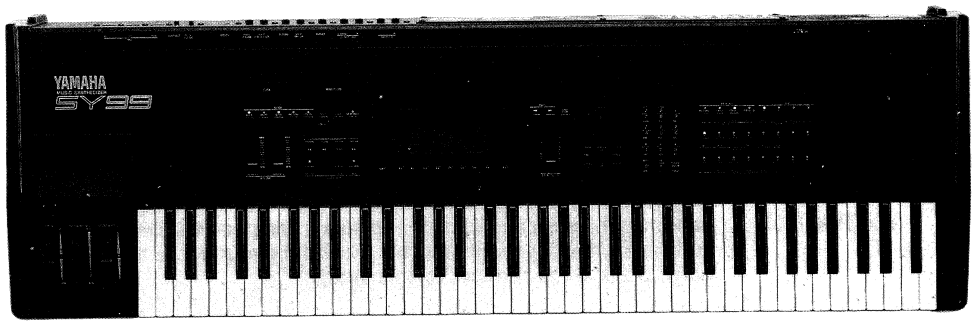
MUSIC SYNTHESIZER

SY99

SERVICE MANUAL



SY99

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PARTS LIST

LM 011046

YAMAHA CORP.
HAMAMATSU. JAPAN
3.0K-4521 ⊖ Printed in Japan '91.07

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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.

This product uses a lithium battery for memory back-up.

WARNING: Lithium batteries are dangerous because they can be exploded by improper handling. Observe the following precautions when handling or replacing lithium batteries.

- Leave lithium battery replacement to qualified service personnel.
- Always replace with batteries of the same type.
- When installing on the PC board, solder using the connection terminals provided on the battery cells. Never solder directly to the cells. Perform the soldering as quickly as possible.
- Never reverse the battery polarities when installing.
- Do not short the batteries.
- Do not attempt to recharge these batteries.
- Do not disassemble the batteries.
- Never heat batteries or throw them into fire.

ADVARSEL!

Lithiumbatteri. Eksplosionsfare.

Udskiftning må kun foretages af en sagkyndig, og som beskrevet i servicemanualen.

WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the production of this product contains LEAD. In addition, other electrical/electronic and/or plastic (where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and/or birth defects or other reproductive harm.

DO NOT PLACE SOLDER, ELECTRICAL/ELECTRONIC OR PLASTIC COMPONENTS IN YOUR MOUTH FOR ANY REASON WHAT SO EVER!

Avoid prolonged, unprotected contact between solder and your skin! When soldering, do not inhale solder fumes or expose eyes to solder/flux vapor!.

If you come in contact with solder or components located inside the enclosure of this product, wash your hands before handling food.

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■SPECIFICATIONS（総合仕様）

Tone generator: Realtime Convolution and Modulation (RCM)
AWM2: 16 bit linear waveform data, maximum 48 kHz sampling frequency
AFM: 6 operators, 45 algorithms, 3 feedback loops, 16 waveforms, modulation from AWM output
Filter: Time variant IIR (infinite impulse response) digital filters, 2 filters for each element (maximum of 8 filters per voice)
Maximum simultaneous notes: 16 (Voice mode), 32 (Multi mode)
Maximum simultaneous timbres: 1 (Voice mode), 16 (Multi mode)
Note assignment: Last note priority, DVA (dynamic voice allocation)

Keyboard: 76 notes, key velocity sensitivity, channel aftertouch (with zoned aftertouch)

DSP effects: 2 units, 63 effect types

Sequencer:
Tracks: 16 (15 tracks + 1 pattern track)
Songs: 10
Resolution: 1/96 of a quarter note (for internal clock), 1/24 of a quarter note (for MIDI sync)
Maximum simultaneous notes: 32
Capacity: approximately 27,000 notes
Patterns: 99
Recording: realtime/step/punch in

Memory:
Preset memory: 128 voices, 16 multis
Internal memory: 64 voices, 16 multis
Waveform memory: 4 Mwords (8 Mbytes), 267 sounds
MDR/sample memory: 512 kbytes (expandable to 1.5 Mwords)
Card slots: synthesizer data × 1, waveform data × 1
Disk: 3.5" floppy disk drive (720 kbyte formatted)

Controllers:
Wheels: PITCH, MODULATION 1, MODULATION 2
Slider: OUTPUT 1, OUTPUT 2, DATA ENTRY
Knobs: LCD contrast, click volume
Dial: data entry dial
Panel switches; MODE × 5, EDIT/COMPARE, COPY/SAVE, EF.BYPASS, SEQUENCER × 7, SHIFT, function × 8, EXIT, PAGE ◁▷, JUMP/MARK, cursor △▽◁▷, −1/NO, +1/YES, numeric keypad 0–9, ENTER, [−], MEMORY × 4, BANK × 4, voice select × 16,

Display:
LCD: 240 × 64 pixels (with backlight)
LED: red × 11, red/green × 21

Terminals:
Audio output: OUTPUT 1 (L/MONO, R), OUTPUT 2 (L, R), PHONES
Controller: BREATH, FOOT VOLUME, FOOT CONTROLLER, SUSTAIN, FOOT SWITCH
MIDI: IN, OUT, THRU

Power requirements:
UL, CSA: 120V
Europe, WG, Australia, BS: 220–240V

Power consumption:
UL, CSA: 35W
Europe, WG, Australia, BS: 35W

Dimensions:
1254(W) × 407(D) × 120(H) mm

Weight: 19.6 kg

Output level:
Headphones: +5.5dBm (150Ω load)
Outputs: 0dBm (10kΩ load)

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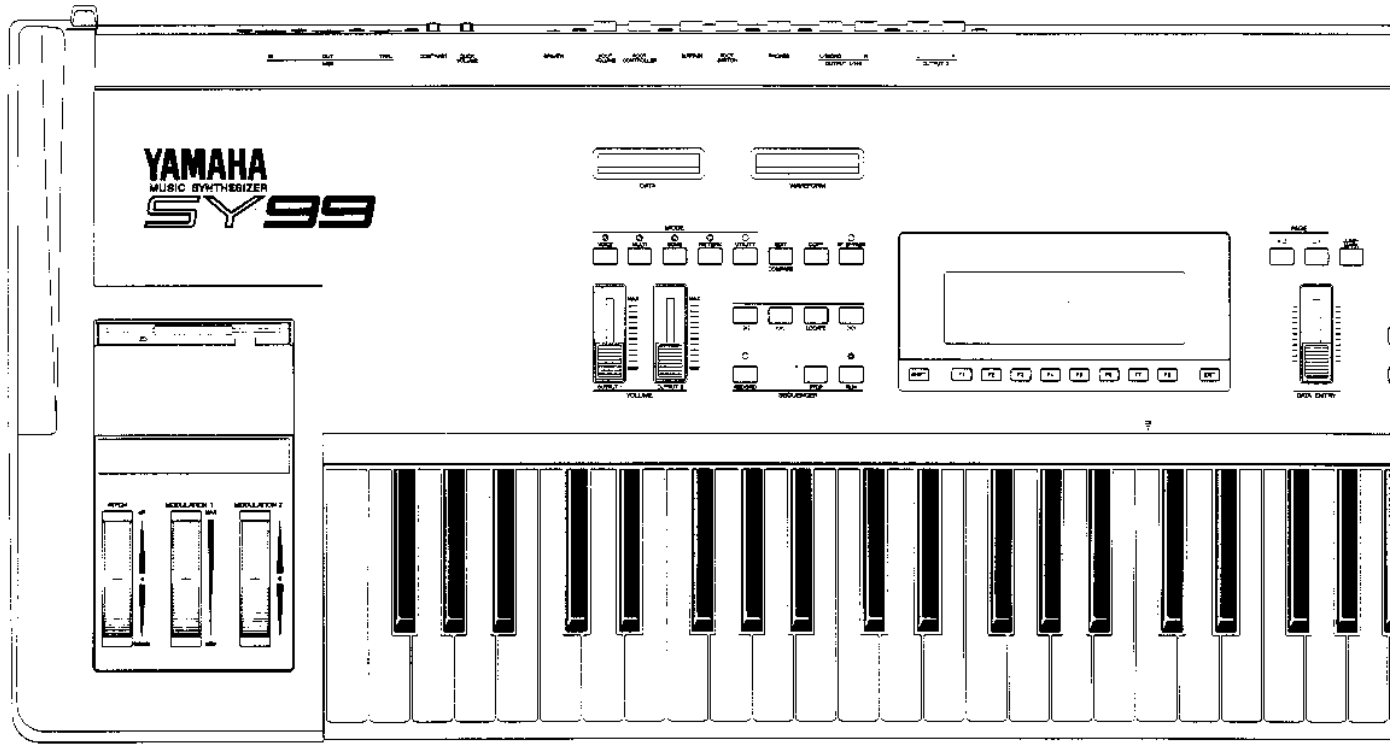
＜機能＞
音　源：
音源形式：
■RCM音源
■AWM2：16ビットリニア波形，サンプリング周波数 f 24/32/48kHz
1音（エレメント）につき1オクターブ12dBのデジタルフィルターを2個搭載
内蔵波形容量
ROM部：4メガワード（8MByte）
RAM部：256キロワード（512KByte）バッテリーバックアップ付拡張スロットに増設メモリーボードを差すことにより、最大1.5メガワード（3MByte）まで拡張可能
■AFM：6オペレータ、45アルゴリズム、3系統フィードバック、16波形
AWM2の出力波形による変調が可能
1音（エレメント）につき1オクターブ12dBのデジタルフィルターを2個搭載
フィルター：
■時変形デジタルフィルター×最大8/ボイス
■各フィルターはLPF，HPFの切り替えができ、この組み合せによりBPFやロールオフ24dBのLPFとしても使用可能
■レゾナンス可変で発振領域までカバー
最大同時発音数：
■AWM2：16音＋AFM：16音
最大同時音色数：
■16
発音形式：
■後着優先、DVA
鍵　盤：
■76キー/イニシャル&チャンネルアフタータッチ付き
エフェクタータイプ：
■高品位DSPを2基搭載（シリアルまたはパラレル接続）
■プログラム数63
■エフェクトパラメーターをリアルタイムにコントロール可（2系統）
シーケンサー：
トラック数：
■16トラック（含むパターントラック1）
ソング：
■10（Next Song，Next Mode付）
分解能：
■♪/96（内部クロック時）
最大同時発音数：
■32
最大記憶音数：
■約27000音
パターン数：
■99
録音方式：
■リアルタイム/ステップ/パンチイン
＜内部構成＞
プリセットメモリー：
■ボイス：128ーマルチ：16
インターナルメモリー：
■ボイス：64ーマルチ：16
波形用メモリー：
■ROM：4メガワード（8MByte）
PRESET 1=155，PRESET 2=112
■RAM：512 KByte（RAMボードの追加により最大3072 KByteまで拡張可）
MIDIサンプルダンプ、ディスク、ウェイブフォームカードより供給
カードスロット：
■音色パラメータ用×1
MCD64：1バンク
※1バンク：64ボイス＋16マルチー1システム
■波形用×1
3.5インチFDD：
■1（フォーマット時713KB）

＜操作子＞
Wheel：
■ピッチベンド、モジュレーション1、モジュレーション2
スライダーボリューム：
■アウトプットボリューム1・2、データエントリー
ロータリーボリューム：
■LCD コントロール、クリックボリューム
ダイヤル：
■データエントリー
パネルスイッチ：
■Mode(5)Voice,Multi.Song,Pattern，Utility
■Edit(2)Edite/Compare，Copy
■Effect bypass(1)
■Memory select(4)Preset 1, Preset 2, Internal, Card
■Bank select (4)A～D
■Program select(16)1～16
■Page(3)Page＋，Page－，Jump/Mark
■テンキー(12)0～9，Enter，　－
■Data Entry(2)Inc, Dec
■カーソル(4)←，→，↑，↓
■Function(10)function　1～8．Shift, Exit
■Sequencer(7)Run, Stop, Rec, Top, Rew, FF, Auto Locate
＜ディスプレイ＞
LCD：
■240×64 Dots(バックライト付き)
LED：
■Red×11
■Red/Green×21
＜接続端子＞
音声出力：
■4　Output1(L/Mix L/Mono，R/Mix R)，Output2(L,R)
ヘッドフォン：
■1
コントローラ：
■5　Foot control，Foot volume，Foot switch，Sustain switch，Breath control
MIDI：
■3　IN，OUT，THRU
＜出力レベル＞
ヘッドフォン：
■＋5.5dBm（150Ω）
リア出力端子：
■0 dBm（10kΩ）
＜電源（国内）＞
電源電圧：
■100V
消費電力：
■25W
＜寸法、重量＞
寸法：
■1254(W)×407(D)×120(H)(㎜)
重量：
■19.6kg
＜付属品＞
■デモディスク2枚（3.5インチフロッピーディスク）

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■PANEL LAYOUT（パネルレイアウト）

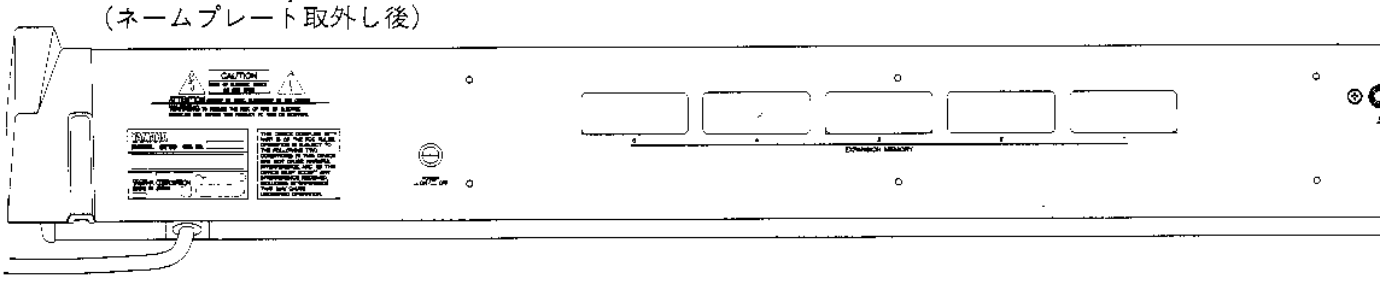
● Front Panel（フロントパネル）



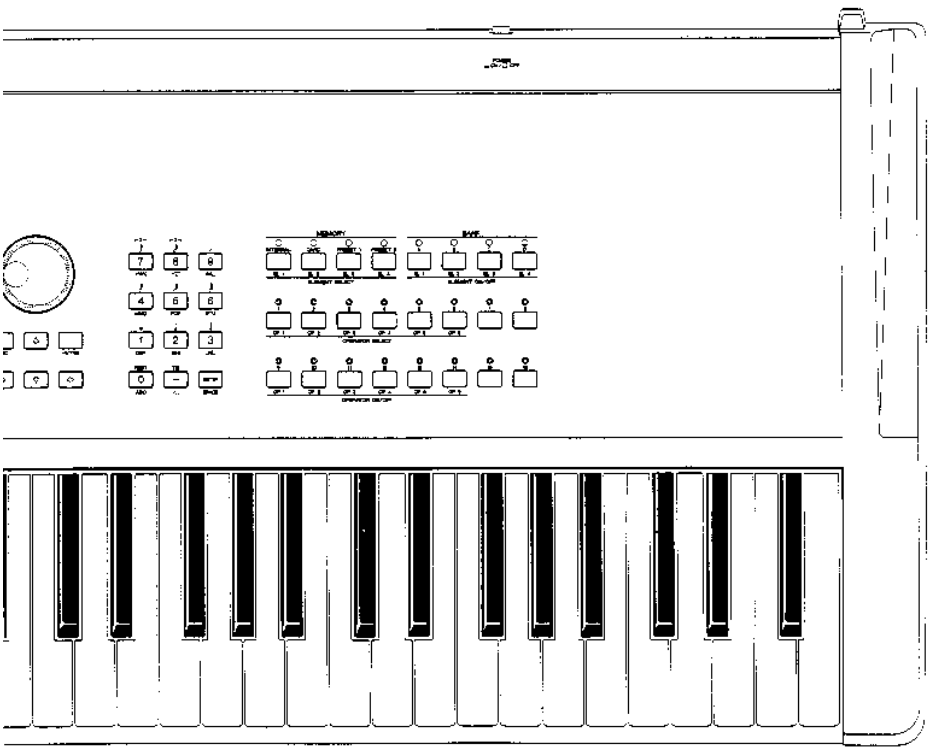
● Rear Panel（リアパネル）

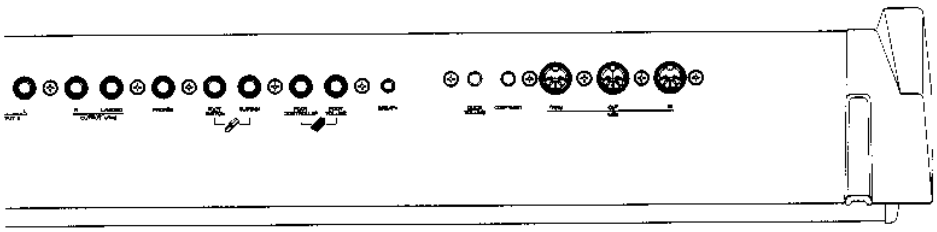


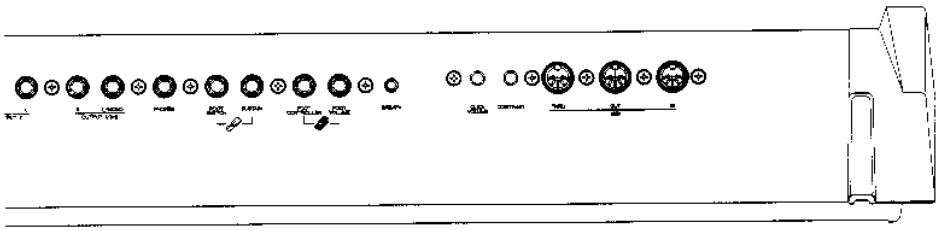
After the name plate has been removed；
（ネームプレート取外し後）



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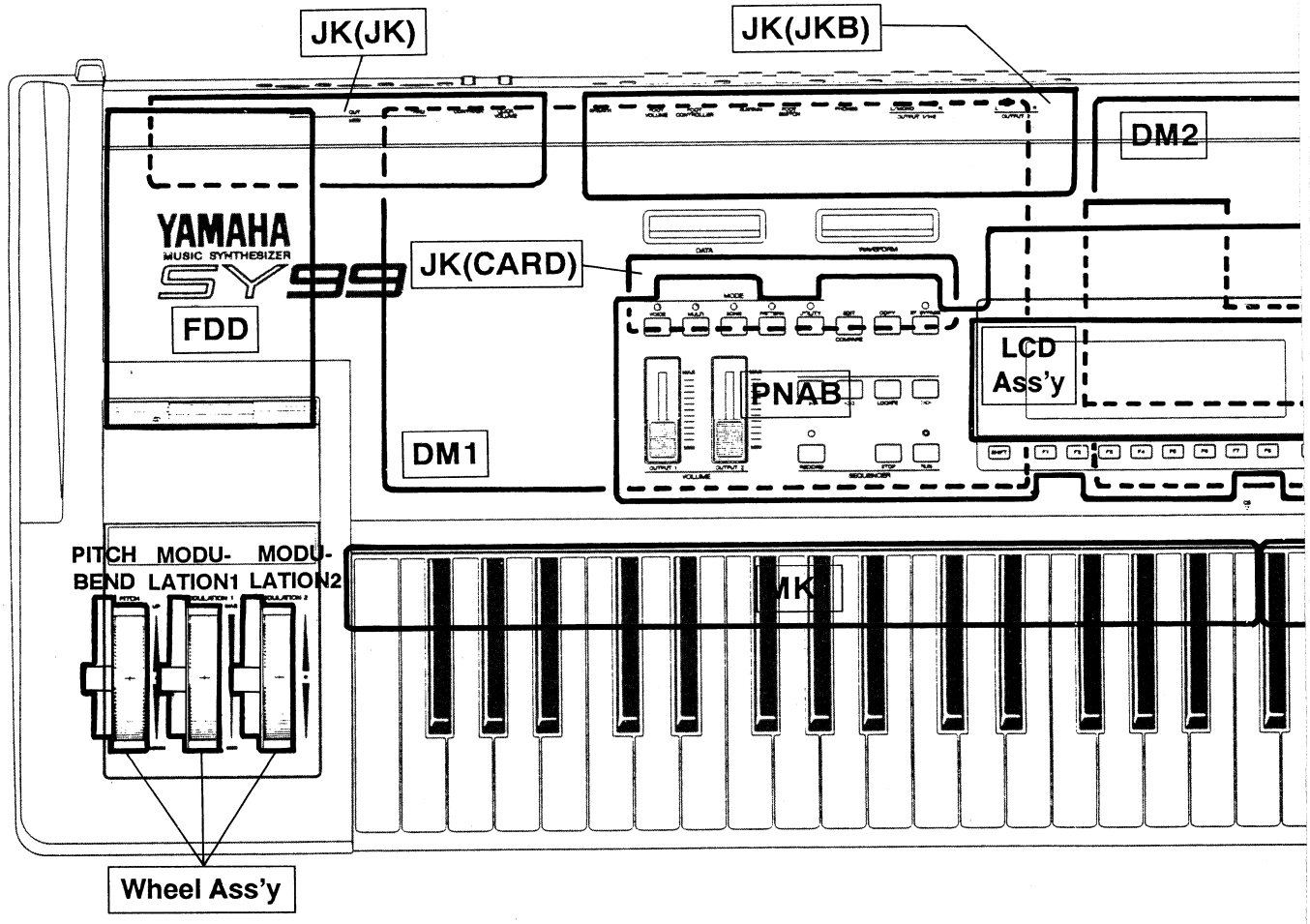




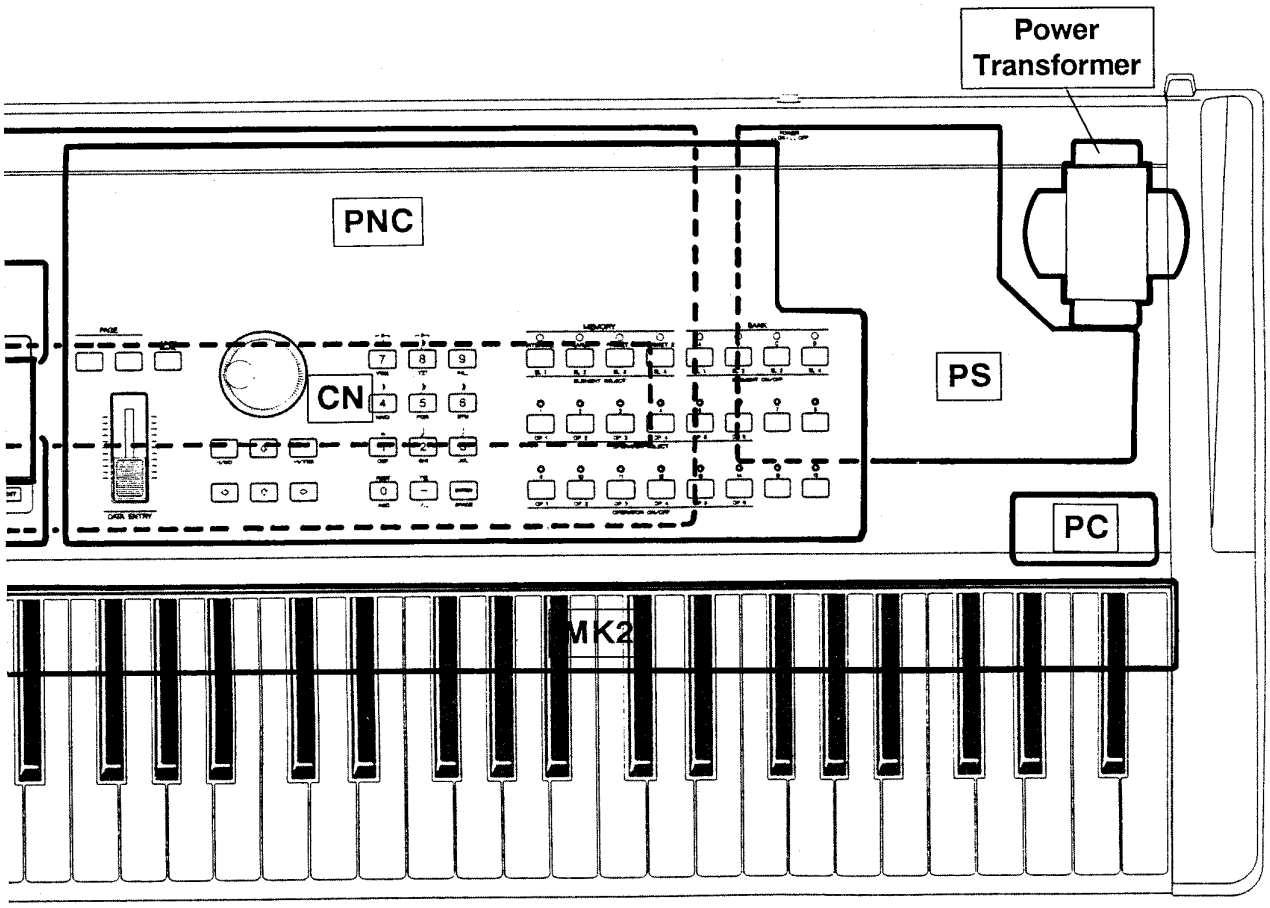


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■CIRCUIT BOARD LAYOUT（ユニットレイアウト）

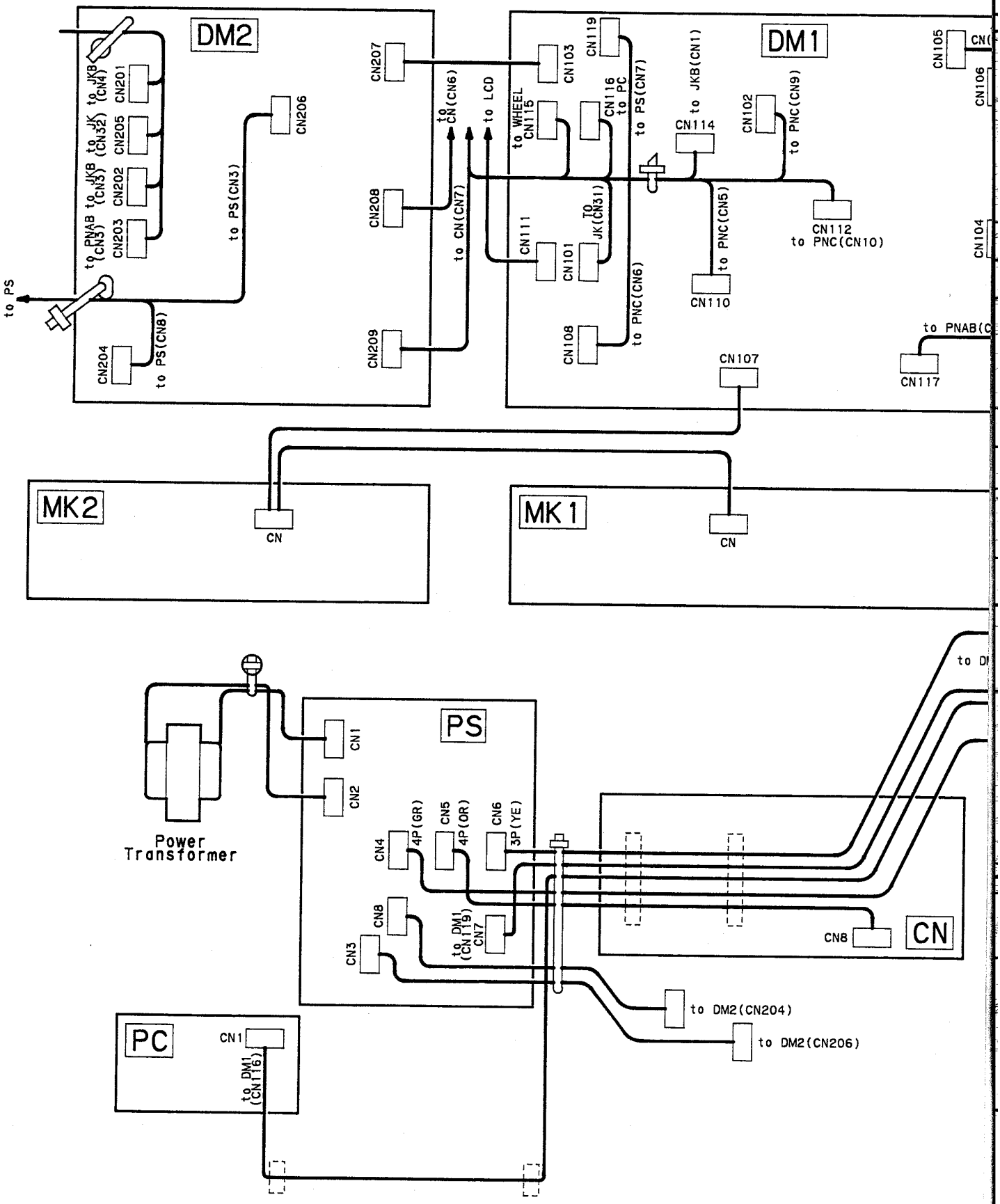


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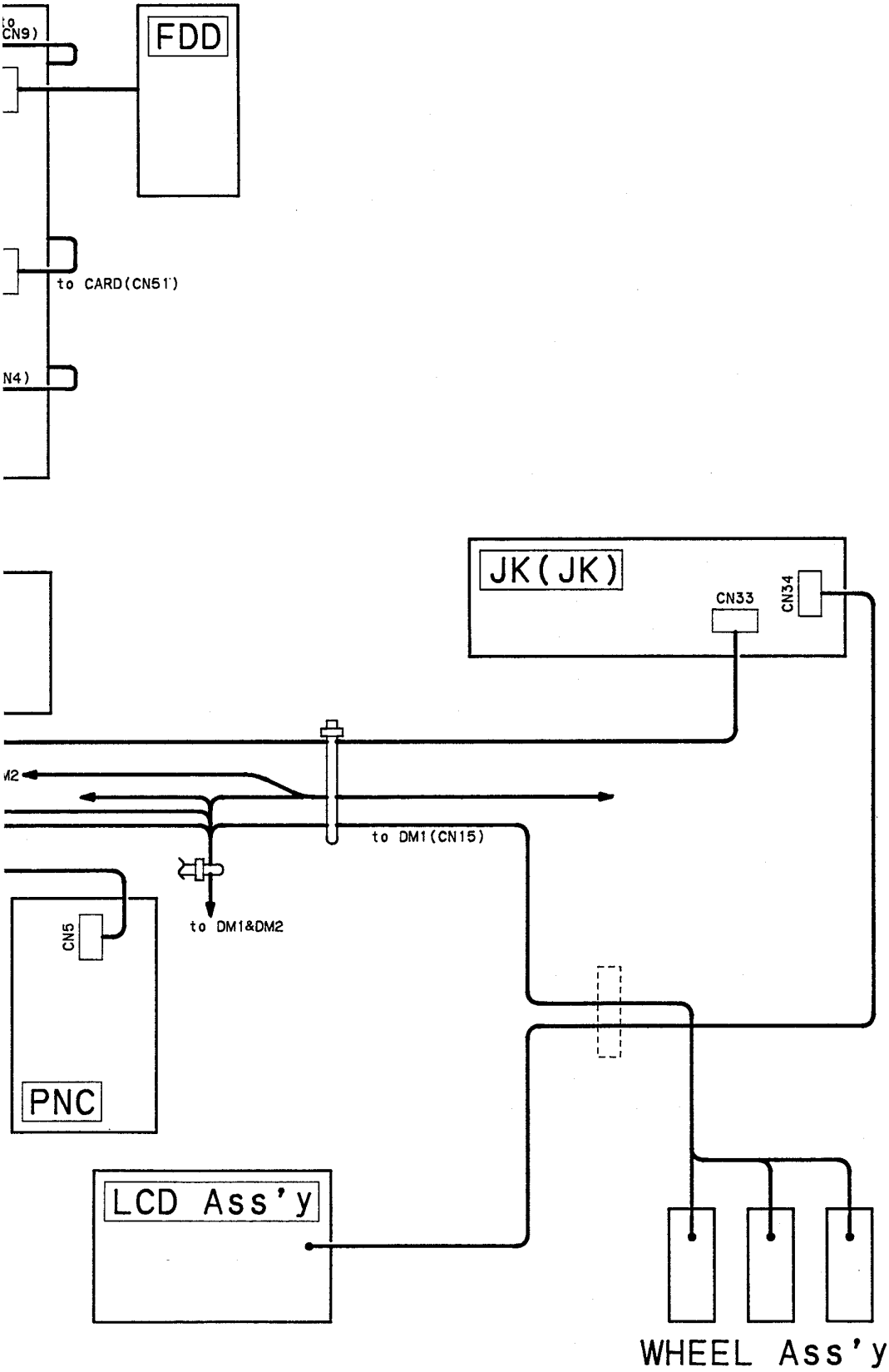


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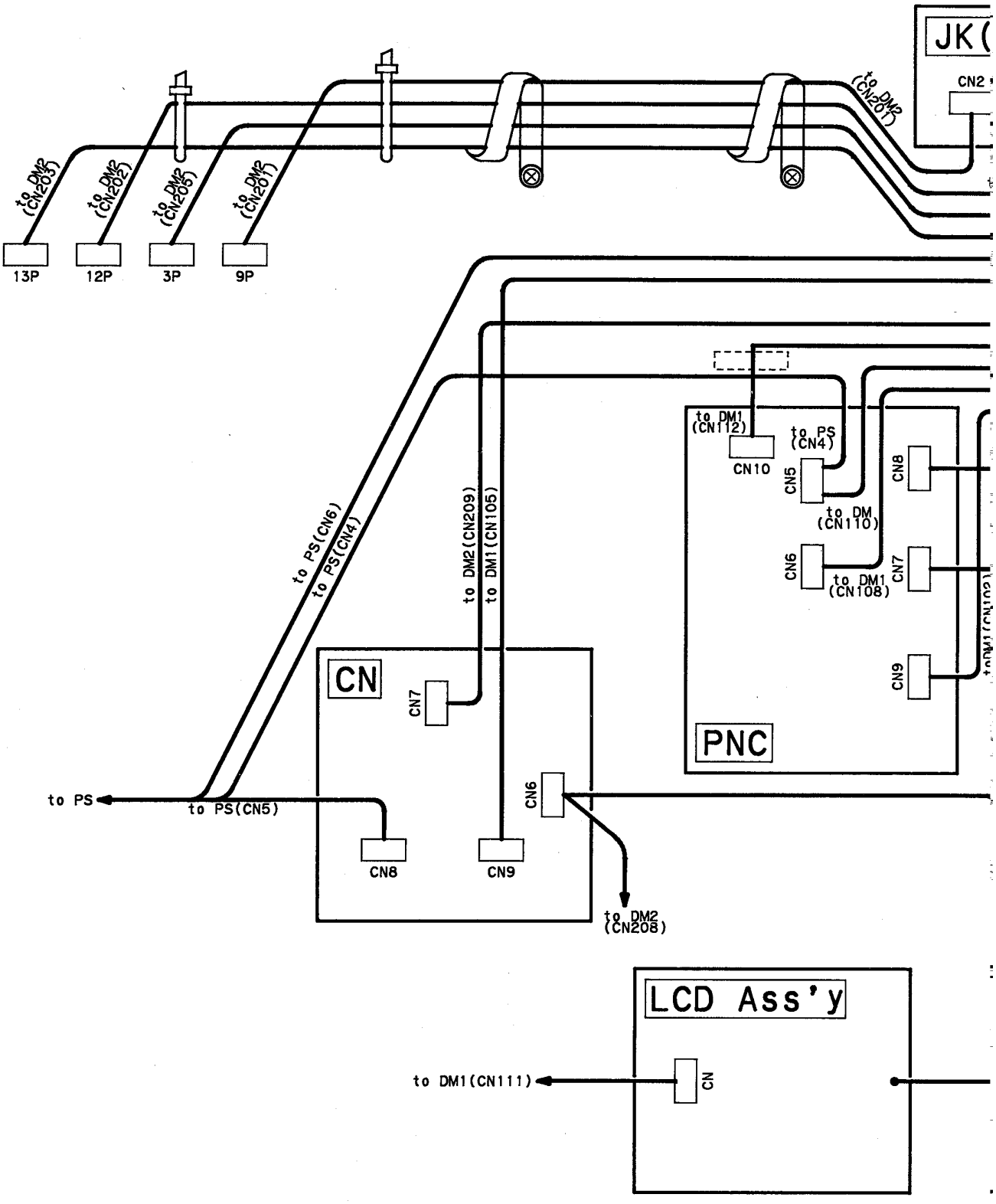
■WIRING（結線図）



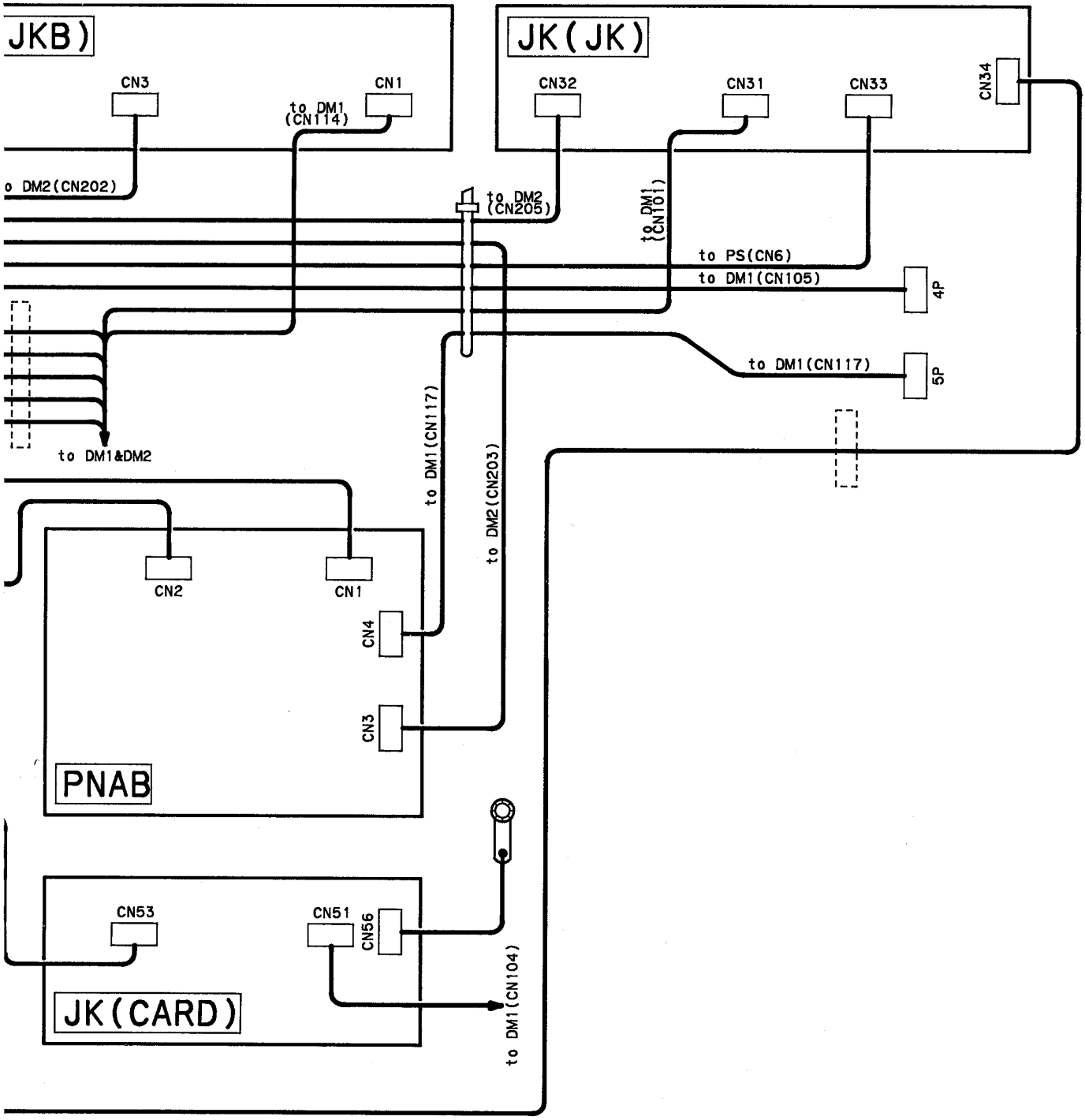
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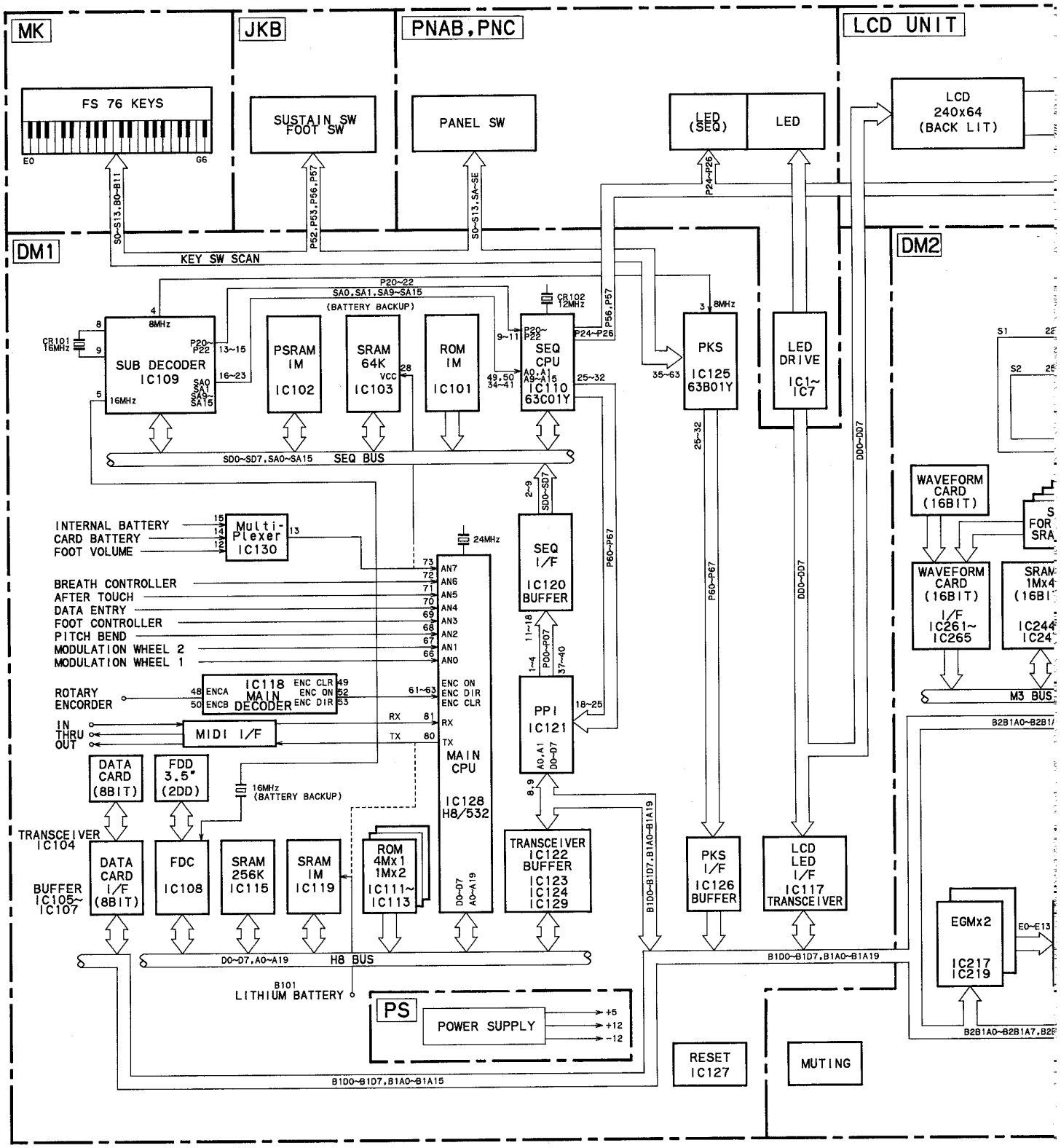


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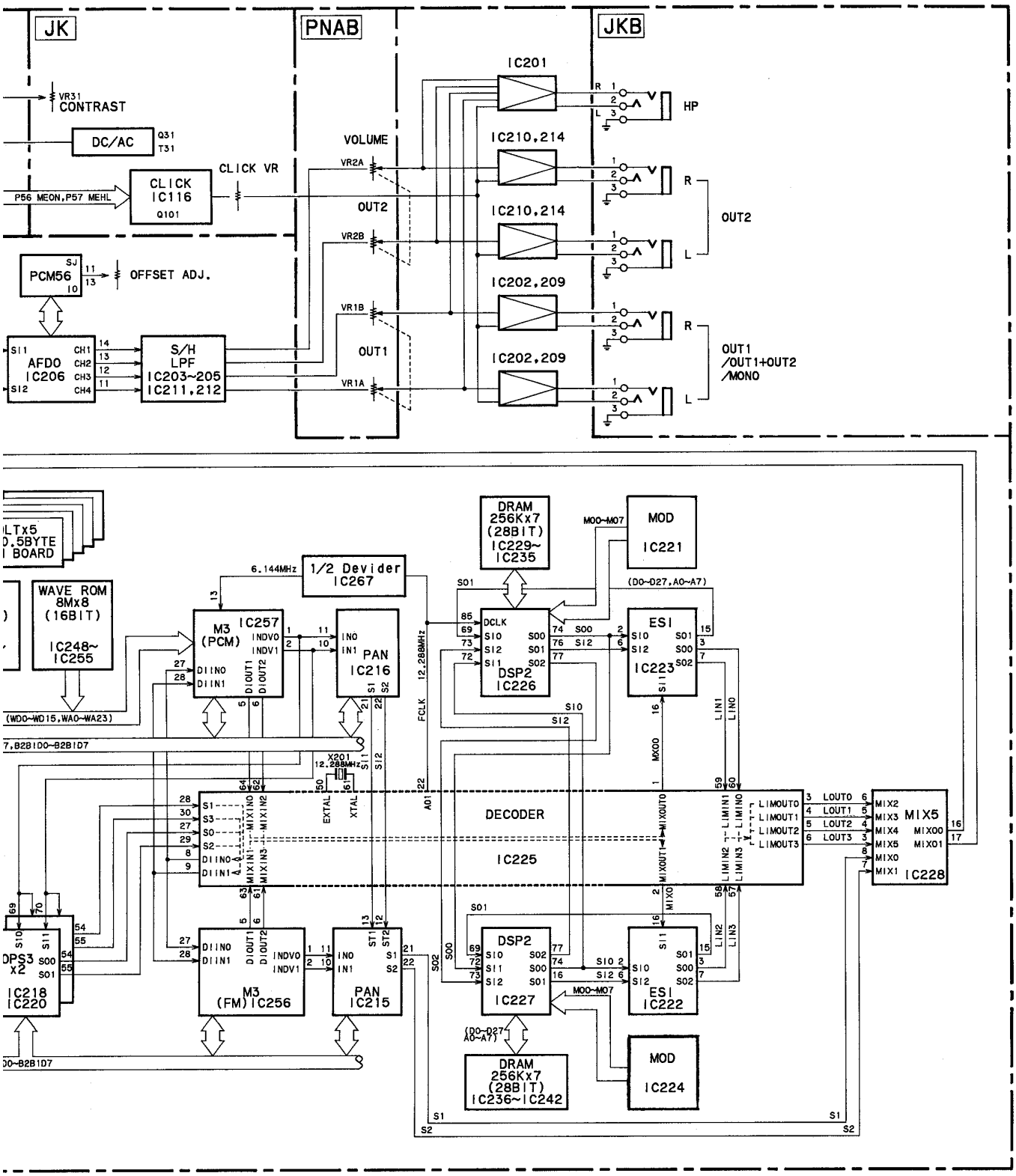


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■BLOCK DIAGRAM（ブロックダイアグラム）



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■DISASSEMBLY PROCEDURE（分解手順）

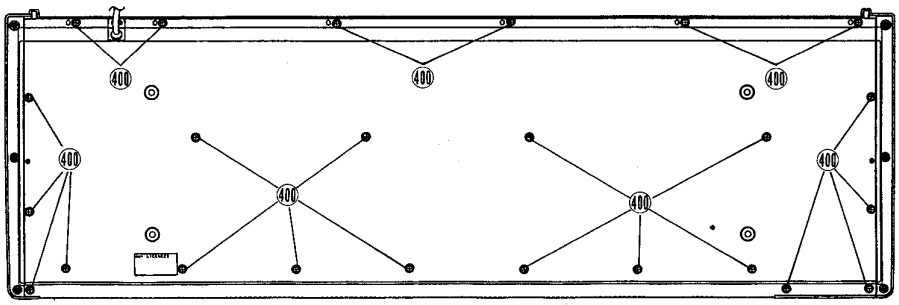
1. Bottom Cover Assembly Removal

1-1. Remove the twenty-four (24) screws marked ㊵ , the bottom cover assembly can be removed. (Fig. 1)

* This will give you access to the DM1, DM2, PS circuit boards, FDD assembly and wheel assembly.

1．底板Ass'yの外し方

1-1. ㊵ のネジ24本を外して底板Ass'yを取り外します。(図 1)



㊵ : 4.0×8 Bonding Tapping Screw（ボンディングタッピングネジ）

(Fig. 1)

2. DM1 Circuit Board Removal

2-1. Remove the bottom cover assembly. (see procedure 1)

2-2. Remove the six (6) screws marked ㊱ , the DM1 circuit board can be raised. (Fig. 2)
After the connectors have been disconnected, the DM1 circuit board can be taken out of the unit completely.

2．DM1シートの外し方

2-1. 底板Ass'yを外します。(1項参照)

2-2. ㊱ のネジ6本を外しコネクターを抜いて、DM1シートを取り外します。(図 2)

3. DM2 Circuit Board Removal

3-1. Remove the bottom cover assembly. (see procedure 1)

3-2. Remove the six (6) screws marked ㊳ , the DM2 circuit board can be raised. (Fig. 2)
After the connectors have been disconnected, the DM2 circuit board can be taken out of the unit completely.

3．DM2シートの外し方

3-1. 底板Ass'yを外します。(1項参照)

3-2. ㊳ のネジ6本を外しコネクターを抜いて、DM2シートを取り外します。(図 2)

4. Power Supply Assembly Removal

4-1. Remove the bottom cover assembly. (see procedure 1)

4-2. Remove the screw marked ㊶ to remove the AC panel. (Fig. 2)

4-3. The power supply assembly can be removed by removing the four (4) screws marked ㉕ and disconnecting the connectors. (Fig. 2)

4．電源Ass'yの外し方

4-1. 底板Ass'yを外します。(1項参照)

4-2. ㊶ のネジ1本を外し、ACパネルを外しておきます。(図 2)

4-3. ㉕ のネジ4本を外しコネクターを抜いて、電源Ass'yを取り外します。(図 2)

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5. Power Transformer Removal

5-1. Remove the bottom cover assembly. (see procedure 1)

5-2. Remove the two (2) screws marked ㉚ and disconnect the connectors, then remove the power transformer. (Fig. 2)

6. FDD Assembly Removal

6-1. Remove the bottom cover assembly. (see procedure 1)

6-2. Remove the three (3) screws marked ㉘ and disconnect the connectors, the FDD assembly can be taken out of the SY99 unit. (Fig. 2)

6-3. To remove the FDD bracket from the FDD assembly, remove the four (4) screws marked ㉚ . (Fig. 3)

5．電源トランスの外し方

5-1.底板Ass'yを外します。(1項参照)

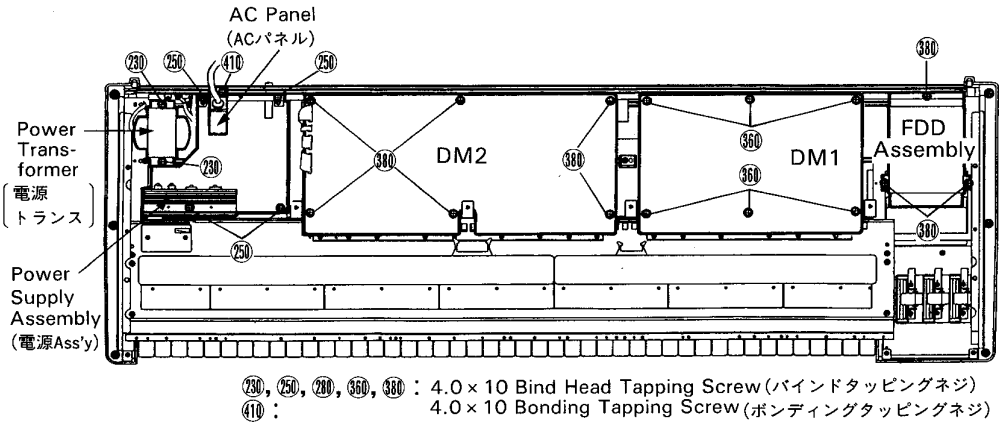
5-2.㉚のネジ2本を外しコネクターを抜いて、電源トランスを取り外します。(図 2)

6．FDD Ass'y の外し方

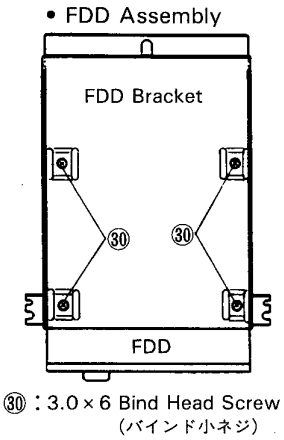
6-1.底板Ass'yを外します。(1項参照)

6-2.㉘のネジ3本を外しコネクターを抜いて、FDD Ass'yを取り外します。(図 2)

6-3.FDD金具は、㉚のネジ4本を外して取り外します。(図 3)



(Fig. 2)



(Fig. 3)

7. Keyboard Assembly Removal

7-1. Remove the bottom cover assembly. (see procedure 1)

7-2. Remove the DM1 and DM2 circuit boards. (see procedures 2 and 3)

7-3. Remove the isolation sheet located under the DM2 circuit board.

7-4. The keyboard assembly can be removed by removing the four (4) screws marked ⑭⑤ , four (4) screws marked ⑮⓪ , eight (8) screws marked ⑱⓪ and six (6) screws marked ㉑⓪ . (Fig. 4)

8. JK (JK, JKB, CARD) circuit boards Removal

8-1. Remove the bottom cover assembly. (see procedure 1)

8-2. Remove the DM1 circuit board. (see procedure 2)

8-3. Raise the DM1 shield sheet up to this side. (Fig. 4)

7．鍵盤Ass'yの外し方

7-1.底板Ass'yを外します。(1項参照)

7-2.DM1シートとDM2シートを外します。(2、3項参照)

7-3.DM2シートの下側にある、絶縁シートを外します。

7-4.⑭⑤のネジ4本と⑮⓪のネジ4本、⑱⓪のネジ8本、㉑⓪のネジ6本を外し、MKシートのコネクターを抜いて、鍵盤Ass'yを取り外します。(図 4)

8．JK(JK,JKB,CARD)シートの外し方

8-1.底板Ass'yを外します。(1項参照)

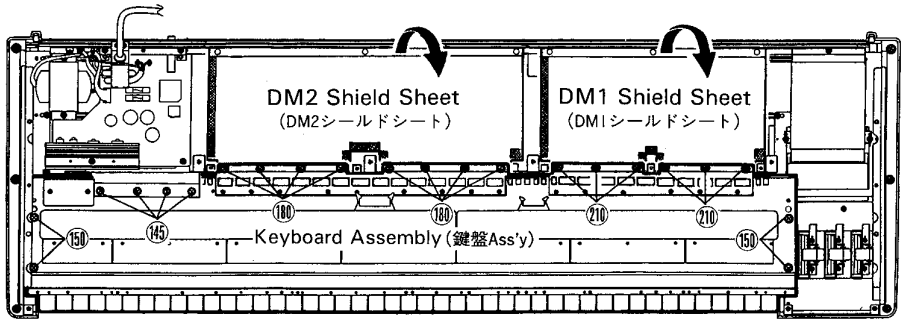
8-2.DM1シートを外します。(2項参照)

8-3.DM1シールドシートを手前に起こします。(図 4)

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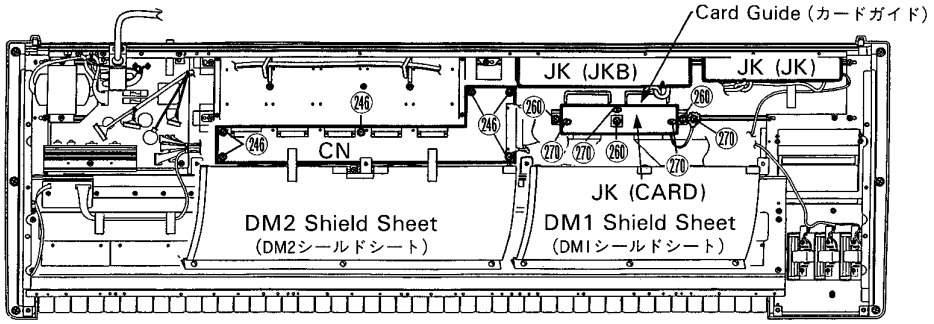
8-4. JK (JK) circuit board removal
8-4-1. Remove the FDD assembly. (see procedure 6)
8-4-2. Remove the four (4) screws marked (290a) and one (1) screw marked (295) on the rear panel and disconnect the connector, the JK (JK) circuit board can be removed. (Fig. 5 and Fig. 6)
8-5. JK (JKB) circuit board removal
8-5-1. Remove the six (6) screws marked (290b) on the rear panel, the JK (JKB) circuit board can be removed. (Fig. 5 and Fig. 6)
8-6. JK (CARD) circuit board removal
8-6-1. There are four (4) screws marked (270), three (3) on the CARD circuit board and one on the lug terminal. After these screws have been removed, the JK (CARD) circuit board can be removed. (Fig. 5)

8-4. JK(JK)シートの外し方
8-4-1. FDD Ass'yを外します。(6項参照)
8-4-2. リア側よりJK(JK)シートを止めている(290a)のネジ4本と(295)のネジ1本を外し、コネクターを抜いて、JK(JK)シートを取り外します。(図 5、6)
8-5. JK(JKB)シートの外し方
8-5-1. リア側よりJK(JKB)シートを止めている(290b)のネジ6本を外して、JK(JKB)シートを取り外します。(図 5、6)
8-6. JK(CARD)シートの外し方
8-6-1. (270)のネジ4本(CARDシート:3本、ラグ端子:1本)を外し、コネクターを抜いて、JK(CARD)シートを取り外します。(図 5)



(145): 3.0×6 Bind Head Screw (バインド小ネジ) (150): 4.0×16 Bind Head Tapping Screw (バインドタッピングネジ)
(180), (210): 4.0×10 Bind Head Tapping Screw (バインドタッピングネジ)

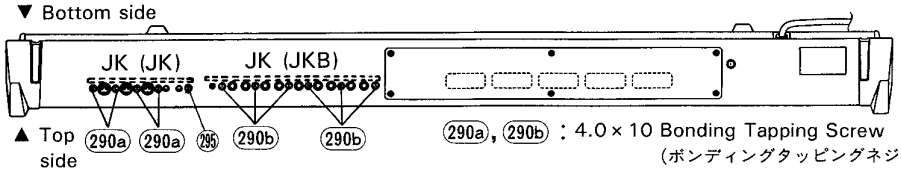
(Fig. 4)



(246): 3.0×6 Bind Head Screw (バインド小ネジ)
(260), (270): 4.0×10 Bind Head Tapping Screw (バインドタッピングネジ)

(Fig. 5)

• Rear view



290a, 290b: 4.0×10 Bonding Tapping Screw (ボンディングタッピングネジ)
295: 4.0×10 Bonding Head Screw (ボンディング小ネジ)

(Fig. 6)

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9. CN Circuit Board Removal

9-1. Remove the bottom cover assembly. (see procedure 1)
9-2. Remove the DM1 and DM2 circuit boards. (see procedures 2 and 3)
9-3. Remove the isolation sheet located under the DM2 circuit board.
9-4. Raise the DM1 and DM2 shield sheets up to this side. (Fig. 4)
9-5. Remove the six (6) screws marked ㉖ and disconnect the connector, then remove the CN circuit board. (Fig. 5)

10. Slot Unit Removal

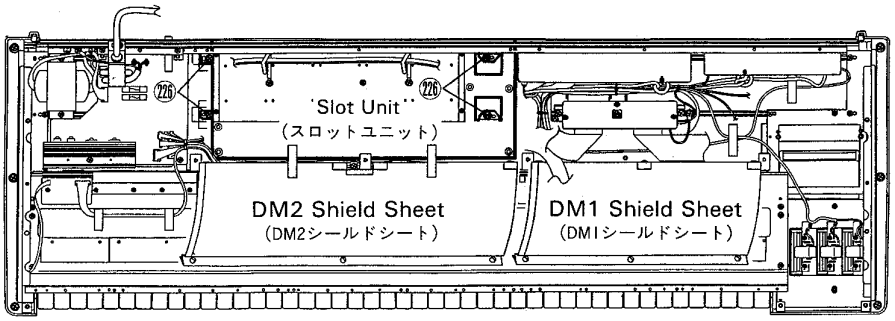
10-1. Remove the bottom cover assembly. (see procedure 1)
10-2. Remove the DM1 and DM2 circuit boards. (see procedures 2 and 3)
10-3. Remove the CN circuit board. (see procedure 9)
10-4. To remove the slot unit, remove the four (4) screws marked ㉖ (Fig. 7)

9．CNシートの外し方

9-1.底板Ass'yを外します。(1項参照)
9-2.DM1シートとDM2シートを外します。(2、3項参照)
9-3.DM2シートの下側にある、絶縁シートを外します。
9-4.DM1シールドシートとDM2シールドシートを手前に起こします。(図 4)
9-5. ㉖ のネジ6本を外しコネクターを抜いて、CNシートを取り外します。(図 5)

10．スロットユニットの外し方

10-1.底板Ass'yを外します。(1項参照)
10-2.DM1シートとDM2シートを外します。(2、3項参照)
10-3.CNシートを外します。(9項参照)
10-4. ㉖ のネジ4本を外して、スロットユニットを取り外します。(図 7)



㉖ : 4.0 × 10 Bind Head Tapping Screw (バインドタッピングネジ)

(Fig. 7)

11. PNAB and PNC Circuit Boards Removal

11-1. Pull out the knobs on the control panel.
11-2. Remove the bottom cover assembly. (see procedure 1)
11-3. Remove the DM1 and DM2 circuit boards. (see procedures 2 and 3)
11-4. Remove the power supply assembly. (see procedure 4)
11-5. Remove the keyboard assembly. (see procedure 7)
11-6. Remove the sixteen (16) screws marked ㉔ to remove the center angle bracket with the DM1, DM2 and MK shield sheets. (Fig. 8)
11-7. Remove the CN circuit board. (see procedure 9)
11-8. Remove the slot unit. (see procedure 10)

11．PNABシートとPNCシートの外し方

11-1.パネル表側より、スライドボリューム類のツマミを抜き取っておきます。
11-2.底板Ass'yを外します。(1項参照)
11-3.DM1シートとDM2シートを外します。(2、3項参照)
11-4.電源Ass'yを外します。(4項参照)
11-5.鍵盤Ass'yを外します。(7項参照)
11-6. ㉔ のネジ16本を外して、DM1シールドシート、DM2シールドシート、MKシールドシートと一緒にセンターアングルを外します。(図 8)
11-7.CNシートを外します。(9項参照)
11-8.スロットユニットを外します。(10項参照)

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11-9. PNAB circuit board removal

11-9-1. Remove the three (3) screws marked ㉖⓪ to remove the card guide with the JK (CARD) circuit board. (Fig. 5)

11-9-2. After the six (6) screws marked ⑲⓪ have been removed, the PNAB circuit board can be removed. (Fig. 9)

* The PNAB circuit board is connected to the PNC circuit board with connector assembly.

11-10. PNC circuit board removal

11-10-1. Remove the two (2) screws marked ㉓① to remove the PNC shield sheet. (Fig. 9)

11-10-2. After the six (6) screws marked ㉒⓪ have been removed, the PNC circuit board can be removed. (Fig. 10)

11-9.PNABシートの外し方

11-9-1. ㉖⓪のネジ3本を外して、JK(CARD)シートと一緒にカードガイドを取り外します。(図 5)

11-9-2. ⑲⓪のネジ6本を外して、PNABシートを取り外します。(図 9)

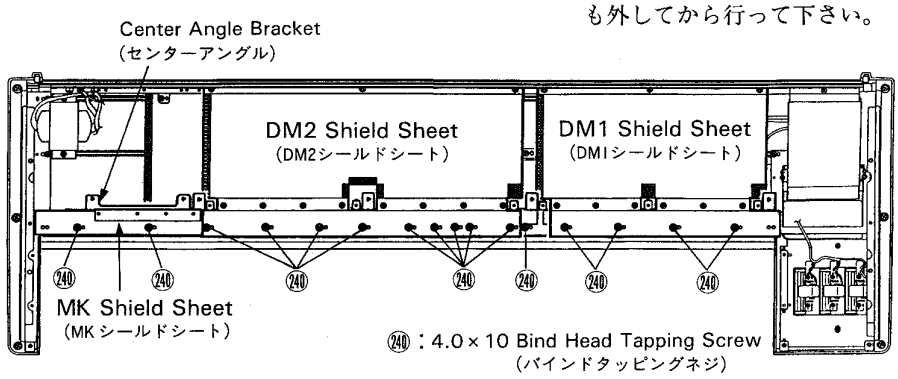
※コネクターも一緒に外す場合は、PNCシートも外してから行って下さい。

11-10.PNCシートの外し方

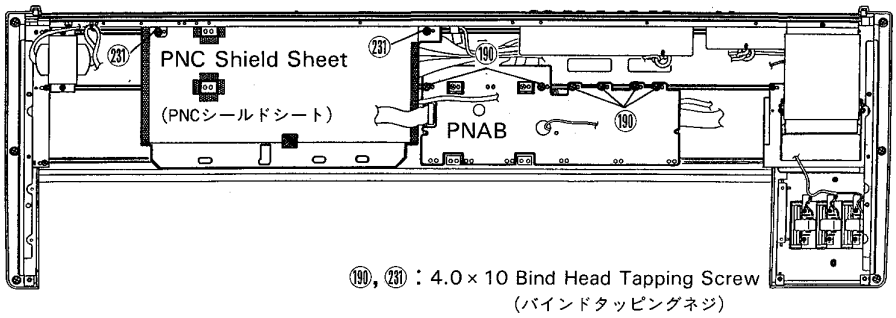
11-10-1. ㉓①のネジ2本を外して、PNCシールドシートを外します。(図 9)

11-10-2. ㉒⓪のネジ6本を外して、PNCシートを取り外します。(図10)

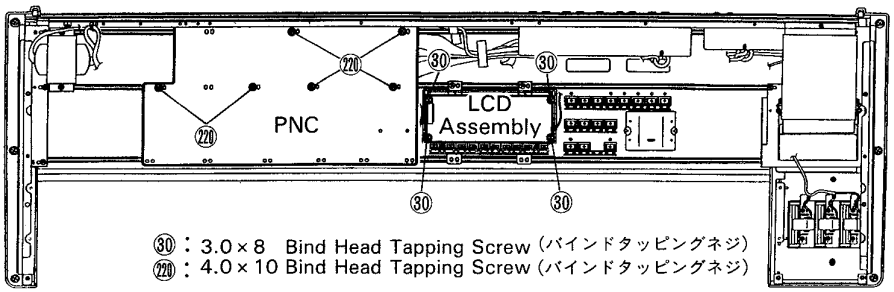
※コネクターも一緒に外す場合は、PNABシートも外してから行って下さい。



(Fig. 8)



(Fig. 9)



(Fig. 10)

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12. LCD Assembly Removal

12-1. Remove the bottom cover assembly. (see procedure 1)
12-2. Remove the DM1 and DM2 circuit boards. (see procedures 2 and 3)
12-3. Remove the power supply assembly. (see procedure 4)
12-4. Remove the keyboard assembly. (see procedure 7)
12-5. Remove the CN circuit board. (see procedure 9)
12-6. Remove the slot unit. (see procedure 10)
12-7. Remove the PNAB circuit board. (see procedure 11-9)
12-8. The LCD assembly can be removed by removing the four (4) screws marked ㉚ . (Fig. 10)

13. Wheel Assembly Removal

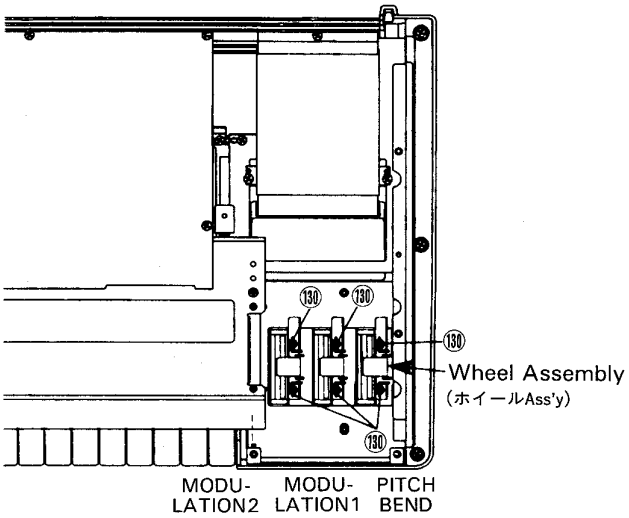
13-1. Remove the bottom cover assembly. (see procedure 1)
13-2. After the six (6) screws marked ⑬⓪ have been removed, the wheel assembly can be removed. (Fig. 11)

12. LCD Ass'yの外し方

12-1. 底板Ass'yを外します。(1項参照)
12-2. DM1シートとDM2シートを外します。(2、3項参照)
12-3. 電源Ass'yを外します。(4項参照)
12-4. 鍵盤Ass'yを外します。(7項参照)
12-5. CNシートを外します。(9項参照)
12-6. スロットユニットを外します。(10項参照)
12-7. PNABシートを外します。(11-9項参照)
12-8. ㉚のネジ4本を外して、LCD Ass'yを取り外します。(図10)

13. ホイールAss'yの外し方

13-1. 底板Ass'yを外します。(1項参照)
13-2. ⑬⓪ のネジ6本を外して、ホイールAss'yを取り外します。(図11)



⑬⓪ : 3.0 × 8 Bonding Tapping Screw (ボンディングタッピングネジ)

(Fig. 11)

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14. Rotary Encoder Knob Removal

14-1. Remove the bottom cover assembly. (see procedure 1)
14-2. Remove the DM1 and DM2 circuit boards. (see procedures 2 and 3)
14-3. Remove the power supply assembly. (see procedure 4)
14-4. Remove the keyboard assembly. (see procedure 7)
14-5. Remove the CN circuit board. (see procedure 9)
14-6. Remove the slot unit. (see procedure 10)
14-7. Remove the PNC circuit board. (see procedure 11-10)
14-8. Pull out the rotary encoder knob on the PNC circuit board.

14. ロータリーエンコーダツマミ(データエントリーツマミ)の外し方

14-1. 底板Ass'yを外します。(1項参照)
14-2. DM1シートとDM2シートを外します。(2、3項参照)
14-3. 電源Ass'yを外します。(4項参照)
14-4. 鍵盤Ass'yを外します。(7項参照)
14-5. CNシートを外します。(9項参照)
14-6. スロットユニットを外します。(10項参照)
14-7. PNCシートを外します。(11-10項参照)
14-8. PNCシートからロータリーエンコーダツマミを取り外します。

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■LSI PIN DESCRIPTION (LSI端子機能表)

• H8/532 (XI722D00) CPU

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	XTAL	I	Clock	43	A8	O	Address bus
2	Vss	I	Ground	44	A9	O	
3	P10/φ	O	System clock	45	A10	O	
4	P11/E	O	Enable	46	A11	O	
5	P12	O	(Bus acknowledge)	47	A12	O	
6	P13	I	(Bus request)	48	A13	O	
7	P14/$\overline{WAIT}$	I	Wait	49	A14	O	
8	P15/$\overline{IRQ0}$	I	Interrupt request 0	50	A15	O	
9	P16/$\overline{IRQ1}$	I	Interrupt request 1	51	A16	O	
10	P17	O	8-bit timer output	52	A17	O	
11	$\overline{AS}$	O	Address strobe	53	A18	O	
12	R/$\overline{W}$	O	Read/Write	54	A19	O	
13	$\overline{DS}$	O	Data strobe	55	Vcc		Power supply
14	$\overline{RD}$	O	Read control	56	P70	I/O	Port 7
15	$\overline{WR}$	O	Write control	57	P71	I/O	
16	Vcc		Power supply	58	P72	I/O	
17	MD0	I	Mode control	59	P73	I/O	
18	MD1	I		60	P74	I/O	
19	MD2	I		61	P75	I/O	
20	$\overline{STBY}$	I	Standby	62	P76	I/O	
21	$\overline{RES}$	I	Reset	63	P77	I/O	
22	NMI	I	Non-maskable interrupt	64	Vss		Ground
23	NC			65	AVss		Analog ground
24	Vss		Ground	66	AN0	I	Port 8
25	D0	I/O	Data bus	67	AN1	I	
26	D1	I/O		68	AN2	I	
27	D2	I/O		69	AN3	I	
28	D3	I/O		70	AN4	I	
29	D4	I/O		71	AN5	I	
30	D5	I/O		72	AN6	I	
31	D6	I/O		73	AN7	I	
32	D7	I/O		74	AVcc		Analog power supply
33	A0	O	Address bus	75	P90	I/O	Port 9
34	A1	O		76	P91	I/O	
35	A2	O		77	P92	I/O	
36	A3	O		78	P93	I/O	
37	A4	O		79	P94	I/O	
38	A5	O		80	TXD	I/O	(Transmit data)
39	A6	O		81	RXD	I	(Receive data)
40	A7	O		82	P97	I/O	
41	Vss		Ground	83	Vss		Ground
42	Vss			84	EXTAL	I	Clock

• HD63C01Y0F64P (XF148A00) CPU

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	Vss	I	Ground	33	Vcc		DC Supply (+5V)
2	XTAL	I	Clock (8MHz)	34	A15	O	Address bus
3	EXTAL	I		35	A14	O	
4	MP0	I	Mode program	36	A13	O	
5	MP1	I		37	A12	O	
6	$\overline{RES}$	I	Reset	38	P11	O	
7	$\overline{STBY}$	I	Stand-by mode signal	39	P10	O	
8	NMI	I	Non-maskable interrupt	40	A9	O	
9	P20	I/O	Port 2	41	A8	O	
10	P21	I/O		42	Vss		Ground
11	P22	I/O		43	A7	O	Address bus
12	P23	I/O		44	A6	O	
13	P24	I/O		45	A5	O	
14	P25	I/O		46	A4	O	
15	P26	I/O		47	A3	O	
16	P27	I/O		48	A2	O	
17	P50	I/O	Port 5	49	A1	O	
18	P51	I/O		50	A0	O	
19	P52	I/O		51	D7	I/O	Data bus
20	P53	I/O		52	D6	I/O	
21	P54/$\overline{IS}$	I/O		53	D5	I/O	
22	P55/$\overline{OS}$	I/O		54	D4	I/O	
23	P56	I/O		55	D3	I/O	
24	P57	I/O		56	D2	I/O	
25	P60	I/O	Port 6	57	D1	I/O	
26	P61	I/O		58	D0	I/O	
27	P62	I/O		59	$\overline{BA}$	O	Bus available
28	P63	I/O		60	$\overline{LIR}$	O	Load instruction resistor
29	P64	I/O		61	R/$\overline{W}$	O	Read/Write control
30	P65	I/O		62	$\overline{WR}$	O	Write
31	P66	I/O		63	$\overline{RD}$	O	Read
32	P67	I/O		64	E	O	Enable

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• YM3029 (XF237A00) AFD0 (Floating Point Converter)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	DVDD		Digital power supply (+5V)	15	SHA	I	Sample and hold input (Channel A)
2	LE	O	Latch enable	16	EXG		Exponent ground
3	DAB	O	Channel A/B data output	17	EXG		
4	SYW	I	Sync pulse	18	EXI	I	Exponent input
5	CLK	I	Clock	19	EXO	O	Exponent output
6	φ1	O	Clock for DAC	20	AVSS		Analog power supply (−5V)
7	DGND		Digital ground	21	AVDD		Analog power supply (+5V)
8	AVDD		Analog power supply (+5V)	22	SI1	I	Serial data input 1 (Channel A)
9	AVSS		Analog power supply (−5V)	23	VLA0	I	Volume level select (Channel A)
10	SHB	I	Sample and hold input (Channel B)	24	VLA1	I	
11	CH4	O	Output (Channel 4)	25	SI2	I	Serial data input 2 (Channel B)
12	CH3	O	Output (Channel 3)	26	VLB0	I	Volume level select (Channel B)
13	CH2	O	Output (Channel 2)	27	VLB1	I	
14	CH1	O	Output (Channel 1)	28	4/2	I	Channel number select (4 or 2-channel)

• YM3422B (XE862B00) ESI

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	Vss		Ground	9	M0	I	Mode select
2	SI0	I	Serial data input 0	10	M1	I	
3	SO0	O	Serial data output 0	11	M2	I	
4	BC0	I	Clock CH0	12	M3	I	
5	WC0	I	W-clock CH1	13	WC1	I	W-clock CH1
6	SI2	I	Serial data input 2	14	BC1	I	Clock CH1
7	SO2	O	Serial data output 2	15	SO1	O	Serial data output 1
8	VDD		Power supply	16	SI1	I	Serial data input 1

• YM3807 (XA902001) MOD (Modulation Signal Generator)

Pin No.	Name	I/O	Function	Pin No.	Name	I/O	Function
1	NC			24	Vss		Power supply ground
2	MDSI0	I	Inputs data to add to the waveform data inside MOD	23	CDO	O	CD interface serial data output
3	MDSI1	I		22	CDI	I	CD interface serial data intput
4	MDSO0	O	Outputs MOD internal waveform data with the same data format as MDSIO.	21	NC		
5	MDSO1	O		20	XCLK	I	CD interface transmission clock input
6	MOD0	O	Outputs waveform data for all channels inside MOD.	19	XMD	I	Selects 1/16 mode (asynchronous) or 1/1 mode (synchronous) for the CD interface
7	MOD1	O		18	$\overline{CRS}$	I	CD counter reset
8	MOD2	O		17	CLK	I	Clock
9	MOD3	O		16	$\overline{IC}$	I	Initial clear
10	MOD4			15	$\overline{SYW}$	I	Sync signal input. One 64th of the master clock.
11	MOD5	O		14	MOD7	O	Outputs waveform data for all channels inside MOD.
12	VDD		Power supply (+5V)	13	MOD6	O	

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• YM6007 (XF164A00) DSP 2 (Digital Signal Processor)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	D18	I/O	Data bus	65	NC		
2	D17	I/O		66	CDO	O	Serial control data output
3	D16	I/O		67	CDI	I	Serial control data input
4	NC			68	VDD		Power supply
5	VDD		Power supply	69	SIO	I	Serial data input (28bit × 4ch)
6	D15	I/O	Data bus	70	NC		
7	NC			71	NC		
8	NC			72	SI1	I	Serial data input (28bit × 4ch)
9	D14	I/O		73	SI2	I	Serial data input (28bit × 2ch)
10	NC			74	SO0	O	Serial data output (28bit × 4ch)
11	D13	I/O		75	NC		
12	D12	I/O		76	SO1	O	Serial data output (28bit × 4ch)
13	D11	I/O		77	SO2	O	Serial data output (28bit × 2ch)
14	NC			78	SCLK	O	Clock (64bit/sample)
15	D10	I/O		79	NC		
16	NC			80	NC		
17	NC			81	NC		
18	D9	I/O		82	NC		
19	D8	I/O		83	TRGO	O	Trigger output
20	D7	I/O		84	TRGI	I	Trigger input
21	NC			85	DCLK	I	Clock (Master clock × 2)
22	D6	I/O		86	SYW	I	Synch. pulse
23	D5	I/O		87	IC	I	Initial clear
24	NC			88	NC		
25	D4	I/O		89	MRQ	O	Control data receival
26	NC			90	MDA0	I	
27	D3/A15	I/O		91	NC		
28	NC			92	NC		Serial mode: Internal registor select
29	D2/A14	I/O		93	MDA1	I	Parallel mode: CDI, CDO data format
30	D1/A13	I/O					select
31	D0/A12	I/O		94	MDA2	I	
32	NC			95	NC		
33	CAS/A11	O	Column address strobe	96	MWE	I	MD pin input strobe
34	RAS/A10	O	Row address strobe	97	MOE	I	MD pin output strobe
35	A9	O	Address bus	98	MOS	I	Communication mode select
36	A8	O					(0: serial 1: parallel)
37	VSS		Ground	99	DM7	I/O	Parallel data
38	A7	O	Address bus	100	DM6	I/O	
39	NC			101	NC		
40	A6	O		102	NC		
41	NC			103	DM5	I/O	
42	A5	O		104	NC		
43	NC			105	DM4	I/O	
44	A4	O		106	NC		
45	A3	O		107	DM3	I/O	
46	NC			108	DM2	I/O	
47	NC			109	DM1	I/O	
48	NC			110	DM0	I/O	
49	NC			111	NC		
50	NC			112	NC		
51	NC			113	D27	I/O	Memory data
52	A2	O		114	NC		Ground
53	A1	O		115	D26	I/O	
54	A0	O		116	NC		
55	WE	O	Write control	117	D25	I/O	
56	OE	O	Output enable	118	D24	I/O	
57	NC			119	NC		
58	DBOE	I	Memory data bus output enable	120	D23	I/O	
59	NC			121	NC		
60	TIM1	O	Timing pulse	122	NC		
61	TST		Test pin	123	D22	I/O	
62	CRS	I/O	Reset (Serial mode:I Parallel mode: O)	124	VSS		
				125	NC		
63	NC			126	D21	I/O	
64	XCLK	I	Shift clock for serial control data	127	D20	I/O	
				128	D19	I/O	

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• YM7102 (XG996A00) PAN (Panning Processor)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	A0	I	Address bus	41	L8/ACC8	O	L channel data
2	D7	I/O	Data bus	42	L9/ACC9	O	
3	D6	I/O		43	L10/ACC10	O	
4	D5	I/O		44	L11/ACC11	O	
5	D4	I/O		45	L12/ACC12	O	
6	D3	I/O		46	L13/ACC13	O	
7	D2	I/O		47	L14/ACC14	O	
8	D1	I/O		48	L15/ACC15	O	
9	D0	I/O		49	R0/ACC16	O	R channel data
10	IN1	I	Data from OPS	50	R1/ACC17	O	
11	IN0	I		51	R2/ACC18	O	
12	SI2	I	Data from PAN (cathcade input)	52	R3/ACC19	O	
13	SI1	I		53	R4	O	
14	$\overline{\text{TEGS3}}$	I	Test pin	54	R5	O	
15	$\overline{\text{TEGS2}}$	I		55	R6	O	
16	$\overline{\text{TEGS1}}$	I		56	R7	O	
17	$\overline{\text{TEGS0}}$	I		57	R8	O	
18	NC			58	R9	O	
19	CDO	O	Control data for DSP	59	R10	O	
20	CRS	O	Sync pulse for CD	60	R11	O	
21	S1	O	Signal to DSP	61	R12	O	
22	S2	O		62	R13	O	
23	SYW	O	Sync pulse for DSP	63	R14	O	
24	DSPCLK	O	Clock for DSP	64	R15	O	
25	MODE	I	Output mode (L:16bits DAC H:20bits DAC)	65	NC		
26	$\overline{\text{IC}}$	I	Initial clear	66	$\overline{\text{TTIM}}$	I	Test pin
27	$\overline{\text{SYNC}}$	I	Sync pulse	67	$\overline{\text{TEG1}}$	I	
28	ϕM	I	Clock	68	$\overline{\text{TEG0}}$	I	
29	V_{SS}		Ground	69	$\overline{\text{TRD}}$	I	
30	V_{SS}			70	$\overline{\text{CS2}}$	I	Chip select
31	V_{DD}		Power supply	71	$\overline{\text{CS1}}$	I	
32	V_{DD}			72	V_{DD}		Power supply
33	L0/ACC0	O	L channel data	73	CS0	I	Chip select
34	L1/ACC1	O		74	A7	I	Address bus
35	L2/ACC2	O		75	A6	I	
36	L3/ACC3	O		76	A5	I	
37	L4/ACC4	O		77	A4	I	
38	L5/ACC5	O		78	A3	I	
39	L6/ACC6	O		79	A2	I	
40	L7/ACC7	O		80	A1	I	

• μPD71055C (XB361001) PPI (Programmable Peripheral Interface)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	PO3	I/O	Port 0	21	P13	I/O	Port 2
2	PO2	I/O		22	P14	I/O	
3	PO1	I/O		23	P15	I/O	
4	PO0	I/O		24	P16	I/O	
5	$\overline{\text{RD}}$	I	Read control	25	P17	I/O	
6	$\overline{\text{CS}}$	I	Chip Select	26	V_{DD}		DC Supply
7	GND		DC Supply (0V)	27	D7	I/O	Data bus
8	A1	I	Port address	28	D6	I/O	
9	A0	I		29	D5	I/O	
10	P27	I/O	Port 2	30	D4	I/O	
11	P26	I/O		31	D3	I/O	
12	P25	I/O		32	D2	I/O	
13	P24	I/O		33	D1	I/O	
14	P20	I/O		34	D0	I/O	
15	P21	I/O		35	$\overline{\text{RESET}}$	I	Reset
16	P22	I/O		36	$\overline{\text{WR}}$	I	Write control
17	P23	I/O		37	PO7	I/O	Port 0
18	P10	I/O	Port B	38	PO6	I/O	
19	P11	I/O		39	PO5	I/O	
20	P12	I/O		40	PO4	I/O	

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• YM7103 (XG993A00) EGM2 (Envelope Generator)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	A0	I	Address bus	41	NC		
2	D7	I/O	Data bus	42	KON	O	Key on data
3	D6	I/O		43	E0	O	Envelope data, Pitch data (portament), Pitch envelope data
4	D5	I/O		44	E1	O	
5	D4	I/O		45	E2	O	
6	D3	I/O		46	E3	O	
7	D2	I/O		47	E4	O	
8	D1	I/O		48	E5	O	
9	D0	I/O		49	E6	O	
10	NC			50	E7	O	
11	TST10	O	Test pin	51	E8	O	
12	TST9	O		52	E9	O	
13	TST8	O		53	E10	O	
14	TST7	O		54	E11	O	
15	TST6	O		55	E12	O	
16	TST5	O		56	E13	O	
17	TST4	O		57	NC		
18	TST3	O		58	NC		
19	TST2	O		59	NC		
20	TST1	O		60	NC		
21	TST0	O		61	NC		
22	φM0	O	Clock	62	NC		
23	XTAL	O	Quartz crystal	63	NC		
24	EXTAL	I		64	NC		
25	IC	I	Initial clear	65	NC		
26	SYO	O	Sync pulse	66	NC		
27	SYI	I	Sync pulse	67	NC		
28	φMI	I	Clock	68	NC		
29	Vss		Ground	69	NC		
30	Vss			70	NC		
31	NC			71	TRD	I	Test pin
32	VDD		Power supply	72	VDD		Power supply
33	NC			73	CS0	I	Chip select
34	NC			74	CS1	I	
35	NC			75	CS2	I	
36	TEGS2	I	Test pin	76	A5	I	Address bus
37	TEGS1	I		77	A4	I	
38	TEGS0	I		78	A3	I	
39	TS01	O	Test pin	79	A2	I	
40	TS00	O		80	A1	I	

• WD37C65C-JM00 (XH129B00) FDC (Floppy Disk Controller)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	RD	I	Read control	23	XT2	I	XTAL osc. in
2	WR	I	Write control	24	DRV	I	Drive type
3	CS	I	Chip select	25	XT1	O	XTAL osc. drive
4	A0	I	Register select	26	XT1	I	XTAL osc. in
5	DACK	I	DMA acknowledge	27	PCVAL	I	Precompensation value
6	TC	I	Terminal Count	28	HS	O	Head select (Side select)
7	DB0	I/O	Data bus	29	WE	O	Write enable
8	DB1	I/O		30	WD	O	Write data
9	DB2	I/O		31	DIRC	O	Direction control
10	DB3	I/O		32	STEP	O	Step pulse
11	DB4	I/O		33	DS1	O	Drive select 1
12	DB5	I/O		34	Vss		Ground
13	DB6	I/O		35	DS2	O	Drive select 2
14	DB7	I/O		36	M01/DS3	O	Motor ON 1/Drive select 3
15	DMA	O	Direct memory access request	37	M02/DS4	O	Motor ON 2/Drive select 4
16	IRQ	O	Interrup request	38	HDL	O	Head loaded
17	DCHGEN	I	Disk change enable	39	RPM/RWC	O	Revolutions per minute/Reduced write current
18	LDOR	I	Load operations register	40	DCHG	I	Disk change
19	LDCR	I	Load control register	41	WP	I	Write protected
20	RST	I	Reset	42	TR00	I	Track 00 signal
21	RDD	I	Read disk data	43	IDX	I	Index
22	XT2	O	XTAL osc. drive	44	Vcc		Power supply

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• YM7107 (XG994A00) OPS3 (FM Tone Generator)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	A0	I	Address bus	41	DA8	O	D/A signal (straight binary)
2	D7	I/O	Data bus	42	DA9	O	
3	D6	I/O		43	DA10	O	
4	D5	I/O		44	DA11	O	
5	D4	I/O		45	DA12	O	
6	D3	I/O		46	DA13	O	
7	D2	I/O		47	DA14	O	
8	D1	I/O		48	DA15	O	(MSB)
9	D0	I/O		49	SH1	O	Sample and hold
10	E13	I	Envelope data, Pitch envelope data, Pitch data	50	SH2	O	
11	E12	I		51	SC0	O	Channel distribution
12	E11	I		52	SC1	O	
13	E10	I		53	SC2	O	
14	E9	I		54	SO0	O	Serial data (2 compl. 16bits LSB first)
15	E8	I		55	SO1	O	
16	E7	I		56	NC		
17	E6	I		57	NC		
18	E5	I		58	NC		
19	E4	I		59	NC		
20	E3	I		60	NC		
21	E2	I		61	NC		
22	E1	I		62	NC		
23	E0	I		63	NC		
24	KON	I	Phase reset for phase acumulator	64	NC		
25	$\overline{IC}$	I	Initial clear	65	NC		
26	NC			66	NC		
27	SYNC	I	Sync pulse (127C127)	67	NC		
28	ϕM	I	Clock	68	Vss		
29	Vss		Ground	69	SI0	I	Serial data
30	Vss			70	SI1	I	
31	VDD		Power supply	71	NC		
32	VDD			72	VDD		Power supply
33	DA0	O	(LSB)	73	$\overline{CS0}$	I	Chip select
34	DA1	O	D/A signal (straight binary)	74	$\overline{CS1}$	I	
35	DA2	O		75	CS2	I	
36	DA3	O		76	A4	I	Address bus
37	DA4	O		77	A3	I	
38	DA5	O		78	A2	I	
39	DA6	O		79	A1	I	
40	DA7	O		80	Vss		Ground

• HD63B01Y0RM21P (XG950C00) CPU (PKS)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	Vss		Ground	33	Vcc		DC Supply (+5V)
2	XTAL	I	Clock (8MHz)	34	P47	O	Port 4
3	EXTAL	I		35	P46	O	
4	MP0	I	Mode program	36	P45	O	
5	MP1	I		37	P44	O	
6	$\overline{RES}$	I	Reset	38	P43	O	
7	$\overline{STBY}$	I	Stand-by mode signal	39	P42	O	
8	$\overline{NMI}$	I	Non-maskable interrupt	40	P41	O	
9	P20	I/O	Port 2	41	P40	O	
10	P21	I/O		42	Vss		Ground
11	P22	I/O		43	P17	O	Port 1
12	P23	I/O		44	P16	O	
13	P24	I/O		45	P15	O	
14	P25	I/O		46	P14	O	
15	P26	I/O		47	P13	O	
16	P27	I/O		48	P12	O	
17	P50	I/O	Port 5	49	P11	O	
18	P51	I/O		50	P10	O	
19	P52	I/O		51	P37	I/O	Port 3
20	P53	I/O		52	P36	I/O	
21	P54	I/O		53	P35	I/O	
22	P55	I/O		54	P34	I/O	
23	P56	I/O		55	P33	I/O	
24	P57	I/O		56	P32	I/O	
25	P60	I/O		57	P31	I/O	
26	P61	I/O		58	P30	I/O	
27	P62	I/O	Port 6	59	P74	O	Port 7
28	P63	I/O		60	P73	O	
29	P64	I/O		61	P72	O	
30	P65	I/O		62	P71	O	
31	P66	I/O		63	P70	O	
32	P67	I/O		64	E	O	Enable

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• YM7119 (XG995A00) M3 (AWM Tone generator & Digital Filter)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	INDV0	O	Individual output 0 (8 channels)	65	WA8	O	
2	INDV1	O	Individual output 1 (8 channels)	66	WA9	O	
3	OPZ	I	MELIN input select (Ⓗ OPZ, Ⓛ PAN)	67	WA10	O	
4	DIOUT0	O	Stereo output (L & R)	68	WA11	O	
5	DIOUT1	O	Assignable output (ch.0 & ch.4)	69	WA12	O	
6	DIOUT2	O	Assignable output (ch.1 & ch.5)	70	WA13	O	
7	DIOUT3	O	Assignable output (ch.2 & ch.6)	71	WA14	O	
8	DIOUT4	O	Assignable output (ch.3 & ch.7)	72	NC		
9	MELIN	I	MEL formatted signal input	73	WA15	O	Wave memory address bus
10	LSB/MSB	I	Individual output mode select	74	WA16	O	
11	TTPAD0	I/O	(Ⓗ MSB first, Ⓛ LSB first)	75	WA17	O	
12	TTPAD1	I/O		76	WA18	O	
13	NC			77	WA19	O	
14	TTPAD2	I/O		78	WA20	O	
15	TTPAD3	I/O		79	WA21	O	
16	TTPAD4	I/O		80	WA22	O	
17	TTPAD5	I/O		81	WA23	O	
18	NC		Test pin	82	A0	I	
19	TTPAD6	I/O		83	A1	I	
20	TTPAD7	I/O		84	A2	I	CPU address bus
21	NC			85	A3	I	
22	TTPAD8	I/O		86	A4	I	
23	TTPAD9	I/O		87	A5	I	
24	NC			88	D0	I/O	
25	TTPAD10	I/O		89	NC		
26	TTPAD11	I/O		90	D1	I/O	
27	DIIN0	I	Individual input 0 (8 channels)	91	D2	I/O	
28	DIIN1	I	Individual input 1 (8 channels)	92	D3	I/O	CPU data bus
29	WD0	I/O		93	D4	I/O	
30	WD1	I/O		94	D5	I/O	
31	WD2	I/O		95	D6	I/O	
32	WD3	I/O		96	D7	I/O	
33	NC			97	S/HSC0	I	
34	WD4	I/O		98	S/HSC1	I	Sample and hold set timing 0~3
35	WD5	I/O		99	S/HSC2	I	
36	WD6	I/O		100	S/HSC3	I	
37	WD7	I/O		101	S/HEN	O	Sample and hold enable
38	WD8	I/O	Wave memory data	102	S/H0	O	
39	WD9	I/O		103	S/H1	O	Sample and hold 0~3
40	NC			104	S/H2	O	
41	NC			105	S/HRCA	I	
42	WD10	I/O		106	S/HRCB	I	Sample and hold reset A and B
43	WD11	I/O		107	$\overline{IC}$	I	Initial clear
44	NC			108	Vss		Ground
45	WD12	I/O		109	XTAL	O	
46	WD13	I/O		110	EXTAL	I	Clock
47	WD14	I/O		111	NC		
48	Vss		Ground	112	FCLKOUT	O	
49	VDD		Power supply	113	FCLKIN	I	Sync. signal on 2 chips mode
50	WD15	I/O		114	NC		
51	$\overline{MSBW}$	O	Wave data MSB write signal	115	CLK3	O	6.144MHz clock
52	$\overline{LSBW}$	O	Wave data LSB write signal	116	VDD		Power supply
53	$\overline{OE}$	O	Output enable for wave data	117	SYWIN	I	Sync. signal for MEL format
54	ODD/EVEN	I	Odd/Even select on 2 chips mode	118	CLKMEL	O	3.072MHz clock for MEL format
55	SINGLE/DUAL	I	Wave memory single/dual mode	119	NC		
56	WA0	O	select (Ⓗ : dual-2 chips mode,	120	DACLE	O	Latch enable for PCM56 (DAC)
57	WA1	O	Ⓛ : single-1 chip mode)	121	SYWOUT	O	Sync pulse for MEL format
58	WA2	O		122	SYW64	O	6.144MHz sync. signal
59	WA3	O		123	$\overline{IRQ}$	O	Interrupt request (open drain)
60	WA4	O	Wave memory address bus	124	$\overline{CS}$	I	Chip select
61	WA5	O		125	R/$\overline{W}$	I	Read/Write control
62	WA6	O		126	CHPIN	I	EG lowest ch. detect
63	WA7	O		127	CHPOUT	O	EG lowest ch. detect
64	NC			128	KSYNC	I	Key on sync. signal from AFM

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• TMC57800N (XG662A00) MIX5 (Mixer)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	MXI7	I	Voice data input	11	SYM	I	Synch pulse
2	MXI6	I		12	CDO	O	Control data output
3	MXI5	I		13	XCLK	I	CDI and CDO in/out clock
4	MXI4	I		14	$\overline{\text{CDI}}$	I	Control data input
5	MXI3	I		15	$\overline{\text{CRS}}$	I	Counter reset for CDI and CDO
6	MXI2	I		16	MXO0	O	Voice data output
7	MXI1	I		17	MXO1	O	
8	MXI0	I		18	MXO2	O	
9	CLK	I	Master clock	19	MXO3	O	
10	Vss		Ground	20	VDD		Power supply

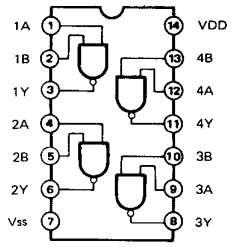
• LC9116A-483 (XI364A00) <TW80> Decoder

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	MXO0	O	Mix output (24-bit limit) MEL (A)	33	Vss		Ground
2	MXO1	O	(B)	34	RSTB	O	Reset output
3	LIMO0	O	Limiter output (22-bit limit) MEL	35	WA17	I	Wave address bus
4	LIMO1	O		36	WA18	I	
5	LIMO2	O		37	WA19	I	
6	LIMO3	O		38	WA20	I	
7	Vss		Ground	39	WA21	I	
8	CO1	O	OR-output (A)	40	WA22	I	
9	CO2	O	(B)	41	WA23	I	
10	CO3	O	(C)	42	CARDB	O	Decoder output to WAVE CARD
11	AI4	I	Buffer input	43	RAM2B	O	Decoder output to WAVE RAM
12	AI3	I		44	RAM1B	O	
13	AI2	I		45	ROM4B	O	Decoder output to WAVE ROM
14	AI1	I		46	ROM3B	O	
15	BI1	I	Inverting input	47	ROM2B	O	
16	BO1	O	Inverting output	48	ROM1B	O	
17	Vss		Ground	49	Vss		Ground
18	SYW1	I	Synch. signal	50	EXTAL	I	Clock (12.288 MHz)
19	CLK	I	Clock	51	XTAL	I	
20	PST1B	I	Reset input	52	Vss		Ground
21	PST2B	I		53	FCLK	O	Clock (12.288 MHz)
22	AO1	O	Buffer output	54	LCLK2	O	Clock (6.144 MHz)
23	AO2	O		55	LCLK1	O	Clock (6.144 MHz)
24	VDD		Power supply	56	VDD		Power supply
25	AO3	O	Buffer output	57	LIMI3	I	Limiter input (24-bit) MEL
26	AO4	O		58	LIMI2	I	
27	S0	I	OR-input (A)	59	LIMI1	I	
28	S1	I		60	LIMI0	I	
29	S2	I	OR-input (B)	61	MXI3	I	Mix input (B)
30	S3	I		62	MXI2	I	
31	S4	I	OR-input (C)	63	MXI1	I	Mix input (A)
32	S5	I		64	MXI0	I	

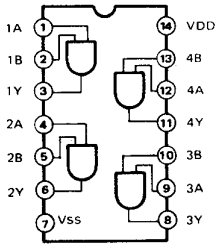
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■IC BLOCK DIAGRAM (ICブロック図)

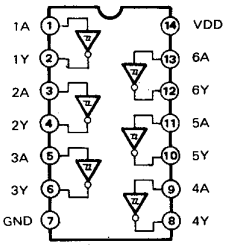
- **TC74HC00AF-TP1** (XD655A00)
  Quad 2 Input NAND



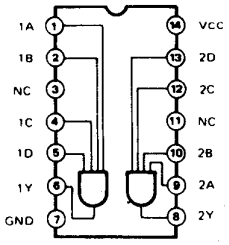
- **TC74HC08AF-TP1**
  Quad 2 Input AND



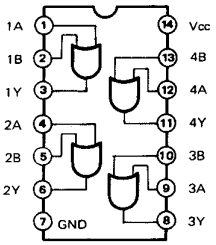
- **SN74HC14N** (IR001450)
- **SN74LS14N** (IG049650)
  Hex Inverter



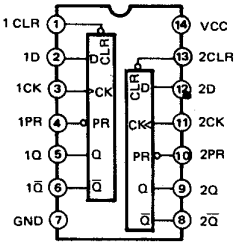
- **TC74HC21AF** (XJ622A00)
  Dual 4 Input AND



- **SN74ALS32N** (XA055001)
  Quad 2 Input OR

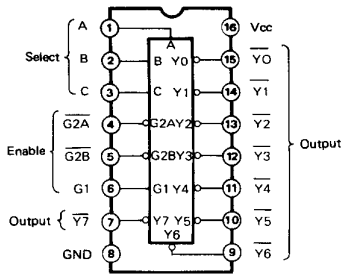


- **SN74HC74NSR** (XC726001)
  Dual D-Type Flip-Flop

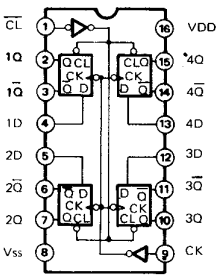


INPUTS				OUTPUTS	
PR	CLR	CLK	D	Q	Q̄
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H	H
H	H	↑	H	H	L
H	H	↑	L	L	H
H	H	L	X	Q_0	$\bar{Q}_0$

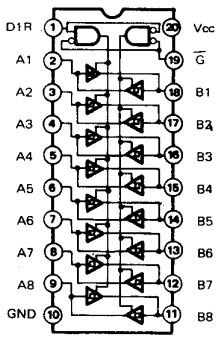
- **SN74ALS138N** (IG149600)
- **SN74HC138NSR** (XD835A00)
- **TC74HC138AP** (IR013800)
  3 to 8 Demultiplexer



- **TC74HC175AF-TP1**
  (XD658A00)
  Quad D-Type Flip-Flop

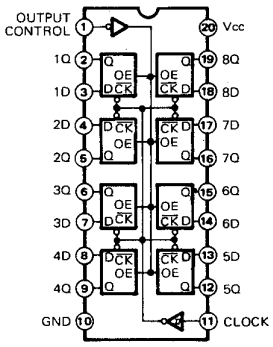


- **SN74ALS245ANSR** (XE057A00)
- **SN74LS245ANSR** (XH779A00)
- **TC74AC245P** (XH608A00)
- **TC74HC245AP** (IR024500)
- **TC74HC245F-T1** (XD603A00)
  Octal 3-State Bus Transceiver

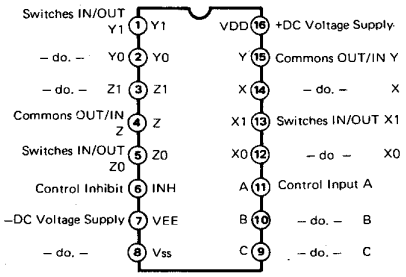


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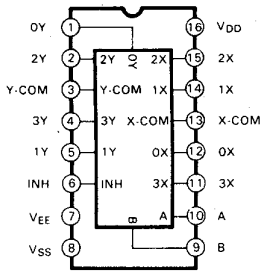
- **SN74HC273N** (IR027350)
  Octal D-Type Flip-Flop



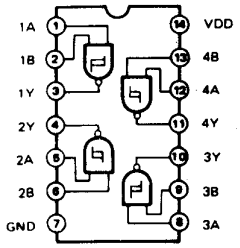
- **TC74HC4051AF** (XJ623A00)
  Single 8-ch.
  Multiplexer/Demultiplexer



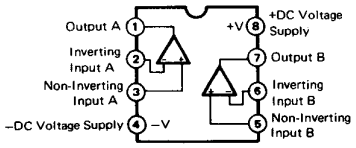
- **TC74HC4052AP** (IR405200)
  Differential 4-Channel
  Multiplexer/Demultiplexer



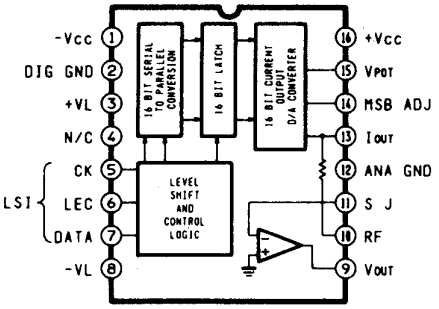
- **TC4093BP** (IG043300)
  Quad 2-Input NAND Schmitt Trigger



- **M5238P R610** (XJ748A00)
- **NJM4556** (IG042500)
- **RC4558D-V** (IG001390)
  Dual Operational Amplifier



- **PCM56P-Y** (XH690A00)
  Digital Analog Converter

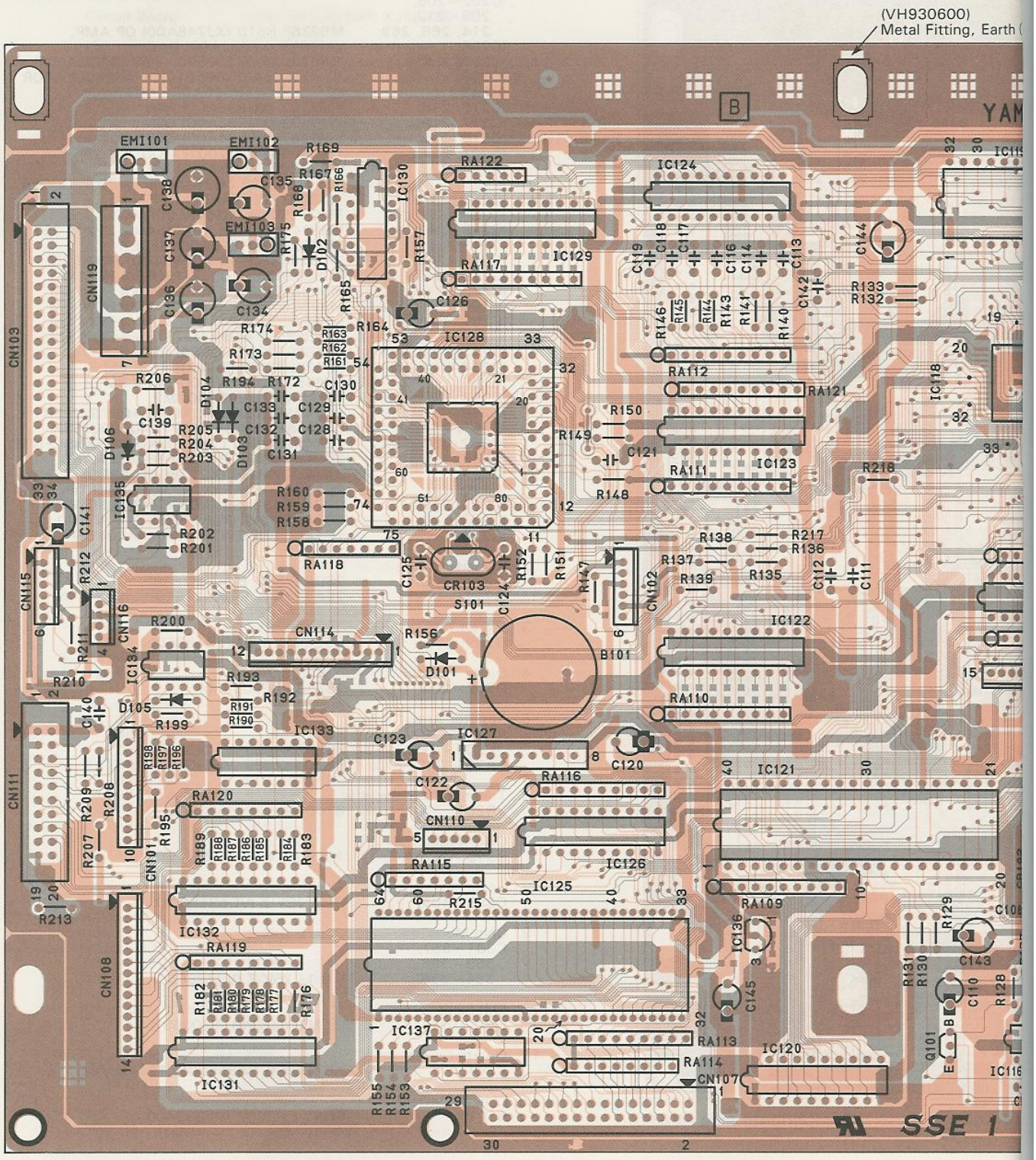


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■CIRCUIT BOARDS（シート基板図）

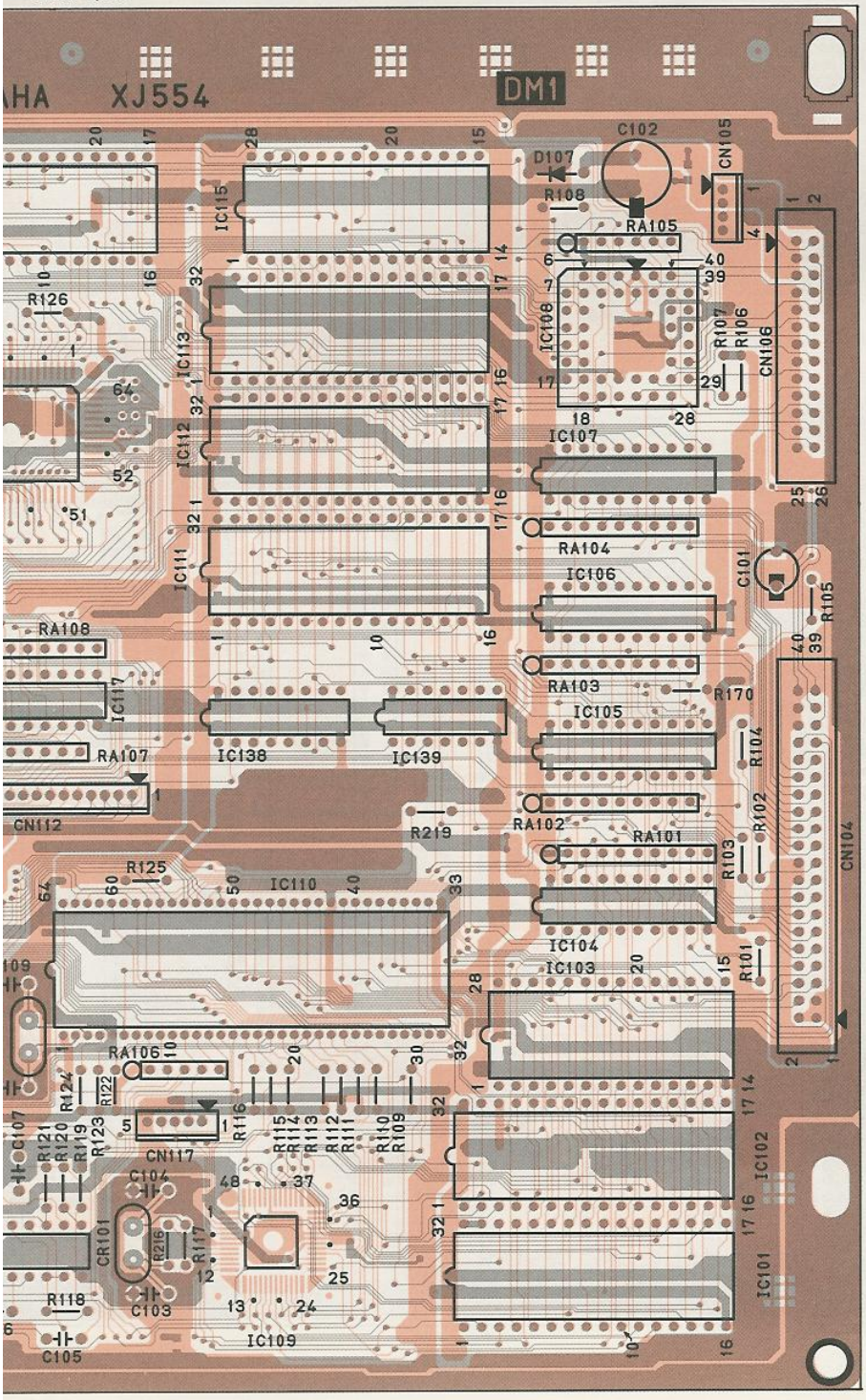
• DM1 Circuit Board



3NA1-VK28740 ⚠1

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ース金具) 3pcs



Components side (部品側)

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SY99

Notes)

Circuit Board: DM1 (VK287400) XJ55AB0

1. IC

IC101:	M5M27C201K (XJ616C00) EPROM (040DV120)
IC102:	HM658128P-12 (XE612A00) PSRAM
IC103:	LH5164D-10L (XF876A00) SRAM
IC104~107, 122, 123, 129:	SN74ALS245AN (IG149900) BUS TRANSCEIVER
IC108:	WD37C65C-JM00 (XH129B00) FDD CONTROLLER
IC109:	LZ95A13 (XI501A00) GATE ARRAY
IC110:	HD63C01Y0F64P (XF148A00) CPU
IC111:	TC574000D (XJ613D00) EPROM (040AV120)
IC112:	HN27C101AG (XJ614B00) EPROM (040BV110)
IC113:	HN27C101AG (XJ615C00) EPROM (040CV120)
IC115:	HM62256LP-10 (XH266A00) SRAM
IC116:	TC4093BP (IG043300) NAND
IC117, 120, 126, 131, 132:	TC74HC245AP (IR024500) BUS BUFFER
IC118:	LZ95B12 (XI500A00) GATE ARRAY
IC119:	HM628128LP-10 (XI580A00) SRAM
IC121:	μPD71055C (XB361001) PPI
IC124:	TC74AC245P (XH608A00) BUS TRANSCEIVER
IC125:	HD63B01Y0RM21P (XG950C00) PKS
IC127:	M62021L (XH970A00) RESET
IC128:	H8/532 (XI722D00) CPU
IC130:	TC74HC4052AP (IR405200) MULTIPLEXER
IC133:	SN74LS14N (IG049650) INVERTER
IC135:	RC4558D-V (IG001390) OP AMP.
IC137:	SN74HC14N (IR001450) INVERTER
IC138:	SN74ALS138N (IG149600) DECODER
IC139:	SN74ALS32N (XA055001) OR

2. Photo Coupler

IC134:	6N137 (VD473200)

3. Transistor

Q101:	2SC2603 E, F (IC260320)

4. Diode

D101~106:	1SS133 (IF003450)
D107:	11ES4 (VB481900)

5. Metal Film Resistor

R201, 202:	10KΩ 1/5W F (VA074400)

6. Resistor Array

RA101~104, 108~112, 116, 117, 121:	RGLD8X103J (VE445200)
RA105:	RMLS5J102 (VK409500)
RA106, 122:	RGLD4X103J (VE443500)
RA107, 114:	RMLS7J103 (VG284400)
RA113:	RGLD8X223J (VE445400)
RA115:	RMLS6-223J (VA823000)
RA118:	RMLS6J103 (HZ004650)
RA119, 120:	RMLS7153J (VK437400)

7. Chip Resistor

R301~303, 324:	47Ω 0.1W J (RD254470)
R304, 308:	10KΩ 0.1W J (RD257100)
R305:	4.7KΩ 0.1W J (RD256470)
R309~323, 325~332:	100Ω 0.1W J (RD255100)
R333:	1KΩ 0.1W J (RD256100)

8. Electrolytic Cap.

C102:	470μ 16V (UJ838470)

9. Chip Monolithic Cera. Cap.

C201~218, 220~272:	F 0.1μ 25V Z (VJ798800)

10. EMI Filter

EMI101~103:	LS MT Y223NB (FZ006970)

11. Quartz Crystal Unit

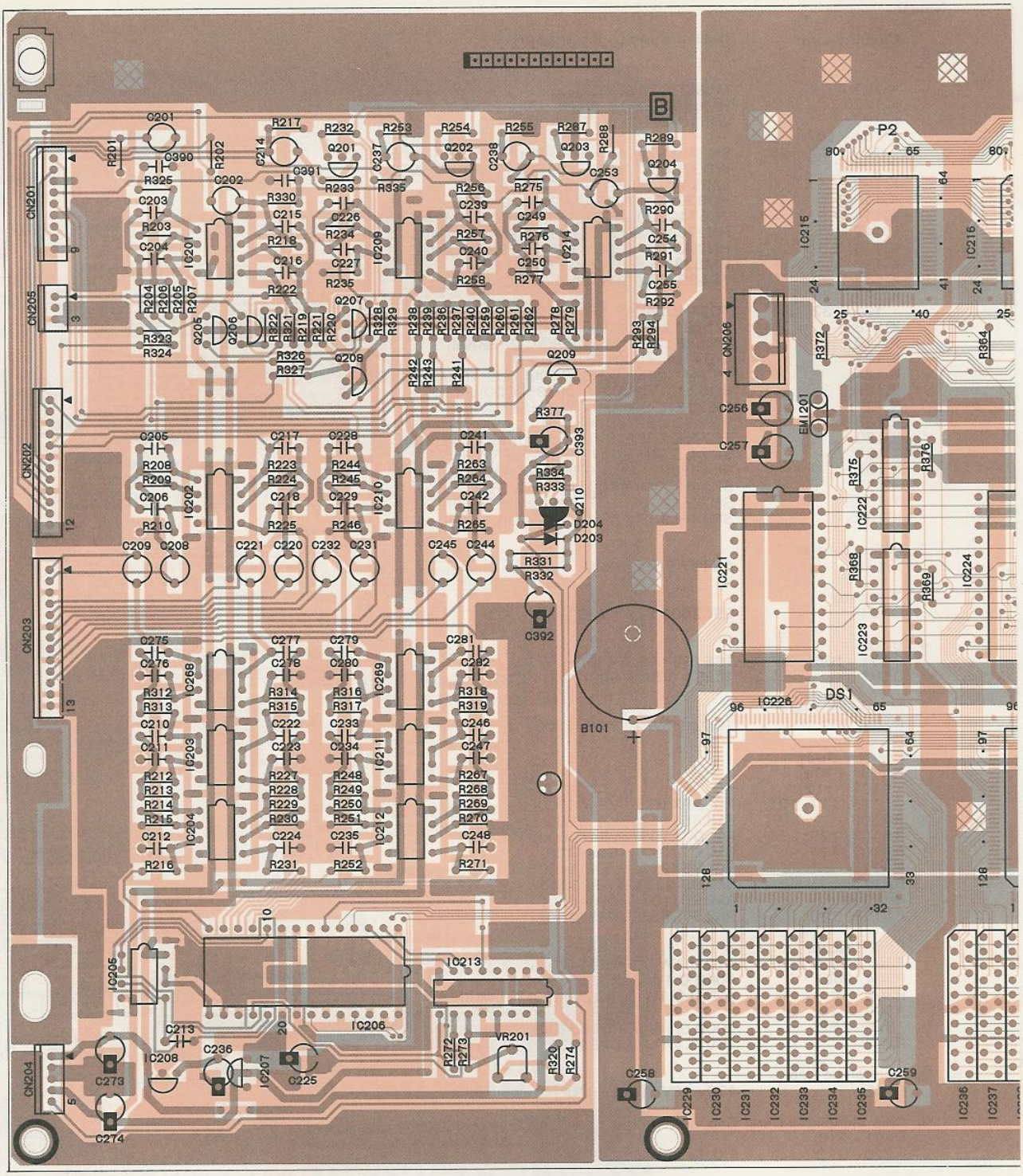
CR101:	16MHz AT-49 (VI573400)
CR102:	12MHz AT-49 (VE463500)
CR103:	24MHz AT-49 (VK409400)

12. Lithium Battery

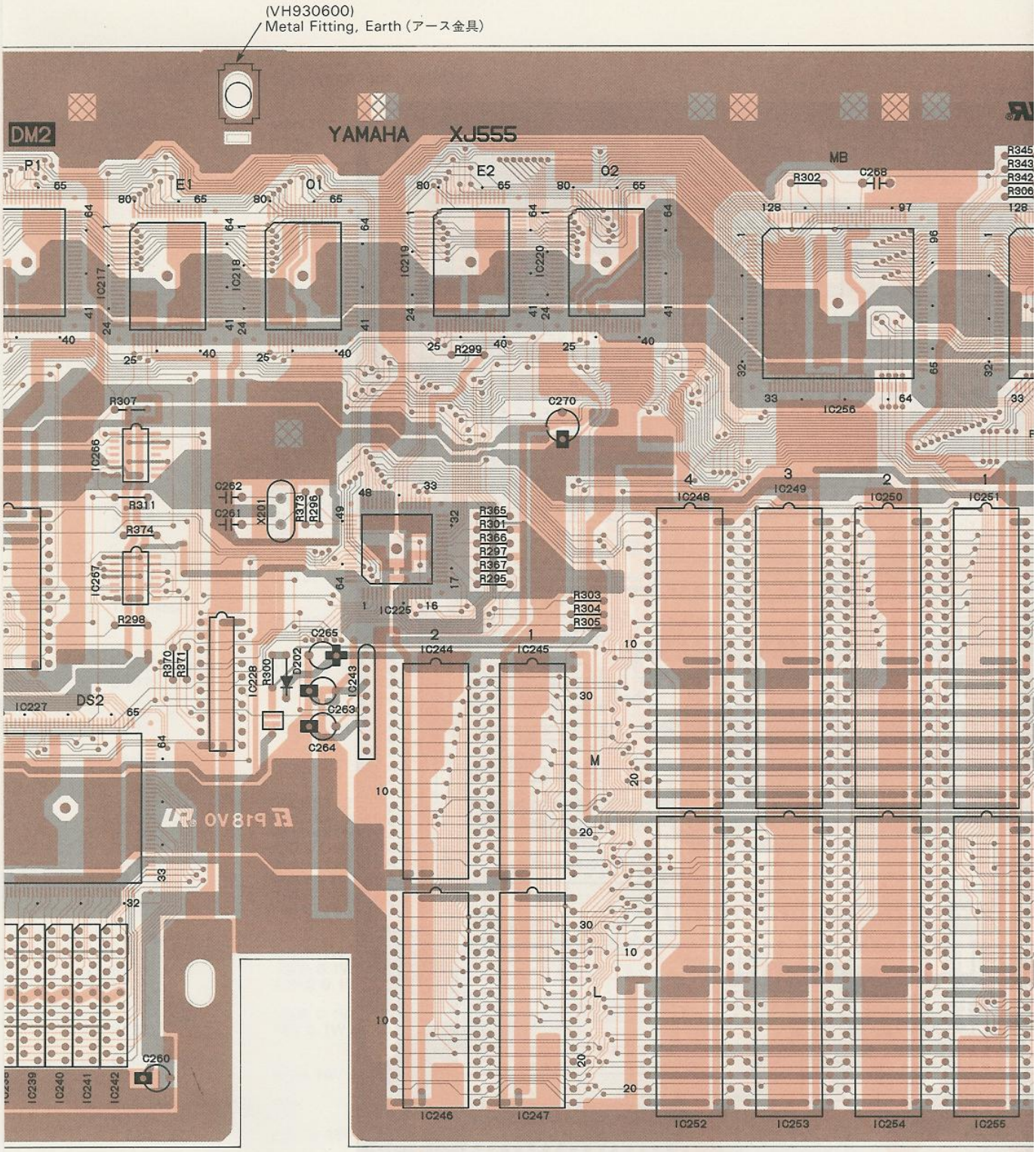
B101:	SONY/CR2032 (VE338400)

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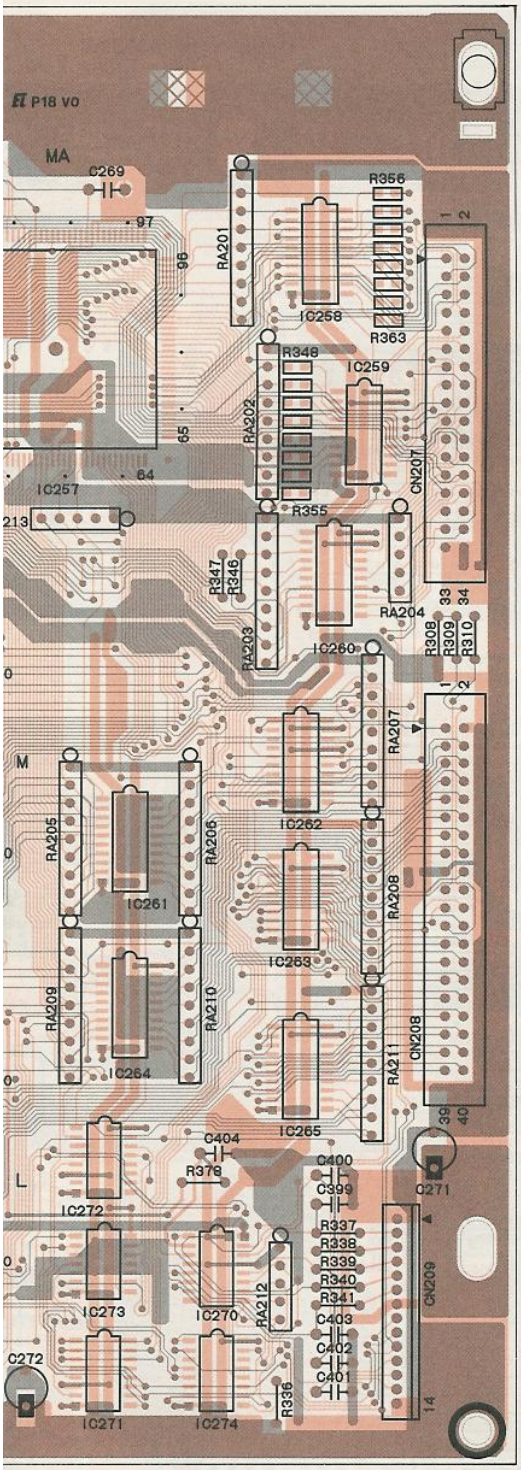
• DM2 Circuit Board



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Components side (部品側)

Notes)

Circuit Board: DM2 (VK287500) XJ555B0

1. IC
   - IC201: NJM4556 (IG042500) OP AMP.
   - IC202 ~ 205, 209 ~ 212, 214, 268, 269: M5238P R610 (XJ748A00) OP AMP.
   - IC206: YM3029 (XF237A00) DAC
   - IC207: NJM79L05 (IG130500) − 5V REGULATOR
   - IC208: NJM78L05A (IG065510) + 5V REGULATOR
   - IC213: PCM56P-Y (XH690A00) DAC
   - IC215, 216: YM7102 (XG996A00) PAN
   - IC217, 219: YM7103 (XG993A00) EGM2
   - IC218, 220: YM7107 (XG994A00) OPS3
   - IC221, 224: YM3807 (XA902001) MOD
   - IC222, 223: YM3422B (XE862B00) ESI
   - IC225: LC9116A-483 (XI364A00) TW80 DECODER
   - IC226, 227: YM6007 (XF164A00) DSP2
   - IC228: TMC57800N (XG662A00) MIX5
   - IC229 ~ 242: MB81464-12PSZ (XD265A00) DRAM 256K
   - IC243: M62021L (XH970A00) RESET
   - IC244 ~ 247: HM628128LP-10 (XI580A00) SRAM 1M
   - IC248: TC538200P-H100 (XI735B00) ROM 8M
   - IC249: MB838200-20P-G (XI734A00) ROM 8M
   - IC250: MB838200-20P-G (XI733A00) ROM 8M
   - IC251: MB838200-20P-G (XI732A00) ROM 8M
   - IC252: TC538200P-H099 (XI731B00) ROM 8M
   - IC253: LH538089 (XI730A00) ROM 8M
   - IC254: LH538088 (XI729A00) ROM 8M
   - IC255: LH538087 (XI728A00) ROM 8M
   - IC256, 257: YM7119 (XG995A00) M3
   - IC258 ~ 260: SN74ALS245ANSR (XE057A00) BUFFER
   - IC261, 264: SN74LS245ANSR (XH779A00) BUFFER
   - IC262, 263, 265: TC74HC245F-T1 (XD603A00) TRANSCEIVER
   - IC266: TC74HC00AF-TP1 (XD655A00) NAND
   - IC267: SN74HC74NSR (XC726001) DFF
   - IC270: TC74HC4051AF (XJ623A00) MULTIPLEXER
   - IC271, 272: SN74HC138NSR (XD835A00) DECODER
   - IC273: TC74HC21AF (XJ622A00) 2-4 IN AND
   - IC274: TC74HC175AF-TP1 (XD658A00) DFF

2. Transistor
   - Q201 ~ 208: 2SC2878 A, B (IC287820)
   - Q210: 2SA1115 E, F (IA111510)

3. Digital Transistor
   - Q209: DTC143XS TP (VD488500)

4. Diode
   - D202 ~ 204: 1SS133 (IF003450)

5. Resistor Array
   - RA201 ~ 203, 205 ~ 211: RGLD8X103J (VE445200)
   - RA204, 212, 213: RGLD4X103J (VE443500)

6. Trimmer Potentiometer
   - VR201: B100K EVN (VB593200)

7. Chip Resistor
   - R348 ~ 363: 100Ω 0.1W J (RD255100)

8. Semiconductive Cera. Cap.
   - C399 ~ 404: 0.1μ 25V Z (VC694800)

9. Chip Monolithic Cera. Cap.
   - C301 ~ 357, 359 ~ 388, 394 ~ 398: F 0.1μ 25V Z (VJ798800)

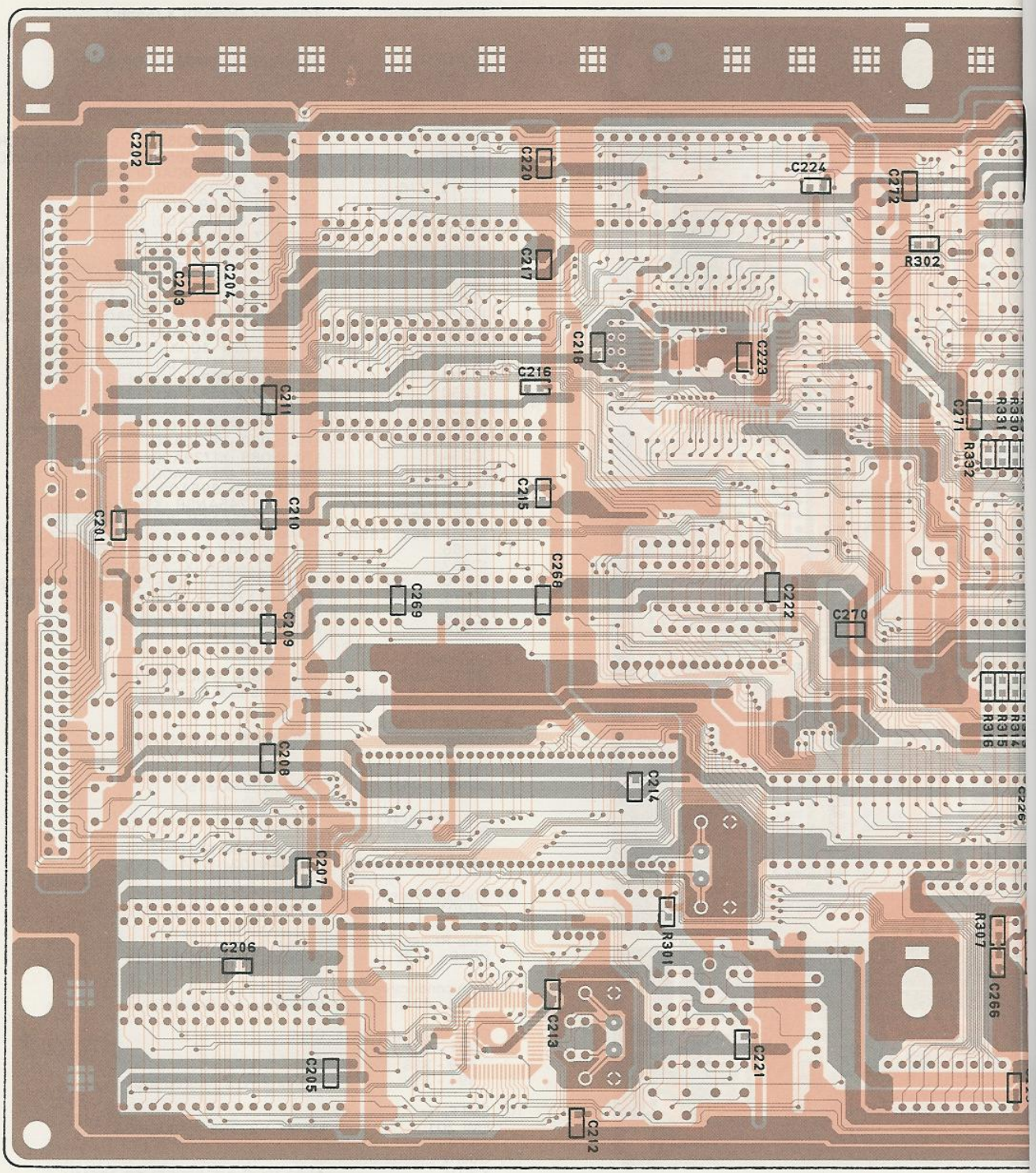
10. EMI Filter
    - EMI 201: LS MT Y223NB (FZ006970)

11. Quartz Crystal Unit
    - X201: AF2138CG (VI552000) 12.288MHz

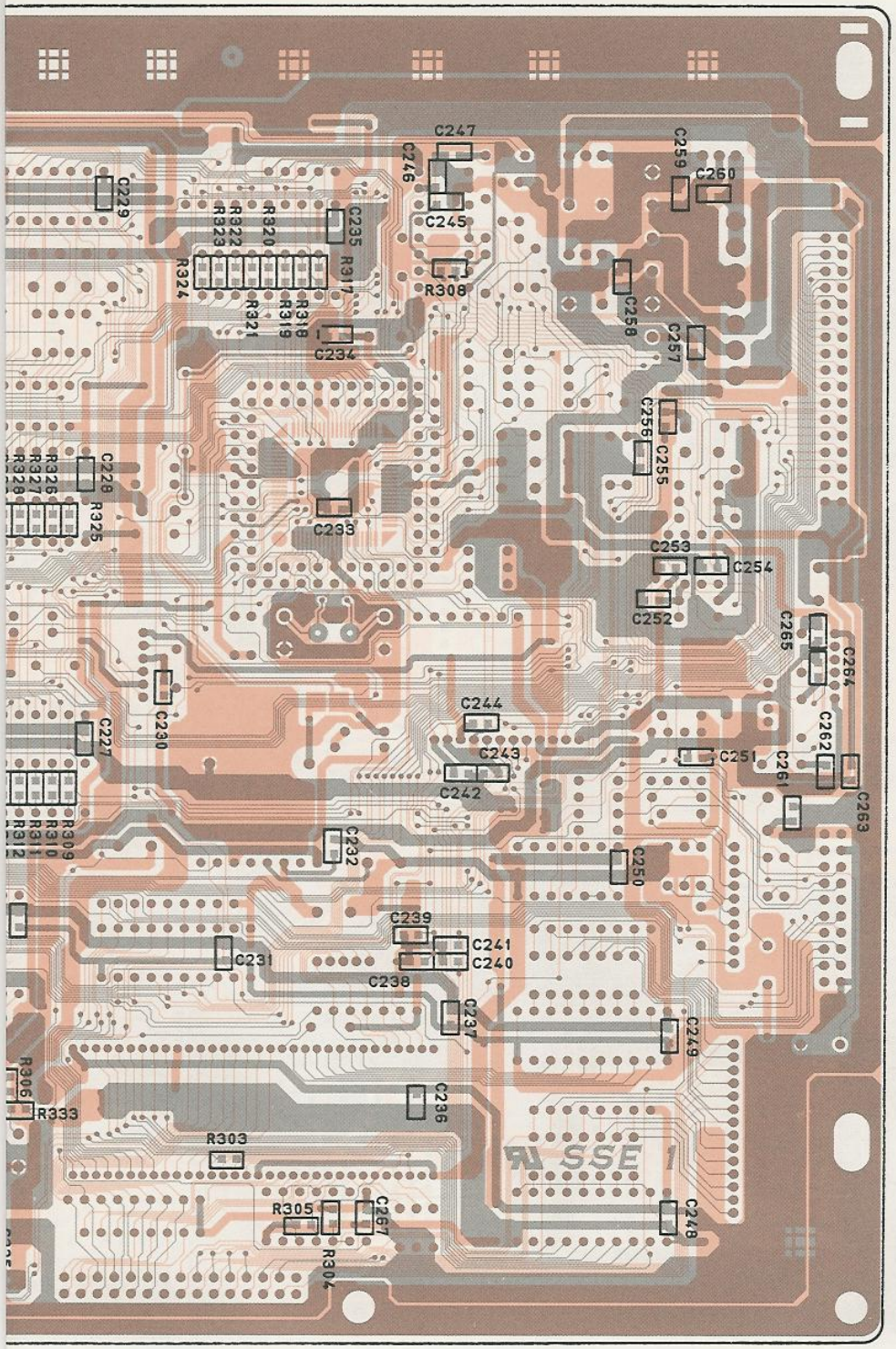
12. Lithium Battery
    - B101: SONY/CR2032 (VE338400)

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● **DM1 Circuit Board**（Pattern side — パターン側）



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Notes)

Circuit Board: DM1 (VK287400) XJ55AB0

1. IC
   - IC101: M5M27C201K (XJ616C00) EPROM (040DV120)
   - IC102: HM658128P-12 (XE612A00) PSRAM
   - IC103: LH5164D-10L (XF876A00) SRAM
   - IC104 ~ 107, 122, 123, 129: SN74ALS245AN (IG149900) BUS TRANSCEIVER
   - IC108: WD37C65C-JM00 (XH129B00) FDD CONTROLLER
   - IC109: LZ95A13 (XI501A00) GATE ARRAY
   - IC110: HD63C01Y0F64P (XF148A00) CPU
   - IC111: TC574000D (XJ613D00) EPROM (040AV120)
   - IC112: HN27C101AG (XJ614B00) EPROM (040BV110)
   - IC113: HN27C101AG (XJ615C00) EPROM (040CV120)
   - IC115: HM62256LP-10 (XH266A00) SRAM
   - IC116: TC4093BP (IG043300) NAND
   - IC117, 120, 126, 131, 132: TC74HC245AP (IR024500) BUS BUFFER
   - IC118: LZ95B12 (XI500A00) GATE ARRAY
   - IC119: HM628128LP-10 (XI580A00) SRAM
   - IC121: μPD71055C (XB361001) PPI
   - IC124: TC74AC245P (XH608A00) BUS TRANSCEIVER
   - IC125: HD63B01Y0RM21P (XG950C00) PKS
   - IC127: M62021L (XH970A00) RESET
   - IC128: H8/532 (XI722D00) CPU
   - IC130: TC74HC4052AP (IR405200) MULTIPLEXER
   - IC133: SN74LS14N (IG049650) INVERTER
   - IC135: RC4558D-V (IG001390) OP AMP.
   - IC137: SN74HC14N (IR001450) INVERTER
   - IC138: SN74ALS138N (IG149600) DECODER
   - IC139: SN74ALS32N (XA055001) OR

2. Photo Coupler
   - IC134: 6N137 (VD473200)

3. Transistor
   - Q101: 2SC2603 E, F (IC260320)

4. Diode
   - D101 ~ 106: 1SS133 (IF003450)
   - D107: 11ES4 (VB481900)

5. Metal Film Resistor
   - R201, 202: 10KΩ 1/5W F (VA074400)

6. Resistor Array
   - RA101 ~ 104, 108 ~ 112, 116, 117, 121: RGLD8X103J (VE445200)
   - RA105: RMLS5J102 (VK409500)
   - RA106, 122: RGLD4X103J (VE443500)
   - RA107, 114: RMLS7J103 (VG284400)
   - RA113: RGLD8X223J (VE445400)
   - RA115: RMLS6-223J (VA823000)
   - RA118: RMLS6J103 (HZ004650)
   - RA119, 120: RMLS7153J (VK437400)

7. Chip Resistor
   - R301 ~ 303, 324: 47Ω 0.1W J (RD254470)
   - R304, 308: 10KΩ 0.1W J (RD257100)
   - R305: 4.7KΩ 0.1W J (RD256470)
   - R309 ~ 323, 325 ~ 332: 100Ω 0.1W J (RD255100)
   - R333: 1KΩ 0.1W J (RD256100)

8. Electrolytic Cap.
   - C102: 470μ 16V (UJ838470)

9. Chip Monolithic Cera. Cap.
   - C201 ~ 218, 220 ~ 272: F 0.1μ 25V Z (VJ798800)

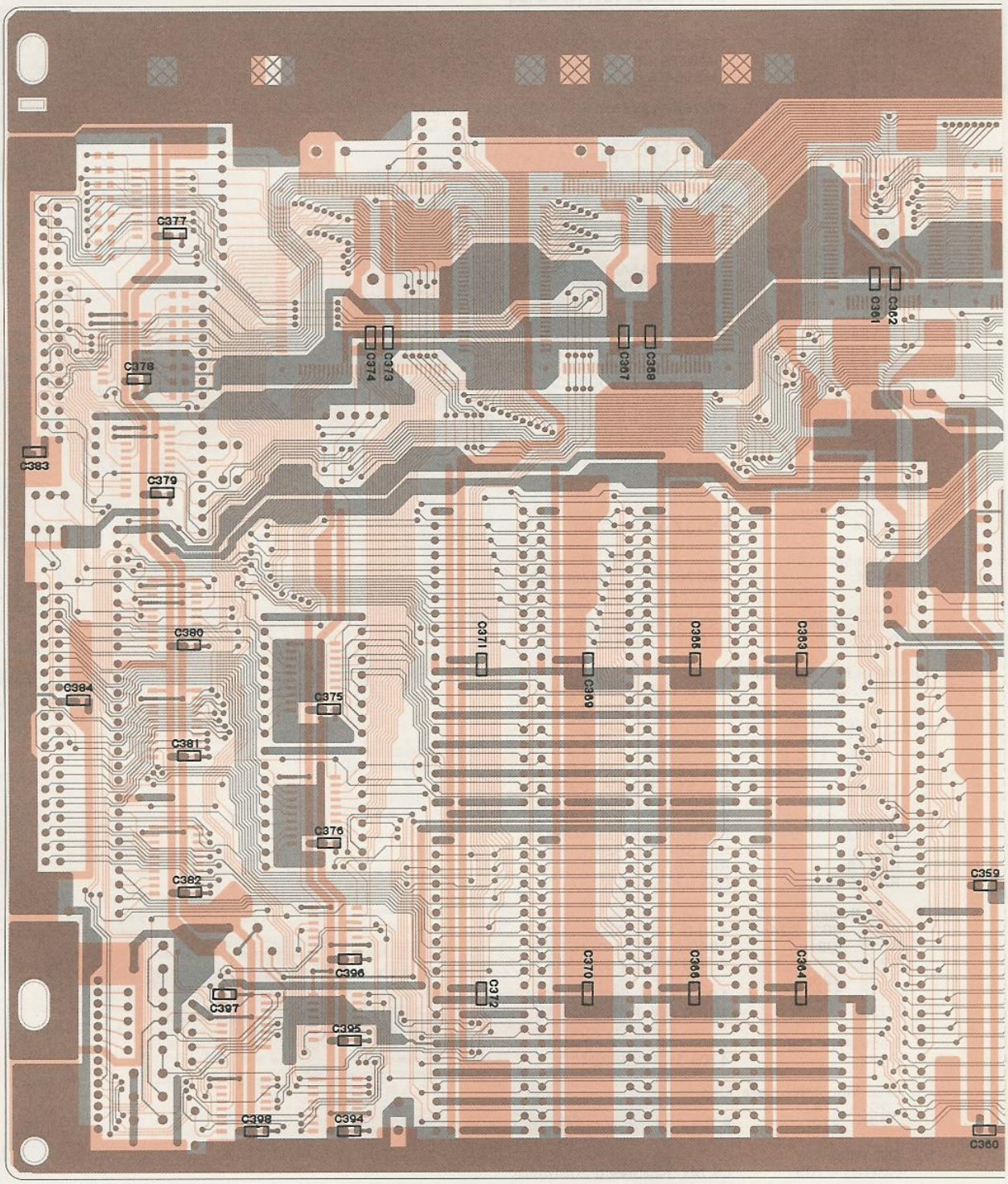
10. EMI Filter
    - EMI101 ~ 103: LS MT Y223NB (FZ006970)

11. Quartz Crystal Unit
    - CR101: 16MHz AT-49 (VI573400)
    - CR102: 12MHz AT-49 (VE463500)
    - CR103: 24MHz AT-49 (VK409400)

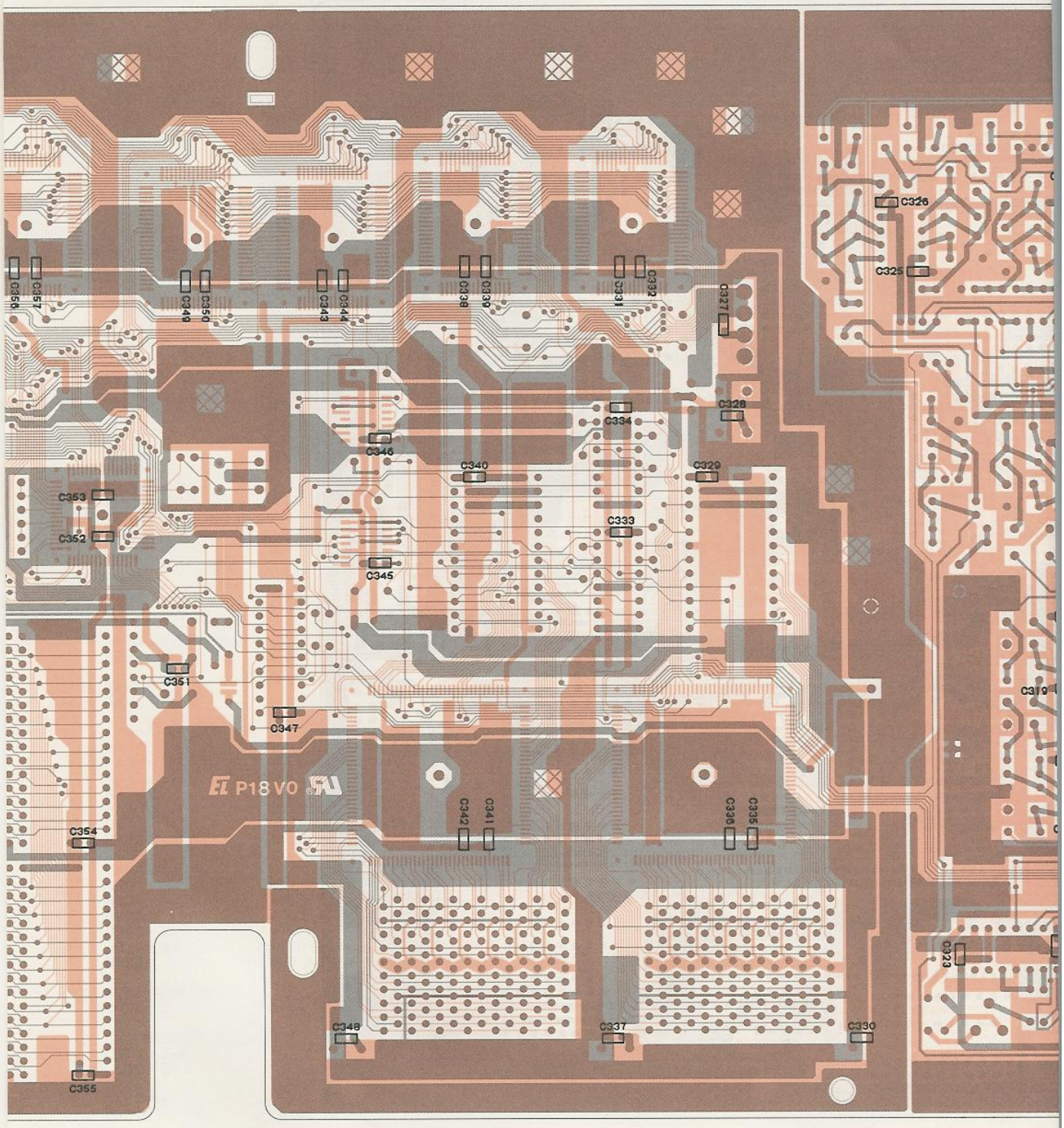
12. Lithium Battery
    - B101: SONY/CR2032 (VE338400)

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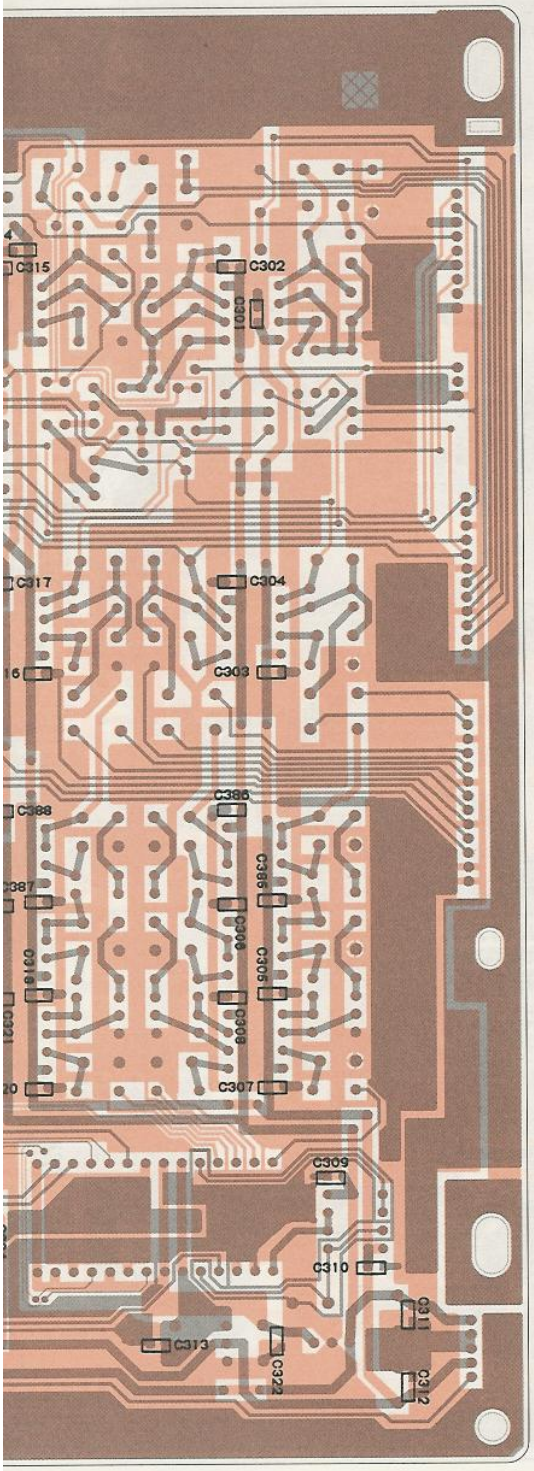
● **DM2 Circuit Board**（Pattern side — パターン側）



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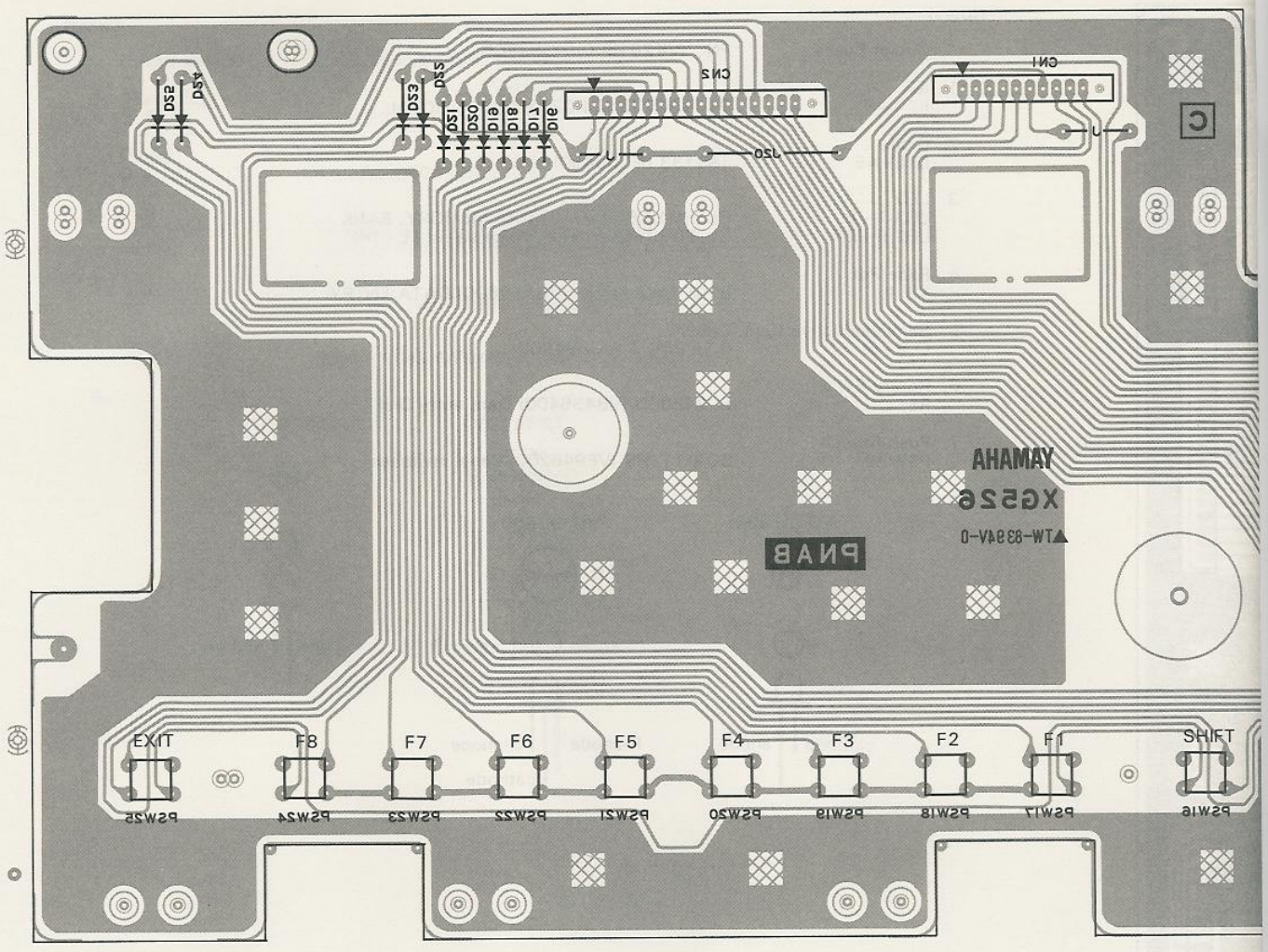


Notes)

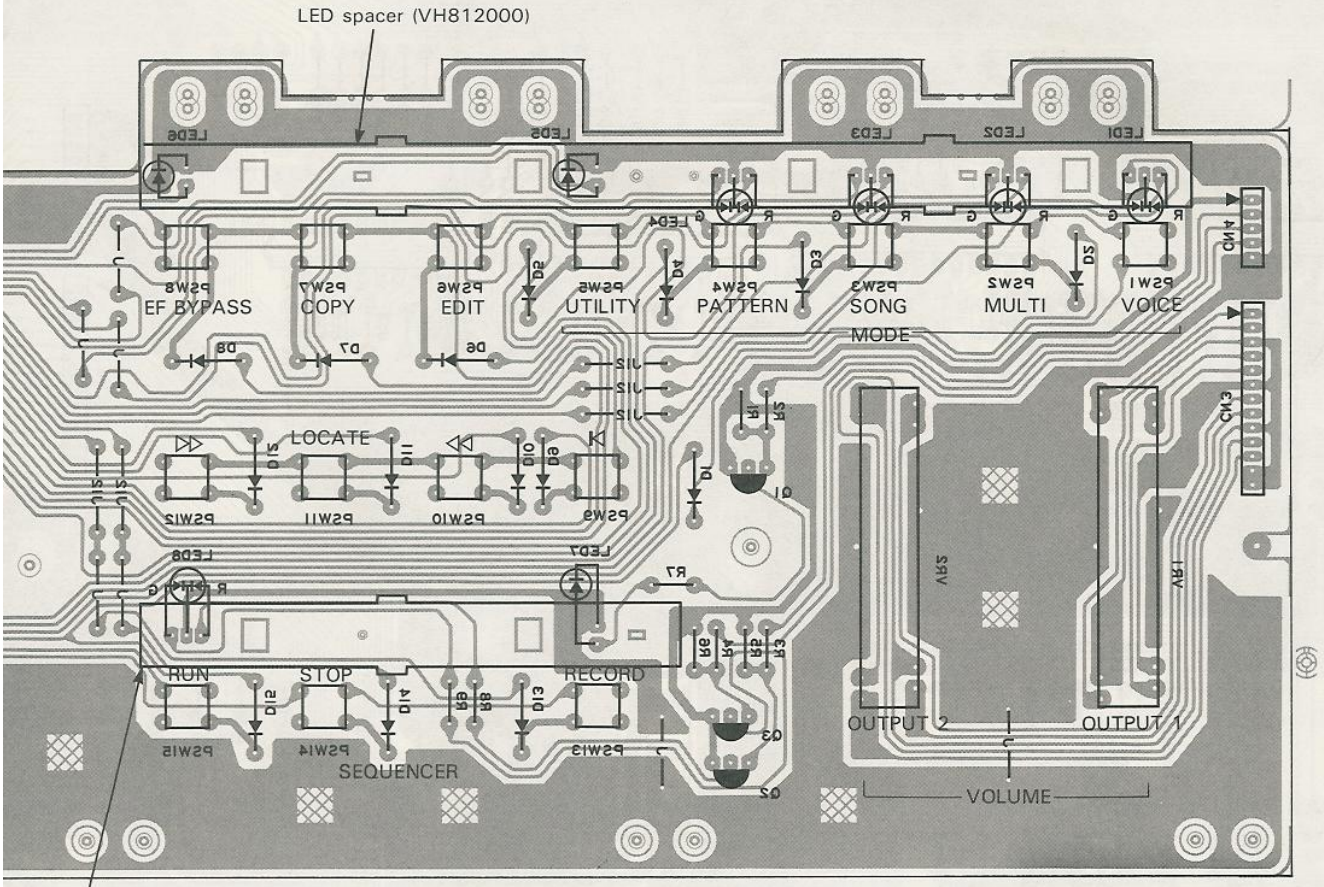
Circuit Board:	DM2 (VK287500) XJ555B0
1. IC	
IC201:	NJM4556 (IG042500) OP AMP.
IC202 ~ 205, 209 ~ 212, 214, 268, 269:	M5238P R610 (XJ748A00) OP AMP.
IC206:	YM3029 (XF237A00) DAC
IC207:	NJM79L05 (IG130500) – 5V REGULATOR
IC208:	NJM78L05A (IG065510) + 5V REGULATOR
IC213:	PCM56P-Y (XH690A00) DAC
IC215, 216:	YM7102 (XG996A00) PAN
IC217, 219:	YM7103 (XG993A00) EGM2
IC218, 220:	YM7107 (XG994A00) OPS3
IC221, 224:	YM3807 (XA902001) MOD
IC222, 223:	YM3422B (XE862B00) ESI
IC225:	LC9116A-483 (XI364A00) TW80 DECODER
IC226, 227:	YM6007 (XF164A00) DSP2
IC228:	TMC57800N (XG662A00) MIX5
IC229 ~ 242:	MB81464-12PSZ (XD265A00) DRAM 256K
IC243:	M62021L (XH970A00) RESET
IC244 ~ 247:	HM628128LP-10 (XI580A00) SRAM 1M
IC248:	TC538200P-H100 (XI735B00) ROM 8M
IC249:	MB838200-20P-G (XI734A00) ROM 8M
IC250:	MB838200-20P-G (XI733A00) ROM 8M
IC251:	MB838200-20P-G (XI732A00) ROM 8M
IC252:	TC538200P-H099 (XI731B00) ROM 8M
IC253:	LH538089 (XI730A00) ROM 8M
IC254:	LH538088 (XI729A00) ROM 8M
IC255:	LH538087 (XI728A00) ROM 8M
IC256, 257:	YM7119 (XG995A00) M3
IC258 ~ 260:	SN74ALS245ANSR (XE057A00) BUFFER
IC261, 264:	SN74LS245ANSR (XH779A00) BUFFER
IC262, 263, 265:	TC74HC245F-T1 (XD603A00) TRANSCEIVER
IC266:	TC74HC00AF-TP1 (XD655A00) NAND
IC267:	SN74HC74NSR (XC726001) DFF
IC270:	TC74HC4051AF (XJ623A00) MULTIPLEXER
IC271, 272:	SN74HC138NSR (XD835A00) DECODER
IC273:	TC74HC21AF (XJ622A00) 2-4 IN AND
IC274.	TC74HC175AF-TP1 (XD658A00) DFF
2. Transistor	
Q201 ~ 208:	2SC2878 A, B (IC287820)
Q210:	2SA1115 E, F (IA111510)
3. Digital Transistor	
Q209:	DTC143XS TP (VD488500)
4. Diode	
D202 ~ 204:	1SS133 (IF003450)
5. Resistor Array	
RA201 ~ 203, 205 ~ 211:	RGLD8X103J (VE445200)
RA204, 212, 213:	RGLD4X103J (VE443500)
6. Trimmer Potentiometer	
VR201:	B100K EVN (VB593200)
7. Chip Resistor	
R348 ~ 363:	100Ω 0.1W J (RD255100)
8. Semiconductive Cera. Cap.	
C399 ~ 404:	0.1μ 25V Z (VC694800)
9. Chip Monolithic Cera. Cap.	
C301 ~ 357, 359 ~ 388, 394 ~ 398:	F 0.1μ 25V Z (VJ798800)
10. EMI Filter	
EMI 201:	LS MT Y223NB (FZ006970)
11. Quartz Crystal Unit	
X201:	AF2138CG (VI552000) 12.288MHz
12. Lithium Battery	
B101:	SONY/CR2032 (VE338400)

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● PNAB Circuit Board



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Pattern side (パターン側)

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Notes)

Circuit Board: PNAB (VK261900) XG526C0

1. Transistor
   Q 1~3: 2SA1015 Y (IA101521)

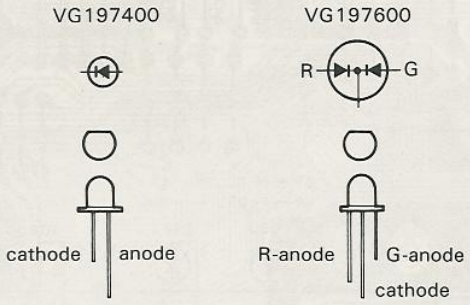
2. Diode
   D 1~25: 1SS133 (IF003450)

3. LED
   LED 1~4, 8: GL3ED8 (VG197600) MODE, SEQ. (RUN)
   LED 5~7: GL3HD18 RE (VG197400) UTILITY, BYPASS, REC

4. Slide Pot.
   VR 1, 2: A10K × 2 (VE373500) VOL. (OUTPUT 1, 2)

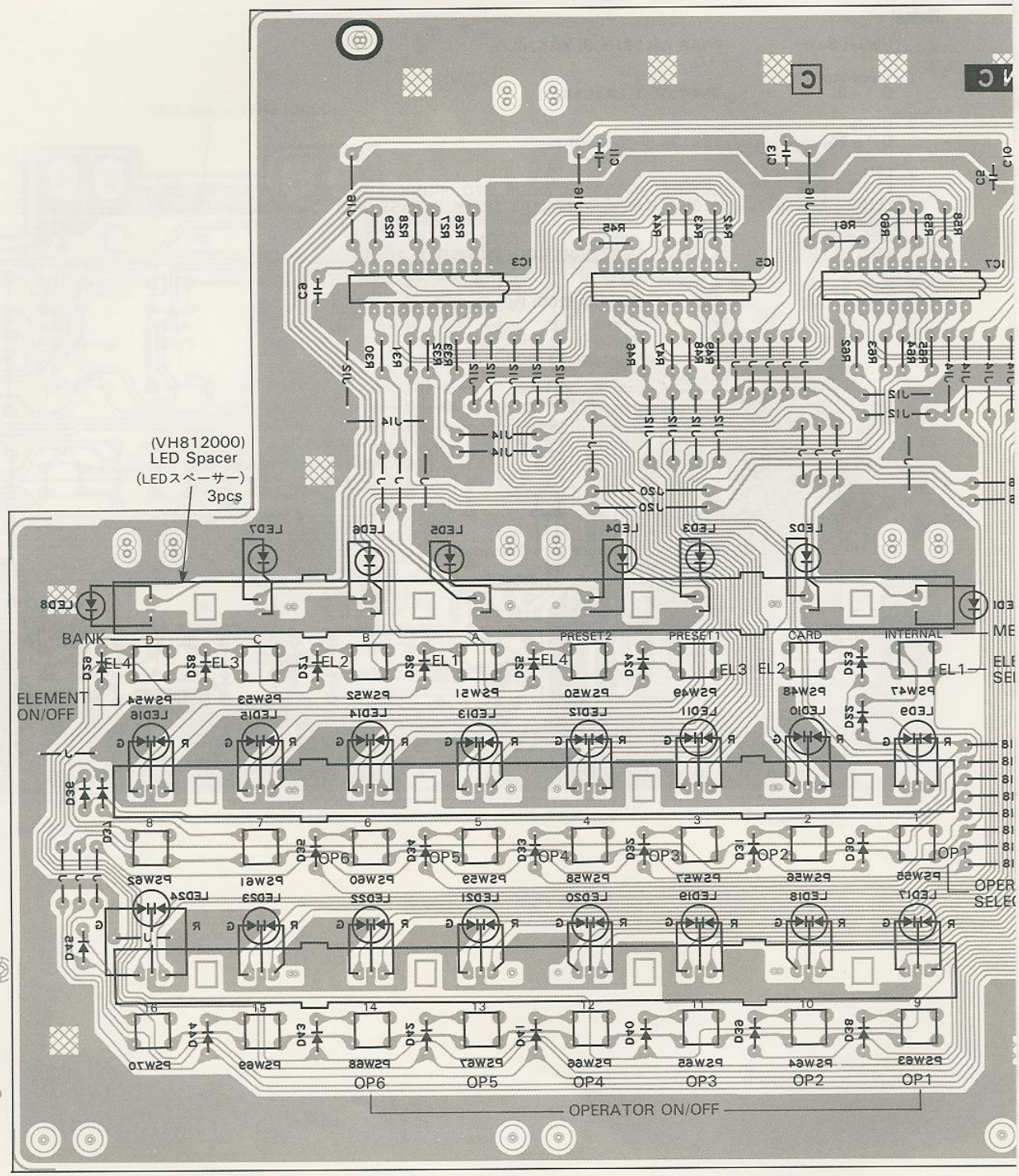
5. Push Switch
   PSW 1~25: SOA-111HS (VF946200) Panel switches

6.

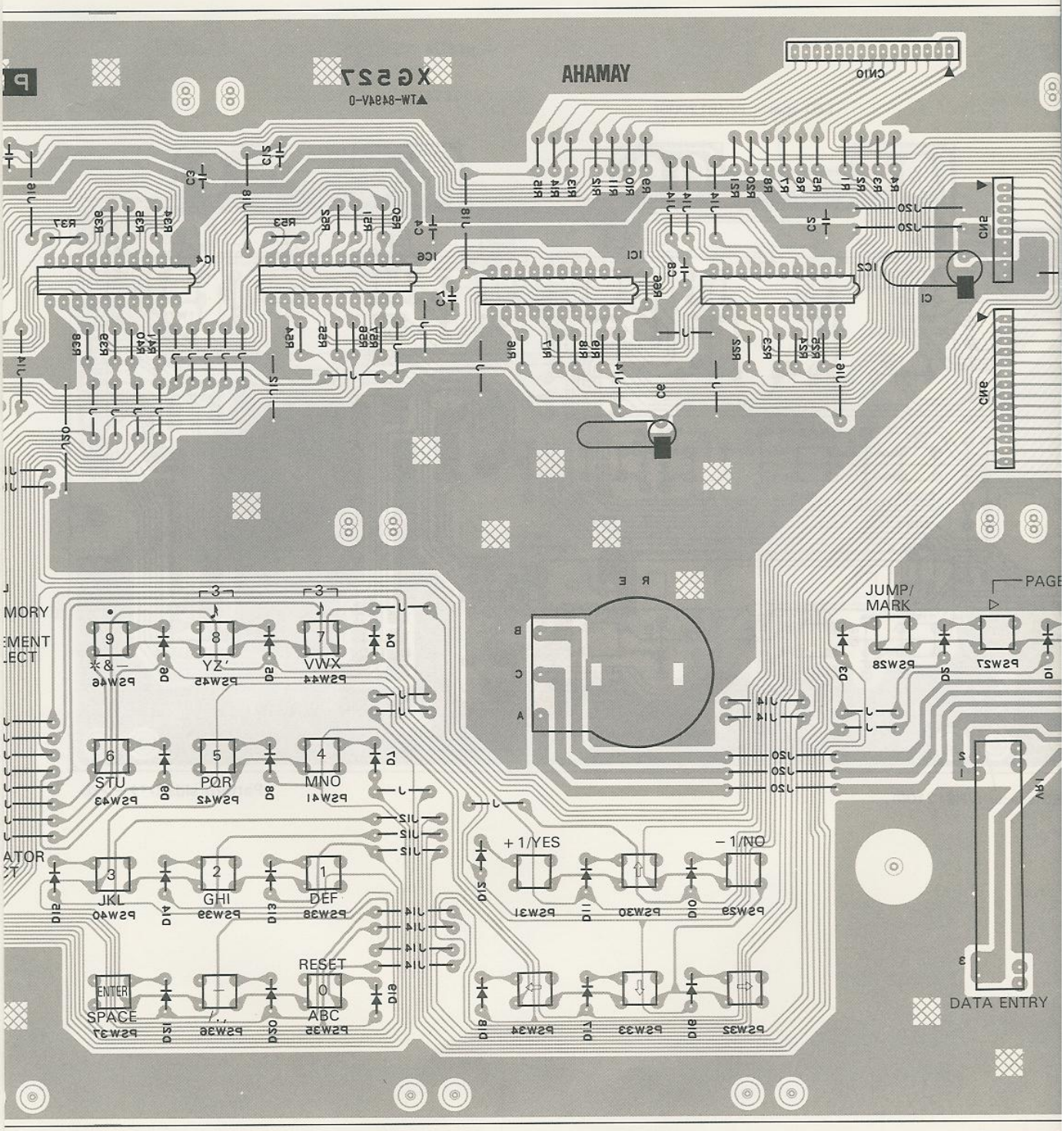


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● PNC Circuit Board

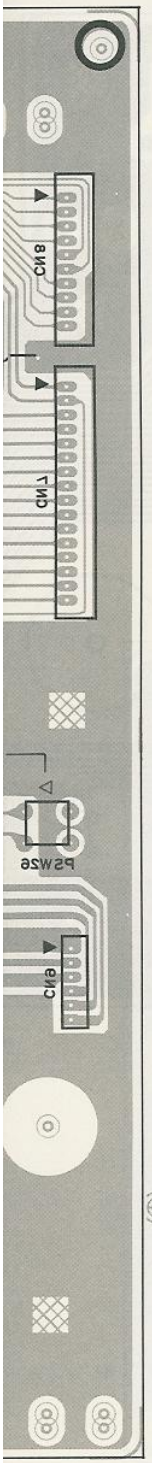


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Pattern si

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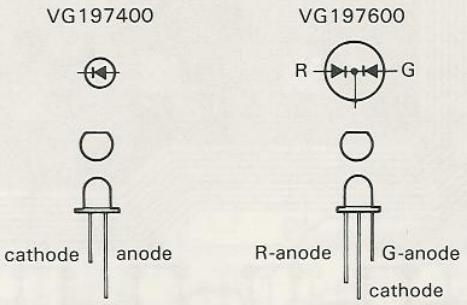


le (パターン側)

Notes)

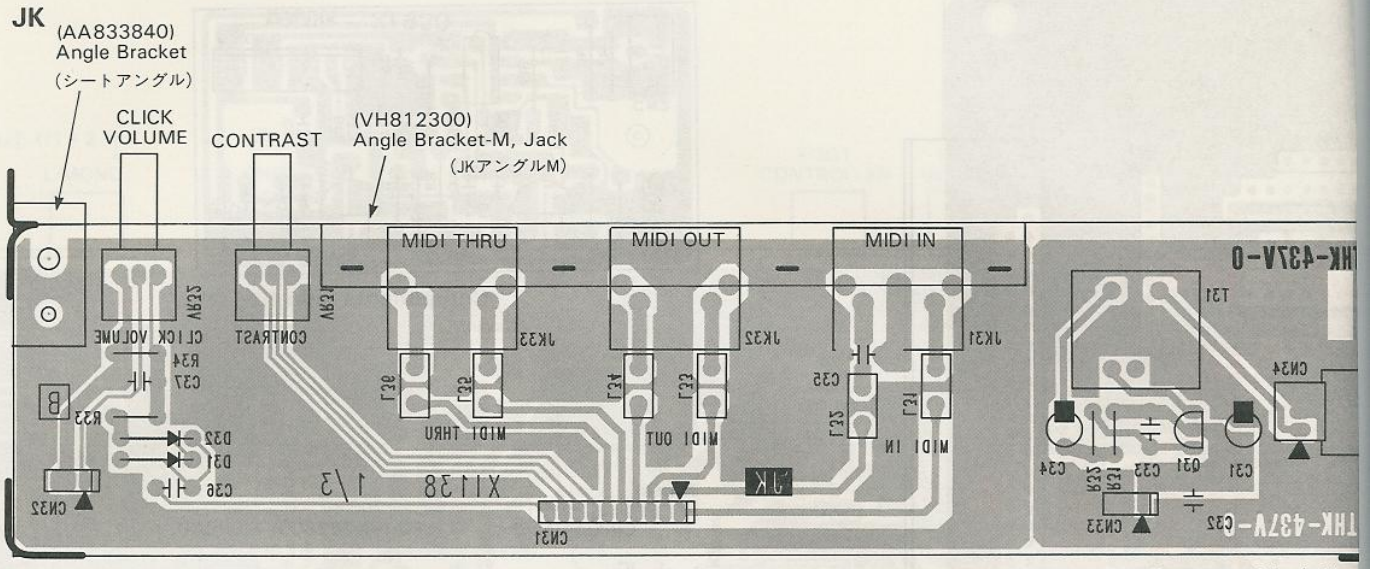
Circuit Board: PNC (VK261800) XG527C0

1. IC
   IC 1～7: SN74HC273N (IR027350) DFF OCTAL
2. Diode
   D 1～45: 1SS133 (IF003450)
3. LED
   LED 1～8: GL3HD18 RE (VG197400) MEMORY, BANK
   LED 9～24: GL3ED8 (VG197600) Voice select (1～16)
4. Slide Pot.
   VR 1: B10K EWA-NFOC (VC250600) DATA ENTRY
5. Semiconductive Cera. Cap.
   C 2～5: 0.1μ 25V Z (VC694800)
6. Rotary Switch
   RE: EC24B30D (VB436400) Data entry Dial
7. Push Switch
   PSW26～70: SOA-111HS (VF946200) Panel switches
8.



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● JK Circuit Boards

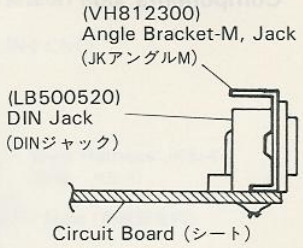


Pattern side (パター

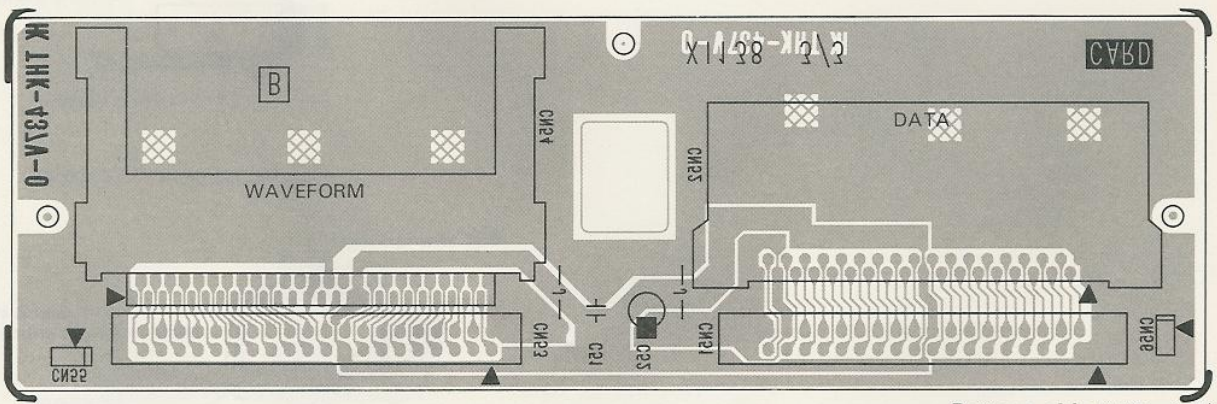
Notes)

Circuit Board: JK (JK) (NX809690) XI138D0

1. Transistor
   Q31: 2SC945A PA (IC094530)
2. Diode
   D31, 32: 1SS133 (IF003450)
3. Variable Resistor
   VR31: B1K EVU-E2A (VI573700) CONTRAST
   VR32: A10K EVU-E (VD048800) CLICK VOLUME
4. Semiconductive Cera. Cap.
   C32, 35: 0.1μ 25V Z (VC694800)
5. DC/AC Inverter Transformer
   T31: D32-49A (VK458100)
6. Coil
   L31～36: 20μH FL5R200QN (VB835000)
7. DIN Jack
   JK31～33: 5P TCS4650-01 (LB500520) MIDI (IN



CARD

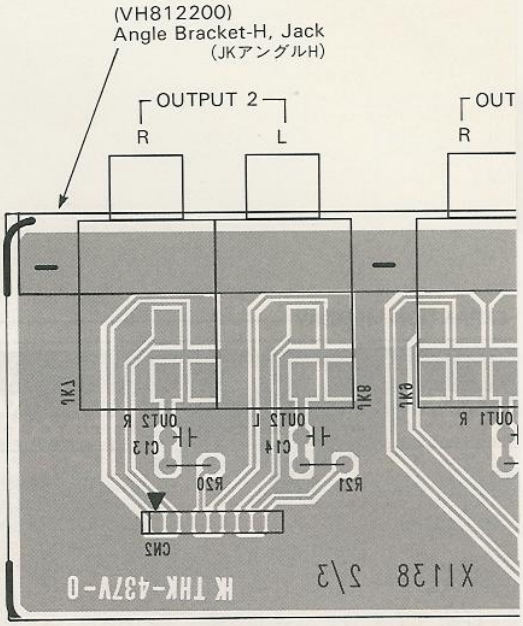


Pattern side (パターン側)

3NA1-VJ87540 ⚠2

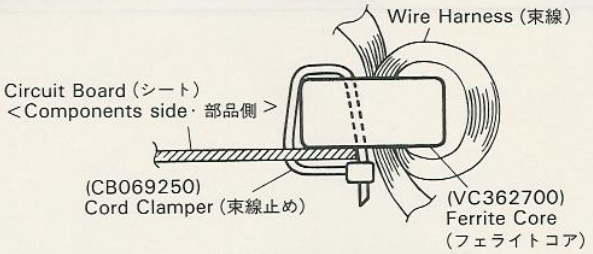
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JKB



8. Ferrite Core
FR31: FR25/15/12-1400 (VC362700)

, OUT, THRU)



Notes)

Circuit Board:

1. Coil
L 1~11:

2. Phone Jack
JK 1:
JK 2, 3:
JK 4, 5, 10:
JK 6:
JK 7, 8:
JK 9:

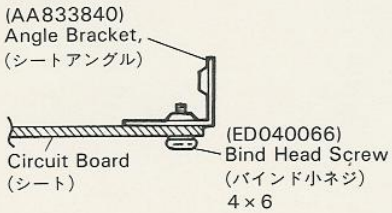
lotes)

Circuit Board: JK (CARD) (NX809710) XI138D0

1. Semiconductive Cera. Cap.
C51: 0.1μ 25V Z (VC694800)

2. Connector, IC Card
CN52: 38P IC3A-38PS-1.27D (VF821100) DATA
CN54: 50P 264D-550P-28D8 (VH985300) WAVEFORM

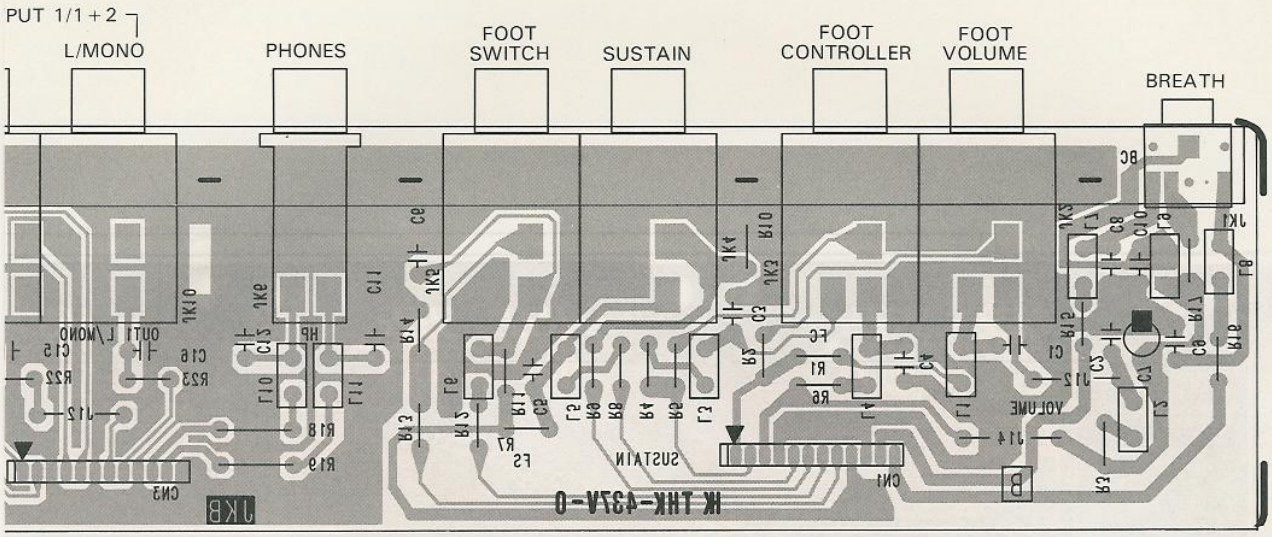
3. Angle Bracket, C.B.



3. Ferrite Core
FR 1:

Circ
<C

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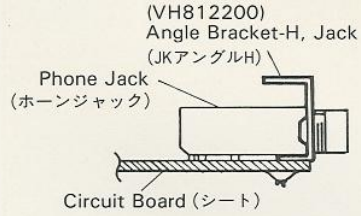


Pattern side (パターン側)

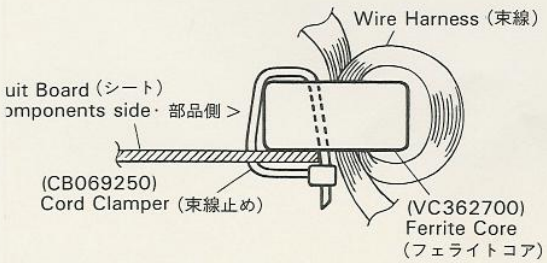
JK (JKB) (NX809700) XI138Đ0

20μH FL5R200QN (VB835000)

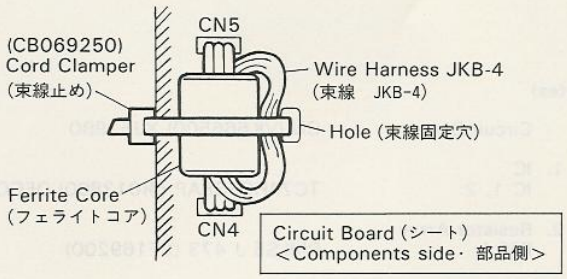
ST.MINI HSJ0912 (LB302010) BREATH
STEREO HLJ4306 (VE742200) F.VOLUME, F.CONT
MONO HLJ4306 (VE742000) SUS, F.SW, OUTP1 (L)
STEREO HLJ0521 (LB203090) PHONES
STEREO HLJ4306 (VI662400) OUTPUT 2 (L, R)
STEREO HLJ4306 (LB301780) OUTPUT 1/1+2 (R)



FR25/15/12-1400 (VC362700)

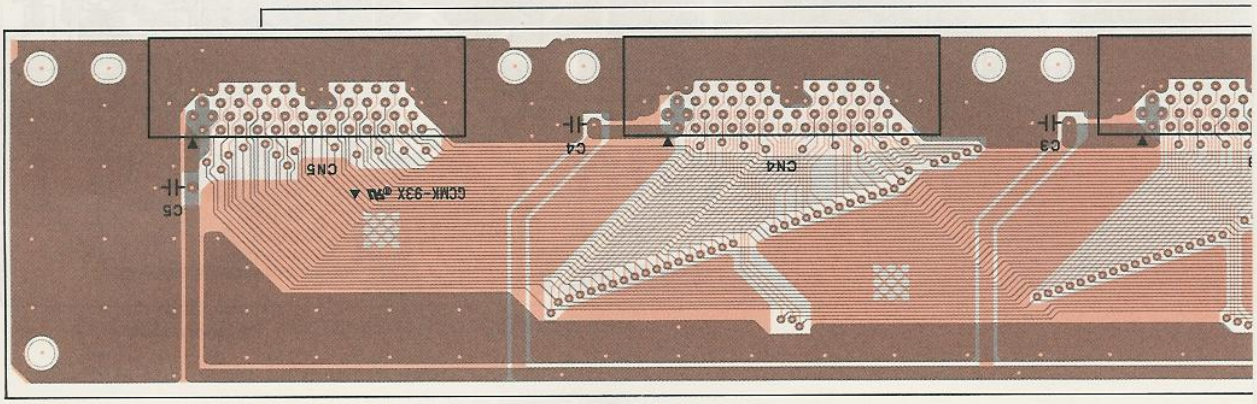


4. Connector Assembly JKB-4 (CN4-CN5)



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● CN Circuit Board

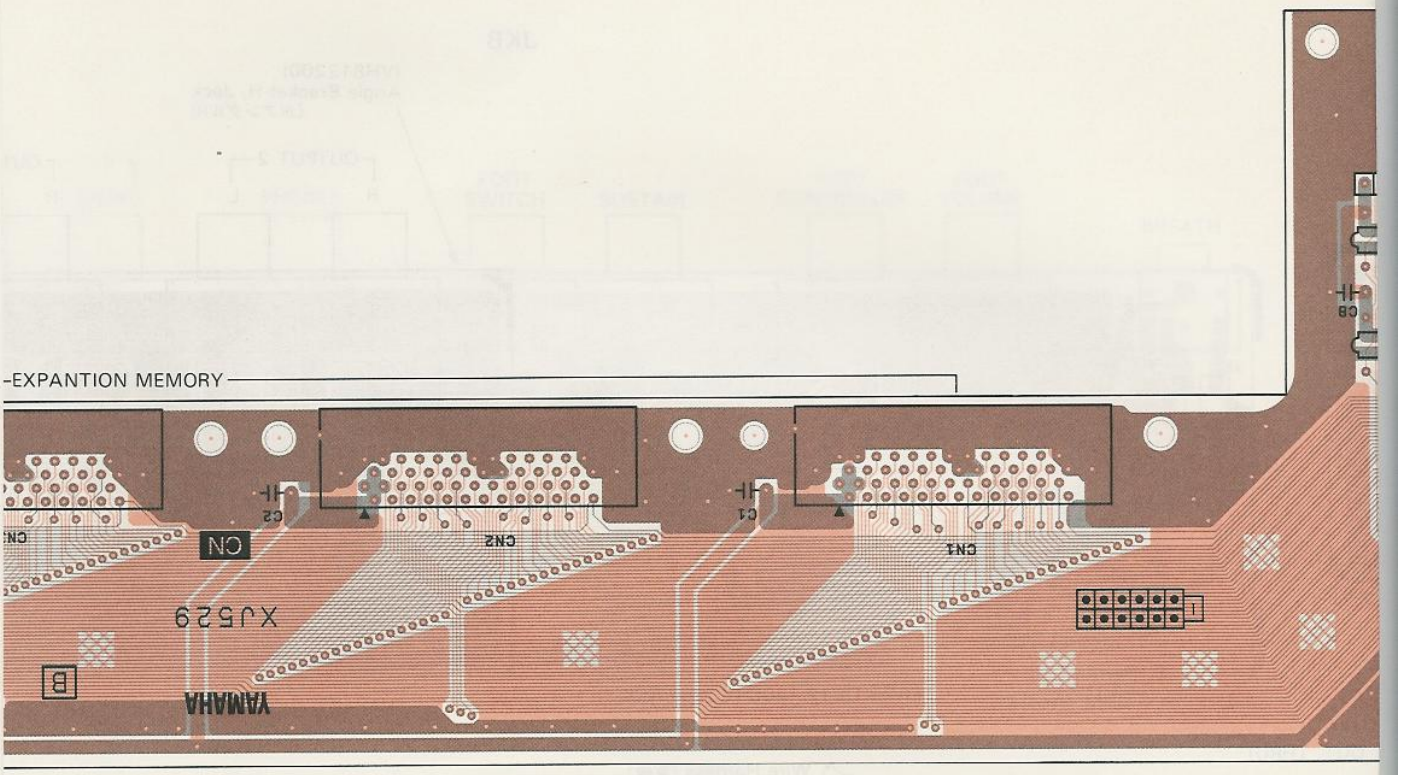


Notes)

Circuit Board: CN (VK666500) XJ529B0

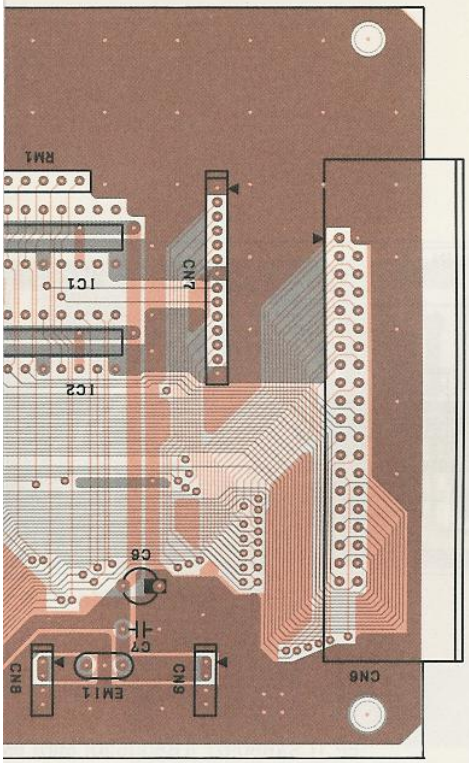
1. IC
   IC 1, 2: TC74HC138AP (IR013800) DECODER-8
2. Resistor Array
   RM 1: RMLS5 J 473 (VF169200)
3. Semiconductive Cera. Cap.
   C 1~5, 7, 8: 0.1μ 25V Z (VC694800)
4. EMI Filter
   EMI 1: DSS306-93F223Z1 (VD542700)
5. Connector
   CN 1~5: FX2 52P SE (VL347400)
   CN 6: HIF 40P SE (LB903400)

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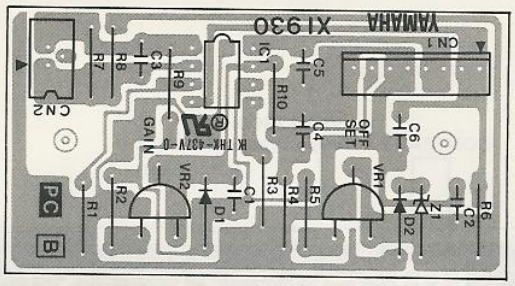


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● PC Circuit Board



Components side (部品側)



Components side (部品側)

Notes)

Circuit Board: PC (VK263600) XI930A0

1. IC
   IC 1: RC4558D-V (IG001390) OP AMP.
2. Diode
   D 1, 2: 1SS176 (VA240700)
3. Zener Diode
   Z 1: 05AZ5.1Y 5.1V (VI692000)
4. Trimmer Potentiometer
   VR 1: B5K 3P EVN (HT370250) OFFSET ADJ.
   VR 2: B100K 3P EVN (HT370260) GAIN ADJ.

CN: 3NA1-VK66650
PC: 3NA1-VK26360

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● PS Circuit Board

Notes)

Circuit Board: PS (VJ800200) XI139C0 (J)
PS (VJ800300) XI139C0 (U)
PS (VJ800400) XI139C0 (C)
PS (VJ800500) XI139C0 (H, D, A, B)

1. IC
   IC 1, 2: SI-3052V (IG136200) 5V 2A REGULATOR
   IC 3: AN78M12F (XD340001) +12V REGULATOR
   IC 4: AN79M12F (XD342001) −12V REGULATOR

2. Diode
   D 4~7: 11ES4 (VB481900)

3. Diode Stack
   D 1: D5FB20 5A 200V (IH001370)
   D 2: S4VB20 (IH001210) 2.6A 200V
   D 3: DF04M 1A 400V (VD488400)

4. Zener Diode
   Z 1, 2: MTZ6.8C 6.8V (IF010780)

5. Metal Oxide Film Resistor
   R 1: 220Ω 1W J (VC745800)

6. Ceramic Cap.
   C 1: 0.01μ 400V (FI494100)
   C 2, 3: 2200P 400V (FI383220)
   C 4, 5: 4700P 400V (FI383470) (H, D, A, B only)

7. Electrolytic Cap.
   C10, 11, 19: 10000μ 16V (UJ63A100)
   C27: 1000μ 25V (UJ649100)
   C29: 2200μ 25V (UJ649220)

8. Semiconductive Cera. Cap.
   C12, 13, 20, 21, 28, 30, 31, 33: 0.1μ 25V Z (VC694800)

9. Coil
   L 1: 3mH PLA3021A (GD900760)

10. Push Switch
    SW 1: ESB-8236V JUCS (VF576000) POWER

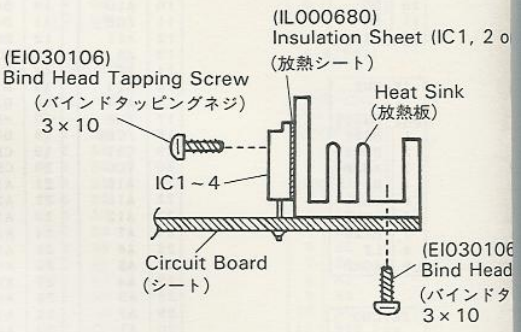
11. Fuse
    F 1 (J): T 5A 250V (KB000400)
    (U, C): T 5A 250V (KB002590)
    (H, D, A, B): T5A 250V S (KB000780)
    F 2 (U only): T 3A 250V (KB002650)
    F 3 (J): T 2.5A 250V (KB000420)
    (U, C): T 2.5A 250V (KB002680)
    (H, D, A, B): T2.5A 250V S (KB000690)

12. Jumper Wire & Fuse Label

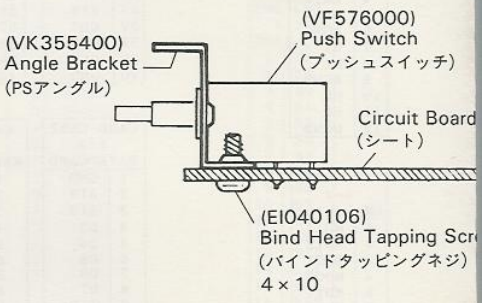
	J1	J2	Fuse Label
J	○	○	×
U	○	×	○
C	○	○	×
H, D, A, B	×	○	×

(○: installed ×: not installed)

13.



14.

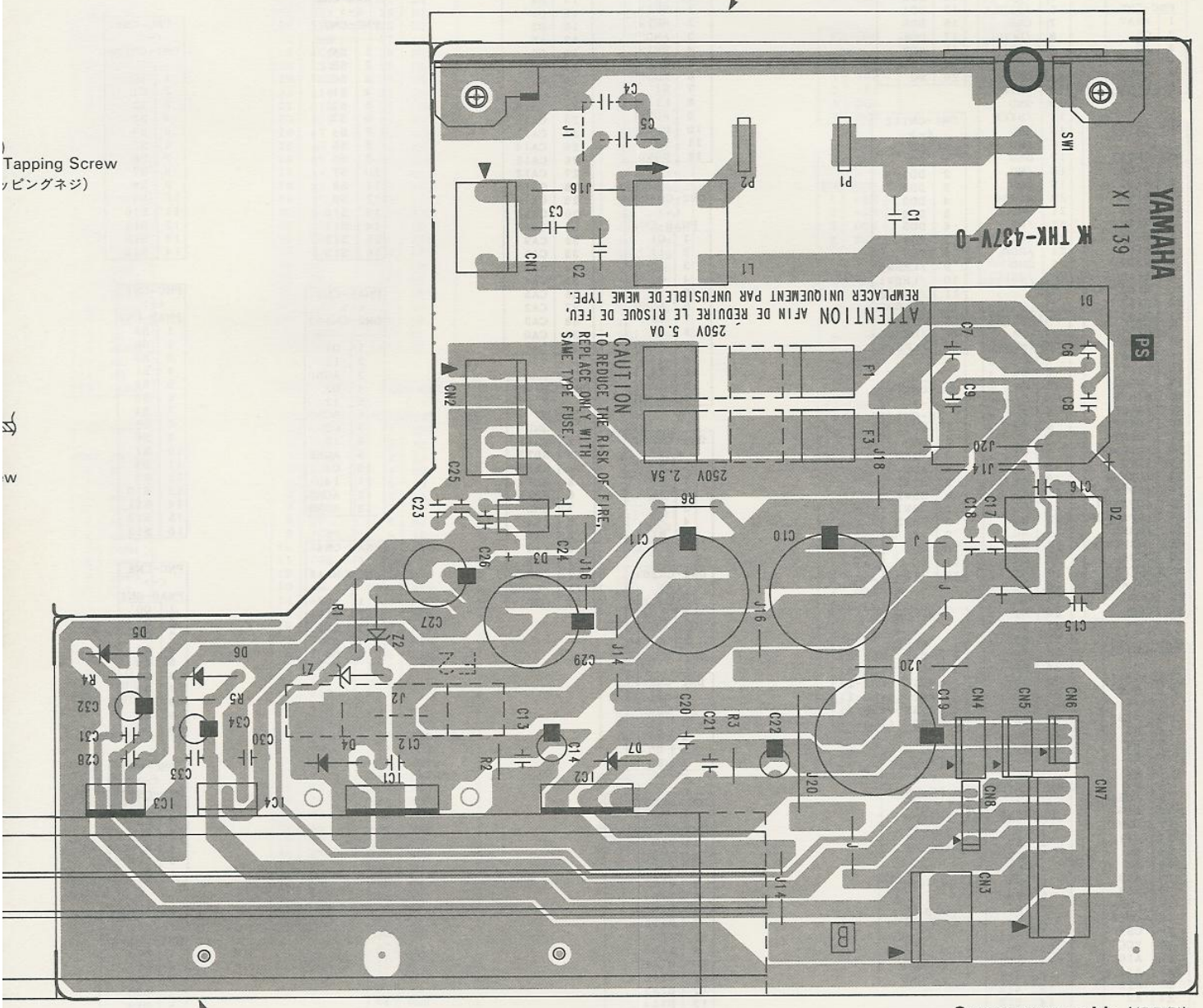


3NA1-VJ80020 ⚠5

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(VK355400)
Angle Bracket, Power Sw.
(PSアングル)

Tapping Screw
(タッピングネジ)



Heat Sink (放熱板)

Components side (部品側)

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• DM1

DM1-CN101 <-> JK-CN31	
1	MDI1
2	MDI2
3	MDO1
4	MDO2
5	MDT1
6	MDT2
7	CON1
8	CON2
9	CON3
10	CLI

DM1-CN102 <-> PNC-CN9	
1	+5AV
2	CS
3	AG
4	A
5	COM
6	B

DM1-CN103 <-> DM2-CN207	
1	B1D0
2	B1D1
3	B1D2
4	B1D3
5	B1D4
6	B1D5
7	B1D6
8	B1D7
9	B1A0
10	B1A1
11	B1A2
12	B1A3
13	B1A4
14	B1A5
15	B1A6
16	B1A7
17	/RES2
18	B1R/W
19	/B1RD
20	/B1WR
21	/DDM2
22	/IRQM3
23	IBT2
24	/DEMG2
25	/DOPS3
26	/DPANFM
27	/DPANPCM
28	/M3FM
29	/M3PCM
30	FMSEL
31	/CTS2
32	ANLATCH
33	GND
34	GND

DM1-CN104 <-> CARD-CN51	
1	GND
2	A17
3	A18
4	D3
5	D4
6	D5
7	D6
8	D7
9	/CE1
10	A10
11	/OE
12	A11
13	A9
14	A8
15	A13
16	A14
17	/WE
18	/CE2
19	CST
20	VCC
21	A16
22	A15
23	A12
24	A7
25	A6
26	A5
27	A4
28	A3
29	A2
30	A1
31	A0
32	D0
33	D1
34	D2
35	MR
36	A19
37	CBT
38	GND
39	GND
40	GND

DM1-CN105 <-> CN-CN9	
1	FD+5
2	FD+5
3	FDG
4	FDG

DM-CN106 <-> FDD-CN	
1	+5V
2	/INDEX
3	+5
4	/DSEL0
5	+5V
6	/DSEL1
7	GND
8	/DCHG
9	GND
10	/MTON
11	GND
12	/DIRC
13	GND
14	/STEP
15	GND
16	/WD
17	GND
18	/WG
19	GND
20	/TR00
21	GND
22	/WP
23	GND
24	/RDD
25	GND
26	/SSEL

DM1-CN107 <-> MK2-CN1	
1	C#
2	D
3	D#
4	E
5	F
6	F#
7	G
8	G#
9	A
10	A#
11	B
12	C
13	NC
14	NC
15	M0
16	B0
17	M1
18	B1
19	M2
20	B2
21	M3
22	B3
23	M4
24	B4
25	M5
26	B5
27	M6
28	B6
29	NC
30	NC

DM1-CN108 <-> PNC-CN6	
1	S0
2	S1
3	S2
4	S3
5	S4
6	S5
7	S6
8	S7
9	S8
10	S9
11	S10
12	S11
13	S12
14	S13

DM1-CN110 <-> PNC-CN5	
1	SA
2	SB
3	SC
4	SD
5	SE

DM1-CN111 <-> LCD-CN1	
1	FGND
2	GND
3	VDD1
4	VEE
5	NWR1
6	/B1RD
7	/LCD
8	B1A0
9	NC
10	/RES1
11	DD0
12	DD1
13	DD2
14	DD3
15	DD4
16	DD5
17	DD6
18	DD7
19	+5
20	NC

DM1-CN112 <-> PNC-CN10	
1	DD0
2	DD1
3	DD2
4	DD3
5	DD4
6	DD5
7	DD6
8	DD7
9	/LEDW0
10	/LEDW1
11	/LEDW2
12	/LEDW3
13	/LEDW4
14	/LEDW5
15	/LEDW6

DM1-CN114 <-> JK-CN1	
1	FVOL
2	FC
3	+5AD
4	ADG
5	SSW1
6	SSW2
7	FSW1
8	FSW2
9	+5
10	GND
11	BC
12	-12

DM1-CN115 <-> WHEEL		
1	+5AD	(VR3-3)
2	PB	(VR1-2)
3	MW1	(VR2-2)
4	MW2	(VR3-2)
5	2.5V	(VR3-4)
6	ADG	(VR3-1)

DM1-CN116 <-> PC-CN1	
1	AT
2	A00
3	+12
4	-12

DM1-CN117 <-> PNAB-CN4	
1	+5
2	Q10
3	Q11
4	Q12
5	GND

DM1-CN119 <-> PS-CN7	
1	+5AD
2	+5A
3	DGA
4	DGA
5	+12
6	ADG
7	-12

• DM2

DM2-CN201 <-> JK-CN2	
1	BR21
2	BR22
3	AGND
4	R2
5	BL21
6	AGND
7	BL22
8	L2
9	AGND

DM2-CN202 <-> JK-CN3	
1	BR11
2	BR12
3	ANG
4	BR13
5	BR14
6	AGND
7	R1
8	L1
9	AGND
10	HL
11	HR
12	HGND

DM2-CN203 <-> PNAB-CN3	
1	O1
2	I1
3	AGND
4	O2
5	I2
6	AGND
7	O3
8	I3
9	AGND
10	O4
11	I4
12	AGND
13	AGND

DM2-CN204 <-> PS-CN8	
1	+12
2	AG
3	AG
4	-12
5	MT

DM2-CN205 <-> JK-CN32	
1	CLI
2	NC
3	AGND

DM2-CN206 <-> PS-CN3	
1	+5
2	+5
3	DG
4	DG

DM2-CN207 <-> DM1-CN103	
1	B1D0
2	B1D1
3	B1D2
4	B1D3
5	B1D4
6	B1D5
7	B1D6
8	B1D7
9	B1A0
10	B1A1
11	B1A2
12	B1A3
13	B1A4
14	B1A5
15	B1A6
16	B1A7
17	/RES2
18	B1R/W
19	/B1RD
20	/B1WR
21	/DDM2
22	/IRQM3
23	IBT2
24	/DEMG2
25	/DOPS3
26	/DPANFM
27	/DPANPCM
28	/M3FM
29	/M3PCM
30	FMSEL
31	/CTS2
32	ANLATCH
33	GND
34	GND

DM2-CN208 <-> CN-CN6	
1	D15
2	GND
3	D13
4	D14
5	D11
6	D12
7	D9
8	D10
9	D7
10	D8
11	D5
12	D6
13	D3
14	D4
15	D1
16	D2
17	+5
18	D0
19	CE
20	CST
21	CA18
22	CA19
23	CA16
24	CA17
25	CA14
26	CA15
27	CA12
28	CA13
29	CA10
30	CA11
31	CA8
32	CA9
33	CA6
34	CA7
35	CA4
36	CA5
37	CA2
38	CA3
39	CA0
40	CA1

DM2-CN209 <-> CN-CN7	
1	GND
2	SBT1
3	SBT2
4	SBT3
5	SBT4
6	SBT5
7	GND
8	/Y4
9	/Y5
10	/IC
11	/OE
12	/MSBW
13	/LSBW
14	GND

• PNAB

PNAB-CN1 <-> PNC-CN8	
1	Q0
2	Q1
3	Q2
4	Q3
5	Q4
6	Q5
7	Q6
8	Q7
9	Q8
10	Q9

PNAB-CN2 <-> PNC-CN7	
1	SA
2	SB
3	S0
4	S1
5	S2
6	S3
7	S4
8	S5
9	S6
10	S7
11	S8
12	S9
13	S10
14	S11
15	S12
16	S13

PNAB-CN3 <-> DM2-CN203	
1	O1
2	I1
3	AGND
4	O2
5	I2
6	AGND
7	O3
8	I3
9	AGND
10	O4
11	I4
12	AGND
13	AGND

PNAB-CN4 <-> DM1-CN117	
1	+5V
2	Q10
3	Q11
4	Q12
5	DG

• PNC

PNC-CN5 <-> DM1-CN110 PS-CN4	
1	SA
2	SB
3	SC
4	SD
5	SE
6	+5V
7	-
8	DG
9	-

(1-5:DM1 6-9:PS1)

PNC-CN6 <-> DM1-CN108	
1	S0
2	S1
3	S2
4	S3
5	S4
6	S5
7	S6
8	S7
9	S8
10	S9
11	S10
12	S11
13	S12
14	S13

PNC-CN7 <-> PNAB-CN2	
1	SA
2	SB
3	S0
4	S1
5	S2
6	S3
7	S4
8	S5
9	S6
10	S7
11	S8
12	S9
13	S10
14	S11
15	S12
16	S13

PNC-CN8 <-> PNAB-CN1	
1	Q0
2	Q1
3	Q2
4	Q3
5	Q4
6	Q5
7	Q6
8	Q7
9	Q8
10	Q9

PNC-CN9 <-> DM1-CN102	
1	+5AV
2	CS
3	AG
4	A
5	COM
6	B

PNC-CN10 <-> DM1-CN112	
1	DD0
2	DD1
3	DD2
4	DD3
5	DD4
6	DD5
7	DD6
8	DD7
9	/LEDW0
10	/LEDW1
11	/LEDW2
12	/LEDW3
13	/LEDW4
14	/LEDW5
15	/LEDW6

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• JK

JK-CN1 <-> DM1-CN114	
1	FVL
2	FC
3	+5AD
4	AG
5	SSW1
6	SSW2
7	FSW1
8	FSW2
9	+5
10	DG
11	BC
12	-12

JK-CN2 <-> DM2-CN201	
1	BR21
2	BR22
3	AGND
4	R2
5	BL21
6	AGND
7	BL22
8	L2
9	AGND

JK-CN3 <-> DM2-CN202	
1	BR11
2	BR12
3	ANG
4	BR13
5	BR14
6	AGND
7	R1
8	L1
9	AGND
10	HL
11	HR
12	HGND

JK-CN31 <-> DM1-CN101	
1	MDI1
2	MDI2
3	MDO1
4	MDO2
5	MDT1
6	MDT2
7	CON1
8	CON2
9	CON3
10	CL1

JK-CN32 <-> DM2-CN205	
1	CLO
2	AGND
3	AGND

JK-CN33 <-> PS-CN6	
1	+5
2	GND
3	GND

JK-CN34 <-> LCD	
1	AC
2	GND
3	GND

• CARD

CARD-CN51 <-> DM1-CN104	
1	GND
2	A17
3	A18
4	D3
5	D4
6	D5
7	D6
8	D7
9	/CE1
10	A10
11	/OE
12	A11
13	A9
14	A8
15	A13
16	A14
17	/WE
18	/CE2
19	CST
20	VCC
21	A16
22	A15
23	A12
24	A7
25	A6
26	A5
27	A4
28	A3
29	A2
30	A1
31	A0
32	D0
33	D1
34	D2
35	MR
36	A19
37	CBT
38	GND
39	GND
40	GND

CARD-CN53 <-> DM2-CN208	
1	D15
2	GND
3	D13
4	D14
5	D11
6	D12
7	D9
8	D10
9	D7
10	D8
11	D5
12	D6
13	D3
14	D4
15	D1
16	D2
17	+5
18	D0
19	CE
20	CST
21	A19
22	A20
23	A17
24	A18
25	A15
26	A16
27	A13
28	A14
29	A11
30	A12
31	A9
32	A10
33	A7
34	A8
35	A5
36	A6
37	A3
38	A4
39	A1
40	A2

CARD-CN52 <-> DATA CARD	
1	GND
2	A17
3	A18
4	D3
5	D4
6	D5
7	D6
8	D7
9	/CE1
10	A10
11	/OE
12	A11
13	A9
14	A8
15	A13
16	A14
17	/WE
18	/CE2
19	CST
20	VCC
21	A16
22	A15
23	A12
24	A7
25	A6
26	A5
27	A4
28	A3
29	A2
30	A1
31	A0
32	D0
33	D1
34	D2
35	MR
36	A19
37	CBT
38	GND

CARD-CN54 <-> WAVEFORM CARD	
1	GND
2	A1
3	A2
4	A3
5	A4
6	A5
7	A6
8	A7
9	A8
10	A9
11	A10
12	A11
13	A12
14	A13
15	A14
16	A15
17	A16
18	A17
19	A18
20	A19
21	A20
22	NC
23	/WE
24	/RAM/ROM
25	CE1
26	CE2
27	/WPROT
28	/OE
29	CST
30	VBB
31	VCC
32	VCC
33	VPP
34	D0
35	D1
36	D2
37	D3
38	D4
39	D5
40	D6
41	D7
42	D8
43	D9
44	D10
45	D11
46	D12
47	D13
48	D14
49	D15
50	GND

• CN

CN-CN6 <-> CARD-CN53 DM2-CN208	
1	D15
2	GND
3	D13
4	D14
5	D11
6	D12
7	D9
8	D10
9	D7
10	D8
11	D5
12	D6
13	D3
14	D4
15	D1
16	D2
17	+5
18	D0
19	CE
20	CST
21	CA18
22	CA19
23	CA16
24	CA17
25	CA14
26	CA15
27	CA12
28	CA13
29	CA10
30	CA11
31	CA8
32	CA9
33	CA6
34	CA7
35	CA4
36	CA5
37	CA2
38	CA3
39	CA0
40	CA1

CN-CN7 <-> DM2-CN209	
1	GND
2	SBT1
3	SBT2
4	SBT3
5	SBT4
6	SBT5
7	GND
8	/Y4
9	/Y5
10	/IC
11	/OE
12	/MSBW
13	/LSBW
14	GND

CN-CN8 <-> PS-CN5	
1	+5B
2	+5B
3	DGB
4	DGB

CN-CN9 <-> DM1-CN105	
1	FD+5
2	FD+5
3	FDG
4	FDG

• PC

PC-CN1 <-> DM1-CN116	
1	-12
2	-12
3	+12
4	+12
5	E
6	E
7	SO
8	E

• PS

PS-CN1 <-> P.T.	
1	AC1
2	NC
3	NC
4	AC2

PS-CN2 <-> P.T.	
1	+A1
2	+A2
3	+B1
4	AE
5	+B2

PS-CN3 <-> DM2-CN206	
1	+5A
2	+5A
3	DGA
4	DGA

PS-CN4 <-> PNC-CN5	
1	+5B
2	+5B
3	DGB
4	DGB

PS-CN5 <-> CN-CN8	
1	+5B
2	+5B
3	DGB
4	DGB

PS-CN6 <-> JK-CN3	
1	+5B
2	DGB
3	DGB

PS-CN7 <-> DM1-CN119	
1	+5AD
2	+5AD
3	DGA
4	DGA
5	+12
6	ADG
7	-12

PS-CN8 <-> DM2-CN204	
1	+12
2	AG
3	AG
4	-12
5	MT

• MK1

MK1-CN1 <-> MK2-CN1	
1	C#
2	D
3	D#
4	E
5	F
6	F#
7	G
8	G#
9	A
10	A#
11	B
12	C
13	NC
14	NC
15	M0
16	B0
17	M1
18	B1
19	M2
20	B2

• MK2

MK2-CN1 <-> MK1-CN1	
1	C#
2	D
3	D#
4	E
5	F
6	F#
7	G
8	G#
9	A
10	A#
11	B
12	C
13	NC
14	NC
15	M0
16	B0
17	M1
18	B1
19	M2
20	B2
21	M3
22	B3
23	M4
24	B4
25	M5
26	B5
27	M6
28	B6
29	NC
30	NC

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■TEST PROGRAM

VERSION DISPLAY MODE

In order to verify the ROM versions of the SY99, you may want to initiate the Version Display Mode. To initiate this mode press and hold the [Voice], the [INTERNAL], and the [1] switches then the versions of the MAIN ROM and SEQUENCE (SEQ) ROM will be displayed. Press [EXIT] to return to the main program.

A. HOW TO ENTER THE TEST PROGRAM

Turn on the power switch of the SY99 and wait until the LCD has initialized and displays a normal operating mode message. While pressing the [VOICE] switch, press and hold the [BANK D] switch then the [8] switch. The SY99 will run the INITIAL TEST routine (refer to the INITIAL TEST section for details) and indicate that you have entered the Test Program by displaying the following message.

```
*** SY99 TEST Ver #.## *** Please Select

  Main ROM : Version #.#    1990-10-??
  SEQ. ROM : Version #.#    1990-10-??

    [-1] : AUTO          [+1] : MANUAL

  [COPY] : Fact.set    [EXIT] : Exit
```

Use the [−1], [+1], [COPY], or [EXIT] panel switches to select the appropriate test mode. If you press [−1], the auto test mode will be initiated. If you press [+1], the MANUAL test mode will be initiated. If you press [COPY], the SY99 will execute Test 49, ''49. Factory settings'', and then automatically exit the test mode and return to play mode (refer to Test 49 for details).
If you press [EXIT], you will exit the test mode and return to the play mode. The MANUAL mode is the preferred method of running the test program because it allows you to select or jump to any test and execute it. AUTO mode automatically executes each test in a fixed order. Some of the tests in the AUTO mode are automatically executed due to the nature of the test. In the AUTO mode simply press the [+1] switch to exit and automatically execute the next test or press [EXIT] to abort the test, then press [+1] to automatically execute the next test.

B. PROCEEDING THROUGH THE TESTS

(**MOST OF THESE FUNCTIONS MAINLY PERTAIN TO THE MANUAL TEST MODE**)
When you enter the test program, the following display will appear.

```
*** SY99 TEST Ver #.## *** MODE : MANUAL


 * 01 : ROM CHECK
   02 : RAM Read/Write
   03 : SEQENCER ROM
   04 : SEQENCER RAM
   05 : RAM Battery
```

Use the [+1], [−1], [ENTER], [COPY], [PAGE+], [PAGE−], [EXIT], or the numeric key pad, or the rotary encoder to move through the various tests of the test program.
Pressing: [+1] will execute the test which follows the current test.
[−1] will execute the test which precedes the current test.
[ENTER] will execute the currently selected test.
[PAGE+] will select the test which follows the current test and displays the test items.
[PAGE−] will select the test which precedes the current test and displays the test items.
[EXIT] will execute Test 50, ''50. EXIT'' (refer to Test 50 for details).

The numeric keys 0 through 9 of the entry pad can be used to enter a two-digit number to directly select a test. Simply enter the number and then press the [ENTER] switch. For example, if you would like to select TEST 6, press [0], [6] then press the [ENTER] switch.

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TEST SELECTION WHEN AN ERROR IS DETECTED

In each of the following tests listed below, if an NG (No Good) error is detected, the following operations of the test will make the SY99 wait for the entry of a test number. You can then retry the test or perform another test. If you press [EXIT], the SY99 will wait for the entry of a test number.

9. Panel switches	10. Pitch bend	11. Modulation wheel 1
12. Modulation wheel 2	13. Data entry	14. Rotary encoder
15. Keyboard	16. Aftertouch	17. MIDI IN/OUT/THRU
18. Card insert	20. Card protect switch	22. Wave card insert
26. Disk eject	27. Breath controller	28. Foot volume
29. Foot controller	30. Sustain switch	31. Foot switch
48. Jacks all off		

INITIAL TEST

The following tests will be performed automatically when the test program is initiated.

A. Read/write check for the RAM work area of CPU (IC128) of the DM1 circuit board.
B. Checks the interrupt levels of both M3 ICs (IC256 & IC257) of the DM2 circuit board.

DISPLAY OF TEST RESULTS

If each test checks OK then the Test program proceeds to the Test Program entry display.
If Test A is NG the RAM WORK AREA may be at fault and the display will indicate:

```
** IC128(RAM) ERROR,TEST CONTINUE? **
```

If Test B is NG then the error may be related to one of the M3 IC's IRQ levels.
The display will indicate the error by showing the following message:

```
* M3 IRQ CHECK ERROR,TEST CONTINUE? *
```

EXITING THE TEST

This test automatically proceeds to the Test Program entry display if the items under test are OK.
If an error message occurs press [YES] to exit the test.
However, a RAM ERROR may not allow the SY99 to function normally.

TEST PROGRAM TEST 1 – 50 (MANUAL MODE OPERATION)

1. TEST 1: SYSTEM ROM TEST

```
* 01: ROM CHECK
```

Performs a read test on the ROM for the following addresses.

IC111 : 80000h – 8000Fh	IC111 : A0000h – A000Fh
IC111 : C0000h – C000Fh	IC111 : E0000h – E000Fh
IC112 : 60000h – 6000Fh	IC113 : 10000h – 1000Fh

(This test checks only 16 bytes.)

DISPLAY OF TEST RESULTS

OK

```
* 01: ROM CHECK                    OK
```

or

NG

```
* 01: ROM CHECK          n:ICxxx    NG
```

(where n = ROM # and xxx = IC #)

TEST END

Ends after displaying the results.

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2. TEST 2: SYSTEM RAM TEST

```
* 02: RAM Read/Write
```

Performs a read/write test of RAM on the following addresses.
IC119 : 40000h – 5FFFh IC115 : 30000h – 37FFFh

DISPLAY OF TEST RESULTS

OK

```
* 02: RAM Read/Write                    OK
```

or

NG

```
* 02: RAM Read/Write    IC119           NG
```

TEST END

Ends after displaying the results. All RAM data is preserved.

3. TEST 3: SEQUENCER ROM TEST

```
* 03: SEQENCER ROM
```

Performs a read test on the ROM (IC101) of DM1 circuit board.
IC101 : 8000h – BFFFh 7 banks (#0 – #6)
C000h – FFFFh 1 bank (#7)

DISPLAY OF TEST RESULTS

OK

```
* 03: SEQENCER ROM                      OK
```

NG

```
* 03: SEQENCER ROM                      NG
```

TEST END

Ends after displaying the results.

4. TEST 4: SEQUENCER RAM TEST

```
* 04: SEQENCER RAM
```

Performs a RAM read/write test on all addresses of IC103 (RAM 1), IC102 (RAM 2).
1. IC103 : 4000h – 5FFFh
2. IC102 : 6000h (WINDOW 0), 6200h (WINDOW 1), 6400h (WINDOW 2), 6600h (WINDOW 3)

DISPLAY OF TEST RESULTS

OK

```
* 04: SEQENCER RAM                      OK
```

NG

```
* 04: SEQENCER RAM    ICxxx             NG
```

(xxx = IC #)

TEST END

Ends after displaying the results. All RAM data is preserved.

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5. TEST 5: RAM BACKUP BATTERY TEST

```
* 05: RAM Battery
```

This test checks that the voltage of the RAM backup battery is greater than 2.9V and less than 3.3V.

DISPLAY OF TEST RESULTS

OK

```
* 05: RAM Battery     3.2V          OK
```

NG

```
* 05: RAM Battery     #.#V  Low     NG
* 05: RAM Battery     #.#V  High    NG
```

TEST END

Ends after displaying the test results.

6. TEST 6: LCD – ALL DOTS "ON" TEST

```
* 06: LCD All On
```

Check that all dots of the LCD change to black (ON) and contrust of the LCD can be controlled by the contrust volume.

DISPLAY OF TEST RESULTS

First, the display indicates "* 06 LCD All On", then all dots of the LCD change to black (ON).

TEST END

Press [EXIT] to end the test. The display shown below will appear and the SY99 will wait for you to enter a test number.

```
* 06: LCD All On
```

7. TEST 7: LCD – ALL DOTS "OFF" TEST

```
* 07: LCD All Off
```

Check that all dots change to white (OFF).

DISPLAY OF TEST RESULTS

First, the display indicates "* 07 LCD All OFF", then all dots of the LCD change to white (OFF).

TEST END

Press [EXIT] to end the test. The display shown below will appear and the SY99 will wait for you to enter a test number.

```
* 07: LCD All Off
```

8. TEST 8: LED ON/OFF TEST

```
* 08: LED Check
```

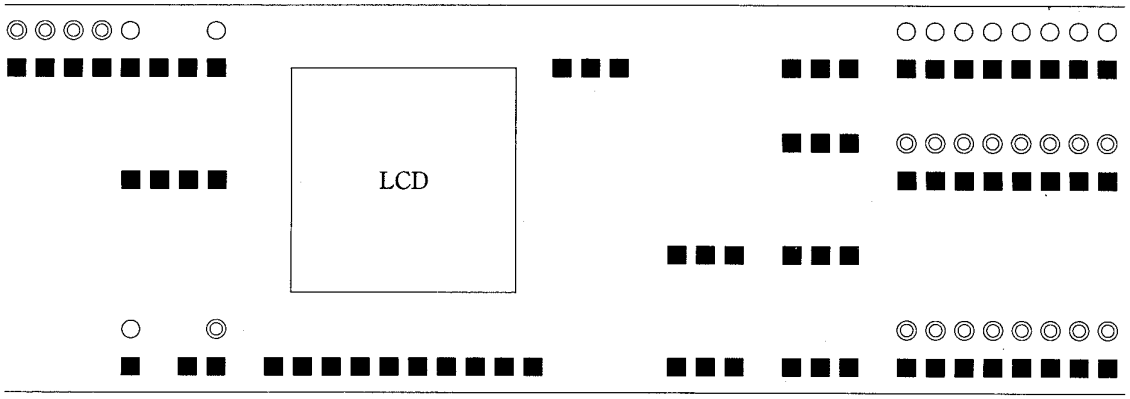
Check that each red LED blinks once in succession from the left end of the unit (refer to the diagram shown below) and then verify that all red LEDs blink together. Next, check that each green LED blinks once, and then all green LEDs blink together. The currently blinking LEDs will be displayed in the LCD as follows.

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```
* 08: LED Check          REC  RED   On
```

(e.g. The red RECORD LED is blinking)

Check that all LEDs blink. (21 of the 32 LEDs are dual-color red/green LEDs)



Note: (◎) indicates a dual-color LED. (○) indicates a single-color LED.

TEST END

Press [EXIT] to end the test. The SY99 will then be waiting for the entry of a test number.

9. TEST 9: PANEL SWITCH TEST

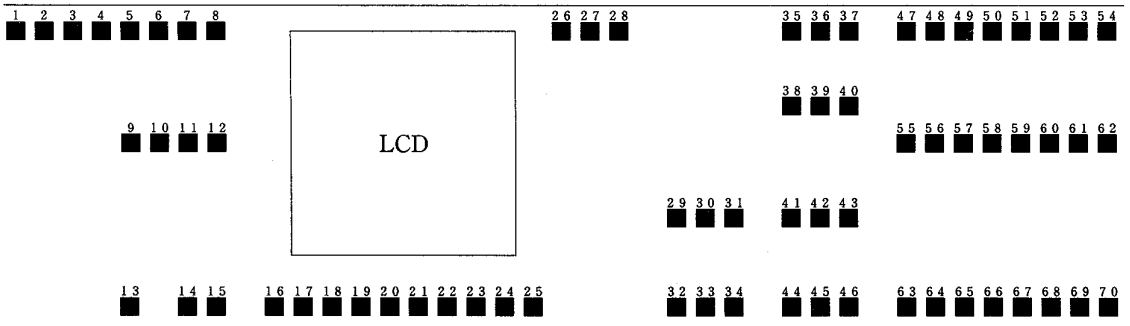
```
* 09: Panel Switch
```

Press the panel switches consecutively from the [VOICE] switch to switch [16], according to the order indicated by the LCD display.

```
* 09: Panel Switch     Push REC
```

(e.g. When checking [RECORD])

The switch pressing order is displayed in the diagram below. If the switch is OK, a beep will sound and you should proceed to test the next switch. If the wrong switch is pressed an unexpected code is sent from the PKS CPU, and the error message NG will be displayed and no sound will be heard. At this time, if the correct switch is pressed then the proper code is received. You will then be able to proceed to test the next switch. The display will indicate OK, if all switches are good.



DISPLAY OF TEST RESULTS

OK

```
* 09: Panel Switch     Push 16          OK
```

NG

```
* 09: Panel Switch     Push REC  17 Err
```


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TEST END

When switch [16] is pressed, OK is displayed and the test will end. During the test, if NG is detected, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

10. TEST 10: PITCH BEND WHEEL TEST

```
* 10: Pitch Bend      50     99
```

According to the target value displayed on the LCD, slowly move the pitch bend wheel. Check that the value changes from 50 to 99 then to 00 and back to 50 (in other words, center to top then to bottom and back to center).

```
* 10: Pitch Bend      xx     yy
```

(where xx = current pitch bend value and yy = next target value)

DISPLAY OF TEST RESULTS

OK

```
* 10: Pitch Bend      50     50     OK
```

NG

```
* 10: Pitch Bend      xx     Center NG
```

(If the pitch bend value at the beginning or end of the test is not center, then xx indicates the pitch bend value when NG was detected)

TEST END

After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

11. TEST 11: MODULATION WHEEL 1 TEST

```
* 11: Modulation Wh1 00      20-80
```

According to the target value displayed on the LCD, slowly move modulation wheel 1.
Check that the value changes from 00→20→80→99 then back down to 80→20→00 (in other words, from bottom to top the back to the bottom).

```
* 11: Modulation Wh1 xx      yy
```

```
* 11: Modulation Wh1 xx      yy-zz
```

(where xx = current value of modulation wheel 1, yy and zz are the next target values)

DISPLAY OF TEST RESULTS

OK

```
* 11; Modulation Wh1 00      00     OK
```

NG (No change in display message)

TEST END

After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

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12. TEST 12: MODULATION WHEEL 2 TEST

```
* 12: Modulation WH2  50      99
```

Before beginning this test, move modulation wheel 2 to the center position. According to the target value displayed on the LCD, slowly move modulation wheel 2. Check that the value changes from 50 to 99 then to 00 and back to 50 (in other words, from center to top then to bottom and back to center).

```
* 12: Modulation WH2  xx      yy
```

```
* 12: Modulation WH2  xx      yy-zz
```

(where xx = current value of modulation wheel 2, yy and zz are the next target values)

DISPLAY OF TEST RESULTS

OK

```
* 12: Modulation WH2  50      50      OK
```

NG (No change in display message)

TEST END

After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

13. TEST 13: DATA ENTRY SLIDER TEST

```
* 13: Data Entry      00      20-80
```

According to the target value displayed on the LCD, slowly move the data entry slider. Check that the value changes from 00→20→80→99 and the back down to 80→20→00 (in other words, from the bottom to the top and back down to the bottom).

```
* 13: Data Entry      xx      yy
```

```
* 13: Data Entry      xx      yy-zz
```

(where xx = current value of data entry, yy and zz are the next target values)

DISPLAY OF TEST RESULTS

OK

```
* 13: Data Entry      00      00      OK
```

NG (No change in display message)

TEST END

After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

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14. TEST 14: ROTARY ENCODER (DATA ENTRY WHEEL) TEST

```
* 14: R-Encorder        Right  00
```

Rotate the rotary encoder (data entry wheel) to the right as indicated by the LCD display. Check that the value on the LCD changes from Right 00→Left 00→Left 01 (in other words, first rotate to the right then to the left).

```
* 14: R-Encoder         Right  xx
```

```
* 14: R-Encoder         Left   xx
```

(where xx = current value)

DISPLAY OF TEST RESULTS

OK

```
* 14: R-Encoder         Left   01      OK
```

NG (No change in display message)

TEST END

After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

15. TEST 15: KEYBOARD TEST

```
* 15: Keyboard Check
```

Play a scale on the keyboard from E0 to G6 with a steady and even touch.

```
* 15: Keyboard Check  Push   C1
```

(e.g. in the case of C1)

If the key switch is ok, the note will sound and you should proceed to play the next key. If you play the wrong key this will produce an unexpected code to the PKS CPU and Err will be displayed. As a result the sound of that note will not be heard. However, if the right key is played following the playing of the wrong key, then correct code is received and the note for that key will sound. You can then proceed to play the next key. If all key switches are good then OK will be displayed on the LCD.

DISPLAY OF TEST RESULTS

OK

```
* 15: Keyboard Check  Push   G6      OK
```

NG

```
* 15: Keyboard Check  Push   xxx !? Err
```

(if play the wrong key)

NG

```
* 15: Keyboard Check  Push   xxx $nn NG
```

(if the initial touch was incorrect)

TEST END

When you play the G6 key and OK is displayed, the test will end.
If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

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16. TEST 16: AFTERTOUCH TEST

```
* 16: After Touch      00      20-80
```

According to the target value displayed on the LCD, press a key on the keyboard. Check that the value changes from 00→20→80→99 and back down to 80→20→00 (in other words, apply light pressure and increase pressure to a heavier touch then decrease back to a light touch).

```
* 16: After Touch      xx      yy
```

```
* 16: After Touch      xx      yy-zz
```

(where xx = the current aftertouch value, yy and zz are the next target values)

DISPLAY OF TEST RESULTS

OK

```
* 16: After Touch      00      00      OK
```

NG (No change in display message)

TEST END

After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

17. TEST 17: MIDI TEST

```
* 17: MIDI (I/O/T)
```

After connecting the MIDI IN to the MIDI OUT via a MIDI cable, execute the test. The following message will appear on the LCD.

```
* 17: MIDI (I/O/T)     Tx:yy   Rx:zz
```

TEST END

When you press [EXIT] the test will end and the SY99 will wait for a test number to be entered. If an NG error occurs, because unexpected data was received, the test will end at that point. If an NG error occurs because no data was received within a certain time, the test will continue until [EXIT] is pressed.

18. TEST 18: DATA CARD INSERT TEST

```
* 18: D-Card Insert    0
```

Insert a RAM card (MCD64) into the DATA card slot and execute the test. Check that when you remove and insert the card back into the slot, the number on the display changes from 0 to 1 and that the OK result is displayed.

DISPLAY OF TEST RESULTS

OK

```
* 18: D-Card Insert    1                OK
```

NG (No change in display message)

TEST END

After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

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19. TEST 19: DATA CARDS READ/WRITE TEST

```
* 19: D-Card R/Write
```

This performs a read/write test on the following addresses of the RAM card.
CARD 1 : 20000h – 27FFFh CARD 2 : 28000h – 2FFFFh
Insert a RAM card with the memory protect turned off and execute the test.

DISPLAY OF TEST RESULTS

OK
```
* 19: D-Card R/Write  CARD : 12      OK
```

NG
```
* 19: D-Card R/Write  CARD :  x      NG
```

(e.g. if CARD 2 is No Good)

TEST END

After displaying the results, the test will end. All card data is preserved.

20. TEST 20: DATA CARD PROTECT SWITCH TEST

```
* 20: D-Card Protect  0
```

Use a RAM card to check that the card protect switch status is being read. Check that when the switch is set from ''protect off'' to ''protect on'', the number on the display changes from 0 to 1 and that the OK result is also displayed.

DISPLAY OF TEST RESULTS

OK
```
* 20: D-Card Protect  1              OK
```

NG (No change in display)

TEST END

After displaying the result, the test will end. If NG is detected during the test, refer to section B, ''B. PROCEEDING THROUGH THE TESTS''.

21. TEST 21: RAM BACKUP BATTERY TEST

```
* 21: D-Card Battery
```

This test checks that the voltage of the RAM card backup battery.

DISPLAY OF TEST RESULTS

OK
```
* 21: D-Card Battery  #.#V          OK
```

NG
```
* 21: D-Card Battery  #.#V  Low     NG
```
```
* 21: D-Card Battery  #.#V  High    NG
```

TEST END

Ends after displaying the test results.

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22. TEST 22: WAVEFORM CARD INSERT TEST

```
* 22: W-Card Insert     0
```

Check that when a waveform card is inserted into the slot, the number on the display changes from 0 to 1 and that the OK result is displayed.

DISPLAY OF TEST RESULTS

OK
```
* 22: W-Card Insert     1                    OK
```

NG (No change in display)

TEST END

After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

23. TEST 23: WAVE ROM READ TEST

```
* 23: W-ROM Read
```

This test is utilized by the factory and it is not intented for field service use.

24. TEST 24: WAVE RAM READ/WRITE TEST

```
* 24: W-RAM
```

This performs a read/write test on the following addresses of the wave RAMs.

Internal WAVE RAM : 400000h – 43FFFFh	Expansion WAVE RAM 1 : 440000h – 47FFFFh
Expansion WAVE RAM 2 : 480000h – 4BFFFFh	Expansion WAVE RAM 3 : 4C0000h – 4FFFFFh
Expansion WAVE RAM 4 : 500000h – 53FFFFh	Expansion WAVE RAM 5 : 540000h – 57FFFFh

And then checks the voltage of the backup battery of the internal WAVE RAM and the expansion WAVE RAMs.

DISPLAY OF TEST RESULTS

OK
```
* 24: W-RAM     000000                    OK
```

NG
```
* 24: W-RAM     XORBOX                    NG
```

The LCD will indicate that the error is occured by displaying the alphabet R, B, O or X.

R : Only the read/write test is NG.	O : The read/write test and the battery check are OK.
B : Only the battery check is NG.	X : The read/write test and the battery check are NG.

TEST END

After displaying the results, the test will end. All RAM data is preserved.

25. TEST 25: DISK READ/WRITE TEST

```
* 25: Disk Read/Write
```

Use a blank disk to test the disk format. This test will write and read two types of data. Testing is performed on the following tracks.

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SIDE 0 : TRACK 40 (sector 4) – TRACK 00 (sector 1) – TRACK 79 (sector 9)
SIDE 1 : TRACK 40 (sector 4) – TRACK 00 (sector 1) – TRACK 79 (sector 9)

Insert a blank disk with the write protect off and execute the test.

DISPLAY OF TEST RESULTS

OK
```
* 25: Disk Read/Write C79:Hl Verify  OK
```

NG
```
* 25: Disk Read/Write Cyy:Hx nnnnnnn NG
```

(where x = side or head number, yy = track or cylinder number, and nnnnnn: condition at time of error)

TEST END
After displaying the results, the test will end.

26. TEST 26: DISK EJECT TEST

```
* 26: Disk Eject       0
```

Insert a blank disk and execute the test. Check that when the eject button is pressed and the disk is removed, the number on the display changes from 0 to 1 and that the OK result is displayed.

DISPLAY OF TEST RESULTS

OK
```
* 26: Disk Eject       1                OK
```

NG (No change in display message)

TEST END
After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

27. TEST 27: BREATH CONTROLLER TEST

```
* 27: Breath Control  99 00
```

Connect a breath controller and blow into it. Check that the number on the display changes from 00→01→20→80→95→99→80→20→01→00 (in other words, off to strong and back to off).

```
* 27: Breath Control  xx     yy-zz
```

(where xx = current breath control value, yy and zz are the next target values)

DISPLAY OF TEST RESULTS

OK
```
* 27: Breath Control  xx     00      OK
```

(where xx = breath controller value at end of test)

NG (No change in display)

TEST END
After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

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28. TEST 28: FOOT VOLUME TEST

```
* 28: Foot Volume      00      20-80
```

Connect a foot controller and operate it throughout its range. Check that the number on the display changes from 00→01→20→80→95→99→95→80→20→01→00 (in other words, starting from the raised position then to the lowered position and back to the raised position).

```
* 28: Foot Volume      xx      yy-zz
```

(where xx = current foot volume value, yy and zz are the next target values)

DISPLAY OF TEST RESULTS

OK

```
* 28: Foot Volume      xx      00      OK
```

(where xx = foot volume value at end of test)

NG (No change in display)

TEST END

After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

29. TEST 29: FOOT CONTROLLER TEST

```
* 29: Foot Control     00      20-80
```

Connect a foot controller and operate it throughout its range. Check that the number on the display changes from 00→01→20→80→95→99→95→80→20→01→00 (in other words, starting from the raised position then to the lowered position and back to the raised position).

```
* 29: Foot Control     xx      yy-zz
```

(where xx = current foot controller value, yy and zz are the next target values)

DISPLAY OF TEST RESULTS

OK

```
* 29: Foot Control     xx      00      OK
```

(where xx = foot controller value at end of test)

NG (No change in display)

TEST END

After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

30. TEST 30: SUSTAIN SWITCH TEST

```
* 30: Sustain          1
```

Connect a sustain switch and press it on and off. Check that the number on the display changes from 1 to 0 then back to 1 and verify that the OK result is displayed.

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DISPLAY OF TEST RESULTS

OK

```
* 30: Sustain          1              OK
```

NG (No change in display)

TEST END

After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

31. TEST 31: FOOT SWITCH TEST

```
* 31: Foot Switch      1
```

Connect a foot switch and press it on and off. Check that the number on the display changes from 1 to 0 then back to 1 and verify that the OK result is displayed.

DISPLAY OF TEST RESULTS

OK

```
* 31: Foot Switch      1              OK
```

NG (No change in display)

TEST END

After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

32. TEST 32: 1 kHz FM SOUND OUTPUT (OUTPUT L1) TEST

```
* 32: 1KHz to L1-> L1
```

Check that the correct signal is output from OUTPUT L1 and PHONES (L) jacks.
The signal route is as follows:
The digital representation of the 1 kHz signal is output from SO0 terminal (channel 0) of OPS3 IC (IC220) to INDV1 terminal (channel 13) of the M3 IC (IC256). From the INDV1 terminal of the M3 IC, the signal sent to the IN1 terminal of the PAN(2) IC (IC215). From the PAN(2) IC, the signal is output from the S1 and S2 terminals. The signal is then sent to the MXI0 and the MXI1 inputs of the MIX5 IC (IC228). Now the signal is sent out of the MIX5 IC via the MXO0 and the MXO1 terminals which feeds the signal to the SI1 and SI2 inputs of the AFDO (FLOATING POINT CONVERTER) IC (IC206). The AFDO and the DAC work together to produce the analog that is output from the CH1 (Channel 1) terminal. The signal goes to the analog circuits and is output from the OUTPUT L1 jack. It should be noted that the active low FMSEL signal must be at a 0 volt or LOW logic level in order to output this signal.

ITEMS TO CHECK

Insert the appropriate 1/4" phone plugs into each output jack and check OUTPUT L1, OUTPUT L2, OUTPUT R1, OUTPUT R2, and PHONES (L/R) outputs. If necessary, verify the frequency, output waveform, output level, and THD of each output using a frequency counter, oscilloscope, AC voltmeter (with 12.47 kHz filter) and distortion meter. The volume control must be set at maximum for these checks. While sounding, the LCD will display the following message:

```
* 32: 1KHz to L1-> L1  Output On
```

Listed below are the specifications and conditions of each output during this test.

OUTPUT L1 : 1kHz ± 1.5Hz, sine wave, distortion 0.2%, 0.0dB ± 2dB (10k ohm load)
OUTPUT L2 : less than −70dB
OUTPUT R1 : less than −70dB
OUTPUT R2 : less than −70dB

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PHONES (L) : 1kHz, sine wave, distortion 0.2% or less, +5.5dB±2dB (150 ohm load)
PHONES (R) : less than −60dB

TEST END
Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 32: 1KHz to L1-> L1  Output Off
```

33. TEST 33: 1kHz FM SOUND OUTPUT (OUTPUT R1) TEST

```
* 33: 1KHz to R1-> R1
```

ITEMS TO CHECK
Check that the correct signal is output from OUTPUT R1 and the PHONES (R) jacks.
The basic signal route is the same as it was in TEST 32 except the signal is output from the CH2 (Channel 2) of the AFDO IC.
Insert the appropriate 1/4'' phone plugs into each output jack and check OUTPUT L1, OUTPUT L2, OUTPUT R1, OUTPUT R2, and PHONES (L/R) outputs. If necessary, verify the frequency, output waveform, output level, and THD of each output using the previously specified test equipment (refer to TEST 32). The volume control must be set at maximum for these checks. While sounding, the LCD will display the following message:

```
* 33: 1KHz to R1-> R1  Output On
```

Listed below are the specifications and conditions of each output during this test.
OUTPUT R1 : 1kHz±1.5Hz, sine wave, distortion 0.2%, 0.0dB±2dB (10k ohm load)
OUTPUT R2 : less than −70dB
OUTPUT L1 : less than −70dB
OUTPUT L2 : less than −70dB
PHONES (L) : less than −60dB
PHONES (R) : 1kHz, sine wave, distortion 0.2% or less, +5.5dB±2dB (150 ohm load)

TEST END
Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 33: 1KHz to R1-> R1  Output Off
```

34. TEST 34: 1kHz FM SOUND OUTPUT (OUTPUT L2) TEST

```
* 34: 1KHz to L2-> L2
```

ITEMS TO CHECK
Check that the correct signal is output from OUTPUT L2 and the PHONES (L) jacks.
The basic signal route is the same as it was in TEST 32 except the signal is output from the CH3 (Channel 3) of the AFDO IC.
Insert the appropriate 1/4'' phone plugs into each output jack and check OUTPUT L1, OUTPUT L2, OUTPUT R1, OUTPUT R2, and PHONES (L/R) outputs. If necessary, verify the frequency, output waveform, output level, and THD of each output using the previously specified test equipment (refer to TEST 32). The volume control must be set at maximum for these checks. While sounding, the LCD will display the following message:

```
* 34: 1KHz to L2-> L2  Output On
```


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Listed below are the specifications and conditions of the output during this test.

OUTPUT L2 : 1kHz ± 1.5Hz, sine wave, distortion 0.2%, 0.0dB ± 2dB (10k ohm load)
OUTPUT L1 : less than −70dB
OUTPUT R1 : less than −70dB
OUTPUT R2 : less than −70dB
PHONES (L) : 1kHz, sine wave, distortion 0.2% or less, +5.5dB ± 2dB (150 ohm load)

TEST END

Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 34: 1KHz to L2-> L2  Output Off
```

35. TEST 35: 1kHz FM SOUND OUTPUT (OUTPUT R2) TEST

```
* 35: 1KHz to R2-> R2
```

ITEMS TO CHECK

Check that the correct signal is output from OUTPUT R2 and the PHONES (R) jacks.
The basic signal route is the same as it was in TEST 32 except the signal is output from the CH4 (Channel 4) of the AFDO IC.
Insert the appropriate 1/4'' phone plugs into each output jack and check OUTPUT L1, OUTPUT L2, OUTPUT R1, OUTPUT R2, and PHONES (L/R) outputs. If necessary, verify the frequency, output waveform, output level, and THD of each output using the previously specified test equipment (refer to TEST 32). The volume control must be set at maximum for these checks. While sounding, the LCD will display the following message:

```
* 35: 1KHz to R2-> R2  Output On
```


Listed below are the specifications and conditions of each output during this test.

OUTPUT R2 : 1kHz ± 1.5Hz, sine wave, distortion 0.2%, 0.0dB ± 2dB (10k ohm load)
OUTPUT R1 : less than −70dB
OUTPUT L1 : less than −70dB
OUTPUT L2 : less than −70dB
PHONES (R) : 1kHz, sine wave, distortion 0.2% or less, +5.5dB ± 2dB (150 ohm load)

TEST END

Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 35: 1KHz to R2-> R2  Output Off
```

36. TEST 36: 1kHz FM SOUND OUTPUT (OUTPUT L2 OUTPUT L1) TEST

```
* 36: 1KHz to L2-> L1
```

ITEMS TO CHECK

Check that when the plug connected to OUTPUT L2 is pulled out, the signal being output from OUTPUT L2 is now output from OUTPUT L1. The basic signal route is the same as it was for TEST 34.
Insert the appropriate 1/4'' phone plug into OUTPUT L1 and verify, if necessary, the frequency, output waveform, output level, and THD of this output using the previously specified test equipment (refer to TEST 32). The volume control must be set at maximum for this test. While sounding, the LCD will display the following message:

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```
* 36: 1KHz to L2-> L1  Output On
```

The specifications for this test are as follows:
OUTPUT L1 : 1kHz, sine wave, 0.0dB ± 2dB (10k ohm load)

TEST END
Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 36: 1KHz to L2-> L1  Output Off
```

37. TEST 37: 1kHz FM SOUND OUTPUT (OUTPUT R2 OUTPUT R1) TEST

```
* 37: 1KHz to R2-> R1
```

ITEMS TO CHECK
Check that when the plug connected to OUTPUT R2 is pulled out, the signal being output from OUTPUT R2 is now output from OUTPUT R1. The basic signal route is the same as it was for TEST 35.
Insert the appropriate 1/4'' phone plug into OUTPUT R1 and verify, if necessary, the frequency, output waveform, output level, and THD of this output using the previously specified test equipment (refer to TEST 32). The volume control must be set at maximum for this test. While sounding, the LCD will display the following message:

```
* 37: 1KHz to R2-> R1  Output Off
```

The specifications for this test are as follows:
OUTPUT R1 : 1kHz, sine wave, 0.0dB ± 2dB (10k ohm load)

TEST END
Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 37: 1KHz to R2-> R1  Output Off
```

38. TEST 38: 1kHz FM SOUND OUTPUT (OUTPUT R1→OUTPUT L1) TEST

```
* 38: 1KHz to R1-> L1
```

ITEMS TO CHECK
Check that when the plug connected to OUTPUT R1 is pulled out, the signal being output from OUTPUT R1 is now output from OUTPUT L1. The basic signal route is the same as it was for TEST 33.
Insert the appropriate 1/4'' phone plug into OUTPUT L1 and verify, if necessary, the frequency, output waveform, output level, and THD of this output using the previously specified test equipment (refer to TEST 32). The volume control must be set at maximum for this test. While sounding, the LCD will display the following message:

```
* 38: 1KHz to R1-> L1  Output On
```

The specifications for this test are as follows:
OUTPUT L1 : 1kHz, sine wave, 0.0dB ± 2dB (10k ohm load)

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TEST END

Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 38: 1KHz to R1-> L1  Output Off
```

39. TEST 39: 1kHz PCM SOUND OUTPUT (EFFECT → OUTPUT L, R) TEST

```
* 39: PCM to Eff Para
```

SIGNAL PATH

The digital representation of 1 kHz signal is output from SO0 terminal (channel 1) of the OPS3 IC (IC218) to DIIN0 terminal of the M3 IC (IC257). From DIOUT1 and DIOUT2 terminals of the M3 IC, the signal is sent to the SI1 terminal of the ESI ICs (IC222 and IC223). The signal output from the SO1 terminal of ESI IC is sent to the SI0 terminal of the DSP2 ICs (IC226 and IC227).
From the DSP2 ICs, the signal is out from SO0 terminal to the ESI IC and the other DSP2 IC. These signals then sent to the MIX inputs of the MIX5 IC (IC228). Now the signal is sent out of the MIX5 IC via the MXO terminals which feeds the signal to the SI1 and SI2 inputs of the AFD0 IC. The AFD0 and the DAC work together to produce the analog that is output from each output terminals via the analog circuits. It should be noted that the active low FMSEL signal must be at a +5V or HIGH logic level in order to output this signal.
Each effective signal route is as follows:

OUTPUT L1 : MOD(IC221), DRAM(IC229-IC232), SO0 terminal of DSP2 (IC226), MXO0 terminal (channel L) of MIX5 (IC228)
OUTPUT R1 : MOD(IC221), DRAM(IC232-IC235), SO1 terminal of DSP2 (IC226), MXO0 terminal (channel R) of MIX5 (IC228)
OUTPUT L2 : MOD(IC223), DRAM(IC236-IC239), SO0 terminal of DSP2 (IC227), MXO1 terminal (channel L) of MIX5 (IC228)
OUTPUT R2 : MOD(IC223), DRAM(IC232-IC235), SO1 terminal of DSP2 (IC227), MXO1 terminal (channel R) of MIX5 (IC228)

ITEMS TO CHECK

Insert the appropriate 1/4'' phone plug into each output jack and verify, if necessary, the frequency, output waveform, output level, and THD of this output using the previously specified test equipment (refer to TEST 32).
The volume control must be set at maximum for this test. While sounding, the LCD will display the following message:

```
* 39: PCM to Eff Para        Output On
```

The specifications for this test are as follows:

OUTPUT L1 : 1kHz, sine wave, distortion 0.3% or less, 0.0±2dBm (10k ohm load)
OUTPUT R1 : 1kHz, sine wave, distortion 0.3% or less, 0.0±2dBm (10k ohm load)
OUTPUT L2 : 1kHz, sine wave, distortion 0.3% or less, 0.0±2dBm (10k ohm load)
OUTPUT R2 : 1kHz, sine wave, distortion 0.3% or less, 0.0±2dBm (10k ohm load)

TEST END

Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 39: PCM to Eff Para        Output Off
```


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40. TEST 40: 1kHz FM SOUND OUTPUT (EFFECT → OUTPUT L) TEST

```
* 40:  FM to Eff Para
```

Check that the correct signal is output from OUTPUT L1 and OUTPUT L2 jacks.
The signal route is the same as it was in TEST 39 except for the following:
The signal is output from the SO0 terminal (channel 0) of the OPS3 IC (IC220) to the M3 IC (IC256). And the FMSEL signal must be at LOW logic level.

ITEMS TO CHECK

Insert the appropriate 1/4'' phone plug into each output jack and verify, if necessary, the frequency, output waveform and output level using the previously specified test equipment (refer to TEST 32). The volume control must be set at maximum for this test. While sounding, the LCD will display the following message:

```
* 40:  FM to Eff Para        Output On
```

The specifications for this test are as follows:

OUTPUT L1 : 1kHz, sine wave, 0.0±2dBm (10k ohm load)
OUTPUT L2 : 1kHz, sine wave, 0.0±2dBm (10k ohm load)

TEST END

Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 40:  FM to Eff Para        Output Off
```

41. TEST 41: 1kHz FM SOUND OUTPUT (EFFECT → OUTPUT L1) TEST

```
* 41:  FM to Eff Seri
```

Check that the correct signal is output from OUTPUT L1 jacks.
The digital representation of 1 kHz signal is output from SO0 terminal (channel 0) of the OPS3 IC (IC220) to DIIN0 terminal of the M3 IC (IC256). From DIOUT1 and DIOUT2 terminals of the M3 IC, the signal is sent. Then the signal output from the SO2 terminal of the DPS2 IC (IC226) is sent to the DSP2 IC (IC227).
From the DSP2 IC (IC227), the signal is sent to the input terminal of the MIX5 IC (IC228). Now the signal is sent out of the MIX5 IC via the MXO0 terminal. It should be noted that the FMSEL signal must be at a 0V or LOW logic level, and the MOD ICs, DRAM ICs are not used during this test.

ITEMS TO CHECK

Insert the appropriate 1/4'' phone plug into OUTPUT L1 jack and verify, if necessary, the frequency, output waveform and output level using the previously specified test equipment (refer to TEST 32). The volume control must be set at maximum for this test. While sounding, the LCD will display the following message:

```
* 41:  FM to Eff Seri        Output On
```

The specifications for this test is as follows:

OUTPUT L1 : 1kHz, sine wave, 0.0±2dBm (10k ohm load)

TEST END

Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 41:  FM to Eff Seri        Output Off
```


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42. TEST 42: AWM (M3) SOUND OUTPUT TEST

```
* 42: PCM Check
```

SIGNAL PATH

This outputs the sound which is stored in addresses 012000h – 01FFFFh of WAVE ROM. The data stored at these addresses is retrieved by the M3(A) IC (IC257) and output via pin 1 (INDV0 terminal, channel 0). The signal from pin 1 is then output to pin 11 (IN0 terminal) of the PAN(1) IC (IC216). The PAN (1) IC outputs the signal from pins 21 and 22 (S1 and S2 terminals, respectively) and sends the signal to pins 12 and 13 (SI2 and SI1 terminals, respectively) of the PAN (2) IC (IC215). The PAN (2) IC outputs the signal from pins 21 and 22 (S1 and S2 terminals, respectively) to pins 8 and 7 (MXI0 and MXI1 terminals) of MIX5 (IC228) IC. The signal is sent out of the MIX5 IC via the MXO0 and the MXO1 terminals. This ultimately produces signal output from OUTPUT L1.

ITEMS TO CHECK

Confirm that a AWM signal is being sent to OUTPUT L1 using an amplifier and speaker to monitor the signal. The AWM signal is not a steady tone. While this signal is sounding, the LCD will display the following message:

```
* 42: PCM Check          Output On
```

TEST END

Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 42: PCM Check          Output Off
```

43. TEST 43: FM SOUND OUTPUT THROUGH M3 IC (AWM) TEST

```
* 43: FM Thru M3(PCM)
```

SIGNAL PATH

A sine wave which is frequency swept by the EGM2 (1) IC will cause signals to be alternately output from OUTPUT L1, OUTPUT R1, OUTPUT L2 and OUTPUT R2 in a two channel pair sequence. The FMSEL signal to the EGM2 (1) and OPS3 (1) must be at a 1 or HIGH logic level for this test. The appropriate data from EGM2 (1) IC (IC217) is sent to the OPS3 (1) IC (IC218) in order to produce the sound. The OPS3 (1) IC outputs the signals from pins 54 and 55 (SO0, channel 1 and SO1, channel 9) via IC225 (pins 8 and 9) to pins 27 and 28 (terminals DIIN0 and DIIN1) of the M3 (A) IC (IC257). The M3 (A) IC outputs the signals from pins 1 and 2 (INDV0, channel 5 and INDV1, channel 6) to pins 10 and 11 (IN1 and IN0 terminals) of the PAN (1) IC (IC216). The PAN (1) IC sends the signals out from pins 21 and 22 (S1 and S2 terminals) to pins 12 and 13 (ST2 and ST1 terminals) of the PAN (2) IC (IC215). The PAN (2) IC outputs the signals from pins 21 and 22 (S1 and S2 terminals) to pins 8 and 7 (MXI0 and the MXI1 terminals) of MIX5 IC (IC228). The signal is sent out of the MIX5 IC via the MXO0 and the MXO1 terminals. This ultimately produces signal output from OUTPUT L1, OUTPUT R1, OUTPUT L2, OUTPUT R2.

ITEMS TO CHECK

Insert the appropriate 1/4'' phone plug into OUTPUT L1 and observe the output waveform with an oscilloscope. Check that the level does not change excessively as the output sweeps through its frequency range. The volume control must be set at comfortable listening level for this test. While sounding, the LCD will display the following message.

```
* 43: FM Thru M3(PCM)  Output On
```


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TEST END
Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 43: FM Thru M3(PCM)  Output Off
```

44. TEST 44: FM SOUND OUTPUT THROUGH M3 IC (DIGITAL FILTER) TEST

```
* 44: FM Thru M3(FM)
```

SIGNAL PATH
A sine wave which is frequency swept by the EGM2 (2) IC will cause signals to be alternately output from OUTPUT L1, OUTPUT R1, OUTPUT L2 and OUTPUT R2 in a two channel pair sequence. The FMSEL signal to the EGM2 (2) must be at a 0 or LOW logic level and the OPS3 (2) must be at a 1 or HIGH logic level for this test. The appropriate data from EGM2 (2) IC (IC219) is sent to the OPS3 (2) IC (IC220) in order to produce the sound. The OPS3 (2) IC outputs the signals from pins 54 and 55 (SO0, channel 0 and SO1, channel 8) via IC225 (pins 8 and 9) to pins 27 and 28 (terminals DIIN0 and DIIN1) of the M3 (B) IC (IC256). The M3 (B) IC outputs the signals from pins 1 and 2 (INDV0, channel 14 and INDV1, channel 15) to pins 10 and 11 (IN1 and IN0 terminals) of the PAN (2) IC (IC215). The PAN (2) IC sends the signals out from pins 21 and 22 (S1 and S2 terminals) to pins 8 and 7 (MXI0 and MXI1 terminals) of MIX5 IC. The signal is sent out of the MIX5 IC via the MXO0 and the MXO1 terminals. This ultimately produces signal output from OUTPUT L1, OUTPUT R1, OUTPUT L2, OUTPUT R2.

ITEMS TO CHECK
Insert the appropriate 1/4'' phone plug into OUTPUT L1 and observe the output waveform with an oscilloscope. Check that the level does not change excessively as the output sweeps through its frequency range. The volume control must be set at a comfortable listening level for this test. While sounding, the LCD will display the following message.

```
* 44: FM Thru M3(FM)  Output On
```

TEST END
Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 44: FM Thru M3(FM)  Output Off
```

45. TEST 45: FM SOUND OUTPUT FEEDBACK THROUGH M3 IC TEST

```
* 45: Feedback FM->M3
```

The basic signal path is the same as it was for TEST 43 except for the following:
The frequency swept sine wave produced by the EGM2 (1) and OPS3 (1) will be fed back from the M3 (A) IC to the OPS3 (1) IC. As in TEST 43, the output signals will occur alternately in a two channel pair sequence. For this test, the signals from pins 1 and 2 (INDV0 and INDV1 terminals) of M3 (A) IC (IC257) will be fed back to pins 69 and 70 (SI0 and SI1 terminals) of OPS3 (1) IC (IC218).

ITEMS TO CHECK
Insert the appropriate 1/4'' phone plug into OUTPUT L1 and observe the output waveform with an oscilloscope. Check that the level does not change excessively as the output sweeps through its frequency range. It should be noted that due to the feedback condition of this test there may be a slight amount of distortion present in the output signal. The volume control must be set at a comfortable listening level for this test. While sounding, the LCD will display the following message:

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```
* 45: Feedback FM->M3  Output On
```

TEST END

Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 45: Feedback FM      Output Off
```

46. TEST 46: HIGH CLICK SOUND TEST

```
* 46: Click High
```

ITEMS TO CHECK

Check that a high click signal is properly output from OUTPUT L1, OUTPUT L2, OUTPUT R1 and OUTPUT R2. Make sure that the click volume control is set to maximum. While sounding, the LCD will display the following message:

```
* 46: Click High      Click On
```

Verify that the high click signal is sent to each output by using an amplifier and speaker to monitor signal. Insert the appropriate 1/4'' phone plugs into OUTPUT L1, OUTPUT L2, OUTPUT R1 and OUTPUT R2 and observe the output waveform with an oscilloscope. Check that the output waveform is a rounded square wave with an approximate peak-to-peak voltage of 500mV.

TEST END

Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 46: Click High      Click Off
```


47. TEST 47: LOW CLICK SOUND TEST

```
* 47: Click Low
```

ITEMS TO CHECK

Check that a low click signal is properly output from OUTPUT L1. Make sure that the click volume control is set to maximum. While sounding, the LCD will display the following message:

```
* 47: Click Low       Click On
```

Verify that the low click signal is sent to OUTPUT L1 by using an amplifier and speaker to monitor signal. Insert the appropriate 1/4'' phone plugs into OUTPUT L1, OUTPUT L2, OUTPUT R1 and OUTPUT R2 and observe the output waveform with an oscilloscope. Check that the output waveform is a rounded square wave with an approximate peak-to-peak voltage of 500mV.

TEST END

Press [EXIT] to end the test. After pressing [EXIT] three things occur;
(1) the following display will appear, (2) the sound will stop and (3) the SY99 will wait for the entry of a test number.

```
* 47: Click Low       Click Off
```


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48. TEST 48: JACKS ALL OFF TEST

```
* 48: Jack All Off
```

Connect the Sustain and Foot Switch pedals to the appropriate jacks. With nothing connected to the Foot Volume, Foot Controller, and Breath controller jacks, check that the following display appears.

```
* 48: Jack All Off          SU FS
```

Then while pressing the foot switches connected to the Sustain and Foot Switch jacks, remove the pedal plugs, and check that the display shows "OK".

DISPLAY OF TEST RESULTS

OK

```
* 48: Jack All Off                    OK
```

NG

```
* 48: Jack All Off     FV             NG
```

(e.g. if the foot volume jack is NG)

TEST END

The result is displayed and the test will end.

49. TEST 49: FACTORY SET TEST

```
* 49: Factory Set
```

This test is used to initialize the data listed below to the factory settings:

Synthesizer system data
64-internal voice data
16-internal multi data
Sequencer setup data

When this test is executed, the following display will appear.

```
* 49: Factory Set      [NO] or [YES] ?
```

If you press [YES], the factory preset data will be restored.
If you press [NO], they will not be restored.

DISPLAY OF TEST RESULTS

If factory settings are restored.

OK

```
* 49: Factory Set                    OK
```

If not restored there will be no change in the display as shown below.

```
* 49: Factory Set      [NO] or [YES] ?
```

TEST END

The LCD displays the results, the factory preset data will be restored, and the test will then end. After the factory preset data has been restored, the system data will be as follows:

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****
SYNTH
****

Note Shift ····· +0
Fine Turning ····· +0
Fixed Velocity ····· off
Velocity Curve ····· 0 (normal)
Assignable Foot Switch ····· 65
Assignable Wheel ····· 13
Edit Confirm ····· on
Kbd Trans Ch ····· 1
Voice Recv Ch ····· 1
Local on/off ····· on
Note on/off ····· all
Device Number ····· all
Bulk Protect ····· on
Program Change ····· on
Pattern Protect ····· on
MDR Memory ····· 0Kbyte

---------- **Greeting Message** ----------

"Create YOUR sound ! "
" ...I'm ready"

---------- **PAN factary set** ----------

I1~I32 = P1 ~P32

---------- **MCT factory set** ----------

I 1 = P62 (Far East)
I 2 = P63 (Blue)

-------- **VOICE** -------- --------

I-A01~D16 =P1-A01~D16

-------- **MULTI** -------- --------

I-01~16 =P1-01~16

****
SEQUENCER
****

record quantize ····· 0 (off)
click sw ····· 1 (rec)
click beat ····· 0 (1/4)

record type ····· over
sync ····· 0 (internal)
receive ····· KBD

filter velocity ····· 1 (on)
filter control change ····· 1 (on)
filter pitch bend ····· 1 (on)
filter program change ····· 1 (on)
filter after touch ····· 0 (off)
filter exclusive ····· 1 (on)

midi control ····· 1 (on)
click/beat ····· 1/96

accent1 value ····· 24
accent2 value ····· 56
accent3 value ····· 88
accent4 value ····· 120
gate type ····· 1 (normal)

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50. TEST 50: EXIT TEST PROGRAM

```
* 50: Exit
```

When this is executed, the following display will appear.

```
* 50: Exit                    [NO] or [YES] ?
```

To exit the test program mode, press the [YES] switch. To remain in the test program mode press the [NO] switch. This will cause the SY99 to wait for the entry of a test number.

DISPLAY OF TEST RESULTS

If test mode is not exited.

```
* 50: Exit                    [NO] or [YES] ?
```


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■テストプログラム

A．テストエントリー

本体の電源立ち上げ後、数秒待ち、次の操作をする。
[VOICE]を押しながら[BANK D]を押しさらに[8]を押すと、次の画面が表示される。

```
*** SY99 TEST Ver #.## *** Please Select

  Main ROM : Version #.#    1990-10-77
  SEQ. ROM : Version #.#    1990-10-77

    [-1] : AUTO          [+1] : MANUAL

  [COPY] : Fact.set    [EXIT] : Exit
```

[−1]、[+1]、[COPY]および[EXIT]を使用してテストモードの選択を行う。
[+1]を押すと、マニュアルモードで、テストにエントリーされる。
[COPY]を押すと、〝49. ファクトリーセット〟を実行した後、自動的にテストモードから抜け、プレイモードになる。
[EXIT]を押すとテストモードを抜け、プレイモードになる。

B．テストの進め方

テストにエントリーすると、まず、次の画面が表示される。

```
*** SY99 TEST Ver #.## *** MODE : MANUAL


 * 01 : ROM CHECK
   02 : RAM Read/Write
   03 : SEQENCER ROM
   04 : SEQENCER RAM
   05 : RAM Battery
```

[+1]、[−1]、[ENTER]、[COPY]、[PAGE+]、[PAGE−]、[EXIT]、[TEN KEY]およびロータリーエンコーダーを使用してテストを進める。
[+1]を押すと、現在選択されているテストの次のテストが実行される。
[−1]を押すと、現在選択されているテストの一つ前のテストが実行される。
[ENTER]を押すと、現在選択されているテストが実行される。
[PAGE+]を押すと、現在選択されているテストの次のテストが選択され、テスト項目が表示される。
[PAGE−]を押すと、現在選択されているテストの一つ前のテストが選択され、テスト項目が表示される。
[EXIT]を押すと、〝50. EXIT〟が実行される。
[TEN KEY 0]から[TEN KEY 9]を使用して、2桁の数字を入力することにより、テストの選択が行える。

バージョン表示モード；
[Voice]→[INT]→[1]を押す。MAIN ROMとSEQ ROMのバージョンが表示され、[EXIT]によって、本体プログラムへ復帰する。

NGと判断した時のテストの進めかた
次の各テストにおいて、NGと判断した場合、以下に示す操作により、テストナンバー待ち状態にでき、もう一度テストを行うか、他のテストを行う事が出来る。

9. パネルスイッチ
10. ピッチベンド
11. モジュレーションホイール1
12. モジュレーションホイール2

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13. データエントリー
14. ロータリーエンコーダー
15. キーボード
16. アフタータッチ
17. MIDI IN/OUT
18. カードインサート
20. カードプロテクトスイッチ
22. ウェーブカードインサート
26. ディスクイジェクト
27. ブレスコントロール
28. フットボリューム
29. フットコントロール
30. サスティーン
31. フットスイッチ
48. ジャック オール オフ

[EXIT]を押すと、テストナンバー待ち状態となる。
ただし、〝9. パネルスイッチ〟の[EXIT]のテストの場合には、この方法は、対応していない。

0. INITIAL TEST

テストに使用するH8内蔵RAM h'FB80-h'FF7F
DM2シート M3×2 よりのIRQ (DM2 BUS TEST)。
テストプログラムエントリー時、自動的に実施。

判定結果の表示

OK　　特に無し
NG　＊WORK RAM ERROR

```
** IC128(RAM) ERROR,TEST CONTINUE? **
```

＊M3 IRQ

```
* M3 IRQ CHECK ERROR,TEST CONTINUE? *
```

テストの終了方法

[YES]を押す

1. SYSTEM ROM

```
* 01; ROM CHECK
```

ROMのリードテストを行う。次の6つのアドレスに対してテストを行う。
IC111 =h'80000-h'8000F
IC111 =h'A0000-h'A000F
IC111 =h'C0000-h'C000F
IC111 =h'E0000-h'E000F
IC112 =h'60000-h'6000F
IC113 =h'10000-h'1000F
(ROMテストは16byteのみCheck)

判定結果の表示

OK

```
* 01: ROM CHECK                    OK
```

NG

```
* 01: ROM CHECK          n:ICxxx      NG
```

(ROM n がNGの場合、xxx：NGとなったICの番号)

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テストの終了方法
判定を表示、出力して終了する。

2. SYSTEM RAM

```
* 02: RAM Read/Write
```

RAMのリード/ライトテストを行う。次のICのアドレスに対してテストを行う。
IC119 =h'40000-h'5FFFF
IC115 =h'30000-h'37FFF

判定結果の表示

OK

```
* 02: RAM Read/Write                    OK
```

NG

```
* 02: RAM Read/Write    IC119           NG
```

テストの終了方法
判定を表示、出力して終了する。
すべての RAMのデータは保存される。

3. SEQUENCER ROM

```
* 03: SEQENCER ROM
```

ROMのリードテストを行う。次のICのアドレスに対してテストを行う。
IC101=h'8000-h'BFFFで#0-#6の7BANK
IC101=h'C000-h'FFFFで#7の1BANK

判定結果の表示

OK

```
* 03: SEQENCER ROM                      OK
```

NG

```
* 03: SEQENCER ROM                      NG
```

テストの終了方法
判定を表示、出力して終了する。

4. SEQUECER RAM

```
* 04: SEQENCER RAM
```

RAMのリード/ライトテストを行う。次のICの全アドレスに対してテストを行う。
1: IC103=h'4000-h'5FFF
2: IC102=h'6000(WINDOW 0),h'6200(WINDOW 1),h'6400(WINDOW 2),h'6600(WINDOW 3)

判定結果の表示

OK

```
* 04: SEQENCER RAM                      OK
```

NG

```
* 04: SEQENCER RAM    ICxxx             NG
```

(ICxxx:NGとなったICの番号)

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テストの終了方法
判定を表示、出力して終了する。
すべての RAMのデータは保存される。

5. Battery

```
* 05: RAM Battery
```

RAMバックアップバッテリー電圧が、2.9V以上3.3V以下を確認する。

判定結果の表示

OK
```
* 05: RAM Battery      3.2V          OK
```

NG
```
* 05: RAM Battery      #.#V   Low    NG
```

```
* 05: RAM Battery      #.#V   High   NG
```

テストの終了方法
判定を表示、出力して終了する。

6. LCDドット黒

```
* 06: LCD All On
```

全ドットが黒に変化していることを確認する。コントラストVRで、コントラスト調整が出来る事。

テストの終了方法
[EXIT]を押すと、テストは終了し、次の画面を表示して、テストナンバー待ち状態になる。

```
* 06: LCD All On
```

7. LCDドット白

```
* 07: LCD All Off
```

全ドットが白に変化していることを確認する。

テストの終了方法
[EXIT]を押すと、テストは終了し、次の画面を表示して、テストナンバー待ち状態になる。

```
* 07: LCD All Off
```

8. LED順次点燈・全点燈

```
* 08: LED Check
```

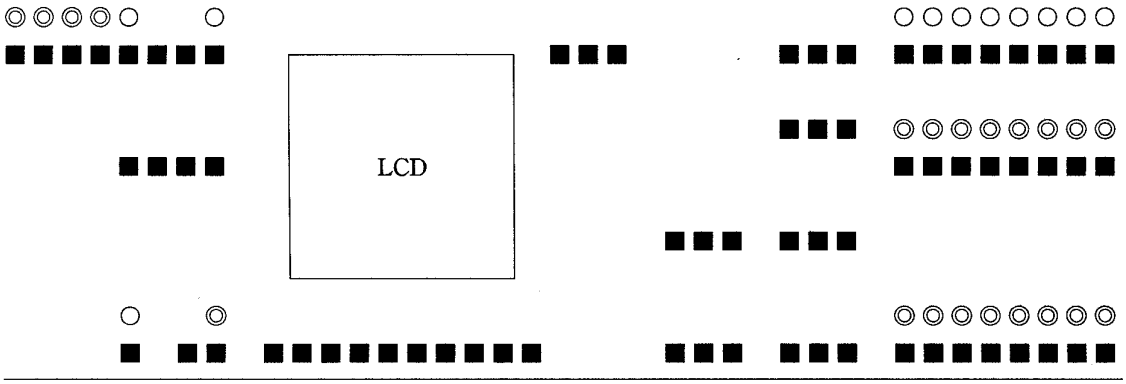
次の図の左から順に赤LEDが1回点滅した後、すべての赤色のLEDが同時に点燈し、次に緑LEDが1回点滅した後、すべての緑色のLEDが同時に点燈することを確認する。現在点滅しているLEDが以下の様にLCDに表示される。

```
* 08: LED Check        REC  RED   On
```

(RECORDの赤色のLEDが点滅している場合)

すべてのLEDが点滅することを確認する。(32個中21個は赤/緑の2色)

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注）◎印は、2色のLEDを示す。○印は、単色のLEDを示す。

テストの終了方法

[EXIT]を押すと、その時点の各LEDの点燈/消燈の状態のままテストは終了し、テストナンバー待ち状態になる。

9. パネルスイッチ

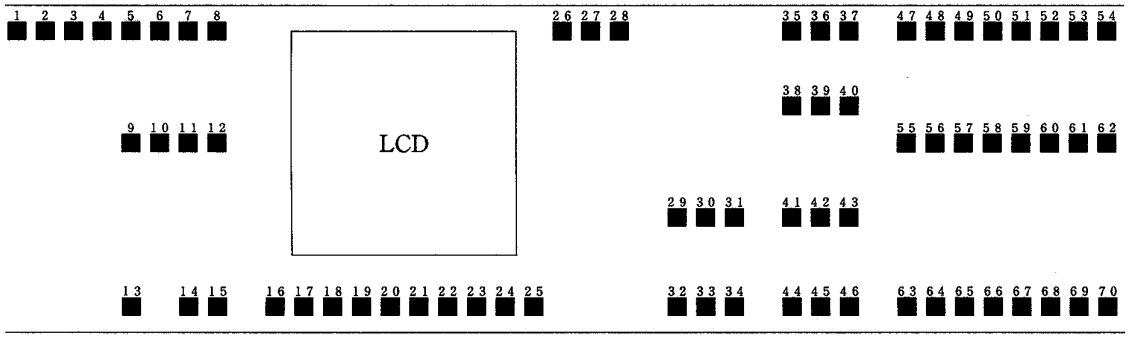
```
* 09: Panel Switch
```

[VOICE]から[16]までのパネルスイッチを、以下の様なLCDの表示に従ってON/OFFする。

```
* 09: Panel Switch     Push REC
```

([Record]のチェックの場合)

チェックの順序を下図に示す。
正常な場合、〝ポーッ〟と発音して、次のスイッチのテストに進む。
期待されないコードがPKSより送られると、NGが表示され発音しない。
その後、正しいコードが受信されると、次のスイッチのテストに進む。
すべてのスイッチが正常であれば、OKが表示される。



判定結果の表示

OK

```
* 09: Panel Switch     Push 16          OK
```

NG

```
* 09: Panel Switch     Push REC  17 Err
```

テストの終了方法

[16]までチェックすると、OKが表示され、テストは終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〟を参照のこと。

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10. ピッチベンド

```
* 10: Pitch Bend      50      99
```

ピッチベンドを、以下の様なLCD表示に従って50－99－00－50(中央－上－下－中央)と滑らかに動かす。

```
* 10: Pitch Bend      xx      yy
```

xx；現在のピッチベンドの値
yy；次の目標値

引っ掛りがなく、数字が滑らかに変化し、OKの判定が出ることを確認する。

判定結果の表示

OK

```
* 10: Pitch Bend      50      50      OK
```

NG

```
* 10: Pitch Bend      xx      Center  NG
```

テスト開始時および終了時にピッチベンドの値がCenterでなかった場合、xx：NG判定時のピッチベンドの値

テストの終了方法

判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〞を参照のこと。

11. モジュレーションホイール1

```
* 11: Modulation Wh1 00      20-80
```

モジュレーションホイール1を、以下の様なLCD表示に従って00－20-80－99－20-80－00(下－上－下)と滑らかに動かす。

```
* 11: Modulation Wh1  xx      yy
```

```
* 11: Modulation Wh1  xx      yy-zz
```

xx　　：現在のモジュレーションホイール1の値
yy, yy-zz　：次の目標値

引っ掛りがなく、数字が滑らかに変化し、OKの判定が出ることを確認する。

判定結果の表示

OK

```
* 11; Modulation Wh1  00      00      OK
```

NG　　表示なし

テストの終了方法

判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〞を参照のこと。

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12. モジュレーションホイール2

```
* 12: Modulation WH2   50      99
```

検査を始める前にモジュレーションホイール2の位置を中央にセットしておく。
モジュレーションホイール2を、以下の様なLCD表示に従って50－99－00－50(中央－上－下－中央)と滑らかに動かす。

```
* 12: Modulation WH2   xx      yy
```

```
* 12: Modulation WH2   xx      yy-zz
```

xx　　；現在のモジュレーションホイール2の値
yy, yy-zz　；次の目標値

引っ掛りがなく、数字が滑らかに変化し、OKの判定が出ることを確認する。

判定結果の表示

OK

```
* 12: Modulation WH2   50      50      OK
```

NG　　表示なし

テストの終了方法

判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〞を参照のこと。

13. データエントリー

```
* 13: Data Entry       00      20-80
```

データエントリーを、以下の様なLCD表示に従って00－20-80－99－20-80－00(下－上－下)と滑らかに動かす。

```
* 13: Data Entry       xx      yy
```

```
* 13: Data Entry       xx      yy-zz
```

xx　　；現在のデータエントリーの値
yy, yy-zz　；次の目標値

引っ掛りがなく、数字が滑らかに変化し、OKの判定が出ることを確認する。

判定結果の表示

OK

```
* 13: Data Entry       00      00      OK
```

NG　　表示なし

テストの終了方法

判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〞を参照のこと。

14. ロータリーエンコーダー

```
* 14: R-Encorder       Right   00
```

ロータリーエンコーダーを、以下の様なLCD表示に従って00－01－00－01(右回転、左回転)と動かす。

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```
* 14: R-Encoder        Right   xx
```

```
* 14: R-Encoder        Left    xx
```

xx；現在の値

引っ掛りがなく、OKの判定が出ることを確認する。

判定結果の表示

OK

```
* 14: R-Encoder        Left    01      OK
```

NG　　表示なし

テストの終了方法

判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〞を参照のこと。

15. キーボード

```
* 15: Keyboard Check
```

E0からG6まで76鍵を、以下の様なLCDの表示に従い、イニシャルタッチh'10－h'6Fの強さでスケーリングする。

```
* 15: Keyboard Check  Push   C1
```

(C1のチェックの場合)

正常な場合、キーON音を出力し、次のキーのチェックへ進む。
期待されないコードがPKSより送られると、NGが表示されSINE波は出力されないが、その後、正しいコードが受信されると、キーON音を出力し、次のキーのチェックへ進む。
すべてのキーが正常であれば、OKが表示される。

判定結果の表示

OK

```
* 15: Keyboard Check  Push   G6      OK
```

NG

```
* 15: Keyboard Check  Push   xxx !? Err
```

(期待されないコードがPKSより送られて来た場合)

```
* 15: Keyboard Check  Push   xxx $nn NG
```

(イニシャルタッチが正常でない場合)

テストの終了方法

G6までチェックすると、OKが表示され、テストは終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〞を参照のこと。

16. アフタータッチ

```
* 16: After Touch     00      20-80
```

アフタータッチを、以下の様なLCD表示に従って
00－20-80－99－20-80－00(弱－強－弱)と鍵盤を押す。

```
* 16: After Touch     xx      yy
```


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```
* 16: After Touch      xx      yy-zz
```

xx　　；現在のアフタータッチの値
yy, yy-zz　；次の目標値

引っ掛かりがなく、数字が滑らかに変化し、OKの判定が出ることを確認する。

判定結果の表示

OK
```
* 16: After Touch      00      00      OK
```

NG　　表示なし

テストの終了方法

判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、"B. テストの進めかた"を参照のこと。

17. MIDI IN/OUT

```
* 17: MIDI (I/O/T)
```

IN、OUTをMIDIケーブルで接続した後、テストを実行する。
LCDには、以下の様に表示が行われる。

```
* 17: MIDI (I/O/T)     Tx:yy  Rx:zz
```

テストの終了方法

[EXIT]を押すと、テストは終了し、テストナンバー待ち状態になる。
期待されないデータが受信されたため、NGとなった場合、その時点でテストは終了する。
一定時間内に受信が終了しないため、NGとなった場合は、[EXIT]が押されるまでテストは続けられる。

18. カードインサート

```
* 18: D-Card Insert    0
```

テスト用カードをスロットに挿入し、テストを実行する。カードを抜いて再度入れた時、数字が0から1に変化し、OKの判定が出ることを確認する。

判定結果の表示

OK
```
* 18: D-Card Insert    1                 OK
```

NG　　表示なし

テストの終了方法

判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、"B. テストの進めかた"を参照のこと。

19. カードリードライト

```
* 19: D-Card R/Write
```

テスト用カードを使用して、次の2つのアドレスに対してカードのリード/ライト テストを行う。
CARD 1 = h'20000 - h'27FFF
CARD 2 = h'28000 - h'2FFFF
メモリープロテクトをオフにしたテスト用カードを差し込み、テストを実行させる。

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判定結果の表示

OK

```
* 19: D-Card R/Write  CARD : 12      OK
```

NG

```
* 19: D-Card R/Write  CARD :  x      NG
```

(CARD 2が NG の場合)

テストの終了方法

判定を表示、出力して終了する。
すべてのCARD上のデータは保存される。

20. カードプロテクトスイッチ

```
* 20: D-Card Protect  0
```

テスト用カードを使用して、カードプロテクトスイッチの状態を読み込めることを確認する。スイッチを操作して、プロテクトオフからプロテクトオンの状態にした時、数字が0から1に変化しOKの判定が出ることを確認する。

判定結果の表示

OK

```
* 20: D-Card Protect  1                OK
```

NG　　表示なし

テストの終了方法

判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〟を参照のこと。

21. カードバッテリー

```
* 21: D-Card Battery
```

RAMカードバックアップバッテリー電圧が、測定できることを確認する。

判定結果の表示

OK

```
* 21: D-Card Battery  #.#V          OK
```

NG

```
* 21: D-Card Battery  #.#V   Low    NG
```

```
* 21: D-Card Battery  #.#V   High   NG
```

テストの終了方法

判定を表示、出力して終了する。

22. ウェーブカードインサート

```
* 22: W-Card Insert    0
```

テスト用ウェーブカードをスロットに入れた時、数字が0から1に変化し、OKの判定が出ることを確認する。

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判定結果の表示

OK

```
* 22: W-Card Insert    1                    OK
```

NG　　表示なし

テストの終了方法

判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〞を参照のこと。

23. ウェーブROMリード

```
* 23:  W-ROM Read
```

本テストは、工業出荷検査用のため、ここでは実行しません。

24. ウェーブ RAM

```
* 24:  W-RAM
```

インターナショナルWAVE RAM、拡張WAVE RAM のリード／ライトテストを行う。
テストするアドレスは、

インターナルWAVE RAM :h'400000-h'43FFFF　　拡張WAVE RAM1 : :h'440000-h'47FFFF
拡張　　WAVE RAM2 :h'480000-h'4BFFFF　　拡張WAVE RAM3 : h'4C0000-h'4FFFFF
拡張　　WAVE RAM4 :h'500000-h'53FFFF　　拡張WAVE RAM5 : h'540000-h'57FFFF

インターナルWAVE RAM、拡張WAVE RAMのバッテリーチェックを行う。

判定結果の表示

OK

```
* 24:  W-RAM     000000                    OK
```

NG

```
* 24:  W-RAM     XORBOX                    NG
```

テスト結果は、インターナルWAVE RAM、拡張WAVE RAM 1~5 の順に記号で表示する。記号は、
R : リード／ライト　テストのみNG　　B : バッテリーチェックのみNG
O : 両方ともOK　　X : 両方ともNG

テストの終了方法

判定を表示、出力して終了する。
すべてのRAMのデーターは保存される。

25.ディスクリードライト

```
* 25:  Disk Read/Write
```

生ディスクを使用して、ディスクのフォーマット/リード/ライトを2種類のDataに対してテストを行う。
次のトラックに対してテストを行う。

SIDE 0 ＝ 40(SEC 4)－00(SEC 1)－79(SEC 9)
SIDE 1 ＝ 40(SEC 4)－00(SEC 1)－79(SEC 9)

メモリープロテクトをオフにした生ディスクを差し込み、テストを実行させる。

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判定結果の表示

OK

```
* 25: Disk Read/Write C79:H1 Verify  OK
```

NG

```
* 25: Disk Read/Write Cyy:Hx nnnnnnn NG
```

(x ；side番号、yy；トラック番号)
(nnnnnn；エラー時の状態)

テストの終了方式
判定を表示、出力して終了する。

26. ディスクイジェクト

```
* 26: Disk Eject       0
```

生ディスクを挿入してテストを実行する。
イジェクトボタンを押しディスクを取り出した時、数字が0から1に変化し、OKの判定が出ることを確認する。

判定結果の表示

OK

```
* 26: Disk Eject       1                OK
```

NG　　表示なし

テストの終了方法
判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〞を参照のこと。

27. ブレスコントロール

```
* 27: Breath Control  99 00
```

ブレスコントローラーを接続し、以下の様なLCD表示に従って00-01－20-80－95-99－20-80－00-01(止－強－止)のシュミレーションをする。

```
* 27: Breath Control  xx     yy-zz
```

xx　　；現在のブレスコントロールの値
yy,yy-zz　；次の目標値

数字が滑らかに変化し、OKの判定が出ることを確認する。

判定結果の表示

OK

```
* 27: Breath Control  xx     00      OK
```

xx ；テスト終了時のブレスコントロールの値

NG　　表示なし

テストの終了方法
判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〞を参照のこと。

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28. フットボリューム

```
* 28: Foot Volume      00      20-80
```

フットボリュームを接続し、以下の様なLCD表示に従って00-01－20-80－95-99－20-80－00-01(上げる－踏み込む－上げる)と滑らかに動かす。

```
* 28: Foot Volume      xx      yy-zz
```

xx　　；現在のフットボリュームの値
yy, yy-zz　；次の目標値

数字が滑らかに変化し、OKの判定が出ることを確認する。

判定結果の表示

OK

```
* 28: Foot Volume      xx      00      OK
```

xx；テスト終了時のフットボリュームの値

NG　　表示なし

テストの終了方法

判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〞を参照のこと。

29. フットコントロール

```
* 29: Foot Control     00      20-80
```

フットコントロールを接続し、以下の様なLCD表示に従って00-01－20-80－95-99－20-80－00-01(上げる－踏み込む－上げる)と滑らかに動かす。

```
* 29: Foot Control     xx      yy-zz
```

xx　　；現在のフットコントロールの値
yy, yy-zz　；次の目標値

数字が滑らかに変化し、OKの判定が出ることを確認する。

判定結果の表示

OK

```
* 29: Foot Control     xx      00      OK
```

xx；テスト終了時のフットコントロールの値

NG　　表示なし

テストの終了方法

判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〞を参照のこと。

30. サスティーン

```
* 30: Sustain          1
```

サスティーンペダルを接続し、ON/OFFする。この時、数字が1-0-1と変化し、OKの判定が出ることを確認する。

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判定結果の表示

OK

```
* 30: Sustain          1              OK
```

NG　　表示なし

テストの終了方法

判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〟を参照のこと。

31. フットスイッチ

```
* 31: Foot Switch      1
```

フットペダルを接続し、ON/OFFする。この時、数字が1-0-1と変化し、OKの判定が出ることを確認する。

判定結果の表示

OK

```
* 31: Foot Switch      1              OK
```

NG　　表示なし

テストの終了方法

判定を表示、出力して終了する。
テスト途中で、NGと判断した場合の処理方法は、〝B. テストの進めかた〟を参照のこと。

32. 1kHz OUTPUT L1発音(FM)

```
* 32: 1KHz to L1-> L1
```

OUTPUT L1およびPHONES(L)より正常な信号が出力されていることを確認する。
なお信号源は、FMSEL＝L-OPS3(IC220)のS00(CH0)-M3(IC256)のINDV1(CH13)-PAN(IC215)のS1, S2-MIX5(IC228)のMXO1,2のルートを使っている。
OUTPUT L1、OUTPUT L2、OUTPUT R1、OUTPUT R2、PHONES(L)、PHONES(R) 共にジャックを差し込み、各出力の周波数、出力波形、出力レベルを周波数カウンタ、オシロスコープ、レベル計(12.47kHzフィルター付き)、歪率計で観測する。
マスターボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

```
* 32: 1KHz to L1-> L1  Output On
```

チェック項目

OUTPUT L1 ；1kHz±1.5Hz、sine波、歪率 0.2%、0.0±2dbm(負荷10kohm)
OUTPUT L2 ；−70dbm以下
OUTPUT R1 ；−70dbm以下
OUTPUT R2 ；−70dbm以下
PHONES(L) ；1kHz、sine波、歪率 0.2%、+5.5±2dbm(負荷150ohm)
PHONES(R) ；−60dbm以下

テストの終了方法

[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 32: 1KHz to L1-> L1  Output Off
```


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33. 1kHz OUTPUT R1発音(FM)

```
* 33: 1KHz to R1-> R1
```

OUTPUT R1およびPHONES(R)より正常な信号が出力されていることを確認する。
なお信号源は、TEST 32と同じ。
OUTPUT L1、OUTPUT L2、OUTPUT R1、OUTPUT R2、PHONES(L)、PHONES(R)共にジャックを差し込み、各出力の出力波形、出力レベルを、オシロスコープ、レベル計(12.47kHzフィルター付き)、歪率計で観測する。
マスターボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

```
* 33: 1KHz to R1-> R1  Output On
```

チェック項目

OUTPUT R1 ；1kHz、sine波、歪率 0.2%、0.0±2dbm(負荷10kohm)
OUTPUT L1 ；−70dbm以下
OUTPUT R2 ；−70dbm以下
OUTPUT L2 ；−70dbm以下
PHONES(R) ；1kHz、sine波、歪率0.2%、+5.5±2dbm(負荷150ohm)
PHONES(L) ；−60dbm以下

テストの終了方法

[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 33: 1KHz to R1-> R1  Output Off
```

34. 1kHz OUTPUT L2 発音(FM)

```
* 34: 1KHz to L2-> L2
```

OUTPUT L2およびPHONES(L)より正常な信号が出力されていることを確認する。
なお信号源は、TEST 32と同じ。
OUTPUT L1、OUTPUT L2、OUTPUT R1、OUTPUT R2、PHONES(L)、PHONES(R)共にジャックを差し込み、各出力の出力波形、出力レベルをオシロスコープ、レベル計(12.47kHzフィルター付き)、歪率計で観測する。
マスターボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

```
* 34: 1KHz to L2-> L2  Output On
```

チェック項目

OUTPUT L2 ；1kHz、sine波、歪率 0.2%、0.0±2dbm(負荷10kohm)
OUTPUT L1 ；−70dbm以下
OUTPUT R1 ；−70dbm以下
OUTPUT R2 ；−70dbm以下
PHONES(L) ；1kHz、sine波、歪率0.2%、+5.5±2dbm(負荷150ohm)

テストの終了方法

[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 34: 1KHz to L2-> L2  Output Off
```


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35. 1kHz OUTPUT R2 発音(FM)

```
* 35: 1KHz to R2-> R2
```

OUTPUT R2および PHONES(R)より正常な信号が出力されていることを確認する。
なお信号源は、TEST 32と同じ。
OUTPUT L1、OUTPUT L2、OUTPUT R1、OUTPUT R2、PHONES(L)、PHONES(R)共にジャックを差し込み、各出力の出力波形、出力レベルをオシロスコープ、レベル計(12.47kHzフィルター付き)、歪率計で観測する。
マスターボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

```
* 35: 1KHz to R2-> R2  Output On
```

チェック項目
OUTPUT R2 ；1kHz波、sine波、歪率0.2%、0.0±2dbm(負荷10kohm)
OUTPUT L1 ；−70dbm以下
OUTPUT L2 ；−70dbm以下
OUTPUT R1 ；−70dbm以下
PHONES(R) ；1kHz、sine波、歪率0.2%、+5.5±2dbm(負荷150ohm)

テストの終了方法
[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 35: 1KHz to R2-> R2  Output Off
```

36. L MONO

```
* 36: 1KHz to L2-> L1
```

OUTPUT L2より出力されている信号がOUTPUT L2のプラグを抜いた時、OUTPUT L1より出力されることを確認する。なお信号源は、TEST 32と同じ。
OUTPUT L1にジャックを差し込み、出力波形、出力レベルを、オシロスコープ、レベル計(12.47kHzフィルター付き)で観測する。
マスターボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

```
* 36: 1KHz to L2-> L1  Output On
```

チェック項目
OUTPUT L1 ；1kHz、sine波、0.0±2dbm(負荷10kohm)

テストの終了方法
[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 36: 1KHz to L2-> L1  Output Off
```

37. R MONO

```
* 37: 1KHz to R2-> R1
```

OUTPUT R2より出力されている信号がOUTPUT R2のプラグを抜いた時、OUTPUT R1より出力されることを確認する。なお信号源は、TEST 32と同じ。
OUTPUT R1にジャックを差し込み、出力波形、出力レベルを、オシロスコープ、レベル計(12.47kHzフィルター付き)で観測する。
マスターボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

```
* 37: 1KHz to R2-> R1  Output Off
```


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チェック項目
OUTPUT R1 ；1kHz、sine波、0.0±2dbm（負荷10kohm）

テストの終了方法
[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 37: 1KHz to R2-> R1  Output Off
```

38. L R MONO

```
* 38: 1KHz to R1-> L1
```

OUTPUT R1より出力されている信号がOUTPUT R1のプラグを抜いた時、OUTPUT L1より出力されることを確認する。なお信号源は、TEST 32と同じ。
OUTPUT L1にジャックを差し込み、出力波形、出力レベルを、オシロスコープ、レベル計（12.47kHzフィルター付き）で観測する。
マスターボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

```
* 38: 1KHz to R1-> L1  Output On
```

チェック項目
OUTPUT L1；1kHz、sine波、0.0±2dbm（負荷10kohm）

テストの終了方法
[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 38: 1KHz to R1-> L1  Output Off
```


39. PCM to Effect Parallel

```
* 39: PCM to Eff Para
```

Effectを通ったPCM側の信号が、OUTPUT L1,OUTPUT R1,OUTPUT L2,OUTPUT R2より正常に出力されていることを確認する。
なお信号源は、FMSEL＝H-OPS3(IC218)のSO0(CH1)-M3(IC257)のDIOUT1,2-DSP2(IC226,IC227)のSO0,1-MIX5(IC228)のMXO0,1のルートを使用。
DSP2は、それぞれのMOD,DRAMを通して出力されます。
2基のDSP2の接続はパラレルです。Effect部の信号経路は下記のとおり。

OUTPUT L1＝MOD(IC221),DRAM(IC229-232),DSP2(IC226)のSO0-MIX5のMXO0-L
OUTPUT R1＝MOD(IC221),DRAM(IC232-235),DSP2(IC226)のSO1-MIX5のMXO0-R
OUTPUT L2＝MOD(IC223),DRAM(IC236-239),DSP2(IC227)のSO0-MIX5のMXO0-L
OUTPUT R2＝MOD(IC223),DRAM(IC239-242),DSP2(IC227)のSO1-MIX5のMXO0-R

OUTPUT L1、OUTPUT R1、OUTPUT L2、OUTPUT R2 にジャックを差し込み（他はオープン）、出力波形、出力レベルを、オシロスコープ、レベル計（12.47kHz フィルター付き）、歪率計で観測する。
マスターボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

```
* 39: PCM to Eff Para        Output On
```

チェック項目
OUTPUT L1；1kHz、sine波、歪率0.3%、0.0±2dbm(負荷10kohm)
OUTPUT R1；1kHz、sine波、歪率0.3%、0.0±2dbm(負荷10kohm)
OUTPUT L2；1kHz、sine波、歪率0.3%、0.0±2dbm(負荷10kohm)
OUTPUT R2；1kHz、sine波、歪率0.3%、0.0±2dbm(負荷10kohm)

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テストの終了方法
[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 39:  PCM to Eff Para      Output Off
```

40. FM to Effect Parallel

```
* 40:  FM to Eff Para
```

Effectを通ったFM側の信号が、OUTPUT L1、OUTPUT L2より正常に出力されていることを確認する。
信号源は、FMSEL＝L-OPS3(IC220)のSO0(CH0)-M3(IC256)のDIOUT0,1-DSP2(IC226,227)のSO0,1のルートを使っています。
Effect部はTEST39と同じです。
OUTPUT L1、OUTPUT R1、OUTPUT L2、OUTPUT R2 にジャックを差し込み(他はオープン)、出力波形、出力レベルを、オシロスコープ、レベル計 (12.47kHz フィルター付き) で観測する。
マスターボリュームは max とする。発音中は、LCD 表示が以下の様になる。

```
* 40:  FM to Eff Para      Output On
```

チェック項目
OUTPUT L1 ；1kHz、sine波、0.0±2dbm(負荷10kohm)
OUTPUT L2 ；1kHz、sine波、0.0±2dbm(負荷10kohm)

テストの終了方法
[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 40:  FM to Eff Para      Output Off
```

41. FM to Effect Seri

```
* 41:  FM to Eff Seri
```

シリアル接続されたエフェクトを通った信号がOUTPUT L1に正常に出力されている事を確認する。
尚信号源は、FMSEL＝L-OPS3(IC220)のSO0(CHO) - M3(IC256)のDIOUT0,1-DSP2(IC226)のSO2 - DSP2(IC227)のSO0 - MIX5(IC228)のMXO0のルートを使用。MOD、DRAMは使用していない。2基のDSP2の接続はシリアルです。
OUTPUT L1にジャックを差し込み(他はオープン)、出力波形、出力レベルをオシロスコープ、レベル計(12.47kHz フィルター付き)で観測する。
マスターボリュームはmaxとする。発音中は、LCD表示が以下のようになる。

```
* 41:  FM to Eff Seri      Output On
```

チェック項目
OUTPUT L1 ；1kHz、sine波、0.0±2dbm (負荷10kohm)

テストの終了方法
[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 41:  FM to Eff Seri      Output Off
```


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42. PCM Check

```
* 42: PCM Check
```

WAVE ROM 012000番地～01FFFF番地に記録されている音を、M3(IC257), INDV0端子(CH0)-PAN(IC216) S1, S2-PAN(IC215)S1, S2-MIX5(IC228)のMXO0,1を通してOUTPUT L1に出力する。
OUTPUT L1 にジャックを差し込み、OUTPUT L1の出力波形を観測する。
マスターボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

```
* 42: PCM Check          Output On
```

チェック項目
聴感

テストの終了方法
[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 42: PCM Check          Output Off
```

43. FM Thru M3(PCM)

```
* 43: FM Thru M3(PCM)
```

EGM2で周波数 SWEEPされた正弦波をL1, R1, L2, R2各端子より2ch分交互に出力する。音源は、FMSEL＝H-EGM2(IC217)-FMSEL＝H-OPS3(IC218)の SO0(CH1)， SO1(CH9)-M3(IC257)の INDV0(CH5),INDV1(CH6)-PAN(IC216)のS1, S2-PAN(IC215)のS1、S2-MIX5(IC228)のMXO0,1のルートを使用している。
OUTPUT L1にジャックを差し込み、出力波形を観測する。又、レベルが周波数SWEEPに対し著しく変化しない事を確認する。
マスターボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

```
* 43: FM Thru M3(PCM)  Output On
```

チェック項目
聴感

テストの終了方法
[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 43: FM Thru M3(PCM)  Output Off
```

44. FM Thru M3(FM)

```
* 44: FM Thru M3(FM)
```

EGM2で周波数 SWEEPされた正弦波をL1, R1, L2, R2各端子より2ch分交互に出力する。音源は、FMSEL＝L-EGM2(IC219)-FMSEL＝H-OPS3(IC220)の SO0(CH0)， SO1(CH8)-M3(IC256)の INDV0(CH14),INDV1(CH15)-PAN(IC215)のS1, S2-MIX5(IC228)のMXO0,1のルートを使用している。
OUTPUT L1にジャックを差し込み、出力波形を観測する。又、レベルが周波数SWEEPに対し著しく変化しない事を確認する。
マスターボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

```
* 44: FM Thru M3(FM)  Output On
```

チェック項目
聴感

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テストの終了方法
[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 44: FM Thru M3(FM)  Output Off
```

45. Feedback FM- M3

```
* 45: Feedback FM->M3
```

EGM2で周波数 SWEEPされた正弦波が、M3を通してフィードバックされる。2ch分交互に出力される。
音源は、TEST 43と同じ、但しM3(IC257)のINDV0, INDV1の信号がOPS3(IC218)のSI0,SI1端子にフィードバックされる。
OUTPUT L1にジャックを差し込み、出力波形を観測する。
特にフィードバックされて歪みっぽい音である事を確認する。
マスターボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

```
* 45: Feedback FM->M3  Output On
```

チェック項目
聴感

テストの終了方法
[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 45: Feedback FM      Output Off
```

46. ハイクリック発音

```
* 46: Click High
```

OUTPUT L1, L2, R1, R2 より正常なハイクリック信号が出力されていることを確認する。
OUTPUT L1、OUTPUT R1、OUTPUT L2、OUTPUT R2共にジャックを差し込み、OUTPUT L1, R1, L2, R2 の出力波形をオシロスコープで観測する。
クリックボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

```
* 46: Click High     Click On
```

チェック項目
聴感により、ハイクリックと判別がつくことを確認する。
出力波形が、なまった方形波であることを確認する。
500mVp-p

テストの終了方法
[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 46: Click High      Click Off
```

47. ロークリック発音

```
* 47: Click Low
```

OUTPUT L1より正常なロークリック信号が出力されていることを確認する。
OUTPUT L1、OUTPUT R1、OUTPUT L2、OUTPUT R2 共にジャックを差し込み、OUTPUT L1 の出力波形をオシロスコープで観測する。
クリックボリュームはmaxとする。発音中は、LCD表示が以下の様になる。

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```
* 47: Click Low      Click On
```

チェック項目
聴感により、ロークリックと判別がつくことを確認する。
出力波形が、なまった方形波であることを確認する。
500mVp-p

テストの終了方法
[EXIT]を押すと、次の画面を表示し、発音は終了し、テストナンバー待ち状態になる。

```
* 47: Click Low      Click Off
```

48. ジャック オールオフ

```
* 48: Jack All Off
```

サスティーン、フットスイッチはプラグを差したままで、フットボリューム、フットコントロール、ブレスコントロールのジャックにプラグを差さない状態で、次の状態が表示される事。

```
* 48: Jack All Off          SU FS
```

その後、サスティーン、フットスイッチのペダルを踏みながらプラグを抜いた時、〝OK〟が表示される事を確認する。

判定結果の表示

OK

```
* 48: Jack All Off                    OK
```

NG

```
* 48: Jack All Off     FV             NG
```

(フットボリュームのジャックがNGの場合)

デストの終了方法
判定を表示し、出力して終了する。

49. ファクトリーセット

```
* 49: Factory Set
```

次のデータを、イニシャルデータにセットする。
シンセサイザーシステム
インターナル64ボイス
インターナル16マルチ
シーケンサーセットアップ
テストを実行すると、次の画面が表示される。

```
* 49: Factory Set      [NO] or [YES] ?
```

[YES]を押すと、ファクトリーセットされる。
[NO]を押すと、セットされない。

判定結果の表示
セットされた場合

```
* 49: Factory Set                    OK
```


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セットされなかった場合

```
* 49: Factory Set     [NO] or [YES] ?
```

テストの終了方法
判定を表示、出力して終了する。

ファクトリーセット終了後、次に示すシステムデータがセットされる。

＊＊＊＊＊＊＊＊＊＊＊＊
SYNTH
＊＊＊＊＊＊＊＊＊＊＊＊

Note Shift……+0
Fine Turning ……+0
Fixed Velocity……off
Velocity Curve ……0(normal)
Assignable Foot Switch ……65
Assignable Wheel ……13
Edit Confirm ……on
Kbd Trans Ch ……1
Voice Recv Ch……1
Local on/off……on
Note on/off ……all
Device Number ……all
Bulk Protect ……on
Program Change……on
Pattern Protect ……on
MDR Memory……0Kbyte

Greeting Message

〝Create YOUR sound ! 〞
〝 ...I'm ready〞

PAN factary set

I1～I32 = P1 ～P32

MCT factory set

I 1 = P62(Far East)
I 2 = P63(Blue)

VOICE

I-A01～D16 =P1-A01～D16

MULTI

I-01～16 =P1-01～16

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＊＊＊＊＊＊＊＊＊＊＊＊
SEQUENCER
＊＊＊＊＊＊＊＊＊＊＊＊

record quantize ……0(off)
click sw……1(rec)
click beat ……0(1/4)

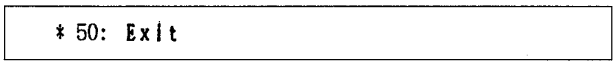
record type ……over
sync ……0(internal)
receive ……KBD

filter velocity ……1(on)
filter control change ……1(on)
filter pitch bend ……1(on)
filter program change ……1(on)
filter after touch……0(off)
filter exclusive ……1(on)

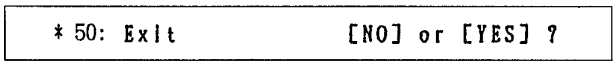
midi control ……1(on)
click/beat ……1/96

accent1 value ……24
accent2 value ……56
accent3 value ……88
accent4 value ……120
gate type ……1(normal)

50. EXIT



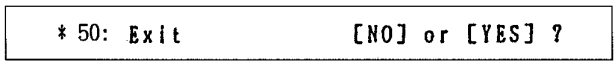
テストを実行すると、次の画面が表示される。



[YES]を押すと、テストモードから抜ける。
[NO]を押すと、テストナンバー待ち状態になる。

判定結果の表示

テストモードから抜けなかった場合



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■ ERROR MESSAGES

MIDI

MIDI buffer full !
When the SY99 attempted to receive or transmit a large amount of MIDI data, its handling capacity was exceeded.

MIDI data error !
An error occurred when receiving MIDI data.

MIDI checksum error !
An error occurred when receiving bulk data.

Data empty !
Sequence data (bulk) was received, but the message contained no data.

Bulk rejected; sample exists !
An unoccupied sample number could not be found, so the bulk sample data was not received.

Song memory full !
When receiving sequence data (bulk), the internal memory capacity was exceeded, and not all the data was received.

Device number is off !
Since the device number is off, bulk data cannot be transmitted or received.

Device number mismatch !
Since the device numbers did not match, the bulk data was not received.

Bulk canceled !
While receiving or transmitting bulk data, EXIT was pressed to abort the operation.

Data card

Data card not ready !
The data card is not correctly inserted into the slot.

Card protected !
Since the memory protect switch of the card is on, data cannot be saved to the card.

Illegal format !
The card is the wrong format.

Verify error !
The data was not correctly saved.

Illegal size !
The data card is not of the 64 Kbyte variety accepted by the SY99.

Wave card

Wave card not ready !
The wave card is not correctly inserted into the slot.

Different wave card (ID=) !
The wave card which is inserted is not the one used by the voice or multi.

ID Number mismatch !
A multi includes voices which use two or more wave cards.

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Disk

Disk not ready !
The disk is not correctly inserted into the disk drive.

Illegal change !
During the backup operation, the original and back up disks were inserted in the wrong order.

Illegal disk !
The data in the disk is faulty.

Bad disk !
The disk is faulty.

File not found !
The file was not found.

Write protected !
The disk is write protected.

Disk full !
There is no more memory available on the disk.

Directory full !
The directory area on the disk is full, and new files cannot be created.

Media type error !
The disk is the wrong type.

Illegal file !
The file is not for the SY99.

Song memory full !
The sequencer memory is full.

Sample memory full !
The sample memory area is full.

MDR memory full !
The MDR memory area is full.

Sequencer and display

Please stop sequencer !
The sequencer cannot play during disk or card loading or saving, during bulk data transmission, or during master control setting.

Illegal time !
You attempted to execute the Get Pattern operation, but the time signature was incorrect.

Illegal input !
You attempted to enter an invalid data value in Edit Insert mode.

Range is exceeded !
The parameter you specified in an edit job is beyond the valid range.

Data not found !
When you executed the Search Part operation in Chain Pattern, the specified data was not found.

Internal buffer full !
More sequence data was played back than could be sounded.

Battery

Change internal battery !
The internal backup battery needs to be replaced.

Change wave BAT !
The backup battery for the internal MDR/sample RAM area or an expansion memory board (as specified in the message) needs to be replaced.

Change card battery !
The card backup battery needs to be replaced.

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Other

Use bank D !
The voice must be stored in bank D.

Only C1–C6 data valid !
You are attempting to save a drum voice to bank A, B, or C. Only the data for notes C1 through C6 will be saved as a result of this operation. Save the voice to bank D if you wish to save the data for all notes E0 through G6.

Illegal mark !
You attempted to mark a display page while using the compare function.

Use bank A–C !
The voice must be stored in bank A, B, or C.

Sample

Please allocate sample memory !
You attempted to enter Sample utility mode, but no memory has been allocated for sample use. Please use the System utility memory allocate function to allocate memory for sample use.

Not enough memory for sample !
You attempted to reduce the memory area allocated for sample use beyond the minimum required by currently existing samples. Please initialize the sample memory or delete samples before attempting to reduce the amount of MDR/sample RAM allocated for sample use.

Over internal waveform number !
You attempted to load a number of waveforms exceeding the internal memory maximum of 64.

Sample data not exists !
You attempted copy or save sample data from a sample number which does not contain any data.

Sample data protected !
Copy-protected sample data may not be saved to disk or transmitted via MIDI dump.

Over sample number !
You attempted to load a number of samples exceeding the internal memory maximum of 99.

MDR

Please allocate MDR memory !
You attempted to enter Sample utility mode, but no memory has been allocated for MDR use. Please use the System utility memory allocate function to allocate memory for MDR use.

Not enough memory for MDR !
You attempted to reduce the memory area allocated for MDR use beyond the minimum required by currently existing MDR data. Please initialize the MDR memory or delete MDR data before attempting to reduce the amount of MDR/sample RAM allocated for MDR use.

MDR data already exists !
You attempted to input data to an MDR number already occupied by data. Please choose a different MDR number as the destination for incoming data.

MDR data not found !
You attempted to output data from an empty MDR number.

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■エラーメッセージ

MIDI関係	
ディスプレイ表示	メッセージの内容
MIDI buffer full !	一度に多量のMIDIデータが送受信されたため、送受信ができません。データ量を減らしてください。
MIDI data error !	MIDIデータを受信した際、異常がありました。
MIDI checksum err !	バルクデータの受信の際、異常がありました。
Bulk canceled !	シーケンスバルクデータ受信中や、サンプルダンプスタンダード送信中にEXITが押されたので、データの送受信を中止しました。
Bulk protected !	バルクプロテクトがオンになっているため、バルクデータの受信ができません。
Device number is off !	デバイスナンバーがオフになっているため、バルクデータの送受信ができません。
Device number mismatch !	デバイスナンバーのチャンネルが一致していないため、バルクデータの受信ができません。

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データカード関係	
ディスプレイ表示	メッセージの内容
Data Card not ready !	カードが本体に正しくセットされていません。
Card protected !	カード自体のプロテクトスイッチがオンになっているため、カードへのデータの書き込みができません。
Illegal format !	カードのフォーマットが違います。
Verify error !	カードのセーブが正しく行われていません。
Illegal size !	カードの容量が64KByte ではありません。
Verity error !	カードの不良で、書き込みができません。

ウェイブカード関係	
ディスプレイ表示	メッセージの内容
Wave card not ready !	ウェイブカードが本体に正しくセットされていません。
Different wave card (ID=) !	プレイしようとしているボイスで使用されるべきウェイブフォームは、現在カードスロットにセットされているものと異なるウェイブフォームカードのものです。
ID Number mismatch !	同時には1つのウェイブフォームカードしか使用できないにもかかわらず、マルチを構成する各々のボイスの必要なウェイブカードが異なっているため正常に発音できません。

ディスク関係	
ディスプレイ表示	メッセージの内容
Disk not ready !	ディスクが本体に正しくセットされていません。
Illegal change !	バックアップ作業中に、新旧のディスクの順番を間違って挿入しました。
Illegal disk !	ディスク内のデータ不良です。
Bad disk !	ディスク不良です。

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File not found !	ファイルが見つかりません。
Write protected !	ディスクがプロテクトされています。
Disk full !	ディスクのメモリーが一杯です。
Directory full !	ディレクトリのエリアが一杯で、ファイルが作れません。
Media type error !	ディスクの種類が違います。
Illegal file !	本機用のファイルではありません。

シーケンサー関係	
ディスプレイ表示	メッセージの内容
Please stop sequencer !	ディスクやカードのロード、セーブまたは、バルク送信などは、シーケンサーのプレイ中には実行することはできません。
Illeagal Time !	ゲットパターンを実行しようとしたが、設定されている拍子が異なっています。
Range is exceeded !	エディットジョブで指定したパラメータは設定できる範囲を超えています。
Data not Found !	チェインパターンでサーチパートを実行したが、目的のデータはありませんでした。
Illeagal input !	エディットのインサートモードで入力しようとしたデータの値が正しくありません。
Internal buffer full !	シーケンサーを再生している時、シーケンスデータが多くて、すべてを発音することができません。（エラー処理の間、しばらくシーケンサーの発音が止まります）
Data Empty !	エディットジョブを実行しようとした小節には、データがありません。
Song Memory full !	シーケンサー用の内部メモリーが一杯です。エディットジョブの実行、MIDIの受信、ディスクのロードができません。

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電池関係	
ディスプレイ表示	メッセージの内容
Change internal battery !	本体内のバックアップバッテリーが寿命です。
Change card battery !	カードのバックアップバッテリーが寿命です。
Change wave BAT ! ――――	インターナル RAMまたは、増設 RAMボードのバックアップバッテリー（―――の部分に表示）が寿命です。

サンプル関係	
ディスプレイ表示	メッセージの内容
Sample memory full !	サンプル領域が不足するため、データのロードができません。
Please allocate Sample memory !	サンプル領域が設定されていません。
Not enough memory for Sample !	サンプル領域が不足するため、メモリーアロケートの設定を変更できません。
Sample data not exists !	指定されたサンプルナンバーにサンプルが存在しないため、バルクの送信、ディスクへのセーブ、サンプルのコピーができません。
Sample data protected !	サンプルにプロテクトがかかっているため、データのセーブ、バルク送信ができません。
Over internal waveform number !	ウェイブフォームの数が多すぎてロードできません。
Over Sample number !	サンプルの数が多すぎてロードできません。
Bulk rejected; Sample exists !	空きサンプルナンバーがないので、サンプルデータスタンダードを受信することができません。

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MDR 関係	
ディスプレイ表示	メッセージの内容
MDR memory full !	MDR 領域が不足するため、データのロードができません。
Please allocate MDR memory !	MDR 領域が設定されていません。
Not enough memory for MDR !	MDR 領域が不足するため、メモリーアロケートの設定を変更できません。
MDR data already exists !	既にデータが存在しているので、インプットできません。
MDR data not found !	指定された MDRナンバーにデータが存在しません。

その他	
ディスプレイ表示	メッセージの内容
Use bank D !	・4エレメントタイプのボイスは、バンクDにしかストアできません。 ・Disk 1 Voice load の時、セーブ時にバンクDにあったボイスはバンクA～Cにしかロードできません。
Use bank A-C !	Disk 1 Voice load の時、セーブ時にバンクA－CにあったボイスはバンクA－Cにしかロードできません。
Illegal mark !	コンペア中のため、現在の画面には、マークすることはできません。
Only C1-C6 data valid !	ドラムセットボイスをバンクA～Cにストアすると、C1～C6のデータ以外は無効となります。

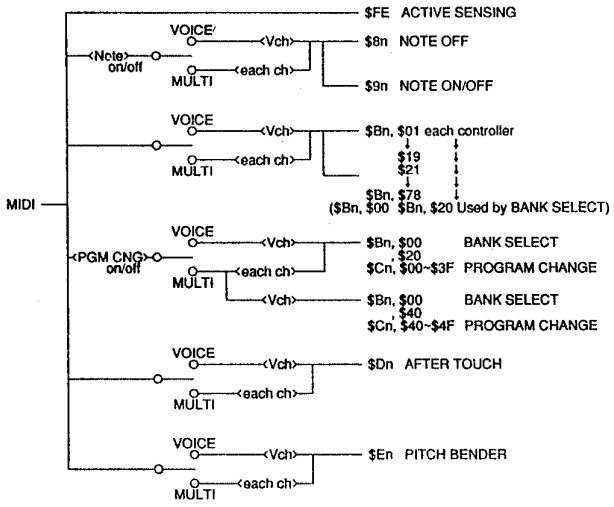
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■MIDI DATA FORMAT

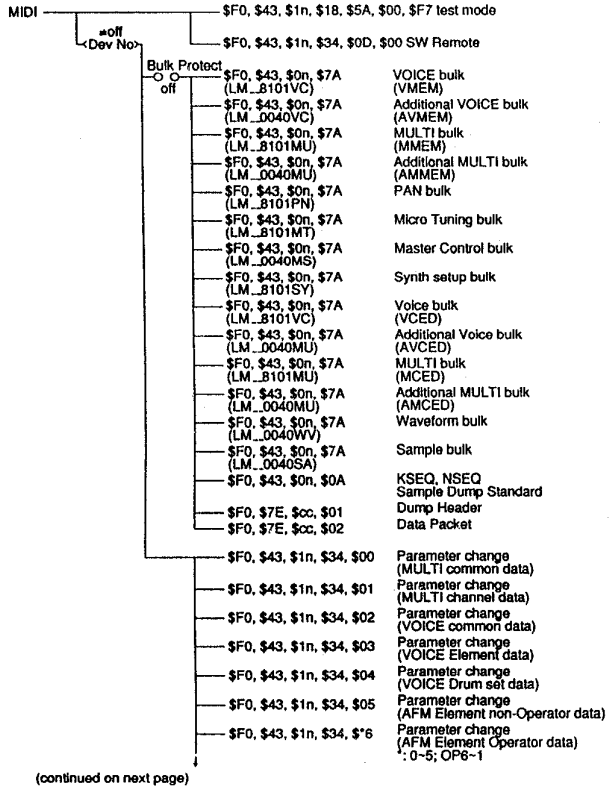
1. Synthesizer mode

1.1 MIDI reception/transmission block diagram

< MIDI reception conditions > 1/2
Vch ... Voice Receive ch.



< MIDI reception conditions > 2/2



(continued on next page)

(continued on previous page)

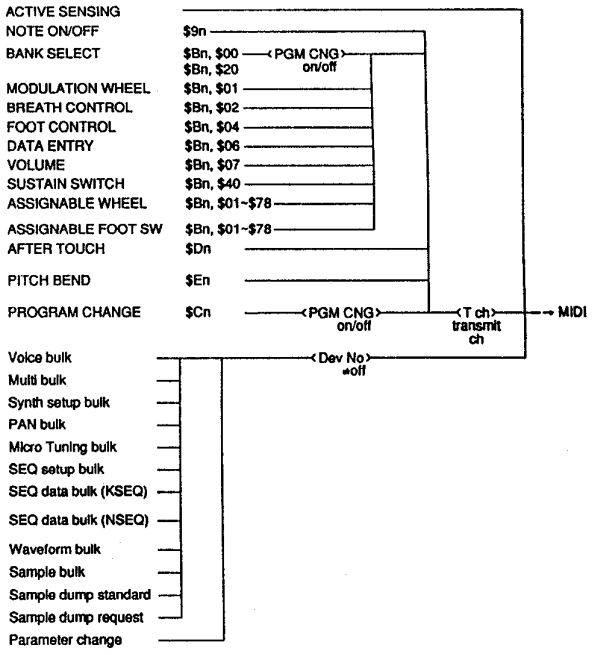
$F0, $43, $1n, $34, $07 Parameter change (AWM Element data)
$F0, $43, $1n, $34, $08 Parameter change (Effector data)
$F0, $43, $1n, $34, $09 Parameter change (Filter data)
$F0, $43, $1n, $34, $0A Parameter change (PAN data)
$F0, $43, $1n, $34, $0B Parameter change (Micro Tuning data)
$F0, $43, $1n, $34, $0E Parameter change (Master Control, Waveform and Sample data)
$F0, $43, $1n, $34, $0F Parameter change (Synth System Setup data)
$F0, $43, $1n, $04, $40 Parameter change (Master Tuning; same format as DX1)

$F0, $43, $2n, $7A (LM_8101VC) 1 VOICE bulk D.req.
$F0, $43, $2n, $7A (LM_0040VC) 1 VOICE bulk D.req. (VMEM + AVMEM)
$F0, $43, $2n, $7A (LM_8101MU) 1 MULTI bulk D.req.
$F0, $43, $2n, $7A (LM_0040MU) 1 MULTI bulk D.req. (MMEM + AMMEM)
$F0, $43, $2n, $7A (LM_8101PN) 1 PAN bulk D.req.
$F0, $43, $2n, $7A (LM_8101MT) 1 Micro Tuning bulk D.req.
$F0, $43, $2n, $7A (LM_8101SY) System Setup bulk D.req.
$F0, $43, $2n, $7A (LM_0040WV) 1 Waveform bulk D.req.
$F0, $43, $2n, $0A KSEQ, NSEQ bulk D.req. Sample Dump Standard
$F0, $7E, $cc, $03 Dump Request
$F0, $7E, $cc, $7C Wait
$F0, $7E, $cc, $7D Cancel
$F0, $7E, $cc, $7E NAK
$F0, $7E, $cc, $7F ACK

Dev No = Device Number

VCED = Voice edit buffer
AVCED = Additional Voice edit buffer
MCED = Multi edit buffer
AMCED = Additional Multi edit buffer
VMEM = Voice memory
AVMEM = Additional Voice memory
MMEM = Multi memory
AMMEM = Additional Multi memory

< MIDI transmission conditions >



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1.2 Channel messages

1.2.1 Transmission

1.2.1.1 Note on/off

Transmission note range = C1 (36) ... C6 (96)
Velocity range = 0 ... 127 (0: note off)

1.2.1.2 Control change

When the following controllers are moved MIDI data will be transmitted.

ctl#	parameter	data rng
1	Modulation wheel	1~127
2	Breath control	1~127
4	Foot control	1~127
6	Data entry slider	1~127
7	Volume pedal	1~127
64	Sustain switch	1, 127
96	data increment Sw.	127
97	data decrement Sw.	127
0~120	Assignable wheel	1~127
0~120	Assignable foot sw	1, 127

← Transmitted in all modes other than Voice Play mode or Multi Play mode.

1.2.1.3 Program change

When a voice is selected in voice mode, or when a multi is selected in multi mode, a program change is transmitted. The program change number is assigned according to the mode, as follows.

		Bank No. (MSB), (LSB)	PGM CNG No.
Voice	Internal	1 ($00), ($00)	1~64 ($00~$3F)
	Card	2 ($00), ($01)	↓
	Preset 1	3 ($00), ($02)	↓
	Preset 2	6 ($00), ($05)	↓
Multi	Internal	17 ($00), ($10)	65~80 ($40~$4F)
	Card	18 ($00), ($11)	↓
	Preset	19 ($00), ($12)	↓
Voice In Multi	Internal	33 ($00), ($20)	1~64 ($00~$3F)
	Card	34 ($00), ($21)	↓
	Preset 1	35 ($00), ($22)	↓
	Preset 2	38 ($00), ($25)	↓

BANK SELECT $Bn, $00, $00~$7F (MSB)
$Bn, $20, $00~$7F (LSB)
PROGRAM CHANGE $Cn, $00~$7F

No bank select or program change messages are transmitted if Program Change mode is set to OFF.

1.2.1.4 Pitch bend

Pitch bend is transmitted with 7 bit precision.

1.2.1.5 Aftertouch

Transmitted from MIDI when aftertouch is operated.

1.2.1.6 Channel mode messages

Channel mode messages are not transmitted.

1.2.2 Reception

1.2.2.1 Note on/off

Received note range = C-2 ... G8
Velocity range = 1 ... 127 (note on only)
* A system setup parameter allows selection of
normal = receive all note numbers
odd = receive odd note numbers
even = receive even note numbers

1.2.2.2 Control change

The following parameters can be controlled via MIDI.

cntrl#	parameter	data rng
1~120	Pitch Modulation	0...127
1~120	Amplitude Modulation	0...127
1~120	Filter Modulation	0...127
1~120	Pan LFO Modulation	0...127
1~120	Cutoff Bias	0...127
1~120	Pan Bias	0...127
1~120	EG Bias	0...127
1~120	Volume (assignable)	0...127
5	Portamento Time	0...127
7	Volume	0...127
64	Sustain Switch	0...127
65	Portamento Switch	0...127

Control #s 0($00) and 32($20) are used for bank select.

1.2.2.3 Program change

The SY99 responds as follows when a program change message is received:

1) If Program Change mode is OFF:
: Bank select and program change messages are not recognized.

2) If Program Change mode is ON:
: Response as described by the chart in 2.2.1.3. Voice selection is carried out upon reception of the program change message.

1.2.2.4 Pitch bend

Pitch bend is recognized by the MSB only.

1.2.2.5 Aftertouch

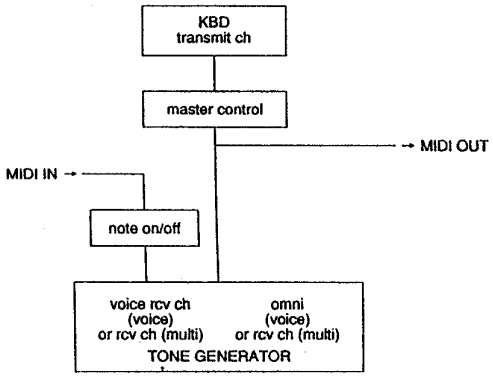
Channel aftertouch is recognized. Polyphonic aftertouch is not recognized.

1.2.2.6 Channel mode messages

Not received

1.2.3 Diagram of the keyboard section and tone generator section

* Normal mode

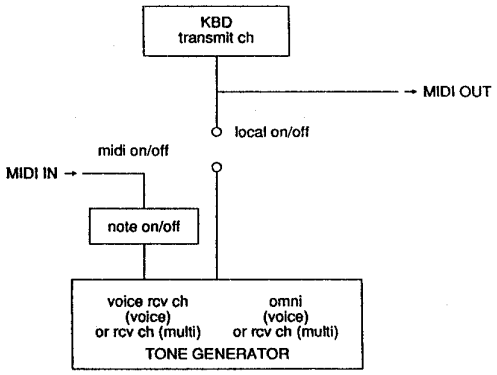


Note 1) In voice mode, sound will be produced even if the Voice Receive Channel does not match the Keyboard Trans. Channel.

Note 2) Notes from the keyboard and notes from MIDI will be distinguished in polyphonic mode, and not distinguished in monophonic mode. Controller data from the keyboard and controller data from the MIDI (control change, aftertouch, pitch bend) will not be distinguished except for the sustain switch.

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* Master control mode



2. System exclusive messages

2.1 Parameter changes

The SY99 is capable of transmitting and recognizing the following 17 types of parameter change message (with the exception of 14. Switch Remote, which is recognized but cannot be transmitted). Recognition of 14. Switch Remote has the same effect on the display as pressing the switch.

1). Multi Common Data parameter change
2). Multi Channel Data parameter change
3). Voice Common Data parameter change
4). Voice Element Data parameter change
5). Voice Drum Set Data parameter change
6). AFM Element Common Data parameter change
7). AFM Element Operator Data parameter change
8). AWM Element Data parameter change
9). Waveform Data parameter change
10). Effect Data parameter change
11). Filter Data parameter change
12). PAN Data parameter change
13). Micro Tuning Data parameter change
14). Switch Remote parameter change
15). Master Control Data parameter change
16). System Setup Data parameter change
17). Sample Data parameter change

Parameter message recognition can be turned off by turning the Device Number switch off. It cannot be turned off using any other MIDI switch.

2.1.1 Multi Common Data parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00000000   00
00000000   00
00000000   00
000ppppp   ppppp    - Table 1-1, N2
00000000   00
0vvvvvvv   vvvvvvv - ascii
11110111   F7
```

This message modifies Multi Common data (multi name) one parameter at a time. When this message is received, the following will occur.

Voice Play mode	: ignore.
Voice Edit mode	: ignore.
Multi Play mode	: move to Multi Edit mode and receive. (Display changes.)
Multi Edit mode	: receive. (Display changes.)
Voice Edit mode in Multi	: receive.
Utility mode (Voice mode)	: ignore.
Utility mode (Multi mode)	: move to Voice Edit mode and receive. (Display changes.)

2.1.2 Multi Channel Data parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00000001   01
0000cccc   cccc     - Voice Channel Number
00000000   00
000ppppp   ppppp    - Table 1-2, N2
00000000   00
0vvvvvvv   vvvvvvv - Data Value
11110111   F7
```

This message modifies the channel data of a multi one parameter at a time. When this message is received, the following will occur.

Voice Play mode	: ignore.
Voice Edit mode	: ignore.
Multi Play mode	: move to Multi Edit mode and receive. (Display changes.)
Multi Edit mode	: receive. (Display changes.)
Voice Edit mode in Multi	: receive.
Utility mode (Voice mode)	: ignore.
Utility mode (Multi mode)	: move to Voice Edit mode and receive. (Display changes.)

2.1.3 Voice Common Data parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00000010   02
00000000   00
00000000   00
0ppppppp   ppppppp - Table 1-3, N2
00000000   00
0vvvvvvv   vvvvvvv - Data Value
11110111   F7
```

This message modifies voice common data one parameter at a time. When this message is received, the following will occur.

Voice Play mode	: move to Voice Edit mode and receive. (Display changes.)
Voice Edit mode	: receive. (Display changes.)
Multi Play mode	: ignore.
Multi Edit mode	: ignore.
Voice Edit mode in Multi	: receive. (Display changes.)
Utility mode (Voice mode)	: move to Voice Edit mode and receive. (Display changes.)
Utility mode (Multi mode)	: ignore.

2.1.4 Voice Element Data parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00000011   03
0ee00000   ee       - Element Number
00000000   00
0000pppp   pppp     - Table 1-4, N2
00000000   00
0vvvvvvv   vvvvvvv - Data Value
11110111   F7
```

This message modifies voice element data one parameter at a time. When this message is received, the following will occur.

Voice Play mode	: if the specified element exists, move to Voice Edit mode and receive. If not, ignore.
Voice Edit mode	: if the specified element exists, receive. if not, ignore. (The screen goes into Edit Mode.)
Multi Play mode	: ignore.
Multi Edit mode	: ignore.
Voice Edit mode in Multi	: same as for Voice Edit mode.
Utility mode (Voice mode)	: same as for Voice Play mode.
Utility mode (Multi mode)	: ignore.

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2.1.5 Voice Drum Set Data parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00000100   04
0mmmmmmm   mmmmmmm - MIDI Note Number
00000000   00
0000pppp   pppp     - Table 1-5, N2
0000000v   v        - Data Value (MSB)
0vvvvvvv   vvvvvvv - Data Value (LS7bits)
11110111   F7
```

This message modifies voice drum set data one parameter at a time. When this message is received, the following will occur.

Voice Play mode	: if originally a drum set, move to Voice Edit mode and receive. (Display changes.) If not, ignore. (The screen goes into Edit Mode.)
Voice Edit mode	: if originally a drum set, receive. (Display changes.) If not, ignore.
Multi Play mode	: ignore.
Multi Edit mode	: ignore.
Voice Edit mode in Multi	: same as for Voice Edit mode.
Utility mode (Voice mode)	: same as for Voice Play mode.
Utility mode (Multi mode)	: ignore.

2.1.6 AFM Element Common Data parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00000101   05
0ee00000   ee       - Element Number
00000000   00
000ppppp   ppppp    - Table 1-6, N2
00000000   00
0vvvvvvv   vvvvvvv - Data Value
11110111   F7
```

This message modifies AFM element common data one parameter at a time. When this message is received, the following will occur.

Voice Play mode	: if the specified element exists and is AFM, move to Voice Edit mode and receive. (Display changes.) If not, ignore. (The screen goes into Edit Mode.)
Voice Edit mode	: if the specified element exists and is AFM, receive. If not, ignore. (Display changes.)
Multi Play mode	: ignore.
Multi Edit mode	: ignore.
Voice Edit mode in Multi	: same as Voice Edit mode.
Utility mode (Voice mode)	: same as Voice Play mode.
Utility mode (Multi mode)	: ignore.

2.1.7 AFM Element Operator Enable Parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00000101   05
0ee00000   ee       - Element Number
01111111   7F
01111111   7F
00000000   00
00vvvvvv   vvvvvv   - Data Value
11110111   F7
```

This message modifies AFM operator enable data one parameter at a time. When this message is received, the following will occur.

Voice Play mode	: if the specified element exists and is AFM, move to Voice Edit mode and receive. (Display changes.) If not, ignore. (The screen goes into Edit Mode.)
Voice Edit mode	: if the specified element exists and is AFM receive. If not, ignore. (Display changes.)
Multi Play mode	: ignore.
Multi Edit mode	: ignore.
Voice Edit mode in Multi	: same as Voice Edit mode.
Utility mode (Voice mode)	: same as Voice Play mode.
Utility mode (Multi mode)	: ignore.

2.1.8 AFM Element Operator Data Parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
0ooo0110   ooo      - 6 — (Operator Number)
0ee00000   ee       - Element Number
00000000   00
00pppppp   pppppp   - Table 1-7, N2
0000000v   v        - Data Value (MSB)
0vvvvvvv   vvvvvvv - Data Value (LS7bits)
11110111   F7
```

This message modifies AFM operator parameter data one parameter at a time. When this message is received, the following will occur.

Voice Play mode	: if the specified element exists and is AFM, move to Voice Edit mode and receive. (Display changes.) If not, ignore. (The screen goes into Edit Mode.)
Voice Edit mode	: if the specified element exists and is AFM, receive. (Display changes.) If not, ignore.
Multi Play mode	: ignore.
Multi Edit mode	: ignore.
Voice Edit mode in Multi	: same as in Voice Edit mode.
Utility mode (Voice mode)	: same as in Voice Play mode.
Utility mode (Multi mode)	: ignore.

2.1.9 AWM Element Data parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00000111   07
0ee00000   ee       - Element Number
00000000   00
0ppppppp   ppppppp - Table 1-8, N2
0000000v   v        - Data Value (MSB)
0vvvvvvv   vvvvvvv - Data Value (LS7bits)
11110111   F7
```

This message modifies AWM element data one parameter at a time. When this message is received, the following will occur.

Voice Play mode	: if the specified element exists and is AWM, move to Voice Edit mode and receive. (Display changes.) If not, ignore. (The screen goes into Edit Mode)
Voice Edit mode	: if the specified element exists and is AWM, receive. If not, ignore. (Display changes.)
Multi Play mode	: ignore.
Multi Edit mode	: ignore.
Voice Edit mode in Multi	: same as in Voice Edit mode.
Utility mode (Voice mode)	: same as in Voice Play mode.
Utility mode (Multi mode)	: ignore.

2.1.10 Waveform and Sample parameter change

Waveform parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn - Device Number
00110100   34
00001110   0E
00wwwwww   wwwwww - Waveform Number
00000101   05
0ppppppp   ppppppp - Table 1-9, N2
00000000   00
0vvvvvvv   vvvvvvv - Data Value
11110111   F7
```

Sample parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn - Device Number
00110100   34
00001110   0E
0sssssss   sssssss - Sample Number
00000101   06
0ppppppp   ppppppp - Table 1-17, N2
00000000   00
0vvvvvvv   vvvvvvv - Data Value
11110111   F7
```

These messages change a single parameter of waveform or sample data. These messages are recognized, and the data for the specified waveform or sample are changed, regardless of the SY99's current mode setting.

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2.1.11 Effect Data parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00001000   08
00000000   00
00000000   00
000ppppp   ppppp    - Table 1-10, N2
00000000   00
0vvvvvvv   vvvvvvv - Data Value
11110111   F7
```

This message modifies effect data one parameter at a time. When this message is received, the following will occur.

Voice Play mode	: move to Voice Edit mode and receive.
Voice Edit mode	: receive. (Display changes.)
Multi Play mode	: move to Multi Edit mode and receive.
Multi Edit mode	: receive. (Display changes.)
Voice Edit mode in Multi	: receive. Modify the Multi effect. (Display changes.)
Utility mode (Voice mode)	: same as in Voice Play mode.
Utility mode (Multi mode)	: same as in Multi Play mode.

2.1.12 Filter Data parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00001001   09
0ee00fff   ee       - Element Number,  fff - filter Number
00000000   00
00ppppppp  ppppppp  - Table 1-11, N2
0000000v   v        - Data Value (MSB)
0vvvvvvv   vvvvvvv - Data Value (LS7bits)
11110111   F7
```

This message modifies filter data one parameter at a time. When this message is received, the following will occur.

Voice Play mode	: if the specified element exists, move to Voice Edit mode and receive. If not, ignore.
Voice Edit mode	: if the specified element exist, receive. If not, ignore. (Display changes.)
Multi Play mode	: ignore.
Multi Edit mode	: ignore.
Voice Edit mode in Multi	: same as in Voice Edit mode.
Utility mode (Voice mode)	: same as in Voice Play mode.
Utility mode (Multi mode)	: ignore.

2.1.13 PAN Data parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00001010   0A
000mmmmm   mmmmm    - Memory Number
00000000   00
000ppppp   ppppp    - Table 1-12, N2
00000000   00
00vvvvvv   vvvvvv   - Data Value
11110111   F7
```

This message modifies dynamic pan data one parameter at a time. When this message is received, the mode will not change, and the pan data of the specified memory will be modified.

2.1.14 Micro Tuning Data parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00001010   0B
000mmmmm   mmmmm    - Memory Number
0000000p   p        - Table 1-13, N1
0ppppppp   ppppppp  - Table 1-13, N2
0vvvvvvv   vvvvvvv - Data Value (MS7bits)
0vvvvvvv   vvvvvvv - Data Value (LS7bits)
11110111   F7
```

This message modifies micro tuning data one parameter at a time. When this message is received, the mode will not change, and the micro tuning data of the specified memory will be modified.

2.1.15 Switch Remote parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00001010   0D
00000000   00
00000000   00
0ppppppp   ppppppp - Table 1-14, N2
00000000   00
0vvvvvvv   vvvvvvv - Data Value
11110111   F7
```

This message is only received, and allows remote control of all panel switches. The message will have the same effect as if that switch had been pressed.

2.1.16 Master Control Data parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00001110   0E
00nn0ttt   nnttt    - Table 1-15, T2
0ppppppp   ppppppp - Table 1-15, N1
0ppppppp   ppppppp - Table 1-15, N2
0vvvvvvv   vvvvvvv - Data Value
0vvvvvvv   vvvvvvv - Data Value
11110111   F7
```

This message modifies master control data one parameter at a time. When this message is received, the mode will not change.

2.1.17 System Setup Data parameter change

```
11110000   F0
01000011   43
0001nnnn   nnnn     - Device Number
00110100   34
00001111   0F
00000000   00
00000000   00
0ppppppp   ppppppp - Table 1-16, N2
00000000   00
0vvvvvvv   vvvvvvv - Data Value
11110111   F7
```

This message modifies system setup data one parameter at a time. When this message is received, the mode will not change.

3. Bulk dump

Reception is possible any time when not playing back or recording.
The data is transmitted when the MIDI UTILITY "bulk dump" is executed or when a dump request is received.

3.1 Voice data bulk dump

There are nine types of voice data bulk dump as follows.

1). 1AFM Voice bulk dump
2). 2AFM Voice bulk dump
3). 4AFM Voice bulk dump
4). 1AWM Voice bulk dump
5). 2AWM Voice bulk dump
6). 4AWM Voice bulk dump
7). 1AFM_1AWM Voice bulk dump
8). 2AFM_2AWM Voice bulk dump
9). Drum_set Voice bulk dump

```
 0     11110000      F0
 1     01000011      43
 2     0000nnnn      nnnn   - Device Number
 3     01111010      7A
 4     0bbbbbbb      ┐byte count
 5     0bbbbbbb      ┘
 6     01001100      4C(ascii"L")
 7     01001101      4D(ascii"M")
 8     00100000      20(ascii" ")
 9     00100000      20(ascii" ")
10     00111000      38(ascii"8")
11     00110001      31(ascii"1")
12     00110000      30(ascii"0")
13     00110001      31(ascii"1")
14     01010110      56(ascii"V")
15     01000011      43(ascii"C")
16     00000000      00
 ↓        ↓            ↓
29     00000000      00
30     0ttttttt      ttttttt - Memory_type
31     00mmmmmm      mmmmmm  - Memory Number
32     0ddddddd      ddddddd - data
 ↓        ↓            ↓
       0ssssssss     sssssss - check_sum
       11110111      F7
```


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MIDI Utility 1 Voice Bulk transmission

Memory_type = 7F
Memory Number = 00

MIDI Utility Vc & Mlt Bulk or 64 Voices Bulk transmission

Memory_type = 00 (INT)
Memory Number = start from 0 and transmit consecutively to 63 (During Vc & Mlt, start from Multi 0 and transmit consecutively to 15.)

1 Voice Bulk transmission by Dump Request

Memory_type = 00 (INT)
02 (PRESET1)
03 (PRESET2)
7F (Edit_Buffer)
Memory Number = 0~63 (the number specified by the Dump Request)

For reception, data will be processed as Edit_buffer when the Memory_type is 7F, and as INTERNAL for other cases.

* For details of the bulk dump data and dump request format, refer to table 2-1.
For transmission at the main unit panel operation, additional voice data is also transmitted. When a dump request is received, only voice data is transmitted.

3.2 Additional voice data bulk dump

1). 1AFM & 1AWM Voice bulk dump
2). 2AFM & 2AWM & 1AFM_1AWM Voice bulk dump
3). 4AFM & 4AWM & 2AFM_2AWM Voice bulk dump
4). Drum_set Voice bulk dump

```
 0      11110000        F0
 1      01000011        43
 2      0000nnnn        nnnn    - Device Number
 3      01111010        7A
 4      0bbbbbbb        ┐byte count
 5      0bbbbbbb        ┘
 6      01001100        4C(ascii"L")
 7      01001101        4D(ascii"M")
 8      00100000        20(ascii" ")
 9      00100000        20(ascii" ")
10      00110000        30(ascii"0")
11      00110000        30(ascii"0")
12      00110100        34(ascii"4")
13      00110000        30(ascii"0")
14      01010110        56(ascii"V")
15      01000011        43(ascii"C")
16      00000000        00
 ↓        ↓               ↓
29      00000000        00
30      0ttttttt        ttttttt - Memory_type
31      00mmmmmm        mmmmmm  - Memory Number
32      0ddddddd        ddddddd - data
 ↓        ↓               ↓
        0ssssssss       sssssss - check_sum
        11110111        F7
```

MIDI Utility 1 Voice Bulk transmission

Memory_Type = 7F
Memory Number = 00

MIDI Utility Vc & Mlt Bulk or 64 Voice Bulk transmission

Memory_type = 00 (INT)
Memory Number = start from 0 and transmit consecutively to 63 (During Vc & Mlt, start from Multi 0 and transmit consecutively to 15.)

1 Voice Bulk transmission by Dump Request

Memory_type = 00 (INT)
02 (PRESET1)
03(PRESET2)
Memory Number = 0~63 (the number specified by the Dump Request)

For reception, data will be processed as Edit_buffer when the Memory_type is 7F, and as INTERNAL for other cases.

* For details of the bulk dump data and dump request format, refer to table 2-2.
For transmission at the main unit panel operation or at the reception of a dump request, voice data is also transmitted.

3.3 Multi data bulk dump

```
 0      11110000        F0
 1      01000011        43
 2      0000nnnn        nnnn    - Device Number
 3      01111010        7A
 4      0bbbbbbb        ┐byte count
 5      0bbbbbbb        ┘
 6      01001100        4C(ascii"L")
 7      01001101        4D(ascii"M")
 8      00100000        20(ascii" ")
 9      00100000        20(ascii" ")
10      00111000        38(ascii"8")
11      00110001        31(ascii"1")
12      00110000        30(ascii"0")
13      00110001        31(ascii"1")
14      01001101        4D(ascii"M")
15      01010101        55(ascii"U")
16      00000000        00
 ↓        ↓               ↓
29      00000000        00
30      0ttttttt        ttttttt - Memory_type
31      00mmmmmm        mmmmmm  - Memory Number
32      0ddddddd        ddddddd - data
 ↓        ↓               ↓
        0ssssssss       sssssss - check_sum
        11110111        F7
```

MIDI Utility 1 Multi Bulk transmission

Memory_type = 7F
Memory Number = 00

MIDI Utility Vc & Mlt Bulk or 16 Multi Bulk transmission

Memory_type = 00 (INT)
Memory Number = start from 0 and transmit consecutively to 15 (During Vc & Mlt, start from Voice 0 and transmit consecutively to 63.)

1 Multi Bulk transmission by Dump Request

Memory_type = 00 (INT)
02 (PRESET)
Memory Number = 0~15 (the number specified by the Dump Request)

For reception, data will be processed as Edit_buffer when the Memory_type is 7F, and as INTERNAL for other cases.

* For details of the bulk dump data and dump request format, refer to table 3-1.
For transmission at the main unit panel operation, additional voice data is also transmitted. When a dump request is received, only multi data is transmitted.

3.4 Additional multi data bulk dump

```
 0      11110000        F0
 1      01000011        43
 2      0000nnnn        nnnn    - Device Number
 3      01111010        7A
 4      0bbbbbbb        ┐byte count
 5      0bbbbbbb        ┘
 6      01001100        4C(ascii"L")
 7      01001101        4D(ascii"M")
 8      00100000        20(ascii" ")
 9      00100000        20(ascii" ")
10      00110000        30(ascii"0")
11      00110000        30(ascii"0")
12      00110100        34(ascii"4")
13      00110000        30(ascii"0")
14      01001101        4D(ascii"M")
15      01010101        55(ascii"U")
16      00000000        00
 ↓        ↓               ↓
29      00000000        00
30      0ttttttt        ttttttt - Memory_type
31      00mmmmmm        mmmmmm  - Memory Number
32      0ddddddd        ddddddd - data
 ↓        ↓               ↓
        0ssssssss       sssssss - check_sum
        11110111        F7
```

MIDI Utility 1 Multi Bulk transmission

Memory_type = 7F
Memory Number = 00

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MIDI Utility Vc & Mlt Bulk or 16 Multi Bulk transmission

Memory_type = 00 (INT)
Memory Number = start from 0 and transmit consecutively to 15. (During Vc & Mlt, start from Voice 0 and transmit consecutively to 63.)

1 Multi Bulk transmission by Dump Request

Memory_type = 00 (INT) 02 (PRESET)
Memory Number = 0~15 (the number specified by the Dump Request)

For reception, data will be processed as Edit_buffer when the Memory_type is 7F, and as INTERNAL for other cases.

* For details of the bulk dump data and dump request format, refer to table 3-2.
For transmission at the main unit panel operation or at the reception of a dump request, voice data is also transmitted.

3.5 Pan data bulk dump

```
0     11110000     F0
1     01000011     43
2     0000nnnn     nnnn    - Device Number
3     01111010     7A
4     0bbbbbbb     ┐byte count
5     0bbbbbbb     ┘
6     01001100     4C(ascii"L")
7     01001101     4D(ascii"M")
8     00100000     20(ascii" ")
9     00100000     20(ascii" ")
10    00111000     38(ascii"8")
11    00110001     31(ascii"1")
12    00110000     30(ascii"0")
13    00110001     31(ascii"1")
14    01010000     50(ascii"P")
15    01001110     4E(ascii"N")
16    00000000     00
↓       ↓            ↓
29    00000000     00
30    0ttttttt     ttttttt - Memory_type
31    00mmmmmm     mmmmmm  - Memory Number
32    0ddddddd     ddddddd - data
↓       ↓            ↓
      0sssssss     sssssss - check_sum
      11110111     F7
```

MIDI Utility Vc & Mlt Bulk or PAN Bulk transmission

Memory_type = 00 (INT)
Memory Number = start from 0 and transmit consecutively to 31

PAN Bulk transmission by Dump Request

Memory_type = 00 (INT)
02 (PRESET)
Memory Number = 0~63 (the number specified by the Dump Request)

For reception, bits 5 and 6 of Memory_type and memory Number will be ignored, and the data will be processed as INTERNAL.

* For details of the bulk dump data and dump request format, refer to table 4.

3.6 Micro tuning data bulk dump

```
0     11110000     F0
1     01000011     43
2     0000nnnn     nnnn    - Device Number
3     01111010     7A
4     0bbbbbbb     ┐byte count
5     0bbbbbbb     ┘
6     01001100     4C(ascii"L")
7     01001101     4D(ascii"M")
8     00100000     20(ascii" ")
9     00100000     20(ascii" ")
10    00111000     38(ascii"8")
11    00110001     31(ascii"1")
12    00110000     30(ascii"0")
13    00110001     31(ascii"1")
14    01001101     4D(ascii"M")
15    01010100     54(ascii"T")
16    00000000     00
↓       ↓            ↓
29    00000000     00
30    00000000     00      - Memory_type
31    00mmmmmm     mmmmmm  - Memory Number
32    0ddddddd     ddddddd - data
↓       ↓            ↓
      0sssssss     sssssss - check_sum
      11110111     F7
```

MIDI Utility Vc & Mlt Bulk or Micro Tuning Bulk transmission

Memory_type = 00 (INT)
Memory Number = start from 0 and transmit consecutively to 1

MCT Bulk transmission by Dump Request

Memory_type = 00 (INT)
02 (PRESET)
Memory Number = 0~63 (the number specified by the Dump Request)

For reception, bits 1–6 of Memory_type and Memory Number will be ignored, and the data will be processed as INTERNAL.

* For details of the bulk dump data and dump request format, refer to table 5.

3.7 Master control data bulk dump

```
0     11110000     F0
1     01000011     43
2     0000nnnn     nnnn    - Device Number
3     01111010     7A
4     0bbbbbbb     ┐byte count
5     0bbbbbbb     ┘
6     01001100     4C(ascii"L")
7     01001101     4D(ascii"M")
8     00100000     20(ascii" ")
9     00100000     20(ascii" ")
10    00110000     30(ascii"0")
11    00110000     30(ascii"0")
12    00110100     34(ascii"4")
13    00110000     30(ascii"0")
14    01001101     4D(ascii"M")
15    01010011     53(ascii"S")
16    00000000     00
↓       ↓            ↓
31    00000000     00
32    0ddddddd     ddddddd - data
↓       ↓            ↓
      0sssssss     sssssss - check_sum
      11110111     F7
```

* For details of the bulk dump data and dump request format, refer to table 6.
Data transmitted at the main unit panel operation is followed by SYNTH system setup data when it is transmitted.
For transmission at the reception of a dump request, only master control data is transmitted.

3.8 SYNTH system setup data bulk dump

```
0     11110000     F0
1     01000011     43
2     0000nnnn     nnnn    - Device Number
3     01111010     7A
4     0bbbbbbb     ┐byte count
5     0bbbbbbb     ┘
6     01001100     4C(ascii"L")
7     01001101     4D(ascii"M")
8     00100000     20(ascii" ")
9     00100000     20(ascii" ")
10    00111000     38(ascii"8")
11    00110001     31(ascii"1")
12    00110000     30(ascii"0")
13    00110001     31(ascii"1")
14    01010011     53(ascii"S")
15    01011001     59(ascii"Y")
16    00000000     00
↓       ↓            ↓
31    00000000     00
32    0ddddddd     ddddddd - data
↓       ↓            ↓
      0sssssss     sssssss - check_sum
      11110111     F7
```

* For details of the bulk dump data and dump request format, refer to table 7.
For transmission at the main unit panel operation, master control data is transmitted before this data.
For transmission at the reception of a dump request, only this data is transmitted.

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3.9 SEQ setup data bulk dump

```
0     11110000     F0
1     01000011     43
2     0000nnnn     nnnn    - Device Number
3     01111110     7E
4     0bbbbbbb     ┐byte count
5     0bbbbbbb     ┘
6     01001100     4C(ascii"L")
7     01001101     4D(ascii"M")
8     00100000     20(ascii" ")
9     00100000     20(ascii" ")
10    00111000     38(ascii"8")
11    00110001     31(ascii"1")
12    00110000     30(ascii"0")
13    00110001     31(ascii"1")
14    01010011     53(ascii"S")
15    01010011     53(ascii"S")
16    0ddddddd     ddddddd - data
↓       ↓            ↓
      0sssssss     sssssss - check_sum
      11110111     F7
```

* For details of the bulk dump data, refer to table 8-1.

Dump request

```
0     11110000     F0
1     01000011     43
2     0000nnnn     nnnn    - Device Number
3     01111110     7E
4     01001100     4C(ascii"L")
5     01001101     4D(ascii"M")
6     00100000     20(ascii" ")
7     00100000     20(ascii" ")
8     00111000     38(ascii"8")
9     00110001     31(ascii"1")
10    00110000     30(ascii"0")
11    00110001     31(ascii"1")
12    01010011     53(ascii"S")
13    01010011     53(ascii"S")
14    11110111     F7
```

3.10 SEQ song and pattern data bulk dump (KSEQ)

Reception is possible at any time when not playing or recording. This data is transmitted when the MIDI UTILITY "bulk dump" is executed, or when a dump request is received.

```
0     11110000     F0
1     01000011     43
2     0000nnnn     nnnn    - Device Number
3     00001010     0A
4     0bbbbbbb     ┐byte count
5     0bbbbbbb     ┘max. 4096
6     01001100     4C(ascii"L")   ┐
7     01001101     4D(ascii"M")   │
8     00100000     20(ascii" ")   │
9     00100000     20(ascii" ")   │
10    01001011     4B(ascii"K")   │
11    01010011     53(ascii"S")   │ byte count
12    01000101     45(ascii"E")   │
13    01010010     51(ascii"Q")   │
14    00100000     20(ascii" ")   │
15    00100000     20(ascii" ")   │
16    0ddddddd     ddddddd - data ┘
↓       ↓            ↓
      0sssssss     sssssss - check_sum ──┐
      11110111     F7                    │
                                         │
When the byte count is below 4096, the byte count is that count. When the byte count exceeds 4096, a byte count and check_sum operation is repeated for every 4096 bytes marked off from the top. ┘
```

Dump request

```
0     11110000     F0
1     01000011     43
2     0000nnnn     nnnn    - Device Number
3     00001010     0A
4     01001100     4C(ascii"L")
5     01001101     4D(ascii"M")
6     00100000     20(ascii" ")
7     00100000     20(ascii" ")
8     01001011     4B(ascii"K")
9     01010011     53(ascii"S")
10    01000101     45(ascii"E")
11    01010010     51(ascii"Q")
12    00100000     20(ascii" ")
13    00100000     20(ascii" ")
14    11110111     F7
```

3.11 SEQ song and pattern data bulk dump (NSEQ)

Reception is possible at any time when not playing or recording. This data is transmitted when the MIDI UTILITY "bulk dump" is executed, or when a dump request is received.

```
0     11110000     F0
1     01000011     43
2     0000nnnn     nnnn    - Device Number
3     00001010     0A
4     0bbbbbbb     ┐byte count
5     0bbbbbbb     ┘max. 4096
6     01001100     4C(ascii"L")   ┐
7     01001101     4D(ascii"M")   │
8     00100000     20(ascii" ")   │
9     00100000     20(ascii" ")   │
10    01001110     4E(ascii"N")   │
11    01010011     53(ascii"S")   │ byte count
12    01000101     45(ascii"E")   │
13    01010010     51(ascii"Q")   │
14    00100000     20(ascii" ")   │
15    00100000     20(ascii" ")   │
16    0ddddddd     ddddddd - data ┘
↓       ↓            ↓
      0sssssss     sssssss - check_sum ──┐
      11110111     F7                    │
                                         │
When the byte count is below 4096, the byte count is that count. When the byte count exceeds 4096, a byte count and check_sum operation is repeated for every 4096 bytes marked off from the top. ┘
```

Dump request

```
0     11110000     F0
1     01000011     43
2     0000nnnn     nnnn    - Device Number
3     00001010     0A
4     01001100     4C(ascii"L")
5     01001101     4D(ascii"M")
6     00100000     20(ascii" ")
7     00100000     20(ascii" ")
8     01001110     4E(ascii"N")
9     01010011     53(ascii"S")
10    01000101     45(ascii"E")
11    01010010     51(ascii"Q")
12    00100000     20(ascii" ")
13    00100000     20(ascii" ")
14    11110111     F7
```

3.12 Waveform data bulk dump

```
0     11110000     F0
1     01000011     43
2     0000nnnn     nnnn - Device Number
3     01111010     7A
4     0bbbbbbb     ┐byte count
5     0bbbbbbb     ┘
6     01001100     4C(ascii"L")
7     01001101     4D(ascii"M")
8     00100000     20(ascii" ")
9     00100000     20(ascii" ")
10    00110000     30(ascii"0")
11    00110000     30(ascii"0")
12    00110100     34(ascii"4")
13    00110000     30(ascii"0")
14    01010111     57(ascii"W")
15    01010110     56(ascii"V")
16    00000000     00
↓       ↓            ↓
29    00000000     00
30    00000ttt     ttt      - Memory_type
31    0mmmmmmm     mmmmmmm  - Memory Number
32    0ddddddd     ddddddd - data
↓       ↓            ↓
      0sssssss     sssssss - check_sum
      11110111     F7
```

Dump request

```
0     11110000     F0
1     01000011     43
2     0010nnnn     nnnn - Device Number
3     01111010     7A
4     01001100     4C(ascii"L")
5     01001101     4D(ascii"M")
6     00100000     20(ascii" ")
7     00100000     20(ascii" ")
8     00110000     30(ascii"0")
9     00110000     30(ascii"0")
10    00110100     34(ascii"4")
11    00110000     30(ascii"0")
12    01010111     57(ascii"W")
13    01010110     56(ascii"V")
14    00000000     00
↓       ↓            ↓
27    00000000     00
28    00000ttt     ttt      - Memory_type
29    0mmmmmmm     mmmmmmm  - Memory Number
30    11110111     F7
```

The Sample utility Waveform Bulk Dump operation transmits the following information:

Memory_type	= $00 (INT)
Memory number	= $00 to $3F, in sequence

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A bulk dump in response to a dump request message transmits the following:

Memory_type	=	$00 (INT), $01 (CARD), $02, $03 (PRE1), $04 (PRE2)
Memory number	=	a number from $00 to $3F, as specified by the dump request

	Preset 1, numbers 1 to 128	Preset 1, numbers 129 to 155
Memory_type	$02	$03
Memory Number	$00~$7F	$00~$1A

Requests for nonexistent numbers are ignored.

Incoming bulk dumps are handled as INTERNAL memory; bit 6 of Memory_type and Memory Number are ignored.

* Refer to attached Table 9-1 for details regarding bulk dump data format.

4. Sample dumps

The SY99 is capable of handling two sample dumps in two formats: the Sample Dump Standard, and the SY99 Sample Bulk Dump. Sample dumps in both of these formats are recognized. Sample dumps in both are transmitted when the Sample utility Sample Dump operation is executed, and in response to a Sample Dump Standard Dump Request. When an SY99 Sample Bulk Dump Request is received, the SY99 Sample Bulk Dump only is transmitted. The upper limit on sample numbers for dumps in either format is set at $62; sample numbers higher than $62 are treated as $62.

Sample Dump Standard

```
DUMP REQ        F0, 7E, cc, 03, ss, ss, F7
ACK             F0, 7E, cc, 7F, pp, F7
NAK             F0, 7E, cc, 7E, pp, F7
CANCEL          F0, 7E, cc, 7D, pp, F7
WAIT            F0, 7E, cc, 7C, pp, F7
DATA PACKET     F0, 7E, cc, 02, kk, <120 byte>, ll, F7
DUMP HEADER     F0, 7E, cc, 01, ss, ss, ee, ff, ff, ff, gg, gg, gg,
                hh, hh, hh, ii, ii, ii, jj, F7

        pp      : packet number
        cc      : channel number
        ss ss   : sample number
        ee      : sample format (8 to 28 bits; SY99 handles samples
                  of 16 bits or less)
        ff ff ff : sample period
        gg gg gg : sample length
        hh hh hh : loop start
        ii ii ii : loop end
        jj      : loop type
        kk      : running packet count (0-127)
                  (number of current packet)
        ll      : checksum (XOR of 7E cc 02 kk <120 bytes>)
```

SY99 Sample Bulk Dump

```
 0      11110000        F0
 1      01000011        43
 2      0000nnnn        nnnn    - Device Number
 3      01111010        7A
 4      0bbbbbbb        ┐ byte count
 5      0bbbbbbb        ┘
 6      01001100        4C(ascii"L")
 7      01001101        4D(ascii"M")
 8      00100000        20(ascii" ")
 9      00100000        20(ascii" ")
10      00110000        30(ascii"0")
11      00110000        30(ascii"0")
12      00110100        34(ascii"4")
13      00110000        30(ascii"0")
14      01010011        53(ascii"S")
15      01000001        41(ascii"A")
16      00000000        00
↓       ↓               ↓
30      00000000        00
31      0mmmmmmm        mmmmmmm - Memory number
32      0ddddddd        ddddddd - data
↓       ↓               ↓
        0sssssss        sssssss - check_sum
        11110111        F7
```

Dump request

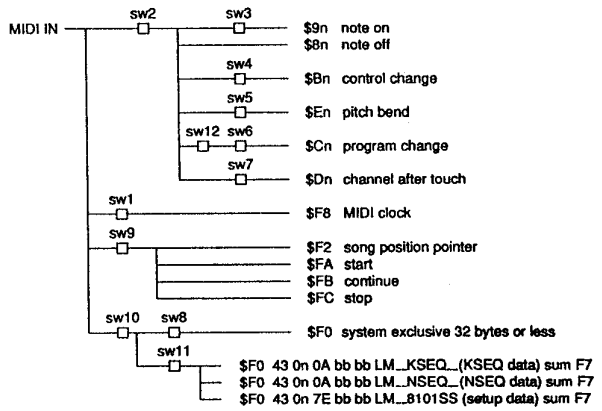
```
0       11110000        F0
1       01000011        43
2       0010nnnn        nnnn    - Device Number
3       01111010        7A
4       01001100        4C(ascii"L")
5       01001101        4D(ascii"M")
6       00100000        20(ascii" ")
7       00100000        20(ascii" ")
8       00110000        30(ascii"0")
9       00110000        30(ascii"0")
10      00110100        34(ascii"4")
11      00110000        30(ascii"0")
12      01010011        53(ascii"S")
13      01000001        41(ascii"A")
14      00000000        00
↓       ↓               ↓
28      00000000        00
29      0mmmmmmm        mmmmmmm - Memory number
30      11110111        F7
```

* Refer to attached Table 9-2 for details regarding bulk dump data format.

5. Sequencer mode

5.1 MIDI reception/transmission block diagram

(Receive flow chart)

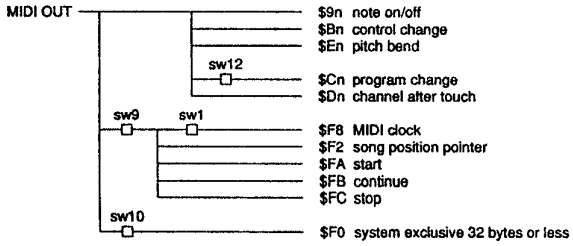


(Note)

- sw1 □ on when SEQ SETUP sync is set to MIDI
- sw2 □ during RECORD, the SEQ SETUP reception channel
- sw3 □ during RECORD, the SEQ SETUP velocity on/off
- sw4 □ during RECORD, the SEQ SETUP control change on/off
- sw5 □ during RECORD, the SEQ SETUP pitch bend on/off
- sw6 □ during RECORD, the SEQ SETUP program change on/off
- sw7 □ during RECORD, the SEQ SETUP channel pressure on/off
- sw8 □ during RECORD, the SEQ SETUP system exclusive (of 32 bytes or less) on/off
- sw9 □ on/off in SEQ SETUP for song position pointer, start, continue, stop
- sw10 □ set by the utility Device Number
- sw11 □ received only when utility Bulk Memory Protect = off
- sw12 □ received only when utility Program Change Mode is not off

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(Transmit flow chart)



(Note)
sw1 □ on when SEQ SETUP sync is set to INTERNAL
sw9 □ on/off in SEQ SETUP for MIDI clock song position pointer, start, continue, stop
sw10 □ set by the utility Device Number
sw12 □ received only when utility Program Change Mode is not off

5.2 Channel messages

Received only during RECORD. Transmitted only during PLAY and overdubbing.
For transmission and reception conditions, refer to the Receive flow chart and Transmit flow chart.

5.3 Mode messages

Neither received nor transmitted.

5.4 System common messages

Receive only $F2 and $F7. All others are neither received nor transmitted.

5.5 System realtime messages

5.5.1 Status F8, FA, FB, FC

Receive.

5.5.2 Status F9, FD, FF

After decoding, do nothing.

6. Status FE (active sensing)

a) Transmission
Transmit FE at intervals of approximately 170 msec.

b) Reception
Once FE has been received, if no MIDI data arrives for an interval longer than approximately 300 msec, the MIDI receive buffer is cleared, and if any keys remain on, they will be turned off.

< Table 1-1 >

MIDI Parameter Change table (Multi mode Common Data)

$F0, $43, $1n, $34, $00, $00, $00, N2, $00, V2, $F7

Note) n ; Device Number
V2 ; parameter value

[header section]

	N2	data name	data range	note
				—Multi Voice Set Name—
0	00	MNAM 0	ascii	
1	01	MNAM 1	ascii	
2	02	MNAM 2	ascii	
3	03	MNAM 3	ascii	
4	04	MNAM 4	ascii	
5	05	MNAM 5	ascii	
6	06	MNAM 6	ascii	
7	07	MNAM 7	ascii	
8	08	MNAM 8	ascii	
9	09	MNAM 9	ascii	
10	0A	MNAM10	ascii	
11	0B	MNAM11	ascii	
12	0C	MNAM12	ascii	
13	0D	MNAM13	ascii	
14	0E	MNAM14	ascii	
15	0F	MNAM15	ascii	
16	10	MNAM16	ascii	
17	11	MNAM17	ascii	
18	12	MNAM18	ascii	
19	13	MNAM19	ascii	

< Table 1-2 >

MIDI Parameter Change table (Multi mode Channel Data)

$F0, $43, $1n, $34, $01, T2, $00, N2, $00, V2, $F7

Note) n ; Device Number
T2 ; voice channel number
V2 ; parameter value

[channel data]

	N2	data name	data range	note
				—Channel 1—
0	00	OFVCSW	b6 ; off/on	Off_voice_switch
		INDV	b5~2 ; off, 1~8	Individual Output select
		OUT0CH	b0 ; off/on	Output 1 select
		OUT1CH	b1 ; off/on	Output 2 select
				Note: INDV0 #8104 only valid.
1	01	VMEM	int, p1, p2, crd	Voice Memory Select
2	02	VNUM	0~63	Voice number
3	03	VOL	0~127	Volume
4	04	MTUN	-64~+63 (o/b)	Tuning
5	05	MNSF	-64~+63 (o/b)	Note shift
6	06	STPAN	voice, -31~+31 (o/b)	Performance static PAN Note: Voice PAN setting not valid if a setting other than "voice" is selected.
7	07	EFSDMD	voice/multi	effect send mode
8	08	EFLN1CH	b0 ; off/on	effect send line 1 select
		EFLN2CH	b1 ; off/on	effect send line 2 select
		EFLN3CH	b2 ; off/on	effect send line 3 select
		EFLN4CH	b3 ; off/on	effect send line 4 select
9	09	EFSDLV	0~127	effect send level

Note) (o/b) ; offset binary

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< Table 1-3 >

MIDI Parameter Change table (Voice data common data)

$F0, $43, $1n, $34, $02, $00, $00, N2, $00, V2, $f7

Note) n ; channel number
V2 ; parameter value

[header data]

	N2	data name	data range	note
0	00	ELMODE	0; 1AFM_mono 1; 2AFM_mono 2; 4AFM_mono 3; 1AFM_poly 4; 2AFM_poly 5; 1AWM_poly 6; 2AWM_poly 7; 4AWM_poly 8; 1AFM_1AWM_poly 9; 2FM_2PCM_poly 10; DRUM_SET	—Element Select Mode—
1	01	VNAM0	ascii	—Voice Name—
2	02	VNAM1	ascii	
3	03	VNAM2	ascii	
4	04	VNAM3	ascii	
5	05	VNAM4	ascii	
6	06	VNAM5	ascii	
7	07	VNAM6	ascii	
8	08	VNAM7	ascii	
9	09	VNAM8	ascii	
10	0A	VNAM9	ascii	

[Controllers]

	N2	data name	data range	note
11	28	WPBR	0~12	—Pitch Bend— Wheel Pitch Bend Range
12	29	ATPBR	−12~+12 (s/m)	After_Touch Pitch Bend Range
13	2A	PMASN	0~121	—Pitch Modulation— Device Assign (MIDI control #)
14	2B	PMRNG	0~127	Modulation range
15	2C	AMASN	0~121	—Amplitude Modulation— Device Assign (MIDI control #)
16	2D	AMRNG	0~127	Modulation range
17	2E	FMASN	0~121	—Filter Modulation— Device Assign (MIDI control #)
18	2F	FMRNG	0~127	Modulation range
19	30	PNLASN	0~121	—PAN Modulation— Note) Valid only when Multi is selected Device Assign (MIDI control #)
20	31	PNLRNG	0~127	Modulation range
21	32	COASN	0~121	—Filter Cut_off Bias— Device Assign (MIDI control #)
22	33	CORNG	0~127	Cut_off range
23	34	PNBASN	0~121	—PAN Bias— Note) Valid only when Multi is selected Device Assign (MIDI control #)
24	35	PNBRNG	0~127	Bias range
25	36	EGBASN	0~121	—EG Bias— Device Assign (MIDI control #)
26	37	EGBRNG	0~127	Bias range
27	38	VVLASN	0~121	—Voice Volume— Device Assign (MIDI control #)
28	39	VVLLML	0~127	Volume Limit Low

Note) For the above Device Assigns, 121 will select After Touch.

[Only for Normal]

	N2	data name	data range	note
29	3A	MCTUN	0~65	Micro Tuning table select
30	3B	RNDP	0~7	Random Pitch fluctuation
31	3C	PORM	0, 1	—Portamento— Note: Only valid in FM_Element only Voice modes. Mode
32	3D	POS	0~127	Time
33	3E	reserve		
34	3F	VVOL	0~127	Voice Volume
35	40	reserve		
36	41	reserve		
37	42	AFTMD	all, top, btm, hi, low	zoned after touch mode
38	43	SPTPNT	0~127	zoned after touch split point

Note) (s/m) ; sign magnitude

< Table 1-4 >

MIDI Parameter Change table (Normal Voice Element Data)

$F0, $43, $1n, $34, $03, T2, $00, N2, $00, V2, $F7

Note) n ; Device Number
V2 ; parameter value
T2 ; 0, el, e0, 0, 0, 0, 0, 0

e1	e0	
0	0	Element 1
0	1	Element 2
1	0	Element 3
1	1	Element 4

	N2	data name	data range	note
0	00	ELVL	0~127	Element Level
1	01	ELDT	−7~+7 (s/m)	Element Detune
2	02	ELNS	−64~+63 (o/b)	Element Note Shift
3	03	ENLL	0~127 (note #)	—Element Note Limit— Low Limit
4	04	ENLH	0~127 (note #)	High Limit
5	05	EVLL	0~127 (note #)	—Element Velocity Limit— Low Limit
6	06	EVLH	0~127 (note #)	High Limit
7	07	PANNM	0~31	PAN data set table select Note: Only valid when selected for Multi
8	08	MCTEN	b0 ; off/on	Micro Tuning switch
		OUT0SEL	b1 ; off/on	Output 1 select
		OUT1SEL	b2 ; off/on	Output 2 select
9	09	EFLN1EL	b0 ; off/on	effect send line 1 select
		EFLN2EL	b1 ; off/on	effect send line 2 select
		EFLN3EL	b2 ; off/on	effect send line 3 select
		EFLN4EL	b3 ; off/on	effect send line 4 select
10	0A	EFSDLV	0~127	effect send level
11	0B	EFSDVL	−7~+7 (s/m)	effect send velocity sense
12	0C	EFSDSC	−7~+7 (s/m)	effect send level scale

Note) (s/m) ; sign magnitude
(o/b) ; offset binary

< Table 1-5 >

MIDI Parameter Change table (Drum_Set)

$F0, $43, $1n, $34, $04, T2, $00, N2, V1, V2, $F7

Note) n ; channel number
T2 ; MIDI note number
N2 ; parameter number
V1 ; MSB of parameter value (for parameters other than WAV*, V1 will be $00)
V2 ; LSB of parameter value

	N2	data name	data range	note
0	00	ALTGRP	b6 ; 0~1	Alternate group
		OUT1	b1 ; 0~1	Output 2 select
		OUT0	b0 ; 0~1	Output 1 select
1	01	WSRC	0;Pre1 1;Card 2;— 3;Int 4;Pre2	Wave Source
2	02	WAV	0~max. 255	Wave Number (V1;MSB V2;LS7bits)
3	03	WVL	0~127	Wave Volume
4	04	WTN	−64~+63 (o/b)	Wave Tuning
5	05	WNS	−48~+36 (o/b)	Wave Note Shift
6	06	WPN	−31~+31 (o/b)	Static PAN
7	07	EFLN1C_1	b0 ; off/on	effect send line 1 select
		EFLN2C_1	b1 ; off/on	effect send line 2 select
		EFLN3C_1	b2 ; off/on	effect send line 3 select
		EFLN4C_1	b3 ; off/on	effect send line 4 select
8	08	EFSDLVC_1	0~127	effect send level
9	09	EFSDVLC_1	−7~+7 (s/m)	effect send velocity sense

Note) (o/b) ; offset binary

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< Table 1-6 >

MIDI Parameter Change table (AFM Element Common)

$F0, $43, $1n, $34, $05, T2, $00, N2, $00, V2, $F7

Note) n ; Device Number
N2 ; parameter number
V2 ; parameter value

T2	
$00	Element 1
$20	Element 2
$40	Element 3
$60	Element 4

	N2	data name	data range	note
0	00	ALGNUM	0~44	(127 is free algorithm number. Algorithm only via MIDI)
				—Pitch EG—
1	01	FPR1	0~63	key_on Rate 1
2	02	FPR2	0~63	key_on Rate 2
3	03	FPR3	0~63	key_on Rate 3
4	04	FPRR1	0~63	key_off Rate 1
5	05	FPL0	-64~+63 (o/b)	key_on Level 0
6	06	FPL1	-64~+63 (o/b)	key_on Level 1
7	07	FPL2	-64~+63 (o/b)	key_on Level 2
8	08	FPL3	-64~+63 (o/b)	key_on Level 3
9	09	FPRL1	-64~+63 (o/b)	key_off Level 1
10	0A	FPEGR	0~3	Range (0: 8oct, 1: 2oct, 2: 1oct, 3: 1/2oct)
11	0B	FPRS	0~7	Rate Scaling
12	0C	FVPSW	off/on	Velocity Switch
				—Main LFO—
13	0D	FLFSPD	0~99	Speed
14	0E	FLFDLY	0~99	Delay time
15	0F	FLFPMD	0~127	Pitch Modulation Depth
16	10	FLFAMD	0~127	Amplitude Modulation Depth
17	11	FLFFMD	0~127	Filter Modulation Depth
18	12	FLFWAV	0~5	Wave
19	13	FLINTP	0~99	Initial Phase
20	14	reserve		
				—Sub LFO—
21	15	SLFWD	0~3	Wave
22	16	SLFS	0~127	Speed
23	17	SLFDM	delay/decay	delay mode/decay mode
24	18	SLFDT	0~99	Delay time/decay time
25	19	SLPMD	0~127.	Pitch Modulation Depth

< Table 1-7 >

MIDI Parameter Change table (AFM Element)

$F0, $43, $1n, $34, T1, T2, $00, N2, V1, V2, $F7

Note) n ; Device Number
N2 ; parameter number
V1 ; MSB of parameter value
V2 ; LSB of parameter value

T1	
$06	OP6
$16	OP5
$26	OP4
$36	OP3
$46	OP2
$56	OP1

T2	
$00	Element 1
$20	Element 2
$40	Element 3
$60	Element 4

	N2	data name	data range	note
0	00	R1	0~63	EG key_on Rate 1
1	01	R2	0~63	EG key_on Rate 2
2	02	R3	0~63	EG key_on Rate 3
3	03	R4	0~63	EG key_on Rate 4
4	04	RR1	0~63	EG key_off Rate 1
5	05	RR2	0~63	EG key_off Rate 2
6	06	L1	0~63	EG key_on Level 1
7	07	L2	0~63	EG key_on Level 2
8	08	L3	0~63	EG key_on Level 3
9	09	L4	0~63	EG key_on Level 4
10	0A	RL1	0~63	EG key_off Level 1
11	0B	RL2	0~63	EG key_off Level 2
12	0C	SLP	0~3	EG Sustain Loop Point
13	0D	HT	0~63 (disp: 63~0)	EG key_on/Hold Time
14	0E	L0	0~63	EG key_on Level 0
15	0F	RS	-7~+7 (s/m)	EG Rate Scaling
16	10	FAMS	0~7	Amplitude Modulation Sens.
17	11	VSON	-7~+7 (s/m)	Velocity Sensitivity
18	12	reserve		
19	13	ALGSRC0	V2 b3~0 ; 0~10	oscilator input 0 Source
		ALGSRC1	V1 b0, V2 b6~4 ; 0~10	oscilator input 1 Source
20	14	ALGDST	V2 b1, 0 ; 0~3	oscilator output Destination
		OASCRC0	V2 b3, 2 ; 0~2	Out_Accumulator input 0 Source
		OASCRC1	V2 b4 ; 0~1	Out_Accumulator input 1 Source
21	15	SHIFT0	V2 b5~3 ; 0~7	oscilator input 0 Shift value
		SHIFT1	V2 b2~0 ; 0~7	oscilator input 1 Shift value
22	16	OCR	0~7	output level Correction
23	17	PWAVE	0~15	Waveform of oscilator
24	18	FMLPMS	V2 b4~2 ; 0~7	M_LFO Pitch Modulation Sens.
		PES	V2 b1 ; 0~1	Pitch EG Switch
		FPM	V2 b0 ; 0~1	frequency Mode
25	19	KOE	V1 b0 ; 0~1	initial phase set Enable
		PHASE	V2 b6~0 ; 0~127	initial Phase of oscilator
26	1A	FPD	-15~+15 (s/m)	Pitch Detune
27	1B	TL	0~127	out_level
28	1C	BP1	0~127 (note #)	out_level scaling Break Point
29	1D	BP2	0~127 (note #)	out_level scaling Break Point
30	1E	BP3	0~127 (note #)	out_level scaling Break Point
31	1F	BP4	0~127 (note #)	out_level scaling Break Point
32	20	EGOS1	-128~+127 (2bytes)	out_level offset (BP1)
33	21	EGOS2	-128~+127 (2bytes)	out_level offset (BP2)
34	22	EGOS3	-128~+127 (2bytes)	out_level offset (BP3)
35	23	EGOS4	-128~+127 (2bytes)	out_level offset (BP4)
36	24	RVSW	off/on	Rate Velocity Switch
37	25	FPC		frequency Course
38	26	FPF		frequency Fine

< Table 1-8 >

MIDI Parameter Change table (AFM Element)

$F0, $43, $1n, #34, $07, T2, $00, N2, V1, V2, $F7

Note) n ; Device Number
N2 ; parameter number
V1 ; MSB of parameter value
V2 ; LSB of parameter value
T2 ; table at right

T2	
$00	Element 1
$20	Element 2
$40	Element 3
$60	Element 4

[AWM generator unit]

	N2	data name	data range	note
0	00	WSOURCE	0; Pre1, 1; Card ,2; AFM, 3; Int, 4; Pre2	AWM Wave Source
1	01	AWMWAVE	V1; MSB1bit V2; LS7bits	AWM Wave number
2	02	PPM	normal/fixed	frequency Mode
3	03	PNOTE	0~127	fixed mode note #
4	04	PPF	-64~+63	frequency Fine
5	05	PMLPMS	0~7	pitch modulation sensitivity
				—Pitch EG—
6	06	PPR1	0~63	key_on Rate 1
7	07	PPR2	0~63	key_on Rate 2
8	08	PPR3	0~63	key_on Rate 3
9	09	PPRR1	0~63	key_off Rate 1
10	0A	PPL0	-64 ~+63 (o/b)	key_on Level 0
11	0B	PPL1	-64 ~+63 (o/b)	key_on Level 1
12	0C	PPL2	-64 ~+63 (o/b)	key_on Level 2
13	0D	PPL3	-64 ~+63 (o/b)	key_on Level 3
14	0E	PPRL1	-64 ~+63 (o/b)	key_off Level 1
15	0F	PPEGR	1~3	Range (1: 2oct, 2: 1oct, 3: 1/2oct)
16	10	PPRS	-7~+7	Rate Scaling
17	11	PVPSW	off/on	Velocity Switch
				—multi LFO—
18	12	PLFSPD	0~99	Speed
19	13	PLFDLY	0~99	Delay time
20	14	PLFPMD	0~127	Pitch Modulation Depth
21	15	PLFAMD	0~127	Amplitude Modulation Depth
22	16	PLFFMD	0~127	Filter Modulation Depth
23	17	PLFWAV	0~5	Wave
24	18	PLINTP	0~99	Initial Phase
25	19	reserve		

[Amplitude EG data]

	N2	data name	data range	note
25	4F	PAEGMD	normal/hold	EG mode
26	50	PAR1	0~63	key_on Rate 1 (attack/hold)
27	51	PAR2	0~63	key_on Rate 2 (decay)
28	52	PAR3	0~63	key_on Rate 3
29	53	PAR4	0~63	key_on Rate 4 (decay)
30	54	PARR1	0~63	key_off Rate 1 (release)
31	55	PAL2	0~63	key_on Level 2 (decay)
32	56	PAL3	0~63	key_on Level 3 (decay)
33	57	PARS	-7~+7	rate scaling
34	58	PABP1	0~127 (note #)	out_level scaling Break Point
35	59	PABP2	0~127 (note #)	out_level scaling Break Point
36	5A	PABP3	0~127 (note #)	out_level scaling Break Point
37	5B	PABP4	0~127 (note #)	out_level scaling Break Point
38	5C	PAOS21	-128~+127 (2bytes)	out_level scaling offset
39	5D	PAOS22	-128~+127 (2bytes)	out_level scaling offset
40	5E	PAOS23	-128~+127 (2bytes)	out_level scaling offset
41	5F	PAOS24	-128~+127 (2bytes)	out_level scaling offset
42	60	PAVSON	-7~+7 (s/m)	Velocity Sensitivity
43	61	PARVSW	off/on	Attack Rate Velocity Switch
44	62	PAMS	-7~+7 (s/m)	amplitude modulation sens.

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< Table 1-9 >

MIDI Parameter Change table (Waveform)

$F0, $43, $1n, $34, $0E, $T2, 05, N2, 00, V2, $F7

Note) n ; Device Number
T2 ; Waveform number
N2 ; parameter number
V2 ; parameter value

	N2	data name	data range	note
				—Waveform Name—
0	00	WVNAM0	ascii	
1	01	WVNAM1	ascii	
2	02	WVNAM2	ascii	
3	03	WVNAM3	ascii	
4	04	WVNAM4	ascii	
5	05	WVNAM5	ascii	
6	06	WVNAM6	ascii	
7	07	WVNAM7	ascii	
8	08	WVFROM	—, 1~99	Sample From
9	09	WVTO	—, 1~99	Sample To

< Table 1-10 >

MIDI Parameter Change table (Effect Data)

$F0, $43, $1n, $34, $08, $00, $00, N2, $00, V2, $F7

Note) n ; Device Number
V2 ; parameter value

	N2	data name	data range	note
				—Effect—
32	20	EFMODE	0~2	mode select (off, seri, palla)
33	21	EF1TYPE	0~60	effect 1 type
34	22	EF1PRM1		effect 1 parameter 1
36	24	EF1PRM2		effect 1 parameter 2
38	26	EF1PRM3		effect 1 parameter 3
40	28	EF1PRM4		effect 1 parameter 4
42	2A	EF1PRM5		effect 1 parameter 5
44	2C	EF1PRM6		effect 1 parameter 6
46	2E	EF1PRM7		effect 1 parameter 7
48	30	EF1PRM8		effect 1 parameter 8
50	32	EF1PRM9		effect 1 parameter 9
52	34	EF1PRM10		effect 1 parameter 10
54	36	EF1OUTLV1	0~100	effect 1 output level 1
55	37	EF1OUTLV2	0~100	effect 1 output level 2
56	38	EF2TYPE	0~60	effect 2 type
57	39	EF2PRM1		effect 2 parameter 1
59	3B	EF2PRM2		effect 2 parameter 2
61	3D	EF2PRM3		effect 2 parameter 3
63	3F	EF2PRM4		effect 2 parameter 4
65	41	EF2PRM5		effect 2 parameter 5
67	43	EF2PRM6		effect 2 parameter 6
69	45	EF2PRM7		effect 2 parameter 7
71	47	EF2PRM8		effect 2 parameter 8
73	49	EF2PRM9		effect 2 parameter 9
75	4B	EF2PRM10		effect 2 parameter 10
77	4D	EF2EFBAL1	0~100	effect 2 mix level
78	4E	EF2OUTLV1	0~100	effect 2 output level 1
79	4F	EF2OUTLV2	0~100	effect 2 output level 2
80	50	OUT1EFBAL	0~100	output 1 effect balance wet:dry
81	51	OUT2EFBAL	0~100	output 2 effect balance wet:dry
82	52	CTRL1PRM	0~32	controller 1 parameter select
83	53	CTRL1ASN	0-120, AT, VL, SC, LFO	controller 1 device assign
84	54	CTRL1MIN	0~99	controller 1 MIN
85	55	CTRL1MAX	0~99	controller 1 MAX
86	56	CTRL2PRM	0~32	controller 2 parameter select
87	57	CTRL2ASN	0-120, AT, VL, SC, LFO	controller 2 device assign
88	58	CTRL2MIN	0~99	controller 2 MIN
89	59	CTRL2MAX	0~99	controller 2 MAX
90	5A	EFLFOWV	tri, dwn, up, squ, sin, S/H	effect LFO wave select
91	5B	EFLFOSP	0~99	effect LFO speed
92	5C	EFLFODL	0~99	effect LFO delay time
93	5D	EFLFOPH	0~99, free	effect LFO initial phase

< Table 1-11 >

MIDI Parameter Change table (Filter Data)

$F0, $43, $1n, $34, $09, T2, $00, N2, V1, V2, $F7

Note) n ; Device Number
N2 ; parameter number
V1 ; MSB of parameter value
V2 ; LSB of parameter value
T2 ; O, E, E, O, O, N, N, N
(E, N table at right)

E	
00	Element 1
01	Element 2
10	Element 3
11	Element 4

N	
000	AFM filt. 1
001	AFM filt. 2
010	AMF common
011	AWM filt. 1
100	AWM filt. 2
101	AWM common

[filter 1 & 2]

	N2	data name	data range	note
0	00	FTYPE	thru/LPF/(HPF)	filter type
1	01	FCTOF	0~127	cut_off frequency
2	02	FMODE	EG, LFO, EG-VA	filter mode
3	03	FR1	0~63	key_on Rate 1
4	04	FR2	0~63	key_on Rate 2
5	05	FR3	0~63	key_on Rate 3
6	06	FR4	0~63	key_on Rate 4
7	07	FRR1	0~63	key_off Rate 1
8	08	FRR2	0~63	key_off Rate 2
9	09	FL0	-64~+63 (o/b)	key_on cut_off Level 0
10	0A	FL1	-64~+63 (o/b)	key_on cut_off Level 1
11	0B	FL2	-64~+63 (o/b)	key_on cut_off Level 2
12	0C	FL3	-64~+63 (o/b)	key_off cut_off Level 3
13	0D	FL4	-64~+63 (o/b)	key_off cut_off Level 4
14	0E	FRL1	-64~+63 (o/b)	key_on cut_off Level 1
15	0F	FRL2	-64~+63 (o/b)	key_on cut_off Level 2
16	10	FRS	-7~+7	rate scaling
17	11	FBP1	0~127 (note #)	c_off_lvl scaling Break Point
18	12	FBP2	0~127 (note #)	c_off_lvl scaling Break Point
19	13	FBP3	0~127 (note #)	c_off_lvl scaling Break Point
20	14	FBP4	0~127 (note #)	c_off_lvl scaling Break Point
21	15	FOS1	-128~+127 (2bytes)	c_off_lvl scaling offset
22	16	FOS2	-128~+127 (2bytes)	c_off_lvl scaling offset
23	17	FOS3	-128~+127 (2bytes)	c_off_lvl scaling offset
24	18	FOS4	-128~+127 (2bytes)	c_off_lvl scaling offset

[filter common]

	N2	data name	data range	note
25	32	FRES	0~99	resonance
26	33	FVSON	-7~+7 (s/m)	Velocity Sensitivity
27	34	FCMS	-7~+7 (s/m)	Cut_off modulation sensitivity

< Table 1-12 >

MIDI Parameter Change table (Pan Data)

$F0, $43, $1n, $34, $0A, T2, $00, N2, $00, V2, $F7

Note) n ; Device Number
T2 ; Memory number
N2 ; parameter number
V2 ; parameter value

	N2	data name	data range	note
0	00	PNSCSEL	velocity, note #, LFO	PAN source select
1	01	PNSCDPT	0~99	PAN source depth
				—EG—
2	02	PNDT	0~63	key_on/Hold Time
3	03	PNR1	0~63	key_on Rate 1
4	04	PNR2	0~63	key_on Rate 2
5	05	PNR3	0~63	key_on Rate 3
6	06	PNR4	0~63	key_on Rate 4
7	07	PNRR1	0~63	key_off Rate 1
8	08	PNRR2	0~63	key_off Rate 2
9	09	PNL0	-32~+31 (o/b)	key_on Level 0
10	0A	PNL1	-32~+31 (o/b)	key_on Level 1
11	0B	PNL2	-32~+31 (o/b)	key_on Level 2
12	0C	PNL3	-32~+31 (o/b)	key_on Level 3
13	0D	PNL4	-32~+31 (o/b)	key_on Level 4
14	0E	PNRL1	-32~+31 (o/b)	key_off Level 1
15	0F	PNRL2	-32~+31 (o/b)	key_off Level 2
16	10	PNSLP	0~3	repeat segment
				—Dynamic PAN Name—
17	11	PNNAM0	ascii	
18	12	PNNAM1	ascii	
19	13	PNNAM2	ascii	
20	14	PNNAM3	ascii	
21	15	PNNAM4	ascii	
22	16	PNNAM5	ascii	
23	17	PNNAM6	ascii	
24	18	PNNAM7	ascii	
25	19	PNNAM8	ascii	
26	1A	PNNAM9	ascii	

Note) (o/b) ; offset binary (invert the sign_bit of the 2's complement)

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< Table 1-13 >

MIDI Parameter Change table (Micro Tuning Data)

$F0, $43, $1n, $34, $0B, T2, N1, N2, V1, V2, $F7

Note) n ; Device Number
V1 ; MS7bits of parameter value
T2 ; memory number
V2 ; LS7bits of parameter value

	N1	N2	data name	data range	note
0	00	00	MCTC_-2	0~10794	C_-2
1	00	02	MCTC#-2	0~10794	C#-2
2	00	04	MCTD_-2	0~10794	D_-2
3	00	06	MCTD#-2	0~10794	D#-2
4	00	08	MCTE_-2	0~10794	E_-2
5	00	0A	MCTF_-2	0~10794	F_-2
6	00	0C	MCTF#-2	0~10794	F#-2
7	00	0E	MCTG_-2	0~10794	G_-2
8	00	10	MCTG#-2	0~10794	G#-2
9	00	12	MCTA_-2	0~10794	A_-2
10	00	14	MCTA#-2	0~10794	A#-2
11	00	16	MCTB_-2	0~10794	B_-2
12	00	18	MCTC_-1	0~10794	C_-1
13	00	1A	MCTC#-1	0~10794	C#-1
14	00	1C	MCTD_-1	0~10794	D_-1
15	00	1E	MCTD#-1	0~10794	D#-1
16	00	20	MCTE_-1	0~10794	E_-1
17	00	22	MCTF_-1	0~10794	F_-1
18	00	24	MCTF#-1	0~10794	F#-1
19	00	26	MCTG_-1	0~10794	G_-1
20	00	28	MCTG#-1	0~10794	G#-1
21	00	2A	MCTA_-1	0~10794	A_-1
22	00	2C	MCTA#-1	0~10794	A#-1
23	00	2E	MCTB_1	0~10794	B_-1
24	00	30	MCTC_0	0~10794	C_0
25	00	32	MCTC#0	0~10794	C#0
26	00	34	MCTD_0	0~10794	D_0
27	00	36	MCTD#0	0~10794	D#0
28	00	38	MCTE_0	0~10794	E_0
29	00	3A	MCTF_0	0~10794	F_0
30	00	3C	MCTF#0	0~10794	F#0
31	00	3E	MCTG_0	0~10794	G_0
32	00	40	MCTG#0	0~10794	G#0
33	00	42	MCTA_0	0~10794	A_0
34	00	44	MCTA#0	0~10794	A#0
35	00	46	MCTB_0	0~10794	B_0
36	00	48	MCTC_1	0~10794	C_1
37	00	4A	MCTC#1	0~10794	C#1
38	00	4C	MCTD_1	0~10794	D_1
39	00	4E	MCTD#1	0~10794	D#1
40	00	50	MCTE_1	0~10794	E_1
41	00	52	MCTF_1	0~10794	F_1
42	00	54	MCTF#1	0~10794	F#1
43	00	56	MCTG_1	0~10794	G_1
44	00	58	MCTG#1	0~10794	G#1
45	00	5A	MCTA_1	0~10794	A_1
46	00	5C	MCTA#1	0~10794	A#1
47	00	5E	MCTB_1	0~10794	B_1
48	00	60	MCTC_2	0~10794	C_2
49	00	62	MCTC#2	0~10794	C#2
50	00	64	MCTD_2	0~10794	D_2
51	00	66	MCTD#2	0~10794	D#2
52	00	68	MCTE_2	0~10794	E_2
53	00	6A	MCTF_2	0~10794	F_2
54	00	6C	MCTF#2	0~10794	F#2
55	00	6E	MCTG_2	0~10794	G_2
56	00	70	MCTG#2	0~10794	G#2
57	00	72	MCTA_2	0~10794	A_2
58	00	74	MCTA#2	0~10794	A#2
59	00	76	MCTB_2	0~10794	B_2
60	00	78	MCTC_3	0~10794	C_3
61	00	7A	MCTC#3	0~10794	C#3
62	00	7C	MCTD_3	0~10794	D_3
63	00	7E	MCTD#3	0~10794	D#3
64	01	00	MCTE_3	0~10794	E_3
65	01	02	MCTF_3	0~10794	F_3
66	01	04	MCTF#3	0~10794	F#3
67	01	06	MCTG_3	0~10794	G_3
68	01	08	MCTG#3	0~10794	G#3
69	01	0A	MCTA_3	0~10794	A_3
70	01	0C	MCTA#3	0~10794	A#3
71	01	0E	MCTB_3	0~10794	B_3
72	01	10	MCTC_4	0~10794	C_4
73	01	12	MCTC#4	0~10794	C#4
74	01	14	MCTD_4	0~10794	D_4
75	01	16	MCTD#4	0~10794	D#4
76	01	18	MCTE_4	0~10794	E_4
77	01	1A	MCTF_4	0~10794	F_4
78	01	1C	MCTF#4	0~10794	F#4
79	01	1E	MCTG_4	0~10794	G_4
80	01	20	MCTG#4	0~10794	G#4
81	01	22	MCTA_4	0~10794	A_4
82	01	24	MCTA#4	0~10794	A#4
83	01	26	MCTB_4	0~10794	B_4
84	01	28	MCTC_5	0~10794	C_5
85	01	2A	MCTC#5	0~10794	C#5
86	01	2C	MCTD_5	0~10794	D_5
87	01	2E	MCTD#5	0~10794	D#5
88	01	30	MCTE_5	0~10794	E_5
89	01	32	MCTF_5	0~10794	F_5
90	01	34	MCTF#5	0~10794	F#5
91	01	36	MCTG_5	0~10794	G_5
92	01	38	MCTG#5	0~10794	G#5
93	01	3A	MCTA_5	0~10794	A_5
94	01	3C	MCTA#5	0~10794	A#5
95	01	3E	MCTB_5	0~10794	B_5
96	01	40	MCTC_6	0~10794	C_6
97	01	42	MCTC#6	0~10794	C#6
98	01	44	MCTD_6	0~10794	D_6
99	01	46	MCTD#6	0~10794	D#6
100	01	48	MCTE_6	0~10794	E_6
101	01	4A	MCTF_6	0~10794	F_6
102	01	4C	MCTF#6	0~10794	F#6
103	01	4E	MCTG_6	0~10794	G_6
104	01	50	MCTG#6	0~10794	G#6
105	01	52	MCTA_6	0~10794	A_6
106	01	54	MCTA#6	0~10794	A#6
107	01	56	MCTB_6	0~10794	B_6
108	01	58	MCTC_7	0~10794	C_7
109	01	5A	MCTC#7	0~10794	C#7
110	01	5C	MCTD_7	0~10794	D_7
111	01	5E	MCTD#7	0~10794	D#7
112	01	60	MCTE_7	0~10794	E_7
113	01	62	MCTF_7	0~10794	F_7
114	01	64	MCTF#7	0~10794	F#7
115	01	66	MCTG_7	0~10794	G_7
116	01	68	MCTG#7	0~10794	G#7
117	01	6A	MCTA_7	0~10794	A_7
118	01	6C	MCTA#7	0~10794	A#7
119	01	6E	MCTB_7	0~10794	B_7
120	01	70	MCTC_8	0~10794	C_8
121	01	72	MCTC#8	0~10794	C#8
122	01	74	MCTD_8	0~10794	D_8
123	01	76	MCTD#8	0~10794	D#8
124	01	78	MCTE_8	0~10794	E_8
125	01	7A	MCTF_8	0~10794	F_8
126	01	7C	MCTF#8	0~10794	F#8
127	01	7E	MCTG_8	0~10794	G_8
128	02	00	MTNAM0	ascii	—Micro Tuning Name—
129	02	01	MTNAM1	ascii	
130	02	02	MTNAM2	ascii	
131	02	03	MTNAM3	ascii	
132	02	04	MTNAM4	ascii	
133	02	05	MTNAM5	ascii	
134	02	06	MTNAM6	ascii	
135	02	07	MTNAM7	ascii	
136	02	08	MTNAM8	ascii	
137	02	09	MTNAM9	ascii	

< Table 1-14 >

MIDI Parameter Change table (Switch Remote)

$F0, $43, $1n, $34, $0D, $00, $00, N2, $00, V2, $F7

Note) n ; Device Number
N2 ; parameter number
V2 ; parameter value data range : off ($00~$3F), on ($40~$7F)

	N2	sw.#	note
0	00	PSW 1	VOICE
1	01	PSW 2	MULTI
2	02	PSW 3	SONG
3	03	PSW 4	PATTERN
4	04	PSW 5	UTILITY
5	05	PSW 6	EDIT
6	06	PSW 7	STORE
7	07	PSW 8	EFFECT
8	08	PSW 9	I <
9	09	PSW10	<<
10	0A	PSW11	LOCATE
11	0B	PSW12	>>
12	0C	PSW13	RECORD
13	0D	PSW14	STOP
14	0E	PSW15	RUN
15	0F	PSW16	SHIFT
16	10	PSW17	F1
17	11	PSW18	F2
18	12	PSW19	F3
19	13	PSW20	F4
20	14	PSW21	F5
21	15	PSW22	F6
22	16	PSW23	F7
23	17	PSW24	F8
24	18	PSW25	EXIT
25	19	PSW26	PAGE <
26	1A	PSW27	PAGE >
27	1B	PSW28	JUMP
28	1C	PSW29	-1
29	1D	PSW30	↑
30	1E	PSW31	+1
31	1F	PSW32	←
32	20	PSW33	↓
33	21	PSW34	→
34	22	PSW35	0
35	23	PSW36	±

	N2	sw.#	note
36	24	PSW37	ENTER
37	25	PSW38	1
38	26	PSW39	2
39	27	PSW40	3
40	28	PSW41	4
41	29	PSW42	5
42	2A	PSW43	6
43	2B	PSW44	7
44	2C	PSW45	8
45	2D	PSW46	9
46	2E	PSW47	INTERNAL
47	2F	PSW48	CARD
48	30	PSW49	PRESET 1
49	31	PSW50	PRESET 2
50	32	PSW51	A
51	33	PSW52	B
52	34	PSW53	C
53	35	PSW54	D
54	36	PSW55	1
55	37	PSW56	2
56	38	PSW57	3
57	39	PSW58	4
58	3A	PSW59	5
59	3B	PSW60	6
60	3C	PSW61	7
61	3D	PSW62	8
62	3E	PSW63	9
63	3F	PSW64	10
64	40	PSW65	11
65	41	PSW56	12
66	42	PSW57	13
67	43	PSW58	14
68	44	PSW59	15
69	45	PSW60	16
70	46	PSW71	DIAL DEC
71	47	PSW72	DIAL INC

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< Table 1-15 >

MIDI Parameter Change table (Master control)

$F0, $43, $1n, $34, $0E, T2, N1, N2, V1, V2, $F7

Note) n ; channel number
T2 ; control number
N1 ; parameter type
N2 ; parameter number
V1 ; MS7bits of parameter value
V2 ; LS7bits of parameter value

[Filter section] T2=00

	N1	N2	data name	data range	note
0	00	00	FILPGMMS	0~b'11111111	Program Change Filter ch 16-9
1	00	01	FILPGMLS	0~b'11111111	0;off 1;on ch 8-1
2	00	02	FILCONMS	0~b'11111111	Control Change Filter ch 16-9
3	00	03	FILCONLS	0~b'11111111	0;off 1;onch 8-1
4	00	04	FILPBNDMS	0~b'11111111	Pitch Bend Filter ch 16-9
5	00	05	FILPBNDLS	0~b'11111111	0;off 1;onch 8-1
6	00	06	FILSUSMS	0~b'11111111	Sustain Pedal Filter ch 16-9
7	00	07	FILSUSLS	0~b'11111111	0;off 1;onch 8-1
8	00	08	FILATCHMS	0~b'11111111	After Touch Filter ch 16-9
9	00	09	FILATCHLS	0~b'11111111	0;off 1;onch 8-1
10	00	0A	FILMVOLMS	0~b'11111111	Main Volume Filter ch 16-9
11	00	0B	FILMVOLLS	0~b'11111111	0;off 1;onch 8-1

[controller element section] T2=0, 0, n, n, 0, t, t, t

n	
00	MIDI-1
01	MIDI-2
10	MIDI-3
11	MIDI-4

t	
000	Control 1
001	Control 2
010	Control 3
011	Control 4
100	Control 5
101	Control 6
110	Control 7
111	Control 8

	N1	N2	data name	data range	note
0	02	00	CONENABL	0~B'00011111	Control Enable 0;off 1;on Bit 0 = midi off/on 1 = pc off/on 2 = Ms/Ls off/on 3 = volume off/on 4 = MDR off/on
1	02	01	MIDITCH	0~15	MIDI Transmit Channel
2	02	02	NLIML	0~127	Note Limit Low
3	02	03	NLIMH	0~127	High
4	02	04	VLIML	1~127	Velocity Limit Low
5	02	05	VLIMH	1~127	High
6	02	06	XPOSE	0~127	Transpose [center 64 (40h)]
7	02	07	VELCURV	0~3	Velocity Curve
8	02	08	AFTCURV	0~3	After Touch Curve
9	02	09	MAINVOL	0~127	MAIN Volume
10	02	0A	BANK	0~16383	Bank Select
11	02	0C	PCNUM	0~127	Program Change Number
12	02	0D	MDRNUM	0~98	MDR Number

[Control name section]

T2=0, 0, 0, 0, 0, t, t, t

t	
000	Control 1
001	Control 2
010	Control 3
011	Control 4
100	Control 5
101	Control 6
110	Control 7
111	Control 8

	N1	N2	data name	data range	note
					—Control Name—
0	03	00	CNAM0	ascii	
1	03	01	CNAM1	ascii	
2	03	02	CNAM2	ascii	
3	03	03	CNAM3	ascii	
4	03	04	CNAM4	ascii	
5	03	05	CNAM5	ascii	
6	03	06	CNAM6	ascii	
7	03	07	CNAM7	ascii	
8	03	08	CNAM8	ascii	
9	03	09	CNAM9	ascii	

[Control voice section]

T2=0, 0, 0, 0, 0, t, t, t

t	
000	Control 1
001	Control 2
010	Control 3
011	Control 4
100	Control 5
101	Control 6
110	Control 7
111	Control 8

	N1	N2	data name	data range	note
0	04	00	PTM	off/on	Program
		01	VM	voice/multi	Program Mode
		02	VMEM	I/C/P1/P2	Voice Memory
		03	VNUM	0~63	Voice Number
		04	MMEM	I/C/P	Multi Memory
		05	MNUM	0~15	Multi Number

< Table 1-16 >

MIDI Parameter Change table (System Setup)

$F0, $43, $1n, $34, $0F, $00, $00, N2, $00, V2, $F7

Note) n ; channel number
N2 ; parameter number
V2 ; parameter value

Note) Exception ; Master_Tuning (at transmit) $F0 $43, $1N, $04, DT, $F7 (DX1 Master Tuning is used)

	N2	data name	data range	note
				—Greeting Message—
0	00	GRTMSU 0	ascii	Upper *
1	01	GRTMSU 1	ascii	Upper *
2	02	GRTMSU 2	ascii	Upper *
3	03	GRTMSU 3	ascii	Upper *
4	04	GRTMSU 4	ascii	Upper *
5	05	GRTMSU 5	ascii	Upper *
6	06	GRTMSU 6	ascii	Upper *
7	07	GRTMSU 7	ascii	Upper *
8	08	GRTMSU 8	ascii	Upper *
9	09	GRTMSU 1	ascii	Upper *
10	0A	GRTMSU10	ascii	Upper *
11	0B	GRTMSU11	ascii	Upper *
12	0C	GRTMSU12	ascii	Upper *
13	0D	GRTMSU13	ascii	Upper *
14	0E	GRTMSU14	ascii	Upper *
15	0F	GRTMSU15	ascii	Upper *
16	10	GRTMSU16	ascii	Upper *
17	11	GRTMSU17	ascii	Upper *
18	12	GRTMSU18	ascii	Upper *
19	13	GRTMSU19	ascii	Upper *
20	14	GRTMSL 0	ascii	Lower *
21	15	GRTMSL 1	ascii	Lower *
22	16	GRTMSL 2	ascii	Lower *
23	17	GRTMSL 3	ascii	Lower *
24	18	GRTMSL 4	ascii	Lower *
25	19	GRTMSL 5	ascii	Lower *
26	1A	GRTMSL 6	ascii	Lower *
27	1B	GRTMSL 7	ascii	Lower *
28	1C	GRTMSL 8	ascii	Lower *
29	1D	GRTMSL 1	ascii	Lower *
30	1E	GRTMSL10	ascii	Lower *
31	1F	GRTMSL11	ascii	Lower *
32	20	GRTMSL12	ascii	Lower *
33	21	GRTMSL13	ascii	Lower *
34	22	GRTMSL14	ascii	Lower *
35	23	GRTMSL15	ascii	Lower *
36	24	GRTMSL16	ascii	Lower *
37	25	GRTMSL17	ascii	Lower *
38	26	GRTMSL18	ascii	Lower *
39	27	GRTMSL19	ascii	Lower *
40	28	MNSFT	-64~63 (o/b)	Master Note Shift
41	29	MTUNE	-64~63 (o/b)	Master Fine Tuning (receive only)
				—Velocity—
42	2A	FIXVEL	off, 1~127	Fixed velocity
43	2B	VELCRV	0~7	Velocity Curve select
				—MIDI Control Number Assign—
44	2C	MW2MCN	0~120	Modulation Wheel 2
45	2D	FSASN	0~120	Foot Switch assign
46	2E	EDCONFSW	off/on	Edit Confirm switch
				—MIDI—
47	2F	TXCH	0~15	keyboard transmit channel
48	30	VRCH	0~15, omni	Voice Receive channel
49	31	LOCAL	off/on	Local switch
50	32	DVCNUM	off, 0~15, all	Device number
51	33	NTSW	all/odd/even	Note_Even_Odd switch
52	34	BLKMPRT	off/on	Bulk data Memory protect switch
53	35	PGCMOD	0off/on	Program Change mode
54	36	reserve		
55	37	PATPRT	off/on	Bulk Data Pattern Protect Switch

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	N2	data name	data range	note
56	38	CONTHOLD	off/on	Controller Hold
57	39	MEMALOC	0~127	memory alocate for MDR (x4Kbyte)
58	3A	reserve		
59	3B	reserve		
60	3C	reserve		
61	3D	reserve		
62	3E	reserve		
63	3F	reserve		
	40	EBYP	0~2	Effect Bypass Sw (param cng only) 0:off 1:on Normal 2:on OUT-1 Direct OUT-2 Effect

Note) (o/b) ; offset binary (invert the sign_bit of the 2's complement)

< Table 1-17 >

MIDI Parameter Change table (Sample)

$F0, $43, $1n, $34, $0E, $T2, 06, N2, V1, V2, $F7

Note) n ; Device Number
T2 ; Sample number
N2 ; parameter number
V1 ; MS7bits of parameter value
V2 ; LS7bits of parameter value

	N2	data name	data range	note
0	00	HIKEY	1~127 (note #)	High key
1	02	ORIKEY	0~127 (note #)	Original key
2	04	PITCH	-5376~+5376 (2bytes, o/b)	Pitch
3	08	LOOPMODE	b2 ; 0 forward 1 backward b1 ; 0 loop off 1 loop on b0 ; 0 normal 1 alternate	Loop type, Mode
4	12	VOL	0~127	Volume
5	1C	LOWKEY	1~127 (note #)	Low key
6	1E	SANAM0	ascii	—Sample Name—
7	1F	SANAM1	ascii	
8	20	SANAM2	ascii	
9	21	SANAM3	ascii	
10	22	SANAM4	ascii	
11	23	SANAM5	ascii	
12	24	SANAM6	ascii	
13	25	SANAM7	ascii	

< Table 2-1 >

Voice Bulk Dump

Note) Memory_type internal ; $00
preset 1 ; $02
preset 2 ; $03
Edit Buffer ; $7F (Used only when transmitting from SY99. Memory# is transmitted as $00, ignored when receiving.)

When receiving Bulk dump, if Memory_type is other than $7F, this is processed as Internal.

Note) Memory# $00~$0F ; Bank A, 1~16
$10~$1F ; Bank B, 1~16
$20~$2F ; Bank C, 1~16
$30~$3F ; Bank D, 1~16

Note) When receiving Bulk dump, bit 6 of Memory# is ignored.

(1) 1AFM

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	V
15	C
16	$00
↓	
29	
30	Memory_type
31	Memory#
32	Refer to 00~0A of Table 1-3. $00 or $03 (ELMODE)
33	VNAM0
↓	↓
43	Refer to Dummy of Table 1-10. EFMODE
↓	↓
72	Refer to 28~3F of Table 1-3. WPBR
↓	↓
95	VVOL
96	AWMID high 7bit
97	AWMID low 7bit
98	Refer to 00~08 of Table 1-4. ELVL0
↓	↓
106	MCTEN0

	Element1 data
107	Refer to 00~26 of Table 1-7. OP6_R1
↓	↓
125	reserve
126	OP6_ALGSRC (MSB)
127	OP6_ALGSRC (low 7bits)
128	OP6_ALGDST
↓	↓
132	OP6_FMPMS
133	OP6_K0E
134	OP6_PHASE
135	OP6_FPD
↓	↓
140	OP6_BP4
141	OP6_EGOS1 (MSB)
142	OP6_EGOS1 (low 7bits)
143	OP6_EGOS2 (MSB)
144	OP6_EGOS2 (low 7bits)
145	OP6_EGOS3 (MSB)
146	OP6_EGOS3 (low 7bits)
147	OP6_EGOS4 (MSB)
148	OP6_EGOS4 (low 7bits)
149	OP6_RVSW
150	OP6_FPC
151	OP6_FPF
152	Refer to 00~26 of Table 1-7. OP5_R1
↓	↓
↓	↓
197	Refer to 00~26 of Table 1-7. OP4_R1
↓	↓
↓	↓
242	Refer to 00~26 of Table 1-7. OP3_R1
↓	↓
↓	↓
287	Refer to 00~26 of Table 1-7. OP2_R1
↓	↓
↓	↓
332	Refer to 00~26 of Table 1-7. OP1_R1
↓	↓
↓	↓

	Element1 data
377	Refer to 00~19 of Table 1-6. ALGNUM
↓	↓
403	Refer to 00~18 of Table 1-11. FL1_FTYPE
↓	↓
423	FL1_FBP4
424	FL1_FOS1 (MSB)
425	FL1_FOS1 (low 7bits)
426	FL1_FOS2 (MSB)
427	FL1_FOS2 (low 7bits)
428	FL1_FOS3 (MSB)
429	FL1_FOS3 (low 7bits)
430	FL1_FOS4 (MSB)
431	FL1_FOS4 (low 7bits)
432	Refer to 00~18 of Table 1-11. FL2_FTYPE
↓	↓
↓	↓
459	FL2_FOS4 (MSB)
460	FL2_FOS4 (low 7bits)
461	Refer to 32~34 of Table 1-11. FFRES
462	FFVSON
463	FFCMS
464	check_sum
465	$F7

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(2) 2AFM

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	V
15	C
16 ↓ 29	$00
30	Memory_type
31	Memory#
32	$01 or $04 (ELMODE)
33 ↓ 97	Same as (1) AFM 33~97
98 ↓ 106	Refer to 00~08 of Table 1-4. ELVL0 ↓ MCTEN0
107 ↓ 115	Refer to 00~08 of Table 1-4. ELVL1 ↓ MCTEN1

	Element1 data
116 ↓ 472	Same as (1) AFM 107~463
	Element2 data
473 ↓ 829	Same as (1) AFM 107~463
830	check_sum
831	$F7

(3) 4AFM

Note) Memory# ; $30~$3F
When receiving, cancel if Memory# is other than the above.

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	V
15	C
16 ↓ 29	$00
30	Memory_type
31	Memory#
32	$02 (ELMODE)
33 ↓ 97	Same as (1) AFM 33~97
98 ↓ 106	Refer to 00~08 of Table 1-4. ELVL0 ↓ MCTEN0
107 ↓ 115	Refer to 00~08 of Table 1-4. ELVL1 ↓ MCTEN1
116 ↓ 124	Refer to 00~08 of Table 1-4. ELVL2 ↓ MCTEN2
125 ↓ 133	Refer to 00~08 of Table 1-4. ELVL3 ↓ MCTEN3

	Element1 data
134 ↓ 490	Same as (1) AFM 107~463
	Element2 data
491 ↓ 847	Same as (1) AFM 107~463
	Element3 data
848 ↓ 1204	Same as (1) AFM 107~463
	Element4 data
1205 ↓ 1561	Same as (1) AFM 107~463
1562	check_sum
1563	$F7

(4) 1AWM

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	V
15	C
16 ↓ 29	$00
30	Memory_type
31	Memory#
32	$05 (ELMODE)
33 ↓ 97	Same as (1) AFM 33~97
98 ↓ 106	Refer to 00~08 of Table 1-4. ELVL0 ↓ MCTEN0

	Element1 data
107	Refer to 00~19 of Table 1-8. WSOURCE
108	PCMWAVE (MSB)
109	PCMWAVE (low 7bits)
110 ↓	PPM ↓
134 ↓ 194	Same as (1) AFM 403~463
195 ↓ 207	Refer to 4F~62 of Table 1-8. PAEGMD ↓ PABP4
208	PAOS21 (MSB)
209	PAOS21 (low 7bits)
210	PAOS22 (MSB)
211	PAOS22 (low 7bits)
212	PAOS23 (MSB)
213	PAOS23 (low 7bits)
214	PAOS24 (MSB)
215	PAOS24 (low 7bits)
216	PAVSON
217	PARVSW
218	PAMS
219	check_sum
220	$F7

(5) 2AWM

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	V
15	C
16 ↓ 29	$00
30	Memory_type
31	Memory#
32	$06 (ELMODE)
33 ↓ 97	Same as (1) AFM 33~97
98 ↓ 106	Refer to 00~08 of Table 1-4. ELVL0 ↓ MCTEN0
107 ↓ 115	Refer to 00~08 of Table 1-4. ELVL1 ↓ MCTEN1

	Element1 data
116 ↓ 227	Same as (1) 1AWM 107~218
	Element2 data
228 ↓ 339	Same as (1) 1AWM 107~218
340	check_sum
341	$F7

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(6) 4AWM

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	V
15	C
16 ↓ 29	$00
30	Memory_type
31	Memory#
32	$07 (ELMODE)
33 ↓ 97	Same as (1) AFM 33~97
98 ↓ 106	Refer to 00~08 of Table 1-4. ELVL0 ↓ MCTEN0
107 ↓ 115	Refer to 00~08 of Table 1-4. ELVL1 ↓ MCTEN1
116 ↓ 124	Refer to 00~08 of Table 1-4. ELVL2 ↓ MCTEN2
125 ↓ 133	Refer to 00~08 of Table 1-4. ELVL3 ↓ MCTEN3

	Element1 data
134 ↓ 245	Same as (1) 1AWM 107~218
	Element2 data
246 ↓ 357	Same as (1) 1AWM 107~218
	Element3 data
358 ↓ 469	Same as (1) 1AWM 107~218
	Element4 data
470 ↓ 581	Same as (1) 1AWM 107~218
582	check_sum
583	$F7

(7) 1AFM_1AWM

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	V
15	C
16 ↓ 29	$00
30	Memory_type
31	Memory#
32	$08 (ELMODE)
33 ↓ 97	Same as (1) AFM 33~97
98 ↓ 106	Refer to 00~08 of Table 1-4. ELVL0 ↓ MCTEN0
107 ↓ 115	Refer to 00~08 of Table 1-4. ELVL1 ↓ MCTEN1

	Element1 data
116 ↓ 472	Same as (1) AFM 107~463
	Element2 data
473 ↓ 584	Same as (4) 1AWM 107~218
585	check_sum
586	$F7

(8) 2AFM_2AWM

Note) Memory# ; $30~$3F
When receiving, cancel if Memory# is other than the above.

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	V
15	C
16 ↓ 29	$00
30	Memory_type
31	Memory#
32	$09 (ELMODE)
33 ↓ 97	Same as (1) AFM 33~97
98 ↓ 106	Refer to 00~08 of Table 1-4. ELVL0 ↓ MCTEN0
107 ↓ 115	Refer to 00~08 of Table 1-4. ELVL1 ↓ MCTEN1
116 ↓ 124	Refer to 00~08 of Table 1-4. ELVL2 ↓ MCTEN2
125 ↓ 133	Refer to 00~08 of Table 1-4. ELVL3 ↓ MCTEN3

	Element1 data
134 ↓ 490	Same as (1) AFM 107~463
	Element2 data
491 ↓ 847	Same as (1) AFM 107~463
	Element3 data
848 ↓ 959	Same as (1) AFM 107~218
	Element4 data
960 ↓ 1071	Same as (1) AFM 107~218
1072	check_sum
1073	$F7

(9) Drum_set

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	V
15	C
16 ↓ 29	$00
30	Memory_type
31	Memory#
32	$0A (ELMODE)
33 ↓ 71	Same as (1) AFM 33~71
72 ↓ 87	$00 (ctrl)
88	VVLASN
89	VVLLML
90 ↓ 95	$00 (norm)
96	AWMID high 7
97	AWMID low 7

	Drum_set data
98	ALTC_1, OUT*C_1
99	WSRCC_1
100	WAVC_1 (MSB)
101	WAVC_1 (low 7bits)
102	WVLC_1
103	WTNC_1
104	WNSC_1
105	WPNC_1
106 ↓ 113	ALTC#1, OUT*C#1 ↓ ↓
114 ↓ 121	ALTD_1, OUT*D_1 ↓ ↓
122 ↓ 129	ALTD#1, OUT*D1 ↓ ↓
130 ↓ 137	ALTE_1, OUT*E_1 ↓ ↓
138 ↓ 145	ALTF_1, OUT*F_1 ↓ ↓
146 ↓ 153	ALTF#1, OUT*F#1 ↓ ↓
154 ↓ 161	ALTG_1, OUT*G_1 ↓ ↓
162 ↓ 169	ALTG#1, OUT*G#1 ↓ ↓
170 ↓ 177	ALTA_1, OUT*A_1 ↓ ↓
178 ↓ 185	ALTA#1, OUT*A#1 ↓ ↓
186 ↓	ALTB_1, OUT*B_1 ↓ ↓

	Drum_set data
194 ↓ 289	ALTC_2, OUT*C_2 ↓ ↓
290 ↓ 385	ALTC_3, OUT*C_3 ↓ ↓
386 ↓ 481	ALTC_4, OUT*C_4 ↓ ↓
482 ↓ 577	ALTC_5, OUT*C_5 ↓ ↓
578 ↓ 585	ALTC_6, OUT*C_6 ↓ WPNC_6
586	check_sum
587	$F7

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(10) dump request

	data
0	$F0
1	$43
2	$2N
3	$7A
4	L
5	M
6	–
7	–
8	8
9	1
10	0
11	1
12	V
13	C
14 ↓ 27	$00
28	Memory type
29	Memory#
30	$F7

* Memory type = not $7F (edit buffer)

< Table 2-2 >

Additional Voice Bulk Dump

Note) Memory_type internal ; $00
preset 1 ; $02
preset 2 ; $03
Edit Buffer ; $7F (Used only when transmitting from SY99. Memory# is transmitted as $00, ignored when receiving.)

For WSOURCE, AWMWAV, data which has the same name exists in the Voice Bulk Dump which is the AWM Element data shown in table 1-8, but when Voice Bulk and Additional Voice Bulk are transmitted together, Additional bulk WSOURCE, AWMWAV becomes effective.

When receiving Bulk dump, if Memory_type is other than $7F, this is processed as Internal.

Note) Memory# $00~$0F ; Bank A, 1~16
$10~$1F ; Bank B, 1~16
$20~$2F ; Bank C, 1~16
$30~$3F ; Bank D, 1~16

Note) When receiving Bulk dump, bit 6 of Memory# is ignored.

(1) 1AFM & 1AWM

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	0
11	0
12	4
13	0
14	V
15	C
16 ↓ 29	$00
30	Memory_type
31	Memory#
32	Refer to 00 of Table 1-3. $00, $03, $05 (ELMODE)
33 ↓	Refer to 20~5D of Table 1-10. EFMODE ↓
95	AWMID high 7bit
96	AWMID low 7bit
97	AFTMD
98	SPTPNT
99	Refer to 09~12 of Table 1-4. EFLN1EL0
100	EFSDLV0
101	EFSDVL0
102	EFSDSC0
103	WSOURCE1
104	AWMWAV (MSB)
105	AWMWAV (low 7bit)
106	check_sum
107	$F7

(2) 2AFM & 2AFM & 1AFM_1AWM

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	0
11	0
12	4
13	0
14	V
15	C
16 ↓ 29	$00
30	Memory_type
31	Memory#
32	Refer to 00 of Table 1-3. $01, $04, $06, $08 (ELMODE)
33 ↓	Refer to 20~5D of Table 1-10. EFMODE ↓
95	AWMID high 7bit
96	AWMID low 7bit
97	AFTMD
98	SPTPNT
99	Refer to 09~12 of Table 1-4. EFLN1EL0
100	EFSDLV0
101	EFSDVL0
102	EFSDSC0
103	EFLN1EL1
104	EFSDLV1
105	EFSDVL1
106	EFSDSC1
107	WSOURCE1
108	AWMWAV (MSB)
109	AWMWAV (low 7bit)
110	WSOURCE2
111	AWMWAV (MSB)
112	AWMWAV (low 7bit)
113	check_sum
114	$F7

(3) 4AFM & 4AWM & 2AFM_2AWM

Note) Memory# ; $30~$3F
When receiving, cancel if Memory# is other than the above.

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	0
11	0
12	4
13	0
14	V
15	C
16 ↓ 29	$00
30	Memory_type
31	Memory#
32	Refer to 00 of Table 1-3. $02, $07, $09 (ELMODE)
33 ↓	Refer to 20~5D of Table 1-10. EFMODE ↓
95	AWMID high 7bit
96	AWMID low 7bit
97	AFTMD
98	SPTPNT
99	Refer to 09~12 of Table 1-4. EFLN1EL0
100	EFSDLV0
101	EFSDVL0
102	EFSDSC0
103	EFLN1EL1
104	EFSDLV1
105	EFSDVL1
106	EFSDSC1
107	Refer to 09~12 of Table 1-4. EFLN1EL2
108	EFSDLV2
109	EFSDVL2
110	EFSDSC2
111	Refer to 09~12 of Table 1-4. EFLN1EL3
112	EFSDLV3
113	EFSDVL3
114	EFSDSC3
115	WSOURCE1
116	AWMWAV (MSB)
117	AWMWAV (low 7bit)
118	WSOURCE2
119	AWMWAV (MSB)
120	AWMWAV (low 7bit)
121	WSOURCE3
122	AWMWAV (MSB)
123	AWMWAV (low 7bit)
124	WSOURCE4
125	AWMWAV (MSB)
126	AWMWAV (low 7bit)
127	check_sum
128	$F7

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(4) Drum_set

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	0
11	0
12	4
13	0
14	V
15	C
16	$00
↓	
29	
30	Memory_type
31	Memory#
	Refer to 00 of Table 1-3.
32	$0A (ELMODE)
	Refer to 20~5D of Table 1-10.
33	EFMODE
↓	↓
95	AWMID high 7bit
96	AWMID low 7bit
97	AFTMD
98	SPTPNT
	Refer to 07~09 of Table 1-5.
99	WSOURCEC_1
100	AWMWAV (MSB)
101	AWMWAV (low 7bit)
102	EFLN1C_1
103	EFSDLVC_1
104	EFSDVLC_1
↓	↓
↓	↓
↓	↓
459	WSOURCEC_6
460	AWMWAV (MSB)
461	AWMWAV (low 7bit)
462	EFLN1C_6
463	EFSDLVC_6
464	EFSDVLC_6

	Refer to 07~09 of Table 1-5.
465	ALTE_0
↓	↓
531	ALTB_0
↓	↓
541	EFSDVLB_0
542	ALTC#_6
↓	↓
619	ALTG_6
↓	↓
629	ALTG_6
630	WSOURCEE_0
631	AWMWAV (MSB)
632	AWMWAV (low 7bit)
↓	↓
↓	↓
663	WSOURCEG_6
664	AWMWAV (MSB)
665	AWMWAV (low 7bit)
666	check_sum
667	$F7

(5) dump request

	data
0	$F0
1	$43
2	$2N
3	$7A
4	L
5	M
6	–
7	–
8	0
9	0
10	4
11	0
12	V
13	C
14	$00
↓	
27	
28	Memory type
29	Memory#
30	$F7

* Memory type = not $7F (edit buffer)

< Table 3-1 >

Multi Bulk Dump

Note) Memory_type internal ; $00
preset ; $02
Edit Buffer ; $7F (Used only when transmitting from SY99. Memory# is transmitted as $00, ignored when receiving.)

When receiving Bulk dump, if Memory_type is other than $7F, this is processed as Internal.

Note) Memory# $00~$0F ; INT1~16

Note) When receiving Bulk dump, bits 6~4 of Memory# are ignored.

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	M
15	U
16	$00
↓	
29	
30	Memory_type
31	Memory#
	Refer to 00~13 of Table 1-1.
32	MNAM0
↓	↓
51	MNAM19
	Refer to Dummy of Table 1-10.
52	EFMODE
↓	↓
80	ST_MIX2

	data
	Refer to 00~06 of Table 1-2.
90	OFVCSW_0, OUT*CH_0
↓	↓
97	OFVCSW_1, OUT*CH_1
↓	↓
104	OFVCSW_2, OUT*CH_2
↓	↓
111	OFVCSW_3, OUT*CH_3
↓	↓
118	OFVCSW_4, OUT*CH_4
↓	↓
125	OFVCSW_5, OUT*CH_5
↓	↓
132	OFVCSW_6, OUT*CH_6
↓	↓
139	OFVCSW_7, OUT*CH_7
↓	↓
146	OFVCSW_8, OUT*CH_8
↓	↓
153	OFVCSW_9, OUT*CH_9
↓	↓
160	OFVCSW10, OUT*CH10
↓	↓
167	OFVCSW11, OUT*CH11
↓	↓
174	OFVCSW12, OUT*CH12
↓	↓
181	OFVCSW13, OUT*CH13
↓	↓
188	OFVCSW14, OUT*CH14
↓	↓
195	OFVCSW15, OUT*CH15
↓	↓
201	STPAN15
202	check_sum
203	$F7

dump request

	data
0	$F0
1	$43
2	$2N
3	$7A
4	L
5	M
6	–
7	–
8	8
9	1
10	0
11	1
12	M
13	U
14	$00
↓	
27	
28	Memory type
29	Memory#
30	$F7

* Memory type = not $7F (Edit buffer)

< Table 3-2 >

Additional Multi Bulk Dump

Note) Memory_type internal ; $00
preset ; $02
Edit Buffer ; $7F (Used only when transmitting from SY99. Memory# is transmitted as $00, ignored when receiving.)

When receiving Bulk dump, if Memory_type is other than $7F, this is processed as Internal.

Note) Memory # $00~$0F ; INT1~16

Note) When receiving Bulk dump, bits 6~4 of Memory# are ignored.

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	0
11	0
12	4
13	0
14	M
15	U
16	$00
↓	
29	
30	Memory_type
31	Memory#
	Refer to 20~5D of Table 1-10.
32	EFMODE
↓	↓
94	EFLFOPH

	data
	Refer to 07~09 of Table 1-2.
95	EFSDMD0
↓	↓
98	EFSDMD1
↓	↓
101	EFSDMD2
↓	↓
104	EFSDMD3
↓	↓
107	EFSDMD4
↓	↓
110	EFSDMD5
↓	↓
113	EFSDMD6
↓	↓
116	EFSDMD7
↓	↓
119	EFSDMD8
↓	↓
122	EFSDMD9
↓	↓
125	EFSDMD10
↓	↓
128	EFSDMD11
↓	↓
131	EFSDMD12
↓	↓
134	EFSDMD13
↓	↓
137	EFSDMD14
↓	↓
140	EFSDMD15
143	check_sum
144	$F7

dump request

	data
0	$F0
1	$43
2	$2N
3	$7A
4	L
5	M
6	–
7	–
8	0
9	0
10	4
11	0
12	M
13	U
14	$00
↓	
27	
28	Memory type
29	Memory#
30	$F7

* Memory type = not $7F (Edit buffer)

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< Table 4 >

Pan Bulk Dump

Note) Memory_type internal ; $00
preset ; $02

When receiving Bulk dump, processed as Internal regardless of the Memory_type.

Note) Memory# $00~$1F ; INT1~32

Note) When receiving Bulk dump, bits 6, 5 of Memory# are ignored.

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	P
15	N
16	$00
↓	
29	
30	Memory_type
31	Memory#
	Refer to 00~1A of Table 1-12.
32	PNSCSEL
↓	↓
58	PNNAM9
59	check_sum
60	$F7

dump request

	data
0	$F0
1	$43
2	$2N
3	$7A
4	L
5	M
6	–
7	–
8	8
9	1
10	0
11	1
12	P
13	N
14	$00
↓	
27	
28	Memory type
29	Memory#
30	$F7

< Table 5 >

Micro Tuning Bulk Dump

Note) Memory# $00~$01 ; INT1~2

Note) When receiving Bulk dump, bits 6~1 of Memory# are ignored.

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	M
15	T
16	$00
↓	
29	
30	$00
31	Memory#
	Refer to 0000~017E of Table 1-13.
32	MCTC_-2 (high 7bits)
33	MCTC_-2 (low 7bits)
↓	↓
286	MCTG_8 (high 7bits)
287	MCTG_8 (low 7bits)
	Refer to 0200~0209 of Table 1-13.
288	MTNAM_1
↓	↓
297	MTNAM10
298	check_sum
299	$F7

dump request

	data
0	$F0
1	$43
2	$2N
3	$7A
4	L
5	M
6	–
7	–
8	8
9	1
10	0
11	1
12	M
13	T
14	$00
↓	
27	
28	$00
29	Memory#
30	$F7

< Table 6 >

Master Control Bulk Dump

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	0
11	0
12	4
13	0
14	M
15	S
16	$00
↓	
31	
	Refer to Table 1-15.
32	FILPGMH (MSB)
33	FILPGMH (low 7 bits)
34	FILPGML (MSB)
35	FILPGML (low 7 bits)
↓	↓
52	FILMVOLH (MSB)
53	FILMVOLH (low 7 bits)
54	FILMVOLL (MSB)
55	FILMVOLL (low 7 bits)
56	reserved
57	reserved

58	CONENA1_1
↓	↓
71	MDRNUM1_1
72	CONENA2_1
↓	↓
85	MDRNUM2_1
86	CONENA3_1
↓	↓
99	MDRNUM3_1
100	CONENA4_1
↓	↓
113	MDRNUM4_1
114	CONENA1_2
↓	↓
505	MDRNUM4_8
506	CNAM0_1
↓	↓
515	CNAM9_1
516	CNAM0_2
↓	↓
585	CNAM9_8
586	PGM_1
↓	↓
591	MNUM_1
592	PGM_2
↓	↓
633	MNUM_8
634	check_sum
635	$F7

dump request

	data
0	$F0
1	$43
2	$2N
3	$7A
4	L
5	M
6	–
7	–
8	0
9	0
10	4
11	0
12	M
13	S
14	$00
↓	
29	
30	$F7

< Table 7 >

System Setup Bulk Dump

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	S
15	Y
16	$00
↓	
31	
	Refer to 00~3F of Table 1-16.
32	GRTMSU_0
↓	↓
95	reserve
96	check_sum
97	$F7

dump request

	data
0	$F0
1	$43
2	$2N
3	$7A
4	L
5	M
6	–
7	–
8	8
9	1
10	0
11	1
12	S
13	Y
14	$00
↓	
29	
30	$F7

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< Table 8-1 >

Squencer Setup Bulk Dump

dump request

	data
0	$F0
1	$43
2	$0N
3	$7E
4	byte count
5	
6	L
7	M
8	–
9	–
10	8
11	1
12	0
13	1
14	S
15	S
16	QUANTIZE
17	CLICK SWITCH
18	CLICK BEAT
19	reserve
20	SYNC MODE
21	REC MIDI CHANNEL
22	VELOCITY SW.
23	CONTROL CHANGE SW.
24	PITCH BEND SW.
25	PROGRAM CHANGE SW.
26	AFTER TOUCH SW.
27	SY.EXCLUSIVE SW.
28	MIDI CONTROL SW.
29	EDIT BEAT/CLOCK
30	ACCENT1
31	ACCENT2
32	ACCENT3
33	ACCENT4
34	GATE TYPE
35	check_sum
36	$F7

	data
0	$F0
1	$43
2	$2N
3	$7E
4	L
5	M
6	–
7	–
8	8
9	1
10	0
11	1
12	S
13	S
14	$F7

< Table 8-2 >

Squencer Song & Pattern (KSEQ, NSEQ) Bulk Dump

KSEQ and NSEQ data is converted from 1 byte to 2 byte ascii data and transmitted. The data for one song consists of more than one track of data, where each track begins with F0 0n, (n=track number) and ends with F2. Empty tracks will not be included.

hex	description
F0	top of record track #1
00	
—	
—	time/event/control data
—	
F2	end of record track #1
—	
—	track #2~#15 data
—	
F0	top of record track #16
0F	
—	
—	time/event/control data
—	
F2	end of record track #16

< Table 9-1 >

Waveform Data Bulk Dump

Note) FROM, TO When Memory_type of $01 (card), $02 or $03 (pre1), or $04 (pre2) is specified, FROM and TO are both set to a value of $00.

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	0
11	0
12	4
13	0
14	W
15	V
16	
↓	$00
29	
30	Memory_type
31	Memory#
	Refer to 0~9 of Table 1-9.
32	WVNAM0
↓	↓
39	WVNAM7
40	WVFROM
41	WVTO
42	check_sum
43	$F7

< Table 9-2 >

Sample data Bulk Dump

	data
0	$F0
1	$43
2	$0N
3	$7A
4	byte count
5	
6	L
7	M
8	–
9	–
10	0
11	0
12	4
13	0
14	S
15	A
16	
↓	$00
30	
31	Memory#
	Refer to 6~13 of Table 1-17.
32	SANAM0
↓	↓
39	SANAM7
40	HIKEYCODEH (MSB)
41	HIKEYCODEH (low 7bit)
42	HIKEYCODEL (MSB)
43	HIKEYCODEL (low 7bit)
44	ORIKEY
45	PITCHCODEH (MSB)
46	PITCHCODEH (low 7bit)
47	PITCHCODEL (MSB)
48	PITCHCODEL (low 7bit)
49	LOOPMODE
50	VOLCODE (MSB)
51	VOLCODE (low 7bit)
52	LOWKEYCODEH (MSB)
53	LOWKEYCODEH (low 7bit)
54	LOWKEYCODEL (MSB)
55	LOWKEYCODEL (low 7bit)
56	check_sum
57	$F7

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YAMAHA [Music synthesizer---sequencer part] Date :25-APR-1991
Model SY99 MIDI Implementation Chart Version : 1.0

Function ...	Transmitted	Recognized	Remarks
Basic Default	1 - 16	1 - 16	memorized
Channel Changed	1 - 16	1 - 16	
Mode Default	x	x	
Messages	x	x	
Altered	**********	x	
Note Number : True voice	0 - 127 **********	0 - 127	
Velocity Note ON	o 9nH,v=1-127	o v=1-127	
Note OFF	x 9nH,v=0	x	
After Touch Key's	x	x	
Ch's	o	o	
Pitch Bender	o	o	
0 - 120	o	o	
Control Change			
Prog Change : True #	o 0 - 127 **********	o 0 - 127	
System Exclusive	o	o	Song data etc.
Common : Song Pos	o	o	
: Song Sel	o	o	
: Tune	x	x	
System :Clock	o	o	
Real Time :Commands	o	o	
Aux :Local ON/OFF	x	x	
:All Notes OFF	x	x	
Mes- :Active Sense	x	x	
sages:Reset	x	x	
Notes			

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO o : Yes
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO x : No

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YAMAHA [Music Synthesizer---synthesizer part] Date :25-APR-1991
Model SY99 MIDI Implementation Chart Version : 1.0

Function ...		Transmitted	Recognized	Remarks
Basic	Default	1 - 16	1 - 16	memorized
Channel	Changed	1 - 16	1 - 16	
Mode	Default	3	1,2,3,4	memorized
	Messages	x	x	
	Altered	**********	x	
Note Number : True voice		28 - 103 **********	0 - 127 1 - 127	
Velocity	Note ON	o 9nH,v=1-127	o v=1-127	
	Note OFF	x 9nH,v=0	x	
After Touch	Key's	x	x	
	Ch's	o	o	
Pitch Bender		o	o 0-12 semi	7 bit resolution
Control Change	0	o	o	Bank select
	1	o M.Wheel	o	
	2	o Breath cont.	o	
	4	o Foot cont.	o	
	6	o Data entry	o	
	7	o Foot volume	o	Volume
	32	o	o	Bank select
	64	o Sustain sw.	o	Sustain
	65	o Portamento sw	o	Portamento
	96	o inc.	o	
	97	o dec.	o	
	1 - 6	o Assignable	o	
	8 - 120	o Assignable	o	
Prog Change : True #		o 0-79 *1 **********	o 0-79 *2	
System Exclusive		o	o	voice etc.
Common : Song Pos Common : Song Sel Common : Tune		See the sequencer part.		
System Real Time : Clock				
System Real Time : Commands				
Aux : Local ON/OFF		x	x	
Aux : All Notes OFF		x	x	
Mes- sages: Active Sense		o	o	
Mes- sages: Reset		x	x	

Note *1 ; Send PC,Master control: 0 - 127
*2 ; voice : 0 - 63 , multi : 64 - 79

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO o : Yes
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO x : No

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MUSIC SYNTHESIZER

SY99

PARTS LIST

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Note) DESTINATION ABBREVIATIONS

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

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■ELECTRICAL PARTS（電気部品）

	Ref. No.	Part No.	Description		部品名	Remarks	ランク
*		VK287400	Circuit Board	DM1	DM1シート	SY99	66
*		VK287500	Circuit Board	DM2	DM2シート		90
*		VK261900	Circuit Board	PNAB	PNABシート		19
*		VK261800	Circuit Board	PNC	PNCシート		23
*		VJ875400	Circuit Board	JK	JKシート		
*		NX809690	Circuit Board	JK(JK)	JK(JK)シート		
*		NX809700	Circuit Board	JK(JKB)	JK(JKB)シート		
*		NX809710	Circuit Board	JK(CARD)	JK(CARD)シート		
*		VK666500	Circuit Board	CN	CNシート		
		NA810850	Circuit Board	MK1	MK1シート		07
		NA810860	Circuit Board	MK2	MK2シート		08
*		VK263600	Circuit Board	PC	PCシート		08
*		VJ800200	Circuit Board	PS	PSシート	J	19
*		VJ800300	Circuit Board	PS	PSシート	U	20
*		VJ800400	Circuit Board	PS	PSシート	C	20
*		VJ800500	Circuit Board	PS	PSシート	H,D,A,B	20
*		VK287400	Circuit Board	DM1	DM1シート		66
		IG001390	IC	RC4558D-V	IC	OP AMP	03
		XH970A00	IC	M62021L	IC	RESET	04
		IG043300	IC	TC4093BP	IC	NAND	05
		IG049650	IC	SN74LS14N	IC	INVERTER	05
		IR001450	IC	SN74HC14N	IC	INVERTER	05
		XA055001	IC	SN74ALS32N	IC	OR	03
		IG149600	IC	SN74ALS138N	IC	DECODER	04
		IG149900	IC	SN74ALS245AN	IC	BUS TRANSCEIVER	07
		IR024500	IC	TC74HC245AP	IC	BUS BUFFER	07
		XH608A00	IC	TC74AC245P	IC	BUS TRANSCEIVER	05
		IR405200	IC	TC74HC4052AP	IC	MULTIPLEXER	03
*		XI722D00	IC	H8/532	IC	CPU	
		XF148A00	IC	HD63C01Y0F64P	IC	CPU	09
		XG950C00	IC	HD63B01Y0RM21P	IC	PKS	08
		XB361001	IC	μPD71055C	IC	PPI	06
		XH129B00	IC	WD37C65C-JM00	IC	FDD CONTROLLER	15
*		XI500A00	IC	LZ95B12	IC	GATE ARRAY	05
*		XI501A00	IC	LZ95A13	IC	GATE ARRAY	05
		XE612A00	IC	HM658128P-12	IC	PSRAM	17
		XF876A00	IC	LH5164D-10L	IC	SRAM	08
		XH266A00	IC	HM62256LP-10	IC	SRAM	13
*		XI580A00	IC	HM628128LP-10	IC	SRAM	22
*		XJ613D00	IC	TC574000D	IC	EPROM(040AV120)	
*		XJ614B00	IC	HN27C101AG	IC	EPROM(040BV110)	
*		XJ615C00	IC	HN27C101AG	IC	EPROM(040CV120)	
*		XJ616C00	IC	M5M27C201K	IC	EPROM(040DV120)	
		VD473200	Photo Coupler	6N137	フォトカプラ		05
		IC260320	Transistor	2SC2603 E,F	トランジスタ		01
		IF003450	Diode	1SS133	ダイオード		01
		VB481900	Diode	11ES4	ダイオード		01
		VA074400	Metal Film Resistor	10KΩ 1/5W F	金属皮膜抵抗		01
		HZ004650	Resistor Array	RMLS6J103	抵抗アレイ		02
		VA823000	Resistor Array	RMLS6-223J	抵抗アレイ		01
		VE443500	Resistor Array	RGLD4X103J	抵抗アレイ		01
		VE445200	Resistor Array	RGLD8X103J	抵抗アレイ		01
		VE445400	Resistor Array	RGLD8X223J	抵抗アレイ		01
		VG284400	Resistor Array	RMLS7J103	抵抗アレイ		01
*		VK409500	Resistor Array	RMLS5J102	抵抗アレイ		01
*		VK437400	Resistor Array	RMLS7153J	抵抗アレイ		01
		RD254470	Chip Resistor	47Ω 0.1W J	チップ抵抗		01
		RD255100	Chip Resistor	100Ω 0.1W J	チップ抵抗		01
		RD256100	Chip Resistor	1KΩ 0.1W J	チップ抵抗		01
		RD256470	Chip Resistor	4.7KΩ 0.1W J	チップ抵抗		01
		RD257100	Chip Resistor	10KΩ 0.1W J	チップ抵抗		01
		UJ838470	Electrolytic Cap.	470μ 16V	ケミコン		01
*		VJ798800	Chip Monolithic Cera. Cap.	F 0.1μ 25V Z	チップ積層セラコン		01
		FZ006970	EMI Filter	LS MT Y223NB	LCフィルターEMI		02
		VE463500	Quartz Crystal Unit	12MHz AT-49	水晶振動子		03
		VI573400	Quartz Crystal Unit	16MHz AT-49	水晶振動子		03
*		VK409400	Quartz Crystal Unit	24MHz AT-49	水晶振動子		03
		VE338400	Lithium Battery	SONY/CR2032	リチュウム電池		03
		VH930600	Metal Fitting, Earth		アース金具	(3pcs)	01
*		VK287500	Circuit Board	DM2	DM2シート		90
		IG042500	IC	NJM4556	IC	OP AMP.	04
*		XJ748A00	IC	M5238P R610	IC	OP AMP.	03
		IG065510	IC	NJM78L05A	IC	+5V REGULATOR	03
		IG130500	IC	NJM79L05	IC	-5V REGULATOR	03
		XH970A00	IC	M62021L	IC	RESET	04
*		XD655A00	IC	TC74HC00AF-TP1	IC	NAND	01
*		XJ622A00	IC	TC74HC21AF	IC	2-4 IN AND	01

*New Parts（新規部品）

ランク：Japan only

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	Ref. No.	Part No.	Description		部品名	Remarks	ランク
		XC726001	IC	SN74HC74NSR	IC	DFF	03
		XD835A00	IC	SN74HC138NSR	IC	DECODER	02
		XD658A00	IC	TC74HC175AF-TP1	IC	DFF	02
		XD603A00	IC	TC74HC245F-T1	IC	TRANSCEIVER	04
		XE057A00	IC	SN74ALS245ANSR	IC	BUFFER	05
*		XH779A00	IC	SN74LS245ANSR	IC	BUFFER	03
*		XJ623A00	IC	TC74HC4051AF	IC	MULTIPLEXER	02
		XG662A00	IC	TMC57800N	IC	MIX5	07
		XH690A00	IC	PCM56P-Y	IC	DAC	07
*		XI364A00	IC	LC9116A-483	IC	TW80 DECODER	07
		XF237A00	IC	YM3029	IC	DAC	09
		XE862B00	IC	YM3422B	IC	ESI	05
		XA902001	IC	YM3807	IC	MOD	09
		XF164A00	IC	YM6007	IC	DSP2	18
		XG996A00	IC	YM7102	IC	PAN	10
		XG993A00	IC	YM7103	IC	EGM2	13
		XG994A00	IC	YM7107	IC	OPS3	13
		XG995A00	IC	YM7119	IC	M3	18
		XD265A00	IC	MB81464-12PSZ	IC	DRAM 256K	08
*		XI580A00	IC	HM628128LP-10	IC	SRAM 1M	22
*		XI728A00	IC	LH538087	IC	ROM 8M	13
*		XI729A00	IC	LH538088	IC	ROM 8M	13
*		XI730A00	IC	LH538089	IC	ROM 8M	13
*		XI731B00	IC	TC538200P-H099	IC	ROM 8M	
*		XI732A00	IC	MB838200-20P-G	IC	ROM 8M	13
*		XI733A00	IC	MB838200-20P-G	IC	ROM 8M	13
*		XI734A00	IC	MB838200-20P-G	IC	ROM 8M	13
*		XI735B00	IC	TC538200P-H100	IC	ROM 8M	
		IA111510	Transistor	2SA1115 E,F	トランジスタ		01
		IC287820	Transistor	2SC2878 A,B	トランジスタ		01
		VD488500	Digital Transistor	DTC143XS TP	デジタルトランジスタ		03
		IF003450	Diode	1SS133	ダイオード		01
		VE443500	Resistor Array	RGLD4X103J	抵抗アレイ		01
		VE445200	Resistor Array	RGLD8X103J	抵抗アレイ		01
		RD255100	Chip Resistor	100Ω 0.1W J	チップ抵抗		01
		VB593200	Trimmer Potentiometer	B100K EVN	半固定抵抗		01
		VC694800	Semiconductive Cera. Cap.	0.1μ 25V Z	半導体セラコン		01
*		VJ798800	Chip Monolithic Cera. Cap.	F 0.1μ 25V Z	チップ積層セラコン		01
		FZ006970	EMI Filter	LS MT Y223NB	LCフィルターEMI		02
		VI552000	Quartz Crystal Unit	AF2138CG	水晶振動子	12.288MHz	03
		VE338400	Lithium Battery	SONY/CR2032	リチュウム電池		03
		VH930600	Metal Fitting, Earth		アース金具	(3pcs)	01
*		VK261900	Circuit Board	PNAB	PNABシート		19
		IA101521	Transistor	2SA1015 Y	トランジスタ		01
		IF003450	Diode	1SS133	ダイオード		01
		VG197400	LED	GL3HD18 RE	LED	UTI,BYPASS,RECO	01
		VG197600	LED	GL3ED8	2色LED	MODE,RUN (5pcs)	01
		VH812000	LED Spacer	×8	LEDスペーサー	(LED 1-6)	02
		VH812100	LED Spacer	×4	LEDスペーサー	(LED 7,8)	01
		VE373500	Slide Pot.	A10K ×2	二連ｽﾗｲﾄﾞﾎﾞﾘｭｰﾑ	VOL.(OUTPUT 1,2	03
		VF946200	Push Switch	SOA-111HS	プッシュスイッチ	(25pcs)	01
*		VK261800	Circuit Board	PNC	PNCシート		23
		IR027350	IC	SN74HC273N	IC	DFF OCTAL	05
		IF003450	Diode	1SS133	ダイオード		01
		VG197400	LED	GL3HD18 RE	LED	MEMORY,BANK (8p	01
		VG197600	LED	GL3ED8	2色LED	voice sel. 1-16	01
		VH812000	LED Spacer	×8	LEDスペーサー	(3pcs)	02
		VC250600	Slide Pot.	B10K EWA-NF0C	スライドボリューム	DATA ENTRY	03
		VC694800	Semiconductive Cera. Cap.	0.1μ 25V Z	半導体セラコン		01
		VB436400	Rotary Switch	EC24B30D	ロータリースイッチ	Data entry Dial	07
		VF946200	Push Switch	SOA-111HS	プッシュスイッチ	(45pcs)	01
*		VJ875400	Circuit Board	JK	JKシート		
*		NX809690	Circuit Board	JK(JK)	JK(JK)シート		
*		NX809700	Circuit Board	JK(JKB)	JK(JKB)シート		
*		NX809710	Circuit Board	JK(CARD)	JK(CARD)シート		
		IC094530	Transistor	2SC945A PA	トランジスタ		01
		IF003450	Diode	1SS133	ダイオード		01
		VD048800	Variable Resistor	A10K EVU-E	ロータリーボリューム	CLICK VOLUME	02
		VI573700	Variable Resistor	B1K EVU-E2A	ロータリーボリューム	CONTRAST	02
		VC694800	Semiconductive Cera. Cap.	0.1μ 25V Z	半導体セラコン		01
		VK458100	DC/AC Inverter Transformer	D32-49A	DC/ACｲﾝﾊﾞｰﾀﾄﾗﾝｽ		07
		VB835000	Coil	20μH FL5R200QN	コイル		01
		LB203090	Phone Jack	STEREO HLJ0521	ホーンジャック	PHONES	02
		LB301780	Phone Jack	STEREO HLJ4306	ホーンジャック	OUTPUT1/1+2 (R)	03
		LB302010	Phone Jack	ST.MINI HSJ0912	ホーンジャック	BREATH	02
		VE742000	Phone Jack	MONO HLJ4306	ホーンジャック	SUS,F.SW,OUT1(L	02

*New Parts (新規部品)

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Ref. No.	Part No.	Description		部品名	Remarks	ランク
	VE742200	Phone Jack	STEREO HLJ4306	ホーンジャック	F.VOLUME,F.CONT	02
	VI662400	Phone Jack	STEREO HLJ4306	ホーンジャック	OUTPUT2 (L/R)	02
	LB500520	DIN Jack	5P TCS4650-01	ＤＩＮジャック	MIDI(IN,OUT,THR	03
	VF821100	Connector, IC Card	IC3A-38PS-1.27D	ＩＣカード用コネクタ	38P DATA	06
	VH985300	Connector, IC Card	264D-550P-28D8	ＩＣカード用コネクタ	50P WAVEFORM	08
	VC362700	Ferrite Core	FR25/15/12-1400	フェライトコア	2pcs	04
	CB069250	Cord Clamper	BK-1	束線止め	3pcs	01
	AA833840	Angle Bracket, C.B.		シートアングル		01
	VH812200	Angle Bracket-H, Jack		ＪＫアングル(Ｈ)		03
	VH812300	Angle Bracket-M, Jack		ＪＫアングル(Ｍ)		02
	ED040066	Bind Head Screw	4.0×6 ZMC2Y	バインド小ネジ		01
*	VK666500	Circuit Board	CN	ＣＮシート		
	IR013800	IC	TC74HC138AP	ＩＣ	DECODER-8	05
	VF169200	Resistor Array	RMLS5 J 473	抵抗アレイ		01
	VC694800	Semiconductive Cera. Cap.	0.1μ 25V Z	半導体セラコン		01
	VD542700	EMI Filter	DSS306-93F223Z1	ＬＣフィルターＥＭＩ		01
	LB903400	Connector HIF	40P SE	ＨＩＦコネクター		07
*	VL347400	Connector FX2	52P SE	ＦＸ２コネクター	EXPANSION M.(5p	04
	NA810850	Circuit Board	MK1	ＭＫ１シート		07
	IF003450	Diode	1SS133	ダイオード		01
	NA810860	Circuit Board	MK2	ＭＫ２シート		08
	IF003450	Diode	1SS133	ダイオード		01
	LB920300	Connector	30P SE	コネクタ		06
	ED040066	Bind Head Screw	4.0×6 ZMC2Y	バインド小ネジ		01
*	VK263600	Circuit Board	PC	ＰＣシート		08
	IG001390	IC	RC4558D-V	ＩＣ	OP AMP.	03
	VA240700	Diode	1SS176	ダイオード		01
	VI692000	Zener Diode	05AZ5.1Y 5.1V	ツェナーダイオード		01
	HT370250	Trimmer Potentiometer	B5K 3P EVN	半固定抵抗	OFFSET ADJ.	02
	HT370260	Trimmer Potentiometer	B100K 3P EVN	半固定抵抗	GAIN ADJ.	02
*	VJ800200	Circuit Board	PS	ＰＳシート	J	19
*	VJ800300	Circuit Board	PS	ＰＳシート	U	20
*	VJ800400	Circuit Board	PS	ＰＳシート	C	20
*	VJ800500	Circuit Board	PS	ＰＳシート	H,D,A,B	20
	IG136200	IC	SI-3052V	ＩＣ	5V 2A REGULATOR	06
	XD340001	IC	AN78M12F	ＩＣ	+12V REGULATOR	03
	XD342001	IC	AN79M12F	ＩＣ	-12V REGULATOR	03
	VB481900	Diode	11ES4	ダイオード		01
	IH001210	Diode Stack	S4VB20	ダイオードスタック	2.6A 200V	04
	IH001370	Diode Stack	D5FB20 5A 200V	ダイオードスタック		05
	VD488400	Diode Stack	DF04M 1A 400V	ダイオードスタック		02
	IF010780	Zener Diode	MTZ6.8C 6.8V	ツェナーダイオード		01
*	VC745800	Metal Oxide Film Resistor	220Ω 1W J	酸化金属皮膜抵抗		
	FI383220	Ceramic Cap.	2200P 400V	規格認定コン		01
	FI383470	Ceramic Cap.	4700P 400V	規格認定コン	H,D,A,B only	01
	FI494100	Ceramic Cap.	0.01μ 400V	規格認定コン		01
	UJ63A100	Electrolytic Cap.	10000μ 16V	ケミコン		04
	UJ649100	Electrolytic Cap.	1000μ 25V	ケミコン		02
	UJ649220	Electrolytic Cap.	2200μ 25V	ケミコン		03
	VC694800	Semiconductive Cera. Cap.	0.1μ 25V Z	半導体セラコン		01
	GD900760	Coil	3mH PLA3021A	コイル		06
	VF576000	Push Switch	ESB-8236V JUCS	プッシュスイッチ	POWER	03
	KB000400	Fuse	T 5A 250V	ヒューズ	J	01
	KB000420	Fuse	T 2.5A 250V	ヒューズ	J	01
	KB002590	Fuse	T 5A 250V	ヒューズ	U,C	02
	KB002650	Fuse	T 3A 250V	ヒューズ	U	03
	KB002680	Fuse	T 2.5A 250V	ヒューズ	U,C	03
	KB000690	Fuse	T2.5A 250V S	ヒューズ	H,D,A,B	02
	KB000780	Fuse	T5A 250V S	ヒューズ	H,D,A,B	02
	LB201530	Fuse Holder	PC-FH1	ヒューズホルダー	(4pcs, U:6pcs)	01
	VA855400	Terminal		ＰＣ用カラゲ端子	(2pcs)	01
	IL000680	Insulation Sheet	BFG-20	放熱シート	(2pcs)	01
	--	Heat Sink		放熱板		
*	VK355400	Angle Bracket, Pw. Switch		ＰＳアングル		05
	EI030106	Bind Head Tapping Screw	3.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(6pcs)	01
	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(2pcs)	01
*	VK372800	LCD Assembly		ＬＣＤ Ａss'y		
	VF931200	LCD	DMF5005NYL-EW	液晶ディスプレイ		28
	VK588200	Variable Resistor	10K RK1241110	ロータリーボリューム	PITCH BEND	03
	HS412160	Variable Resistor	10K K161100S	ロータリーボリューム	MODULATION 1	03
	VI666700	Variable Resistor	10K RK1631110	ロータリーボリューム	MODULATION 2	03

*New Parts (新規部品)

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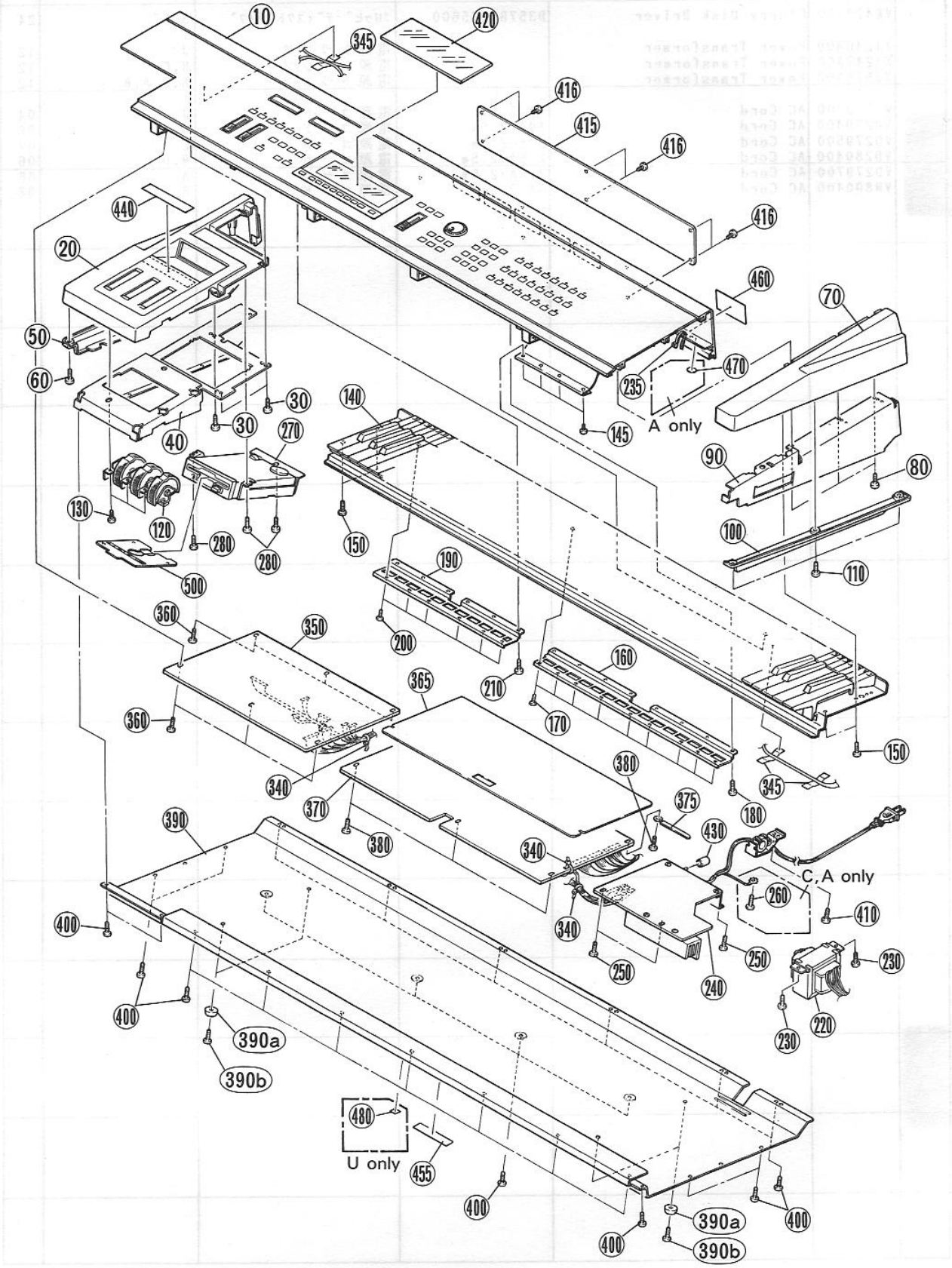
	Ref. No.	Part No.	Description		部品名	Remarks	ランク
*		VK423800	Floppy Disk Driver	D357B 045600	ﾌﾛｯﾋﾟｰﾃﾞｨｽｸﾄﾞﾗｲﾌﾞ	3.5"	24
*		XI246A00	Power Transformer		電源トランス	J	12
*		XI247A00	Power Transformer		電源トランス	U,C	12
*		XJ576A00	Power Transformer		電源トランス	H,D,A,B	12
		VD279200	AC Cord	7A 2.5m	電源コード	J	04
		VD279400	AC Cord	10A 2.5m	電源コード	U	06
		VD279500	AC Cord	10A 2.5m	電源コード	C	07
		VD280400	AC Cord	2.5A 2.5m	電源コード	H,D	06
		VD279700	AC Cord	7.5A 2.5m	電源コード	A	06
		VH890400	AC Cord	6A 2.5m	電源コード	B	08

*New Parts（新規部品）

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■OVERALL ASSEMBLY（総組立）



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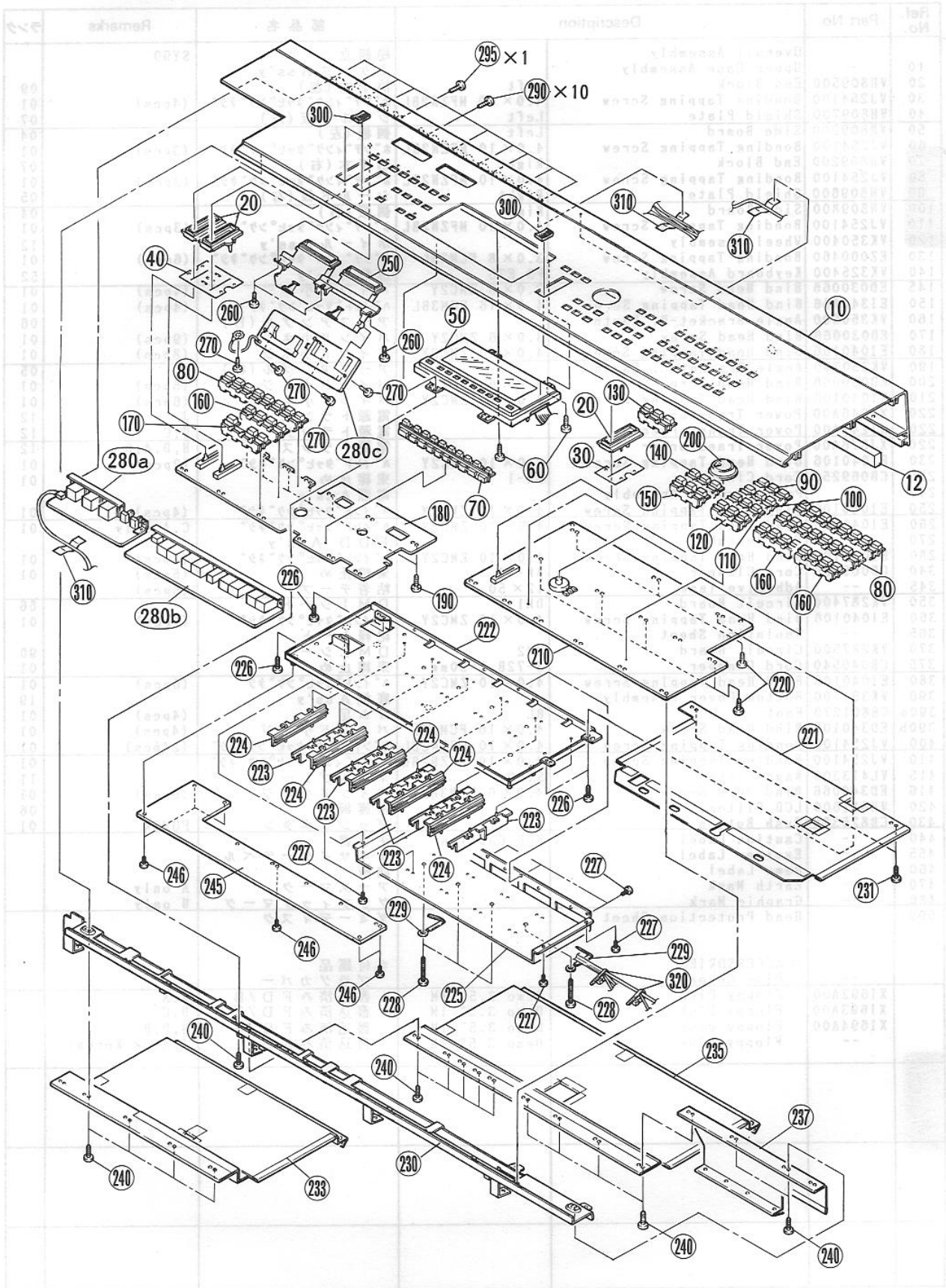
Ref. No.	Part No.	Description		部品名	Remarks	ランク
		Overall Assembly		総組立	SY99	
10	--	Upper Case Assembly		上ケースAss'y		
20	VH809500	End Block	Left	拍子木(左)		09
* 30	VJ254100	Bonding Tapping Screw	4.0×10 MFZN2BL	ﾎﾞﾝﾃﾞｨﾝｸﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(4pcs)	01
40	VH809700	Shield Plate	Left	シールド板(左)		07
50	VH809900	Side Board	Left	側板(左)		04
* 60	VJ254100	Bonding Tapping Screw	4.0×10 MFZN2BL	ﾎﾞﾝﾃﾞｨﾝｸﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(3pcs)	01
70	VH809200	End Block	Right	拍子木(右)		07
* 80	VJ254100	Bonding Tapping Screw	4.0×10 MFZN2BL	ﾎﾞﾝﾃﾞｨﾝｸﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(3pcs)	01
90	VH809600	Shield Plate	Right	シールド板(右)		05
100	VH809800	Side Board	Right	側板(右)		04
* 110	VJ254100	Bonding Tapping Screw	4.0×10 MFZN2BL	ﾎﾞﾝﾃﾞｨﾝｸﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(3pcs)	01
* 120	VK350400	Wheel Assembly		ホイールAss'y		12
130	EZ000460	Bonding Tapping Screw	3.0×8 FCM3BL	ﾎﾞﾝﾃﾞｨﾝｸﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(6pcs)	01
* 140	VK325400	Keyboard Assembly	FS E76	鍵盤Ass'y		52
145	ED030066	Bind Head Screw	3.0×6 ZMC2Y	バインド小ネジ	(4pcs)	01
150	EI340166	Bind Head Tapping Screw	4.0×16 FCM3BL	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(4pcs)	01
* 160	VK350600	Angle Bracket-B, Earth		アースアングル(B)		06
170	ED030066	Bind Head Screw	3.0×6 ZMC2Y	バインド小ネジ	(9pcs)	01
180	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	バインド小ネジ	(8pcs)	01
* 190	VK350700	Angle Bracket-C, Earth		アースアングル(C)		05
200	ED030066	Bind Head Screw	3.0×6 ZMC2Y	バインド小ネジ	(6pcs)	01
210	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	バインド小ネジ	(6pcs)	01
* 220	XI246A00	Power Transformer		電源トランス	J	12
* 220	XI247A00	Power Transformer		電源トランス	U,C	12
* 220	XJ576A00	Power Transformer		電源トランス	H,D,A,B	12
230	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(2pcs)	01
235	CB069250	Cord Clamper	BK-1	束線止め		01
240	--	Power Supply Assembly		電源Ass'y		
250	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(4pcs)	01
260	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	C,A only	01
270	--	FDD Assembly		FDD Ass'y		
280	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(3pcs)	01
340	CB069250	Cord Clamper	BK-1	束線止め	(6pcs)	01
345	--	Adhesive Tape	12×50	粘着テープ	(5pcs)	
* 350	VK287400	Circuit Board	DM1	DM1シート		66
360	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(6pcs)	01
365	--	Isolation Sheet		絶縁シート		
* 370	VK287500	Circuit Board	DM2	DM2シート		90
375	CB040540	Cord Clamper	S-72B L=50mm	束線止め		01
380	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(6pcs)	01
* 390	VK351700	Bottom Cover Assembly		底板Ass'y		19
390a	CB801270	Foot	BL	ゴム足	(4pcs)	01
390b	ED340106	Bind Head Screw	4.0×10 FCM3BL	バインド小ネジ	(4pcs)	01
* 400	VJ254100	Bonding Tapping Screw	4.0×10 MFZN2BL	ﾎﾞﾝﾃﾞｨﾝｸﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(24pcs)	01
* 410	VJ254100	Bonding Tapping Screw	4.0×10 MFZN2BL	ﾎﾞﾝﾃﾞｨﾝｸﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ		01
* 415	VL413300	Name Plate	SY99	ネームプレート		11
416	ED340066	Bind Head Screw	4.0×6 FCM3BL	バインド小ネジ	(6pcs)	01
420	VH811600	LCD Filter		保護板		06
430	CB825380	Push Button		プッシュボタン	POWER	01
440	--	Caution Label	FDD Caution	注意書		
455	--	Exciter Label		エキサイターラベル		
460	--	Name Label		銘板		
470	--	Earth Mark		アースマーク	A only	
480	--	Graphic Mark		グラフィックマーク	U only	
500	--	Head Protection Sheet		ダミーディスク		
	--	* ACCESSORIES Plug Cover		*付属品 プラグカバー		
*	XI692A00	Floppy Disk	Demo 3.5" 1M	書込済みFD/B	J,A	
*	XI693A00	Floppy Disk	Demo 3.5" 1M	書込済みFD/P	U,C	
*	XI694A00	Floppy Disk	Demo 3.5" 1M	書込済みFD/G	H,D,B	
	--	Floppy Disk	Demo 3.5" 1M	書込済みFD	(Chick Korea)	

*New Parts (新規部品)

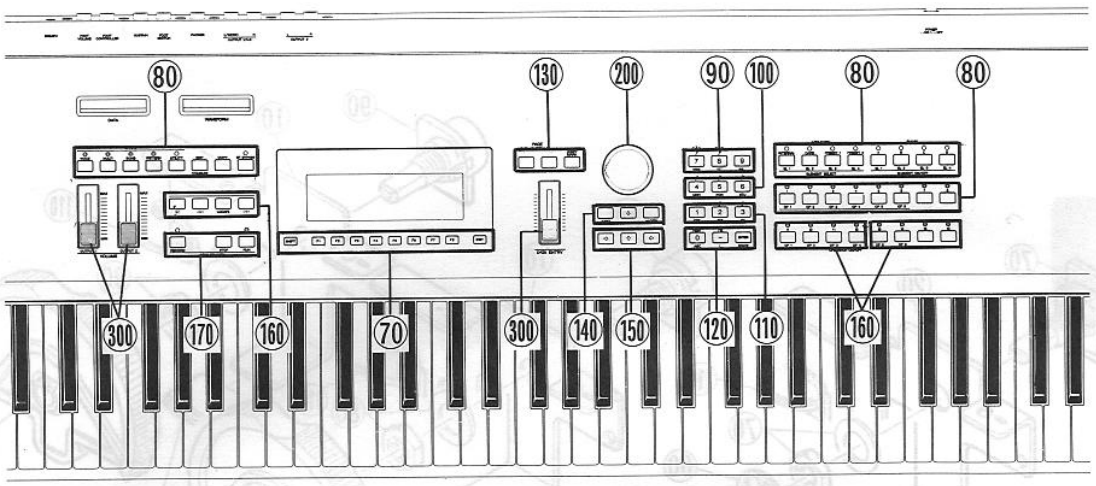
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■UPPER CASE ASSEMBLY（上ケースAss'y）



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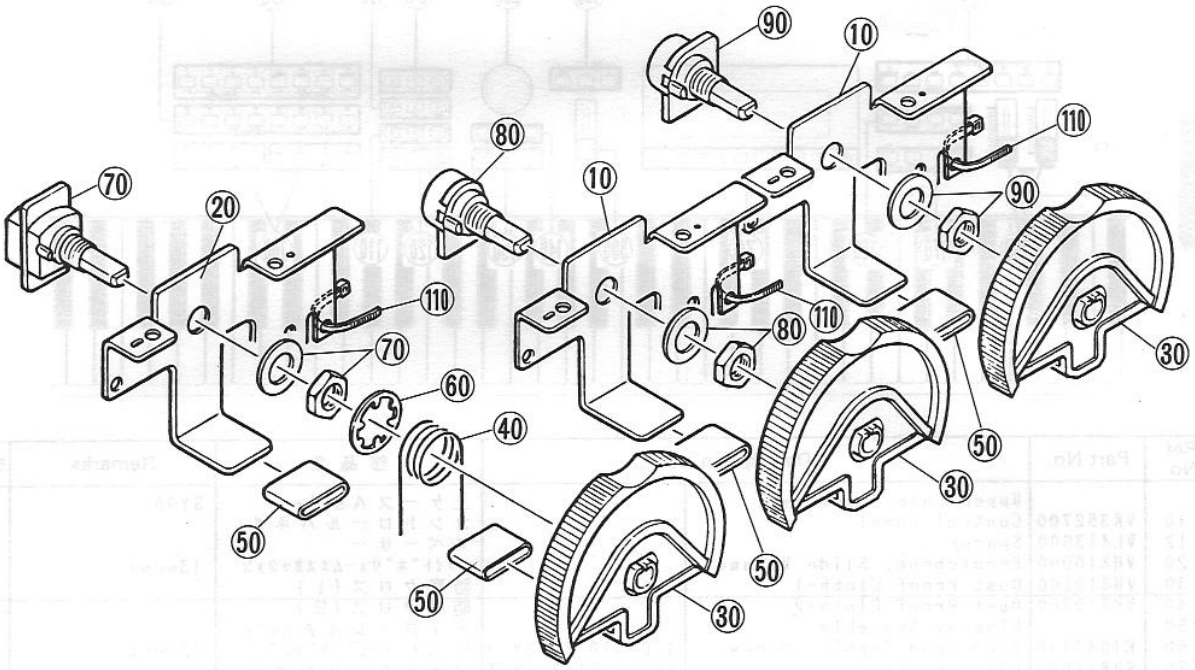
Ref No.	Part No.	Description		部品名	Remarks	ランク
		Upper Case Assembly		上ケースAss'y	SY99	
10	VK352700	Control Panel		コントロールパネル		30
12	VL413600	Spacer		スペーサー		05
20	VH810000	Escutcheon, Slide Volume		ｽﾗｲﾄﾞﾎﾞﾘｭｰﾑｴｽｶｯｼｮﾝ	(3pcs)	02
30	VH810100	Dust Proof Cloth-1		防塵クロス(1)		01
40	VH810200	Dust Proof Cloth-2		防塵クロス(2)		01
50	--	Display Assembly		ディスプレイAss'y		
60	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(2pcs)	01
70	VH811500	Function Key	SHIFT,F1-8,EXIT	ファンクションキー		03
80	VH810400	Knob-A	(×8)	ノブA(8連)	(3pcs)	02
90	VI524400	Knob-B	(×3) 7,8,9	ノブB(3連)	VWX, YZ', ±&	02
100	VI524500	Knob-C	(×3) 4,5,6	ノブC(3連)	MNO, PQR, STU	02
110	VI524600	Knob-D	(×3) 1,2,3	ノブD(3連)	DEF, GHI, JKL	02
120	VI524700	Knob-E	(×3) 0,-,ENTER	ノブE(3連)	ABC, /.,, ,SPACE	02
130	VI524300	Knob-G	(×3)	ノブG(3連)	◁,▷,JUMP/MARK	01
140	VI534600	Knob-H	(×3) ↑(center	ノブH(3連)	-1/NO, ,+1/YES	03
150	VI537200	Knob-I	(×3) ←,↓,→	ノブI(3連)		03
160	VH810500	Knob-J	(×4)	ノブJ(4連)	(3pcs)	01
170	VH810600	Knob-K	(×3)	ノブK(飛3連)		01
180	VK261900	Circuit Board	PNAB	PNABシート		19
190	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(6pcs)	01
200	VI250800	Rotary Knob		ロータリーツマミ	Data entry Dial	01
210	VK261800	Circuit Board	PNC	PNCシート		23
220	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(6pcs)	01
221	--	Shield Sheet PNC		PNCシールドシート		
222	VL413100	Slot Unit Base		ユニットベース		09
223	VL413400	Rail-A		レール(A)	(5pcs)	03
224	VL413500	Rail-B		レール(B)	(5pcs)	03
225	VL413200	Slot Unit Cover		ユニットカバー		06
226	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(4pcs)	01
227	ED030066	Bind Head Screw	3.0×6 ZMC2Y	バインド小ネジ	(8pcs)	01
228	ED340256	Bind Head Screw	4.0×25 FCM3BL	バインド小ネジ	(4pcs)	01
229	CB817510	Cord Clamper	S-14B	束線止め	(2pcs)	01
230	VK353100	Angle Bracket	Center	センターアングル		10
231	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(2pcs)	01
233	--	Shield Sheet DM1		DM1シールドシート		
235	--	Shield Sheet DM2		DM2シールドシート		
237	--	Shield Sheet MK		MKシールドシート		
240	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(16pcs)	01
245	VK666500	Circuit Board	CN	CNシート		
246	ED030066	Bind Head Screw	3.0×6 ZMC2Y	バインド小ネジ	(6pcs)	01
250	VH812800	Card Guide		カードガイド		06
260	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(3pcs)	01
270	EI040106	Bind Head Tapping Screw	4.0×10 ZMC2Y	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(3pcs)	01
280	VJ875400	Circuit Board	JK	JKシート		
280a	NX809690	Circuit Board	JK(JK)	JK(JK)シート		
280b	NX809700	Circuit Board	JK(JKB)	JK(JKB)シート		
280c	NX809710	Circuit Board	JK(CARD)	JK(CARD)シート		
290	VJ254100	Bonding Tapping Screw	4.0×10 MFZN2BL	ﾎﾞﾝﾃﾞｨﾝｸﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(10pcs)	01
295	ED340106	Bind Head Screw	4.0×10 FCM3BL	バインド小ネジ	(1pcs)	01
300	VB774000	Knob		ツマミ	VOL,D.ENTRY(3pc	01
310	--	Adhesive Tape	12×50	粘着テープ	(3pcs)	
320	CB069250	Cord Clamper	BK-1	束線止め	(3pcs)	01

*New Parts (新規部品)

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■WHEEL ASSEMBLY（ホイールAss'y）



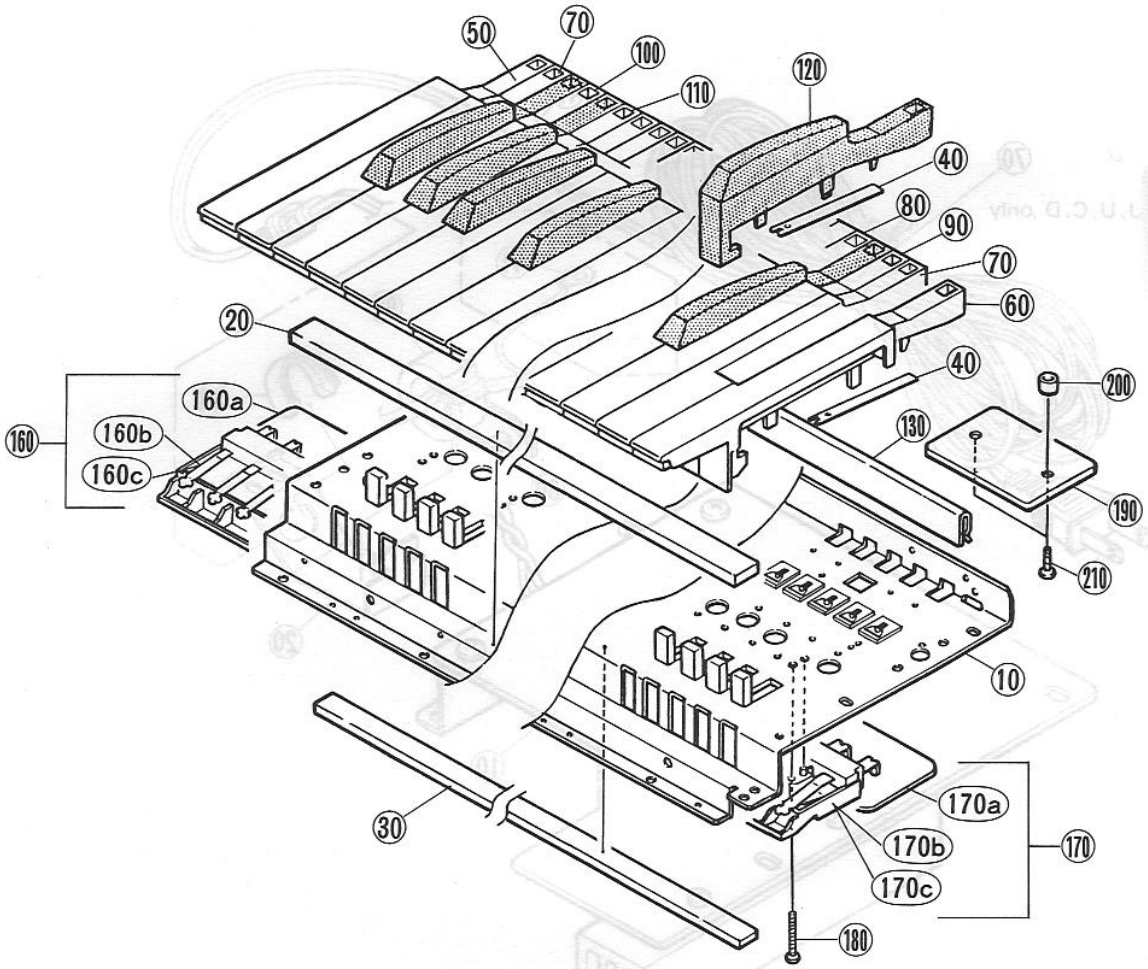
Ref. No.	Part No.	Description		部品名	Remarks	ランク
		Wheel Assembly		ホイールAss'y	SY99	
10	VF536800	Frame		フレーム	MOD. 1,2 (2pcs)	01
* 20	VJ187600	Frame-A		フレーム(A)	PITCH BEND	02
30	VF537400	Wheel		ホイール	(3pcs)	02
40	VC792800	Spring		リターンスプリング	PITCH BEND	01
50	CB819020	Wheel Tube		ホイールチューブ	(4pcs)	02
60	EW600110	Wheel Ring	φ12.0	CS形止め輪	PITCH BEND	01
70	VK588200	Variable Resistor	10K RK1241110	ロータリーボリューム	PITCH BEND	03
80	HS412160	Variable Resistor	10K K161100S	ロータリーボリューム	MODULATION 1	03
90	VI666700	Variable Resistor	10K RK1631110	ロータリーボリューム	MODULATION 2	03
110	CB069250	Cord Clamper	BK-1	束線止め	(3pcs)	01

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■KEYBOARD ASSEMBLY（鍵盤Ass'y）



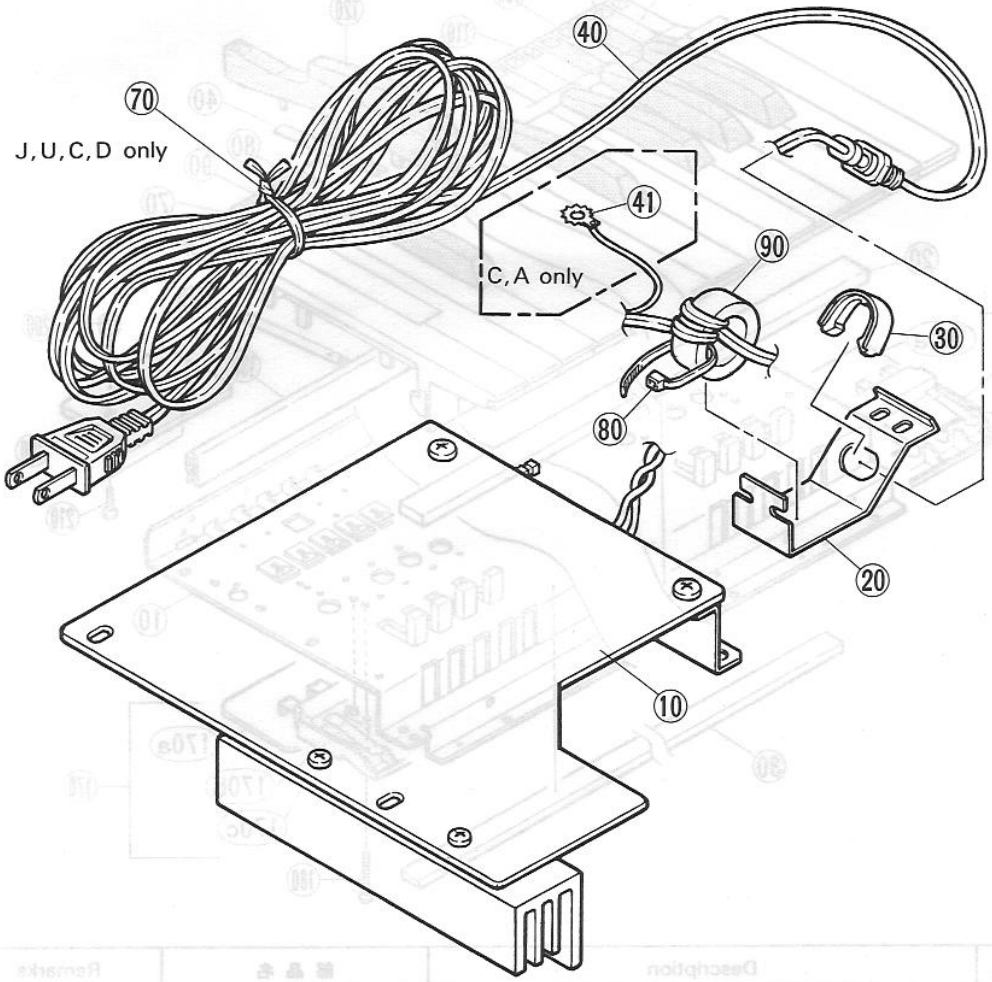
	Ref. No.	Part No.	Description		部品名	Remarks	ランク
*		VK325400	Keyboard Assembly	FS E76	鍵盤Ass'y	SY99	52
	10	MK Frame		FS E76.	MKフレーム		
*	20	VK735000	PC Sensor		PCセンサー		11
*	30	VK659200	Felt	WH 1027×6×3	フェルト（白）		04
	40	AA055430	Key Spring		鍵バネ	(76pcs)	02
	50	NB826010	White Key Assembly	E'	白鍵Ass'y		04
	60	NB826020	White Key Assembly	G'	白鍵Ass'y		04
	70	NB107540	White Key Assembly	C,F	白鍵Ass'y	(13pcs)	03
	80	NB107550	White Key Assembly	D	白鍵Ass'y	(6pcs)	03
	90	NB107560	White Key Assembly	B,E	白鍵Ass'y	(12pcs)	03
	100	NB107570	White Key Assembly	G	白鍵Ass'y	(6pcs)	03
	110	NB107580	White Key Assembly	A	白鍵Ass'y	(6pcs)	03
	120	NB107600	Black Key Assembly		黒鍵Ass'y	(31pcs)	03
*	130	VK325600	Stopper	FS E76	ストッパー		04
	160	NB825940	Key Switch Unit	FS E76	MKスイッチユニット		17
	160a	NA810850	Circuit Board	MK1	MK1シート		07
	160b	NB107130	Key Switch Assembly	9I FS	スイッチAss'y		08
	160c	NB107120	Key Switch Assembly	12Q FS	スイッチAss'y	(2pcs)	08
	170	NB825950	Key Switch Unit	FS E76	MKスイッチユニット		19
	170a	NA810860	Circuit Board	MK2	MK2シート		08
	170b	NB107120	Key Switch Assembly	12Q FS	スイッチAss'y	(3pcs)	08
	170c	NB107150	Key Switch Assembly	7G FS	スイッチAss'y		08
	180	ED330166	Bind Head Screw	3.0×16 FCM3BL	バインド小ネジ	(20pcs)	01
*	190	VK263600	Circuit Board	PC	PCシート		08
	200	VA032600	Spacer		スペーサー	(2pcs)	01
	210	ED030126	Bind Head Screw	3.0×12 ZMC2Y	バインド小ネジ	(2pcs)	01

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■POWER SUPPLY ASSEMBLY（電源Ass'y）



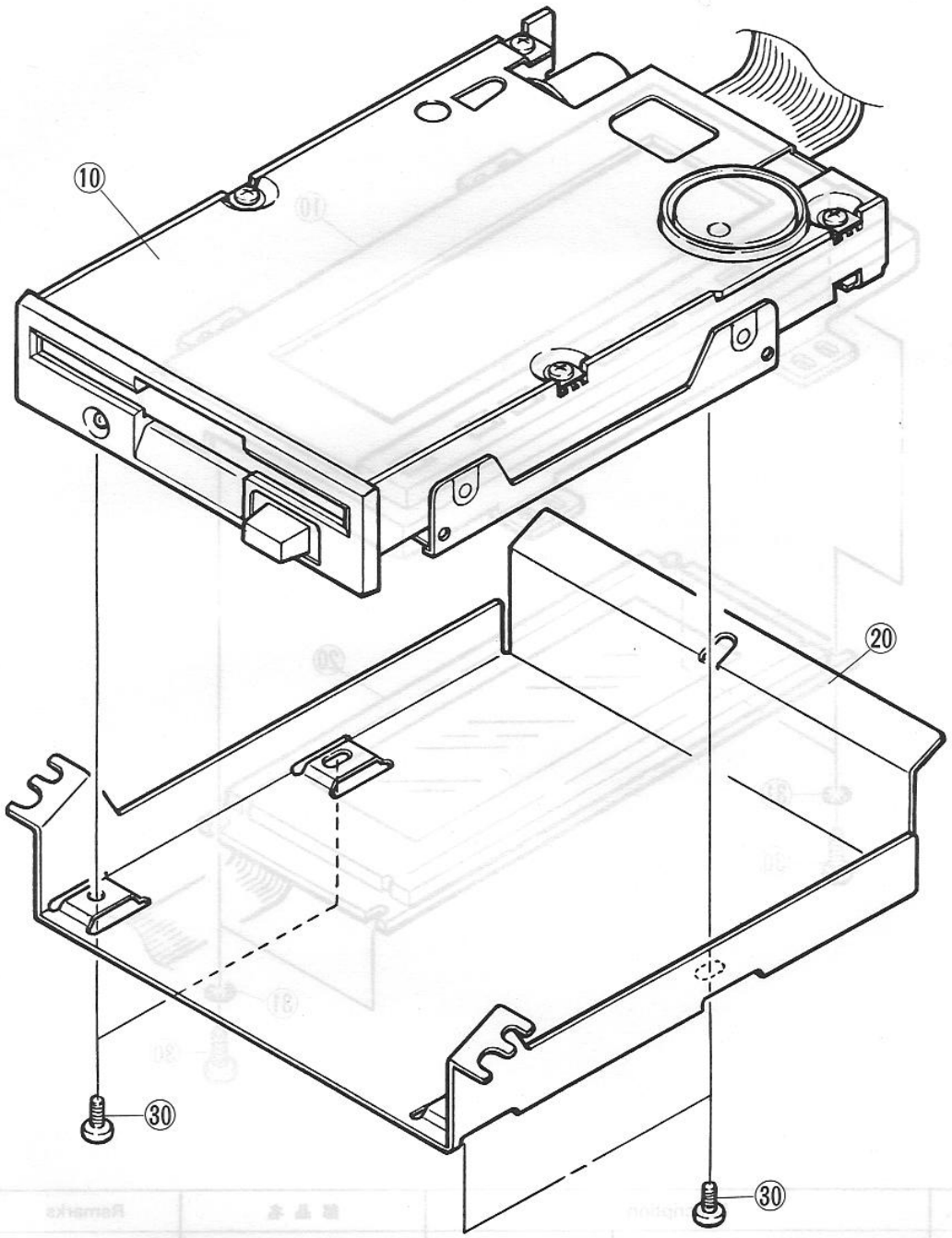
	Ref. No.	Part No.	Description		部品名	Remarks	ランク
			Power Supply Assembly		電源Ass'y	SY99	
*	10	VJ800200	Circuit Board	PS	PSシート	J	19
* *	10	VJ800300	Circuit Board	PS	PSシート	U	20
* *	10	VJ800400	Circuit Board	PS	PSシート	C	20
*	10	VJ800500	Circuit Board	PS	PSシート	H,D,A,B	20
	20	VH812600	AC Panel		ACパネル	J	02
	20	VI319500	AC Panel		ACパネル	U	02
	20	VI319600	AC Panel		ACパネル	C	02
	20	VI319700	AC Panel		ACパネル	H,D,A,B	02
	30	CB811230	Cord Strain Relief	SR-6N-4	コードストッパー	U	02
	30	CB806850	Cord Strain Relief	SR-6N3-4	コードストッパー	C	02
	30	CB072750	Cord Strain Relief	SR-4N-4	コードストッパー	H,D,B	01
	30	CB032840	Cord Strain Relief	SR-5N-4	コードストッパー	A	01
	40	VD279200	AC Cord	7A 2.5m	電源コード	J	04
	40	VD279400	AC Cord	10A 2.5m	電源コード	U	06
	40	VD279500	AC Cord	10A 2.5m	電源コード	C	07
	40	VD280400	AC Cord	2.5A 2.5m	電源コード	H,D	06
	40	VD279700	AC Cord	7.5A 2.5m	電源コード	A	06
	40	VH890400	AC Cord	6A 2.5m	電源コード	B	08
	41	LA003690	Lug Terminal	Earth	ラグ端子	C,A only	01
	70	--	Cord Clamper	L=150	ビニタイ	J,U,C,A only	
	80	CB069250	Cord Clamper	BK-1	束線止め		01
	90	VC362700	Ferrite Core	FR25/15/12-1400	フェライトコア		04

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■FDD ASSEMBLY (FDD Ass'y)



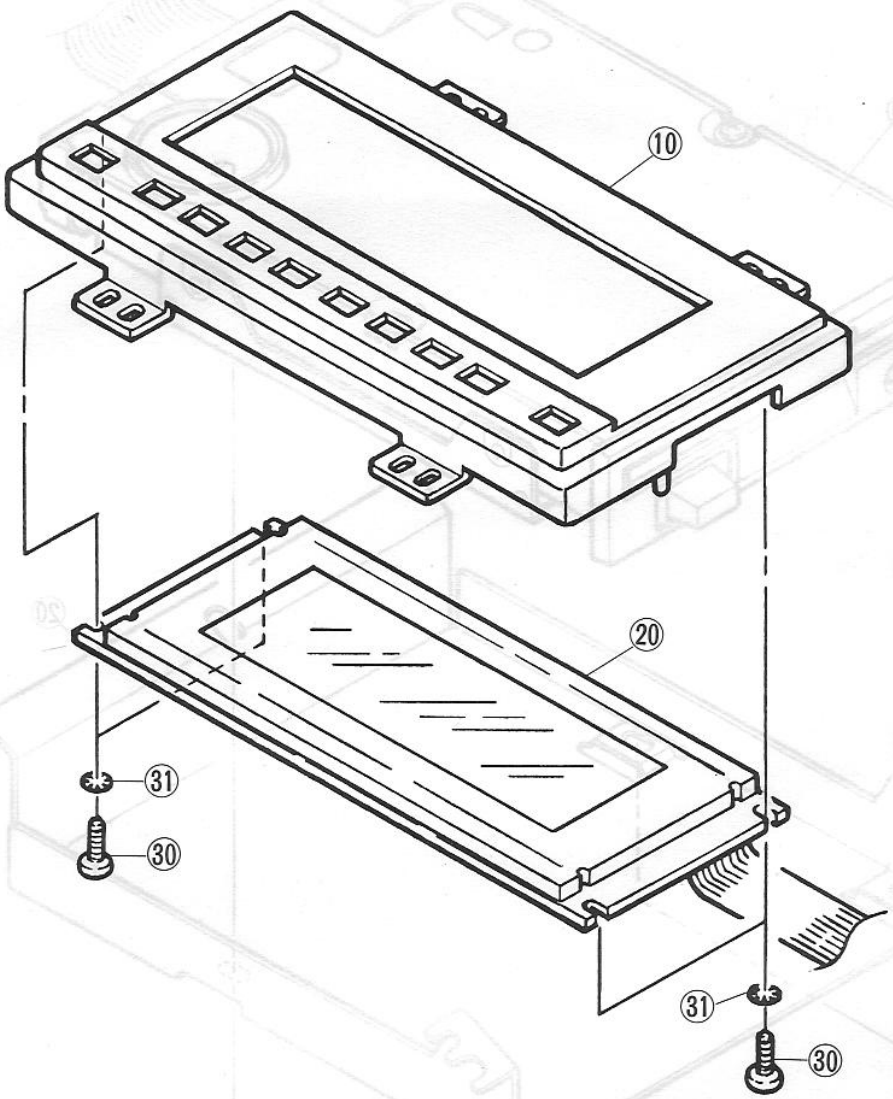
Ref. No.	Part No.	Description		部品名	Remarks	ランク
		FDD Assembly		FDD Ass'y	SY99	
* 10	VK423800	Floppy Disk Driver	D357B 045600	フロッピーディスクドライブ	3.5"	24
20	VH813000	Angle Bracket, FDD		FDD金具		04
30	ED330066	Bind Head Screw	3.0×6 FCM3BL	バインド小ネジ	(4pcs)	01

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■DISPLAY ASSEMBLY（ディスプレイAss'y）



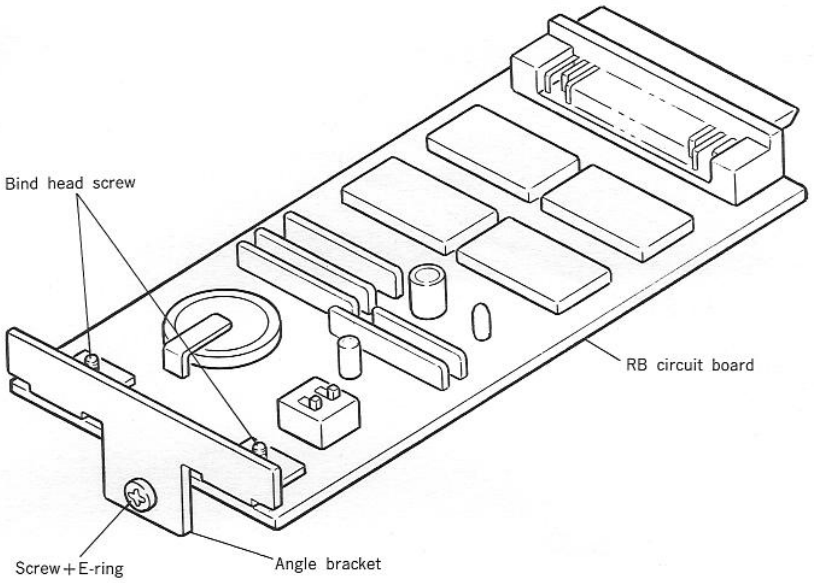
Ref. No.	Part No.	Description		部品名	Remarks	ランク
		Display Assembly		ディスプレイAss'y	SY99	
10	VH811400	Escutcheon, LCD		LCDエスカッション		05
* 20	VK372800	LCD Assembly		LCD Ass'y		
30	EI330086	Bind Head Tapping Screw	3.0×8 FCM3BL	ﾊﾞｲﾝﾄﾞﾀｯﾋﾟﾝｸﾞﾈｼﾞ	(4pcs)	01
31	EV413036	Toothed Lock Washer	A φ3.0 FCM3BL	歯付座金内歯形	(4pcs)	01

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■EXPANSION MEMORY BOARD（SY拡張メモリーボード）SYEMB05



	Ref. No.	Part No.	Description		部品名	Remarks	ランク
			<RAM Board>	SYEMB05	<SY拡張ﾒﾓﾘｰﾎﾞｰﾄﾞ>		
	--		Circuit Board	RB	RBシート		
*		VL413800	Angle Bracket RB		ボードアングル		09
*		ED030066	Bind Head Screw	3.0×6 ZMC2Y	バインド小ネジ	(2pcs)	01
*		VL413700	Screw	SWCH12A	ボードネジ	(1pc.)	04
		EV501256	E-Ring	φ2.5 FNM3-3G	E形止め輪	(1pc.)	01
	--		Circuit Board	RB	RBシート		
		XI686A00	IC	M62021FP	IC	SYST.RESET (1pc	04
	--		IC	TC74HC08AF-TP1	IC	AND (1pc.)	
	--		IC	HM628128LFP-10	IC	SRAM 1M (4pcs)	
		VB797600	Diode	RLS-73 0.1A	ダイオード	(1pc.)	01
		VE331300	Resistor Array	RGLD8X104J	抵抗アレイ	100K×8 (4pcs)	01
		VL972100	Resistor Array	EXB-F7E104J5	抵抗アレイ	100K×6 (1pc.)	01
		RD256470	Chip Resistor	4.7KΩ 0.1W J	チップ抵抗	(1pc.)	01
		RD257100	Chip Resistor	10KΩ 0.1W J	チップ抵抗	(2pcs)	01
		RD257470	Chip Resistor	47KΩ 0.1W J	チップ抵抗	(1pc.)	01
	--		Chip Monolithic Cera. Cap.	F 0.1μ 25V Z	チップ積層セラコン	(7pcs)	
	--		Slide Switch	KSD02	スライドスイッチ	(1pc.)	
*		VL347500	Connector FX2	FX2-52S-1.27DSL	FX2コネクター	52P SE (1pc.)	04
		VE338400	Lithium Battery	SONY/CR2032 3V	リチュウム電池	(1pc.)	03

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