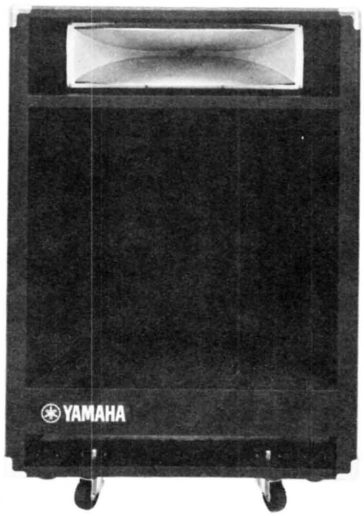
SERVICE MANUAL

A4115H

SOUND REINFORCEMENT
MONITOR LOUDSPEAKER



SINCE 1887 YAMAHA

NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN

006359

2000 Printed in Japan 11 · 76

CONTENTS

SPECIFICATIONS

SPEAKER SECTION

Speaker	Woofer JA3803 x 1 38cm (15"), 8 ohms H·F – Driver & Horn JA4201 8 ohms
Enclosure	Front Loaded Bass Reflex
Crossover Frequency	2KHz (12dB/OCT)
Dispersion	Horizontal: 70° Vertical: 40° (6dB down points at 1KHz)

AMPLIFIER SECTION

Output Power	100 Watts (RMS) @ 8Ω
Frequency Response	[0dBm] 10Hz ~ 30KHz $^{0}_{-1}$dB
	[–20dBm] 40Hz ~ 50KHz $^{0}_{-3}$dB
Power Band Width	20Hz ~ 20KHz (8Ω, 100W T·H·D 0.1%)
Total Harmonic Distortion	Less than 0.01% (80W RMS)
Danping Factor	90 (20Hz ~ 3KHz)
Hum & Noise	–76dBm
Input Sensitivity	0dBm/–20dBm (8Ω, 100W)
Input Impedance	8KΩ (VR Maximum Setting)
Power Supply	100, 117, 220, 240V, AC50/60Hz
Dimensions (WxDxH)	610 x 452 x 908 mm (24 x 17-3/4 x 35-3/4")
Weight	58kg (128 lbs)
Finish	Black Leatherette

Specifications subject to change without notice.

PARTIAL DISASSEMBLY

1. HOW TO REMOVE THE POWER TRANSISTOR

a) Remove screws (1) to (8) in Photo 1 and remove the heat sink.

b) Remove screws (1) to (4) in Photo 2 and pull out the power transistor.

Note: Care must be taken to avoid removing the heat dissipating compound coating the power transistor.

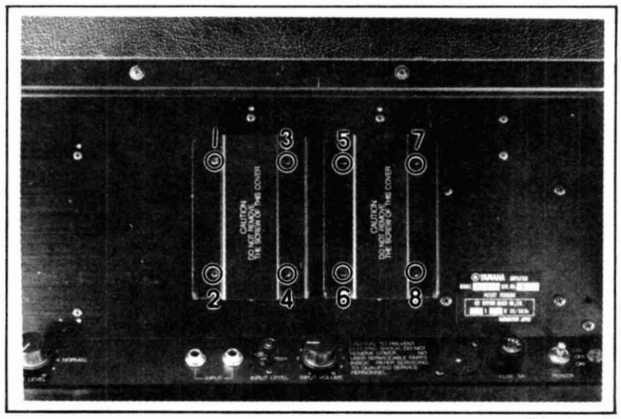


Photo 1

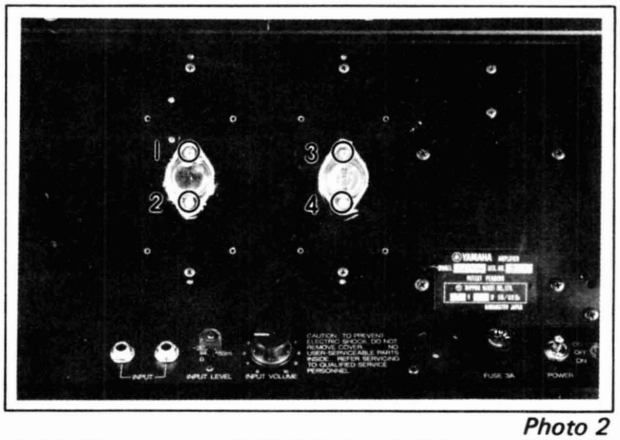


Photo 2

2. HOW TO REMOVE THE WOOFER

a) Remove screws (1) to (14) in Photo 3 and remove back cover.

b) Remove connector and trunked wiring connected to the woofer and remove woofer after removing nuts (1) to (8) shown in Photo 4.

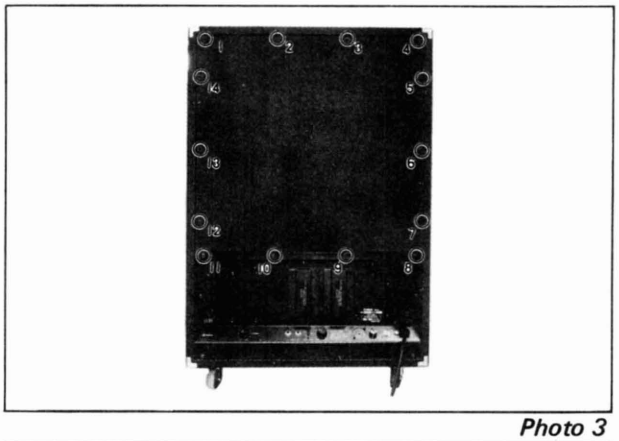


Photo 3

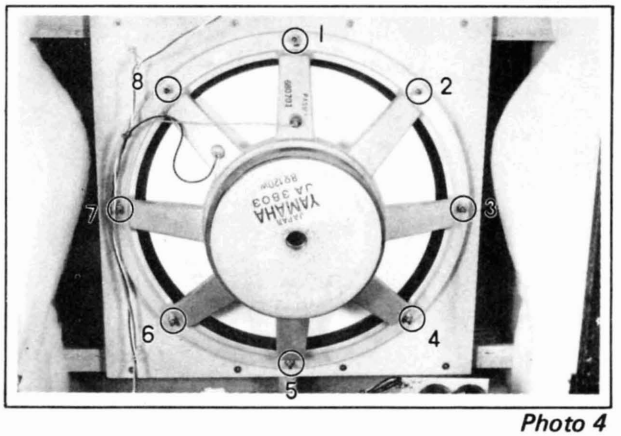


Photo 4

3. HOW TO REMOVE THE DRIVER UNIT

a) Remove screws (1) to (8) shown in Photo 5.

b) Disconnect the connectors connected to the driver unit shown in Photo 6.

c) Remove screws (1) and (2) securing the driver retaining bracket and pull out the driver unit gently from the front.

d) Remove screws (1) to (4) shown in Photo 7 and remove the driver unit from the horn.

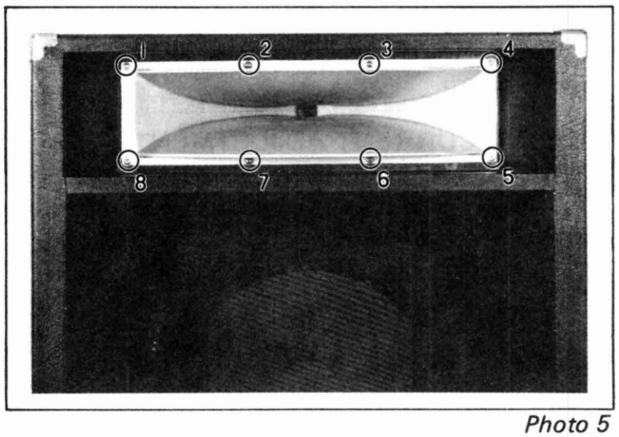


Photo 5

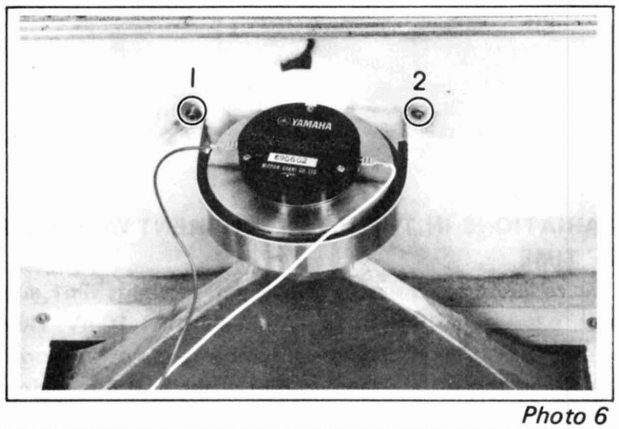


Photo 6

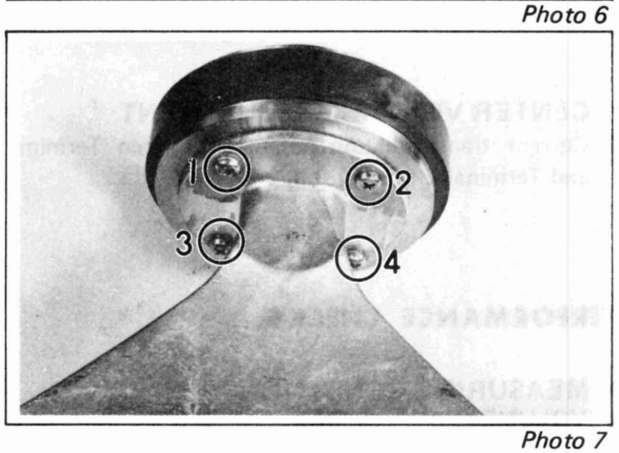


Photo 7

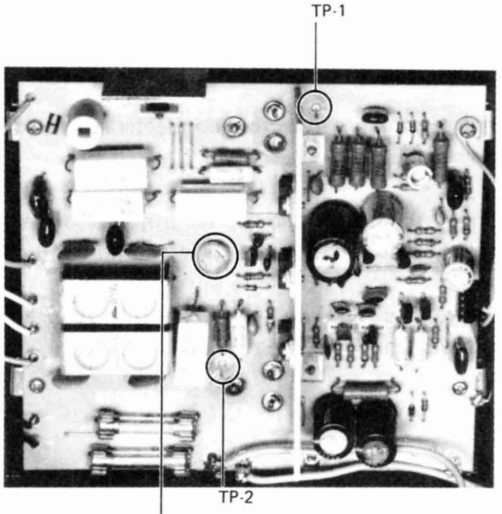
GENERAL ADJUSTMENT AND CHECK SPECIFICATIONS

* Set simi-fixed control VR-1 on the MA sheet to minimum (fully counter clockwise) prior to turning on the power supply switch.

■ IDLING CURRENT ADJUSTMENT

* Set control VR-1 so the voltage between test points Tp1 and Tp2 reads 27mV ± 1mV within 30 seconds after turning on the power supply switch.

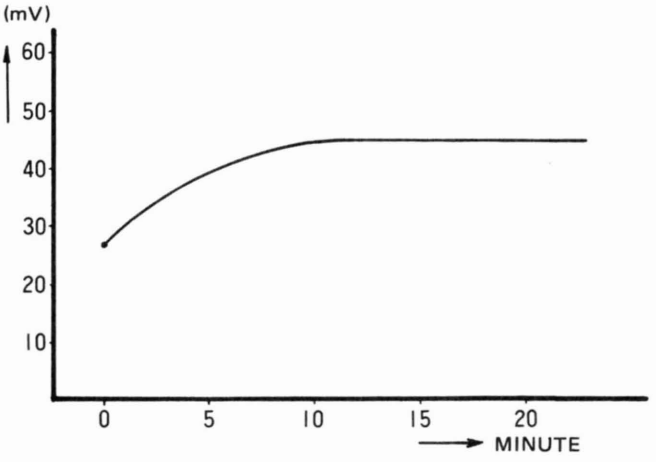
MA CIRCUIT BOARD



VR-1: Idling Current Adjustment

VARIATIONS IN THE IDLING CURRENT WITH PASSAGE OF TIME

The variations in voltages between test points Tp1 and Tp2 with passage of time to be within 44mV ± 10mV. However, measurements to be made with ambient temperature of 10~ 30°C and the surface temperature of the heat dissipating plate within 20~ 40°C.



■ CENTER VOLTAGE ADJUSTMENT

* Current transformation potential between Terminal "O" and Terminal E to be within 0 ± 50mV.

PERFORMANCE CHECKS

■ MEASURING CONDITIONS

VOLUME	MAX
H·F LEVEL	MAX
INPUT LEVEL SW	0dBm side

* When measuring with the output terminal at "O", remove the connector between the MA sheet and the network sheet and connect an 8 ohm load resistor to the connector of the MA sheet (between O and E).

* When measuring with the output terminals at "Lo" and "Ho", connect the MA sheet and the network sheet and connect an 8 ohm load resistor between both Lo – E and Ho – E.

■ GAIN

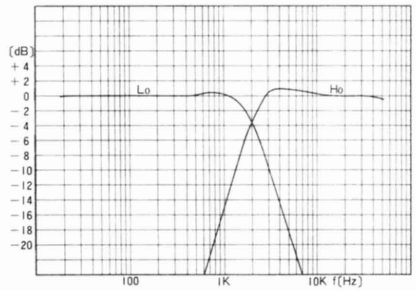
There is obtained the following level.

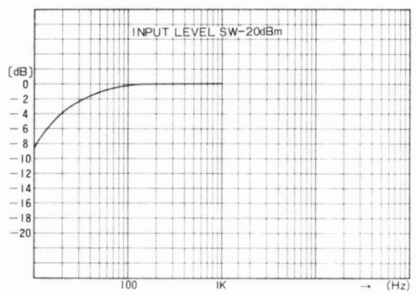
INPUT LEVEL SW	INPUT LEVEL (–40dBm)	OUTPUT TERMINAL		
		O	L_O	H_O
–20dBm	100Hz	+11.5 ± 1.5	+11.5 ± 1.5	–
	1KHz	+11.5 ± 1.5	–	–
	10KHz	+11.5 ± 1.5	–	+11.5 ± 1.5
0dBm	100Hz	–9 ± 1	–9 ± 1	–
	1KHz	–9 ± 1	–	–
	10KHz	–9 ± 1	–	–9 ± 1

■ DISTORTION

With the output terminal at "O", the distortion factor at an output of 10W (+21.2dBm) must be under 0.03% at each of the frequencies 100Hz, 1KHz and 10KHz. Also, when the input level switch is set to the –20dBm side, the distortion factor must be under 0.07% at the same output level.

■ FREQUENCY CHARACTERISTICS





* With the Input Level Switch at –0dBm
The reading at the output terminal at "O", with a standard frequency of 1KHz, to be 0 ± 0.5dB at 20Hz and $^{+0}_{-1}$ dB at 20KHz. The reading at the output terminal at "Lo", with a standard frequency of 100Hz, to be 0 ± 1dB at 20Hz and –3.5 ± 1dB at 12KHz.
The reading at the output terminal at "Ho", with a standard frequency of 100Hz, to be –3.5 ± 1.5dB at 2KHz and 0 ± 1 at 20KHz.

* With the Input Level Switch at –20dBm
The reading at the output terminal at "O", with a standard frequency of 1KHz, to be –1 ± 1dB at 50Hz and 0 $^{+0.5}_{-1}$ dB at 20KHz.

■ MAXIMUM OUTPUT

A 100W output (+31.2dBm) with a distortion factor of under 0.5% to be obtained with a 1KHz input signal and the output terminal at "O"

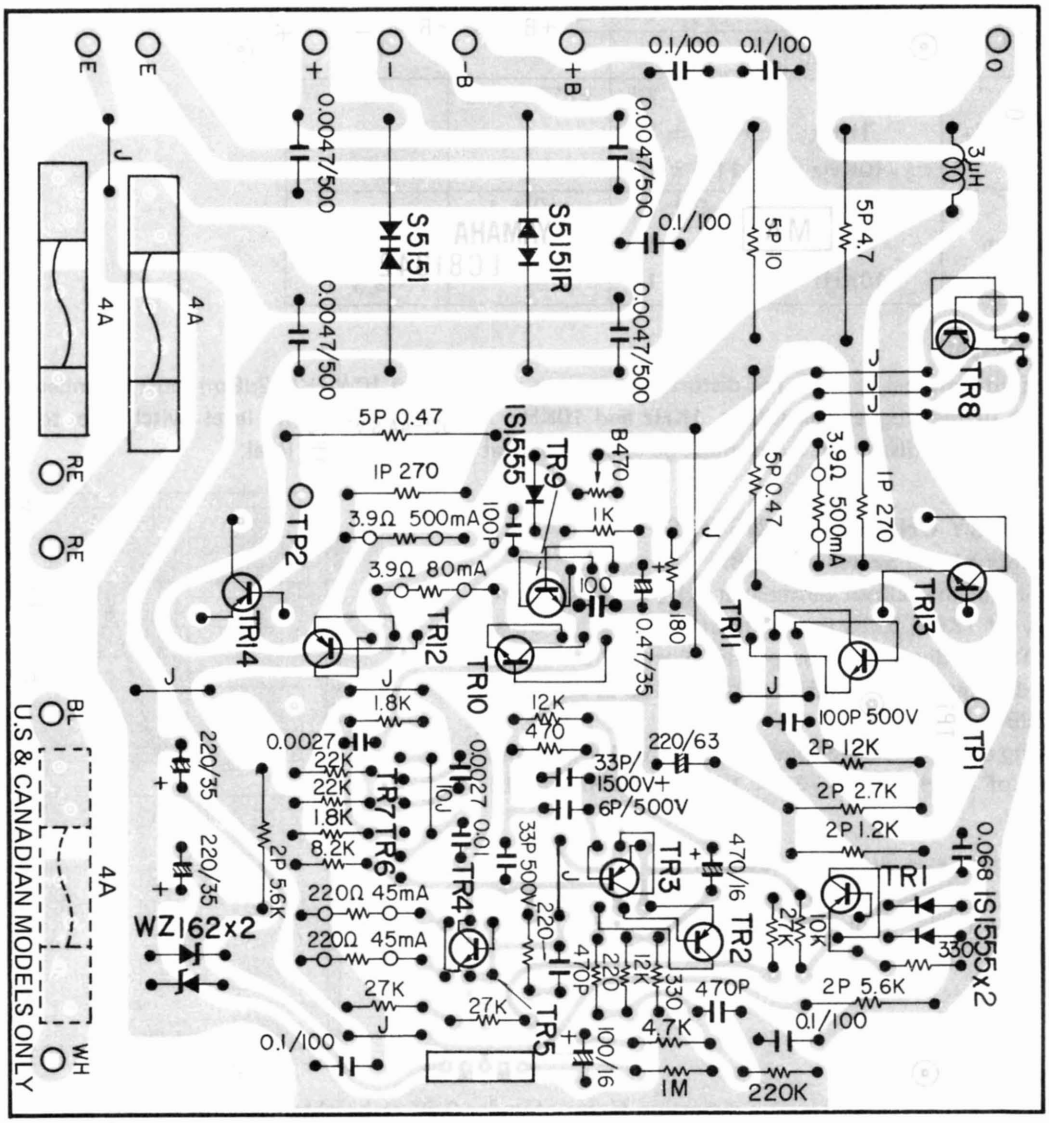
■ NOISE LEVEL AND RESIDUAL NOISE

Noise level to be under –63dBm. To be under –40dBm when the input LEVEL switch is set to –20dBm. Also, it must be under –70dBm when the volume control is set to minimum.
(However, measurements to be made with a 560 ohm resistor connected to the input terminal and the power switch set to low noise position.)

NOTE: An oscillator with an output impedance of under 600 ohms and distortion under 0.05% is desirable.
Input impedance of over 100K ohms are desirable for oscilloscope volimeters etc.

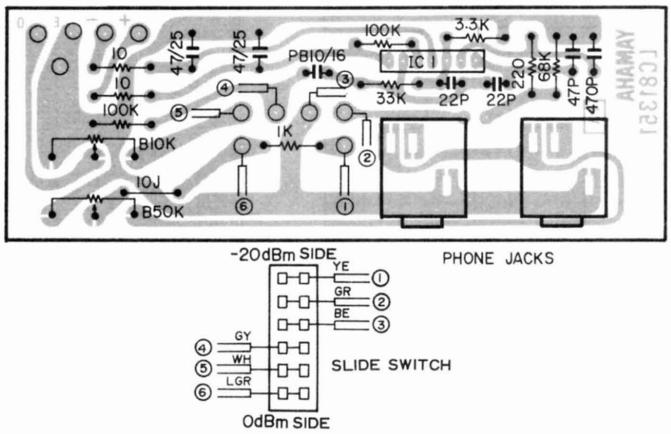
CIRCUIT BOARD

MA CIRCUIT BOARD (NA80192) General, & African Australian models
(NA80193) U. S & Canadian models
(NA80194) N. European & British models

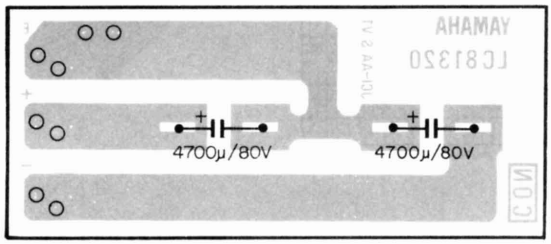


Fuse	
NA80192	4A, 250V x 2
NA80193	4A, 250V x 3
NA80194	4AT, 250V x 2

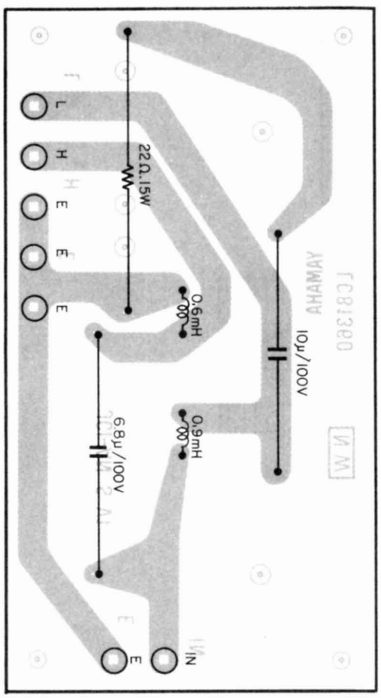
PA CIRCUIT BOARD (NA80191)



ELECTROLYTIC CAPACITOR (NA80190) CIRCUIT BOARD



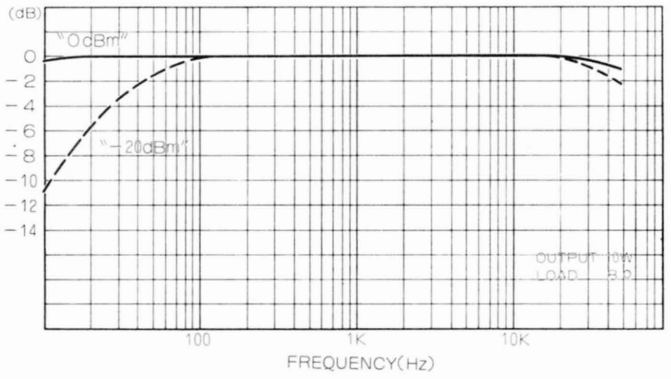
NETWORK CIRCUIT BOARD (NA80189)



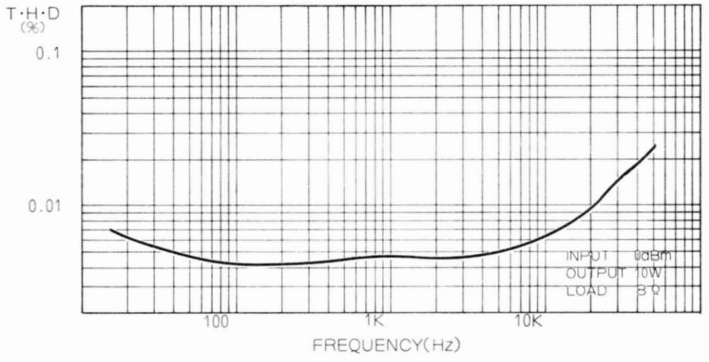
CHARACTERISTIC DIAGRAMS

(AMPLIFIER SECTION)

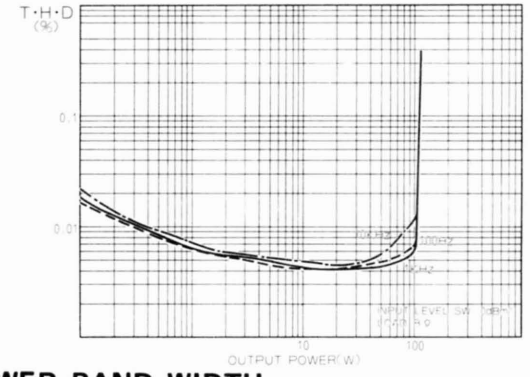
- **FREQUENCY RESPONSE**



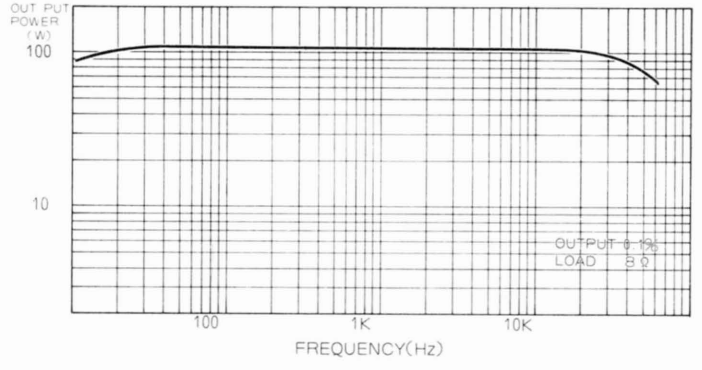
- **FREQUENCY: T·H·D**



- **POWER: T·H·D**

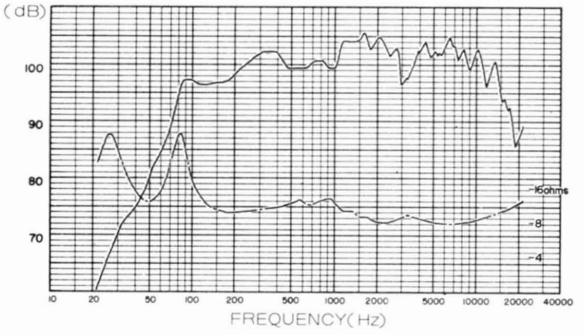


- **POWER BAND WIDTH**

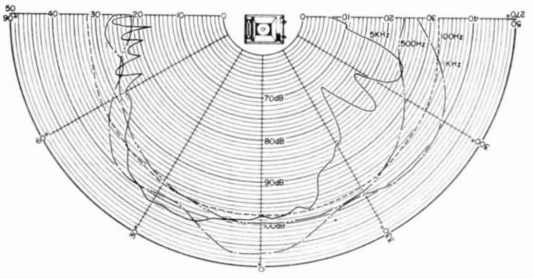


(SPEAKER SECTION)

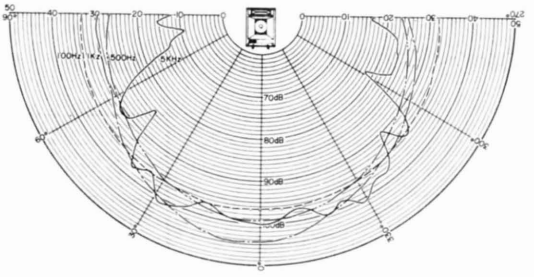
- **FREQUENCY RESPONSE (1W, 1.0m)**



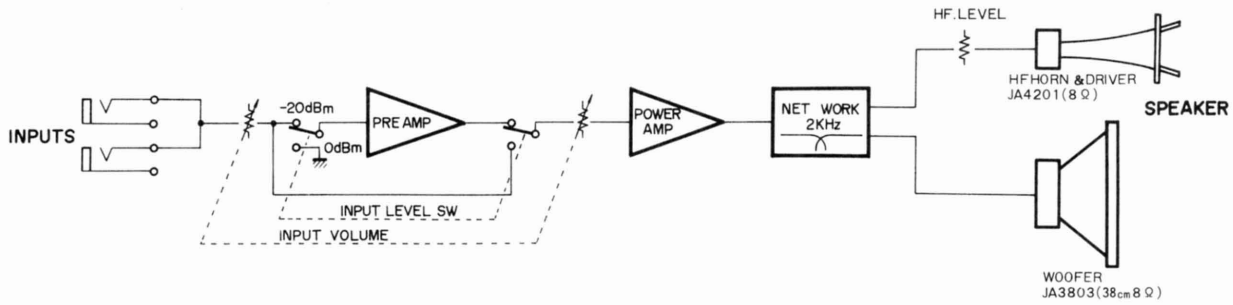
- **VERTICAL 180° DISPERSION**

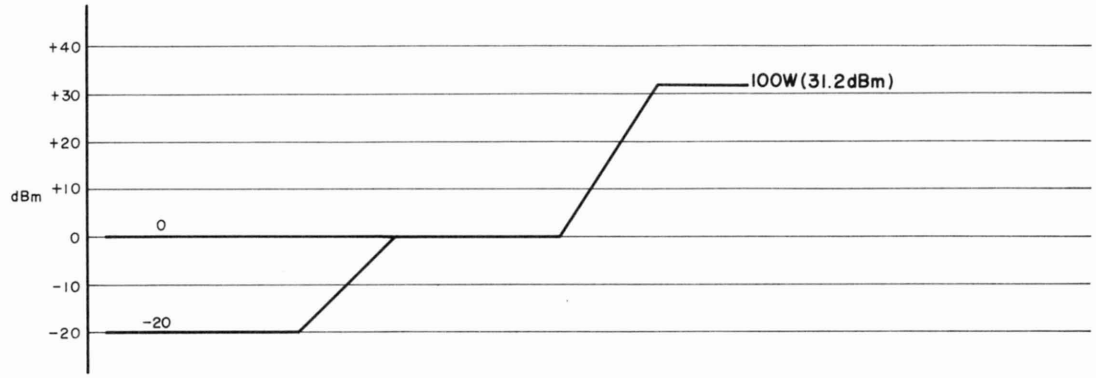


- **HORIZONTAL 180° DISPERSION**



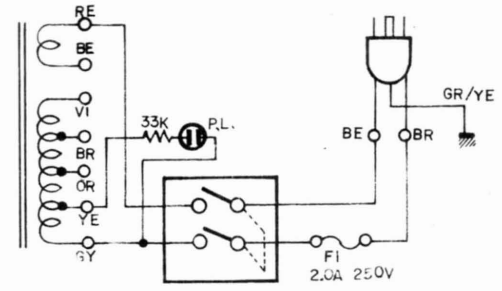
BLOCK & LEVEL DIAGRAM





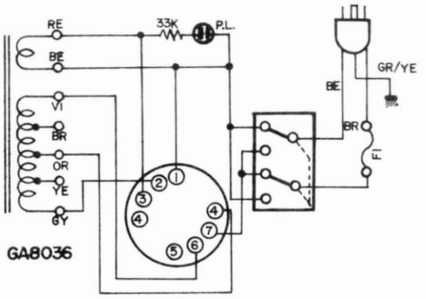
POWER CIRCUIT ARRANGMENT

■ FOR AUSTRALIAN MODEL



GA8036

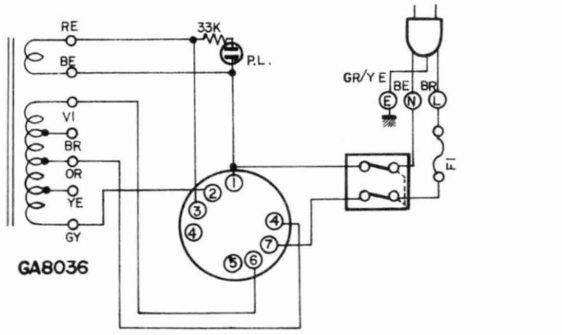
■ FOR SOUTH AFRICAN MODEL



GA8036

AC 110~130V ARIA 3.0A 250V
AC 220~240V " 2.0A 250V

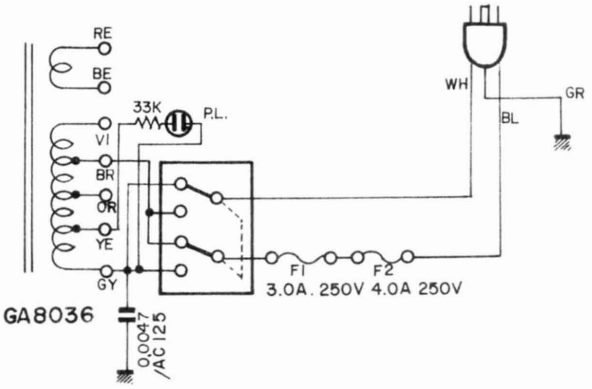
■ FOR BS/NORTH EUROOPEAN MODELS



GA8036

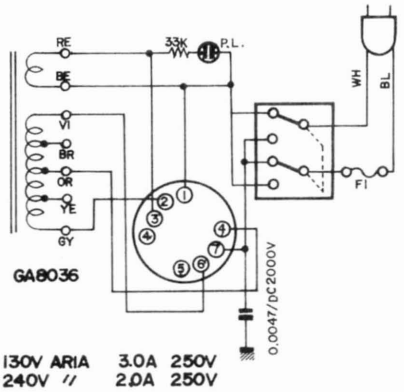
AC 110~130V ARIA 3.15AT 250V
AC 220~240V " 2.0AT 250V

■ FOR US/CANADIAN MODELS



GA8036

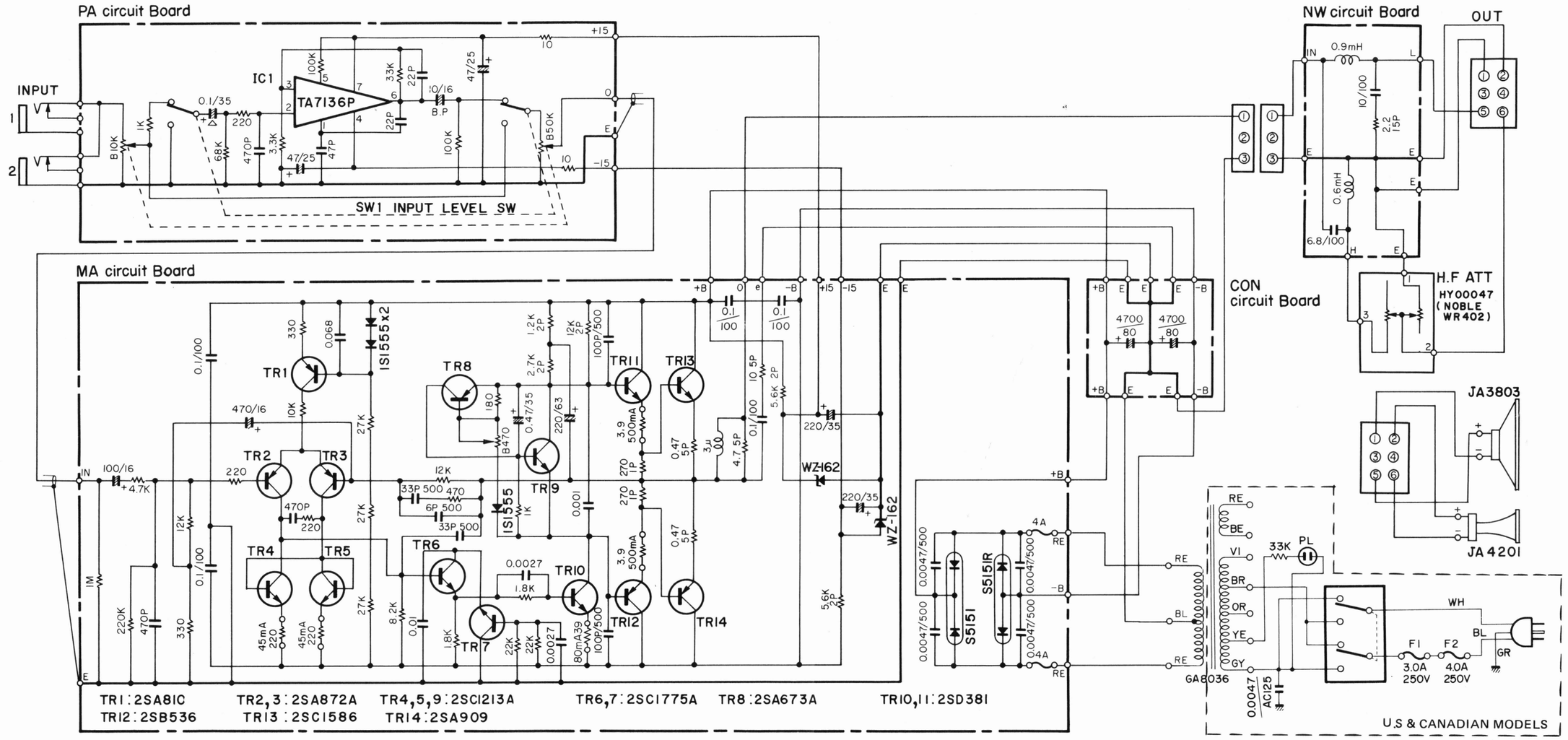
■ FOR GENERAL MODEL



GA8036

AC 110~130V ARIA 3.0A 250V
AC 220~240V " 2.0A 250V

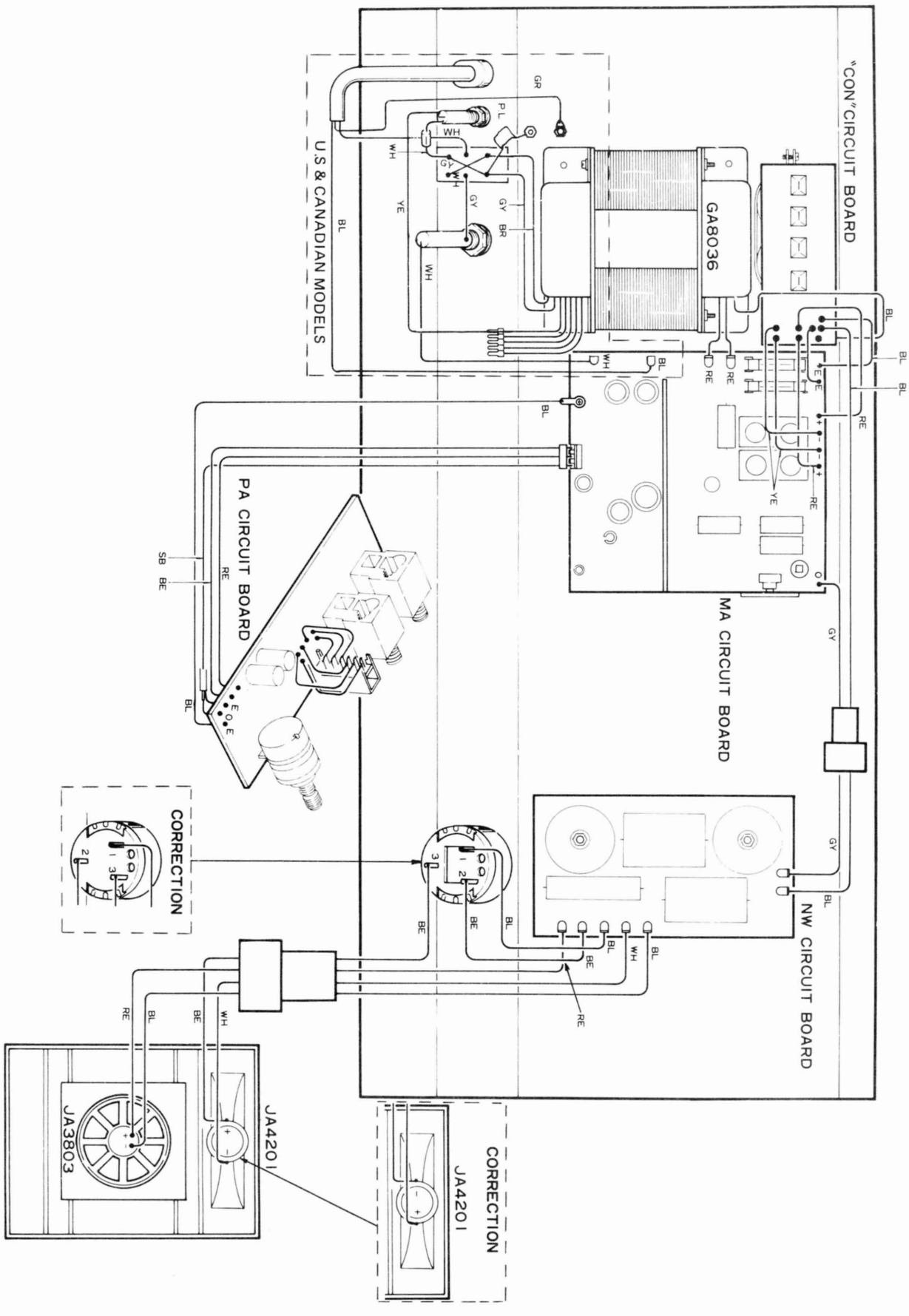
SCHEMATIC DIAGRAM



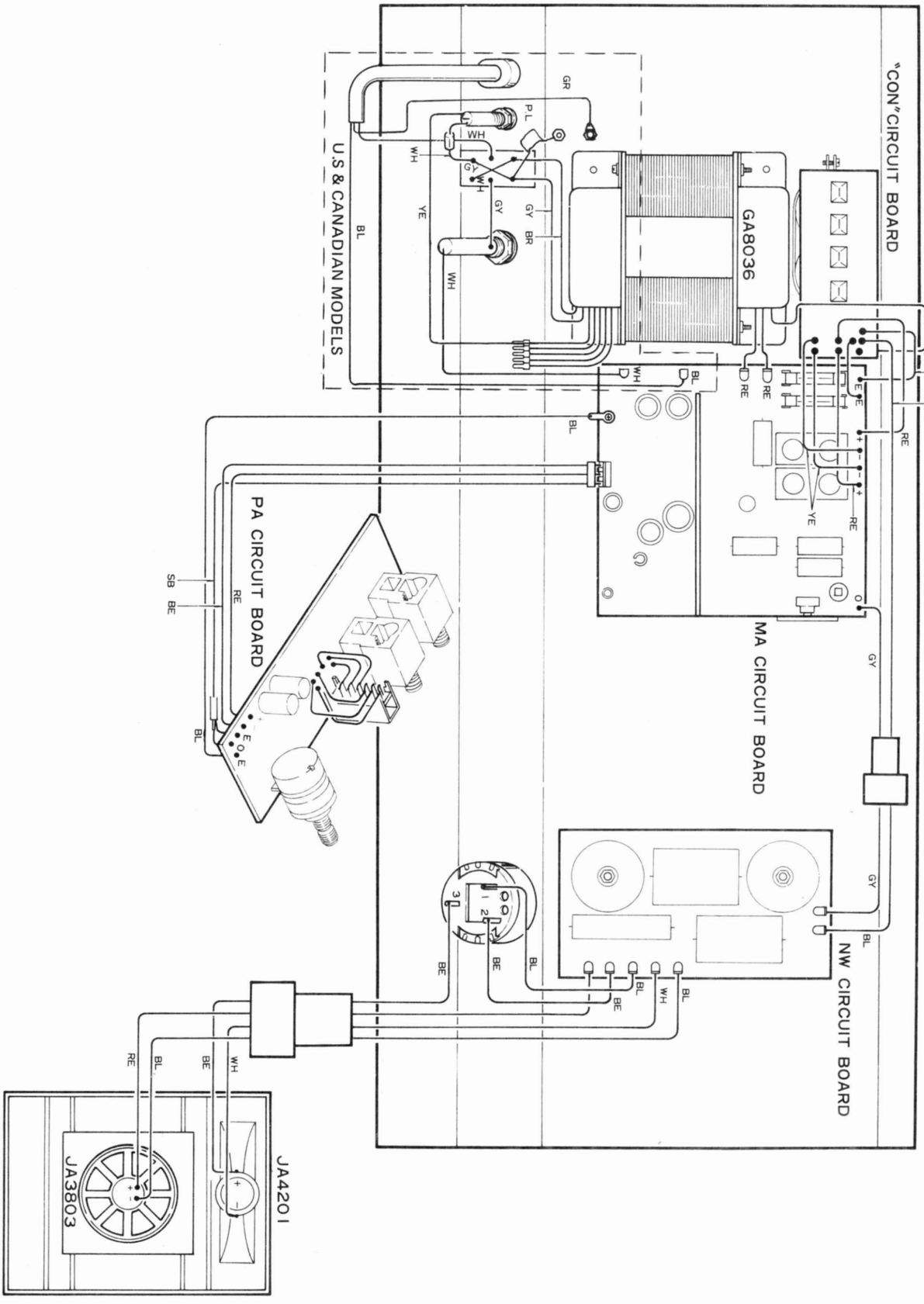
WIRE COLOR

RE: RED	WH: WHITE
BE: BLUE	GY: GRAY
BL: BLACK	OR: ORANGE
GR: GREEN	YE: YELLOW
VI: VIOLET	BR: BROWN

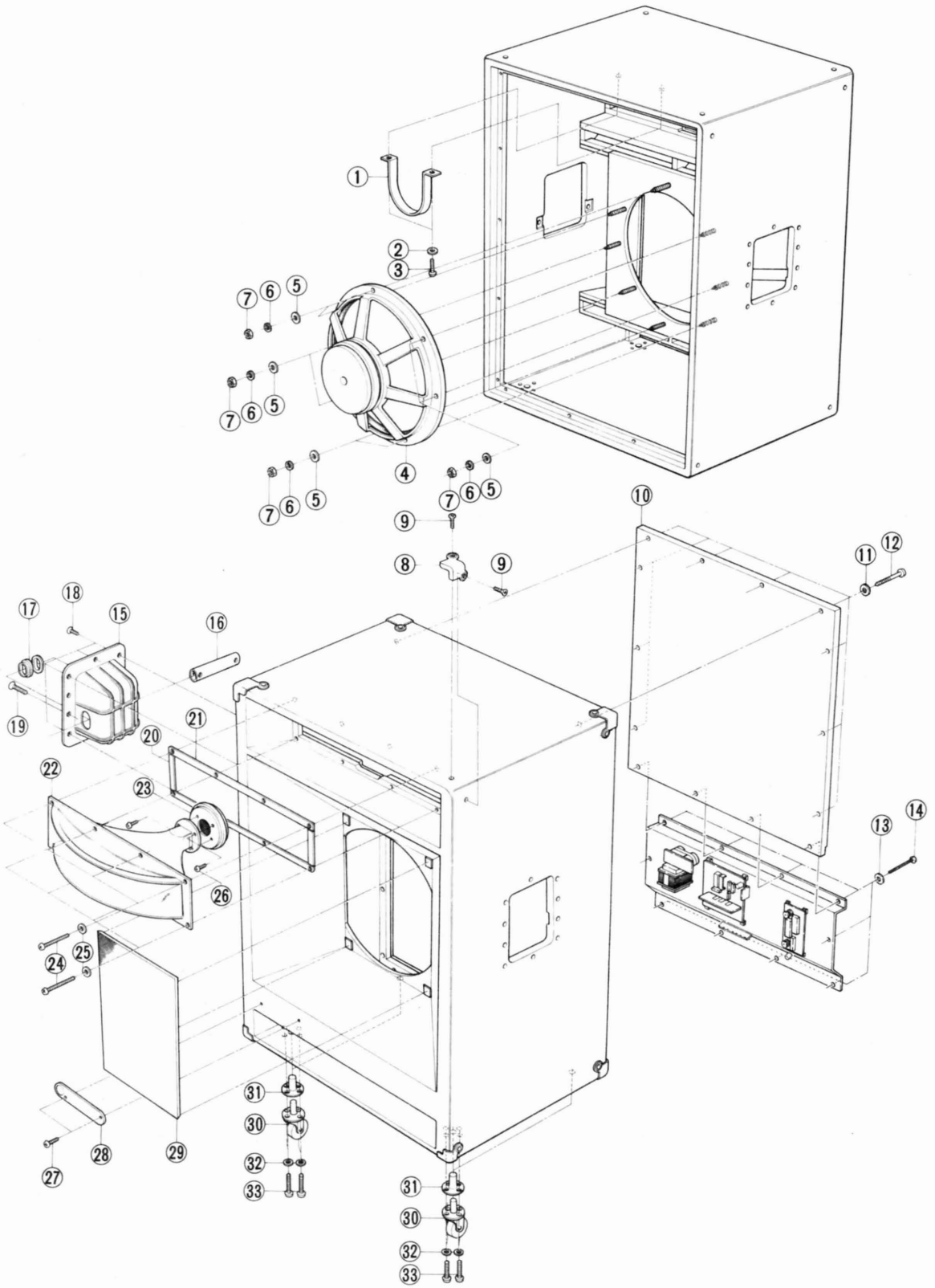
WIRING The wiring on the page 13 to be revised as bellow;



WIRING


"CON" CIRCUIT BOARD
U.S & CANADIAN MODELS
GA8036
MA CIRCUIT BOARD
PA CIRCUIT BOARD
NW CIRCUIT BOARD
JA3803
JA4201
GR
P.L
WH
GY
BR
YE
BL
RE
SB
BE

PARTS LIST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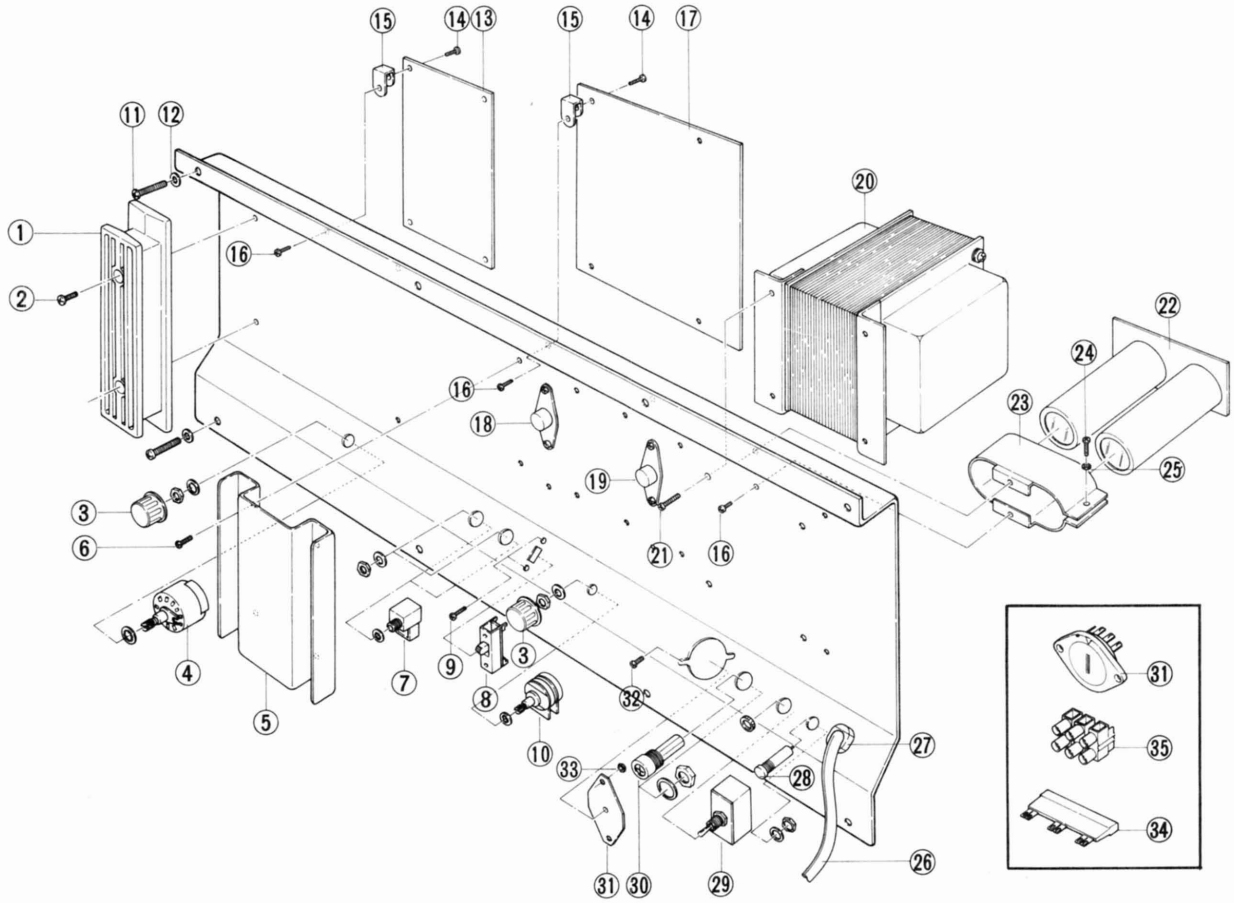
Ref. No.	Parts No.	Description				
1	30 54 00 BA 80 07 20	Holder		ドライバー押え		
2	40 10 00 EV 20 00 40	Plain Washer	4S	平座金４Ｓ		
3	40 10 00 EA 04 02 00	Pan Head Screw	M4 x 20	ナベ小ネジ M4×20		
4	30 54 00 JA 38 03 00	Speaker		スピーカー		
5	40 10 00 EV 20 00 50	Plain Washer	5S	平座金５Ｓ		
6	40 10 00 EV 30 00 50	Spring Locked Washer	5S	バネ座金５Ｓ		
7	40 10 00 EV 10 00 50	Hexagonal Nut	5S	六角ナット		
8	30 54 00 AA 80 25 50	Corner Holder Bracket		コーナー金具		
9	40 10 00 EP 23 51 60	Flat Head Wooden Screw	3.5 x 16	皿木ネジ3.5×16		
10	30 54 32 OO 00 10 00	Back Board		裏板		
11	40 10 00 EV 20 00 50	Plain Washer	5S	平座金５Ｓ		
12	40 10 00 EQ 33 53 20	Round Head Wooden Screw	3.5 x 32	丸木ネジ3.5×32		
13	40 10 00 EV 20 00 40	Plain Washer	4S	平座金		
14	40 10 00 EA 34 02 50	Pan Head Screw	M4 x 25	ナベ小ネジM4×25		
15	30 54 00 CB 80 42 50	Handle Cover		把手カバー		
16	30 54 00 AA 80 17 00	Handle Pipe		把手パイプ		
17	30 54 00 CB 80 42 60	Rubber Bush		ゴムブッシュ		
18	40 10 00 ER 33 11 30	Oval Head Wooden Screw	3.5 x 13	丸皿木ネジ3.5×13		
19	40 10 00 EF 35 02 50	Oval Head Screw	M5 x 25	丸皿小ネジM5×25		
20	40 10 00 CB 80 48 90	Soft Tape (A)		ソフトテープ（A）		
21	40 10 00 CB 80 49 00	Soft Tape (B)		ソフトテープ（B）		
22	30 54 00 BA 06 77 70	Horn		ホーン		
23	30 54 00 NB 07 80 00	Driver Unit		ドライバーユニット		
24	40 10 00 EA 24 04 50	Pan Head Screw	M4 x 45	ナベ小ネジM4×45		
25	40 10 00 EV 20 00 40	Plain Washer	4S	平座金４Ｓ		
26	40 10 00 EA 06 01 20	Pan Head Screw	M6 x 12	ナベ小ネジM6×12		
27	40 10 00 ER 33 11 30	Oval Head Wooden Screw	3.1 x 13	丸皿木ネジ3.1×13		
28	30 54 00 CB 80 08 40	Name Plate		ネームプレート		
29	30 54 90 OO 00 01 00	Front Panel		前板サランバリ		
30	30 54 00 AA 80 16 80	Caster		キャスター		
31	30 54 00 AA 80 16 90	Caster Socket		ソケット		
32	40 10 00 EV 20 00 60	Plain Washer	6S	平座金６Ｓ		
33	40 10 00 EA 36 03 00	Pan Head Screw	M6 x 30	ナベ小ネジM6×30		



Ref. No.	Parts No.	Description			
1	30 54 00 CB 80 66 40	Cord Reel	コードリール		
2	40 10 00 Ei 04 01 20	Binding Tapping Screw	M4 x 12	バインドタッピングネジ M4×12	
3	30 54 00 CB 80 63 70	Knob	ツマミ		
4	40 10 00 HY 00 05 20	Attenuator	アッテネーター		
5	30 54 00 BA 80 16 30	Heat Sink	放熱板		
6	40 10 00 Ei 33 00 80	Binding Tapping Screw	M3 x 8	バインドタッピングネジ M3×8	
7	40 10 00 LB 20 08 60	Jack	ホーンジャック		
8	40 10 00 KA 40 05 00	Slide Switch	スライドスイッチ		
9	40 10 00 EA 32 60 50	Pan Head Screw	M2.6 x 5	⊕ナベ小ネジ M2.6×5	
10	40 10 00 HS 32 04 00	Variable Resistor	B10K + B50K	ボリューム B50K+B50K	
11	40 10 00 EA 34 02 50	Pan Head Screw	M4 x 25	⊕ナベ小ネジ M4×25	

Ref. No.	Parts No.	Description			
12	40 10 00 EV 20 00 40	Plain Washer	4S	平 座 金 4 S	
13	30 54 00 NA 80 18 90	N.W Circuit Board		N. W シ ー ト	
14	40 10 00 EA 03 00 80	Pan Head Screw	M3 x 8	⊕ナベ小ネジM3×8	
15	30 54 00 AA 80 07 30	Holder		シ ー ト ホ ル ダ ー	
16	40 10 00 ED 33 00 60	Binding Head Screw	M3 x 6	バインド小ネジ M3×6	
17	30 54 00 NA 80 19 20	M.A Circuit Board		M. A シ ー ト	
	30 54 00 NA 80 19 20	— do. — (General, S.African & Australian models)			
	30 54 00 NA 80 19 30	— do. — (U.S & Canadian models)			
	30 54 00 NA 80 19 40	— do. — (N.European & British models)			
18	40 10 00 iC 15 86 00	Transistor	2SC1586	トランジスター 2SC1586	
19	40 10 00 iA 09 09 00	— do. —	2SA909	トランジスター 2SA909	
20	40 10 00 GA 80 36 00	Power Transformer		電 源 ト ラ ン ス	
21	40 10 00 ED 34 01 50	Binding Head Screw	M4 x 15	バインド小ネジM4×15	
22	30 54 00 NA 80 19 00	C.O.N. Circuit Board		C O N シ ー ト	
23	30 54 00 AA 80 42 50	Cap. Holder		コンデンサーホルダー	
24	40 10 00 EA 03 01 50	Pan Head Screw	M3 x 15	⊕ナベ小ネジ M3×15	
25	40 10 00 EV 20 00 30	Plain Washer	3S	平 座 金 3 S	
26	40 10 00 MG 00 05 90	AC. Cord		電 源 コ ー ド	
	40 10 00 MG 00 05 40	— do. — (General model)			
	40 10 00 MG 00 02 70	— do. — (U.S & Canadian models)			
	40 10 00 MG 00 04 50	— do. — (N.European model)			
	40 10 00 MG 00 05 50	— do. — (Australian model)			
	40 10 00 MG 00 02 40	— do. — (British model)			
	40 10 00 MD 00 00 60	— do. — S.African model)			
	40 10 00 LB 20 06 70	AC Plug (S.African model)		A C プ ラ グ	
27	40 10 00 CB 00 44 10	Cord Stopper		コードストッパー	
	40 10 00 CB 07 06 90	— do. — (General, Australian, S. African, N.European & British model)			
	40 10 00 CB 80 68 50	— do. — (U.S & Canadian models)			
28	40 10 00 JB 00 03 60	Neon lamp		ネ オ ン ラ ン プ	
29	40 10 00 KA 30 02 10	Power Switch		パ ワ ー ス イ ッ チ	
	40 10 00 KA 30 02 10	— do. — (General S.African U.S & Canadian models)			
	40 10 00 KA 30 00 10	— do. — (Australian British & N. European models)			
30	40 10 00 LB 20 04 90	Fuse Holder		ヒューズホルダー	
	40 10 00 LB 20 04 80	— do. — (General U.S & Canadian S.African & Australian models)		〃	
	40 10 00 LB 20 05 90	Fuse Holder (British & N.European models)			
31	40 10 00 AA 02 43 10	Blind Plate		電圧切替器盲板	
	40 10 00 AA 02 43 10	— do. — (U.S Canadian & Australian models)			
	40 10 00 LB 20 02 50	Voltage Selector (General N.Afriacn British & European models)		電 圧 切 替 器	
32	40 10 00 ED 33 01 00	Binding Head Screw	M3 x 10	バインド小ネジ M3×10	
33	40 10 00 EV 10 00 30	Hexagonal Nut	M3	六角ナット M3	
34	40 10 00 LA 00 07 50	Lug Terminal (Australian model)		カラー端子板CU-1P	
35	40 10 00 LA 00 10 40	Terminal (Britch & N.European models)		ボ イ ボ 端 子	

PARTS LIST OF CIRCUIT BOARD

Ref. No.	Parts No.	Description				
	30 54 00 NA 80 18 90	**NW. Circuit Board**		N W シート		
	40 10 00 HM 48 32 20	Cement Molded Resistor	2.2Ω 15W	セメント抵抗2.2Ω、15W		
	40 10 00 FC 06 71 00	Metalized Mylar Cap	10μ/100V	M. Mコンデンサー 10μ・100V		
	40 10 00 FC 06 66 80	— do. —	6.8μ/100V	M. Mコンデンサー 6.3μ・100V		
	40 10 00 GD 30 04 00	Filter Coil	0.9mH	コイル 0.9mH		
	40 10 00 GD 30 04 10	— do. —	0.6mH	コイル 0.6mH		
	30 54 00 NA 80 19 00	**CON. Circuit Board**		C O N シート		
	40 10 00 FL 28 94 70	Electrolitic Capacitor	4700μ/80V	ケミコン4700μ・80V		
	30 54 00 NA 80 19 10	**PA. Circuit Board**		P A シート		
	40 10 00 iG 00 13 30	Integrated Circuits TA7136P		IC. TA7136P		
	40 10 00 HS 32 04 00	Variable Resistor	B10K + B50K	ボリューム B10K+B50K		
	40 10 00 KA 40 05 00	Slide Switch		スライドスイッチ		
	40 10 00 FP 15 51 00	Tantalum Capacitor	0.1μ/35V	タンタルコン 0.1μ 35V		
	40 10 00 FJ 14 74 70	Electrolitic Capacitor	47μ/25V	ケミコン47μ・25V		
	40 10 00 FM 09 61 00	Bipolar Electrolitic, Cap	1μ/16V	B.Pケミコン1μ・16V		
	40 10 00 FM 09 71 00	— do. —	10μ/16V	B.Pケミコン10μ・16V		
	30 54 00 NA 80 19 20	**MA. Circuit Board**		M A シート		
	30 54 00 NA 80 19 20	— do. —	(General, N.African & Australian models)			
	30 54 00 NA 80 19 30	— do. —	(U.S & Canadian models)			
	30 54 00 NA 80 19 40	— do. —	(N.European & British models)			
	40 10 00 iA 06 73 10	Transistor	2SA673	Tr. 2SA673		
	40 10 00 iA 08 10 00	— do. —	2SA810	Tr. 2SA810		
	40 10 00 iA 08 72 10	— do. —	2SA872	Tr. 2SA872		
	40 10 00 iB 05 36 20	— do. —	2SB536	Tr. 2SB536		
	40 10 00 iC 12 13 30	— do. —	2SC1213	Tr. 2SC1213		
	40 10 00 iC 17 75 10	— do. —	2SC1775	Tr. 2SC1775		
	40 10 00 iD 03 81 20	— do. —	2SD381	Tr. 2SB381		
	40 10 00 iF 00 00 40	Diode	1S1555	Dr. 1S1555		
	40 10 00 iF 00 06 50	Zener Diode	WZ-162	シェナーダイオード WZ-162		
	40 10 00 HT 41 01 20	Solid Volume	B470Ω	半固定ボリューム B470Ω		
	40 10 00 HL 41 52 70	Metaloxide Film Resistor	270Ω 1W	酸金抵抗 270Ω1W		
	40 10 00 HL 42 61 20	— do. —	1.2KΩ 2W	〃 1.2KΩ2W		
	40 10 00 HL 42 62 70	— do. —	2.7KΩ 2W	〃 2.7KΩ2W		
	40 10 00 HL 42 65 60	— do. —	5.6KΩ 2W	〃 5.6KΩ2W		
	40 10 00 HL 42 71 20	— do. —	12KΩ 2W	〃 12KΩ2W		
	40 10 00 HM 55 24 70	Cement Molded Resistor	0.47Ω 5W	セメント抵抗0.47Ω5W		
	40 10 00 HM 55 34 70	— do. —	4.7Ω 5W	〃 4.7Ω5W		
	40 10 00 HM 55 41 00	— do. —	10Ω 5W	〃 10Ω5W		
	40 10 00 HW 11 33 90	Fuse Resistor	3.9Ω 500mA	ヒューズ抵抗 3.9Ω・500mA		
	40 10 00 HW 10 52 20	— do. —	220Ω 45mA	ヒューズ抵抗 220Ω・45mA		
	40 10 00 FP 45 54 70	Tantalum Capacitor	0.47μ/35V	タンタルコン 0.47μ・35V		
	40 10 00 GD 90 00 50	Coil	3μH	コイル 3μH		
	40 10 00 LB 50 01 80	CIS Socket T.E 5P		CISコネクター ソケット 5Pトップエントリー		
	40 10 00 LB 10 01 60	CIS Keying Pin		CISキーピングピン		
	30 54 00 BA 80 16 40	Heat Sink		放熱板		
	40 10 00 KB 00 03 80	Fuse	4A 250V	ヒューズ4A・250V		
	40 10 00 KB 00 03 80	Fuse 4A	250V (General N.African & Australian models)			
	40 10 00 KB 00 07 90	Fuse 4AT	250V (British & N.European models)	Ⓢ ヒューズ4AT. 250		
	40 10 00 KB 00 10 50	UL Fuse 4A	250V (US & Canadian Models)	ULヒューズ 4A. 250V		