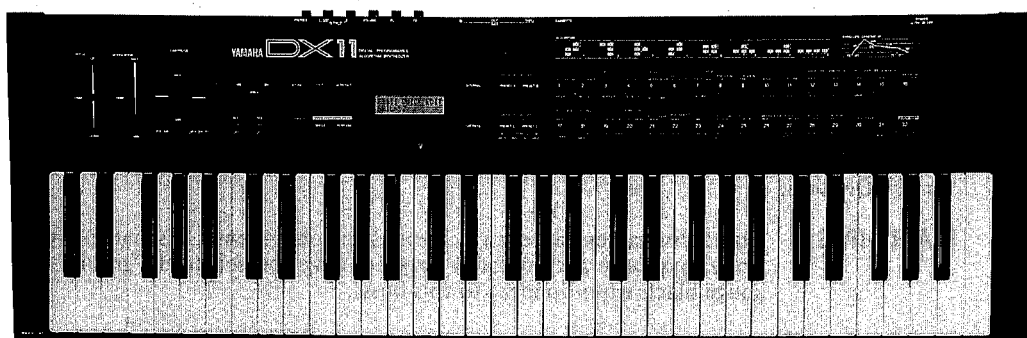


DIGITAL PROGRAMMABLE ALGORITHM SYNTHESIZER

DX11

SERVICE MANUAL



DX11

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IMPORTANT NOTICE

This manual has been provided for the use of authorized Yamaha Retailers and their service personnel. It has been assumed that basic service procedures inherent to the industry, and more specifically Yamaha Products, are already known and understood by the users, and have therefore not been restated.

WARNING: Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components and failure of the product to perform as specified. For these reasons, we advise all Yamaha product owners that all service required should be performed by an authorized Yamaha Retailer or the appointed service representative.

IMPORTANT: The presentation or sale of this manual to any individual or firm does not constitute authorization, certification, recognition of any applicable technical capabilities, or establish a principle-agent relationship of any form.

The data provided is believed to be accurate and applicable to the unit(s) indicated on the cover. The research, engineering, and service departments of Yamaha are continually striving to improve Yamaha products. Modifications are, therefore, inevitable and changes in specification are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

WARNING: Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground buss in the unit (heavy gauge black wires connect to this buss).

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

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

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

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

ADVARSEL!

Lithiumbatteri. Eksplosionsfare.

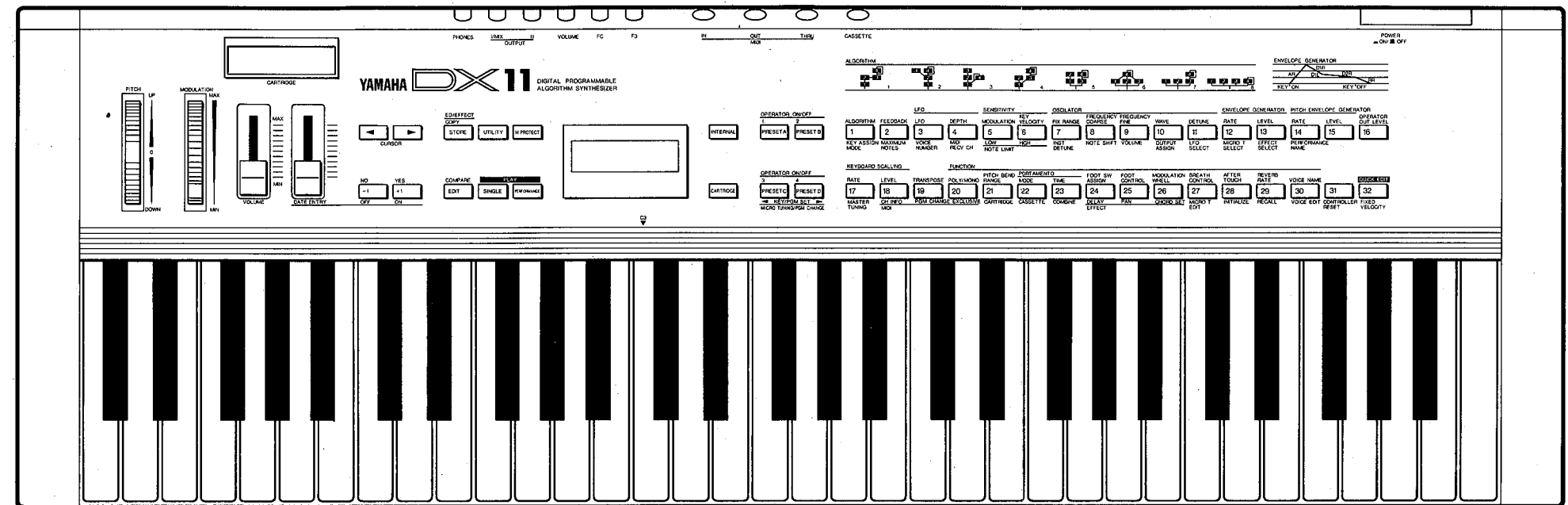
Udskiftning må kun foretages af en sagkyndig, og som beskrevet i servicemanualen.

SPECIFICATIONS

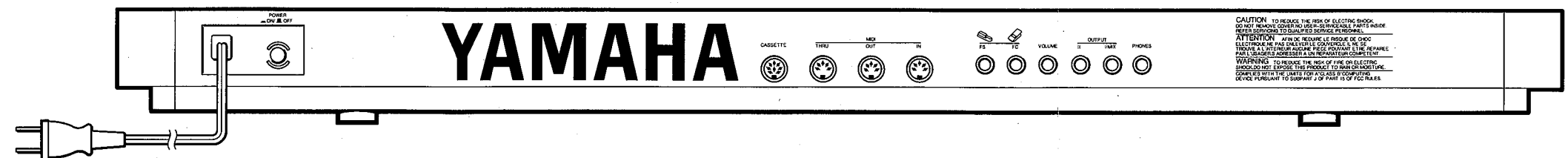
- **Keyboard**
61 keys C1—C6, velocity and pressure sensitive
- **Tone Generator**
FM tone generator: 4 operator (8 wave) x 8 voice
- **Polyphony**
8 notes
- **Memory**
128 ROM voice, 32 RAM voice, 32 RAM performance
- **Controls**
PITCH, MODULATION, VOLUME, DATA ENTRY
- **Display**
LCD (16 characters x 2 lines, illuminated)
- **Terminals**
BREATH, PHONES, OUTPUT (I/MIX, II), VOLUME PEDAL, FOOT CONTROLLER, FOOT SWITCH, MIDI (IN, OUT, THRU), CASSETTE
- **Dimensions (W x H x D)**
901 x 298 x 63 mm (35 1/2 x 11 3/4 x 2 1/2")
- **Weight**
7.0 kg (15 lbs 6 ozs)
- **Power Requirements**
U.S. & Canadian models: 120V, 50/60 Hz
General models: 220—240V, 50Hz
- **Power Consumption**
10 W
- **Included Items**
Cassette cable

PANEL LAYOUT

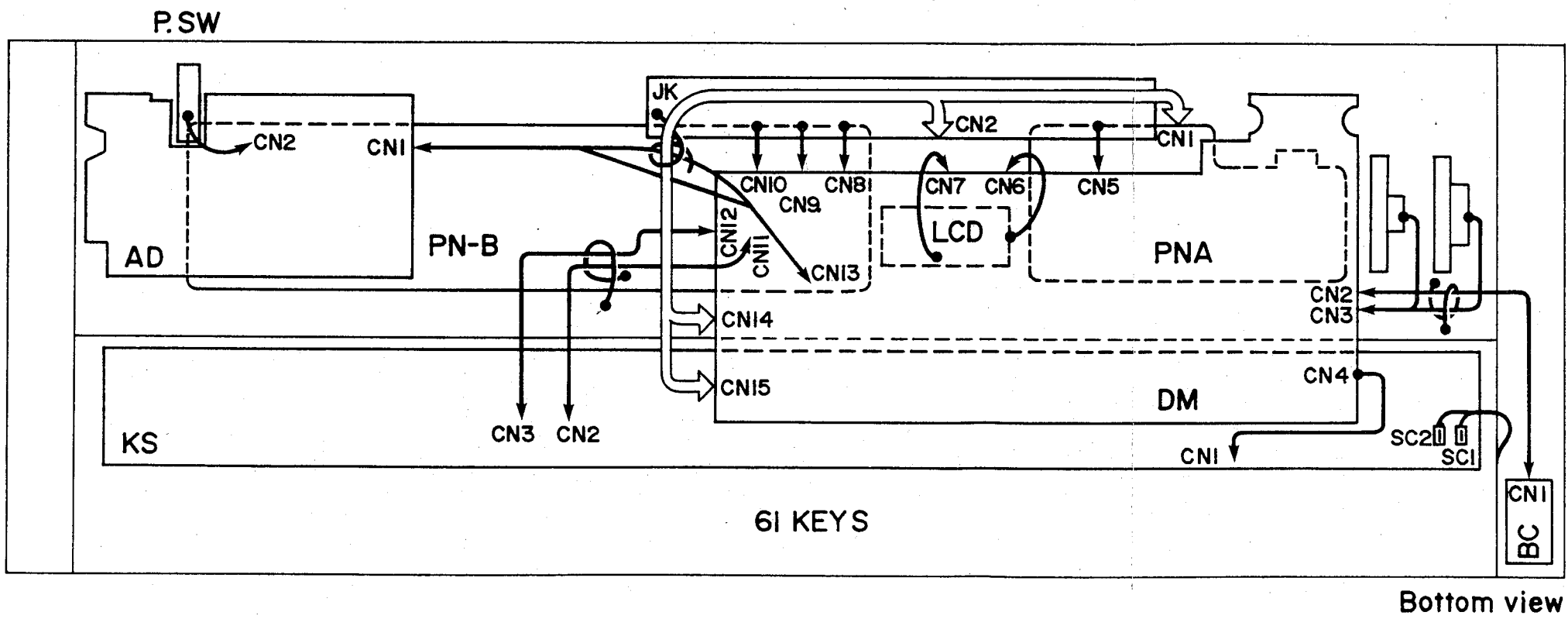
● Front Panel



● Rear Panel

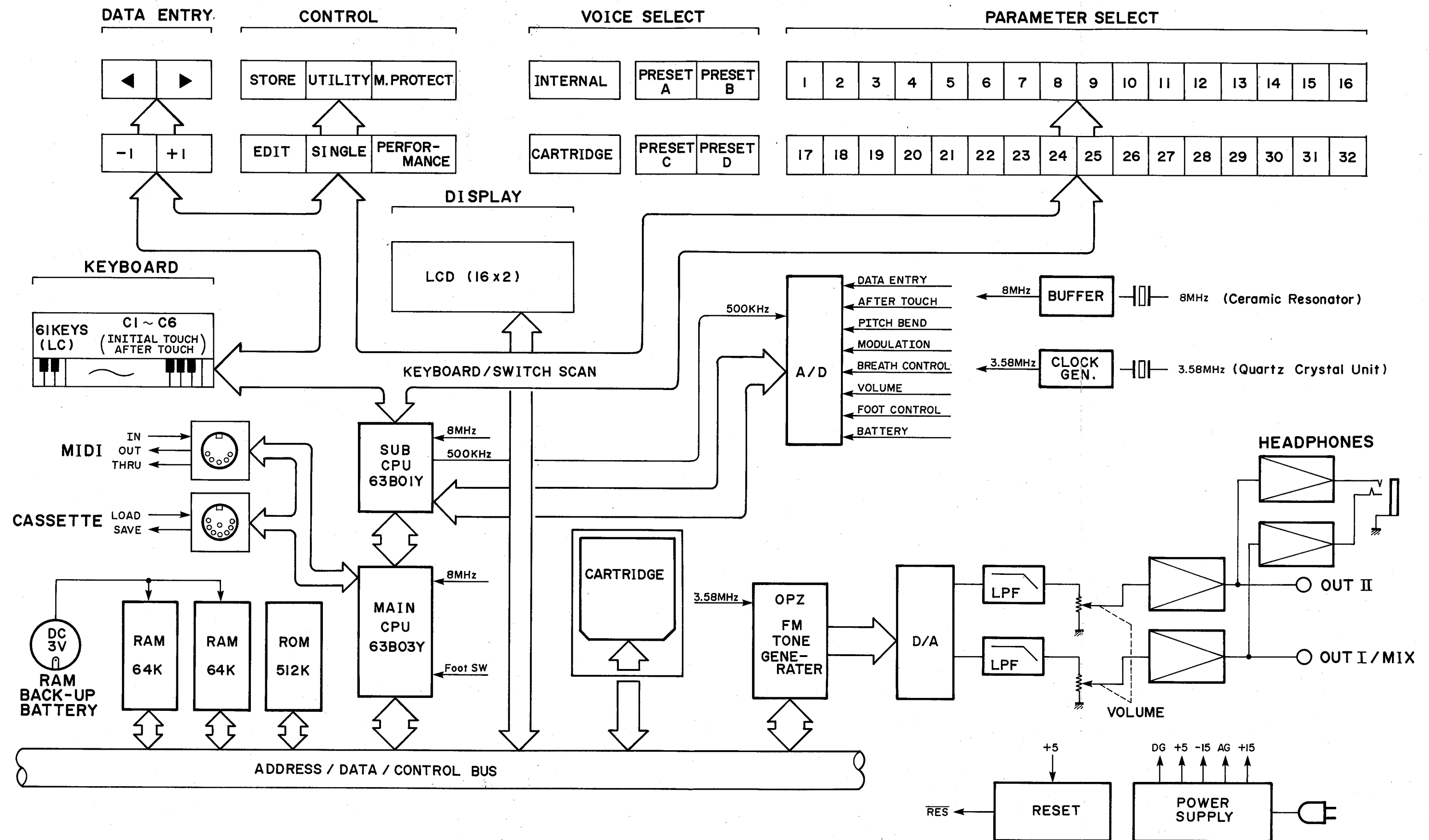


■CIRCUIT BOARD LAYOUT



DX11

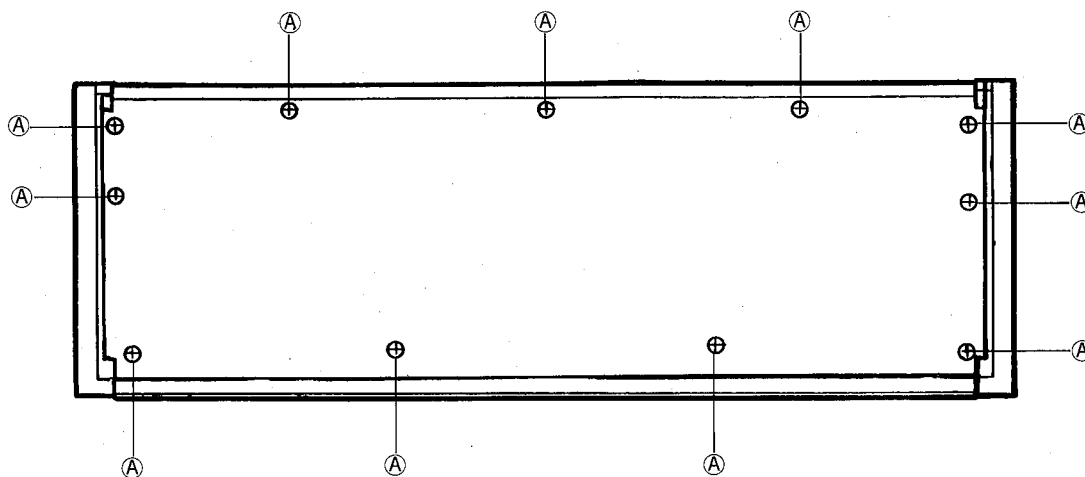
■ BLOCK DIAGRAM



■ DISASSEMBLY PROCEDURE

1. Bottom Cover Removal (Refer to Fig. 1.)

Remove the 11 screws (Ⓐ 3 x 8 Bind head tapping screw) and then remove the bottom cover.



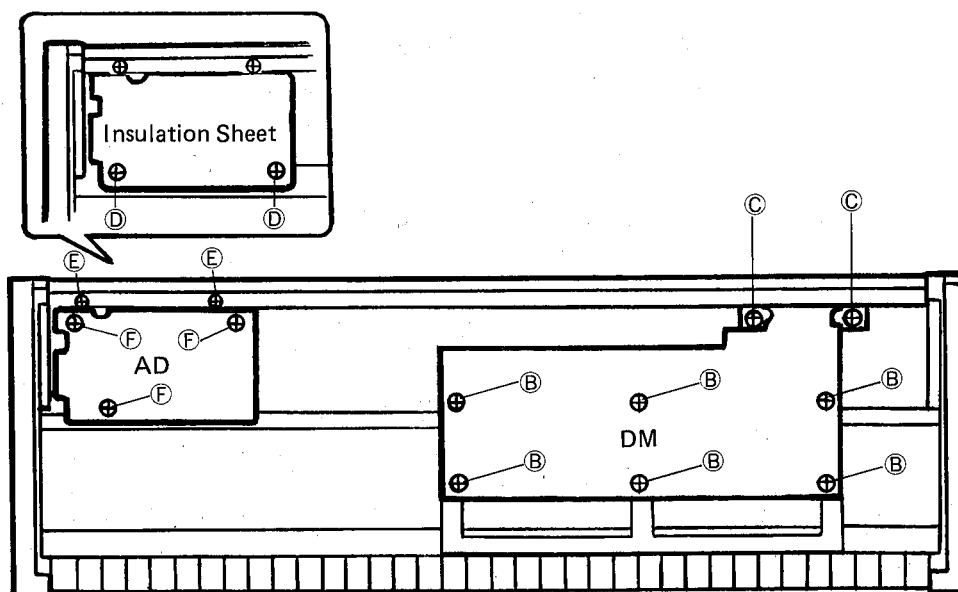
< Fig. 1 >

2. DM Circuit Board Removal (Refer to Fig. 2.)

- Remove the bottom cover (Refer to step 1).
- To remove the DM circuit board, remove the 8 screws (Ⓑ 3 x 8 Bind head screw, 6 pcs. Ⓒ 3 x 20 Bind head tapping screw, 2 pcs.).

3. AD Circuit Board Removal (Refer to Fig. 2.)

- Remove the bottom cover. (Refer to step 1.)
- 3-1. To remove the insulation sheet, remove the 2 screws (Ⓓ 3 x 8 Bind head screw).
- 3-2. To remove the AD circuit board, remove the 5 screws (Ⓔ 3 x 8 Bind head tapping screw, 2 pcs. Ⓕ 3 x 8 Bind head screw, 3 pcs.).

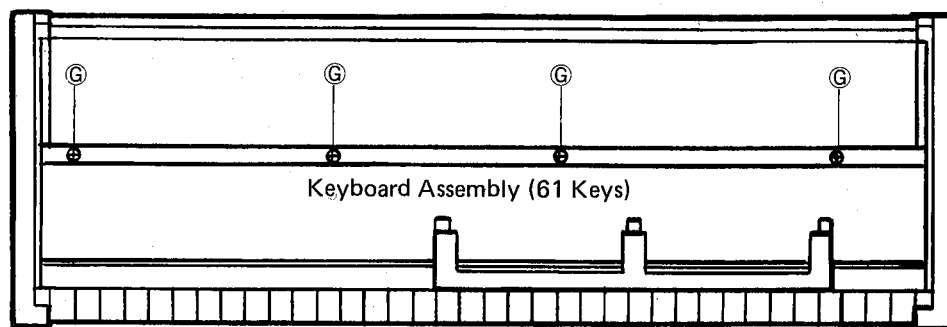


< Fig. 2 >

4. Keyboard Assembly Removal (Refer to Fig. 3.)

- Remove the bottom cover. (Refer to step 1.)
- Remove the DM and AD circuit boards. (Refer to step 2, 3.)

Remove the 4 screws (Ⓒ 4 x 10 Bind head screw) and then remove the keyboard assembly.

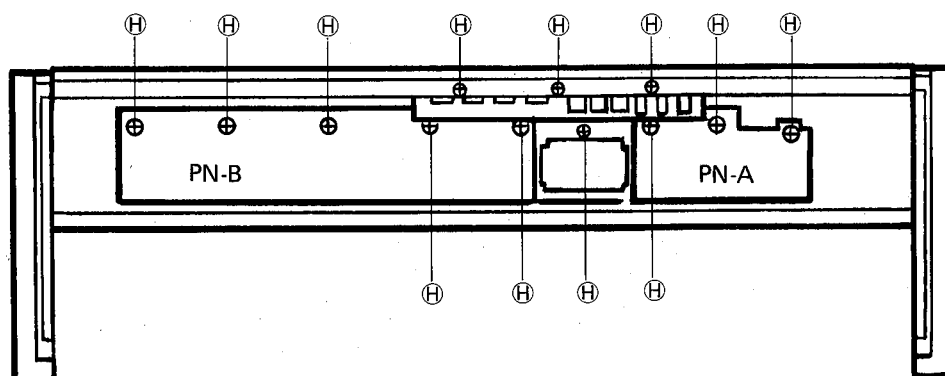


< Fig. 3 >

5. JK, PN-A, PN-B Circuit Boards and LCD Assembly Removal (Refer to Fig. 4.)

- Remove the bottom cover. (Refer to step 1.)
- Remove the DM and AD circuit boards. (Refer to step 2, 3.)
- Remove the keyboard assembly. (Refer to step 4.)

Remove the 9 screws (Ⓗ 3 x 8 Bind head tapping screw) and then remove the JK, the PN-A, PN-B circuit boards and LCD assembly together.



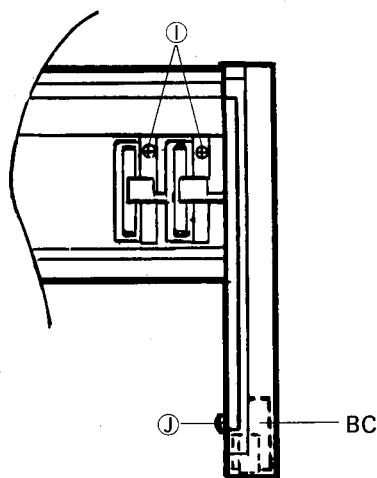
< Fig. 4 >

6. Wheel Assembly and Headphone (BC) Circuit Board Removal (Refer to Fig. 5.)

- Remove the bottom cover. (Refer to step 1.)
- Remove the DM and AD circuit boards. (Refer to step 2, 3.)
- Remove the keyboard assembly. (Refer to step 4.)

6-1. To remove wheel assembly, remove the 2 screws (① 3 x 8 Bind head tapping screw).

6-2. To remove the BC circuit board, remove the 1 screw (② 3 x 8 Bind head tapping screw).



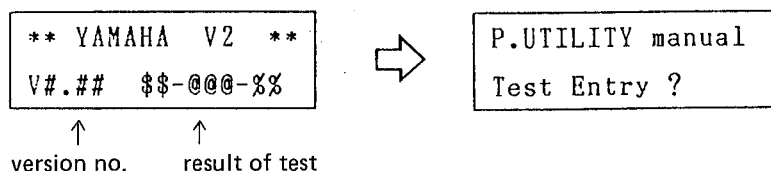
< Fig. 5 >

■ TEST PROGRAM

NOTE: Once the system enters the TEST PROGRAM MODE, the Voice Edit Buffer and System Set-up Memory are initialized.

[A] TEST PROGRAM ENTRY

- (1) Press and hold down the EDIT switch, then press and hold the #16 switch while pressing the #32 switch.
- (2) The following message will appear on the LCD.



- (3) Press the YES switch to activate the test program.

[B] RAM Check

- (1) After the system has entered the test program mode, the internal RAM is automatically checked and memories are initialized.
- (2) If the test is OK, the LCD will indicate a message as shown below.

Test Load ?	
RAM check	OK

Pressing the "NO" switch will advance the program to the next step.

Test Verify ?

If the "NO" switch is pressed, the program will proceed to the BATTERY CHECK.

- (3) If the test is "No Good", a message will appear in the LCD as shown below.

RAM check	NG
-----------	----

- (4) Initialized data

Master Tune	0	D.Ent.	7
MIDI	on	Pgm Change	com
Basic Rcv. ch	omn	Exclusive	on
Transmit ch	1	CRT BK	1A
Local	on	Combine	on
Cont. Change	norm	Controller	reset
A. Touch	norm	Fix Velocity	off
Pitch Bend	norm	EG Damp	medium
Note on/off	all		

[C] Battery Check

The Battery is automatically checked.

- Result OK: The battery voltage is adequate (2.6V-4.1V).

version no.
↓

** Test V1△△□□ **

Battery=##V OK

- Result NG: The battery voltage is too low or too high.

-- Test *-*-*

Battery=##.##V NG

** Test V1△△□□ **

Battery=##V NG

Whether or not the test is OK, the system will enter the [D] state.

[D] Panel Switch Event Queue

- (1) After each test is performed, the system automatically enters the [D] state (Panel Switch Event Queue).
- (2) The TESTS can be executed by pressing the following Panel selectors.
 - "YES" : The TEST immediately following the previous one is performed. If the system has just entered the Test Program Mode, the program starts with [TEST 1] A4 SOUND GENERATION.
 - "NO" : The test just performed is re-executed.
 - "1"- "24" : The Test which corresponds to a numbered switch will be executed when that switch is pressed.
- (3) If the test is "No Good" for some reason or as a result of no change in A/D check, Foot Switch check, Keyboard Scaling check, Panel Switch check, Cartridge Protect and Type Switch check, the system will return to the [D] state.

[TEST 1] A4 Sound Generation (OUTPUT I)

1;Check A4 outI

- (1) Attach phone jacks to the OUTPUT I and II connectors.
- (2) The following 880 Hz sine wave ± 5 cents is detected at each connector.
 - -13.5 ± 2 dBm at the OUTPUT I. (load 10k ohms)
 - less than -70 dBm at the OUTPUT II.
 - -2.5 ± 2 dBm at the PHONES R. (load 150 ohms)
 - less than -60 dBm at the PHONES L.
- (3) If the jack is disconnected from the OUTPUT II;
 - -18.5 ± 2 dBm at the OUTPUT I.
 - -4.5 ± 2 dBm at the PHONES.

[TEST 2] A4 Sound Generation (OUTPUT II)

2;Check A4outII

- (1) Attach phone jacks to the OUTPUT I and II connectors.
- (2) The following sine wave of $880 \text{ Hz} \pm 5 \text{ cents}$ is detected at each connector.
 - less than -70 dBm at the OUTPUT I.
 - $-13.5 \pm 2 \text{ dBm}$ at the OUTPUT II. (load 10k ohms).
 - less than -60 dBm at the PHONES L.
 - $-2.5 \pm 2 \text{ dBm}$ at the PHONES R. (load 150 ohms)

[TEST 3] LCD Check

The LCD will flash "ON" and "OFF" continuously, allowing proper LCD lighting to be verified.

[TEST 4] Pitch Bend Check

4;PB	50
------	----

Rotate the Pitch Bend Wheel through a sequence of 50 to 99 down to 0 and back to 50. Check to see that the numerals shown on the display change smoothly.

If the Pitch Bend check is OK, the OK message is displayed on the LCD and the system enters the [D] state. If the center decent is out of alignment, the NG message will be displayed.

4;PB	50
	OK

4;PB	50
	Center NG

[TEST 5] Modulation Wheel Check

5;MW	0
------	---

Move the Modulation Wheel through from 0 to 99 and back to 0. Check to see that the numerals on the display change smoothly.

If the Test is good, an OK will be displayed and the system will enter the [D] state.

5;MW	0
	OK

[TEST 6] Data Entry Slider Check

Same as the Modulation Wheel check.

6;DE	0
------	---

6;DE	0
	OK

[TEST 7] After Touch Check

0-1 - 20-8 - 95-90 - 20-80 - 0-1

7;AFT 0

7;AFT 0
OK**[TEST 8] Foot Control Check**

Same as After Touch check.

8;FC 0

8;FC 0
OK**[TEST 9] Foot Volume Check**

Same as After Touch check.

9;FV 0

9;FV 0
OK**[TEST10] Breath Control Check**

Same as After Touch check.

10;BC 0

10;BC 0
OK**[TEST11] Foot Switch Check**

When the switch is turned OFF and ON and OFF again, the number on the right-hand side of the LCD will change from 0 to 1 to 0. If the check is good, an OK is displayed and the system enters the [D] state.

11;FSW 0

11;FSW 0
OK**[TEST12] Keyboard Scaling Check**

12;KBD push C1

Scale from 36 (= C1) through 96 (= C6).

Touch the key with a force of initial touch \$10 - \$6F.

If the test is OK, the "OK" message will appear in the LCD and sine wave is produced. If the test is no good, "NG" will appear in the LCD and sine wave is not produced.

12;KBD push C1
OK12;KBD push C1
NG

If scaling up to 96 (= C6) checks OK, the system will enter the [D] state.

[TEST13] Panel Switch Check

When this test is initiated, switch number 1 will appear in the LCD.
Turn the switches ON and OFF in the following sequence.

1	2	3	4	5		6	7	8	9.....24
48	47	46	45	44	LCD	43	42	41	40.....25

If a switch does not check OK, you cannot proceed with the subsequent switch.

When all switches check OK, the LCD indicates "OK" as shown below, and the system enters the [D] state.

13;PSW push 1
OK

Switch 1 check is OK.

13;PSW push 1
NG

Switch 1 check is NG.

13;PSW push

Test 13 is completed.

If the Test is "No Good", press and hold the "<" switch, then the ">" switch, and then press the "NO" switch. The program will restart from that step.

* IGNORE THE FOLLOWING FOUR TESTS 14 THROUGH 17. THEY ARE PERFORMED IN THE FACTORY.

[TEST14] Cartridge Read/Write Check**[TEST15] Cartridge Protect Switch Check****[TEST16] Cartridge Type Check****[TEST17] Cartridge Mode Check****[TEST18] MIDI Mode Check**

- (1) Connect the MIDI IN to MIDI OUT jack with a MIDI cable and execute the program.
- (2) If the loop test is OK, the "OK" message will appear in the LCD; if not, "NG" shows.

18;MIDI
OK

18;MIDI
NG

[TEST19] Cassette Check

- (1) Attach the CASSETTE connector to the 10 dB amplifier with a DIN cable and activate the program.
- (2) The LCD indicates the results of the test as shown below.

19;Casset
OK

19;Casset
NG

- (3) While the Test is in progress, a continuous sound is emitted from the "PHONES".

[TEST20] 8 Notes Generation Check

- (1) An 880 Hz $\pm$ 5 cents sine wave of -13 ± 2 dBm is detected at the OUTPUT connector.
- (2) Each note of channels 1 through 8 will be produced for one second.

20;Check 1ch

[TEST21] Factory Set

- (1) If the test is activated, the LCD will indicate a message as shown below.

21;Factory set .?

- (2) Insert a TEST PROGRAM cartridge to the CARTRIDGE slot.
- (3) If the YES switch is pressed, memories will be set with factory set data.
 - Initialized memories
 - 1 Internal voices (32)
 - 2 Performance voices (32)
 - 3 Effect (1-4)
 - 4 Program Change table
 - 5 Micro tuning (Oct., Full)
 - 6 Power ON message
- (4) Pressing the NO switch causes the system to return to the [D] state.

[TEST22] EXIT

- (1) If this function is initiated, a message will appear in the LCD as shown below.

22;Exit ?

- (2) If the YES switch is pressed, normal operation will be restored.
- (3) Pressing the NO switch will return the system to the [D] state.

[TEST23] Foot Switch Jack Check

When a phone jack is attached to the FS connector and disconnected, then reinserted, the number on the right hand side of the LCD should change from 1 to 0 to 1.

23;FSW Jack 1

[TEST24] Copy TEST PROGRAM

- (1) When this routine is initiated, the following message will appear on the LCD.

Set original

- (2) Insert a TEST PROGRAM cartridge to the CARTRIDGE slot, then press the YES switch.

Set Duplicate

- (3) Insert a RAM4 cartridge to the slot.
 (4) Press the YES switch to carry out the copy function.

Completed

NG

- (5) If the NO switch is pressed, a message will be displayed and the system will enter the [D] state.

Copy undo

● LOAD TEST PROGRAM

The Test Program is memorised in the RAM area.
 It will be lost when you change a back up battery or replace a RAM.
 You might perform the following procedure to load the program.

- (1) Insert a TEST PROGRAM cartridge to the CARTRIDGE slot.
 (2) Press and hold down the EDIT switch, then press and hold the #16 switch, while pressing the #32 switch.

Test Load ?

RAM Check OK

- (3) Press the YES switch to load the Test program.
 If loading is completed, the LCD will display the following messages, and the program will then enter the Battery check.

Test Load ?

OK



Test ID check

OK

- (4) Error messages
 1 RAM check is No Good.

RAM check NG

- 2 A Test Program cartridge is not inserted, or the Cartridge slot contains a wrong cartridge.

Test Load ?

NG

- 3 The loaded program can not be written to the internal RAM.

Test ID check

2 Load-Check NG

LSI DATA TABLE

• HD63B01Y0D60P (XD681001) CPU

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

• HD63B03YP-N (XD245001) CPU

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	Vss	I	Ground	33	Vcc	O	DC Supply (+5V)
2	XTAL	I	Clock (8MHz)	34	V15	O	Address bus
3	EXTAL	I		35	A14	O	
4	MP0	I	Mode program	36	A13	O	Address bus
5	MP1	I		37	A12	O	
6	RES	I	Reset	38	A11	O	Ground
7	STBY	I	Stand-by mode signal	39	A10	O	
8	NMI	I	Non-maskable interrupt	40	A9	O	Address bus
9	P20	I/O	Port 2	41	A8	O	
10	P21	I/O		42	Vss	O	Address bus
11	P22	I/O		43	A7	O	
12	P23	I/O		44	A6	O	Data bus
13	P24	I/O		45	A5	O	
14	P25	I/O		46	A4	O	Data bus
15	P26	I/O		47	A3	O	
16	P27	I/O	Port 5	48	A2	O	Data bus
17	P50	I/O		49	A1	O	
18	P51	I/O		50	A0	O	Data bus
19	P52	I/O		51	D7	I/O	
20	P53	I/O		52	D6	I/O	Data bus
21	P54	I/O		53	D5	I/O	
22	P55	I/O		54	D4	I/O	Data bus
23	P56	I/O	Port 6	55	D5	I/O	
24	P57	I/O		56	D2	I/O	Data bus
25	P60	I/O		57	D1	I/O	
26	P61	I/O		58	D0	I/O	Data bus
27	P62	I/O		59	BA	O	
28	P63	I/O		60	LIR	O	Bus available
29	P64	I/O		61	R/W	O	Load instruction resistor
30	P65	I/O		62	WR	O	Read/Write control
31	P66	I/O		63	RD	O	Write
32	P67	I/O		64	E	O	Read

● M58990P-1 (IG106100) Analog Digital Converter

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	IN3	I	Analog data in	15	2-6	O	Digital data output
2	IN4	I		16	REF(-)	O	Reference voltage (-)
3	IN5	I		17	2-8	O	Digital data output
4	IN6	I		18	2-4	O	
5	IN7	I		19	2-3	O	
6	START	I	Start data in	20	2-2	O	
7	EOC	O	End of conversion data output	21	2-1	O	Address latch enable data in
8	2-5	O	Digital data output	22	ALE	I	
9	OE	I	Output enable data in	23	ADD A	I	Address data in
10	CLK	I	Clock data in	24	ADD B	I	
11	Vcc		Supply power (+5V)	25	ADD C	I	
12	REF(+)		Reference voltage (+)	26	IN 0	I	Analog data in
13	GND		Supply power (0V)	27	IN 1	I	
14	2-7	O	Digital data output	28	IN 2	I	

● YM2414 (XB768001) OPZ (Operator)

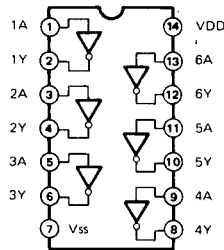
PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	VSS		Ground	13	D2	I/O	Data bus
2	IRQ	O	Interrupt request	14	D3	I/O	
3	IC	I	Initial Clear	15	D4	I/O	
4	A0	I	Address bus	16	D5	I/O	
5	WR	I	Write control	17	D6	I/O	
6	RD	I	Read control	18	D7	I/O	
7	CS	I	Chip Select	19	SH2	O	Sample and hold (Ch2)
8	CT ₁	O	Control data 1	20	SH1	O	Sample and hold (Ch1)
9	CT ₂	O	Control data 2	21	SD	O	Tone signal data
10	D0	I/O	Data bus	22	Vcc		DC Supply
11	VSS		Ground	23	φ1	I	Synchro pulse
12	D1	I/O	Data bus	24	φM	I	Clock

● YM3012 (IT301200) Digital to Analog Converter

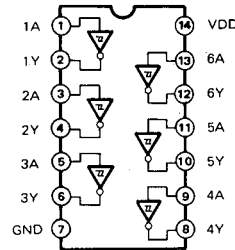
PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	VDD	I	DC supply	9	CH1	O	Sample and hold analog SW output (ch1)
2	CK	I	Timing clock	10	CH2	O	Sample and hold analog SW output (ch2)
3	D GND	I	Digital ground	11	COM	I	Ch1 ch2 analog SW common input
4	DI	I	Serial data input	12	TB	O	Analog output to Buffer AMP
5	SH2	I	Sample and hold (ch2)	13	MP	I	Middle point 1/2 VDD bias
6	SH1	I	Sample and hold (ch1)	14	BC	I	Bias compensation
7	IC	I	Initial clear	15	RB	O	Bias-R
8	A. GND	I	Analog ground	16	A. GND	I	Analog ground

IC BLOCK DIAGRAM

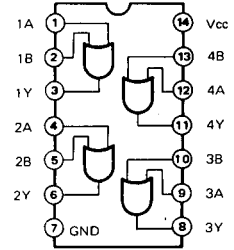
- MC74HC04N (IR000470)
 - TC40H004P (IG051000)
- Hex Inverter



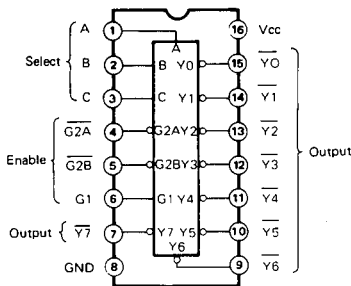
- MC74HC14N (IR001470)
- Hex Inverter



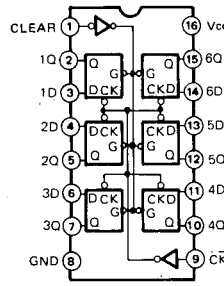
- MC74HC32N (IR003270)
- Quad 2 Input OR



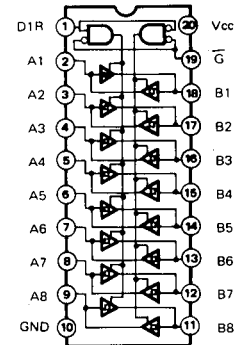
- MC74HC138N (IR013870)
- 3 to 8 Demultiplexer



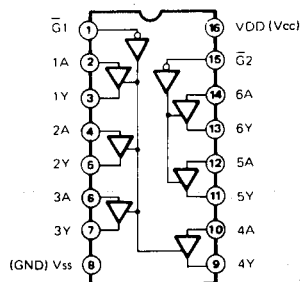
- MC74HC174N (IR017470)
- Hex D-Type Flip-Flop



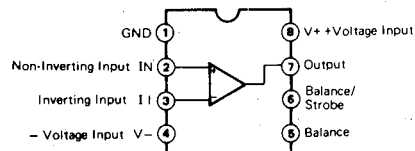
- MC74HC245AN (XD715001)
- Octal 3-State Bus Transceiver



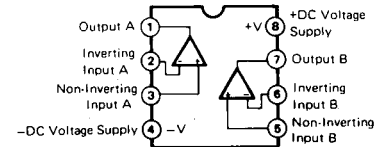
- MC74HC367N (IR036770)
- Hex 3-State Bus Buffer



- IR9311 (IG134900)
- Voltage Comparator



- NJM4558DV (IG001390)
 - NJM4556DV (IG042500)
 - NJM072D (IG070000)
- Dual Operational Amplifier



■ ERROR MESSAGES

The DX11 will sometimes display one of the following messages to indicate an unexpected event or a completed operation.

Cartridge Errors:

'Insert cartridge'	You tried to select/save/load a cartridge voice or performance when there was no cartridge inserted.
'Cart verify err'	You tried to save/load/format a cartridge, but the cartridge and internal memory contained different data.
'Memory Protected'	You tried to save/load to/from internal/cartridge, but memory protect was on. (Either the INT/CRT memory protect on the DX11, or the switch on the cartridge.)
'Cart format err'	You tried to save/load to/from cartridge, but it contained data not meant for the DX11.
'CartBank unavail'	You tried to save/load/format/store to or from a cartridge bank that did not exist. (The RAM4 cartridge has only one bank, but future cartridges will have more.)

Cartridge Messages:

'> Completed! <'	Cartridge save/load/format has been executed normally.
------------------	--

MIDI Errors:

'Midi Buffer Full'	Bulk data has been received at MIDI IN more quickly than the DX11 can handle it. If you are using a bulk data storage device to transmit data to the DX11, set it for a time wait between bulks.
'Memory Protected'	32 voice, 32 performance, or setup bulk data has been received, but the DX11 INT memory protect is on.
'Midi Data Error'	Faulty MIDI data has been received. Perhaps a MIDI cable was pulled out during reception.
'Midi CSUM Error'	Bulk data has been received, but the contents may be faulty. (Check sum error.)

MIDI Messages:

'Midi Received'	Bulk data has been received normally.
-----------------	---------------------------------------

Cassette Errors:

'Memory Protected'	You tried to load from cassette, but INT protect was on.
'Tape to INT ERR'	When loading from cassette, the data on cassette was faulty.
'Verify Tape ERR'	When verifying cassette data, the tape data did not match the data in DX11 memory.
'Search Tape ERR'	When loading 1 voice/performance from tape, the tape data was faulty.

Cassette Messages:

'Load Completed'	Cassette load has been executed normally.
'Verify Completed'	After verifying, the tape data matches the data in DX11 memory.

Store Errors:

'Memory Protected'	You tried to store a voice/performance to cartridge or internal memory, but memory protect was on. (Either the INT/CRT memory protect on the DX11, or the switch on the cartridge.)
--------------------	---

DX11

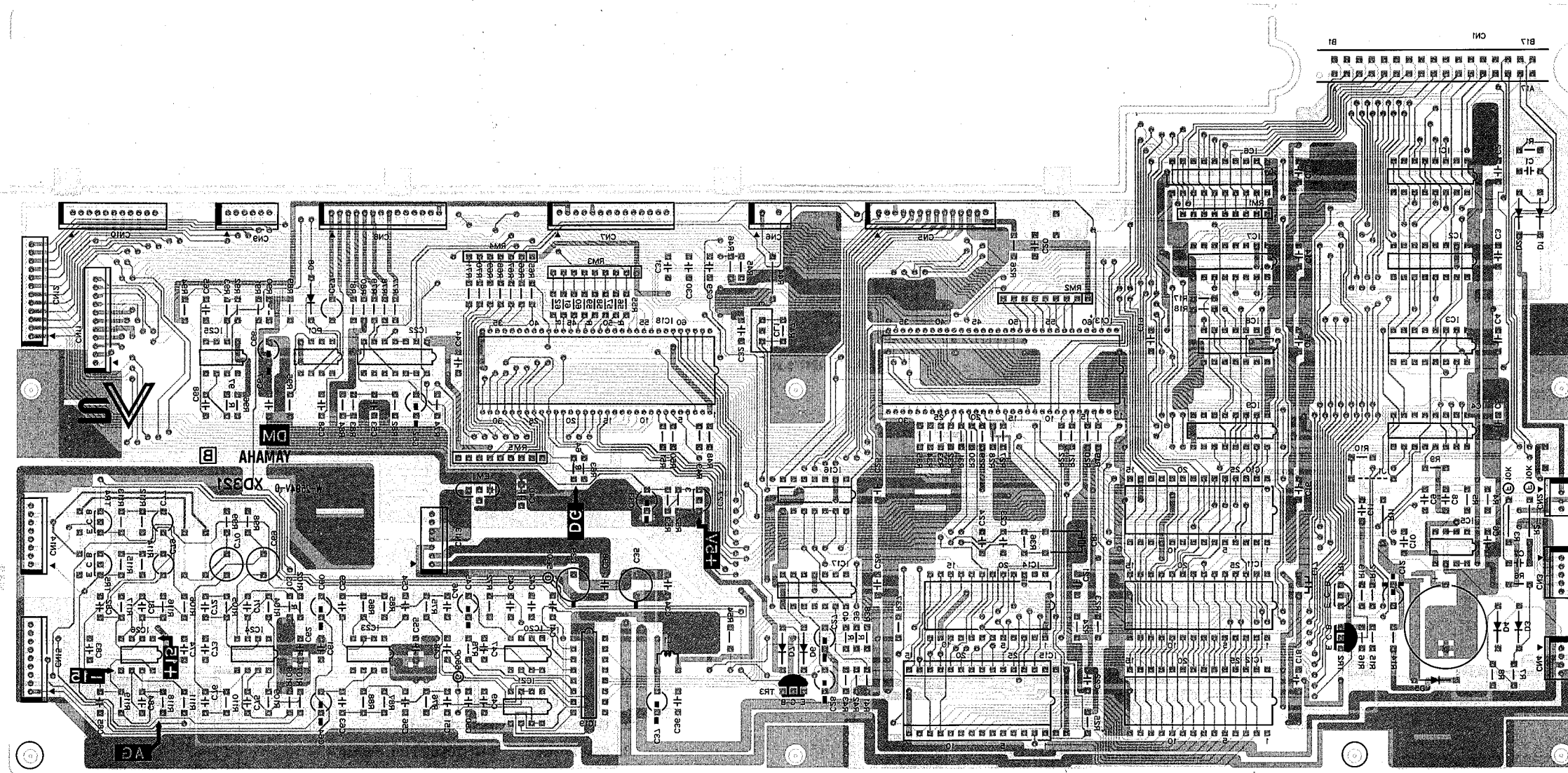
[Digital Programmable Algorithm Synthesizer]

Model DX11 MIDI Implementation Chart Version : 1.0

Function		Transmitted	Recognized	Remarks
Basic	Default	1 - 16	1 - 16	memorized
Channel	Changed	1 - 16	1 - 16	
Mode	Default	3	1, 2, 3, 4	memorized
	Messages	POLY, MONO(M=1)	POLY, MONO(M=1)	sgl mode only
	Altered	*****	x	
Note		36 - 96	0 - 127	
Number	True voice	*****	13 - 108	
Velocity	Note ON	o 9nH, v=1-127	o v=1-127	
	Note OFF	x 9nH, v=0	x	
After	Key's	x	x	
Touch	Ch's	o *3	o *3	
Pitch Bender		o *2	o 0-12 semi *2	7 bit resolution
Control	1	o *1	o *1	Modulation wheel
	2	o *1	o *1	Breath control
	4	o *1	o *1	Foot control
	5	x	o (sgl only) *1	Portamento time
	6	o *1	x	Data entry knob
	7	o *1	o *1	Volume
	10	x	o (pfm only) *1	Pan(1,1+11,11)
	64	o	o	Sustain
	65	o *1	o *1	Portamento
	96	o *1	x	Data entry +1
Change	97	o *1	x	Data entry -1
	0 - 31	o *1		Data entry knob
				in play mode
Prog		o 0 - 127 *4	o 0 - 127	if pgm cng sw is
Change	True #	*****	0 - 255	on.(assignable)
System Exclusive		o *5	o *5	Voice parameters
System	Song Pos	x	x	
	Song Sel	x	x	
Common	Tune	x	x	
System	Clock	x	x	
Real Time	Commands	x	x	
Aux	Local ON/OFF	x	x	
	All Notes OFF	x	o (123,126,127)	126,127 sgl only
Mes-	Active Sense	o	o	
sages	Reset	x	x	
Notes: *1 = transmit/receive if control change sw is on.				
*2 = transmit/receive if pitch bend sw is on.				
*3 = transmit/receive if after touch sw is on.				
*4 = transmit if pgm change sw is on and exclusive sw is off.				
*5 = transmit/receive if exclusive sw is on.				

CIRCUIT BOARD

DM Circuit Board



Pattern side

Notes

1. Circuit Board : XD321B0

2. IC

- IC1 : MC74HC174N (IR017470) D.F.F
- IC2, 3, 7 : MC74HC367N (IR036770) BUS.DRI
- IC4, 9 : MC74HC138N (IR013870) DECODER
- IC5, 23, 26 : NJM4558DV (IG001390) OP AMP.
- IC6 : MC74HC245AN (XD715001) TRANSCEIVER
- IC8 : MC74HC32N (IR003270) OR
- IC10 : M58990P-1 (IG106100) ADC
- IC11, 12 : TC5564PL-15 (XB013001) SRAM 8K x 8
- IC13 : HD63B03YP-N (XD245001) CPU (Main)
- IC14 : YM2414 (XB768001) OPZ
- IC15 : 023V100 V1.0 (XD820001) EPROM
- IC16 : TC40H004P (IG051000) INV
- IC17 : MC74HC04N (IR000470) INV
- IC18 : HD63B01Y 1CH1P (XD681001) CPU (Sub)
- IC19 : YM3012 (IT301200) SUX DAC
- IC20, 21 : NJM072D (IG107000) OP AMP.
- IC22 : MC74HC14N (IR001470) INV
- IC24 : NJM4556DV (IG042500) OP AMP.
- IC25 : IR9311 (IG134900) COMPARATOR

IC27 : PST518B-2 (IG116200) SYSTEM RESET

3. Transistor

- Tr1 : 2SC2603 (E, F)
- Tr2, 3 : 2SA1115 (E, F)
- Tr4, 5 : 2SC2878 (A, B)

4. Diode

- D1 ~ 3, 5 ~ 8 : 1SS133

5. Resonator

- CL1 : 8MHz CST8MT Ceramic Resonator
- CR1 : AT-49/TS3.5795M Quartz Crystal Unit

6. Resistor Array

- RM1 : RMLS8-473J 47K x 8
- RM2, 3, 5 : EXB-F9E103J5 10K x 8
- RM4 : RMLS6-103J 10K x 6

7. L1 :

20μ FL5R200QNT Coil

8. B1 :

CR2032-P5-2 Lithium Battery 3V

9. PC1 :

6N137 Photo Coupler

DM		CN1 (RAM Cartridge)	
Pin No.	Pin Name	Pin No.	Pin Name
A1	GND	B1	WE
A2	CD0	B2	CA0
A3	CD1	B3	CA1
A4	CD2	B4	CA2
A5	CD3	B5	CA3
A6	CD4	B6	CA4
A7	CD5	B7	CA5
A8	CD6	B8	CA6
A9	CD7	B9	CA7
A10	CE1	B10	CA8
A11	CE2	B11	CA9
A12	RD	B12	CA10
A13	CA15	B13	CA11
A14	CA16	B14	CA12
A15	CT0	B15	CA13
A16	CT1	B16	CA14
A17	+5	B17	PROT

DM		CN2	
Pin No.	Pin Name	Wire Color	Destination
1	IN5	RE	BC-CN1-1
2	-15	WH	BC-CN1-2
3	+5	WH	BC-CN1-3

DM		CN3	
Pin No.	Pin Name	Wire Color	Destination
1	+5	RE	MW-3
2	IN4	WH	PB-2
3	IN3	WH	MW-2
4	+2.5	WH	PB-4
5	GND	WH	MW-1

DM		CN4	
Pin No.	Pin Name	Wire Color	Destination
1	IN7	RE	KS-CN1-1
2	GND	WH	KS-CN1-2
3	+15	WH	KS-CN1-3
4	-15	WH	KS-CN1-4

DM		CN5	
Pin No.	Pin Name	Wire Color	Destination
1	SD	RE	PNA-CN2-1
2	S9	WH	PNA-CN2-2
3	S8	WH	PNA-CN2-3
4	S7	WH	PNA-CN2-4
5	S6	WH	PNA-CN2-5
6	S5	WH	PNA-CN2-6
7	S4	WH	PNA-CN2-7
8	S3	WH	PNA-CN2-8
9	S2	WH	PNA-CN2-9
10	S1	WH	PNA-CN2-10
11	S0	WH	PNA-CN2-11
12	+5	WH	PNA-CN2-12
13	IN2	WH	PNA-CN2-13
14	GND	WH	PNA-CN2-14

DM		CN6	
Pin No.	Pin Name	Wire Color	Destination
1	+V	RE	LCD-Anode
2	-		
3	GND	BL	LCD-Cathode

DM		CN7	
Pin No.	Pin Name	Wire Color	Destination
1	Vss	RE	LCD-CN1-1
2	VDD	WH	LCD-CN1-2
3	Vo	WH	LCD-CN1-3
4	RS	WH	LCD-CN1-4
5	R/W	WH	LCD-CN1-5
6	E	WH	LCD-CN1-6
7	D0	WH	LCD-CN1-7
8	D1	WH	LCD-CN1-8
9	D2	WH	LCD-CN1-9
10	D3	WH	LCD-CN1-10
11	D4	WH	LCD-CN1-11
12	D5	WH	LCD-CN1-12
13	D6	WH	LCD-CN1-13
14	D7	WH	LCD-CN1-14

DM		CN8	
Pin No.	Pin Name	Wire Color	Destination
1	LOAD	RE	JK-CN1-1
2	SAVE	WH	JK-CN1-2
3	THRU	WH	JK-CN1-3
4	THRU+	WH	JK-CN1-4
5	OUT	WH	JK-CN1-5
6	OUT+	WH	JK-CN1-6
7	IN	WH	JK-CN1-7
8	IN+	WH	JK-CN1-8
9	GND	WH	JK-CN1-9
10	P22	WH	JK-CN1-10
11	P25	WH	JK-CN1-11
12	IN6	WH	JK-CN1-12
13	IN1	WH	JK-CN1-13
14	+5	WH	JK-CN1-14

DM		CN9	
Pin No.	Pin Name	Wire Color	Destination
1	S13	RE	PNB-CN1-1
2	S12	WH	PNB-CN1-2
3	S11	WH	PNB-CN1-3
4	S10	WH	PNB-CN1-4
5	S9	WH	PNB-CN1-5
6	S8	WH	PNB-CN1-6

DM		CN10	
Pin No.	Pin Name	Wire Color	Destination
1	SA	RE	PNB-CN2-1
2	SB	WH	PNB-CN2-2
3	SC	WH	PNB-CN2-3
4	S7	WH	PNB-CN2-4
5	S6	WH	PNB-CN2-5
6	S5	WH	PNB-CN2-6
7	S4	WH	PNB-CN2-7
8	S3	WH	PNB-CN2-8
9	S2	WH	PNB-CN2-9
10	S1	WH	PNB-CN2-10
11	S0	WH	PNB-CN2-11

DM		CN11	
Pin No.	Pin Name	Wire Color	Destination
1	B2	RE	KS-CN2-1
2	B3	WH	KS-CN2-2
3	B4	WH	KS-CN2-3
4	B5	WH	KS-CN2-4
5	B6	WH	KS-CN2-5
6	B7	WH	KS-CN2-6
7	B8	WH	KS-CN2-7
8	B9	WH	KS-CN2-8
9	B10	WH	KS-CN2-9
10	B11	WH	KS-CN2-10
11	B12	WH	KS-CN2-11

DM		CN12	
Pin No.	Pin Name	Wire Color	Destination
1	N15	RE	KS-CN3-1
2	N14	WH	KS-CN3-2
3	N13	WH	KS-CN3-3
4	N12	WH	KS-CN3-4
5	N11	WH	KS-CN3-5
6	N10	WH	KS-CN3-6
7	N5	WH	KS-CN3-7
8	N4	WH	KS-CN3-8
9	N3	WH	KS-CN3-9
10	N2	WH	KS-CN3-10
11	N1	WH	KS-CN3-11
12	N0	WH	KS-CN3-12

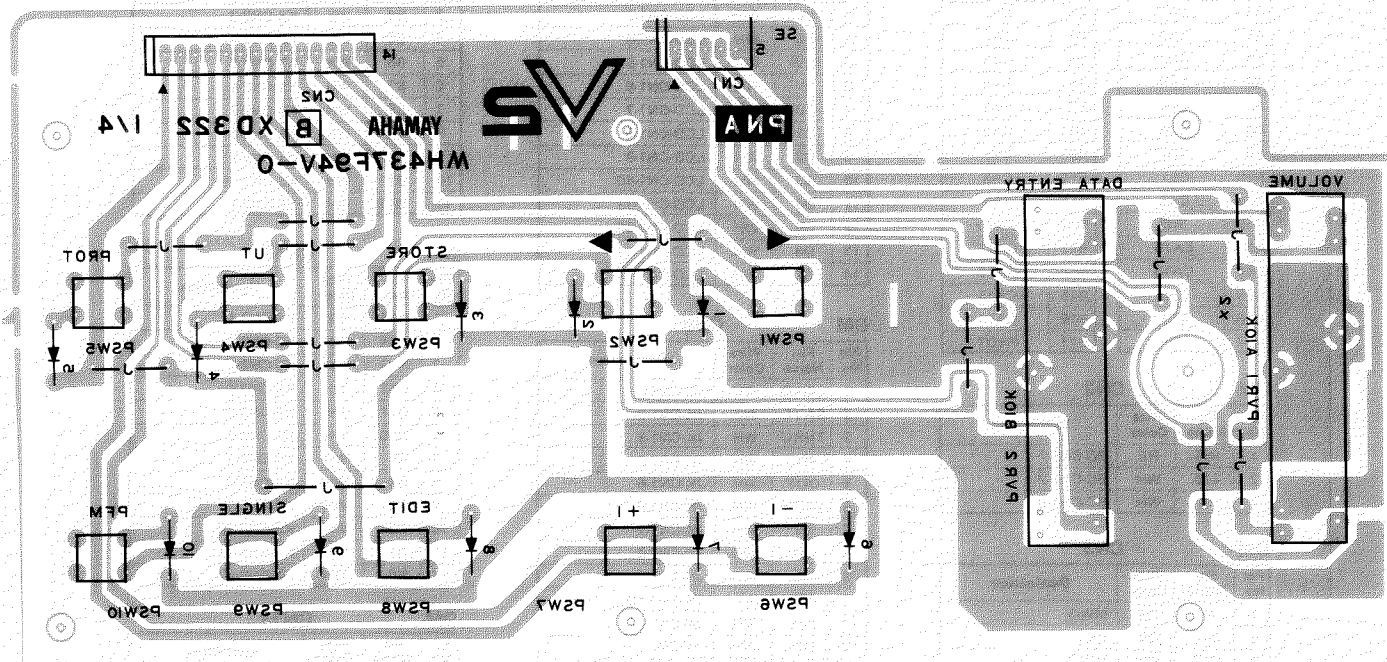
DM		CN13	
Pin No.	Pin Name	Wire Color	Destination
1	+15	RE	AD-CN1-1
2	AG	WH	AD-CN1-2
3	-15	WH	AD-CN1-3
4	+5	WH	AD-CN1-4
5	+5	WH	AD-CN1-5
6	DG	WH	AD-CN1-6
7	DG	WH	AD-CN1-7

DM		CN14	
Pin No.	Pin Name	Wire Color	Destination
1	OUT2	GR	JK-CN2-1
2	GND	GRS	
3	OUT1	BE	JK-CN2-2
4	GND	BES	
5	GND	BL	JK-CN2-3
6	HR	OR	JK-CN2-4
7	HL	YE	JK-CN2-5
8	GND	GR	JK-CN2-6

DM		CN15	
Pin No.	Pin Name	Wire Color	Destination
1	OUT2	BR	PNA-CN1-1
2	GND	BRS	
3	IN2	RE	PNA-CN1-2
4	GND	RES	
5	OUT1	OR	PNA-CN1-3
6	GND	ORS	
7	IN1	YE	PNA-CN1-4
8	GND	YES	
9	GND	BL	PNA-CN1-5

● PN-A, PN-B, BC & AD Circuit Boards

PN-A



Pattern side

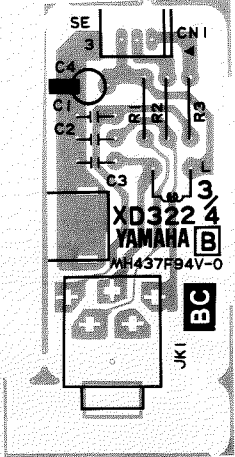
Notes)

- 1. Circuit Board : XD322B0
- 2. D1 ~ 10 : 1SS133 Diode
- 3. PSW1 ~ 10 : KHH10908 Push Switch
- 4. Slide Pot.
PVR1 : A10K x 2 VOLUME
B10K : EWA-NFOC DATA ENTRY

PNA		CN1	
Pin No.	Pin Name	Wire Color	Destination
1	3	BR	DM-CN15-1
2	2	RE	DM-CN15-3
3	3'	OR	DM-CN15-5
4	2'	YE	DM-CN15-7
5	1	BL	DM-CN15-9

PNA		CN2	
Pin No.	Pin Name	Wire Color	Destination
1	SD	RE	DM-CN5-1
2	S9	WH	DM-CN5-2
3	S8	WH	DM-CN5-3
4	S7	WH	DM-CN5-4
5	S6	WH	DM-CN5-5
6	S5	WH	DM-CN5-6
7	S4	WH	DM-CN5-7
8	S3	WH	DM-CN5-8
9	S2	WH	DM-CN5-9
10	S1	WH	DM-CN5-10
11	S0	WH	DM-CN5-11
12	+5	WH	DM-CN5-12
13	DE	WH	DM-CN5-13
14	GND	WH	DM-CN5-14

BC



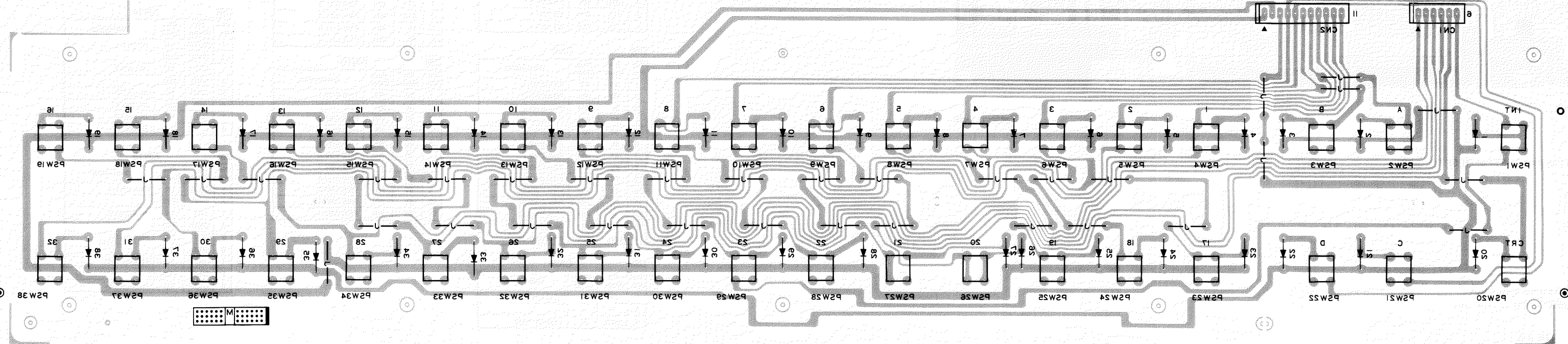
Components side

Notes)

- 1. Circuit Board : XD322B0
- 2. L1 : 20μ FL5R200QNT Coil
- 3. JK1 : JM35A JM35A Phone Jack

BC		CN1	
Pin No.	Pin Name	Wire Color	Destination
1	e	RE	DM-CN2-1
2	b	WH	DM-CN2-2
3	d	WH	DM-CN2-3

PN-B



Pattern side

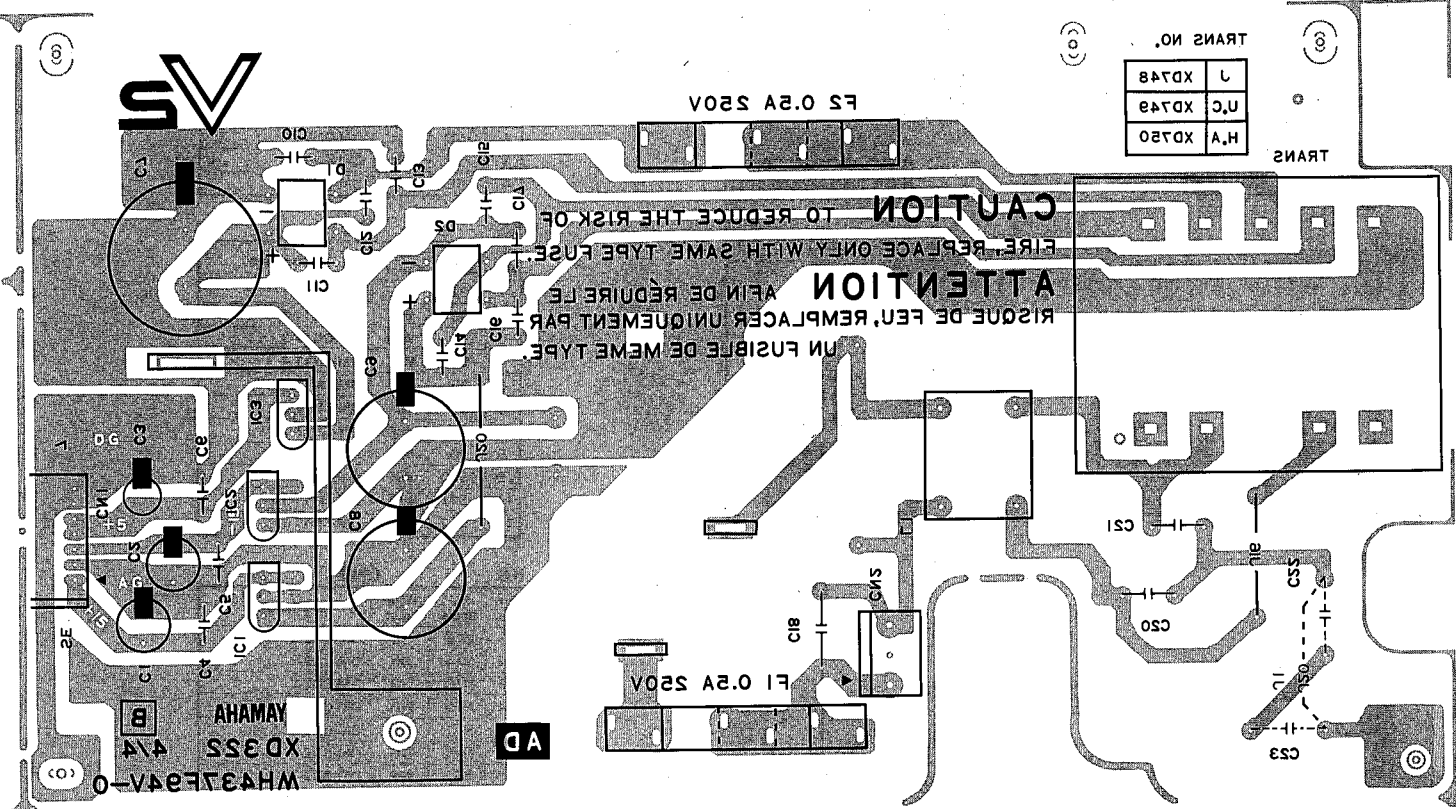
Notes)

- 1. Circuit Board : XB322B0
- 2. D1 ~ 38 : 1SS133 Diode
- 3. PSW1 ~ 38 : KHH10908 Push Switch

PNB		CN1	
Pin No.	Pin Name	Wire Color	Destination
1	S13	RE	DM-CN9-1
2	S12	WH	DM-CN9-2
3	S11	WH	DM-CN9-3
4	S10	WH	DM-CN9-4
5	S9	WH	DM-CN9-5
6	S8	WH	DM-CN9-6

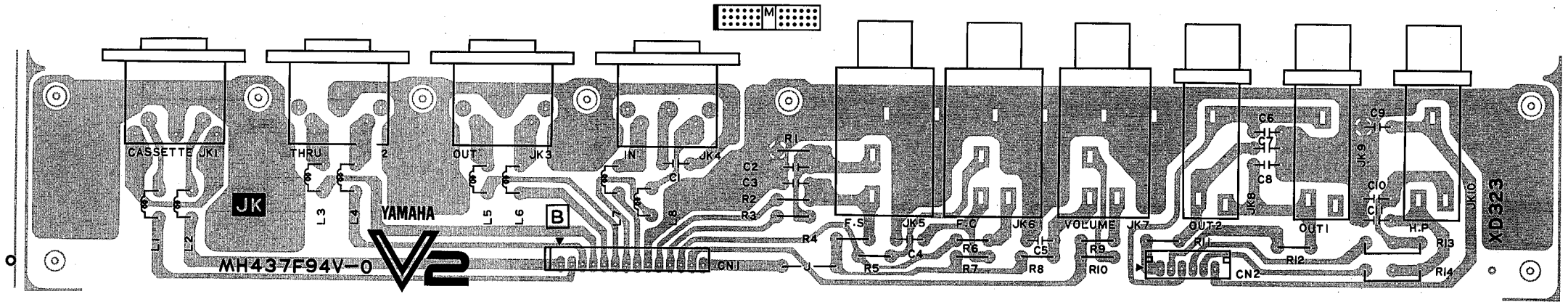
PNB		CN2	
Pin No.	Pin Name	Wire Color	Destination
1	SA	RE	DM-CN10-1
2	SB	WH	DM-CN10-2
3	SC	WH	DM-CN10-3
4	S7	WH	DM-CN10-4
5	S6	WH	DM-CN10-5
6	S5	WH	DM-CN10-6
7	S4	WH	DM-CN10-7
8	S3	WH	DM-CN10-8
9	S2	WH	DM-CN10-9
10	S1	WH	DM-CN10-10
11	S0	WH	DM-CN10-11

AD



Pattern side

● JK Circuit Board



Components side

Notes)

1. Circuit Board : XD323A0
2. Jack
- JK1 : TCS4680 CASSETT DIN Jack
- JK2 ~ 4 : TCS4650 MIDI Jacks
- JK5 : HLJ0521 MONAURAL (F.S) Phone Jack
- JK6, 7 : HLJ0521 STEREO (F.C) Phone Jack
- JK8, 9 : HLJ4306 MONAURAL (OUT) Phone Jack
- JK10 : HLJ4306 STEREO (H.P) Phone Jack
3. L1 ~ 8 : 20μ FL5R200QNT Coil

Notes)

1. Circuit Board : XB322B0
2. IC
- IC1 : AN78M15F (XB466001) 15V 0.5A
- IC2 : AN79M15F (XB467001) -15V 0.5A
- IC3 : AN78M05F (XB646001) 5V 0.5A
3. D1, 2 : RDF04M 1A 400V Diode Stack
4. L1 : PLA3021A Coil
5. Fuse, Transformer

MODELS	F1, F2	TRANS.
JAPANESE	▽ 0.5A 250V	XD748
U.S., CANADIAN	UL 0.5A 250V	XD749
AUSTRALIAN, GERMAN, NORTH EUROPEAN	Ⓣ 0.5A 250V	XD750

6. C22, C23, J1

MODELS	C22	C23	J1
JAPANESE	X	X	○
U.S., CANADIAN	X	X	○
AUSTRALIAN, GERMAN, NORTH EUROPEAN	○	X	X

AD CN1

Pin No.	Pin Name	Wire Color	Destination
1	+15	RE	DM-CN13-1
2	AG	WH	DM-CN13-2
3	-15	WH	DM-CN13-3
4	+5	WH	DM-CN13-4
5	+5	WH	DM-CN13-5
6	DG	WH	DM-CN13-6
7	DG	WH	DM-CN13-7

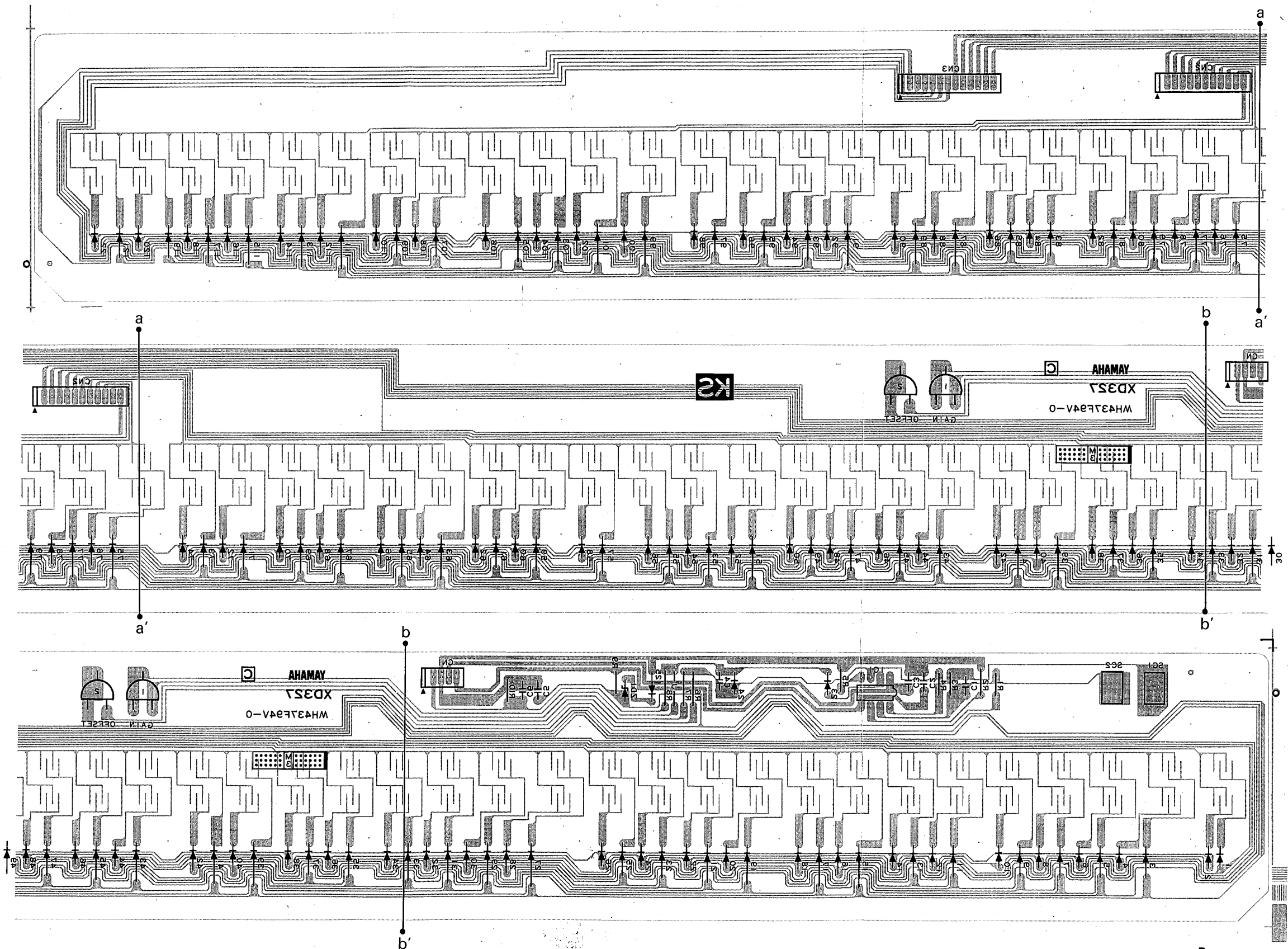
JK CN1

Pin No.	Pin Name	Wire Color	Destination
1	CAS5	RE	DM-CN8-1
2	CAS4	WH	DM-CN8-2
3	THRU5	WH	DM-CN8-3
4	THRU4	WH	DM-CN8-4
5	OUT5	WH	DM-CN8-5
6	OUT4	WH	DM-CN8-6
7	IN5	WH	DM-CN8-7
8	IN4	WH	DM-CN8-8
9	GND	WH	DM-CN8-9
10	FS2	WH	DM-CN8-10
11	FS4	WH	DM-CN8-11
12	FC	WH	DM-CN8-12
13	VOL	WH	DM-CN8-13
14	+5	WH	DM-CN8-14

JK CN2

Pin No.	Pin Name	Wire Color	Destination
1	OUT2	GR	DM-CN14-1
2	OUT1	BE	DM-CN14-3
3	GND	BL	DM-CN14-5
4	HR	OR	DM-CN14-6
5	HL	YE	DM-CN14-7
6	GND	GR	DM-CN14-8

●KS Circuit Board



KS		CN1	
Pin No.	Pin Name	Wire Color	Destination
1	OUT	RE	DM-CN4-1
2	GND	WH	DM-CN4-2
3	+15	WH	DM-CN4-3
4	-15	WH	DM-CN4-4

KS		CN2	
Pin No.	Pin Name	Wire Color	Destination
1	B2	RE	DM-CN11-1
2	B3	WH	DM-CN11-2
3	B4	WH	DM-CN11-3
4	B5	WH	DM-CN11-4
5	B6	WH	DM-CN11-5
6	B7	WH	DM-CN11-6
7	B8	WH	DM-CN11-7
8	B9	WH	DM-CN11-8
9	B10	WH	DM-CN11-9
10	B11	WH	DM-CN11-10
11	B12	WH	DM-CN11-11

KS		CN3	
Pin No.	Pin Name	Wire Color	Destination
1	N15	RE	DM-CN2-1
2	N14	WH	DM-CN2-2
3	N13	WH	DM-CN2-3
4	N12	WH	DM-CN2-4
5	N11	WH	DM-CN2-5
6	N10	WH	DM-CN2-6
7	N5	WH	DM-CN2-7
8	N4	WH	DM-CN2-8
9	N3	WH	DM-CN2-9
10	N2	WH	DM-CN2-10
11	N1	WH	DM-CN2-11
12	N0	WH	DM-CN2-12

KS		SC1	
Pin No.	Pin Name	Wire Color	Destination
1	1		Touch sensor
2	1		
3	1		

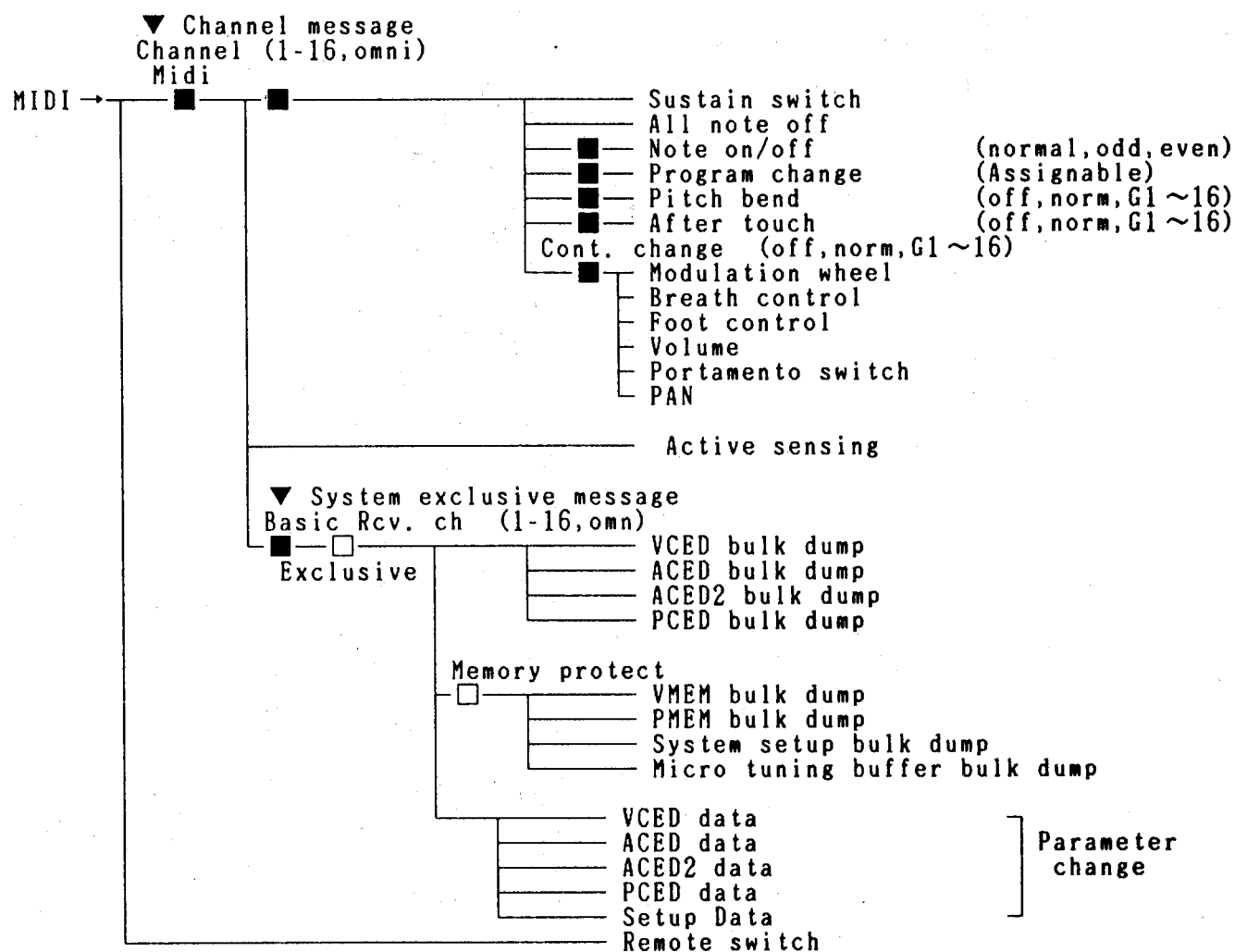
KS		SC2	
Pin No.	Pin Name	Wire Color	Destination
1	2		Touch sensor
2	2		
3	2		

- Notes)
1. Circuit Board : XD327C0
 2. IC1 : NJM4558DV (IG001390) OP AMP.
 3. D1 ~ 123 : 1SS133 Diode

■ MIDI DATA FORMAT

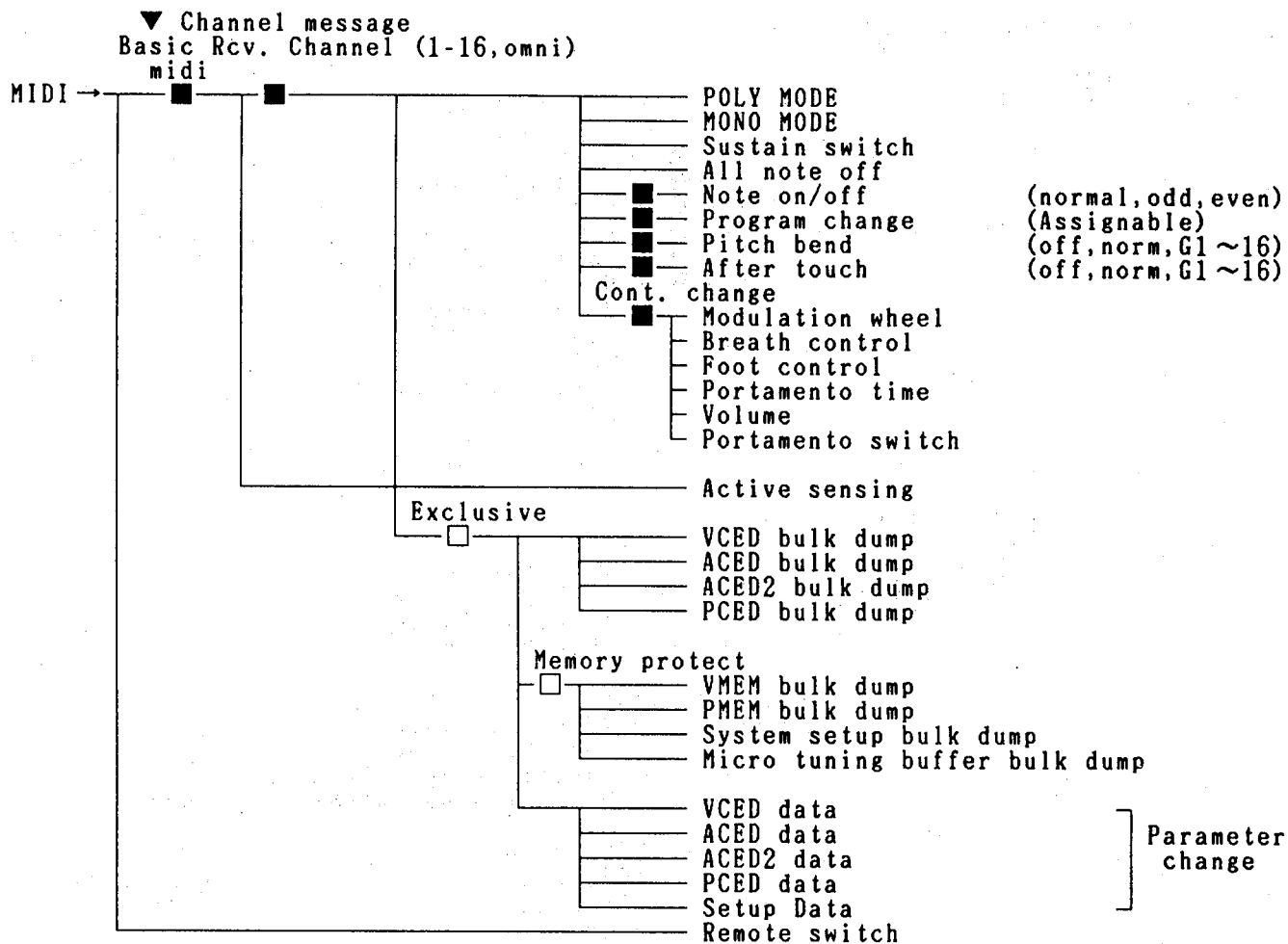
1. RECEPTION BLOCK DIAGRAM

1.1 << PERFORMANCE MODE >>



- ∴ VCED = Voice edit buffer
 ACED = Additional voice edit buffer (for TX81Z)
 ACED2 = Additional voice edit buffer 2 (for V2)
 PCED = Performance edit buffer
 VMEM = Voice memory
 PMEM = Performance memory
- ∴ ☐ = on/off switch
 ☒ = select switch

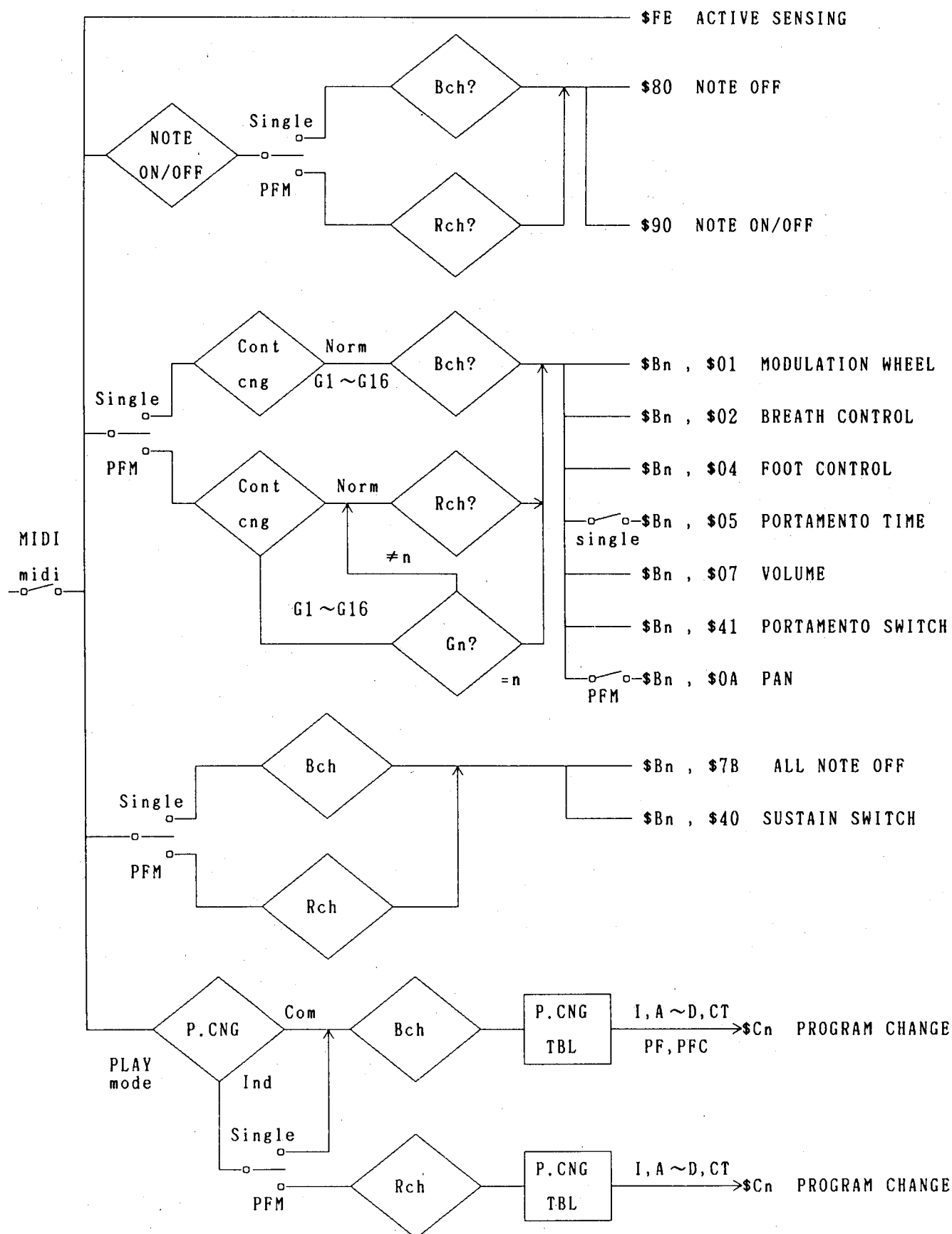
1.2 << SINGLE MODE >>



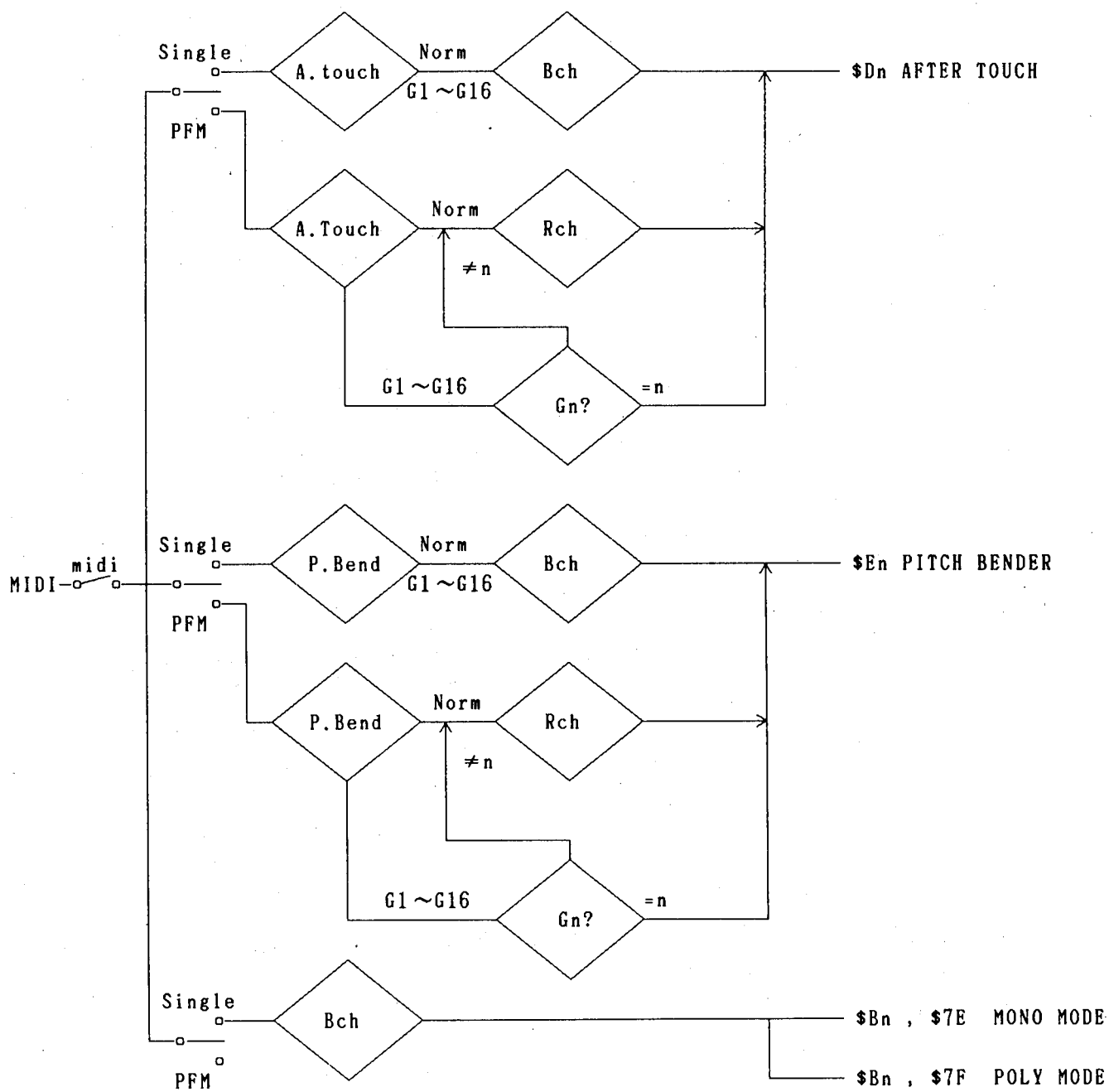
∴ VCED = Voice edit buffer
 ACED = Additional voice edit buffer (for TX81Z)
 ACED2 = Additional voice edit buffer 2 (for V2)
 PCED = Performance edit buffer
 VMEM = Voice memory
 PMEM = Performance memory

∴ ☐ = on/off switch
☒ = select switch

● Reception Conditions 1/3

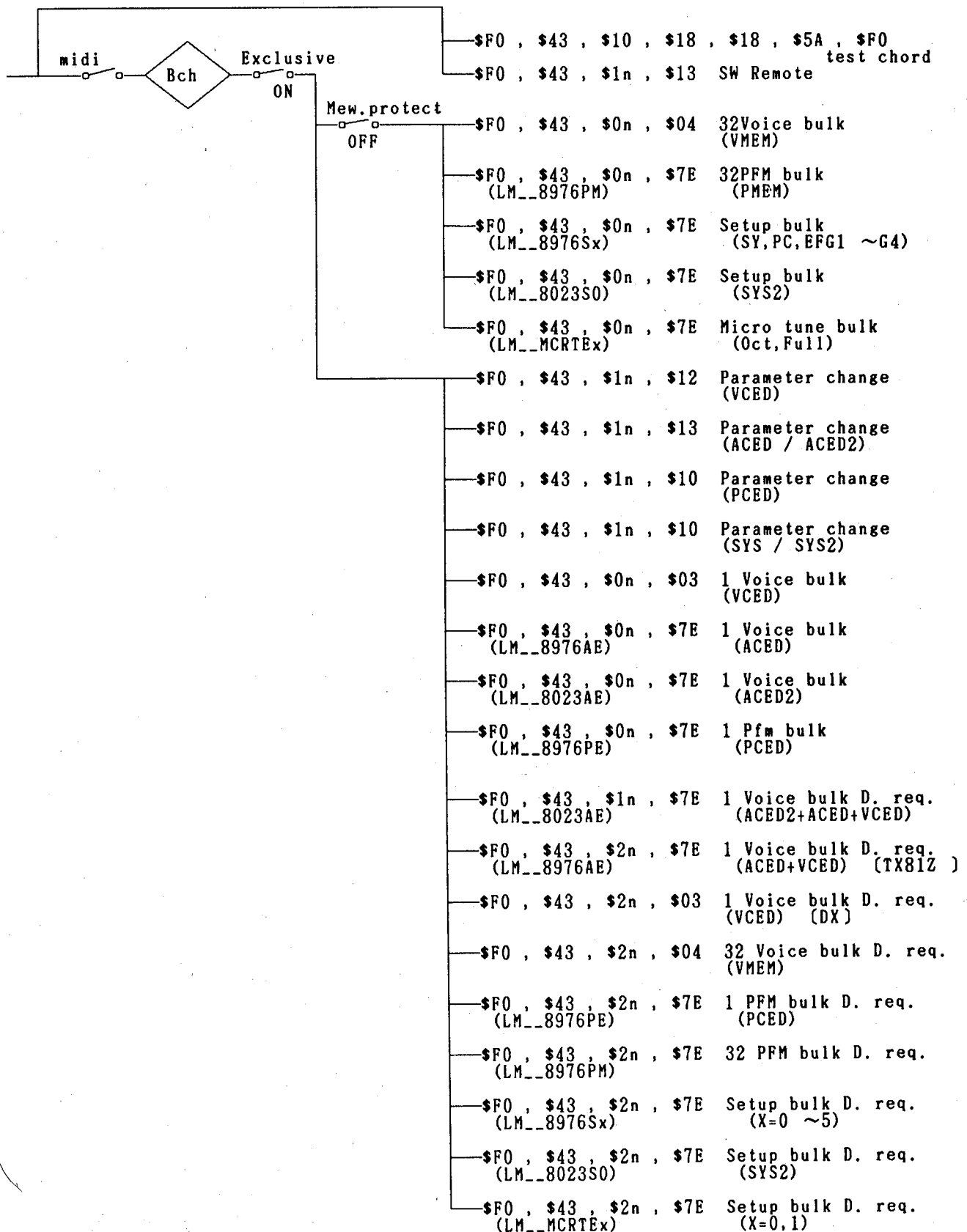


• Reception Conditions 2/3



Bch----Basic Rcv. ch.
 Rch----Receive ch.
 Gn-----Global ch.

● Reception Conditions 3/3



Active Sensing

Diagram illustrating a single-pole double-throw switch (SPDT) configuration. The diagram shows two single-pole double-throw switches connected in parallel to a common output line. Each switch is labeled "Single".

Figure 1 shows a block diagram of the control logic for the 16-bit counter. A 16-bit data bus is connected to a diamond-shaped logic block labeled 'CONT CNG'. The block has two outputs: 'Com' and 'ind'. A 'play' button is connected to the bottom of the data bus.

AFTER
T. norm
G1 ~ G16

P.BEND norm
G1~G16
Exclusive

\$ Cn ——— ☒ ☐
PLAY
mode

Transmit
channel

OFF
□
→
MIDI

			(PGMCNG)
I1	~C32	→	0 ~127
D1	~D32	→	0 ~31
PF1	~32	→	32 ~63
CT1	~CT32	→	64 ~95
PFC1	~32	→	96 ~127

2. CHANNEL MESSAGES

2.1 TRANSMISSION

2.1.1 Note ON/OFF

Range of transmitted notes = C1 (36) to C6 (96)

Velocity range = 0 to 127 (0: Note OFF)

2.1.2 Control Changes

Whenever any of the controllers listed below are operated, their corresponding data is output to MIDI.

ctl#	parameter	data rng
1	Modulation wheel	0...127
2	Breath control	0...127
4	Foot control	0...127
6	Data entry slider at Edit/utility mode	0...127
7	Volume pedal	0...127
64	Sustain switch	0, 127
65	Portamento switch	0, 127
0 ~31	Assigned Data entry Slider at Play mode	0...127

*1

***1 The Transmission ON/OFF status for control changes cannot be switched using a control change.**

◆ The Transmission ON/OFF mode for control changes can be set during system setup.

OFF : No control changes are transmitted.

Norm/G1 to G16 : Transmission is performed over by channel specified by TRNS CH.

2.1.3 Program Changes

Whenever a voice is selected during Single mode or a performance is selected during Performance mode, a program change is transmitted.

The Program change numbers are assigned according to the table below.

Performance	Program Change No.
I01 — I32	0 — 31
A01 — C32	32 — 127
D01 — D32	0 — 31
PF01 — PF32	32 — 63
CT01 — CT32	64 — 95
PFC01 — PFC32	96 — 127

Also, the Transmission ON/OFF status for program changes can be selected according to mode.

(1) OFF : No program changes are transmitted.

(2) COM/IND : Transmission is performed over the channel specified by TRNS CH.

2.1.4 Pitch Bend

The transmission of Pitch Bend data is conducted using seven-bit resolution.

◆ The Transmission ON/OFF status for Pitch Bend data can be set during system setup. (OFF, Norm, G1 to G16).

The settings are identical to those for control changes.

2.1.5 After Touch

◆ The transmission ON/OFF status for After Touch data can be set during system setup. (OFF, Norm, G1 to G16).

The settings are identical to those for control changes.

2.1.6 Channel Mode Messages

Whenever the Mono/Poly mode setting for a voice is changed, one of the below messages is transmitted.

- ☆ MONO mode (\$Bn, \$7E, \$01) Single mode only
- ☆ POLY mode (\$BN, \$7F, \$00) Single mode only

2.2 RECEPTION

2.2.1 Note ON/OFF

Range of received notes = C-2 to G8

Velocity range = 0 to 127 (For Note ON only)

The Reception mode can be set during system setup.

- Normal : All notes are received.
- Odd : Odd notes are received.
- Even : Even notes are received.

2.2.2 Control Changes

The parameters listed below can be controlled by MIDI.

ctl#	parameter	data rng
1	Modulation wheel	0...127
2	Breath control	0...127
4	Foot control	0...127
5	Portamento time	0...127 *1
7	Volume	0...127
10	PAN	0...127 *2
64	Sustain switch	0...127 *3
65	Portamento switch	0...127

*1 In Single mode only.

*2 Only in Performance mode: 0 to 42 (I), 43 to 85 (I + II), 86 to 127 (II)

*3 The Reception ON/OFF status for control changes cannot be switched using the Control Change switch.

◆ The Reception ON/OFF mode for Control Changes can be set during system setup.

OFF : No control changes are received.

Norm : Control changes are received according to channel (normal reception).

G1 to G16 : A Global Channel can be specified, and the numeral after "G" indicates the MIDI Channel No. In Performance mode, any control change received over this channel will be effective for all channels (the control change will affect all instruments).

(At this time, each musical instrument will receive both the data from this Global Channel and the data from the channel set at that instrument according to a last-in first-out priority.

2.2.3 Program Changes

When a program change is received, this device operates as described below.

During system setup, one of three Reception modes can be set.

- (1) OFF : No program changes are received.
- (2) COM : Any program change is received after being converted to its assigned number in the Program Change Table. If performance numbers (PF1 to PF32) are assigned to the Program Change Table, you can shift to Performance mode even from Single mode.
- (3) IND : Set this mode if you wish to change the Voice No. for each musical instrument during Performance mode. Even in this case, the Program Change Table will be used as reference but will be ignored in the case that performance numbers have been assigned. In Single mode, Ind mode operates in the same way as Com mode. Moreover, the selected voice will vary according to the status (INT or CRT) of the currently selected Performance.

Program Change Table Data	Current Performance Status	
	INT	CRT
I1 — I32	I1 — 32	CT1 — CT32
A1 — A32	←	←
B1 — B32	←	←
C1 — C32	←	←
D1 — D32	←	←
PF1 — PF32	Ignored	←
CT1 — CT32	I1 — I32	CT1 — CT32
PFC1 — PFC32		←

2.2.4 Pitch Bend

The reception of Pitch Bend data is performed using only the Four higher-order bits.

- ◆ The Reception ON/OFF status for Pitch Bend data can be set during system setup. (OFF, Norm, G1 to G16).
The settings are identical to those for control changes.

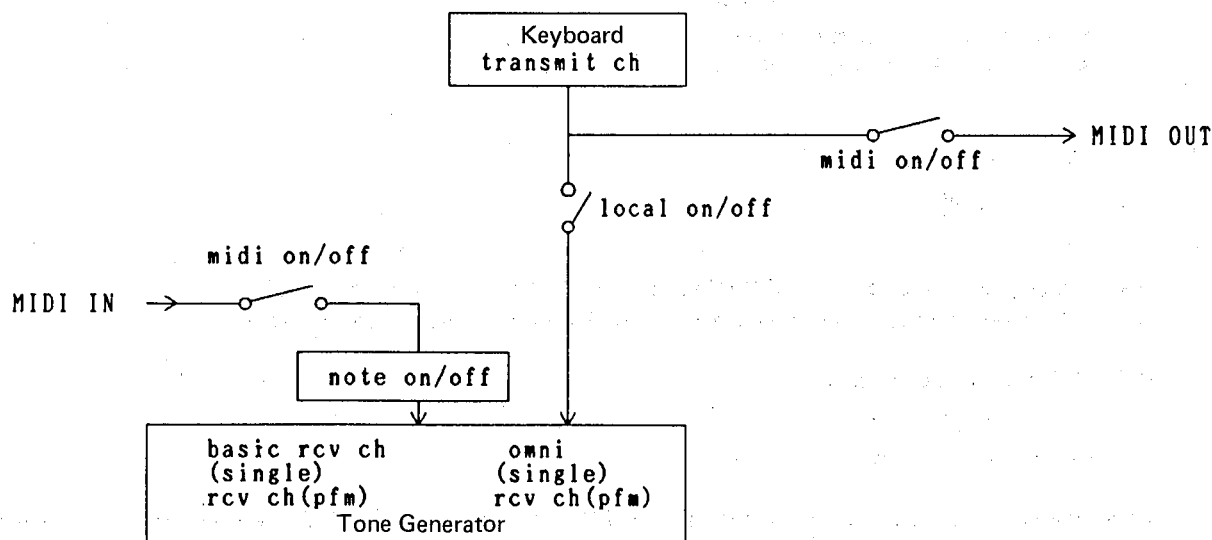
2.2.5 After Touch

- ◆ The Reception ON/OFF status for After Touch data can be set during system setup. (OFF, Norm, G1 to G16).
The settings are identical to those for control changes.

2.2.6 Channel Mode Messages

- ☆ ALL NOTE off (\$Bn, \$7B, \$00)
- ☆ MONO mode (\$Bn, \$7E, \$01) Single mode only
- ☆ POLY mode (\$BN, \$7F, \$00) Single mode only

2.3 CONNECTION DIAGRAM OF THE KEYBOARD UNIT AND TONE GENERATOR



NOTE 1: In Single mode, notes will be sounded even if the Basic Receive Channel and Transmit Channel do not match.

NOTE 2: The Note ON data from the keyboard is distinguished from the Note ON data from MIDI.
There is not distinction between the Controller data from the keyboard and the Controller data from MIDI (Sustain switch, control changes, After Touch data, Pitch Bend data).

3. SYSTEM EXCLUSIVE MESSAGES

3.1 PARAMETER CHANGES

This device can receive and transmit the eight types of parameter changes listed below. (However, the remote switch parameter change (8) can only be received.)

While a parameter is being received, the LCD changes to the menu for editing that parameter. (For the remote switch parameter change (8), the display remains the same as when the switch was pressed.)

- | | |
|---|---------|
| 1). VCED parameter change | |
| 2). ACED / ACED2 parameter change | |
| 3). PCED parameter change | |
| 4). System parameter change (SYS, SYS2) | |
| 5). Effect parameter change (EFG1~4) | |
| 6). Micro tuning parameter change (OCT, FULL) | } setup |
| 7). Program change Table para. change | |
| 8). Remote switch parameter change | |

The format for parameter changes are follows:

★ Format for 1), 2), 3), 4), 5), and 8):

```

11110000    f0
01000011    43
0001nnnn    nnnn    = Basic Rcv. ch
0ggggghh    gggggg    = group number, hh = sub group number
0ppppppp    pppppp    = parameter number
0ddddd      dddddd    = data
11110111    f7
  
```

For details on gggggg, hh, pppppp, and dddddd, refer to the description of the pertinent parameter change.

- ★ Format of 4): See subsection 4.1.4
- ★ Format of 5): See subsection 4.1.5
- ★ Format of 6): See subsection 4.1.6
- ★ Format of 7): See subsection 4.1.7
- ★ Format of 8): See subsection 4.1.8

3.1.1 VCED Parameter Change

```

ggggg = 00100    (4)
hh     = 10       (2)
  
```

This message changes the data of VCED (Voice Edit Buffer) by one parameter at a time.

For details on pppppp (parameter number) and dddddd (data), see Appended Table 1.

3.1.2 ACED/ACED2 Parameter Changes

```

ggggg = 00100    (4)
hh     = 11       (3)
  
```

These messages respectively change the data of ACED (Additional Voice Edit Buffer) and ACED2 by one parameter at a time.

For details on pppppp (parameter number) and dddddd (data), see Appended Table 1.

3.1.3 PCED Parameter Change

ggggg = 00100 (4)
hh = 00 (0)

This message changes the data of PCED (Performance Edit Buffer) by one parameter at a time.
For details on ppppppp (parameter number) and dddddd (data), see Appended Table 1.

3.1.4 System Parameter Change (SYS, SYS2)

★ Format

11110000 f0
01000011 43
0001nnnn nnnn = Basic Rcv. ch
Oggggghh ggggg = 00100 (4), hh = 00 (0)
Oppppppp ppppppp = 1111011 (123)
Okkkkkkk kkkkkkk = Parameter number
Oddddddd ddddddd = data
11110111 f7

This message changes the System data by one parameter at a time.
For details on kkkkkkk (parameter number) and ddddddd (data), see Appended Table 3.

3.1.5 Effect Parameter Change

★ Format

11110000 f0
01000011 43
0001nnnn nnnn = Basic Rcv. ch
Oggggghh ggggg = 00100 (4), hh = 00 (0)
Oppppppp ppppppp = 1111100 (123:EFG1), 1111000 (120:EFG2)
Okkkkkkk kkkkkkk = Parameter number, 1111001 (121:EFG3)
Oddddddd ddddddd = data, 1111010 (122:EFG4)
11110111 f7

This message changes the Effect 1/2/3 data (Delay Pan, Chord) by one parameter at a time. Also, the Group No. can be set by the ppppppp value.

EFG1 : delay1, pan1, chord1
EFG2 : delay2, pan2, chord2
EFG3 : delay3, pan3, chord3

For details on kkkkkkk (parameter number) and ddddddd (data), see Appended Table 3.

3.1.6 Micro Tuning Parameter Change

```

11110000  f0
01000011  43
0001nnnn  nnnn   = Basic Rcv. ch
0ggggghh  ggggg  = 00100 (4) , hh = 00 (0)
0ppppppp  ppppppp = 1111011 (125:OCT), 1111110 (126:FULL)
0kkkkkkk  kkkkkkk = key number
0hhhhhhh  hhhhhhh = data (high)
01111111  1111111 = data (low)
11110111  f7

```

This message changes the Micro Tuning data by one key at a time.
For details on kkkkkkk (key number), see Appended Table 3.

3.1.7 Program Change Parameter Change

★ Format

```

11110000  f0
01000011  43
0001nnnn  nnnn   = Basic Rcv. ch
0ggggghh  ggggg  = 00100 (4) , hh = 00 (0)
0ppppppp  ppppppp = 1111111 (127)
0kkkkkkk  kkkkkkk = PGM change No
0hhhhhhh  hhhhhhh = data (high)
01111111  1111111 = data (low)
11110111  f7

```

This message changes the data of the Program Change Table.

The parameter change data corresponds to the Program Change Table data as follows:

```

0 ~ 31 ( I1 ~ I32 )
32 ~ 63 ( A1 ~ A32 )
64 ~ 95 ( B1 ~ B32 )
96 ~ 127 ( C1 ~ C32 )
128 ~ 159 ( D1 ~ D32 )
160 ~ 191 ( PF1 ~ PF32 )
192 ~ 223 ( CT1 ~ CT32 )
224 ~ 225 ( PFC1 ~ PFC32 )

```

For details on kkkkkkk (program change number), see Appended Table 3.

3.1.8 Remote Switch Parameter Change

```

ggggg  = 4
hh      = 3
ddddd  = 1111111 ($7F)  ON
        = 0000000      OFF

```

This parameter change can only be received, and enables all switches of the panel to be operated by remote control.

Reception of this message has the same effect as pressing the pertinent switch. Furthermore, this data cannot be set to Reception OFF status by any of the MIDI switches.

For details on ppppppp (switch number), refer to Appended Table 1.

3.2 VOICE DATA BULK DUMP

There are two types of voice data bulk dump operations:

- 1). Voice edit buffer bulk dump
- 2). Voice memory bulk dump

◆ For details on the format of each type of bulk dump data, see Appended Tables 1, 2, and 3.

3.2.1 Voice Edit Buffer Bulk Dump

Whenever a voice is selected in PLAY mode of Single mode or whenever an Init Voice or Recall Edit job is executed, the voice data in the Voice Edit Buffer is transmitted.

Moreover, in case Voice Edit Buffer bulk data is received, that voice data is loaded to the Voice Edit Buffer. Note that ACED2 is the data of the parameters added to the TX81Z parameter as a result of this device.

(a) Transmission

The transmission of bulk data is performed in the sequence below:

- 1). ACED2 (Additional voice edit buffer2) bulk data
- 2). ACED (Additional voice edit buffer) bulk data
- 3). VCED (voice edit buffer) bulk data

(b) Reception

The reception of Voice Edit Bulk data will conform to one of the five cases below.

- 1) When only ACED2 is received:
Only ACED2 is set and there are no action is taken.
- 2) When only ACED is received:
Only the Additional Voice Edit Buffer (ACED) is set.
The Voice Edit Buffer is not affected. ACED2 is initialized.
- 3) When only VCED is received:
The Voice Edit Buffer is set and the Additional Voice Edit Buffer (ACED) is initialized.
ACED2 is also initialized.
- 4) When ACED and VCED are consecutively received:
Both the Voice Edit Buffer and Additional Voice Edit Buffer (ACED) are set. ACED2 is initialized.
- 5) When ACED2, ACED, and VCED are consecutively received, they are all set.

3.2.2 Voice Memory Bulk Dump

This operation performs reception or transmission for the voice data of either the 32 voices in internal memory or the Preset Voice Bank (32 voices).

a) Transmission

The types of data below can be transmitted:

VMEM (Voice Memory) bulk data (combining VCED, ACED, and ACED2).

b) Reception

When VMEM bulk data is received, "Midi Received" is displayed. And if an Internal or Preset voice is selected and the current mode is Single mode, the Voice Edit Buffer will also change to the voice having that same voice number.

3.3 PERFORMANCE DATA BULK DUMP

There are two types of Performance data bulk dump operations.

- 1). Performance edit buffer bulk dump
- 2). Performance memory bulk dump

3.3.1 Performance Edit Buffer Bulk Dump

Whenever a performance is selected in PLAY mode of Performance mode or whenever an Init Performance or Recall Performance job is executed, the performance data in the Performance Edit Buffer is transmitted.

Moreover, in case Performance Edit Buffer bulk data is received, that performance data is loaded to the Performance Edit Buffer.

◆ For details on the format of each type of bulk dump data, see Appended Tables 1, 2, and 3.

3.3.2 Performance Memory Bulk Dump

This operation performs reception or transmission for the data of 32 performances in internal memory.

◆ For details on the format of each type of bulk dump data, see Appended Tables 1, 2, and 3.

3.4 SYSTEM SETUP DATA BULK DUMP

This operation performs reception or transmission of this device's system setup data.

During transmission, the system setup data is divided into four types of bulk data. (EF is split into the four groups of EFG1 through EFG4.)

SYS2 is the data of the parameters added to the TX81Z parameter as a result of this device.

SY.....System (SYS+SYS2)
 PC.....Program Change table
 EF.....Effect data (EFG1, 2, 3, 4)
 MC.....Micro tuning data (Oct, FULL)

In order to consecutively transmit the three above types of bulk data excluding System, select "AL" then execute transmission; the data will be transmitted in the sequence below:

- 1) PC
- 2) EF (EFG1 → 2 → 3 → 4)
- 3) MC Reception and transmission will be based on the Micro Tuning data in the Micro Tuning OCT, FULL buffers.

◆ For details on the format of each type of bulk dump data, see Appended Table 2.

◆ The "n" of "EFG n" represents the setting of Delay n, Pan n, and Chord n (n = 1 to 4).

3.5 DUMP REQUEST

It is possible to make a dump request with respect to any of the bulk dump operations described in the preceding sections.

◆ For details on the Dump Request messages, see Appended Table 4.

4. SYSTEM COMMON MESSAGES (Reception Only)

Status Messages F1 through F7 are internally registered as Status data but have no other function.

5. SYSTEM REALTIME MESSAGES (Reception Only)

5.1 Status Messages F8 to FD, FF

After the messages are decoded, no action is taken.

5.2 Status Message FE (Active Sensing)

(a) Transmission

FE is transmitted in approximately 150-ms intervals.

(b) Reception

If no signal is received from MIDI after approximately 300 ms after FE has been received, the Receive Buffer of MIDI is cleared and, if any keys are ON, Key OFF processing is performed for those keys.

● Table 1-1

Parameter list of parameter change and bulk									
*** VCED *** 93 byte voice edit parameter (1 bulk edit format)									
para. cng g=4, h=2									
VCED address	b7	b6	b5	b4	b3	b2	b1	b0	
(para.cng)									
edit	0	0	0	0	0	0	0	0	AR 0-31
1	0	0	0	0	0	0	0	0	D1R 0-31
2	0	0	0	0	0	0	0	0	D2R 0-31
3	0	0	0	0	0	0	0	0	RR 1-15
4	0	0	0	0	0	0	0	0	D1L 0-15
5	0	0	0	0	0	0	0	0	LS 0-99
6	0	0	0	0	0	0	0	0	RS 0-3 OP.4
7	0	0	0	0	0	0	0	0	EBS 0-7
8	0	0	0	0	0	0	0	0	AME 0-1
9	0	0	0	0	0	0	0	0	KVS 0-7
10	0	0	0	0	0	0	0	0	OUT 0-99
11	0	0	0	0	0	0	0	0	CRS 0-63 (RATIO)
12	0	0	0	0	0	0	0	0	CRS x x 0-63 (FIX)
13	0	0	0	0	0	0	0	0	DET 0-6 (center=3)
14	0	0	0	0	0	0	0	0	
15	0	0	0	0	0	0	0	0	
16	0	0	0	0	0	0	0	0	OP.2
17	0	0	0	0	0	0	0	0	
18	0	0	0	0	0	0	0	0	
19	0	0	0	0	0	0	0	0	OP.3
20	0	0	0	0	0	0	0	0	
21	0	0	0	0	0	0	0	0	
22	0	0	0	0	0	0	0	0	OP.1
23	0	0	0	0	0	0	0	0	
24	0	0	0	0	0	0	0	0	
25	0	0	0	0	0	0	0	0	
26	0	0	0	0	0	0	0	0	
27	0	0	0	0	0	0	0	0	
28	0	0	0	0	0	0	0	0	
29	0	0	0	0	0	0	0	0	
30	0	0	0	0	0	0	0	0	
31	0	0	0	0	0	0	0	0	
32	0	0	0	0	0	0	0	0	
33	0	0	0	0	0	0	0	0	
34	0	0	0	0	0	0	0	0	
35	0	0	0	0	0	0	0	0	
36	0	0	0	0	0	0	0	0	
37	0	0	0	0	0	0	0	0	
38	0	0	0	0	0	0	0	0	
39	0	0	0	0	0	0	0	0	
40	0	0	0	0	0	0	0	0	
41	0	0	0	0	0	0	0	0	
42	0	0	0	0	0	0	0	0	
43	0	0	0	0	0	0	0	0	
44	0	0	0	0	0	0	0	0	
45	0	0	0	0	0	0	0	0	
46	0	0	0	0	0	0	0	0	
47	0	0	0	0	0	0	0	0	
48	0	0	0	0	0	0	0	0	
49	0	0	0	0	0	0	0	0	
50	0	0	0	0	0	0	0	0	
51	0	0	0	0	0	0	0	0	
52	0	0	0	0	0	0	0	0	ALG 0-7
53	0	0	0	0	0	0	0	0	FBL 0-7
54	0	0	0	0	0	0	0	0	LFS 0-99
55	0	0	0	0	0	0	0	0	LFD 0-99
56	0	0	0	0	0	0	0	0	PMD 0-99
57	0	0	0	0	0	0	0	0	AMD 0-99
58	0	0	0	0	0	0	0	0	SY 0-1 LFO SYNC
59	0	0	0	0	0	0	0	0	LFW 0-3
60	0	0	0	0	0	0	0	0	PMS 0-7
61	0	0	0	0	0	0	0	0	AMS 0-3
62	0	0	0	0	0	0	0	0	TRPS 0-48 (center=24)
63	0	0	0	0	0	0	0	0	MONO
64	0	0	0	0	0	0	0	0	PBR 0-12
65	0	0	0	0	0	0	0	0	PM 0-99
66	0	0	0	0	0	0	0	0	PORT 0-99
67	0	0	0	0	0	0	0	0	FC VOL 0-99
68	0	0	0	0	0	0	0	0	SU 0-1 sus. (F.SW)
69	0	0	0	0	0	0	0	0	PO 0-1 por. (F.SW)
70	0	0	0	0	0	0	0	0	CH 0-1 chorus set 0
71	0	0	0	0	0	0	0	0	MW PITCH 0-99
72	0	0	0	0	0	0	0	0	MW AMPLI 0-99
73	0	0	0	0	0	0	0	0	BC PITCH 0-99
74	0	0	0	0	0	0	0	0	BC AMPLI 0-99
75	0	0	0	0	0	0	0	0	BC P BIAS 0-100 (center=50)
76	0	0	0	0	0	0	0	0	BC E BIAS 0-99
77	0	0	0	0	0	0	0	0	VOICE NAME 1 32-127
78	0	0	0	0	0	0	0	0	VOICE NAME 2
79	0	0	0	0	0	0	0	0	VOICE NAME 3
80	0	0	0	0	0	0	0	0	VOICE NAME 4
81	0	0	0	0	0	0	0	0	VOICE NAME 5
82	0	0	0	0	0	0	0	0	VOICE NAME 6
83	0	0	0	0	0	0	0	0	VOICE NAME 7
84	0	0	0	0	0	0	0	0	VOICE NAME 8
85	0	0	0	0	0	0	0	0	VOICE NAME 9
86	0	0	0	0	0	0	0	0	VOICE NAME 10
87	0	0	0	0	0	0	0	0	PR1 0-99 PEG
88	0	0	0	0	0	0	0	0	PR2 0-99
89	0	0	0	0	0	0	0	0	PR3 0-99
90	0	0	0	0	0	0	0	0	PL1 0-99 (center=50)
91	0	0	0	0	0	0	0	0	PL2 0-99
92	0	0	0	0	0	0	0	0	PL3 0-99
parameter change only ***									
nn	b7	b6	b5	b4	b3	b2	b1	b0	dd comment
(para.no)									(value)
93	0	0	0	0	0	0	0	0	0-1 op. on(1)/off(0)

note) Marked ☆ is the data of the parameters added to the TX81Z parameter.

DX11

*** ACED *** 23 byte additional parameters (1 bulk edit format)

para. cng g=4, h=3

N0.(para)	b7	b6	b5	b4	b3	b2	b1	b0	Data	note
0	0	0	0	0	0	0	0	FIX	0-1	OP.4
1	0	0	0	0	0		FIXRG	0-7	0(255Hz)-7(32KHz)	
2	0	0	0	0			FINE	0-15	7(F=0-3)	
3	0	0	0	0	0		OSW	0-7		
4	0	0	0	0	0	0	EGSFT	0-3	0(off)-3(12dB)	
5										OP.2
10										OP.3
15										OP.1
19									0(off)	
20	0	0	0	0	0		REV	0-7	0(off),7(first)	
21	0								FC PITCH	0-99
22	0								FC AMPLI	0-99

*** ACED2 *** 10 byte additional parameter 2 for DX11

para. cng g=4, h=3

N0.	para.Nob7	b6	b5	b4	b3	b2	b1	b0	Data	note
0	23	0							AT PITCH	0-99
1	24	0							AT AMPLI	0-99
2	25	0							AT P.BIAS	0-100
3	26	0							AT EG BIAS	0-99
4	27	0							reserved	
5	28	0							reserved	
6	29	0							reserved	
7	30	0							reserved	
8	31	0							reserved	
9	32	0							reserved	

*** PCED *** 110 byte. Performance data (edit format)
para. cng g=4, h=0

N0.(para)	b7	b6	b5	b4	b3	b2	b1	b0	Data	note
0	0	0	0	0	NUM of NOTE	0-8			INST1	
1	0	0	0	0	0	0	0	MSB	0-1	VNO MSB
2	0				Voice Number	0-127				
3	0	0	0		Recv. ch	0-16				16(omni)
4	0				LIMIT/L	0-127				0(C-2)-127(G8)
5	0				LIMIT/H	0-127				
6	0	0	0	0	DETUNE	0-14				7(center)
7	0	0			NOTE SHIFT	0-48				24 (center)
8	0				VOLUME	0-99				
9	0	0	0	0	0	0	OUT ASGN	0-3		0(off),1(I),2(II),3(I II)
10	0	0	0	0	0	0	LFOS	0-3		0(off),1(1st Inst),2(2nd Inst) 3(vib)
11	0	0	0	0	0	0	0	MTE	0-1	
12										INST2
24										INST3
36										INST4
48										INST5
60										INST6
72										INST7
84										INST8
96	0	0	0	0	MITBL	0-12				0(oct),1(full)
97	0	0	0	0	0	0	0	ASMODE	0-1	0(norm),1(alter)
98	☆	0	0	0	0			EFSEL	0-12	
99	0	0	0	0	0			KEY	0-11	0(C)-11(B)
100	0				PFM NAME 1	32-127				ASCII
101	0				2					
109	0				PFM NAME 10					

note) 98 EFSEL=0(off),1(delay1),2(pan1),3(chord1),4(delay2),5(pan2),.....
.....,11(pan4),12(chord4)

*** remote switch ***
para. cng g=4, h=3

g	h	p	switch
4	3	76	SW1
		77	SW2
		107	SW32
		108	PRESET A
		109	PRESET B
		110	PRESET C
		111	PRESET D
		112	INT
		113	CRT
		114	STORE
		115	UTILITY
		116	PROTECT
		117	EDIT
		118	SINGLE
		119	PERFRM
		120	CURSOR -1
		121	CURSOR +1
		122	DATA ENTRY -1
		123	DATA ENTRY +1
		124	POWER ON(restart)

• Table 2

Detail of Bulk Dump Format

★ VCED

$f = 3$
 data size = 93 (\$005D)
 data format = 7bit binary
 total bulk size = $93+8 = 101$
 f0, 43, 0n, 03, 00, 5D, <VCED data>, sum, f7

★ VMEM

$f = 4$
 data size = $128 \times 32 = 4096$ (\$1000)
 data format = 7bit binary
 total bulk size = $4096+8 = 4104$
 f0, 43, 0n, 04, 20, 00, <VMEM data>, sum, f7

★ ACED

$f = 126$ LM__8976AE
 data size = $23+10 = 33$ (\$0021)
 data format = 7bit binary
 total bulk size = $33+8 = 41$
 f0, 43, 0n, 7e, 00, 21, LM__8976AE, <ACED data>, sum, f7

☆

★ ACED2

$f = 126$ LM__8023AE
 data size = $10+10 = 20$ (\$0014)
 data format = 7bit binary
 total bulk size = $20+8 = 28$
 f0, 43, 0n, 7e, 00, 14, LM__8023AE, <ACED2 data>, sum, f7

★ PCED

$f = 126$ LM__8976PE
 data size = $110+10 = 120$ (\$0078)
 data format = 7bit binary
 total bulk size = $120+8 = 128$
 f0, 43, 0n, 7e, 00, 78, LM__8976PE, <PCED data>, sum, f7

★ PMEM

$f = 126$ LM__8976PM
 data size = $10+76 \times 32 = 2442$ (\$098A)
 data format = 7bit binary
 total bulk size = $2442+8 = 2450$
 f0, 43, 0n, 7e, 13, 0a, LM__8976PM, <PMEM data>, sum, f7

★ system setup

$f = 126 \text{ LM_8976Sx } (x=0, 1, 2)$
 $X = 0(\text{SYS})$ data size = $10+27 = 37$ (\$0025)
 data format = 7bit binary
 total data size = $37+8 = 45$
 $f0, 43, 0n, 7e, 00, 25, \text{LM_8976S0}, <\text{system data}>, \text{sum}, f7$
 $X = 1(\text{PC})$ data size = $10+128 \times 2 = 266$ (\$010A)
 data format = 7bit binary
 total data size = $266+8 = 274$
 $f0, 43, 0n, 7e, 02, 0A, \text{LM_8976S1}, <\text{P. CNGTBL data}>, \text{sum}, f7$
 $X = 2(\text{EFG1})$ delay1, pan1, chord1
 data size = $10+55 = 65$ (\$0041)
 data format = 7bit binary
 total data size = $65+8 = 73$
 $f0, 43, 0n, 7e, 00, 41, \text{LM_8976S2}, <\text{effect group1 data}>, \text{sum}, f7$
 ☆ $X = 3(\text{EFG2})$ delay2, pan2, chord2
 data size = $10+55 = 65$ (\$0041)
 data format = 7bit binary
 total data size = $65+8 = 73$
 $f0, 43, 0n, 7e, 00, 41, \text{LM_8976S3}, <\text{effect group2 data}>, \text{sum}, f7$
 ☆ $X = 4(\text{EFG3})$ delay3, pan3, chord3
 data size = $10+55 = 65$ (\$0041)
 data format = 7bit binary
 total data size = $65+8 = 73$
 $f0, 43, 0n, 7e, 00, 41, \text{LM_8976S4}, <\text{effect group3 data}>, \text{sum}, f7$
 ☆ $X = 5(\text{EFG4})$ delay4, pan4, chord4
 data size = $10+55 = 65$ (\$0041)
 data format = 7bit binary
 total data size = $65+8 = 73$
 $f0, 43, 0n, 7e, 00, 41, \text{LM_8976S5}, <\text{effect group4 data}>, \text{sum}, f7$

★ micro tuning buffer

$f = 126 \text{ LM_MCRTE} \quad (x=0, 1)$
 $X = 0(\text{OCT})$ data size = $24+10 = 34$ (\$0022)
 data format = 7bit binary
 total bulk size = $34+8 = 42$
 $f0, 43, 0n, 7e, 00, 22, \text{LM_MCRTE}, <\text{MCR OCT data}>, \text{sum}, f7$
 $X = 1(\text{Full})$ data size = $256+10 = 266$ (\$010a)
 data format = 7bit binary
 total bulk size = 274
 $f0, 43, 0n, 7e, 02, 0a, \text{LM_MCRTE}, <\text{MCR Full data}>, \text{sum}, f7$

☆ ★ system setup 2 for V2

$f = 126 \text{ LM_8023Sx } (x=0)$
 $X = 0(\text{SYS2})$ data size = $10+16 = 26$ (\$001A)
 data format = 7bit binary
 total data size = $26+8 = 34$
 $f0, 43, 0n, 7e, 00, 1A, \text{LM_8023S0}, <\text{system data}>, \text{sum}, f7$

• Table 3

*** VMEM *** 128 byte (88 byte is used) voice data (memory format)

* address	b7	b6	b5	b4	b3	b2	b1	b0	dd	comment	*
									(value)		
* 0	0	0	0	.....	AR	.....			0-31		*
* 1	0	0	0	.....	D1R	.....			0-31		*
* 2	0	0	0	.....	D2R	.....			0-31		*
* 3	0	0	0	0	.....	RR	.....		1-15		*
* 4	0	0	0	0	.....	DIL	.....		0-15	OP.4	*
* 5	0			LS	.....				0-99		*
* 6	0	AME	.....	EBS	.....	KVS	.....		0-1,0-7,0-7		*
* 7	0	0	.....	CRS	.....				0-63 (RATIO)		*
* 8	0	0	.....	CRS	.....	x	x		0-63 (FIX)		*
* 9	0	0	0	.....	F	.....			0-63 (CRS)		*
				RS	.....	DET	.....		0-3,0-6		*
* 10											*
* .										OP.2	*
* .											*
* 20											*
* .										OP.3	*
* .											*
* 30											*
* .										OP.1	*
* .											*
* 40	0	SY	.....	FBL	.....	ALG	.....		0-1,0-7,0-7		*
* 41	0			LFS	.....				0-99		*
* 42	0			LFD	.....				0-99		*
* 43	0			PMD	.....				0-99		*
* 44	0			AMD	.....				0-99		*
* 45	0	PMS	.....	AMS	.....	LFW	.....		0-7,0-3,0-3		*
* 46	0	0		TRPS	.....				0-48		*
* 47	0	0	0	0	.....	PBR	.....		0-12		*
* 48	0	0	0	CH	MO	SU	PO	PM	0-1,0-1,0-1,0-1		*
* 49	0			PORT	.....				0-99		*
* 50	0			FC VOL	.....				0-99		*
* 51	0			MW PITCH	.....				0-99		*
* 52	0			MW AMPLI	.....				0-99		*
* 53	0			BC PITCH	.....				0-99		*
* 54	0			BC AMPLI	.....				0-99		*
* 55	0			BC P BIAS	.....				0-100		*
* 56	0			BC E BIAS	.....				0-99		*
* 57	0			VOICE NAME	1	.....			32-127		*
* 58	0			VOICE NAME	2	.....					*
* 59	0			VOICE NAME	3	.....					*
* 60	0			VOICE NAME	4	.....					*
* 61	0			VOICE NAME	5	.....					*
* 62	0			VOICE NAME	6	.....					*
* 63	0			VOICE NAME	7	.....					*
* 64	0			VOICE NAME	8	.....					*
* 65	0			VOICE NAME	9	.....					*
* 66	0			VOICE NAME	10	.....					*
* ☆ 67	0			PR1	.....				0-99		*
* ☆ 68	0			PR2	.....				0-99		*
* ☆ 69	0			PR3	.....				0-99		*
* ☆ 70	0			PL1	.....				0-99		*
* ☆ 71	0			PL2	.....				0-99		*
* ☆ 72	0			PL3	.....				0-99		*

*** VMEM ***

NO.	b7	b6	b5	b4	b3	b2	b1	b0	Data	note
0										
67										same as DX21 VMEM
72										PEG PR1
73	0	0	-EGSFT-	FIX					FIXRG	OP.4
74	0		OSW						FINE	
75										OP.2
77										OP.3
79										OP.1
81	0	0	0	0	0				REV	FUNCTION
82	0								FC PITCH	
83	0								FC AMPLI	

*** VMEM for V2 ***

NO.	b7	b6	b5	b4	b3	b2	b1	b0	Data	note
84	0								AT PITCH	
85	0								AT AMPLI	
86	0								AT P.BIAS	center=0
87	0								AT EG BIAS	
88-127	0	0	0	0	0	0	0	0		
note)	AT P.BIAS			data	0,....,49,50,51,....,100					
				LCD	-50,....,-1, 0,+1,....,+50					
				MIDI	51,....,100,0,+1,....,+50					

*** PMEM *** 76 byte Performance data (memory format)

NO.	b7	b6	b5	b4	b3	b2	b1	b0	Data	note
0	0	OUT ASGN	MSB						NUM of NOTE	INST1
1	0			VOICE NO						
2	0	LFOS							RCV CH	
3	0			LIMIT/L						
4	0			LIMIT/H						
5	0	0	0	0					DETUNE	
6	0	MTE							NOTE SHIFT	
7	0			VOLUME						
8										INST2
16										INST3
24										INST4
32										INST5
40										INST6
48										INST7
56										INST8
64	☆	0	0	EFSEL2					MTIBL	
65				KEY					EFSEL1- ASMODE	
66	0			PFM NAME 1						
67	0			PFM NAME 2						
75	0			PFM NAME 10						

note1) effect select

PCED	EFSEL	PMEM	EFSEL2	EFSEL1	
0	off		%00	%00	
1	delay1			%01	
2	pan1			%10	
3	chord1			%11	
4	d2		%01	%01	
5	p2			%10	
6	c2			%11	
7	d3		%10	%01	
8	p3			%10	
9	c3			%11	
10	d4		%11	%01	
11	p4			%10	
12	c4			%11	
			%01	%00	-->off(%00 %00)
			%10	%00	-->off(%00 %00)
			%11	%00	-->off(%00 %00)

$$EFSEL(PCED) = EFSEL2 \times 3 + EFSEL1$$

note2) Compatibility (Effect select)(DX11 --> TX81Z)

PMEM bulk	DX11 delay1,delay2,delay3,delay4 pan1,pan2,pan3,pan4 chord1,chord2,chord3,chord4	TX81Z --> delay --> pan --> chord
PCED bulk	delay1 pan1 chord1 delay2 - chord4	--> delay --> pan --> chord --> chord

* SYSTEM SETUP bulk dump

*** SYS *** 27 byte system setup for TX81Z
para. cng g=4, h=0, k=123

No.(para)	b7	b6	b5	b4	b3	b2	b1	b0	Data	note
0	0	0							TUNE	0-127 master tune center=64
1	1	0	0						MIDBCH	0-16 basic rcv ch 16:omni
2	2	0	0	0					MIDTCH	0-15 trans ch
3	3	0	0	0	0	0	0	0	PCINF	0-2 p.cng sw
4	4	0	0	0					CHINF	0-17 cont.cng sw 1:norm,2-17(G1-G16)
5	5	0	0	0					PBSW	0-17 p.bend sw 1:norm,2-17(G1-G16)
6	6	0	0	0	0	0	0	0	NOTESW	0-2 note on/off 0:all,1:odd,2:even
7	7	0	0	0	0	0	0	0	SYSVL	0-1 exclusive on/off
8	8	0	0	0	0	0	0	0	MLOCK	0-1 mem. protect
9	8	0	0	0	0	0	0	0	CMBIN	0-1 combine
10	10	0	0	0	0	0	0	0	ATBCSW	0-1 AT to BC sw on/off
11	11	0							ID1	32-127 ID (ascii)
12	12	0							ID2	
13	13	0							ID3	
.	.									
26	26	0							ID16	

*** SYS2 for V2 *** 16 byte system setup 2

para. cng g=4, h=0, k=123

No.	para	b7	b6	b5	b4	b3	b2	b1	b0	Data	note
0	27	0	0	0	0	0	0	0	MIDIE	0-1	midi on/off
1	28	0	0	0	0	0	0	0	LOCALF	0-1	local on/off
2	29	0	0	0			ATSW			0-17	After T.SW 1=norm, 2-17 (G1-G16)
3	30	0	0	0			DEASGN			0-31	D.E. asgn
4	31	0	0	0	0	0	0	0	CRTBNK	0-1	crt bank
5	32	0	0	0	0	0	0	0	CNTRST	0-1	controller reset
6	33	0	0	0	0	0	0	0	CRTLCK	0-1	crt prot
7	34	0			FIXTCH					0-127	fixed velocity
8	35	0	0	0	0	0	0		EGFDMP	0-3	EG forced damp
9	36	0			reserved						
10	37	0			reserved						
11	38	0			reserved						
12	39	0			reserved						
13	40	0			reserved						
14	41	0			reserved						
15	42	0			reserved						

*** parameter change only ***

43	0	.....	QEDATK	.....	0-99
44	0	.....	QEDREL	.....	0-99
45	0	.....	QEDVOL	.....	0-99
46	0	.....	QEDBRI	.....	0-99

*** PGM CNG *** 256 byte program change table (extend to 2 byte per 1 number)

para. cng g=4, h=0, k=127

No.	para	b7	b6	b5	b4	b3	b2	b1	b0	Data	note
0	0	0	0	0	0	0	0	0	MSB	0-1	MSB of Number
		0			NUMBER (without MSB)					0-127	PGM1
1	1										PGM2
:	:										:
127	127										PGM128

(note)

NUMBER											
0-31	:	I1-I32								128-159	: D1-D32
32-63	:	A1-A32								160-191	: PF1-PF32
64-95	:	B1-B32								192-223	: CT1-CT32
96-127	:	C1-C32								224-255	: PFC1-PFC32

*** EFFECT *** 55 byte, effect data

para. cng g=4, h=0, k=124,120,121,122

No.	para	b7	b6	b5	b4	b3	b2	b1	b0	Data	note
0	0	0								EF1T	0-127 effect 1 time 0.01s-1.28s
1	1	0	0							EF1P	0-48 effect 1 pitch center=24
2	2	0	0	0	0	0				EF1F	0-7 effect 1 feed back
3	3	0								EF1L	0-99 effect 1 out level
4	5 *1	0	0	0	0	0	0	0		EF2S	0-2 effect 2 select 0(LF0),1(velocity) 2(note)
5	4 *2	0	0	0	0	0	0	0	0	EF2D	0-1 effect 2 direction 0(I->I1),1(I1->I)
6	6	0								EF2R	0-99 effect 2 range
7	7	0	0							CHORD	0-49 effect 3 chord note center=24 no use=49
8	8										
9	9										
10	10										KEY C3
11	11										
12	12										
13	13										
14	14										KEY C#3

51 51
52 52
53 53
54 54

KEY B3

note) *1,*2

parameter change No.(4,5) is not the same as bulk No.

*1 (EF2S) para. change No=5
*2 (EF2D) para. change No=4

* micro tuning bulk dump *

*** OCTAVE *** 24 byte micro tuning data (octave)

para. cng g=4, h=0, k=125

No.	para	b7	b6	b5	b4	b3	b2	b1	b0	Data	note
0	0	0								MS BYTE of MCT	13-108 (C#-1-C7)
		0								LS BYTE of MCT	0-63 C
1	1										C#
2	2										
11	11										B

*** FULL KBD *** 256 byte micro tuning data (full keyboard)

para. cng g=4, h=0, k=126

No.	para	b7	b6	b5	b4	b3	b2	b1	b0	Data	note
0	0	0								MS BYTE of MCT	13-108
		0								LS BYTE of MCT	0-63 C-2 (0)
1	1										C#-2 (1)
2	2										
127	127										G8 (127)

● Table 4

Dump Request Messages

	★ VCED	f0, 43, 2n, 03, f7
	★ VMEM	f0, 43, 2n, 04, f7
	★ ACED + VCED	f0, 43, 2n, 7e, LM__8976AE, f7
☆	★ ACED2 + ACED + VCED	f0, 43, 2n, 7e, LM__8023AE, f7
	★ PCED	f0, 43, 2n, 7e, LM__8976PE, f7
	★ PMEM	f0, 43, 2n, 7e, LM__8976PM, f7
	★ system setup	f0, 43, 2n, 7e, LM__8976Sx, f7 (x = 0, 1, 2) SY PC EFG1
☆	★ setup(effect grp2-4)	f0, 43, 2n, 7e, LM__8976Sx, f7 (x = 3, 4, 5) EFG2-EFG4
☆	★ system setup 2	f0, 43, 2n, 7e, LM__8023S0, f7
	★ micro tuning buffer	f0, 43, 2n, 7e, LM__MCRTE0, f7 (x = 0, 1)
note)	Ascii number	HEX
	★ LM__8976AE	4c, 4d, 20, 20, 38, 39, 37, 36, 41, 45
	★ LM__8023AE	4c, 4d, 20, 20, 38, 30, 32, 33, 41, 45
	★ LM__8976PE	4c, 4d, 20, 20, 38, 39, 37, 36, 50, 45
	★ LM__8976PM	4c, 4d, 20, 20, 38, 39, 37, 36, 50, 5d
	★ LM__8976S0	4c, 4d, 20, 20, 38, 39, 37, 36, 53, 30
	LM__8976S1	4c, 4d, 20, 20, 38, 39, 37, 36, 53, 31
	LM__8976S2	4c, 4d, 20, 20, 38, 39, 37, 36, 53, 32
	LM__8976S3	4c, 4d, 20, 20, 38, 39, 37, 36, 53, 33
	LM__8976S4	4c, 4d, 20, 20, 38, 39, 37, 36, 53, 34
	LM__8976S5	4c, 4d, 20, 20, 38, 39, 37, 36, 53, 35
	★ LM__8023S0	4c, 4d, 20, 20, 38, 30, 32, 33, 53, 30
	★ LM__MCRTE0	4c, 4d, 20, 20, 4d, 43, 52, 54, 45, 30
	LM__MCRTE1	4c, 4d, 20, 20, 4d, 43, 52, 54, 45, 31

● Table 5 parameter change No. List

<<< \$F0, \$43, \$1n, ... >>>

	VCED	\$12 (g=4, h=2), p=0-92, 93	
	VCED (DX21)	\$12 (g=4, h=2), p=94-127	
	ACED	\$13 (g=4, h=3), p=0-22	
☆	ACED2 (V2)	\$13 (g=4, h=3), p=23-32	
	SYS (81Z remote)	\$13 (g=4, h=3), p=64-75	
☆	SYS (DX11 remote)	\$13 (g=4, h=3), p=76-124	
	PCED	\$10 (g=4, h=0), p=0-109	
	SYS (system)	\$10 (g=4, h=0), p=123,	k=0-26
☆	SYS2 (V2 system)	\$10 (g=4, h=0), p=123,	k=27-46
	SYS (effect gp1)	\$10 (g=4, h=0), p=124,	k=0-54
☆	SYS (effect gp2)	\$10 (g=4, h=0), p=120,	k=0-54
☆	SYS (effect gp3)	\$10 (g=4, h=0), p=121,	k=0-54
☆	SYS (effect gp4)	\$10 (g=4, h=0), p=122,	k=0-54
	MCT (oct)	\$10 (g=4, h=0), p=125,	k=0-11
	MCT (full)	\$10 (g=4, h=0), p=126,	k=0-127
	SYS (pgmcng)	\$10 (g=4, h=0), p=127,	k=0-127

DIGITAL PROGRAMMABLE ALGORITHM SYNTHESIZER

DX11**PARTS LIST**

DX11

Notes 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

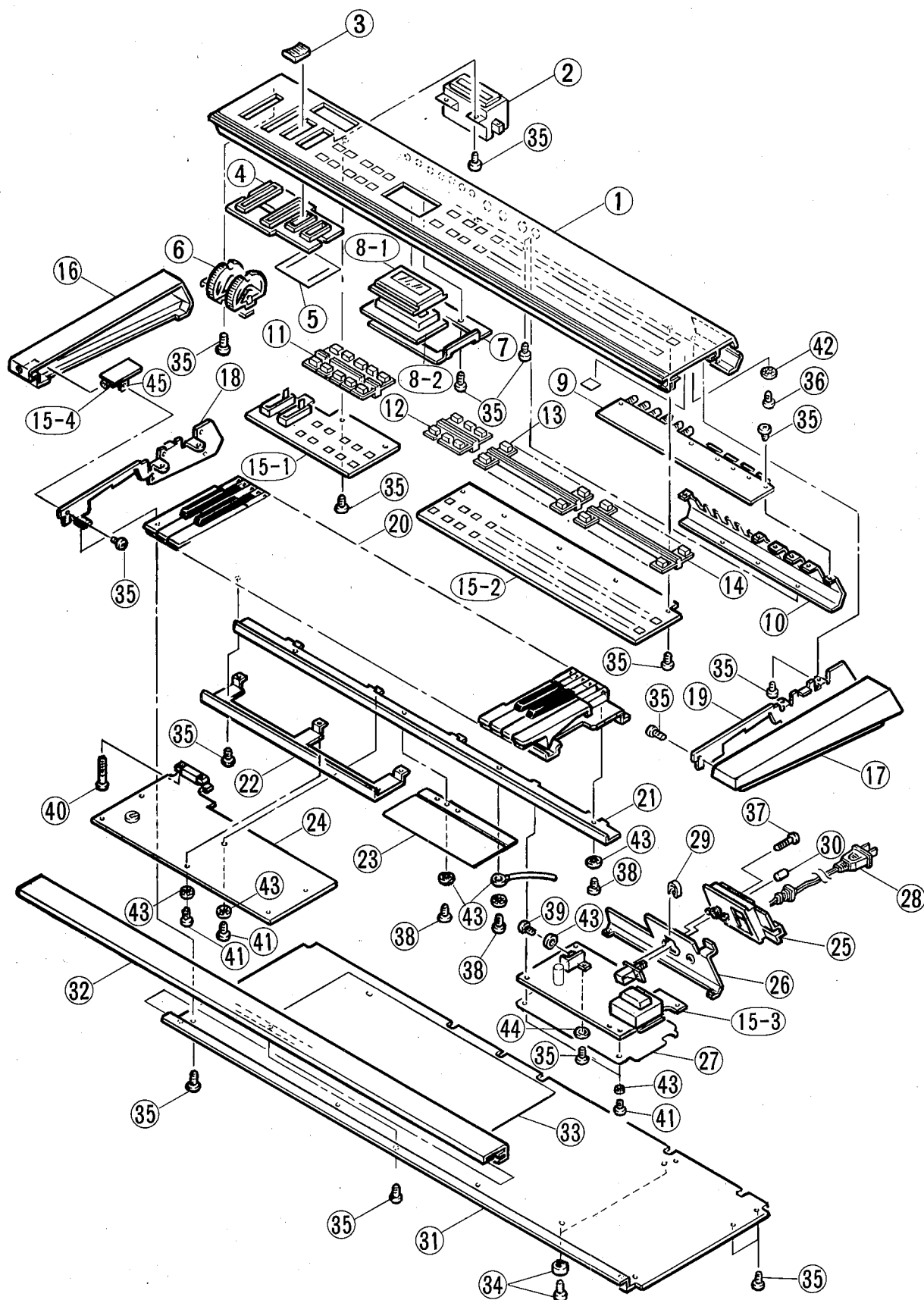
Ref. No.	Part No.	Description	部 品 名	Remarks	ランク
	VE197200	Circuit Board	DM	D M シート	
	VE197500	Circuit Board	KS	K S シート	
	VE197400	Circuit Board	JK	J K シート	
	NX803440	Circuit Board	PNA	P N A シート	
	NX803450	Circuit Board	PNB	P N B シート	
	NX803470	Circuit Board	AD	A D シート	J
	NX803510	Circuit Board	AD	A D シート	U,C
	NX803550	Circuit Board	AD	A D シート	H,D,A
	NX803460	Circuit Board	BC	B C シート	
	VE197200	Circuit Board	DM	D M シート	
	IG001390	IC	NJM4558DV	I C	OP AMP. 03
	IG042500	IC	NJM4556DV	I C	OP AMP. 04
	IG107000	IC	NJM072D	I C	OP AMP. 04
	IG116200	IC	PST518B-2	I C	SYSTEM RESET 04
	IG134900	IC	IR9311	I C	COMPARATOR 04
	IG051000	IC	TC40H004P	I C	INV 03
	IR000470	IC	MC74HC04N	I C	INV 01
	IR001470	IC	MC74HC14N	I C	INV 03
	IR003270	IC	MC74HC32N	I C	OR 02
	IR013870	IC	MC74HC138N	I C	DECODER 02
	IR017470	IC	MC74HC174N	I C	D.F.F 03
	IR036770	IC	MC74HC367N	I C	BUS.DRI 03
	XD715001	IC	MC74HC245AN	I C	TRANSCIEVER 04
	XB768001	IC	YM2414	I C	OPZ 12
	XD245001	IC	HD63803YP-N	I C	CPU(Main) 08
	XD681001	IC	HD63B01Y0D60P	I C	CPU(Sub) 08
	XB013001	IC	TC5564PL-15	I C	SRAM 8K×8 20
	XD820001	IC	023V100 V1.0	I C	EPROM
	IG106100	IC	M58990P-1	I C	ADC 09
	IT301200	IC	YM-3012	I C	SUX DAC 08
	VD473200	Photo Coupler	6N137	フ ォ ト カ プ ラ	05
	IA111510	Transistor	2SA1115 (E.F)	ト ラ ン ジ ス タ	03
	IC260310	Transistor	2SC2603 (E.F)	ト ラ ン ジ ス タ	03
	IC287800	Transistor	2SC2878 (A,B)	ト ラ ン ジ ス タ	03
	IF003450	Diode	1SS133	ダ イ オード	01
	HU597100	Metal Film Resistor	10KΩ 1/4W	金 属 被 膜 抵 抗	04
	HZ004650	Resistor Array	RMLS6-103J	抵 抗 ア レ イ	02
	VA238800	Resistor Array	RMLS8-473J	抵 抗 ア レ イ	01
	VB187500	Resistor Array	EXB-F9E103J5	抵 抗 ア レ イ	01
	FZ005030	Semiconductive Cera. Cap.	0.1μF 25V	半 導 体 セ ラ コ ン	01
	VB835000	Coil	20μ FL5R200QNT	コ イ ル	01
	FZ006970	EMI Filter	LS MT Y223NB	L C フィ ル ター E M I	02
	VD627500	Quartz Crystal Unit	AT-49/TS3.5795M	水 晶 振 動 子	03
	VB657100	Ceramic Resonator	8MHz CST8.00MT	セ ラ ミ ッ ク 振 動 子	02
	VB436300	Socket	34P	ソ ケ ッ ト	07
	VB436900	Lithium Battery	CR2032-P5-2 3V	リ チ ュ ウ ム 電 池	05
	VE197500	Circuit Board	KS	K S シート	
	IG001390	IC	NJM4558DV	I C	OP AMP. 03
	IF003450	Diode	1SS133	ダ イ オード	01
	HT370280	Trimmer Potentiometer	B 500K 3P EVN	半 固 定 ボ リ ュ ウ ム	02
	FZ005030	Semiconductive Cera. Cap.	0.1μF 25V	半 導 体 セ ラ コ ン	01
	VE197400	Circuit Board	JK	J K シート	
	FS683330	Semiconductive Cera. Cap.	0.0033μF 25V	半 導 体 セ ラ コ ン	01
	FZ005030	Semiconductive Cera. Cap.	0.1μF 25V	半 導 体 セ ラ コ ン	01
	VB835000	Coil	20μ FL5R200QNT	コ イ ル	01
	LB202330	Phone Jack	HLJ0521	ホ ー ン ジ ャ ッ ク	MONAURAL(F.S) 02
	LB203090	Phone Jack	HLJ0521	ホ ー ン ジ ャ ッ ク	STEREO(F.C) 02
	VE742000	Phone Jack	HLJ4306	ホ ー ン ジ ャ ッ ク	MONAURAL(OUT) 02
	VE742200	Phone Jack	HLJ4306	ホ ー ン ジ ャ ッ ク	STEREO(H.P) 02
	LB500520	DIN Jack	TCS4650	D I N ジ ャ ッ ク	03
	LB603710	DIN Jack	TCS4680	D I N ジ ャ ッ ク	CASSETTE 03
	NX803440	Circuit Board	PNA	P N A シート	
	IF003450	Diode	1SS133	ダ イ オード	01
	VC250600	Slide Pot.	B10K EWA-NFOC	ス ラ イ ド ボ リ ュ ウ ム	DATA ENTRY 03
	VE373500	Slide Pot.	A10K×2	二 連 ス ラ イ ド V R	VOLUME 03
	KA907030	Push Switch	KHH10908	プ ッ シ ュ ス イ ッ チ	01
	NX803450	Circuit Board	PNB	P N B シート	
	IF003450	Diode	1SS133	ダ イ オード	01
	KA907030	Push Switch	KHH10908	プ ッ シ ュ ス イ ッ チ	01
	NX803470	Circuit Board	AD	A D シート	J
	NX803510	Circuit Board	AD	A D シート	U,C
	NX803550	Circuit Board	AD	A D シート	H,D,A
	XB466001	IC	AN78M15F	I C	15V 0.5A 03

* New Parts (新規部品)

ランク : Japan only

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OVERALL ASSEMBLY

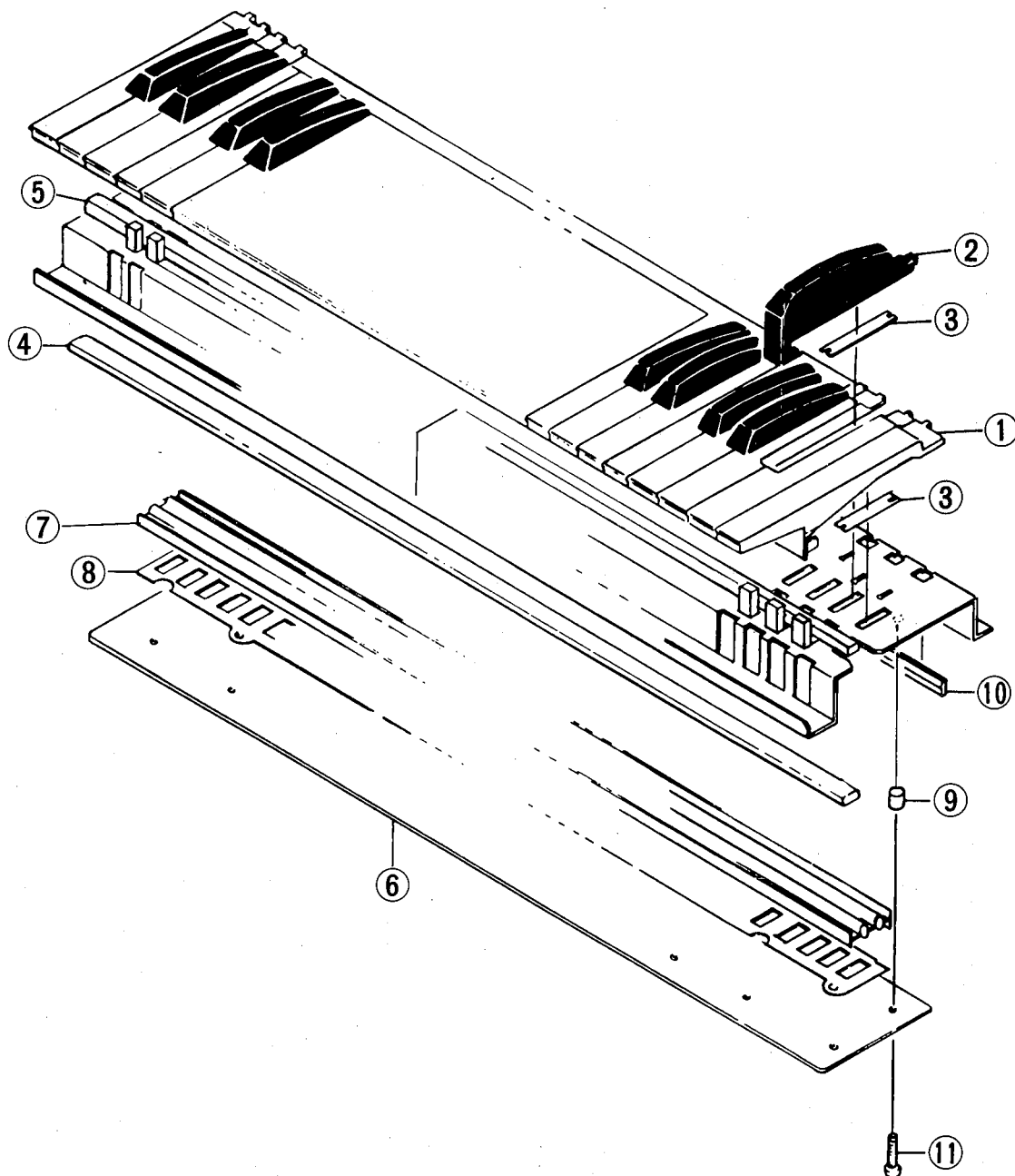


Ref. No.	Part No.	Description	部品名	Remarks	ランク
1	VE876700	Control Panel	コントロールパネル	DX11	05
2	VE194700	Cartridge Assembly	カートリッジ Ass'y		01
3	VB774000	Knob	ツマミ		03
4	VE194400	Escutcheon, SVW	SVW エスカッション		01
5	VE194500	Dust Proof Cloth	防塵クロス		
6	VE195200	Wheel Assembly	ホイール Ass'y		02
7	VE195700	LCD Frame	LCD フレーム		
8	VE211800	LCD Assembly	LCD Ass'y		05
8-1	VE195600	Plate, Protection	保護板		15
8-2	VC171100	LCD Display	液晶ディスプレイ		
9	VE197400	Circuit Board	JK		03
10	VE196100	Angle, JK	JK シート		
11	VF100600	Knob	JK アングル		
12	VF100700	Knob	ノブ		
13	VF100400	Knob	ノブ		
14	VF100500	Knob	ノブ		
15-1	NX803440	Circuit Board	PNA		
15-2	NX803450	Circuit Board	PNB		
15-3	NX803470	Circuit Board	AD	J	
15-3	NX803510	Circuit Board	AD	U, C	
15-3	NX803550	Circuit Board	AD	H, D, A	
15-4	NX803460	Circuit Board	BC		07
16	VE193900	Side Cover	側板 (左)		06
17	VE194000	Side Cover	側板 (右)		03
18	VE194200	Insulation Frame	シールド板 (左)		
19	VE194300	Insulation Frame	シールド板 (右)		03
20	VE452800	Keyboard Assembly	LC 鍵盤 Ass'y		05
21	VE196000	Rail, Circuit Board	シールドレール		03
22	VE196200	Angle Bracket, DM	DM アングル		03
23	VE580300	Shield Sheet	シールドシート		
24	VE197200	Circuit Board	DM		02
25	VB773900	Escutcheon, AC	AC エスカッション		03
26	VE196300	Panel, AC	AC パネル	J	03
26	VE196500	Panel, AC	AC パネル	U	03
26	VE196600	Panel, AC	AC パネル	C	03
26	VE196700	Panel, AC	AC パネル	H, D, A	03
27	VE211000	Insulation Sheet, AD	AD 絶縁シート		03
28	MG001820	AC Cord	7A 3.0M	J	05
28	MG000100	AC Cord	10A 12FT	U	08
28	MG000270	AC Cord	10A 3.3M	C	09
28	MG001200	AC Cord	2.5A 3.3M	H, D	
28	MG001300	AC Cord	7.5A 3.05M	A	02
29	CB811230	Cord Strain Relief	SR-6N-4	U	02
29	CB806850	Cord Strain Relief	SR-6N3-4	C	01
29	CB072750	Cord Strain Relief	SR-4N-4	H, D	
29	CB032840	Cord Strain Relief	SR-5N-4	A	01
30	CB825380	Push Button	コードストッパー		01
31	VE196800	Bottom Cover	プッシュボタン		11
32	VE196900	Front Rail	ボトムカバー		08
33	VE211100	Insulation Sheet, DM	DM 絶縁シート		03
34	VC999400	Foot	ゴム脚		01
35	EI330086	Bind Head Tapping Screw	ハイトタッピングネジ		01
36	ED340086	Bind Head Screw	4.0X8 FCM3BL	C, A	01
37	ED330166	Bind Head Screw	4.0X8 ZMC2BL		01
38	ED340106	Bind Head Screw	3.0X16 FCM3BL		01
39	EI330066	Bind Head Tapping Screw	4.0X10 FCM3BL		01
40	EI330206	Bind Head Tapping Screw	3.0X6 FCM3BL		01
41	ED330086	Bind Head Screw	3.0X20 FCM3BL		01
42	EV413046	Toothed Lock Washer	ハイトタッピングネジ		01
43	EV413036	Toothed Lock Washer	3.0X8 FCM3BL		01
44	EV203036	Flat Washer	A4.0 FCM3BL		01
45	VE339700	Angle, BC	A3.0 FCM3BL		01
			平座金		
			BC アングル		

* New Parts (新規部品)

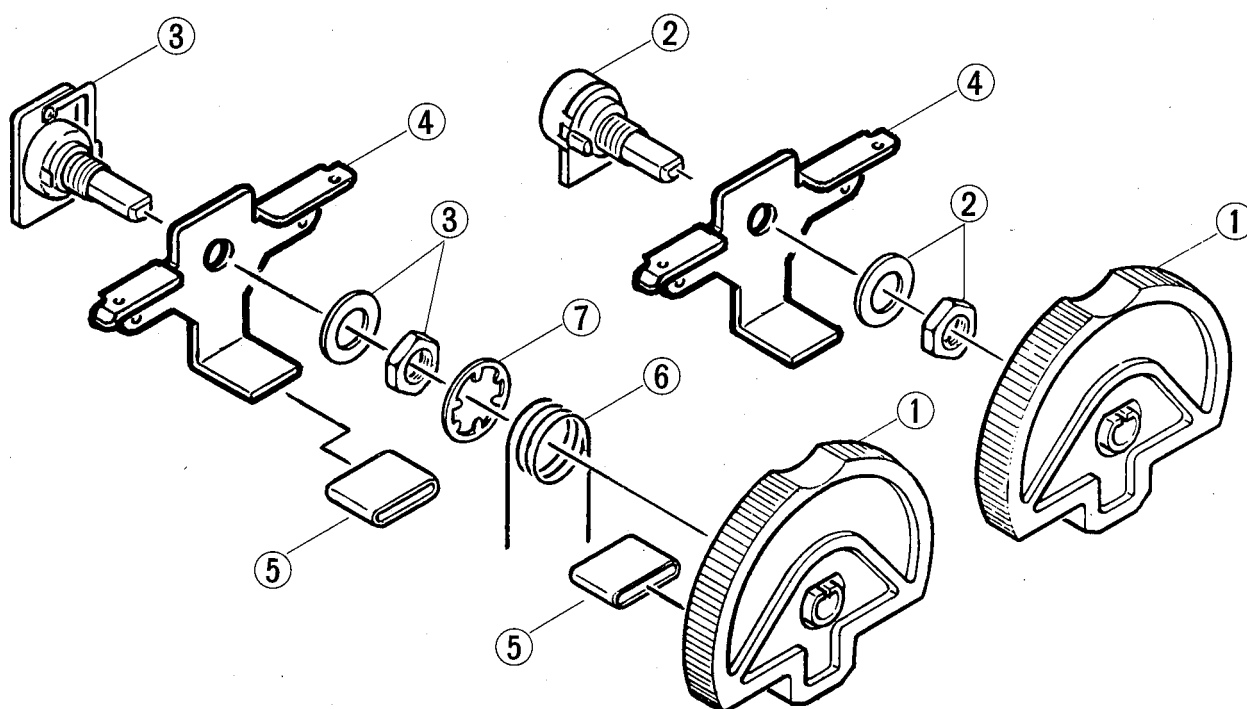
ランク: Japan only

KEYBOARD ASSEMBLY



Ref. No.	Part No.	Description	部品名	Remarks	ランク
	VE452800	Keyboard Assembly	C61K6	L C 鍵盤 A s s ' y	
1	VA850000	White Key	C, F	白 鍵	02
1	VA850100	White Key	D	白 鍵	02
1	VA850200	White Key	B	白 鍵	02
1	VA850300	White Key	G	白 鍵	02
1	VA850400	White Key	A	白 鍵	02
1	VA853800	White Key	C'	白 鍵	02
2	VA850500	Black Key		黒 鍵	01
3	VC077600	Spring			
4	VC078900	Felt	836X6X4	フェルトアカ	RED 03
5	VE453100	PC Sensor	MK-LC	P C センサー	14
6	VE197500	Circuit Board	KS	K S シート	
7	VC077700	Rubber Contact		可動導電ゴム	08
8	VC078600	Insulation Spacer		絶縁スペーサー	03
9	EK003740	Spacer	4.0X5	スペーサー	01
10	VC079800	Stopper		ストッパ	02
11	EI030106	Bind Tapping Screw	3.0X10 ZNC2Y	ハインド*タッピングネジ	01

WHEEL ASSEMBLY



Ref. No.	Part No.	Description	部品名	Remarks	ランク
1	VE195200	Wheel Assembly	ホイール A s s 'y		
2	VC091700	Wheel	ホイール		01
3	HS412160	Variable Resistor	ロータリーポリウム		03
4	VC363100	Variable Resistor	ロータリーポリウム		04
5	VE195900	Frame, Wheel	ホイールフレーム		
6	CB819020	Wheel Tube	ホイールチューブ		02
7	VC792800	Return Spring	リターンスプリング		01
	EW600110	Wheel Ring	C S 形止め輪		01

* New Parts (新規部品)

ランク: Japan only

