

4-CHANNEL/2-CHANNEL POWER AMPLIFIER

P2040

SERVICE MANUAL



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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 changes in specification are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

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).

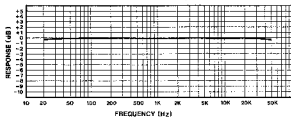
IMPORTANT: Turn the unit OFF during disassembly and parts replacement. Recheck all work before you apply power to the unit.

■ PERFORMANCE GRAPHS (特性図)

FREQUENCY RESPONSE CHARACTERISTICS

● 周波数特性

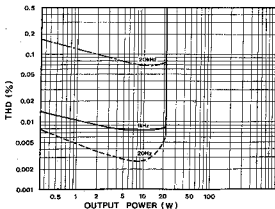
Load Impedance: 8Ω Mode: 4ch
Input Attenuators: Max $\text{dB} = 1\text{W}/8\Omega$



THD vs OUTPUT POWER CHARACTERISTICS

● 出力対全高調波歪率

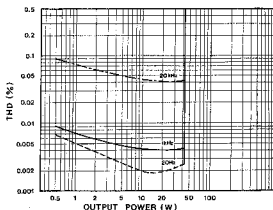
Load Impedance: 8Ω Mode: 4ch



THD vs OUTPUT POWER CHARACTERISTICS

● 出力対全高調波歪率

Load Impedance: 8Ω Mode: 2ch



■ SPECIFICATIONS

POWER OUTPUT LEVEL

2-CHANNEL: 40W x 2, RL=8 ohms, f=20~20 kHz, THD ≤ 0.05%
4-CHANNEL: 20W x 4, RL=8 ohms, f=20~20 kHz, THD ≤ 0.07%

FREQUENCY RESPONSE

±0.5 dB, F=20 Hz~20 kHz, RL=8 ohms, Po=1W

POWER BANDWIDTH (≤ 0.18% THD)

2-CHANNEL: 10 Hz~50 kHz, Po=20W, RL=8 ohms
4-CHANNEL: 10 Hz~40 kHz, Po=10W, RL=8 ohms

TOTAL HARMONIC DISTORTION

2-CHANNEL: ≤ 0.08%, Po=20W, f=20 Hz~20 kHz, RL=8 ohms
4-CHANNEL: ≤ 0.1%, Po=10W, f=20 Hz~20 kHz, RL=8 ohms

INTERMODULATION DISTORTION (70 Hz; 7 kHz = 4 : 1)

2-CHANNEL: ≤ 0.08%, Po=20W, RL=8 ohms
4-CHANNEL: ≤ 0.1%, Po=10W, RL=8 ohms

CHANNEL SEPARATION

2-CHANNEL: ≥ 70 dB, f=1 kHz
4-CHANNEL: ≥ 60 dB, f=1 kHz

DAMPING FACTOR

≥ 70, f=1 kHz, RL=8 ohms

SIGNAL-TO-NOISE RATIO

2-CHANNEL: ≥ 117 dB, INPUT short, IHF-A
4-CHANNEL: ≥ 114 dB, INPUT short, IHF-A

RESIDUAL NOISE

≤ -86 dBm, ATT min., @ fc=12.7 kHz 6 dB/oct LPF
≤ -90 dBm, ATT min., @ IHF-A Network

SLEW RATE

10 V/μs, RL=8 ohms, full swing

SENSITIVITY

2-CHANNEL: +2.2 dBm (1.0 V), Po=40W, RL=8 ohms, f=1 kHz
4-CHANNEL: -0.8 dBm (0.7 V), Po=20W, RL=8 ohms, f=1 kHz

VOLTAGE GAIN

26 dB, ATT. max., f=1 kHz

INPUT IMPEDANCE

≥ 20 k-ohms

INDICATORS

Clip: Red LED
Pilot: Red LED, power ON
4ch Mode: Green LED, Lights when the 4-channel mode is active.

PROTECTION CIRCUITS

Muting: 4 ± 3 sec. after power turned ON
DC Sense: DC ± 3 V output voltage
Over-current: ON when speaker short @ 1 kHz, 10W

CONTROLS

Front: Push-ON/Push-OFF POWER switch
Attenuators x 4
(only CH A and B function during 2CH operation)
Rear: 2CH/4CH mode switch

POWER REQUIREMENTS

General model: 220/240 VAC, 50/60 Hz
Canadian model: 120 VAC, 60 Hz

POWER CONSUMPTION

General model: 150W
Canadian model: 150W

DIMENSIONS (W x H x D)

480 mm x 90 mm x 337 mm
(18-7/8" x 3-1/2" x 13-1/4")

WEIGHT

6.5 kilograms (14.3 lbs.)

■ 総合仕様

定格出力

(4CHモード) 20W x 4 (RL=8Ω, f=20Hz~20kHz,
THD ≤ 0.07%)
(2CHモード) 40W x 2 (RL=8Ω, f=20Hz~20kHz,
THD ≤ 0.05%)

高周波特性

20Hz~20kHz 0dB ± 0.5dB
(RL=8Ω, Po=1W)

パワーバンド幅

(4CHモード) 10Hz~40kHz
(Po=10W, RL=8Ω, THD ≤ 0.18%)
(2CHモード) 10Hz~50kHz
(Po=20W, RL=8Ω, THD ≤ 0.18%)

全高調波歪率

(4CHモード) ≤ 0.1%
(Po=10W, f=20Hz~20kHz, RL=8Ω)
(2CHモード) ≤ 0.08%
(Po=20W, f=20Hz~20kHz, RL=8Ω)

浪音調歪率

(4CHモード) ≤ 0.1% (Po=10W, 70Hz:
7kHz=4:1, RL=8Ω)
(2CHモード) ≤ 0.08% (Po=20W, 70Hz:
7kHz=4:1, RL=8Ω)

チャンネルセパレーション

(4CHモード) ≥ 60dB (f=1kHz, RL=8Ω)
(2CHモード) ≥ 70dB (f=1kHz, RL=8Ω)

ダンピングファクター

≥ 70 (f=1kHz, RL=8Ω)

S/N比

(4CHモード) ≥ 114dB (INPUTショート,
IHF-Aネットワーク使用)
(2CHモード) ≥ 117dB (INPUTショート,
IHF-Aネットワーク使用)

残音ノイズ

≤ -90dB (入力レベルコントローラー=0,
IHF-Aネットワーク使用)

スループレート

10V/μsec (RL=8Ω, Full Swing)

入力感度

(4CHモード) -0.8dB (0.7V) (Po=20W, f=1kHz,
RL=8Ω, 入力レベルコントローラー=10)
(2CHモード) +2.2dB (1.0V) (Po=40W, f=1kHz,
RL=8Ω, 入力レベルコントローラー=10)

電圧利得

(4CHモード) 25dB (入力レベルコントローラー=10,
f=1kHz, RL=8Ω)
(2CHモード) 25dB (入力レベルコントローラー=10,
f=1kHz, RL=8Ω)

入力インピーダンス

≥ 20kΩ

定格電源

AC100V, 50/60Hz

定格消費電力

75W

最大外形寸法(W x H x D)

480mm x 90mm x 337mm

ラックマウント

19インチ標準ラックマウント仕様
(BTS準拠)

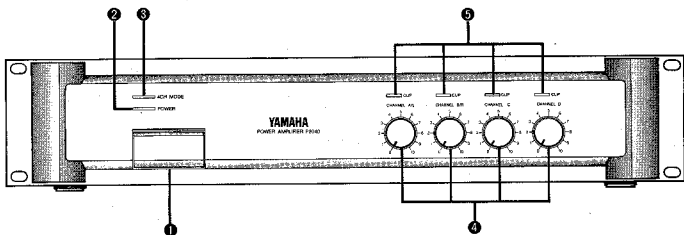
重量

6 kg

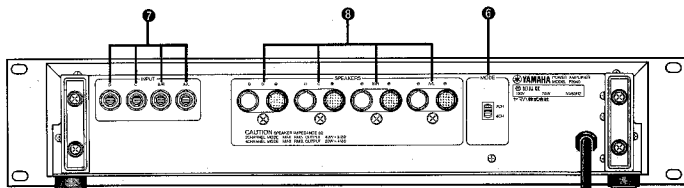
● 0dB = 0.775Vr.m.s.

■ PANEL LAYOUT (パネルレイアウト)

● Front Panel (フロントパネル)



● Rear Panel (リアパネル)

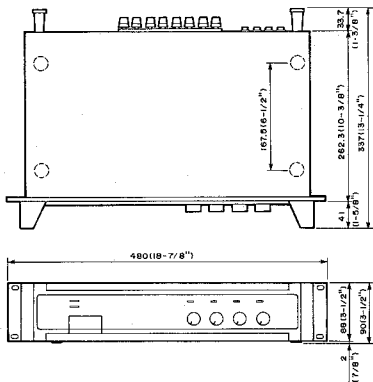


Japanese model

- ① POWER Switch
- ② POWER インジケータ
- ③ 4CH MODE インジケータ
- ④ 入力レベルコントローラ
- ⑤ CLIP インジケータ
- ⑥ 2CH/4CH MODE Switch
- ⑦ INPUT Connectors
- ⑧ SPEAKER Output Terminals

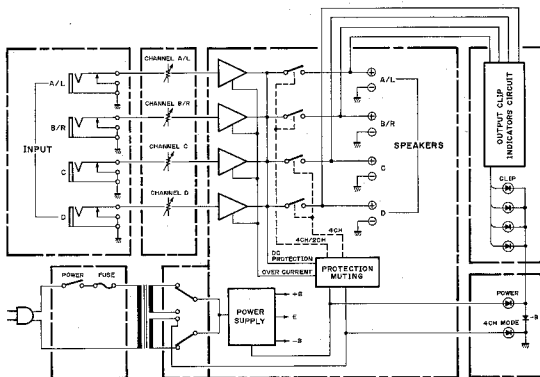
- ① POWERスイッチ
- ② POWERインジケータ
- ③ 4CH MODE インジケータ
- ④ 入力レベルコントローラ
- ⑤ CLIPインジケータ
- ⑥ MODE切替スイッチ
- ⑦ INPUT端子
- ⑧ SPEAKERS端子

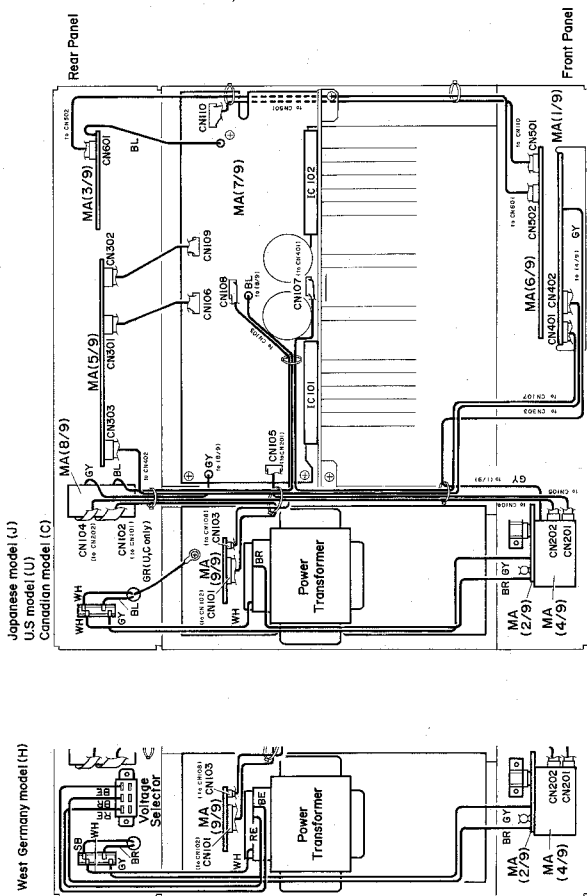
■ DIMENSIONS (寸法図)



Unit : mm (Inch)
(単位)

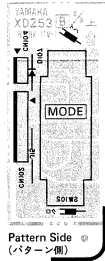
■ BLOCK DIAGRAM (ブロックダイアグラム)



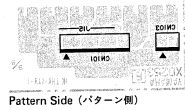
■CIRCUIT BOARD LAYOUT/WIRING(ユニットレイアウト/接続図)


■CIRCUIT BOARD(シート基板図)

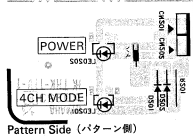
● 8/9



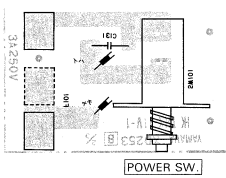
● 9/9



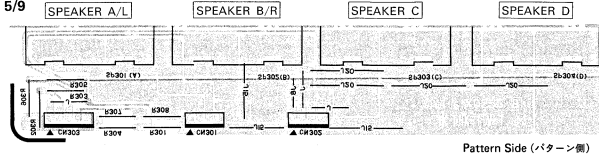
● 4/9



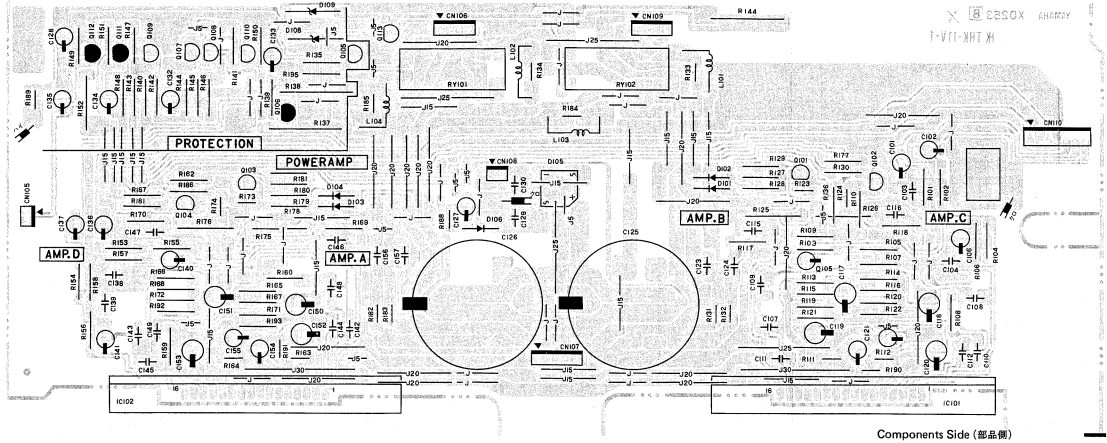
● 2/9 Pattern Side (パターン側)



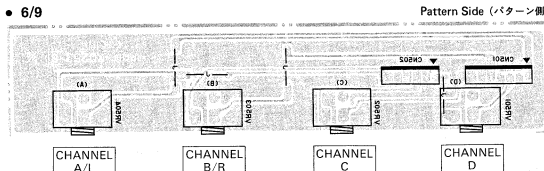
● 5/9



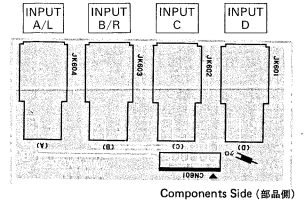
● 7/9



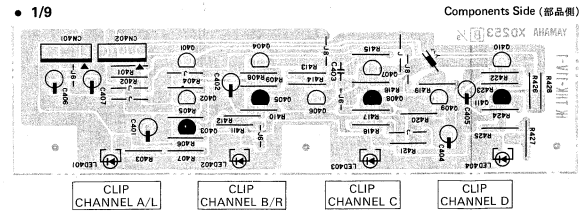
● 6/9

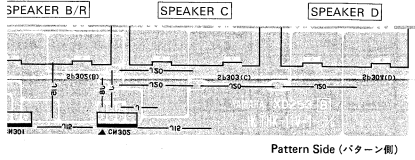


● 3/9

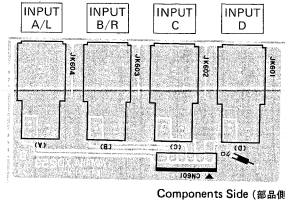


● 1/9

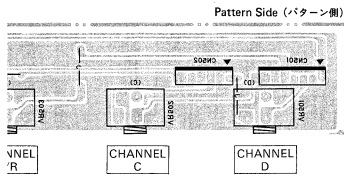
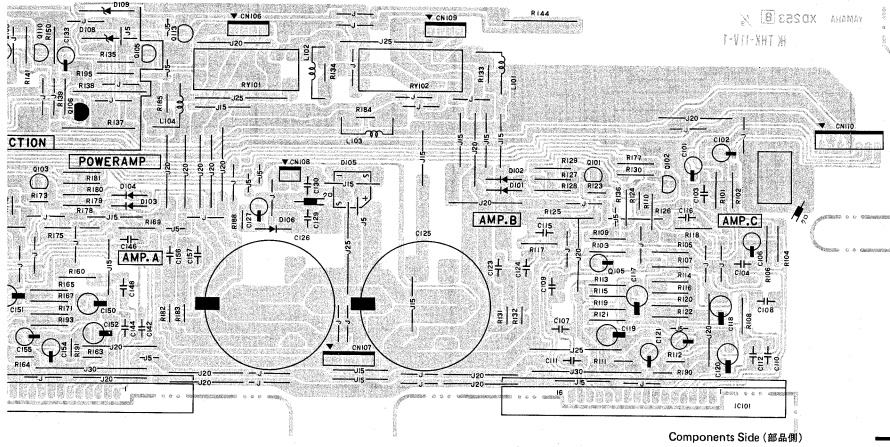




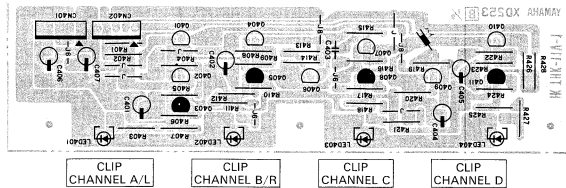
● 3/9



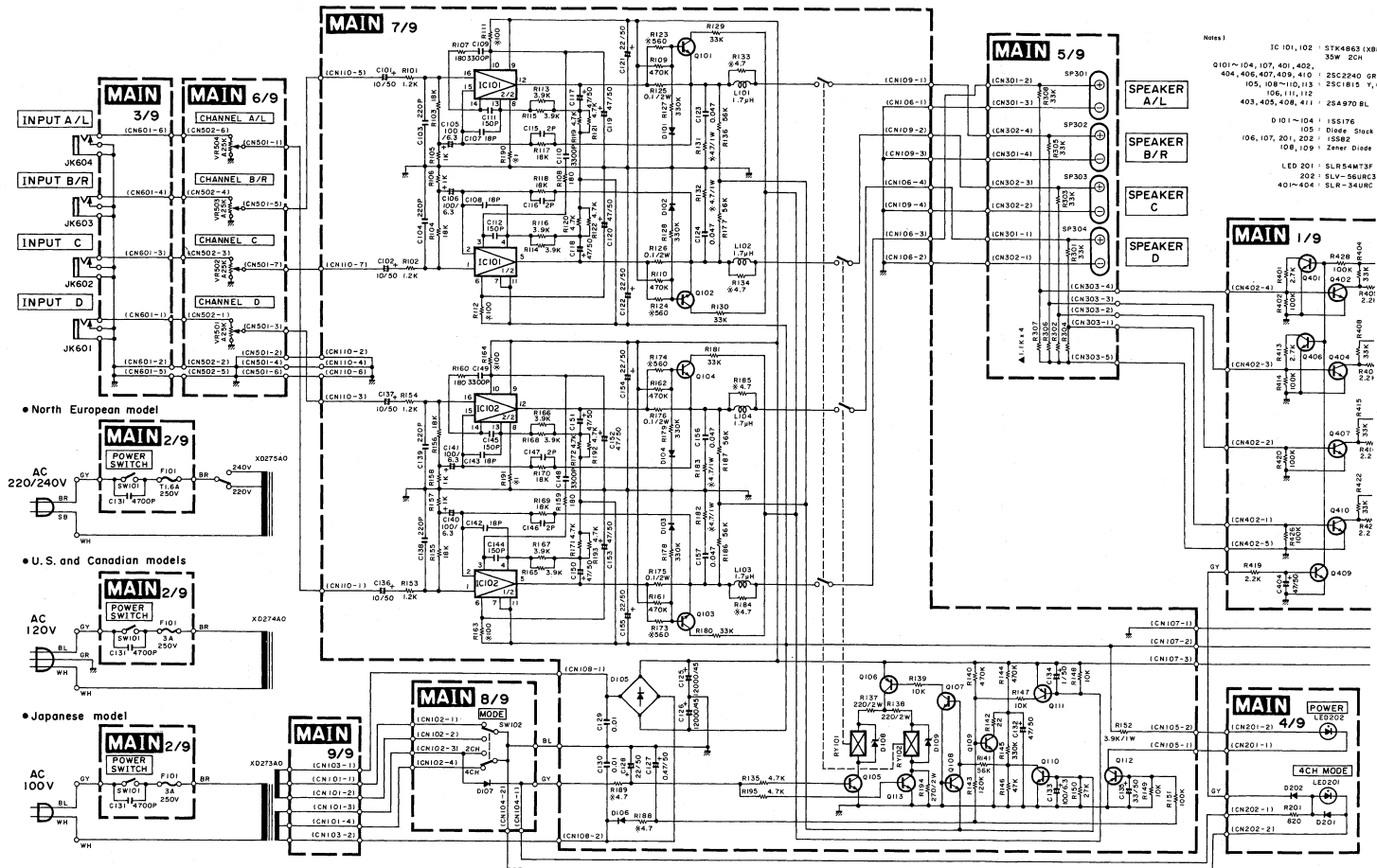
- Notes
- | | |
|---|---|
| 1. Circuit Board: | XD253C0 |
| 2. IC101, 102: | STK4863 (XB112001) POWER AMP. 35W 2CH |
| 3. Q101 ~ 104, 107, 401, 402, 404, 406, 407, 409, 410:
105, 108 ~ 110, 113:
106, 111, 112,
403, 405, 406, 411: | 2SC2240 GR, BL
2SC1815 Y, GR
2SA970 BL |
| 4. D101 ~ 104:
105:
106, 107, 201, 202:
108, 109: | 1SS176
Diode Stack 4D4842 3A 200V
1SS82
Zener Diode RD24F 24V |
| 5. LED201:
202:
401 ~ 404: | SLR54MT3F GR 4CH MODE (VE564700)
SLV-56URC3H RE POWER (IF004440)
SLR-34URC RE CLIP (IF002380) |
| 6. L101 ~ 104: | Coil 1.7μH |
| 7. RY101, 102: | Relay JR2AD-DC24V |
| 8. VR501 ~ 504: | Rotary Pot. A25KΩ |
| 9. C125, 126:
131: | Electrolytic Cap. 12000μF 45V
Ceramic Cap. 4700pF 400V |
| 10. SP 301 ~ 304: | #552 2P J, H
#554 2P U, C |
| 11. F101: | T3.0A 250V J
T3.0A 250V U, C
T1.6A 250V H |

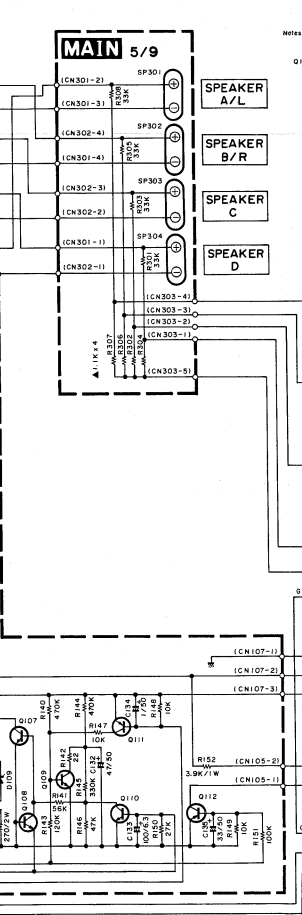
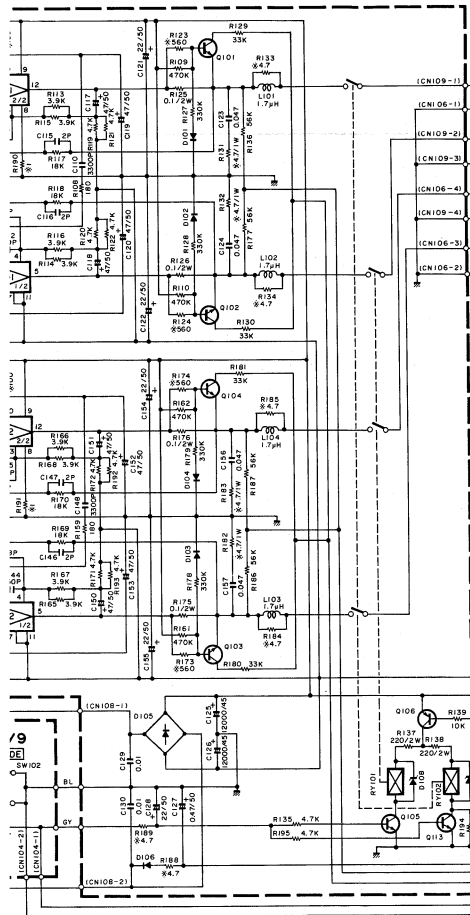


● 1/9



■ P2040 OVERALL CIRCUIT DIAGRAM (総回路図)





Notes 1

IC 101, 102 5TK4863 (XB12001) POWER AMP.
35W 25W

Q101~104, 107, 401, 402,
404, 406, 407, 409, 410 2SC2240 GR, BL
105, 101~101, 113 2SC1813 Y, GR
106, 111, 112
403, 405, 408, 411 2SA970 BL

D 101~104 155176
105 Diode Stack 4D4842 3A 200V
106, 107, 201, 202 15582
108, 109 Zener Diode RD24F 24V

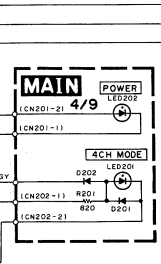
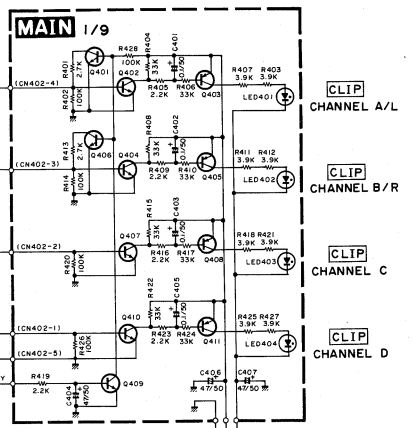
LED 201 5LR54MT3F GR 4CH MODE
202 5LV-5URC3H RE POWER
401~404 5LR-34URC RE CLIP

L 101~104 1.7uH
R V 101, 102 Relay JR240-DC24V
marked & Flame Proof Carbon Resistor
marked Δ Metal Film Resistor

SP 301~304 #552 2P J.H
#554 2P U.C

F 101 T3.0A 250V J
T3.0A 250V U.C
T1.6A 250V H

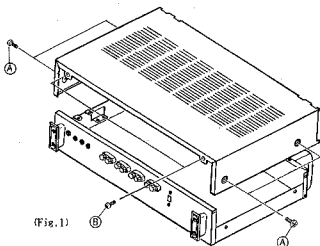
Power Transformer X0273001 J
X0274001 U.C
X0275001 H



DISASSEMBLY PROCEDURE(分解手順)

1. Removal of Top Cover

Remove the 4 bind head screws A(4×10) and 2 bind tapping screws B(3×8). (Fig.1)

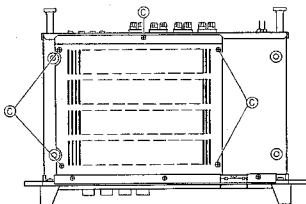


1. トップカバーのはずし方

バインド小ネジA(4×10)4本とバインドタッピングネジB(3×8)2本をはずし、トップカバーをはずします。(Fig.1)

2. Removal of Bottom Cover

Remove the 5 bind tapping screws C(3×8). (Fig.2)

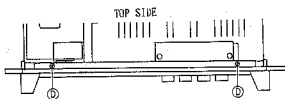


2. ボトムカバーのはずし方

バインドタッピングネジC(3×8)5本をはずし、ボトムカバーをはずします。(Fig.2)

3. Removal of Front Panel

Remove the 2 bind tapping screws D(3×8) and 3 bind tapping screws E(3×8) and 4 flat head tapping screws F(3×8). (Fig.3,4,5)

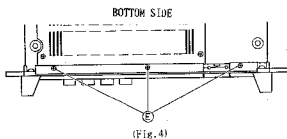


3. フロントパネルのはずし方

バインドタッピングネジD(3×8)2本とバインドタッピングネジE(3×8)3本とタッピングネジF(3×8)4本をはずし、フロントパネルをはずします。(Fig.3,4,5)

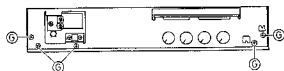
4. Removal of Front Sub Chassis

Remove the 5 bind tapping screws G(3×8). (Fig.6)



4. フロントサブシャーシのはずし方

バインドタッピングネジG(3×8)5本をはずし、フロントサブシャーシをはずします。(Fig.6)

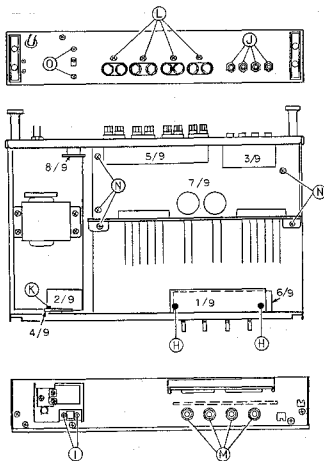


5. Removal of Circuit Boards (1/9~8/9) (Fig.7)

- 1/9 (CLIP LED)
Remove the 2 plastic rivets H.
- 2/9 (POWER SWITCH)
Remove the front panel.
And remove the 2 bind head screws I (3×6).
- 3/9 (INPUT JACKS)
Remove the 4 hexagonal nuts J.
- 4/9 (4CH MODE, POWER LED)
Remove the 1 plastic rivet K.
- 5/9 (SPEAKERS)
Remove the 4 bind tapping screws L (4×10).
- 6/9 (CH LEVEL)
Remove the front panel.
And remove the 4 hexagonal nuts M.
- 7/9 (MAIN)
Remove the 5 bind tapping screws N (3×8).
- 8/9 (4CH MODE)
Remove the 2 bind tapping screws O (3×8).

5. シート(1/9~8/9)のはずし方 (Fig.7)

- 1/9 (CLIP LED)
プラスチックリベットH2本を抜いて、はずします。
- 2/9 (POWER SWITCH)
フロントパネルをはずしてから、バインド小ネジI (3×6)
2本をはずし、はずします。
- 3/9 (INPUT JACKS)
六角ナットJ 4個 をはずし、はずします。
- 4/9 (4CH MODE, POWER LED)
プラスチックリベットK 1本を抜いて、はずします。
- 5/9 (SPEAKERS)
バインドタッピングネジL (4×10) 4本をはずし、はずします。
- 6/9 (CH LEVEL)
フロントパネルをはずしてから、六角ナットM 4個をはずし、
はずします。
- 7/9 (MAIN)
バインドタッピングネジN (3×8) 5本をはずし、はずします。
- 8/9 (4CH MODE)
バインドタッピングネジO (3×8) 2本をはずし、はずします。



(Fig.7)

4-CHANNEL/2-CHANNEL POWER AMPLIFIER

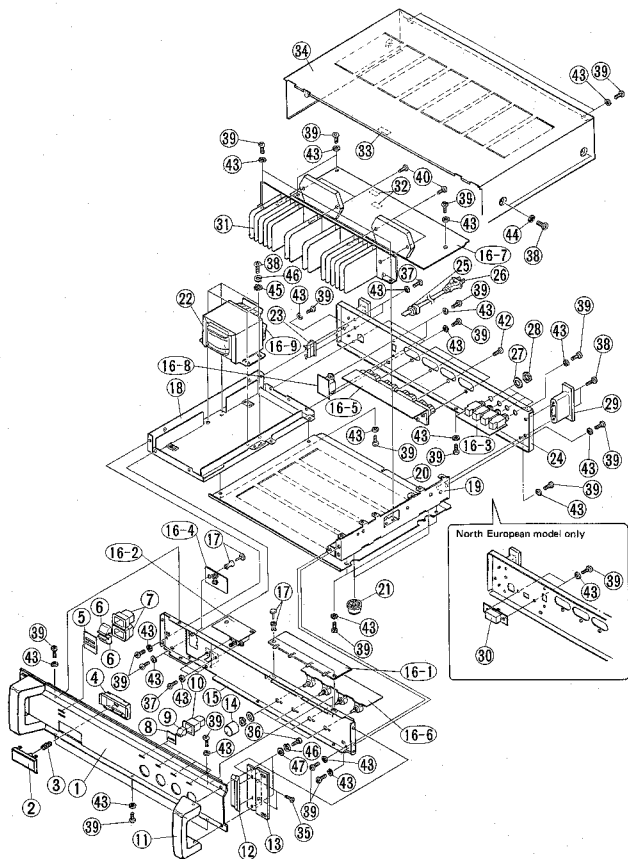
P2040

PARTS LIST

Note) DESTINATION ABBREVIATIONS

J : Japanese model	A : Australian model
U : U.S. model	E : European model
C : Canadian model	D : West German model
X : General model	B : British model
M : South African model	I : Indonesian model
H : North European model	

OVERALL ASSEMBLY (総組立)



OVERALL ASSEMBLY (総組立)

Ref. No.	Part No.	Description	部品名	Remarks	ランク
1	VD789200	Front Panel	フロントパネル		11
2	VE027600	Knob, Power Switch	パワーボタン		03
3	AA817880	Spring	スプリング		01
4	VE027500	Escutcheon, Power Switch	パワーボタン枠		03
5	VE240900	Spacer A	スペーサー A		01
6	CB630020	Lens	レンズ	POWER/4CH MODE	
7	CB630010	Reflector	リフレクター	POWER/4CH MODE	
8	VE038500	Spacer B	スペーサー B		01
9	VA287700	Lens	レンズ	CHANNEL	
10	VA288600	Reflector	リフレクター	CHANNEL	
11	VE169200	Handle	ハンドル		09
12	VE176800	Cap	キャップ		01
13	VE136200	Angle, Rock	アングル		07
14	VE027700	Knob	ノブ		02
15	VD788700	Sub Chassis	サブシャーシ		05
16	VE028600	Circuit Board	MAIN	MAINシールド	J
16	VE028700	Circuit Board	MAIN	MAINシールド	B, C
17	VE028800	Circuit Board	MAIN	MAINシールド	H
18	CB068880	Plastic Rivet #1027	プラスチックリベット #1027		01
18	VE027500	Side Frame Left	サイドフレーム(L)		07
19	AA813180	Side Frame Right	サイドフレーム(R)		03
20	AA806690	Bottom Cover	ボトムカバー		05
21	VE085400	Foot	フット		01
22	XD273001	Power Transformer	電源トランス	S-E H=10	J
22	XD274001	Power Transformer	電源トランス		H, C
22	XD275001	Power Transformer	電源トランス		H
23	VD942100	Lug Terminal	端子ラック		13
24	VE026700	Rear Panel	リアパネル		02
24	VE026800	Rear Panel	リアパネル		J
24	VE027000	Rear Panel	リアパネル		H, C
24	VE027000	Rear Panel	リアパネル		07
25	CB806850	Cord Strain Relief	SR-6N3-4	コードストッパー	J, H, C
25	CB032840	Cord Strain Relief	SR-5N-4	コードストッパー	H
26	NG000610	AC Cord 15A 2.1M	電源コード 15A 2.1M		01
26	NG000620	AC Cord 10A 3.3M	電源コード 10A 3.3M		J, C
26	NG001130	AC Cord 6A 3.5M	電源コード 6A 3.5M		H
27	LX200010	Flat Washer 9X14X0.5 FCW3	特殊平洗合		01
28	LX200060	Hexagonal Nut 9.0 FCW33G	特殊六角ナット		01
29	CR811820	Cord Holder	ケーブルホルダー		02
30	VE205900	Slide Switch	スライドスイッチ		03
31	V8516400	Radiator	ラジエーター	H VOL. SELECT	07
32	CB818370	Rubber	防振ゴム		
33	VC118200	Damper	ダンパー		01
34	VD788900	Top Cover	トップカバー		09
35	E0330080	Flat Head Tapping Screw	皿タップネジ		01
36	EA340186	Pan Head Screw	3.0X8 ZWC2BL	パネルネジ	01
37	ED330068	Bind Head Screw	4.0X10 FCW3BL	バインド小ネジ	01
38	ED340108	Bind Head Screw	4.0X10 FCW3BL	バインド小ネジ	01
39	E1330068	Bind Tapping Screw	3.0X8 FCW3BL	バインドタップネジ	01
40	E1340088	Bind Tapping Screw	3.0X14 FCW3BL	バインドタップネジ	01
41	E1340086	Bind Tapping Screw	4.0X8 FCW3BL	バインドタップネジ	01
42	E1340108	Bind Tapping Screw	4.0X10 FCW3BL	バインドタップネジ	01
43	EV413038	Toothed Lock Washer	Aφ 3.0 FCW3BL	歯付洗合内筒形	01
44	EV403048	Toothed Lock Washer	Aφ 4.0 FCW3BL	歯付洗合内筒形	01
45	EV423046	Toothed Lock Washer	Bφ 4.0 ZWC2BL	歯付洗合外筒形	01
46	EV303406	Spring Washer	φ 4.0 FCW3BL	バネ洗合	01
47	EV203046	Flat Washer	φ 4.0 FCW3BL	平洗合	01

* New Parts (新規部品)

ランク: Japan only

ELECTRICAL PARTS (電気部品)

Ref. No.	Part No.	Description	部品名	Remarks	ランク
	VE028600	Circuit Board	MAIN	J	
	VE028700	Circuit Board	MAIN	U,C	
	VE028800	Circuit Board	MAIN	H	
	XB112001	IC	STK4865 35W 2CH	POWER AMP.	10
	JA097010	Transistor	2SA970 BL		03
	IC181550	Transistor	2SC1815 Y,GR		03
	IC224000	Transistor	2SC2240 GR,BL		03
	IX000760	Diode	1SS176		01
	IF001400	Diode	1SS82		02
	IN001790	Diode Stack	4D4B42 3A 200V		04
	VC674800	Zener Diode	KD24F 24V		01
	IF002380	LED	SLR-349RC RE	CLIP	02
	IF004440	LED	SLV-560RC3H RE	POWER	01
	VE504700	LED	SLR54HT3F GR	4CH MODE	01
	HW753100	Flame Proof C. Resistor	1.0Ω 1/4 J		01
	HW453470	Flame Proof C. Resistor	4.7Ω 1/4 J		01
	HW455100	Flame Proof C. Resistor	100Ω 1/4 J		01
	HW455560	Flame Proof C. Resistor	560Ω 1/4 J		01
	HU576110	Metal Film Resistor	1.1KΩ 1/4 F		02
	WB124400	Metal Oxide Resistor	0.1Ω 2W J		01
	HL325220	Metal Oxide Resistor	220Ω 2W K		01
	HL725270	Metal Oxide Resistor	270Ω 2W K		01
	HL716390	Metal Oxide Resistor	3.9KΩ 1W K		01
	VE157600	Rotary Pot.	B25K		03
	VB877400	Electrolytic Cap.	12000μF 45V		07
	V4889010	Ceramic Cap.	4700P 400V		01
	G9900470	Coil	真空管コン		01
	KA803610	Push Switch	ESB-8213A		01
	V5208000	Slide Switch	SDKGB		03
	LA005520	Speaker Terminal	#552 2P	POWER	06
	LA005540	Speaker Terminal	#554 2P	MODE SELECT	03
	LB301800	Phone Jack	HLJ0544		03
	KC002900	Relay	DC JR2AD-DC24V	MONAURAL	05
	KB000360	Fuse	T3.0A 250V		01
	KB002550	Fuse	T3.0A 250V	J	03
	KB000740	Fuse	T1.0A 250V	U,C	02
	LB201880	Fuse Holder	PC-PH1	H	01
	MG000610	AC Cord	15A 2.1M	J	06
	MG000270	AC Cord	10A 3.3M	U,C	09
	MG001130	AC Cord	6A 3.5M	H	06
	XD273001	Power Transformer		J	13
	XD274001	Power Transformer		U,C	13
	XD275001	Power Transformer		H	13