



YAMAHA

EM-150 Ensemble Mixer

SERVICE MANUAL

SPECIFICATIONS

Number of Inputs	6-input channels (each switchable for MIC, INST or LINE). 2-auxiliary stereo input (AUX and REC OUT). 1-auxiliary monaural input (FROM ECHO).
Input Channel Controls	VOLUME, BASS & TREBLE tone (± 12 dB of low and high frequency equalization), REVERB/ECHO, BALANCE (stereo pan), MIC/INST/LINE (Input Selector).
Mixing Buses	2-Program (stereo Left and Right), 1-Reverb/Echo.
Number of Outputs	2-SPEAKER, 2-MONITOR OUT, 2-RECORD OUT, 1-PHONES, 1-TO ECHO.
Master Controls	MASTER VOLUME, MONITOR VOLUME, MASTER REVERB/ECHO, AUX VOLUME, graphic equalizer ON/OFF (Left & Right).
Echo and Reverb	Built-in Accutronics spring-type reverberation unit; provisions for connection of external reverb, echo delay, or other effects devices.
Power Output	150-Watts RMS (2 X 75-W) amplifier. For 8-ohm speakers.
Graphic Equalizer	7-Band, for SPEAKER and PHONES outputs; 12dB of boost or cut at: 60Hz, 150Hz, 400Hz, 1kHz, 2.5kHz, 5kHz & 10kHz.
Level Indicators	2-illuminated VU meters; 0 VU=37.5 Watts (8-ohm termination).
Amplifier Type	All solid state, discrete and integrated circuit.
Power Requirements	110, 117, 130, 220 or 240 VAC, 50/60Hz.
Physical Dimensions	Width 24 $\frac{1}{4}$ " (61.5cm) X Height 7 $\frac{1}{4}$ " (18.2cm) X Depth 16 $\frac{1}{4}$ " (41.0cm), Weight 39.7lbs. (18kg).
Finish	Black, with protective aluminum trim.
Additional Features	Integral carrying strap, rubber feet, 2-way power switch to minimize hum, power ON indicators in VU meters, color-coded control knobs.

Connector, Level & Impedance Information

Circuit	Type Connector*	Nominal Level	Impedance
Inputs:			
LINE	standard phone (x6)	-27dBm(35mV)	50 kohms
INST	(same jack)	-33dBm(17mV)	50 kohms
MIC	(same jack)	-52dBm(2mV)	10 kohms
AUX	pin jack (x2)	-21dBm(69mV)	50 kohms
FROM ECHO	standard phone (x2)	-31dBm(22mV)	50 kohms
Outputs:			
SPEAKER	standard phone (x2)	<u>75-Watts RMS</u>	8 ohms
MONITOR OUT	standard phone (x2)	+4dBm (1.23V)	5 kohms
TO ECHO	standard phone	-20dBm(78mV)	50 kohms
RECORD OUT	pin jack (x2)	-22dBm(62mV)	50 kohms
PHONES	stereo phone	(varies w/SPEAKER)	8 ohms

**All connections are unbalanced.*

TOP CASE REMOVAL

1. Set the unit up on its side and remove the 6 wood screws, as shown in Figure 1.
2. Reset the unit in its normal position and lift up the top case, as shown in Figure 2.

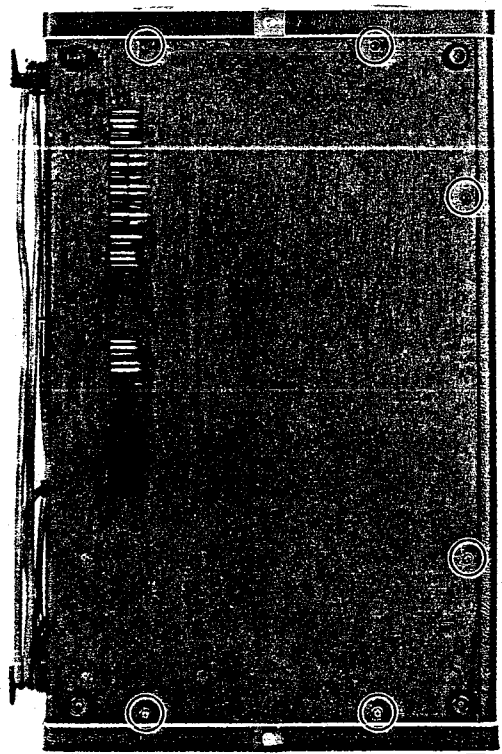


Figure 1

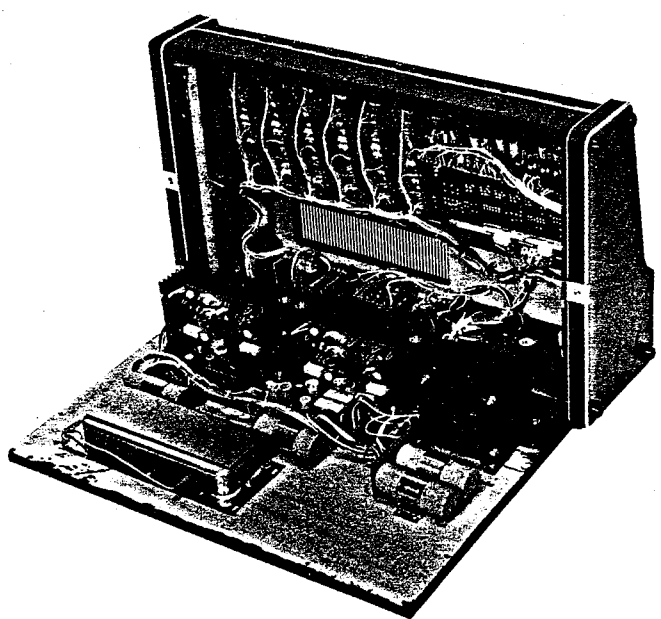


Figure 2

3. Feed a $-60\text{dBm}/1\text{kHz}$ signal through the input jack for that channel.
4. The output level at each channel should be within the limits indicated in Table 2.

Input Selector	Output Level (in dBm)
MIC	$+21.5 \pm 3$
INST	$+2.5 \pm 3$
LINE	-3.5 ± 3

Table 2

Distortion (THD)

5. With all other settings as shown in Table 1, set the Volume control for the channel to be measured to maximum, all other channels to minimum.
6. Feed a 1kHz signal through the input jack. Set the input level so that the output level at the Speaker jack is $+27\text{dBm}$ (37.5 W).
7. The distortion factor should be less than 1% on each channel (L, R).
8. At an output of $+30\text{dBm}$ (75 W) distortion factor should be less than 3%.

Frequency Response

9. Feed -60dBm signals from 20kHz down to 20Hz observing the output on a level meter.
10. The indicated response should be within $\pm 3\text{dB}$ of the specified response curves.

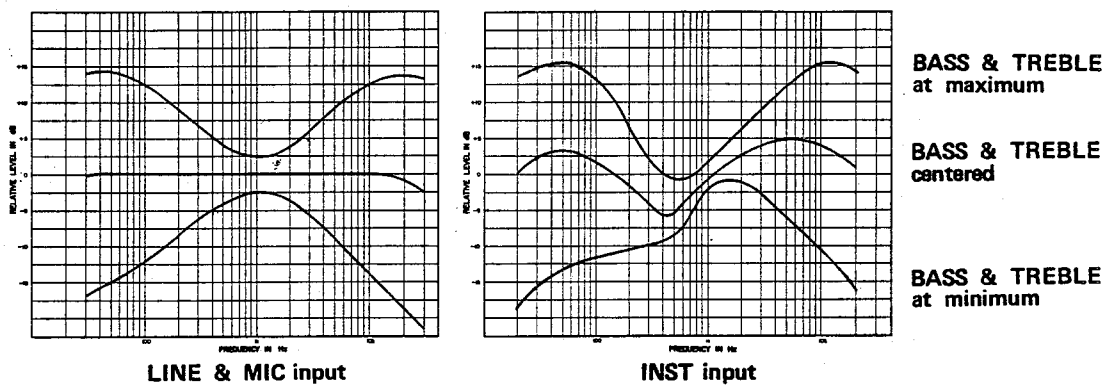


Figure 5 Frequency Response Curves

Treble Control

11. Feed a 10kHz signal through the input jack.
12. When the Treble knob is turned from maximum to minimum, variation must be $26 \pm 3\text{ dB}$.

Bass Control

13. Feed a 100Hz signal through the input jack.
14. When the Bass knob is turned from maximum to minimum, variation must be $24 \pm 3\text{ dB}$.

Graphic Equalizer

15. Set the Equalizer switch to ON.
16. Feed a -65dBm signal through the input jack.
17. Slide that frequency level control from maximum to minimum. The variation should be within the limits indicated in Table 3.

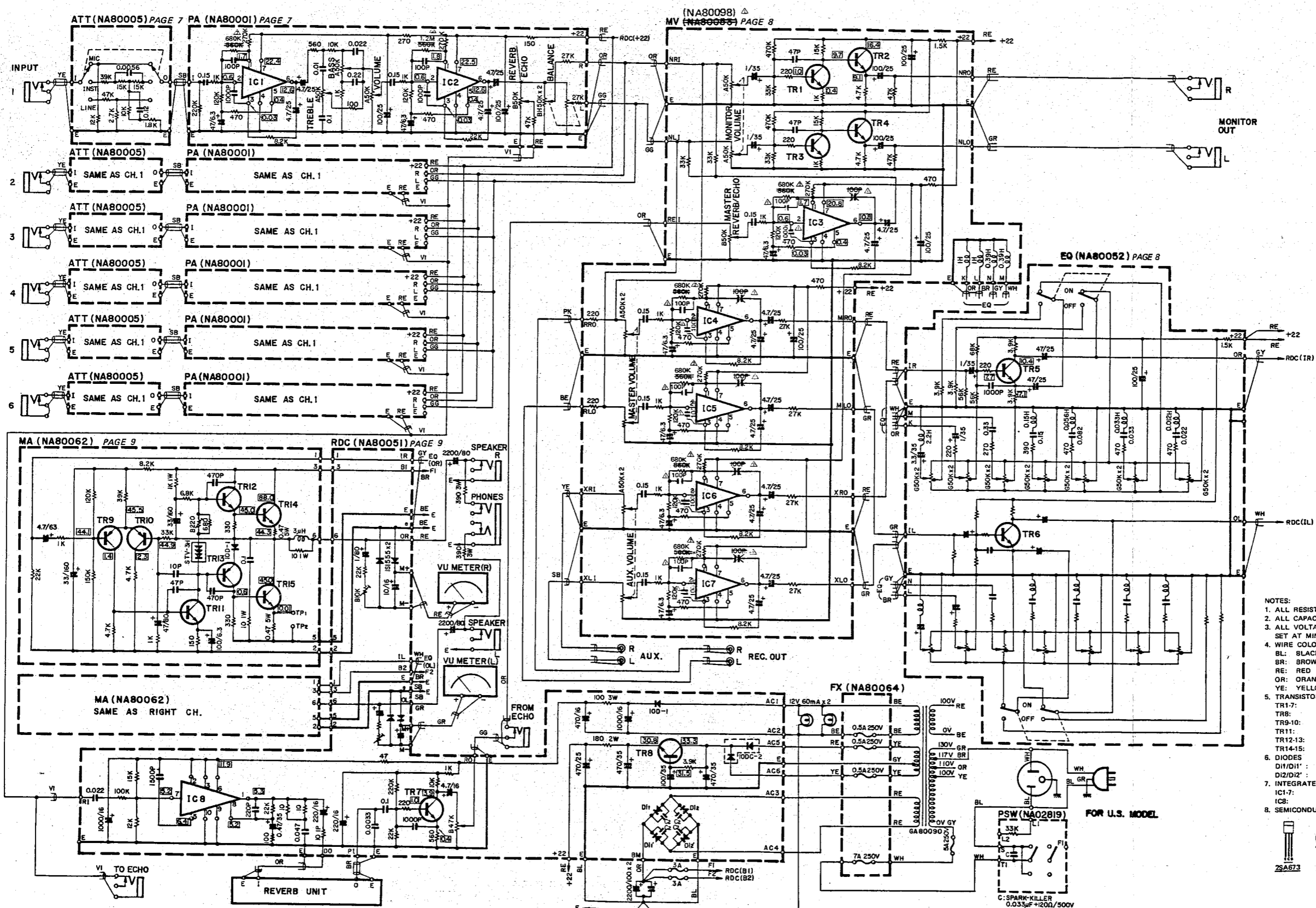
Level Controls Settings	60Hz	150Hz	400Hz	1kHz	2.5kHz	5kHz	10kHz
Max. (+12)	$+12 \pm 3$	$+12 \pm 3$	$+12 \pm 3$	$+12 \pm 3$	$+12 \pm 3$	$+12 \pm 3$	$+12 \pm 3$
Min. (-12)	-12 ± 3	-12 ± 3	-12 ± 3	-12 ± 3	-12 ± 3	-12 ± 3	-12 ± 3

Table 3

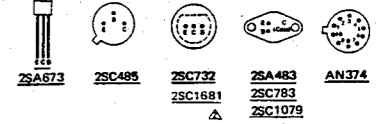
Noise Level

18. Set the Input Selector switch to MIC.
19. At no input condition noise level should be below -25dBm . During this check, make sure the power switch is set to the On position which provides the lower hum level.

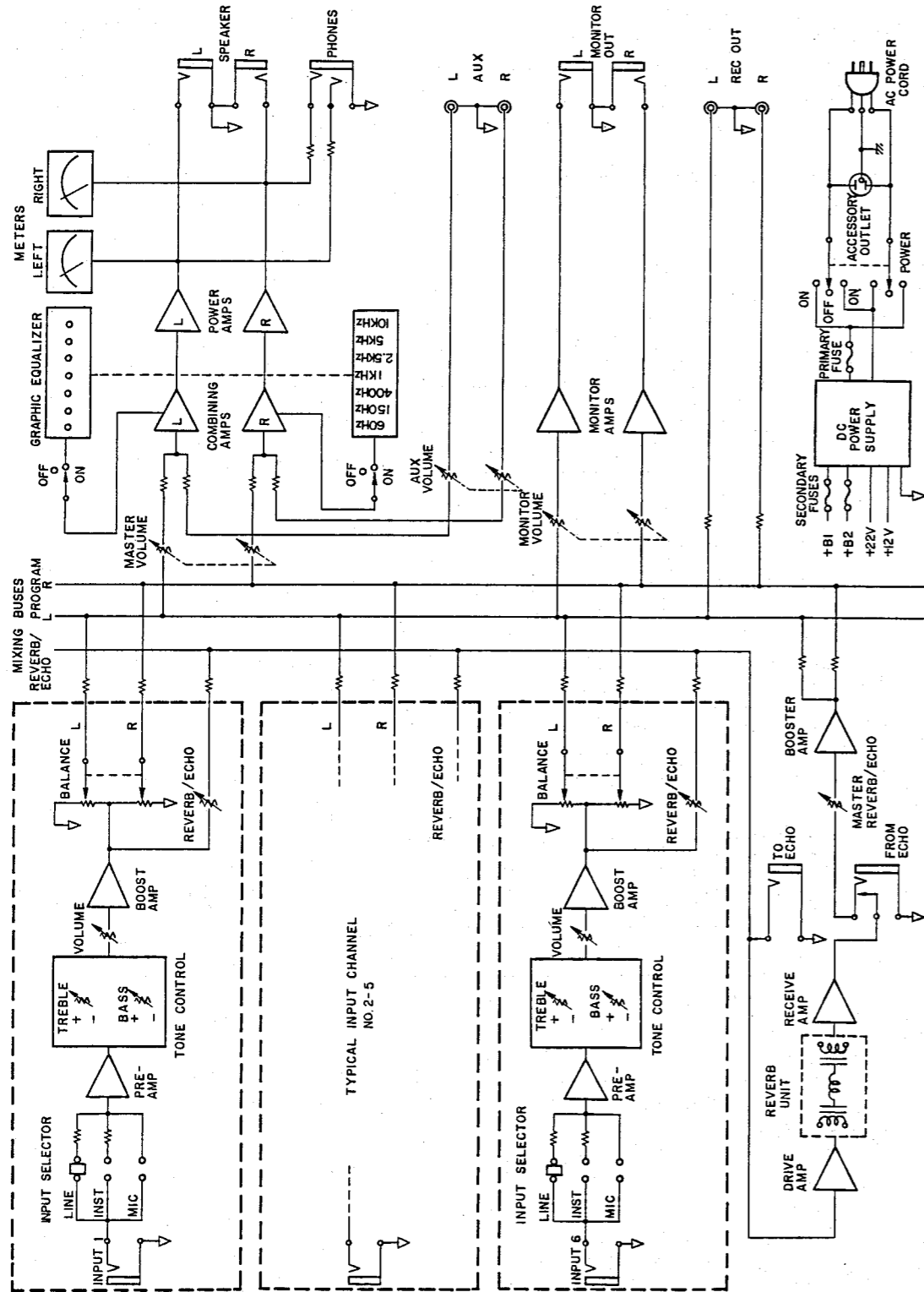
REVISIONS		
REF	DATE	UNITS AFFECTED
△	9/20/75	S/ # 2881 ~ up
△	12/24/75	S/ # 3061 ~ up
△	4/26/76	S/ # 5066 ~ up



- NOTES:
- ALL RESISTORS IN OHMS 1/4 WATT UNLESS OTHERWISE NOTED.
 - ALL CAPACITORS IN MFD. UNLESS OTHERWISE NOTED.
 - ALL VOLTAGES MEASURED WITH A VTVM, WITH ALL CONTROLS SET AT MINIMUM.
 - WIRE COLOR ABBREVIATIONS
 BL: BLACK GR: GREEN GG: LIGHT GREEN
 BR: BROWN BE: BLUE SB: LIGHT BLUE
 RE: RED VI: VIOLET PK: PINK
 OR: ORANGE GY: GRAY TR: TRANSPARENT
 YE: YELLOW WH: WHITE TP: TIN PLATED
 - TRANSISTORS
 TR1-7: 2SC732 2SC1681 △
 TR8: 2SC485
 TR9-10: 2SA673
 TR11: 2SA483
 TR12-13: 2SC783
 TR14-15: 2SC1079
 - DIODES
 D1/D11: SS151
 D2/D12: SS151R
 - INTEGRATED CIRCUITS
 IC1-7: BA311F
 IC8: AN374
 - SEMICONDUCTOR LEAD IDENTIFICATION

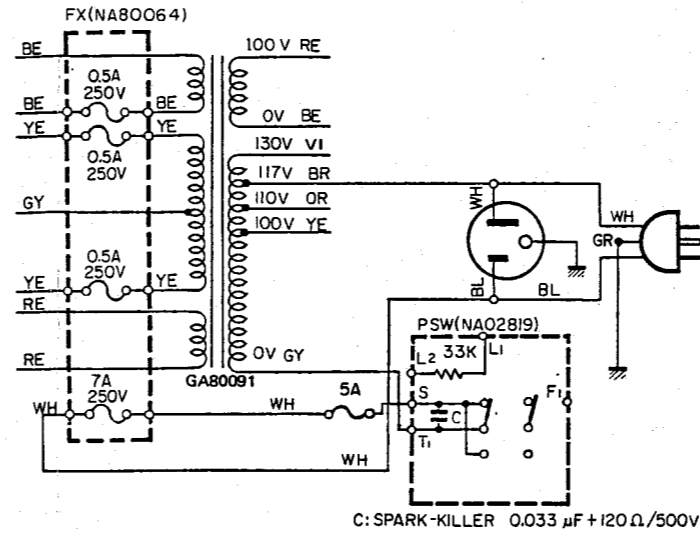


YAMAHA EM-150 ENSEMBLE MIXER SCHEMATIC DIAGRAM

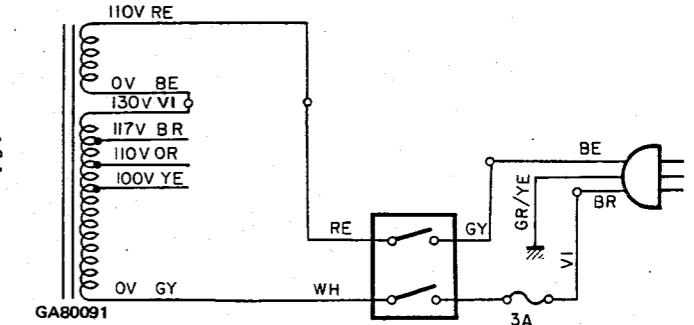


BLOCK DIAGRAM

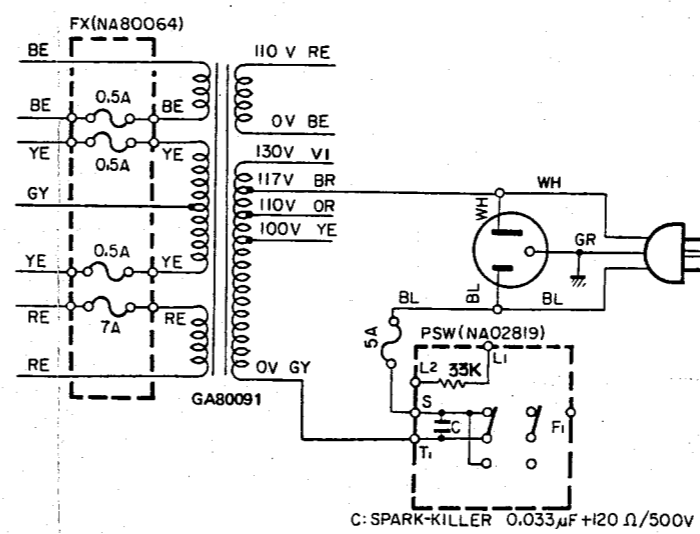
▼ FOR U.S. MODEL



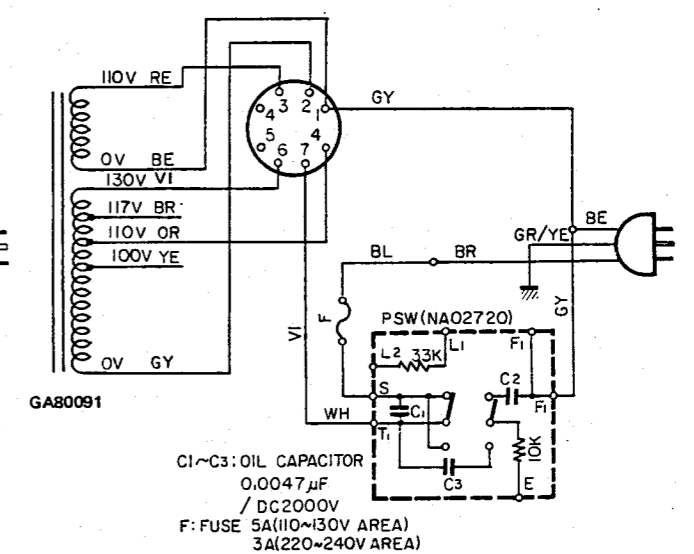
▼ FOR AUSTRALIAN MODEL



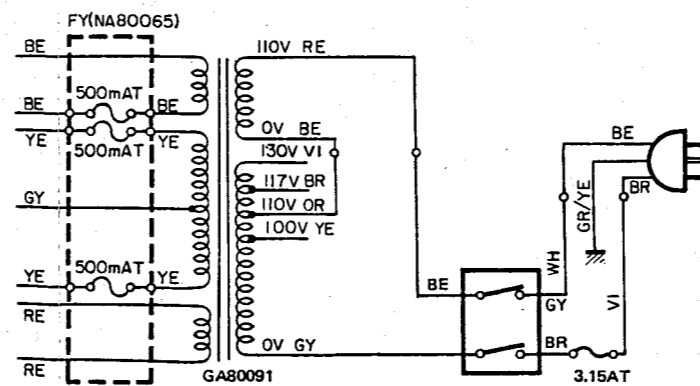
▼ FOR CANADIAN MODEL



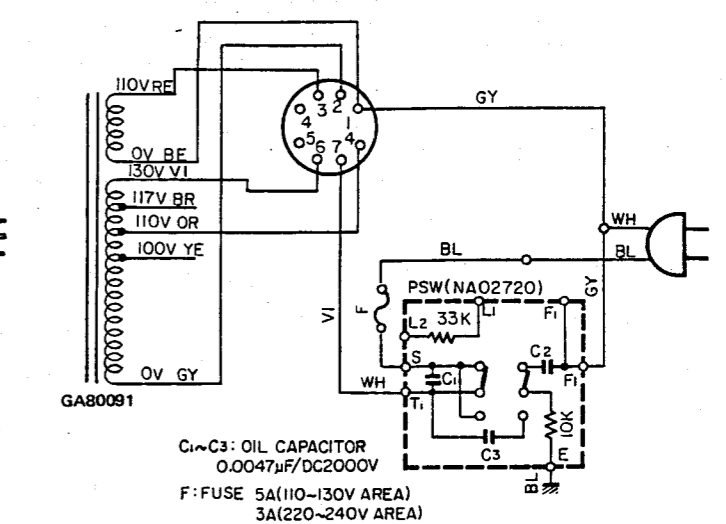
▼ FOR SOUTH AFRICAN MODEL



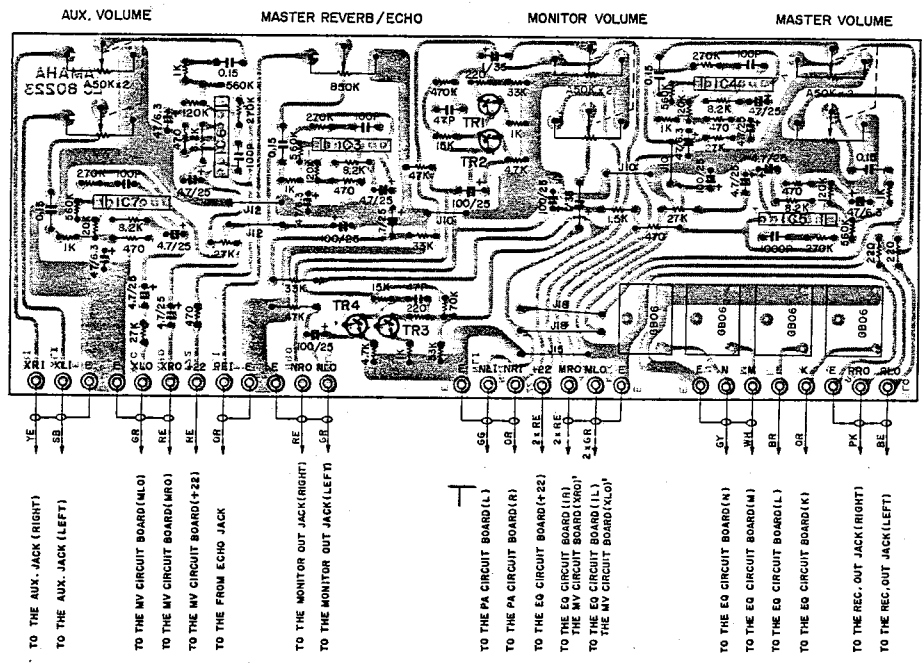
▼ FOR EUROPEAN MODEL



▼ FOR GENERAL MODEL

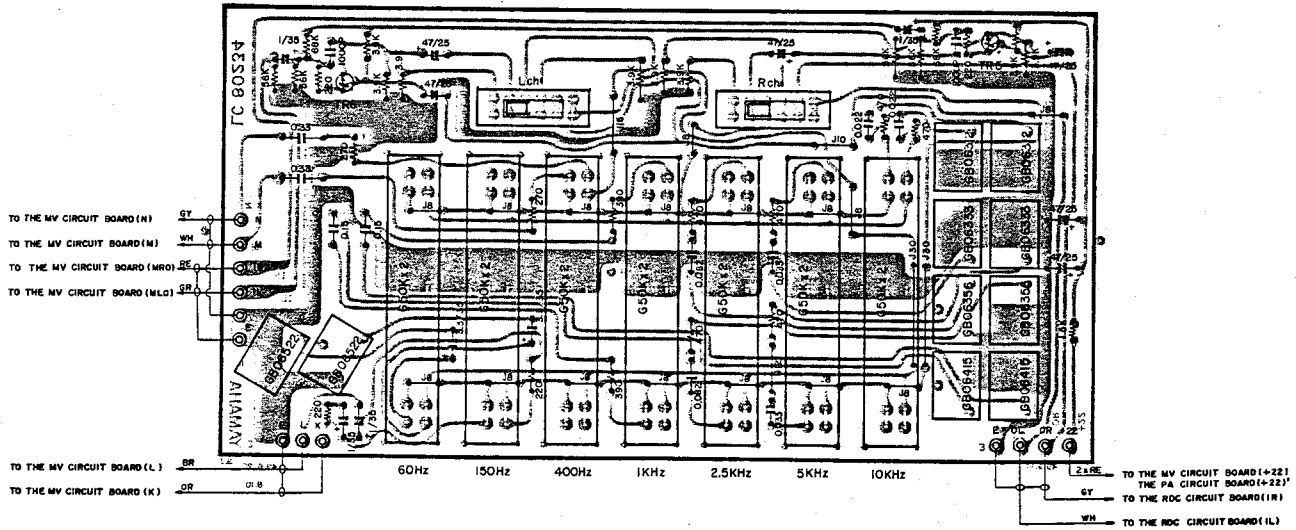


POWER CIRCUIT ARRANGEMENTS



MV CIRCUIT BOARD

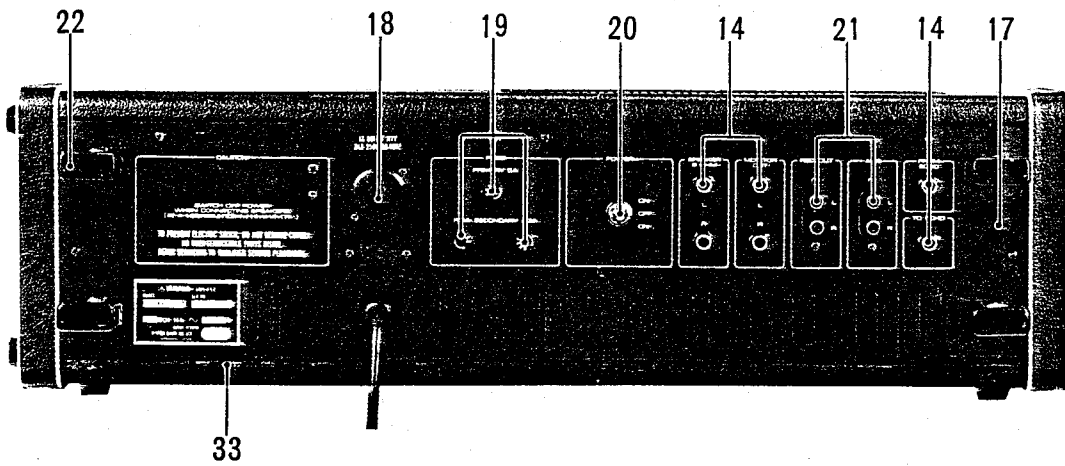
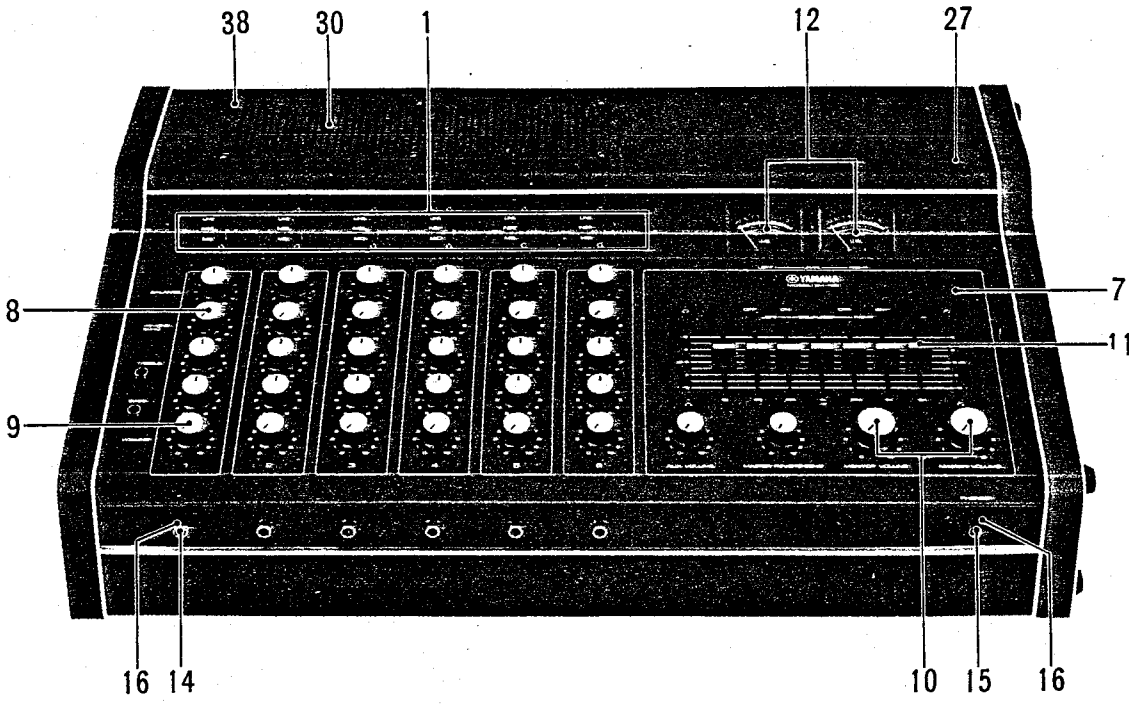
Part No.	Description
305600NA800530	MV Circuit Board Ass'y #80223
401000IC073240	Transistor 2SC732
401000IG000470	IC BA311(F)
401000GB065100	Filter Coil 1.0H
401000GB064390	Filter Coil 0.39H
401000HS320240	Variable Resistor A50kΩ x 2
401000HS320220	Variable Resistor B50kΩ
401000FP156100	Tantalum Capacitor 1μF/35V

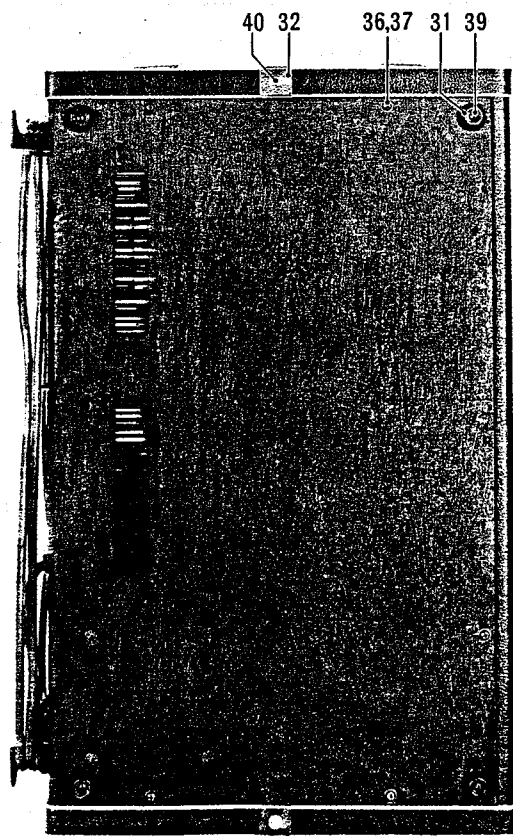
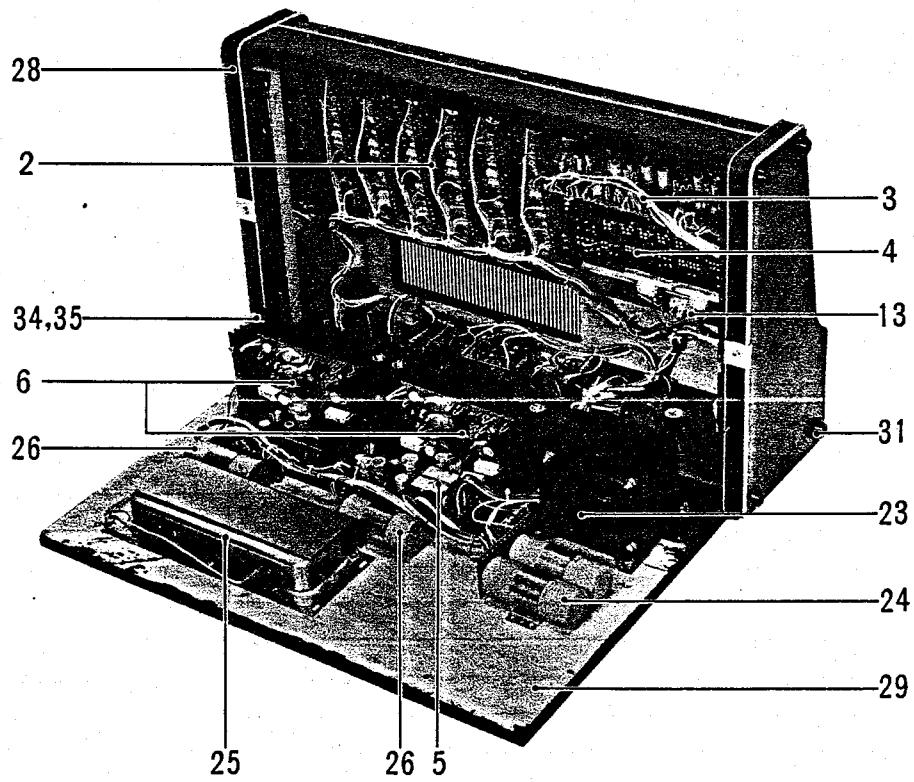


EQ CIRCUIT BOARD

Part No.	Description
305600NA800520	EQ Circuit Board Ass'y #80234
401000IC073240	Transistor 2SC732
401000GB065220	Filter Coil 2.2H
401000GB064150	Filter Coil 0.15H
401000GB063560	Filter Coil 0.056H
401000GB063330	Filter Coil 0.033H
401000GB063120	Filter Coil 0.012H
401000HQ100030	Slide Variable Resistor G50kΩ x 2
401000FP156100	Tantalum Capacitor 1μF/35V
401000FP156330	Tantalum Capacitor 3.3μF/35V
401000KA400340	Slide Switch

PARTS LIST



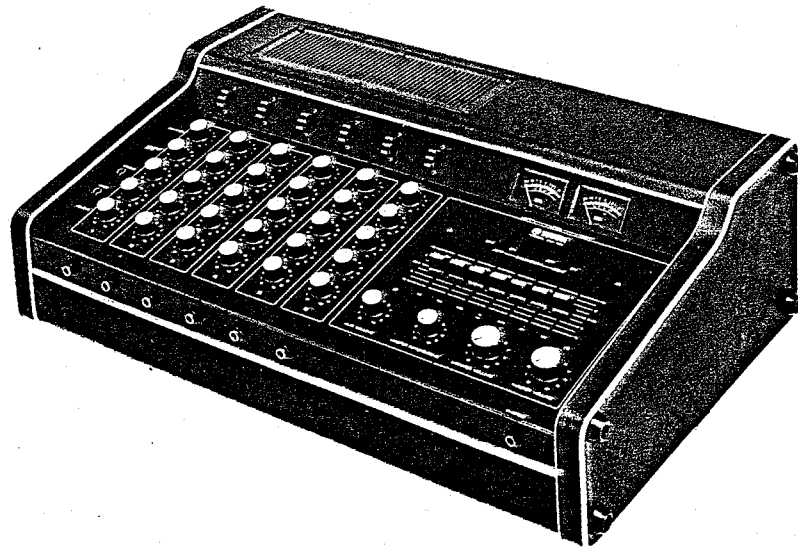


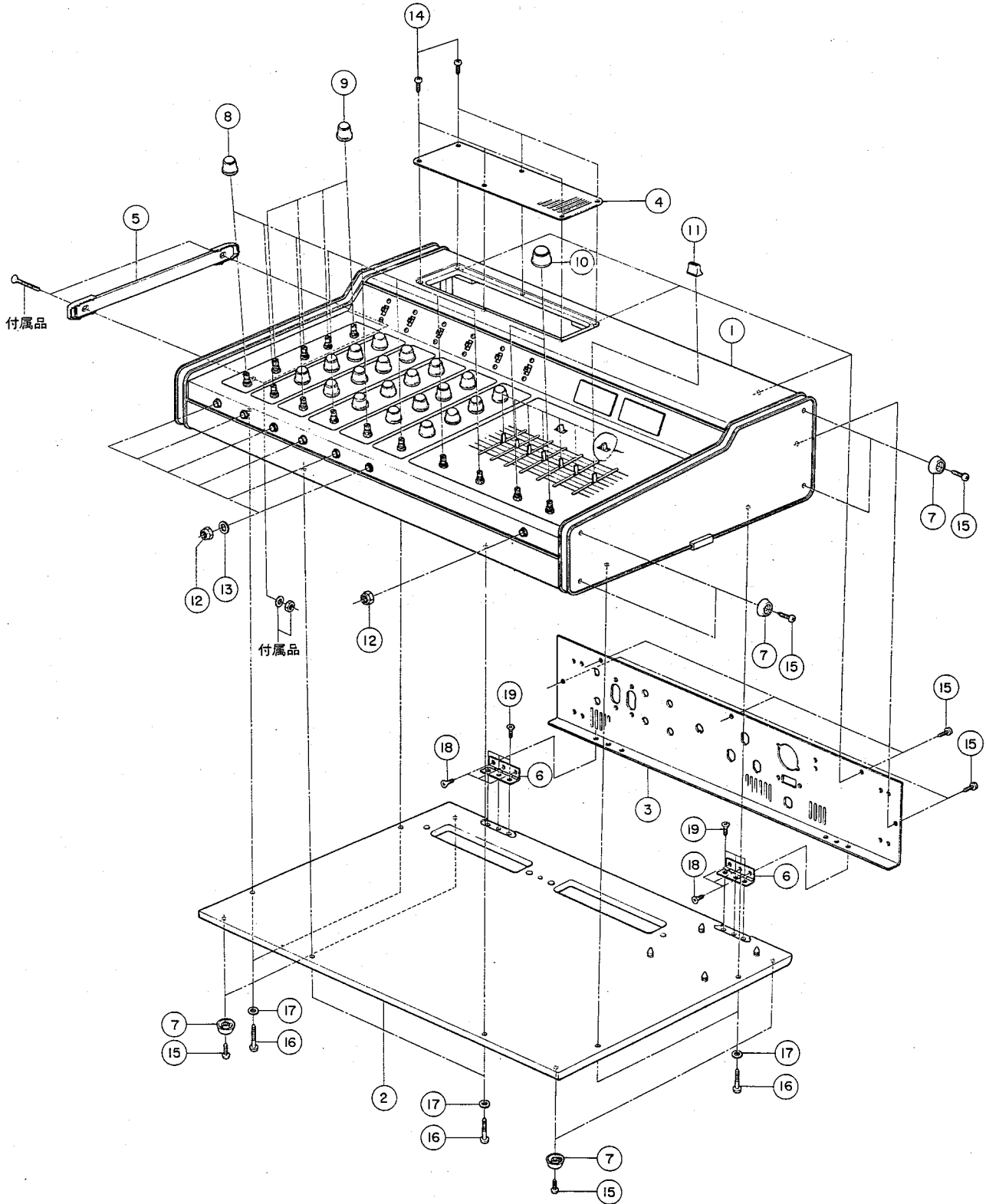
Ref. No.	Part No.	Description	Remarks	Common Models
1	305600NA800050	ATT Circuit Board # 80050	ATT シート	
2	305600NA800010	PA Circuit Board # 80084	PA シート	
3	305600NA800530	MV Circuit Board # 80223	MV シート	
4	305600NA800520	EQ Circuit Board # 80234	EQ シート	
5	305600NA800510	RDC Circuit Board # 80215	RDC シート	
6	305600NA800620	MA Circuit Board # 80203	MA シート	
7	305600AA801050	Panel	パネル	
8	305600CB801080	Knob, Light Blue	ツマミ、ライトブルー	
9	305600CB800780	Knob, White	ツマミ、アイボリー	
10	305600CB800760	Knob, Orange	ツマミ、オレンジ	
11	305400CB018340	Knob	ツマミ	
	305400CB024190	Spacer, Circuit Boards	スペーサー	
12	401000J1000210	VU Meter	レベルメータ	
13	401000JB000020	Lead Type Lamp 12V 60mA	リード付ランプ	
14	401000LB200630	Jack	ジャック	
15	401000LB300060	Jack, Phones	ジャック	
16	305600CB062010	Phone Nut	ホーンナット	
17	305600AA801110	Rear Panel	リアパネル	
18	401000LB300250	3P AC Outlet	3P ACコンセント	U.S./Canadian Model only
	401000LB200250	Voltage Selector	電圧切換器	General & South African Models
19	401000LB200480	Fuse Holder	ヒューズホルダー	except for European Model
19	401000LB200590	Fuse Holder	ヒューズホルダー	European Model only
	401000KB001040	Fuse 3A 250V	ヒューズ	except for European Model
	401000KB001100	Fuse 5A 250V	ヒューズ	U.S./Canadian, General & South African Models (110~130V area) only
	401000KB000360	Miniature Fuse 3AT	ミニヒューズ	European Model only
20	305400NA028190	PSW (Power Switch) Circuit Board #15681	PSW シート	U.S./Canadian Model only
20	305400NA027200	PSW (Power Switch) Circuit Board #14990	PSW シート	General & South African Models only
20	401000KA300010	Power Switch	トグルスイッチ	European & Australian Models only
21	401000LB200190	Pin Jack	ピンジャック	
22	305400CB022570	Power Cord Holder	コード巻付コラム	
23	401000GA800900	Power Transformer	電源トランス	
	305600NA800640	FX (Fuse) Circuit Board #80290	FX シート	U.S./Canadian Model only
	305600NA800650	FY (Fuse) Circuit Board #80290	FY シート	European Model only
24	305600NA800630	CO (Capacitor) Circuit Board #80281	CO シート	
25	401000JH000070	Reverb Unit	リバーブユニット	
26	401000FM259220	Electrolytic Capacitor 2200 μ F/80V	電解コンデンサ	
27	30560900000010	Cabinet Ass'y	外装組立	
28	30560900000020	Top Case	上ケース	
29	30560900000030	Bottom Cover	底板	
30	305600AA801140	Grille	放熱グリル	
	305400NB801550	Carrying Strap Ass'y	把手 Ass'y	
31	401000CB801180	Foot	スベリ座	
32	305600AA801130	Trim Holder	サッシ押え金具	
33	305600AA801120	Hinge	蝶番	
34	401000EG051090	⊕ Pan Head Screw M5 x 109, MA Circuit Board	ナベ小ネジ	
35	401000EV430050	Toothed Washer AB 5S, MA Circuit Board	歯付座金	
36	401000EQ341320	⊕ Round Head Screw 4.1 X 32, Bottom Cover	丸木ネジ	FCM-BL
37	401000EV200040	Washer 4S, Bottom Cover	平座金	FCM-BL
38	401000EZ980130	⊕ Tapping Screw 3 x 12S, Grille	トラスタッピンネジ	FCM3-BL

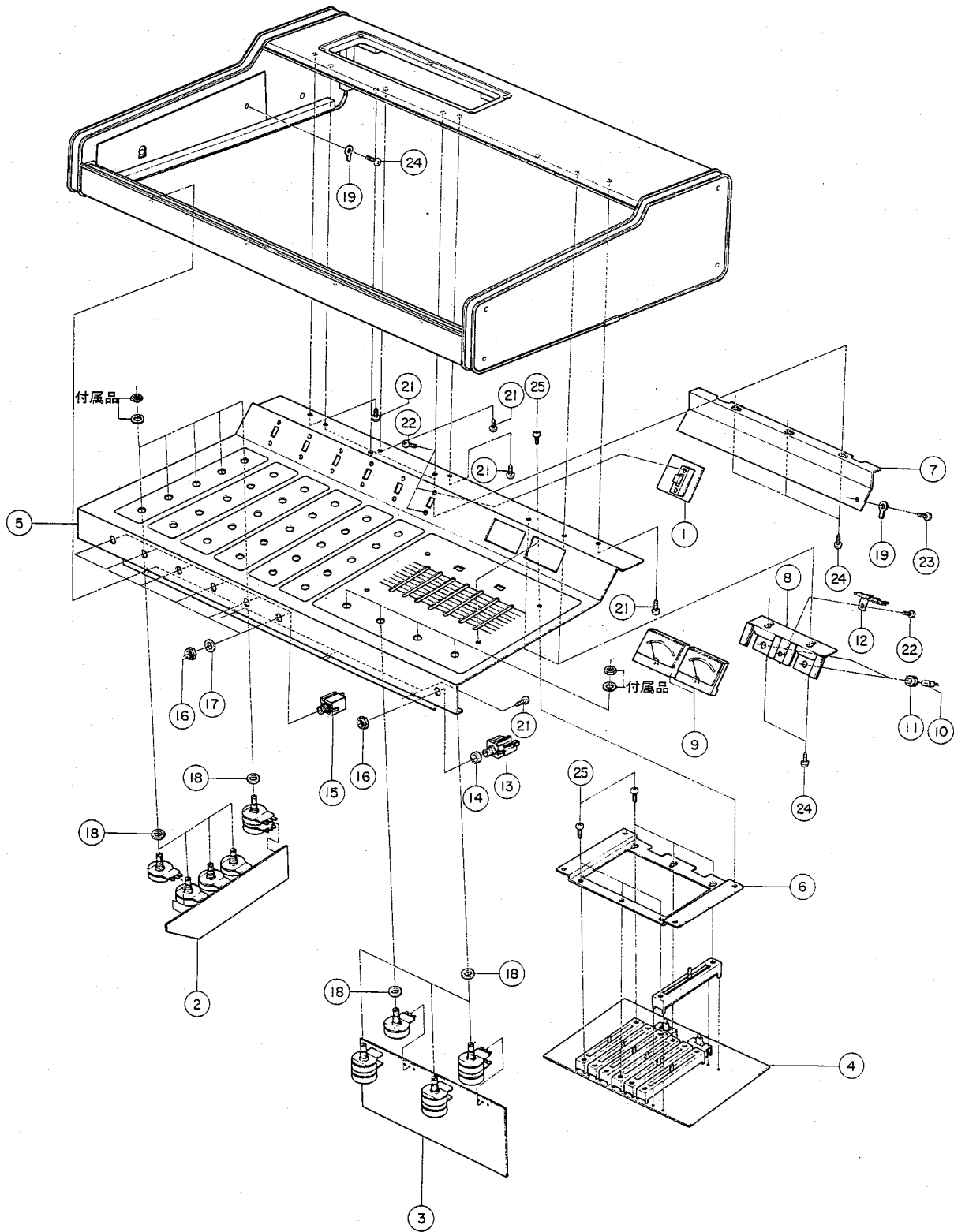
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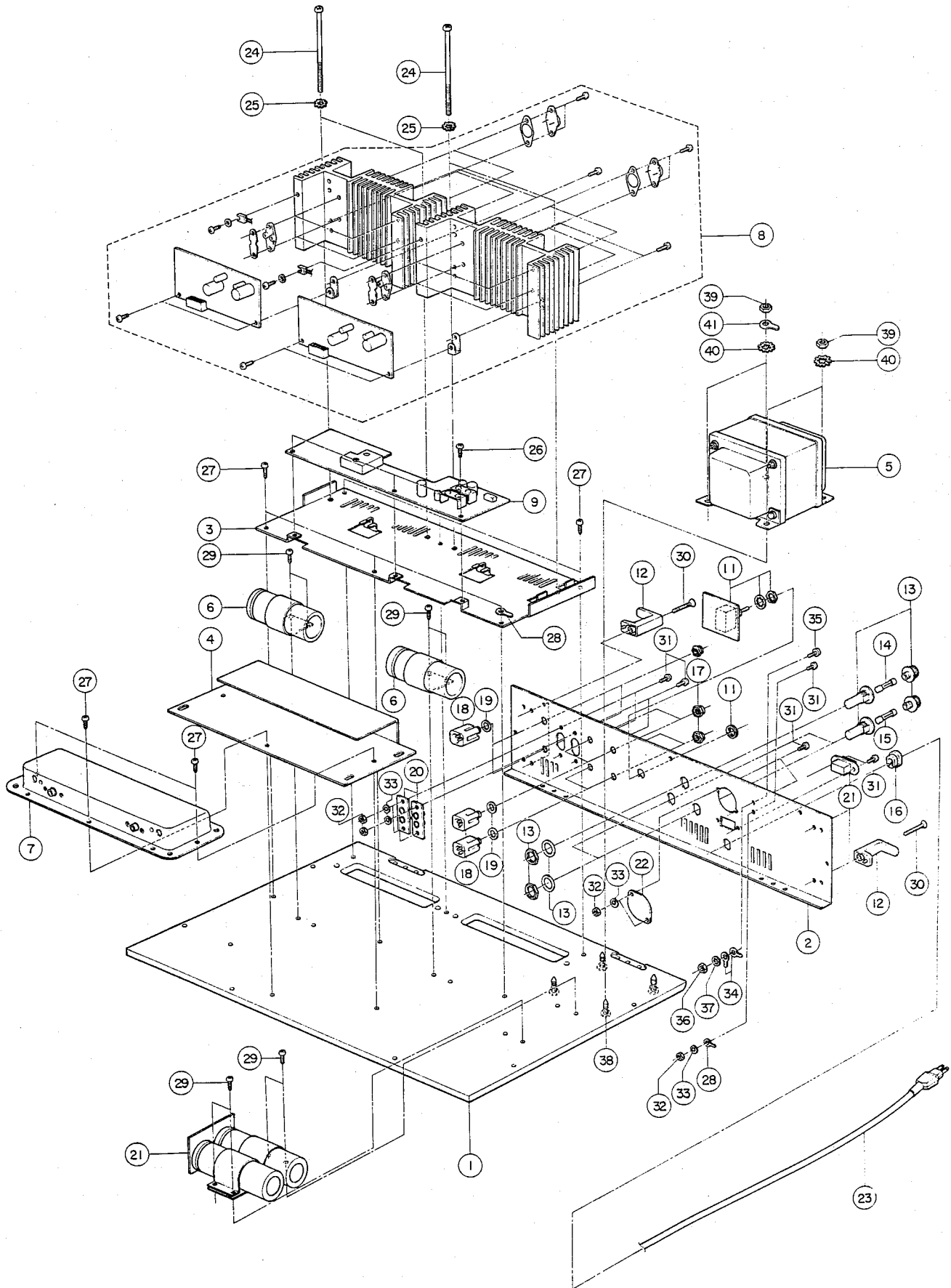
YAMAHA ENSEMBLE MIXER

EM-150 部品表









No.	コード No.						品名	備考	卸 価	小売価
30	56	00	NA	80	00	50	ATTシート		450	600
40	10	00	KA	40	00	70	スライドスイッチ		135	180
30	56	00	NA	80	00	10	PAシート		2,250	3,000
40	10	00	IG	00	04	70	IC BA311F		225	300
40	10	00	HS	32	02	10	ボリューム A50k Ω	VOLUME BASS・TREBLE	113	150
40	10	00	HS	32	02	20	ボリューム B50k Ω	REVECHO	113	150
40	10	00	HS	32	02	30	ボリューム BH50k Ω ×2	BALANCE	225	300
30	56	00	NA	80	09	80	MVシート		3,750	5,000
40	10	00	IC	16	81	10	トランジスター 2SC1681		75	100
40	10	00	IG	00	04	70	IC BA311F		225	300
40	10	00	GB	06	51	00	フィルターコイル 1.0H		150	200
40	10	00	GB	06	43	90	フィルターコイル 0.39H		150	200
40	10	00	HS	32	02	40	ボリューム A50k Ω ×2	MASTER AUX MONITOR	225	300
40	10	00	HS	32	02	20	ボリューム B50k Ω	REVERB	113	150
40	10	00	FP	15	61	00	タンタルコンデンサ 1/35		45	60
30	56	00	NA	80	05	20	EQシート		4,500	6,000
40	10	00	IC	07	32	40	トランジスター 2SC732		75	100
40	10	00	GB	06	52	20	フィルターコイル 2.2H		150	200
40	10	00	GB	06	41	50	フィルターコイル 0.15H		150	200
40	10	00	GB	06	35	60	フィルターコイル 0.056H		150	200
40	10	00	GB	06	33	30	フィルターコイル 0.033H		150	200
40	10	00	GB	06	31	20	フィルターコイル 0.012H		150	200
40	10	00	HQ	10	00	30	スライドボリューム G50k Ω ×2		300	400
40	10	00	FP	15	61	00	タンタルコンデンサ 1/35		45	60
40	10	00	FP	15	63	30	タンタルコンデンサ 3.3/35		60	80
40	10	00	KA	40	03	40	スライドスイッチ		150	200
30	56	00	NA	80	05	10	RDCシート		3,300	4,000
40	10	00	IC	04	85	20	トランジスター 2SC485		188	250
40	10	00	IC	16	81	10	トランジスター 2SC1681		75	100
30	54	00	BA	00	51	20	放熱板(2SC485用)		23	30
40	10	00	IG	00	01	50	IC AN374		375	500
40	10	00	IF	00	00	40	ダイオードIS1555		23	30
40	10	00	IH	00	01	40	ダイオード10DC-2	10DC-4でサービス	75	100
40	10	00	IH	00	01	40	ダイオード10DC-1	10DC-4でサービス	75	100
40	10	00	IH	00	02	10	ダイオードS5151		338	450
40	10	00	IH	00	02	20	ダイオードS5151R		338	450
40	10	00	HL	31	41	00	酸化金属皮膜抵抗 10 Ω 1P		12	15
40	10	00	HL	32	51	80	酸化金属皮膜抵抗 180 Ω 2P		15	20
40	10	00	HM	53	51	00	セメント抵抗 100 Ω 3P		38	50
40	10	00	HT	41	00	70	ソリッドボリューム B10k Ω		53	70
40	10	00	HT	41	01	40	ソリッドボリューム B47k Ω		53	70
40	10	00	FP	15	54	70	タンタルコンデンサ 0.47/35		45	60
40	10	00	LB	60	02	70	6P コネクタープラグ		38	50
30	56	00	NA	80	06	20	MAシート		5,250	7,000
40	10	00	IA	07	63	30	トランジスター 2SA763		113	150

