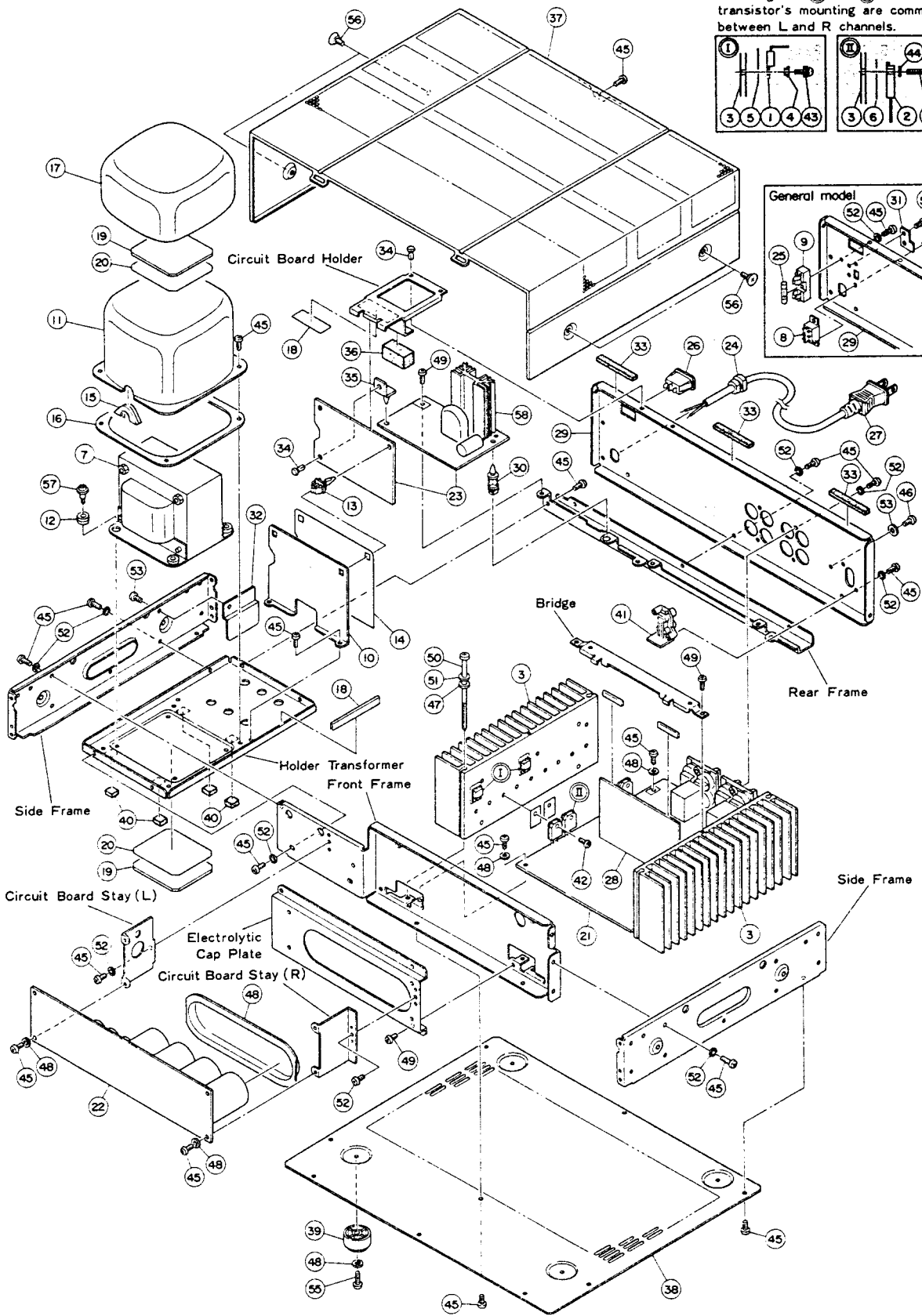
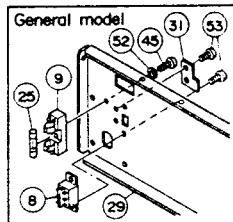
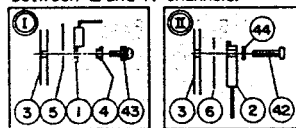
004453

EXPLODED VIEW (FRONT PANEL)



EXPLODED VIEW (REAR PANEL)

The diagrams ① and ② showing the transistor's mounting are common between L and R channels.



■ PARTS LIST

Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
*	1	NB:60:23:90	Panel Unit	パネルユニット		J
*	"	NB:60:24:00	"	"		R,U,A,G,C,B
	1-1	CB:60:50:70	Cap, Lamp	ランプキャップ	M-70	
	1-2	CB:08:47:50	Damper	ダンパー		
*	1-3	CB:60:50:50	Shade Tape	シャコウテープ		
	1-4	CB:60:50:60	Damper	ダンパー	M-70	
	1-5	CB:07:41:90	Adhesive Tape	ダブルタックテープ		
*	2	NA:07:50:60	PJ & VR Circuit Board	P J & V R シート		J
*	"	NA:07:91:80	"	"		R,U,C
*	"	NA:07:96:70	"	"		A,G,B
*	3	NA:07:74:70	Meter Circuit Board	メーターシート		J
*	"	NA:07:74:80	"	"		R,A,G,B
*	"	NA:07:74:90	"	"		U,C
	4	CB:60:34:20	Meter Housing	メーターハウジング	M-70	
	5	CB:60:34:30	Reflector Lamp	ランプリフレクター	M-70	
	6	CB:60:34:40	Diffusion Plate	拡散板	M-70	
	7	CB:60:34:50	Diffusion Sheet	拡散シート	M-70	
*	8	CB:60:36:50	Scale Plate	メーター文字板		
	9	CB:60:34:70	Cover, Meter	メーターカバー	M-70	
	10	CB:60:44:10	Cap, Lamp	ランプキャップ	M-70	
	11	CB:06:88:80	Plastic Rivet	プラスチックリベット		
	12	CB:09:34:70	Spacer	スペーサー		
*	13	CB:60:73:30	Shade Damper	シャコウダンパー		
	14	KA:80:26:20	Push Switch	SDZ1P	ブッシュスイッチ	POWER M-70 J
	"	KA:80:25:50	"	SDZ1P-A	"	" R,U,C
	"	KA:80:21:70	"	SDS3P	"	" A,G,B
	15	Fi:16:41:00	Ceramic Cap	0.01 μ F 125V	セラコン	J
	"	Fi:34:41:00	"	0.01 μ F	"	R,U,C
	"	FR:16:41:00	Metalized Paper Cap	0.01 μ F 250V	M P コン	A,G,B
	16	CB:07:21:90	Cover	コンデンサーカバー		"
	"	CB:09:52:60	"	"		J,R,U,C
	17	CB:08:01:00	Tape	粘着テープ		
	18	BA:08:15:50	Level Knob	レベルツマミ	M-70	
	19	CB:60:42:80	Side Plate	サイドプレート	M-70	
	20	CB:60:50:80	Cap Lamp	ランプキャップ	PROTECTION M-70	
	21	JB:00:06:70	Lamp	14.5V 80mA	パイロットランプ	POWER
	22	CB:60:33:30	Reflector, LED	LEDリフレクター	M-70	
	23	JB:00:06:80	Lamp	14.5V 80mA	パイロットランプ	
	24	ED:33:00:60	Bind Head Screw	M3x6 FCM3-B \varnothing	バインド小ネジ	
	25	EN:93:70:10	Bind Head Tapping Screw with Step	3x8 ZMC2-B \varnothing	身付バインドタッピンネジ(3種)	
	26	EN:33:00:10	Bind Head Tapping Screw	3x8 FCM3-B \varnothing	バインドタッピンネジ(2種)	
	27	EV:41:30:39	Toothed Lock Washer	M3 FCM3-B \varnothing	内歯形歯付座金	
	28	EV:20:33:00	Plain Washer	M3 FCM3-B \varnothing	平座金	
	29	EN:33:00:20	Bind Head Tapping Screw	3x6 FCM3-B \varnothing	バインドタッピンネジ(2種)	
	30	AA:60:82:20	Make Up Screw		化粧ネジ	M-70
	31	CB:60:29:20	Spacer, Switch		スイッチスペーサー	C
			Accessories Assembly	付 属 品 Ass'y		
		Mi:06:99:20	Cord		接続コード(ピンピン)	

→ New Parts (新規部品)

4. PJ & VR circuit board removal

- a. Remove screws ① through ③ in Fig. 4 and remove the volume circuit board holder.
- b. Remove screws ④ and ⑤ and hexagonal nut ⑥ and ⑦ in Fig. 4, the VR circuit board may be removed.

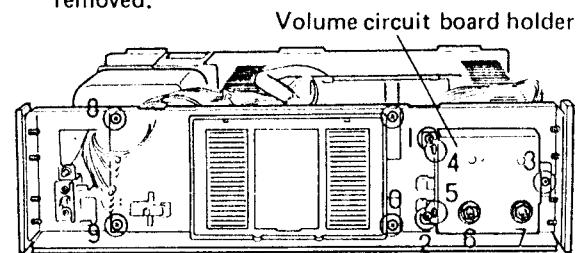


Fig. 4

- c. Remove screws ① and ② in Fig. 5 and then remove the PJ circuit board.

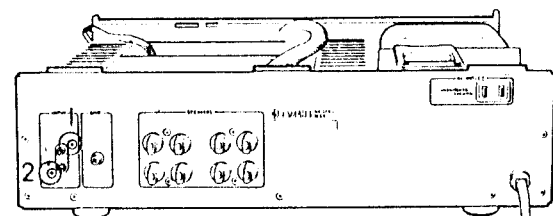


Fig. 5

5. Meter circuit board removal & replacement of parts

- a. Remove screws ⑧ through ⑪ in Fig. 4 and remove the meter circuit board, and then take off three illumination lamps of the meter circuit board.
- b. Remove the plastic rivets ① through ⑧ in Fig. 6 from the back side of the meter circuit board and remove the meter housing.

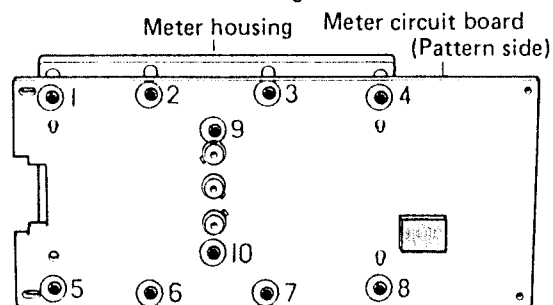


Fig. 6

- c. Detach one side of the adhesive tape which adheres the meter plate (It is difficult to set on just position if you detach the both left and right sides.), and open the meter plate as shown in Fig. 7.
- d. Remove plastic rivets ⑨ and ⑩ in Fig. 6 and remove the lamp reflector.
- * When mounting the lamp reflector, mount so that the "damper, shade" is placed under the lamp reflector.
- e. In this condition it is possible to replace IC503 and 506.

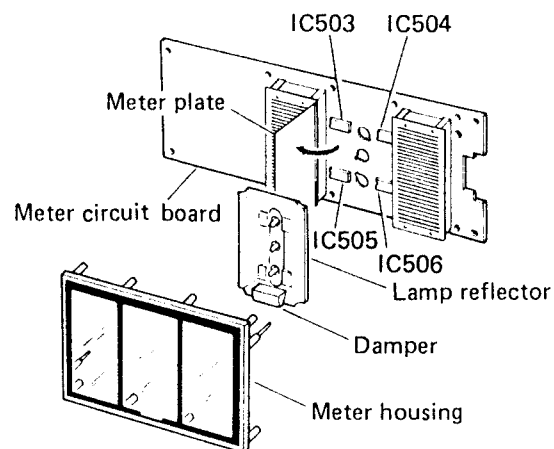


Fig. 7

6. Parts of the Electrolytic capacitor circuit board replacement

- a. Remove screws ① and ② in Fig. 8.

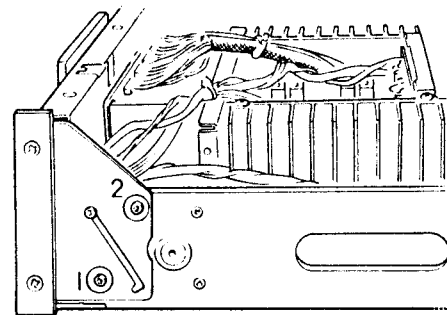


Fig. 8

- b. Open the sub-chassis as shown in Fig. 9. In this condition it is possible for you to check the power circuit board.
- c. Remove the screws ① and ② in Fig. 9.
- d. Remove the electrolytic capacitor circuit board and replace the parts of the circuit board.

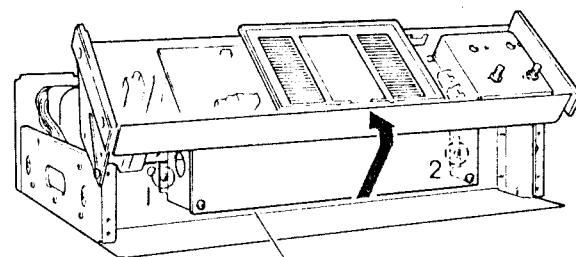


Fig. 9

7. Power transistor replacement (Rch)

- a. Detach the connectors ① and ② in Fig. 10 which are connected to the drive transistor.
- b. Unsolder the lead wires of the power transistor.
- c. Remove screws ④ and ⑤ in Fig. 3 and detach the bridge.
- d. Remove screws ⑧ and ⑨ in Fig. 3 and detach the heat sink.
- e. Remove screws ③ through ⑥ in Fig. 10 which fix the power transistors and then exchange the transistors.

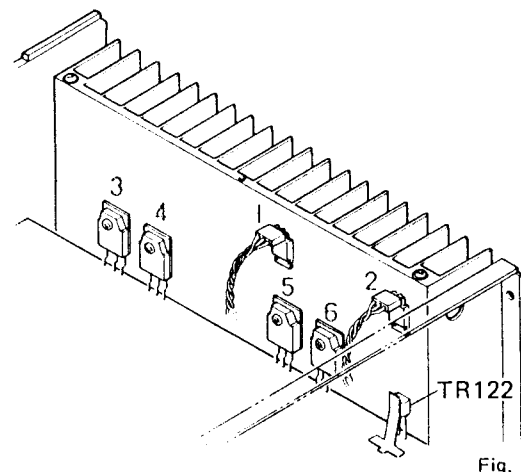


Fig. 10

- * When mounting the power transistors, install a mica base between the heat sink and transistors so that the heat sink will not touch the case of the power transistor. Apply silicon grease to both sides of the mica base so that heat coupling between power transistors and the heat sink will be efficient. (Fig. 11).

Mounting TR135 ~ 142

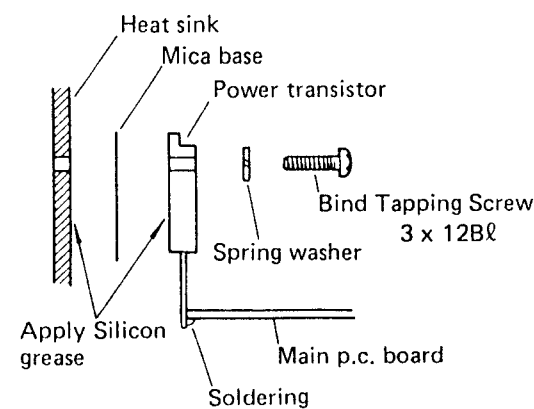


Fig. 11

- f. Replace the drive transistors as shown in Fig. 11. Use the isolation bushing as shown in Fig. 12 when mounting drive transistors.
- g. Mount the heat sink on which power and drive transistors have been secured. After the heat sink is secured with screws ⑧ and ⑨ in Fig. 3, solder the lead wires of power transistors to the main circuit board.
- * After the heat sink has been mounted, check that TR122 can sufficiently touch the heat sink. Apply silicon grease to the contact surface. When the heat coupling between power transistor and the heat sink is imperfect, the power transistors may be damaged thermal run away. (Fig. 10).
- h. Attach the connector to the drive transistor.
- * Be careful about the direction (B,C,E) of the connector. (Fig. 12)

Mounting TR131 ~ TR134

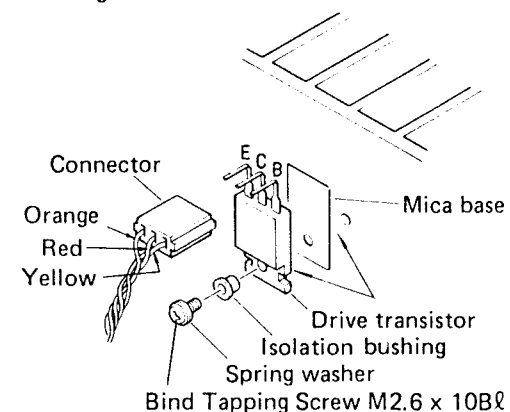


Fig. 12

8. Power transformer removal

- a. Remove screws ⑩ through ⑬ in Fig. 3 and remove the transformer cover.
- b. Detach the lead wires of the transformer.
- c. Remove screws ① through ④ in Fig. 13 and then remove the power transformer.

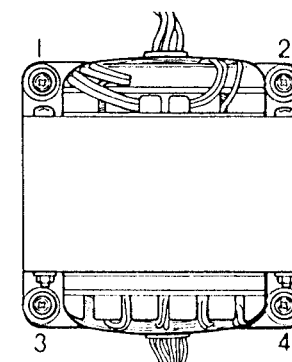


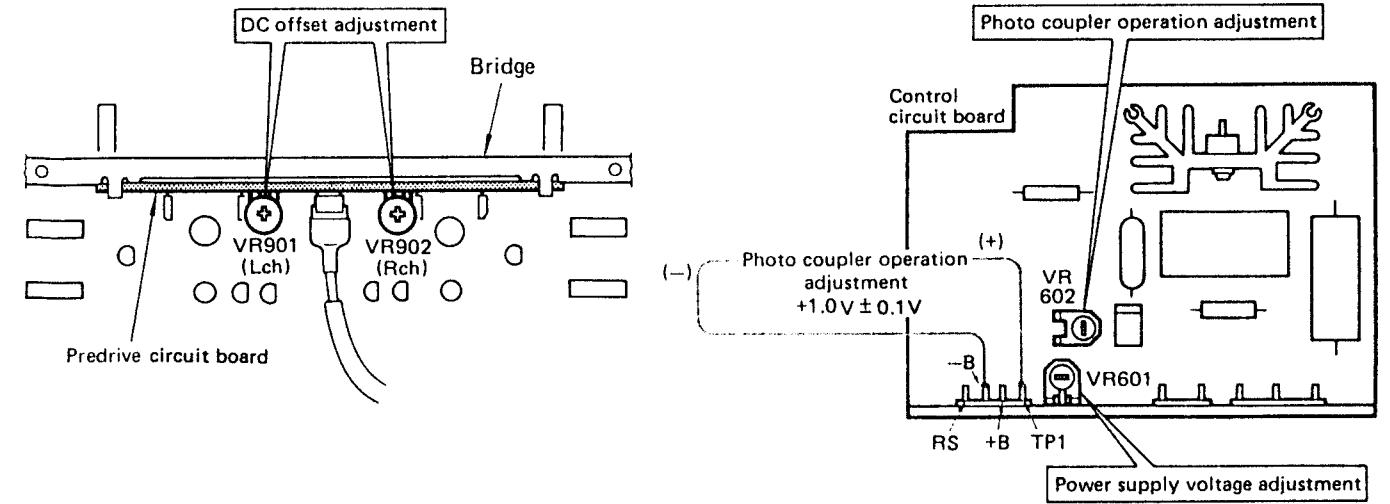
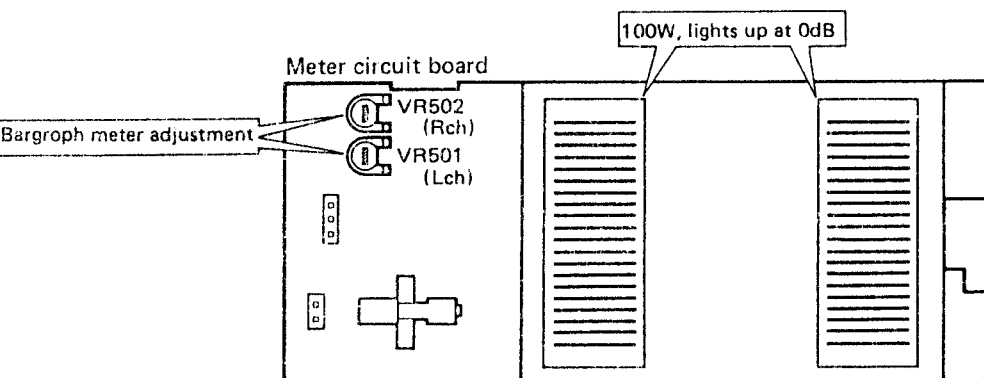
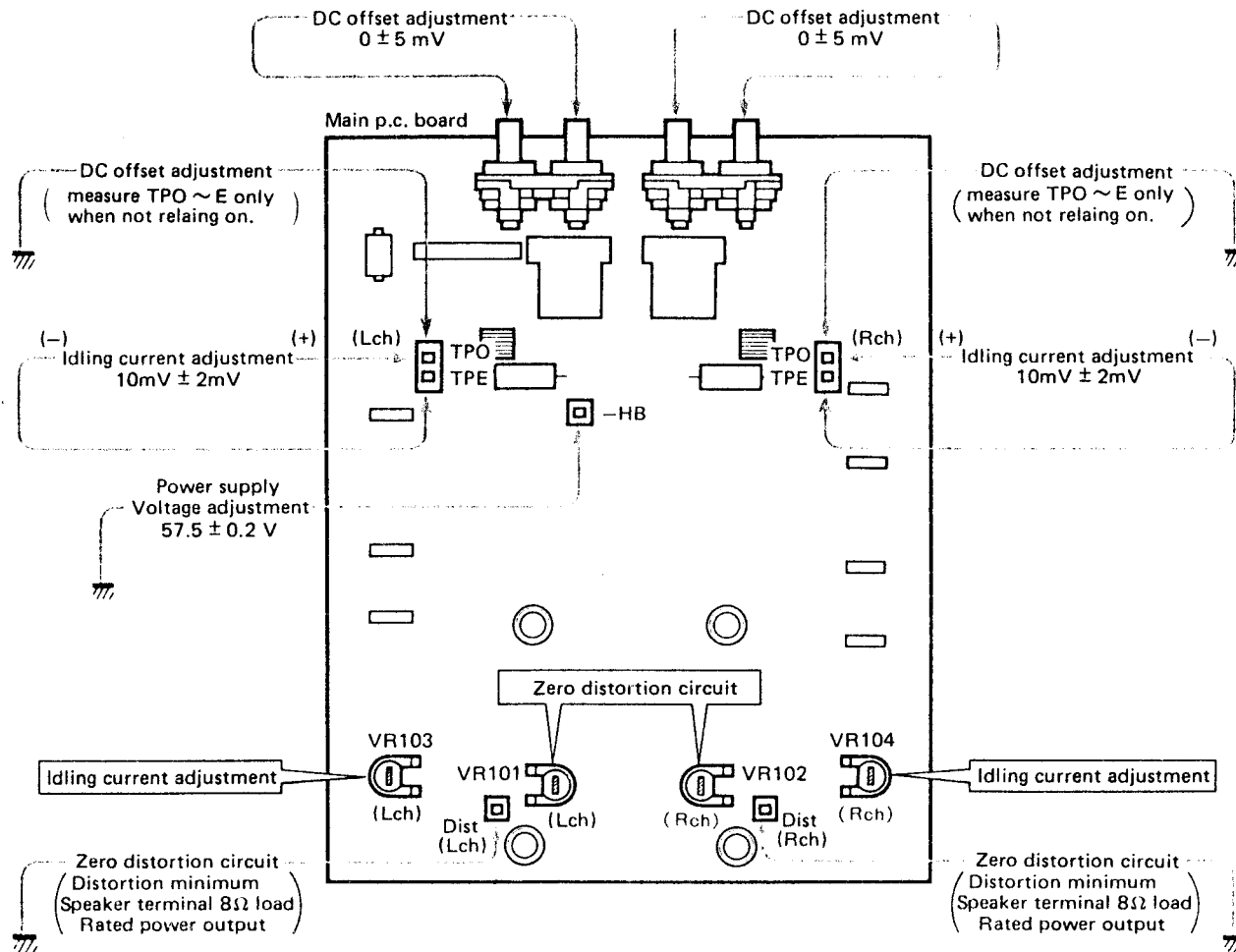
Fig. 13

ADJUSTMENTS

BEFORE COMMENCING

1. Make sure that primary supply voltage comes within $\pm 10\%$ (U, C models).
2. Proceed with the adjustments about 5 minutes after the power has been turned on to stabilize the operation of the amplifier.

* G model 220V
B, A models 240V



Step	Adjustment	Adjustment points	Test points	Rating	Remarks
1*	-B power supply voltage adjustment	Control circuit board VR601	Main circuit board -B(-) ~ E(+)	$54.5 \text{ V} \pm 0.2 \text{ V}$ [A,G,B] $56.5 \text{ V} \pm 0.2 \text{ V}$ [U,C,R]	No load
2*	Photo coupler voltage adjustment	Control circuit board VR602	Control circuit board -B(-) ~ TP1(+)	$+1.0 \text{ V} \pm 0.1 \text{ V}$	No load
3	DC offset adjustment	Pre-drive circuit board VR901(L) VR902 (R)	Speaker terminal TPO(+) ~ TPE(-) only when relay not on	$0 \text{ V} \pm 5 \text{ mV}$	
4	Idling current adjustment	Main circuit board VR103 (L) VR104 (R)	Main circuit board TPO(+) ~ TPE(-)	$10 \text{ mV} \pm 2 \text{ mV}$	No load
5	Bargraph meter adjustment	Meter circuit board VR501 (L) VR502 (R)	Speaker terminal 1kHz 100W (31.24dBm) 8Ω	Meter point 0dB	0.5dB decreasing, it is lit dimly.
6	Zero distortion circuit adjustment	Main circuit board VR101 (L) VR102 (R)	DIST ~ E (1kHz at SP terminal 8Ω load) output power U,C,R 120W (32.03dBm) G,A,B 110W (31.66dBm)	After confirming minimum point of distortion, adjust so that the distortion comes minimum	Adjust as shorty as possible with taking notice of the load.

* Accomplish steps 1* and 2* at the same time by using two digital multimeters.

Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
R221	HJ 35:63:90	Carbon Resistor	3.9kΩ RD25	カーボン抵抗		
R222	HJ 35:81:50	"	150kΩ "	"		
R223	HJ 35:41:00	"	10Ω "	"		
R224	HJ 35:73:90	"	39kΩ "	"		
R225,226	HJ 35:71:20	"	12kΩ "	"		
R227	HJ 35:75:60	"	56kΩ "	"		
R228,229	HJ 35:78:20	"	82kΩ "	"		
* R230	HL 71:53:30	Metal Oxide Film Resistor	330Ω 1P	酸化金抵抗		
R232	HJ 35:72:20	Carbon Resistor	22kΩ RD25	カーボン抵抗		
R233~248	HJ 35:73:90	"	39kΩ "	"		
R249~252	HJ 35:51:00	"	100Ω "	"		
R253,254	HJ 35:61:00	"	1kΩ "	"		
R255~258	HJ 35:78:20	"	82kΩ "	"		
* VR101~VR104	HY 00:09:90	Metal Grazed Variable Resistor	B500Ω	メタルグレイズボリューム		
TR101,102	iC 27:05:00	Transistor	2SC2705(O,Y)	トランジスタ		
TR103,104	iA 11:45:00	"	2SA1145(O,Y)	"		
TR105~TR108	iA 10:15:70	"	2SA1015(O,Y)	"		
TR109~TR116	iC 18:15:70	"	2SC1815(O,Y)	"		
TR117~TR120	iA 10:15:70	"	2SA1015(O,Y)	"		
TR121,122	iC 22:40:00	"	2SC2240(GR,BL)	"		
TR123,124	iC 15:09:30	"	2SC1509(Q,R)	"		
TR125,126	iA 07:77:30	"	2SA777(Q,R)	"		
TR127,128	iC 27:05:00	"	2SC2705(O,Y)	"		
TR129,130	iA 11:45:00	"	2SA1145(O,Y)	"		
TR143	iA 06:73:10	"	2SA673(C,D)	"		
TR144	iB 05:60:00	"	2SB560	"		
TR145~TR147	iC 18:15:70	"	2SC1815(O,Y)	"		
TR148	iA 10:15:70	"	2SA1015(O,Y)	"		
D101,102	iF 00:07:90	Varistor	MV12	バリスタ		
D103~106	iF 00:14:70	Zener Diode	RD6.2EB2	ツェナーダイオード		
D107~114	iF 00:14:00	Diode	1S582	ダイオード		
D115~118	iF 00:00:40	"	1S1555	"	Inter-changeable	
"	iF 00:06:70	"	1S2473	"		
D119~122	iF 00:14:00	"	1S582	"		
D123	iF 00:00:40	"	1S1555	"	Inter-changeable	
"	iF 00:06:70	"	1S2473	"		
D124,125	iF 00:16:20	"	1S2076A	"		
D126	iF 00:14:70	Zener Diode	RD6.2EB2	ツェナーダイオード		
D127	iF 00:00:40	Diode	1S1555	ダイオード	Inter-changeable	
"	iF 00:06:70	"	1S2473	"		
D128	iF 00:14:70	Zener Diode	RD6.2EB2	ツェナーダイオード		
D129,130	iF 00:00:40	Diode	1S1555	ダイオード	Inter-changeable	
"	iF 00:06:70	"	1S2473	"		
* RY101,102	KC 00:12:20	Relay	MSJ12D2-OM	リレー		
	LA 00:21:10	Wrapping Terminal	P=5 2P (i Type)	i型ラッピング端子板		
	LA 00:21:20	"	P=5 3P (i Type)	"		
	LA 00:35:10	Lock Terminal	4P	4Pワックロックターミナル		
	LA 00:35:20	"	"	"		
	LB 40:05:70	2.5 Pitch Base Pin	TEB4P-SHF	2.5ピッチベースピン		
	LA 00:20:30	Wrapping Terminal	P=5 4P (i Type)	i型ラッピング端子板		
	LA 00:41:20	Test Point Pin		テストポイントピン		
	BB 06:52:50	Pusher, Transistor		T R ブ ッ シ ャ ー		
	BB 06:83:70	Plate, Ground		ア ー ス 金 具		

⊕ New Parts (新規部品)

Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
	BB 06:62:90	Washer	ワ ッ シ ャ ー			
※	NA:07:76:60	Electrolytic Cap. Circuit Board	ケ ミ コ ン シ ー ト			J
※	NA:07:76:70	"	"			U,C
※	NA:07:76:80	"	"			A,G,B
※	NA:07:95:20	"	"			R
※	C801 FZ 00:27:80	Electrolytic Cap.	4700 μ F 16V	ケ ミ コ ン		
	C802 UW 93:71:00	"	10 μ F 16V	"		
	C803 UW 86:61:00	"	1 μ F 50V	"		
	C804 UW 86:71:00	"	10 μ F 50V	"		
※	C805~808 FZ 00:28:10	"	10000 μ F 63V	"		
※	C809,810 FZ 00:27:90	"	1000 μ F 80V	"		
	R801 HJ 35:45:60	Carbon Resistor	56 Ω RD25	カ ー ボ ン 抵 抗		
	R802,803 HJ 35:71:80	"	18k Ω "	"		
	R804 HJ 35:61:80	"	1.8k Ω "	"		
	R805 HJ 35:73:30	"	33k Ω "	"		
	R806 HJ 35:61:00	"	1k Ω "	"		
※	R807 HL 72:36:80	Metal Oxide Film Resistor	6.8 Ω 2P	酸 金 抵 抗		
※	R808,809 HL 82:71:80	"	18k Ω 2P	"		J,R
※	" HL 82:65:60	"	5.6k Ω 2P	"		U,A,G,C,B
※	R810,811 HL 81:71:50	"	15k Ω 1P	"		
	TR801 iC 22:35:00	Transistor	2SC2235(O,Y)	ト ラ ン ジ ス タ		
	TR802 iC 19:83:00	"	2SC1983	"		
※	D801 iH 00:11:70	Diode Bridge	D4BB20	ダ イ オ ー ド ブ リ ッ ジ		
※	D802 iH 00:11:20	"	S2VB20	"		
※	D803 iH 00:02:80	Diode	1D2C1	ダ イ オ ー ド	Inter-changeable	
※	" iH 00:11:80	"	S2VC10	"		
	D804 iF 00:02:00	Zener Diode	WZ-120	ツ ェ ナ ー ダ イ オ ー ド		
	D805~808 iH 00:07:10	Diode	W06C	ダ イ オ ー ド		
	F801,802 KB 00:04:20	Fuse	T2.5A 250V	ヒ ュ ー ス		J,R
	" KB 00:07:50	"	T2.0A 250V	"		A,G,B
	" KB 00:11:10	"	2.5A 250V	"		U,C
	LA 00:23:50	Wrapping Terminal	P=5 2P (L Type)	L型ラッピング端子板		
	LA 00:23:60	"	P=5 3P (L Type)	"		
	LA 00:23:90	"	P=7.5 2P (L Type)	"		
	LA 00:24:20	"	P=10 3P (L Type)	"		
	LA 00:26:10	"	P=5 2P (L Type)	"		
※	LA 00:26:20	"	P=5 3P (L Type)	"		
	LB 20:18:80	Fuse Holder Pin	PC-FH1	ヒ ュ ー ス ホ ル ダ ー ピ ン		
※	NA:07:78:70	Pre Drive Circuit Board	ブ リ ド ラ イ ブ シ ー ト			J
※	NA:07:78:80	"	"			R,A,G,B
※	NA:07:78:90	"	"			U,C
	C901,902 FT 55:21:00	Polypropylene Film Cap.	100pF 50V	ポ リ プ ロ ピ レ ン フ ィ ル ム コ ン		
	C903,904 FH 61:04:00	Ceramic Cap.	4pF 500V	セ ラ コ ン		R,U,A,G,C,B
	" FU 35:04:00	Mica Cap.	4pF 500V	マ イ カ コ ン		J
	C905,906 FG 41:22:20	Ceramic Cap.	220pF 50V	セ ラ コ ン		R,U,A,G,C,B
	" FT 51:22:20	Polypropylene Film Cap.	220pF 50V	ポ リ プ ロ ピ レ ン フ ィ ル ム コ ン		J
	C907,908 UA 25:31:00	Mylar Cap	0.001 μ F 50V	マ イ ラ ー コ ン		J
	" FG 41:31:00	Ceramic Cap.	0.001 μ F 50V	セ ラ コ ン		R,U,A,G,C,B
	C909~912 FG 41:22:20	"	22pF 50V	"		R,U,A,G,C,B
	" FU 35:12:20	Mica Cap.	22pF 500V	マ イ カ コ ン		J
	C913~916 FH 61:08:00	Ceramic Cap.	8pF 500V	セ ラ コ ン		R,U,A,G,C,B
	" FU 35:08:00	Mica Cap.	8pF 500V	マ イ カ コ ン		J

※ New Parts (新規部品)

Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
* C917~920	FC 34:44:70	Mylar Cap.	0.047 μ F 50V	マイラーコン		J
"	UA 25:44:70	"	0.047 μ F 50V	"		R,U,A,G,C,B
C921,922	FH 61:16:80	Ceramic Cap.	68pF 500V	セラコン		R,A,G,B
"	FH 61:21:00	"	100pF 500V	"		U,C
"	FU 35:21:00	Mica Cap.	100pF 500V	マイカコン		J
C923~926	UW 88:72:20	Electrolytic Cap.	22 μ F 80V	ケミコン		R,U,A,G,C,B
"	FV 69:72:20	"	22 μ F 100V	プラスチックケミコン		J
* C927,928	UW 91:74:70	"	47 μ F 6.3V	ケミコン		R,U,A,G,C,B
* "	UM 07:61:00	"	1 μ F 50V	"		J
C929,930	FH 61:13:30	Ceramic Cap.	33pF 500V	セラコン		R,A,G,B
R901,902	HJ 35:83:30	Carbon Resistor	330k Ω RD25	カーボン抵抗		
R903,904	HJ 35:61:00	"	1k Ω "	"		
R905,906	HJ 35:56:80	"	680 Ω "	"		
R907,908	HJ 35:42:20	"	22 Ω "	"		
R909,910	HJ 35:48:20	"	82 Ω "	"		
R911~914	HJ 35:63:30	"	3.3k Ω "	"		
R915,916	HJ 35:53:30	"	330 Ω "	"		
R917~920	HU 07:71:80	Metal Film Resistor	18k Ω RE35	金属被膜抵抗		
R921,922	HU 07:58:20	"	820 Ω "	"		J
R923,924	HJ 35:53:30	Carbon Resistor	330 Ω RD25	カーボン抵抗		R,U,A,G,C,B
"	HU 07:55:60	Metal Film Resistor	560 Ω RE35	金属被膜抵抗		J
R925,926	HJ 35:83:30	Carbon Resistor	330k Ω RD25	カーボン抵抗		
R927~930	HJ 35:63:30	"	3.3k Ω "	"		
R931~934	HJ 35:62:20	"	2.2k Ω "	"		
R935~938	HJ 35:56:80	"	680 Ω "	"		
R939~946	HJ 35:42:20	"	22 Ω "	"		
R947,948	HJ 35:51:50	"	150 Ω "	"		
R949,950	HJ 35:81:50	"	150k Ω "	"		
R951~954	HJ 35:64:70	"	4.7k Ω "	"		
R955~958	HJ 35:62:20	"	2.2k Ω "	"		
R959~962	HJ 35:51:20	"	120 Ω "	"		
R963~966	HV 35:52:20	Flame Proof Carbon Resistor	220 Ω RDF25SF	不燃化カーボン抵抗		
* VR901,902	HT 18:03:70	Metal Gazed Variable Resistor	B100 Ω	メタルグレースボリューム		
TR901,902	iE 10:19:10	Dual FET	μ PA68H (L,H)	デュアルFET		
TR903,904	iC 27:05:00	Transistor	2SC2705(O,Y)	トランジスタ		
TR905,906	iA 11:45:00	"	2SA1145(O,Y)	"		
TR907,908	iC 22:40:00	"	2SC2240(GR,BL)	"		
TR909,910	iA 09:70:00	"	2SA970(GR,BL)	"		
TR911,912	iZ 00:01:20	Dual Transistor	μ PA74V	デュアルトランジスタ		
TR913,914	iZ 00:01:30	"	μ PA75V	"		
TR915,916	iA 09:99:10	Transistor	2SA999(E,F)	トランジスタ	Inter-changeable	
"	iA 10:15:70	"	2SA1015(O,Y)	"		
TR917,918	iC 23:20:10	"	2SC2320(E,F)	"	Inter-changeable	
"	iC 18:15:70	"	2SC1815(O,Y)	"		
TR919,920	iA 11:45:00	"	2SA1145(O,Y)	"		
TR921,922	iC 27:05:00	"	2SC2705(O,Y)	"		
TR923,924	iA 09:70:00	"	2SA970(GR,BL)	"		
TR925,926	iC 22:40:00	"	2SC2240(GR,BL)	"		
D901~908	iF 00:14:70	Zener Diode	RD6.2EB2	ツェナーダイオード		
D909~912	iF 00:00:40	Diode	1S1555	ダイオード	Inter-changeable	
"	iF 00:06:70	"	1S2473	"		
D913~916	iF 00:08:30	Zener Diode	RD4.7E	ツェナーダイオード		
	LA 00:23:60	Wrapping Terminal	P=5 3P (L Type)	L型ラッピング端子板		

◆ New Parts (新規部品)

Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
	LA:00:23:80	Wrapping Terminal	P=5 5P (L Type)	L型ラッピング端子板		
	LB:30:07:30	2.5 Pitch Base Pin	TEB3P-SHF	2.5ピッチベースピン		
*	NA:07:77:40	Control Circuit Board		制御回路シート		J,U,C
*	NA:07:77:60	"		"		R,A,G,B
*	NA:07:77:50	"		"		R,A,G,B
*	NA:07:77:70	"		"		A,G,B
C601	UW:86:62:20	Electrolytic Cap.	2.2μF 50V	ケミコン		J,U,C
"	UW:86:64:70	"	4.7μF 50V	"		R,A,G,B
C602	UW:91:81:00	"	100μF 6.3V	"		
C603	FH:21:31:00	Ceramic Cap.	0.001μF 500V	セラコン		
C604	FG:41:21:00	"	100pF 50V	"		
C605	UA:25:43:30	Mylar Cap.	0.033μF 50V	マイラーコン		
C606	FA:45:54:70	"	0.47μF 50V	"		
C607	FO:02:52:20	Oil Cap.	0.22μF 630V	オイルコン		J
"	FC:24:52:20	Metalized Mylar Cap.	0.22μF 125V	M M コン		U,C
"	FR:15:52:20	Metalized Paper Cap.	0.22μF 250V	M P コン		R
"	FR:15:54:70	"	0.47μF 250V	"		A,G,B
C608.609	Fi:34:33:30	Ceramic Cap.	0.0033μF 125V	セラコン		J,U,C
C608-610	FR:16:36:80	Metalized Paper Cap.	0.0068μF 250V	M P コン		R,A,G,B
C611	FO:02:51:00	Oil Cap.	0.1μF 630V	オイルコン		J
"	FC:24:51:00	Metalized Mylar Cap.	0.1μF 630V	M M コン		U,C
"	FO:09:46:80	Oil Cap.	0.068μF 450V	オイルコン		R,A,G,B
L601	GD:90:04:20	Coil	150μH	雑防コイル		
R601	HJ:35:73:30	Carbon Resistor	33kΩ RD25	カーボン抵抗		
R602	HJ:35:58:20	"	820Ω "	"		
R603.604	HJ:35:73:30	"	33kΩ "	"		
R605	HJ:35:61:00	"	1kΩ "	"		
R606.607	HV:35:51:20	Flame Proof Carbon Resistor	120Ω RDF25SF	不燃化カーボン抵抗		J,U,C
"	HV:35:52:20	"	220Ω "	"		R,A,G,B
R608	HJ:35:63:90	Carbon Resistor	820Ω RD25	カーボン抵抗		
R609	HJ:35:71:50	"	15kΩ "	"		J
"	HJ:35:71:80	"	18kΩ "	"		U,C
"	HJ:35:73:30	"	33kΩ "	"		R,A,G,B
R610	HJ:35:73:30	"	33kΩ "	"		
R611	HV:35:45:60	Flame Proof Carbon Resistor	56Ω RDF25SF	不燃化カーボン抵抗		
R612	HJ:35:58:20	Carbon Resistor	820Ω RD25	カーボン抵抗		
R613	HJ:35:81:00	"	100kΩ "	"		
R614	HJ:35:82:20	"	220kΩ "	"		
R615	HJ:35:71:00	"	10kΩ "	"		
R616	HJ:35:75:60	"	56kΩ "	"		
R617	HJ:35:81:50	"	150kΩ "	"		J
*	HL:72:81:00	Metal Oxide Film Resistor	100kΩ 2P	酸化膜抵抗		R,U,A,G,C,B
*	HL:72:71:00	"	10kΩ 2P	"		J
"	HL:62:71:20	"	12kΩ 2P	"		U,C
"	HL:72:73:90	"	39kΩ 2P	"		R,A,G,B
R622	HL:72:73:90	"	39kΩ 2P	"		R,A,G,B
R623	HV:35:61:00	Flame Proof Carbon Resistor	1kΩ RDF25SF	不燃化カーボン抵抗		
R624	HJ:35:84:70	Carbon Resistor	470kΩ RD25	カーボン抵抗		
R625	HJ:35:71:50	"	15kΩ "	"		
R626	HJ:35:81:20	"	120kΩ "	"		R,U,C
"	HJ:35:81:80	"	180kΩ "	"		A,G,B
R627	HJ:35:71:00	"	10kΩ "	"		J

* New Parts (新規部品)

Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets
R627	HJ 35 75 60	Carbon Resistor	56kΩ RD25	カーボン抵抗		R,U,C
"	HJ 35 81 80	"	180kΩ "	"		A,G,B
R628	HJ 35 73 30	"	33kΩ "	"		R
R629	HV 35 41 50	Flame Proof Carbon Resistor	15Ω RDF25SF	不燃化カーボン抵抗		
R630,631	HJ 35 54 70	Carbon Resistor	470Ω RD25	カーボン抵抗		
* R632	HL 72 53 90	Metal Oxide Film Resistor	390Ω 2P	酸化金抵抗		
R633	HL 31 41 80	"	18Ω 1P	"		
VR601	HT 18 02 10	Semi Variable Resistor	B5kΩ	半固定抵抗		
* VR602	HY 00 10 30	Metal Grazed Variable Resistor	"	メタルグレイズホリウム		
TR601	iA 09 49 00	Transistor	2SA949(O,Y)	トランジスタ		
TR602,603	iA 09 70 00	"	2SA970(GR,BL)	"		
TR604	iC 18 15 70	"	2SC1815(O,Y)	"		
TR605	iC 22 40 00	"	2SC2240(GR,BL)	"		
TR606	iK 00 03 00	Photo Coupler	TLP508 (V)	フォトカプラ		
D601,602	iF 00 14 70	Zener Diode	RD6.2E82	ツェナーダイオード		
D603-605	iF 00 00 40	Diode	1S1555	ダイオード	Inter-changeable	
"	iF 00 06 70	"	1S2473	"		
D606,607	iF 00 19 40	Zener Diode	HZ-24	ツェナーダイオード		
D608	iH 00 08 80	Diode Bridge	S1WB	ダイオードブリッジ		
D609,610	iF 00 14 00	Diode	1SS82	ダイオード		J
"	iH 00 00 60	"	10D-4	"		R,U,A,G,C,B
D611,612	iF 00 14 00	"	1SS82	"		J
IC601	iG 04 08 00	IC	iG04080	トリガーIC	Trigger	
* SCR601	iH 00 11 50	Thyristor	0.3A SFOR3G42	サイリスタ		
SCR602	iH 00 09 00	Triac	0.5A SMOR5G42	トライアック		
SCR603	iH 00 10 50	"	16A AC16DGM-L	"		
F601	KB 00 12 70	Fuse	T15A 250V	ヒューズ		J
"	KB 00 15 40	"	12A 250V	"		U,C
"	KB 00 13 80	"	15A 250V	"		R
* " " " "	KB 00 22 40	"	F6.3A 250V	"		A,G,B
	LA 00 23 70	Wrapping Terminal	P=5 4P(L Type)	L型ラッピング端子板		
	LA 00 24 10	"	P=10 2P(L Type)	"		
	LA 00 24 20	"	P=10 3P(L Type)	"		
	LB 20 09 00	Fuse Holder Pin	YSH402P PC	ヒューズホルダーピン		J,R,U,C
	LB 20 10 60	"	YSH403T	"		A,G,B
	BA 07 95 30	Heat Sink		放熱板	A-760	
	BB 06 62 90	Washer		ワッシャー		
	CB 07 28 80	Isolation Bush		絶縁ブッシュ		
	CB 60 38 40	Coil Cap.		コイルキャップ	A-1060	
	CB 60 40 80	Coil Base		コイルベース	"	
	iL 00 02 70	Mica Base	AC-229	マイカベース		
	EA 02 61 00	Pan Head Screw	M2.6x10 ZMC2-Y	ナベ小ネジ		
	Ei 03 00 80	Bind Head Tapping Screw	3x8 ZMC2-Y	バインドタッピングネジ(2種)		
	CB 60 52 10	Spacer		スペーサー	A-1060	
	EV 20 02 60	Plain Washer	M2.6 ZMC2-Y	平座金		
	EV 30 02 60	Spring Washer	M2.6 ZMC2-Y	バネ座金		

* New Parts (新規部品)