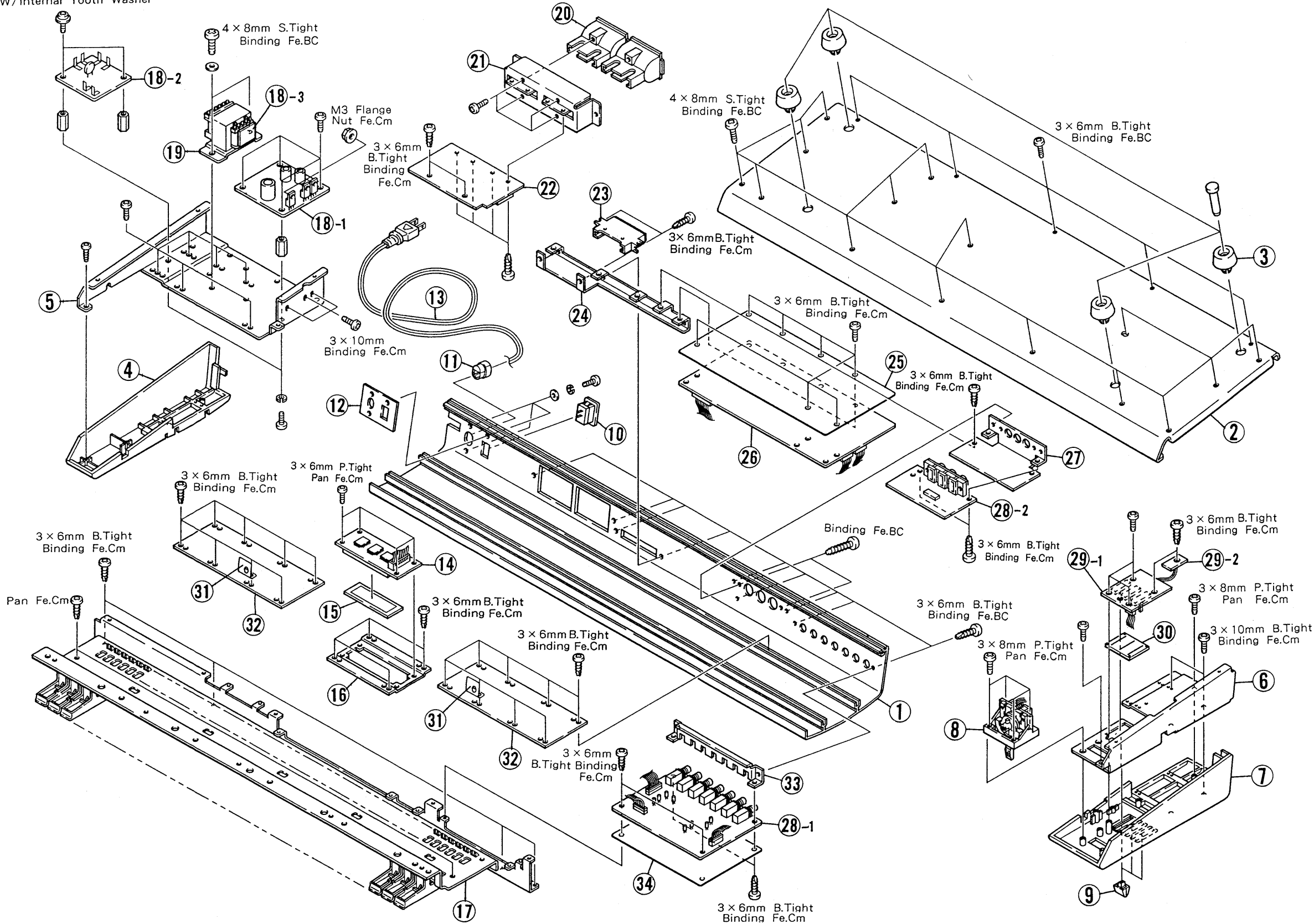


EXPLODED / 分解图

3 × 6mm S.Tight Binding Fe.BC
W/Internal Tooth Washer



No.	PART NAME	PART No.
1	Front Panel	22215632
2	Bottom Cover	22025437
3	Rubber Foot	12359139
4	Side Panel R	22215871
5	Power Transformer Holder	22205316
6	Bender Holder	22205315
7	Bender Panel	22215870
8	Bender Unit	23275916
9	Knob	22485187
10	Power Switch Δ	13149108
11	AC Cord Bushing Δ	
	100V,220V	12369533
	117V, 240VE, 240VA	12369539
12	AC Cord Bushing Holder Δ	
	100V, 220V, 240VA	22205357
	117V, 240VE	22205358
13	AC Cord Δ	
	100V	23495117
	117V	23495113
	220V	23495116
	240VE (with 13A Fuse)	23495115
	240VA	23495114
14	LCD Unit	15029490
15	LCD Cover	22045187
16	LCD Holder	22205322
17	Keyboard	7621320000
18-1	Power Supply Board	7621308000
18-2	Primary Board	
18-3	Jumper Board	
19	Power Transformer Δ	22455512U0
20	Card Escutcheon	22225338
21	Card Holder	22205318
22	Card Board	7621330000
23	Card Slot	22200188
24	Main Holder	22205319
25	Main Shield Paper	22255290
26	Main Board	7621390000
27	MIDI Holder	22205340
28-1	Jack Board	7621317000
28-2	MIDI Board	
29-1	Bender Board	7621331000
29-2	Jumper Board	
30	Slide VR Cover	22245468
31	Grounding Reaf	23455314
32	Switch Board	7621314000
33	Jack Holder	22205317
34	Jack Shield Paper	22255289

KEYBOARD EXPLODED VIEW / 鍵盤分解図

KEY REMOVAL

1. Remove the stopper.

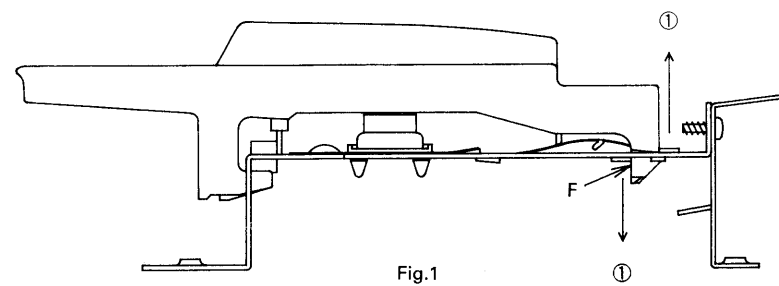


Fig.1

2. Pulling the key in the direction of arrow ②, disengage the key fulcrum from the chassis. See Fig.3 and 4 for disengaged status.

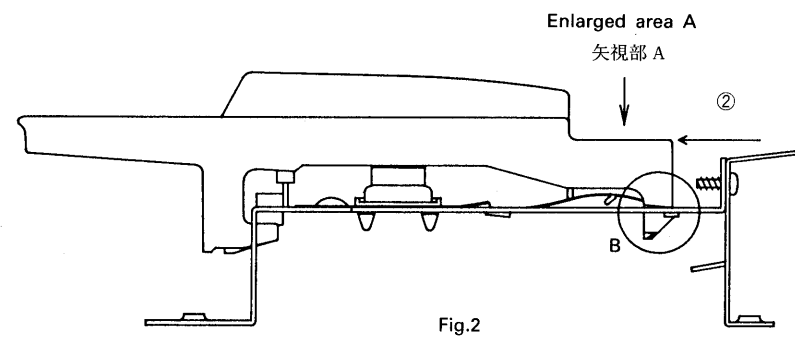


Fig.2

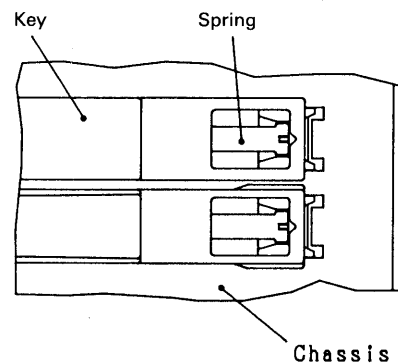


Fig.3
矢視部 A 詳細

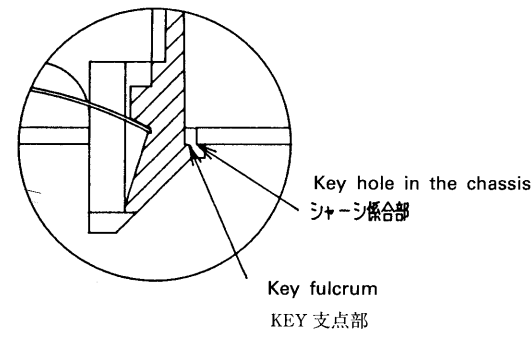


Fig.4
B 部詳細

3. Taking care not to distort the spring, lift the key in the direction of ③.

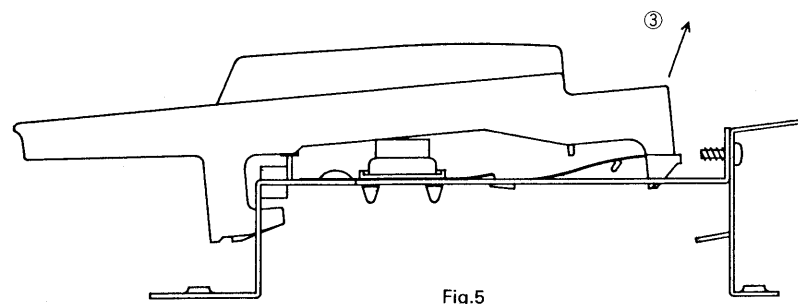


Fig.5

KEYの取りはずし方

1. ストッパーをはずす。

2. KEYを手前(方向2)に引きKEY支点部をシャーシ係合部から離す。Fig.3, Fig.4は、離された状態を示す。

3. KEYを引き上げる。(方向3) この時スプリングを变形させない様、注意すること。

KEY INSTALLATION

1. Place the spring onto the chassis as show in Fig.6.

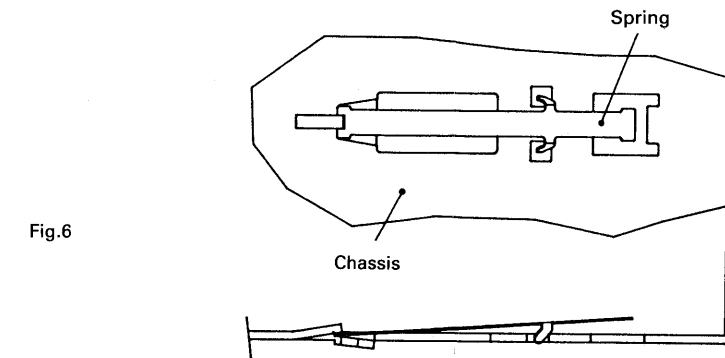


Fig.6

2. Referring to Fig.8, press the key in the direction of ④.

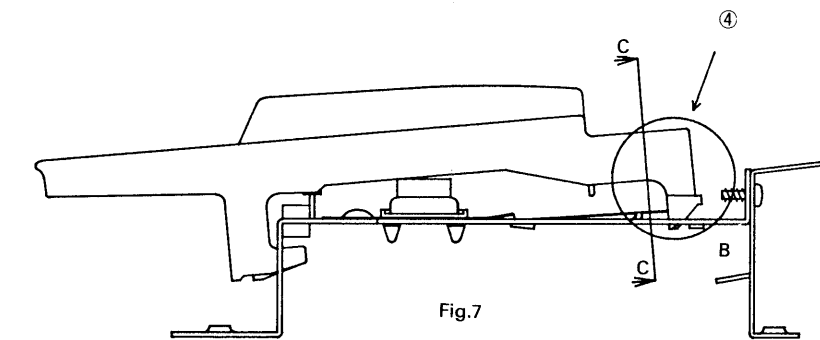


Fig.7

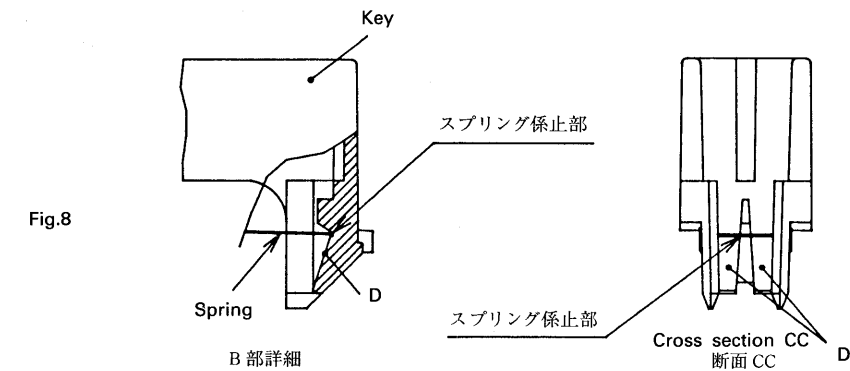


Fig.8

Caution:
Firmly rest the spring on the spring dent (Fig.8). Don't let the spring stop at the slope D or the key touch will differ from the previous sensitivity.

注) スプリングをFig. 8に示すスプリング係止部に確実に係止しないと(斜面Dに止まる事がある)KEYタッチが変化してしまう。

3. Verify that there is on clearance between the key fulcrum and portion F in the chassis. Attach the stopper (Fig. 1) on the portion F.

3. KEY支点部とシャーシ係合部間(F)に隙間の無い事を確認し、ストッパーはFig. 1に示す(F)に沿って貼る。

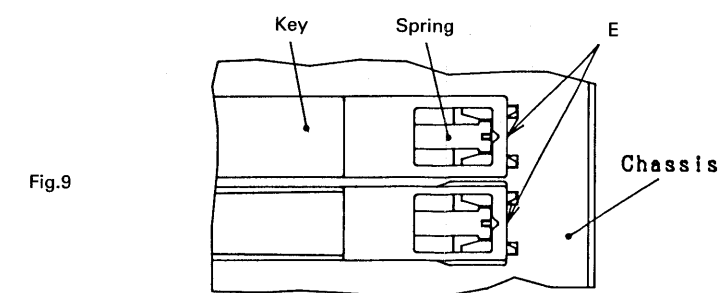


Fig.9

KEYの取り付け方

1. Fig. 6に示す様スプリングをシャーシに置く。

2. スプリングをKEYスプリング係止部にあて(Fig. 8参考)方向4にKEYを押し込む。

3. KEY支点部とシャーシ係合部間(F)に隙間の無い事を確認し、ストッパーはFig. 1に示す(F)に沿って貼る。

① CONTACT BOARD INSTALLATION

First align the $\phi 2.1$ mm hole between C3 and C3# of the contact board with a half pierce of the chassis. Next align the slot ($\phi 2.1 \times 4$ mm) of remaining octaves with half pierces, respectively. Make sure the joint of the CIC cable and te board end are on the left end of the lowest G of the chassis.

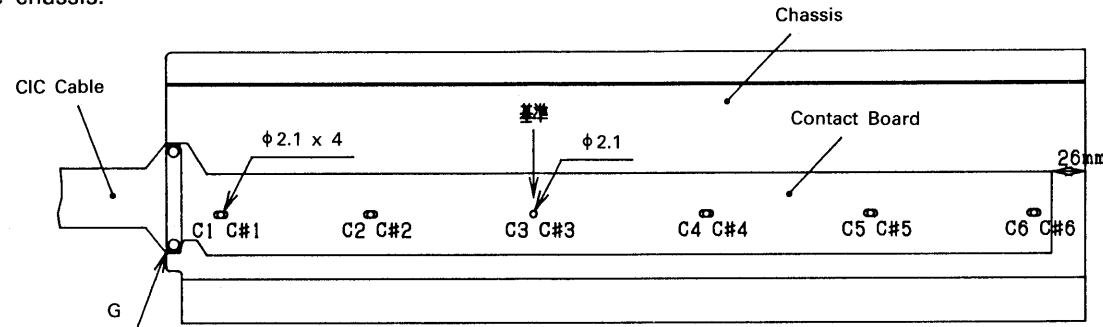


Fig.10

① 基板の取り付け方

まず C3 と C# 3 キーの中間にある $\phi 2.1$ mm の基板の丸穴をシャーシのハーフピースに合わせ、次に 1 オクターブに 1 コずつある $\phi 2.1 \times 4$ mm の長穴を合わせて行く。この時 CIC ケーブルと基板のつなぎ目がシャーシ低音部左端 (G) と一致する事を確認する。

② CONTACT BOARD INSTALLATION

Place the contact rubber sheet on the contact board. Align contact projections with holes in the board. Press the hole in top face of the projection with a small rod (like clip shown in Fig.11) so that the projection is held in a hole of the chassis. Note that the left end of a rubber contact should be placed over the right end of the left side rubber sheet (see H in Fig.11).

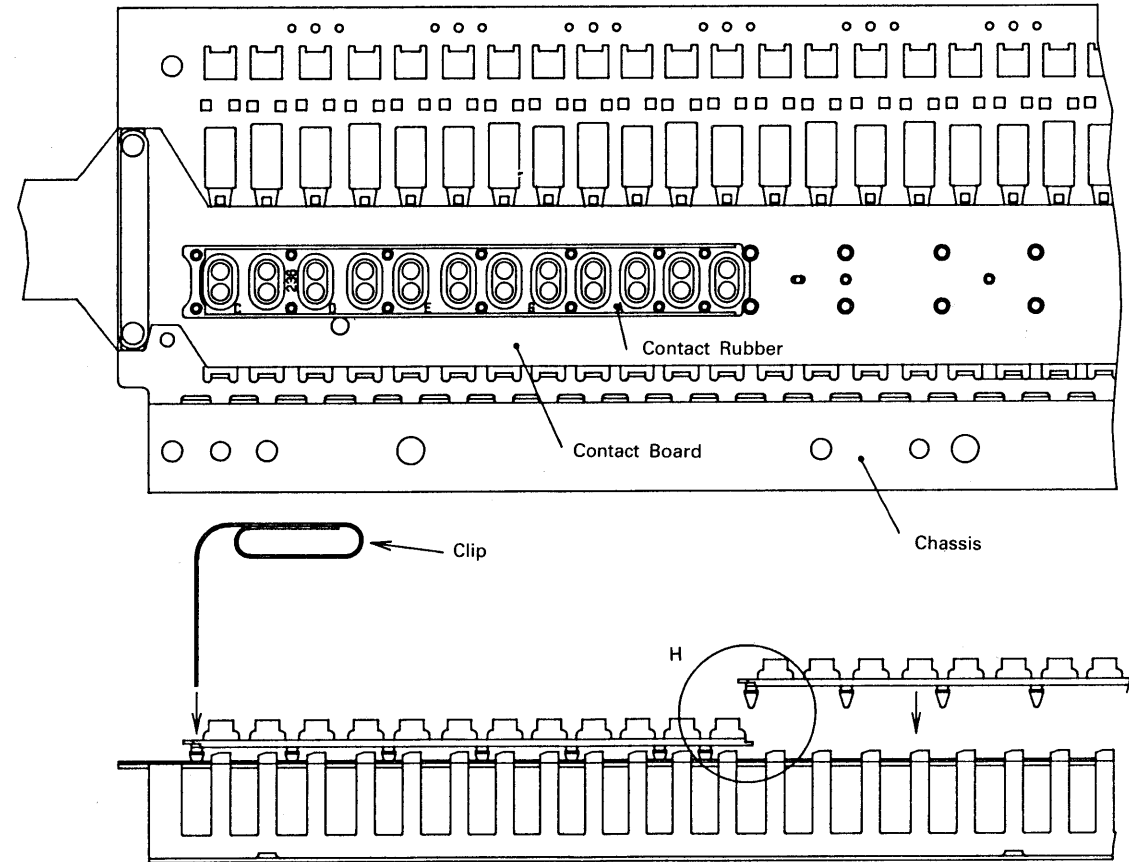


Fig.11

CAUTION: When removing a contact rubber sheet, gently pull it off the board or sheet will break off.

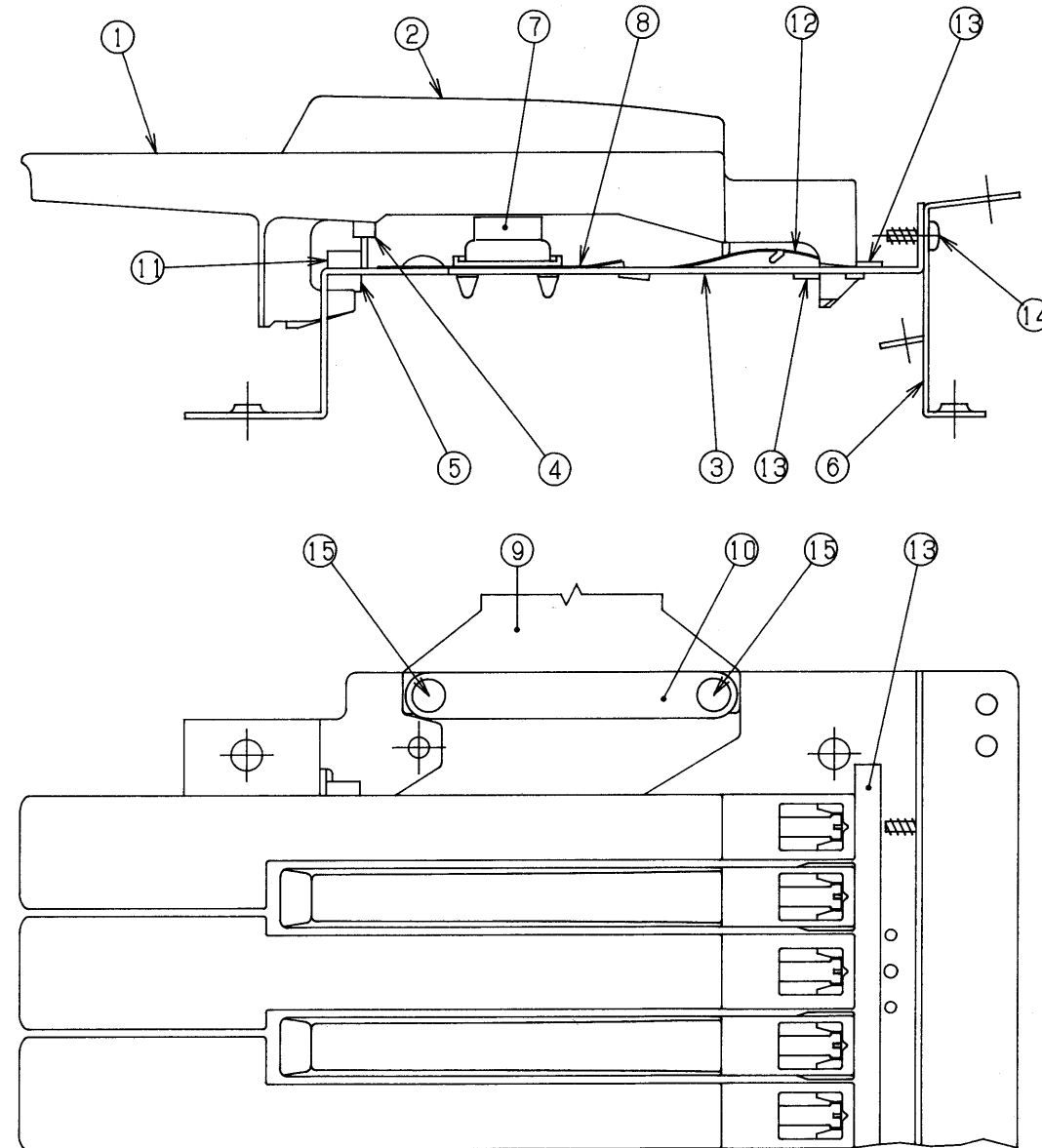
② 基板の取り付け方

接点ゴムの足を基板の穴に合わせて置き、先端のとがっていない細い棒状の物で接点ゴム上面の穴を押しシャーシに係止する。治具としてクリップを図の様に伸ばした物を使用すると良いでしょう。またゴム接点の左端は、その左側の接点ゴム右端に重ねる様係止する。(H 部参考)

注：接点ゴムを取りはずす時、無理に引っ張るとゴム足が切れることがあるので慎重に扱うこと。

U-20 (SK-761-BWCA) PARTS LIST

NO.	PARTS NO.	PARTS NAME	
1	22575254	SK-7 NATURAL KEY C/F	257-254
	22575256	" E/B	257-256
	22575258	" D	257-258
	22575259	" G	257-259
	22575253	" A	257-253
	22575255	" C' /F'	257-255
2	22575261	SK-7 SHARP KEY	257-261
3	22815653	SK-7 CHASSIS 61P	281-653
4	22155775	SK-7 GUIDE BUSH	215-775
5	22265493	SK-7 FELT 61KEY	226-493
6	22125285	ANGLE	212-285
7	22185236	SK-7 CONTACT LUBBER 12PW	218-236
8	22185237	SK-7 CONTACT LUBBER 13PW	218-237
9	22925669	SK-7 CONTACT BOARD 61P	229-669
10	23475276	CIC CABLE	347-276
11	22205309	SK-761 CONNECTOR HOLDER	220-309
12	23165695	SK-761 CA-01 AFTERTOUCH ASSY	231-695
13	22175203	SK-7 SPRING	217-203
14	22135430	SK-761 STOPPER	213-430
15		TAPPING SCREWS 3X6 B1	★
		NYLON RIVET NRP-355	★



PARTS LIST

SAFETY PRECAUTIONS:
The parts marked Δ have safety-related characteristics. Use only listed parts for replacement.
安全上の注意：
 Δ が付いている部品は、安全上特別な規格でつくられたものです。
交換の際は、指定された部品番号以外の部品は使わないようにして下さい。

CONSIDERATIONS ON PARTS ORDERING
When ordering any parts listed in the parts list, please specify the following items in the order sheet.
Ex. QTY PART NUMBER DESCRIPTION MODEL NUMBER
10 22575241 Sharp Key C-20/50
15 2247017300 Knob (orange) DAC-15D
Failure to completely fill the above items with correct number and description will result in delayed or even undelivered replacement.
パーツ発注に関するお願い
オーダーシートには、必ず下記の4項目は正確に記入して下さい。(例外は除く)
例) 必要数 パーツ番号 品名 使用機種
10 22575241 Sharp Key C-20/50
15 2247017300 Knob (orange) DAC-15D
もし記入漏れ、誤記等がある場合、必要部品が発送出来なったり、大幅な遅れの原因になります。御協力をお願いします。

CASING

22215632	Front Panel
22025437	Bottom Cover
22215871	Side Panel R
22215870	Bender Panel
22045187	LCD Cover
22245468	Slide VR Cover
12359139	Rubber Foot FF-018

PCB ASSY

7621390000	Main Board (PCB 22925735)
7621330000	Card Board (PCB 22925724)
7621314000	Switch Board (PCB 22925726)
7621317000	Jack Board (PCB 22925727 3/3)
	MIDI Board (PCB 22925727 1/3)
7621310000	Bender Board (PCB 22925727 2/3)
7621308000	Power Supply Board (PCB 22925725)

Note: 1. The jack board includes the MIDI board.
2. The power supply board can be use for any voltage of 100V, 117V, 220V and 240V.
注) 1. ジャックボードは、MIDIボードを含みます。
2. 電源ボードは各電圧共通に使用できます。

BUTTON, KNOB

22485187	Knob NA05B	VOLUME, C1, C2/VALUE
22495222	Button (S) quad	EDIT, DATA, PART \blacktriangleleft , EXIT, ENTER, MARK, JUMP, CUSSOR \blacktriangleright , VALUE \blacktriangle
22495230	Button (L) dual	BANK1~8, NUMBER1~8, CARD/B, INT/A
22495224	Button (D) dual (with LED window)	MODE (KEYBOARD, SOUND, PART, RHYTHM, TRANSPOSE, CHORD1, CHORD2, ARPEGGIO)

SWITCH

13169697	SKHVBD 100G	Panel Board
Δ 13149108	WK2A44 6A/250V	Power Supply Board

JACK, SOCKET

13449145	YKB21 - 5010 (Stereo)	PHONES, EXT CONTROL
13449146	YKB21 - 5012 (Mono)	MIX OUT L (MONO) /R, DIR OUT L/R, PEDAL HOLD
13429551	DICF - 32CS - E	IC Socket
13429274	YKF51 - 5041 (Triplet)	MIDI IN/ OUT/ THRU

POWER TRANSFORMER

Δ 22455512U0	Universal	100/117/220/240V
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INDUCTOR

12449361	EXC - ELSR35T	Main Board, Jack Board, MIDI Board
13529186	ELKTR150GA	Main Board
13529187	ELKTR391CA	Main Board, Jack Board, MIDI Board
12449347	EXCELD35V	Main Board

RESONATOR

15299106	CA301 12.000MHz	Crystal	Main Board
15299117	CA301 32.768MHz	Crystal	Main Board

POTENTIOMETER

13359356	EWA - NAB \times 15A14 10KA	VOLUME	
13359361	EWA - NPE \times 15B15 100kB	C1, C2/VALUE	
13299217	RVF6P51 - 5 - 104N 100k	Trimmer D/A Adjust	Jack Board

TRANSISTOR

15329507	DTA - 114EK T - 96	Main Board
15329508	DTC - 114WK T - 96	Main Board
15329501	DTA - 124EK T - 96	Main Board
15309101	2SA1037KR T - 96	Main Board
15319101	2SC2412KR T - 96	Main Board
15119135	2SA1115 - TP - E	Jack Board
15129198	DTA124ES - TP	MIDI Board
15129194	DTC314 - TS - TP	Jack Board
15129168	DTC124ES - TP	MIDI Board

TRANSISTOR ARRAY

15289113	TD62305F - T2	Main Board
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IC

15179286	P8098	CPU	Main Board
15179950	LH5310	MASK ROM	Main Board
(15179986	U - 20 OTP ROM M5M27C100P	OTP ROM)	
15179892F0	MB834000A - 20P - G - 226	Wave ROM - A	Main Board
15179893F0	MB834000A - 20P - G - 227	Wave ROM - B	Main Board
15179894F0	MB834000A - 20P - G - 228	Wave ROM - C	Main Board
15179895F0	MB834000A - 20P - G - 229	Wave ROM - D	Main Board
15179947	MB834000A - 20P - G - 3A1	Wave ROM - E	Main Board
15179948	MB834000A - 20P - G - 3A2	Wave ROM - F	Main Board
15179362	MB81464 - 12	D RAM	Main Board
15279508	HM62256LFP - 12T (Flat)	256k SRAM	Main Board
15229894	MB87419 R06 - 0005 (Flat)	PCM Custom IC	Main Board
15229895	MB87420 R06 - 0006 (Flat)	PCM Custom IC	Main Board
15239126	TC23SC140AF - 007 (Flat)	Effect Custom IC	Main Board
15239124	SSC1000	Key SCAN Gate Array	Main Board
15229848	μ PD65005G - 062 (Flat)	RAM CARD Gate Array	Main Board
15239130	MB623157 μ PF - G - BND (Flat)	I/O Gate Array	Main Board
15259706T0	TC74HC04F - T2	Hex Inverter	Main Board
15259704T0	TC74HC04F - T2	Hex Inverter	Main Board
15269601	74F04SJL	Hex Inverter	Main Board
15169304H0	HD74LS04P	Hex Inverter	Main Board
15259701T0	TC74HC00F - T2	Quad 2 - Input NAND Gate	Main Board
15259716T0	TC74HC32F - T2	Quad 2 - Input OR Gate	Main Board
15269609	74F02SJL	Quad 2 - Input NOR Gate	Main Board
15269610	74F32SJL	Quad 2 - Input OR Gate	Main Board
15259101	BU4051BF T2	8 - channel Analog Multiplexer	Main Board
15169605	TC74HC4052	4 - channel Analog Multiplexer	Jack Board
15209122	PCM56P	D/A Converter	Jack Board
15189210	BA15218F T - 2 (Flat)	OP AMP (Dual in line)	Main Board
15189231	NJM4565DD	OP AMP (Dual in line)	Bender Board, Jack Board
15189209	BA15218	OP AMP (Dual in line)	Jack Board
15189193	M5238P	OP AMP (Dual in line)	Jack Board
15289110	μ PC4062G (Flat)	J - FET OP AMP (Dual in line)	Main Board
15189220	NJM2082D	J - FET OP AMP (Dual in line)	Jack Board
Δ 15199155	L78MR05R	+ 5V Voltage Regulator	Power Supply Board
Δ 15199176	L78M12ML	+ 12V Voltage Regulator	Power Supply Board
Δ 15199172	TA79L005P - TPE6	- 5V Voltage Regulator	Jack Board
Δ 15199177	L79M12ML	- 12V Voltage Regulator	Power Supply Board

OPT - ISOLATOR

15229718	6N137	MIDI Board
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DIODE, LED

15339103	MA - 153	Chip	Main Board
15339104	RLS - 71 TE - 11	Chip	Main Board
15339105	DAN202K T - 96	Chip	Main Board
Δ 15019273	4B4B41 LC1	100V/4A Bridge	Power Supply Board
Δ 15019245	1B4B41	100V/1A Bridge	Power Supply Board
15019674	0.5AZ5.1Y - TPB2	Zener	Power Supply Board
15019281	1SR35 - 100A T - 93 100V 1A		Power Supply Board
15029289	SLH - 34VC	LED (red)	Switch Board
15019120	1S - 2473 - T77		Switch Board
(15019103	1S - 2473)		
15019126	1SS133T - 77		Jack Board, MIDI Board
(15019125	1SS133)		

DIODE ARRAY

15019142	DAN801	Main Board
15019154	DAP801	Main Board

CAPACITOR

13529104	DE7150F472MVA1	Line Bypass	Power Supply Board
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CAPACITOR ARRAY

13529115	EXF - P8101MW	Main Board
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RESISTOR

13829848	ERD2FCG100P	Fuse Resistor	Main Board
Δ 12559823	ERQ12HUK R22 1/2W	Fuse Resistor	Power Supply Board

RESISTOR ARRAY

15239108	MNRDM4J \times 681E	Chip	Main Board
15399917	MNR34J5A103E	Chip	Main Board
15399904	MNR34J5A333E	Chip	Main Board
15399943	MNR34J5A183	Chip	Main Board
13910114	RLGLD 4 \times 223J		Jack Board

CONNECTOR

(Wire trap)			
13439413	52004 - 0410	4P	Main Board (CN5), Power Supply Board (CN4)
13439412	52004 - 0510	5P	Main Board (CN3, CN7)
13439411	52004 - 0610	6P	Main Board (CN16)
13439410	52004 - 0710	7P	Main Board (CN4)
13439409	52004 - 0810	8P	Main Board (CN5, CN14)
13439408	52004 - 0910	9P	Main Board (CN10)
13439407	52004 - 1010	10P	Main Board (CN13)
13439406	52004 - 1110	11P	Main Board (CN6)
13439414	52004 - 1210	12P	Jack Board (CN1)
13439436	52004 - 1410	14P	Main Board (CN12)
(Cable Holder)			
13439461	SD - 51016 - 0400	4P	Bender Board (CN4), Card Board (CN3)
13439462	SD - 51016 - 0500	5P	MIDI Board (CN4), Switch Board (CN6)
13439463	SD - 51016 - 0600	6P	Power Supply Board (CN1)
13439464	SD - 51016 - 0700	7P	Jack Board (CN2), Switch Board (CN3)
13439465	SD - 51016 - 0800	8P	Bender Board (CN3), Card Board (CN6)
13439466	SD - 51016 - 0900	9P	Switch Board (CN1), Power Supply Board (CN2)
13439467	SD - 51016 - 1000	10P	Card Board (CN5)
13439468	SD - 51016 - 1100	11P	Switch Board (CN4, CN5)
13439469	SD - 51016 - 1200	12P	Power Supply Board (CN3)
13439471	SD - 51016 - 1400	14P	Card Board (CN4)
(Pin Header)			
13439351	IL - S - 6P - S2L2 - EF	6P	Bender Board (CN1)
13439335	IL - S - 6P - S2T2 - EF	6P	Jack Board (CN3)
13439364	IL - FPC - 4N - 4 - SIL1	4P	Jumper Board (CN5)
13369562	B15PHKS	15P	Main Board (CN11)
13369557	SLP10R - 5 BURNDY	10P	Main Board (CN2)
13369559	SLP14R - 5 BURNDY	14P	Main Board (CN1)
13429233	7508095A	IC Card	Main Board (CN9), Card Board (CN1, CN2)

AC CORD

Δ 23495117	100V
Δ 23495113	117V
Δ 23495116	220V
Δ 23495115	240VE (with 13A Fuse)
Δ 23495114	240VA

COLLAR/BUSHING

Δ 12369533	KF - 41	100V, 220V	Power Supply Board
Δ 12369539	KR - 61A	117V, 240VE, 240VA	Power Supply Board

KEYBOARD

7621320000	SK - 761 - BWCA	61Key
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Note: See KEYBOARD PARTS LIST for details.
詳細は、鍵盤パーツリスト参照

BENDER UNIT

23275916	PB - A0105
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LCD UNIT

15029490	DMC24201N - LY (with LED, PCB and wiring)	24 \times 2 STN
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HOLDER

12199570	BBH - 1	Battery retainer	Main Board
Δ 22205357	AC Cord Bush A Holder	100V, 220V, 240VA	Power Supply Board
Δ 22205358	AC Cord Bush B Holder	117V, 240VE	Power Supply Board
22205316	Power Transformer Holder		Power Supply Board
22205317	Jack Holder		Jack Board
22205340	MIDI Holder		Jack Board
22205318	Card Holder		Card Board
22225338	Card Escutcheon		Card Board
22200188	Card Slot		Main Board
22205322	LCD Holder		
22205315	SIDE (Bender) Holder		
22205319	Main Holder		Main Board

BATTERY

125692X9	CR2032 (Lead less)	Lithium DC 3V
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ACCESSORIES

26025695	Owner's Manual	Japanese
26025696	Owner's Manual	English
23430675S0	Cord (PJ - 1M)	2.5m
12569249	Lithium Battery	CR2032 3V

MISCELLANEOUS

22255289	Shield Paper	Jack Board
22255290	Shield Paper	Main Board
23455314	Grounding Reaf	Switch Board

WIRING/ワイヤリング

fig. 1

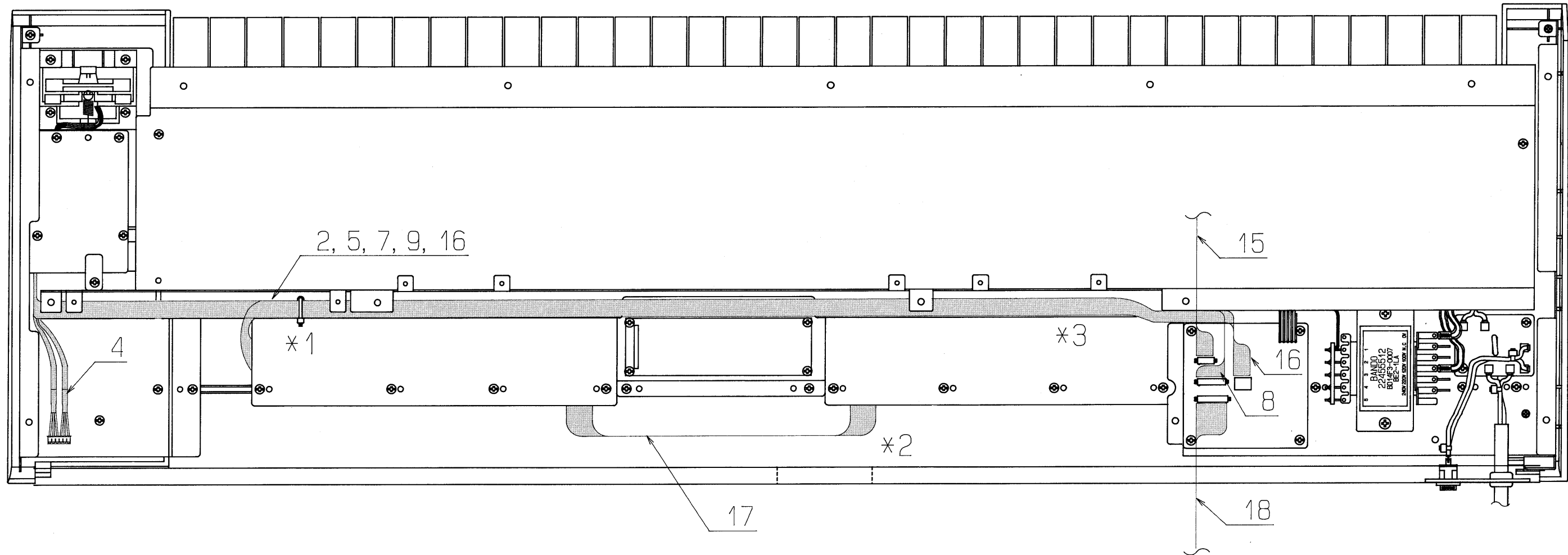
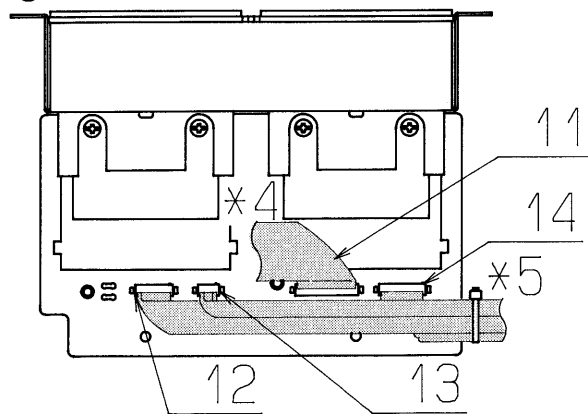


fig. 2

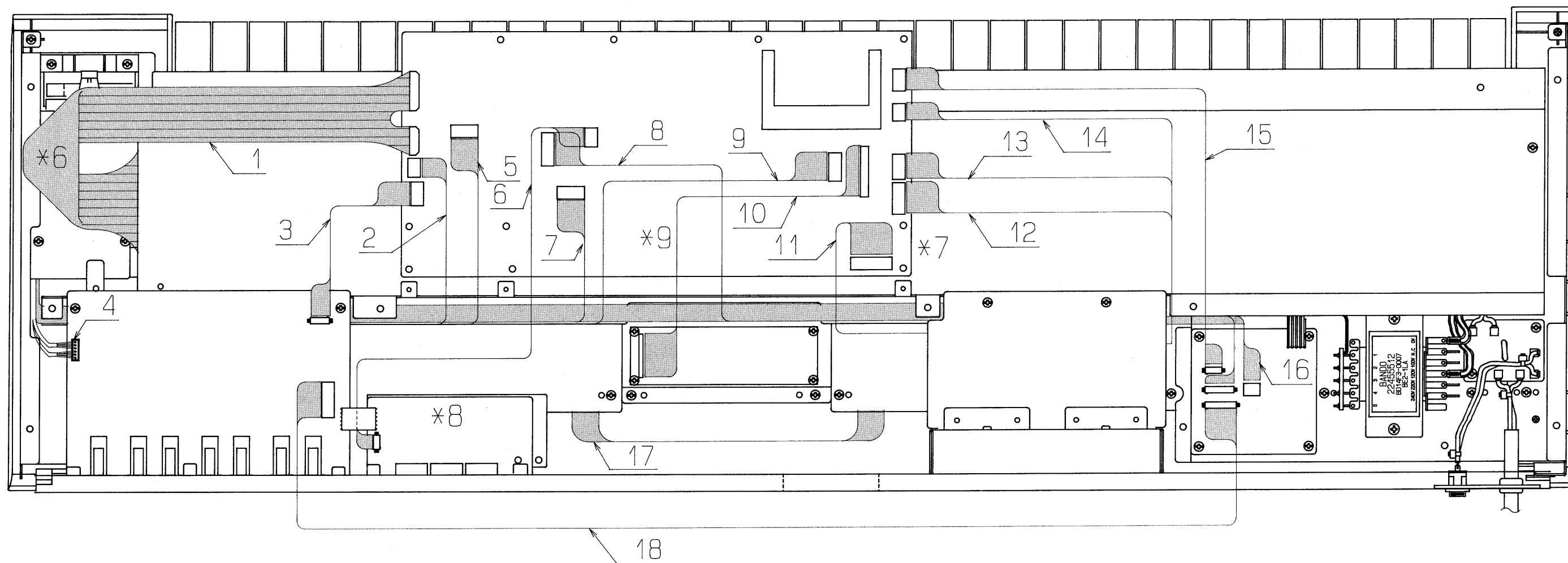


- * 1. Clamp the 5 wires on the keyboard angle in the order of 16, 9, 7, 5 and 2 from the panel side.
- * 2. Bend the wiring toward the panel surface so that it does not catch on the card insertion port.
- * 3. Trail wires 8 and 16 along the keyboard angle.
- * 4. Do not the wiring catch on the card and connector insertion ports.
- * 5. Clamp in the order of 12, 13 and 14 from beneath.

- * 1. ワイヤリング5本をパネル側から16、9、7、5、2の順番で鍵盤のアングルにクランプします。
- * 2. ワイヤリングがカード挿入口に掛からないようワイヤリングをパネル面側に折り曲げます。
- * 3. 8と16を鍵盤のアングルに沿ってはわします。
- * 4. ワイヤリングがカード・コネクタの挿入口に掛からないこと。
- * 5. 下から12、13、14の順番でクランプする。

- | | |
|--|---|
| 1: From keyboard to main board (flat cable) | 10: From LCD unit to main board (15P) |
| 2: From switch board to main board (5P white) | 11: From card board to main board (14P red) |
| 3: From jack board to main board (7P white) | 12: From card board to main board (10P black) |
| 4: From bender board to jack board (6P) | 13: From card board to main board (8P white) |
| 5: From switch board to main board (8P black) | 14: From card board to main board (4P red) |
| 6: From MIDI board to main board (5P black) | 15: From power supply board to main board (6P black) |
| 7: From bender board to main board (8P white) | 16: From bender board to power supply board (4P red) |
| 8: From power supply board to main board (11P red) | 17: From switch board L to switch board r (11P white) |
| 9: From switch board to main board (9P red) | 18: From power supply board to jack board (12P black) |

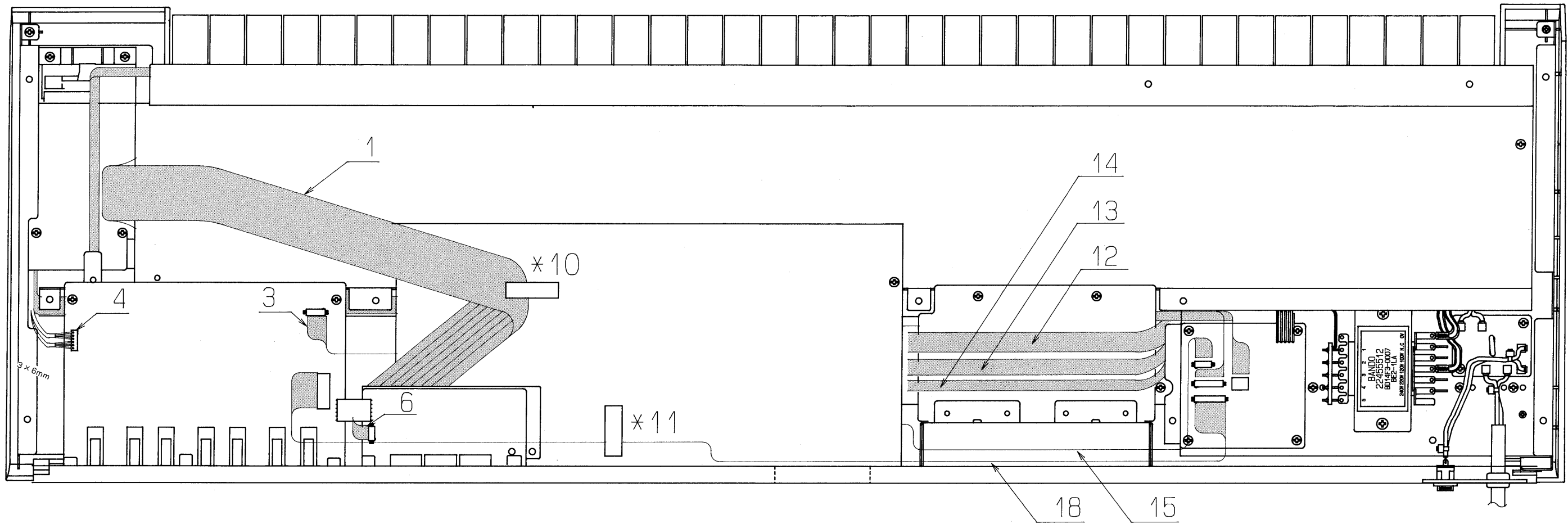
fig. 3



- * 6. Bending is strictly prohibited. Be careful in twisting the wires.
- * 7. When installing the main board, bend the wiring toward the center of the main board so that it does not touch the keyboard molding.
- * 8. Install the MIDI board in the panel after installing the main board.
- * 9. Clamp the wiring of the LCD unit at the center so it will not spread out loosely.

- * 6. 折り曲げ厳禁 ねじり方に注意。
- * 7. メイン・ボードを取り付けした際に、ワイヤリングが鍵盤のモールドにあたらぬようにワイヤリングをメイン・ボード中央方向に折り曲げること。
- * 8. MIDIボードはメイン・ボードを取り付けてからパネルに取り付けること。
- * 9. LCDユニットのワイヤリングがバラバラにならぬよう中央でクランプのこと。

fig. 4



* 10. Attach with a piece of tape no longer than 60mm.
Bending is strictly prohibited.

* 11. Attach with a piece of tape no longer than 60mm.

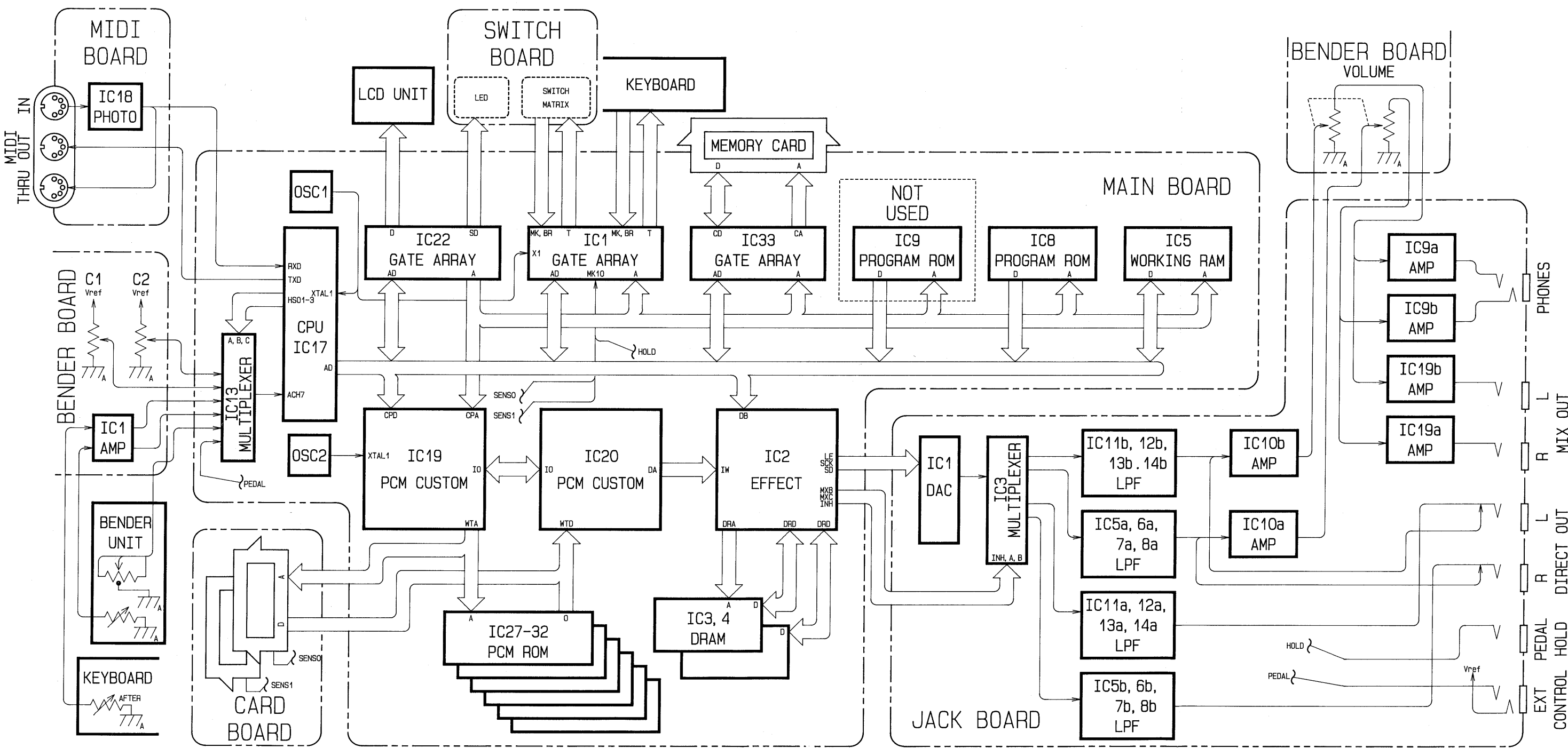
* 10. 長さ60 以内のテープで貼り付けること。折り曲げ厳禁

* 11. 長さ60 以内のテープで貼り付けること。

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

BLOCK DIAGRAM

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V



TEST MODE

テスト・モード

To enter Test Mode,(1) first press **PART** and **RHYTHM** at the same time to activate ROM play Mode and (2) then press **ENTER** while pressing **MARK** and **JUMP**.

Test Modeに入るには、**PART**、**RHYTHM**を同時に押し、ROM Play Modeにし、**MARK**、**JUMP**を押しながら、**ENTER**を押す。

Version Number
バージョンナンバーの表示

```

====< U-20 TEST MODE >====
U-20 U-.- 89/--/--- ----
    
```

↑ Version Number

Switch operation while in Test Mode

Test Mode中のスイッチ操作

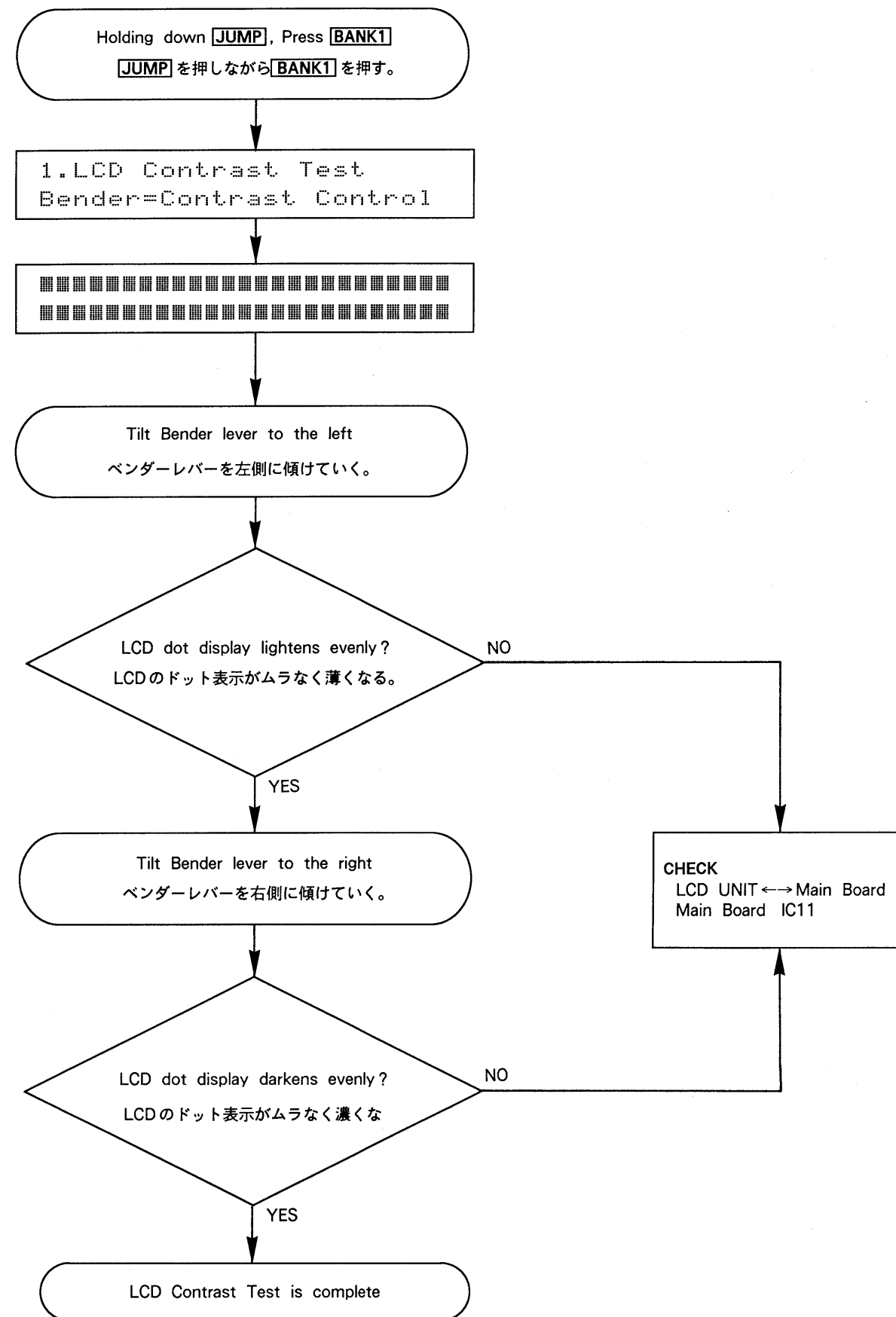
JUMP + CURSOR▶	Moves to next test item 次のテスト項目に移動
JUMP + ◀CURSOR	Moves to previous test item 1つ前のテスト項目に移動
JUMP + BANK1 - 8	Directly selects test items 1 - 8 テスト項目1 - 8をダイレクト選択
JUMP + NUMBER1 - 8	Directly selects test item 9 - 16 テスト項目9 - 16をダイレクト選択
JUMP + EXIT	Exits Test Mode テスト・モード 終了

List of Test Items

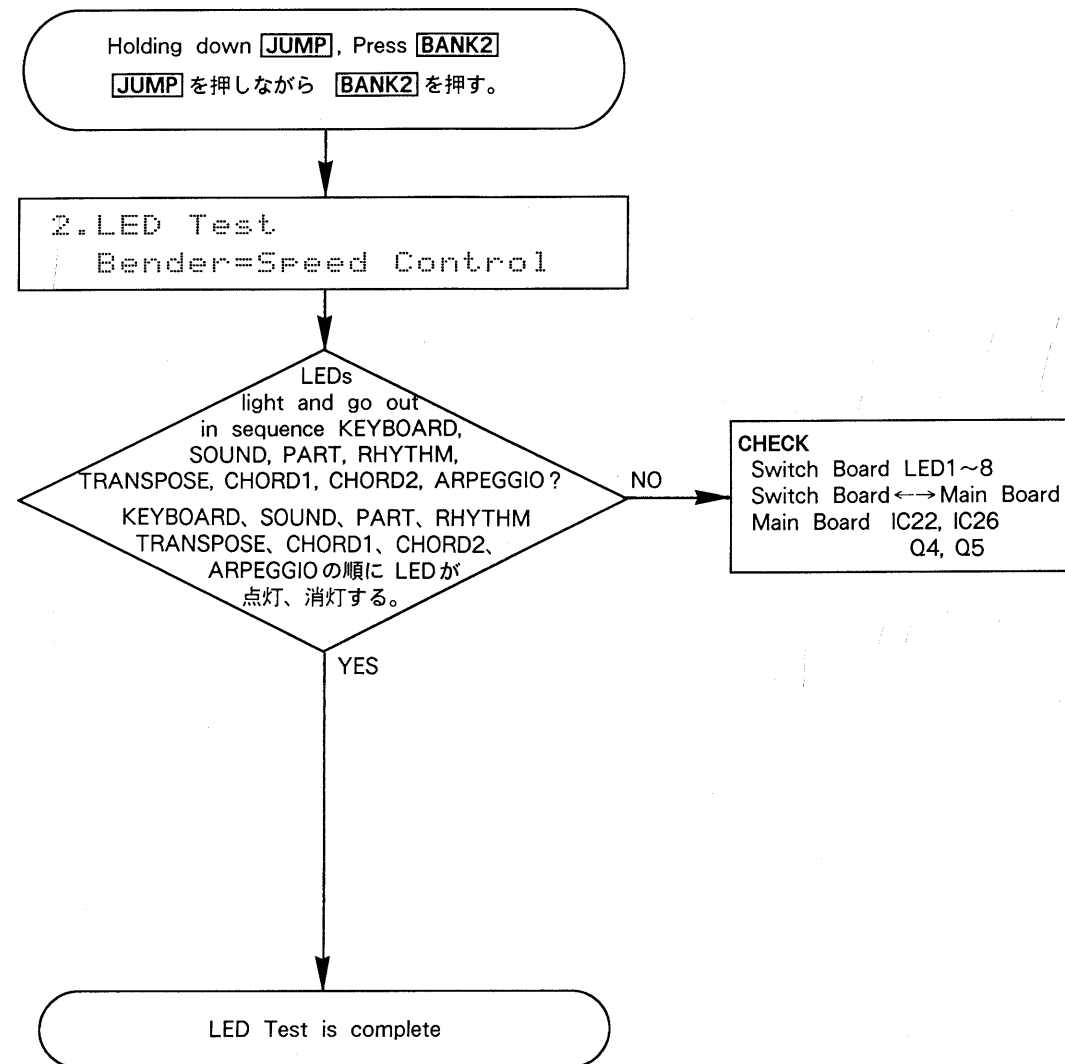
テスト項目一覧

1	LCD Contrast Test	JUMP + BANK 1
2	LED Test	JUMP + BANK 2
3	Internal RAM Test	JUMP + BANK 3
4	RAM Card Test	JUMP + BANK 4
5	PCM Card Test	JUMP + BANK 5
6	INT PCM ROM Test	JUMP + BANK 6
7	Key & Button Test	JUMP + BANK 7
8	A/D Test (1)	JUMP + BANK 8
9	A/D Test (2)	JUMP + NUMBER 1
10	MIDI Test	JUMP + NUMBER 2
11	Sound Test (1)	JUMP + NUMBER 3
12	Sound Test (2)	JUMP + NUMBER 4
13	DAC MSB Adjust	JUMP + NUMBER 5
14	Effect Test	JUMP + NUMBER 6
15	Memory Initialize	JUMP + NUMBER 7
16	Factory Data Load	JUMP + NUMBER 8

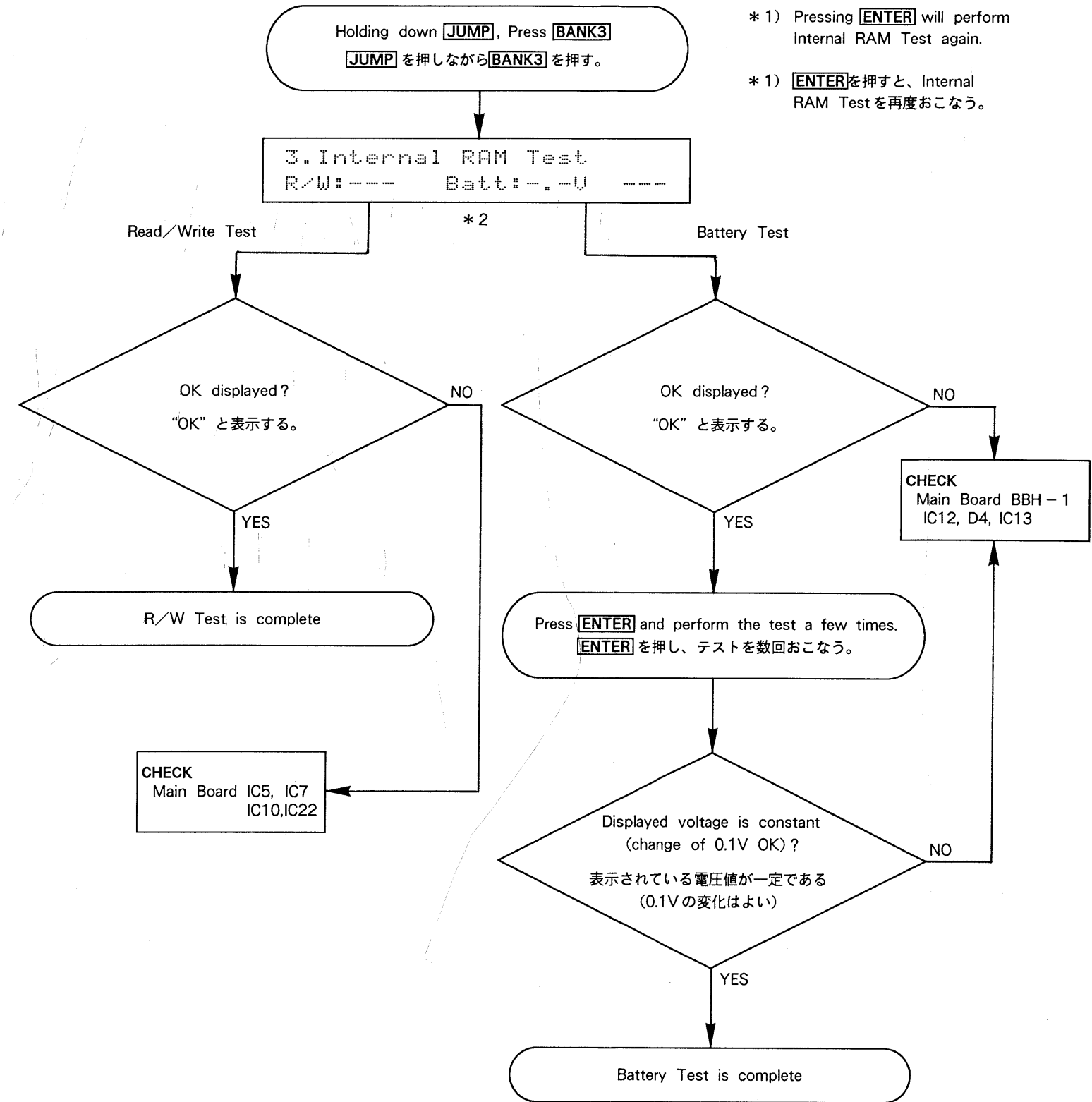
1.LCD Contrast Test



2. LED Test



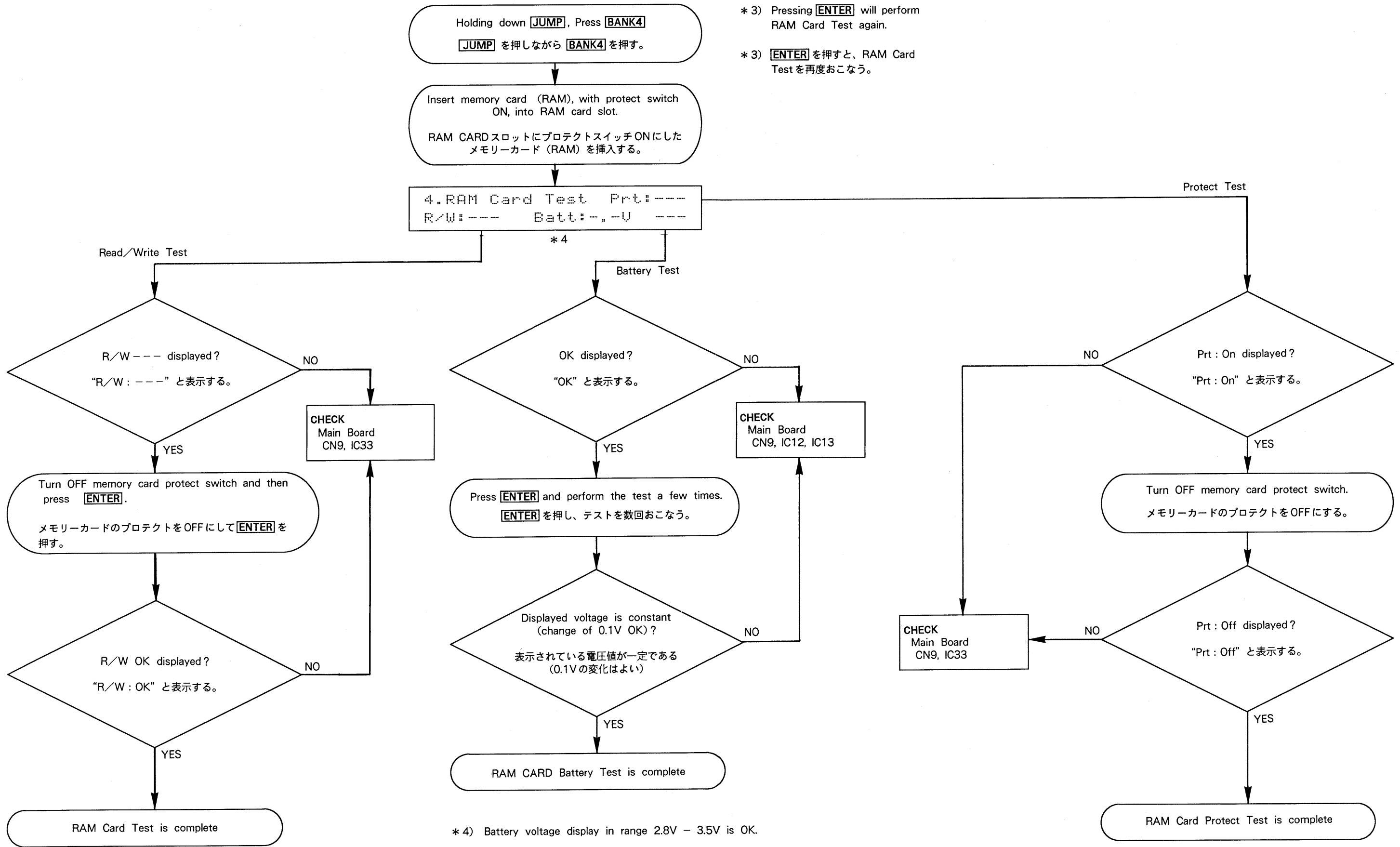
3. Internal RAM Test



* 1) Pressing **ENTER** will perform Internal RAM Test again.
* 1) **ENTER**を押すと、Internal RAM Testを再度おこなう。

* 2) Battery voltage display in range 2.8V - 3.5V is OK.
* 2) バッテリーの電圧表示は、2.8V~3.5Vの間で "OK" となる。

4. RAM Card Test



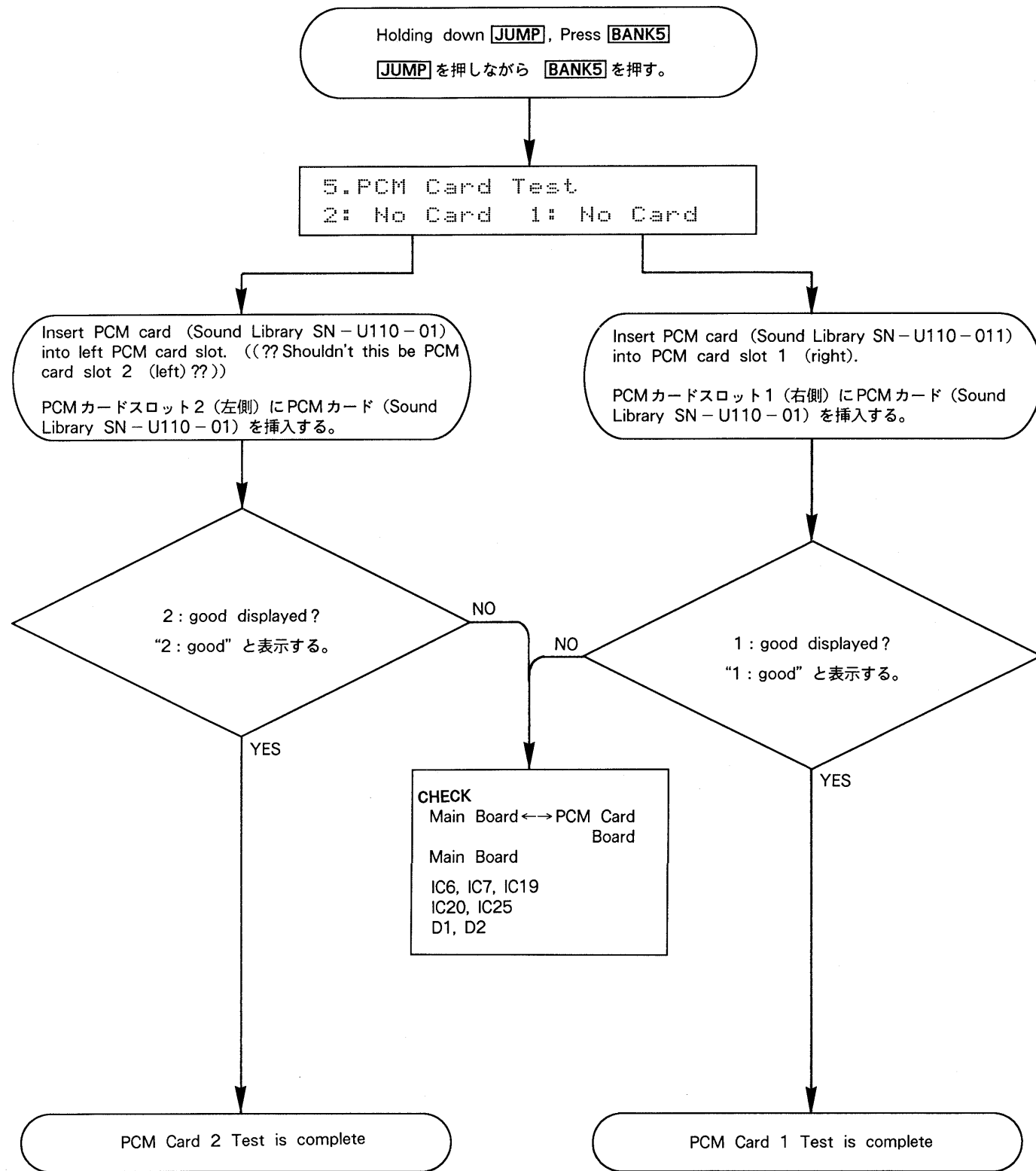
* 3) Pressing **ENTER** will perform RAM Card Test again.

* 3) **ENTER** を押すと、RAM Card Test を再度おこなう。

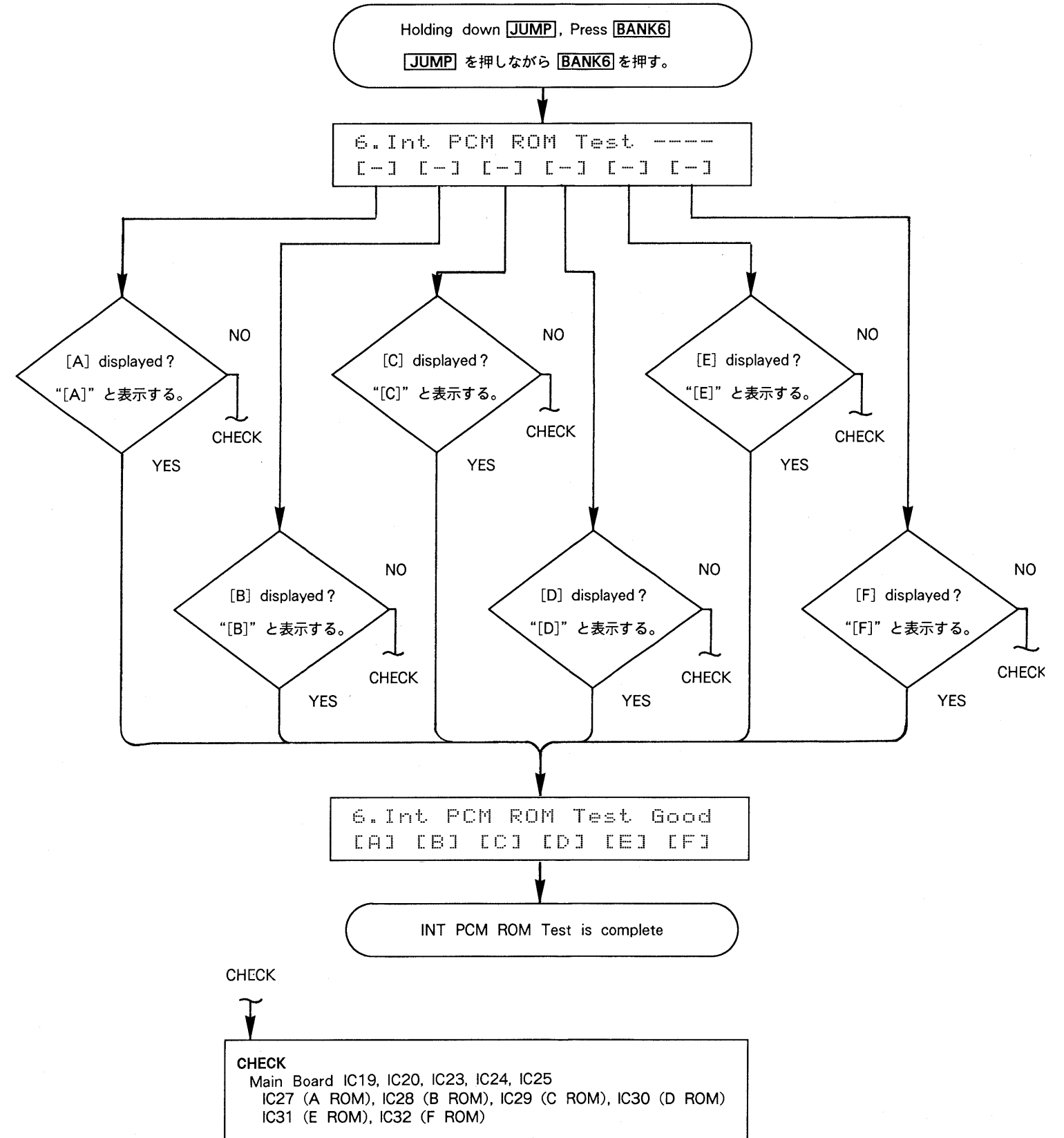
* 4) Battery voltage display in range 2.8V - 3.5V is OK.

* 4) バッテリーの電圧表示は、2.8V~3.5Vの間で“OK”となる。

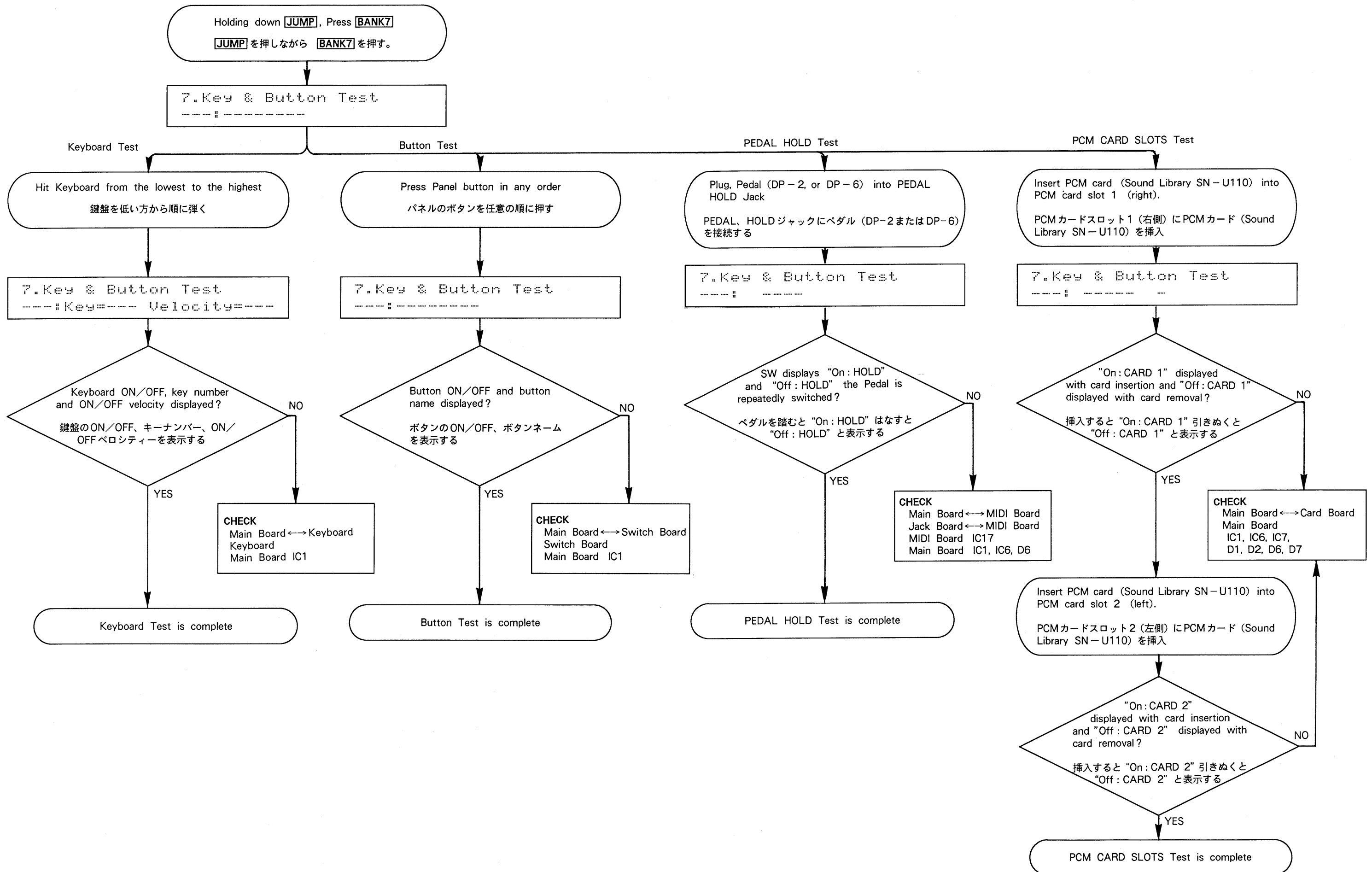
5. PCM Card Test



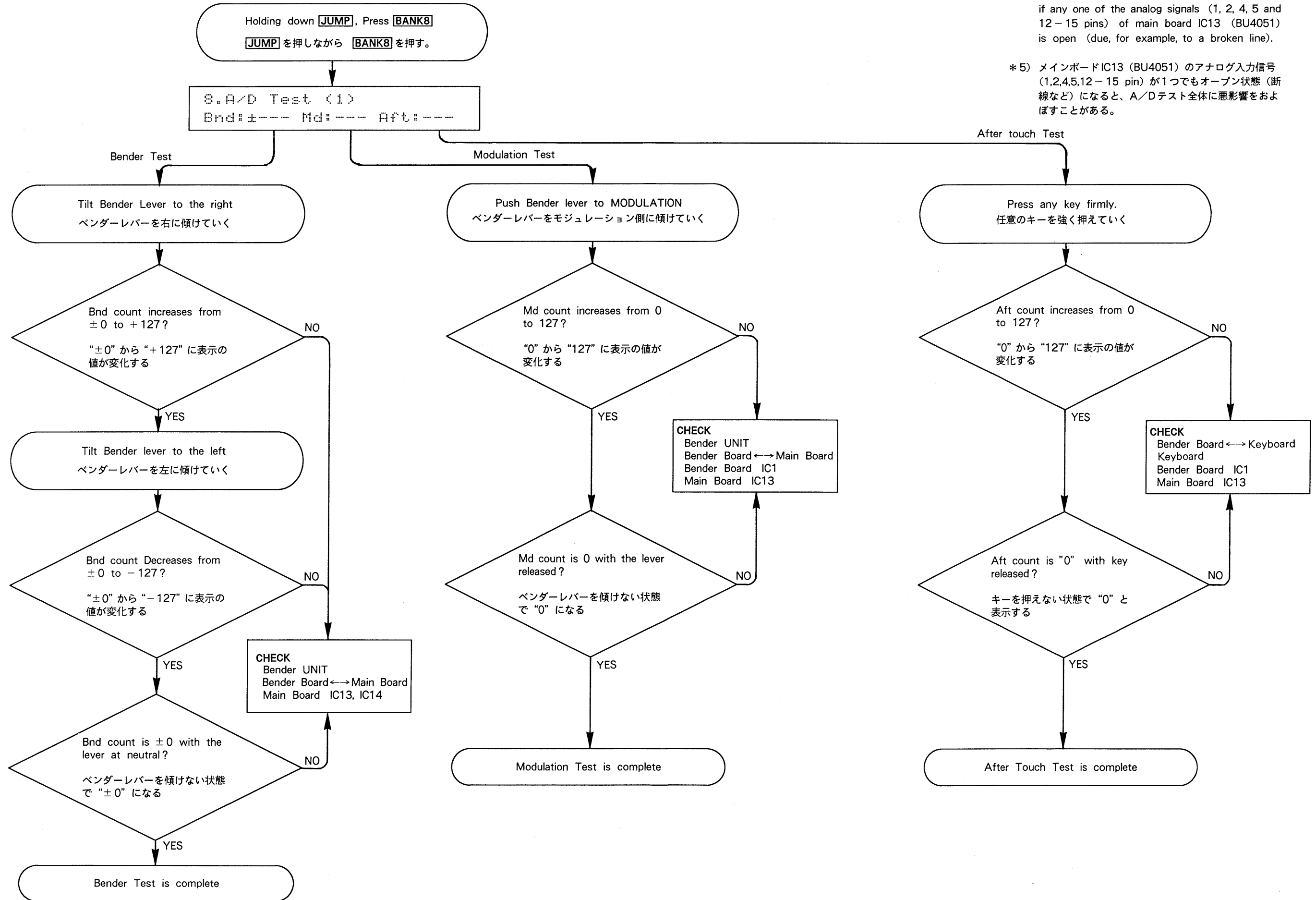
6. INT PCM ROM Test



7.Key and Button Test



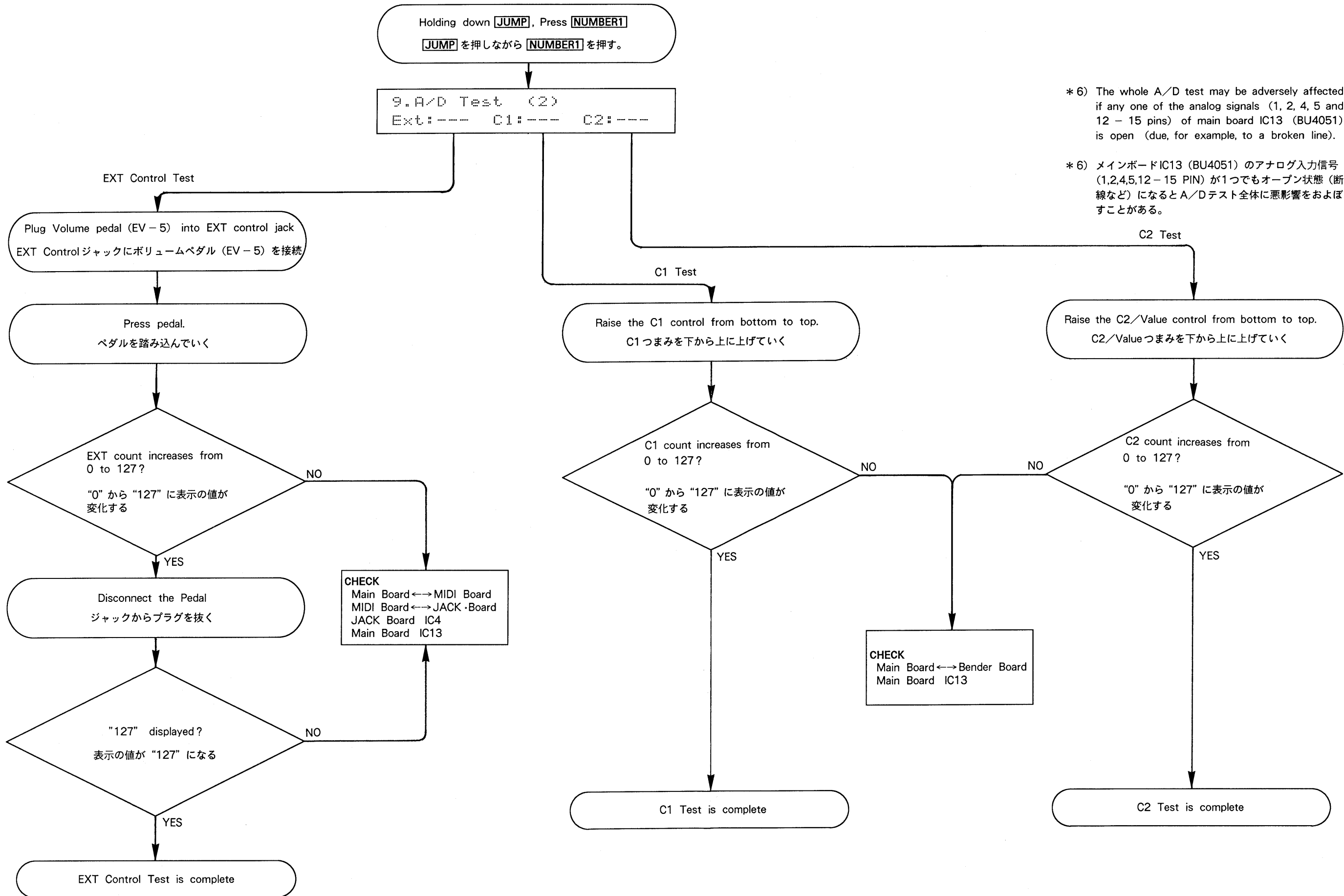
8.A/D Test (1)



* 5) The whole A/D test may be adversely affected if any one of the analog signals (1, 2, 4, 5 and 12-15 pins) of main board IC13 (BU4051) is open (due, for example, to a broken line).

* 5) メインボード IC13 (BU4051) のアナログ入力信号 (1,2,4,5,12-15 pin) が1つでもオープン状態 (断線など) になると、A/Dテスト全体に悪影響をおよぼすことがある。

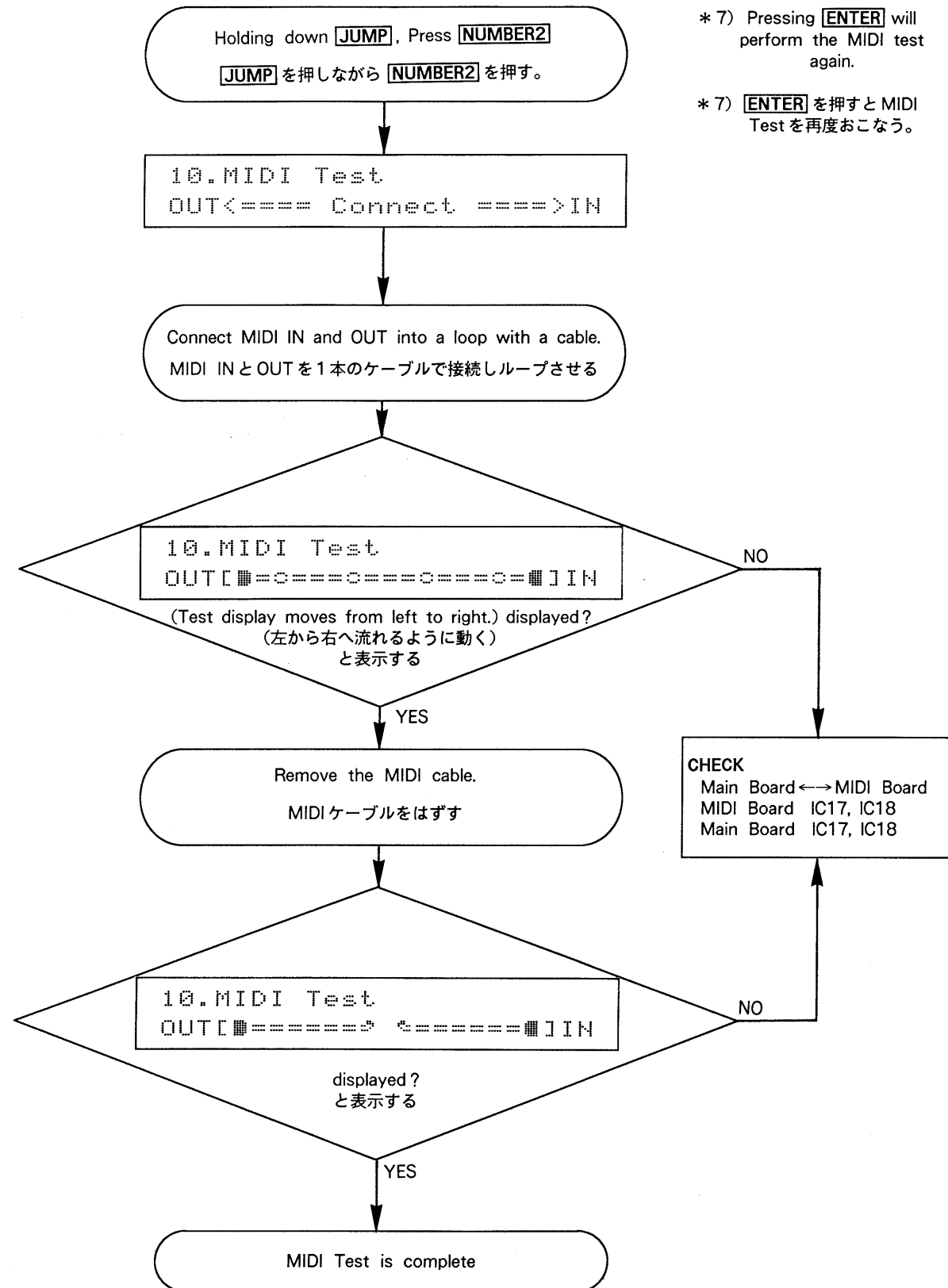
9.A/D Test (2)



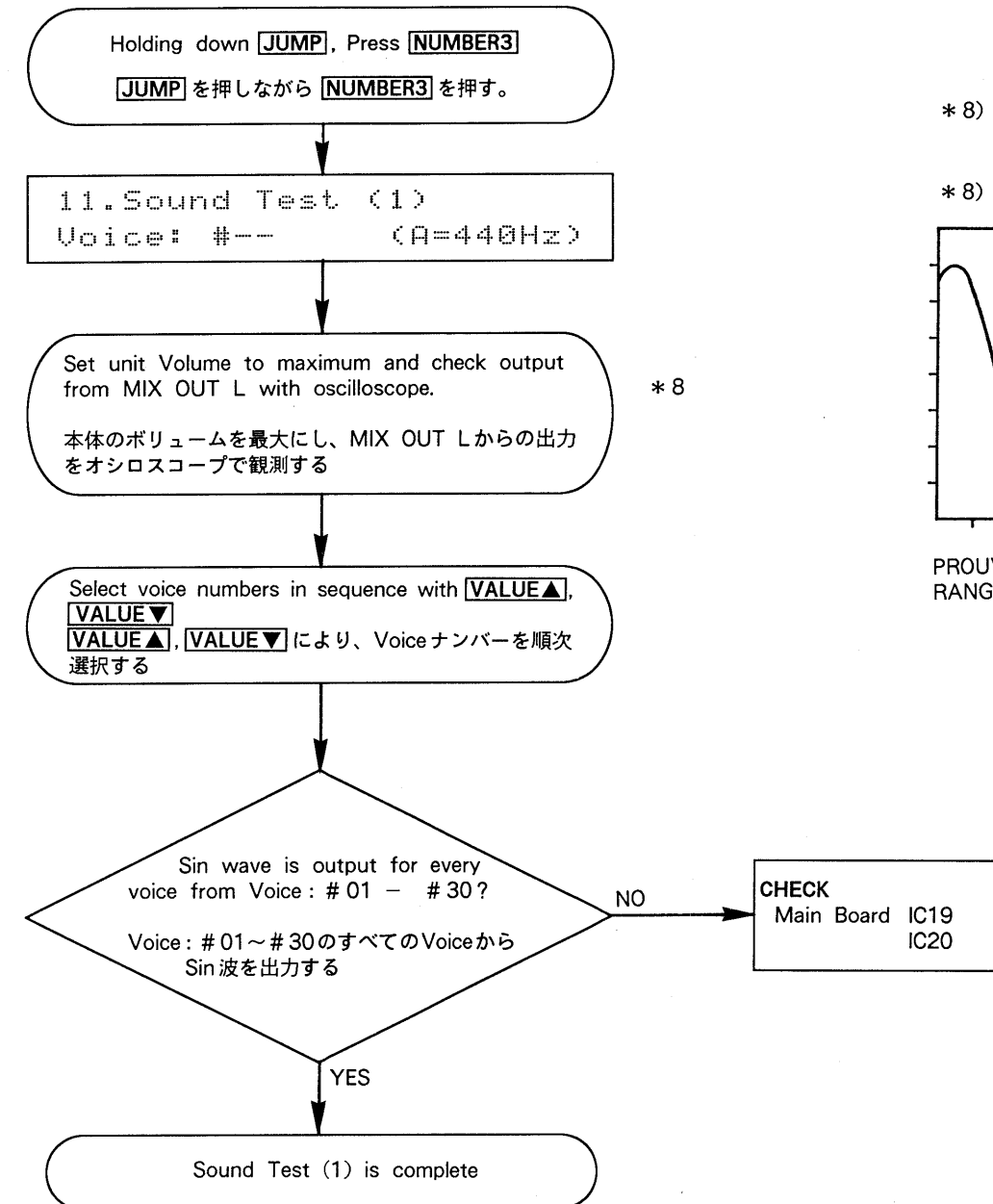
* 6) The whole A/D test may be adversely affected if any one of the analog signals (1, 2, 4, 5 and 12 - 15 pins) of main board IC13 (BU4051) is open (due, for example, to a broken line).

* 6) メインボードIC13 (BU4051) のアナログ入力信号 (1,2,4,5,12-15 PIN) が1つでもオープン状態 (断線など) になるとA/Dテスト全体に悪影響をおよぼすことがある。

10. MIDI Test

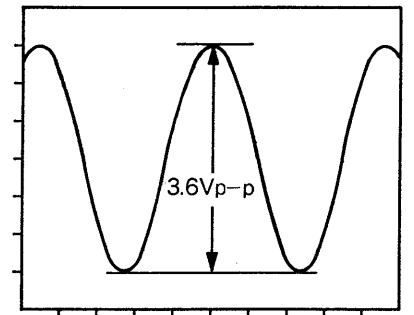


11. Sound Test (1)



* 8) The wave shape as displayed on the oscilloscope.

* 8) オシロスコープで見る波形



PROUVE 1:1 プローブ 1:1
 RANGE 0.5V/div レンジ 0.5V/div
 0.5ms/div 0.5ms/div

* 8

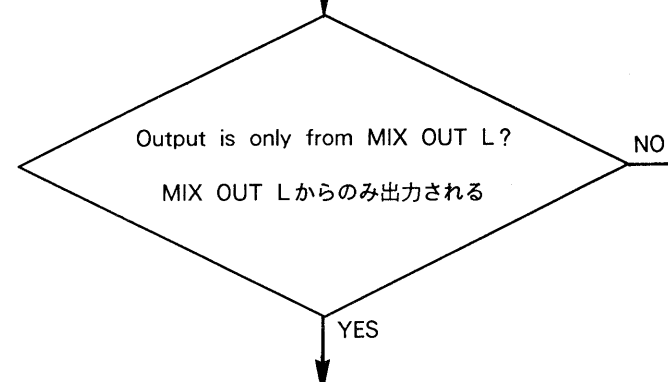
12. Stound Test (2)

Holding down **JUMP**, Press **NUMBER4**
JUMP を押しながら **NUMBER4** を押す。

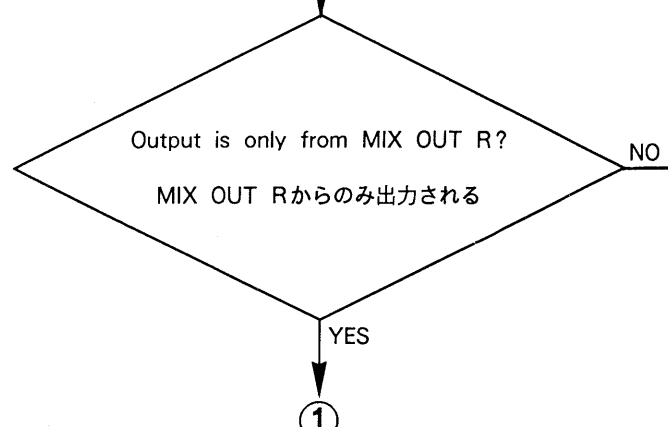
12. Sound Test (2)
 Output: --- ---

Insert plugs into all output jacks (MIX L/R, DIR L/R) and set the unit volume to the maximum. Check each output with oscilloscope.
 全てのアウトプットジャック (MIX L/R, DIR L/R) にプラグを差し込み本体のボリュームを最大にする。それぞれの出力をオシロスコープで観測する。

Set display to "Output: MIX L".
 表示を "Output: MIX L" にする

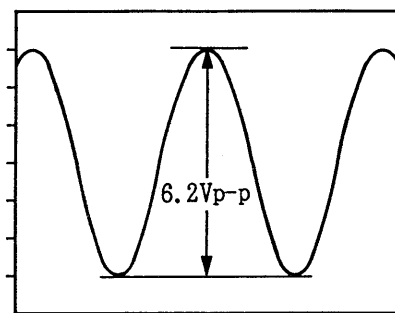


Press **VALUE▲** and set display to "Output: MIX <R".
VALUE▲ を押し、表示を "Output: MIX <R" にする



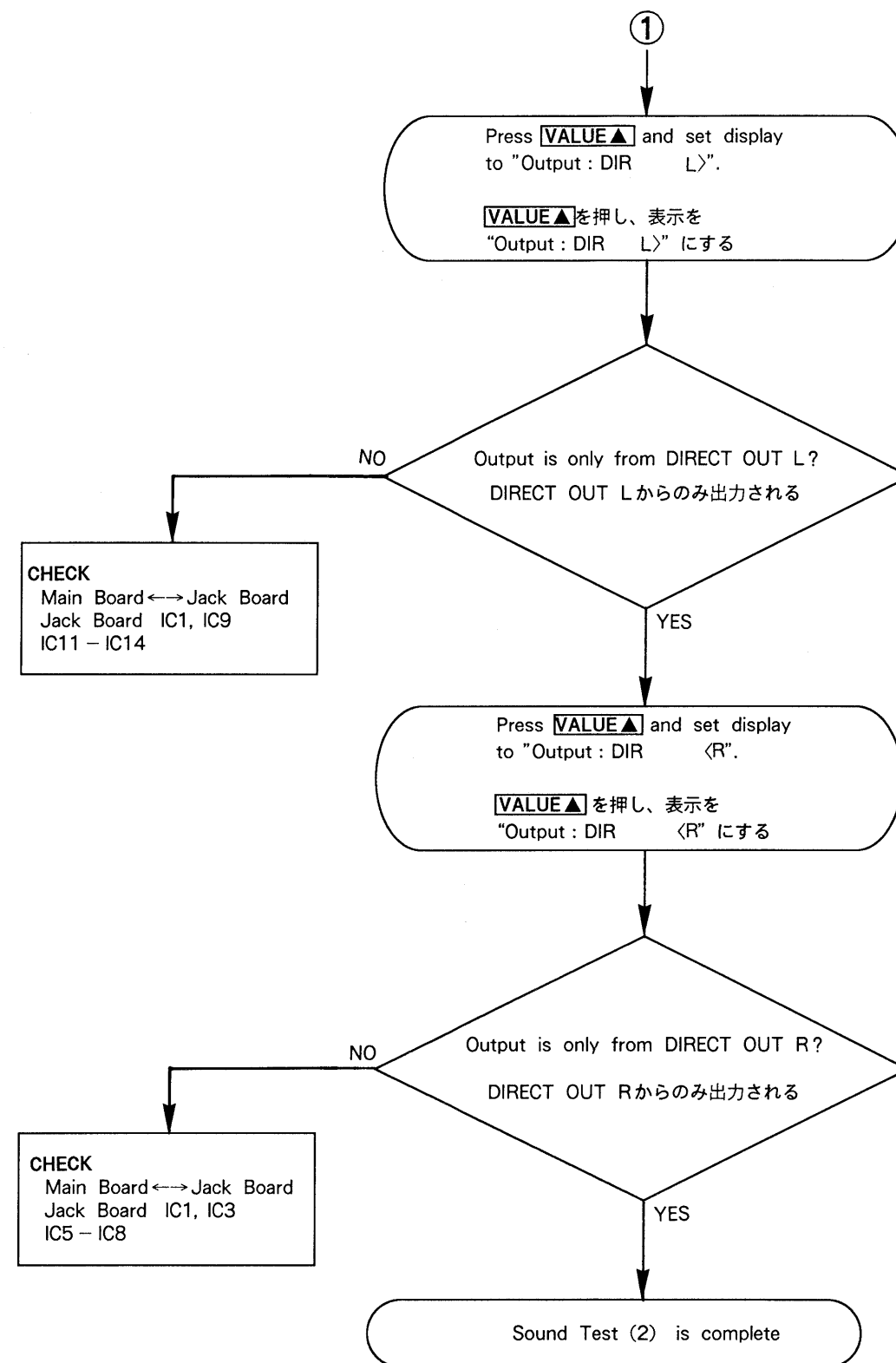
* 9) The wave shape as displayed on the oscilloscope.

* 9) オシロスコープで見る波形

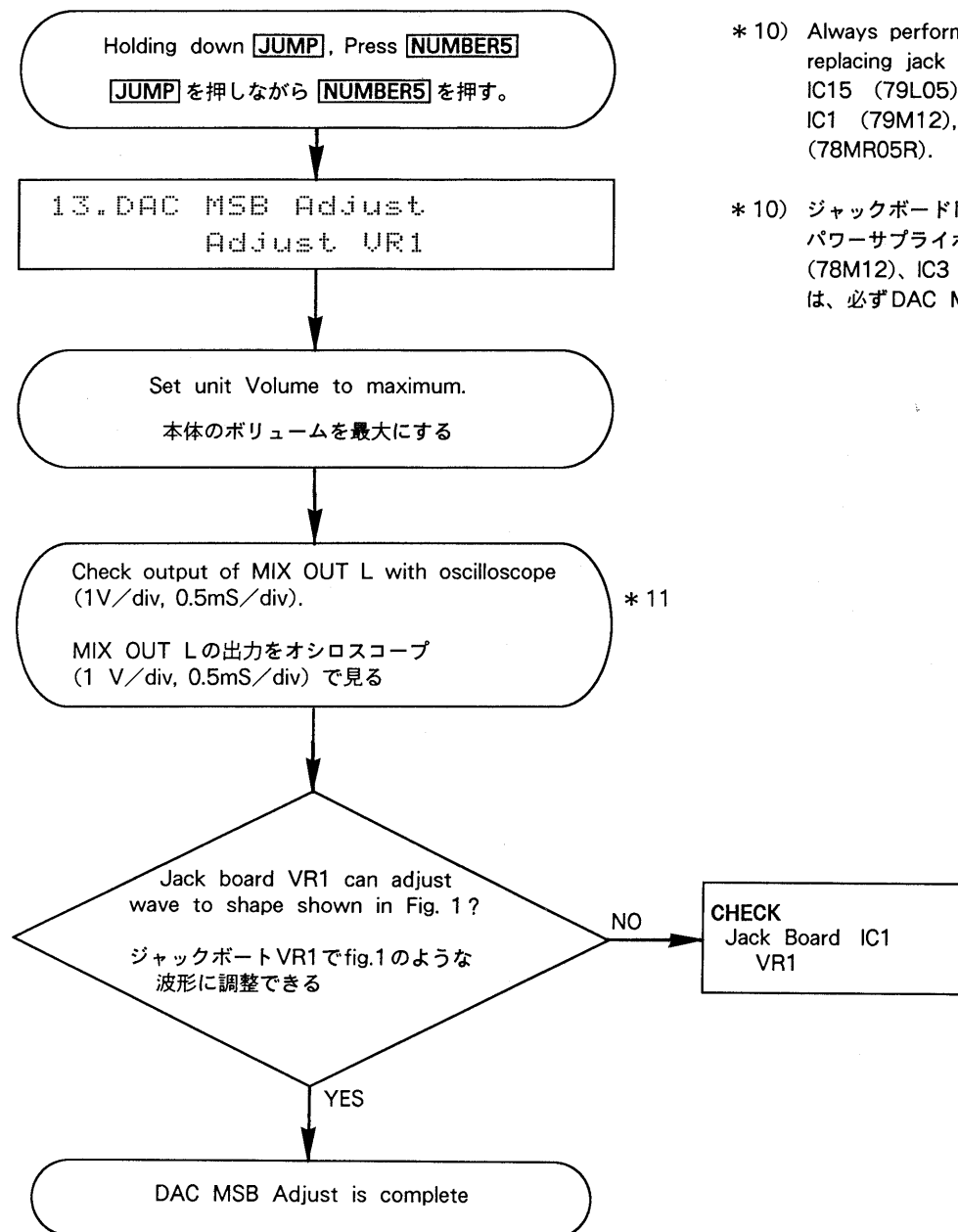


PROUVE 1:1 プローブ 1:1
 RANGE 1V/div レンジ 1V/div
 0.5ms/div 0.5ms/div

* 9



13. DAC MSB Adjust



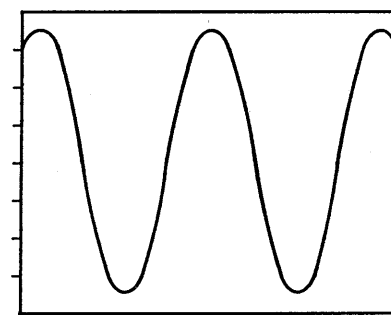
* 10) Always perform DAC MSB Adjust when replacing jack boards IC1 (PCM56) or IC15 (79L05), or power supply boards IC1 (79M12), IC2 (78M12) or IC3 (78MR05R).

* 10) ジャックボード IC1 (PCM56)、IC1 (79L05) パワーサプライボード IC1 (79M12)、IC2 (78M12)、IC3 (78MR05R) を交換した場合は、必ず DAC MSB Adjust をおこなう。

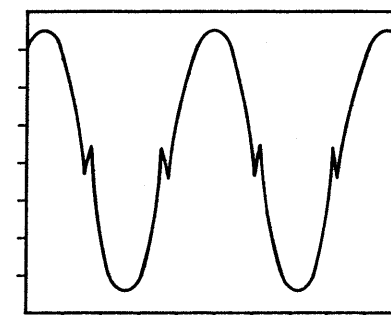
* 11

* 11) The wave shape as displayed on the oscilloscope. (Probe 1:1 Range: 5mV/div 0.5mS/div)

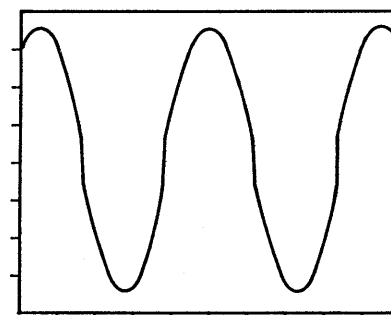
* 11) オシロスコープで見る波形 (プローブ 1:1 レンジ 5mV/div 0.5mS/div)



調整済

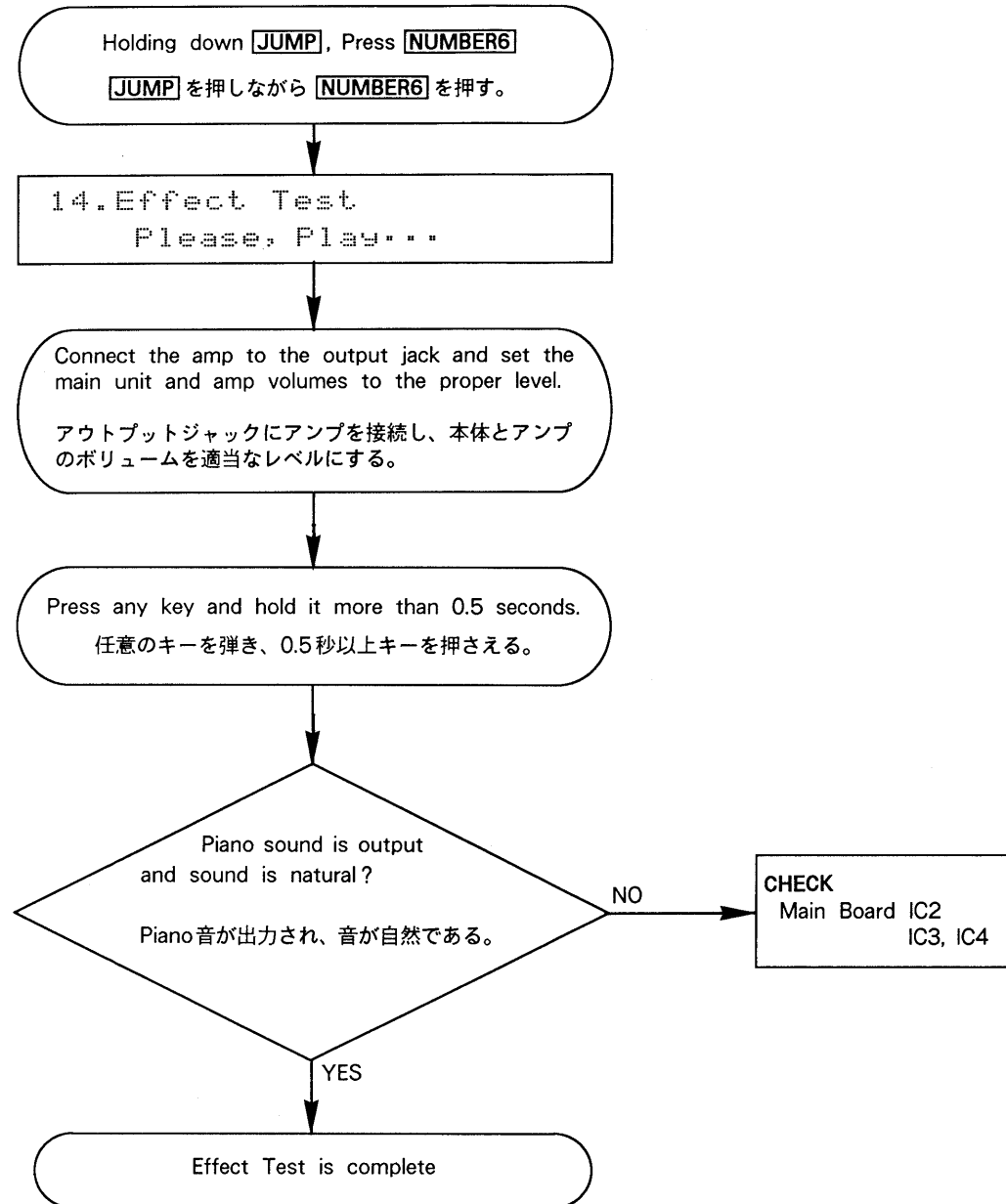


調整必要

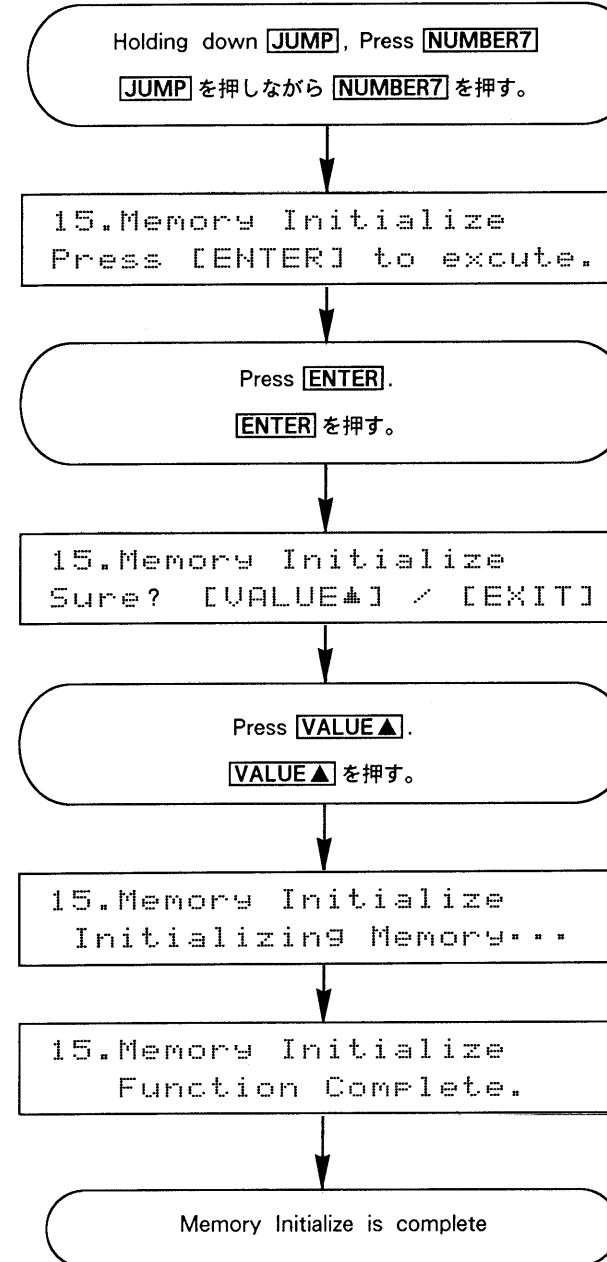


(Since the level is low for the performance of the oscilloscope, the wave shape may contain noise and be difficult to see.)
(レベルが小さいため、オシロスコープの性能で、ノイズを含んで波形が見づらくなることある)

14. Effect Test

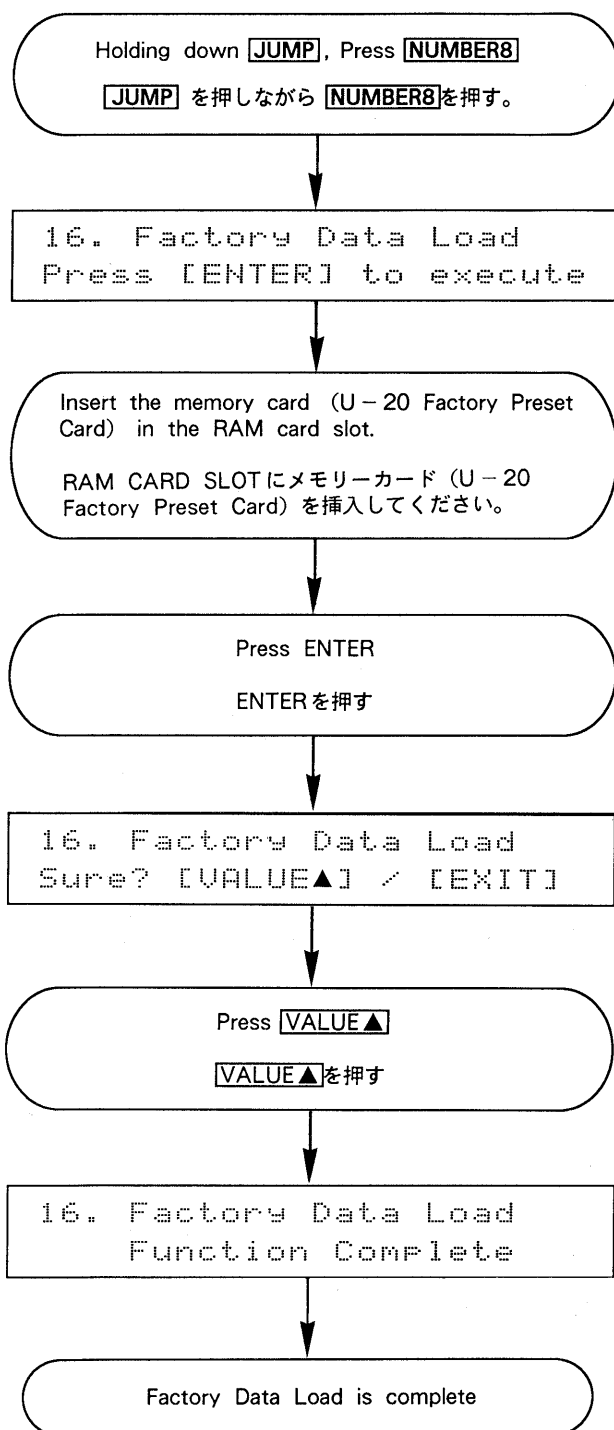


15. Memory Initialization



- * 11) Set all temporary contents to the initialization value. (Data stored in the main unit (internal) will not be initialized.)
- * 11) テンポラリーの全ての内容を、イニシャライズ時の設定にします。(本体 (Internal) に記憶されているデータは、イニシャライズされません。)
- * 12) The contents of the working RAM may be destroyed when replacing the battery (BT1) or working RAM (main board IC5). In this case, perform a Factory Data Load at the same time as Memory Initialize with the procedure shown at left.
- * 12) バッテリー (BT1) や、ワーキングRAM (メインボードIC5) の交換などで、ワーキングRAMの内容が破壊されることがあります。その場合は、左記の手順により、メモリーのイニシャライズと同時にファクトリーデータのロードを行います。

16. Factory Data Load



* 13) The contents of the working RAM may be destroyed when replacing the battery (BT1) or working RAM (main board IC5). In this case, perform a Factory Data Load at the same time as Memory Initialize with the procedure shown at left.

* 13) バッテリー (BT1) や、ワーキングRAM (メインボードIC5) の交換などで、ワーキングRAMの内容が破壊されることがあります。その場合は、左記の手順により、メモリーのイニシャライズと同時にファクトリーデータのロードを行います。

* 14) A RAM Card (M-256E) is used for the memory card, but an OTP ROM Card (M-256N) can also be used. If the OTP ROM Card (M-256N) is used, the message "RAM Card Battery Low!" may be displayed! However, the factory data can be loaded by pressing ENTER and then VALUE▲

* 14) メモリーカードには、RAM Card (M-256E) を使用しますが、OTP ROM Card (M-256N) を使用することもできます。OTP ROM Card (M-256N) を使用した場合には、"RAM Card Battery Low!" と表示したままになることがあります。ENTER を押し、VALUE▲ を押し、ファクトリーデータのロードを行います。

Program ROM Replacement Procedure

プログラムROMの交換手順

Follow the work procedure below in order to perform the work safely.

安全に作業を行う為に、以下の作業手順に従ってください。

1) Turn OFF the power supply switch and remove the power supply cord. Turn over the U-20 unit, loosen (1) 15 screws and (2) 5 screws and then remove the bottom cover from the unit. (Fig.1)

1) 電源スイッチを切り、電源コードを抜きます。U-20本体を裏返し、①ネジ15ヶと②ネジ5ヶをゆるめて、ボトムカバーを本体から取り外します。(図-1)

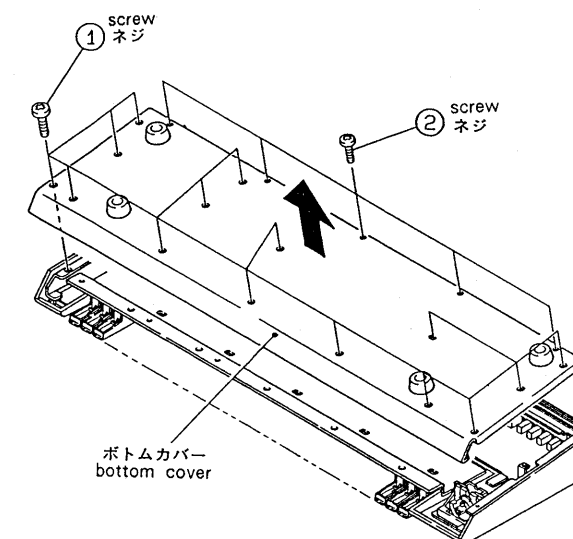


Fig.1 (図-1)

2) Loosen (3) 2 screws (short), (3) 2 screws (long) and (5) 1 screw on the rear panel and remove the MIDI board from the panel. Remove the wiring (12 pin) of the jack board and place the MIDI board on the jack board. (Fig.2)

2) パネルリヤ部の③ネジ(短)2ヶと④ネジ(長)2ヶと⑤ネジ1ヶをゆるめMIDIボードをパネルからはずします。JACKボードのワイヤリング(12pin)をはずしてMIDIボードをJACKボードの上ののせます。(図-2)

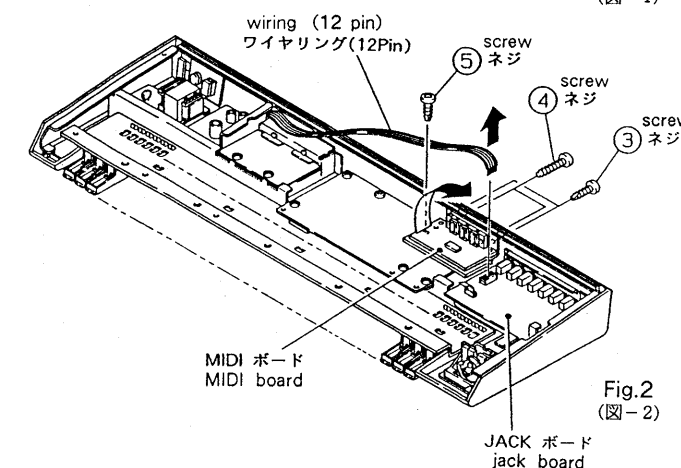


Fig.2 (図-2)

3) Loosen (6) 3 screws on the rear panel and (7) 3 installation screws on the main board and remove the main board from the panel and keyboard angle. Place the main board face up and to the keyboard side so that the part surface is visible. (Fig.3)

3) パネルリヤ部の⑥ネジ3ヶとMAINボードの取り付けネジ⑦3ヶをゆるめてパネル及び鍵盤アングルから外します。MAINボードの部品面が見えるように鍵盤側に仰向けにします。(図-3)

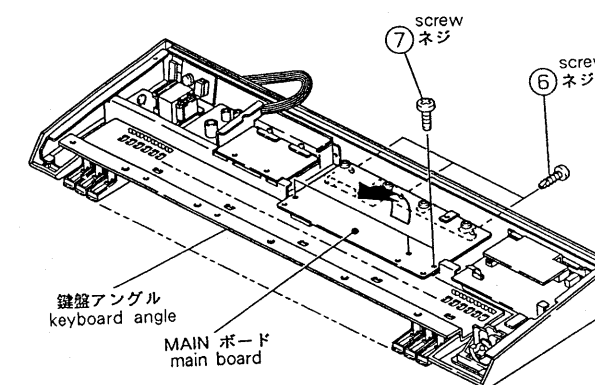


Fig.3 (図-3)

4) When the main board is positioned face up, the program ROM can be seen First verify that it is the program ROM of IC8 and then remove the ROM from the IC with a tool such as a ROM puller. (Fig.4)

4) MAINボードを仰向けにしますとプログラムROMが見えますのでIC8のプログラムROMであることを確認してから、ROM抜き機等でICソケットから引き抜きます。(図-4)

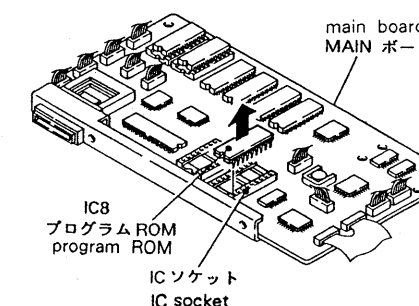


Fig.4 (図-4)

* When reassembling the unit after completion of ROM replacement, follow steps 1) - 4) in the opposite sequence for correct assembly.

* 交換作業が終了して組み立てる際は手順を4) ~ 1) の順に正しく組み立ててください。

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

A
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ADVARSEL!
 Lithiumbatteri. Eksplosionsfare.
 Udskiftning må kun foretages af en sagkyndig,
 og som beskrevet i servicemanual.

Lithium batteri må kun udskiftes med samme type og fabrikat.

VARNING!
 Lithiumbatteri. Explosionsrisk.
 Får endast bytas av behörig servicetekniker.
 Se instruktioner i servicemanualen.

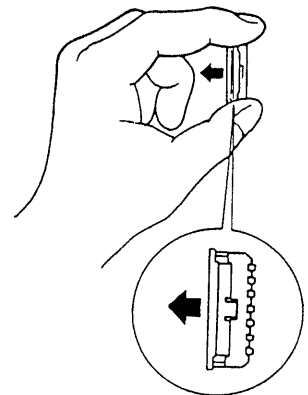
Lithium batteri för endast ersättes med samme typ och fabrikat.

ADVARSEL!
 Lithiumbatteri. Fare for eksplotion.
 Måbare skiftes av kvalifisert tekniker som
 beskrevet i servicemanualen.

Lithium batteri må kun utskiftes med samme type og fabrikat.

VAROITUS!
 Lithiumparisto. Rajähdyysvaara.
 Pariston saa vaihtaa ainoastaan
 alan ammottimes.

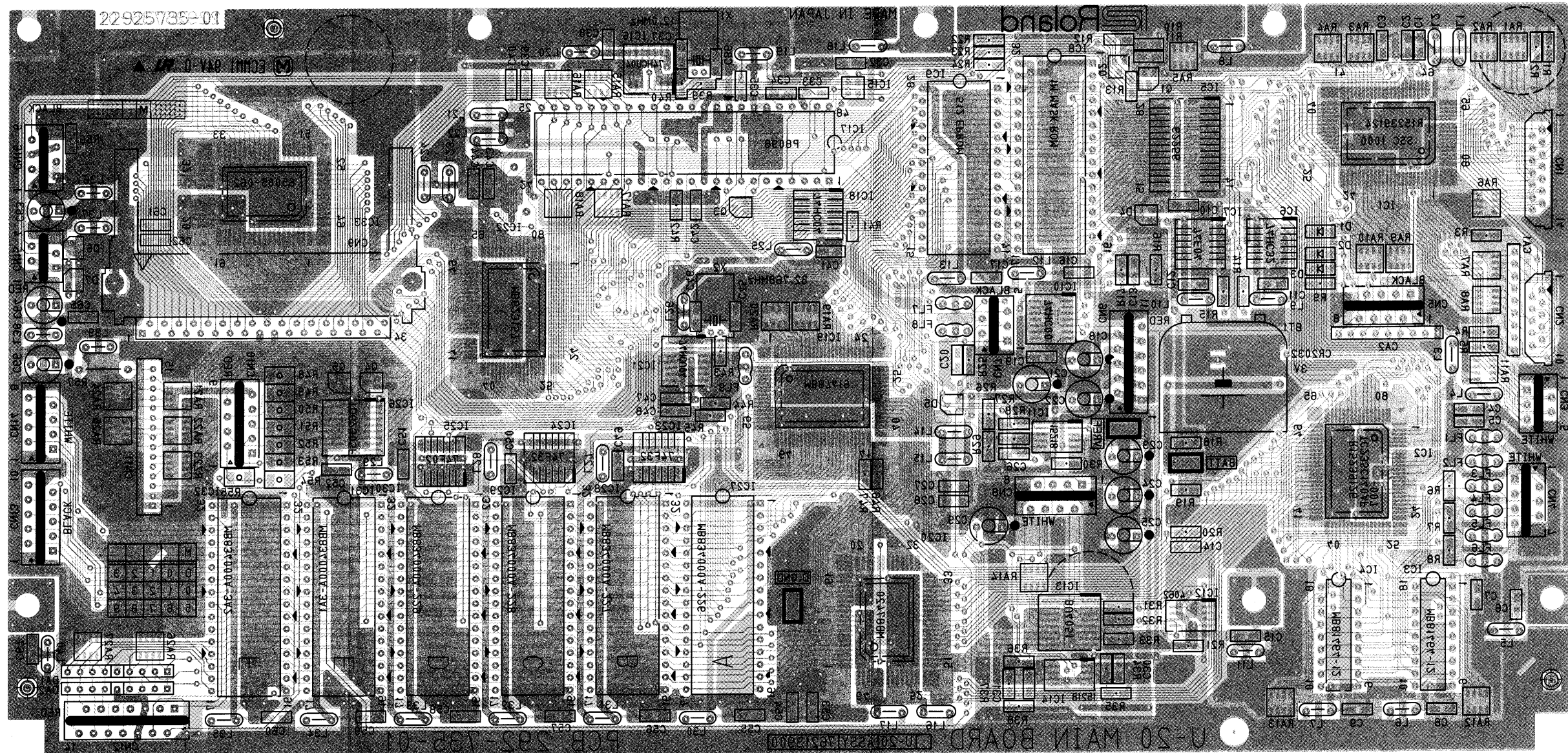
Kun vaihat lithium pariston KÄYTÄ saman valmistajan samaa tyyppiä.



IMPROVEMENTS
 Connection/disconnection of CNs 1 and 2 on main board
 when removing the cables, grey first, and vice versa.

メインボードCN1, CN2の抜き差し方法
 CN1, CN2のケーブルを抜き差しする時は、
 グレー色の部分を引き出してから行う事。

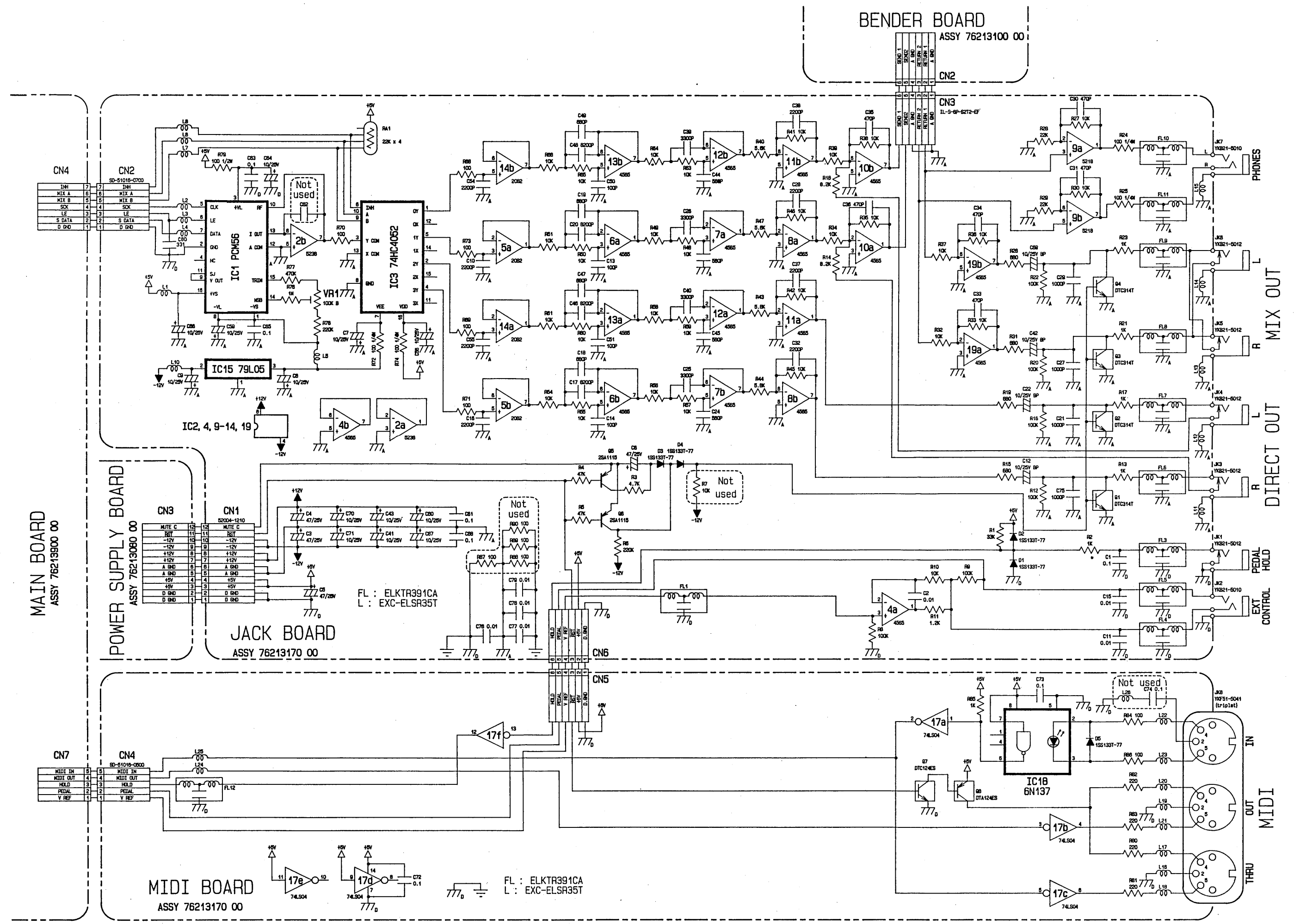
MAIN BOARD
 ASSY 7621390000
 (PCB 22925735)



View from foil Side

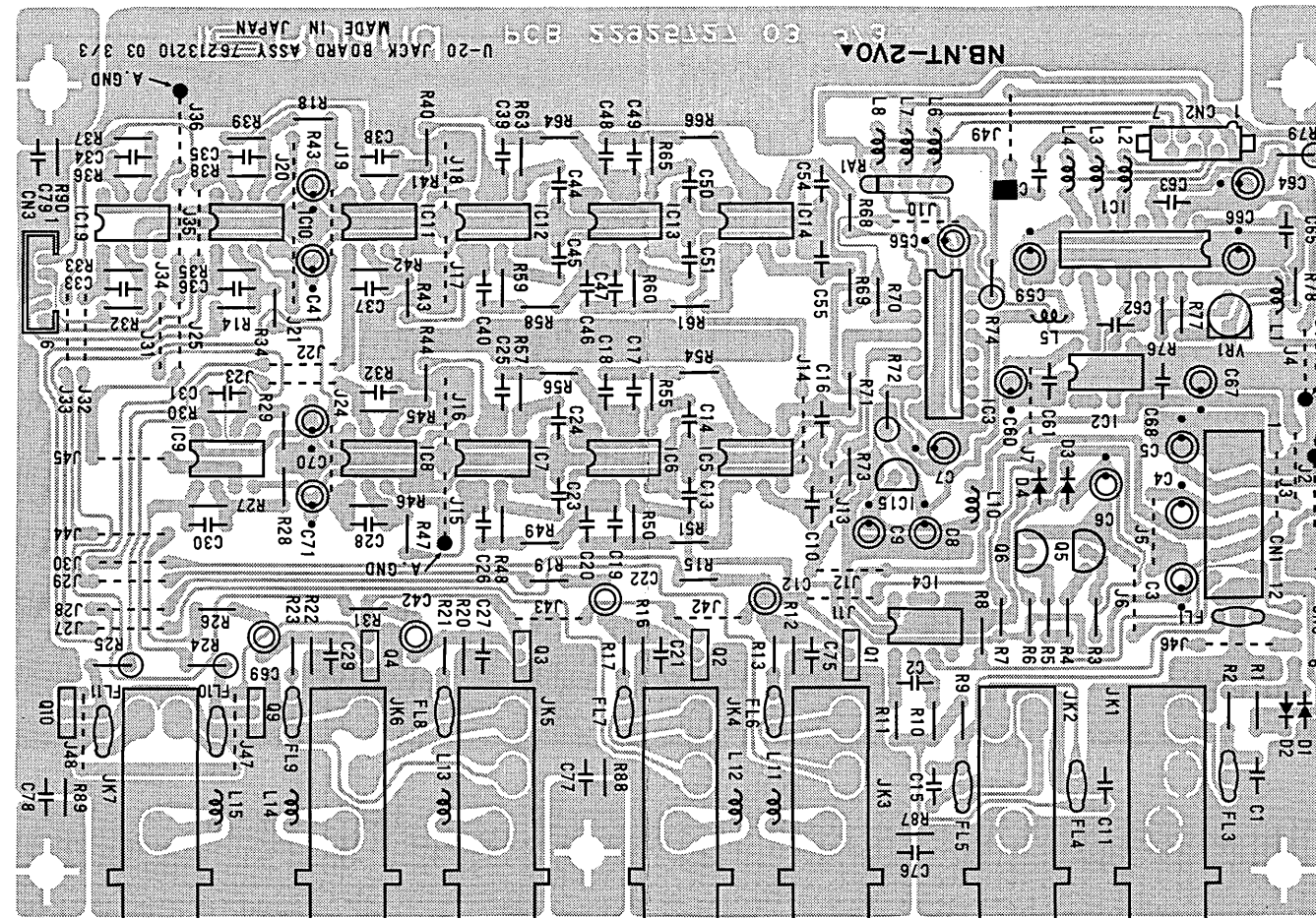
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

A
B
C
D
E
F
G
H
I
J
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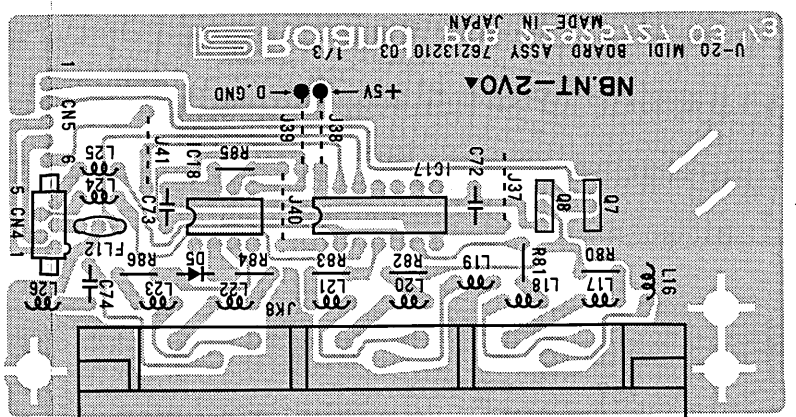
JACK BOARD
ASSY 7621317000
(PCB 22925727 3/3)

There is a mistake in the ASSY number on the PCB
基板上の ASSY ナンバーに誤りがあります。
Wrong (誤) ASSY 76213210 03
Right (正) ASSY 79213170 00



View from Component Side

MIDI BOARD
ASSY 7621317000
(PCB 22925727 1/3)



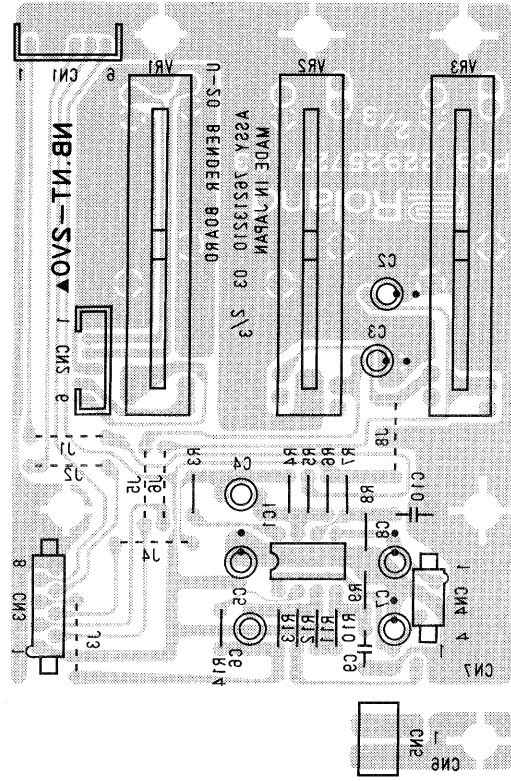
View from Component Side

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

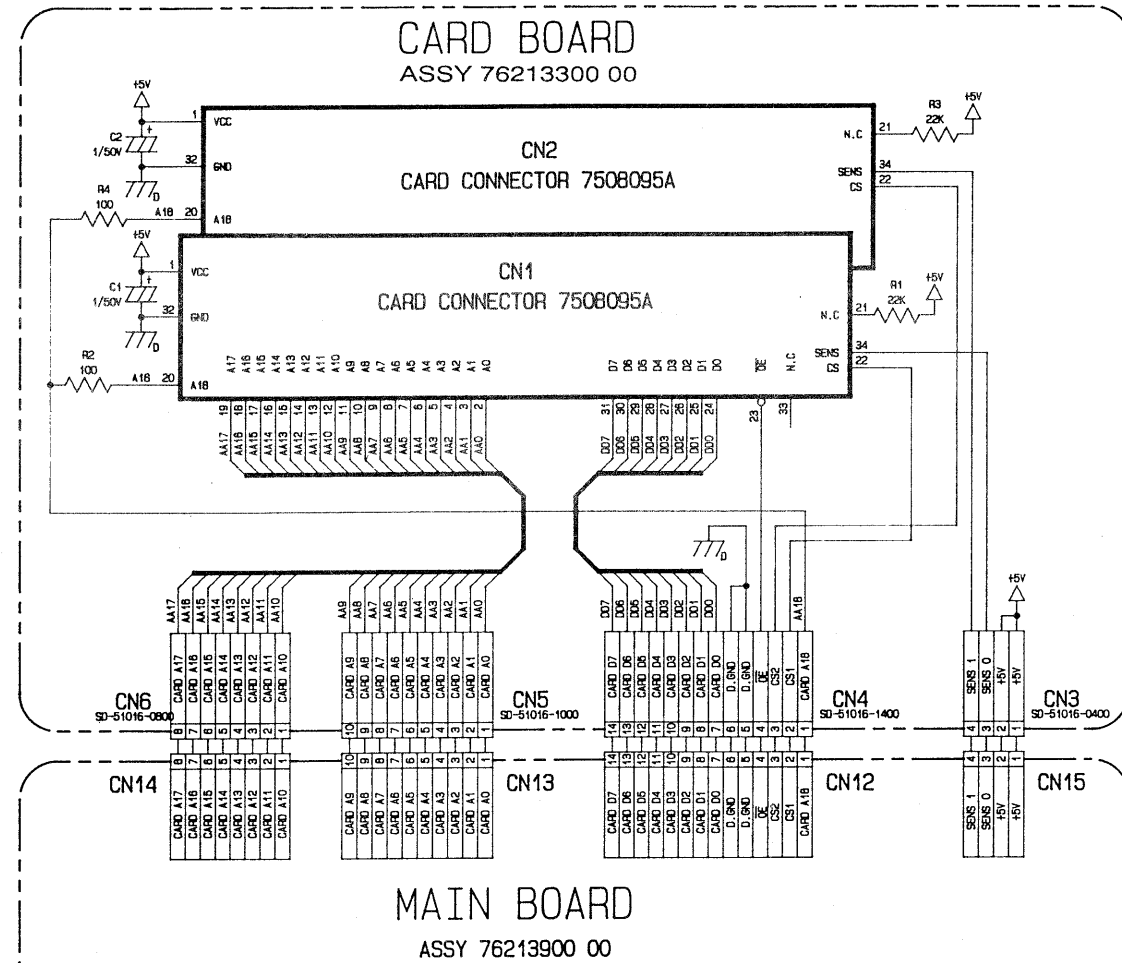
A
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BENDER BOARD
ASSY 7621310000
(PCB 22925727 2/3)

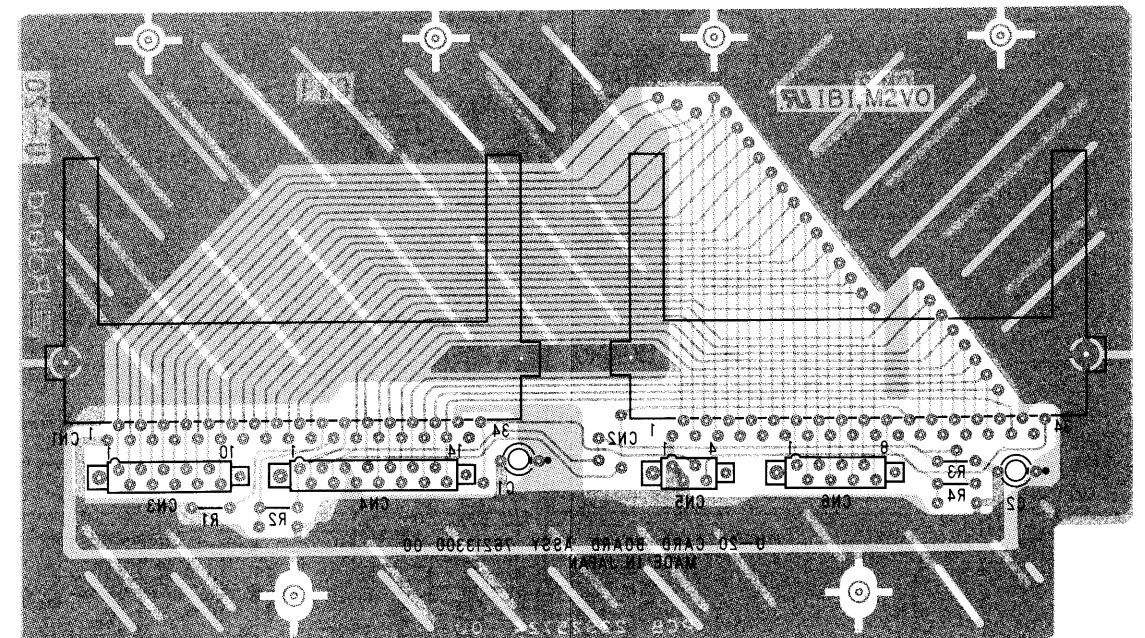
There is a mistake in the ASSY number on the PCB
基板上的 ASSY ナンバーに誤りがあります。
Wrong (誤) ASSY 76213210 03
Right (正) ASSY 76213100 00



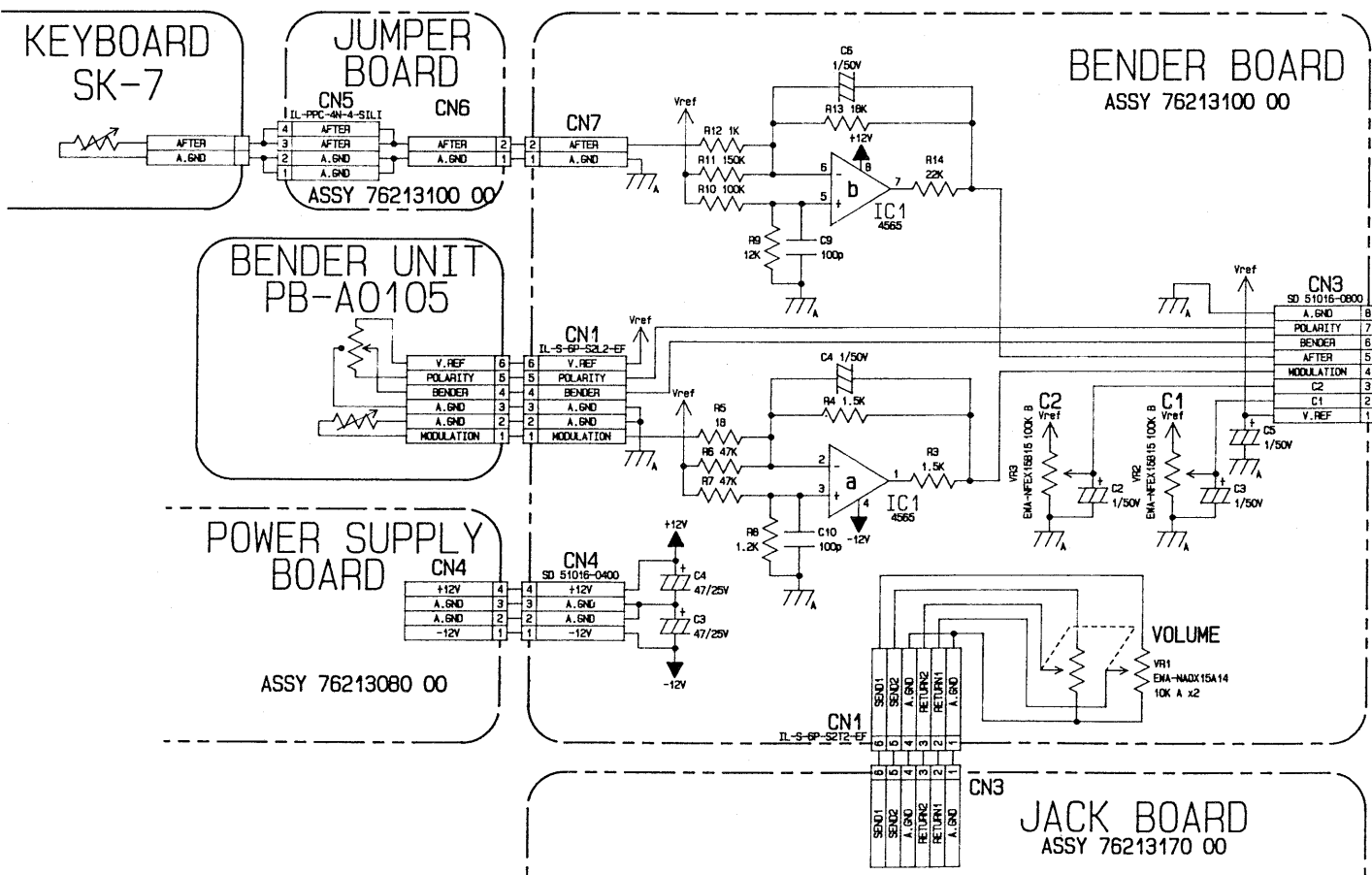
View from foil Side



CARD BOARD
ASSY 7621330000
(PCB 22925724)

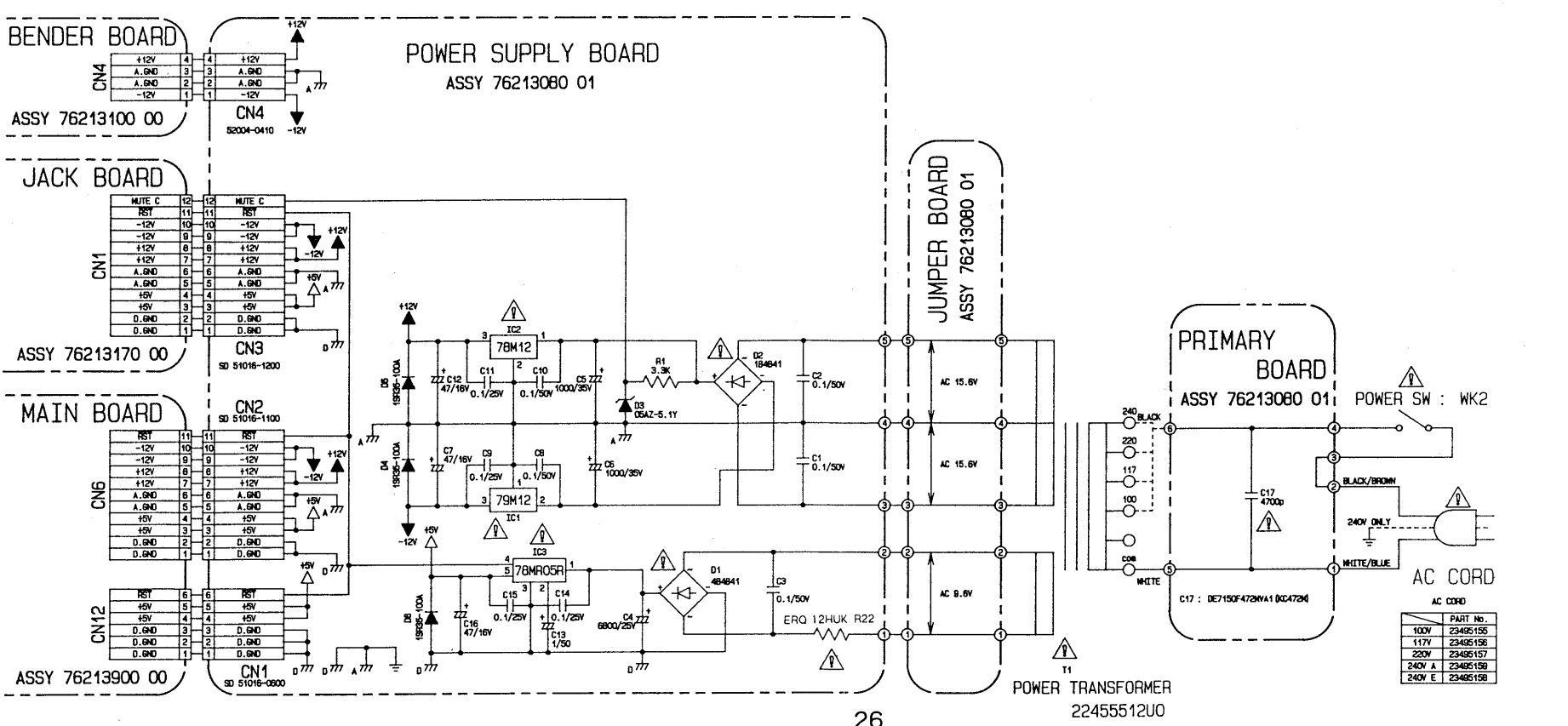
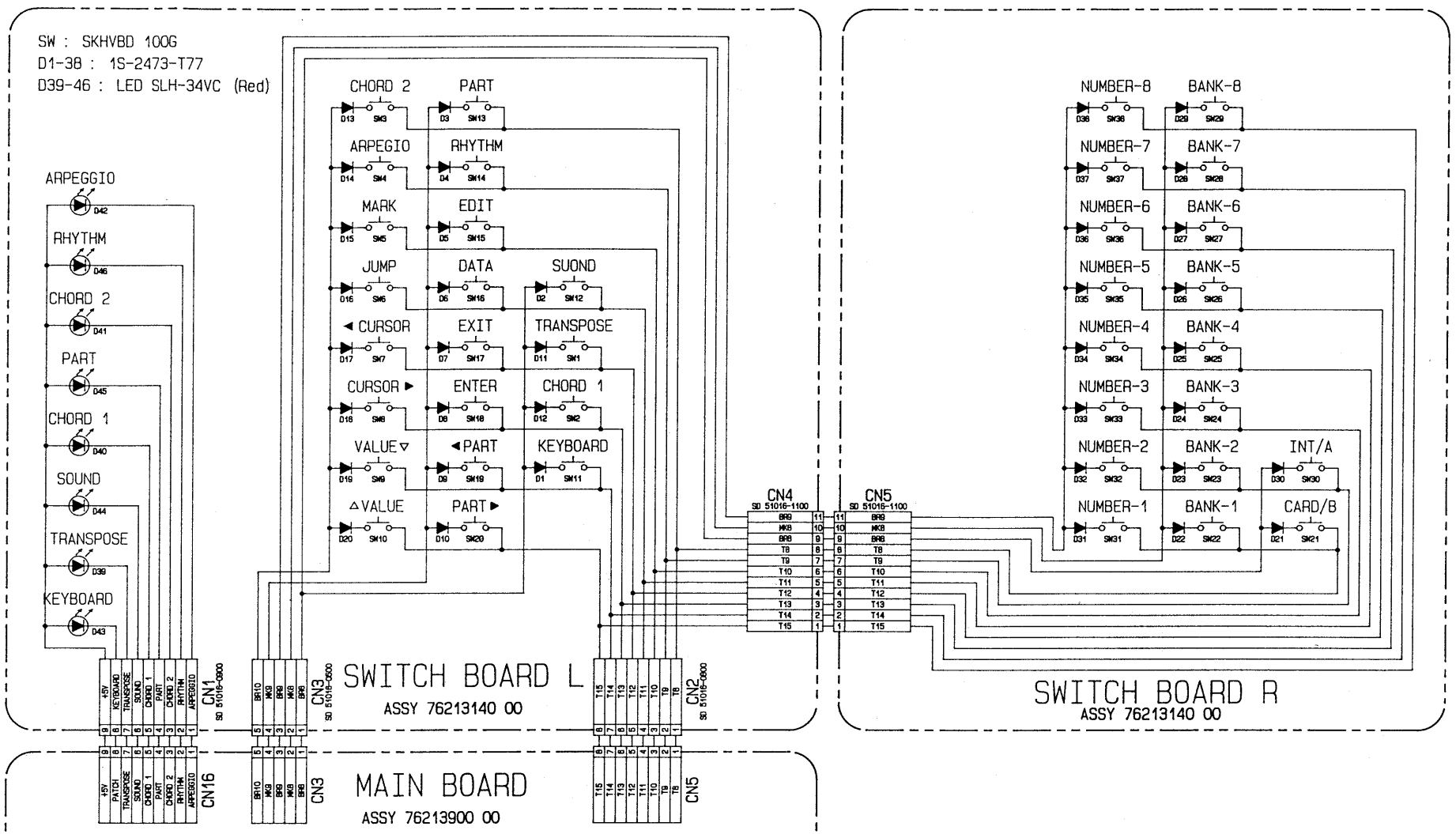


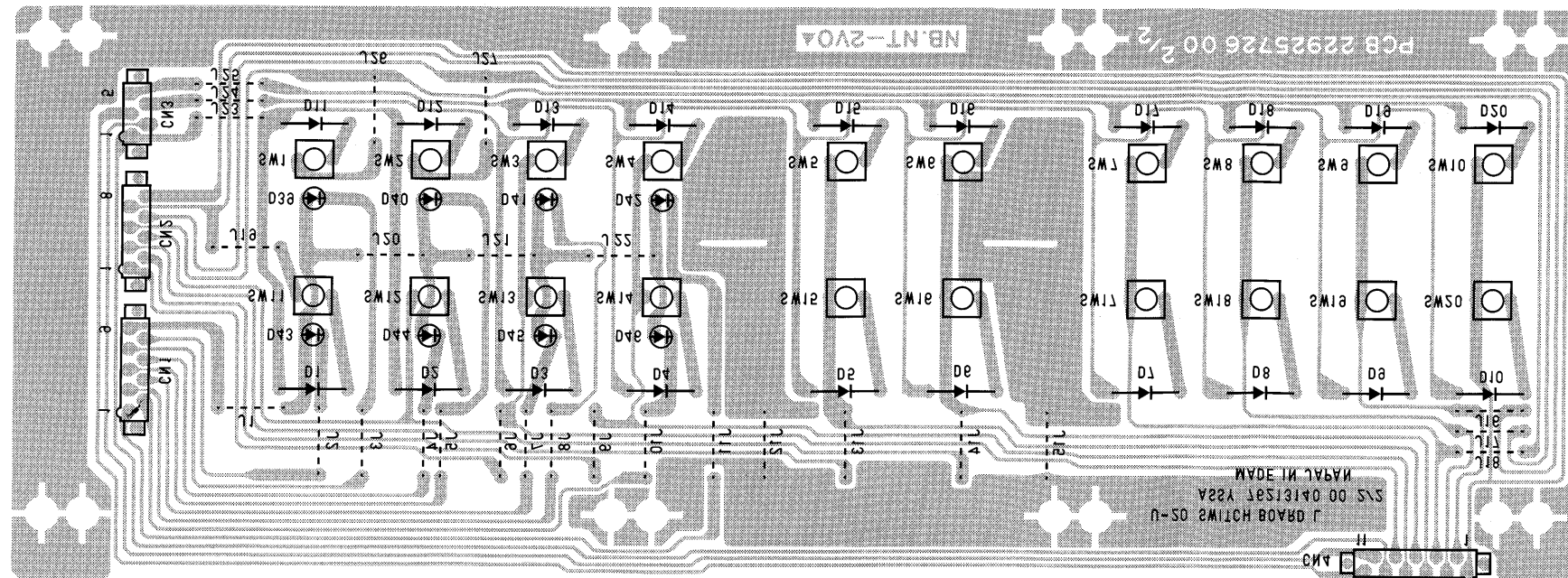
View from foil Side



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

A
B
C
D
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F
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V

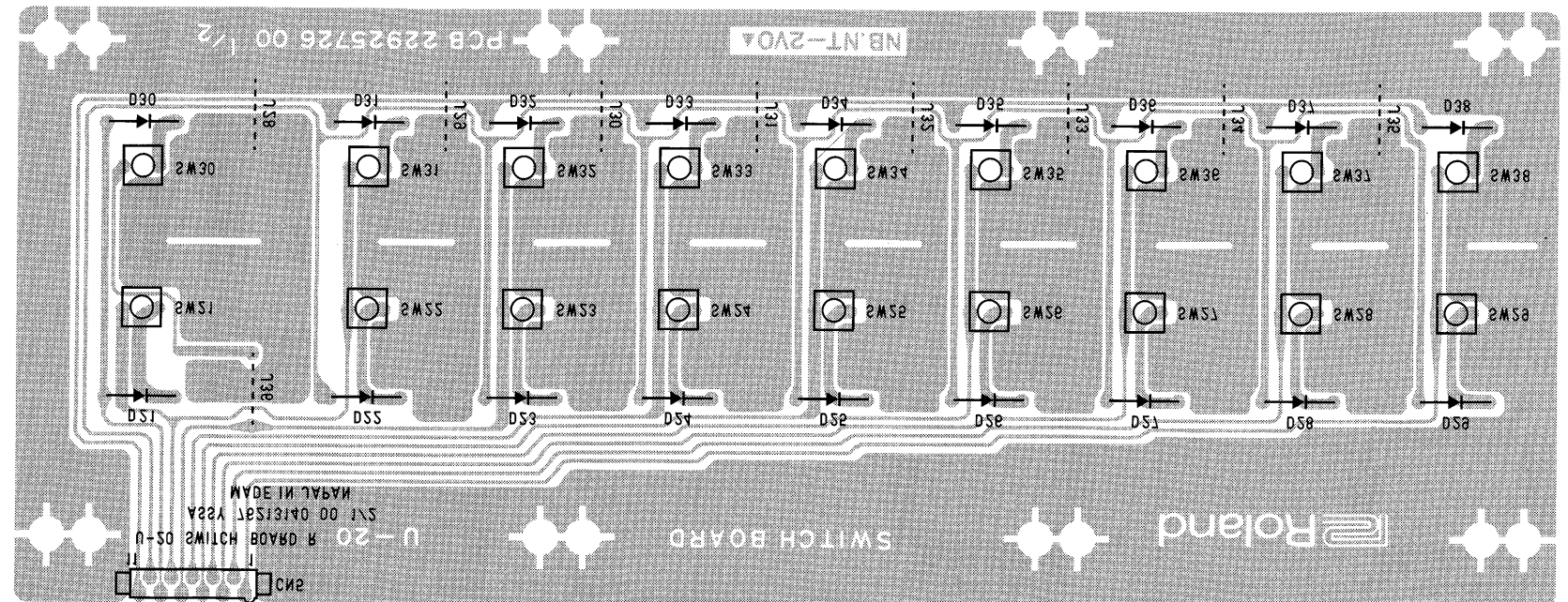




SWITCH BOARD L
 ASSY 7621314000
 (PCB 22925726)
 PCB2292572600

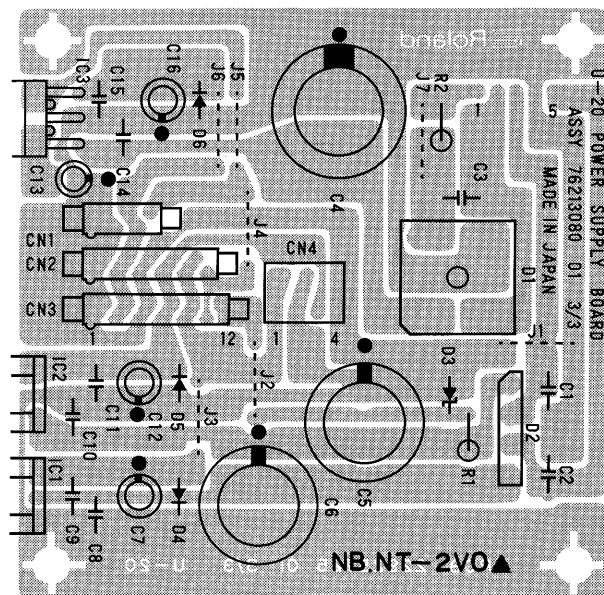
View from foil Side

SWITCH BOARD R
 ASSY 7621314000
 (PCB 22925726)



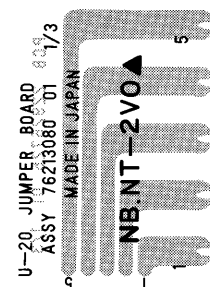
View from foil Side

POWER SUPPLY BOARD
 ASSY 7621308000
 (PCB 22925725 3/3)



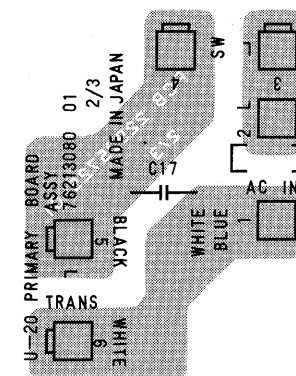
View from Component Side

JUMPER BOARD
 ASSY 7621308000
 (PCB 22925725 1/3)



View from Component Side

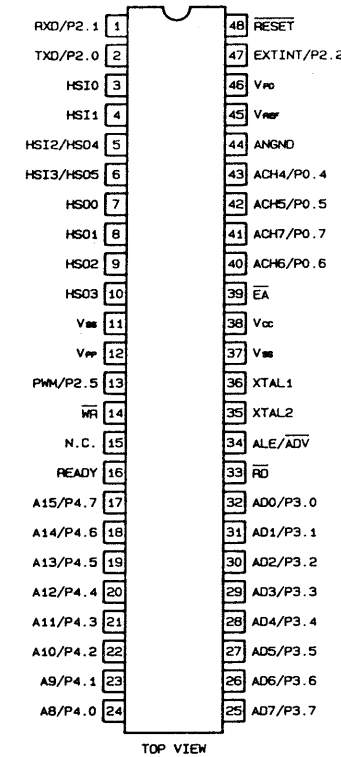
PRIMARY BOARD
 ASSY 7621308000
 (PCB 22925725 2/3)



View from Component Side

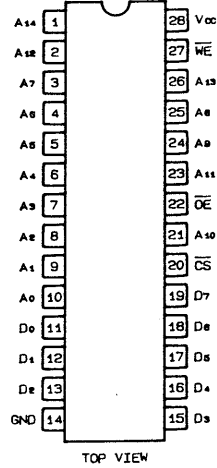
IC DATA

CPU
P8098
(15179286)

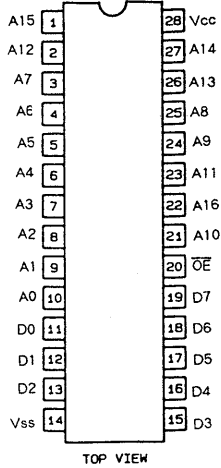


PIN NO.	PIN NAME	IO	DESCRIPTION
38	Vcc	-	Main supply voltage (5V). 主電源5V
11, 37	Vss	-	Digital circuit ground (0V). デジタル・グラウンド
46	VPD	-	RAM standby supply voltage (5V). RAMスタンバイ電源5V
45	VREF	-	Reference voltage for the AD converter (5V). A/Dコンバータの基準電圧
44	ANGND	-	Reference ground for the AD converter (5V). アナログ・グラウンド
12	Vpp	-	Programming voltage for the future EP ROM parts.
36	XTAL1	I	Input of the oscillator inverter and of the internal clock generator. クロック接続端子
35	XTAL2	O	Output of the oscillator inverter. クロック接続端子
48	RESET	I	Reset input to the chip. リセット入力端子
39	EA	I	Input for the memory select. メモリー選択入力
34	ALE/ADV	O	Address Latch Enable or Address Valid output. アドレス・ラッチ・イネーブル
33	RD	O	Read signal output to external memory. 外部メモリー呼び出し信号出力
14	WR	O	Write output to external memory. 外部メモリー書き込み信号出力
16	READY	I	Ready input to lengthen external memory cycles. スピードの遅いメモリーの使用を可能にする入力端子
3, 4, 5	HSI	I	Input to High Speed Input Unit. 状態変化入力
5 - 10	HSO	O	Output from High Speed Output Unit. 指定時間に出力変化を起こさせる出力端子
40 - 43	Port 0	I	4-bit high impedance input - only port. 4ビット・ハイ・インピーダンス入力専用ポート
13, 47	Port 2	IO	4-bit multi-functional port. 4ビット・マルチ・ファンクショナル・ポート
25 - 32	AD	IO	Address data bus. 下位8ビット・アドレス・データ端子
17 - 24	A	O	Address bus. 下位8ビット・アドレス端子
1	RXD	I	Serial input. シリアル入力
2	TXD	O	Serial output. シリアル出力

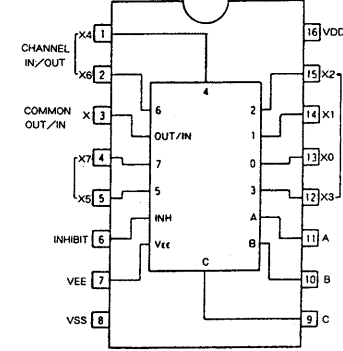
256K SRAM
HM62256LFP-12T
(15279508)



Program ROM
LH5310
(15179950)



8-channel Analog Multiplexer
BU4051BF T2
(15259101)

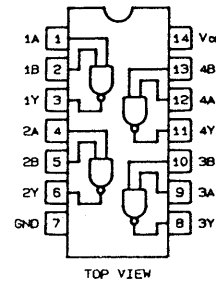


TRUTH TABLE

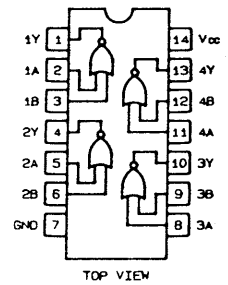
INHIBIT	A	B	C	ON SWITCH
L	L	L	L	X0
L	L	L	L	X1
L	L	L	L	X2
L	L	L	L	X3
L	L	L	L	X4
L	L	L	L	X5
L	L	L	L	X6
L	L	L	L	X7
L	H	X	X	NONE

X: Don't Care

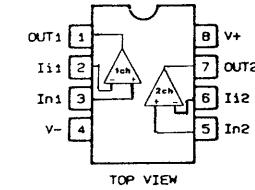
Quad 2-Input NAND Gate
TC74HC00F-T2
(15259701T0)



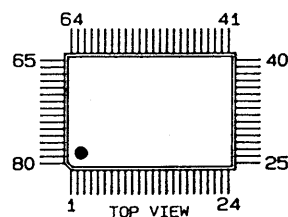
Quad 2-Input NOR Gate
74F02SJL
(15269609)



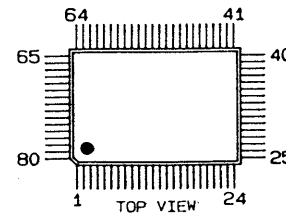
OP AMP
NJM4565DD (15189231)
BA15218 (15189209)
M5238P (15189193)
μ PC4062G (15289110)
NJM2082D (15189220)



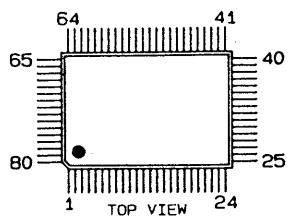
Effect Custom IC
TC23SC140AF-007
(15239126)



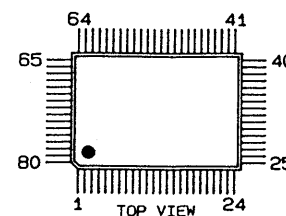
Key Scan Gate Array
SSC1000
(15239124)



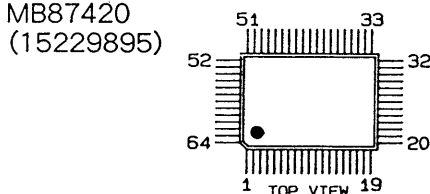
PCM Custom IC
MB87419
(15229894)



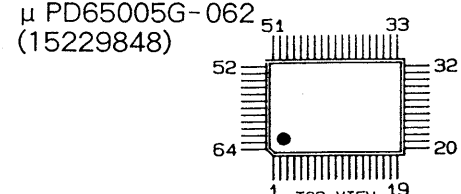
I/O Gate Array
MB623157 μ PF-G-BND
(15239130)



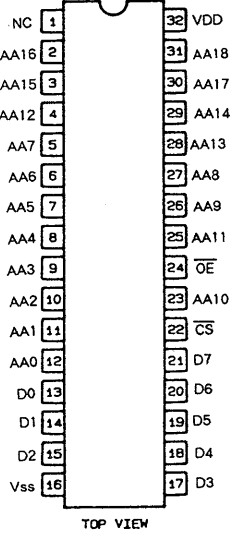
PCM Custom IC
MB87420
(15229895)



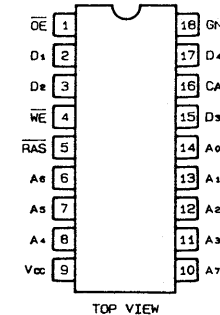
RAM CARD Gate Array
μ PD65005G-062
(15229848)



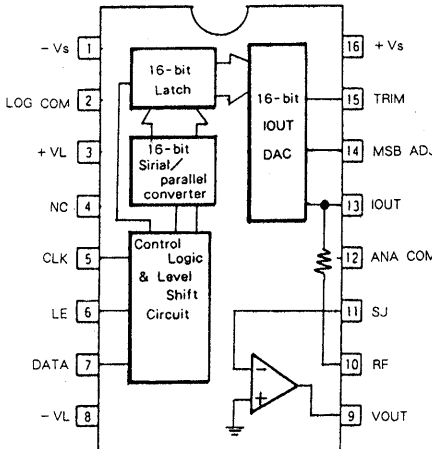
Wave ROM A-F
A : MB834000A-20P-G-226 (15179892F0)
B : MB834000A-20P-G-227 (15179893F0)
C : MB834000A-20P-G-228 (15179894F0)
D : MB834000A-20P-G-229 (15179895F0)
E : MB834000A-20P-G-3A1 (15179947)
F : MB834000A-20P-G-3A2 (15179948)



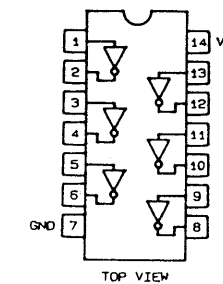
D RAM
MB81464-12
(15179362)



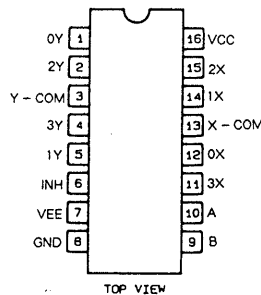
D/A Converter
PCM56P
(15209122)



Hex Inverter
TC74HCU04F-T2 (15259706T0)
TC74HC04F-T2 (15259704T0)
74F04SJL (15269609)
HD74LS04P (15169304H0)



4-channel Analog Multiplexer
TC74HC4052
(15169605)

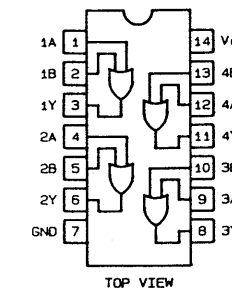


TRUTH TABLE

INHIBIT	C	B	A	"ON" CHANNEL
L	L	L	L	0X, 0Y
L	L	L	H	1X, 1Y
L	L	H	L	2X, 2Y
L	L	H	H	3X, 3Y
L	H	L	L	- -
L	H	L	H	- -
L	H	H	L	- -
L	H	H	H	- -
H	X	X	X	NONE

X: Don't Care

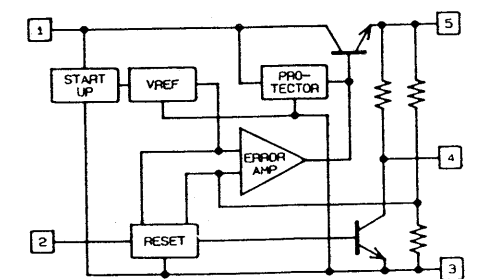
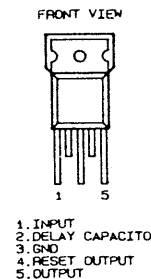
Quad 2-Input OR Gate
TC74HC32F-T2 (15259716T0)
74F32SJL (15269610)



TRUTH TABLE

A	B	Y
L	L	L
L	H	H
H	L	H
H	H	H

+5V Voltage Regulator
L78MR05R
(15199155)



U-20 SERVICE NOTES
 ERRATA & SUPPLEMENT 正誤表 & 追加情報

U-20 (SK-761-BWGA) PARTS LIST

NO.	PARTS NO.	PARTS NAME		
1	22575254W0	SK-7 NATURAL KEY C/F	257-254	
	22575256W0	" E/B	257-256	
	22575258W0	" D	257-258	
	22575259W0	" G	257-259	
	22575253W0	" A	257-253	
	22575255W0	" C'/F'	257-255	
2	22575261W0	SK-7 SHARP KEY	257-261	
3	22815653	SK-7 CHASSIS 61P	281-653	SK-761 CHASSIS 281-653CA ASSY
4	22155775	SK-7 GUIDE BUSH	215-775	
5	22265493	SK-7 FELT 6IKEY	226-493	281-677 22815677
6	22125285	ANGLE	212-285	
7	22185236	SK-7 CONTACT LUBBER 12PW	218-236	SK-761 CONTACT LUBBER
	22185237	SK-7 CONTACT LUBBER 13PW	218-237	
8	7621322000	SK-761-BWGA CONTACT BOARD ASSY	7621422000	
9	22205309	SK-761 CONNECTOR HOLDER	220-309	
10	23165695	SK-761 CA-01 AFTERTOUCH ASSY		
11	22175203	SK-7 SPRING	217-203	
12	22135430	SK-761 STOPPER	213-430	
13		TAPPING SCREWS 3x6 B1	☆	
14		NYLON RIVET NRP-355	☆	

