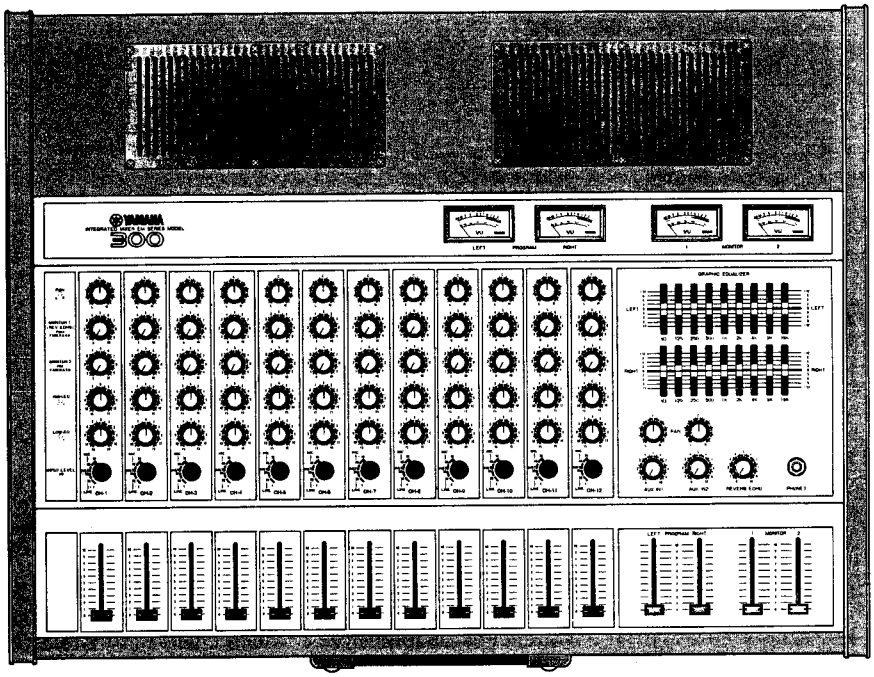
EM-300

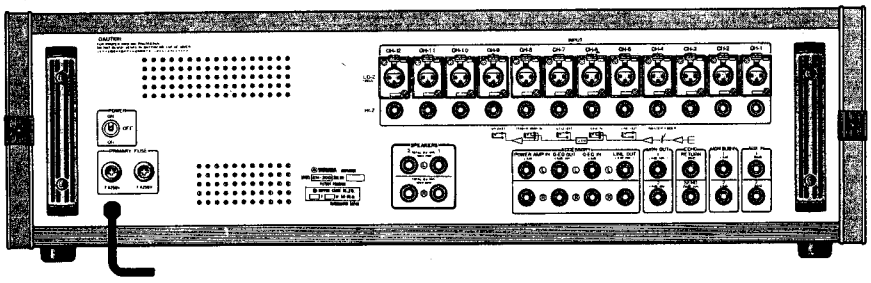
SERVICE MANUAL

■FRONT PANEL



■REAR PANEL

USA & CANADIAN MODELS



■CONTENTS

006395

YAMAHA

2K. Printed in Japan 10.78

■OVERALL SPECIFICATION

Channel controls (CH1 ~ CH12)	PAN MONITOR 1 (REV/ECHO) MONITOR 2 HIGH-EQ LOW-EQ INPUT LEVEL switch (–50/–40/–30/–20/+4) Channel faders
Master controls	AUX IN controls, AUX PAN (1, 2) REVERB/ECHO controls MONITOR master faders (1, 2) PROGRAM master faders (L, R) GRAPHIC EQUALIZER (L, R)
Others	VU meters x 4 (PROGRAM x 2, MONITOR x 2)
Power output	200W per channel (4 Ω, 1kHz, 0.5%) 140W per channel (8 Ω, 1kHz, 0.5%)
Frequency response	20Hz to 15kHz 0 ± 1dB (60W, 8 Ω) 20Hz to 30kHz 0 $^{+1dB}_{-3dB}$ (60W, 8 Ω)
Total harmonic distortion	Less than 0.2% (1kHz, 120W, 8 Ω) Less than 0.5% (20Hz ~ 20kHz, 120W, 8Ω)
Intermodulation distortion	Less than 0.5% (70Hz : 7KHz = 4 : 1 at 60W, 8 Ω)
Hum and noise level (20Hz to 20kHz)	–118dB (Equivalent Input Noise)

Maximum gain	
SPEAKERS (L, R)	81dB (CH IN → SPEAKER OUT)
MON OUT (1, 2)	54dB (CH IN → MON OUT)
ECHO SEND	30dB (CH IN → ECHO SEND)
LINE OUT (L, R)	54dB (CH IN → LINE OUT)
G-EQ OUT	54dB (CH IN → G-EQ OUT)
AUX IN (1, 2)	51dB (AUX IN → SPEAKER OUT)
Equalizer	
LOW-EQ	±15dB (100Hz)
HIGH-EQ	±15dB (10kHz)
GRAPHIC-EQ	±12dB (63Hz/125Hz/250Hz/500Hz/1kHz/2kHz /4kHz/8kHz/16kHz)
Power supply	U.S.A. & CANADIAN MODELS: AC120V, 4A, 50/00Hz GENERAL MODELS: AC220/240V, 900W, 50/60Hz
Dimensions (W x D x H)	787 x 631 x 229 mm (31 x 24-3/4 x 9″)
Weight	35 kg (77 lbs)

* Specifications subject to change without notice.

■INPUT/OUTPUT SPECIFICATION

- **Input jacks**

Connection	Actual Load Impedance	For Use w/Nominal	Sensitivity (at max. gain)	Input level		Connector
				Nominal	Max. befor Clip	
INPUTS (1 ~12 CH)						
–50	Hi-Z 10KΩ	Hi-Z 3KΩ	–50dB (2.5mV)	–50dB (2.5mV)	–22dB (6.2mV)	XLR-3-31 and
–40	Lo-Z 600Ω	Lo-Z 150Ω	–40dB (7.8mV)	–40dB (7.8mV)	–12dB (193mV)	Phone Jack
–30			–30dB (25mV)	–30dB (25mV)	– 2dB (616mV)	
–20			–20dB (78mV)	–20dB (78mV)	+ 8dB (1.93V)	
+ 4			+ 4dB (1.23V)	+ 4dB (1.23V)	+32dB (31V)	
AUX IN (1, 2)	30KΩ	5KΩ	–20dB (78mV)	–20dB (78mV)		Phone Jack
ECHO RETURN	30KΩ	5KΩ	–30dB (25mV)	–30dB (25mV)		Phone Jack
GEQ IN (L, R)	100KΩ	5KΩ	+ 4dB (1.23V)	+ 4dB (1.23V)	+18dB (6.2V)	Phone Jack
POWER AMP IN (L, R)	30KΩ	5KΩ	+ 4dB (1.23V)			Phone Jack
MON SUB IN (1, 2)	30KΩ	5KΩ	+ 4dB (1.23V)	+ 4dB (1.23V)	+24dB (12.3V)	Phone Jack

- **Output jacks**

Connection	Actual Source Impedance	For Use w/Nominal	Output level		Connector
			Nominal	Max. befor Clip	
SPEAKER OUT (L, R)	0.065Ω	4Ω 8Ω	200W 140W		Phone Jack
LINE OUT (L, R)	1KΩ	10KΩ 600Ω	+ 4dB (1.23V) 0dB (0.775V)	+18dB (6.2V) +14dB (3.9V)	Phone Jack
GEQ OUT (L, R)	1KΩ	10KΩ 600Ω	+ 4dB (1.23V) 0dB (0.775V)	+18dB (6.2V) +14dB (3.9V)	Phone Jack
MON OUT (1, 2)	390Ω	10KΩ 600Ω	+ 4dB (1.23V) 0dB (0.775V)	+18dB (6.2V) +14dB (3.9V)	Phone Jack
ECHO SEND	100Ω	10KΩ	–20dB (78mV)	– 6dB (0.39V)	Phone Jack
PHONES	150Ω	8Ω		+ 2dB (0.96V)	Stereo Phone Jack

Note: All the inputs and outputs are unbalanced.

■GENERAL ADJUSTMENT AND CHECK SPECIFICATIONS

- Use an oscilloscope and a level meter with an input impedance of over 500 kΩ for the measurements.
- Use a filter with a bandwidth of 20 Hz to 20 kHz in the level meter for noise level measurements. (12.47 kHz filter or IHF-C)

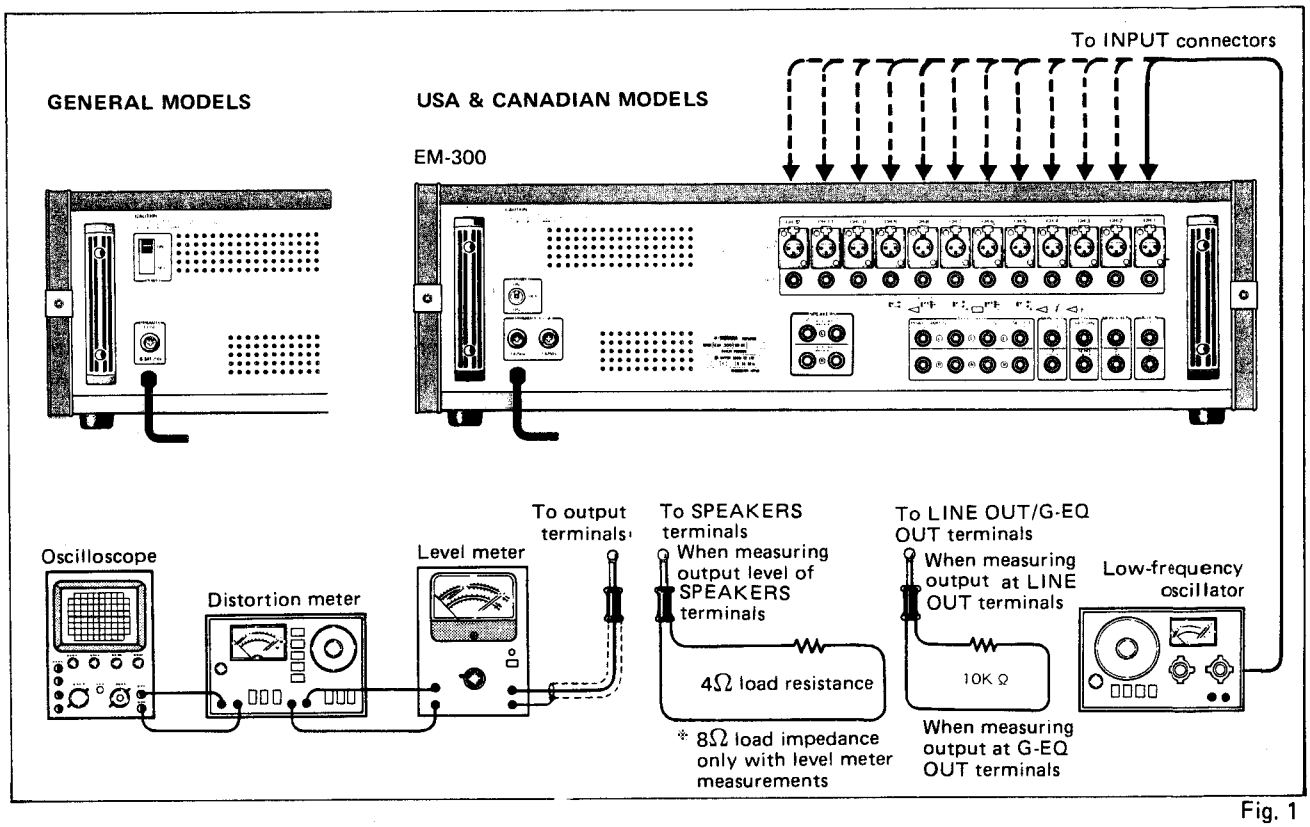


Fig. 1

- Measurement conditions

Switch, control	Set position
Channel faders	Max for measurement channel only, all others to minimum position
LOW-EQ	Center
HIGH-EQ	Center
MONITOR 2	Max for measurement channel only, all others to minimum position
MONITOR 1	Max for measurement channel only, all others to minimum position
INPUT LEVEL switch	–50 (no conditions)
PAN	Center
AUX IN (1, 2)	Max for measurement only, otherwise minimum
AUX PAN (1, 2)	Center
REVERB/ECHO	Max for measurement only, otherwise minimum
GRAPHIC EQUALIZER (L, R)	Center (Max or min for measurement only)
PROGRAM master faders (L, R)	Max
Monitor master faders (1, 2)	Max

Table 1

1. GAIN

Check that the outputs listed in Table 2 are available at the respective terminals when the controls and switches are set to the positions given in Table 1, and a –55 dBm 1 kHz sine wave signal is applied to the INPUT connectors (phone jacks).

* Connect a 4Ω load resistance to the SPEAKERS terminals and a 10kΩ load resistance to the LINE OUT and G-EQ OUT terminals during measurement.

* Check that the difference in level between the channels for all the outputs is less than 2 dB.

Channel INPUT level switch	Output level of LINE OUT terminals	Output level of G-EQ OUT terminals	Output level of SPEAKERS terminals
–50	–1 ± 2 dBm	–1 ± 2 dBm	–26 ± 2 dBm
–40	–11 ± 2 dBm	–11 ± 2 dBm	–16 ± 2 dBm
–30	–21 ± 2 dBm	–21 ± 2 dBm	+6 ± 2 dBm
–20	–31 ± 2 dBm	–31 ± 2 dBm	–4 ± 2 dBm
+4	–53 ± 3 dBm	–53 ± 3 dBm	–28 ± 3 dBm

Table 2

2. DISTORTION

Check that the harmonic distortion is less than 1% when the controls and switches are set to the positions in Table 1 and when a −55 dBm, 1 kHz sine wave signal is applied to the INPUT connectors and the output level at the SPEAKERS terminals is +26 dBm (60 W).

3. FREQUENCY RESPONSE

Check that the frequency response is within ±3 dB of the basic curve given in Fig. 2 at the LINE OUT terminals when the controls and switches are set to the positions given in Table 1 and a −55 dBm sine wave signal is applied to the INPUT connectors of each channel.

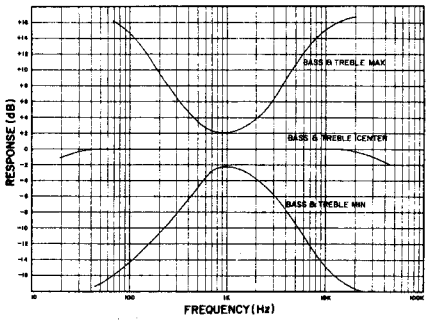


Fig. 2

4. EQUALIZER VARIATION RESPONSE

- HIGH-EQ

  Make sure that a variation of +14 ± 2 dB is produced at the LINE OUT terminals when the HIGH-EQ controls are set to their maximum positions and that a variation of −14 ± 2 dB is produced when the same controls are set to their minimum positions, when the controls and switches are set to the positions given in Table 1 and when a −70 dBm, 10 kHz sine wave signal is applied to the INPUT connectors.

- LOW-EQ

  Make sure that a variation of +14 ± 2 dB is produced at the LINE OUT terminals when the LOW-EQ controls are set to their maximum positions and that a variation of −14 ± 2 dB is produced when the same controls are set to their minimum positions, when the controls and switches are set to the positions given in Table 1 and when a −70 dBm, 100 Hz sine wave signal is applied to the INPUT connectors.

5. MAXIMUM OUTPUT POWER

The distortion must be within 3% when the controls and switches are set to the positions given in Table 1, a 1 kHz sine wave signal is applied to the INPUT connectors, and the output level of the SPEAKERS terminals is +31.2 dBm (200 W).

* Make either the L or R PAN the measurement channel.

6. SEPARATION

Set the controls and switches to the positions given in Table 1, apply a −55 dBm, 1 kHz sine wave signal to the INPUT connectors, rotate the measurement channel PANPOT control to the R channel side, and check that the leakage level at the L channel side of the SPEAKERS terminals is less than −29 dBm (55 dB separation).

In the same way, rotate the PANPOT control to the L channel side, and check the level of the leakage into the R channel.

7. AUX IN 1, 2

Check that a +21 ± 2 dBm output is obtained at the SPEAKERS terminals when the controls and switches are set to the positions given in Table 1, and when a −30 dBm, 1 kHz sine wave signal is applied to the AUX IN 1 or 2 terminals.

8. MONITOR 1, 2

Check that a −1 ± 2 dBm output is obtained at the MONITOR 1 or 2 terminals when the controls and switches are set to the positions given in Table 1, when a −55 dBm, 1 kHz sine wave signal is applied to the INPUT connectors, and when the channel MONITOR 1 or 2 control is set to its maximum position.

* The load resistance is 10 kΩ.

9. MONITOR SUB IN

Check that a −6 ± 2 dBm output is obtained at the MON OUT 1 or 2 terminals when the controls and switches are set to the positions given in Table 1, when a −6 dBm, 1 kHz sine wave signal is applied to the MON. SUB IN 1 or 2 terminals.

10. REV/ECHO

Set the controls and switches as indicated in Table 1, set the REV/ECHO control to its maximum position, and check that a +21 ± 2 dBm output is obtained at the SPEAKERS terminals when a −40 dBm, 1 kHz sine wave signal is applied to the ECHO RETURN terminals.

Furthermore, set the CH-1 MONITOR 1 and MONITOR master fader 1 to their maximum positions, apply a −55 dBm, 1 kHz sine wave signal to the INPUT connectors, and check that a −25 ± 3 dBm output is obtained at the ECHO SEND terminals with a 10 kΩ load when a −1 ± 2 dBm output is obtained at the MONITOR 1 terminals.

11. GRAPHIC EQUALIZER

Set the controls and switches as indicated in Table 1, apply a −70 dBm sine wave signal to the INPUT connectors, and then check that at the specified frequency a variation of +12 ± 1.5 dB and −12 ± 1.5 dB is displayed when each of the band controls are set to the maximum and minimum positions. (Fig. 3)

* Specified frequencies: 60Hz, 125Hz, 250Hz, 500Hz 1kHz, 2kHz, 4kHz, 8kHz and 16kHz (frequencies may vary within a ±15% range)

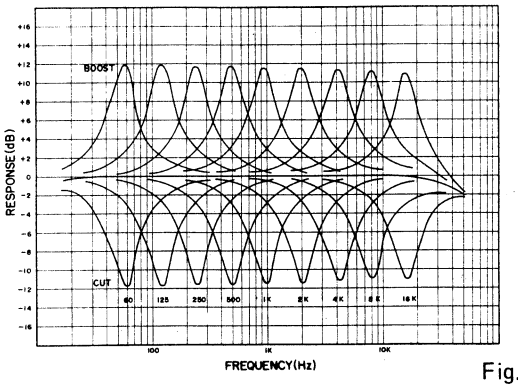


Fig. 3

12. NOISE LEVEL

Check that the noise level at the SPEAKERS terminals is less than −33 dBm when the INPUT connectors are shorted with a 150Ω resistance and that the noise level at the MONITOR 1 or 2 terminals is less than −55 dBm.

13. PHONES

Set the controls and switches as indicated in Table 1, apply a −55 dBm, 1 kHz sine wave signal to the INPUT connectors, connect an 8Ω/8Ω load resistance to the PHONES terminal and check that an output of −5 ± 3 dBm is obtained across both ends.

14. REVERB (REFERENCE)

Set the controls and switches as indicated in Table 1, set the channel MONITOR 1 (REV/ECHO) controls to their maximum position, and apply the output signal (−50 dBm) of the reverberation adjustment oscillator (Electone, flute 8′ C_3-B_3 7 sound mixing signal) to the CH-1 INPUT terminals. Now adjust semi-fixed resistor B47 kΩ so that a −30 ± 2 dBm output is obtained at the RO and E terminals on the DC circuit board. (Fig. 4)

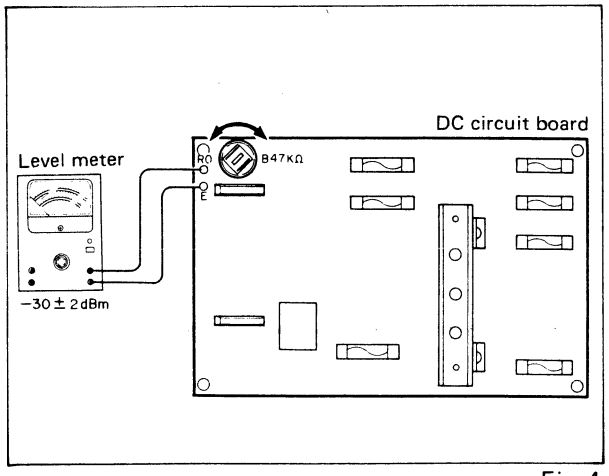


Fig. 4

15. LEVEL METER

Set the controls and switches as indicated in Table 1, apply a −55 dBm, 1 kHz sine wave signal to the INPUT connectors and connect an 8Ω load resistance to the SPEAKERS terminals. Now check that the level meter pointer indicates 0 ± 1 VU when a +29.7 dBm (70 W) output is obtained across the resistance.

16. MA CIRCUIT BOARD ADJUSTMENTS

16-1. Idling current adjustment

Adjust the B470Ω semi-fixed resistor so that the voltage across test points RE (−) and CT (+) is set to DC 23 ± 23 mV under no-signal conditions. (Fig. 5)

* Perform the adjustment within 30 seconds after the POWER switch has been set to ON.
A variation in the idling current after adjustment of 23 ± 10 mV is acceptable across a 15°C to 40°C temperature range of the radiator.

16-2. Midpoint potential adjustment

Check that the DC voltage across the output terminals (O) and E under no-signal conditions is within 0 ± 100 mV. (Fig. 5)

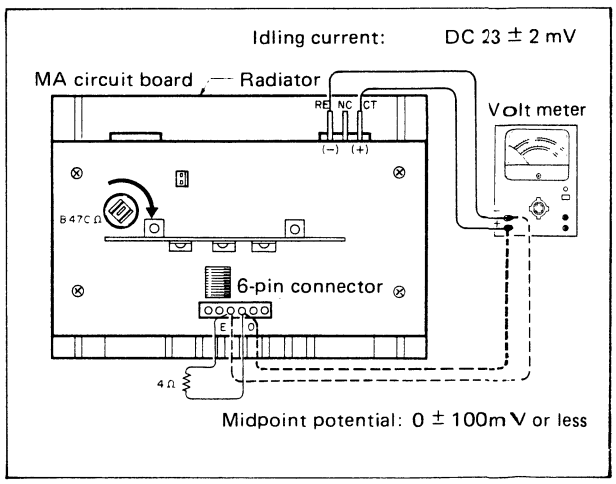


Fig. 5

17. STABILITY

17-1. Power line voltage fluctuations

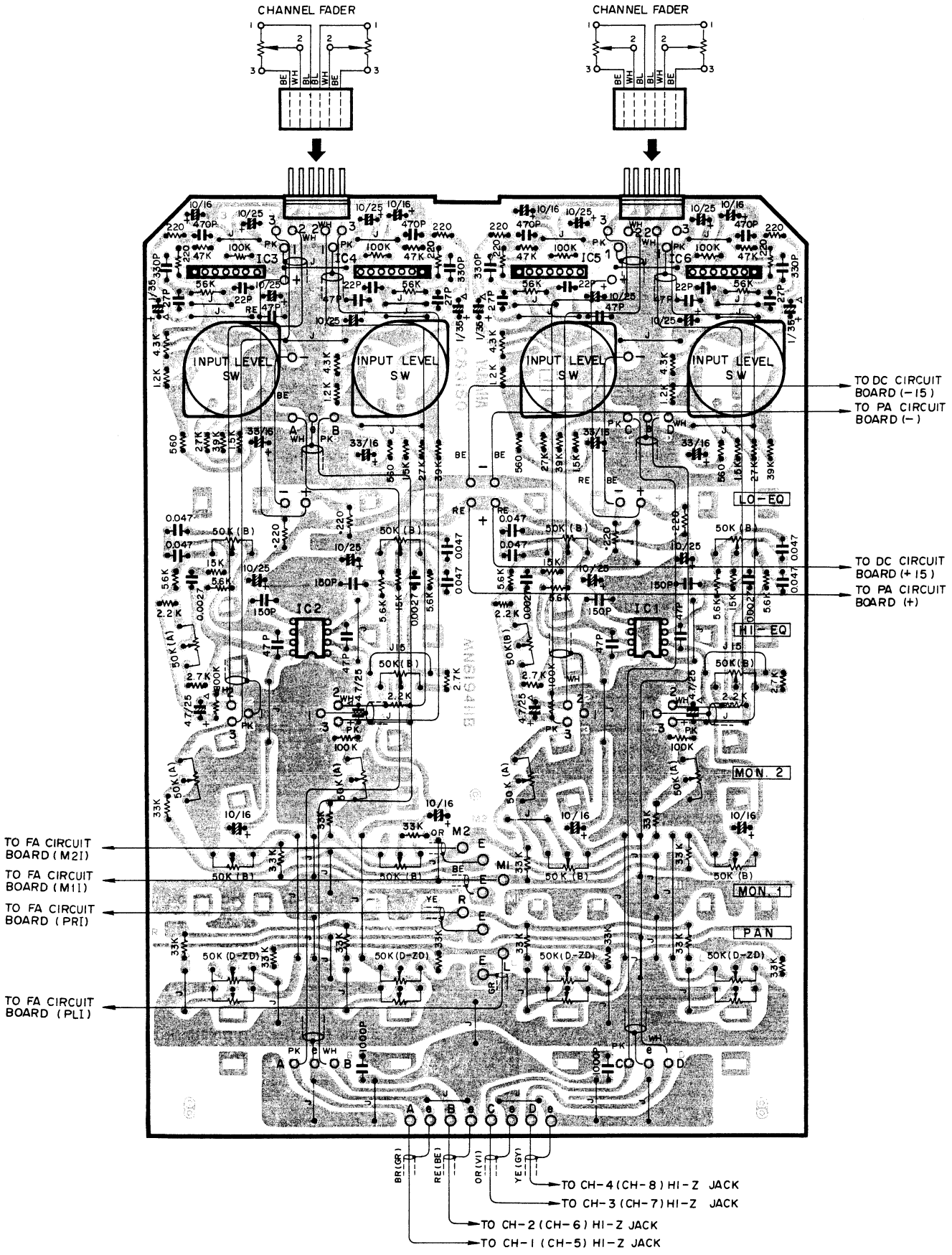
Operation shall not be affected by fluctuations in the regulated ±10% of the power line voltage.

17-2. Oscillation

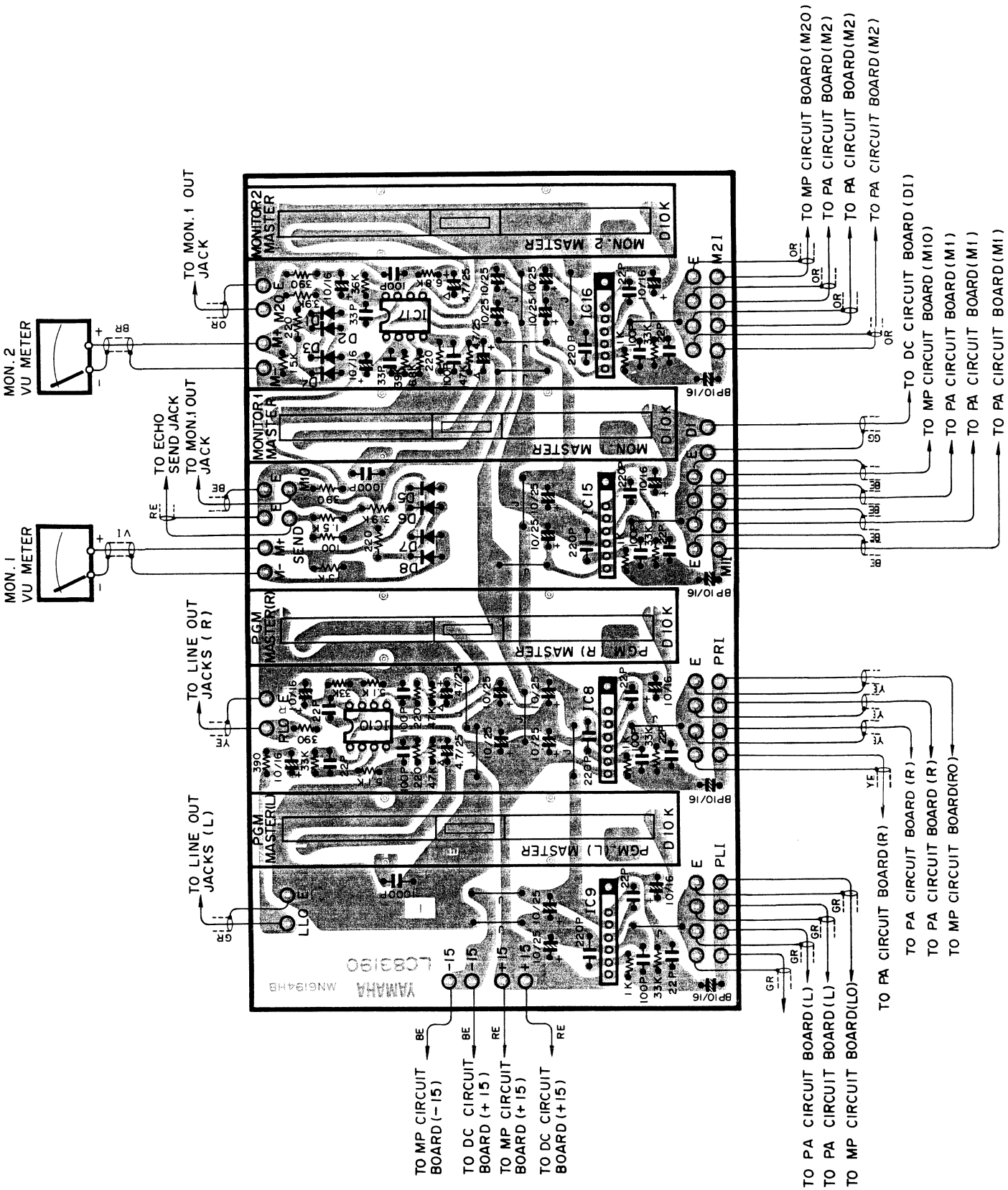
- Set either the LOW-EQ, HIGH-EQ or graphic equalizer to FLAT and the other controls to maximum. The check that there is no abnormal oscillation when all the controls are set to their maximum positions.
  * Short the INPUT connectors of each channel with a 150Ω resistance.
- Check that there is no abnormal oscillation even when 10pF to 0.1μF capacitors are connected in parallel to the 4Ω load resistance at the SPEAKERS terminals.

■PRINTED CIRCUIT BOARD

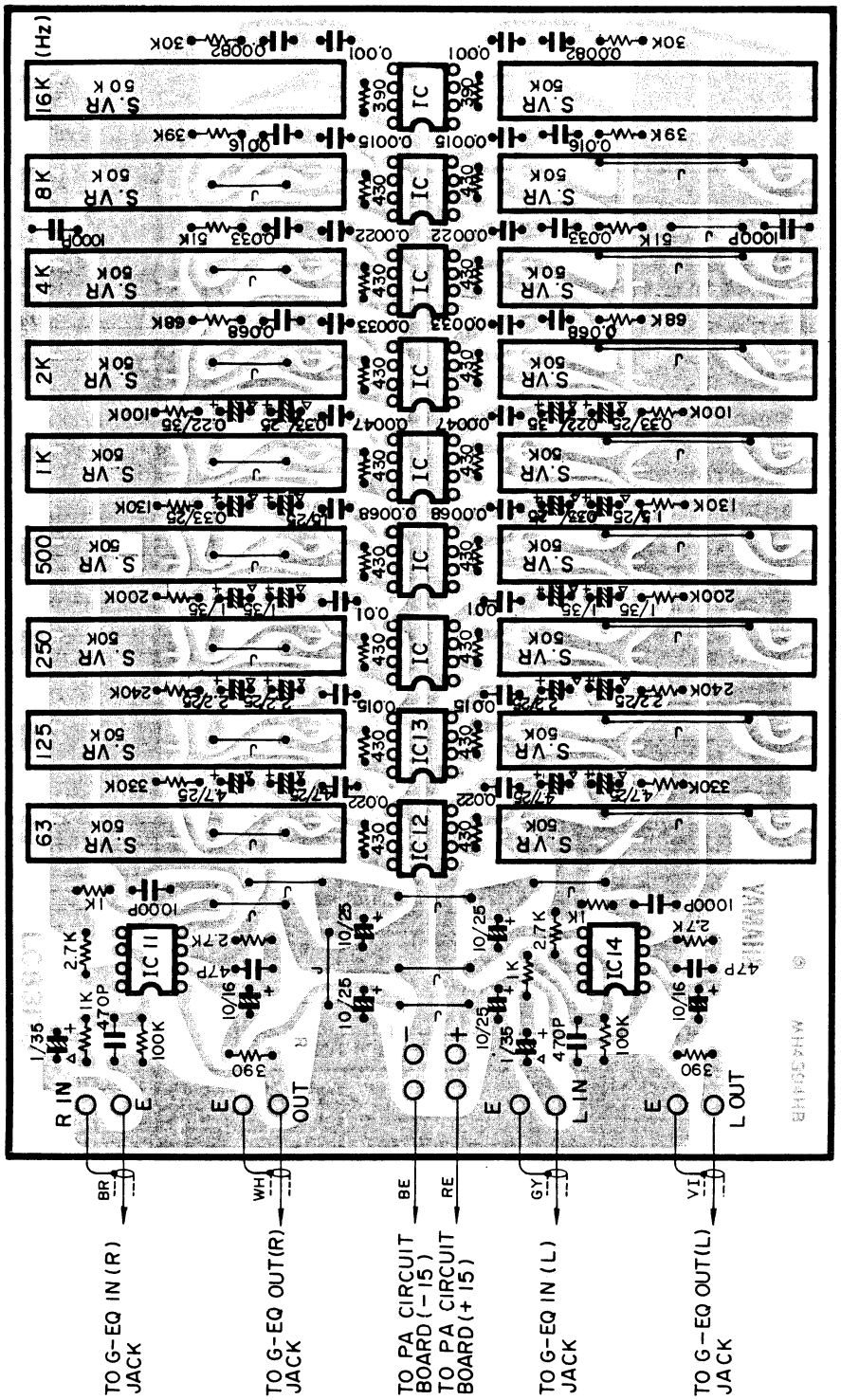
●PA CURCUIT BOARD



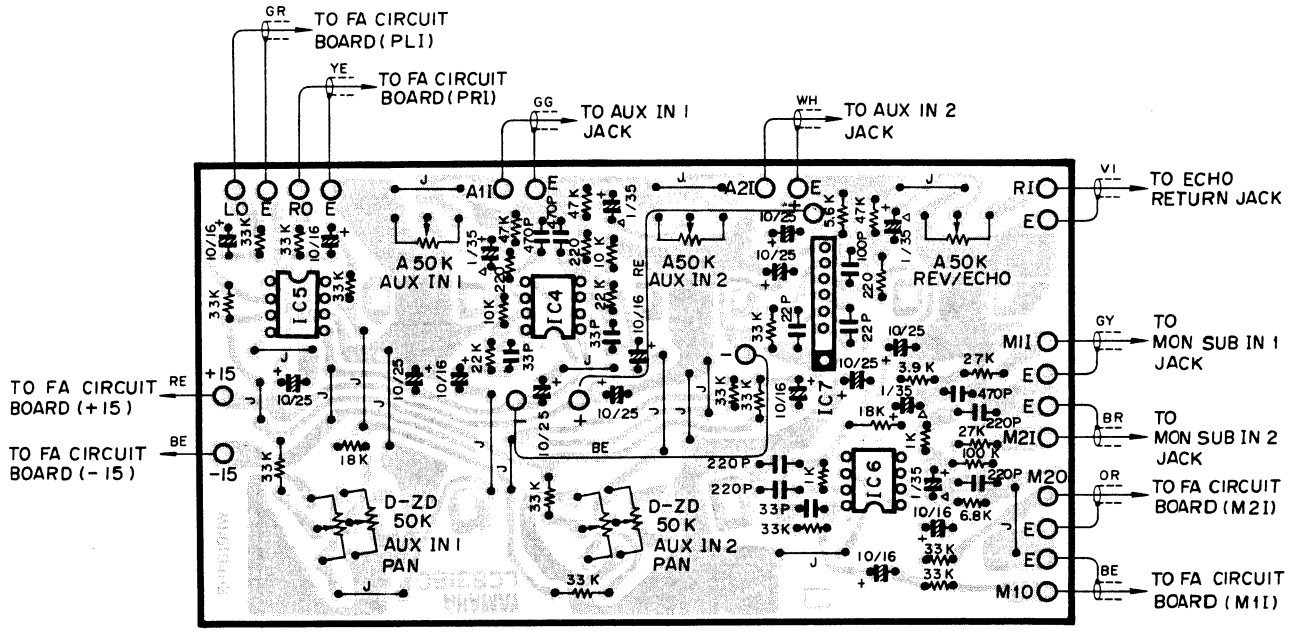
●FA CIRCUIT BOARD



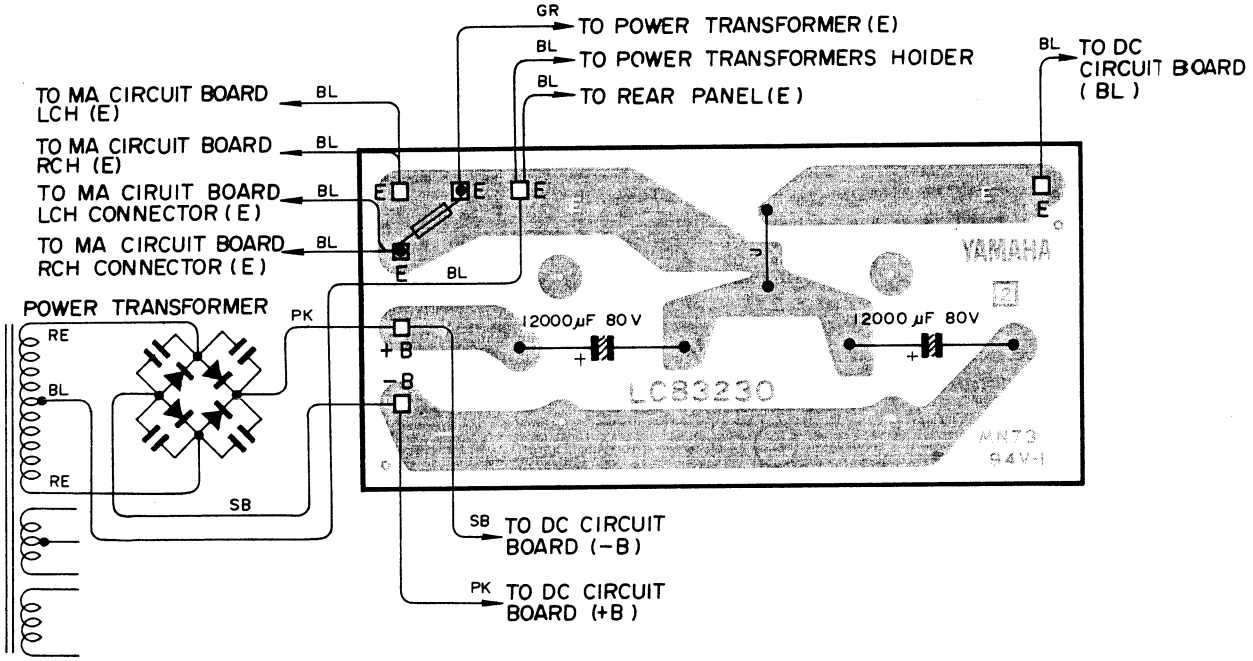
●EQ CIRCUIT BOARD



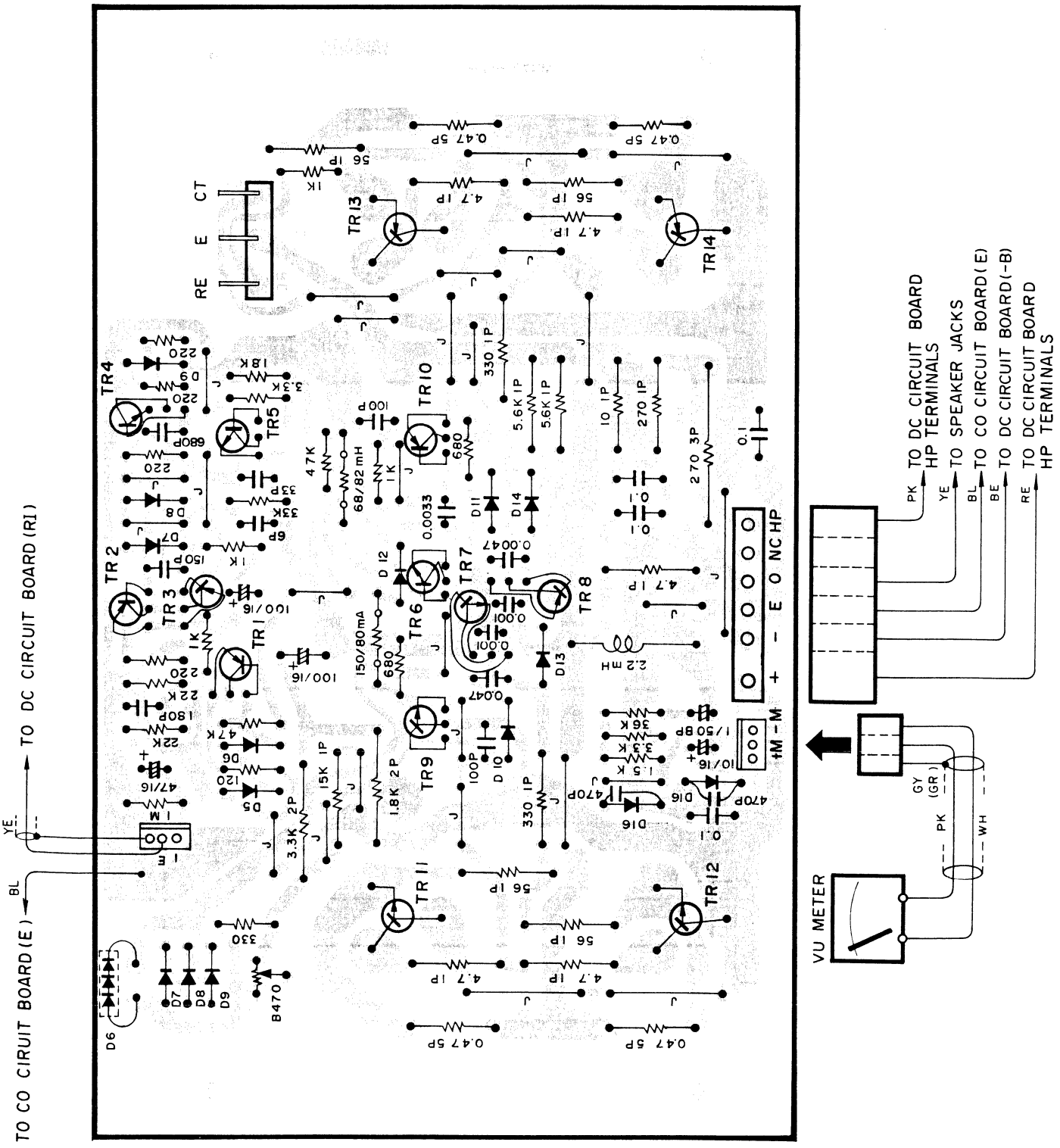
●MP CIRCUIT BOARD

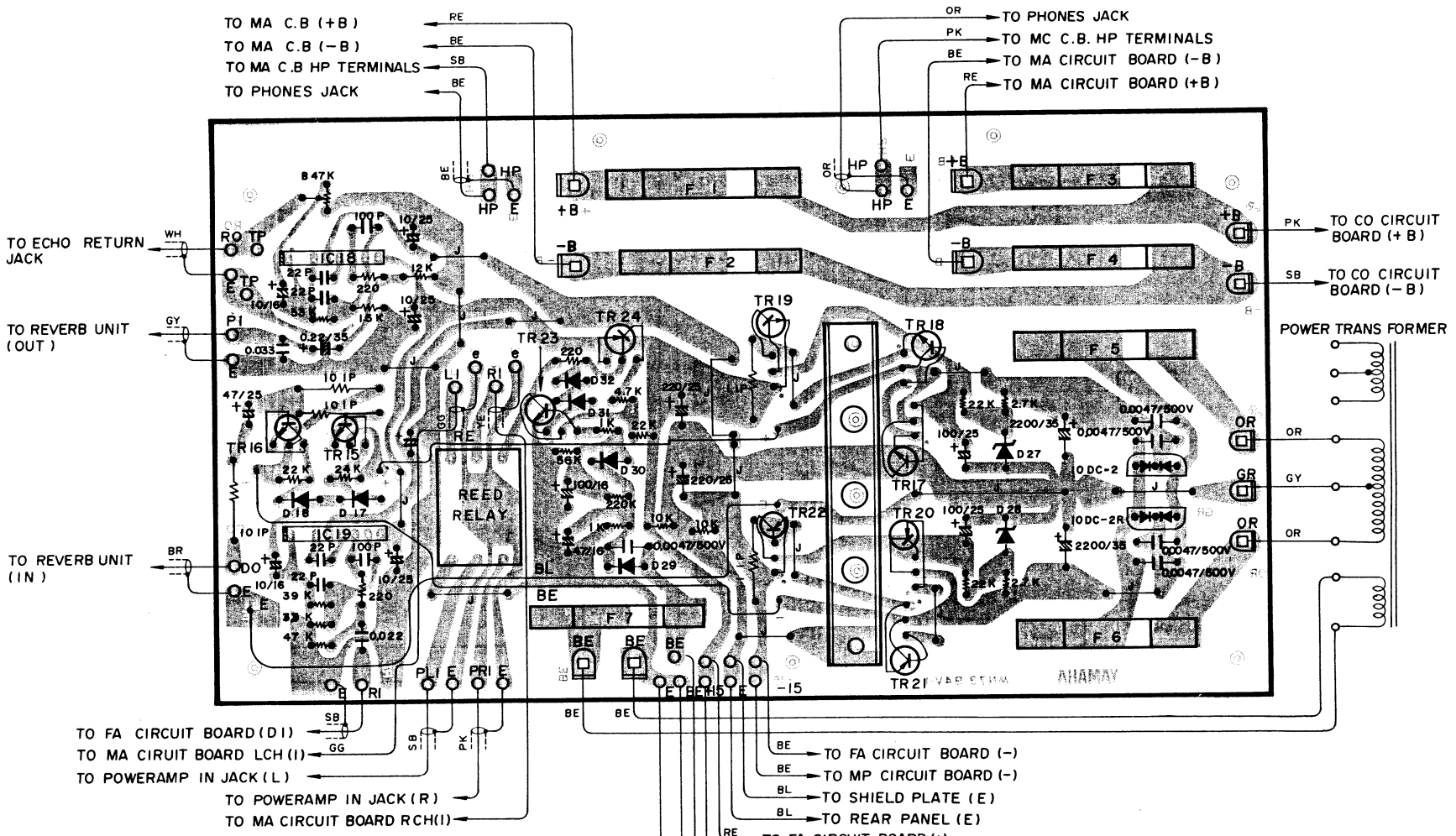


●CO CIRCUIT BOARD



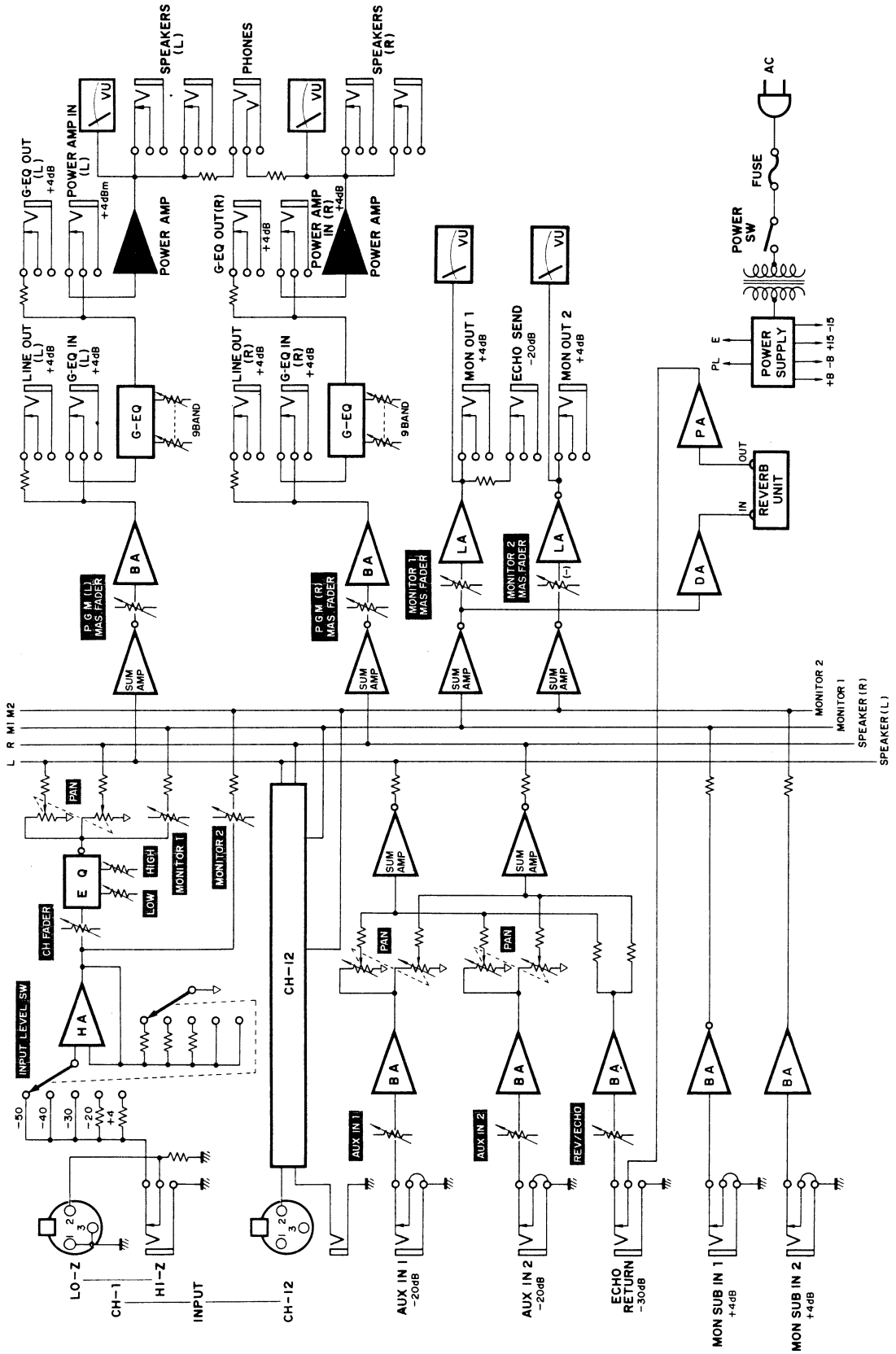
●MA CIRCUIT BOARD



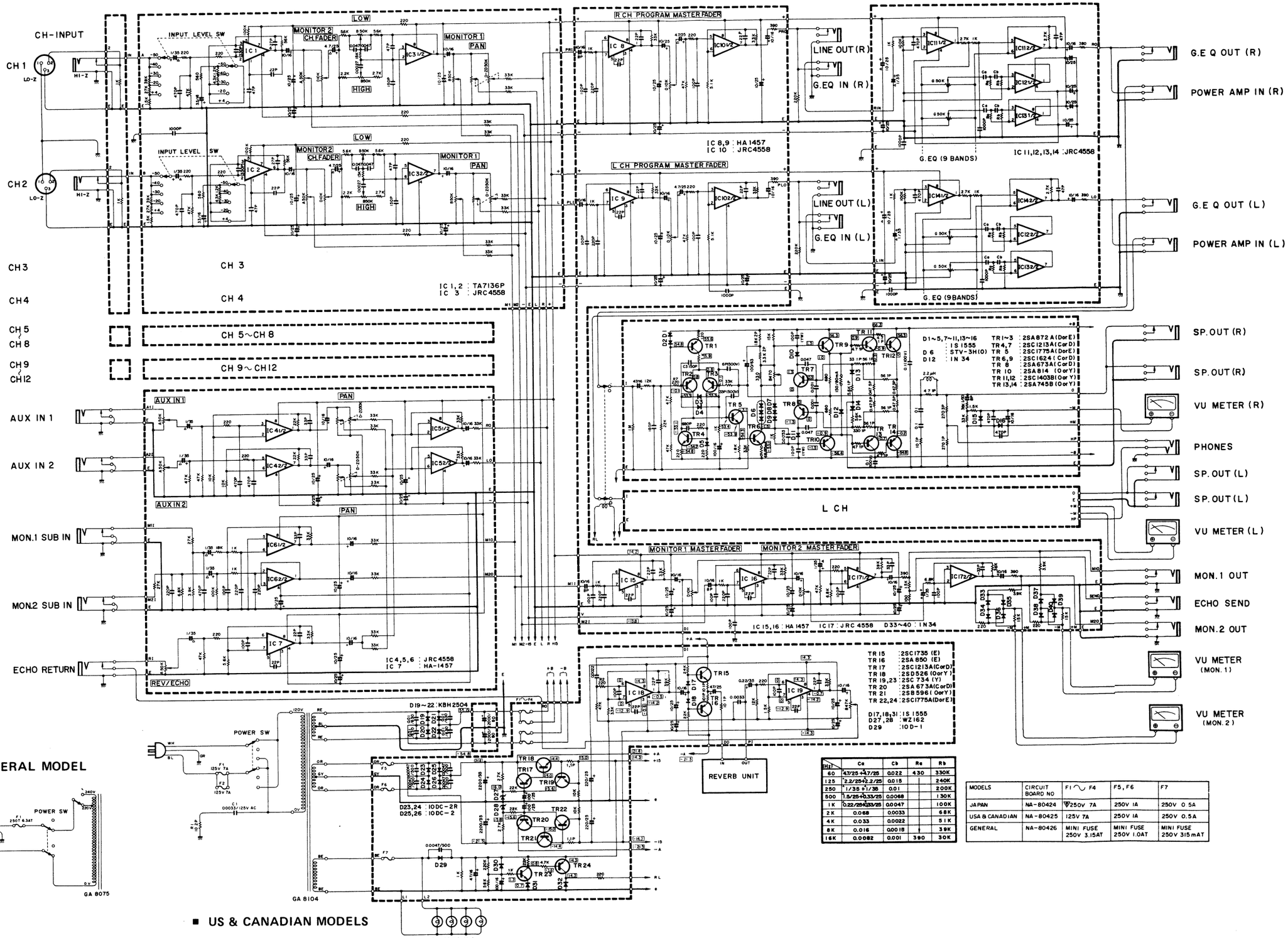


MODELS	CIRCUIT BOARD NO	F1 ∿ F4	F5, F6	F7
JAPAN	NA-80424	▽250V 7A	250V 1A	250V 0.5A
USA & CANADIAN	NA-80425	125V 7A	250V 1A	250V 0.5A
GENERAL	NA-80426	MINI FUSE 250V 3.15AT	MINI FUSE 250V 1.0AT	MINI FUSE 250V 315mAT

■BLOCK DIAGRAM



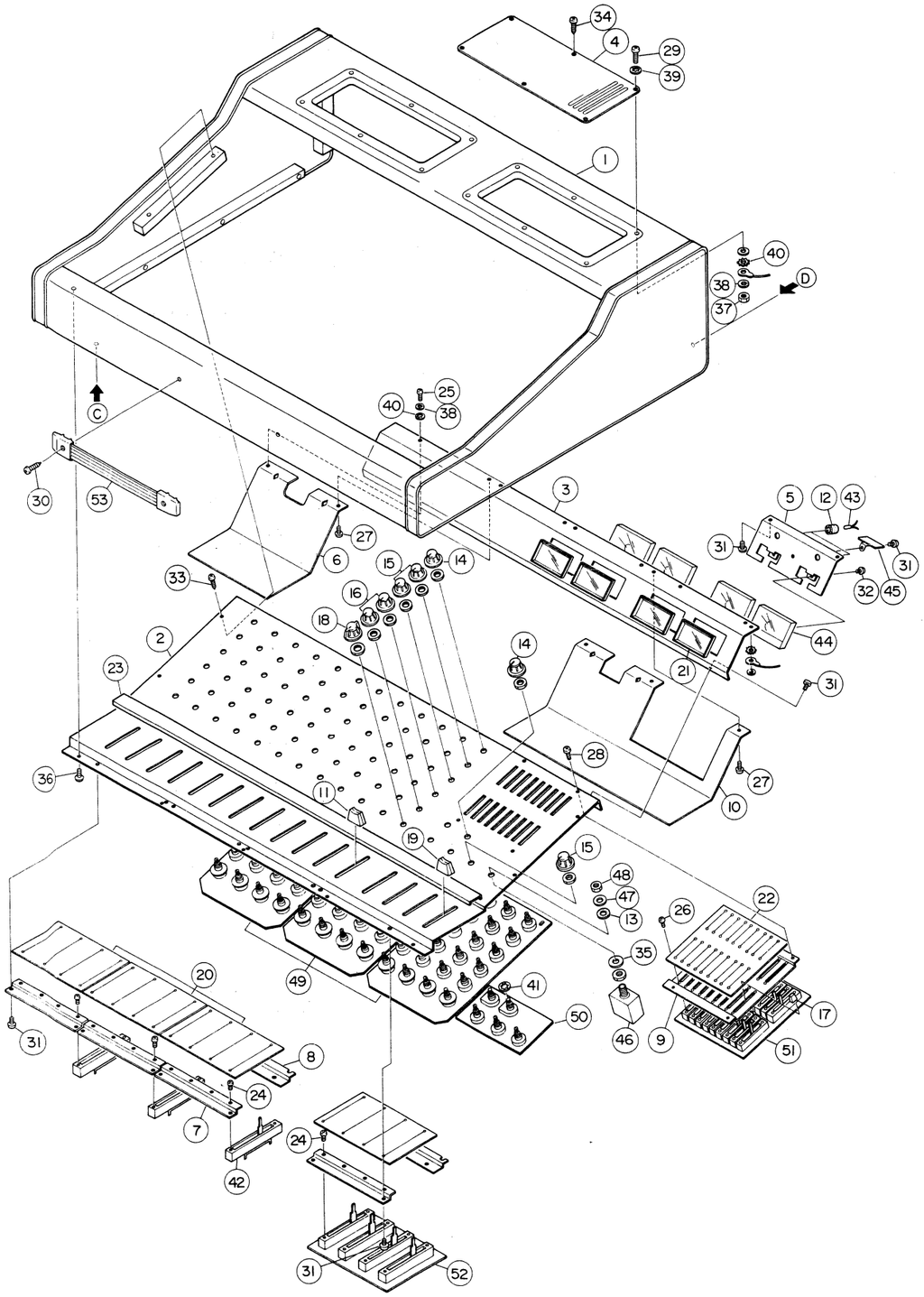
■SCHEMATIC DIAGRAM



Hz	Ca	Cb	Re	Rb
60	4.7/25+4.7/25	0.022	430	330K
125	2.2/25+2.2/25	0.015		240K
250	1/35+1/35	0.01		200K
500	1.5/25+0.33/25	0.0068		130K
1K	0.22/25+0.33/25	0.0047		100K
2K	0.068	0.0033		68K
4K	0.033	0.0022		51K
8K	0.016	0.0018	1	39K
16K	0.0082	0.001	390	30K

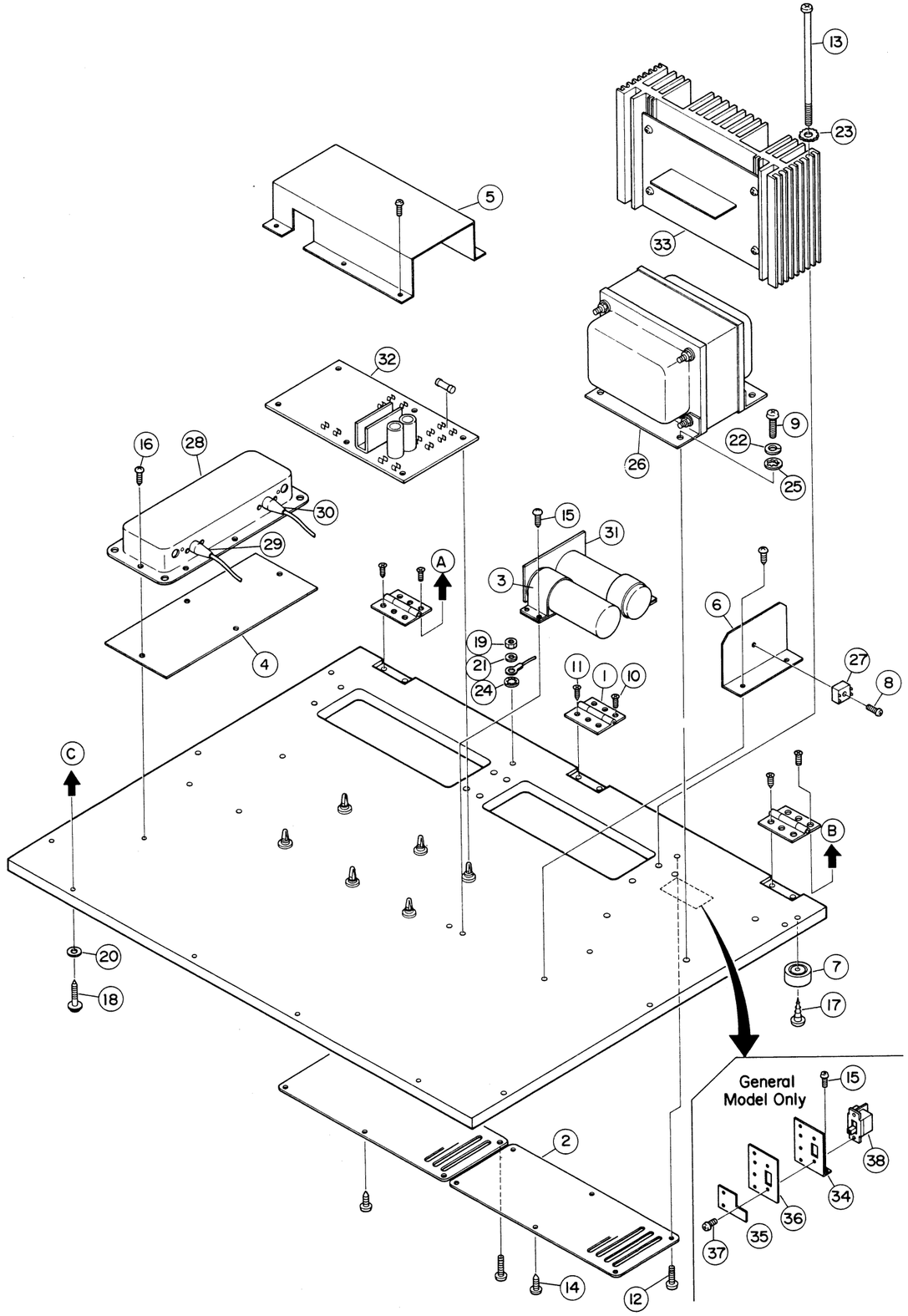
MODELS	CIRCUIT BOARD NO	F1 ~ F4	F5, F6	F7
JAPAN	NA-80424	ψ250V 7A	250V 1A	250V 0.5A
USA & CANADIAN	NA-80425	125V 7A	250V 1A	250V 0.5A
GENERAL	NA-80426	MINI FUSE 250V 3.15AT	MINI FUSE 250V 1.0AT	MINI FUSE 250V 315mAT

■PARTS LIST



* New Parts

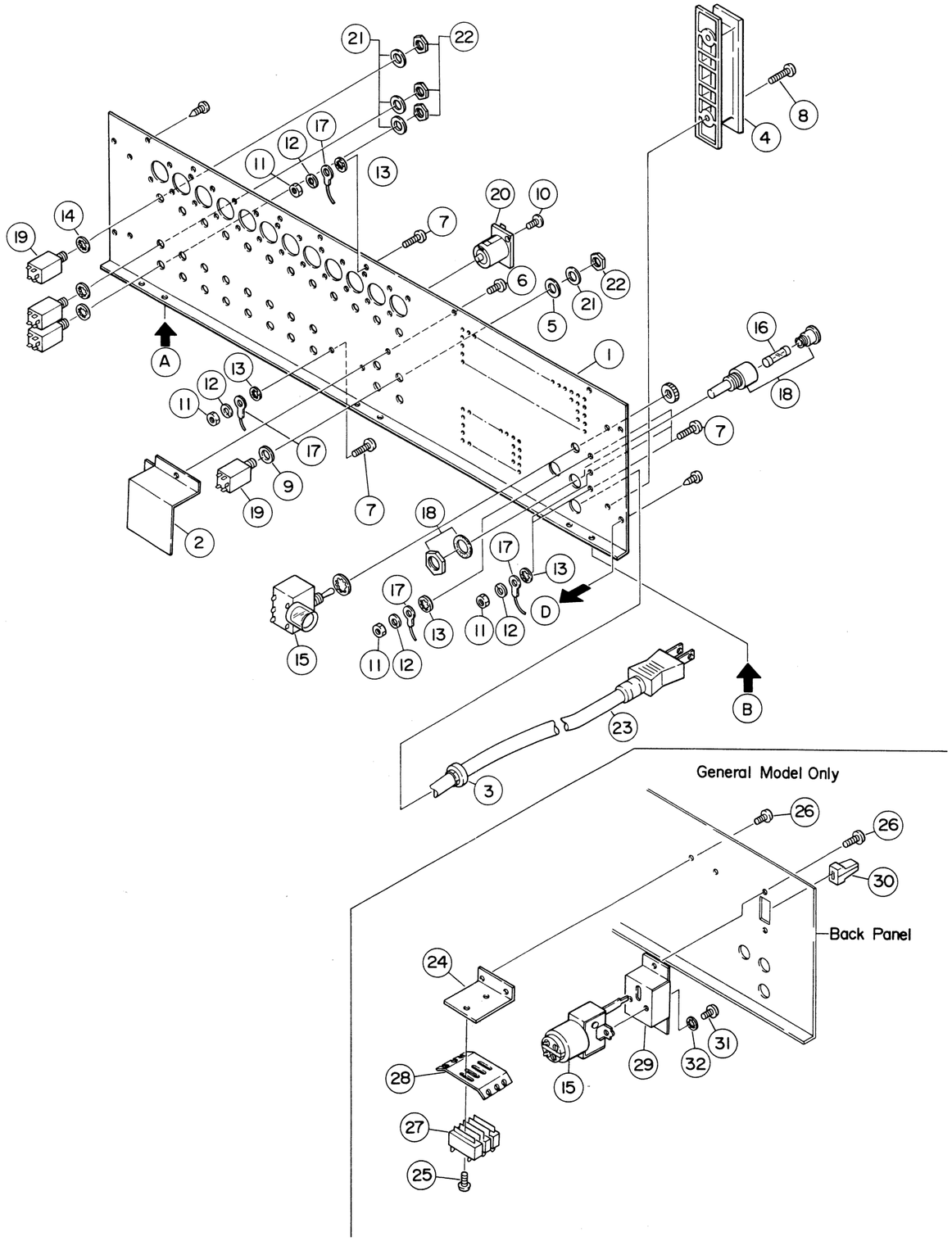
	Ref. No.	Part No.	Description (部品名)		Remarks	Common Model
*	1	30 56 15 00 00 00 10	Case Ass'y	外装組上り		
*	2	30 56 00 AA 80 78 50	Panel (A)	パネル(A)		
*	3	30 56 00 AA 80 78 70	Panel (B)	パネル(B)		
	4	30 56 00 AA 80 80 00	Radiator Grille (L)	放熱グリル(大)		EM200
	5	30 56 00 AA 80 80 20	Meter Sub-Panel	メーターサブパネル		– do. –
	6	30 56 00 AA 80 81 40	Shield Plate	シールド板		– do. –
	7	30 56 00 AA 80 81 50	Sub-Panel (A)	サブパネル(A)		– do. –
	8	30 56 00 AA 80 81 60	Sub-Panel (B)	サブパネル(B)		– do. –
	9	30 56 00 AA 80 82 00	EQ Sub-Panel	EQサブパネル		– do. –
*	10	30 56 00 AA 80 90 70	PS Shield Plate	PSシールド板		
	11	30 54 00 CB 02 38 30	Knob —Black—	ツマミ(クロ)		PM1000
	12	30 54 00 CB 06 86 20	Lamp Holder	ランプホルダー		PM400
	13	30 56 00 CB 81 00 90	Insulation Nut	絶縁ナット		EM120
	14	30 56 00 CB 81 21 30	Knob —Yellow—	ツマミ(イエロー)		EM200
	15	30 56 00 CB 81 21 40	– do. – —Ivory—	〃(アイボリー)		– do. –
	16	30 56 00 CB 81 21 50	– do. – —Gray—	〃(グレー)		– do. –
	17	30 56 00 CB 81 21 60	– do. – —Ivory—	EQツマミ(アイボリー)		– do. –
	18	30 56 00 CB 81 21 80	– do. – —Black—	ツマミ(クロ)		– do. –
	19	30 56 00 CB 81 22 60	– do. – —Red—	〃(アカ)		– do. –
	20	40 10 00 CB 81 22 70	Dust Proof Cover	防塵カバー		– do. –
	21	30 56 00 CB 81 22 80	Meter Escutcheon	メーターエスカッション		– do. –
	22	40 10 00 CB 81 23 00	Dust Proof Cover	防塵カバー		– do. –
*	23	30 56 00 CB 81 23 60	Indication Chip	表示チップ		
	24	40 10 00 EA 03 00 50	Pan Head Screw M3 x 5 ZCM2-Y	ナベ小ネジ		
	25	40 10 00 EA 04 00 80	– do. – M4 x 8 – do. –	〃		
	26	40 10 00 EA 32 00 40	– do. – M2 x 4 ZMC2-BL	〃		
	27	40 10 00 ED 04 00 60	Bind Screw M4 x 6 ZMC2-Y	バインド小ネジ		
	28	40 10 00 ED 33 00 50	– do. – M3 x 5 ZMC2-BL	〃		
	29	40 10 00 ED 34 02 50	– do. – M4 x 25 – do. –	〃		
	30	40 10 00 EF 25 03 00	Oval Head Screw M5 x 30 FCrM3-3g	丸皿小ネジ		
	31	40 10 00 EI 03 00 50	Bind Tapping Screw 3 x 5 ZMC2-Y	バインドタッピングスクリュー		
	32	40 10 00 EI 03 00 80	– do. – 3 x 8 – do. –	〃		
	33	40 10 00 EI 33 01 20	– do. – 3 x 12 ZMC2-BL	〃		
	34	40 10 00 EI 34 01 20	– do. – 4 x 12 – do. –	〃		
	35	40 10 00 EK 00 23 70	Washer	ファイバーワッシャー		
	36	40 10 00 EQ 03 11 30	Round Head Wood Screw 3.1 x 13 ZMC2-Y	丸木ネジ		
	37	40 10 00 EV 10 00 40	Hexagonal Nut 4φ ZMC2-Y	六角ナット		
	38	40 10 00 EV 30 00 40	Spring Lock Washer 4φ – do. –	バネ座金		
	39	40 10 00 EV 41 00 40	Toothed Lock Washer 4φ ZMC2-BL	歯付座金		
	40	40 10 00 EV 43 00 40	–do. – 4φ ZMC2-Y	〃		
	41	40 10 00 EV 43 00 70	– do. – 7φ – do. –	〃		
	42	40 10 00 EQ 20 02 10	Slide Variable Resistor	スライドボリューム		EM200
	43	40 10 00 JB 00 02 30	Lamp (With Lead)	リード付ランプ		– do. –
	44	40 10 00 JI 00 05 30	VU Meter	VUメーター		– do. –
	45	40 10 00 LA 00 01 90	Lug	ラグ端子		
	46	40 10 00 LB 20 11 20	Jack	ジャック		
	47	40 10 00 LX 20 00 10	Flat Washer	特殊平座金		
	48	40 10 00 LX 20 00 60	Hexagonal Nut	特殊六角ナット		
	49	30 56 00 NA 80 40 70	PA Board	PAシート		EM200
	50	30 56 00 NA 80 40 90	MP Board	MPシート		– do. –
	51	30 56 00 NA 80 41 00	EQ Board	EQシート		– do. –
*	52	30 56 00 NA 80 42 10	FA Board	FAシート		
	53	30 10 00 NB 80 59 50	Handle Ass'y	取手 Ass'y		EM200



* New Parts

J: Japanese U: USA C: Canadian G: General

	Ref. No.	Part No.	Description (部品名)		Remarks	Common Model
	1	30 56 00 AA 80 11 20	Hinge	蝶番		EM200
	2	30 56 00 AA 80 80 00	Radiator Grill (L)	放熱グリル(大)		– do. –
	3	30 56 00 AA 80 81 70	Holder, Electrolytic Cap.	コンデンサ取付バンド		– do. –
	4	30 56 00 AA 80 82 10	Shield Board	シールド板		– do. –
*	5	30 56 00 AA 80 95 10	DC Shield Board	DCシールド板		
	6	30 56 00 BA 80 33 30	Diode Radiator	整流ブリッジ放熱板		EM200
	7	30 54 00 CB 80 65 90	Leg	アンプレッグ		– do. –
	8	40 10 00 EA 04 01 50	Pan Head Screw M4 x15 ZMC2-Y	ナベ小ネジ		
	9	40 10 00 EA 36 02 00	– do. – M6 x 20 ZMC2-BL	〃		
	10	40 10 00 EB 03 00 50	Flat Head Screw M3 x 5 ZMC2-Y	サラ小ネジ		
	11	40 10 00 EB 33 01 20	– do. – M3 x 12 ZMC2-BL	〃		
	12	40 10 00 ED 34 02 50	Bind Screw M4 x 25 – do. –	バインド小ネジ		
	13	40 10 00 EG 35 16 40	Pan Head Screw M5 x 164 – do. –	尖先ナベ小ネジ		
	14	40 10 00 EI 34 01 20	Bind Tapping Screw 4 x 12 – do. –	バインドタッピングネジ		
	15	40 10 00 EQ 03 11 30	Round Head Wood Screw 3.1 x 13 ZMC2-Y	丸木ネジ		
	16	40 10 00 EQ 03 51 30	– do. – 3.5 x 13 – do. –	〃		
	17	40 10 00 EQ 34 12 00	– do. – 4.1 x 20 ZMC2-BL	〃		
	18	40 10 00 EQ 34 13 20	–do. – 4.1 x 32 – do. –	〃		
	19	40 10 00 EV 10 00 40	Hexagonal Nut 4φ ZMC2-Y	六角ナット		
	20	40 10 00 EV 20 30 40	Flat Washer 4φ ZMC2-BL	平座金		
	21	40 10 00 EV 30 00 40	Spring Lock Washer 4φ ZMC2-Y	バネ座金		
	22	40 10 00 EV 30 00 60	– do. – 6φ – do. –	〃		
	23	40 10 00 EV 41 00 50	Toothed Lock Washer 5φ ZMC2-BL	歯付座金		
	24	40 100 0 EV 43 00 40	– do. – 4φ ZMC2-Y	〃		
	25	40 10 00 EV 43 00 60	– do. – 6φ ZMC2-Y	〃		
*	26	40 10 00 GA 80 74 00	Power Transformer 100V	電源トランス	J	
*		80 75 00	– do. – 200V	〃	G	
*		81 04 00	– do. – 120V	〃	U, C	
	27	40 10 00 IH 00 03 90	Bridge Rectifier KBH-2504	整流ブリッジ		
	28	40 10 00 JH 00 00 70	Reverb Unit	リバーブユニット		
	29	40 10 00 LB 10 00 40	Pin Plug (Black)	ピンプラグ(クロ)		
	30	40 10 00 LB 10 00 60	– do. – (Red)	〃 (アカ)		
	31	40 10 00 LC 83 23 30	CO P.C. Board	COシートプリント基板		EM200
*	32	30 56 00 NA 80 42 40	DC Board	DC シート	J,	
*		30 56 00 NA 80 42 50	– do. –	〃	U, C	
*		30 56 00 NA 80 42 60	– do. –	〃	G	
*	33	30 56 00 NA 80 42 20	MA Board	MA シート	J, G, C	
*		30 56 00 NA 80 42 30	– do. –	〃	U	
	34	30 56 00 AA 80 81 90	Ungle, Voltage Selector	VS アングル	G	
	35	40 10 00 CB 80 66 30	Stopper, – do. –	VS ストッパー	G	
	36	40 10 00 CB 80 68 40	Insulator, – do. –	VSインシュレーター	G	
	37	40 10 00 EA 03 00 50	Pan Head Screw M3 x 5 ZMC2-Y	ナベ小ネジ	G	
	38	40 10 00 KA 40 04 10	Slide Switch	スライドスイッチ	G	



* New Parts

Ref. No.	Part No.	Description (部品名)		Remarks	Common Model
1	30 56 00 AA 80 80 30	Back Panel	バックパネル	J	
	30 56 00 AA 80 80 40	– do. –	〃	U, C	
	30 56 00 AA 80 80 50	– do. –	〃	G	
2	30 56 00 AA 80 81 80	SP Shield Plate	SPシールド板		
3	40 10 00 CB 07 06 90	Cord Stopper	コードストッパー	G	
	40 10 00 CB 80 68 50	– do. –	〃	J, U, C	
4	30 54 00 CB 80 66 40	Cord Reel	コードリール		
5	30 56 00 CB 81 00 90	Insulation Nut	絶縁ナット		
6	40 10 00 ED 33 00 50	Bind Screw M3 x 5 ZMC2-BL	バインド小ネジ		
7	40 10 00 ED 34 01 20	– do. – M4 x 12 – do. –	〃		
8	40 10 00 EI 34 01 20	Bind Tapping Screw 4 x 12 – do. –	バインドタッピングネジ		
9	40 10 00 EK 00 23 70	Fiber Washer	ファイバーワッシャー		
10	40 10 00 EM 23 00 60	Oval Head Tapping Screw 3 x 6 FNM3-3g	丸皿タッピングネジ		
11	40 10 00 EV 10 00 40	Hexagonal Nut 4φ ZMC2-Y	六角ナット		
12	40 10 00 EV 30 00 40	Spring Lock Washer 4φ – do. –	バネ座金		
13	40 10 00 EV 43 00 40	Toothed Lock Washer 4φ – do. –	歯付座金		
14	40 10 00 EV 43 00 90	– do. – 9φ – do. –	〃		
15	40 10 00 KA 20 09 20	Power Switch	パワースイッチ	G	
	40 10 00 KA 30 02 10	– do. –	〃	J, C	
	40 10 00 KA 30 03 50	– do. –	〃	U	
16	40 10 00 KB 00 07 70	Fuse Mini 250V 6.3AT	ヒューズ	G	
	40 10 00 KB 00 13 00	– do. – 250V 7A	〃	J	
	40 10 00 KB 00 15 20	– do. – UL 125V 7A	〃	U, C	
17	40 10 00 LA 00 07 60	Lug	カラー端子板	J, U, C	
18	40 10 00 LB 20 04 90	Fuse Holder	ヒューズホルダー	U, C, J	
	40 10 00 LB 20 05 90	– do. –	〃	G	
19	40 10 00 LB 20 11 20	Jack	ジャック		
20	40 10 00 LB 30 01 50	Cannon Socket XLR3-31	キャノンソケット		
21	40 10 00 LX 20 00 10	Flat Washer 9φ	特殊平座金		
22	40 10 00 LX 20 00 60	Hexagonal Nut 9φ	特殊六角ナット		
23	40 10 00 MG 00 02 70	Power Cord	電源コード	U, C	
	40 10 00 MG 00 04 50	– do. –	〃	G	
	40 10 00 MG 00 06 10	– do. –	〃	J	
24	30 54 00 AA 80 29 50	Holder, Terminal	ボイボ端子取付金具	G	
25	40 10 00 EA 03 01 60	Pan Head Screw M3 x 16 ZMC2-Y	ナベ小ネジ	G	
26	40 10 00 ED 33 00 50	Bind Screw M3 x 5 ZMC2-BL	バインド小ネジ	G	
27	40 10 00 LA 00 10 40	Terminal	ボイボ端子	G	
28	40 10 00 LA 00 21 90	Wire Holder	ワイヤーホルダー	G	
	40 10 00 AA 03 15 80	Washer, Fuse Holder	ヒューズホルダーワッシャー	G	
29	30 56 00 AA 80 91 60	Sub Chassis, Switch	スイッチサブシャーシ	G	
30	30 10 00 CB 81 12 90	Knob	ツマミ	G	
31	40 10 00 EA 33 00 50	Pan Head Screw M3 x 5 ZMC2-BL	ナベ小ネジ	G	
32	40 10 00 EV 43 00 30	Toothed Lock Washer 3φ – do. –	歯付座金	G	
	40 10 00 FQ 08 34 70	Oil Capacitor 0.0047μF 2000V	オイルコン	J	
	40 10 00 HL 42 71 00	Metal Oxide Film Resistor 10kΩ 2P	酸金抵抗	J, U, C	

* New Parts

Ref. No.	Part No.	Description (部品名)		Remarks	Common Model
	40 10 00 LC 83 23 30	CO P.C Board	COシートプリント基板		
*	40 10 00 FZ 00 14 20	Electrolytic Cap.	12000μF/80V ケミコン		
	30 56 00 NA 80 40 70	PA Board	PAシート		EM200
	40 10 00 FP 15 61 00	Tantalum Capacitor	1μF/35V タンタルコン		
	40 10 00 FP 34 64 70	– do. –	4.7μF/25V 〃		
	40 10 00 HS 31 04 30	Variable Resistor	A50kΩ ボリューム		
	40 10 00 HS 31 04 40	– do. –	B50kΩ 〃		
	40 10 00 HS 31 04 50	– do. –	D-ZD50kΩ 〃		
	40 10 00 HW 79 52 20	Fuse Resistor	220Ω ¼P プレート抵抗		
	40 10 00 IG 00 12 20	IC	TA7136P IC		
	40 10 00 IG 00 13 90	– do. –	JRC4558 〃		
	40 10 00 KA 50 10 90	Rotary Switch	2-5s ロータリーSW		
	40 10 00 LB 60 28 20	2.5 Pich Base Pin Side 6P	2.5ピッチベースピンサイド6P		
	30 56 00 NA 80 40 90	MP Board	MPシート		EM200
	40 10 00 FP 15 61 00	Tantalum Capacitor	1μF/35V タンタルコン		
	40 10 00 HS 31 04 30	Variable Resistor	A50kΩ ボリューム		
	40 10 00 HS 31 04 50	– do. –	D-ZD50kΩ 〃		
	40 10 00 IG 00 13 90	IC	JRC4558 IC		
	40 10 00 IG 02 62 00	– do. –	HA1457 〃		
	30 56 00 NA 80 41 00	EQ Board	EQシート		EM200
	40 10 00 FP 15 53 30	Tantalum Capacitor	0.33μF/35V タンタルコン		
	40 10 00 FP 15 61 00	– do. –	1μF/35V 〃		
	40 10 00 FP 34 61 50	– do. –	1.5μF/25V 〃		
	40 10 00 FP 34 62 20	– do. –	2.2μF/25V 〃		
	40 10 00 FP 34 64 70	– do. –	4.7μF/25V 〃		
	40 10 00 FP 35 52 20	– do. –	0.22μF/35V 〃		
	40 10 00 HQ 30 03 50	Slide Variable Resistor	スライドボリューム		
	40 10 00 IG 00 13 90	IC	JRC4558 IC		
*	30 56 00 NA 80 42 10	FA Board	FAシート		
	40 10 00 FM 09 71 00	BP Capacitor	10μF/16V BPケミコン		
	40 10 00 FP 34 64 70	Tantalum Capacitor	4.7μF/25V タンタルコン		
	40 10 00 HQ 20 02 10	Slide Variable Resistor	D10kΩ スライドボリューム		
	40 10 00 IG 00 13 90	IC	JRC4558 IC		
	40 10 00 IG 02 62 00	IC	HA1457 〃		
	40 10 00 IF 00 00 10	Diode	IN-34 ダイオード		

* New Parts

	Ref. No.	Part No.	Description (部品名)		Remarks	Common Model		
*		30 56 00 NA 80 42 20	MA Board	M A シ ー ト	J, G, C			
*		30 56 00 NA 80 42 30	– do. –	〃	U			
		30 54 00 BA 80 16 40	Heat Sink	放 熱 器				
*		30 56 00 BA 80 34 10	– do. –	〃				
		40 10 00 FM 11 61 00	BP Capacitor 1μF/50V	B P ケ ミ コ ン				
		40 10 00 GD 90 02 10	Coil 2.2μH	コ イ ル				
		40 10 00 HL 31 34 70	Metal Oxide Film Resistor 4.7Ω 1P	酸 金 抵 抗				
		40 10 00 HL 31 41 00	– do. – 10Ω 1P	〃				
		40 10 00 HL 31 45 60	– do. – 56Ω 1P	〃				
		40 10 00 HL 31 52 70	– do. – 270Ω 1P	〃				
		40 10 00 HL 31 53 30	– do. – 330Ω 1P	〃				
		40 10 00 HL 31 65 60	– do. – 5.6kΩ 1P	〃				
		40 10 00 HL 32 63 30	– do. – 3.3kΩ 2P	〃				
		40 10 00 HL 33 52 70	– do. – 270Ω 3P	〃				
		40 10 00 HL 41 71 50	– do. – 15kΩ 1P	〃				
		40 10 00 HL 42 61 80	– do. – 1.8kΩ 2P	〃				
		40 10 00 HM 05 24 70	Cement Molded Resistor 0.47Ω 5P	セ メ ン ト 抵 抗				
		40 10 00 HT 41 01 20	Variable Resistor B470Ω	ソリッドボリューム				
		40 10 00 HW 10 46 80	Fuse Resistor 85mA 68Ω	ヒ ュ ー ズ 抵 抗	Except U			
		40 10 00 HW 11 51 50	– do. – 80mA, 50Ω	〃	Except U			
		40 10 00 HW 20 46 80	– do. – 85mA 68Ω	〃	U			
		40 10 00 HW 21 51 50	– do. – 80mA 150Ω	〃	U			
		40 10 00 HW 79 52 20	– do. – 33mA 220Ω	〃				
		40 10 00 HZ 00 07 10	– do. – 4.7Ω 1P	不 燃 抵 抗				
		40 10 00 IA 06 73 10	Transistor 2SA673	ト ラ ン ジ ス タ				
		40 10 00 IA 07 47 50	– do. – 2SA747	〃				
		40 10 00 IA 08 14 20	– do. – 2SA814	〃				
		40 10 00 IA 08 72 10	– do. – 2SA872	〃				
		40 10 00 IC 11 16 50	– do. – 2SC1116	〃				
		40 10 00 IC 12 13 10	– do. – 2SC1213	〃				
		40 10 00 IC 16 24 20	– do. – 2SC1624	〃				
		40 10 00 IC 17 75 10	– do. – 2SC1775	〃				
		40 10 00 IF 00 00 40	Diode IS1555	ダ イ オ ー ド				
		40 10 00 IF 00 04 50	Varistor STV-3H	〃				
		40 10 00 IH 00 02 40	Diode IS1885	〃				
		40 10 00 LB 30 01 10	Socket	トランジスタソケット				
		40 10 00 LB 30 03 00	Transistor Base	コネクトコンウェハー				
		40 10 00 LB 30 07 30	2.5 Pich Base Pin	2.5 ピッチベースピン				
		40 10 00 LB 60 13 80	6P Connector Plug	6 P コ ネ ク タ ー				

* New Parts

	Ref. No.	Part No.	Description (部品名)		Remarks	Common Model		
*		30 56 00 NA 80 42 40	DC Board	DCシート	J			
*		30 56 00 NA 80 42 50	– do. –	〃	U, C			
*		30 56 00 NA 80 42 60	– do. –	〃	G			
		30 54 00 BA 80 08 10	Heat Sink	放熱器				
		40 10 00 FP 15 52 20	Tantalum Capacitor	0.22μF/35V	タンタルコン			
		40 10 00 HL 31 31 00	Metal Oxide Film Resistor	1Ω 1P	酸金抵抗			
		40 10 00 HL 31 41 00	– do. –	10Ω 1P	〃			
		40 10 00 HT 41 01 40	Variable Resistor	B47kΩ	半固定ボリューム			
		40 10 00 IA 05 61 20	Transistor	2SA561	トランジスタ			
		40 10 00 iA 06 73 10	– do. –	2SA673	〃			
		40 10 00 IA 08 50 00	– do. –	2SA850	〃			
		40 10 00 IB 05 96 20	– do. –	2SB596	〃			
		40 10 00 IC 07 34 10	– do. –	2SC734	〃			
		40 10 00 IC 12 13 10	– do. –	2SC1213	〃			
		40 10 00 IC 17 35 00	– do. –	2SC1735	〃			
		40 10 00 ID 05 26 10	– do. –	2SD526	〃			
		40 10 00 IF 00 00 10	Diode	IN34A	ダイオード			
		40 10 00 IF 00 00 40	– do. –	1S1555	〃			
		40 10 00 IF 00 06 50	Zener Diode	WZ-162	ツェナーダイオード			
		40 10 00 IG 02 62 00	IC	HA1457	IC			
		40 10 00 IH 00 00 30	Diode	10D1	ダイオード			
		40 10 00 IH 00 00 50	– do. –	10DC-2	〃			
		40 10 00 IH 00 01 30	– do. –	10DC-2R	〃			
		40 10 00 KB 00 03 10	Fuse	250V 0.5A	ヒューズ	J		
		40 10 00 KB 00 03 30	–do. –	– do. – 1A	〃	J		
		40 10 00 KB 00 13 00	– do. –	– do. – 7A	〃	J		
		40 10 00 KB 00 10 20	– do. – UL	– do. – 1A	〃	U, C		
		40 10 00 KB 00 15 20	– do. – – do. –	125V 7A	〃	U, C		
		40 10 00 KB 00 10 10	– do. – – do. –	250V 0.5A	〃	U, C		
		40 10 00 KB 00 07 60	– do. – Mini	– do. – 3.15AT	〃	G		
		40 10 00 KB 00 06 50	– do. – – do. –	– do. – 315mAT	〃	G		
		40 10 00 KB 00 07 30	– do. – – do. –	– do. – 1.0AT	〃	G		
		40 10 00 KC 00 03 00	Lead Relay		リードリレー			
		40 10 00 LB 20 05 70	Fuse Holder Pin		ヒューズ受金具			
		40 10 00 LB 10 01 10	Connector Pin		ダイヤモンドコネクターピン			
		40 10 00 BB 00 44 30	Connector Pin		コネクターピン			
		40 10 00 LB 30 07 20	Housing	3P	3Pコネクターハウジング			
		40 10 00 LB 60 13 90	Connector Terminal		コネクターターミナル			
		40 10 00 LB 60 14 00	Housing	6P	6Pコネクターハウジング			