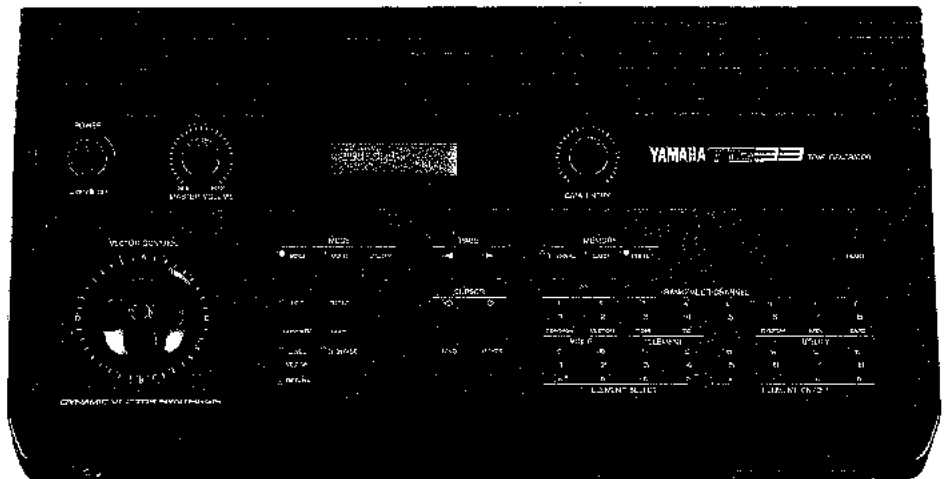


TONE GENERATOR

TG999

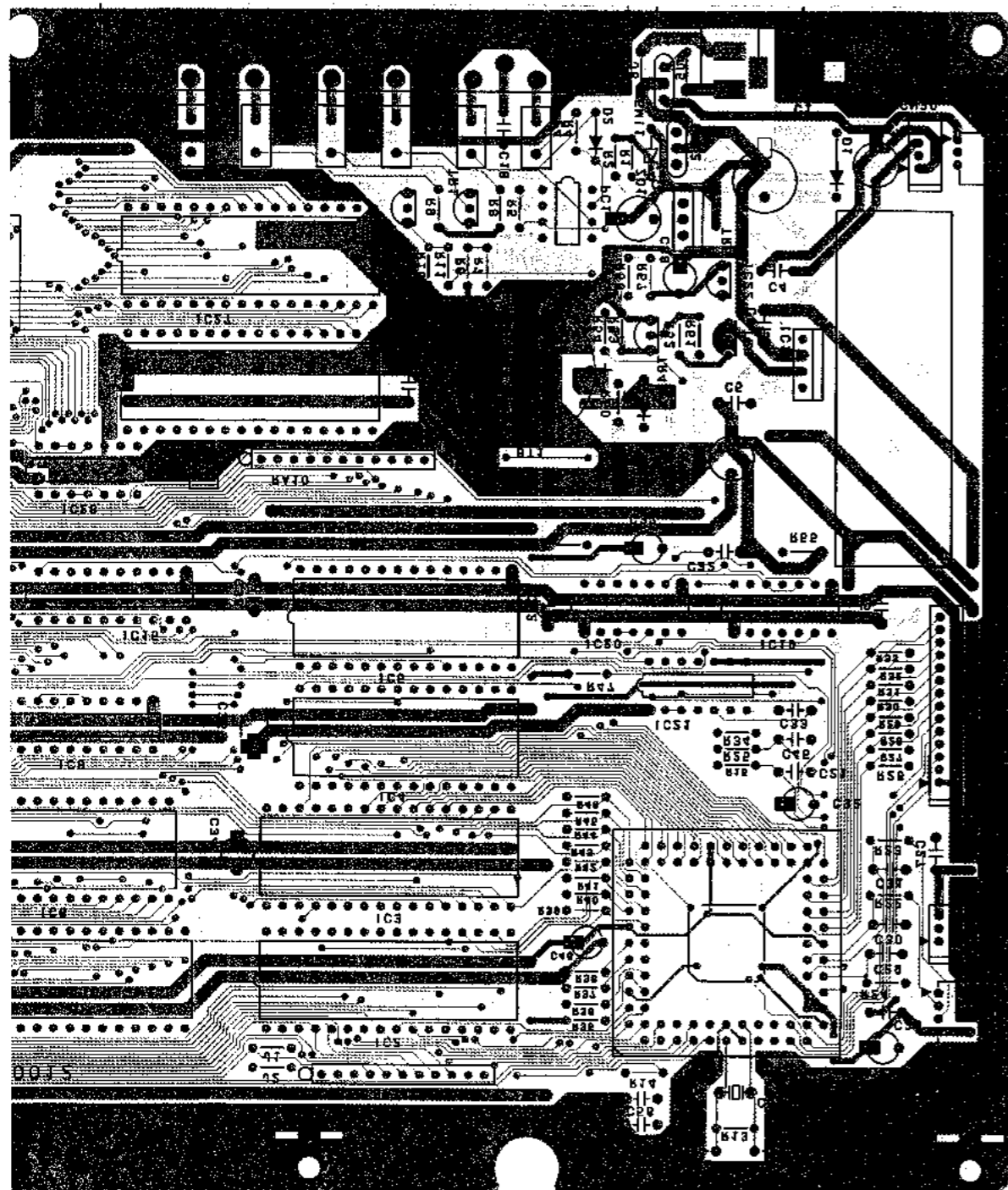
SERVICE MANUAL



■ CONTENTS (目次)

| | |
|---|----|
| SPECIFICATIONS (総合仕様)..... | 2 |
| PANEL LAYOUT (パネルレイアウト)..... | 3 |
| CIRCUIT BOARD LAYOUT & WIRING (ユニットレイアウト & 結線図)..... | 4 |
| BLOCK DIAGRAM (ブロックダイアグラム)..... | 6 |
| DISASSEMBLY PROCEDURE (分解手順)..... | 8 |
| LSI PIN DESCRIPTION (LSI 端子機能表)..... | 12 |
| IC BLOCK DIAGRAM (ICブロック図)..... | 16 |
| CIRCUIT BOARDS (シート基板図)..... | 18 |
| TEST PROGRAM (テストプログラム)..... | 26 |
| MIDI DATA FORMAT..... | 41 |
| MIDI IMPLEMENTATION CHART..... | 58 |
| ERROR MESSAGES (エラーメッセージ)..... | 59 |
| PARTS LIST..... | |

MIDI
THRU OUT IN DC10V 700mA IN



Pattern side (パターン側)

Notes)

- Circuit Board: DM (VJ789400) X1013C0
- IC
 IC 1: HD6475328CP-10 (X1119A00) CPU <H8/532 >
 IC 2: 012AV030 (X1117A00) EPROM A 1M Ver 0.3
 IC 3: 012BV030 (X1118A00) EPROM B 1M Ver 0.3
 IC 4: M5M5255BP-10LL (XH080A00) SRAM 256K
 IC 5: LC3664RL-12 (XG517A00) SRAM 64K
 IC 6: TC51832PL-10 (XC628A00) PSRAM 256K
 IC 7: YM3413 (XE449A00) LDSP
 IC 8: TMC57800N (XG662A00) MIX 5
 IC 9, 10: TMC3489NL (XE755A00) SFC
 IC11 ~ 14: TMC3493APH (XF987A00) GEW5
 IC15: TC74AC245P (XH608A00) BUS TRANSCEIVER
 IC16: PQ05RF1 (X124A00) REGULATOR 5V 1A
 IC17, 23: TC74HC245AP (IR024500) BUS BUFFER
 IC18: TC74AC08P (XG656A00) AND
 IC19: TC74AC04P (XG655A00) INVERTER
 IC20: SN74HC14N (IR001450) INVERTER
 IC21: TC74HC4066AP (IR406600) A-SWITCH
 IC22: PST518B-2 (IG116200) SYSTEM RESET
 IC24: LC92030C-477 (X1074A00) GATE ARRAY SP33
 IC25: LC92018B-476 (X1045A00) GATE ARRAY RI54
 IC26: HN62324BPC68 (X1796A00) ROM 4M VOICE
 IC27: HN62324BPC69 (X1797A00) ROM 4M VOICE
 IC28: TC40HC004P (IG051000) INVERTER
 - Photo Coupler
 PC 1: 6N137 (VD473200)
 - Transistor
 TR 1, 2: 2SC1740S R,S (IC174070)
 TR 3: 2SA1015 O, Y (IA101570)
 TR 4: 2SC1815 Y,GR (IC181580)
 TR 5: 2SD880 O, Y (ID088000)
 - Diode
 D 1: 11ES4 (VB481900)
 D 2, 3: 1S133 (IF003450)
 - Zener Diode
 ZD 1: MTZ9.1A 9.1V (VA095500)
 - Resistor Array
 RA 1, 4, 6: RGLD8X103J (VE445200) 10K x 8
 RA 2, 3, 10, 11: RGLD10X103J (VH564300) 10K x 10
 RA 5, 7~9: RMLS6J103 (HZ004650) 10K x 6
 - Electrolytic Cap.
 C 1: 2200µF 16V (VH603700)
 C 2, 3: 220µF 16V (UJ138220)
 C 7: 470µF 10V (UJ828470)
 - Tantalum Capacitor
 C35: 4.7µF 16V M (FP736470)
 - Semiconductive Cera. Cap.
 C 4~6, 8, 9, 12, 13, 16, 17, 24~27, 29~31, 36, 39, 42, 43, 48~52, 54, 57: 0.1µF 16V M (FZ004100)
 - Coil
 L 1~6: FL5R200QNT 20µ (VB835000)
 - EMI Filter
 EMI 1~3: LS MT Y223NB 0.022 (FZ006970)
 - Quartz Crystal Unit
 CL 1: 20MHz AT-49 (VI927300)
 CL 2: 12.8MHz AT-49 (VI460800)
 - Connector
 JK 1: X-G9242 (VH303600) DC 10V 700mA IN
 - DIN Connector
 JK 2: 3P YKF51-5046 (VI466400) MIDI
 - Lithium Battery
 BT 1: CR2032 (VE338400)
 - Connector, Card
 CN 5: 38P (VF821100) CARD

DM CN1

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|--------------|
| 1 | PSW | RE | Power Switch |
| 2 | NC | - | - |
| 3 | PSW | WH | Power Switch |

DM CN5

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | GND | | CARD-1 |
| 2 | NC | | CARD-2 |
| 3 | NC | | CARD-3 |
| 4 | D3 | | CARD-4 |
| 5 | D4 | | CARD-5 |
| 6 | D5 | | CARD-6 |
| 7 | D6 | | CARD-7 |
| 8 | D7 | | CARD-8 |
| 9 | CE1 | | CARD-9 |
| 10 | A10 | | CARD-10 |
| 11 | OE | | CARD-11 |
| 12 | A11 | | CARD-12 |
| 13 | A9 | | CARD-13 |
| 14 | A8 | | CARD-14 |
| 15 | A13 | | CARD-15 |
| 16 | A14 | | CARD-16 |
| 17 | WE | | CARD-17 |
| 18 | NC | | CARD-18 |
| 19 | CST | | CARD-19 |
| 20 | Vcc | | CARD-20 |
| 21 | A16 | | CARD-21 |
| 22 | A15 | | CARD-22 |
| 23 | A12 | | CARD-23 |
| 24 | A7 | | CARD-24 |
| 25 | A6 | | CARD-25 |
| 26 | A5 | | CARD-26 |
| 27 | A4 | | CARD-27 |
| 28 | A3 | | CARD-28 |
| 29 | A2 | | CARD-29 |
| 30 | A1 | | CARD-30 |
| 31 | A0 | | CARD-31 |
| 32 | D0 | | CARD-32 |
| 33 | D1 | | CARD-33 |
| 34 | D2 | | CARD-34 |
| 35 | MR | | CARD-35 |
| 36 | NC | | CARD-36 |
| 37 | Vcc | | CARD-37 |
| 38 | GND | | CARD-38 |

DM CN2

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | +5D | RE | JKAN-CN1-1 |
| 2 | GND | BL | JKAN-CN1-2 |
| 3 | SRO2 | WH | JKAN-CN1-3 |
| 4 | GND | BL | JKAN-CN1-4 |
| 5 | SRO1 | WH | JKAN-CN1-5 |
| 6 | GND | BL | JKAN-CN1-6 |
| 7 | CLK MEL | WH | JKAN-CN1-7 |
| 8 | GND | BL | JKAN-CN1-8 |
| 9 | SYW | WH | JKAN-CN1-9 |
| 10 | GND | BL | JKAN-CN1-10 |
| 11 | IC | BL | JKAN-CN1-11 |

DM CN5

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | GND | | CARD-1 |
| 2 | NC | | CARD-2 |
| 3 | NC | | CARD-3 |
| 4 | D3 | | CARD-4 |
| 5 | D4 | | CARD-5 |
| 6 | D5 | | CARD-6 |
| 7 | D6 | | CARD-7 |
| 8 | D7 | | CARD-8 |
| 9 | CE1 | | CARD-9 |
| 10 | A10 | | CARD-10 |
| 11 | OE | | CARD-11 |
| 12 | A11 | | CARD-12 |
| 13 | A9 | | CARD-13 |
| 14 | A8 | | CARD-14 |
| 15 | A13 | | CARD-15 |
| 16 | A14 | | CARD-16 |
| 17 | WE | | CARD-17 |
| 18 | NC | | CARD-18 |
| 19 | CST | | CARD-19 |
| 20 | Vcc | | CARD-20 |
| 21 | A16 | | CARD-21 |
| 22 | A15 | | CARD-22 |
| 23 | A12 | | CARD-23 |
| 24 | A7 | | CARD-24 |
| 25 | A6 | | CARD-25 |
| 26 | A5 | | CARD-26 |
| 27 | A4 | | CARD-27 |
| 28 | A3 | | CARD-28 |
| 29 | A2 | | CARD-29 |
| 30 | A1 | | CARD-30 |
| 31 | A0 | | CARD-31 |
| 32 | D0 | | CARD-32 |
| 33 | D1 | | CARD-33 |
| 34 | D2 | | CARD-34 |
| 35 | MR | | CARD-35 |
| 36 | NC | | CARD-36 |
| 37 | Vcc | | CARD-37 |
| 38 | GND | | CARD-38 |

DM CN3

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | Vss | RE | LCD-CN1-1 |
| 2 | Vdd | WH | LCD-CN1-2 |
| 3 | RS | WH | LCD-CN1-3 |
| 4 | R/W | WH | LCD-CN1-4 |
| 5 | E | WH | LCD-CN1-5 |
| 6 | D0 | WH | LCD-CN1-6 |
| 7 | D1 | WH | LCD-CN1-7 |
| 8 | D2 | WH | LCD-CN1-8 |
| 9 | D3 | WH | LCD-CN1-9 |
| 10 | D4 | WH | LCD-CN1-10 |
| 11 | D5 | WH | LCD-CN1-11 |
| 12 | D6 | WH | LCD-CN1-12 |
| 13 | D7 | WH | LCD-CN1-13 |

DM CN5

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | GND | | CARD-1 |
| 2 | NC | | CARD-2 |
| 3 | NC | | CARD-3 |
| 4 | D3 | | CARD-4 |
| 5 | D4 | | CARD-5 |
| 6 | D5 | | CARD-6 |
| 7 | D6 | | CARD-7 |
| 8 | D7 | | CARD-8 |
| 9 | CE1 | | CARD-9 |
| 10 | A10 | | CARD-10 |
| 11 | OE | | CARD-11 |
| 12 | A11 | | CARD-12 |
| 13 | A9 | | CARD-13 |
| 14 | A8 | | CARD-14 |
| 15 | A13 | | CARD-15 |
| 16 | A14 | | CARD-16 |
| 17 | WE | | CARD-17 |
| 18 | NC | | CARD-18 |
| 19 | CST | | CARD-19 |
| 20 | Vcc | | CARD-20 |
| 21 | A16 | | CARD-21 |
| 22 | A15 | | CARD-22 |
| 23 | A12 | | CARD-23 |
| 24 | A7 | | CARD-24 |
| 25 | A6 | | CARD-25 |
| 26 | A5 | | CARD-26 |
| 27 | A4 | | CARD-27 |
| 28 | A3 | | CARD-28 |
| 29 | A2 | | CARD-29 |
| 30 | A1 | | CARD-30 |
| 31 | A0 | | CARD-31 |
| 32 | D0 | | CARD-32 |
| 33 | D1 | | CARD-33 |
| 34 | D2 | | CARD-34 |
| 35 | MR | | CARD-35 |
| 36 | NC | | CARD-36 |
| 37 | Vcc | | CARD-37 |
| 38 | GND | | CARD-38 |

DM CN4

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | Vcc | RE | PN-CN1-1 |
| 2 | DET | WH | PN-CN1-2 |
| 3 | LEV | WH | PN-CN1-3 |
| 4 | EFB | WH | PN-CN1-4 |
| 5 | EDT | WH | PN-CN1-5 |
| 6 | VOI | WH | PN-CN1-6 |
| 7 | MUL | WH | PN-CN1-7 |
| 8 | CRL | WH | PN-CN1-8 |
| 9 | INT | WH | PN-CN1-9 |
| 10 | CRH | WH | PN-CN1-10 |
| 11 | PRH | WH | PN-CN1-11 |
| 12 | PRL | WH | PN-CN1-12 |

DM CN6

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | +5V | RE | JKAN-CN7-1 |
| 2 | D.E | WH | JKAN-CN7-2 |
| 3 | GND | WH | JKAN-CN7-3 |

DM CN20

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | AG2 | RE | JKAN-CN4-1 |
| 2 | +VA | WH | JKAN-CN4-2 |
| 3 | +8A | WH | JKAN-CN4-3 |
| 4 | AG1 | WH | JKAN-CN4-4 |

DM CN7

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|----------------------|
| 1 | +5V | RE | VECTOR control Ass'y |
| 2 | V-Y | YE | VECTOR control Ass'y |
| 3 | V-X | OR | VECTOR control Ass'y |
| 4 | GND | BL | VECTOR control Ass'y |

| | IC2, IC3 | J1 | J2 | J3 | J4 |
|---------------|----------|----|----|----|----|
| EP ROM | x | o | o | o | x |
| MASK ROM (2M) | o | x | x | o | |

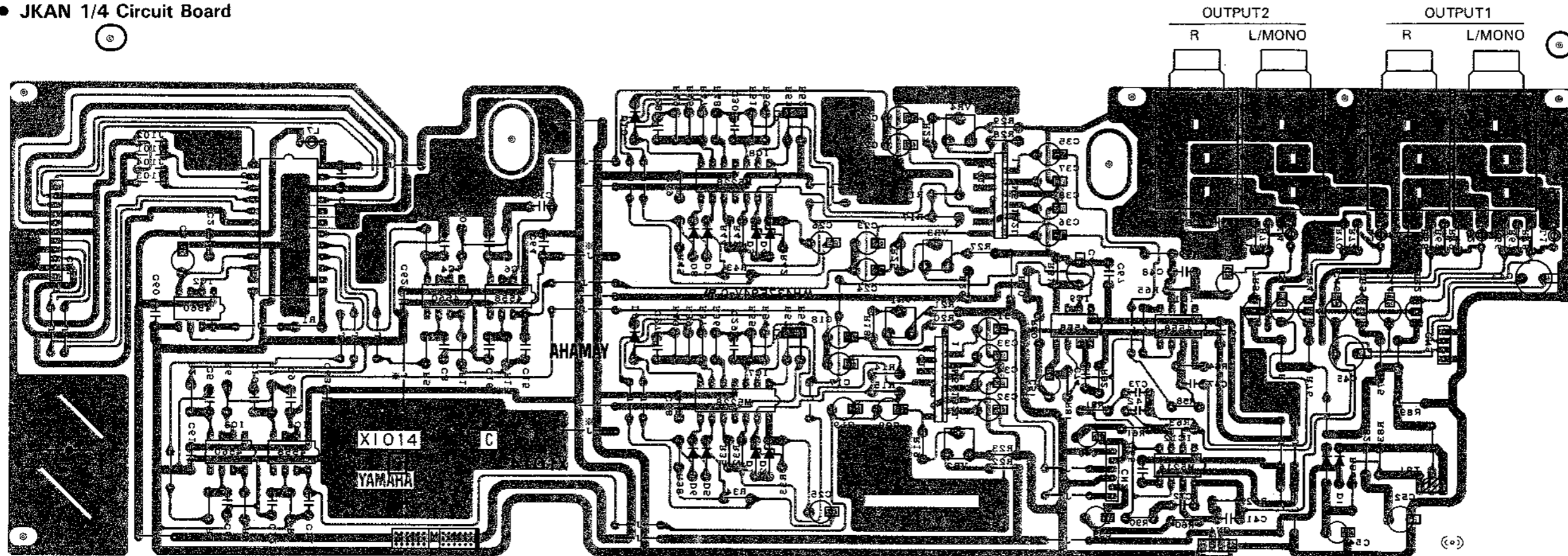
DM CN8

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | GND | RE | PN-CN2-1 |
| 2 | P15 | WH | PN-CN2-2 |
| 3 | P93 | WH | PN-CN2-3 |
| 4 | P92 | WH | PN-CN2-4 |
| 5 | P91 | WH | PN-CN2-5 |
| 6 | P90 | WH | PN-CN2-6 |
| 7 | P77 | WH | PN-CN2-7 |
| 8 | P76 | WH | PN-CN2-8 |
| 9 | P75 | WH | PN-CN2-9 |
| 10 | P74 | WH | PN-CN2-10 |
| 11 | P73 | WH | PN-CN2-11 |
| 12 | P72 | WH | PN-CN2-12 |
| 13 | P71 | WH | PN-CN2-13 |
| 14 | P70 | WH | PN-CN2-14 |

ピンクネジ)

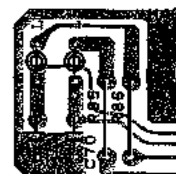
TG33

● JKAN 1/4 Circuit Board



Pattern side (パターン側)

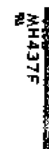
● JKAN 2/4



Cor

● JKAN 3/4

MAST



Pattern

● JKAN 4/4

DA



Pattern

Notes)

- Circuit Board: JKAN1/4 (X1014C0)
- IC
IC 1: YM3032 (XG411A00) DAL3
IC 2-4: NJM4560ED (IG040000) OP AMP.
IC 5, 6, 9, 13: RC4558DV (IG001390) OP AMP.
IC 7, 8: M5228P (XF123A00) OP AMP. 4ch
IC10, 11: M51132L (XE470001) VCA
IC12: NJM4556 (IG042500) OP AMP. 2ch
 - Transistor
TR 1: 2SA1015 Y (IA101520)
TR 2-5: 2SC2878 A, B (IC287800)
 - Diode
D 5-12: 1SS133 (IF003450)
 - Zener Diode
D 1-4: RD3.6EB1 3.6V (IF001660)
 - Trimmer Potentiometer
VR 1-4: B10K EVN (VA024800)
 - Electrolytic Cap.
C43, 52-55: 220 μ F 16V (FZ006950)
 - Semiconductive Cera. Cap.
C 1, 2, 60-69: 0.1 μ F 16V M (FZ004100)
 - Coil
L 1-4, 7: FL5R200QNT 20 μ H (VB835000)
 - Phone Jack
JK 1-4: HLJ4306 Mono (VE742000) OUTPUT

10. Jumper wire, R89

| | | | | | |
|------|------|------|------|-----------|-----|
| J101 | J102 | J103 | J104 | marked * | R89 |
| x | o | o | x | x (4 pcs) | x |

(o: installed x: not installed)

JKAN 1/4 CN1

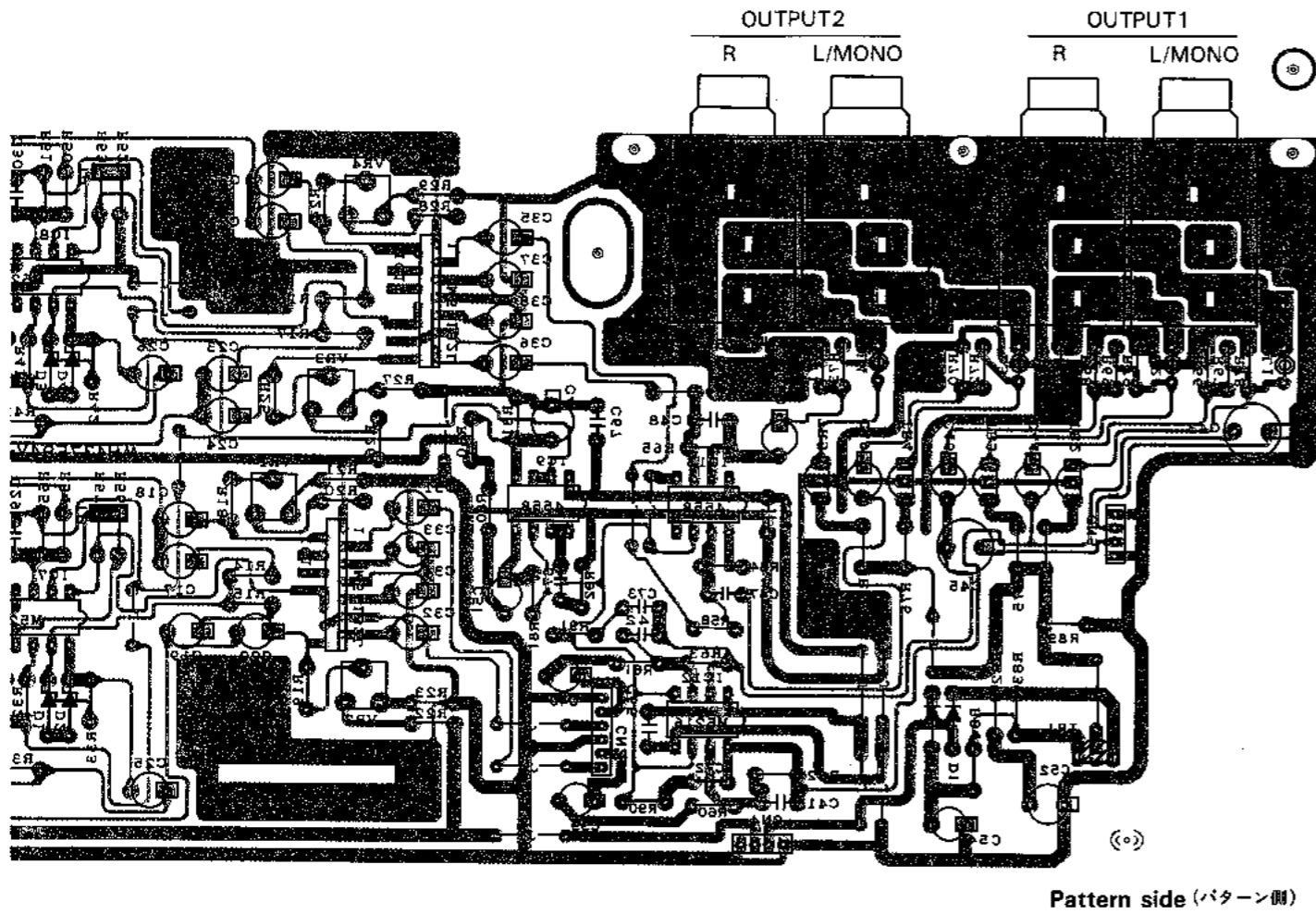
| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | +5D | RE | DM-CN2-1 |
| 2 | D.G | BL | DM-CN2-2 |
| 3 | SRO2 | WH | DM-CN2-3 |
| 4 | D.G | BL | DM-CN2-4 |
| 5 | SRO1 | WH | DM-CN2-5 |
| 6 | D.G | BL | DM-CN2-6 |
| 7 | CLK | WH | DM-CN2-7 |
| 8 | D.G | BL | DM-CN2-8 |
| 9 | SYW | WH | DM-CN2-9 |
| 10 | D.G | BL | DM-CN2-10 |
| 11 | TC | BL | DM-CN2-11 |

JKAN 1/4 CN2

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | INL | SRE-RE | JKAN-CN6-1 |
| 2 | OUTL | SRE-WH | JKAN-CN6-2 |
| 3 | AG | SRES | JKAN-CN6-3 |
| 4 | IN R | SOR-RE | JKAN-CN6-4 |
| 5 | OUT R | SOR-WH | JKAN-CN6-5 |
| 6 | AG | SORS | JKAN-CN6-6 |

JKAN 1/4 CN3

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | AG | SRES | JKAN-CN5-1 |
| 2 | HPL | SRE | JKAN-CN5-2 |
| 3 | HPR | SOR | JKAN-CN5-3 |
| 4 | AG | SORS | JKAN-CN5-4 |



Pattern side (パターン側)

JKAN 1/4 CN1

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | +5D | RE | DM-CN2-1 |
| 2 | D.G | BL | DM-CN2-2 |
| 3 | SRO2 | WH | DM-CN2-3 |
| 4 | D.G | BL | DM-CN2-4 |
| 5 | SRO1 | WH | DM-CN2-5 |
| 6 | D.G | BL | DM-CN2-6 |
| 7 | CLK | WH | DM-CN2-7 |
| 8 | D.G | BL | DM-CN2-8 |
| 9 | SYW | WH | DM-CN2-9 |
| 10 | D.G | BL | DM-CN2-10 |
| 11 | IC | BL | DM-CN2-11 |

JKAN 1/4 CN4

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | AG2 | RE | DM-CN20-1 |
| 2 | +VA | WH | DM-CN20-2 |
| 3 | +BA | WH | DM-CN20-3 |
| 4 | AG1 | WH | DM-CN20-4 |

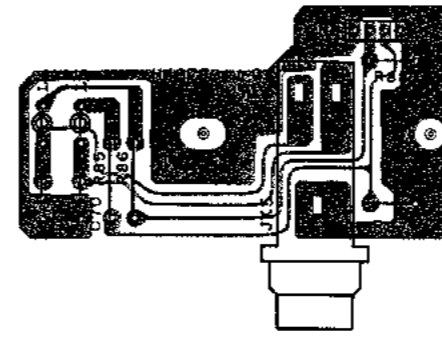
JKAN 1/4 CN2

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | INL | SRE-RE | JKAN-CN6-1 |
| 2 | OUTL | SRE-WH | JKAN-CN6-2 |
| 3 | AG | SRES | JKAN-CN6-3 |
| 4 | IN R | SOR-RE | JKAN-CN6-4 |
| 5 | OUT R | SOR-WH | JKAN-CN6-5 |
| 6 | AG | SORS | JKAN-CN6-6 |

JKAN 1/4 CN3

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | AG | SRES | JKAN-CN5-1 |
| 2 | HPL | SRE | JKAN-CN5-2 |
| 3 | HPR | SOR | JKAN-CN5-3 |
| 4 | AG | SORS | JKAN-CN5-4 |

● JKAN 2/4 Circuit Board



Components side (部品側)

Notes)

- Circuit Board: JKAN2/4 XI014C0
- Coil L 5, 6: FL5R200QNT 20μH (VB935000)
 - Phone Jack JK 5: HLJ0521 Stereo (LB203090) PHONES

JKAN 2/4 CN5

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | AG | SRES | JKAN-CN3-1 |
| 2 | HPL | SRE | JKAN-CN3-2 |
| 3 | HPR | SOR | JKAN-CN3-3 |
| 4 | AG | SORS | JKAN-CN3-4 |

● JKAN 3/4 Circuit Board

MASTER VOLUME



Pattern side (パターン側)

Notes)

- Circuit Board: JKAN3/4 XI014C0
- Variable Resistor VR 5: A10K x 2 (VF636100) MASTER VOLUME

JKAN 3/4 CN6

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | IN L | SRE-RE | JKAN-CN2-1 |
| 2 | OUT L | SRE-WH | JKAN-CN2-2 |
| 3 | AG | SRES | JKAN-CN2-3 |
| 4 | IN R | SOR-RE | JKAN-CN2-4 |
| 5 | OUT R | SOR-WH | JKAN-CN2-5 |
| 6 | AG | SORS | JKAN-CN2-6 |

● JKAN 4/4 Circuit Board

DATA ENTRY



Pattern side (パターン側)

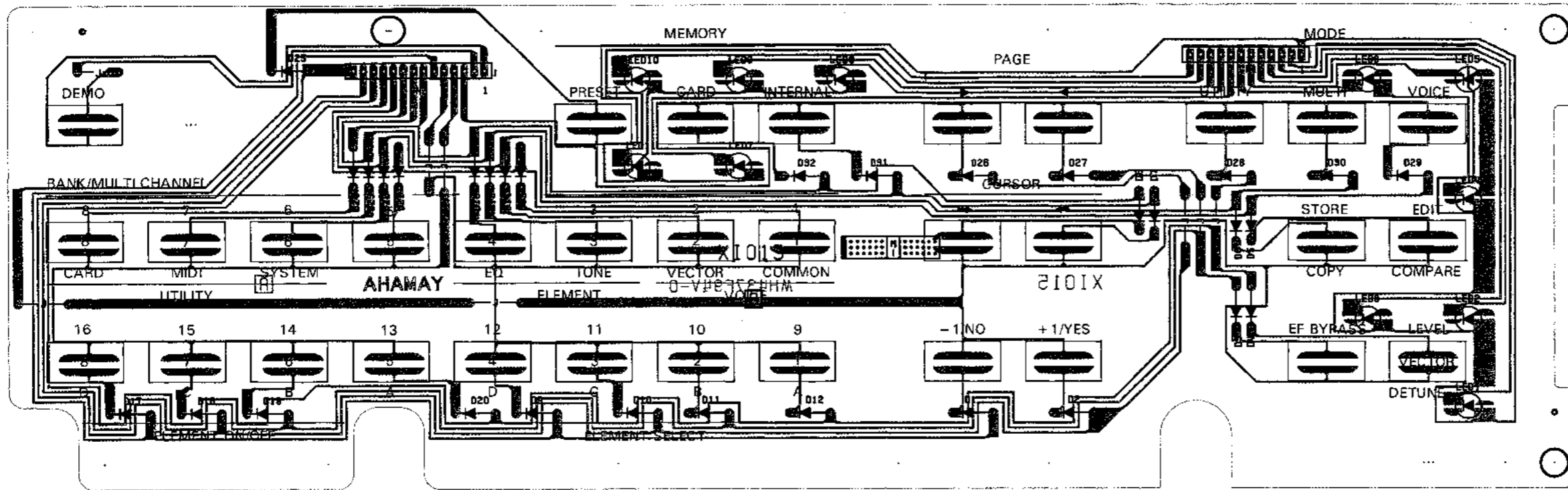
Notes)

- Circuit Board: JKAN4/4 XI014C0
- Variable Resistor VR 6: B10K RK09K113 (VJ789500) DATA ENTRY

JKAN 4/4 CN7

| Pin No. | Pin Name | Wire Color | Destination |
|---------|----------|------------|-------------|
| 1 | +5V | RE | DM-CN6-1 |
| 2 | D.E | WH | DM-CN6-2 |
| 3 | GND | WH | DM-CN6-3 |

● PN Circuit Board



Components side (部品側)

Notes)

- 1. Circuit Board: PN (VJ789200) XI015A0
- 2. Diode D 1-33: 1SS133 (IF003450)
- 3. LED LED 1-11: SLZ-181B09T6 RE (VI813100)

| PN | | CN1 | |
|---------|----------|------------|-------------|
| Pin No. | Pin Name | Wire Color | Destination |
| 1 | Vcc | RE | DM-CN4-1 |
| 2 | DET | WH | DM-CN4-2 |
| 3 | LEV | WH | DM-CN4-3 |
| 4 | EFB | WH | DM-CN4-4 |
| 5 | EDT | WH | DM-CN4-5 |
| 6 | VOI | WH | DM-CN4-6 |
| 7 | MUL | WH | DM-CN4-7 |
| 8 | CRL | WH | DM-CN4-8 |
| 9 | INT | WH | DM-CN4-9 |
| 10 | CRH | WH | DM-CN4-10 |
| 11 | PRH | WH | DM-CN4-11 |
| 12 | PRL | WH | DM-CN4-12 |

| PN | | CN2 | |
|---------|----------|------------|-------------|
| Pin No. | Pin Name | Wire Color | Destination |
| 1 | GND | RE | DM-CN8-1 |
| 2 | P15 | WH | DM-CN8-2 |
| 3 | CA | WH | DM-CN8-3 |
| 4 | Cb | WH | DM-CN8-4 |
| 5 | Cc | WH | DM-CN8-5 |
| 6 | Co | WH | DM-CN8-6 |
| 7 | P77 | WH | DM-CN8-7 |
| 8 | P76 | WH | DM-CN8-8 |
| 9 | P75 | WH | DM-CN8-9 |
| 10 | P74 | WH | DM-CN8-10 |
| 11 | P73 | WH | DM-CN8-11 |
| 12 | P72 | WH | DM-CN8-12 |
| 13 | P71 | WH | DM-CN8-13 |
| 14 | P70 | WH | DM-CN8-14 |

■ TEST PROGRAM (テストプログラム)

A. HOW TO ENTER THE TEST PROGRAM

Turn on the power switch of the TG33 and wait for a few seconds.

While pressing the [VOICE] switch, press and hold the [DEMO] switch then the [16] switch. The TG33 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.

```
TG33 TEST ENTRY
U特. 装置  XXX/XXXX/XX
```

Use the [-1], [COPY], or [EF BYPASS] panel switches to select the appropriate test mode. If you press [-1], the auto test mode will be initiated. If you press [COPY], the TG33 will execute Test 18, "18. Factory settings", and then automatically exit the test mode and return to play mode (refer to Test 18 for details). If you press [EF BYPASS], you will exit the test mode and return to the play mode.

B. PROCEEDING THROUGH THE TESTS

When you enter the test program, the following display will appear.

```
00: TEST NO. ?
AUTO MODE
```

The [1] through [16] keys of the [BANK/MULTI CHANNEL] can be used to enter a two-digit number to directly select a test. Simply enter the number using one of these keys, the test will start from that number in succession. For example, if you would like to start from TEST 6, press [6] switch. If the [DEMO] switch is pressed without selecting the test number by using these keys, the TG33 will execute the Test 1, "1. Battery".

NOTE: Test 17 can not be selected directly by this operation.

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[DEMO]を押しさらに[16]を押すと、次の画面が表示される。

```
EFB-EXT COPY-FACT
-1-AUT
```

[-1]、[COPY]および[EF BYPASS]を使用してテストモードの選択を行う。

[-1]を押すと、オートモードでテストにエントリーされる。

[COPY]を押すと、"18. 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てプレイモードになる。

[EF BYPASS]を押すとテストモードを抜け、直前の画面に戻る。この時、ファクトリーセットは実行されない。

B. テストの進め方

テストにエントリーすると、次の画面が表示される。

[BANK/MULTI CHANNEL](1)-(16)を使用して、テスト番号と同じ数字を押すことで、ダイレクトにテストの選択が行なえる。

但し、"17. 32音発音"は、ダイレクト選択が出来ない。

そして即座に、その設定したテストナンバーより、テストナンバー順に、自動的にテストが実行される。

何も設定せずに[DEMO]を押すと、"1. Battery"より、テストナンバー順に自動的にテストが実行される。エラーが発生した場合、エラー表示を行ってテストは止まる。

TEST SELECTION WHEN AN ERROR IS DETECTED

If an NG (No Good) error is detected in each of tests, the display will indicate the error message and the system will stop at that step. Following operations will proceed the TG33 to the next step. You can then retry the test or perform another test.

Pressing: [DEMO] will re-execute the current test again.
 [+1] will execute the test which follows the current test.
 [EF BYPASS] will execute Test 19, "19. EXIT" (refer to Test 19 for details).

INITIAL TEST

Performs a read/write test of RAM on the following addresses when the test program is initiated.

IC1: 0FB80h-0FF7Fh
 IC4: 40000h-47FFFh
 IC5: 50000h-51FFFh

DISPLAY OF TEST RESULTS

NG

```
00: RAM R/W
ICxxxx NG
```

TEST END

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

TEST PROGRAM 1 -- 19

TEST 1. RAM BACKUP BATTERY TEST

```
01: BATTERY
```

This test checks that the voltage of the RAM backup battery is greater than 2.9V and less than 3.6V.

この場合、[DEMO]、[+1]または[EF BYPASS]のいずれかのスイッチにより、エラー処理を行う。
 [DEMO]を押すと、エラーが発生したテストより、再び自動的にテストが実行される。
 [+1]を押すと、エラーが発生したテストの次のテストより、再び自動的にテストが実行される。
 [EF BYPASS]を押すと、"19. EXIT" が実行される。

イニシャルテスト

RAMテスト

テストプログラムエントリー時、自動的にRAMの次の3つのアドレスに対して、リード/ライトテストを行う。

IC1 = 0FB80h-0FF7Fh
 IC4 = 40000h-47FFFh
 IC5 = 50000h-51FFFh

判定結果の表示

NG

(where xxx = IC#)

(xxxx ; NG となったICの番号)

このテストが実行されても、すべてのRAMのデータは、保存される。

テストプログラム1~19

テスト1. BATTERYテスト

RAMバックアップバッテリー電圧が、2.9V以上、3.5V以下を確認する。

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.

■ SPECIFICATIONS

Tone Generator Systems: AWM (Advanced Wave Memory) & FM (Frequency Modulation)

Internal Memory: Wave ROM; 128 preset AWM & 256 preset FM waveforms
Preset ROM; 128 preset voices
Internal RAM; 64 user voices & 16 user multi setups

External Memory: Voice & Multi data; MCD64 or MCD32 — write & read

Displays: 16-character × 2-line backlit LCD

Controls: MASTER VOLUME, VECTOR CONTROL

Keys & Switches: POWER ON/OFF; MODE VOICE, MULTI and UTILITY; EDIT/COMPARE; STORE/COPY; VECTOR PLAY LEVEL/DETUNE; EF BYPASS ON/OFF; PAGE ◀ and ▶; CURSOR ◀ and ▶; -1/NO and +1/YES; MEMORY INTERNAL, CARD and PRESET; BANK/MULTI CHANNEL 1-16 (VOICE COMMON and VECTOR; ELEMENT TONE and EG; UTILITY SYSTEM, MIDI and CARD; ELEMENT SELECT A, B, C and D; ELEMENT ON/OFF A, B, C and D)

Connectors: DC 10V IN; PHONES; OUTPUT 1 (L/MONO,R) and OUTPUT 2 (L/MONO, R)

MIDI Connectors: IN, OUT, THRU

Power Requirement/Consumption: DC 10V, 700 mA

Dimensions (W × H × D): 439 × 80.4 × 229.9 mm

Weight: 2.8 kg

■ 総合仕様

音源：①方式：ダイナミック・ベクター・シンセシス/
(AWM音源+FM音源)×2系列

②波形メモリー：AWM=128種、FM=256種

③最大同時発音数：AWM×1+FM×1=32音ポリ
AWM×2+FM×2=16音ポリ

④マルチ・ティンバー数：最大16ボイス
(DVA機能付き)

⑤音色構成：1ボイス=2/4エレメント

エフェクト：リバーブ系×16種

内部メモリー：プリセット：128ボイス+16マルチ
インターナル：64ボイス+16マルチ

外部メモリー：別売メモリー・カードMCD32(64ボイス+16
マルチ+1システム)、MCD64(128ボイス+
32マルチ+2システム)

音色データ供給：別売音色ROMカード

コントローラー：ジョイスティック型ベクター・コントロ
ーラー
データ・エントリー・ボリューム
マスター・ボリューム

ディスプレイ：16文字×2行LCD (バックライト付き)

接続端子：アウトプット1 (L/MONO-R)
アウトプット2 (L/MONO-R)
DC12V (700mA) イン

MIDI端子：IN-OUT-THRU

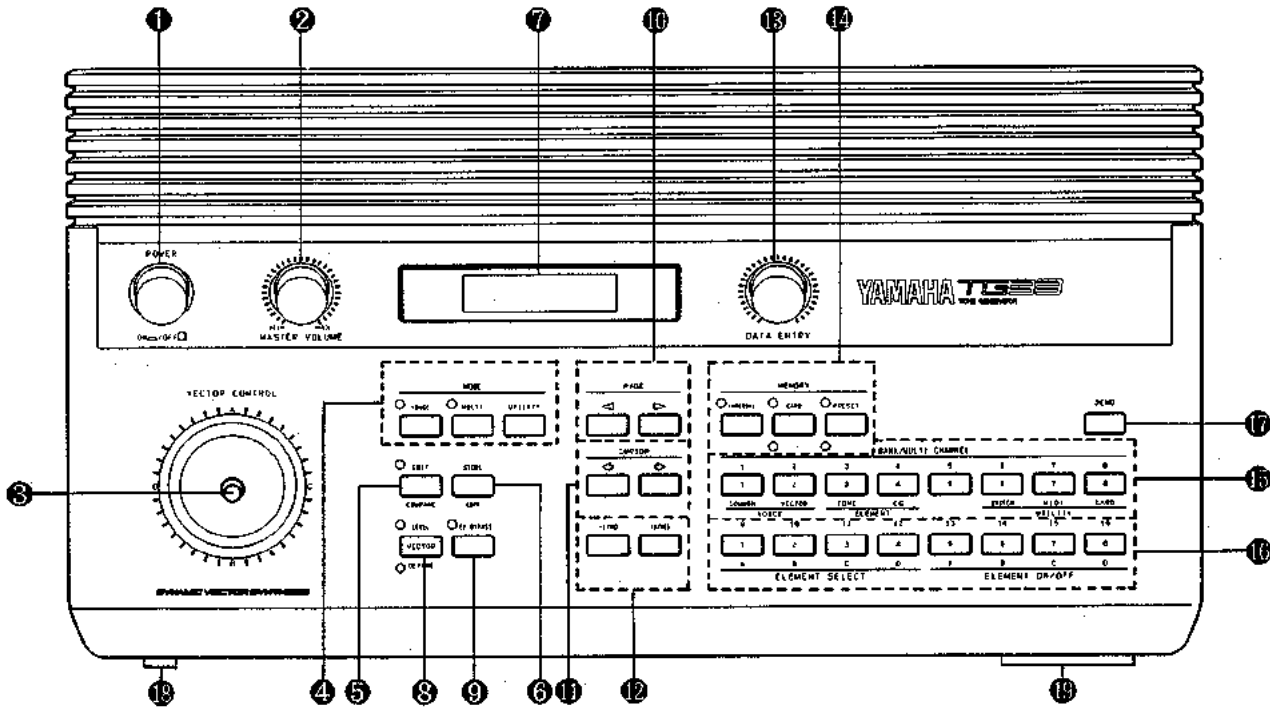
寸法・重量：439W×230Dmm・2.8kg

付属品：電源アダプター PA-3、ラックマウントアダプ
ター×2

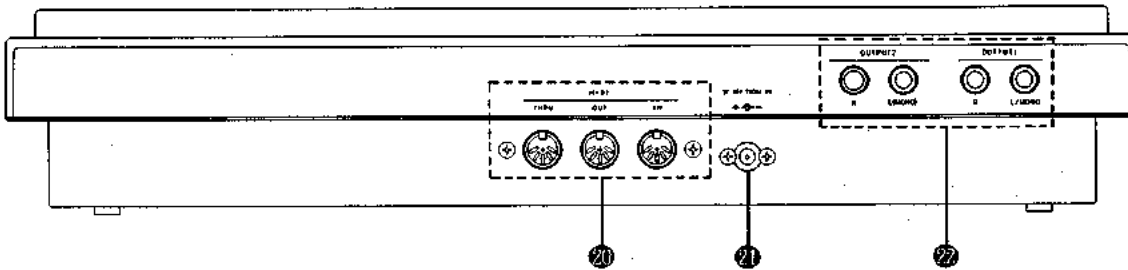
※TG33の音色データはSY22と互換性があります。エフェクトデータは異なります。なお、マルチのデータは読み込みません。

■ PANEL LAYOUT (パネルレイアウト)

● Front Panel



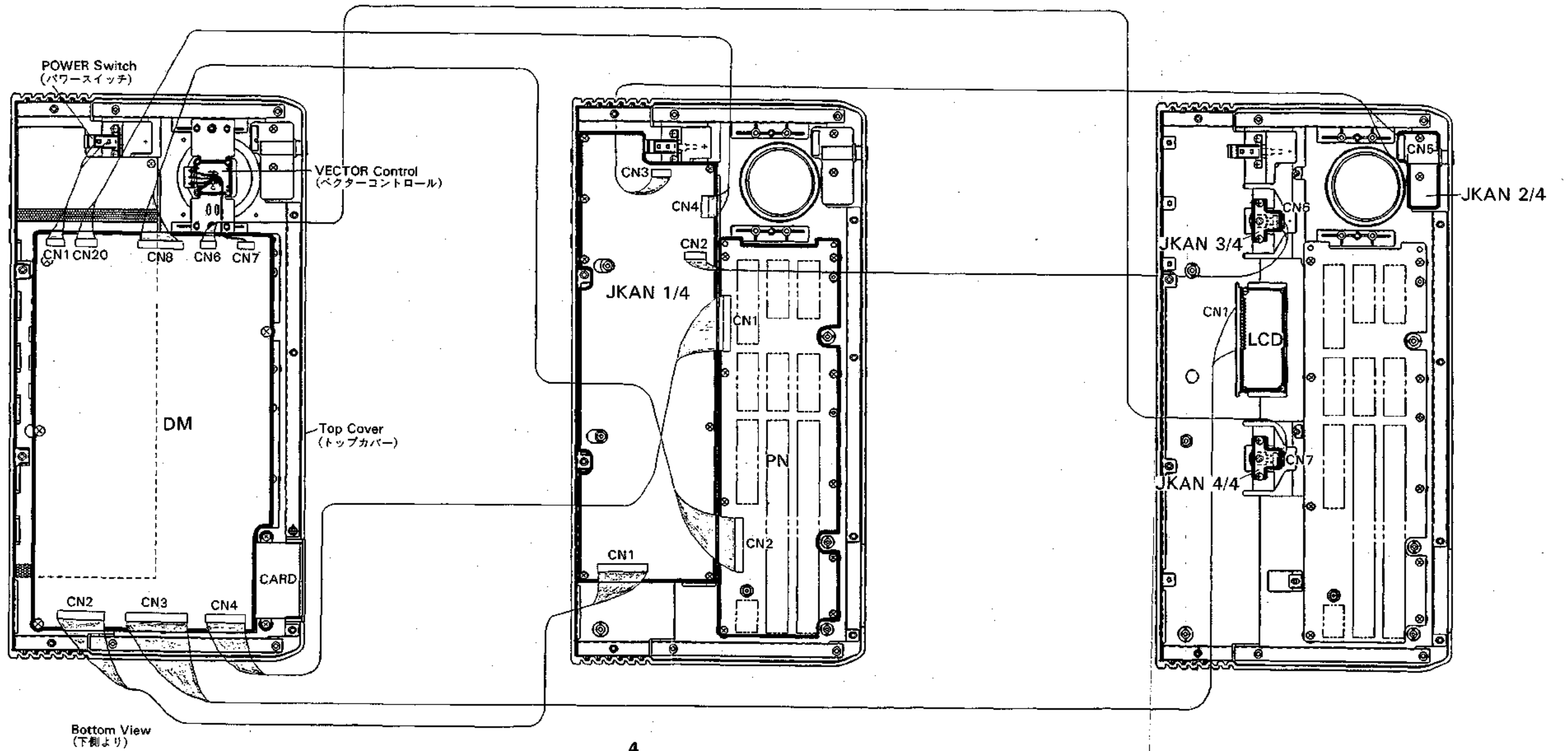
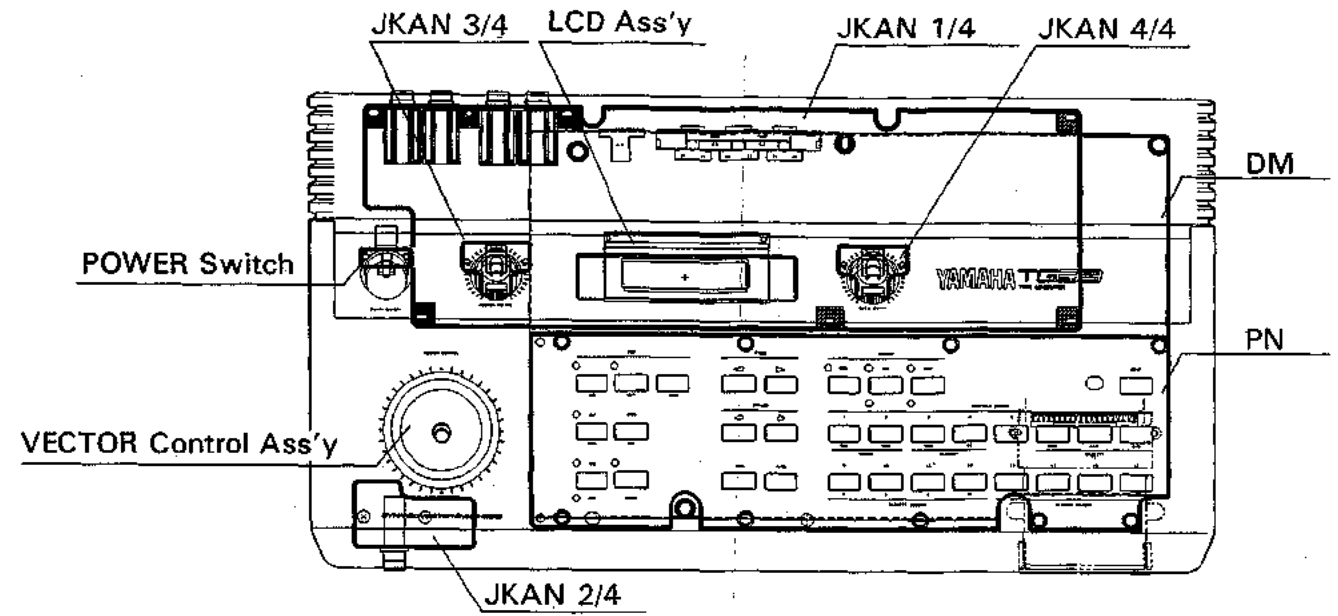
● Rear Panel



- ① [POWER] Switch
- ② [MASTER VOLUME] Control
- ③ [VECTOR CONTROL]
- ④ MODE Keys
[VOICE] Key & Indicator
[MULTI] Key & Indicator
[UTILITY] Key
- ⑤ [EDIT/COMPARE] Key & Indicator
- ⑥ [STORE/COPY] Key
- ⑦ Liquid Crystal Display Panel (LCD)
- ⑧ [VECTOR] Key & LEVEL/DETUNE Indicators
- ⑨ [EF BYPASS] Key & Indicator
- ⑩ PAGE [<] and [>] Keys

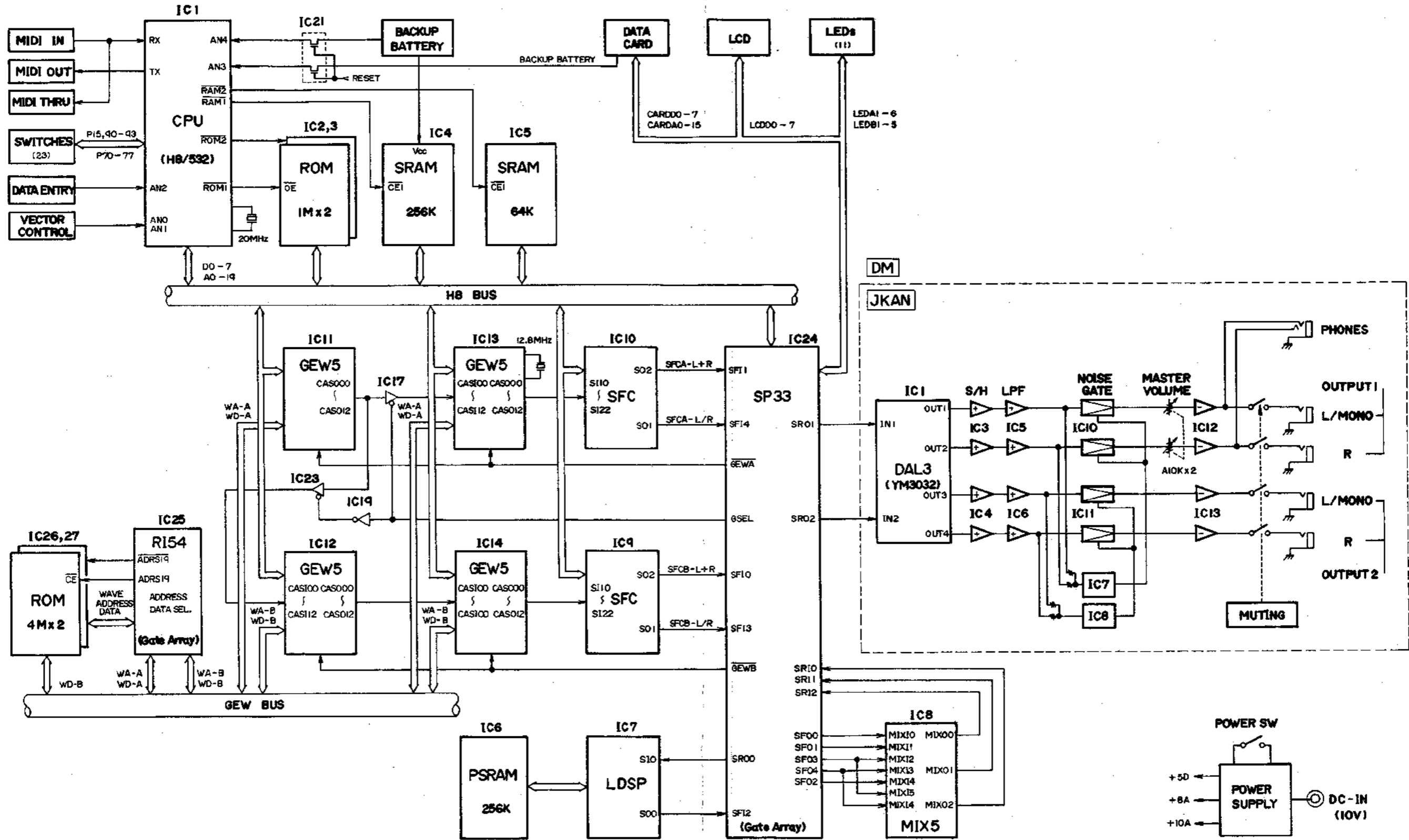
- ⑪ CURSOR [<=>] and [<=>] Keys
- ⑫ [- 1/NO] and [+ 1/YES] Keys
- ⑬ [DATA ENTRY] Control
- ⑭ [INTERNAL], [CARD] and [PRESET] Keys & Indicators
- ⑮ [BANK/MULTI CHANNEL] Select, Edit/Utility Mode Access, and Element Control Keys
- ⑯ [DEMO] Key
- ⑰ PHONES Jack
- ⑱ Card Slot
- ⑳ MIDI IN, OUT and THRU Connectors
- ㉑ DC 10V 700mA IN Jack
- ㉒ OUTPUT 1 and OUTPUT 2 (R and L/MONO) Jacks

■ CIRCUIT BOARD LAYOUT & WIRING (ユニットレイアウト & 結線図)



Bottom View (下側より)

■ BLOCK DIAGRAM (ブロックダイアグラム)



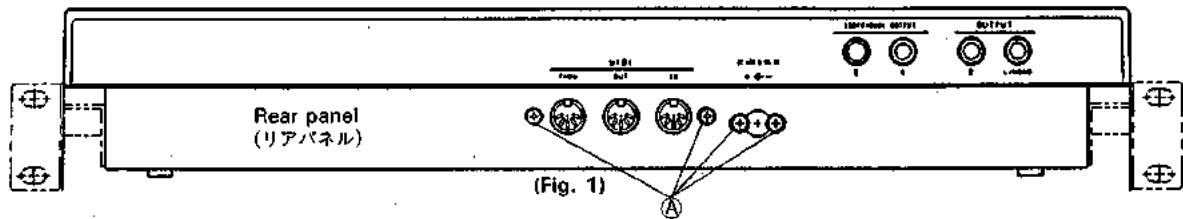
■ DISASSEMBLY PROCEDURE (分解手順)

1. Bottom Cover Removal

1-1. Remove the four (4) screws marked in the figure as ㉑ (3.0×8 pan head tapping screw) and twelve (12) screws marked ㉒ (4.0×10 pan head tapping screw) and two (2) screws marked ㉓ (4.0×10 pan head tapping screw), then the bottom cover can be removed. (Refer to Fig. 1 and Fig. 2)

1. ボトムカバーの外し方

1-1. ㉑のネジ4本 (3.0×8ナベタッピングネジ) と㉒のネジ12本 (4.0×10ナベタッピングネジ) と㉓のネジ2本 (4.0×10ナベタッピングネジ) を外し、ボトムカバーを外します。(図1、2参照)

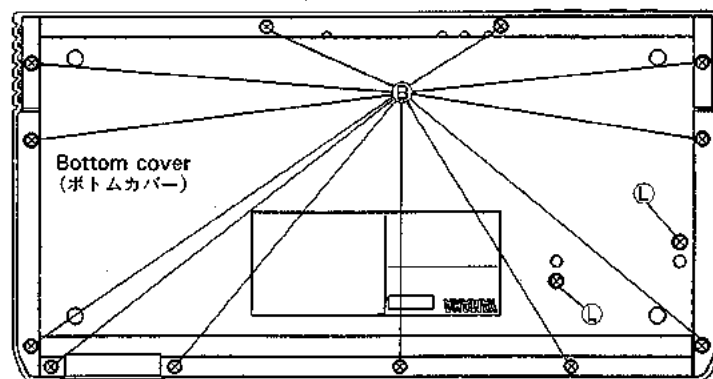


2. Vector Control Assembly Removal

2-1. Remove the bottom cover. (see procedure 1 - Bottom Cover Removal)
2-2. After the bottom cover has been removed, the VECTOR control assembly can be removed.
* The VECTOR control assembly is attached to the bottom cover using the two (2) screws marked ㉔ (4.0×10 pan head tapping screw). (Refer to Fig. 2)

2. ベクターコントロールAss'yの外し方

2-1. ボトムカバーを外します。(1項参照)
2-2. ボトムカバーを外すと、ベクターコントロールAss'yを外すことができます。
*ベクターコントロールAss'yは、ボトムカバー上の㉔のネジ2本 (4.0×10ナベタッピングネジ) で固定されています。(図2参照)



3. DM Circuit Board Removal

3-1. Remove the bottom cover. (see procedure 1 - Bottom Cover Removal)
3-2. Remove the two (2) screws marked ㉕ (3.0×8 pan head tapping screw) and four (4) screws marked ㉖ (4.0×10 pan head tapping screw), then the DM circuit board can be removed. (Refer to Fig. 3)
* After the DM circuit board has been removed, the shield sheet can be removed. (Refer to Fig. 3)

3. DMシートの外し方

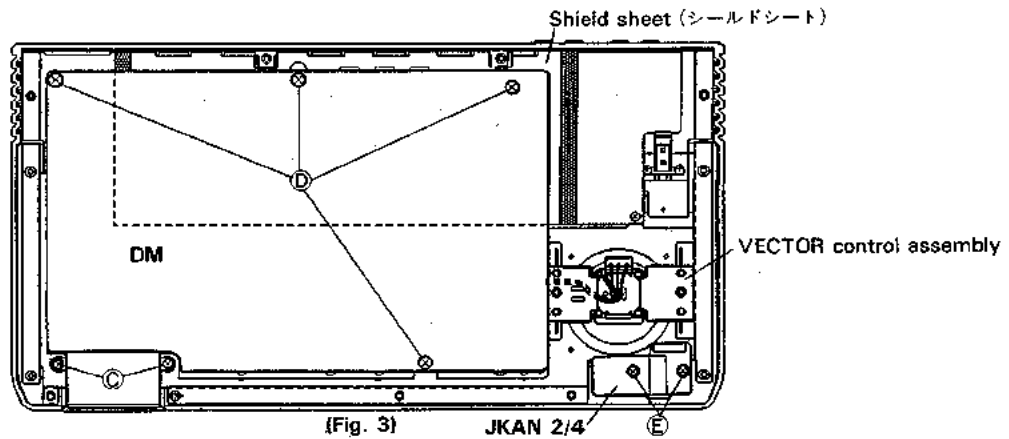
3-1. ボトムカバーを外します。(1項参照)
3-2. ㉕のネジ2本 (3.0×8ナベタッピングネジ) と㉖のネジ4本 (4.0×10ナベタッピングネジ) を外し、DMシートを外します。(図3参照)
*DMシートを外すと、シールドシートを外すことができます。

4. JKAN2/4 Circuit Board Removal

- 4-1. Remove the bottom cover. (see procedure 1 - Bottom Cover Removal)
- 4-2. Remove the two (2) screws marked ㊦ (3.0×8 bind head tapping screw), then the JKAN2/4 circuit board can be removed. (Refer to Fig. 3)

4. JKAN2/4シートの外し方

- 4-1. ボトムカバーを外します。(1項参照)
- 4-2. ㊦のネジ2本 (3.0×8 バインドタッピングネジ) を外し、JKAN2/4シートを外します。(図3参照)

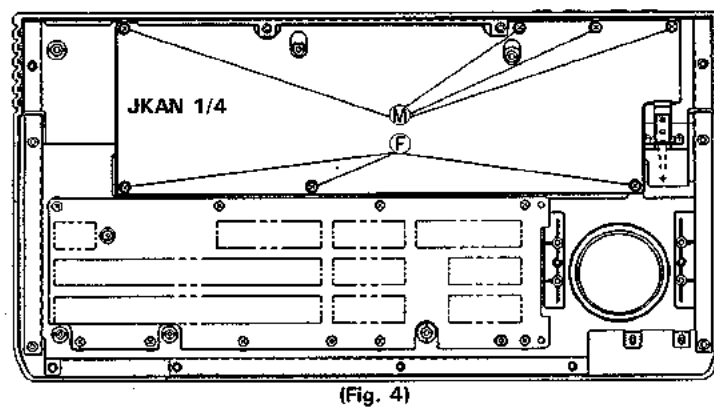


5. JKAN1/4 Circuit Board Removal

- 5-1. Remove the bottom cover. (see procedure 1 - Bottom Cover Removal)
- 5-2. Remove the DM circuit board. (see procedure 3 - DM Circuit Board Removal)
- 5-3. Remove the three (3) screws marked ㊦ (3.0×8 bind head tapping screw) and four (4) screws marked ㊭ (3.0×8 bind head screw), then the JKAN1/4 circuit board can be removed. (Refer to Fig. 4)

5. JKAN1/4シートの外し方

- 5-1. ボトムカバーを外します。(1項参照)
- 5-2. DMシートを外します。(3項参照)
- 5-3. ㊦のネジ3本 (3.0×8 バインドタッピングネジ) と㊭のネジ4本 (3.0×8 バインド小ネジ) を外し、JKAN1/4シートを外します。(図4参照)



6. PN Circuit Board removal

- 6-1. Remove the bottom cover. (see procedure 1 - Bottom Cover Removal)
- 6-2. Remove the DM circuit board. (see procedure 3 - DM Circuit Board Removal)
- 6-3. Remove the nine (9) screws marked ㊧ (3.0×8 bind head tapping screw), then the PN circuit board can be removed. (Refer to Fig. 5)

6. PNシートの外し方

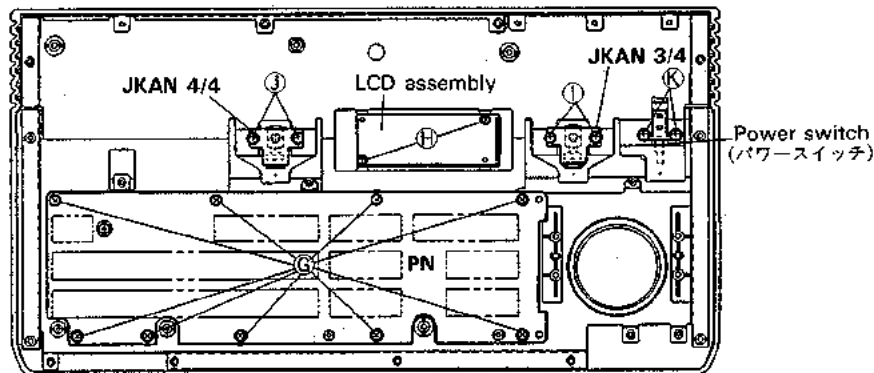
- 6-1. ボトムカバーを外します。(1項参照)
- 6-2. DMシートを外します。(3項参照)
- 6-3. ㊧のネジ9本 (3.0×8 バインドタッピングネジ) を外し、PNシートを外します。(図5参照)

7. LCD Assembly Removal

- 7-1. Remove the bottom cover. (see procedure 1 - Bottom Cover Removal)
- 7-2. Remove the DM circuit board. (see procedure 3 - DM Circuit Board Removal)
- 7-3. Remove the two (2) screws marked ㊸ (2.3×6 bind head tapping screw), then the LCD assembly can be removed. (Refer to Fig. 5)

7. LCD Ass'yの外し方

- 7-1. ボトムカバーを外します。(1項参照)
- 7-2. DMシートを外します。(3項参照)
- 7-3. JKAN1/4シートを外します。(5項参照)
- 7-4. ㊸のネジ2本 (2.3×6 バインドタッピングネジ) を外し、LCD Ass'yを外します。(図5参照)



(Fig. 5)

8. JKAN3/4 Circuit Board Removal

- 8-1. Pull out the MASTER VOLUME control knob located on the control panel. (Refer to Fig. 6)
- 8-2. Remove the bottom cover. (see procedure 1 - Bottom Cover Removal)
- 8-3. Remove the DM circuit board. (see procedure 3 - DM Circuit Board Removal)
- 8-4. Remove the JKAN1/4 circuit board. (see procedure 5 - JKAN1/4 Circuit Board Removal)
- 8-5. Remove the two (2) screws marked ㊹ (3.0×8 bind head screw), then the JKAN3/4 circuit board can be removed. (Refer to Fig. 5)

8. JKAN3/4シートの外し方

- 8-1. フロントパネル上のマスターボリュームつまみ (MASTER VOLUME) 1個を引き抜きます。(図6参照)
- 8-2. ボトムカバーを外します。(1項参照)
- 8-3. DMシートを外します。(3項参照)
- 8-4. JKAN1/4シートを外します。(5項参照)
- 8-5. ㊹のネジ2本 (3.0×8 バインド小ネジ) を外し、JKAN3/4シートを外します。(図5参照)

9. JKAN4/4 Circuit Board Removal

- 9-1. Pull out the DATA ENTRY knob located on the control panel. (Refer to Fig. 6)
- 9-2. Remove the bottom cover. (see procedure 1 - Bottom Cover Removal)
- 9-3. Remove the DM circuit board. (see procedure 3 - DM Circuit Board Removal)
- 9-4. Remove the JKAN1/4 circuit board. (see procedure 5 - JKAN1/4 Circuit Board Removal)
- 9-5. Remove the two (2) screws marked ㊺ (3.0×8 Bind head screw), then the JKAN4/4 circuit board can be removed. (Refer to Fig. 5)

9. JKAN4/4シートの外し方

- 9-1. フロントパネル上のデータエントリーつまみ (DATA ENTRY) 1個を引き抜きます。(図6参照)
- 9-2. ボトムカバーを外します。(1項参照)
- 9-3. DMシートを外します。(3項参照)
- 9-4. JKAN1/4シートを外します。(5項参照)
- 9-5. ㊺のネジ2本 (3.0×8 バインド小ネジ) を外し、JKAN4/4シートを外します。(図5参照)

■ LSI PIN DESCRIPTION (LSI端子機能表)

• HD6475328CP-10 <H8/532> (X1119A00) CPU (Central Processing Unit)

| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION |
|---------|----------|-----|------------------------|---------|---------------|-----|--|
| 1 | XTAL | I | Clock | 43 | P50/A8 | O | Address bus |
| 2 | Vss | I | Ground | 44 | P51/A9 | O | |
| 3 | P10/φ | O | System clock | 45 | P52/A10 | O | |
| 4 | P11/E | O | Enable | 46 | P53/A11 | O | |
| 5 | P12/BACK | O | Bus acknowledge | 47 | P54/A12 | O | |
| 6 | P13/BREQ | I | Bus request | 48 | P55/A13 | O | |
| 7 | P14/WAIT | I | Wait | 49 | P56/A14 | O | |
| 8 | P15/IRQ0 | I | Interrupt request 0 | 50 | P57/A15 | O | |
| 9 | P16/IRQ1 | I | Interrupt request 1 | 51 | P60/A16 | O | |
| 10 | P17/TMO | O | 8-bit timer output | 52 | P61/A17 | O | |
| 11 | P20/AS | O | Address strobe | 53 | P62/A18 | O | |
| 12 | P21/RAW | O | Read/Write | 54 | P63/A19 | O | |
| 13 | P22/DS | O | Data strobe | 55 | Vcc | I | Power supply |
| 14 | P23/RD | O | Read control | 56 | P70/TMC1 | I | 8-bit timer clock input |
| 15 | P24/WR | O | Write control | 57 | P71/FT11 | I | Free running timer input capture (8-bit timer counter reset input) |
| 16 | Vcc | I | Power supply | 58 | P72/FT12 | I | |
| 17 | MD0 | I | Mode control | 59 | P73/FT13/TMR1 | I | Free running timer output compare B/ Free running timer counter clock |
| 18 | MD1 | I | | | | | |
| 19 | MD2 | I | | | | | |
| 20 | STBY | I | Standby | 62 | P76/FT03/FTC3 | O/I | Free running timer output compare A1 Ground |
| 21 | RES | I | Reset | 63 | P77/FT0A1 | O | |
| 22 | NMI | I | Non-maskable interrupt | 64 | Vss | I | Ground |
| 23 | NC | | | 65 | AVss | I | Analog ground |
| 24 | Vss | I | Ground | 66 | P80/ANO | I | Port 8 |
| 25 | P30/D0 | I/O | Data bus | 67 | P81/AN1 | I | |
| 26 | P31/D1 | I/O | | | | | |
| 27 | P32/D2 | I/O | | | | | |
| 28 | P33/D3 | I/O | | | | | |
| 29 | P34/D4 | I/O | | | | | |
| 30 | P35/D5 | I/O | | | | | |
| 31 | P36/D6 | I/O | | | | | |
| 32 | P37/D7 | I/O | | | | | |
| 33 | P40/A0 | O | Address bus | 74 | AVcc | I | Analog power supply |
| 34 | P41/A1 | O | | | | | |
| 35 | P42/A2 | O | | | | | |
| 36 | P43/A3 | O | | | | | |
| 37 | P44/A4 | O | | | | | |
| 38 | P45/A5 | O | | | | | |
| 39 | P46/A6 | O | | | | | |
| 40 | P47/A7 | O | | | | | |
| 41 | Vss | I | Ground | 75 | P90/FT0A2 | O | Free running timer output compare A2 |
| 42 | Vss | I | Ground | 76 | P91/FT0A3 | O | Free running timer output compare A3 |
| | | | | 77 | P92/PW1 | O | Pulse width |
| | | | | 78 | P93/PW2 | O | |
| | | | | 79 | P94/PW3 | O | Transmit data Receive data |
| | | | | 80 | P95/TXD | O | |
| | | | | 81 | P96/RXD | I | Serial clock Ground |
| | | | | 82 | P97/SCK | I/O | |
| | | | | 83 | Vss | I | Ground |
| | | | | 84 | EXTAL | I | Clock |

• YM3413 (XE449A00) LDSP (Digital Signal Processor)

| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION |
|---------|------|-----|-------------------|---------|------|-----|--------------------|
| 1 | VDD | I | DC supply (+5V) | 21 | A5 | O | Address bus |
| 2 | D7 | I/O | | | | | |
| 3 | D6 | I/O | | | | | |
| 4 | D5 | I/O | | | | | |
| 5 | D4 | I/O | | | | | |
| 6 | D3 | I/O | | | | | |
| 7 | D2 | I/O | | | | | |
| 8 | D1 | I/O | | | | | |
| 9 | D0 | I/O | | | | | |
| 10 | S10 | I | Serial data input | 22 | A6 | O | |
| 11 | S11 | I | Sync pulse | 23 | A7 | O | |
| 12 | SYW | I | | | | | |
| 13 | WE | O | Write enable | 24 | A8 | O | |
| 14 | OE | O | Output enable | 25 | A9 | O | |
| 15 | A0 | O | Address bus | 26 | A10 | O | |
| 16 | A1 | O | | | | | |
| 17 | A2 | O | | | | | |
| 18 | A3 | O | | | | | |
| 19 | A4 | O | | | | | |
| 20 | Vss | I | Ground | 27 | A11 | O | |
| | | | | 28 | A12 | O | |
| | | | | 29 | A13 | O | |
| | | | | 30 | A14 | O | |
| | | | | 31 | A15 | O | |
| | | | | 32 | A16 | O | |
| | | | | 33 | SO0 | O | Serial data output |
| | | | | 34 | XCLK | I | Clock |
| | | | | 35 | IC | I | Initial Clear |
| | | | | 36 | CRS | I | CD counter reset |
| | | | | 37 | CDi | I | CD input |
| | | | | 38 | CDo | O | CD output |
| | | | | 39 | SO1 | O | Serial data output |
| | | | | 40 | CLK | I | Clock |

• TMC3493PH (XF987A00) GEW5 (AWM and FM Tone Generator)

| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION | |
|---------|-----------------|-----|-----------------------------|-----------------------------|-----------------|--------|--|--|
| 1 | CAS100 | I | Cascade in A | 41 | MAE | O | Memory address enable | |
| 2 | V _{DD} | | Power supply (+5V) | 42 | V _{DD} | | Power supply | |
| 3 | D0 | I/O | CPU data bus | 43 | MRD | O | Memory read control | |
| 4 | D1 | I/O | | 44 | MWR | O | Memory write control | |
| 5 | D2 | I/O | | 45 | MD7 | I/O | External memory data bus | |
| 6 | D3 | I/O | | 46 | MD6 | I/O | | |
| 7 | D4 | I/O | | 47 | MD5 | I/O | | |
| 8 | D5 | I/O | | 48 | MD4 | I/O | | |
| 9 | D6 | I/O | | 49 | MD3 | I/O | | |
| 10 | D7 | I/O | 50 | MD2 | I/O | | | |
| 11 | A0 | I | CPU address bus | 51 | MD1 | I/O | | |
| 12 | A1 | I | | 52 | MD0 | I/O | | |
| 13 | CS | I | Chip select | 53 | MUTE | O | Analog mute control | |
| 14 | WR | I | Write control | 54 | IC | I | Initial clear | |
| 15 | RD | I | Read control | 55 | SYO | O | Synch. pulse input | |
| 16 | SM | I | Slave/Master select | 56 | SYI | I | Synch. pulse output | |
| 17 | TEST1 | I | Test pin | 57 | XCLK | O | 3.2MHz | |
| 18 | TEST2 | I | | 58 | CLC | I | MCLK in/out select | |
| 19 | MA0 | O | External memory address bus | 59 | MCLK | I/O | 6.4MHz | |
| 20 | MA1 | O | | 60 | V _{DD} | | Power supply | |
| 21 | MA2 | O | | 61 | XOUT | O | Clock | |
| 22 | MA3 | O | | 62 | XIN | I | | |
| 23 | V _{SS} | | Ground | 63 | V _{SS} | | Ground | |
| 24 | MA4 | O | External memory address bus | 64 | SO12 | O | PSD3 format output B | |
| 25 | MA5 | O | | 65 | SO11 | O | | |
| 26 | MA6 | O | | 66 | SO10 | O | | |
| 27 | MA7 | O | | 67 | SO02 | O | PSD3 format output A | |
| 28 | MA8 | O | | 68 | SO01 | O | | |
| 29 | MA9 | O | | 69 | SO00 | O | | |
| 30 | MA10 | O | | External memory address bus | 70 | CAS012 | O | Cascade out B (SFC/RFL format-linear) |
| 31 | MA11 | O | 71 | | CAS011 | O | | |
| 32 | MA12 | O | 72 | | CAS010 | O | Cascade out A (SFC/RFL format-linear) | |
| 33 | MA13 | O | 73 | | CAS002 | O | | |
| 34 | MA14 | O | 74 | | CAS001 | O | | |
| 35 | MA15 | O | 75 | | CAS000 | O | | |
| 36 | MA16 | O | 76 | | CAS112 | I | Cascade in B (serial sum) | |
| 37 | MA17 | O | 77 | | CAS111 | I | | |
| 38 | MA18 | O | 78 | CAS110 | I | | | |
| 39 | MA19 | O | External memory address bus | 79 | CAS102 | I | Cascade in A (serial sum) | |
| 40 | MA20 | O | | 80 | CAS101 | I | | |

• TM3489NL (XE755A00) SFC (Signal Format Converter)

| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION |
|---------|-----------------|-----|-------------------|-----------------|-----------------|-----|--------------------|
| 1 | SI12 | I | Serial data input | 15 | D4 | I/O | Data bus |
| 2 | SI11 | I | | 16 | D5 | I/O | |
| 3 | SI10 | I | | 17 | D6 | I/O | |
| 4 | SI20 | I | | 18 | D7 | I/O | |
| 5 | SI21 | I | | 19 | WR | I | Write control |
| 6 | SI22 | I | Ground | 20 | CS | I | Chip select |
| 7 | V _{SS} | | | 21 | V _{DD} | | DC supply |
| 8 | V _{SS} | | 22 | V _{DD} | | | |
| 9 | TST1 | I | Test input | 23 | CLK | I | Clock |
| 10 | CDO | O | CD data output | 24 | SYW | I | Synchro pulse |
| 11 | D0 | I/O | Data bus | 25 | IC | I | Initial clear |
| 12 | D1 | I/O | | 26 | TST2 | O | Test output |
| 13 | D2 | I/O | | 27 | SO2 | O | Serial data output |
| 14 | D3 | I/O | | 28 | SO1 | O | |

• YM3032 (XG411A00) DAL3 (Digital Analog Converter Logic 3)

| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION |
|---------|------------------|-----|----------------------|-------------------------------|------------------|-----|---------------------------------------|
| 1 | DV _{DD} | | Power supply | 13 | to Buff | O | Analog output to buffer amp. |
| 2 | SYW | I | Synch. pulse | 14 | MP | I | Middle point 1/2 V _{DD} bias |
| 3 | DGND | | Digital ground | 15 | RC | O | Bias compensation |
| 4 | CLK | I | Clock | 16 | RB | O | Bias-R |
| 5 | NC | | Analog signal output | 17 | AGND | | Analog ground |
| 6 | NC | | | 18 | AV _{DD} | | Analog power supply |
| 7 | OUT4 | O | | 19 | LMTEM | I | Limiter enable |
| 8 | OUT3 | O | | 20 | IN1 | I | Digital data input |
| 9 | OUT2 | O | 21 | IN2 | I | | |
| 10 | OUT1 | O | Chip test | 22 | SEL1 | I | Data shift |
| 11 | NS | I | | 23 | SEL2 | I | |
| 12 | COM | I | | Analog input from buffer amp. | 24 | IC | I |

• LC92018B-476 (XIO45A00) R154 (Gate Array)

| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION |
|---------|--------|-----|-----------------------------|---------|--------|--------------------------------|--------------------------|
| 1 | ADRA20 | I | Wave memory address bus (A) | 51 | ADRS15 | O | Wave memory address bus |
| 2 | ADRA19 | I | | 52 | ADRS4 | O | |
| 3 | ADRA18 | I | | 53 | ADRS14 | O | |
| 4 | ADRA17 | I | | 54 | ADRS5 | O | |
| 5 | ADRA16 | I | | 55 | ADRS13 | O | |
| 6 | ADRA15 | I | | 56 | ADRS6 | O | |
| 7 | ADRA14 | I | | 57 | ADRS12 | O | |
| 8 | ADRA13 | I | | 58 | ADRS7 | O | |
| 9 | ADRA12 | I | | 59 | ADRS11 | O | |
| 10 | ADRA11 | I | | 60 | ADRS8 | O | |
| 11 | ADRA10 | I | | 61 | ADRS10 | O | |
| 12 | ADRA9 | I | | 62 | ADRS18 | O | |
| 13 | ADRA8 | I | | 63 | ADRS9 | O | |
| 14 | ADRA7 | I | | 64 | ADRS19 | O | |
| 15 | ADRA6 | I | | 65 | ADRS19 | O | |
| 16 | ADRA5 | I | | 66 | ADRS20 | O | |
| 17 | ADRA4 | I | | 67 | ADRS20 | O | |
| 18 | ADRA3 | I | | 68 | DATB0 | I | Wave memory data bus (B) |
| 19 | ADRA2 | I | | 69 | DATB1 | I | |
| 20 | ADRA1 | I | | 70 | DATB2 | I | |
| 21 | ADRA0 | I | 71 | DATB3 | I | | |
| 22 | ADRB20 | I | 72 | DATB4 | I | | |
| 23 | ADRB19 | I | 73 | DATB5 | I | | |
| 24 | ADRB18 | I | 74 | DATB6 | I | | |
| 25 | ADRB17 | I | 75 | DATB7 | I | | |
| 26 | ADRB16 | I | 76 | DATA0 | O | Wave memory data bus (A) | |
| 27 | ADRB15 | I | 77 | DATA1 | O | | |
| 28 | ADRB14 | I | 78 | DATA2 | O | | |
| 29 | ADRB13 | I | 79 | DATA3 | O | | |
| 30 | ADRB12 | I | 80 | DATA4 | O | | |
| 31 | ADRB11 | I | 81 | DATA5 | O | | |
| 32 | ADRB10 | I | 82 | DATA6 | O | | |
| 33 | ADRB9 | I | 83 | DATA7 | O | | |
| 34 | ADRB8 | I | 84 | SYW | I | Synch. signal | |
| 35 | ADRB7 | I | 85 | MCLK | I | Master clock | |
| 36 | ADRB6 | I | 86 | A2 | I | Address bus for address decode | |
| 37 | ADRB5 | I | 87 | A3 | I | | |
| 38 | ADRB4 | I | 88 | A18 | I | | |
| 39 | ADRB3 | I | 89 | VDD | I | Power supply | |
| 40 | VSS | I | 90 | VSS | I | Ground | |
| 41 | VDD | I | 91 | A19 | I | Address bus for address decode | |
| 42 | ADRB2 | I | 92 | AS | I | Address strobe | |
| 43 | ADRB1 | I | 93 | SFC | O | SFC enable | |
| 44 | ADRB0 | I | 94 | GEW5C | O | GEW5-A chip enable | |
| 45 | ADRS0 | O | 95 | GEW5B | O | GEW5-B chip enable | |
| 46 | ADRS1 | O | 96 | GEW5A | O | GEW5-C chip enable | |
| 47 | ADRS17 | O | 97 | DEV | O | | |
| 48 | ADRS2 | O | 98 | RAM | O | RAM chip enable | |
| 49 | ADRS16 | O | 99 | PSRAM | O | PSRAM chip enable | |
| 50 | ADRS3 | O | 100 | ROM | O | ROM chip enable | |

• LC92030C-477 (X1074A00) SP33 (Gate Array)

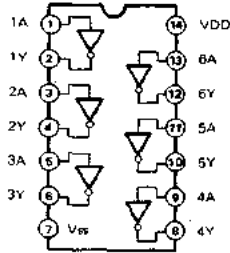
| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION | |
|---------|----------|-----|-----------------------------|-------------------------|--------------|------|---------------------------------------|---|
| 1 | VDD | | Power supply | 65 | Vdd | | Power supply | |
| 2 | WAIT | O | Wait control | 66 | SF12 | I | MEL formatted voice data | |
| 3 | CARD-D0 | I/O | Memory card data bus | 67 | SF13 | I | | |
| 4 | CARD-D1 | I/O | | | | | | |
| 5 | CARD-D2 | I/O | | | | | | |
| 6 | CARD-D3 | I/O | | | | | | |
| 7 | CARD-D4 | I/O | | | | | | |
| 8 | CARD-D5 | I/O | | | | | | |
| 9 | CARD-D6 | I/O | | | | | | |
| 10 | CARD-D7 | I/O | | | | | | |
| 11 | CARD-A0 | O | | Memory card address bus | 68 | SF14 | I | |
| 12 | CARD-A1 | O | | | | | | |
| 13 | CARD-A2 | O | | | | | | |
| 14 | CARD-A3 | O | | | | | | |
| 15 | CARD-A4 | O | | | | | | |
| 16 | CARD-A5 | O | | | | | | |
| 17 | Vss | | Ground | | 69 | SF00 | O | MEL formatted voice data edited at this chip. |
| 18 | CARD-A6 | O | Memory card address bus | | 70 | SF01 | O | |
| 19 | CARD-A7 | O | | | | | | |
| 20 | CARD-A8 | O | | | | | | |
| 21 | CARD-A9 | O | | | | | | |
| 22 | CARD-A10 | O | | | | | | |
| 23 | CARD-A11 | O | | | | | | |
| 24 | CARD-A12 | O | | | | | | |
| 25 | CARD-A13 | O | | | | | | |
| 26 | CARD-A14 | O | | | | | | |
| 27 | CARD-A15 | O | | | | | | |
| 28 | CARD-WE | O | Memory card write enable | 71 | SF02 | O | Mixed voice data edited at this chip. | |
| 29 | CARD-OE | O | Memory card output enable | 72 | SF03 | O | | |
| 30 | CARD-CE | O | Memory card chip enable | 73 | SF04 | O | | |
| 31 | LED-A1 | O | LED drive (A) | 74 | SRI0 | I | | |
| 32 | LED-A2 | O | LED drive (A) | 75 | SRI1 | I | Mixed voice data | |
| 33 | Vss | | | Ground | 76 | SRI2 | | I |
| 34 | LED-A3 | O | | | | | | |
| 35 | LED-A4 | O | | | | | | |
| 36 | LED-A5 | O | | | | | | |
| 37 | LED-A6 | O | | | | | | |
| 38 | LED-B1 | O | | LED drive (B) | 77 | SRO0 | O | |
| 39 | LED-B2 | O | | | | | | |
| 40 | LED-B3 | O | | | | | | |
| 41 | LED-B4 | O | | | | | | |
| 42 | LED-B5 | O | Address strove | 78 | SRO1 | O | Mixed voice data | |
| 43 | AS | I | | | | | | |
| 44 | LCD-D0 | I/O | | | | | | |
| 45 | LCD-D1 | I/O | | | | | | |
| 46 | LCD-D2 | I/O | | Data bus for LCD driver | 79 | SRO2 | O | |
| 47 | LCD-D3 | I/O | | | | | | |
| 48 | LCD-D4 | I/O | | | | | | |
| 49 | Vdd | | | | Power supply | 80 | XCLK | I |
| 50 | LCD-D5 | I/O | | Data bus for LCD driver | 81 | Vss | | Ground |
| 51 | LCD-D6 | I/O | | | | | | |
| 52 | LCD-D7 | I/O | | | | | | |
| 53 | LCD-E | I/O | | | | | | |
| 54 | GEWA | O | GEW5-A chip enable | 82 | CRS | I | Counter reset | |
| 55 | GEWB | O | GEW5-B chip enable | 83 | CDI | I | Control data input | |
| 56 | SFC | O | SFC chip enable | 84 | CDO | O | Control data output | |
| 57 | FDC | O | FDC chip enable | 85 | CLK | I | Clock for control data | |
| 58 | LEDC | O | \$0A000- \$0AFFF decode out | 86 | SYWI | I | Synch signal | |
| 59 | PAGE3 | O | \$30000- \$3FFFF decode out | 87 | SYWO | O | Reversed synch signal | |
| 60 | PAGE7 | O | \$70000- \$7FFFF decode out | 88 | R/W | I | Read/Write control | |
| 61 | RES | I | Reset | 89 | RAM1 | O | RAM1 chip enable | |
| 62 | GSEL | O | Master/slave switching | 90 | RAM2 | O | RAM2 chip enable | |
| 63 | SF10 | I | MEL formatted voice data | 91 | ROM1 | O | ROM1 chip enable | |
| 64 | SF11 | I | | | | | | |
| | | | | 92 | ROM2 | O | ROM2 chip enable | |
| | | | | 93 | ROM3 | O | ROM3 chip enable | |
| | | | | 94 | SYSCCLK | I | System clock | |
| | | | | 95 | A19 | I | Address bus | |
| | | | | 96 | A18 | I | | |
| | | | | 97 | Vss | | | Ground |
| | | | | 98 | RA17 | I | | |
| | | | | 99 | A17 | I | Address bus | |
| | | | | 100 | A16 | I | | |
| | | | | 101 | A15 | I | | |
| | | | | 102 | A14 | I | | |
| | | | | 103 | A13 | I | Address bus | |
| | | | | 104 | A12 | I | | |
| | | | | 105 | A11 | I | | |
| | | | | 106 | A10 | I | | |
| | | | | 107 | A9 | I | Address bus | |
| | | | | 108 | A8 | I | | |
| | | | | 109 | A7 | I | | |
| | | | | 110 | A6 | I | | |
| | | | | 111 | A5 | I | Data bus | |
| | | | | 112 | A4 | I | | |
| | | | | 113 | Vdd | | | Power supply |
| | | | | 114 | A3 | I | | |
| | | | | 115 | A2 | I | Address bus | |
| | | | | 116 | A1 | I | | |
| | | | | 117 | A0 | I | | |
| | | | | 118 | D7 | I/O | | |
| | | | | 119 | D6 | I/O | Data bus | |
| | | | | 120 | D5 | I/O | | |
| | | | | 121 | D4 | I/O | | |
| | | | | 122 | D3 | I/O | | |
| | | | | 123 | D2 | I/O | Data bus | |
| | | | | 124 | D1 | I/O | | |
| | | | | 125 | D0 | I/O | | |
| | | | | 126 | WR | I | | Write control |
| | | | | 127 | RD | I | Read control | |
| | | | | 128 | DS | I | Data strobe | |

• TMC57800N (XG662A00) MIX5 (Mixer)

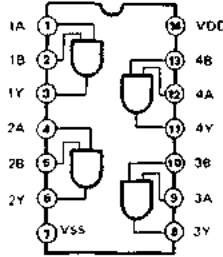
| PIN NO. | NAME | I/O | FUNCTION | PIN NO. | NAME | I/O | FUNCTION | |
|---------|------|-----|--------------------|---------|------|------|---------------------|--------------------|
| 1 | MX17 | I | Signal data input | 11 | SYW | I | Synch. pulse | |
| 2 | MX16 | I | | | | | | |
| 3 | MX15 | I | | | | | | |
| 4 | MX14 | I | | | | | | |
| 5 | MX13 | I | | | | | | |
| 6 | MX12 | I | | | | | | |
| 7 | MX11 | I | | | | | | |
| 8 | MX10 | I | Signal data output | 12 | CDO | O | Control data output | |
| 9 | CLK | I | | Clock | 13 | XCLK | I | Clock |
| 10 | Vss | | | Ground | 14 | CDI | I | Control data input |
| | | | | 15 | CRS | I | Counter reset | |
| | | | | 16 | MX00 | O | Signal data output | |
| | | | | 17 | MX01 | O | | |
| | | | | 18 | MX02 | O | | |
| | | | | 19 | MX03 | O | Power supply | |
| | | | | 20 | Vdd | | | |

■ IC BLOCK DIAGRAM (ICブロック図)

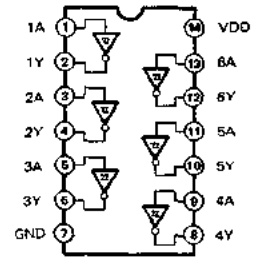
- **TC74AC04P** (XG655A00)
TC40H004P (IG051000)
Hex Inverter



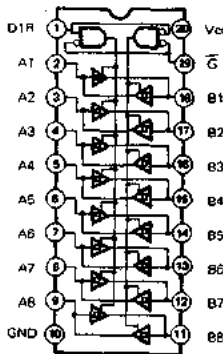
- **TC74AC08P** (IG656A00)
Quad 2 Input AND



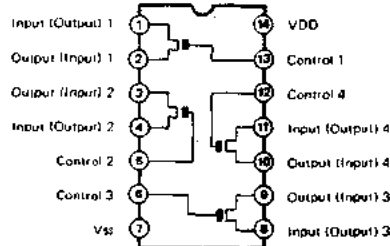
- **SN74HC14N** (IR001450)
Hex Inverter



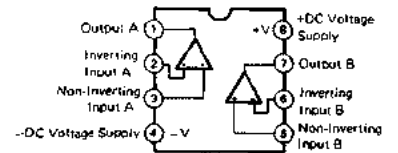
- **TC74HC245P** (IR024500)
TC74AC245P (XH608A00)
Octal 3-State Bus Transceiver



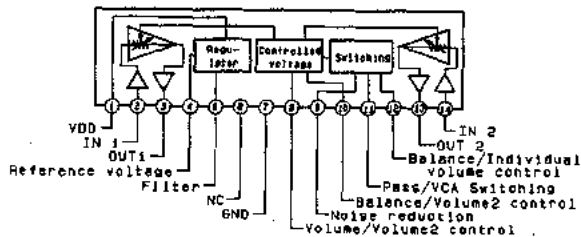
- **TC74HC4066AP** (IR406600)
Quad Bilateral Switch



- **NJM4560ED** (IG040000)
RC4558DV (IG001390)
M5228P (XF123A00)
NJM4556 (IG042500)
Dual Operational Amplifier



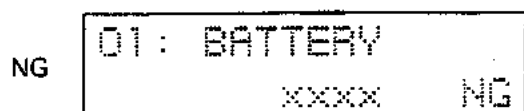
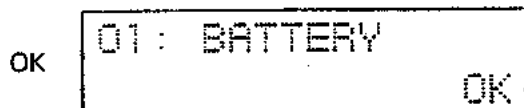
- **M51132L** (XE470001)



TG33

DISPLAY OF TEST RESULTS

判定結果の表示



(where xxxxx = HIGH or LOW)

(xxxxx ; HIGH 又は LOW で示される。)

TEST END

Ends after displaying the test results.

テストの終了方法

判定を表示、出力して終了する。

TEST 2. LCD — ALL DOTS “ON AND OFF” TEST

Check that all dots of the LCD blink.

テスト 2. LCDテスト

全ドットが黒と白にブリンクしていることを、確認する。

TEST END

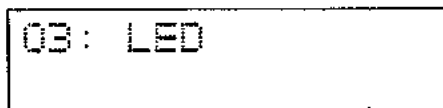
Press [+ 1] to end the test and you will then be able to proceed to test the next program.

テストの終了方法

[+1]を押すと、テストは終了し次のテストへ進む。

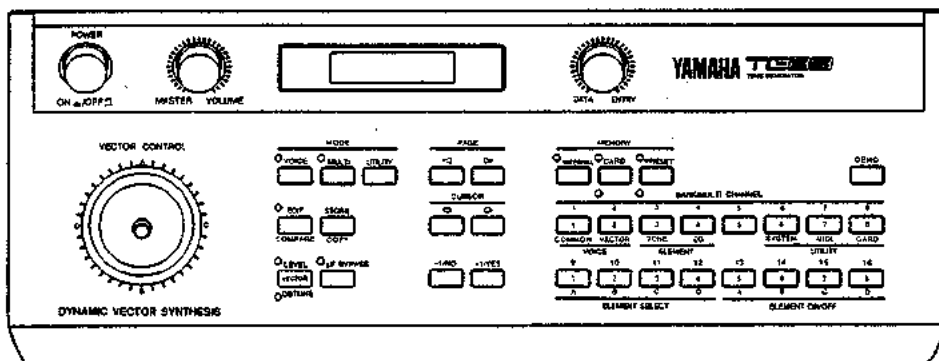
TEST 3. LED ON/OFF TEST

テスト 3. LED順次点燈、全点燈テスト



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.

下図の左から順に赤LEDが1回点滅した後、すべての赤色のLEDが同時に点燈することを繰り返し行うので、LEDの点滅を目で見て確認する。



TEST END

Press [+ 1] to end the test and you will then be able to proceed to test the next program.

テストの終了方法

[+1]を押すと、次のテストへ進む。

TEST 4. PANEL SWITCH TEST

テスト 4. パネルスイッチテスト

04: PANEL SWITCH

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

[VOICE]から[16]までのパネルスイッチを、以下のよ
うなLCDの表示に従ってON/OFFし、パネルスイッチ
が正常に動作することを、確認する。

04: PANEL SWITCH
VOICE

(e.g. When checking [VOICE])

([Voice]のチェックの場合)

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, 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.

チェックの順序を下図に示す。

正常な場合、「ブープ」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。

DISPLAY OF TEST RESULTS

判定結果の表示

OK 04: PANEL SWITCH
XXXXXX

(where xxxxx = next switch name should
be pressed.)

NG 04: PANEL SWITCH
VOICE NG

(xxxxx; 次に押されるべきスイッチ名)

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".

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。

テストの途中で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。

TEST 5. DATA ENTRY TEST

テスト 5. データエントリーテスト

05: DATA ENTRY

Rotate the data entry knob to the right as indicated by the LCD display.
 Check that the value on the LCD changes from 00→20→80→99→80→20→00 (in other words, first rotate to the right then to the left).

データエントリーを、以下の様なLCD表示に従って、00-20-80-99-80-20-00(左から右回転-左回転)と滑らかに動かし、データエントリーが、正常に動作することを確認する。



(where xx=current value, yyyy=next target direction, "RIGHT" or "LEFT")

xx ;現在のデータエントリーの値
 yyyy ;目標方向 (RIGHT/LEFT)

DISPLAY OF TEST RESULTS

判定結果の表示

OK



NG

(No change in display message)
 表示なし

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".

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。

TEST 6. VECTOR CONTROL TEST

テスト6. ベクターコントロールテスト



According to the target direction displayed on the LCD, slowly move the vector control.
 Check that the value changes from 00 to 99 then to 00 and to 99 then back to 00 (in other words, center to up then to down and to right then to left and then back to center).

ベクターコントロールを、以下の様なLCD表示に従って、00-20-80-99-80-20-00-20-80-99-80-20-00(UP-DOWN-RIGHT-LEFT)とスティックを動かし、ベクターコントロールが、正常に動作することを確認する。



(where xx=current value, yyyy=next target direction, "RIGHT" or "LEFT" or "UP" or "DOWN")

xx ;現在のデータエントリーの値
 yyyy ;目標方向 (RIGHT/LEFT/UP/DOWN)

DISPLAY OF TEST RESULTS

判定結果の表示



NG (No change in display message)
表示なし

TEST END

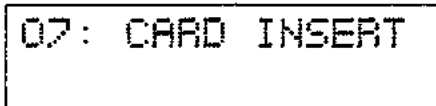
After displaying the result, the test will end. If NG is detected during the test, refer to section B, "B. PROCEEDING THROUGH THE TESTS".

テストの終了方法

判定を表示、出力して終了する。
テストの途中で、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。

TEST 7. INSERT TEST

テスト7. カードインサートテスト



Insert a RAM card (MCD64) into the 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.

MCD64 メモリーカードを使用して、カードレディーの状態を読み込めることを確認する。
MCD64 メモリーカードを抜いて再度入れた時、LCDに表示されている数字が0から1に変化し、OKの判定が出ることを確認する。

DISPLAY OF TEST RESULTS

判定結果の表示



NG (No change in display message)
表示なし

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".

テストの終了方法

判定を表示、出力して終了する。
テストの途中で、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。

TEST 8. DATA CARD READ/WRITE TEST

テスト8. カードリードライトテスト



This performs a read/write test on the following addresses of the RAM card.

- CARD 1: 20000h-27FFFh (BANK 1)
- CARD 2: 28000h-2FFFFh (BANK 2)

Insert a RAM card with the memory protect turned off and execute the test.

MCD64 メモリーカードを使用して、カードの次の2つのアドレスに対してリード/ライトテストを行う。
CARD 1=20000h-27FFFh (Bank 1)
CARD 2=28000h-27FFFh (Bank 2)
メモリープロテクトをオフにしたMCD64 メモリーカードを差し込み、テストを実行させる。

DISPLAY OF TEST RESULTS

判定結果の表示

OK 08: CARD R/W
OK

NG 08: CARD R/W
CARD 2 NG

(e.g. if CARD 2 is No Good)
(CARD2がNGの場合)

TEST END

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

テストの終了方法

判定を表示、出力して終了する。
すべてのカード上のデータは、保存される。

TEST 9. DATA CARD PROTECT SWITCH TEST

テスト9. カードプロテクトスイッチテスト

09: CARD PROTECT

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.

MCD64 メモリーカードを使用して、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、LCDに表示されている数字が0から1に変化し、OKの判定が出ることを確認する。

DISPLAY OF TEST RESULTS

判定結果の表示

OK 09: CARD PROTECT
1 OK

(No change in display)

NG
表示なし

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".

テストの終了方法

判定を表示、出力して終了する。
テストの途中で、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。

TEST 10. CARD BATTERY TEST

テスト10. カードバッテリーテスト

10: CARD BATTERY

This test checks that the voltage of the card backup battery is adequate.

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。

DISPLAY OF TEST RESULTS

判定結果の表示

OK 10: CARD BATTERY
OK

NG 10: CARD BATTERY
LO NG

(When the voltage of card backup is too low.)

NG 10: CARD BATTERY
HI NG

(When the voltage of card backup is too high.)

NG 10: CARD BATTERY
IS NG

(When a RAM card is not inserted to the slot.)

(カードが差してない場合)

TEST END

Ends after displaying the test results.

テストの終了方法

判定を表示、出力して終了する。

TEST 11. WAVE ROM ROM TEST

テスト11. WAVE ROMテスト

11: WAVE ROM SUM

Performs a read test on the ROMs, IC26 and IC27.

WAVE ROM(IC26、IC27)のリードテストを行う。

DISPLAY OF TEST RESULTS

判定結果の表示

OK 11: WAVE ROM SUM
OK

NG 11: WAVE ROM SUM
W-ROM ICxxx NG

(where xxx = IC #)

(ROM n がNG の場合、xxx : NG となったICの番号)

TEST END

Ends after displaying the results.

テストの終了方法

判定を表示、出力して終了する。

TEST 12. 1 kHz FM SOUND OUTPUT
(OUTPUT 1-L/MONO) TEST

テスト12. 1kHz OUTPUT1-L 発音 (FM)

12: 1KHz L1

Check that the correct signal is output from OUTPUT 1-L/MONO and PHONES (L) jacks.

ITEMS TO CHECK

Insert the appropriate 1/4" phone plugs into each output jack and check OUTPUT 1-L/MONO, OUTPUT 2-L, OUTPUT 1-R, OUTPUT 2-R, 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:

12: 1KHz L1
OUTPUT ON

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

OUTPUT 1-L/MONO: 1kHz \pm 1.5Hz, sine wave, distortion 0.2%, 0.0dBm \pm 2dB (10k ohm load)
 OUTPUT 2-L: less than -60dBm
 OUTPUT 1-R: less than -68dBm
 OUTPUT 2-R: less than -60dBm
 PHONES (L): 1kHz, sine wave, distortion 0.2% or less, +4.0dBm \pm 2dB (150 ohm load)
 PHONES (R): less than -62dBm

TEST END

Press [+1] to end the test. After pressing [+1] three things occur; (1) the following display will appear, (2) the sound will stop and (3) the TG33 will proceed to the next test.

12: 1KHz L1
OUTPUT OFF

TEST 13. 1 kHz FM SOUND OUTPUT
(OUTPUT 1-R) TEST

OUTPUT1-L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。

OUTPUT1-L、OUTPUT2-L、OUTPUT1-R、OUTPUT2-R、PHONES(L,R)共にプラグを差し込み、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表示が以下のようにになる。

チェック項目

OUTPUT1-L: 1kHz \pm 1.5Hz、sine波、歪率 0.2%以下、+0.0 \pm 2dBm(負荷10k Ω)
 OUTPUT2-L: -60dBm以下
 OUTPUT1-R: -68dBm以下
 OUTPUT2-R: -60dBm以下
 PHONES(L): 1kHz、sine波、歪率 0.2%以下、+4.0 \pm 2dBm(負荷150 Ω)
 PHONES(R): -62dBm以下

テストの終了方法

[+1]を押すと、次の画面を表示し、発音を終了して次のテストに移行。

13: 1KHz R1

テスト13. 1kHz OUTPUT1-R 発音 (FM)

Check that the correct signal is output from OUTPUT 1-R and PHONES (L) jacks.

ITEMS TO CHECK

Insert the appropriate 1/4" phone plugs into each output jack and check OUTPUT 1-L/MONO, OUTPUT 2-L, OUTPUT 1-R, OUTPUT 2-R, 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:

```
13: 1KHz R1
OUTPUT ON
```

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

OUTPUT 1-L/MONO: less than -68dBm
 OUTPUT 2-L: less than -60dBm
 OUTPUT 1-R: 1kHz \pm 1.5Hz, sine wave, distortion 0.2%, 0.0dBm \pm 2dB (10k ohm load)
 OUTPUT 2-R: less than -60dBm
 PHONES (L): less than -62dBm
 PHONES (R): 1kHz, sine wave, distortion 0.2% or less, +4.0dBm \pm 2dB (150 ohm load)

Check that when the plug connected to OUTPUT 1-R is pulled out, the signal being output from OUTPUT 1-L is now -6.0dBm \pm 2.0dB.

TEST END

Press [+1] to end the test. After pressing [+1] three things occur; (1) the following display will appear, (2) the sound will stop and (3) the TG33 will proceed to the next test.

```
13: 1KHz R1
OUTPUT OFF
```

TEST 14. 1 kHz FM SOUND OUTPUT (OUTPUT 2-L) TEST

```
14: 1KHz L2
```

OUTPUT1-R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。

OUTPUT1-L、OUTPUT2-L、OUTPUT1-R、OUTPUT2-R、PHONES(L,R)共にプラグを差し込み、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表示が以下のようになる。

チェック項目

OUTPUT1-R : 1kHz、sine波、歪率 0.2%以下、+0.0 \pm 2dBm(負荷10k Ω)
 OUTPUT1-L ; -68dBm以下
 OUTPUT2-R ; -60dBm以下
 OUTPUT2-L ; -60dBm以下
 PHONES(R) ; 1kHz、sine波、歪率0.2%以下、+4.0 \pm 2dBm(負荷150 Ω)
 PHONES(L) ; -62dBm以下
 OUTPUT1-L ; OUTPUT1-R ジャックを抜いた時、-6.0dBm \pm 2.0dBm

テストの終了方法

[+1]を押すと、次の画面を表示し、発音は終了し、次のテストに移行。

14. 1kHz OUTPUT2-L 発音 (FM)

Check that the correct signal is output from OUTPUT 2-L jacks.

ITEMS TO CHECK

Insert the appropriate 1/4" phone plugs into each output jack and check OUTPUT 1-L/MONO, OUTPUT 2-L, OUTPUT 1-R, and OUTPUT 2-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:

14: 1KHz L2
OUTPUT ON

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

- OUTPUT 1-L/MONO: less than -90dBm
- OUTPUT 2-L: 1kHz ±1.5Hz, sine wave, distortion 0.2%, 0.0dBm ± 2dB (10k ohm load)
- OUTPUT 1-R: less than -90dBm
- OUTPUT 2-R: less than -68dBm

TEST END

Press [+1] to end the test. After pressing [+1] three things occur; (1) the following display will appear, (2) the sound will stop and (3) the TG33 will proceed to the next test.

14: 1KHz L2
OUTPUT OFF

TEST 15. 1 kHz FM SOUND OUTPUT (OUTPUT 2-R) TEST

15: 1KHz R2

OUTPUT2-Lより、正常な信号が出力されていることを確認する。

OUTPUT1-L、OUTPUT2-L、OUTPUT1-R、OUTPUT2-R共にプラグを差し込み、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表示が以下ようになる。

チェック項目

- OUTPUT2-L ; 1kHz、sine波、歪率 0.2%以下、+0.0±2dBm(負荷10kΩ)
- OUTPUT1-L ; -90dBm以下
- OUTPUT1-R ; -90dBm以下
- OUTPUT2-R ; -68dBm以下

テストの終了方法

[+1]を押すと、次の画面を表示し、発音は終了し、次のテストに移行。

15. 1kHz OUTPUT2-R 発音 (FM)

Check that the correct signal is output from OUTPUT 2-R jacks.

ITEMS TO CHECK

Insert the appropriate 1/4" phone plugs into each output jack and check OUTPUT 1-L/MONO, OUTPUT 2-L, OUTPUT 1-R, and OUTPUT 2-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:

15: 1KHz R2
OUTPUT ON

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

- OUTPUT 1-L/MONO: less than -90dBm
- OUTPUT 2-L: less than -68dBm
- OUTPUT 1-R: less than -90dBm
- OUTPUT 2-R: 1kHz ±1.5Hz, sine wave, distortion 0.2%, 0.0dBm ± 2dB (10k ohm load)

Check that when the plug connected to OUTPUT 2-R is pulled out, the signal being output from OUTPUT 2-L is now -6.0dBm ± 2.0dB.

TEST END

Press [+1] to end the test. After pressing [+1] three things occur; (1) the following display will appear, (2) the sound will stop and (3) the TG33 will proceed to the next test.

15: 1KHz R2
OUTPUT OFF

TEST 16. 1kHz FM SOUND OUTPUT (EFFECT → OUTPUT 1-L) TEST

テスト16. Effect

16: EFFECT

OUTPUT2-Rより、正常な信号が出力されていることを確認する。

OUTPUT1-L, OUTPUT2-L, OUTPUT1-R, OUTPUT2-R共にプラグを差し込み、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表示が以下のようになる。

チェック項目

- OUTPUT2-R : 1kHz, sine波、歪率0.2%以下、+0.0±2dBm(負荷10kΩ)
- OUTPUT1-L ; -90dBm以下
- OUTPUT2-L ; -68dBm以下
- OUTPUT1-R ; -90dBm以下
- OUTPUT2-L ; OUTPUT2-R ジャックを抜いた時、-6.0±2dBm

テストの終了方法

[+1]を押すと、次の画面を表示し、発音は終了し、次のテストに移行。

Check that the effected signal is output from OUTPUT 1-L/MONO jacks.

ITEMS TO CHECK

Insert the appropriate 1/4" phone plug into OUTPUT 1-L/MONO only and verify, if necessary, the frequency, output waveform, output level, and THD of this output using the previously specified test equipment (refer to TEST 12). The volume control must be set at maximum for this test. While sounding, the LCD will display the following message:

```
15: EFFECT
OUTPUT ON
```

The specifications for this test are as follows:

OUTPUT L1: 1kHz, sine wave, distortion 0.2% or less, -12.0dBm ±2dB (10k ohm load)

チェック項目

OUTPUT1-L ; 1kHz, sine波, 歪率 0.2%以下,
-12.0±2dBm (負荷10kΩ)

TEST END

Press [+1] to end the test. After pressing [+1] three things occur; (1) the following display will appear, (2) the sound will stop and (3) the TG33 will proceed to the next test.

テストの終了方法

[+1]を押すと、次の画面を表示し、発音は終了し、次のテストに移行。

```
16: EFFECT
OUTPUT OFF
```

TEST 17. 32 SOUND GENERATION TEST

テスト17. 32音発音

```
17:32 Voice Out
IC      CH
```

Check that the 32 notes correctly sound every 0.5 sec. at the OUTPUT 1-L and OUTPUT 1-R outputs.

ITEMS TO CHECK

Attach an amplifier/speakers system to OUTPUT 1-L/MONO and OUTPUT 1-R outputs and monitor the sine wave signals that are output from the speaker to check by ear whether the signal is correctly output. If necessary, the frequency, output waveform, output level, and THD of this output using the previously specified test equipment (refer to TEST 12). The volume control must be set at comfortable listening level for this test. While sounding, the LCD will display the following message:

OUTPUT1-L, OUTPUT1-R より、32音の発音チャンネルがサイン波形にて正常に発音することを確認する。

| | | |
|----------------|---|------------------------|
| 1.IC14 1ch-8ch | } | OUTPUT Lch AWM-element |
| 2.IC12 1ch-8ch | | |
| 3.IC13 1ch-8ch | } | OUTPUT Rch FM-element |
| 4.IC11 1ch-8ch | | |

発音約0.5秒、間隔約0.1秒で繰り返し発音されるので、聴感にて左右のモニタースピーカーより、32音が正常に発音されていることを確認する。必要ならオシロスコープ観測する。

発音中は、LCD表示が以下の様になる。

```
17:32 Voice Out
IC xx CH yy
```

(where xx=IC# of currently sending note, yy=channel#)

xx:現在発音しているIC番号

yy:現在発音しているチャンネル番号

TEST END

Press [+ 1] to end the test. After pressing [+ 1] three things occur; (1) the following display will appear, (2) the sound will stop and (3) the TG33 will proceed to the next test.

テストの終了方法

[+1]を押すと、次の画面を表示し、発音は終了し、次のテストに移行。

```
17:32 Voice Out
OUTPUT OFF
```

TEST 18. FACTORY SET TEST

テスト18. ファクトリーセット

```
18:FACTORY SET
```

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

- Synthesizer system data
- Internal voice data
- Internal multi data

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

次のデータを、工場出荷データにセットする。

- シンセサイザーシステム
- インターナルボイス
- インターナルマルチ

ファクトリーセットしない場合は、テスト用の音色データが残る。

テストを実行すると、次の画面が表示される。

```
18: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 and the test voice data will remain in the memory

DISPLAY OF TEST RESULTS

If factory settings are restored.

[YES]を押すとファクトリーセットされて

テスト19へ移行、すなわちEXITする。

[NO]を押すとセットされず

テスト19へ移行、すなわちEXITする。

判定の結果

セットされた場合

```
18:FACTORY SET
OK
```

TEST END

The LCD displays the results, the factory preset data will be restored or not, and the system will then proceed to Test 19, "19. EXIT" (refer to Test 19 for details).

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。

----- SYNTHSIZER -----
 MASTER TUNE: +0
 TRANSPOSE: +0
 CONTROLLER RESET: HOLD
 VOICE RECEIVE CHANNEL: OMNI
 VECTOR CONTROL CHANNEL: 1
 PROGRAM CHANGE: ON
 EXCLUSIVE: OFF
 DEVICE NUMBER: ALL

----- VOICE -----
 I-11-I-88: P1-11-P1-88

----- MULTI -----
 I-11-I-18: FACTORY SET DATA
 I-21-I-28: INITIAL MULTI DATA x 8

TEST 19. EXIT TEST

When this is executed, you will exit the test mode and return to the play mode.

テスト19. EXIT

テストが実行されると、テストモードから抜ける。

MIDI DATA FORMAT

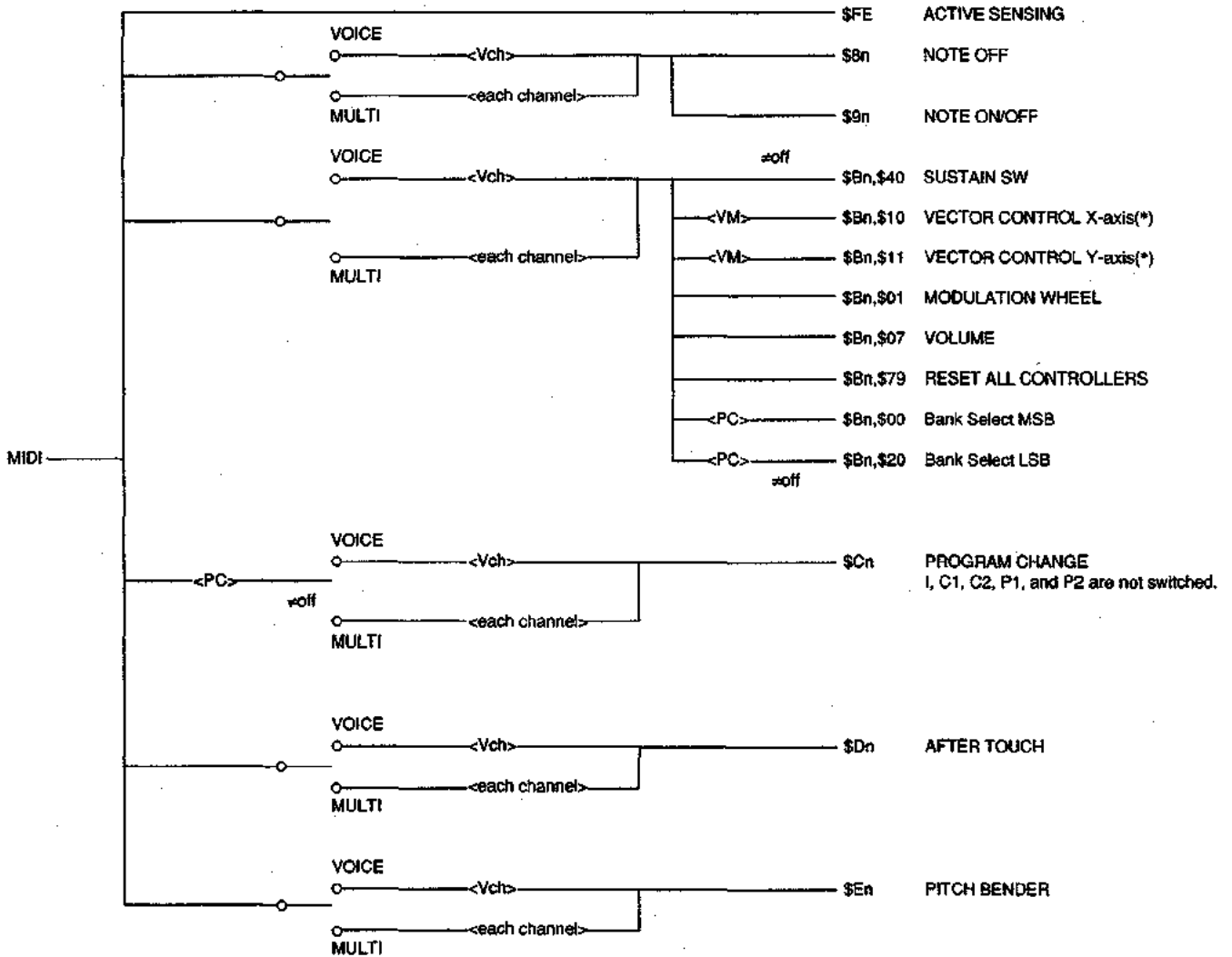
1. MIDI reception/transmission block diagram

<MIDI reception conditions> 1/2

Vch Voice Receive ch.

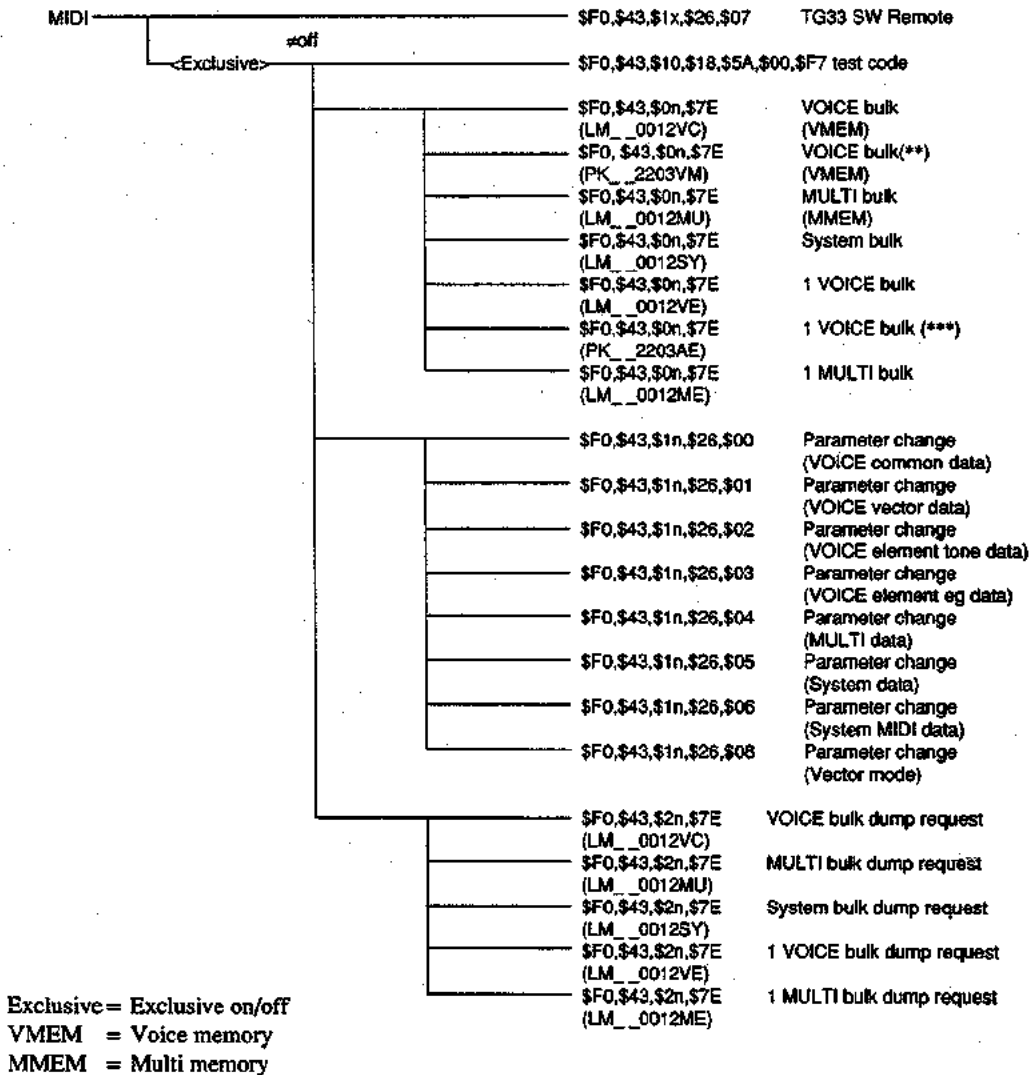
PC Program Change on/off

VM Vector Mode off/level/detune

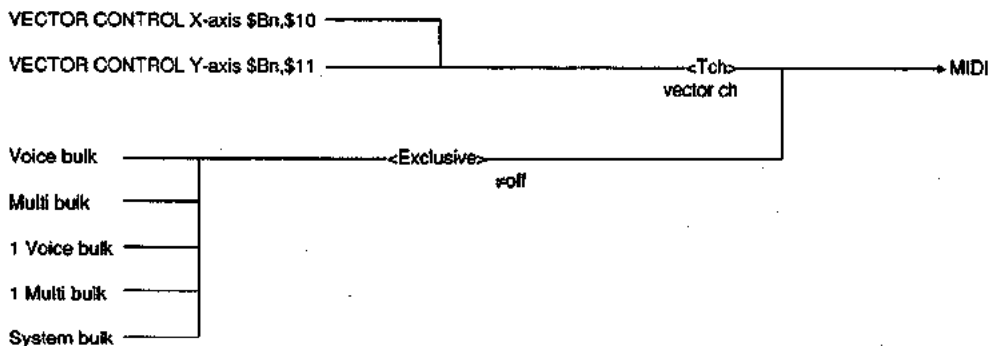


(*) In the case of MULTI, only the channel which matches the vector channel can be received.

<MIDI reception conditions> 2/2



<MIDI transmission conditions>



2. Channel messages

2.1 Transmission

2.1.1 Control change

Data is output to the MIDI port when you operate the following controller.

| ctrl# | parameter | data rng |
|-------|-----------------------|----------|
| 16 | Vector control X-axis | 0~127 |
| 17 | Vector control Y-axis | 0~127 |

2.2 Reception

2.2.1 Note on/off

Reception note range = C2~G8

Velocity range = 1~127 (Only note on can be received for velocity.)

2.2.2 Control change

The following parameters can be controlled via MIDI.

| ctrl# | parameter | data rng | |
|-------|-----------------------|----------|---|
| 0 | Bank Select MSB | 0...127 | # |
| 1 | Modulation Wheel | 0...127 | |
| 7 | Volume | 0...127 | |
| 16 | Vector Control X-axis | 0...127 | |
| 17 | Vector Control Y-axis | 0...127 | |
| 32 | Bank Select LSB | 0...127 | # |
| 64 | Sustain Switch | 0...127 | |
| 121 | Reset All Controllers | 0 | |

The following Bank Select Data can be used for changing mode and the mode and voice are changed when receiving the succeeding program changes 00~79.

| bank select data value | HEX | 14bit | |
|------------------------|----------|--|--|
| * #2 | (0x0002) | Voice Mode PRESET1 | |
| * #0 | (0x0000) | Voice Mode INTERNAL | |
| * #1 | (0x0001) | Voice Mode CARD1 | |
| * #5 | (0x0005) | Voice Mode PRESET2 | |
| * #4 | (0x0004) | Voice Mode CARD2 | |
| * #16 | (0x0010) | Multi Mode Multi INTERNAL | |
| * #17 | (0x0011) | Multi Mode Multi CARD1 | |
| * #20 | (0x0014) | Multi Mode Multi CARD2 | |
| #34 | (0x0022) | Multi Mode Voice PRESET1 | |
| #32 | (0x0020) | Multi Mode Voice INTERNAL or CARD1 (CARD2) (the one selected by MULTI currently) | |
| #33 | (0x0021) | Multi Mode Voice CARD1 (CARD2) or INTERNAL (the one selected by MULTI currently) | |
| #37 | (0x0025) | Multi Mode Voice PRESET2 | |

However, when the receiving device is in Voice mode, #32~#34, #37 will be interpreted as

- #32 → #0
- #33 → #1
- #34 → #2
- #37 → #5

and will be received while remaining in Voice mode.

When 0~79 are received as the Program Change Data immediately after the Bank Select Data is received, the Mode, Voice, and Multi are switched according to the above table.

However, when the Bank Select Data is those other than 16, 17, and 20, the succeeding Program Change Data must be equal to 0~63.

In the similar manner, when the Bank Select Data is 16, 17, and 20, the succeeding Program Change Data must be equal to 64~79.

Those marked by an asterisk mark (*) are valid only when data is received through the Voice Receive Channel.

2.2.3 Program change

When a program change is received, this unit operates as follows. The Utility System allows the following two types of reception modes.

- 1) off: No program changes are received.
- 2) on

[Voice Play Mode]

When the Program Change Data 0~63 are received, the Media selection stays as it is, thus switching only the voice numbers 11~88.

The Program Change Data 64~127 are ignored.

Only the Program Change Data received through the voice Receive Channel is valid.

[Multi Play Mode]

When the Program Change Data 0~63 are received, the Media of Voice corresponding to that Channel stays as it is, thus switching to the Voice 11~88.

When the Program Change Data 64~79 is received through the Voice Receive Channel, the Media selection stays as it is, thus switching to the Multi 11~28.

The Program Change Data 80~127 are ignored.

[Multi Edit Mode]

It is the same as in the case of the Multi Play Mode. However, the Program Change Data 64~79 are ignored.

[Cautions]

- In the case of the Voice Edit Mode, even if the Voice program change and multi program change are received, they are ignored.
- In the case of the Multi Edit Mode, when the Voice (mode) program change and multi program change are received, they are ignored.
- When data is received in Utility Mode, Voice Play or Multi Play mode is selected, thus receiving data.
- No data is received during Vector recording, Compare, Card load/save execution, and Bulk transmit execution.

2.2.4 Pitch bend

Reception of pitch bend is operated at the MSB side only.

2.2.5 After touch

2.2.6 Channel mode message

No data is received.

3. System exclusive message

3.1 Parameter change

This unit receives the following 9 types of parameter changes. Also, when 8). Remote Switch is received, the corresponding display will appear just as if the switch had actually be pressed.

- 1) Voice Common Data parameter change
- 2) Voice Vector Data parameter change
- 3) Voice Element Tone Data parameter change
- 4) Voice Element Envelope Data parameter change
- 5) Multi Data parameter change
- 6) System Data parameter change
- 7) System MIDI Data parameter change
- 8) Switch Remote parameter change
- 9) Vector Mode parameter change

Reception of parameter change cannot be turned off by each MIDI switch other than Exclusive = off.

8) The Switch Remote parameter change can be received even if the exclusive is off.

[Cautions]

- No data is received during Vector recording, Compare, Card load/save execution, and Bulk transmit execution.

3.1.1 Voice Common Data parameter change

```

11110000 F0
01000011 43
0001nnnn nnnn - Device Number
00100110 26
00000000 00
0aaaaaaa aaaaaa - ST of appended table 1-1
00000000 00
0ccccccc ccccc - (MSB7bits) F1 of appended table 1-1
0ccccccc ccccc - (LSB7bits) F2 of appended table 1-1
0000000d d - (MSB) B1 of appended table 1-1
0ddddd dddddd - (LSB7bits) B2 of appended table 1-1
0000000v v - Data Value (MSB)
0vvvvvvv vvvvvv - Data Value (LSB7bits)
11110111 F7
    
```

This message is used to change the Voice Common Data for each parameter.

When this message is received, the following automatically results.

- Voice Play Mode : Shifts to Voice Edit Mode and receives data (Screen shift).
- Voice Edit Mode : The Mode stays as it is, receiving data (Screen shift).
- Multi Play Mode : Shifts to the Voice Edit Mode and receives data (Screen shift).
- Multi Edit Mode : Shifts to the Voice Edit Mode and receives data (Screen shift).
- Utility Mode : Shifts to the Voice Edit mode and receives data (Screen shift).

3.1.2 Voice Vector Data parameter change

```

11110000 F0
01000011 43
0001nnnn nnnn - Device Number
00100110 26
00000001 01
0aaaaaaa aaaaaa - ST of appended table 1-2
00000000 00
0ccccccc ccccc - (MSB7bits) F1 of appended table 1-2
0ccccccc ccccc - (LSB7bits) F2 of appended table 1-2
0000000d d - (MSB) B1 of appended table 1-2
0ddddd dddddd - (LSB7bits) B2 of appended table 1-2
0000000v v - Data Value (MSB)
0vvvvvvv vvvvvv - Data Value (LSB7bits)
11110111 F7
    
```

This message is used to change the Voice Common Data for each parameter.

When this message is received, the following results automatically.

- Voice Play Mode : Shifts to Voice Edit Mode and receives data (Screen shift).
- Voice Edit Mode : The Mode stays as it is, receiving data (Screen shift).
- Multi Play Mode : Shifts to the Voice Edit Mode and receives data (Screen shift).
- Multi Edit Mode : Shifts to the Voice Edit Mode and receives data (Screen shift).
- Utility Mode : Shifts to the Voice Edit mode and receives data (Screen shift).

3.1.3 Voice Element Tone Data parameter change

```

11110000 F0
01000011 43
0001nnnn nnnn - Device Number
00100110 26
00000010 02
0aaaaaaa aaaaaa - ST of appended table 1-3
000000bb bb - Element Number
0ccccccc ccccc - (MSB7bits) F1 of appended table 1-3
0ccccccc ccccc - (LSB7bits) F2 of appended table 1-3
0000000d d - (MSB) B1 of appended table 1-3
0ddddd dddddd - (LSB7bits) B2 of appended table 1-3
0000000v v - Data Value (MSB)
0vvvvvvv vvvvvv - Data Value (LSB7bits)
11110111 F7
    
```

This message is used to change the Voice Element Tone Data for each parameter.

When this message is received, the following results automatically.

- Voice Play Mode : Shifts to Voice Edit Mode and receives data (Screen shift).
- Voice Edit Mode : The Mode stays as it is, receiving data (Screen shift).
- Multi Play Mode : Shifts to the Voice Edit Mode and receives data (Screen shift).
- Multi Edit Mode : Shifts to the Voice Edit Mode and receives data (Screen shift).
- Utility Mode : Shifts to the Voice Edit mode and receives data (Screen shift).

[Cautions]

When the element C data is received in the A-B (2 element) mode, only the screen changes to the element A. When the element D data is received, only the screen changes to the element B.

If there is no parameter agreeing with the corresponding element, it is ignored.

3.1.4 Voice Element Envelope Data parameter change

```

11110000 F0
01000011 43
0001nnnn nnnn - Device Number
00100110 26
00000011 03
0aaaaaaa aaaaaa - ST of appended table 1-4
000000bb bb - Element Number
0ccccccc ccccc - (MSB7bits) F1 of appended table 1-4
0ccccccc ccccc - (LSB7bits) F2 of appended table 1-4
0000000d d - (MSB) B1 of appended table 1-4
0ddddd dddddd - (LSB7bits) B2 of appended table 1-4
0000000v v - Data Value (MSB)
0vvvvvvv vvvvvv - Data Value (LSB7bits)
11110111 F7
    
```

This message is used to change the Voice Element Envelope Data for each parameter.

When this message is received, the following results automatically.

- Voice Play Mode** : Shifts to Voice Edit Mode and receives data (Screen shift).
- Voice Edit Mode** : The Mode stays as it is, receiving data (Screen shift).
- Multi Play Mode** : Shifts to the Voice Edit Mode and receives data (Screen shift).
- Multi Edit Mode** : Shifts to the Voice Edit Mode and receives data (Screen shift).
- Utility Mode** : Shifts to the Voice Edit mode and receives data (Screen shift).

[Cautions]

When the element C data is received in the A-B (2 element) mode, only the screen changes to the element A. When the element D data is received, only the screen changes to the element B.

3.1.5 Multi Data parameter change

```

11110000 F0
01000011 43
0001nnnn nnnn - Device Number
00100110 26
00000100 04
0aaaaaaa aaaaaa - ST of appended table 1-5
0000bbbb bbbb - Channel Number
0ccccccc ccccc - (MSB7bits) F1 of appended table 1-5
0ccccccc ccccc - (LSB7bits) F2 of appended table 1-5
0000000d d - (MSB) B1 of appended table 1-5
0ddddd dddddd - (LSB7bits) B2 of appended table 1-5
0000000v v - Data Value (MSB)
0vvvvvvv vvvvvv - Data Value (LSB7bits)
11110111 F7

```

This message is used to change the Multi Data for each parameter.

When this message is received, the following results automatically.

- Voice Play Mode** : Shifts to Multi Edit Mode and receives data (Screen shift).
- Voice Edit Mode** : Shifts to Multi Edit Mode and receives data (Screen shift).
- Multi Play Mode** : Shifts to Multi Edit Mode and receives data (Screen shift).
- Multi Edit Mode** : The Mode stays as it is, receiving data (Screen shift).
- Utility Mode** : Shifts to the Multi Edit Mode and receives data (Screen shift).

[Cautions]

The Channel Number is ignored if not the parameter for each channel.

3.1.6 System Data parameter change

```

11110000 F0
01000011 43
0001nnnn nnnn - Device Number
00100110 26
00000101 05
0aaaaaaa aaaaaa - ST of appended table 1-6
00000000 00
0ccccccc ccccc - (MSB7bits) F1 of appended table 1-6
0ccccccc ccccc - (LSB7bits) F2 of appended table 1-6
0000000d d - (MSB) B1 of appended table 1-6
0ddddd dddddd - (LSB7bits) B2 of appended table 1-6
0000000v v - Data Value (MSB)
0vvvvvvv vvvvvv - Data Value (LSB7bits)
11110111 F7

```

This message is used to change the System Data for each parameter.

When this message is received, the following results automatically.

- Voice Play Mode** : Shifts to Utility System Mode and receives data (Screen shift).
- Voice Edit Mode** : Shifts to Utility System Mode and receives data (Screen shift).
- Multi Play Mode** : Shifts to Utility System Mode and receives data (Screen shift).
- Multi Edit Mode** : Shifts to Utility System Mode and receives data (Screen shift).
- Utility Mode** : The Mode stays as it is, receiving data (Screen shift).

3.1.7 System MIDI Data parameter change

```

11110000 F0
01000011 43
0001nnnn nnnn - Device Number
00100110 26
00000100 06
0aaaaaaa aaaaaa - ST of appended table 1-7
00000000 00
0ccccccc ccccc - (MSB7bits) F1 of appended table 1-7
0ccccccc ccccc - (LSB7bits) F2 of appended table 1-7
0000000d d - (MSB) B1 of appended table 1-7
0ddddd dddddd - (LSB7bits) B2 of appended table 1-7
0000000v v - Data Value (MSB)
0vvvvvvv vvvvvv - Data Value (LSB7bits)
11110111 F7

```

This message is used to change the System MIDI Data for each parameter.

When this message is received, the following results automatically.

- Voice Play Mode** : Shifts to Utility System Mode and receives data (Screen shift).
- Voice Edit Mode** : Shifts to Utility System Mode and receives data (Screen shift).
- Multi Play Mode** : Shifts to Utility System Mode and receives data (Screen shift).
- Multi Edit Mode** : Shifts to Utility System Mode and receives data (Screen shift).
- Utility Mode** : The Mode stays as it is, receiving data (Screen shift).

3.1.8 Switch Remote parameter change

```

11110000 F0
01000011 43
0001xxxx xxxx - don't care
00100110 26
00000111 07
0sssssss ssssss - CD of appended table 1-8
11110111 F7

```

All panel switches can be remotely controlled. This message has the same effect as pressing the corresponding switch.

3.1.9 Vector Mode parameter change

```

11110000 F0
01000011 43
0001nnnn nnnn - Device Number
00100110 26
00001000 08
000000ss ss=0:OFF, 1:LEVEL, 2:DETUNE
11110111 F7

```

Switches the Vector Mode to OFF (=Auto), LEVEL, or DETUNE. However, no data is received in the case of the VOICE VECTOR EDIT, COMPARE VOICE, COMPARE MULTI, and DEMO.

4. Bulk dump

Reception is enabled in cases other than Vector recording, Comparing, Card load/save execution, and Bulk transmit execution. Transmission is executed when the "Bulk Transmit" of UTILITY MIDI is executed or Dump Request is received.

4.1 Voice data bulk dump

4.1.1 64 voice data

```

11110000 F0
01000011 43
0000nnnn nnnn - Device Number
01111110 7E
0bbbbbbb BYTE count(MSB)
0bbbbbbb BYTE count(LSB)
01001100 4C(ascii"L")
01001101 4D(ascii"M")
00100000 20(ascii" ")
00100000 20(ascii" ")
00110000 30(ascii"0")
00110000 30(ascii"0")
00110001 31(ascii"1")
00110010 32(ascii"2")
01010110 56(ascii"V")
01000011 43(ascii"C")
Oddddddd ddddddd VOICE DATA
↓ ↓ (Appended table 2)
Oddddddd ddddddd (00-03)
Osssssss ssssss CHECK SUM
-----100 msec WAIT-----
0bbbbbbb BYTE count(MSB)
0bbbbbbb BYTE count(LSB)
Oddddddd ddddddd VOICE DATA
↓ ↓ (Appended table 2)
Oddddddd ddddddd (04-07)
Osssssss ssssss CHECK SUM
-----100 msec WAIT-----
As shown in the above, voice data is divided (four voices in a
set) and transmitted. Always keep 100 msec or more between
transmission.
↓ ↓
11110111 F7
    
```

Byte count shows this area.

Check sum is 2's complement 7bits sum of their data bytes.

Byte count shows this area.

Check sum is 2's complement 7bits sum of their data bytes.

- ◆ Reception data is written into the Internal Voice Memory (VMEM).
- ◆ See Appended table 2 for details on each bulk dump data and dump request format. The MIDI data format is different from that on the actual memory since the data size is equal to 7 bits.

4.1.2 1 voice data

```

11110000 F0
01000011 43
0000nnnn nnnn - Device Number
01111110 7E
0bbbbbbb BYTE count(MSB)
0bbbbbbb BYTE count(LSB)
01001100 4C(ascii"L")
01001101 4D(ascii"M")
00100000 20(ascii" ")
00100000 20(ascii" ")
00110000 30(ascii"0")
00110000 30(ascii"0")
00110001 31(ascii"1")
00110010 32(ascii"2")
01010110 56(ascii"V")
01000101 45(ascii"E")
Oddddddd ddddddd VOICE DATA
↓ ↓ (Appended table 2)
Oddddddd ddddddd
Osssssss ssssss CHECK SUM
11110111 F7
    
```

Byte count shows this area.

Check sum is 2's complement 7bits sum of their data bytes.

- ◆ Reception data is written into Voice Edit Buffer (VCED) and is handled as being edited.
- ◆ See Appended table 2 for details on each bulk data and bulk request format. The MIDI data format is different from that on the actual memory since the data size is equal to 7 bits.

4.1.3 SY22 64 voice data

Only 64 voice data out of the SY22 ALL V/M BULK DUMP are expanded into the TG33 format and received. The 16 MULTI Data is ignored. See the SY22 reference for details on data format.

- ◆ The reception data is written into the Internal Voice Memory (VMEM).

4.1.4 SY22 1 voice data

The SY22 1 VOICE BULK DUMP is expanded into the TG33 format and is received. See the SY22 reference for details on data format.

- ◆ The reception data is written into the Voice Edit Buffer (VCED) and is handled as being edited.

4.2 Multi data bulk dump

4.2.1 16 multi data

```

11110000 F0
01000011 43
0000nnnn nnnn - Device Number
01111110 7E
0bbbbbbb BYTE count(MSB)
0bbbbbbb BYTE count(LSB)
01001100 4C(ascii"L")
01001101 4D(ascii"M")
00100000 20(ascii" ")
00100000 20(ascii" ")
00110000 30(ascii"0")
00110000 30(ascii"0")
00110001 31(ascii"1")
00110010 32(ascii"2")
01001101 4D(ascii"M")
01010101 55(ascii"U")
Oddddddd ddddddd MULTI DATA
↓ ↓ (Appended table 3)
Oddddddd ddddddd (00-15)
Osssssss ssssss CHECK SUM
11110111 F7
    
```

Byte count shows this area.

Check sum is 2's complement 7bits sum of their data bytes.

- ◆ The reception data is written into the Internal Multi Memory (MMEM).
- ◆ See Appended table 3 for details on each bulk data and bulk request format. The MIDI data format is different from that on the actual memory since the data size is equal to 7 bits.

4.2.2 1 multi data

```

11110000 F0
01000011 43
0000nnnn nnnn - Device Number
01111110 7E
0bbbbbbb BYTE count(MSB)
0bbbbbbb BYTE count(LSB)
01001100 4C(ascii"L")
01001101 4D(ascii"M")
00100000 20(ascii" ")
00100000 20(ascii" ")
00110000 30(ascii"0")
00110000 30(ascii"0")
00110001 31(ascii"1")
00110010 32(ascii"2")
01001101 4D(ascii"M")
01000101 45(ascii"E")
Oddddddd ddddddd MULTI DATA
↓ ↓ (Appended table 3)
Oddddddd ddddddd
Osssssss ssssss CHECK SUM
11110111 F7
    
```

Byte count shows this area.

Check sum is 2's complement 7bits sum of their data bytes.

- ◆ The reception data is written into the Multi Edit Buffer (MCED) and is handled as being edited.
- ◆ See Appended table 3 for details on each bulk data and bulk request format. The MIDI data format is different from that on the actual memory since the data size is equal to 7 bits.

4.3 System data bulk dump

```

11110000 F0
01000011 43
0000nnnn nnnn = Device Number
01111110 7E
0bbbbbbb BYTE count(MSB)
0bbbbbbb BYTE count(LSB)
01001100 4C(ascii"L")
01001101 4D(ascii"M")
00100000 20(ascii" ")
00100000 20(ascii" ")
00110000 30(ascii"0")
00110000 30(ascii"0")
00110001 31(ascii"1")
00110010 32(ascii"2")
01010011 53(ascii"5")
01011001 59(ascii"Y")
0ddddddd ddddddd SYSTEM DATA
↓
↓ (Appended table 4)
0ddddddd ddddddd
0sssssss sssssss CHECK SUM
11110111 F7
    
```

Byte count shows this area.

Check sum is 2's compliment 7bits sum of their data bytes.

5. Status FE (Active Sensing)

- a) Transmission
No transmission
- b) Reception
If no signal arrives through MIDI port for approximately 300 msec or more after receiving the FE once, the MIDI reception buffer is cleared and the remaining key-on data is keyed off.

◆ See Appended table 4 for details on each bulk data and bulk request format. The MIDI data format is different from that on the actual memory since the data size is equal to 7 bits.

<Table 1-1>

MIDI Parameter Change table (Voice Common)

\$F0, \$43, \$1n, \$26, \$00, \$ST, \$00, \$F1, \$F2, \$B1, \$B2, \$V1, V2, \$F7

Note) n : device number

V1 : MSB of parameter value

V2 : LSB 7bits of parameter value

| | ST | F1 | F2 | B1 | B2 | data name | data range |
|----|------|------|------|------|------|---------------------|---|
| 0 | \$00 | \$00 | \$00 | \$01 | \$7E | CONFIGURATION | \$00:A-B, \$01:A-B-C-D |
| 1 | \$01 | \$00 | \$01 | \$01 | \$7F | EFFECT TYPE | 0:Rev Hall 1:Rev Room 2:Rev Plate 3:Rev Club 4:Rev Metal 5:Delay 1 6:Delay 2 7:Delay 3 8:Doubler 9:Ping_Pong 10:Pan Ref 11:Early Ref 12:Gate Rev 13:Dly&Rev 1 14:Dly&Rev 2 15:Dist&Rev |
| 2 | \$02 | \$00 | \$02 | \$01 | \$7F | EFFECT BALANCE | 0~127 |
| 3 | \$02 | \$00 | \$06 | \$01 | \$7F | EFFECT SEND LEVEL | 0~127 |
| 4 | \$09 | \$00 | \$0C | \$01 | \$7F | VOICE NAME 1 | 32~127 (ASCII) |
| 5 | \$09 | \$00 | \$0D | \$01 | \$7F | VOICE NAME 2 | 32~127 (ASCII) |
| 6 | \$09 | \$00 | \$0E | \$01 | \$7F | VOICE NAME 3 | 32~127 (ASCII) |
| 7 | \$09 | \$00 | \$0F | \$01 | \$7F | VOICE NAME 4 | 32~127 (ASCII) |
| 8 | \$09 | \$00 | \$10 | \$01 | \$7F | VOICE NAME 5 | 32~127 (ASCII) |
| 9 | \$09 | \$00 | \$11 | \$01 | \$7F | VOICE NAME 6 | 32~127 (ASCII) |
| 10 | \$09 | \$00 | \$12 | \$01 | \$7F | VOICE NAME 7 | 32~127 (ASCII) |
| 11 | \$09 | \$00 | \$13 | \$01 | \$7F | VOICE NAME 8 | 32~127 (ASCII) |
| 12 | \$03 | \$00 | \$14 | \$01 | \$7F | PITCH BEND RANGE | 0~12 |
| 13 | \$06 | \$00 | \$15 | \$01 | \$3F | AFTER TOUCH LEVEL | \$00:off, \$40:on |
| 14 | \$05 | \$00 | \$15 | \$01 | \$5F | AFTER TOUCH PM | \$00:off, \$20:on |
| 15 | \$05 | \$00 | \$15 | \$01 | \$6F | AFTER TOUCH AM | \$00:off, \$10:on |
| 16 | \$04 | \$00 | \$15 | \$01 | \$7D | MODULATION WHEEL PM | \$00:off, \$02:on |
| 17 | \$04 | \$00 | \$15 | \$01 | \$7E | MODULATION WHEEL AM | \$00:off, \$01:on |
| 18 | \$06 | \$00 | \$16 | \$01 | \$7F | PITCH BIAS | -12~+12 (2's comp) |
| 19 | \$01 | \$00 | \$17 | \$01 | \$7F | EG DELAY RATE | 0:0~127:99 |
| 20 | \$07 | \$00 | \$18 | \$01 | \$7F | EG ATTACK RATE | \$C1:-99~\$00:0 -99~\$3F:+99 |
| 21 | \$07 | \$00 | \$19 | \$01 | \$7F | EG RELEASE RATE | \$C1:-99~\$00:0 -99~\$3F:+99 |

[Cautions]

The Element EG Delay Rate screen appears when the EG DELAY RATE is received.

<Table 1-2>

MIDI Parameter Change table (Voice Vector)

\$F0, \$43, \$1n, \$26, \$01, \$ST, \$00, \$F1, \$F2, \$B1, \$B2, \$V1, V2, \$F7

Note) n ; device number

V1 ; MSB of parameter value

V2 ; LSB 7bits of parameter value

| | ST | F1 | F2 | B1 | B2 | data name | data range |
|-----|------|------|------|------|------|------------------|--|
| 0 | \$00 | \$00 | \$00 | \$01 | \$7F | LEVEL SPEED | 0:160msec 1:10msec : |
| 1 | \$03 | \$00 | \$01 | \$01 | \$7F | DETUNE SPEED | 15:150msec 0:160msec 1:10msec : 15:150msec |
| 2 | \$02 | \$00 | \$02 | \$01 | \$7F | LEVEL TIME 1 | 0~253, 255:End |
| 3 | \$02 | \$00 | \$03 | \$01 | \$7F | LEVEL X-AXIS 1 | 0:-31~31:+0~62:+31 |
| 4 | \$02 | \$00 | \$04 | \$01 | \$7F | LEVEL Y-AXIS 1 | 0:-31~31:+0~62:+31 |
| : | : | : | : | : | : | : | : |
| 128 | \$02 | \$01 | \$00 | \$01 | \$7F | LEVEL TIME 43 | 0~253, 254:Repeat, 255:End |
| 129 | \$02 | \$01 | \$01 | \$01 | \$7F | LEVEL X-AXIS 43 | 0:-31~31:+0~62:+31 |
| 130 | \$02 | \$01 | \$02 | \$01 | \$7F | LEVEL Y-AXIS 43 | 0:-31~31:+0~62:+31 |
| : | : | : | : | : | : | : | : |
| 149 | \$02 | \$01 | \$15 | \$01 | \$7F | LEVEL TIME 50 | 0~253, 254:Repeat, 255:End |
| 150 | \$02 | \$01 | \$16 | \$01 | \$7F | LEVEL X-AXIS 50 | 0:-31~31:+0~62:+31 |
| 151 | \$02 | \$01 | \$17 | \$01 | \$7F | LEVEL Y-AXIS 50 | 0:-31~31:+0~62:+31 |
| 152 | \$05 | \$01 | \$18 | \$01 | \$7F | DETUNE TIME 1 | 0~253, 255:End |
| 153 | \$05 | \$01 | \$19 | \$01 | \$7F | DETUNE X-AXIS 1 | 0:-31~31:+0~62:+31 |
| 154 | \$05 | \$01 | \$1A | \$01 | \$7F | DETUNE Y-AXIS 1 | 0:-31~31:+0~62:+31 |
| : | : | : | : | : | : | : | : |
| 254 | \$02 | \$01 | \$7E | \$01 | \$7F | LEVEL TIME 35 | 0~253, 254:Repeat, 255:End |
| 255 | \$02 | \$01 | \$7F | \$01 | \$7F | LEVEL X-AXIS 35 | 0:-31~31:+0~62:+31 |
| 256 | \$02 | \$02 | \$00 | \$01 | \$7F | LEVEL Y-AXIS 35 | 0:-31~31:+0~62:+31 |
| : | : | : | : | : | : | : | : |
| 299 | \$05 | \$02 | \$2B | \$01 | \$7F | DETUNE TIME 50 | 0~253, 254:Repeat, 255:End |
| 300 | \$05 | \$02 | \$2C | \$01 | \$7F | DETUNE X-AXIS 50 | 0:-31~31:+0~62:+31 |
| 301 | \$05 | \$02 | \$2D | \$01 | \$7F | DETUNE Y-AXIS 50 | 0:-31~31:+0~62:+31 |

<Table 1-3>

MIDI Parameter Change table (Voice Element Tone)

\$F0, \$43, \$1n, \$26, \$02, \$ST, \$0b, \$F1, \$F2, \$B1, \$B2, \$V1, V2, \$F7

Note) n : device number
 b : element number 0:Element A, 1:Element B, 2:Element C, 3:Element D
 V1 : MSB of parameter value
 V2 : LSB 7bits of parameter value

(f) Element A or C

| | ST | F1 | F2 | B1 | B2 | data name | data range |
|----|------|------|------|------|------|-------------------------|---|
| 0 | \$00 | \$00 | \$00 | \$01 | \$7F | WAVE TYPE | 0~127 |
| 1 | \$01 | \$00 | \$01 | \$01 | \$7F | FREQUENCY SHIFT | -12~+12 (2's comp) |
| 2 | \$05 | \$00 | \$02 | \$01 | \$0F | AFTER TOUCH SENSITIVITY | \$50:-3 \$60:-2 \$70:-1 \$00:+0 \$10:+1 \$20:+2 \$30:+3 |
| 3 | \$04 | \$00 | \$02 | \$01 | \$70 | VELOCITY SENSITIVITY | \$06:-5 \$07:-4 \$08:-3 \$09:-2 \$0A:-1 \$00:+0 \$01:+1 \$02:+2 \$03:+3 \$04:+4 \$05:+5 |
| 4 | \$07 | \$00 | \$03 | \$00 | \$1F | LFO TYPE | \$00:saw down \$20:triangle \$40:square \$60:sample & hold \$80:saw up |
| 5 | \$09 | \$00 | \$03 | \$01 | \$60 | LFO SPEED | \$00~\$1F |
| 6 | \$08 | \$00 | \$04 | \$01 | \$7F | LFO DELAY | 0:0~127:99 |
| 7 | \$08 | \$00 | \$05 | \$01 | \$7F | LFO RATE | 127:0~0:99 |
| 8 | \$07 | \$00 | \$06 | \$01 | \$70 | LFO AM | \$00~\$0F |
| 9 | \$07 | \$00 | \$07 | \$01 | \$60 | LFO PM | \$00~\$1F |
| 10 | \$03 | \$00 | \$08 | \$01 | \$78 | PAN | \$00:left \$01:left center \$02:center \$03:right center \$04:right |
| 11 | \$02 | \$00 | \$09 | \$01 | \$7F | VOLUME | 127:0~0:99 |

(2) Element B or D

| | ST | F1 | F2 | B1 | B2 | data name | data range |
|----|------|------|------|------|------|-------------------------|---|
| 0 | \$00 | \$00 | \$16 | \$01 | \$7F | WAVE TYPE | 0-255 |
| 1 | \$01 | \$00 | \$17 | \$01 | \$7F | FREQUENCY SHIFT | -12~+12 (2's comp) |
| 2 | \$05 | \$00 | \$18 | \$01 | \$0F | AFTER TOUCH SENSITIVITY | \$50:-3 \$60:-2 \$70:-1 \$00:+0 \$10:+1 \$20:+2 \$30:+3 |
| 3 | \$04 | \$00 | \$18 | \$01 | \$70 | VELOCITY SENSITIVITY | \$06:-5 \$07:-4 \$08:-3 \$09:-2 \$0A:-1 \$00:+0 \$01:+1 \$02:+2 \$03:+3 \$04:+4 \$05:+5 |
| 4 | \$07 | \$00 | \$19 | \$00 | \$1F | LFO TYPE | \$00:saw down \$20:triangle \$40:square \$60:sample & hold \$80:saw up |
| 5 | \$09 | \$00 | \$19 | \$01 | \$60 | LFO SPEED | \$00-\$1F |
| 6 | \$08 | \$00 | \$1A | \$01 | \$7F | LFO DELAY | 0:0~127:99 |
| 7 | \$08 | \$00 | \$1B | \$01 | \$7F | LFO RATE | 127:0~0:99 |
| 8 | \$07 | \$00 | \$1C | \$01 | \$70 | LFO AM | \$00-\$0F |
| 9 | \$07 | \$00 | \$1D | \$01 | \$60 | LFO PM | \$00-\$1F |
| 10 | \$03 | \$00 | \$1E | \$01 | \$78 | PAN | \$00:left \$01:left center \$02:center \$03:right center \$04:right |
| 11 | \$06 | \$00 | \$1F | \$01 | \$78 | FEED BACK | \$00-\$07 |
| 12 | \$06 | \$00 | \$21 | \$01 | \$7F | TONE LEVEL | 127:0~0:99 |
| 13 | \$02 | \$00 | \$2D | \$01 | \$7F | VOLUME | 127:0~0:99 |

<Table 1-4>

MIDI Parameter Change table (Voice Element Envelope)

\$F0, \$43, \$1n, \$26, \$03, \$ST, \$0b, \$F1, \$F2, \$B1, \$B2, \$V1, V2, \$F7

Note) n ; device number
 b ; element number 0:Element A, 1:Element B, 2:Element C, 3:Element D
 V1 ; MSB of parameter value
 V2 ; LSB 7bits of parameter value

(1) Element A or C

| | ST | F1 | F2 | B1 | B2 | data name | data range |
|----|------|------|------|------|------|---------------|---|
| 0 | \$00 | \$00 | \$08 | \$01 | \$0F | TYPE | \$00:user \$10:preset \$20:piano \$30:guitar \$40:pluck \$50:brass \$60:strings \$70:organ |
| 1 | \$07 | \$00 | \$0B | \$00 | \$0F | LEVEL SCALING | \$00:1~\$F0:16 |
| 2 | \$08 | \$00 | \$0B | \$01 | \$78 | RATE SCALING | \$00:1~\$07:8 |
| 3 | \$01 | \$00 | \$0C | \$00 | \$7F | DELAY ON/OFF | \$00:off, \$80:on |
| 4 | \$03 | \$00 | \$0C | \$01 | \$40 | ATTACK RATE | \$00:0~\$3F:99 |
| 5 | \$04 | \$00 | \$0D | \$01 | \$40 | DECAY1 RATE | \$00:0~\$3F:99 |
| 6 | \$05 | \$00 | \$0E | \$01 | \$40 | DECAY2 RATE | \$00:0~\$3F:99 |
| 7 | \$06 | \$00 | \$0F | \$01 | \$40 | RELEASE RATE | \$00:0~\$3F:99 |
| 8 | \$02 | \$00 | \$10 | \$01 | \$00 | INITIAL LEVEL | \$7F:0~\$00:99 |
| 9 | \$03 | \$00 | \$11 | \$01 | \$00 | ATTACK LEVEL | \$7F:0~\$00:99 |
| 10 | \$04 | \$00 | \$12 | \$01 | \$00 | DECAY1 LEVEL | \$7F:0~\$00:99 |
| 11 | \$05 | \$00 | \$13 | \$01 | \$00 | DECAY2 LEVEL | \$7F:0~\$00:99 |

(2) Element B or D

| | ST | F1 | F2 | B1 | B2 | data name | data range |
|----|------|------|------|------|------|---------------|---|
| 0 | \$00 | \$00 | \$1E | \$01 | \$0F | TYPE | \$00:user \$10:preset \$20:piano \$30:guitar \$40:pluck \$50:brass \$60:strings \$70:organ |
| 1 | \$07 | \$00 | \$2F | \$00 | \$0F | LEVEL SCALING | \$00:1~\$F0:16 |
| 2 | \$08 | \$00 | \$2F | \$01 | \$78 | RATE SCALING | \$00:1~\$07:8 |
| 3 | \$01 | \$00 | \$30 | \$00 | \$7F | DELAY ON/OFF | \$00:off, \$80:on |
| 4 | \$03 | \$00 | \$30 | \$01 | \$40 | ATTACK RATE | \$00:0~\$3F:99 |
| 5 | \$04 | \$00 | \$31 | \$01 | \$40 | DECAY1 RATE | \$00:0~\$3F:99 |
| 6 | \$05 | \$00 | \$32 | \$01 | \$40 | DECAY2 RATE | \$00:0~\$3F:99 |
| 7 | \$06 | \$00 | \$33 | \$01 | \$40 | RELEASE RATE | \$00:0~\$3F:99 |
| 8 | \$02 | \$00 | \$34 | \$01 | \$00 | INITIAL LEVEL | \$7F:0~\$00:99 |
| 9 | \$03 | \$00 | \$35 | \$01 | \$00 | ATTACK LEVEL | \$7F:0~\$00:99 |
| 10 | \$04 | \$00 | \$36 | \$01 | \$00 | DECAY1 LEVEL | \$7F:0~\$00:99 |
| 11 | \$05 | \$00 | \$37 | \$01 | \$00 | DECAY2 LEVEL | \$7F:0~\$00:99 |

<Table 1-5>

MIDI Parameter Change table (Multi)

\$F0, \$43, \$1n, \$26, \$04, \$ST, \$0b, \$F1, \$F2, \$B1, \$B2, \$V1, V2, \$F7

Note) n : device number
 b : channel number
 V1 : MSB of parameter value
 V2 : LSB 7bits of parameter value

| | ST | F1 | F2 | B1 | B2 | data name | data range |
|----|------|------|------|------|------|--------------------------|---|
| 0 | \$08 | \$00 | \$00 | \$01 | \$7F | EFFECT TYPE | 0:Rev Hall 1:Rev Room 2:Rev Plate 3:Rev Club 4:Rev Metal 5:Delay 1 6:Delay 2 7:Delay 3 8:Doubler 9:Ping_Pong 10:Pan Ref 11:Early Ref 12:Gate Rev 13:Dly&Rev 1 14:Dly&Rev 2 15:Dist&Rev |
| 1 | \$09 | \$00 | \$01 | \$01 | \$7F | EFFECT BALANCE | 0~127 |
| 2 | \$0A | \$00 | \$05 | \$01 | \$7F | GROUP1 EFFECT SEND LEVEL | 0~127 |
| 3 | \$0A | \$00 | \$06 | \$01 | \$7F | GROUP2 EFFECT SEND LEVEL | 0~127 |
| 4 | \$07 | \$00 | \$07 | \$01 | \$7D | GROUP2 OUTPUT SELECT | \$00:out1, \$02:out2 |
| 5 | \$07 | \$00 | \$07 | \$01 | \$7E | GROUP1 OUTPUT SELECT | \$00:out1, \$01:out2 |
| 6 | \$0B | \$00 | \$0D | \$01 | \$7F | MULTI NAME 1 | 32~127 (ASCII) |
| 7 | \$0B | \$00 | \$0E | \$01 | \$7F | MULTI NAME 2 | 32~127 (ASCII) |
| 8 | \$0B | \$00 | \$0F | \$01 | \$7F | MULTI NAME 3 | 32~127 (ASCII) |
| 9 | \$0B | \$00 | \$10 | \$01 | \$7F | MULTI NAME 4 | 32~127 (ASCII) |
| 10 | \$0B | \$00 | \$11 | \$01 | \$7F | MULTI NAME 5 | 32~127 (ASCII) |
| 11 | \$0B | \$00 | \$12 | \$01 | \$7F | MULTI NAME 6 | 32~127 (ASCII) |
| 12 | \$0B | \$00 | \$13 | \$01 | \$7F | MULTI NAME 7 | 32~127 (ASCII) |
| 13 | \$0B | \$00 | \$14 | \$01 | \$7F | MULTI NAME 8 | 32~127 (ASCII) |
| 14 | \$05 | \$00 | \$15 | \$01 | \$7F | ASSIGN MODE | 0:32/0, 1:24/8, 2:16/16 |

| | ST | F1 | F2 | B1 | B2 | data name | data range |
|---|------|------|------|------|------|---|---|
| 0 | \$00 | \$00 | \$00 | \$01 | \$77 | <The same structure in the order of channels 1~16 in the following> VOICE SWITCH | \$00:off voice, \$08:on |
| 1 | \$06 | \$00 | \$00 | \$01 | \$7B | SEND GROUP | \$00:group1, \$04:group2 |
| 2 | \$00 | \$00 | \$01 | \$01 | \$7F | VOICE MEMORY | 0:Internal (Card1, Card2) 1:Preset1 2:Preset2 |
| 3 | \$00 | \$00 | \$02 | \$01 | \$7F | VOICE NUMBER | 0~63 |
| 4 | \$01 | \$00 | \$03 | \$01 | \$7F | VOLUME | 127:0~0.99 |
| 5 | \$02 | \$00 | \$04 | \$01 | \$7F | DETUNE | -50~+50 (2's comp) |
| 6 | \$03 | \$00 | \$05 | \$01 | \$7F | NOTE SHIFT | -24~+24 (2's comp) |
| 7 | \$04 | \$00 | \$06 | \$01 | \$7F | PAN | 0:left 1:left center 2:center 3:right center 4:right 5:voice |

<Table 1-6>

MIDI Parameter Change table (System)

\$F0, \$43, \$1n, \$26, \$05, \$ST, \$00, \$F1, \$F2, \$B1, \$B2, \$V1, V2, \$F7

Note) n ; device number

V1 ; MSB of parameter value

V2 ; LSB 7bits of parameter value

| | ST | F1 | F2 | B1 | B2 | data name | data range |
|---|------|------|------|------|------|------------------|-----------------------|
| 0 | \$01 | \$00 | \$04 | \$01 | \$7F | TRANPOSE | -12~+12 (2's comp) |
| 1 | \$00 | \$00 | \$05 | \$01 | \$7F | MASTER TUNE | -50~+50 (2's comp) |
| 2 | \$02 | \$00 | \$01 | \$01 | \$77 | CONTROLLER RESET | \$00:hold, \$08:reset |

<Table 1-7>

MIDI Parameter Change table (System MIDI)

\$F0, \$43, \$1n, \$26, \$06, \$ST, \$00, \$F1, \$F2, \$B1, \$B2, \$V1, V2, \$F7

Note) n ; device number

V1 ; MSB of parameter value

V2 ; LSB 7bits of parameter value

| | ST | F1 | F2 | B1 | B2 | data name | data range |
|---|------|------|------|------|------|-----------------------|-------------------|
| 0 | \$03 | \$00 | \$00 | \$01 | \$7F | DEVICE NUMBER | 0~15, 16:all |
| 1 | \$03 | \$00 | \$01 | \$01 | \$7B | EXCLUSIVE ON/OFF | \$00:off, \$04:on |
| 2 | \$02 | \$00 | \$01 | \$01 | \$7C | PROGRAM CHANGE | \$00:off, \$01:on |
| 3 | \$00 | \$00 | \$02 | \$01 | \$7F | VOICE RECEIVE CHANNEL | 0~15, 16:omni |
| 4 | \$01 | \$00 | \$03 | \$01 | \$7F | VECTOR CHANNEL | 0~15 |

<Table 1-8>

MIDI Parameter Change table (Switch Remote)

\$F0, \$43, \$1x, \$26, \$07, \$CD, \$F7

Note) x ; don't care

| | CD | switch |
|----|------|---------------|
| 0 | \$00 | VECTOR |
| 1 | \$02 | ← |
| 2 | \$03 | → |
| 3 | \$04 | +1 |
| 4 | \$05 | -1 |
| 5 | \$06 | VOICE |
| 6 | \$07 | MULTI |
| 7 | \$08 | EDIT/COMPARE |
| 8 | \$09 | STORE/COPY |
| 9 | \$0A | CARD |
| 10 | \$0B | INTERNAL |
| 11 | \$0C | PRESET |
| 12 | \$0D | BANK SELECT 1 |
| 13 | \$0E | BANK SELECT 2 |
| 14 | \$0F | BANK SELECT 3 |
| 15 | \$10 | BANK SELECT 4 |
| 16 | \$11 | BANK SELECT 5 |

| | CD | switch |
|----|------|------------------|
| 17 | \$12 | BANK SELECT 6 |
| 18 | \$13 | BANK SELECT 7 |
| 19 | \$14 | BANK SELECT 8 |
| 20 | \$15 | PROGRAM SELECT 1 |
| 21 | \$16 | PROGRAM SELECT 2 |
| 22 | \$17 | PROGRAM SELECT 3 |
| 23 | \$18 | PROGRAM SELECT 4 |
| 24 | \$19 | PROGRAM SELECT 5 |
| 25 | \$1A | PROGRAM SELECT 6 |
| 26 | \$1B | PROGRAM SELECT 7 |
| 27 | \$1C | PROGRAM SELECT 8 |
| 28 | \$1D | DEMO |
| 29 | \$1E | UTILITY |
| 30 | \$21 | PAGE < |
| 31 | \$22 | PAGE > |
| 32 | \$25 | EFFECT BYPASS |

<Appended table 2>

The data format of each voice of (64) voice bulk is the same as that of 1 voice bulk. Only those with data at the MSB are 2-byte data.

Mb7~Mb1='0000000'

| ADRS(HEX) | Mb0 | Lb7 | Lb6 | Lb5 | Lb4 | Lb3 | Lb2 | Lb1 | Lb0 | |
|-----------------------|-----|------|-----|-----|-----|-----|-----|-----|----------------------------|--|
| 00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | DRM | 2/4 | |
| 01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EFFECT | |
| 02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EFFECT BALANCE | |
| 03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ((don't care)) | |
| 04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ((don't care)) | |
| 05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ((don't care)) | |
| 06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EFFECT SEND | |
| 07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ((don't care)) | |
| 08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ((don't care)) | |
| 09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ((don't care)) | |
| 0A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ((don't care)) | |
| 0B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ((don't care)) | |
| 0C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | NAME 1 | |
| 0D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | NAME 2 | |
| 0E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | NAME 3 | |
| 0F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | NAME 4 | |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | NAME 5 | |
| 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | NAME 6 | |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | NAME 7 | |
| 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | NAME 8 | |
| 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | PITCH BEND R- | |
| 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | AFTER TOUCH- PIT -WHEEL- | |
| 16 | 17 | → | 0 | 0 | 0 | 0 | 0 | | LEV PM AM 0 TYP PM AM | |
| 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | AFTER PITCH | |
| 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG DELAY RATE | |
| 19 | 1A | → | 0 | 0 | 0 | 0 | 0 | | COMMON ENV. ATTACK | |
| 1B | 1C | → | 0 | 0 | 0 | 0 | 0 | | COMMON ENV. RELEASE | |
| ***** ELEMENT A ***** | | | | | | | | | | |
| 1E | 1F | → | 0 | 0 | 0 | 0 | 0 | | WAVE NO. | |
| 1F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | FREQUENCY SHIFT | |
| 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | AFTER SNS- VELOCITY TYP | |
| 21 | 22 | → | 0 | 0 | 0 | 0 | 0 | | LFO TYP LFO SPEED | |
| 23 | 24 | → | 0 | 0 | 0 | 0 | 0 | | LFO DELAY TIME | |
| 25 | 26 | → | 0 | 0 | 0 | 0 | 0 | | LFO DELAY RATE | |
| 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | AM AM DEPTH | |
| 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | PM PM DEPTH | |
| 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG TYPE PAN | |
| 2A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | VOLUME | |
| 2B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | DT2 DT1 | |
| 2C | 2D | → | 0 | 0 | 0 | 0 | 0 | | L.SCALING RATE SCALING | |
| 2E | 2F | DLAY | 0 | 0 | 0 | 0 | 0 | | EG AR | |
| 30 | 31 | → | 0 | 0 | 0 | 0 | 0 | | MAX EG DIR | |
| 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG D2R | |
| 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG RR | |
| 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG IL | |
| 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG AL | |
| 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG D1L | |
| 37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG D2L | |
| 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ((don't care)) | |
| 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ((don't care)) | |
| ***** ELEMENT B ***** | | | | | | | | | | |
| 3A | 3B | → | 0 | 0 | 0 | 0 | 0 | | WAVE NO. | |
| 3C | 3D | → | 0 | 0 | 0 | 0 | 0 | | FREQUENCY SHIFT | |
| 3E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | AFTER SNS- VELOCITY TYP | |
| 3F | 40 | → | 0 | 0 | 0 | 0 | 0 | | LFO TYP LFO SPEED | |
| 41 | 42 | → | 0 | 0 | 0 | 0 | 0 | | LFO DELAY TIME | |
| 43 | 44 | → | 0 | 0 | 0 | 0 | 0 | | LFO DELAY RATE | |
| 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | AM AM DEPTH | |
| 46 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | PM PM DEPTH | |
| 47 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG TYPE PAN | |
| 48 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | CONNECT FEEDBACK | |
| 49 | 4A | MFX | 0 | 0 | 0 | 0 | 0 | | M WAVE M MULTI | |
| 4B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | TONE LEVEL | |
| 4C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | M DT2 M DT1 | |
| 4D | 4E | → | 0 | 0 | 0 | 0 | 0 | | M L.SCALING M RATE SCALING | |
| 4F | 50 | MDY | 0 | 0 | 0 | 0 | 0 | | M EG AR | |
| 51 | 52 | → | 0 | 0 | 0 | 0 | 0 | | MAX M EG DIR | |
| 53 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | M EG D2R | |
| 54 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | M EG RR | |
| 55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | M EG IL | |
| 56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | M EG AL | |
| 57 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | M EG D1L | |

| | | | | | | | | | | |
|---------------------------|-----|-----|---|---|---|---|---|--|----------------------------|--|
| 58 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | M EG D2L | |
| 59 | 5A | CFX | 0 | 0 | 0 | 0 | 0 | | C WAVE C MULTI | |
| 5B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | VOLUME | |
| 5C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | C DT2 C DT1 | |
| 5D | 5E | → | 0 | 0 | 0 | 0 | 0 | | C L.SCALING C RATE SCALING | |
| 5F | 60 | CDY | 0 | 0 | 0 | 0 | 0 | | EG AR | |
| 61 | 62 | → | 0 | 0 | 0 | 0 | 0 | | MAX EG DIR | |
| 63 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG D2R | |
| 64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG RR | |
| 65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG IL | |
| 66 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG AL | |
| 67 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG D1L | |
| 68 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | EG D2L | |
| 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ((don't care)) | |
| 6A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ((don't care)) | |
| ***** ELEMENT C ***** | | | | | | | | | | |
| 6B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | WAVE NO. | |
| 6C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 6D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 6E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 6F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 71 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 72 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 73 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 74 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 76 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 77 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 78 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 79 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 7A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 7B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 7C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 7D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 7E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 7F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 81 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 82 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 84 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 86 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 87 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| ***** ELEMENT D ***** | | | | | | | | | | |
| 88 | 89 | 0 | 0 | 0 | 0 | 0 | 0 | | WAVE NO. | |
| 8A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 8B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 8C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 8D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 8E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 8F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 91 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 92 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 93 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 96 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 97 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 98 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 9A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 9B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 9C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 9D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 9E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 9F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| A0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| A1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| A2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| A3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| A4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| A5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| A6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| A7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| A8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| A9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| AA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| AB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| AC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| AD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| AE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| AF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| B0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| B1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| B2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| B3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| B4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| B5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| B6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| B7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| B8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| ***** VECTOR ***** | | | | | | | | | | |
| B9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | LEVEL SPEED | |
| BA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | DETUNE SPEED | |
| ***** LEVEL VECTOR ***** | | | | | | | | | | |
| BB | BC | → | 0 | 0 | 0 | 0 | 0 | | LEVEL TIME INTERVAL STEP | |
| BD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | LEVEL X-axis | |
| BE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | LEVEL Y-axis | |
| ***** DETUNE VECTOR ***** | | | | | | | | | | |
| 183 | 184 | → | 0 | 0 | 0 | 0 | 0 | | DETUNE TIME INTERVAL STEP | |
| 185 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | DETUNE X-axis | |
| 186 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | DETUNE Y-axis | |
| ***** | | | | | | | | | | |
| 24A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | DETUNE Y-axis | |

VOICE bulk dump request

| | data |
|--|------|
|--|------|

<Appended table 3>

The data format of each voice of (64) voice bulk is the same as that of 1 voice bulk. Only those with data at the MSB are 2-byte data.

| Mb7-Mb1='0000000' | | | | | | | | | | | |
|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------|------------------------|
| ADRS(HEX) | Mb0 | Lb7 | Lb6 | Lb5 | Lb4 | Lb3 | Lb2 | Lb1 | Lb0 | | |
| 00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | EFFECT---- |
| 01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | EFFECT BALANCE---- |
| 02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | GROUP1 EFFECT SEND---- |
| 06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | GROUP2 EFFECT SEND---- |
| 07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1/2 | 1/2 | GRP2GRP1 | |
| 08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 0A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 0B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 0C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 0D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | NAME 1---- |
| 0E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | NAME 2---- |
| 0F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | NAME 3---- |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | NAME 4---- |
| 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | NAME 5---- |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | NAME 6---- |
| 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | NAME 7---- |
| 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | NAME 8---- |
| 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ASIN-- |
| 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 1A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 1B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 1C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 1D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 1E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 1F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 1 ***** | | | | | | | | | | | |
| GRP | | | | | | | | | | | |
| 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | MED-- |
| 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | VOICE NUMBER---- |
| 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | VOLUME---- |
| 24 | 25 | → | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | DETUNE---- |
| 26 | 27 | → | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | NOTE SHIFT---- |
| 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 2A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 2 ***** | | | | | | | | | | | |
| 2B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 3 ***** | | | | | | | | | | | |
| 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| 3E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| 3F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 4 ***** | | | | | | | | | | | |
| 41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| 49 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| 4A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 4B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 5 ***** | | | | | | | | | | | |
| 4C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| 54 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| 55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 6 ***** | | | | | | | | | | | |
| 57 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| 5F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 61 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 7 ***** | | | | | | | | | | | |
| 62 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| 6A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| 6B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 6C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 8 ***** | | | | | | | | | | | |
| 6D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| 76 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 77 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 9 ***** | | | | | | | | | | | |
| 78 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| 81 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 82 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 10 ***** | | | | | | | | | | | |
| 83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| 8B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| 8C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 8D | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 11 ***** | | | | | | | | | | | |
| 8E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| 96 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| 97 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| 98 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 12 ***** | | | | | | | | | | | |
| 99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| A1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| A2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| A3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 13 ***** | | | | | | | | | | | |
| A4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| AC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| AD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| AE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 14 ***** | | | | | | | | | | | |
| AF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| B7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| B8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| B9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 15 ***** | | | | | | | | | | | |
| BA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| C2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| C3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| C4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| ***** CHANNEL 16 ***** | | | | | | | | | | | |
| C5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | VSW 1/2 | 0 0 |
| CD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | PAN---- |
| CE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |
| CF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- | ((don't care))---- |

TG33

MULTI bulk dump request

| | data |
|----|------|
| 0 | \$F0 |
| 1 | \$43 |
| 2 | \$2n |
| 3 | \$7E |
| 4 | L |
| 5 | M |
| 6 | — |
| 7 | — |
| 8 | 0 |
| 9 | 0 |
| 10 | 1 |
| 11 | 2 |
| 12 | M |
| 13 | U |
| 14 | \$F7 |

1 MULTI bulk dump request

| | data |
|----|------|
| 0 | \$F0 |
| 1 | \$43 |
| 2 | \$2n |
| 3 | \$7E |
| 4 | L |
| 5 | M |
| 6 | — |
| 7 | — |
| 8 | 0 |
| 9 | 0 |
| 10 | 1 |
| 11 | 2 |
| 12 | M |
| 13 | E |
| 14 | \$F7 |

n: device number

<Table 4>

System bulk dump

Only those with data at the MSB are 2-byte data.

Mb7-Mb1-'0000000'

| ADRS(HEX) | Mb0 | Lb7 | Lb6 | Lb5 | Lb4 | Lb3 | Lb2 | Lb1 | Lb0 |
|-----------|-----|-----|-----------------------|-----|---------------------|-----------------|-----|-----|-----|
| 00 | | 0 | 0 | 0 | ---DEVICE NUMBER--- | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 01 02 | 1 | 0 | 1 | 1 | 1 | h/r | SW | 0 | SW |
| 03 | | 0 | 0 | 0 | -VOICE RECEIVE CH-- | | | | |
| 04 | | 0 | 0 | 0 | 0 | ---VECTOR CH--- | | | |
| 05 06 | → | 0 | -----TRANSPOSE----- | | | | | | |
| 07 08 | → | 0 | -----MASTER TUNE----- | | | | | | |

bulk dump request

| | data |
|----|------|
| 0 | \$F0 |
| 1 | \$43 |
| 2 | \$2n |
| 3 | \$7E |
| 4 | L |
| 5 | M |
| 6 | — |
| 7 | — |
| 8 | 0 |
| 9 | 0 |
| 10 | 1 |
| 11 | 2 |
| 12 | S |
| 13 | Y |
| 14 | \$F7 |

n: device number

YAMAHA [Tone Generator]

Date :13-JUL-1990

Model TG33

MIDI Implementation Chart

Version : 1.00

| Function ... | Transmitted | Recognized | Remarks |
|--------------------------|---|--|---|
| Basic Default | : 1 - 16 | : 1 - 16 | : memorized |
| Channel Changed | : 1 - 16 | : 1 - 16 | : |
| Mode Default | : 3 | : 1,3 | : memorized |
| Mode Messages | : x | : x | : |
| Mode Altered | : ***** | : x | : |
| Note Number : True voice | : x : ***** | : 0 - 127 : 19 - 114 | : |
| Velocity Note ON | : x | : o v=1-127 | : |
| Velocity Note OFF | : x | : x | : |
| After Touch Key's | : x | : x | : |
| After Touch Ch's | : x | : o | : |
| Pitch Bender | : x | : o 0-12 semi | : 7 bit resolution |
| Control Change | 0 : x 1 : x 7 : x 16 : o 17 : o 32 : x 64 : x | : o : o : o : o : o : o | : Bank Select MSB : Modulation Wheel : Volume *1: Vector X-axis *1: Vector Y-axis : Bank Select LSB : Sustain |
| Reset All Cntrls | : x | : o | : |
| Prog Change : True # | : x : ***** | : o 0-79 | : with Bank Select *2: |
| System Exclusive | : o | *3: o | *3: Voice Parameters |
| System : Song Pos | : x | : x | : |
| System : Song Sel | : x | : x | : |
| Common : Tune | : x | : x | : |
| System : Clock | : x | : x | : |
| Real Time : Commands | : x | : x | : |
| Aux : Local ON/OFF | : x | : x | : |
| Aux : All Notes OFF | : x | : x | : |
| Mes- : Active Sense | : x | : o | : |
| sages:Reset | : x | : x | : |
| Notes: *1 | ; receive if vector switch is on. | | |
| *2 | ; voice : 11 - 88 , multi : 11 - 28 | | |
| *3 | ; transmit/receive if exclusive switch is on. | | |

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO o : Yes
 Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO x : No

■ ERROR MESSAGES (エラーメッセージ)

Change int. bat!

The internal memory backup battery voltage has dropped to an unsafe level.

内蔵のバックアップバッテリーの電圧値が、規定値以下になっている。

Card not ready!

You have attempted to perform a data card operation (save, load, format, etc.) while no data card is present in the TG33 card slot.

カードプロテクトスイッチがONのまま、データカードへのセーブあるいはデータカードのフォーマットを実行した。

Card protected!

You have attempted to perform an operation that writes to the data card (save or format) while the card protect switch is ON.

カードプロテクトスイッチがONのまま、データカードへのセーブあるいはデータカードのフォーマットを実行した。

Card not format!

You have attempted to save or load using a card that has not been properly formatted for use with TG33.

TG33用にフォーマットされていないカードを使用して、セーブやロードを実行した。

Change Card Bank

You have attempted to save to, compare or format a 32k card while card bank 2 (C₂) is selected.

32Kのカードを使用中に、“バンク2”を選んでセーブ、コンペアあるいはフォーマットを実行した。

Change card bat!

The data card battery is low and must be replaced.

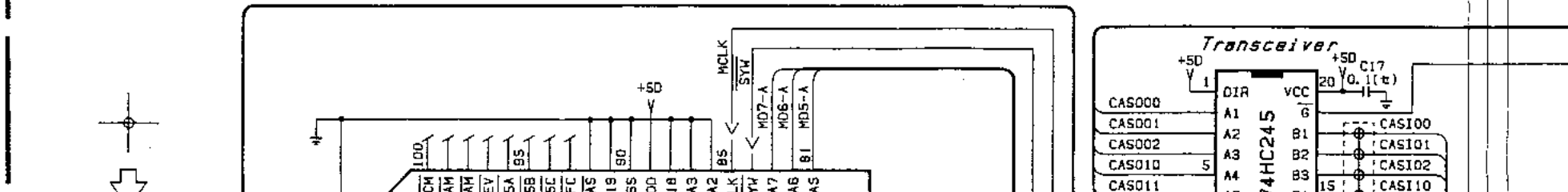
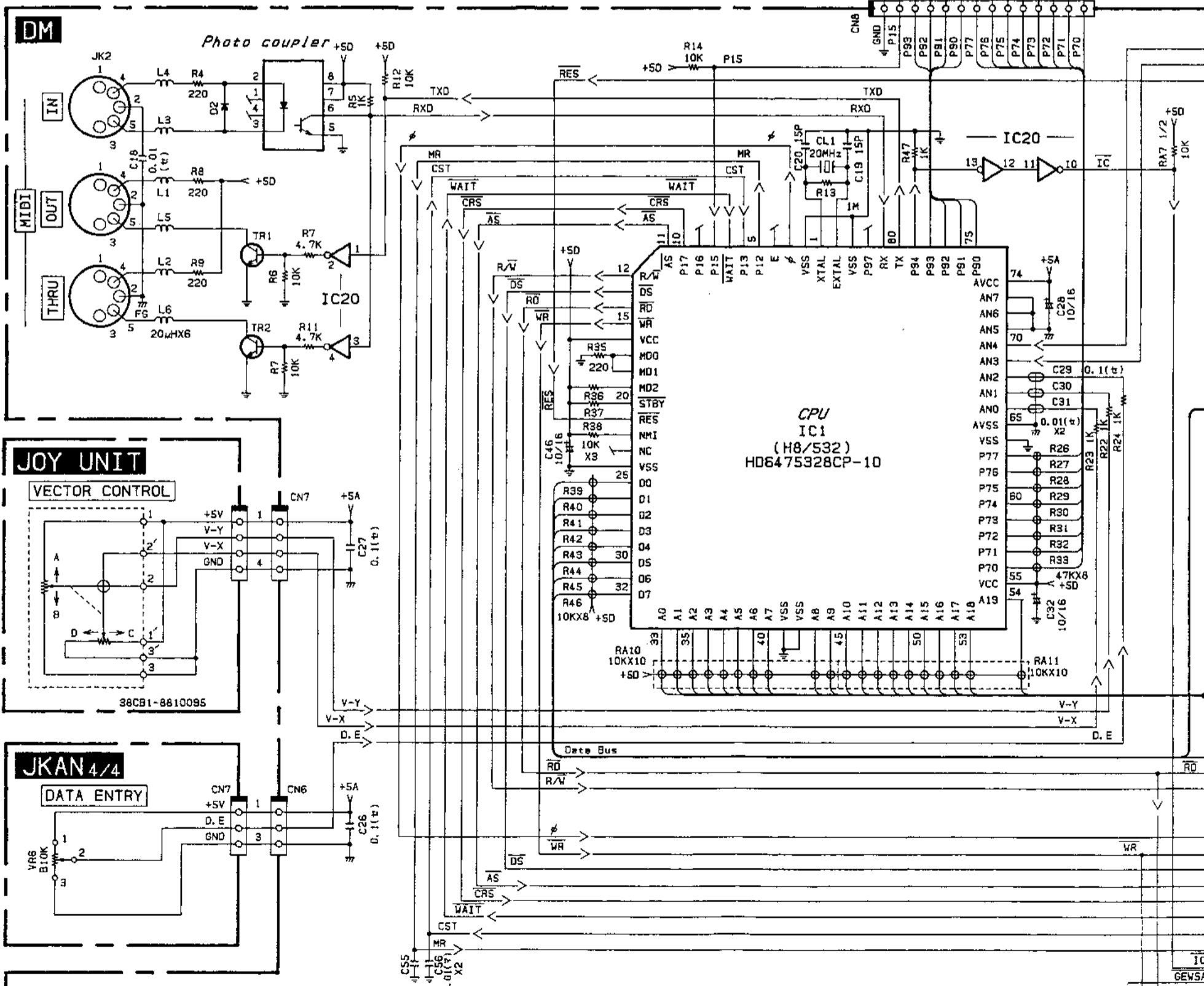
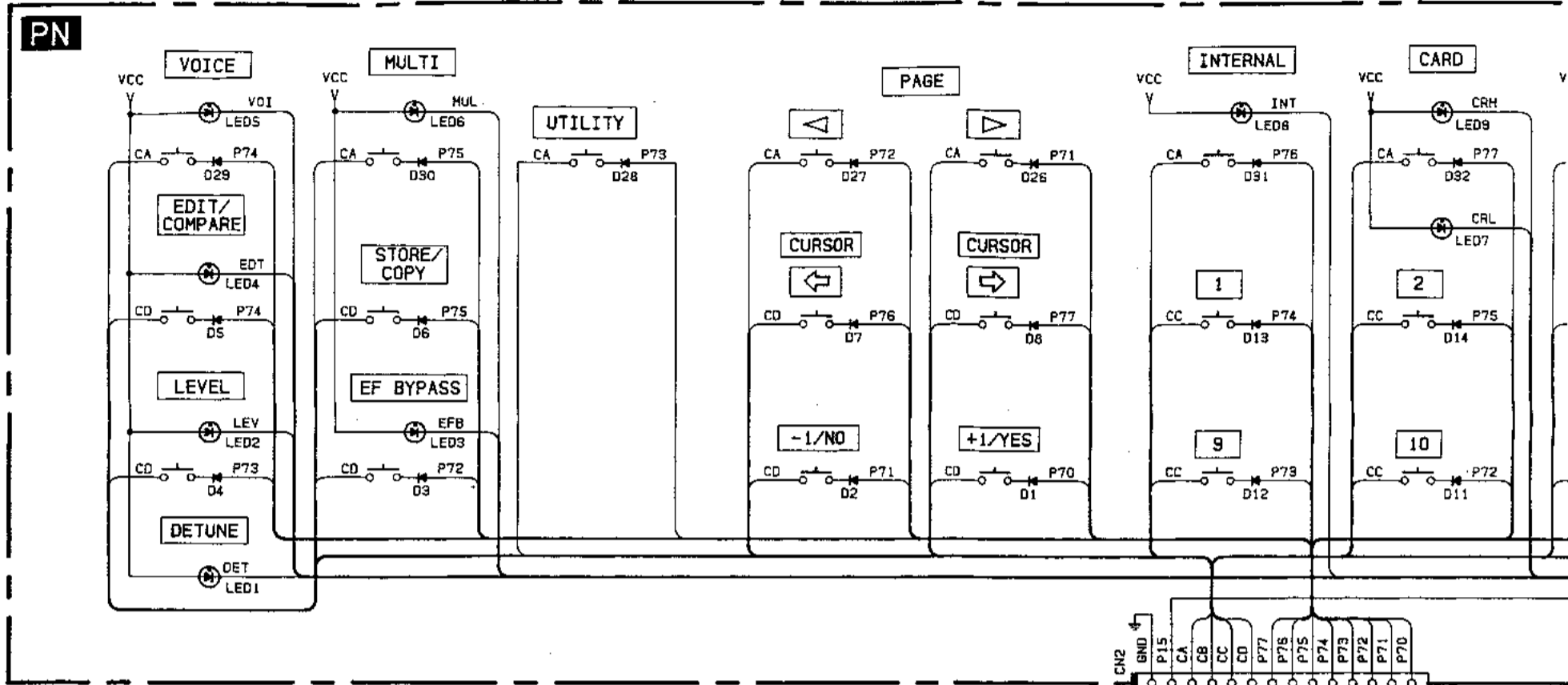
データカードのバックアップバッテリーの電圧値が、規定値以下になっている。

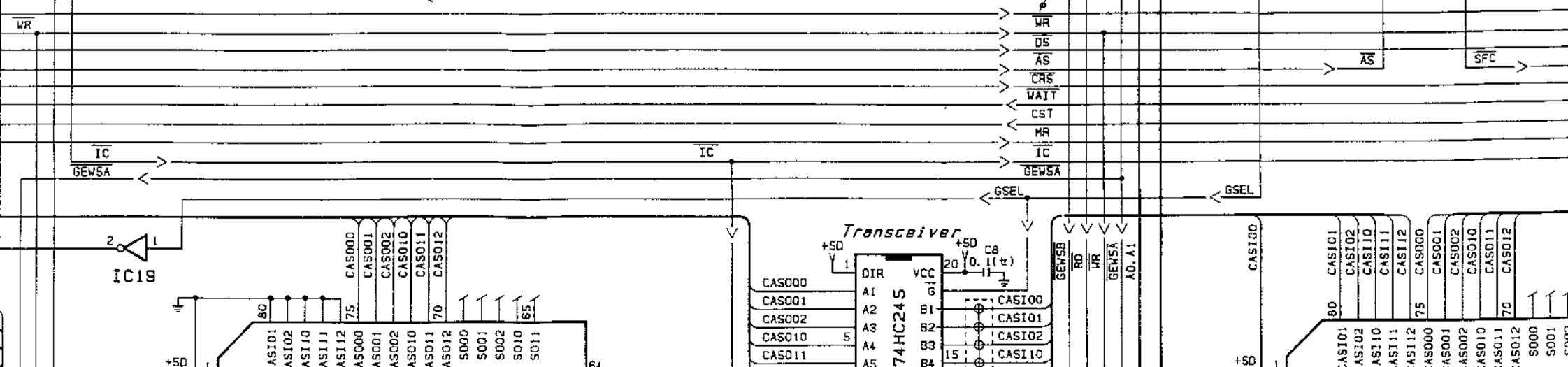
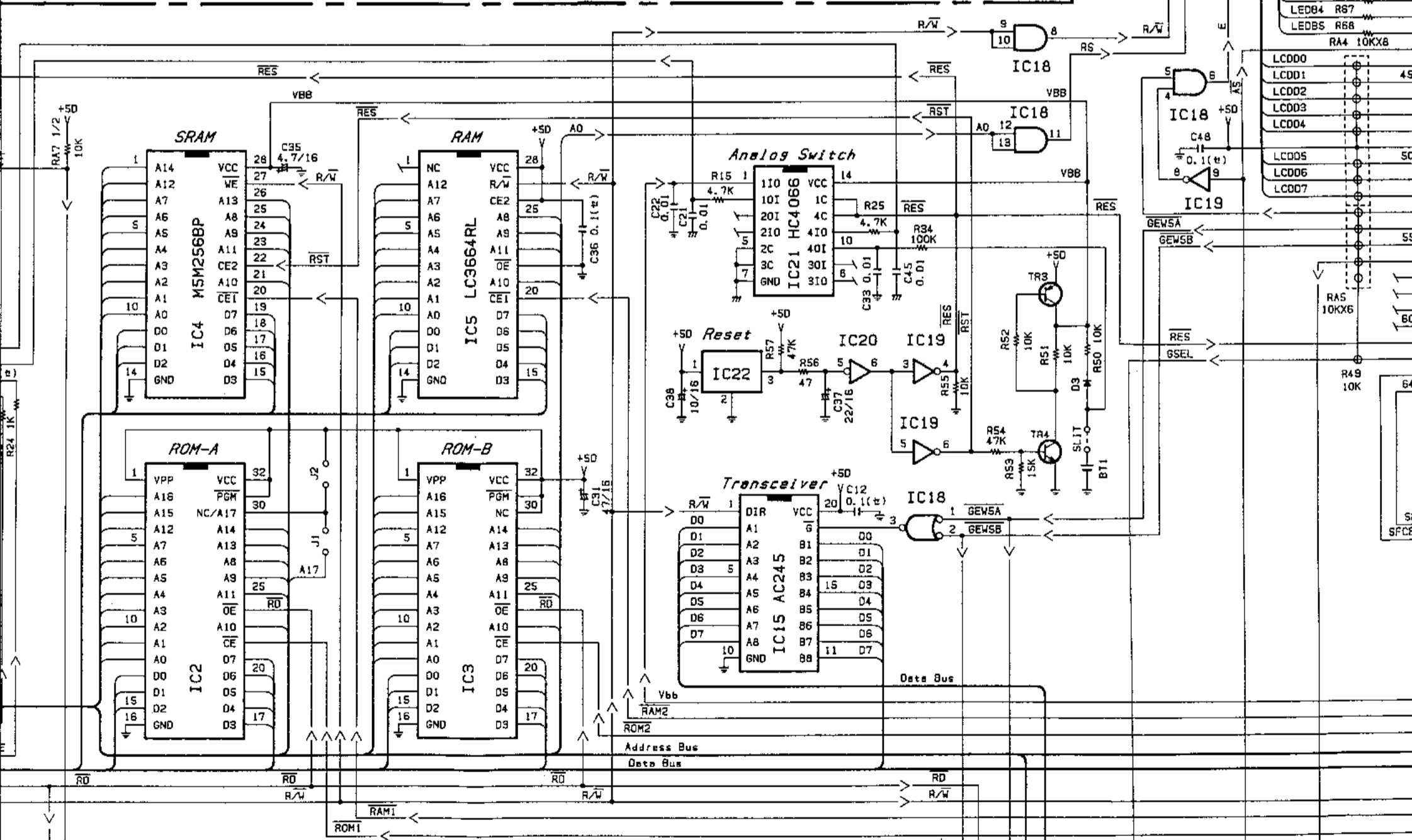
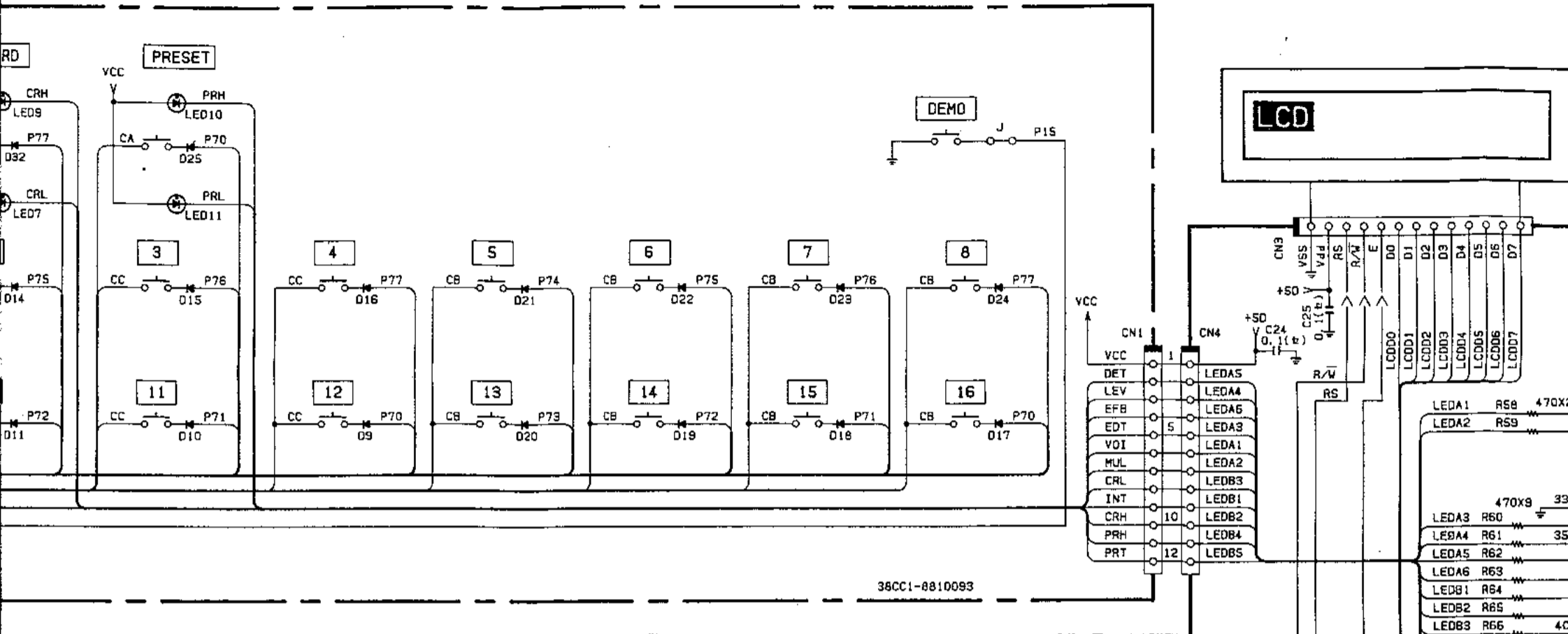
Verify error!

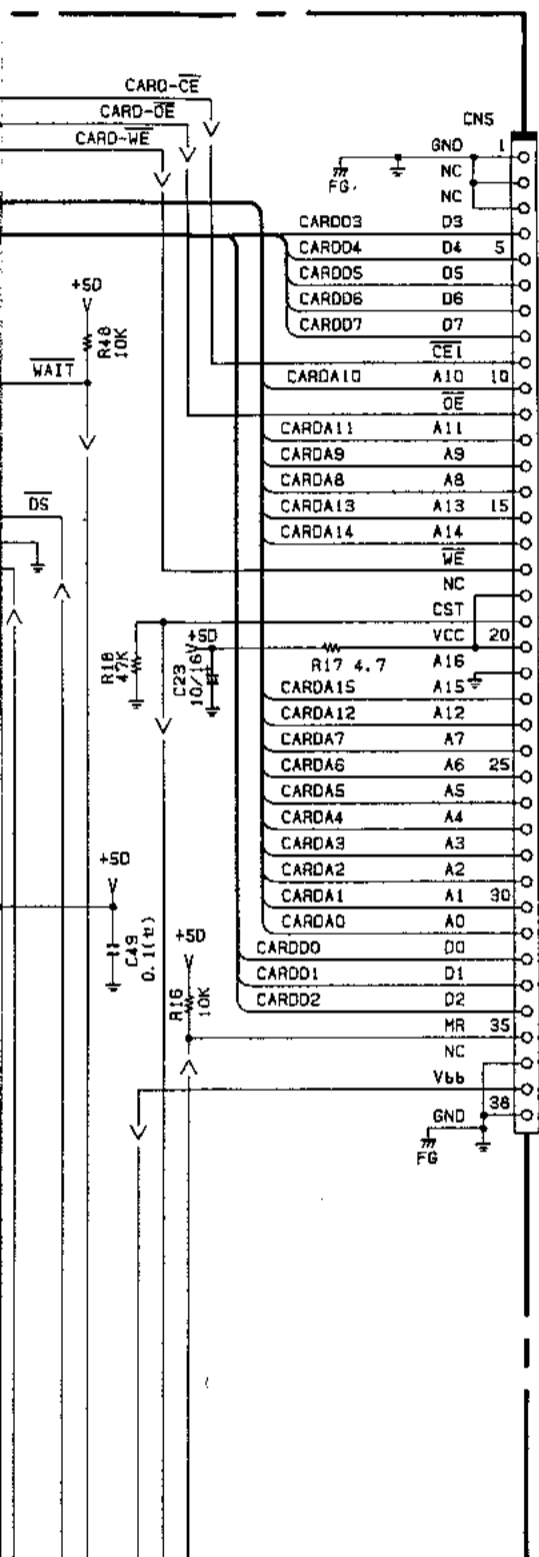
Unrecognizable data has been received by the TG33.

認識できないデータが受信された。

TG33 OVERALL CIRCUIT DIAGRAM







Notes)

- Circuit Board: DM (VJ789400) X1013C0
- IC
IC 1: HD6475328CP-10 (X1119A00) CPU <H8/532>
IC 2: 012AV030 (X1117A00) EPROM A 1M Ver 0.3
IC 3: 012BV030 (X1118A00) EPROM B 1M Ver 0.3
IC 4: MSM52558P-10LL (XH080A00) SRAM 256K
IC 5: LC3664RL-12 (XG517A00) SRAM 64K
IC 6: TC51832PL-10 (XC628A00) PSRAM 256K
IC 7: YM3413 (XE449A00) LDSP
IC 8: TMC57800N (XG662A00) MIX5
IC 9, 10: TMC3493APH (XF987A00) SFC
IC11-14: TC74AC245P (XH608A00) BUS TRANSCEIVER
IC15: PQ05RF1 (X1124A00) REGULATOR 5V 1A
IC17, 23: TC74HC245AP (IR024500) BUS BUFFER
IC18: TC74AC08P (XG656A00) AND
IC19: TC74AC04P (XG655A00) INVERTER
IC20: SN74HC14N (IR001450) INVERTER
IC21: TC74HC4066AP (IR406600) A-SWITCH
IC22: PST518B-2 (IG116200) SYSTEM RESET
IC24: LC92030C-477 (X1074A00) GATE ARRAY SP33
IC25: LC92018B-476 (X1045A00) GATE ARRAY RI54
IC28: HN623248PC68 (X1796A00) ROM 4M VOICE
IC27: HN623248PC69 (X1797A00) ROM 4M VOICE
IC28: TC40HC004P (IG051000) INVERTER
 - Photo Coupler
PC 1: 6N137 (VD473200)
 - Transistor
TR 1, 2: 2SC1740S R,S (IC174070)
TR 3: 2SA1015 O, Y (IA101570)
TR 4: 2SC1815 Y,GR (IC181580)
TR 5: 2SD880 O, Y (ID088000)
 - Diode
D 1: 11E54 (VB481900)
D 2, 3: 1SS133 (IF003450)
 - Zener Diode
ZD 1: MTZ9.1A 9.1V (VA095500)
 - Resistor Array
RA 1, 4, 6: RGLD8X103J (VE445200) 10K x 8
RA 2, 3, 10, 11: RGLD10X103J (VH564300) 10K x 10
RA 5, 7-9: RMLS6J103 (HZ004650) 10K x 6
 - Electrolytic Cap.
C 1: 2200µF 16V (VH603700)
C 2, 3: 220µF 16V (UJ138220)
C 7: 470µF 10V (UJ828470)
 - Tantalum Capacitor
C35: 4.7µF 16V M (FP736470)
 - Semiconductive Cera. Cap.
C 4-6, 8, 9, 12, 13, 16, 17, 24-27, 29-31, 36, 39, 42, 43, 48-52, 54, 57: 0.1µF 16V M (FZ004100)
 - Coil
L 1-6: FL5R200QNT 20µ (VB835000)
 - EMI Filter
EMI 1-3: LS MT Y223NB 0.022 (FZ006970)
 - Quartz Crystal Unit
CL 1: 20MHz AT-49 (VI927300)
CL 2: 12.8MHz AT-49 (VI460600)
 - Connector
JK 1: X-G9242 (VH303600) DC 10V 700mA IN
 - DIN Connector
JK 2: 3P YKF51-5046 (VI466400) MIDI
 - Lithium Battery
BT 1: CR2032 (VE338400)
 - Connector, Card
CN 5: 38P (VF821100) CARD

Notes)

- Circuit Board: PN (VJ789200) X1015A0
- Diode
D 1-33: 1SS133 (IF003450)
 - LED
LED 1-11: SLZ-181809T6 RE (VI813100)
- Circuit Board: JKAN1/4 (X1014C0)
- IC
IC 1: YM3032 (XG411A00) DAL3
IC 2-4: NJM4560ED (IG040000) OP AMP.
IC 5, 6, 9, 13: RC4558DV (IG001390) OP AMP.
IC 7, 8: M5228P (XF123A00) OP AMP. 4ch
IC10, 11: M51132L (XE470001) VCA
IC12: NJM4556 (IG042500) OP AMP. 2ch
 - Transistor
TR 1: 2SA1015 Y (IA101520)
TR 2-5: 2SC2878 A, B (IC287800)
 - Diode
D 5-12: 1SS133 (IF003450)
 - Zener Diode
D 1-4: RD3.6EB1 3.6V (IF001660)
 - Trimmer Potentiometer
VR 1-4: B10K EVN (VA024800)
 - Electrolytic Cap.
C43, 52-55: 220µF 16V (FZ006950)
 - Semiconductive Cera. Cap.
C 1, 2, 60-69: 0.1µF 16V M (FZ004100)
 - Coil
L 1-4, 7: FL5R200QNT 20µH (VB835000)
 - Phone Jack
JK 1-4: HLJ4306 Mono (VE742000) OUTPUT
 - Jumper wire, R89
- | | | | | | |
|------|------|------|------|-----------|-----|
| J101 | J102 | J103 | J104 | marked * | R89 |
| x | o | o | x | x (4 pcs) | x |
- (o: installed x: not installed)

Notes)

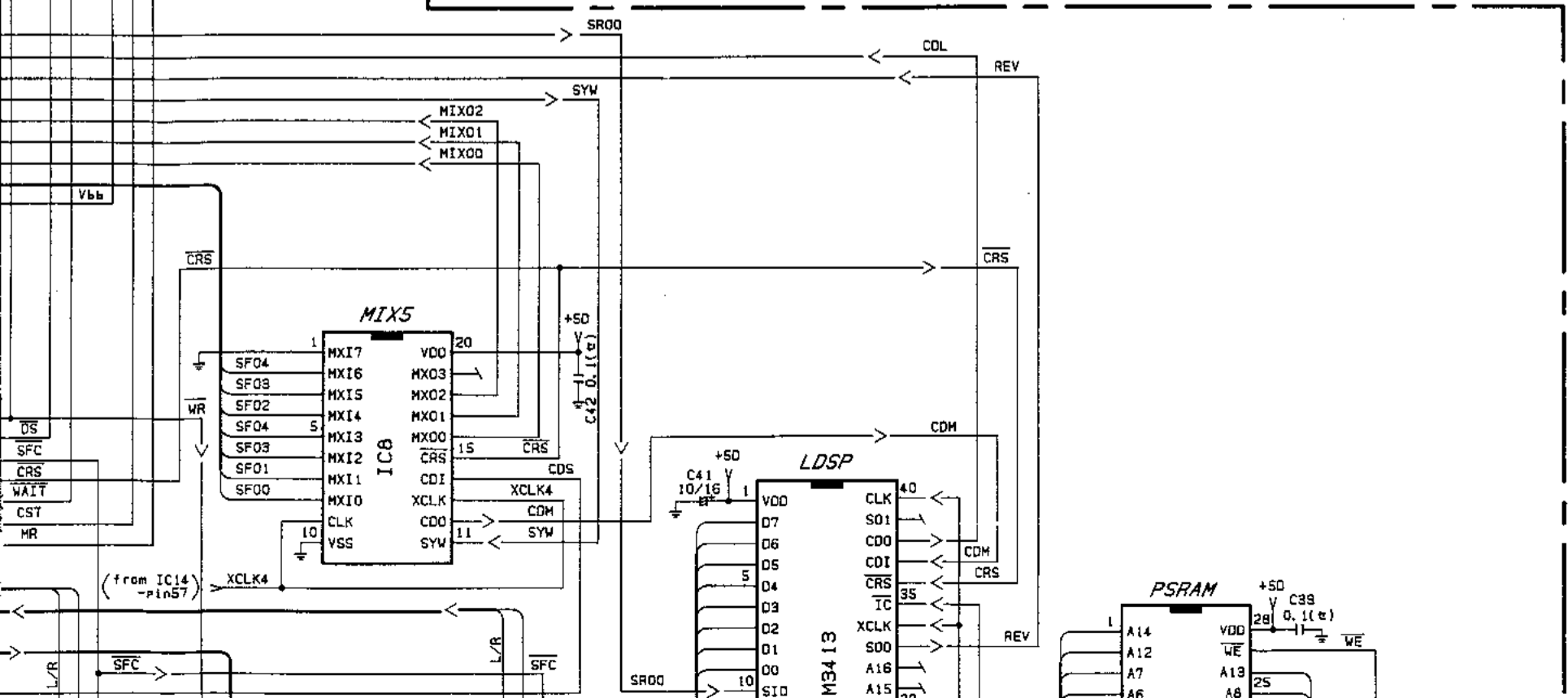
- Circuit Board: JKAN2/4 X1014C0
- Coil
L 5, 6: FL5R200QNT 20µH (VB835000)
 - Phone Jack
JK 5: HLJ0521 Stereo (LB203090) PHONES

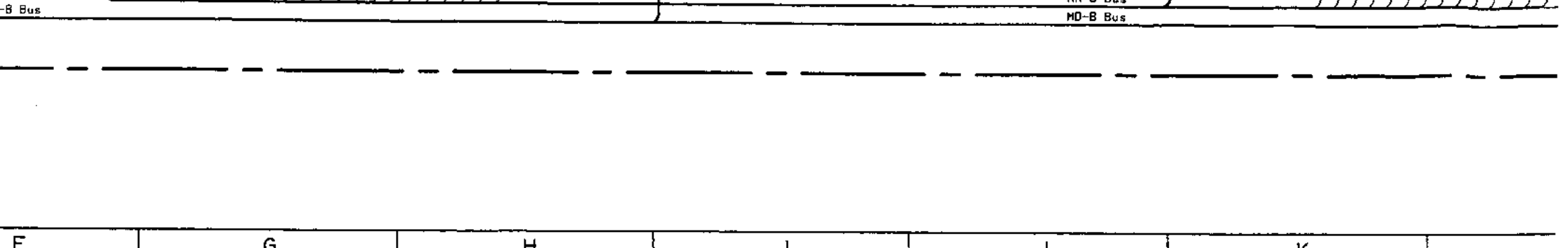
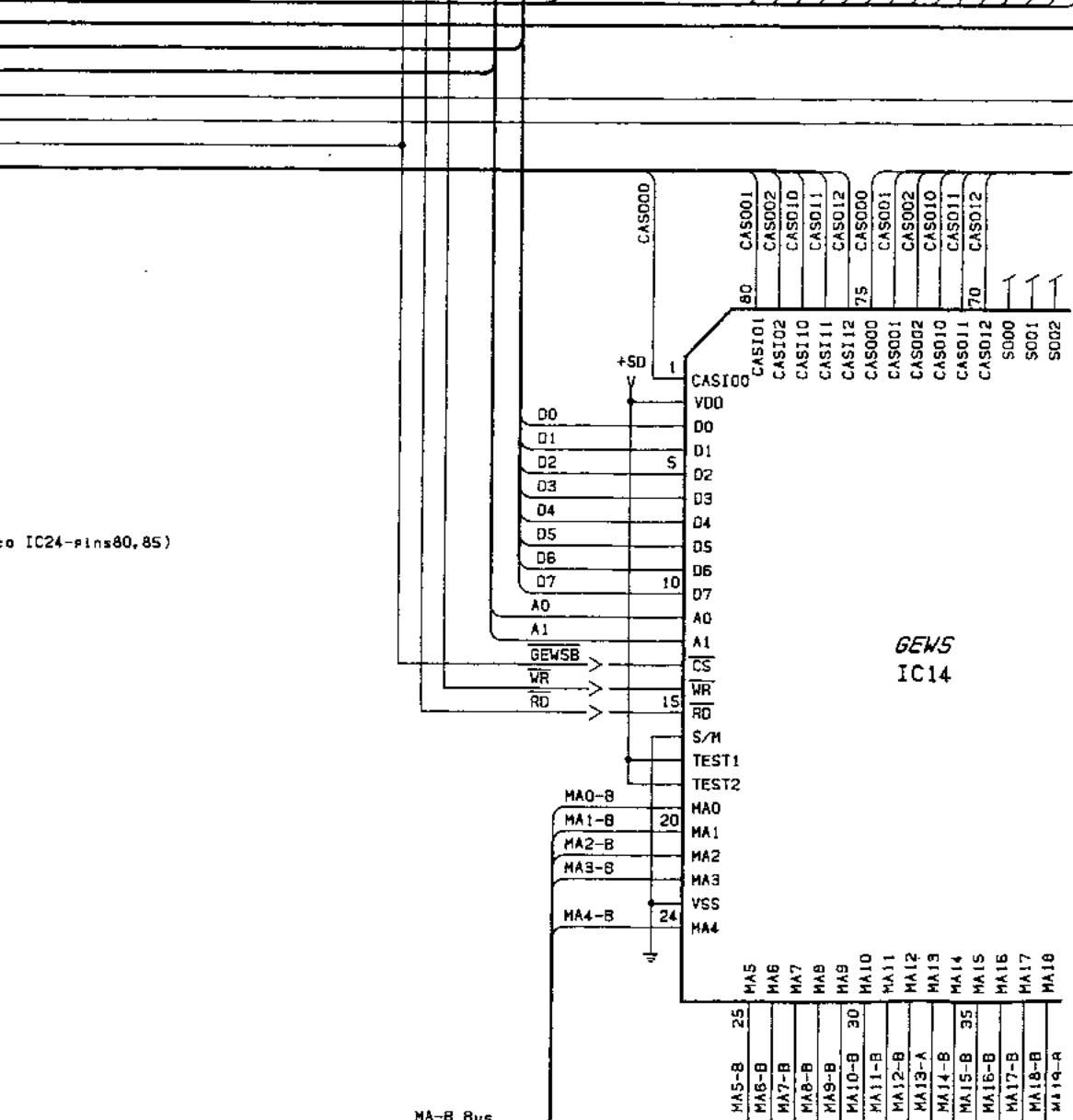
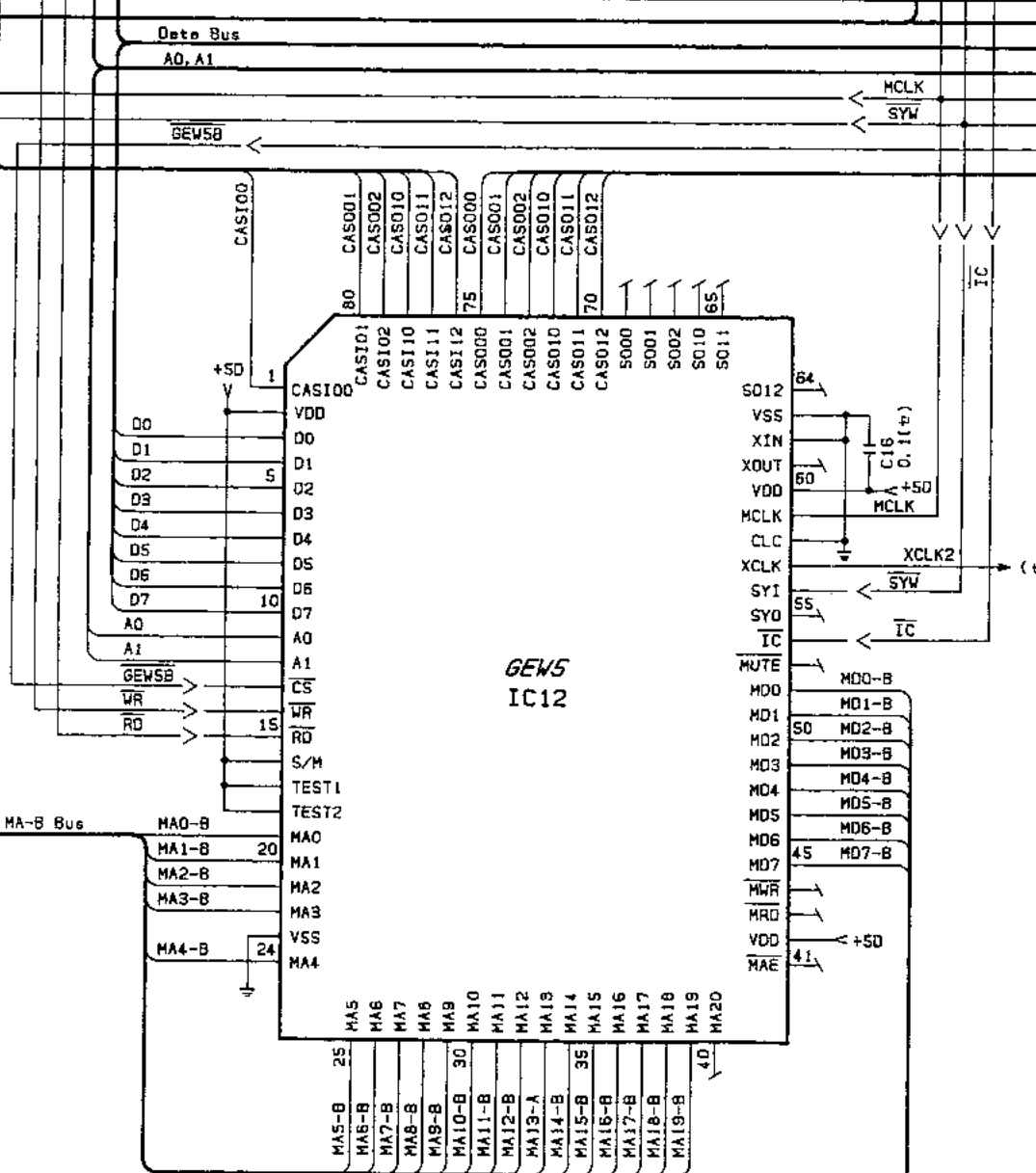
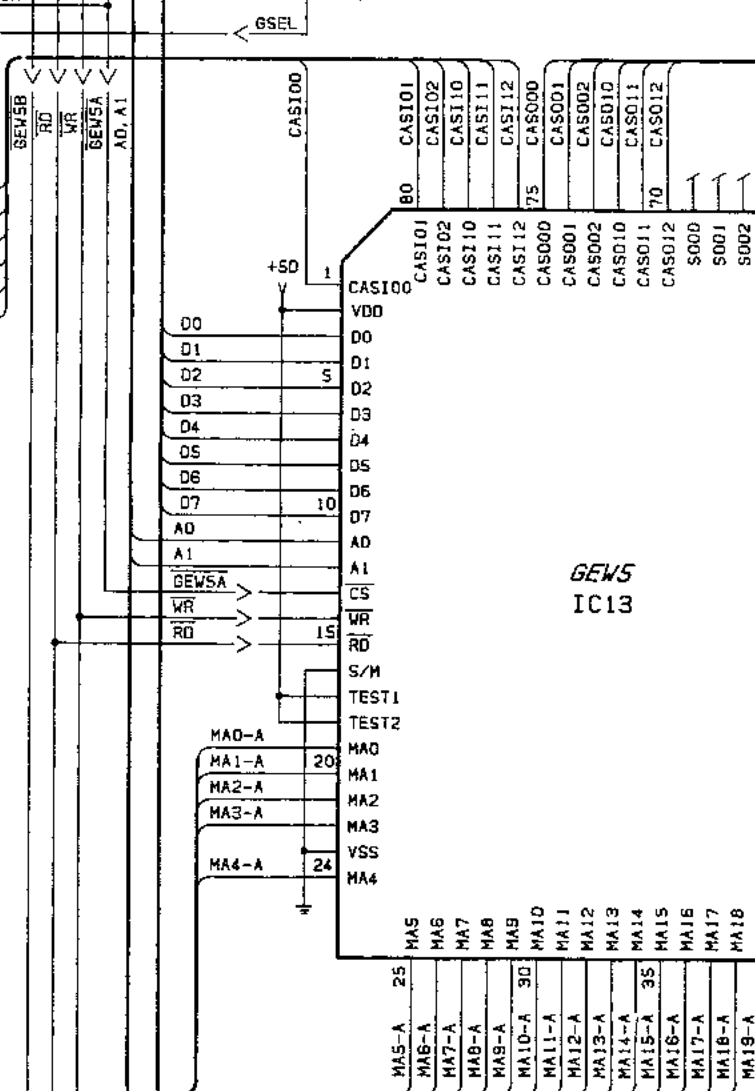
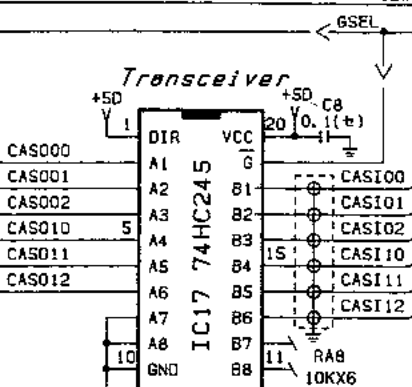
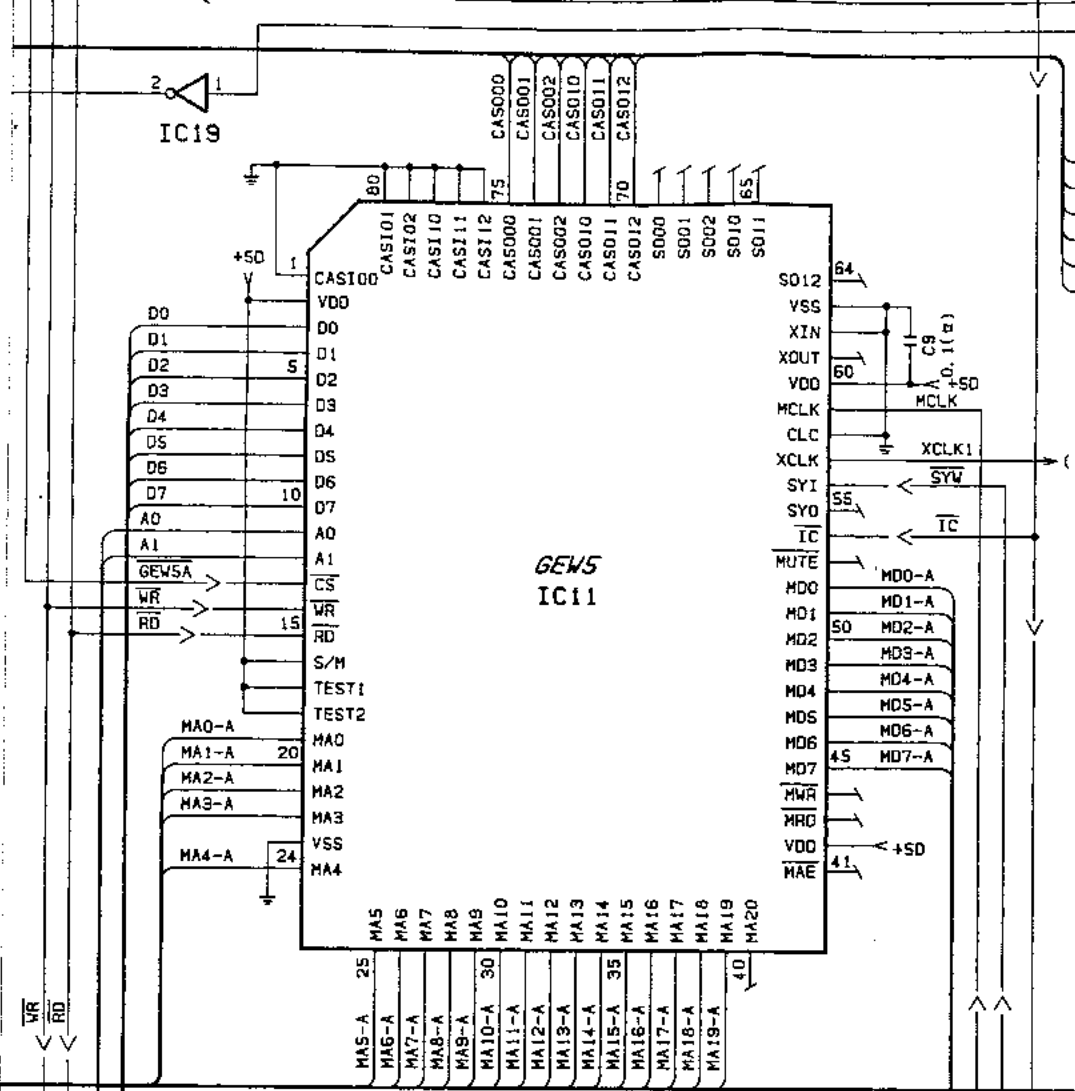
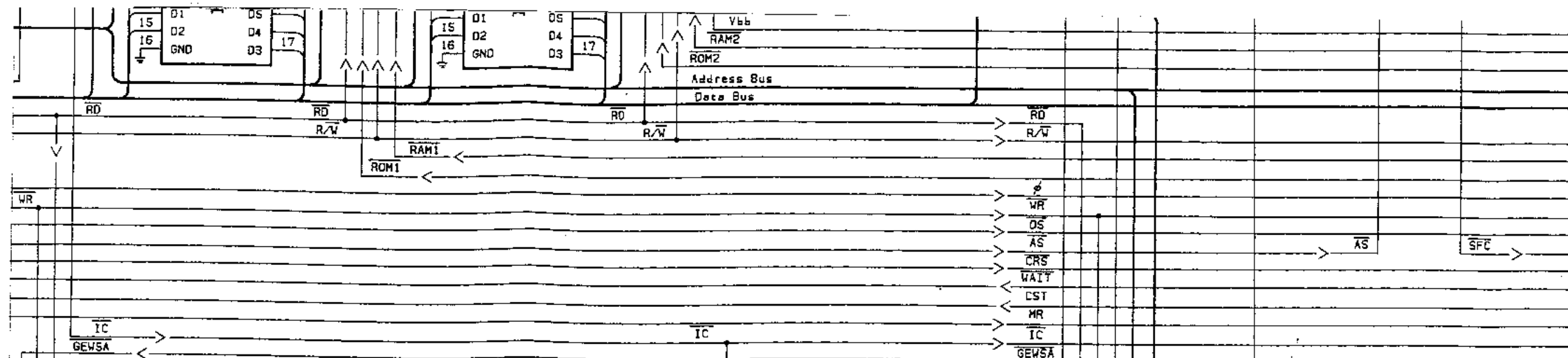
Notes)

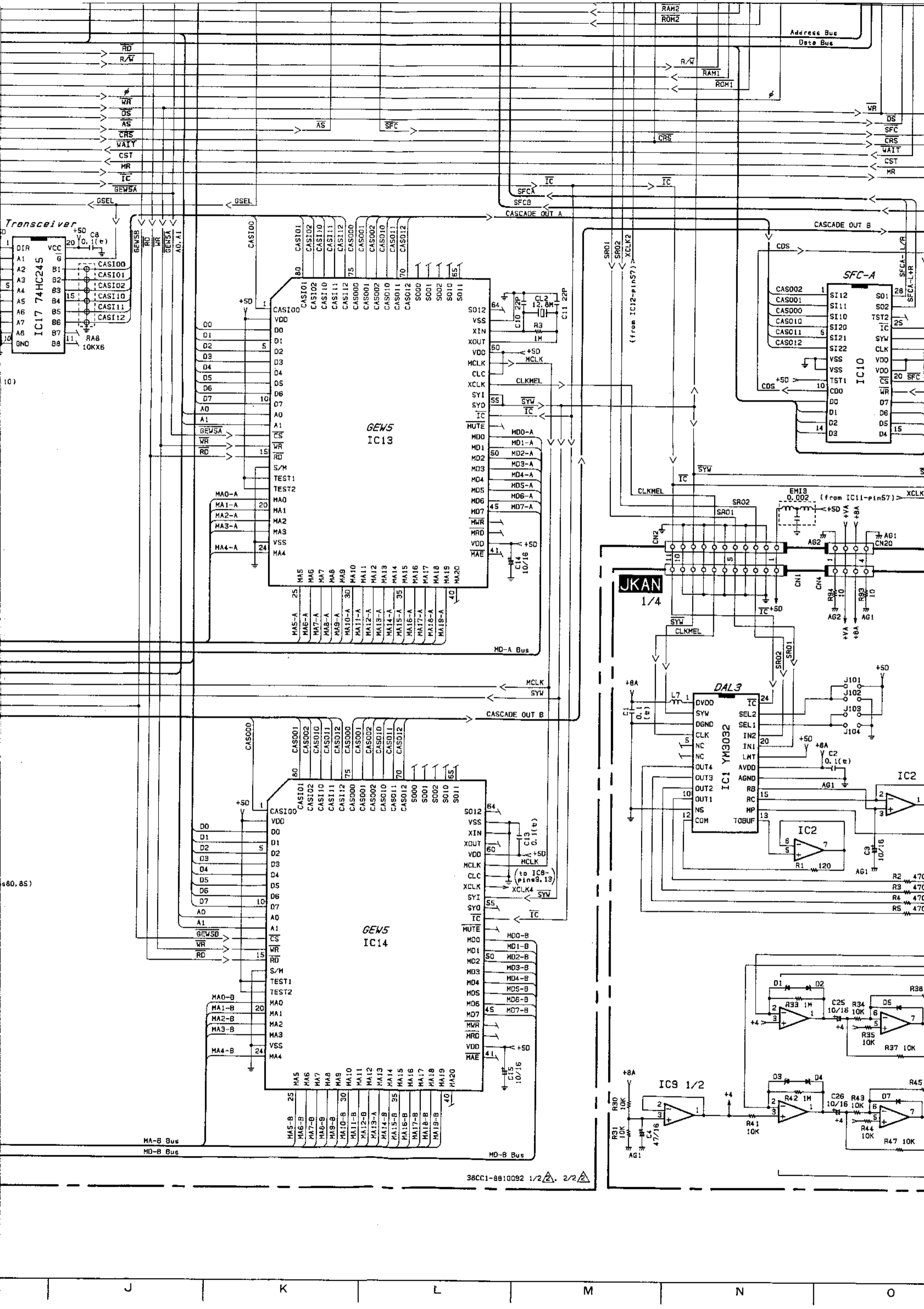
- Circuit Board: JKAN3/4 X1014C0
- Variable Resistor
VR 5: A10K x 2 (VF636100) MASTER VOLUME

Notes)

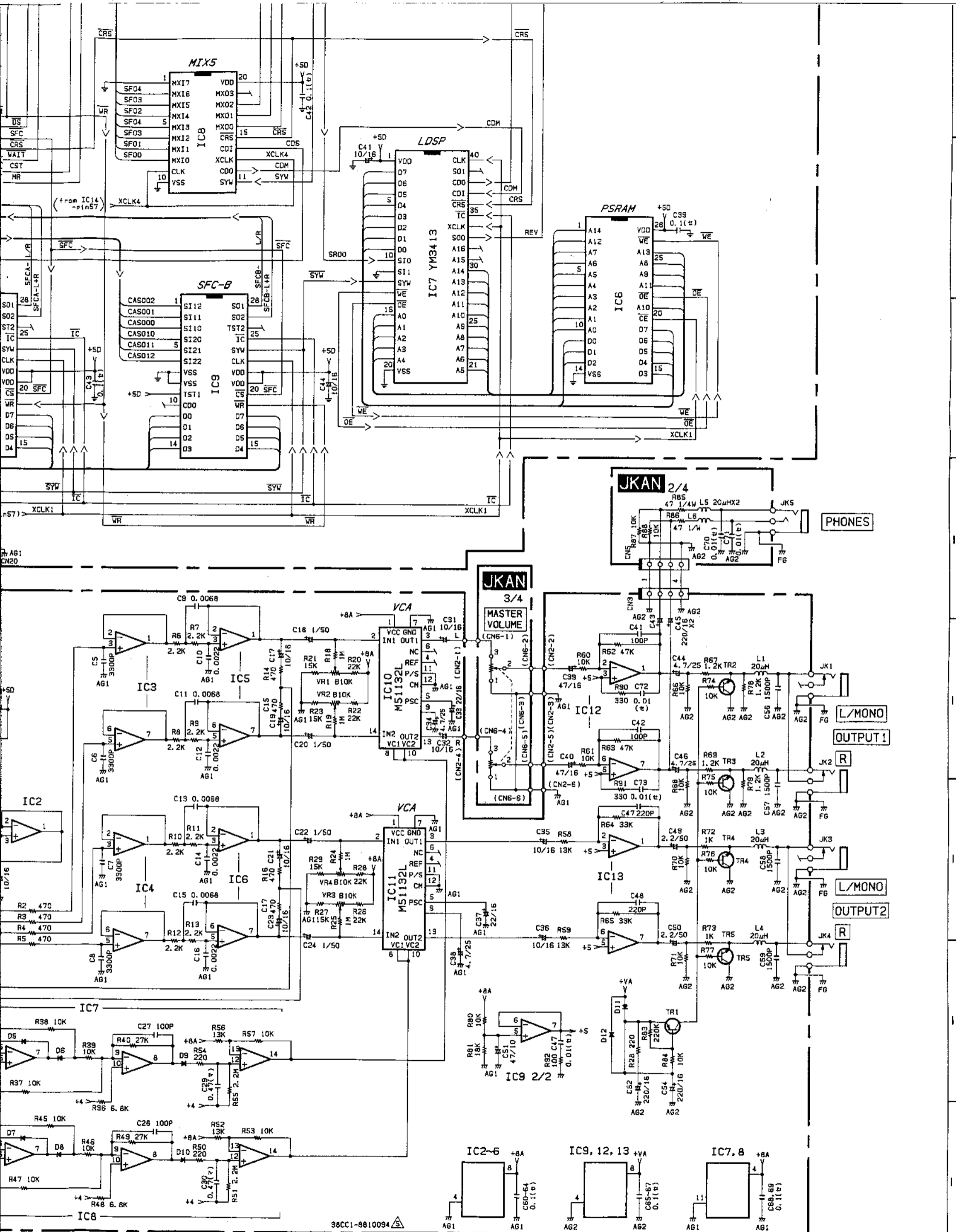
- Circuit Board: JKAN4/4 X1014C0
- Variable Resistor
VR 6: B10K RK09K113 (VJ789500) DATA ENTRY







38CC1-8810092 1/2 2/2



38CC1-8810094

TG33

O P Q R S T U

STONE GENERATOR

TG33

PARTS LIST

Note) DESTINATION ABBREVIATIONS

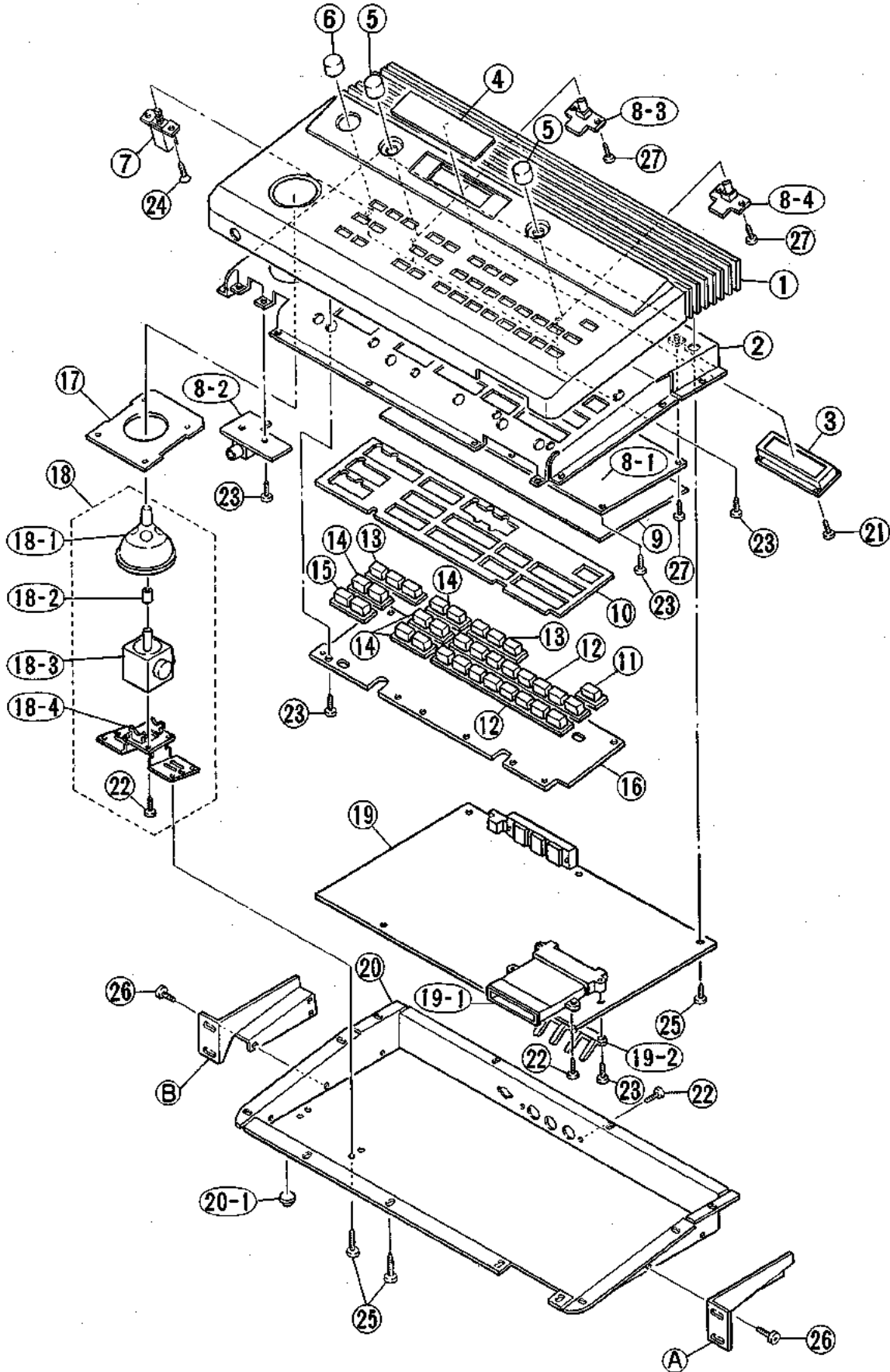
| | |
|--------------------------|-----------------------|
| J : Japanese model | A : Australian model |
| U : U.S. model | E : European model |
| C : Canadian model | D : West German model |
| X : General model | B : British model |
| M : South African model | I : Indonesian model |
| H : North European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

ELECTRICAL PARTS (電気部品)

| Ref. No. | Part No. | Description | 部品名 | Remarks | ランク |
|----------|----------|---------------------------|-----------------|-------------|-----------------|
| | VJ789400 | Circuit Board | DH | DMシート | (TG33) |
| | VJ789200 | Circuit Board | PN | PNシート | |
| | VJ789300 | Circuit Board | JKAN | JKANシート | |
| | | Circuit Board | JKAN1/4 | JKAN1/4シート | |
| | | Circuit Board | JKAN2/4 | JKAN2/4シート | |
| | | Circuit Board | JKAN3/4 | JKAN3/4シート | |
| | | Circuit Board | JKAN4/4 | JKAN4/4シート | |
| | VJ789400 | Circuit Board | DH | DMシート | 57 |
| | XI124A00 | IC | PQ05RF1 | IC | REGULATOR 5V 1A |
| | IG116200 | IC | PST518B-2 | IC | SYSTEM RESET |
| | IR001450 | IC | SN74HC14N | IC | INVERTER |
| | IR024500 | IC | TC74HC245AP | IC | BUS BUFFER |
| | IR406600 | IC | TC74HC4066AP | IC | A-SWITCH |
| | XG655A00 | IC | TC74AC04P | IC | INVERTER |
| | XG656A00 | IC | TC74AC08P | IC | AND |
| | XN608A00 | IC | TC74AC245P | IC | BUS TRANSCEIVER |
| | XG662A00 | IC | TMC57800N | IC | MIX V |
| | XI045A00 | IC | LC92018B-476 | IC | GATE ARRAY RI54 |
| | XI074A00 | IC | LC92030C-477 | IC | GATE ARRAY SP33 |
| | XI119B00 | IC | HD6475328CP-10 | IC | CPU <H8/532> |
| | XG517A00 | IC | LC3664RL-12 | IC | SRAM 64K |
| | XI796A00 | IC | HN62324BPC68 | IC | ROM 4M |
| | XI797A00 | IC | HN62324BPC69 | IC | ROM 4M |
| | XI117B00 | IC | 012AY101 | IC | EPROM A |
| | XI118A00 | IC | 012BY101 | IC | EPROM B |
| | XE449A00 | IC | YM3413 | IC | LDSP |
| | XE755A00 | IC | TMC3489NL | IC | SFC |
| | XF987A00 | IC | TMC3493APH | IC | GEW5 |
| | XH080A00 | IC | M5M5255RP-10LL | IC | SRAM 256K |
| | XC628A00 | IC | TC51832PL-10 | IC | PSRAM 256K |
| | IG051000 | IC | TC40H004P | IC | INVERTER |
| | VD473200 | Photo Coupler | BN137 | フォトカプラ | 05 |
| | IA101570 | Transistor | 2SA1015 O.Y | トランジスタ | 01 |
| | IC174070 | Transistor | 2SC1740S R.S | トランジスタ | 01 |
| | IC181580 | Transistor | 2SC1815 Y.GR | トランジスタ | 01 |
| | ID088000 | Transistor | 2SD880 O.Y | トランジスタ | 02 |
| | VB481900 | Diode | 11ES4 | ダイオード | 01 |
| | IF003450 | Diode | ISS133 | ダイオード | 01 |
| | VA095500 | Zener Diode | MTZ9.1A 9.1V | ツェナーダイオード | 01 |
| | HZ004650 | Resistor Array | RNL56J103 | 抵抗アレイ | 02 |
| | VE445200 | Resistor Array | RGLD8X103J | 抵抗アレイ | 01 |
| | VH564300 | Resistor Array | RGLD10X103J | 抵抗アレイ | 01 |
| | UJ828470 | Electrolytic Cap. | 470μF 10V | ケミコン | 01 |
| | UJ138220 | Electrolytic Cap. | 220μF 16V | ケミコン | 01 |
| | BJ838470 | Electrolytic Cap. | 470μF 16V | ケミコン | 01 |
| | FP736470 | Tantalum Capacitor | 4.7μF 16V M | タンタルコン | 01 |
| | FZ004100 | Semiconductive Cera. Cap. | 0.1μF 16V M | 半導体セラコン | 01 |
| | VB835000 | Coil | FL5R2000NT 20μ | コイル | 01 |
| | FZ006970 | EMI Filter | LS.MT.Y223NB | LCフィルタ EMI | 02 |
| | VI460600 | Quartz Crystal Unit | 12.8MHz AT-49 | 水晶振動子 | 03 |
| | VI927300 | Quartz Crystal Unit | 20MHz AT-49 | 水晶振動子 | 03 |
| | VH303600 | Connector | X-G9242 | 電源コネクタ | DC 10V 700mA IN |
| | VI466400 | DIN Connector | 3P YKF51-5046 | DINジャック | MIDI |
| | VE338400 | Lithium Battery | CR2032 | リチウム電池 | 03 |
| | VF821100 | Connector, Card | 33P | ICカード用コネクタ | CARD |
| | VK304900 | Card Guide | 33 | カードガイド | 33 |
| | VF020600 | Heat Sink | | 放熱板 | 07 |
| | EA030136 | Pin Head Screw | 3.0X10 ZMC2Y | ナベ小ネジ | 01 |
| | EI330086 | Bind Head Tapping Screw | 3.0X8 FCM3BL | バインドタッピングネジ | 01 |
| | EVI00036 | Hexagonal Nut | φ3.0 ZMC2Y | 六角ナット | 01 |
| | VK545200 | Earth Leaf | | 静電リーフ | |
| | VJ789200 | Circuit Board | PN | PNシート | 11 |
| | IF003450 | Diode | ISS133 | ダイオード | 01 |
| | VI813100 | LED | SLZ-181809TG RE | LED | 01 |
| | IG001390 | Circuit Board | JKAN1/4 | JKAN1/4シート | |
| | IG040000 | IC | RC4558DV | IC | OP AMP. |
| | | IC | NJM4560ED | IC | OP AMP. |
| | XE470001 | IC | M51132L | IC | VCA |
| | XF123A00 | IC | M5228P | IC | OP AMP. 4ch |
| | IG042500 | IC | NJM4556 | IC | OP AMP. 2ch |
| | XG411A00 | IC | YM3032 | IC | DAL3 |
| | IA101520 | Transistor | 2SA1015 Y | トランジスタ | 01 |
| | IC287800 | Transistor | 2SC2878 A,B | トランジスタ | 01 |
| | IF003450 | Diode | ISS133 | ダイオード | 01 |
| | IF001660 | Zener Diode | RD3.6EB1 3.6V | ツェナーダイオード | 01 |
| | VA024800 | Trimner Potentiometer | B10K EVN | 半固定ボリューム | 02 |

* New Parts (新規部品)

OVERALL ASSEMBLY (総組立)



| Ref. No. | Part No. | Description | 部品名 | Remarks | ランク |
|----------|----------|--------------------------|------------------|-----------------|-------|
| 1 | VJ747600 | Top Cover | トップカバー | (TG33) | 10 |
| 2 | VJ748400 | Shield Cover | シールドカバー | | 08 |
| 3 | VJ751800 | LCD Assembly | LCD Ass'y | | 04 |
| 4 | VJ752100 | Protector | 保護板 | | 01 |
| 5 | VF456200 | Knob | ツマミ | DATA ENTRY/N.V. | 01 |
| 6 | VF456100 | Push Button | プッシュボタン | POWER | 01 |
| 7 | VF997600 | Power Switch | パワースイッチ | POWER | 03 |
| 8 | VJ789300 | Circuit Board | JKAN | | 22 |
| 8-1 | | Circuit Board | JKAN1/4 | | |
| 8-2 | | Circuit Board | JKAN2/4 | | |
| 8-3 | | Circuit Board | JKAN3/4 | | |
| 8-4 | | Circuit Board | JKAN4/4 | | |
| 9 | VJ799200 | Shield Sheet, JKAN | シールドシート | | 04 |
| 10 | VK240300 | Shield Sheet, PN | シールドシート | | |
| 11 | V1848400 | Key Top Rubber | キートップラバー | DENO | 01 |
| 12 | VJ794500 | Key Top Rubber | × 1 | | |
| 13 | VK304800 | Key Top Rubber | × 8 1-8 ELEMENT | BANK/MULTI CH. | 04 |
| 14 | V1848300 | Key Top Rubber | × 3 | MODE, MEMORY | 03 |
| 15 | VJ794400 | Key Top Rubber | × 2 | PAGE, CURSOR | 01 |
| 16 | VJ789200 | Circuit Board | × 2 VECTOR | LEVEL, DETUNE | 03 |
| | | | PN | | 11 |
| 17 | VJ800900 | Felt | フェルト | | 01 |
| 18 | VJ749100 | Vector Control Assembly | ベクターコントロール Ass'y | VECTOR CONTROL | 09 |
| 18-1 | V1847700 | Knob, JOY | JOY ツマミ | | 02 |
| 18-2 | VJ086000 | Tube | チューブ | | 01 |
| 18-3 | V1864200 | JOY Stick | ジョイスティック | | 06 |
| 18-4 | V1848600 | Angle Bracket, JOY Stick | JOYスティック金具 | | 03 |
| 19 | VJ789400 | Circuit Board | DM | | 57 |
| 19-1 | VK304900 | Card Guide | 33 | | 04 |
| 19-2 | VK545200 | Earth Leaf | 静電リーフ | | |
| 20 | VJ752600 | Bottom Cover Assembly | ボトムカバー Ass'y | | |
| 20-1 | CB037120 | Foot | スベリ座 | | 01 |
| 21 | E1023066 | Bind Head Tapping Screw | 2.3X6 ZNC2Y | A*イント*タッピングネジ | |
| 22 | EJ330086 | Pan Head Tapping Screw | 3.0X8 ZNC2BL | ナベタッピングネジ | 01 |
| 23 | EI330086 | Bind Head Tapping Screw | 3.0X8 FCW3BL | A*イント*タッピングネジ | 01 |
| 24 | EB330086 | Flat Tapping Screw | 3.0X8 ZNC2BL | 皿小ネジ | 01 |
| 25 | EJ340106 | Pan Head Tapping Screw | 4.0X10 FCW3BL | ナベタッピングネジ | 01 |
| 26 | ED340066 | Bind Head Screw | 4.0X6 ZNC2BL | バインド小ネジ | 01 |
| 27 | ED030086 | Bind Head Screw | 3.0X8 ZNC2Y | バインド小ネジ | 01 |
| | | Accessories | 付属品 | | |
| | | AC Adaptor | PA-3 | ACアダプター | J |
| | | AC Adaptor | PA-3 | ACアダプター | U.C |
| | | AC Adaptor | PA-3 | ACアダプター | H.D.S |
| A | VJ807800 | Rack Angle | Right | ラックアングル(右) | 04 |
| B | VJ807700 | Rack Angle | Left | ラックアングル(左) | 04 |

* New Parts (新規部品)

ランク : Japan only