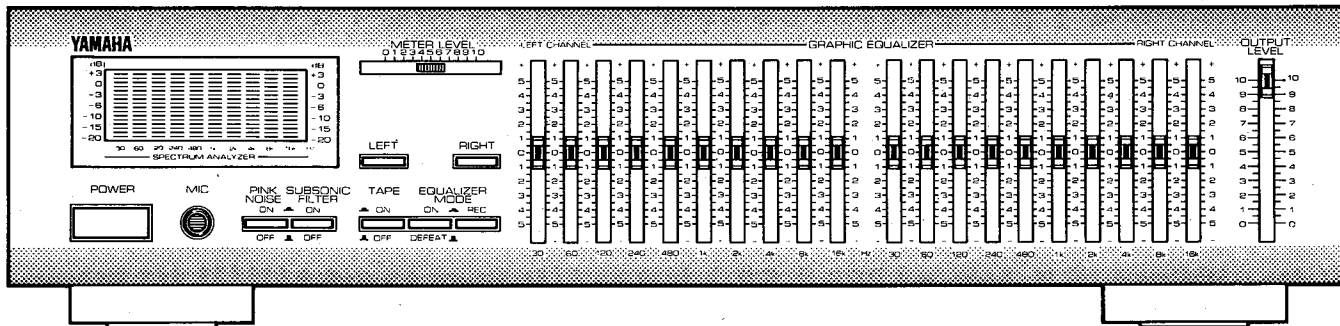


# STEREO GRAPHIC EQUALIZER EQ-550

## SERVICE MANUAL

### FRONT PANEL



### IMPORTANT NOTICE

This manual has been provided for the use of authorized Yamaha Retailers and their service personnel. It has been assumed that basic service procedures inherent to the industry, and more specifically Yamaha Products, are already known and understood by the users, and have therefore not been restated.

**WARNING:** Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components and failure of the product to perform as specified. For these reasons, we advise all Yamaha product owners that all service required should be performed by an authorized Yamaha Retailer or the appointed service representative.

**IMPORTANT:** The presentation or sale of this manual to any individual or firm does not constitute authorization, certification, recognition of any applicable technical capabilities, or establish a principle-agent relationship of any form.

The data provided is believed to be accurate and applicable to the unit(s) indicated on the cover. The research, engineering, and service departments of Yamaha are continually striving to improve Yamaha products. Modifications are, therefore, inevitable and specifications are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service

**WARNING:** Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground buss in the unit (heavy gauge black wires connect to this buss).

**IMPORTANT:** Turn the unit OFF during disassembly and parts replacement. Recheck all work before you apply power to the unit.

### CONTENTS

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100359


# YAMAHA

YAMAHA CORPORATION  
P.O. Box 1, Hamamatsu, Japan

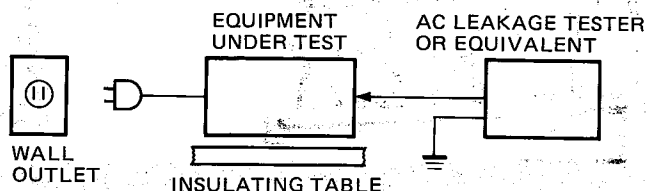
3.05K-131 N © Printed in Japan '90.9

EQ-550

## ■ TO SERVICE PERSONNEL

1. Critical Components Information.  
Components having special characteristics are marked  and must be replaced with parts having specifications equal to those originally installed.
  2. Leakage Current Measurement (For 120V Model Only).  
When service has been completed, it is imperative that you verify that all exposed conductive surfaces are properly insulated from supply circuits.
- Meter impedance should be equivalent to 1500 ohm shunted by 0.15μF.

- Leakage current must not exceed 0.5mA.
- Be sure to test for leakage with the AC plug in both polarities.



## WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the production of this product contains LEAD. In addition, other electrical/electronic and/or plastic (where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and/or birth defects or other reproductive harm.

DO NOT PLACE SOLDER, ELECTRICAL/ELECTRONIC OR PLASTIC COMPONENTS IN YOUR MOUTH FOR ANY REASON WHAT SO EVER!

Avoid prolonged, unprotected contact between solder and your skin! When soldering, do not inhale solder fumes or expose eyes to solder/flux vapor!

If you come in contact with solder or components located inside the enclosure of this product, wash your hands before handling food.

## ■ SPECIFICATIONS

### Input Sensitivity/Impedance

**LINE IN, TAPE, 1 kHz** ..... 1V/47k-ohms  
**MIC** ..... 0.3 mV/47k-ohms

### Rated Output/Impedance

**LINE OUT, REC OUT, 1 kHz**  
**(OUTPUT LEVEL → Max.)** ..... 1V/600-ohms

**Frequency Response** ..... 10 Hz — 35 kHz,  
±0.5 dB

**Center Frequencies** ..... 30 Hz, 60 Hz, 120 Hz,  
240 Hz, 480 Hz, 1 kHz, 2 kHz,  
4 kHz, 8 kHz, 16 kHz,

**Equalizer Control Range** ..... ±12 dB

### Signal-to-Noise Ratio (Input short, IHF A Network)

**At 1V output** ..... More than 105 dB

### Total Harmonic Distortion

**(1 kHz, 1V output)** ..... Less than 0.005%

**Maximum Output (20 Hz — 20 kHz)** ..... More than 7V

### Subsonic Filter Cutoff

**Frequency** ..... 15 Hz  
(12 dB/Oct)

**Pink Noise Output** ..... 150 mV RMS

**Display** ..... 10 bands  
Switchable between L or R, L + R

### Power Requirements

**General model** ..... 110-120/220-240V, 50/60 Hz  
**Europe model** ..... 220V, 50 Hz  
**Australia and U.K. models** ..... 240V, 50 Hz  
**U.S.A. and Canada models** ..... 120V, 60 Hz

**Power Consumption** ..... 15W

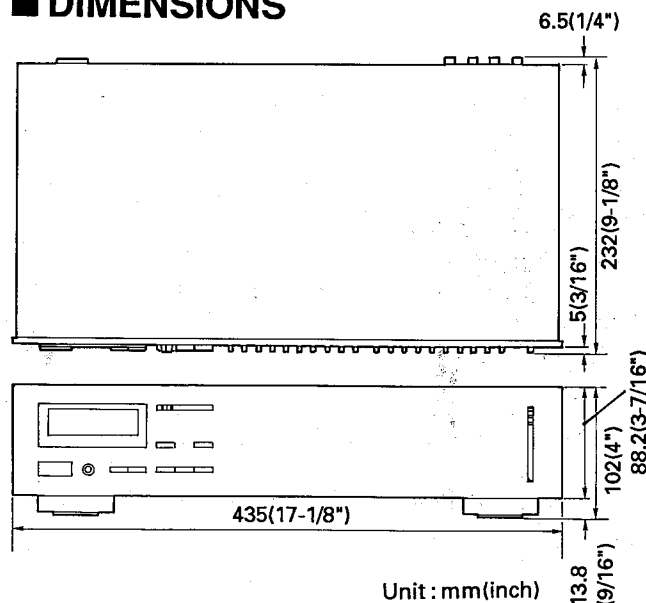
**Dimensions (W x H x D)** ..... 435 × 102 × 232 mm  
(17-1/8" × 4" × 9-1/8")

**Weight** ..... 3.7 kg (8 lbs. 2 oz.)  
**Accessories** ..... Pin plug cords (2)  
MM-110 Electret Condenser Mic  
Mic stand  
Dry battery "AA" (R06) type (1)

\* Specifications subject to change without notice.

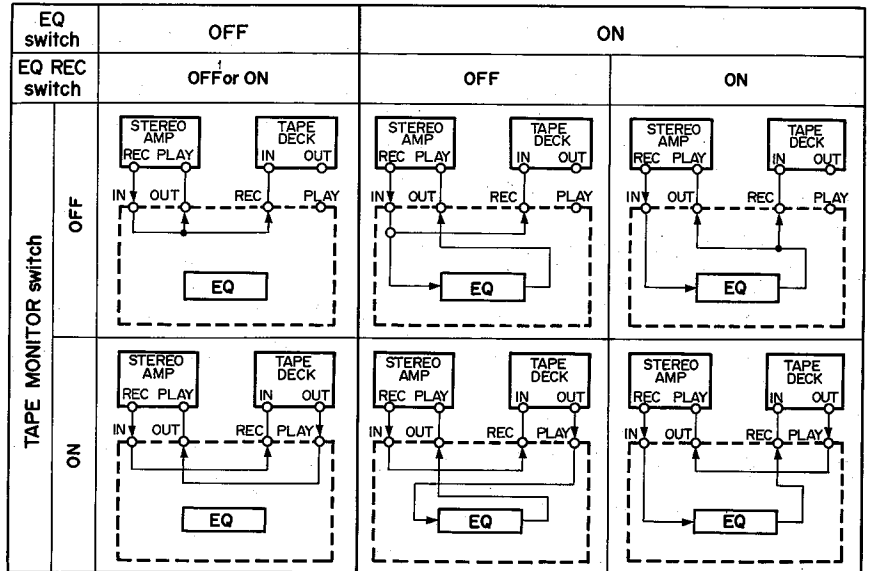
(U) ..... U.S.A. model      (G) ..... European model  
(C) ..... Canadian model      (B) ..... British model  
(A) ..... Australian model      (R) ..... General model

## ■ DIMENSIONS



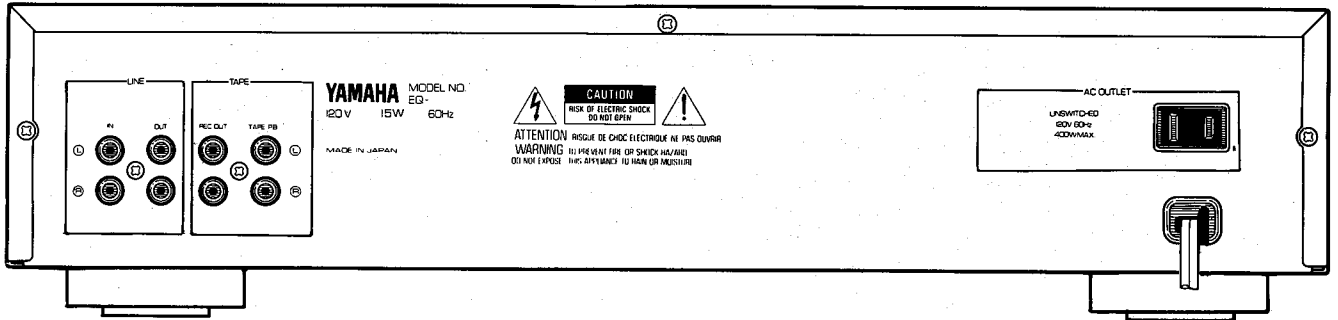
Unit : mm (inch)

**DESCRIPTION OF OPERATIONS**  
(Relationship of Switches)

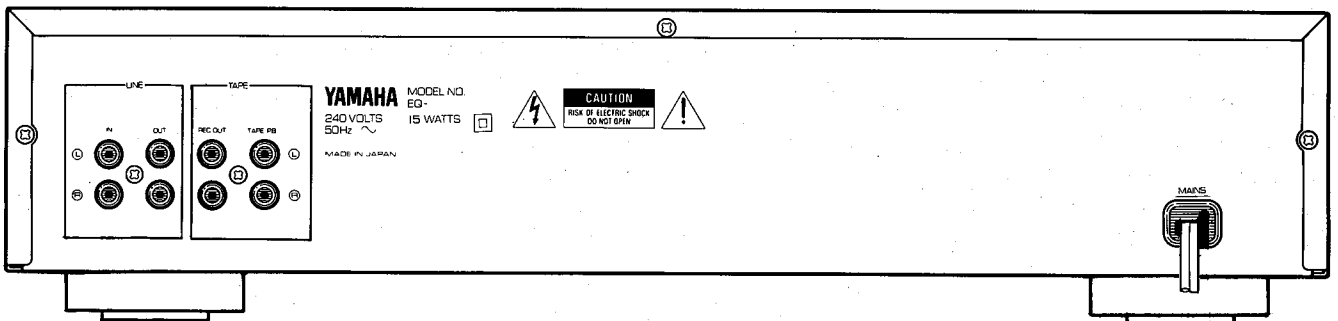


**REAR PANELS**

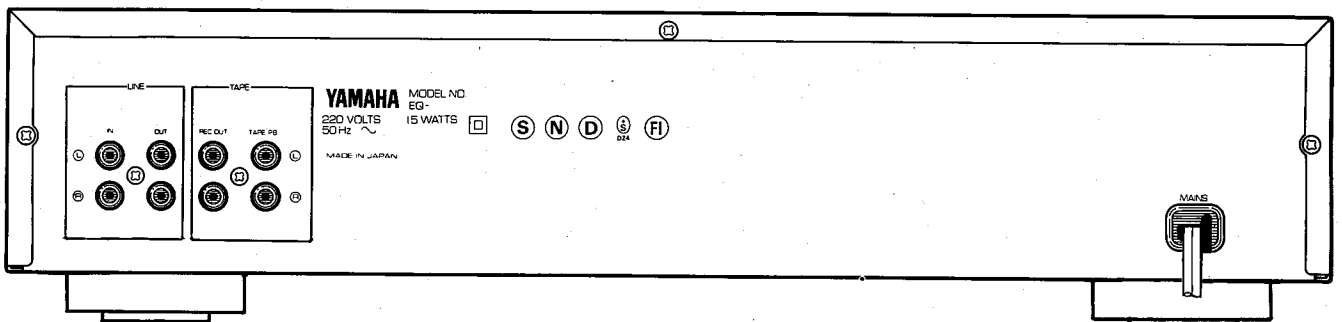
● **U.S.A. and Canadian models**



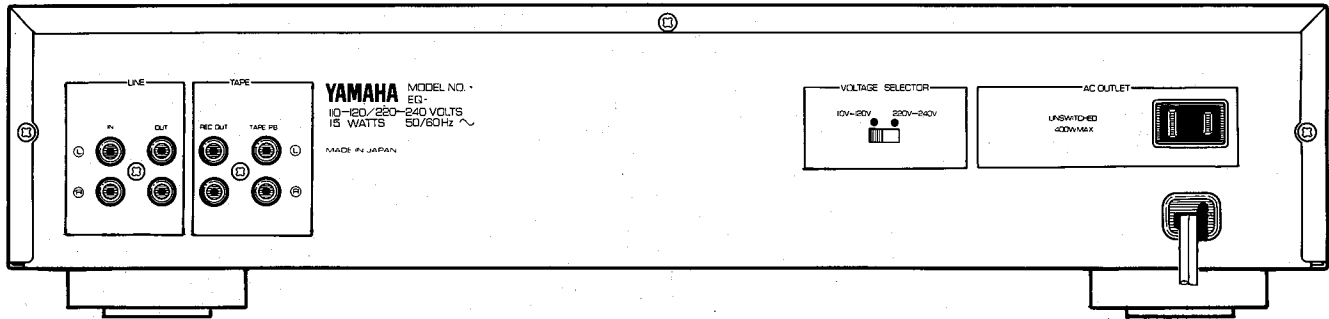
● **Australian and British models**



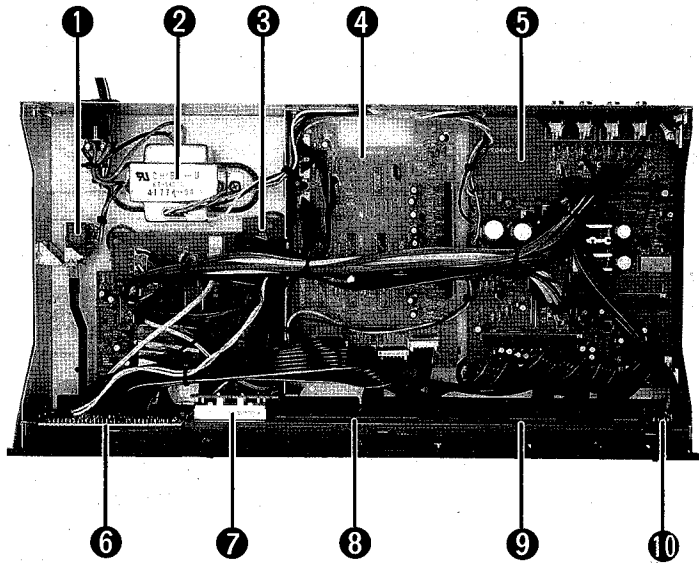
● **European model**



● General model



■ INTERNAL VIEW



- ① POWER SWITCH
- ② POWER TRANSFORMER
- ③ MAIN CIRCUIT BOARD (2)
- ④ SPA CIRCUIT BOARD
- ⑤ MAIN CIRCUIT BOARD (1)
- ⑥ DISPLAY UNIT
- ⑦ MAIN CIRCUIT BOARD (4)
- ⑧ SLIDE VOLUME UNIT (L)
- ⑨ SLIDE VOLUME UNIT (R)
- ⑩ MAIN CIRCUIT BOARD (3)

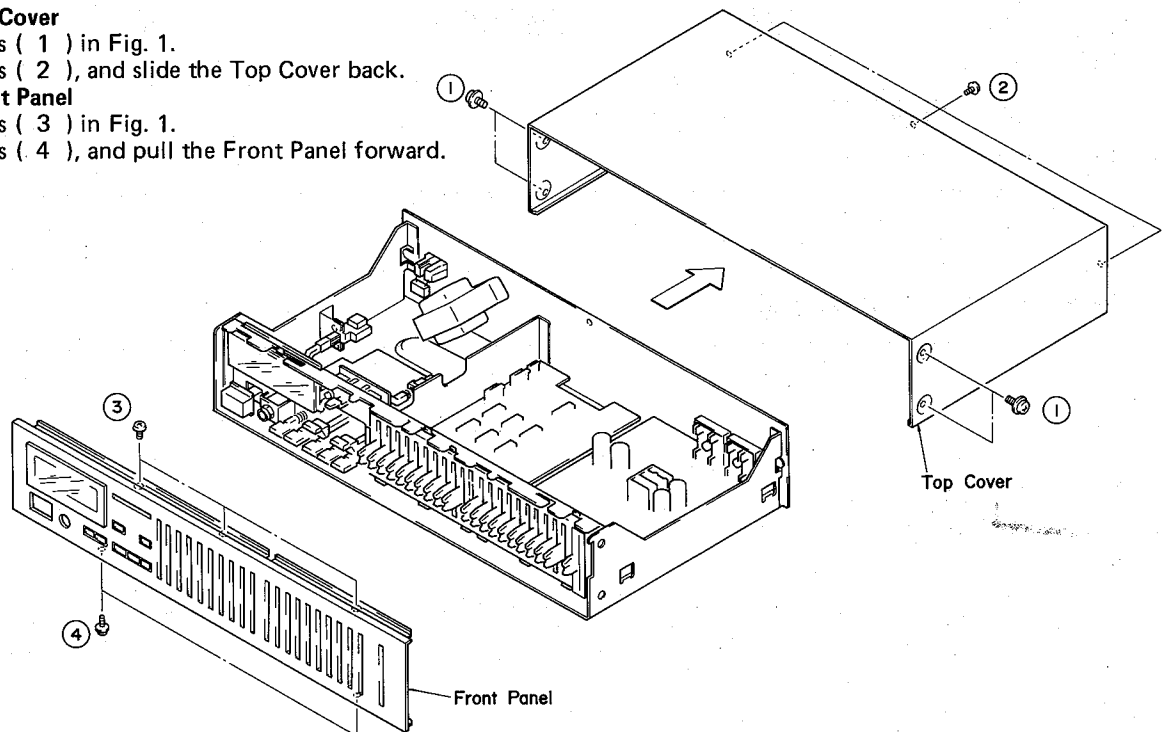
■ DISASSEMBLY PROCEDURES (Remove parts in disassembly order as numbered)

1. Removal of Top Cover

- a. Removal 4 screws ( 1 ) in Fig. 1.
- b. Removal 3 screws ( 2 ), and slide the Top Cover back.

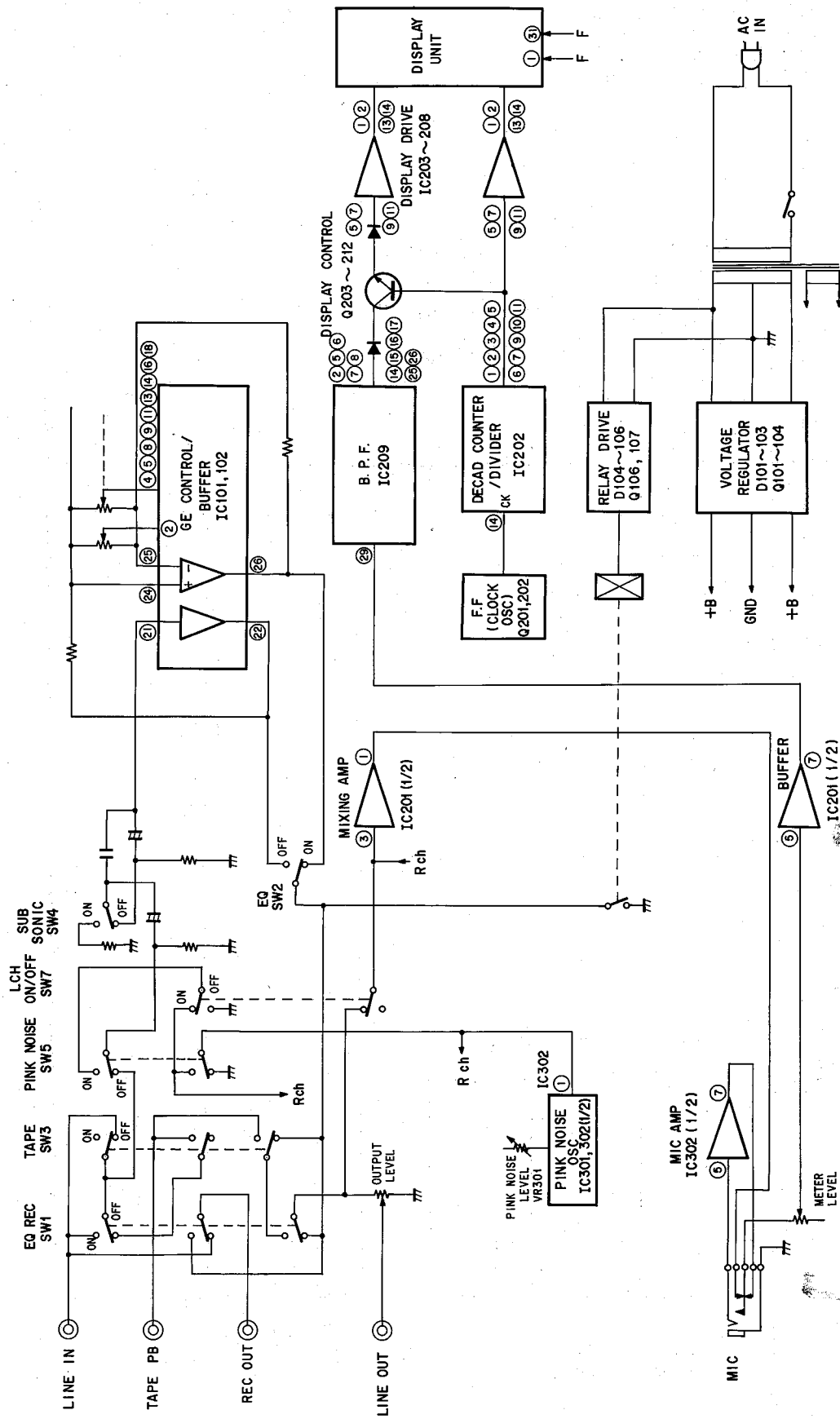
2. Removal of Front Panel

- a. Removal 3 screws ( 3 ) in Fig. 1.
- b. Removal 2 screws ( 4 ), and pull the Front Panel forward.



EQ-550

# ■ BLOCK DIAGRAM



EQ-550

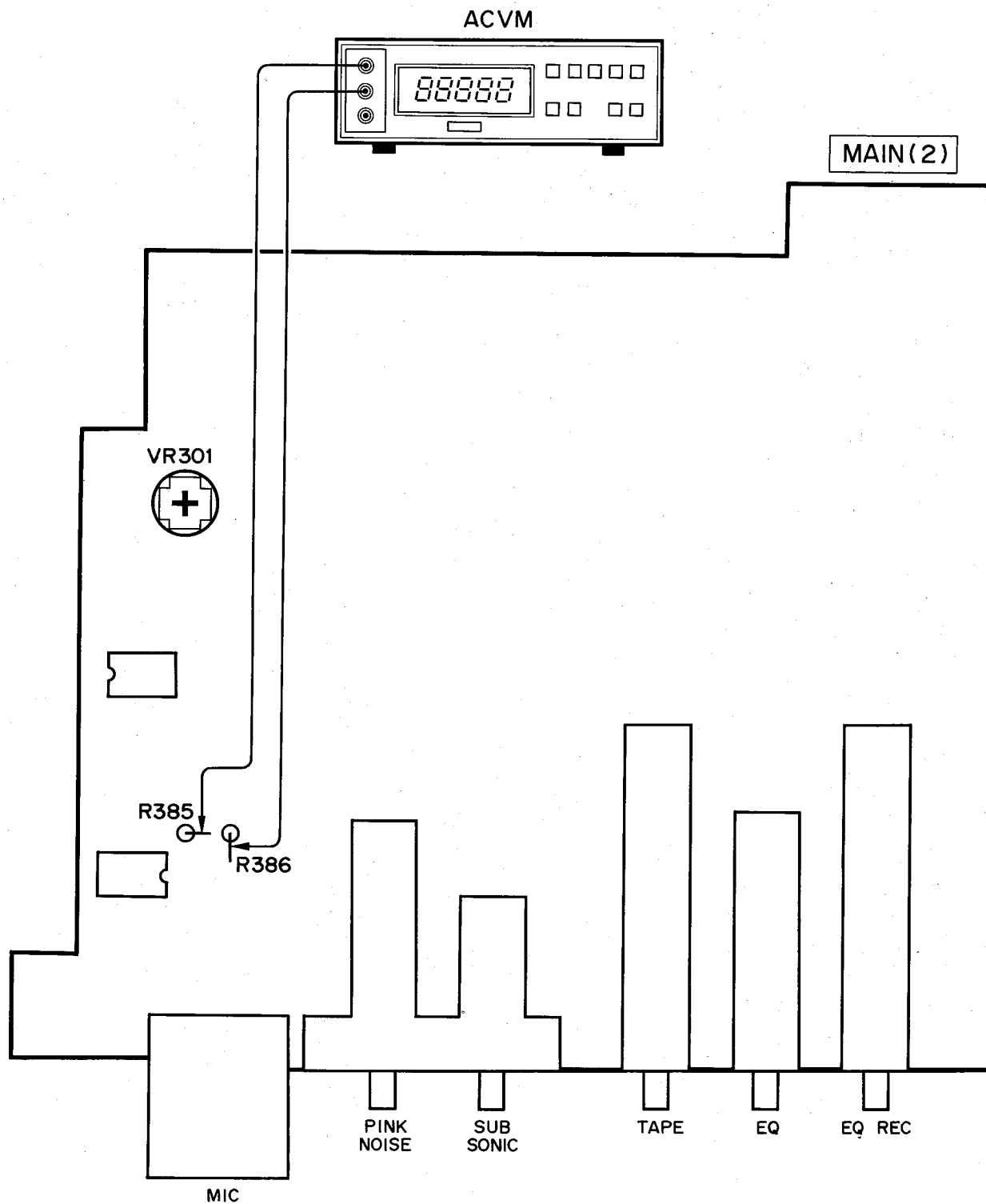
## ■ ADJUSTMENTS

### 1. Before adjustment.

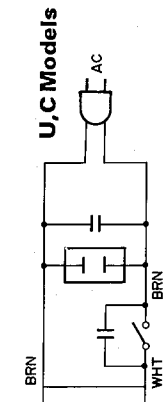
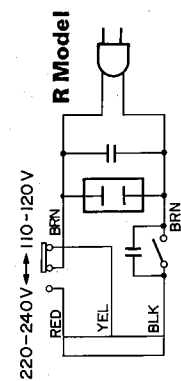
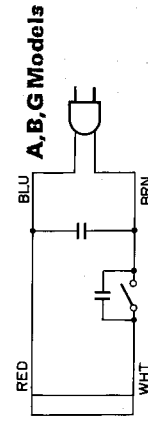
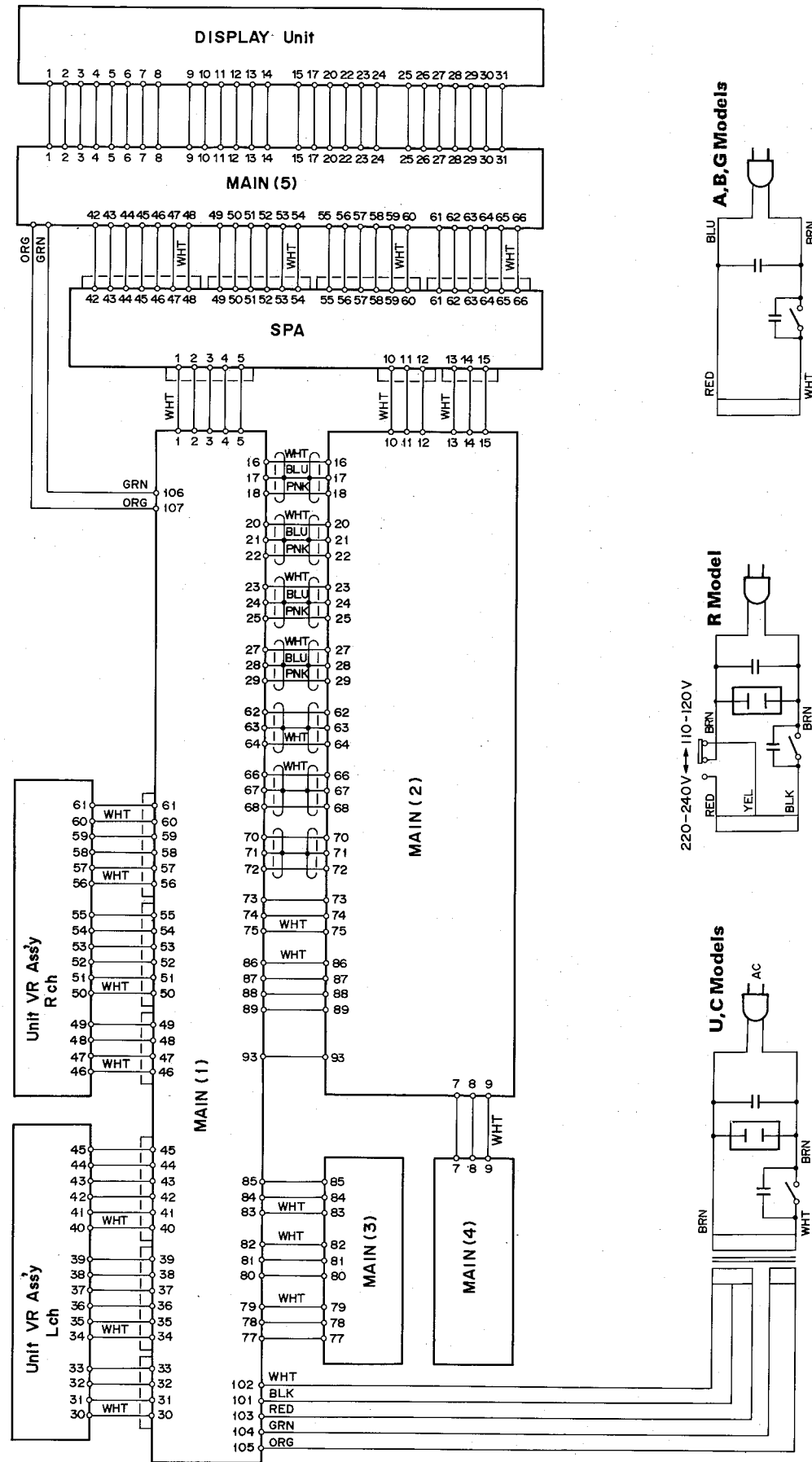
- 1) Power source voltage: 120V AC $\pm$  10%(U,C models)  
220V AC $\pm$  10%(G model)  
240V AC $\pm$  10%(A,B models)
- 2) Let age for approximately 5 minutes after turning the power on.

### ■ Pink noise level adjustment

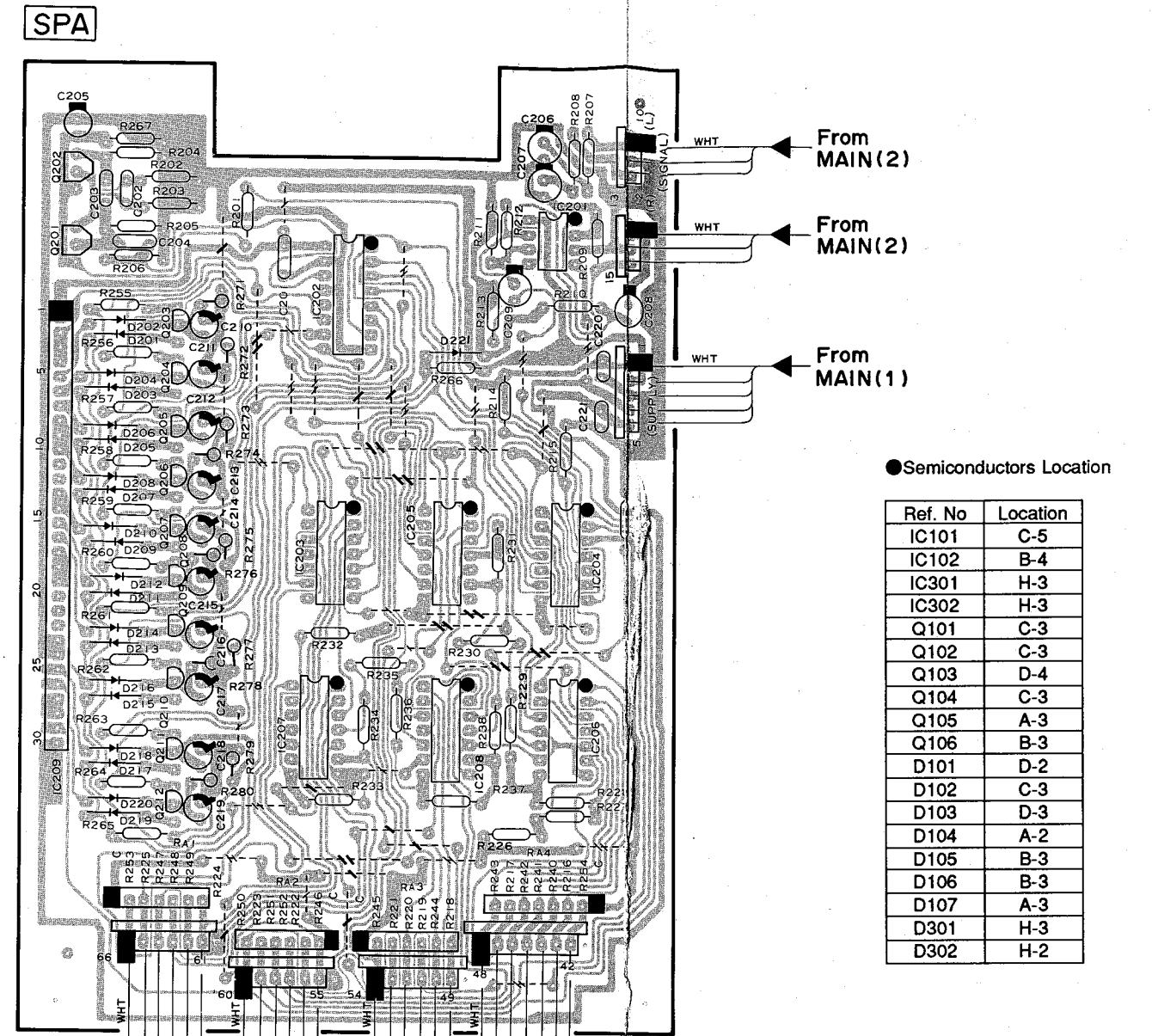
- 1) Connect on AC voltmeter to both sides of R386 and adjust VR301 for a reading of 150mV.



■ WIRING



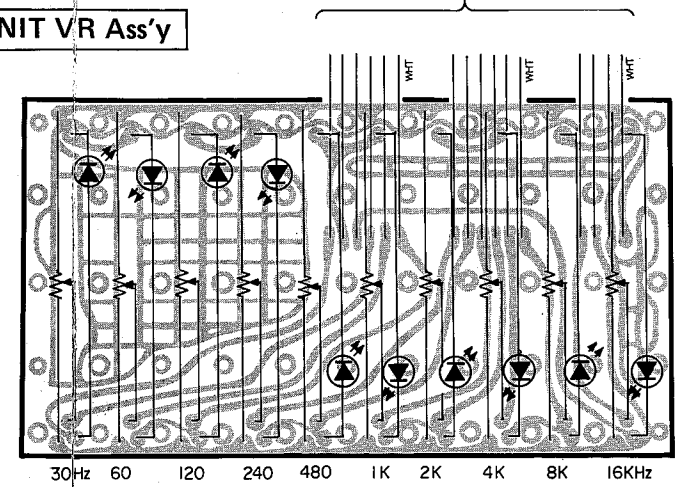
■ PRINTED CIRCUIT BOARD (Pattern Side) (Note) 文字面: Component Side



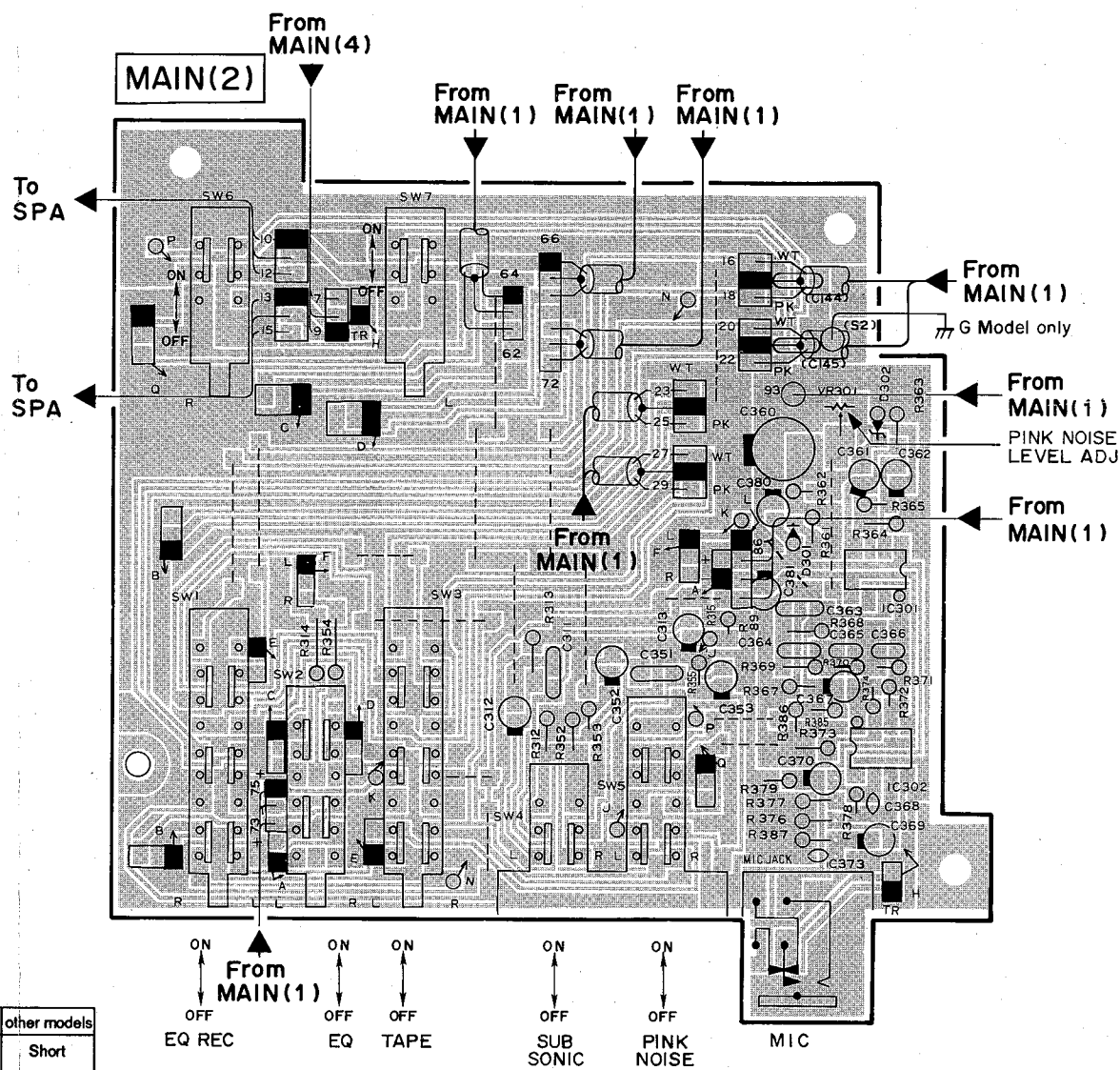
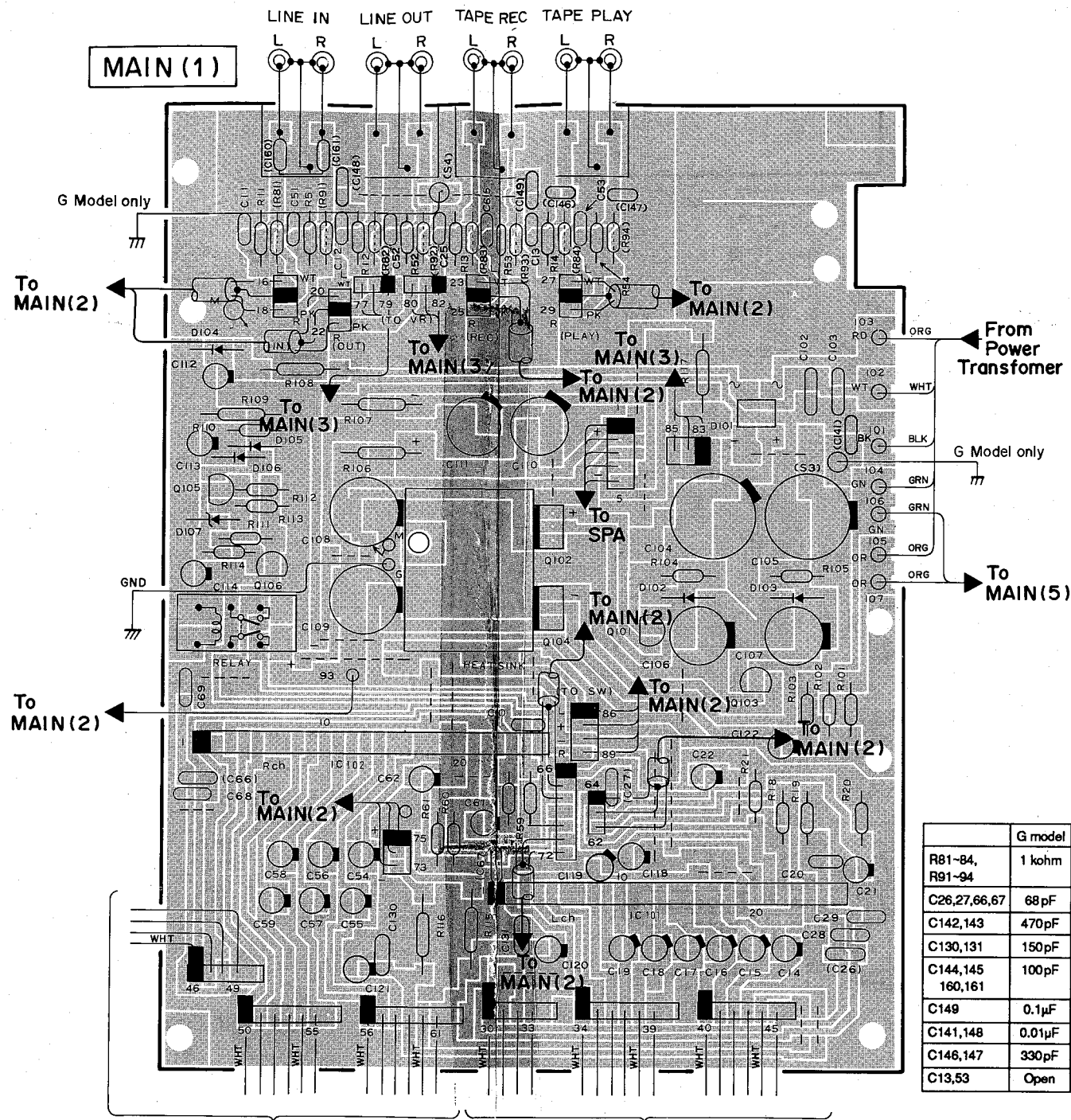
● Semiconductors Location

Ref. No	Location
IC101	C-5
IC102	B-4
IC301	H-3
IC302	H-3
Q101	C-3
Q102	C-3
Q103	D-4
Q104	C-3
Q105	A-3
Q106	B-3
D101	D-2
D102	C-3
D103	D-3
D104	A-2
D105	B-3
D106	B-3
D107	A-3
D301	H-3
D302	H-2

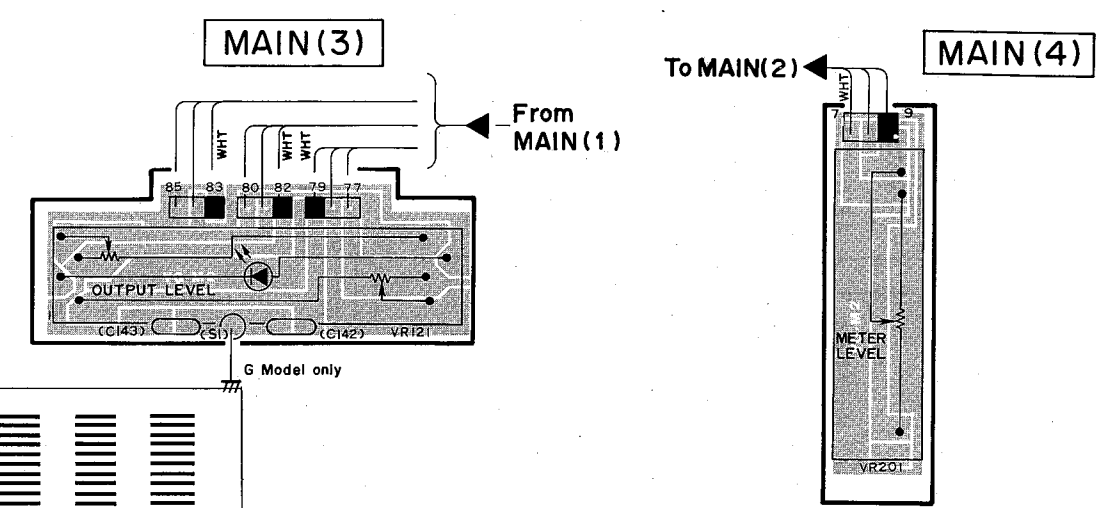
Dont' disassemble UNIT VR Ass'y  
It must be replaced with XX671430 and PX601100.



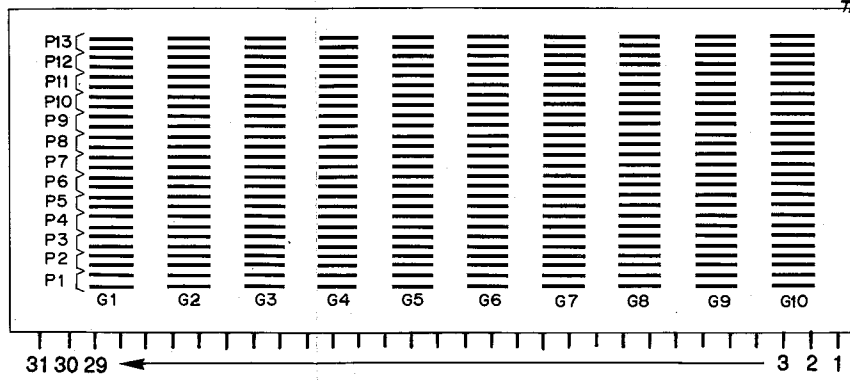
Ref. No	Location
IC201	C-2
IC202	B-2
IC203	B-3
IC204	C-3
IC205	B-3
IC206	C-4
IC207	B-4
IC208	B-4
Q201	A-2
Q202	A-2
Q203	A-2
Q204	A-2
Q205	A-3
Q206	A-3
Q207	A-3
Q208	A-3
Q209	A-3
Q210	A-4
Q211	A-4
Q212	A-4
D201	A-2
D202	A-2
D203	A-2
D204	A-2
D205	A-3
D206	A-3
D207	A-3
D208	A-3
D209	A-3
D210	A-3
D211	A-3
D212	A-3
D213	A-3
D214	A-3
D215	A-4
D216	A-4
D217	A-4
D218	A-4
D219	A-4
D220	A-4
D221	B-2



	G model	other models
R81-84, R91-94	1 kohm	Short
C26,27,66,67	68 pF	Open
C142,143	470 pF	Open
C130,131	150 pF	Open
C144,145, 160,161	100 pF	Open
C149	0.1 μF	Open
C141,148	0.01 μF	Open
C146,147	330 pF	Open
C13,53	Open	470 pF

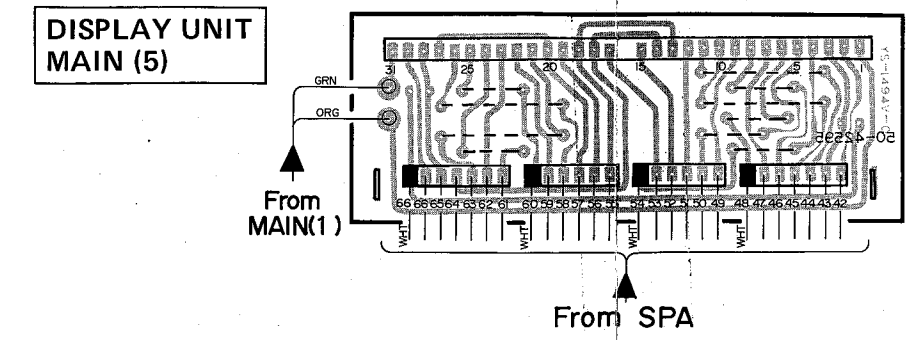


DISPLAY PIN CONNECTIONS



Notes F: Filament NR: No Pin G: Grid NC: No Connection P: Anode

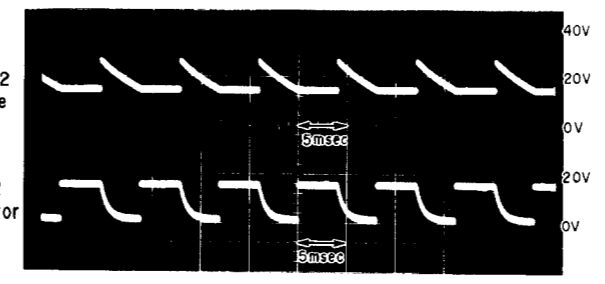
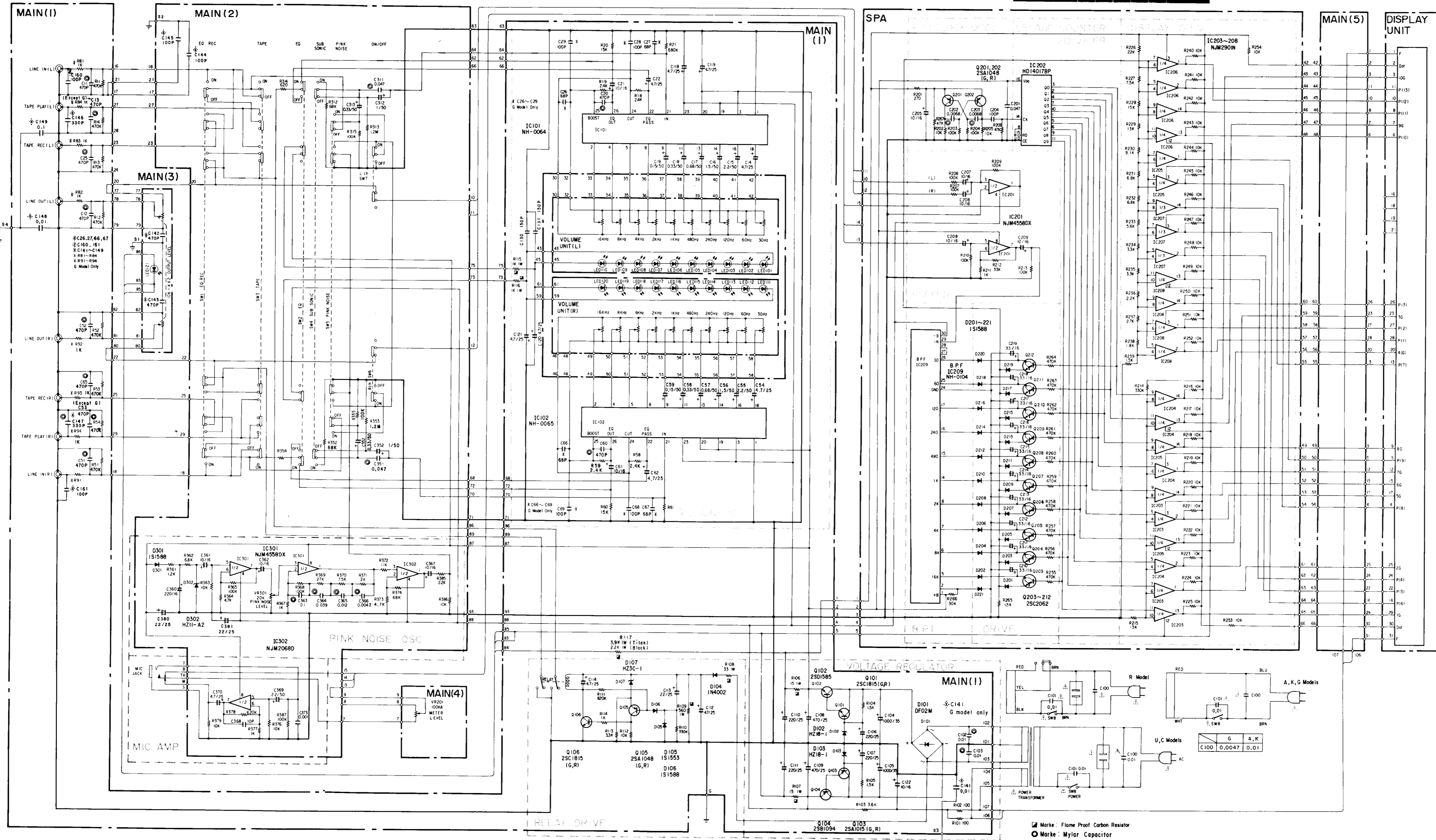
TERMINAL NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
ELECTRODE	F	P(2)	10G	P(8)	P(9)	P(10)	9G	P(11)	8G	P(12)	P(13)	7G	P(7)	P(6)	6G	NP
TERMINAL NO.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
ELECTRODE	5G	NP	NP	4G	NP	P(5)	3G	P(4)	2G	P(3)	P(2)	P(1)	1G	P(2)	F	



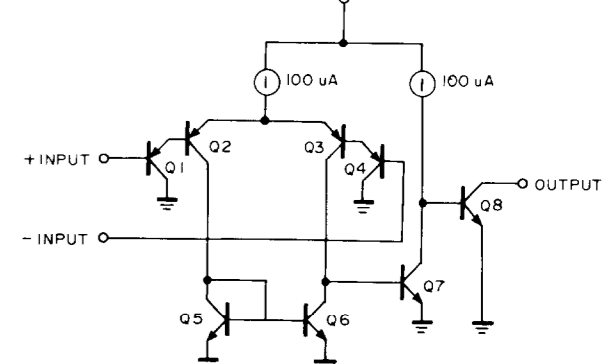
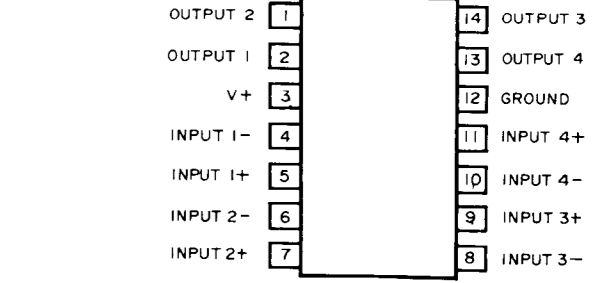
1  
2  
3  
4  
5  
6  
7  
8



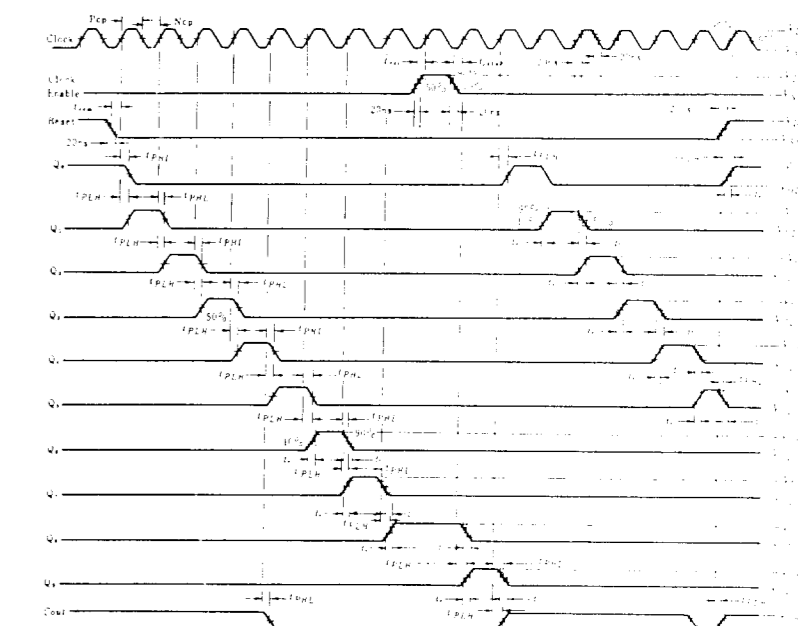
■ SCHEMATIC DIAGRAM



IC203 ~ 208: NJM2901-N

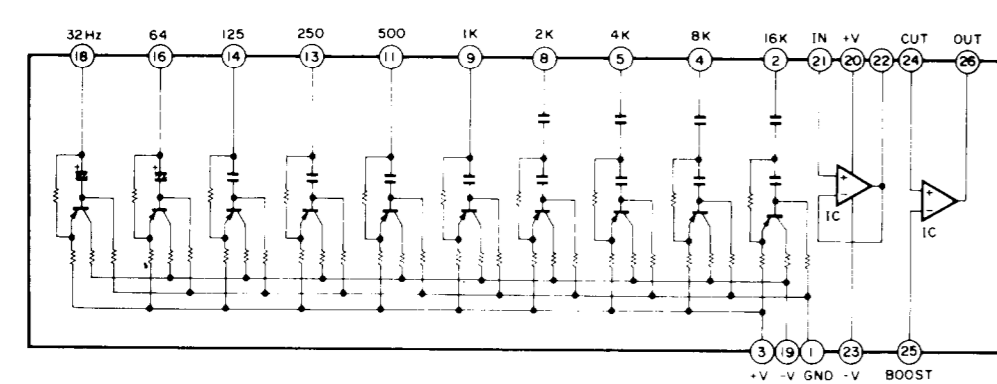


IC202: HD4017

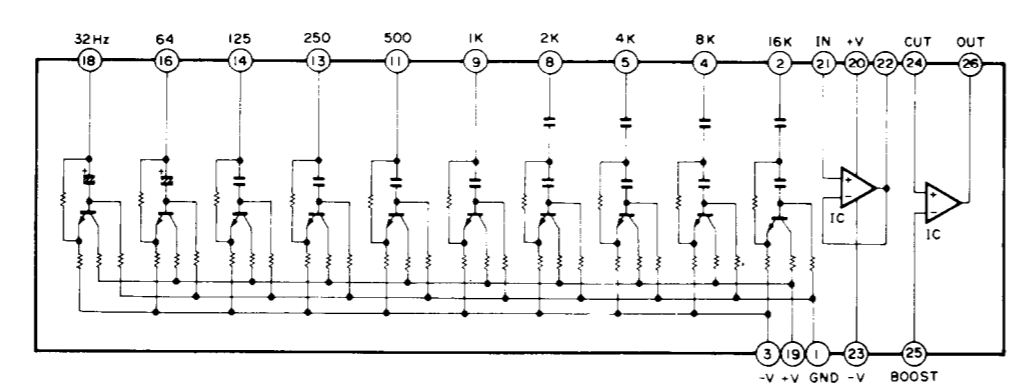


■ IC BLOCK

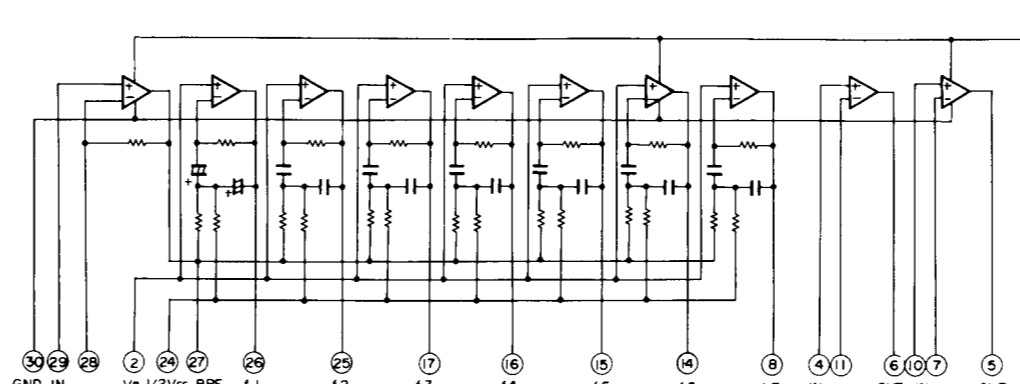
IC101: NH-0064



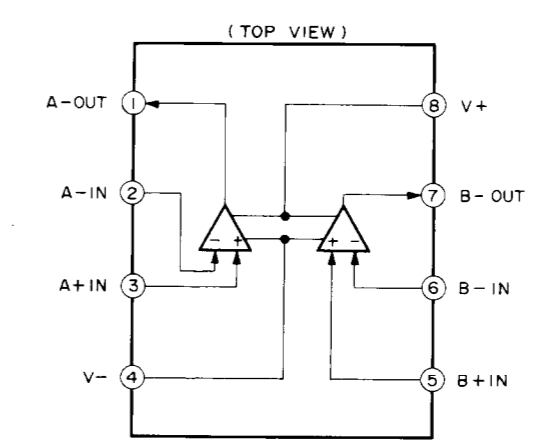
IC102: NH-0065



IC209: NH-0104



IC301: NJM4558DX  
IC302: NJM2068D-D



■ PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODE AND ICs.


2SA1015 (GR) 2SC1815 (GR) 2SC2062	2SD667 (C)	2SA1048	2SB1094 2SD1585	DF02M	1S1588 HZ3C-1 HZ18-1 HZ11A2	1N4002	NJM2068D-D NJM4558DX	NJM2901-N	HD4017	NH-0064 NH-0065	NH-0104

- CAUTION**
- Components having special characteristics are marked  $\Delta$  and must be replaced with parts having specifications equal to those originally installed.
  - All voltages are measured with a 10M $\Omega$ /V DC electric volt meter.
  - Schematic diagram is subject to change without notice.
  - The voltages are measured as NO SIGNAL mode.

## PARTS LIST

## ELECTRICAL PARTS

## ■ WARNING

- Components having special characteristics are marked  and must be replaced with parts having specifications equal to those originally installed.
- Carbon resistors 1/4 W are not included in the ELECTRICAL PARTS list. For the parts No. of the carbon resistor, refer to the last Page.

Ref. No.	Parts No.	Description	部 品 名	Remarks	Common Model	Markets	ランク
※	XX690830	Main Circuit Board	メインシート	Black	EQ-500	U, C, A, B, R	
	XX690840	〃	〃	〃	〃	G	
	NX608610	〃	〃	Titan		U, C, A, B, R	
	NX608620	〃	〃	〃		G	
	FG211100	Ceramic Cap.	セラコン	10pF 50V	C368		
	FG211680	〃	〃	68pF 50V		G	
	FG212100	〃	〃	100pF 50V		G	
	FG212470	〃	〃	470pF 50V		G	
	FG212150	〃	〃	150pF 50V		G	
	FG212100	〃	〃	100pF 50V		G	
	FG213100	〃	〃	0.001 $\mu$ F 50V		G	
	FG245100	〃	〃	0.1 $\mu$ F 50V		G	
	FG244100	〃	〃	0.01 $\mu$ F 50V		G	
	UJ137100	Electrolytic Cap.	ケミコン	10 $\mu$ F 16V			
	UJ137100	〃	〃	10 $\mu$ F 16V			
	UJ638220	〃	〃	220 $\mu$ F 16V			
	UJ146470	〃	〃	4.7 $\mu$ F 25V			
	UJ147220	〃	〃	22 $\mu$ F 25V			
	UJ147470	〃	〃	47 $\mu$ F 25V			
	UJ148220	〃	〃	220 $\mu$ F 25V			
	UJ148470	〃	〃	470 $\mu$ F 25V			
	UJ159100	〃	〃	1000 $\mu$ F 35V			
	UW565150	〃	〃	0.15 $\mu$ F 50V			
	UJ165330	〃	〃	0.33 $\mu$ F 50V			
	UW565680	〃	〃	0.68 $\mu$ F 50V			
※	UJ666100	〃	〃	1 $\mu$ F 50V			
	UJ166150	〃	〃	1.5 $\mu$ F 50V			
	UJ666220	〃	〃	2.2 $\mu$ F 50V			
	FX605600	Mylar Cap.	マイラーコン	330pF 50V			G
	UA252470	〃	〃	470pF 50V			
	UA252470	〃	〃	470pF 50V		U, C, A, B, R	
	FA153470	〃	〃	0.0047 $\mu$ F 50V			
	FA154120	〃	〃	0.012 $\mu$ F 50V			
	FA154390	〃	〃	0.039 $\mu$ F 50V			
	FA154470	〃	〃	0.047 $\mu$ F 50V			
	FA154100	〃	〃	0.01 $\mu$ F 50V			
	FA155100	〃	〃	0.1 $\mu$ F 50V			
	iA101530	Transistor	トランジスター	2SA1015(GR)			
	iX608230	〃	〃	2SB1094			
	iC181511	〃	〃	2SC1815(0)			
	iD043800	〃	〃	2SD438			
	iX608240	〃	〃	2SD1585			
	iX608300	Diode Bridge	ダイオードブリッジ	DF02M			
	iX608310	Diode	ダイオード	1N4002			
	iF003420	〃	〃	1S1588			
	iF003420	〃	〃	1S1588			
	iX608320	Zener Diode	ゼナーダイオード	HZ18-1			
	iF003480	〃	〃	HZ3C-1			
	iX608660	〃	〃	HZ11A2			

※New Parts(新規部品)

Ref. No.	Parts No.	Description	部 品 名		Remarks	Common Model	Markets	ランク
	iX606640 iX606650 iX608670 iG001390	IC " " "	NH-0064 NH-0065 NJM2068D-D NJM4558DV	I C " " "	IC101 IC102 IC302 IC301			
	HX601490 HX601500 HX601510 HX601740 HX601750	Flame Proof Carbon Resistor " " " "	15Ω 1W 33Ω 1W 560Ω 1W 1kΩ 1W 2.2kΩ 1W	不燃性抵抗 " " " "	R106, 107 R108 R109 R115, 116 R117 BL			
※	HX604730 YX690880 HX604720 YX690890 YX690900	" Slide VR " " Pre-Set Potentiometer	3.9kΩ 1W K10kΩ×2 K10kΩ×2 100kΩ B20kΩ	" スライド VR " " 半固定抵抗	R117 Ti OUTPUT LEVEL BL OUTPUT LEVEL Ti METER LEVEL VR301			
※	XX671430 PX601100  YX690910 YX690920	Unit VR Ass'y "  Push Switch "	    4P	ユニットVR Ass'y "  プッシュスイッチ "	BL Ti  SW4,5 SW1,3			
	YX690930 YX690940 KX600450 YX690960 YX686340	" " Relay Mic Jack Pin Jack	  MR62  4P	" " リレー マイクジャック ピンジャック	SW2 SW6,7			
	YX686350 Ei330086	Heat Shink Bind Head Tapping Screw	3×8 FCRM3-B1	放熱板 バインドヘッドタッピング				
	YX690860 FG212100 FG244470 UJ137100 UJ637330	S.P.A Circuit Board Ceramic Cap. " Electrolytic Cap. "	 100pF 50V 0.047μF 50V 10μF 16V 33μF 16V	スベアナシート セラコン " ケミコン "	C204 C201 C205~209 C210~219	EQ-500		
	FG243680  iX608250 iX608260	Mylar Cap.  Transistor "	0.0068μF 50V  2SA1048 (GR) 2SC2062	マイラーコン  トランジスタ "	C202, 203  Q201, 202 Q203~212			
	iF003420  iX608680 iX608280 iX608290	Diode  IC " "	1S1588  NH-0104 HD4017 NJM2901-N	ダイオード  IC " "	D201~221  IC209 IC202 IC203~208			
	iG001390  HX601520 HX601530	"  Resistor "	NJM4558DV  10kΩ×6 10kΩ×7	"  集合抵抗 "	IC201			
	YX690870	Fluorescent Display		蛍光表示管				

※New Parts(新規部品)

A

B

C

D

E

EQ-550

## MECHANISM EXPLODED VIEW

1

2

3

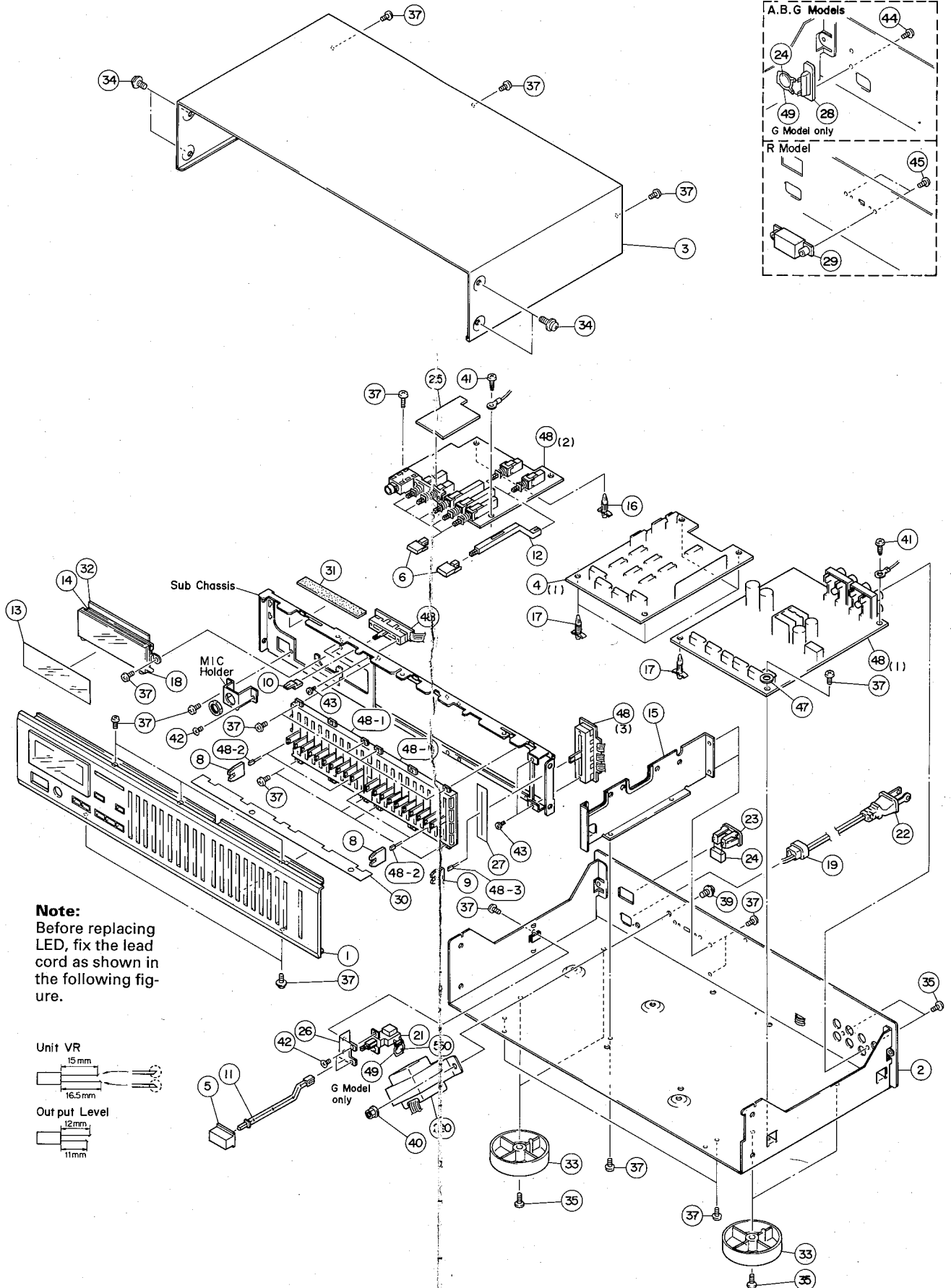
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## MECHANISM PARTS

Ref. No.	Parts No.	Description	部 品 名	Remarks	Common Model			
※	1	PX601070	Front Panel Unit	フロントパネル	Titan		060-22740-02	
	〃	PX601080	〃	〃	Black		060-22740-01	
	※	2	AX611290	Bottom Case	ボトムケース		U, C	060-10575-08
		〃	AX611300	〃	〃		R	060-10575-09
		〃	AX611310	〃	〃		G	060-10575-10
※	〃	AX611320	〃	〃		A, B	060-10575-11	
	※	3	AX611330	Top Cover	トップカバー(キャビネット)	Titan	EQ-500	060-21397-14
		〃	XX670970	〃	〃	Black	EQ-500	060-21397-04
	4	XX690860	S.P.A Circuit Board	スペアナシート		EQ-500	05-362-07	
	5	VH889500	Power Button	パワーボタン	Titan		060-44084-02	
※	〃	VH889400	〃	〃	Black		060-44084-01	
	6	VH816100	Switch Button	スイッチボタン	Titan		060-31663-02	
		〃	VH816000	〃	〃	Black		060-31663-01
	8	CX615310	Slide Knob (A)	スライドノブ(A)	Titan		060-42167-03	
		〃	XX686110	〃	〃	Black	EQ-500	060-42167-02
※	9	CX615220	Slide Knob(B)	スライドノブ(B)	Titan		060-42717-03	
	〃	CX615230	〃	〃	Black		060-42717-01	
	10	CX615240	Meter Slide Knob	メータスライドノブ	Titan		060-42560-03	
		〃	XX690670	〃	〃	Black	EQ-500	060-42560-02
	11	XX690680	Joint (A)	ジョイント(A)		EQ-500	060-42555-01	
※	12	LX604870	Joint (B)	ジョイント(B)			060-44083-01	
	13	NX608590	Sheet	シート			060-44118-01	
		14	XX690690	FL Holder	蛍光表示管ホルダー			060-31242-01
	15	XX690700	Shield Plate	シールドプレート			060-31243-01	
	16	CX615250	P.C.B. Support	シート押え			060-40811-03	
※	17	XX671100	〃	〃			060-40811-06	
	18	XX690710	P.V.C. Cap	P.V.C. キャップ			060-42033-01	
	19	XX686200	Bushing	ブッシング			060-30677-01	
	20	XX690730	Power Transformer	電源トランス		U	050-41774-04	
		〃	XX690740	〃	〃	C	050-42041-03	
※	〃	XX690770	〃	〃		R	050-42562-01	
	〃	XX690760	〃	〃		G	050-41776-03	
	〃	XX690750	〃	〃		A, B	050-42039-02	
	21	XX686220	Push Switch	プッシュスイッチ	POWER		050-42456-01	
		22	XX690790	AC Cord	電源コード		U, C	050-41987-01
※	〃	XX620160	〃	〃		R	050-41451-01	
	〃	XX620280	〃	〃		G	050-41513-01	
	〃	XX620270	〃	〃		A	050-41093-01	
	〃	XX620330	〃	〃		B	050-40847-02	
	23	XX686210	AC Outlet	ACアウトレット		U, C, R	050-42204-01	
※	24	Fi324100	Capacitor	0.01 $\mu$ F 250V	キャパシター	C100	U, C, R, A, B	050-41723-01
	〃	Fi414470	〃	0.0047 $\mu$ F 400V	〃	C100	G	050-40978-03
	25	NX608600	Shield Sheet	シールドシート			060-42800-01	
	26	XX686070	Holder, Power Switch	スイッチホルダー			060-41500-01	
	27	XX686170	Blind	ブラインド			060-42186-01	
※	28	XX671140	Terminal	中継端子		G, A, B	050-40832-01	
	29	XX671250	Voltage Selector	電圧切換スイッチ		R	050-41452-01	
	30	XX671230	Sheet	シート			060-31139-01	
	31	XX690810	Cushion	クッション			060-41763-19	
	32	XX690820	〃	〃			060-4763-20	
33	Vi615300	Leg					060-43638-03	
34	EX601150	Cup S-tite Screw	4×8 FNM3-B1	脚 カップSタイトネジ	Titan			

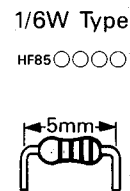
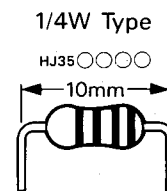
※New Parts (新規部品)

Ref. No.	Parts No.	Description	部 品 名		Remarks	Common Model		
34	EX601080	Cup S-tite Screw	4×8	FCM3-B1	カップSタイトネジ	Black		
35	Ei330086	Binding Head Tapping Screw	3×8	FCRM3-B1	バインド*タッピング*ネジ	PACK		
37	Ei330066	〃	3×6	FCRM3-B1	〃	〃		
39	AX611340	Hexagon Bolt	4×10	FCRM3-B1	ロカクアツ*セット*セット ダブ*ル*ス*ボ*ルト			
40	EV190400	Flange Nut	4φ	ZMC2-Y	フランジナット			
41	Ei130086	Binding Head Tapping Screw	3×8	FNM3-3g	バインド*タッピング*ネジ	PACK		
42	EB030066	Flat Head Screw	3×6	ZMC2-Y	皿小ネジ	〃		
43	EA320036	Pan Head Screw	2×3	FCRM3-B1	ナベ小ネジ	〃		
44	EA330056	〃	3×5	FCRM3-B1	〃	〃	A, B, G	
45	EJ326086	Pan Head Tapping Screw	2.6×8	ZMC2-B1	ナベタッピングネジ	〃	R	
46	Ei130066	Binding Head Tapping Screw	3×6	FNM3-3g	バインド*タッピング*ネジ	〃	G, R, B	
47	EV201036	Washer	t0.5×3×8		ワッシャー			
48	NX608610	Main Circuit Board			メインシート	Titan	U, C, R, A, B	050-470-03
〃	XX690830	〃			〃	Black	U, C, R, A, B	EQ-500
〃	NX608620	〃			〃	Titan	G	050-470-01
〃	XX690840	〃			〃	Black	G	EQ-500
48-1	XX671430	Unit VR Ass'y			ユニットVR Ass'y	Black		050-470-04
〃	PX601100	〃			〃	Titan		050-42118-03 050-42118-04
48-2	iX606680	LED			GL9PR441	Black		
〃	iX618360	〃			GL8HS29	Titan		
48-3	iX606690	〃			GL9PR22	Black		
〃	iX618350	〃			GL8HS42	Titan		
49	XX671260	Condenser Cover			コンデンサ カバー		G	060-41487-01
50	Fi324100	Capacitor	0.01μF	250V	キャパシター	C101	U, C, R, A, B	050-41723-01
〃	Fi504100	〃	0.01μF	400V	〃	〃	G	050-40978-01
〃	CB069250	Binding Tie			インシュロックタイ			
〃	Mi088790	Accessory Pin Cord			付属品 ピンコード			
〃	PX601090	Microphone Unit			マイクユニット			052-286-19

※New Parts(新規部品)

# Parts List for Carbon Resistor

Value	1/4W Type Part No.	1/6W Type Part No.	Value	1/4W Type Part No.	1/6W Type Part No.
1.0 Ω	HJ353100	※	12K Ω	HJ357120	HF857120
1.8 "	HJ353180	※	15 "	HJ357150	HF857150
2.2 "	HJ353220	HF853220	18 "	HJ357180	HF857180
3.3 "	HJ353330	HF853330	22 "	HJ357220	HF857220
4.7 "	HJ353470	HF853470	27 "	HJ357270	HF857270
5.6 "	HJ353560	HF853560	33 "	HJ357330	HF857330
10 "	HJ354100	HF854100	39 "	HJ357390	HF857390
15 "	HJ354150	HF854150	47 "	HJ357470	HF857470
22 "	HJ354220	HF854220	56 "	HJ357560	HF857560
27 "	HJ354270	HF854270	68 "	HJ357680	HF857680
33 "	HJ354330	HF854330	82 "	HJ357820	HF857820
39 "	HJ354390	HF854390	91 "	HJ357910	HF857910
47 "	HJ354470	HF854470	100 "	HJ358100	HF858100
56 "	HJ354560	HF854560	120 "	HJ358120	HF858120
68 "	HJ354680	HF854680	150 "	HJ358150	HF858150
82 "	HJ354820	HF854820	180 "	HJ358180	HF858180
100 "	HJ355100	HF855100	220 "	HJ358220	HF858220
110 "	HJ355110	HF855110	270 "	HJ358270	HF858270
120 "	HJ355120	HF855120	330 "	HJ358330	HF858330
150 "	HJ355150	HF855150	390 "	HJ358390	HF858390
160 "	HJ355160	※	470 "	HJ358470	HF858470
180 "	HJ355180	HF855180	560 "	HJ358560	HF858560
220 "	HJ355220	HF855220	680 "	HJ358680	HF858680
270 "	HJ355270	HF855270	820 "	HJ358820	HF858820
330 "	HJ355330	HF855330	1.0M Ω	HJ359100	HF859100
390 "	HJ355390	HF855390	1.2 "	HJ359120	※
470 "	HJ355470	HF855470	1.5 "	HJ359150	HF859150
510 "	※	HF855510	1.8 "	HJ359180	HF859180
560 "	HJ355560	HF855560	2.2 "	HJ359220	HF859220
680 "	HJ355680	HF855680	3.3 "	HJ359330	HF859330
820 "	HJ355820	HF855820	3.9 "	HJ359390	※
910 "	HJ355910	HF855910	4.7 "	HJ359470	※
1.0K Ω	HJ356100	HF856100			
1.2 "	HJ356120	HF856120			
1.5 "	HJ356150	HF856150			
1.8 "	HJ356180	HF856180			
2.0 "	HJ356200	HF856200			
2.2 "	HJ356220	HF856220			
2.4 "	HJ356240	HF856240			
2.7 "	HJ356270	HF856270			
3.0 "	HJ356300	HF856300			
3.3 "	HJ356330	HF856330			
3.6 "	HJ356360	HF856360			
3.9 "	HJ356390	HF856390			
4.7 "	HJ356470	HF856470			
5.1 "	HJ356510	HF856510			
5.6 "	HJ356560	HF856560			
6.8 "	HJ356680	HF856680			
8.2 "	HJ356820	HF856820			
9.1 "	HJ356910	HF856910			
10 "	HJ357100	HF857100			



JUL. '85