

HP-2000/3000/4500

SERVICE NOTES *First Edition*

SPECIFICATIONS

Keyboard 76 Key, E to G HP-2000
 88 Key, A to C HP-3000/4500

Note
 16 PIANO 1, PIANO 2, PIANO 3
 VIBRAPHONE, E. PIANO 1
 10 HARPSICHORD, CLAVI, E. PIANO 2

Tunable Range ±15 cents

Input Level H: +10dB, M: 0dB, L: -10dB

Output Level H: +10dB, M: 0dB, L: -10dB

Output Power 10W X 2 HP-2000/3000
 13W X 2 HP-4500

Speaker 16cm X 2, 5cm X 2 HP-2000/3000
 20cm X 2, 5cm X 2 HP-4500

Power Consumption ... 50W: 100/117V
 75W: 220/240V

Dimensions 1242(W) X 461(D) X 133(H)mm
 48 7/8 X 18 1/8 X 5 1/4 in. HP-2000
 1405(W) X 461(D) X 133(H)mm
 55 5/8 X 18 1/8 X 5 1/4 in. HP-3000
 1383(W) X 480(D) X 192(H)mm
 54 7/16 X 18 7/8 X 7 9/16 in. HP-4500

Weight 30.0kg, 66 lb 4 oz HP-2000
 33.5kg, 73 lb 15 oz HP-3000
 38 kg / 83lb 14oz HP-4500

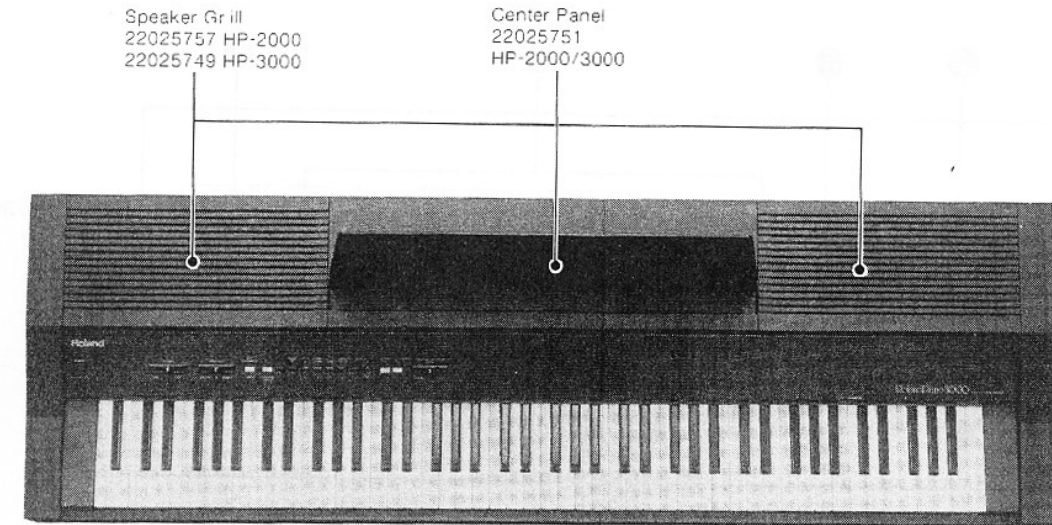


PHOTO HP-3000

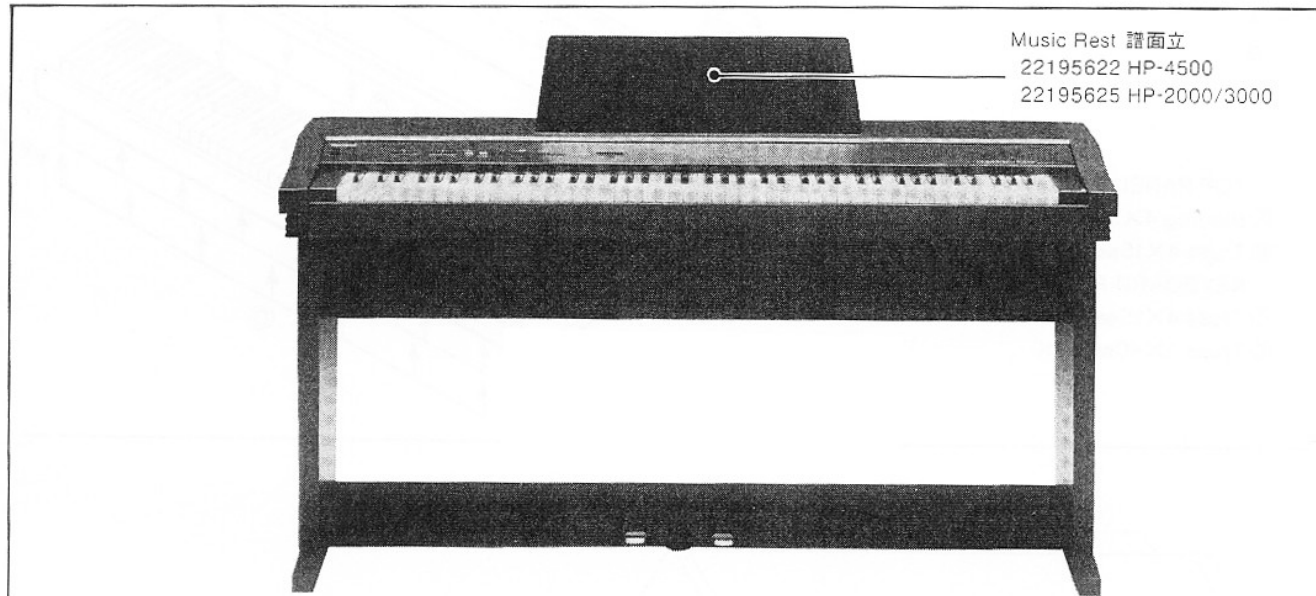


PHOTO HP-3000

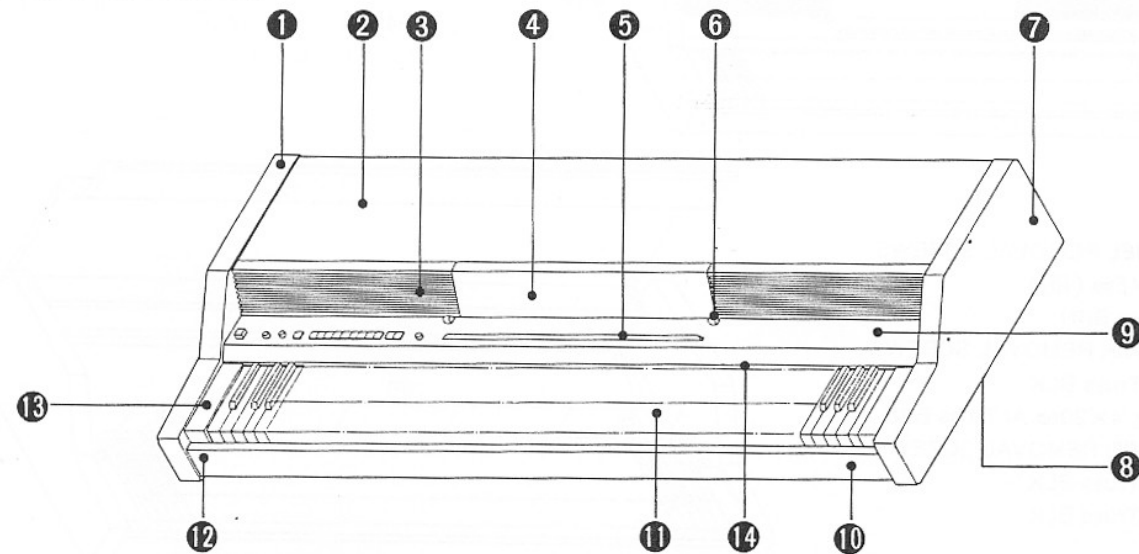


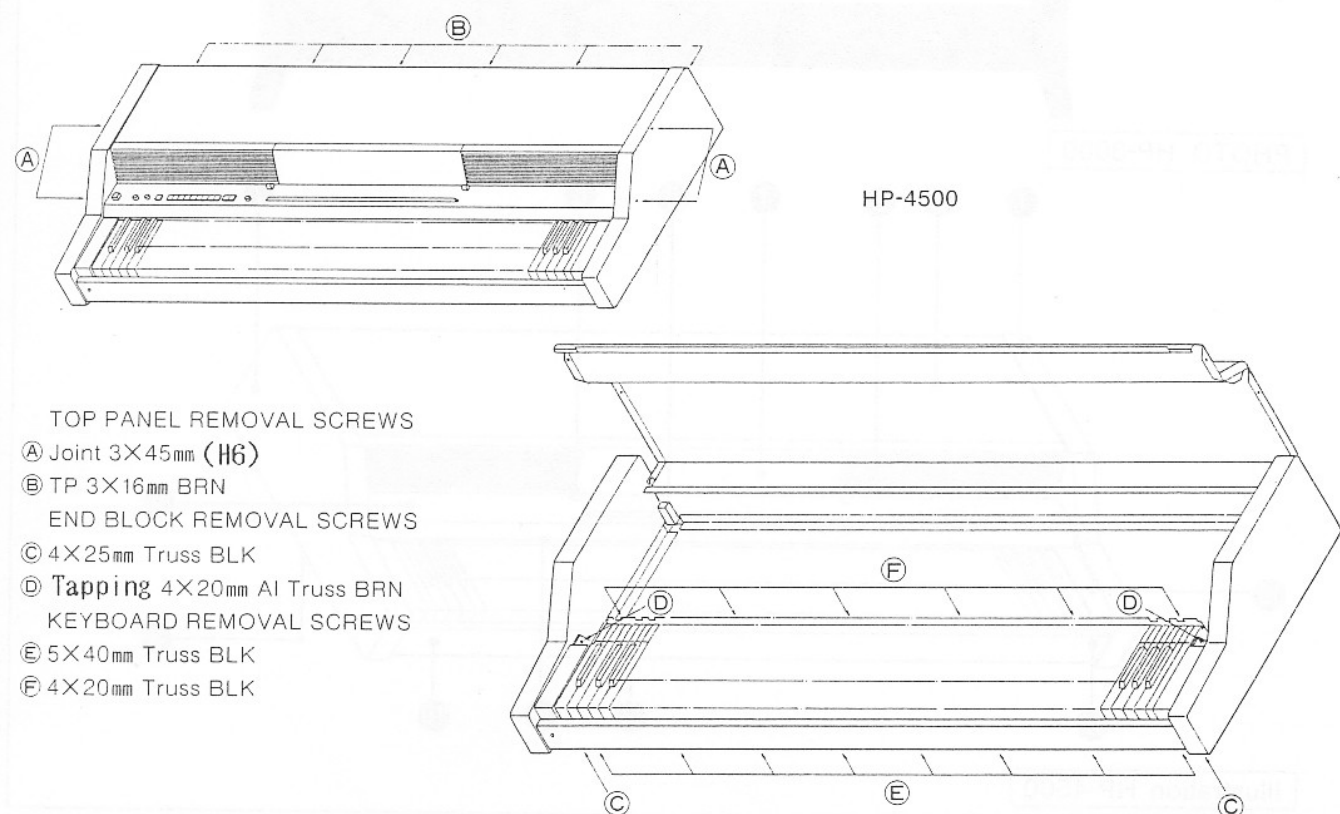
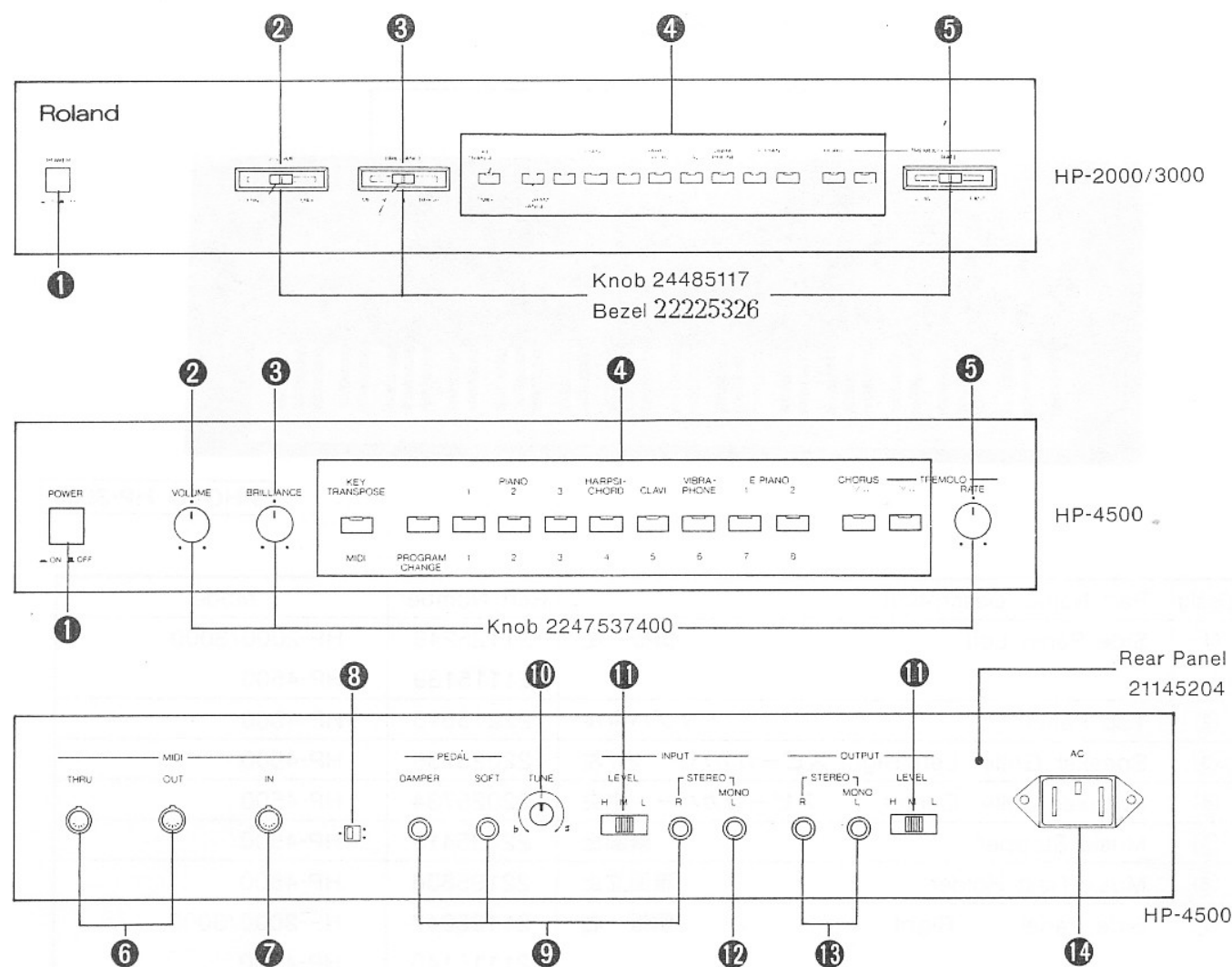
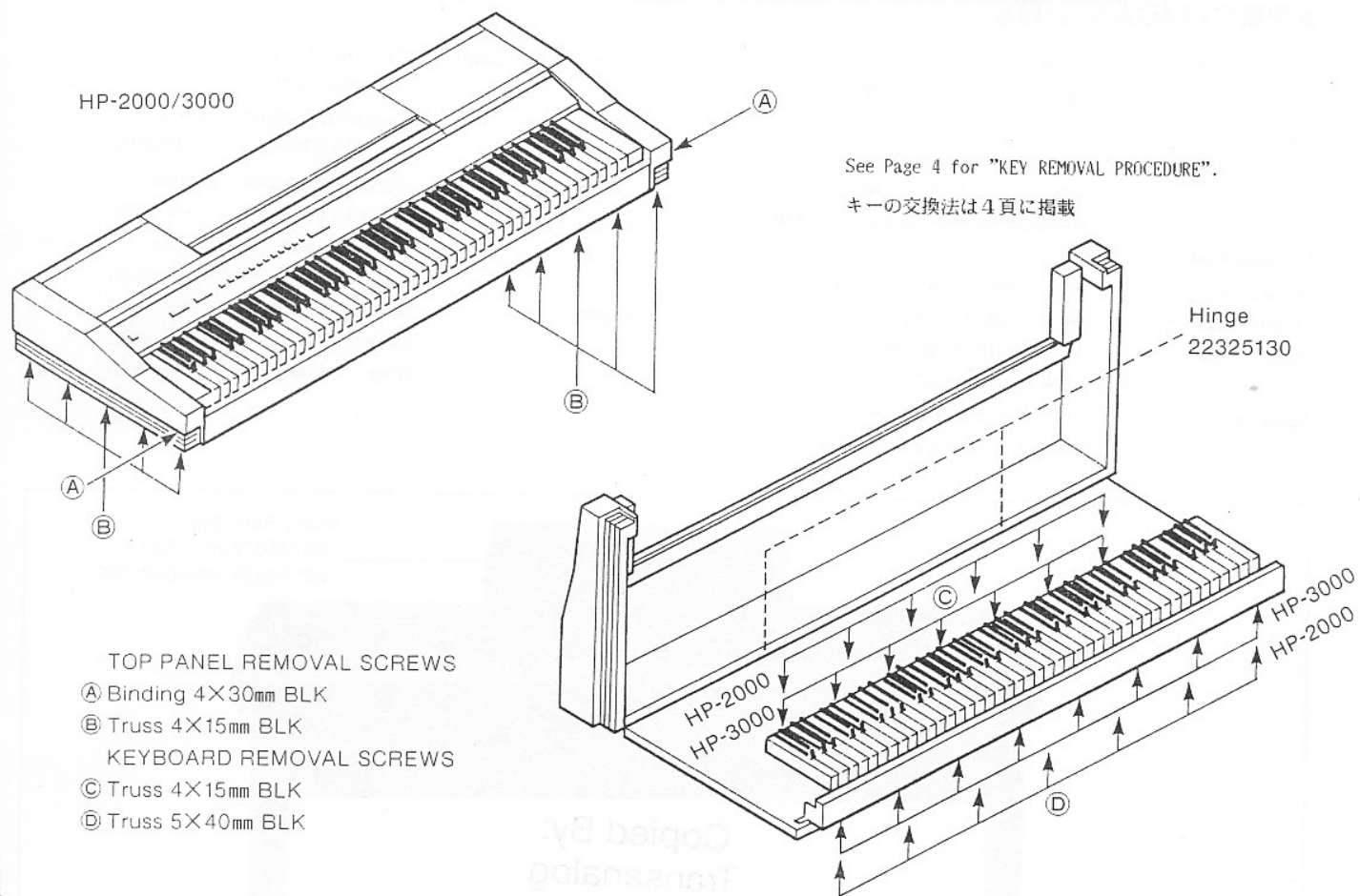
Illustration HP-4500

Desig	Part Name, Description	Part Number	Model	
①	Side Panel Left 側板 左	21125246	HP-2000/3000	
		21115139	HP-4500	
②	Top Panel トップパネル	22215515	HP-4500	
③	Speaker Grille Left/Right スピーカカバー 右/左	22025735	HP-4500	
④	Speaker Grille Center スピーカカバー 中央	22025734	HP-4500	
⑤	Music Stopper 譜面止	22135419	HP-4500	
⑥	Music Rest Holder 譜面立止	22195838	HP-4500	
⑦	Side Panel Right 側板 右	21125247	HP-2000/3000	
		21115140	HP-4500	
⑧	Bottom Panel 底板	21135150	HP-2000	
		21135151	HP-3000	
		21135154	HP-4500	
⑨	Front Panel 前面パネル	22215509	HP-2000	
		22215510	HP-3000	
		22215516	HP-4500	
⑩	Blind 口板	21145206	HP-2000	
		21145207	HP-3000	
		21145203	HP-4500	
⑪	Keyboard Assy SK-588BW 鍵盤完	76162200	See Keyboard Parts List.	
		76169200	HP-2000	
⑫	Jack YKB21-5006 ジャック Phones PCB Holder ホーンズ基板ホルダー	13449252	HP-2000/3000/4500	
		22195876	HP-2000/3000	
		22195710	HP-4500	
⑬	End Block Left/Right 拍子木 右/左	21165128	HP-2000/3000	
		21165127	HP-4500	
		Plate Left プレート 左	22125211	HP-2000/3000
		Plate Right プレート 右	22125212	HP-2000/3000
		Holder Left/Right ホルダ 右/左	22195709	HP-4500
⑭	Key Felt キーフエルト	22265121	HP-2000/3000/4500	

DISASSEMBLY

When replacing the power supply board, do not separate the existing heat sink from the rear panel although a replacement power supply is installed on a heat sink which must be kept aside. Rescrewing the heat sink to the rear panel is difficult without the presence of an assistant.

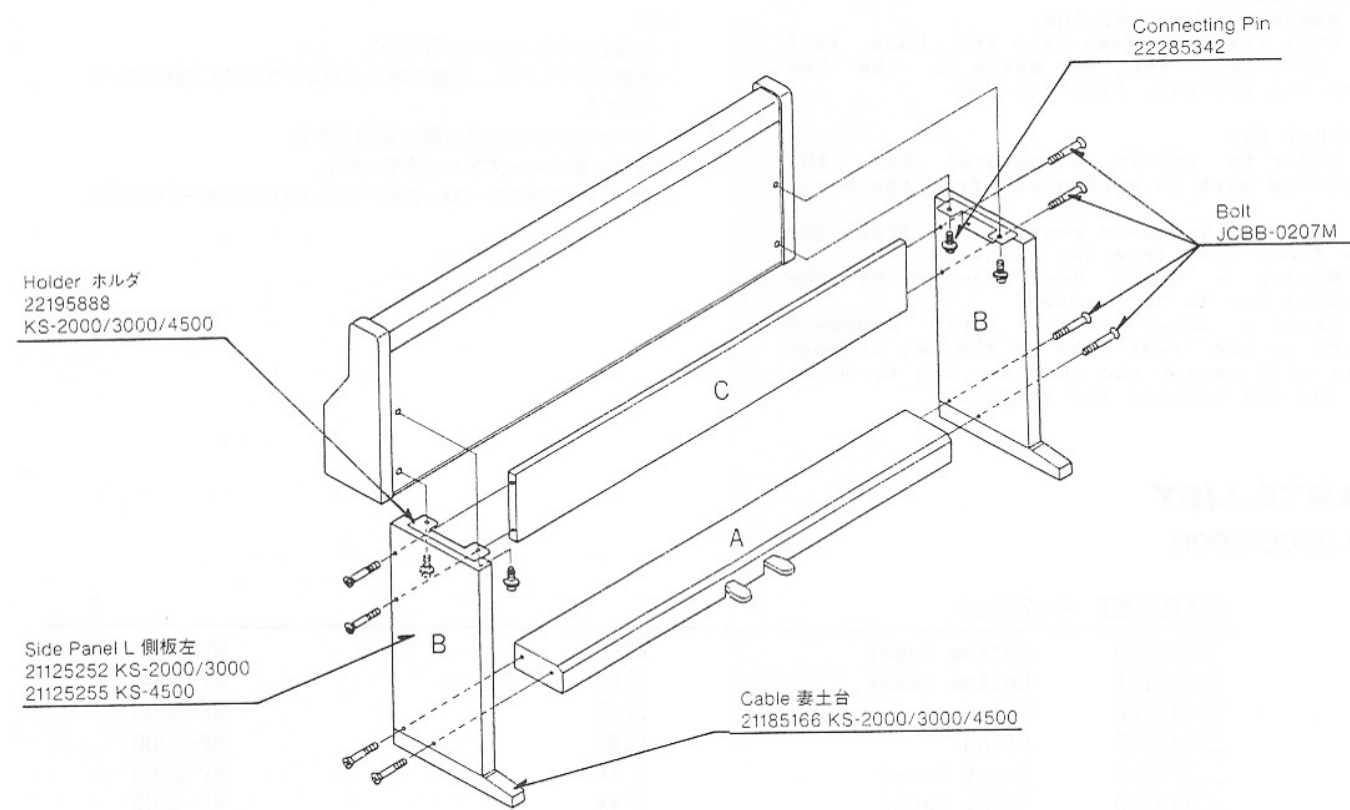
電源基板を交換する場合、ヒートシンクをリアパネルから外さない様にして下さい。再取り付けが非常に困難となります。補修用基板にはヒートシンクが付いていますが使用に及びません。



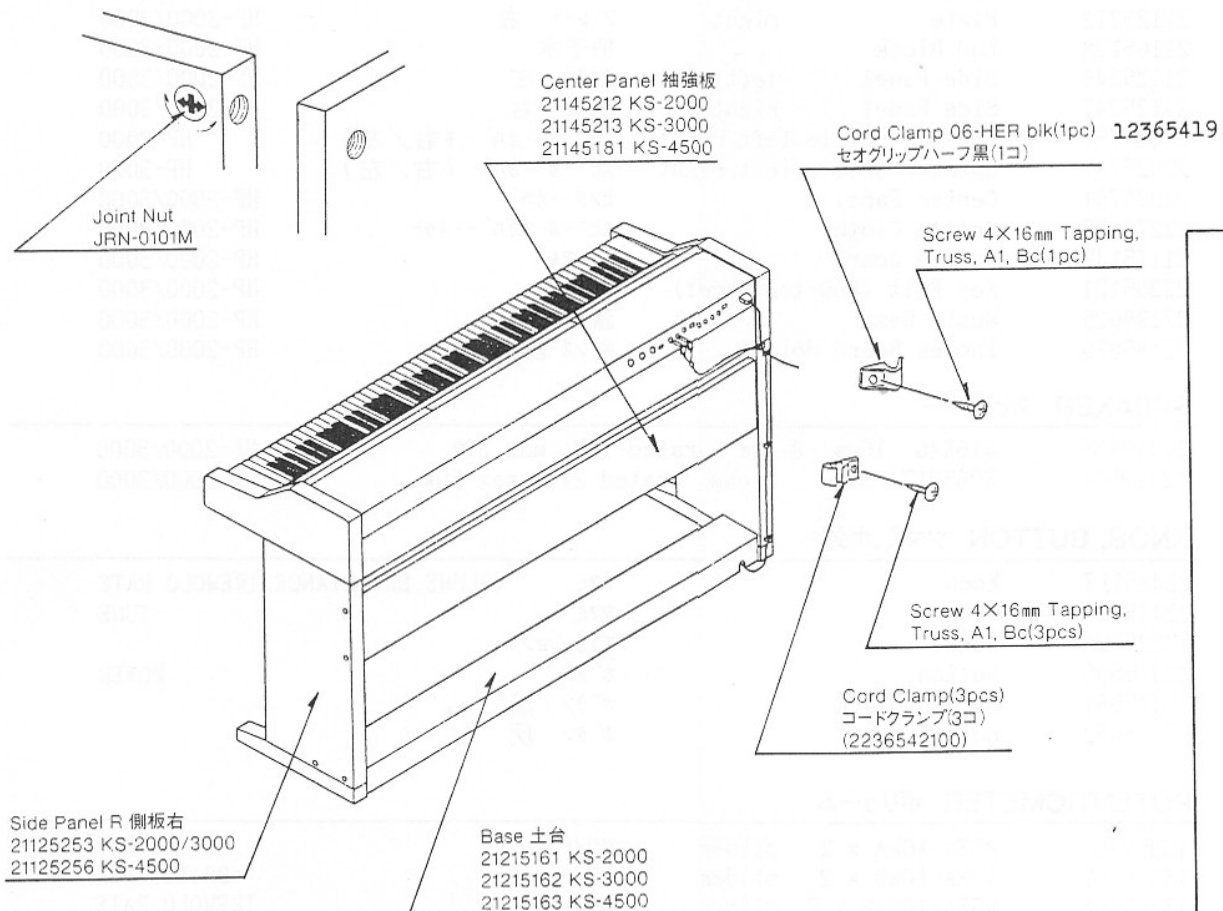
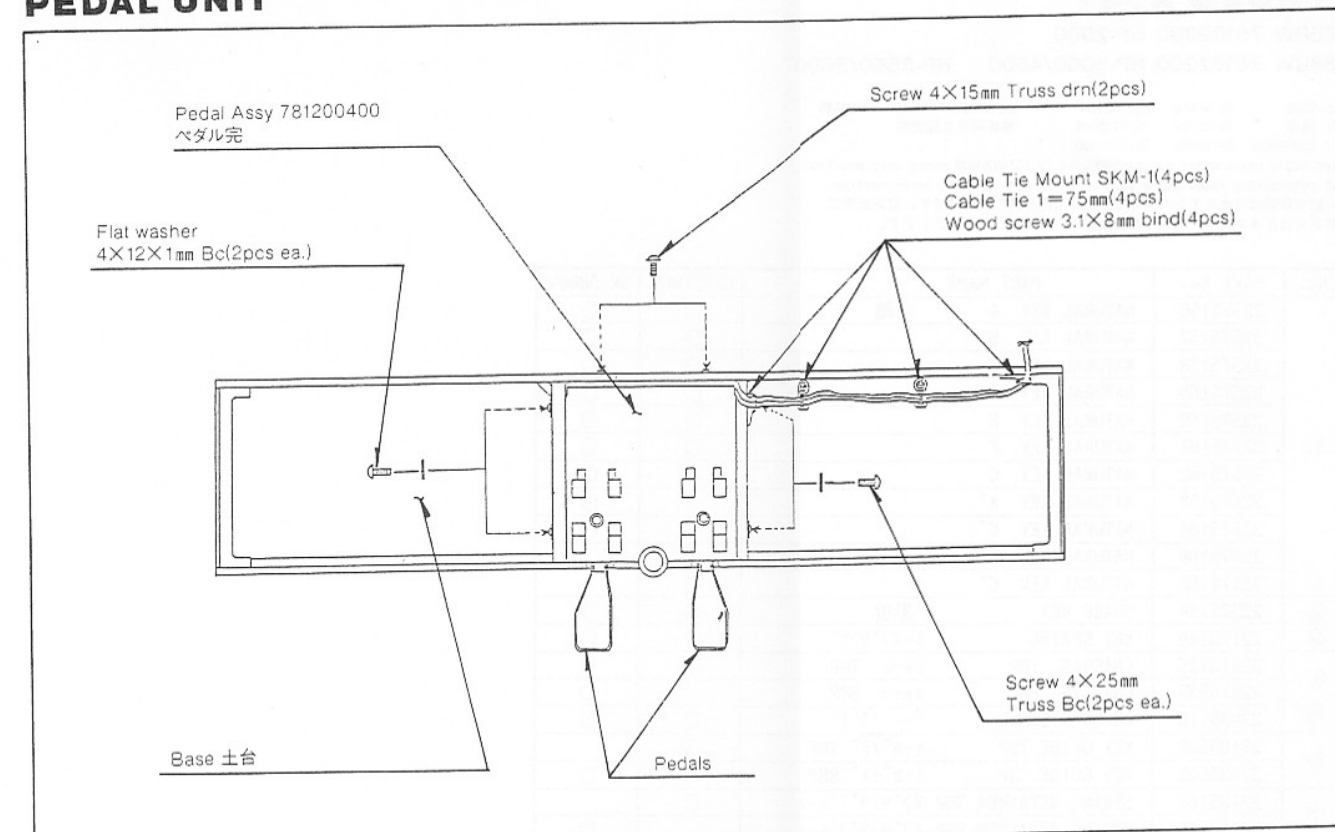
* = Common to three models.
* = 3機種に共通

①	Button Switch Switch Holder	SDDG3078A	22475650 13129124 22195862	* * *
②	Pot.	RSEA-10KA x 2 RKD30001GA 10KA x 2	13359306 13219790	HP-2000/3000 HP-4500
③	Pot.	RSEA-10KB x 2 RK16K1230 10KB x 2	13359307 13239109	HP-2000/3000 HP-4500
④	Button LED Switch	black grey GL9HD12 SKHHPM	22475651 22475652 15029152 13169668	* * * *
⑤	Pot.	RSEA-100KB x 2 RKD3100AMA 100KB	13359308 13219141	HP-2000/3000 HP-4500
⑥	Socket	TC5350-01-1111 DIN	13429615	*
⑦	Socket	TC5354-01-1111 DIN	13429616	*
⑧	Switch	SSSY12050	13159150	*
⑨	Jack	YKB21-5012	13449146	*
⑩	Pot. Knob	EVQ-WVKF1531G Rotary Encoder	13279791 22485109	* *
⑪	Switch	HSW0372-01-520	13159322	*
⑫	Jack	YKB21-5006	13449252	*
⑬	Jack	YKB21-5010	13449145	*
⑭	Inlet	PA-125 3P PA-126 2P	13429709 13429710	* *

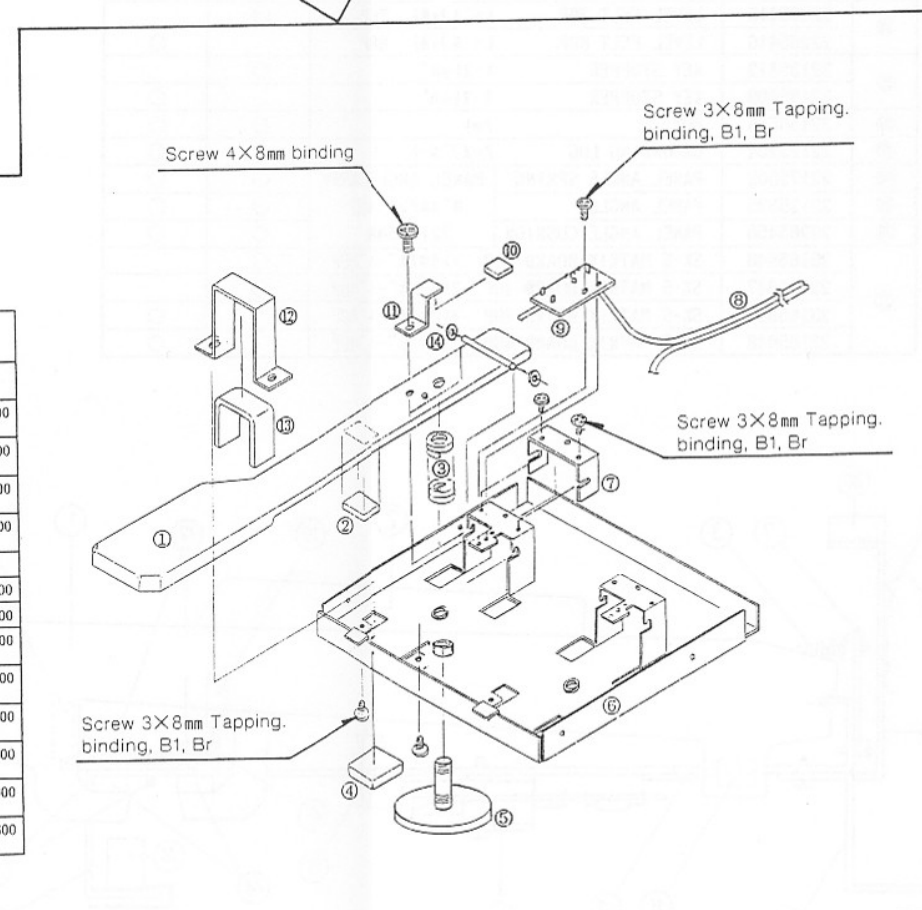
STAND



PEDAL UNIT



PART No.	PART NAME	MODEL (KS = HP)
① 22185544 22185545	PEDAL L silver PEDAL R silver ペダル 左 銀色 ペダル 右 銀色	KS-2000/3000/4500/5500
② 22265422	FELT chip フェルト	KS-3000/3000/4500/5500/5600 KS-350/450
③ 22175184	COIL SPRING コイルスプリング	KS-2000/3000/4500/5500/5600 KS-350/450
④ 22355334	RUBBER FOOT ベース	KS-2000/3000/4500/5500/5600 HRS-10/30/80
⑤ 22285343	ADJUSTOR BOLT 12.5mm 8x20mm BC アジャストボルト	KS-2000/3000/4500/5500/5600
⑥ 22815558	PEDAL CHASSIS ペダルシャーシ	KS-2000/3000/4500
⑦ 22195864	HOLDER シャフトホルダ	KS-2000/3000/4500/5500/5600
⑧ 23485165	CONNECTION CORD 接続コード	KS-2000/3000/4500/5500/5600
⑨ 22825109	SWITCH BOARD スイッチ基板	KS-2000/3000/4500/5500/5600 KS-350/450
⑩ 22265423	CUSHION クッション	KS-2000/3000/4500/5500/5600 KS-350/450
⑪ 22195713	HOLDER ホルダ	KS-2000/3000/4500/5500/5600 KS-350/450
⑫ 22135410	STOPPER ストッパー	KS-2000/3000/4500/5500/5600 KS-350/450
⑬ 22265421	FELT STRIP U Shaped フェルト (U形)	KS-2000/3000/4500/5500/5600 KS-350/450
⑭ 22265406	FELT SPACER フェルト	KS-2000/3000/4500/5500/5600 RD-1000



KEY REMOVAL PROCEDURE

BLACK KEY

Black key is easily removed with the top panel raised.

1. Remove the key spring.
2. Pull the key away from the back rail to disengage the rear notch in the key from the bracket. Lift the key.

NATURAL KEY

In order to remove a natural key, the keyboard must be separated from the base.

1. Move the keyboard rearward to free the key front ends from the blind.
2. Remove a black key adjacent to the natural key to be removed.
3. Using a screw driver, apply downward force to the rear edge of the key stopper. This will permit the rear key leg to slide on the key stopper top surface.

PARTS LIST

HP-2000/3000

CABINET キャビネット

21135150	Bottom Panel	底板	HP-2000
21135151	Bottom Panel	底板	HP-3000
21145206	Blind	口板	HP-2000
21145207	Blind	口板	HP-3000
22215509	Front Panel	ハネ	HP-2000
22215510	Front Panel	ハネ	HP-3000
22325130	Hinge	ヒンジ	HP-2000/3000
22125211	Plate left	プレート 左	HP-2000/3000
22125212	Plate right	プレート 右	HP-2000/3000
21165128	End Block	拍子木	HP-2000/3000
21125246	Side Panel left	側板 左	HP-2000/3000
21125247	Side Panel right	側板 右	HP-2000/3000
22025757	Speaker Grille left,right	スピーカカバー (右/左)	HP-2000
22025749	Speaker Grille left,right	スピーカカバー (右/左)	HP-3000
22025751	Center Panel	センターカバー	HP-2000/3000
22275175	Grille Cloth	スピーカカバーネット	HP-2000/3000
21175142	Baffle Board	ハツフル	HP-2000/3000
22265121	Key Felt (KBD-top panel)	フエルト	HP-2000/3000
22195625	Music Rest	譜面立	HP-2000/3000
22195876	Phones Board Holder	ホンス基板ホルダ	HP-2000/3000

SPEAKER スピーカー

12419533	S16K46	16cm	8 ohm	rated 10W; max 20W	HP-2000/3000
12419534	S065H17	5cm	8 ohm	rated 2W; max 20W	HP-2000/3000

KNOB, BUTTON ツマミ, ボタン

22485117	Knob	ツマミ	VOLUME, BRILLIANCE, TREMOLO RATE
22485109	Knob	ツマミ	TUNE
22225326	Bezel	エスカッション	
22475650	Button	ボタン	POWER
22475651	Button black	ボタン 黒	
22475652	Button gray	ボタン 灰	

POTENTIOMETER ポリウム

13359306	RSEA-10kA x 2	slider	スライダ	VOLUME
13359307	RSEA-10kB x 2	slider	スライダ	BRILLIANCE
13359308	RSEA-100kB x 2	slider	スライダ	TREMOLO RATE

キー交換法

黒鍵

トップパネルを開けキースプリングを取りはずせば容易に抜き取れます。

白鍵

1. 鍵盤を止めているビスを取り除く。
2. 鍵盤を後ろへずらし、鍵盤の前端下部がブラインドに当たらないようにする。
3. 取り外そうとする白鍵の隣の黒鍵を外す。
4. 該当白鍵のキースプリングを取り外す。
5. ドライバーの先でキーストップを下へ押し付けながらキーを引き抜く。

KEYBOARD ASSY

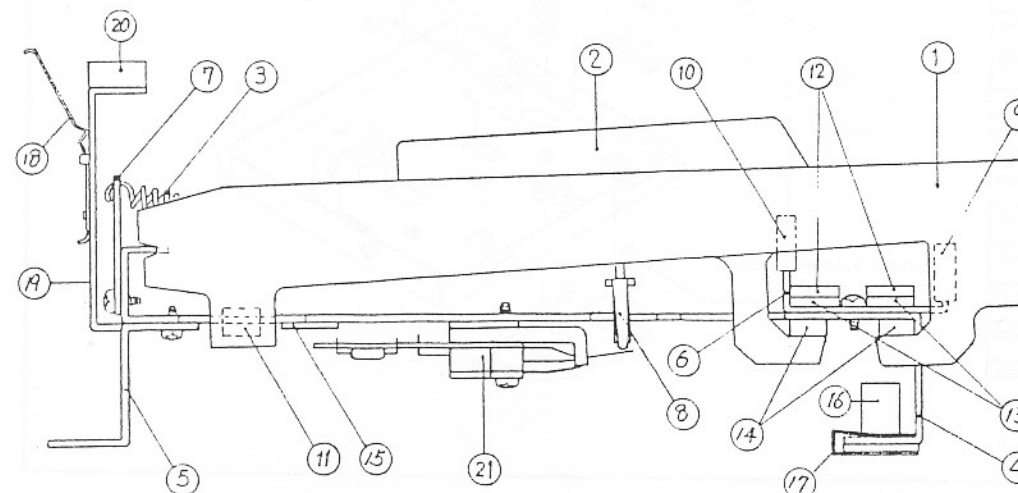
SK-576BW 76169200 HP-2000

SK-588BW 76162200 HP-3000/4500 HP-5500/5600

HP-3000 SK-588CW 7617020000 REPLACEMENT 88-KEY KEYBOARD
 HP-4500 SK-588BW 7617420000 補修用88鍵盤
 HP-5500/5600 SK-588BW 7616220000

Available replacement for SK-588CW/DW is 7616220000 since only position of relocatable Panel Angle Assy is different on these three versions. 上記3鍵盤はパネルアングルの取り付け位置が異なるだけです。位置変更は簡単に行えますので、補修用鍵盤はSK-588BWのみとします。

No.	PART No.	PART NAME	SK-576BW	SK-588BW
①	22575156	NATURAL KEY A 白鍵	○	○
	22575157	NATURAL KEY B	○	○
	22575158	NATURAL KEY C	○	○
	22575159	NATURAL KEY D	○	○
	22575160	NATURAL KEY E	○	○
	22575161	NATURAL KEY F	○	○
	22575162	NATURAL KEY G	○	○
	22575163	NATURAL KEY A'		○
	22575164	NATURAL KEY C'		○
	22575168	NATURAL KEY E'	○	
22474165	NATURAL KEY G'	○		
②	22575166	SHARP KEY 黒鍵	○	○
③	22175146	KEY SPRING キースプリング	○	○
④	22815425	CHASSIS 76P シャーシ 76P	○	
	22815539	CHASSIS 88P シャーシ 88P		○
⑤	22035119	CHASSIS STAND シャーシスタンド	○	○
⑥	22135523	KEY GUIDE 76P キーガイド 76P	○	
	22135522	KEY GUIDE 88P キーガイド 88P		○
⑦	22125167	SPRING RETAINER 76P スプリングプレート	○	
	22125168	SPRING RETAINER 88P スプリングプレート		○
⑧	22135202	ACTUATOR アクチュエータ	○	○
⑨	22155740	GUIDE BUSHING A カイトブッシュ A	○	○
⑩	22155741	GUIDE BUSHING B カイトブッシュ B	○	○
⑪	22155739	GUIDE BUSHING C カイトブッシュ C	○	○
⑫	22265193	STOP FELT 76P ストップフェルト 76P	○	
	22265194	STOP FELT 88P ストップフェルト 88P		○
⑬	22265345	STOP CUSHION ストップクッション	○	○
	22265415	LEVEL FELT 76P レベルフェルト 76P	○	
⑭	22265416	LEVEL FELT 88P レベルフェルト 88P		○
	22135412	KEY STOPPER キーストップ	○	
⑮	22135409	KEY STOPPER キーストップ		○
	22155556	NUT ナット	○	○
⑯	22125204	GROUNDING LUG アースプレート	○	○
⑰	22175502	PANEL ANGLE SPRING PANEL ANGLE ASSY	○	○
⑱	22125535	PANEL ANGLE ハネアングル 88P	○	○
⑳	22265456	PANEL ANGLE CUSHION 22125548	○	○
㉑	23165646	SK-5 MATRIX BOARD 36P マトリクスボード 36P	○	
	23165647	SK-5 MATRIX BOARD 40P マトリクスボード 40P	○	
	23165655	SK-5 MATRIX BOARD 40P マトリクスボード 40P		○
	23165648	SK-5 MATRIX BOARD 48P マトリクスボード 48P		○



PCB ASSEMBLY 基板完成品

See common parts section in this parts list for the remaining PCB assys.
Some of the PCBs listed below are interchangeable with other models with minor modification. See corresponding pcb layouts in this manual,
掲載されていない基板に付いては共通部品覧参照。
僅かな変更で複数機種に共通使用できる基板があります、基板レイアウトの注参照。

76170080	CPU-A Board	CPU-A基板	(PCB 22925358)	HP-3000/4500
76169080	CPU-A Board	CPU-A基板	(PCB 22925358)	HP-2000
76169170	Switch Board	スイッチ基板	(PCB 22925350)1/2	
76169140	Effect Board	エフェクト基板	(PCB 22925349)1/4	
76169270	Jack-A Board	ジャック-A基板	(PCB 22925349)1/4	
76169300	Jack-B Board	ジャック-B基板	(PCB 22925349)1/4	
76169060	Phones Board	ホーンズ基板	(PCB 22925349)1/4	
76169361	Amp Board	アンプ基板	(PCB 22925351)1/2	100/117V
76169364	Amp Board	アンプ基板	(PCB 22925351)1/2	220/240V
76169331	Secondary Power	二次電源基板	(PCB 22925353)1/2	100/117V
76169334	Supply Board	二次電源基板	(PCB 22925353)1/2	220/240V

PCB ASSEMBLY 基板完成品

See common parts section in this parts list for the remainingg PCB assys.
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掲載されていない基板に付いては共通部品覧参照。
僅かな変更で複数機種に共通使用可能なものがあります、基板レイアウトの注参照。

76174100	Switch Board	スイッチ基板	(PCB 22925470)	
76174090	Effect Board	エフェクト基板	(PCB 22925349)1/4	
76174140	Jack-A Board	ジャック A基板	(PCB 22925349)1/4	
76174150	Jack-B Board	ジャック B基板	(PCB 22925349)1/4	
76174080	Phones Board	ホーンズ基板	(PCB 22925349)1/4	
76174181	Amp Board	アンプ基板	(PCB 22925351)1/2	100/117V
76174184	Amp Board	アンプ基板	(PCB 22925351)1/2	220/240V
76174161	Secondary Power	二次電源基板	(PCB 22925353)1/2	100/117V
76174164	Supply Board	二次電源基板	(PCB 22925353)1/2	220/240V

HP-4500

CABINET キャビネット

21135154	Bottom Board	底板
21145203	Blind	口板
21115139	Side Panel left	側板 左
21115140	Side Panel right	側板 右
21145204	Rear Panel	後板
22125557	Angle Bracket A	アングル A
22125547	Angle Bracket B	アングル B
22215516	Front Panel	フロント・パネル
22215515	Top Panel	トップ・パネル
22135419	Music Stopper	譜面止
22195838	Music Rest Holder	譜面立止
22265121	Key Felt	キーフェルト
22025735	Speaker Grille right, left	スピーカークラッド (右/左)
22025734	Speaker Grille center	センター・クラッド
22195890	Speaker Holder left	スピーカホルダ - 左
22195891	Speaker Holder right	スピーカホルダ - 右
22275164	Grille Cloth	スピーカネット
21165127	End Block	拍子木
22195709	End Block Holder	拍子木ホルダ
22175502	Panel Angle Spring	パネルアングル・スプリング
22195622	Music Rest	譜面立
22195710	Phones Board Holder	ホーンズ基板ホルダ

KNOB, BOTTON ツマミ、ボタン

22475274	Knob	ツマミ	VOLUME, BRILLIANCE, TREMOLO RATE
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SPEAKER スピーカー

22415420	PD-2091B	20cm, 8 ohm	rated 10W; max 15W
12419532	TW-362B	2.5cm, 8 ohm	rated 15W; max 40W

POTENTIOMETER ポリウム

13219141	RKD3100AMA	100kΩ	rotary	TREMOLO RATE
13239109	RK16K1230	10kΩ x 2	rotary	BRILLIANCE
13219790	RKD30001GA	10kΩ x 2	rotary	VOLUME

COMMON TO HP-2000/3000/4500

JACK, SOCKET ジャック、ソケット

13449146	YKB21-5012	Mono	(モノ)	INPUT(right), SOFT, DAMPER
13449145	YKB21-5010	Stereo	(ステレオ)	OUTPUT(right/left)
13449252	YKB21-5006	Stereo	(ステレオ)	PHONES, INPUT(left)
13429615	TC5350-01-1111	DIN Socket		MIDI OUT/THRU
13429616	TC5354-01-1111	DIN Socket		MIDI IN

AC INLET ACインレット

13429709	PA-125	3P	100/240V
13429710	PA-126	2P	117/220V

SWITCH スイッチ

13129124	SDDG3078A		POWER
13169668	SKHHPM		Preset, Function
13159322	HSW0372-01-520		LEVEL
13159150	SSSY12050	Jack-B Board SW-1	MIDI
13159137	SSSS21067A	CPU-A Board SW-1	TEST

POTENTIOMETER ポリウム

13299177	RHE0A140XA	trimmer	
13279791	EVQ-WVKF1531G		TUNE
(rotary encoder, 5 bit 31 position, gray code)			

POWER TRANSFORMER 電源トランス

22455451U0	100/117/220/240V
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PCB ASSEMBLY 基板完成品

76169120	CPU-B Board	CPU-B基板	(PCB 22925348)	
76169041	Primary Power	一次電源基板	(PCB 22925456)	100/117V
76169044	Supply Board	一次電源基板	(PCB 22925456)	220/240V

AC CORD(Detachable) ACコード(脱着式)

13439816F0	DC-357-J01	100V
13439812F0	UC-704-J01	117V
13439813F0	EC-210-J06	220V
13439846	BH-301-J01	240V-E
13439814F0	SC-415-J06	240V-A

12559398	ULTSC 1.25A-N1	sec	100/117V
12559400	ULTSC 2A-N1	sec	100/117V
12559402	ULTSC 3A-N1	pri: 100/117V	amp: 100/117V
12559511	CEE T500mA	sec	220/240V
12559521	CEE T1.6A	pri	220/240V
12559514	CEE T2A	sec	220/240V
12559516	CEE T3.15A	amp	220/240V
12559707	FRNB 1/4 100 ohm	Fusing Resistor ヒューズ抵抗	
12199550	H0446 Fuse Holder	ヒューズ・ホルダー	

IC

15179203	HD63B03RP	CPU
15229830	MB63H149	gate array
15229837	R06-0001	gate array
15229838	R06-0002	gate array
15229839	R06-0003	gate array

See " ROM CROSS-REFERENCE " Table in the CPU-B board section.

CPU-B 基板図の頁の " 互換表参照 "

15179793	MB(TMM)2764	ROM A	8k x 8 bit EP ROM	CPU-A Board IC5
15179794	MB(TMM)2764	ROM B	8k x 8 bit EP ROM	CPU-B Board IC11
15179817	TMM2764	ROM C	8k x 8 bit EP ROM	CPU-B Board IC17

15179777	MB831000-256	128k x 8 bit mask ROM
15179747	MB831000-221	128k x 8 bit mask ROM
15179748	MB831000-222	128k x 8 bit mask ROM
15179749	MB831000-223	128k x 8 bit mask ROM
15179734	NB7138H-01	bipolar plain output PROM
15179343	HM6116ASP-12	2k x 8 bit static RAM
15219162	PCM54	16bit D/A converter
15219174	NJU201AD	analog switch
15229706S0	PC-910	opt-isolator
15159503	TC40H00P	quad 2 input NAND gate
15159514	TC40H032P	quad 2 input OR gate
15159525	TC40H139P	dual 2 to 4 line decoder/demultiplexer
15159519	TC40H157P	quad 2 to 1 line selector/multiplexer
15159511	TC40H174P	hex D type Flip flop
15159508	TC40H373P	octal D type latch (3 state output)
15159531	TC40H374P	octal D type Flip flop (3 state output)
15159303	TC4584BP	hex schmitt trigger
15169301H0	HD74LS00P	quadruple 2 input positive NAND gate
15169334H0	HD74LS05P	hex inverter with open collector output
15169324H0	HD74LS245	octal bus transceiver w/3 state output(noninverted)
15219205	MN3007	1024-stage BBD
15179504	MN3101	BBD driver
15219129	CEM3360	dual voltage controlled amplifier
15219163	NE572	programmable analog compander
15189148	NJM072SP	operational amplifier
15189189	uPC4570HA	operational amplifier
15199538	STK4392	stereo power amplifier
15199106NH	uPC7805H	+5 voltage regulator
15199113	NJM87L09A	+9 voltage regulator
15199140	NJM79L09	-9 voltage regulator

CRYSTAL 発振子

12389747	HC-49/U 16MHz
12389751	HC-49/U 12.8MHz

TRANSISTOR トランジスタ

15119106DR	2SA933R	
15119814	2SB10150	
15129113	2SC1740R	
15129136	2SC2878A	
15129834	2SD14080	
15129154	DTA144EA	w/built-in bias resistor
15129155	DTC144EA	w/built-in bias resistor
15129147	DTC124EF	w/built-in bias resistor
15139124	2SK363GR	FET
15139106	2SK117GR	FET

DIODE ダイオード

15019162T0	1SS176	
15019103T0	1S2473	
15019208	1SR-35-200	
15019273	4B4B41-LC1	
15019272	2B4B41-LC2	
15019279	4B4B44	
15029152	GL9HD12 LED	
15019412	MTZ4.7B	zener

RESISTOR ARRAY 抵抗アレイ

13919310	RMLS8-103J	10k X 8
13919311	RMLS8-223J	22k X 8
13919147	RMLS4-103J	10k X 4
13919153	RMLS5-103J	10k X 5
13919322	RMLS4-102J	1k X 4
13919313	RMLS8-104J	100k X 8
13919333	RMLS12-153J	15k X 12
13919334	RMLS10-153J	15k X 10

CAPACITOR コンデンサ

13659201	ECET16R682SW	6800uF/16V
13659222M0	ECET35R222SW	2200uF/35V
13659236	ECET50R332SW	3300uF/50V

CAPACITOR ARRAY コンデンサ・アレイ

13529118	B5RC0139-32N	22P X 4
13520113	B7ZC0724-32N	22P X 6
13529115	EXFP8101MW	100P X 8

COLLAR/BUSHING カラー/ブッシュ

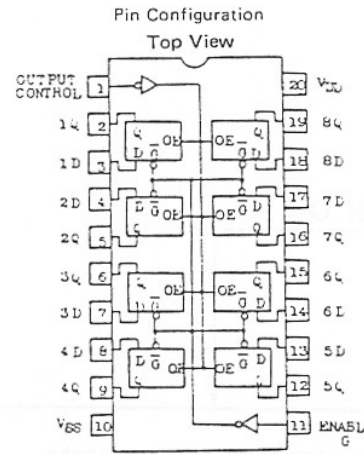
12159713	TA-305	female	メス
12159714	TA-314	female	メス
12159715	TA-300	male	オス
12159733	TA-310	female	メス

OTHERS その他

12449273	BL03 RN2-R62	EMI filter	EMIフィルター
22445240	BL02 RN2-R62	ferrite bead	フェライト・ビーズ
13529105	DSS310-55D223S	EMI filter	EMIフィルター
12449269	0538-014	low pass filter	ローパス・フィルター
22195862	Switch Holder	PW SW	スイッチ・ホルダー
12359105	Rubber Foot		ゴム足
22465492	Heat Sink (sec. PS Brd)		ヒート・シンク
22465491	Heat Sink (Amp Brd)		ヒート・シンク
22195834	Jack Holder (Jack Brds)		ジャック・ホルダー
22195837	DIN Socket Holder		DINソケット・ホルダー

IC DATA

TC40H373P
OCTAL D-TYPE LATCH(3-STATE OUTPUT)



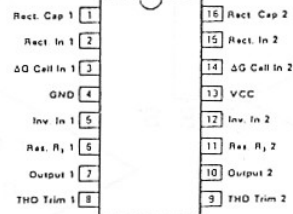
Truth Table

INPUTS		OUTPUT	
OUTPUT CONTROL	ENABLE G	DATA	Q
L	H	H	H
L	H	L	L
L	L	#	Q ₀
H	#	#	High Impedance

= Don't care

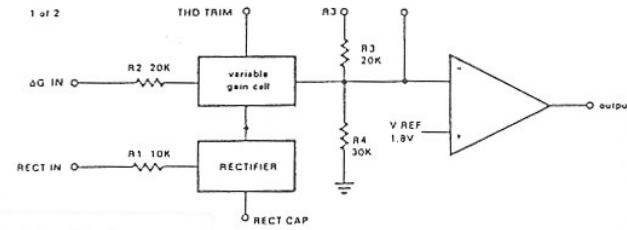
NE572

Pin Configuration
D¹, F, N PACKAGE

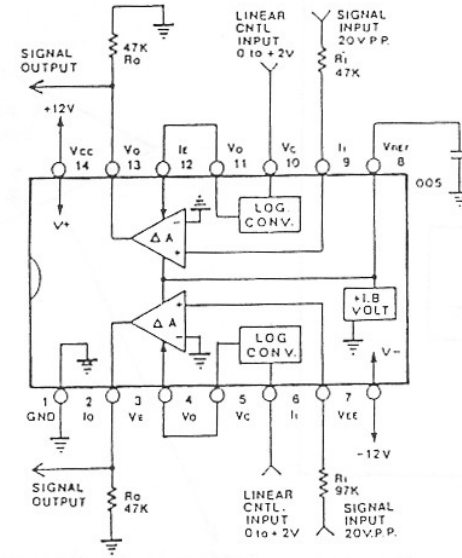


Top View

Block Diagram



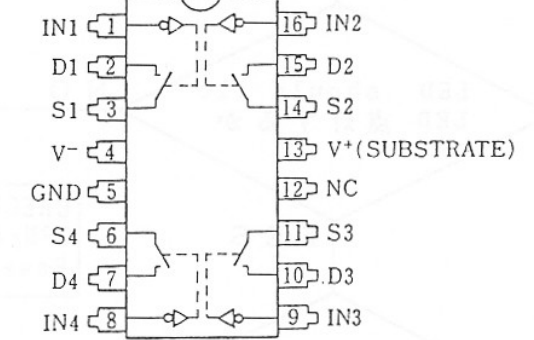
VCA



CEM 3360 Block Diagram and Typical Connection

HI201, NJU201AD

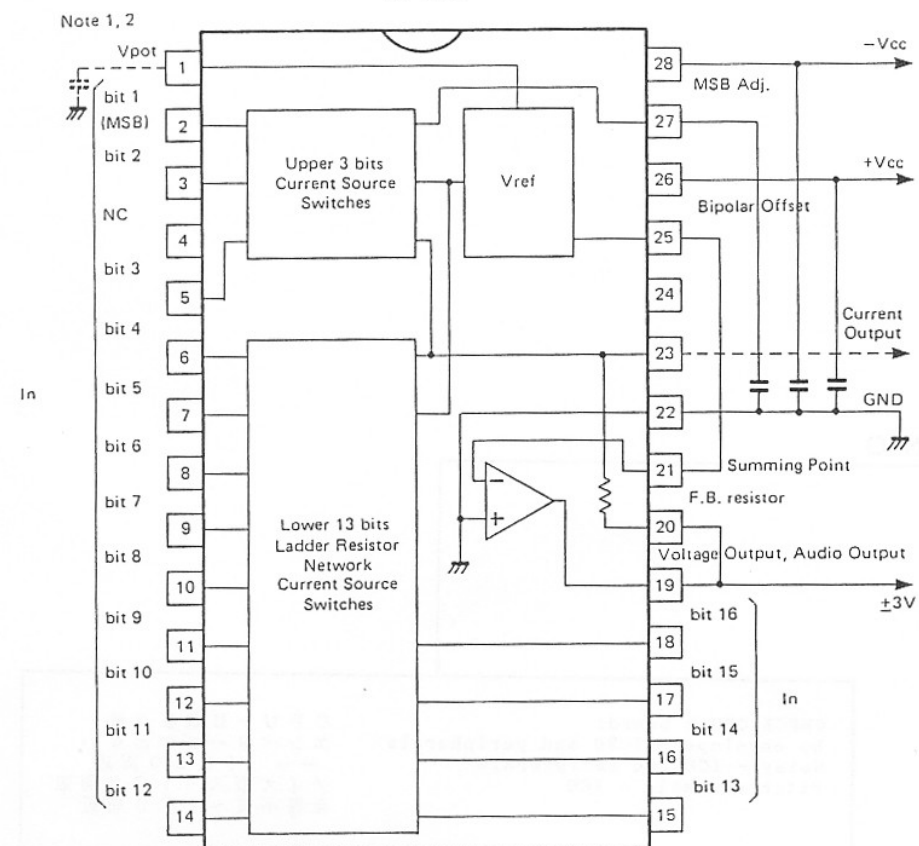
Pin Configuration



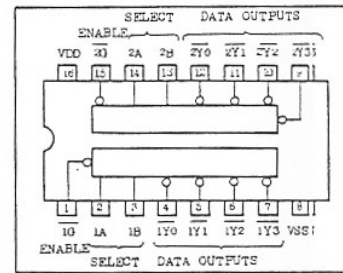
TOP VIEW

PCM-54

Top View



TC40HI39P
DUAL 2-TO-4-LINE DECODE/DEMULTIPLER

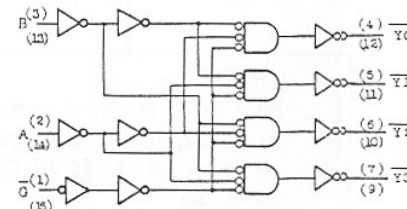


Truth Table

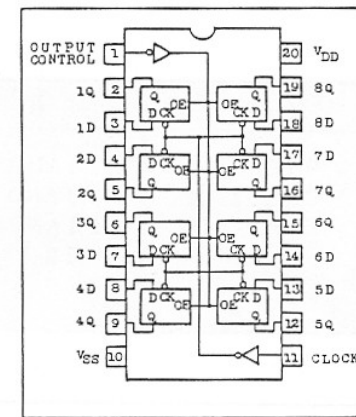
INPUTS		OUTPUTS			
ENABLE G	SELECT	Y ₀	Y ₁	Y ₂	Y ₃
H	#	#	#	#	#
L	L	L	L	H	H
L	H	L	H	L	H
L	L	H	H	L	L
L	H	H	H	H	L

= Don't care

Block Diagram



TC40H374P
OCTAL D-TYPE FLIP-FLOP(3-STATE OUTPUT)



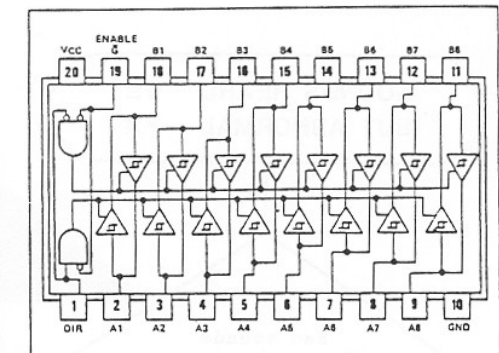
Truth Table

INPUTS		OUTPUT	
OUTPUT CONTROL	CLOCK	DATA	Q
L	↑	H	H
L	↑	L	L
L	↓	#	Q ₀
H	#	#	High Impedance

= Don't care

SN74LS245
OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

(TOP VIEW)

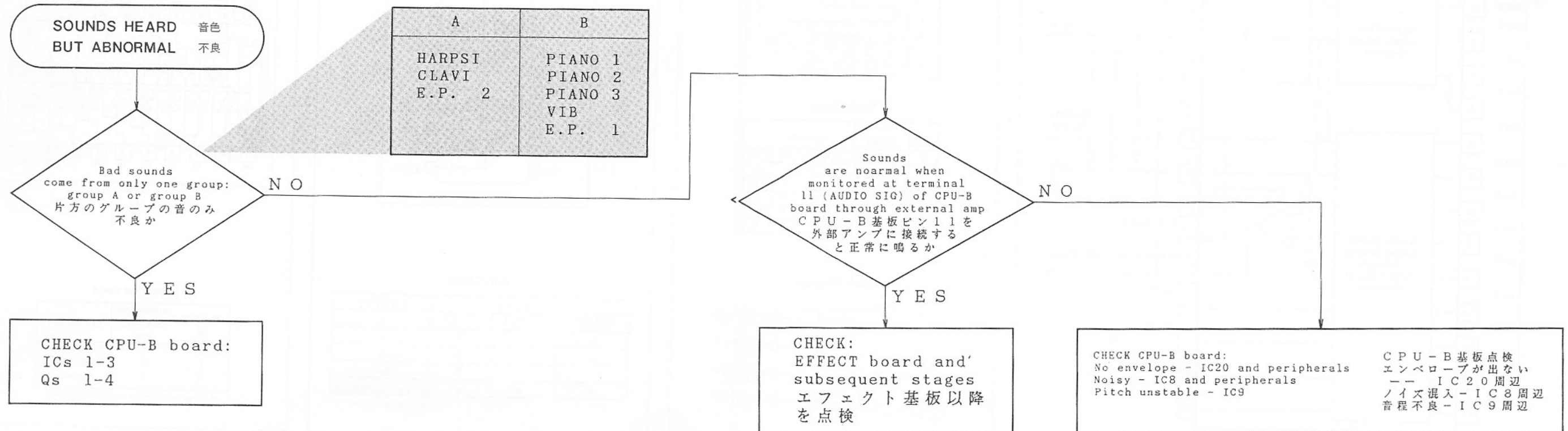
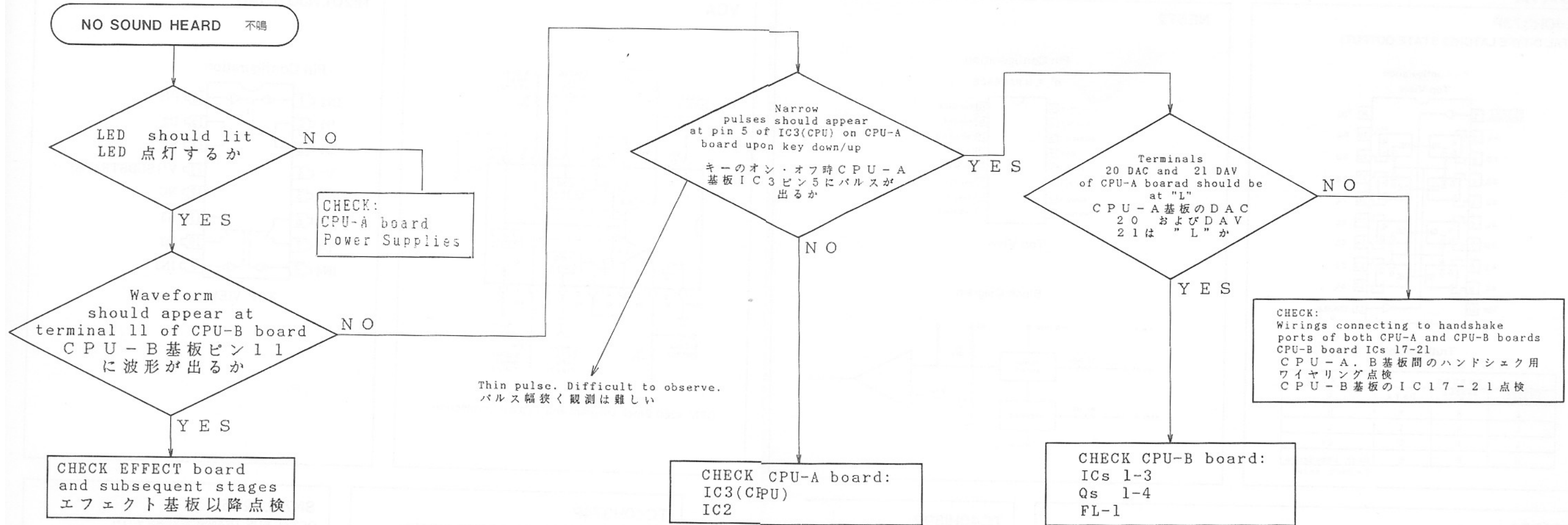


FUNCTION TABLE

ENABLE G	DIRECTION CONTROL DIR	OPERATION
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

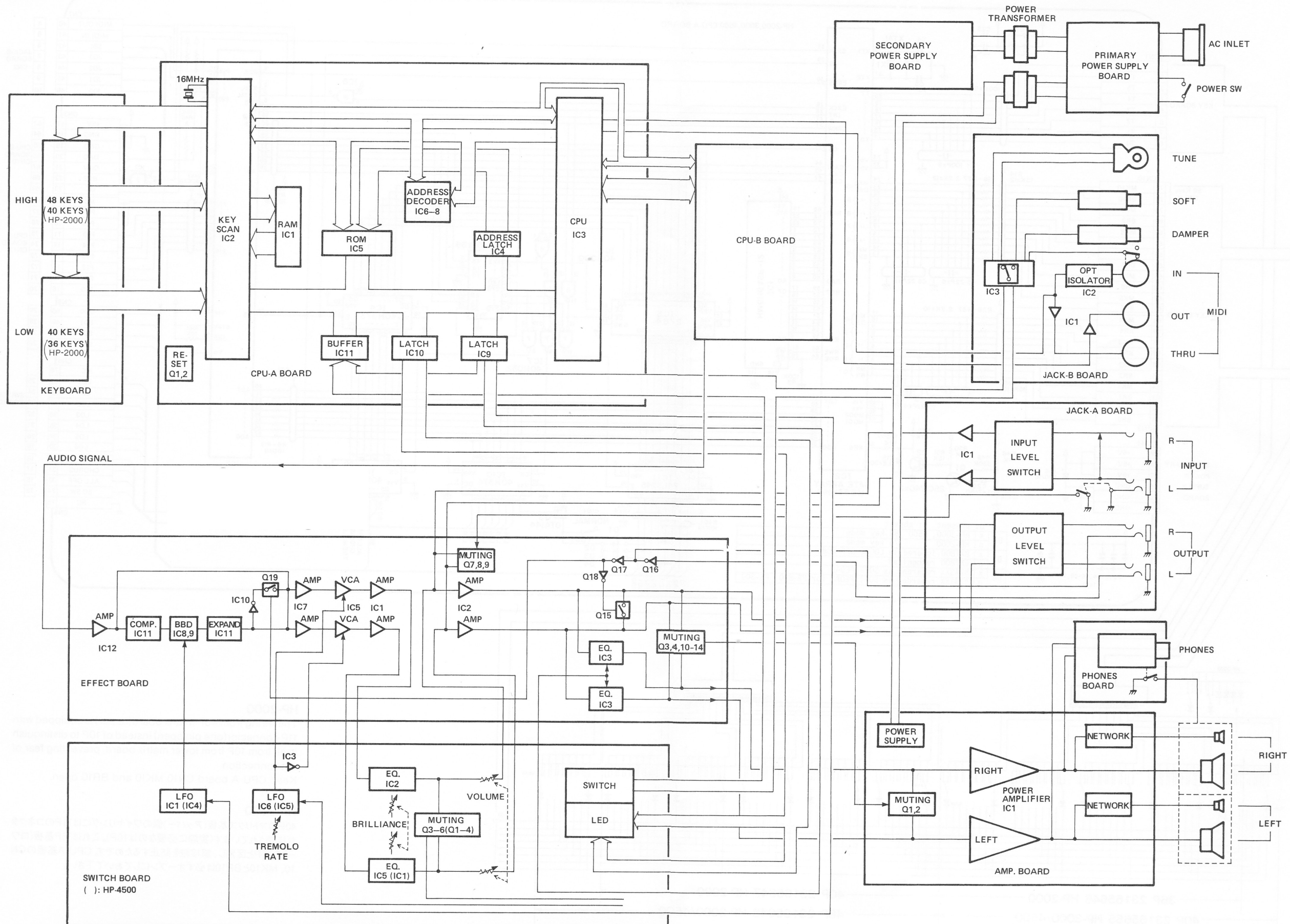
H = high level, L = low level, X = irrelevant

TROUBLESHOOTING Logic Tree トラブルシューティング・ガイド



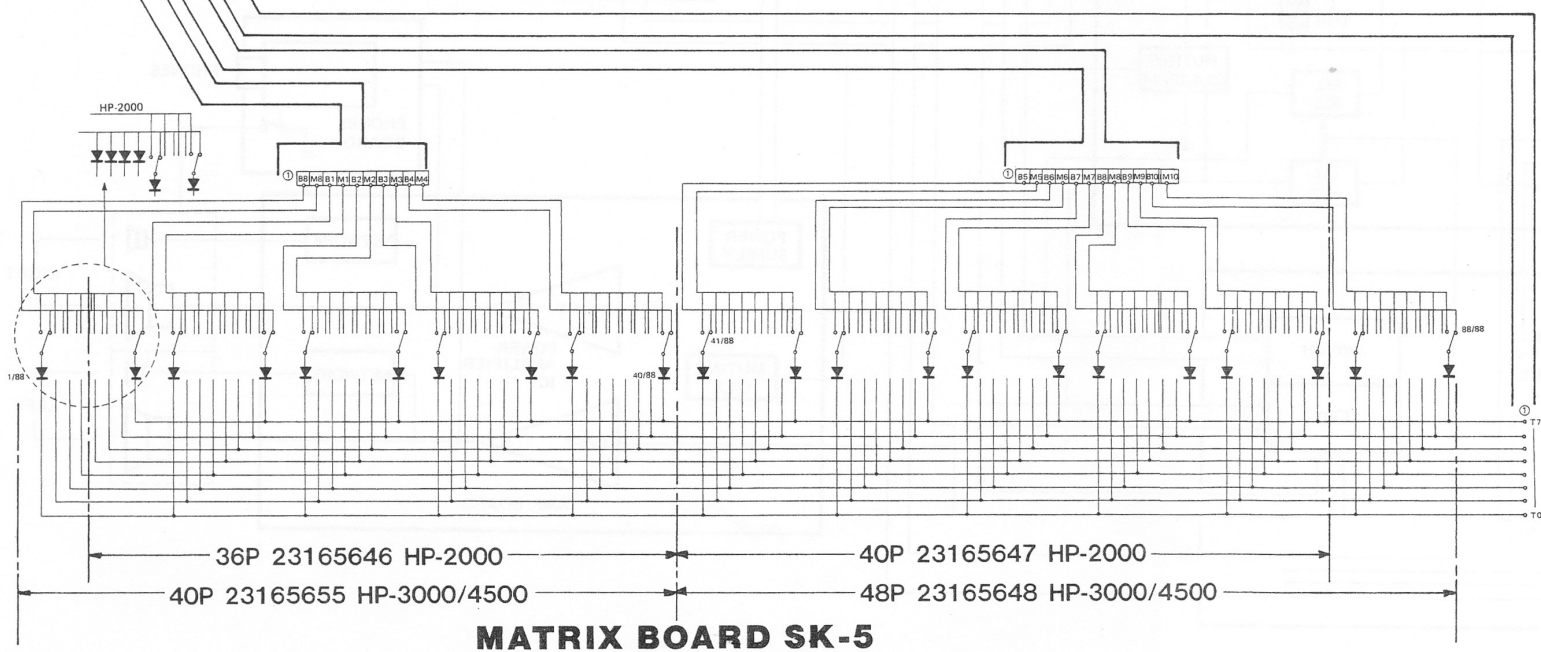
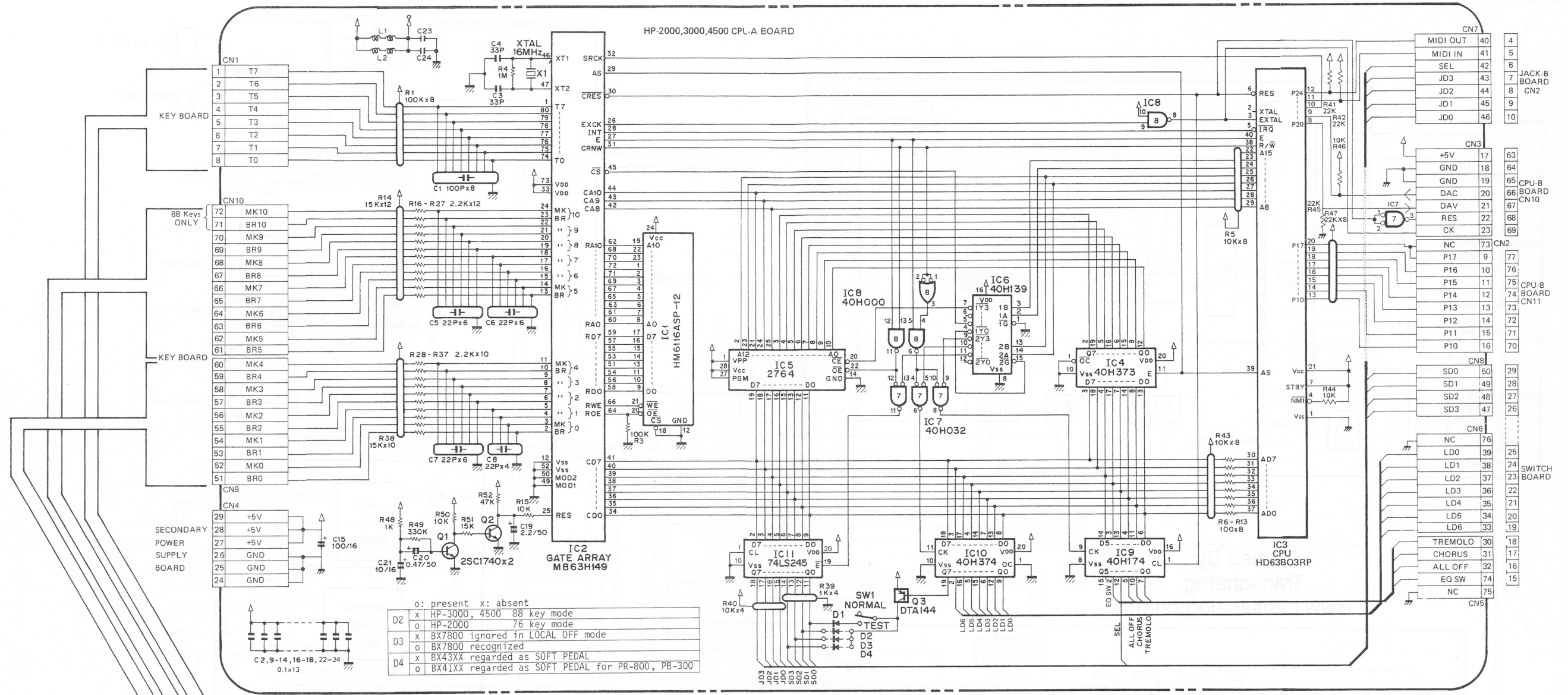
BLOCK DIAGRAM

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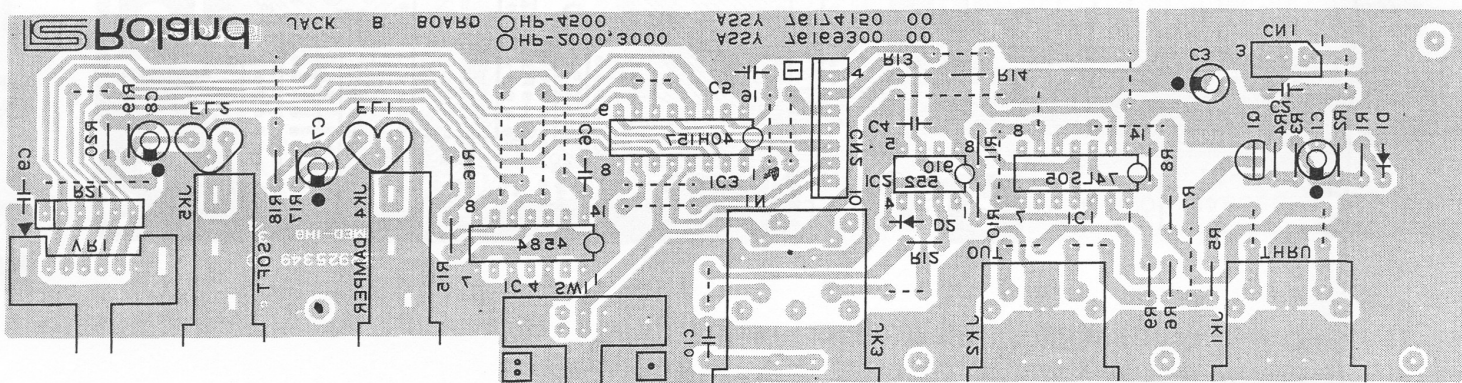
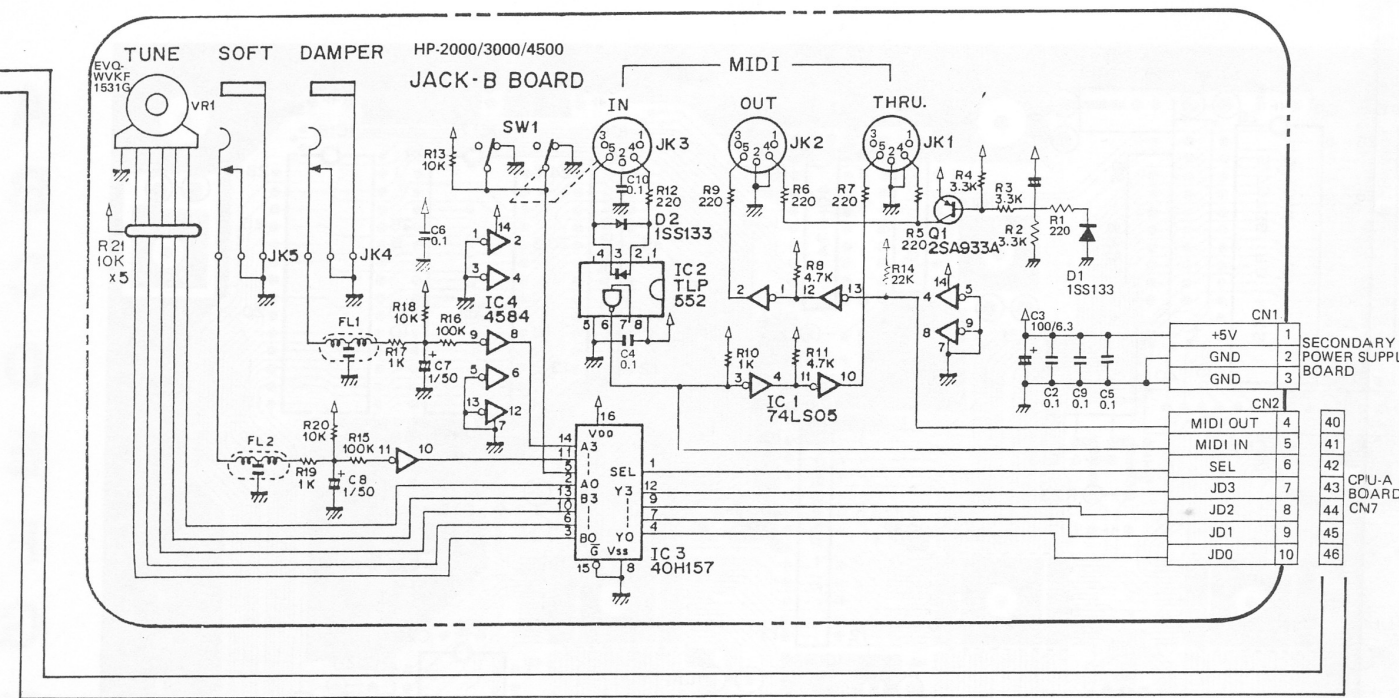


HP-2000
The wiring from 40P matrix board(upper) is equipped with 11P connector(one pin open) instead of 10P to distinguish itself from 10P from lower matrix board, preventing fear of misconnection.
Keep CPU-A board CN10 MK10 and BR10 open.

HP-2000
40Pのマトリクス基板(アッパー)側のワイヤリングには11Pのコネクタが接続されています(実際に必要なのは10P)。これは36P基板(ローワー)の10Pと区別し、誤接続を防止するためです。CPU-A基板のCN10、MK10とBR10は必ずオープンにしておいて下さい。

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

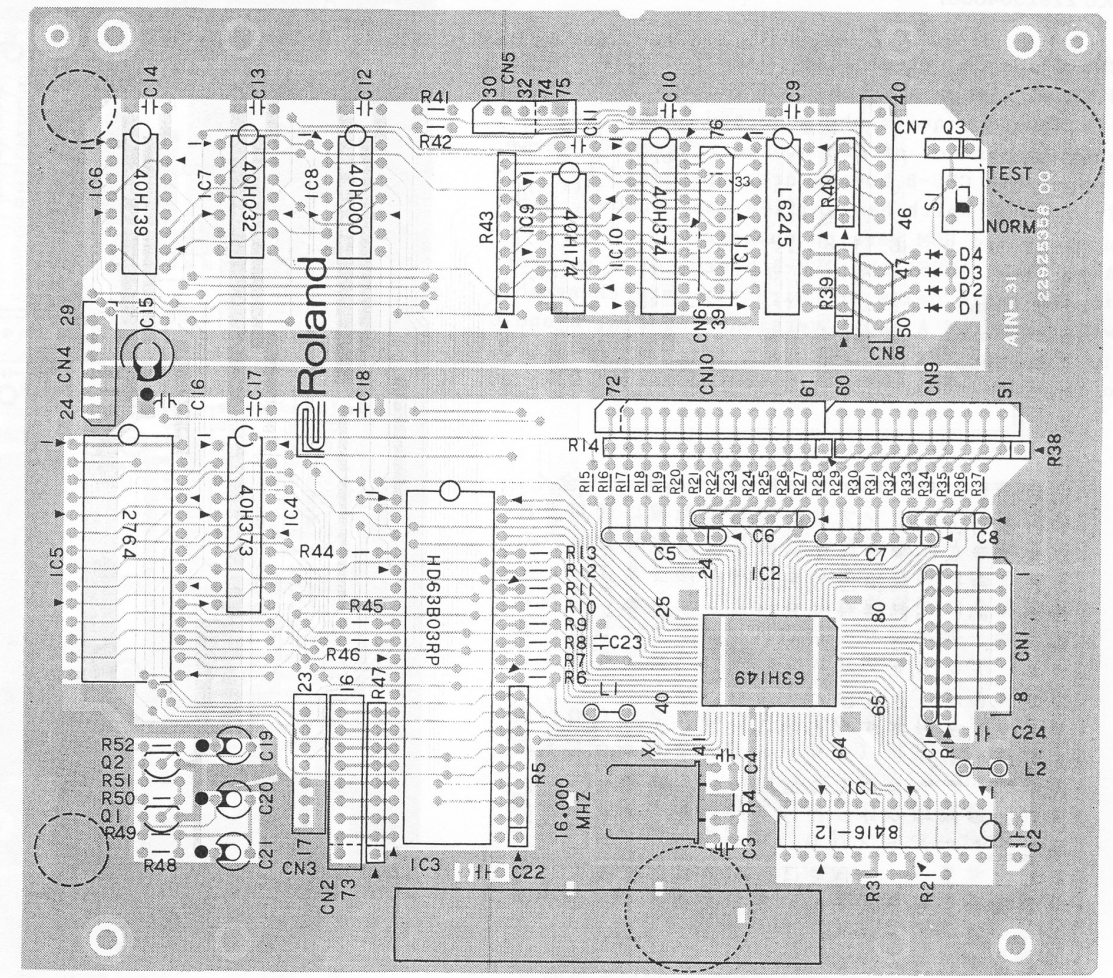
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JACK-B BOARD
 7616930000 HP-2000/3000
 7617415000 HP-4500
 (pcb 2292534900 3/4)

Having longer wirings, 7616930000 can be a direct replacement for 7617415000.

HP-2000/3000用はワイヤリングが長いのでHP-4500用に流用可能。



CPU-A BOARD 76169080 HP-2000
 76170080 HP-3000/4500
 (pcb 2292535800)

Difference between two versions

	76169080	76170080
CN10	11P	12P
D2	present 有	absent 無

76170080 can replace 76169080 by:
 1) inserting D2 2) keeping CN10 terminals 71 and 72 open.

76170080をHP-2000に流用出来ます。ただし、
 1) D2を挿入する。2) CN10の72,71端子を開放しておく。

CPU-B BOARD

7616912000
(pcb 2292534800)

CPU-B boards assemblies used for some Roland digital pianos are based on the similar design --- some are quite the same and some differ only in portion of ROM stored program. Of these compatible CPU-B boards are superseded by 7616912000 which has unified assy number, part numbers and ROM version numbers.

As of Sept.1986, the CPU-B boards of C version in the table below are directly interchangeable with those of A and B versions: ROMs A, B and C in the same stringed-box are the same in terms of program and can be treated as identical ones.

ローランドのデジタルピアノ用CPU-B基板は、全く同じ内容のアッセンブリが複数の機種に使用されている場合と、基板自体は同じでもPROM内のプログラムが異なっている場合があります。この内完全に互換性のあるCPU-B基板を共通化のため、部品番号 ROMバージョンNo. を統一し、アッセンブリNo. を 7616912000とします。

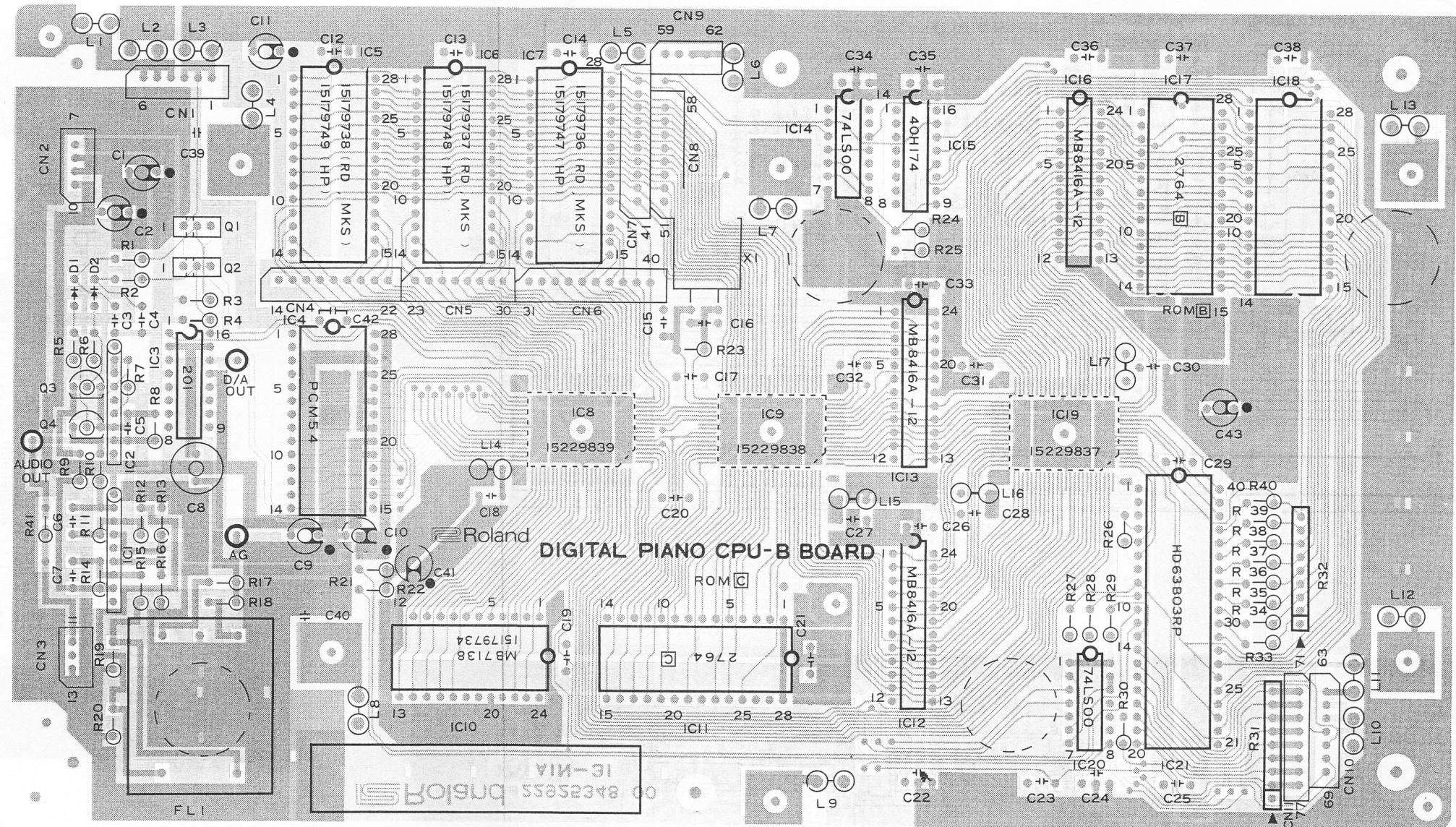
1986年9月現在の7616912000 (表中C) は先行基板 (表中A、B) とは完全に差替え可能です。

表中同一罫線内のROM同士は、機種名、部品番号およびバージョンNo. が異なっても同一品とみなせます。

その他の基板に付いては、ROMの交換を必要とする場合がありますので該当機種のサービスノートを参照して下さい。

なお参考のため、HP-2000/3000/4500と直接関係のあるROMとの互換も併記してあります。

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

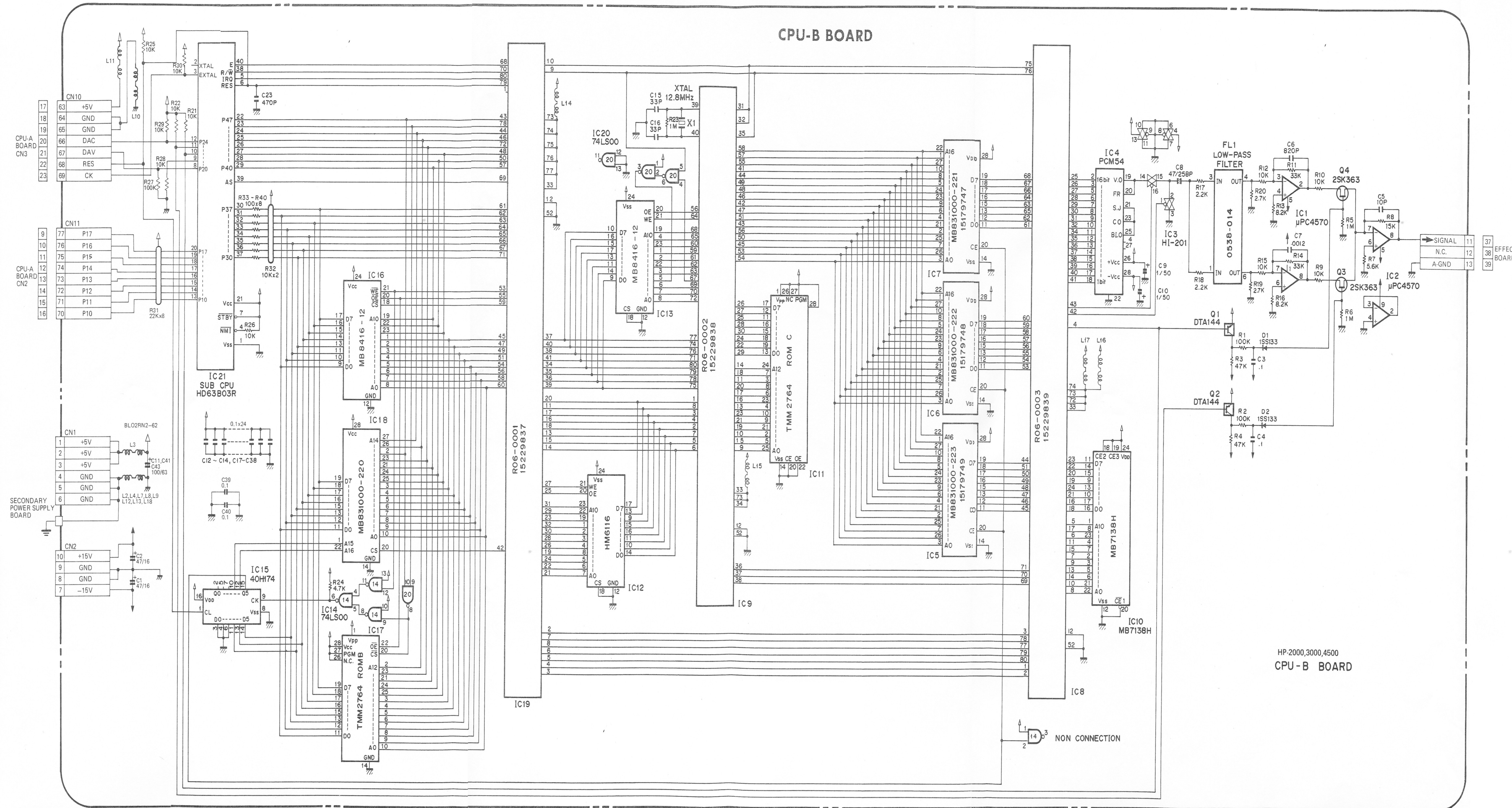


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CPU-B BOARD ASSY	CPU-B BOARD							CPU-A BRD
	MODEL (ROM LABEL)	EPROM B	EPROM C	MASK ROM	MASK ROM	MASK ROM	MASK ROM	EPROM A
	RD-1000, MKS-20	IC 17	IC 11	IC18	IC5	IC6	IC7	IC 5
7616207002 (pcb 2292529100)	A HP-5500, 5600 PART NO.	Ver. 3.0 15179771-02	Ver. 1.0 15179744	15179777	15179749	15179748	15179747	Ver. 2.0 15179770-01
	B HP-2000, 3000, 4500 PART NO.	Ver. 1.0 15179794	Ver. 10 15179817					Ver. 1.0 15179793
7616912000 (pcb 2292534800)	C HP-2000, 3000, 4500 5500, 5600 PART NO.	Ver. 3.0 15179794						Ver. 2.0 15179793
	RD-200, 300 PART NO.							

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68

CPU-B BOARD



ADJUSTMENT—EFFECT BOARD—

1. Entering Test Mode
 - 1-1. Set SW1 on the CPU-A board to TEST.
 - 1-2. Press and hold CHORUS button, then switch the power on.
2. Compressor
 - 2-1. Connect scope to TP-3(AC coupling)
 - 2-2. Center the display on the horizontal graticule.
 - 2-3. Press TREMOLO.
 - 2-4. Adjust VR2 so that the front corners of wave do not drift in either direction.
 - 2-5. Disconnect the scope.
3. BBD Bias
 - 3-1. Press CHORUS.
 - 3-2. Jumper-short TP-4 pins.
 - 3-3. Connect scope to TP-2.
 - 3-4. Adjust VR1 for a symmetrical waveform with respect to the center horizontal line.

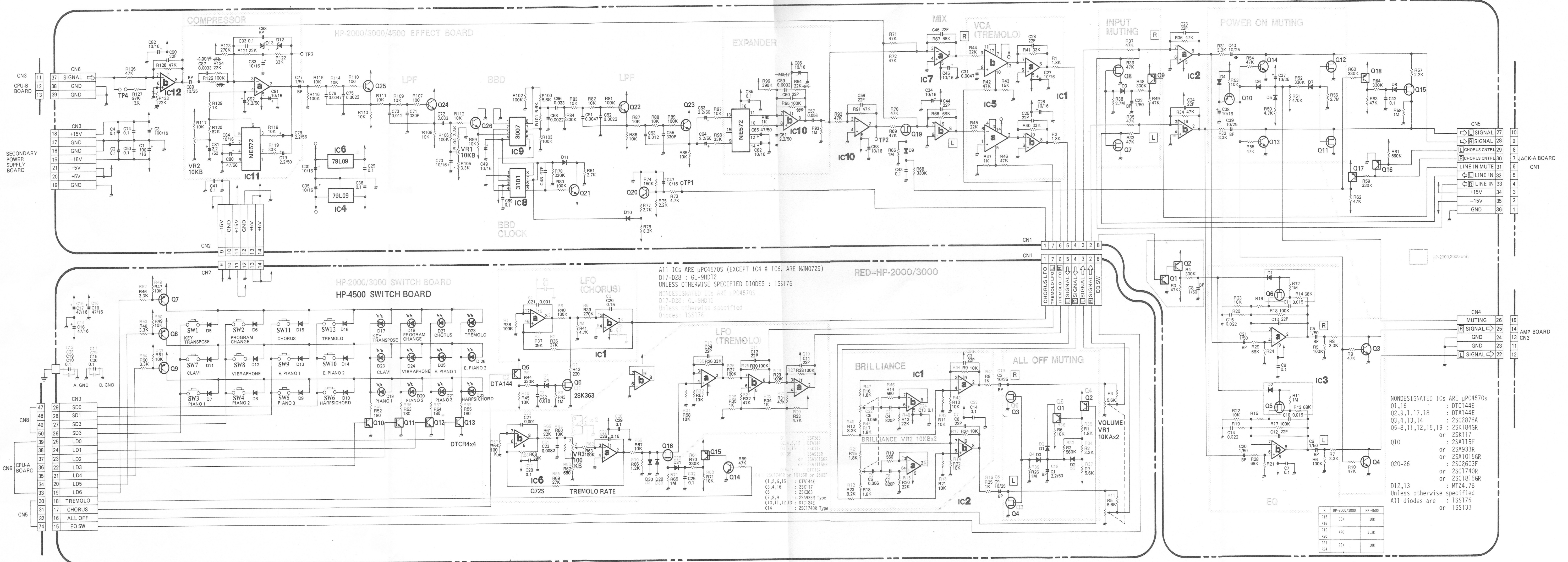
調整—エフェクト基板—

1. テストモード
 - 1-1. CPU-A基板のSW-1をTEST側にする。
 - 1-2. CHORUSボタンを押しながら電源をオンにする。
2. コンプレッサ
 - 2-1. TP-3にシンクロスコープを接続する(AC)。
 - 2-2. TREMOLOを押し。
 - 2-3. 波形の頭部分が上下一方向にゆさぶられている場合は、VR2を調整して水平にする。
3. BBDバイアス
 - 3-1. CHORUSを押し。
 - 3-2. TP-4のピンをショートする。
 - 3-3. TP-2にシンクロスコープを接続する。
 - 3-4. 波形が上下対称になるようVR1を調整する。

HP-2000,3000,4500 CPU-B BOARD

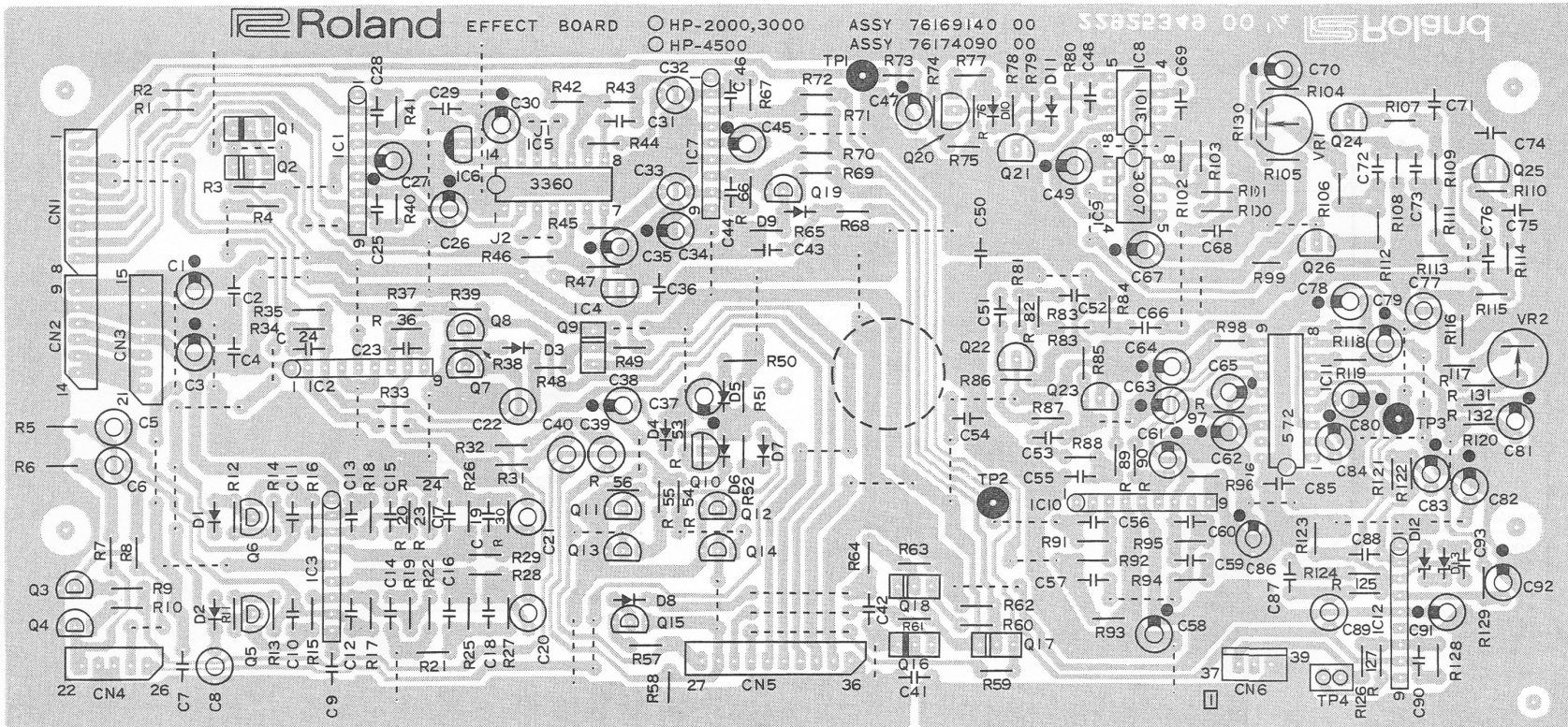
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73

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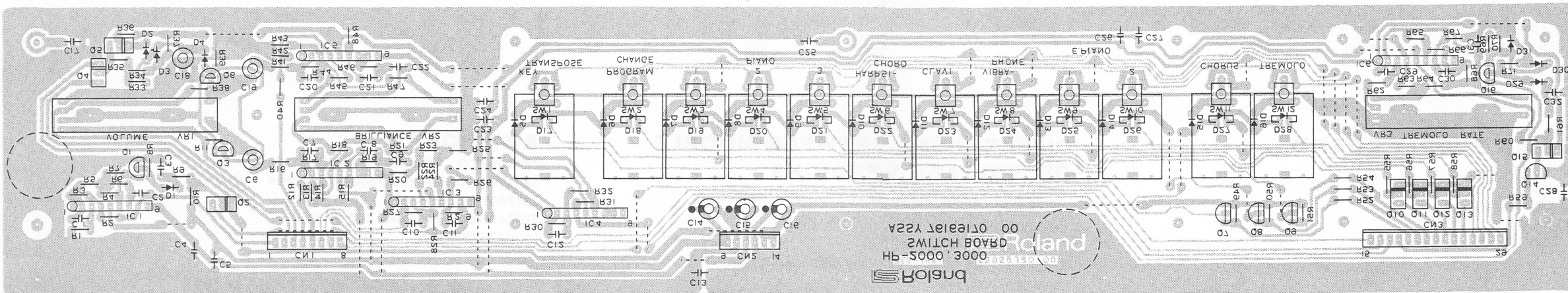


EFFECT BOARD

7616914000 HP-2000/3000
7617409000 HP-4500
(pcb 2292534900 1/4)

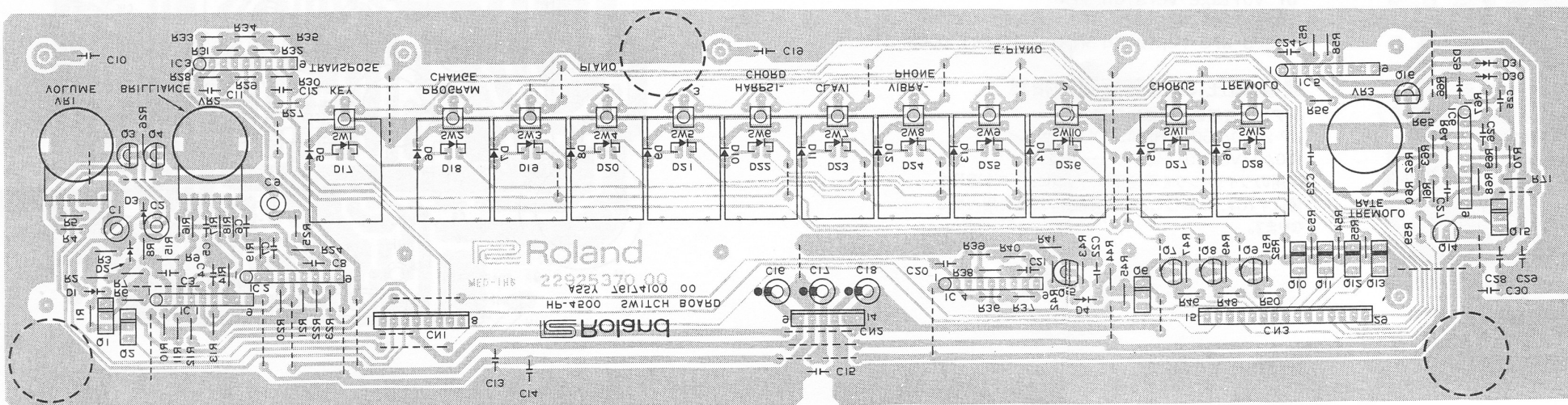
As can be seen from the table below 7616914000 can be used for 7617409000 with minor modification. 表から判ることくHP-2000/3000用基板はわずかな変更でHP-4500に使用出来ます。

HP-2000/3000 7616914000	HP-4500 7617409000
33K	R15, R16 10K
470	R19, R20 3.3K
22K	R21, R24 18K
Required C _s Used	
	Qs 1,2,5,6 Not
	Rs 11-14
	Ds 1-2



SWITCH BOARD

7616917000 HP-2000/3000
(pcb 2292535000)

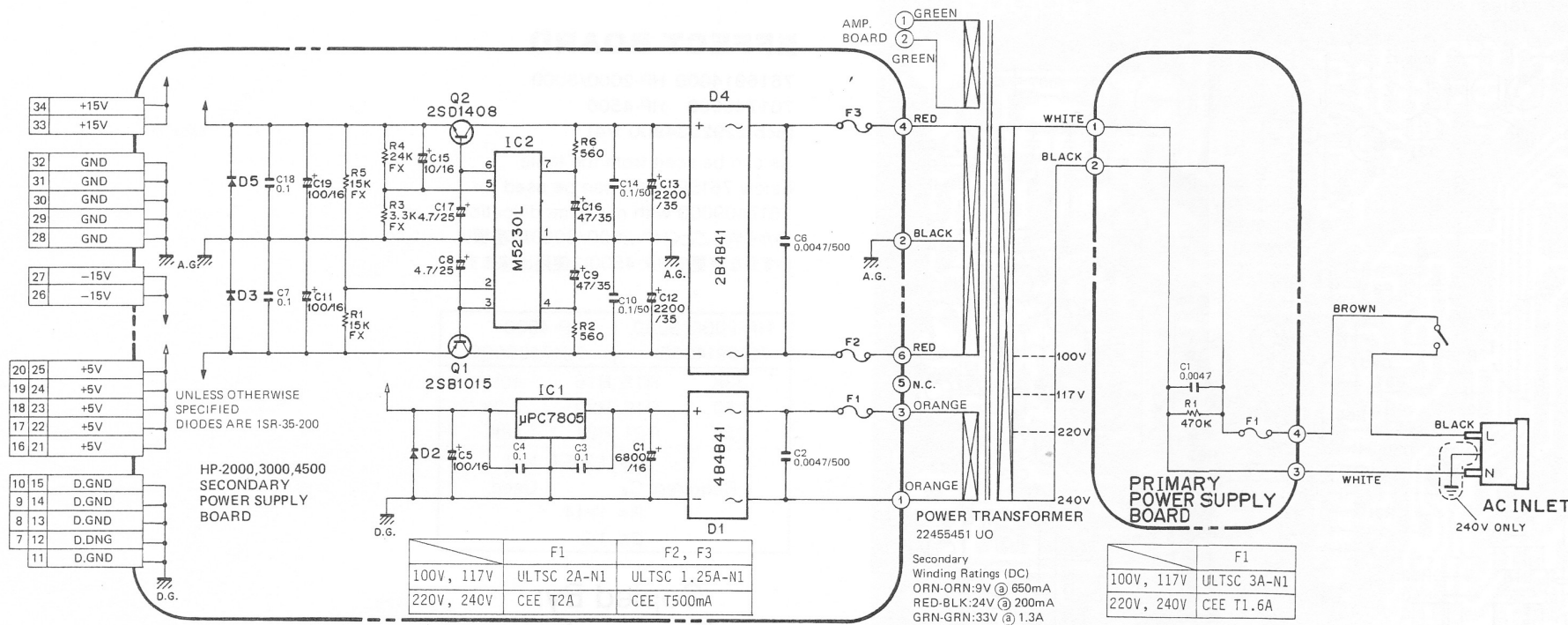


SWITCH BOARD

7617410000 HP-4500
(pcb 2292537000)

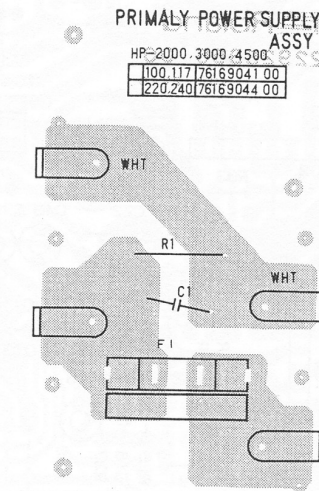
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 3

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PRIMARY POWER SUPPLY BOARD

7616904100 100/117V
7616904400 220/240V
(pcb 2292535600)

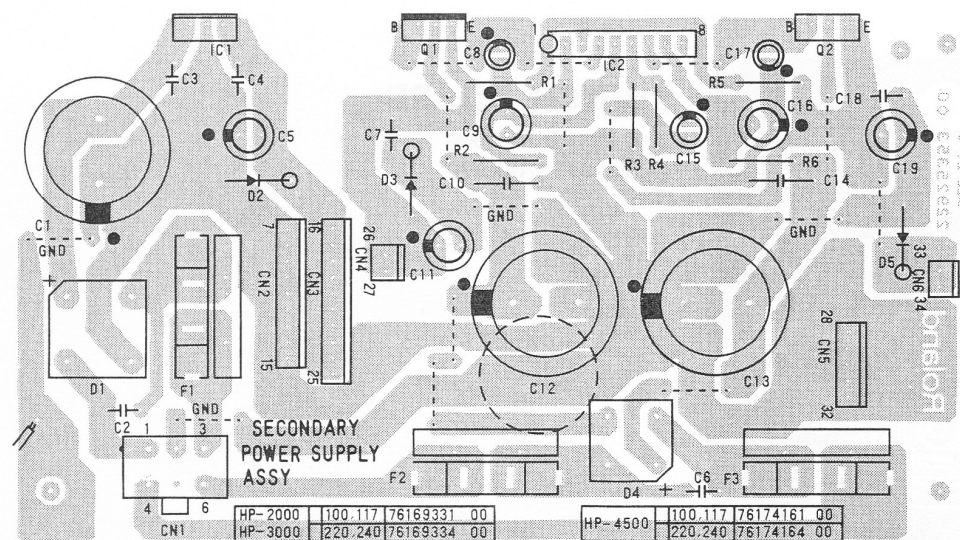


Although a replacement power supply board is mounted on a heat sink, separate them before using. Do not remove the heat sink on the rear panel if an assistant is not present. Securing the heat sink to the rear panel is difficult to achieve by one person.

補修用基板にはヒートシンクが付いていますが、使用前に取り外して下さい。リアパネルのヒートシンクは、一旦取り外すと再取り付けが非常に困難となります。

SECONDARY POWER SUPPLY BOARD

76169331000 HP-2000/3000 100/117V
76169334000 HP-2000/3000 220/240V
76174161000 HP-4500 100/117V
76174164000 HP-4500 220/240V
(pcb 2292535300)



DIFFERENCES BETWEEN MODELS OR VOLTAGE VERSIONS

— Amp Board And Secondary Power Supply Board —

Between HP-2000/3000 and HP-4500
Wiring configuration

Between 100/117V and 220/240V versions
Fuse rating

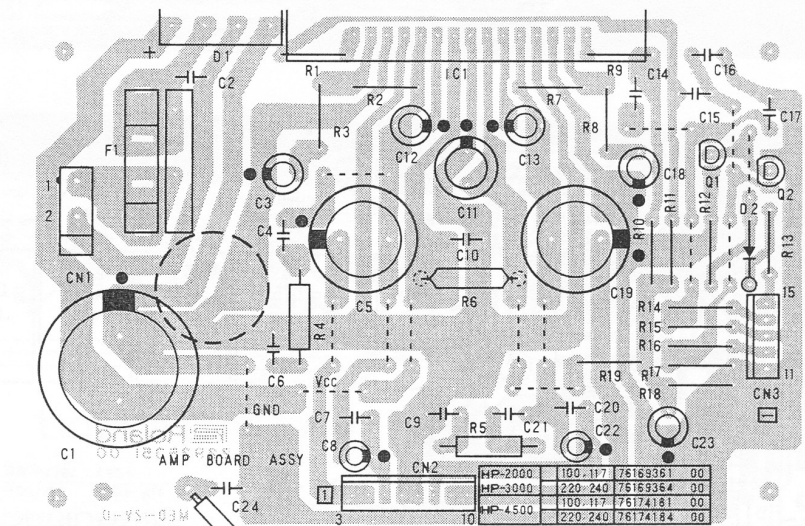
One pcb could be used for another model or voltage version if:
In-system wirings are reused and/or
Fuses are replaced with correct ones

機種、電圧による基板間の相異

— アンプ基板および二次電源基板 —
HP-2000/3000とHP-4500:ワイヤリング長さ
100/117Vと220/240V:ヒューズ値
現用のワイヤリングを再使用し、かつヒューズを適切な値にすれば、三機種および全電圧に共通使用可能となります。

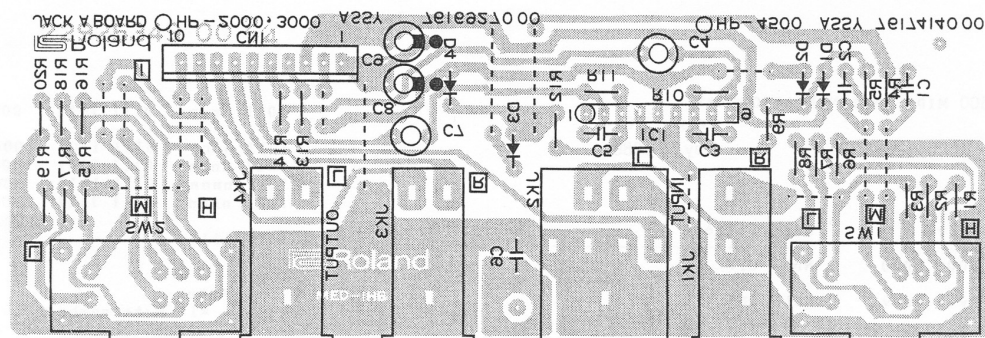
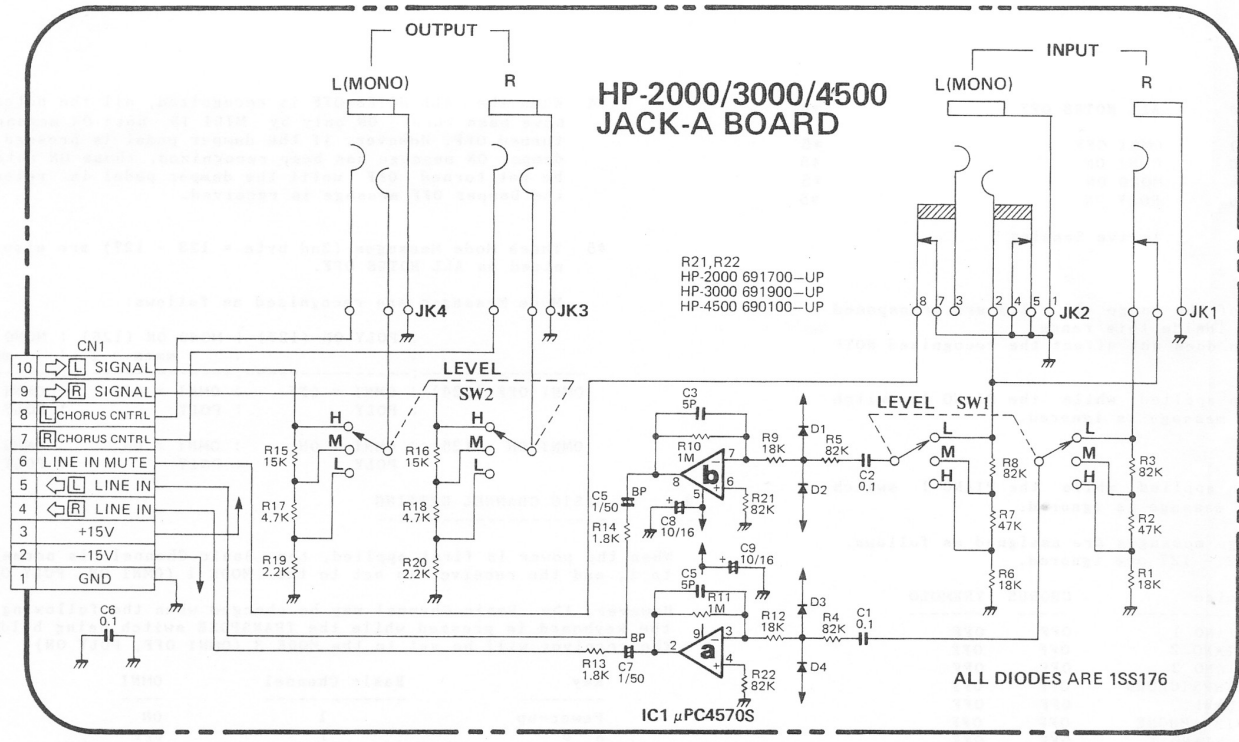
AMP BOARD

7616936100 HP-2000/3000 100/117V
7616936400 HP-2000/3000 220/240V
7617418100 HP-4500 100/117V
7617418400 HP-4500 220/240V
(pcb 2292535100)



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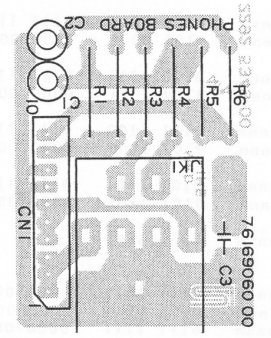
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JACK A BOARD

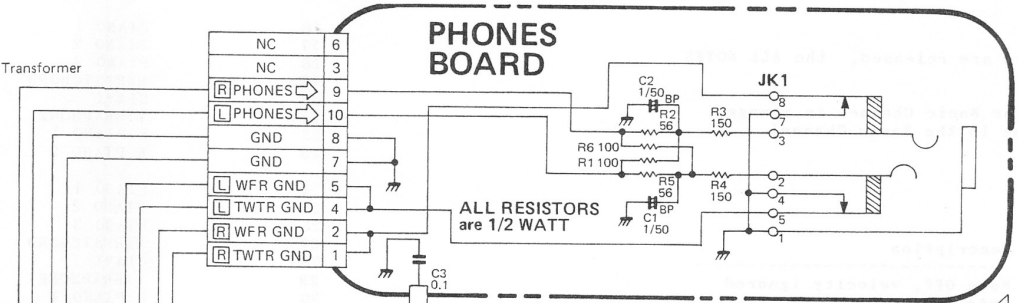
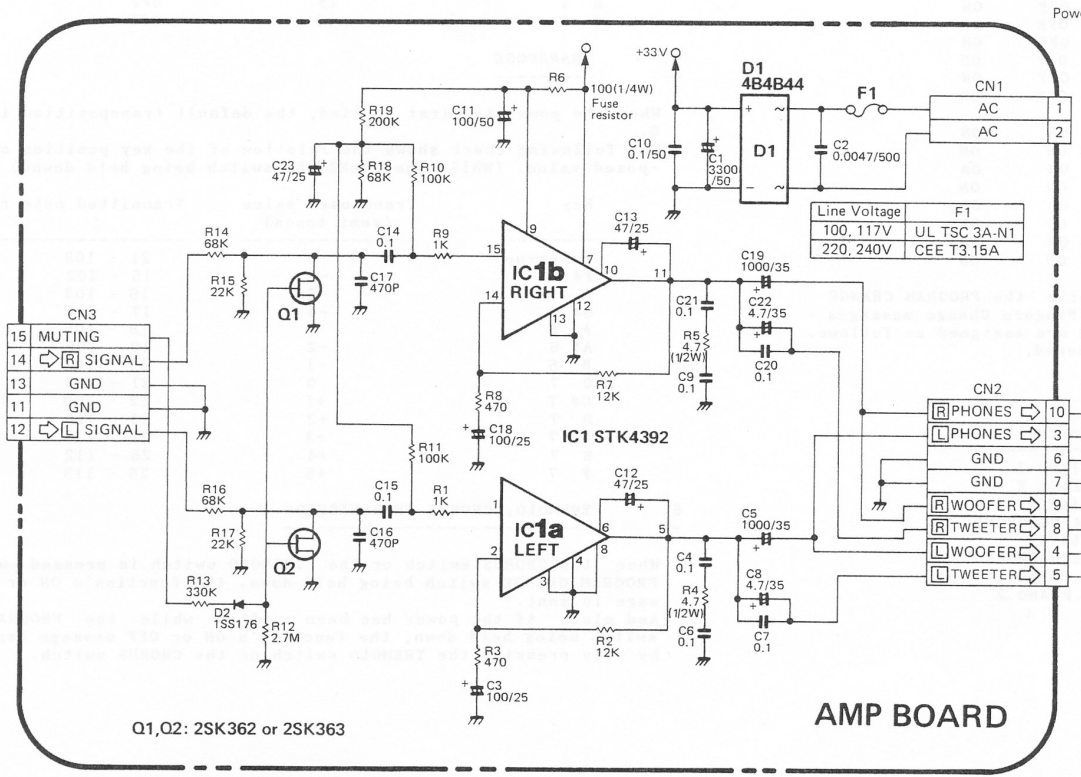
7616927000 HP-2000/3000
 7617404000 HP-4500
 (pcb 2292534900 2/4)

Having a longer wiring 7617414000 can be direct replacement for 7616927000.
 HP-4500用基板は、HP-2000/3000用よりもワイヤリングが長いので三機種共通に使用可能です。



PHONES BOARD

7616906000
 (pcb 2292534900 4/4)



- R TWEETER 8Ω
- R WOOFER 8Ω
- L TWEETER 8Ω
- L WOOFER 8Ω

- S065H17
HP-2000/3000
- TW-362B
HP-4500
- S16K46
HP-2000/3000
- PD-2091B
HP-4500

MIDI IMPLEMENTATION

*** HP-2000/3000/4500 MIDI IMPLEMENTATION ***

Version 1.0
May.20 1986

1. TRANSMITTED DATA

Status	Second	Third	Description
1001 nnnn	0kkk kkkk	0000 0000	Note OFF
1001 nnnn	0kkk kkkk	0vvv vvvv	Note ON kkkkkkk = 15 - 113/ HP-3000 HP-4500 22 - 108/ HP-2000 vvvvvvv = 1 - 127
1011 nnnn	0100 0000	0111 1111	Damper ON
1011 nnnn	0100 0000	0000 0000	Damper OFF
1011 nnnn	0100 0011	0111 1111	Soft ON
1011 nnnn	0100 0011	0000 0000	Soft OFF
1011 nnnn	0101 1100	0111 1111	Tremolo ON
1011 nnnn	0101 1100	0000 0000	Tremolo OFF
1011 nnnn	0101 1101	0111 1111	Chorus ON
1011 nnnn	0101 1101	0000 0000	Chorus OFF
1100 nnnn	0ppp pppp		Program Change ppppppp = 0 - 127
1011 nnnn	0111 1011	0000 0000	ALL NOTES OFF
1011 nnnn	0111 1100	0000 0000	OMNI OFF
1011 nnnn	0111 1111	0000 0000	POLY ON
1111 1110			Active Sensing

Notes :

- nnnn : MIDI Channel number (0000 - 1111), ch-1 = 0000
Refer to Section 3.
- #1 The range may be changed by the transposition.
Refer to Section 4.
- #2 Refer to Section 5.
- #3 Refer to Section 6.
- #4 When all keys on the keyboard are released, the ALL NOTES OFF (\$Bn, \$7B, 0) is sent.
- #5 When power is first applied or Basic Channel is changed, OMNI OFF and POLY ON are sent in the Basic Channel.

2. RECOGNIZED RECEIVE DATA

Status	Second	Third	Description
1000 nnnn	0kkk kkkk	0vvv vvvv	Note OFF, velocity ignored
1001 nnnn	0kkk kkkk	0000 0000	Note OFF kkkkkkk = 0 - 127 (15 - 113) *1 vvvvvvv = 1 - 127
1001 nnnn	0kkk kkkk	0vvv vvvv	Note ON kkkkkkk = 0 - 127 (15 - 113) *1 vvvvvvv = 1 - 127
1011 nnnn	0100 0000	0vvv vvvv	Damper OFF vvvvvvv = 0 - 63 Damper ON vvvvvvv = 64 - 127
1011 nnnn	0100 0011	0vvv vvvv	Soft OFF vvvvvvv = 0 - 63 Soft ON vvvvvvv = 64 - 127
1011 nnnn	0101 1100	0vvv vvvv	Tremolo OFF vvvvvvv = 0 - 63 *2 Tremolo ON vvvvvvv = 64 - 127 *2
1011 nnnn	0101 1101	0vvv vvvv	Chorus OFF vvvvvvv = 0 - 63 *2 Chorus ON vvvvvvv = 64 - 127 *2
1100 nnnn	0ppp pppp		Program Change *3 PPPPPPP = 0 - 31

1011 nnnn	0111 1011	0000 0000	ALL NOTES OFF	*4
1011 nnnn	0111 1100	0000 0000	OMNI OFF	*5
1011 nnnn	0111 1101	0000 0000	OMNI ON	*5
1011 nnnn	0111 1110	0000 mmmm	MONO ON	*5
1011 nnnn	0111 1111	0000 0000	POLY ON	*5
1111 1110			Active Sensing	

Notes :

- #1 Note numbers outside of the range 15 - 113 are transposed to the nearest octave inside this range.
The transpose function does not affect the recognized NOTE numbers.
- #2 If the power has been applied while the PIANO 1 switch being held down, this message is ignored.
- #3 If the power has been applied while the PIANO 1 switch being held down, this message is ignored.
Received Program Change messages are assigned as follows.
The program numbers 32 - 127 are ignored.

Prog #	Voice	CHORUS	TREMOLO
0	PIANO 1	OFF	OFF
1	PIANO 2	OFF	OFF
2	PIANO 3	OFF	OFF
3	HARPSICHORD	OFF	OFF
4	CLAVI	OFF	OFF
5	VIBRAPHONE	OFF	OFF
6	E.PIANO 1	OFF	OFF
7	E.PIANO 2	OFF	OFF
8	PIANO 1	ON	OFF
9	PIANO 2	ON	OFF
10	PIANO 3	ON	OFF
11	HARPSICHORD	ON	OFF
12	CLAVI	ON	OFF
13	VIBRAPHONE	ON	OFF
14	E.PIANO 1	ON	OFF
15	E.PIANO 2	ON	OFF
16	PIANO 1	OFF	ON
17	PIANO 2	OFF	ON
18	PIANO 3	OFF	ON
19	HARPSICHORD	OFF	ON
20	CLAVI	OFF	ON
21	VIBRAPHONE	OFF	ON
22	E.PIANO 1	OFF	ON
23	E.PIANO 2	OFF	ON
24	PIANO 1	ON	ON
25	PIANO 2	ON	ON
26	PIANO 3	ON	ON
27	HARPSICHORD	ON	ON
28	CLAVI	ON	ON
29	VIBRAPHONE	ON	ON
30	E.PIANO 1	ON	ON
31	E.PIANO 2	ON	ON

If the power has been applied while the PROGRAM CHANGE switch being held down, received Program Change messages don't affect TREMOLO and CHORUS and are assigned as follows.
The program numbers 8 - 127 are ignored.

Prog #	Voice
0	PIANO 1
1	PIANO 2
2	PIANO 3
3	HARPSICHORD
4	CLAVI
5	VIBRAPHONE
6	E.PIANO 1
7	E.PIANO 2

#4 When the ALL NOTES OFF is recognized, all the notes which have been turned ON only by MIDI IN note ON messages are turned OFF. However, if the damper pedal is pressed or the damper ON message has been recognized, these ON notes will be not turned OFF until the damper pedal is released or the Damper OFF message is received.

#5 These Mode Messages (2nd byte = 123 - 127) are also recognized as ALL NOTES OFF.

Mode Messages are recognized as follows:

Mode Message	OMNI OFF (124)	OMNI ON (125)	POLY ON (127)	MONO ON (126)	MONO ON (126)
OMNI OFF (124)	OMNI = OFF	OMNI = OFF	OMNI = OFF	OMNI = ON	OMNI = ON
OMNI ON (125)	OMNI = ON	OMNI = ON	OMNI = ON	OMNI = ON	OMNI = ON

3. BASIC CHANNEL SETTING

When the power is first applied, the Basic Channel is normally set to 1, and the receiver is set to the MODE 1 (OMNI ON, POLY ON).

However, the Basic Channel may be changed when the following key on the keyboard is pressed while the TRANSPOSE switch being held down. The receiver will be set to the MODE 3 (OMNI OFF, POLY ON).

Key	Basic Channel	OMNI
Power-up	1	ON
A 0	1	OFF
A# 0	2	OFF
B 0	3	OFF
C 1	4	OFF
C# 1	5	OFF
D 1	6	OFF
D# 1	7	OFF
E 1	8	OFF
F 1	9	OFF
F# 1	10	OFF
G 1	11	OFF
G# 1	12	OFF
A 1	13	OFF
A# 1	14	OFF
B 1	15	OFF
C 2	16	OFF

4. TRANSPOSE

When the power is first applied, the default transposition is set at 0.

The following chart shows the relation of the key position and transposed value. (While the TRANSPOSE switch being held down.)

Key	Transposed value (semi tones)	Transmitted note range
power-up	0	21 - 108
F# 6	-6	15 - 102
G 6	-5	16 - 103
G# 6	-4	17 - 104
A 6	-3	18 - 105
A# 6	-2	19 - 106
B 6	-1	20 - 107
C 7	0	21 - 108
C# 7	+1	22 - 109
D 7	+2	23 - 110
D# 7	+3	24 - 111
E 7	+4	25 - 112
F 7	+5	26 - 113

5. TREMOLO, CHORUS TRANSMISSION

When the CHORUS switch or the TREMOLO switch is pressed while the PROGRAM CHANGE switch being held down, the function's ON or OFF message is sent.

And also, if the power has been applied while the PROGRAM CHANGE switch being held down, the function's ON or OFF message can be sent by only pressing the TREMOLO switch or the CHORUS switch.

Roland Piano

MODEL **HP-2000, HP-3000** **MIDI Implementation Chart**
HP-4500

Function.....		Transmitted	Recognized	Remarks
Basic Channel	Default Changed	1 1 - 16	1 1 - 16	
Mode	Default Messages Altered	3 POLY, OMNI OFF *****	1 POLY, OMNI ON/OFF MONO(M≠1)→1, (M=1)→3	
Note Number	True voice	15-113, 22-108 (HP-2000) *****	0 - 127 15 - 113	
Velocity	Note ON Note OFF	○ × (9n v=0)	○ ×	v = 1-127
After Touch	Key's Ch's	× ×	× ×	
Pitch Bender		×	×	
Control Change	64 67 92 93	○	○	Damper pedal Soft pedal Tremolo Chorus
Prog Change	True #	○ (0-127) *****	○ (0-31) 0 - 31	can be ignored by power-up setting
System Exclusive		×	×	
System Common	Song Pos Song Sel Tune	× × ×	× × ×	
System Real Time	Clock Commands	× ×	× ×	
Aux Messages	Local ON/OFF All Notes OFF Active Sense Reset	× ○ (123) ○ ×	× ○ (123-127) ○ ×	
Notes	When power up, ch-1 OMNI OFF and POLY are sent. When Basic channel is changed, Mode is set to 3.			

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO ○ : Yes
 Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO × : No

6. PROGRAM CHANGE TRANSMISSION

When one of the following switches is pressed while holding the EXT PROG CHANGE switch down.
 And also, if the power has been applied while the EXT PROG CHANGE switch being held down, the PROGRAM CHANGE message can be sent by only pressing following switches.

Switch	Prog #
PIANO 1	0
PIANO 2	1
PIANO 3	2
HARPSICHORD	3
CLAVI	4
VIBRAPHANE	5
E.PIANO 1	6
E.PIANO 2	7

The following table shows the GROUP, BANK and NUMBER values related with key position which is set while the TRANSPOSE switch being held down.

Key	Related value
A 3	GROUP A
B 3	GROUP B
F# 2	BANK 1
G# 2	BANK 2
A# 2	BANK 3
C# 3	BANK 4
D# 3	BANK 5
F# 3	BANK 6
G# 3	BANK 7
A# 3	BANK 8
F 2	NUMBER 1
G 2	NUMBER 2
A 2	NUMBER 3
B 2	NUMBER 4
C 3	NUMBER 5
D 3	NUMBER 6
E 3	NUMBER 7
F 3	NUMBER 8

When one of the above-mentioned keys is pressed while the TRANSPOSE switch being held down, a PROGRAM CHANGE message will be transmitted. The transmitted program change numbers are related with the GROUP, BANK and NUMBER values as follows.

GROUP A	NUMBER	1	2	3	4	5	6	7	8
BANK	:								
1	:	0	1	2	3	4	5	6	7
2	:	8	9	10	11	12	13	14	15
3	:	16	17	18	19	20	21	22	23
4	:	24	25	26	27	28	29	30	31
5	:	32	33	34	35	36	37	38	39
6	:	40	41	42	43	44	45	46	47
7	:	48	49	50	51	52	53	54	55
8	:	56	57	58	59	60	61	62	63
GROUP B	NUMBER	1	2	3	4	5	6	7	8
BANK	:								
1	:	64	65	66	67	68	69	70	71
2	:	72	73	74	75	76	77	78	79
3	:	80	81	82	83	84	85	86	87
4	:	88	89	90	91	92	93	94	95
5	:	96	97	98	99	100	101	102	103
6	:	104	105	106	107	108	109	110	111
7	:	112	113	114	115	116	117	118	119
8	:	120	121	122	123	124	125	126	127