登録済

MUSIC SEQUENCER
QY70
SERVICE MANUAL

■ CONTENTS (目次)

YAMAHA CORP.

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: This 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 principal-agent relationship of any form.

The data provided is belived 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 you 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.

LITHIUM BATTERY HANDLING

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 by soldering, 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 ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens instruktion.

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

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.

■ WARNING

Components having special characteristics are marked ⚠ and must be replaced with parts having specification equal to those originally installed.

⚠印の商品は、安全を維持するために重要な部品です。交換する場合は、安全のため必ず指定の部品をご使用下さい。

■ CIRCUIT BOARD LAYOUT (ユニットレイアウト)

Top cover(トップカバー)

Lithium Battery
(リチウム電池)

(CN2)

DM

(CN1)

黒   赤

to PN-CN1

to LCD

Battom cover(ボトムカバー)

Top cover(トップカバー)

LCD assembly

to DM-CN2

(CN1)

基準穴A

PN

基準穴B

to DM-CN1

MUSIC SEQUENCER QY70

SONG — PATT

SHIFT   EXIT

MENU

LCD assembly

-1   +1
NO   YES

ENTER

YAMAHA
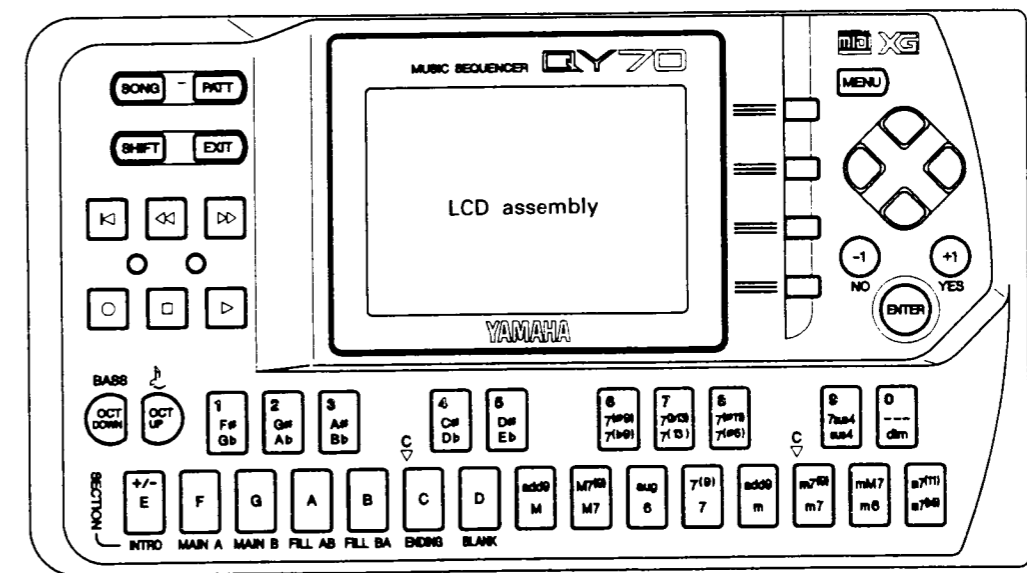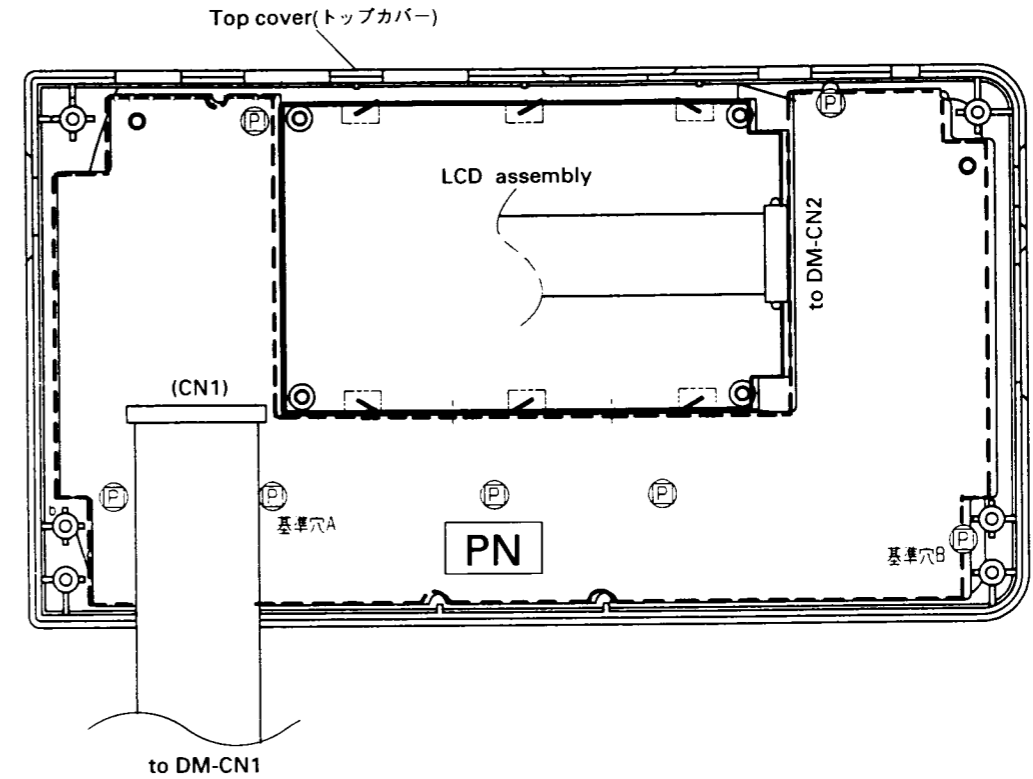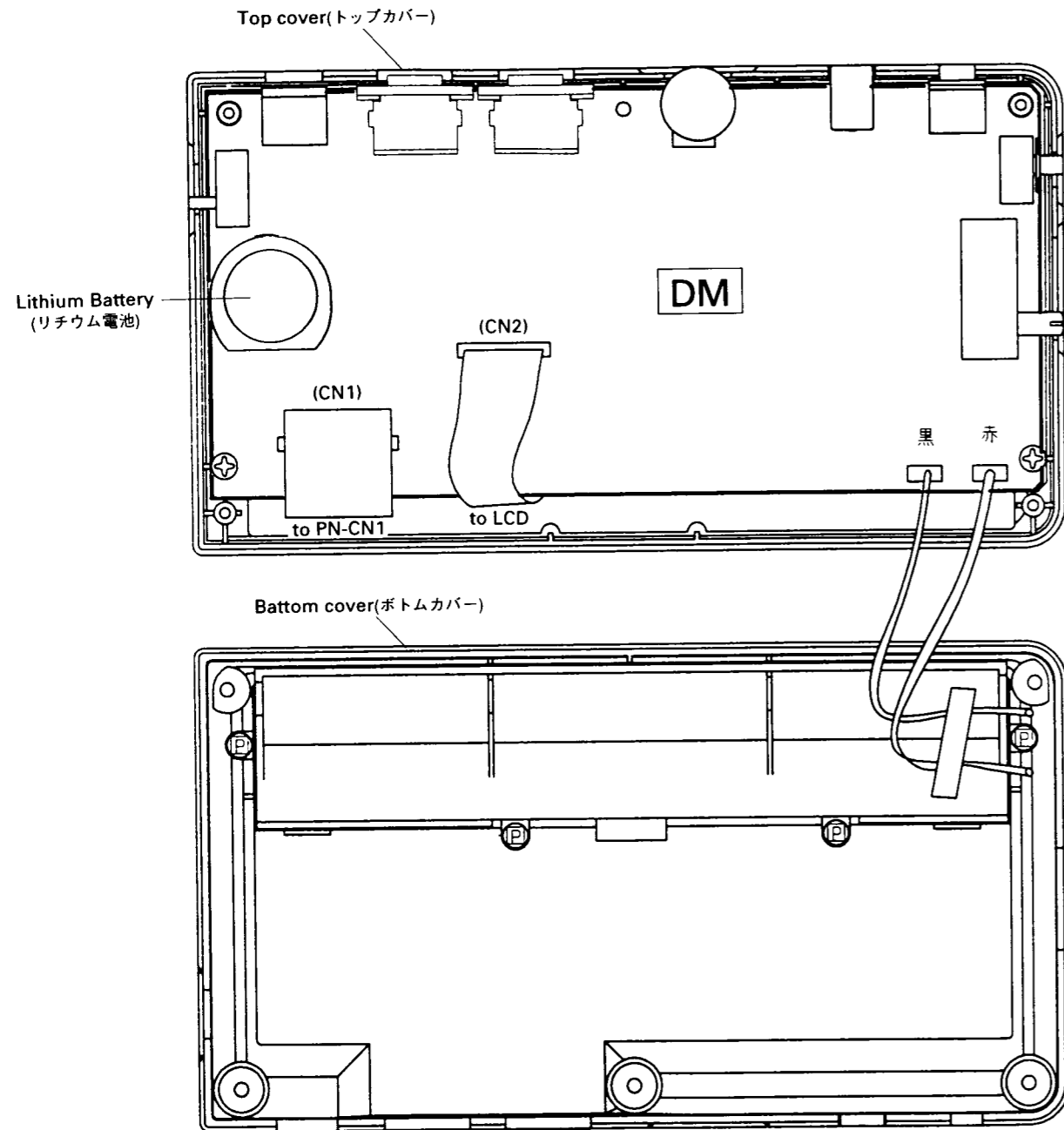
■ BLOCK DIAGRAM (ブロックダイアグラム)
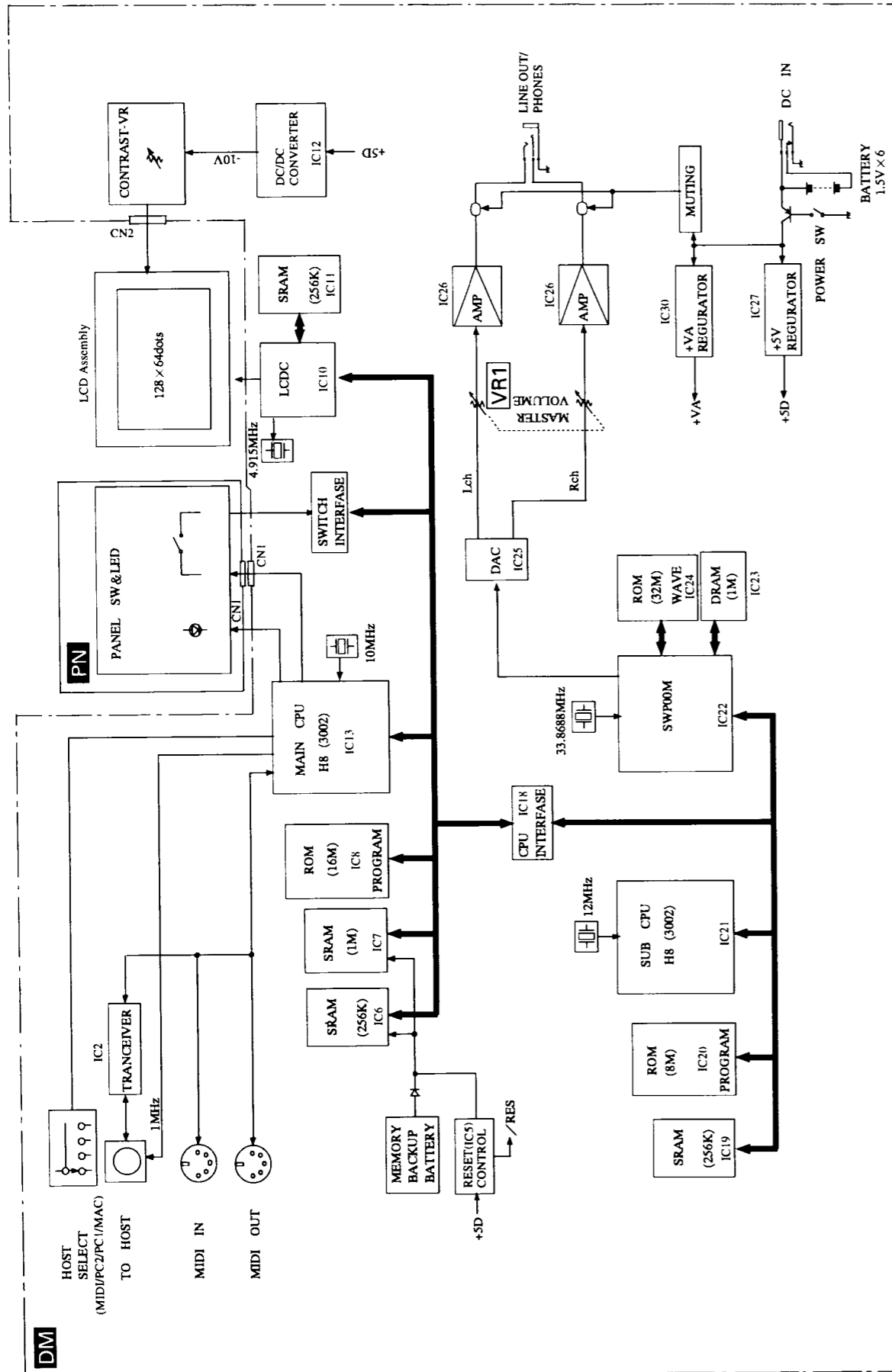
■ DISASSEMBLY PROCEDURE (分解手順)

1. Bottom Cover

1-1. Remove the four (4) screws marked [100] and the one (1) screw marked [110] and then remove the bottom cover. (Fig. 1)

1. ボトムカバー

1-1. [100]のネジ4本と[110]のネジ1本を外して、ボトムカバーを取り外します。（図1）
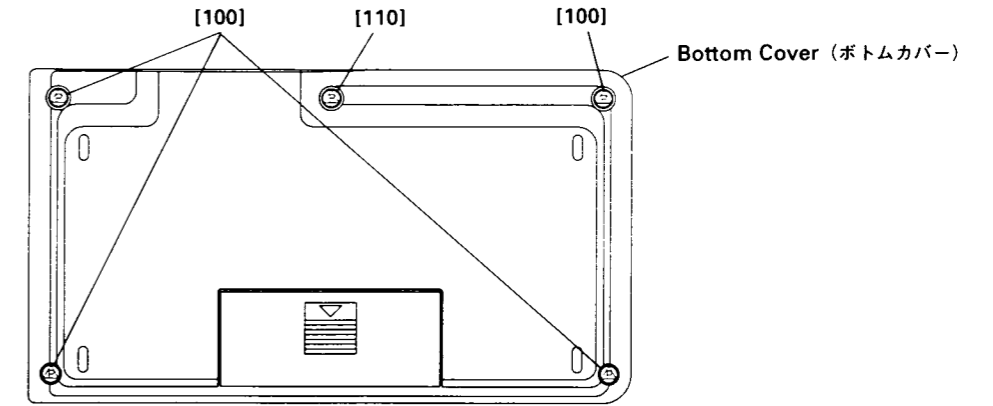
[100]: Bind Head Tapping Screw-P 2.6X8   MFZN2BL (EP620120) ＋バインドPタイト
[110]: Bind Head Tapping Screw-B 2.6X8   MFZN2Y (EP600980) ＋バインドBタイト

(Fig. 1)

2. DM Circuit Board

2-1. Remove the bottom cover. (See procedure 1)

2-2. Remove the two (2) screws marked [T120] and remove the DM circuit board. (Fig. 2)

※ Lithium battery is not a part of DM circuit board. While you replace the DM circuit board, remove the lithium battery and install it in the new circuit board.

2. DM シート

2-1. ボトムカバーを外します。（1項参照）

2-2. [T120]のネジ2本を外して、DM シートを取り外します。（図2）

※ リチウム電池は、DM シートの構成部品ではありません。DM シートを交換する際には、本体のシートからリチウム電池を取り外して新しいシートに取り付けて下さい。

・ Notice for back-up battery removal
  Push the battery as shown in figure, then the battery will pop up.
・ Druk de batterij naar beneden zoals aangeven in de tekeing, de batterij springt dan naar vren.
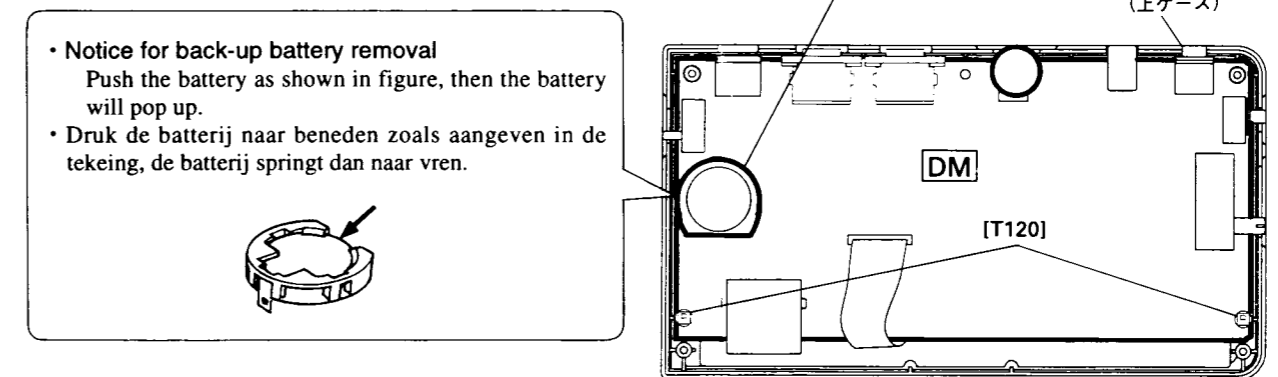
[T120]: Bind Head Tapping Screw-P 2.6X6   MFZN2BL (EP620160) ＋バインドPタイト

(Fig. 2)

3. PN Circuit Board

3-1. Remove the bottom cover. (See procedure 1)

3-2. Remove the DM circuit board. (See procedure 2)

3-3. Remove the five (5) screws marked [T100] and remove the shield plate. (Fig. 3)

3-4. Remove the seven (7) screws marked [T40] and remove the PN circuit board. (Fig. 4)

3. PN シート

3-1. ボトムカバーを外します。（1項参照）

3-2. DM シートを外します。（2項参照）

3-3. [T100]のネジ5本を外して、シールド金具を取り外します。（図3）

3-4. [T40]のネジ7本を外して、PN シートを取り外します。（図4）

[T100]   Upper case （上ケース）

Shield Plate （シールド金具）
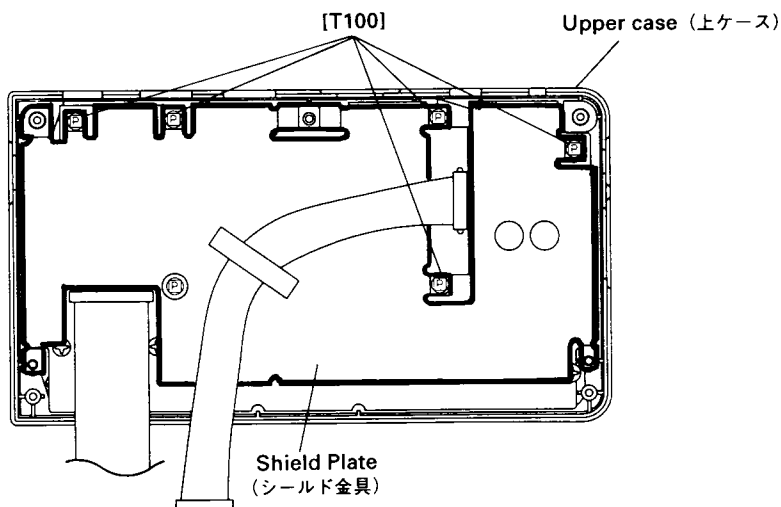
[T100]: Bind Head Tapping Screw-P 2.6X6   MFZN2BL (EP620160) ＋バインドＰタイト

(Fig. 3)

4. LCD Assembly

4-1. Remove the bottom cover. (See procedure 1)

4-2. Remove the DM circuit board. (See procedure 2)

4-3. Remove the shield plate. (See procedure 3-3)

4-4. Remove the one (1) screw marked [T100] and remove the LCD Assembly. (Fig. 4)

4. LCD Ass'y

4-1. ボトムカバーを外します。（1項参照）

4-2. DM シートを外します。（2項参照）

4-3. シールド金具を外します。（3-3項参照）

4-4. [T100]のネジ1本を外して、LCD Ass'y を取り外します。（図4）

[T40]   [T100]   [T40]   Upper case （上ケース）

LCD Assembly (LCD Ass'y)

[T40]

PN

基準穴A   基準穴B
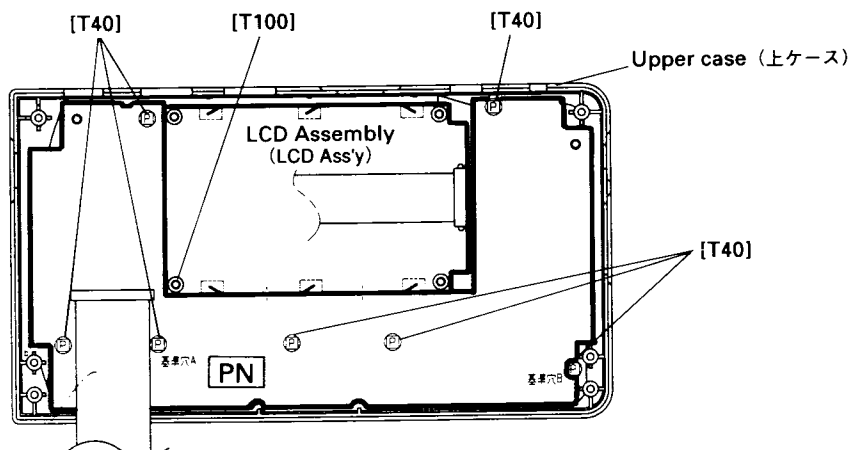
[T40]: Bind Head Tapping Screw-P 2.6X6   MFZN2BL (EP620160) ＋バインドＰタイト
[T100]: Bind Head Tapping Screw-P 2.6X6   MFZN2BL (EP620160) ＋バインドＰタイト

(Fig. 4)

■ LSI DESCRIPTION (LSI端子機能表)

● HD6413002FP16 (XQ375A00) CPU <H8/3002> for IC13

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	PA6	O	Port A	51	A12	O	⎫
2	PA7/A20	O	Address bus	52	A13	O	
3	VCC		Power supply	53	A14	O	
4	PB0	O	⎫	54	A15	O	⎬ Address bus
5	PB1	O		55	A16	O	
6	PB2	O		56	A17	O	
7	PB3	O	⎬ Port B	57	A18	O	
8	PB4	I		58	A19	O	⎭
9	PB5	I		59	VSS		Ground
10	PB6//DREQ0	I		60	P60//WAIT	I	⎫
11	PB7//DREQ1	I	⎭	61	P61//BRED	I	⎬ Port 6
12	/RESO	I	Reset	62	P62//BACK	I	⎭
13	VSS		Ground	63	φ	O	φ out
14	P90/TXD0	O	Transmit data (MIDI OUT)	64	/STBY	I	Stand-by mode signal
15	P91/TXD1	O	Transmit data (TO HOST)	65	/RES	I	Reset
16	P92/RXD0	I	Receive data (MIDI IN)	66	NMI	I	Non-maskable interrupt
17	P93/RXD1	I	Receive data (TO HOST)	67	VSS		Ground
18	P94/SCKO	I	Port 9	68	EXTAL	I	Clock
19	P95/SCK1	I	Port 9	69	XTAL	O	Clock
20	P40/D0	I/O	⎫	70	VCC		Power supply
21	P41/D1	I/O		71	/AS	O	Address strobe
22	P42/D2	I/O		72	/RD	O	Read strobe
23	P43/D3	I/O		73	/HWR	O	Write strobe (High)
24	VSS		(Ground)	74	/LWR	O	Write strobe (Low)
25	P44/D4	I/O		75	MD0	I	⎫
26	P45/D5	I/O		76	MD1	I	⎬ Mode select
27	P46/D6	I/O	⎬ Data bus	77	MD2	I	⎭
28	P47/D7	I/O		78	AVCC		Analog power supply
29	D08	I/O		79	VREF	I	Reference voltage
30	D09	I/O		80	P70/AN0	I	Analog data input (Power)
31	D10	I/O		81	P71/AN1	I	Port 7
32	D11	I/O		82	P72/AN2	I	Analog data input (HOST SELECT)
33	D12	I/O		83	P73/AN3	I	Port 7
34	D13	I/O		84	P74/AN4	I	Analog data input (Back Up)
35	D14	I/O		85	P75/AN5	I	⎫
36	D15	I/O	⎭	86	P76/AN6	I	⎬ Port 7
37	VCC		Power supply	87	P77/AN7	I	⎭
38	A0	O	⎫	88	AVSS		Analog ground
39	A1	O		89	P80	I	Port 8
40	A2	O		90	P81/CS3	O	⎫
41	A3	O		91	P82/CS2	O	⎬ Chip select
42	A4	O		92	P83/CS1	O	
43	A5	O		93	P84/CS0	O	⎭
44	A6	O	⎬ Address bus	94	VSS		Ground
45	A7	O		95	PA0	O	⎫
46	VSS		(Ground)	96	PA1	O	
47	A8	O		97	PA2	O	⎬ Port A
48	A9	O		98	PA3	O	
49	A10	O		99	PA4	O	
50	A11	O	⎭	100	PA5	O	⎭

● HD6413002FP16 (XQ375A00) CPU <H8/3002> for IC21

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	PA6	I	Port A	51	A12	O	⎫
2	PA7/A20	O	Address bus	52	A13	O	
3	VCC		Power supply	53	A14	O	
4	PB0	I	⎫	54	A15	O	⎬ Address bus
5	PB1	I		55	A16	O	
6	PB2	I		56	A17	O	
7	PB3	I	⎬ Port B	57	A18	O	
8	PB4	I		58	A19	O	⎭
9	PB5	I		59	VSS		Ground
10	PB6	I		60	P60	I	⎫
11	PB7	I	⎭	61	P61	I	⎬ Port 6
12	/RESO	I	Reset	62	P62	I	⎭
13	VSS		Ground	63	φ	O	φ out
14	P90/TXD0	I	⎫	64	/STBY	I	Stand-by mode signal
15	P91/TXD1	I	⎬ Port 9	65	/RES	I	Reset
16	P92/RXD0	I		66	NMI	I	Non-maskable interrupt
17	P93/RXD1	I	⎭	67	VSS		Ground
18	P94/IRQ4	I	Interrupt request	68	EXTAL	I	Clock
19	P95/SCK1	I	Port 9	69	XTAL	O	Clock
20	P40/D0	I/O	⎫	70	VCC		Power supply
21	P41/D1	I/O		71	/AS	O	Address strobe
22	P42/D2	I/O		72	/RD	O	Read strobe
23	P43/D3	I/O		73	/HWR	O	Write strobe (High)
24	VSS		(Ground)	74	/LWR	O	Write strobe (Low)
25	P44/D4	I/O		75	MD0	I	⎫
26	P45/D5	I/O		76	MD1	I	⎬ Mode select
27	P46/D6	I/O	⎬ Data bus	77	MD2	I	⎭
28	P47/D7	I/O		78	AVCC		Analog power supply
29	D08	I/O		79	VREF	I	Reference voltage
30	D09	I/O		80	P70	I	⎫
31	D10	I/O		81	P71	I	
32	D11	I/O		82	P72	I	
33	D12	I/O		83	P73	I	⎬ Port 7
34	D13	I/O		84	P74	I	
35	D14	I/O		85	P75	I	
36	D15	I/O	⎭	86	P76	I	
37	VCC		Power supply	87	P77	I	⎭
38	A0	O	⎫	88	AVSS		Analog ground
39	A1	O		89	P80	I	Port 8
40	A2	O		90	/CS3	O	⎫
41	A3	O		91	/CS2	O	⎬ Chip select
42	A4	O		92	/CS1	O	
43	A5	O		93	/CS0	O	⎭
44	A6	O	⎬ Address bus	94	VSS		Ground
45	A7	O		95	PA0	O	⎫
46	VSS		(Ground)	96	PA1	O	
47	A8	O		97	PA2	I	⎬ Port A
48	A9	O		98	PA3	I	
49	A10	O		99	PA4	I	
50	A11	O	⎭	100	PA5	I	⎭

● μPD63200GS-E1 (XP867A00) DAC (Digital to Analog Converter)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	4/8FS	I	4/8 Fs selection	9	R. REF		Channel R voltage reference
2	D. GND		Digital ground	10	L. REF		Channel L voltage reference
3	16/18 BIT	I	16 bit/18 bit selection	11	L. OUT	O	Channel L output
4	D. VDD		Digital power supply	12	A. GND		Analog ground
5	A. GND		Analog ground	13	LRCK/WD	I	Word clock
6	R. OUT	O	Channel R output	14	LR/RSI	I	Channel R series input
7	A. VDD		Analog power supply	15	LSI	I	Channel L series input
8	A. VDD		Analog power supply	16	CLK	I	Clock

● TC203C060AF-001 (XS724A00) **SWP00M** (AWM Tone Generator) Standard Wave Processor

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	Vss		Ground	51	MD2	I	Wave memory data bus
2	/IC	I	Initial clear	52	MD6	I	
3	/CS	I	Chip select	53	MD1	I	
4	/WR	I	Write strobe	54	MD7	I	
5	Vdd		DC +3.3 V supply	55	Vdd		DC +3.3 V supply
6	/RD	I	Read control	56	MD0	I	
7	CA10	I	CPU address bus	57	MA0	O	Wave memory address bus
8	CA9	I		58	MA17	O	
9	CA8	I		59	MA1	O	
10	CA7	I		60	MA16	O	
11	CA6	I		61	MA2	O	
12	CA5	I		62	MA15	O	
13	CA4	I		63	MA3	O	
14	CA3	I		64	MA14	O	
15	Vss		(Ground)	65	MA4	O	
16	CA2	I	CPU address bus	66	Vss		(Ground)
17	CA1	I		67	MA13	O	Wave memory address bus
18	CA0	I		68	MA5	O	
19	CD7	I/O	CPU data bus	69	MA12	O	
20	CD6	I/O		70	MA6	O	
21	CD5	I/O		71	MA11	O	
22	CD4	I/O		72	MA7	O	
23	CD3	I/O		73	MA10	O	
24	CD2	I/O		74	Vss		(Ground)
25	CD1	I/O		75	MA8	O	Wave memory address bus
26	CD0	I/O		76	MA9	O	
27	RA8	O	DRAM address bus	77	MA18	O	
28	RA7	O		78	MA20	O	
29	RA6	O		79	MA19	O	
30	VddS		DC +5 V supply	80	VddS		(Ground)
31	RA5	O	DRAM address bus	81	MA21	O	Wave memory address bus
32	VSS		(Ground)	82	MA22	O	
33	RA4	O	DRAM address bus	83	MA23	O	
34	RA3	O		84	DACLR	O	DAC output (L or L/R)
35	RA2	O		85	DACR	O	DAC output R
36	RA1	O		86	BCLK	O	Bit clock
37	RA0	O		87	WCLK	O	Word clock
38	/RAS	O	Row address strobe	88	SYSCLK	O	System clock
39	/RWE	O	DRAM write enable	89	NSYSON	I	NSYS expansion enable
40	Vss		(Ground)	90	Vss		(Ground)
41	VddS		DC +5 V supply	91	Vdd		DC +3.3 V supply
42	RD3	I/O	DRAM data bus	92	TESTON	I	Tset pin
43	RD2	I/O		93	ACIN	I	
44	RD1	I/O		94	DCTEST	I	
45	RD0	I/O		95	SYI	I	Synch. signal
46	/CAS	O	Column address strobe	96	MCLK1	I	Master clock input
47	MD4	I	Wave memory data bus	97	MCLK0	O	Master clock output
48	Vss		(Ground)	98	Vss		(Ground)
49	MD3	I	Wave memory data bus	99	XOUT	O	Crystal oscillator
50	MD5	I	Wave memory data bus	100	XIN	I	Crystal oscillator

● **T6963C** (XL166A00) LCD Controller

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	HALT	I	Write prohibition	42	ad9	O	
2	RESET	I	Reset	43	ad10	O	Address bus for memory display
3	MDS	I	} Display line select	44	ad11	O	
4	MD0	I		45	ad12	O	When DUAL mode:
5	MD1	I		46	ad13	O	*ad15 = L→upper LCD
6	MD2	I	} Display column select	47	ad14	O	*ad15 = H→lower LCD
7	MD3	I		48	ad15	O	
8	FS0	I	} Display font select	49	ce0	O	*When DUAL = H: display memory chip enable for address 0000h-04FFh
9	FS1	I					*When DUAL = L: serial data output for odd segment of lower LCD
10	D0	I/O					
11	D1	I/O					
12	D2	I/O		50	ce1	O	*When DUAL = H: display memory chip enable for address 0800h-0FFFh
13	D3	I/O	Data bus for CPU				*When DUAL = L: shift clock pulse output for X driver of lower LCD
14	D4	I/O		51	HOD	O	Serial data output for odd segment of upper LCD
15	D5	I/O		52	ED	O	*When SDSEL = H: serial data output for even segment of upper/lower LCD
16	D6	I/O					*When SDSEL = L: serial data output for segment of upper/lower LCD
17	D7	I/O					
18	WR	I	Write strobe				
19	RD	I	Read strobe	53	HSCP	O	Shift clock pulse for X driver of upper LCD
20	CE	I	Chip enable				
21	C/D	I	*Command write/Data write (during write mode) *Status read/Data read (during read mode)	54	DUAL	I	*H: single side LCD drive *L: double sides LCD drive
22	d0	I/O		55	LP	O	Latch pulse for X driver/ Shift clock pulse for Y driver
23	d1	I/O		56	CDATA	O	Synch. signal for Y driver
24	d2	I/O		57	FRTAL	O	Frame signal
25	d3	I/O	Data bus for memory display	58	CH1	O	Check pin (Don't care)
26	d4	I/O		59	CH2	O	
27	Vdd		(Power supply)	60	DSPON	O	External DC/DC control (when L→H: clear X driver) HALT, RESET = L→DSPON = L
28	d5	I/O					
29	d6	I/O					
30	d7	I/O		61	VDD		
31	r/w	O	Read/Write signal for display memory	62	SDSEL	I	*H: odd/even segment separation *L: serial data input
32	ce	O	} Display memory chip enable	63	VSS		Ground
33	ad0	O	Address bus for memory display	64	T2	I	} Test pin
34	ad1	O		65	T1	I	
35	ad2	O	Address bus for memory display	66	XI	I	} Quartz crystal
36	ad3	O		67	XO	O	
37	ad4	O					
38	ad5	O	When DUAL mode:				
39	ad6	O	*ad15 = L→upper LCD				
40	ad7	O	*ad15 = H→lower LCD				
41	ad8	O					

■ IC BLOCK DIAGRAM (ICブロック図)

● **SN74HC32NSR**(XD833A00)
Quad 2 Input OR
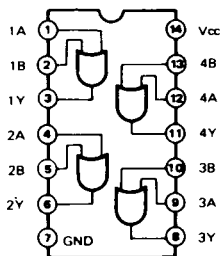
● **SN74HC74NSR**(XC726A00)
Dual D-Type Flip-Flop

● **SN74HC139NSR**(XC727A00)
1 to 4 Demultiplexer
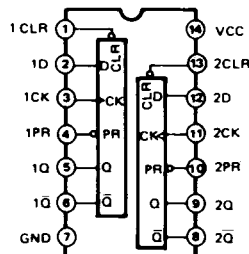
INPUTS				OUTPUTS	
PR	CLR	CLK	D	Q	Q
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H	H
H	H	↑	H	H	L
H	H	↑	L	L	H
H	H	L	X	Q₀	Q̄₀
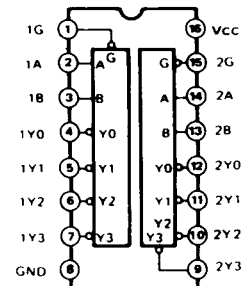
- **SN74HC245NSR**(XD838A00)
  Octal 3-State Bus Transceiver
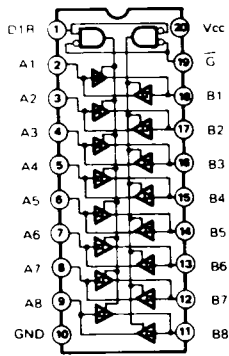
- **SN74HC374ANSR**(XQ042A00)
  Octal 3-State D-Type Flip Flop
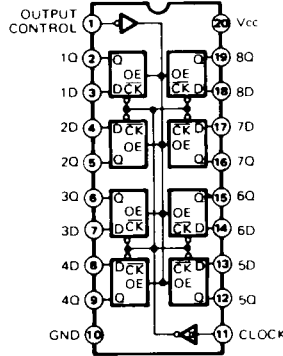
- **NJM4556AMT1**(XQ138A00)
  Dual Operational Amplifier
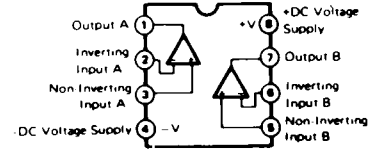
- **MC34051MEL**(XP881A00)
  Dual EIA-422/423 Line
  Transceiver
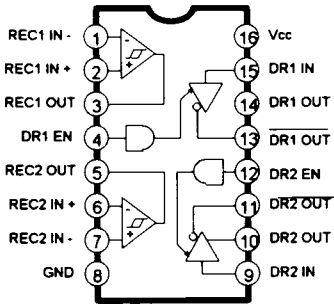
- **SC7SU04FEL**(X1348A00)
  Inverter
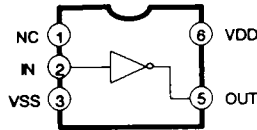
- **TC7S32F**(XM588A00)
  OR
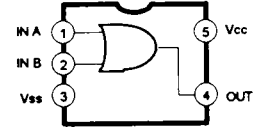
- **SN74HC14NSR**(XC725A00)
  Hex Inverter

- **M5291FP-600C**(XR858A00)
  DC/DC Converter

■ CIRCUIT BOARDS (シート基板図)

● DM Circuit Board

TO HOST   OUT — MIDI — IN   CONTRAST   DC IN   LINE OUT/ PHONES

HOST SELECT MIDI/PC2/PC1/Mac

POWER ON OFF

VOLUME MAX MINI

to PN-CN1

to LCD Assembly

Component side (部品面)
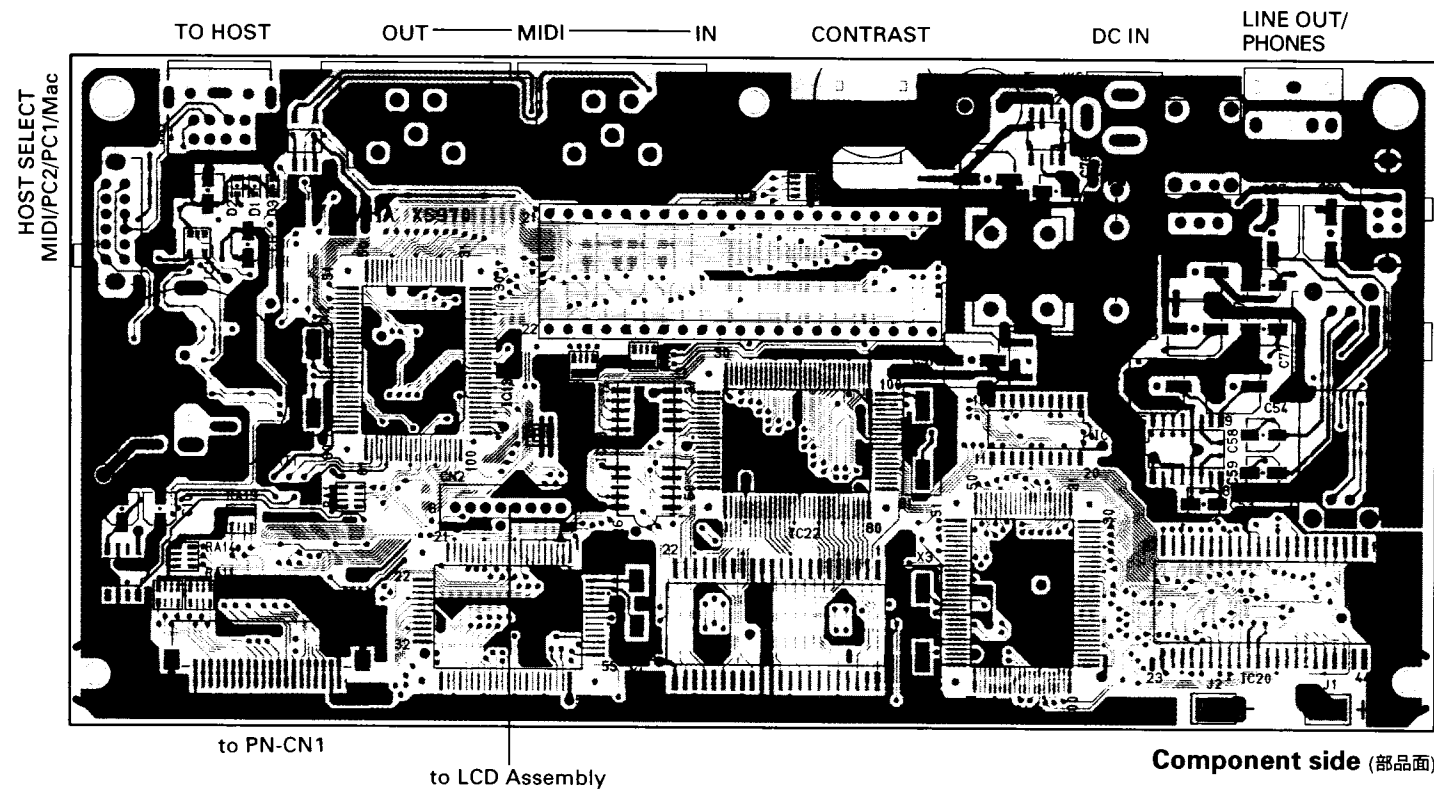
Pattern side (パターン面)

Notes)
Circuit Board: DM (VY867300) XS970B0

1. IC

IC 1:	SC7SU04FEL (XI348A00) INVERTER	
IC 2:	MC34051MEL (XP881A00) LINE TRANSCEIVER	
IC 4:	SN74HC14NSR (XC725A00) INVERTER	
IC 5:	M62021FP (XI686A00) RESET	
IC 6,11:	M5M5256DFP-70LL (XN279C00) SRAM 256K	
IC 7:	HM628128BLFP-7SL (XM901B00) SRAM 1M	
IC 8:	341MV030 (XT344E00) PROGRAM	
IC 9:	SN74HC139NSR (XC727A00) DECODER	
IC 10:	T6963C (XL166A00) LCD CONTROLLER	
IC 12:	M5291FP-600C (XR858A00) DC/DC CONVERTER	
IC 13,21:	HD6413002FP16 (XQ375A00) CPU H8-3002	
IC 14:	SN74HC32NSR (XD833A00) OR-GATE	
IC 15,16:	SN74HC74NSR (XC726A00) D-FF	
IC 17:	SN74HC245NSR (XD838A00) BUF	
IC 18:	SN74HC374ANSR (XQ042A00) D-FF	
IC 20:	MSM538022E (XT650A00) PROGRAM	
IC 22:	TC203C060AF-001 (XS724A00) SWP00M	
IC 23:	LH64256CK-70 (XS242A00) DRAM 256K	
IC 24:	UPD23C32000-12 (XT346A00) WAVE ROM	
IC 25:	UPD63200GS-E1 (XP867A00) D/A CONVERTER	
IC 26:	NJM4556AMT1 (XQ138A00) OP AMP	
IC 27:	SI-8401L (XR925A00) REGURATOR +5V	
IC 28:	TC7S32F (XM588A00) OR-GATE	
IC 29:	UPC2933T (XS516A00) REGURATOR +3.3V	
IC 30:	UPC4570G2 (XF291A00) OP AMP	

2. Photo Coupler
IC 3:   HCPL-M600 (VR903700)

3. Transistor

Q 1:	2SA1567 O (VZ092600)	
Q 2:	2SC2712 Y (VJ927100)	
Q 3:	2SA1162 O,Y (VJ927200)	
Q 4,5:	2SC3326 A,B TE85R (VD303700)	

4. Diode

D 1-3:	1SS355 (VT332900)	
D 4-8,14:	RLS-73 (VV925900)	
D 9,10:	MA737 (VQ282500)	
D 11:	SFPB59 (VU653000)	
D 12,13:	D1F60 (VS201100)	

5. Zener Diode
ZD 1:   UDZ 3.6BTE-17 3.6V (VU171500)
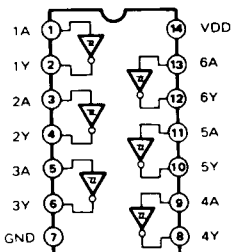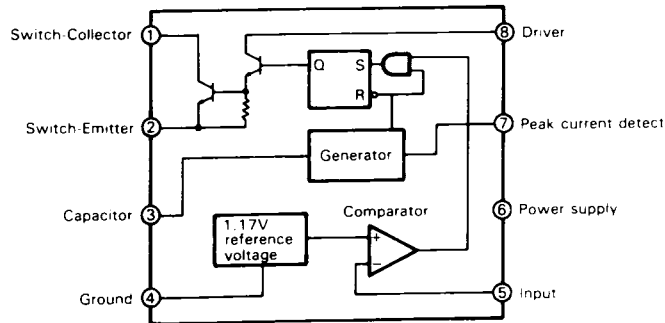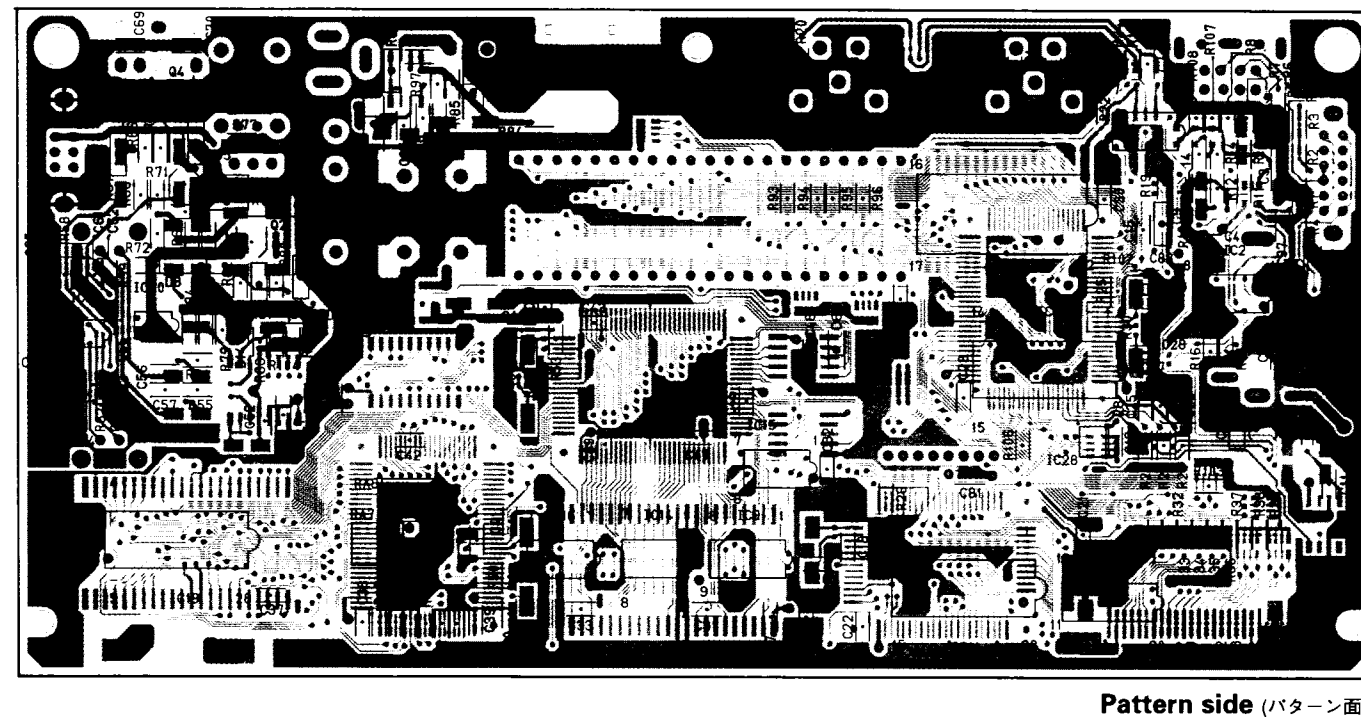ZD 2:   RLZ10C 10.0V (VV660300)

6. Monolithic Ceramic Cap.

C 1,62,65, 95,96:	SL 100P 50V J (UB052100)	
C 3-5,7,9,11,13,15-17, 20-23,27,30-39,42,43, 46-50,52,61,64,66,74, 75,81,85,89,90,92,94, 97:	F 0.100 25V J (UB245100)	
C 8,24-26, 69,70,:	F 0.010 50V Z (UB044100)	
C 18,19:	SL 39P 50V J (UB051390)	
C 28,29,40, 41:	SL 22P 50V J (UB051220)	
C 44,45:	SL 10P 50V D (UB051100)	
C 56,57:	B 4700P 50V K (UB013470)	
C 60,63:	B 6800P 50V K (UB013680)	
C 83,99, 100:	B 680P 50V K (UB012680)	
C 84:	B 2200P 50V K (UB013220)	
C 87,88:	1.500 16V F (VJ927300)	

7. Electrolytic Cap.

C 2,6,10,53, 72,77,86:	10 16V (UF037100)	
C 12,58,59:	3.3 50V (UF066330)	
C 54,55,82, 91:	47 16V (UF037470)	
C 67,68,71, 79:	100 16V (UF038100)	
C 73:	470.00 16.0V (UJ838470)	
C 76:	330.00 25.0V (VH340400)	

8. Chip Inductance

L 1-7:	BK2125HS601-T (VR579900)	
L 11:	ELF1010RR-122K (VU577000)	
R 6,7,107, 108	BK2125HS601-T (VR579900)	

9. Carbon Resistor (chip)

R 1-3,8-10,16,17,23-26, 28,29,48,49,51,64,66, 83,89-96,100,104,105:	10.0K 0.1 J (RD257100)	
R 4,5,70, 102,106:	56.0 0.1 J (RD254560)	
R 13,14,80:	100.0 0.1 J (RD255100)	
R 11,12,15,18, 40-47,54,55, 103:	1.0K 0.1 J (RD256100)	
R 20-22, 33-39,:	220.0 0.1 J (RD255220)	
R 27,53:	1.0M 0.1 J (RD259100)	
R 30,50:	680.0 0.1 J (RD255680)	
R 31,32,73,74, 81,101:	470.0 0.1 J (RD255470)	
R 52,68:	330.0 0.1 J (RD255330)	
R 56,58,60, 62,86:	8.2K 0.1 J (RD256820)	
R 57,61:	3.3K 0.1 J (RD256330)	
R 59,63:	18.0K 0.1 J (RD257180)	
R 65,67:	47.0 1/4 J (RD154470)	
R 69,77:	47.0K 0.1 J (RD257470)	
R 71,79:	100.0K 0.1 J (RD258100)	
R 72,88:	150.0 0.1 J (RD255150)	
R 73,74:	470.0 1/4 J (RD155470)	
R 75,76:	1.8K 1/4 J (RD156180)	
R 78:	82.0K 0.1 J (RD257820)	
R 84,85,97:	2.2K 0.1 J (RD256220)	
R 87:	3.9 1/4 J (RD153390)	
R 98:	4.7 0.1 J (RD256470)	

10. Slide Variable Resistor
VR 1:   A 10.0K RS15H12AD (VK350200) VOLUME

11. Rotary Variable Resistor
VR 2:   B 1K RK09J11T0062A (VN990300) CONTRAST

12. Resistor Array
RA 1,3-5, 11-14:   10KX4 (RE047100)
RA 7,8:   EXBA10E103J (VQ200000)

13. LC Filter
L 10:   PLT2003C (VG238200)

14. Ceramic Resonator
X 1:   4.915M CSAC4.91M (VN990200)

15. Quartz Crystal Unit

X 2:	10M SMD-49 (VR870700)	
X 3:	12M SMD-49 (VS294900)	
X 4:	33.8688M SMD-49 (VT685200)	

16. Slide Switch
SW 1:   SSSF124-S06N-0 (VN210700) HOST SELECT (MIDI,PC-2,PC-1,Mac)
SW 2:   SSSF12302A (VN990400) POWER ON/OFF

17. Phone Jack
JK 4:   ST JACK HSJ0912 (LB302010) LINE OUT/PHONES

18. DC-IN Connector
JK 5:   16V DC 3A HEC2305 (VJ207400) DC IN

19. DIN Connector
JK 1:   DINJACK 8P MD-S810 (VM761000) TO HOST
JK 2:   JACK 3P YKF51-5035 (VU653300) MIDI IN
JK 3:   JACK 3P YKF51-5035 (VU653300) MIDI OUT

20. Connector
CN 1:   52852 20P SE (VY866500) to PN-CN1
CN 2:   PH- 8P TE (VB390400) to LCD Assembly

21. IC Socket
:   DICF-42CS-E (VK863100)

22. Battery Holder
BAT 1:   CR2032 (VN103600)

● **PN Circuit Board**

to DM-CN1

Component side (部品面)
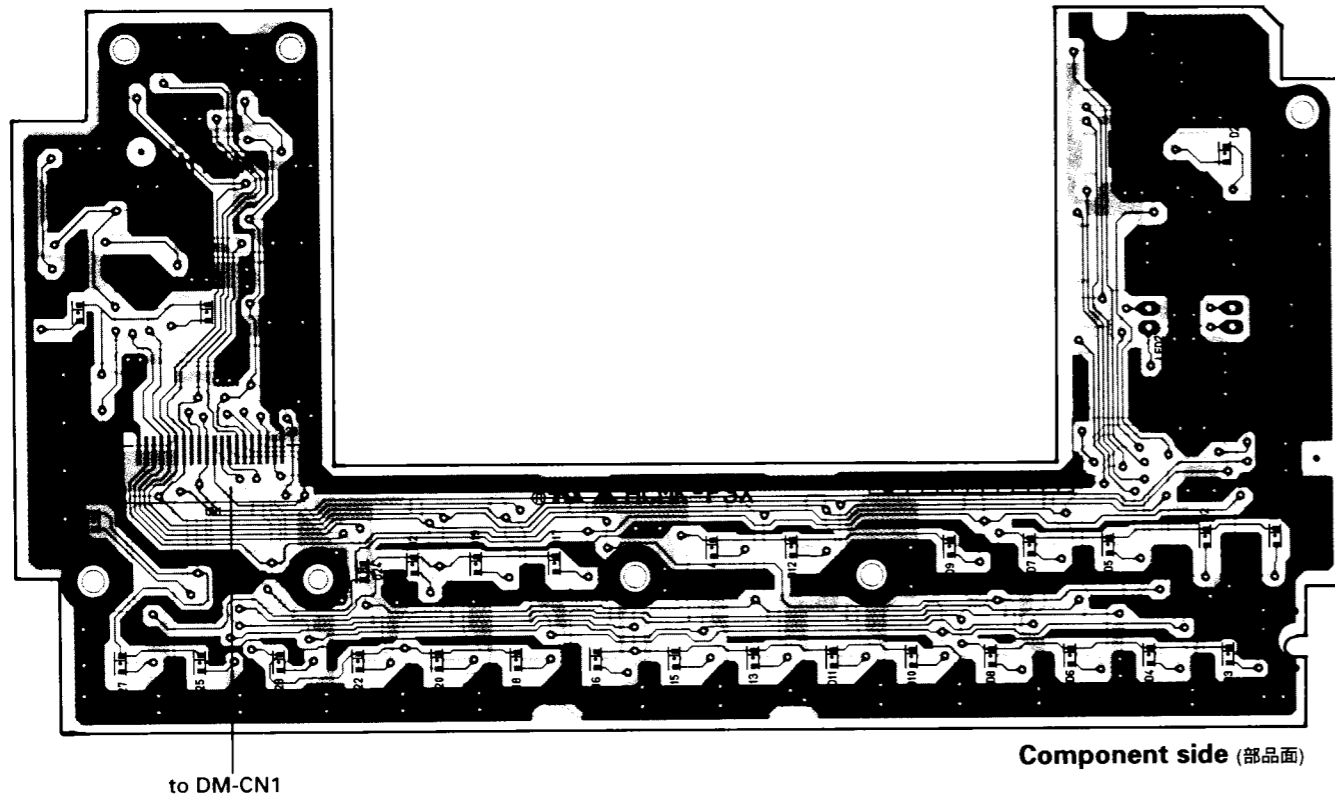
● **Panel Layout** (パネルレイアウト)
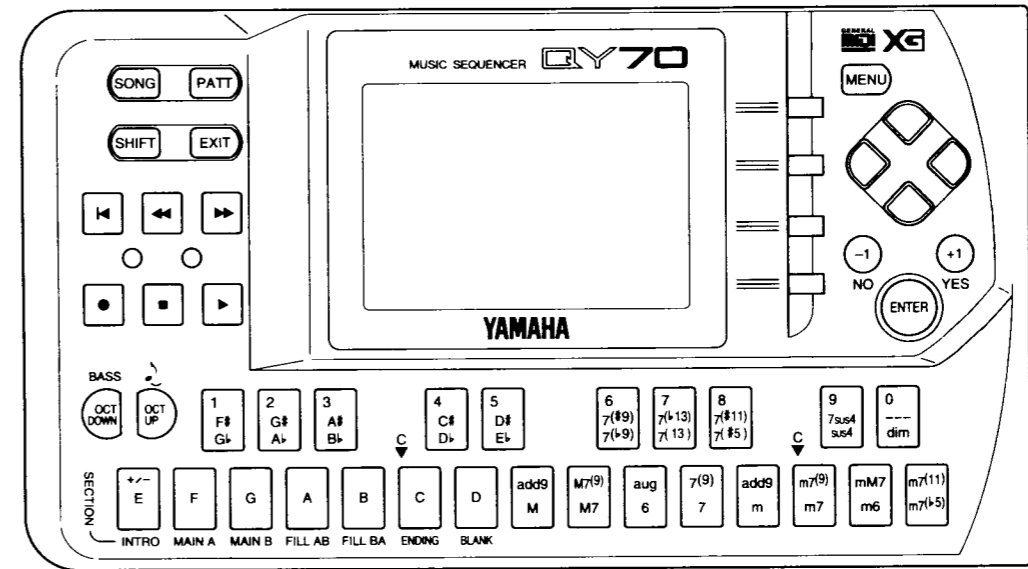
Notes)
Circuit Board: PN (VY867400) XS971B0
1. **Diode**
   D 1-30:   1SS355 TE-17 (VT332900)
2. **LED**
   LED 1:   SEL2210R RE (VU653100)
   LED 2:   SEL2410G GR (VU653200)
3. **Connector**
   CN 1:   52852 20P SE (VY866500) to DM-CN1

14

2NA1-VY86710 ⚠

■ TEST PROGRAM

A. TESTS
1. SYSTEM RAM TEST
2. RAM BACKUP BATTERY TEST
3. POWER BATTERY TEST
4. LCD TEST
5. LED TEST
6. PANEL SWITCH TEST
7. MIDI TEST
8. HOST SELECT TEST
9. TO HOST TEST
10. WAVE ROM TEST
11. SOUND OUTPUT-L TEST
12. SOUND OUTPUT-R TEST
13. FACTORY SETTING
14. EXIT

B. HOW TO ENTER THE TEST PROGRAM

While pressing the [SONG], [PATT] keys and [▶ ▶] button, turn the [POWER] switch on. When the test program is initiated, the LCD shows as follows:

```
**QY70  TEST**
  MAIN ROM Ver=#.##
  SUB   CPU Ver=#.##

  [F1] : AUTO
  [F2] : MANUAL
  [F3] : Factory Set
  [F4] : Exit
```

Use the [F1], [F2], [F3], or [F4] key to select the appropriate test mode. If you press:

[F1] : the AUTO test mode will be initiated.

[F2] : the MANUAL test mode will be initiated.

[F3] : the QY70 will execute the TEST 13, "FACTORY SETTING."

[F4] : You will exit the test mode and return to the play mode.

The MANUAL mode is the preferred method of running the test program because it allows you to select or jump to any test and execute it.

C. PROCEEDING THROUGH THE TESTS

When the test program is entered, the following display will appear.

```
**QY70 TEST** MANUAL
  MAIN ROM Ver=#.##
  SUB   CPU Ver=#.##

  01 : RAM R/W
  [ENTER] : Test Start
  [-1,+1] : INC, DEC
  [F4] : Exit
```

Use the [+1] and [-1] key to move through the various tests of the test program.

Pressing : [+1] will select the test which follows the current test.

Pressing : [-1] will select the test which precedes the current test.

Pressing : [ENTER] will execute the currently selected test.

Pressing : [F4] will execute the TEST 14 "EXIT".

D. TEST SELECTION IF AN ERROR OCCURS

In each test if an NG error is detected, the following operation will make the QY70 wait for the entry of a test number. If you press [F4] key , the QY70 waits for the entry of a test number. Press [+1] key or [-1] key to select the test number which you are going to execute.

1. SYSTEM RAM TEST

Initial Display

```
01: RAM R/W
```

Press the [ENTER] key; then the program performs a read and write check of MAIN CPU and SUB CPU RAM automatically.

Display of Test Result

OK
```
01: RAM R/W
                OK
```

NG
```
01: RAM R/W
                NG
```

TEST END

Ends after displaying the results. All RAM data is preserved. Press the [F4] key and then [+1] key; the program proceeds to the next test.

2. RAM BACKUP BATTERY TEST

Initial Display

```
02: RAM Battery
```

Press the [ENTER] key. This test checks that the voltage of the RAM backup battery is greater than 2.9 ± 0.1 V and less than 3.5 ± 0.1 V automatically.

(Measure point : CPU's A/D input terminal)

Display of Test Results

OK

```
02: RAM Battery
  #.#V           OK
```

NG

```
02: RAM Battery
  #.#V Low       NG
```

NG

```
02: RAM Battery
  #.#V High      NG
```

Test End

Ends after displaying the results.

Press the [F4] key and then [+1] key; the program proceeds to the next test.

3. POWER BATTERY TEST

Initial Display

```
03: Power Battery
```

Press the [ENTER] key. This test checks the voltage of the power battery is less than 6.3 ± 0.1 V automatically.

(Measure point : CPU's A/D input terminal)

Display of Test Result

OK

```
03: Power Battery
  #.#V
```

NG

(No change in display)

Test End

Ends after displaying the results.

Press the [F4] key and then [+1] key; the program proceeds to the next test.

4. LCD TEST

Initial Display

```
04: LCD Check
```

Check that all dots of the LCD blink.

Check that the [CONTRAST] control can be adjusted to a proper contrast display.

Test End

Press the [F4] key and then [+1] key; the program proceeds to the next test.

5. LED TEST

Initial Display

```
05: LED Check
```

Check that the red LED and the green LED indicators blink alternately.

Test End

Press the [F4] key and then [+1] key; the program proceeds to the next test.

6. PANEL SWITCH TEST

Initial Display

```
06: Panel Switch
```

Press the [ENTER] key.

Press the panel switches consecutively from the [SONG] key to the [m7(b5)] key, according to the order indicated on the LCD.

```
┌─────────────────────────────┐
│  06: Panel Switch           │
│      Push [SONG]            │
└─────────────────────────────┘
```
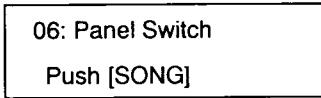
(When you execute [SONG] switch check)

If the switch is OK, a piano note will sound and you can proceed to the next switch test.

If the wrong switch is pressed, the error message NG will be displayed on the LCD and no sound will be heard. At that time, if the correct switch is pressed then the proper code is received, you will be able to proceed to the next switch test. If all switches are OK, the display will indicate OK.

Display of Test Result
OK
```
┌─────────────────────────────┐
│  06: Panel Switch           │
│                      OK     │
└─────────────────────────────┘
```
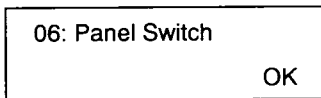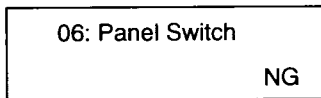
NG
```
┌─────────────────────────────┐
│  06: Panel Switch           │
│                      NG     │
└─────────────────────────────┘
```

Test End

Ends after displaying the results.

Press the [F4] key and then [+1] key; the program proceeds to the next test.

7. MIDI TEST

Initial Display
```
┌─────────────────────────────┐
│  07: MIDI (IN/OUT)          │
└─────────────────────────────┘
```
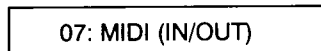
Execute this test after connecting the [MIDI IN] terminal to the [MIDI OUT] terminal via a MIDI cable.

Display of Test Result
OK
```
┌─────────────────────────────┐
│  07: MIDI (IN/OUT)          │
│                      OK     │
└─────────────────────────────┘
```
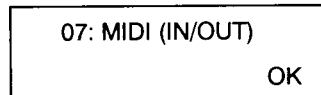
NG
```
┌─────────────────────────────┐
│  07: MIDI (IN/OUT)          │
│                      NG     │
└─────────────────────────────┘
```
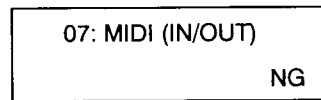
(When an unexpected code is received.)

NG
```
┌─────────────────────────────┐
│  07: MIDI (IN/OUT)          │
│                   TIME OUT  │
└─────────────────────────────┘
```
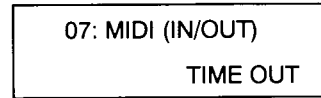
(When a data is not received within a certain time.)

Test End

Ends after displaying the results.

Press the [F4] key and then [+1] key; the program proceeds to the next test.

8. HOST SELECT TEST

Initial Display
```
┌─────────────────────────────┐
│  08: HOST SELECT            │
└─────────────────────────────┘
```
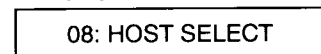
Change the [HOST SELECT] (Mac/PC-1/PC-2/MIDI) switch as indicated on the LCD;

```
┌─────────────────────────────┐
│  08: HOST SELECT            │
│      Select Mac             │
└─────────────────────────────┘
```
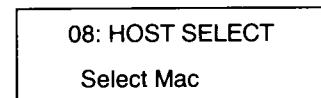
(While you execute [Mac] switch check)

Display of Test Result
OK
```
┌─────────────────────────────┐
│  08: HOST SELECT            │
│      Select MIDI     OK     │
└─────────────────────────────┘
```
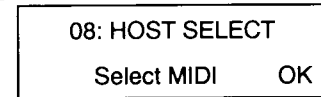
NG   (No change in display)

Test End

Ends after displaying the results.

Press the [F4] key and then [+1] key; the program proceeds to the next test.

9. TO HOST TEST

Initial Display
```
┌─────────────────────────────┐
│  09: TO HOST                │
└─────────────────────────────┘
```
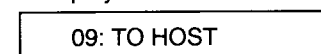
This test is for factory use only.

Press the [F4] key and then [+1] key; the program proceeds to the next test.

10. WAVE ROM TEST

Initial Display

```
10: WAVE ROM
```

Press the [ENTER] key. This program performs a read/write check of WAVE ROM automatically.

Display of Test Result

OK

```
10: WAVE ROM

                    OK
```

NG

```
10: WAVE ROM

                    NG
```

Test End

Ends after displaying the results.

Press the [F4] key and then [+1] key; the program proceeds to the next test.

11. SOUND OUTPUT-L TEST

Initial Display

```
11: PCM SIN 1kHz L
```

Insert the appropriate 1/4" phone plugs into the [LINE OUT/PHONES] jack. Check each output of frequency, output level and THD using a frequency counter, oscilloscope, level meter (with JIS-C filter) and distortion meter. And check the correct signal output at the left channel.

Set the [VOLUME] control at MAX for this check.

While sounding, the LCD shows as follows ;

```
11: PCM SIN 1kHz L

                    ON
```

ITEMS TO CHECK

PHONES (L) jack :

1 kHz±3.0 Hz sine wave, distortion less than 1.0 % (with LPF30), less than 0.5 % (with JIS-C filter),

+2±2 dBm (10 k ohm load), -5±2 dBm (33 ohm load)

PHONES (R) jack : less than -76 dBm

Test End

Press the [F4] key and then [+1] key; the program proceeds to the next test.

12. SOUND OUTPUT-R TEST

Initial Display

```
12: PCM SIN 1kHz R
```

Set the same condition as TEST 11 "SOUND OUTPUT-L TEST". Check the correct signal output at the right channel. While sounding, the LCD shows as follows ;

```
12: PCM SIN 1kHz R

                    ON
```

ITEMS TO CHECK

PHONES (R) jack :

1 kHz±3.0 Hz sine wave, distortion less than 1.0 % (with LPF30), less than 0.5 % (with JIS-C filter)

+2±2 dBm (10 k ohm load), -5±2 dBm (33 ohm load)

PHONES (L) jack : less than -76 dBm

13. FACTORY SETTING

Initial Display

```
13: Factory Set
```

Press the [ENTER] key. The following display will appear.

Display of Test Result

```
13: Factory Set

[NO] or [YES] ?
```

Press the [+1] key. The system data, song data and sequence data will be at factory setting. If you press [-1] key they will not be restored.

Display of Test Result

```
┌─────────────────────────────┐
│   13: Factory Set           │
│                             │
│                        OK   │
└─────────────────────────────┘
```
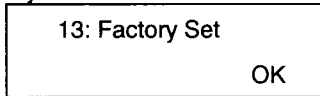
(If factory settings are restored)

```
┌─────────────────────────────┐
│   13: Factory Set           │
│                             │
│              not set        │
└─────────────────────────────┘
```
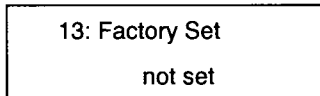
(If not restored)

Test End

Ends after displaying the results.

Press the [F4] key and then [+1] key; the program proceeds to the next test.

```
* * * * * * * * SYNTH * * * * * * * *
MIDI SYNC                = INTERNAL
MIDI CONTROL             = OFF
XG PARAMETER OUT         = OFF
ECHO BACK                = REC MONITOR
PATTERN OUT CHANNEL      = OFF
LOCAL ON/OFF             = ON
MIDI FILTER IN           = ALL
INTERVAL TIME            = 100 ms
ABC ZONE LOW             = C1
ABC ZONE HIGH            = G8
ABC CHANNEL              = ALL
ABC FUNCTION             = OFF
REC PRE COUNT            = 1 BAR
METRONOME                = REC
CLICK BEAT               = QUARTER NOTE
CHORD SOUND              = ON
MASTER TUNE FINE         = 0
* * * * * * * * * * * * * * * * * * * *
```

14. EXIT

Initial Display
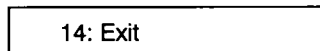
```
┌─────────────────────────────┐
│   14: Exit                  │
└─────────────────────────────┘
```

Press the [ENTER] key. The following display will appear.

Display of Test Result

```
┌─────────────────────────────┐
│   14: Exit                  │
│                             │
│   [NO] or [YES] ?           │
└─────────────────────────────┘
```
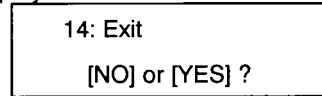
If you press [+1] key, the program will exit the test mode. If you press [-1] key, the LCD shows the test entry display.

NOTE : When the system has returned to the play mode, check that the next points as follows;

1. NOISE LEVEL

OUTPUT-L terminal : less than -78 dBm
OUTPUT-R terminal : less than -78 dBm

2. CLICK NOISE

While turning the [POWER] switch on/off, check that the click noise is less than 0.5 Vp-p among the output terminals.

■ INITIALIZE

The following procedure can be used to reset all QY70 parameters to their initial default settings, and clear all user memory (user patterns and songs-the combination patterns are reset to their contents.)

1) Turn the QY70 [POWER] switch off.

2) Turn the [POWER] switch on while holding the [OCT DOWN], [OCT UP] and [1/F#/G ♭] keys.
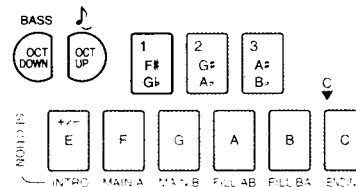
3) "QY70" will appear on the LCD display.

■ テストプログラム

A. テスト項目

1. SYSTEM RAM テスト
2. RAM バックアップバッテリーテスト
3. 電源バッテリーテスト
4. LCD テスト
5. LED テスト
6. パネルスイッチテスト
7. MIDI テスト
8. HOST SELECT テスト
9. TO HOST テスト
10. WAVE ROM テスト
11. OUTPUT-L 発音テスト
12. OUTPUT-R 発音テスト
13. ファクトリーセット
14. EXIT

B. テストプログラムの起動

[SONG]と[PATT]キーと[▶ ▶]ボタンを押しながら、
[POWER]を ON すると LCD に次の様に表示されます。

```
**QY70  TEST**
 MAIN ROM Ver=#.##
 SUB   CPU Ver=#.##


 [F1] : AUTO
 [F2] : MANUAL
 [F3] : Factory Set
 [F4] : Exit
```

[F1]、[F2]、[F3]または[F4]キーを使用してテストモ
ード選択を行ないます。

[F1] : オートモードでテストに入ります。
[F2] : マニュアルモードでテストに入ります。
[F3] : テスト 13 のファクトリーセットが実行されま
   す。
[F4] : テスト 14 の EXIT が実行されます。

ここでは、マニュアルモードでテストに入ったとき
の説明を以下に記載します。

C. テストの進め方

マニュアルモードでテストに入ると、次の画面が表
示されます。

```
**QY70 TEST** MANUAL
 MAIN ROM Ver=#.##
 SUB   CPU Ver=#.##


 01 : RAM R/W
 [ENTER] : Test Start
 [-1,+1] : INC,DEC
 [F4] : Exit
```

[+1]と[-1]キーを使用して実行するテストの番号を
選択し、[ENTER]キーを押してテストを実行します。
[F4]キーを押すと、テスト 14 の EXIT が実行されま
す。

D. NG と判断した時のテストの進め方

[F4]キーを押すとテスト番号の入力待ちの状態とな
りますので、[+1]と[-1]キーを使用して実行するテス
トの番号を選択します。

1. SYSTEM RAM テスト

最初の表示

```
01: RAM R/W
```

[ENTER]キーを押すと、MAIN CPU、SUB CPU のリ
ード／ライトテストが自動的に行われます。

判定結果の表示

OK
```
01: RAM R/W
            OK
```

NG
```
01: RAM R/W
            NG
```

テストの終了方法
判定結果を表示して終了します。[F4]キーを押し、
[+1]キーを押して次のテストに進みます。
また、テストを実行しても RAM のデータは保存さ
れます。

2. RAM バックアップバッテリーテスト

最初の表示

```
02: RAM Battery
```

[ENTER]キーを押すと、RAM のバックアップバッテリーの電圧が 2.9±0.1 V 以上、3.5±0.1 V 以下であることを自動的に確認します。
（測定箇所：CPU の A/D 入力端子）

判定結果の表示

OK

```
02: RAM Battery
    #.#V           OK
```

NG

```
02: RAM Battery
    #.#V Low       NG
```

NG

```
02: RAM Battery
    #.#V High      NG
```

テストの終了方法
判定結果を表示して終了します。
[F4]キーを押し、[+1]キーを押して次のテストに進みます。

3. 電源バッテリーテスト

最初の表示

```
03: Power Battery
```

[ENTER]キーを押すと、乾電池または AC アダプターより供給される電源電圧が、6.3 V 以下であることを自動的に確認します。
（測定箇所：CPU の A/D 入力端子）

判定結果の表示

OK

```
03: Power Battery
    #.#V
```

NG
　　　　表示なし

テストの終了方法
判定結果を表示して終了します。
[F4]キーを押し、[+1]キーを押して次のテストに進みます。

4. LCD テスト

最初の表示

```
04: LCD Check
```

[ENTER]キーを押すと、1 ドットおきに縦縞を表示し、その後白黒反転ブリンクすることを確認します。
また、[CONTRAST]コントロールにてコントラストを調整できるか、確認します。

テストの終了方法
[F4]キーを押し、[+1]キーを押して次のテストに進みます。

5. LED テスト

最初の表示

```
05: LED Check
```

[ENTER]キーを押して、赤 LED と緑 LED が交互に点滅することを確認します。

テストの終了方法
[F4]キーを押し、[+1]キーを押して次のテストに進みます。

6. パネルスイッチテスト

最初の表示

```
06: Panel Switch
```

[ENTER]キーを押し、[SONG]から[m7(b5)]までのスイッチを LCD の表示に従って ON/OFF します。

```
06: Panel Switch
    Push [SONG]
```

（[SONG]スイッチチェックの場合）

スイッチが正常に動作した場合、ピアノ音で発音し次のスイッチのテストに進みます。
LCD の表示と違うスイッチを押すと NG が表示され、発音しません。その後正しいスイッチを押すと、次

のスイッチのテストに進みます。すべてのスイッチ
が正常であれば、LCD に OK が表示されます。

判定結果の表示
OK

```
06: Panel Switch

                    OK
```

NG

```
06: Panel Switch

                    NG
```

テストの終了方法
判定結果を表示して終了します。
[F4]キーを押し、[+1]キーを押して次のテストに進み
ます。

7.　MIDI テスト

最初の表示

```
07: MIDI (IN/OUT)
```

[MIDI IN]端子と[MIDI OUT]端子を MIDI ケーブルで
接続した後、[ENTER]キーを押してテストを実行し
ます。

判定結果の表示
OK

```
07: MIDI (IN/OUT)

                    OK
```

NG

```
07: MIDI (IN/OUT)

                    NG
```
（期待されないコードが受信された場合）

NG

```
07: MIDI (IN/OUT)

                TIMEOUT
```
（一定時間内に受信が終了しない場合）

テストの終了方法
判定結果を表示して終了します。
[F4]キーを押し、[+1]キーを押して次のテストに進み

ます。

8.　HOST SELECT テスト

最初の表示

```
08: HOST SELECT
```

[ENTER]キーを押し、[HOST SELECT]スイッチを、
LCD の表示に従って切り換えます。

```
08: HOST SELECT

Select Mac
```
（[Mac]スイッチチェックの場合）

判定結果の表示
OK

```
08: HOST SELECT

Select MIDI        OK
```

NG　表示なし

テストの終了方法
判定結果を表示して終了します。
[F4]キーを押し、[+1]キーを押して次のテストに進み
ます。

9.　TO HOST テスト

最初の表示

```
09: TO HOST
```

このテストは工場出荷用テストで実行するには専用
治具が必要です。[F4]キーを押し、[+1]キーを押して
次のテストに進んでください。

10. WAVE ROM テスト

最初の表示

```
10: WAVE ROM
```

[ENTER]キーを押すと、WAVE ROM のリードテスト
が自動的に行なわれます。

判定結果の表示
OK

```
10: WAVE ROM

                    OK
```

NG

```
┌─────────────────────────────┐
│   10: WAVE ROM              │
│                       NG    │
└─────────────────────────────┘
```

テストの終了方法
判定結果を表示して終了します。
[F4]キーを押し、[+1]キーを押して次のテストに進みます。

11. PCM サイン波 OUTPUT-L 発音テスト

最初の表示

```
┌─────────────────────────────┐
│     11: PCM SIN 1kHz L      │
└─────────────────────────────┘
```

[LINE OUT/PHONES]端子にプラグを差し込み、各出力の周波数、出力レベル、歪率を周波数カウンター、オシロスコープ、レベル計（JIS-C フィルター付き）、歪率計で測定し、L チャンネルより正常な信号が出力されていることを確認します。
このとき、[VOLUME]は MAX とします。
発音中は LCD に以下の表示がされます。

```
┌─────────────────────────────┐
│   11: PCM SIN 1kHz L        │
│                       ON    │
└─────────────────────────────┘
```

チェック項目
PHONES(L)端子: 1 kHz±3.0 Hz サイン波、歪率 1.0 ％
　　　　　　　以下(LPF30 kHz)、0.5 ％以下(JIS-C)、
　　　　　　　+2±2 dBm (負荷 10 k Ω)、-5±2 dBm
　　　　　　　(負荷 33 Ω)

PHONES(R)端子 : -76 dBm 以下

テストの終了方法
[F4]キーを押し、[+1]キーを押して次のテストに進みます。

12. PCM サイン波 OUTPUT-R 発音テスト

最初の表示

```
┌─────────────────────────────┐
│     12: PCM SIN 1kHz R      │
└─────────────────────────────┘
```

テスト 11（PCM サイン波 OUTPUT-L 発音テスト）と同じ方法で、R チャンネルより正常な信号が出力されていることを確認します。
発音中は LCD に次の表示がされます。

```
┌─────────────────────────────┐
│   12: PCM SIN 1kHz R        │
│                       ON    │
└─────────────────────────────┘
```

チェック項目
PHONES(R)端子: 1 kHz±3.0 Hz サイン波、歪率 1.0 ％
　　　　　　　以下(LPF30 kHz)、0.5 ％以下(JIS-C)、
　　　　　　　+2±2 dBm(負荷 10 k Ω)、-5±2
　　　　　　　dBm(負荷 33 Ω)

PHONES(L)端子 : -76 dBm 以下

テストの終了方法
[F4]キーを押し、[+1]キーを押して次のテストに進みます。

13. ファクトリーセット

最初の表示

```
┌─────────────────────────────┐
│     13: Factory Set         │
└─────────────────────────────┘
```

[ENTER]キーを押すと次の様に LCD に表示されます。

```
┌─────────────────────────────┐
│   13: Factory Set           │
│   [NO] or [YES] ?           │
└─────────────────────────────┘
```

[+1]キーを押すとシステムデータ、ソングデータ、シーケンスデータがファクトリーセットされます。
[-1]キーを押すとファクトリーセットされません。

判定結果の表示
ファクトリーセットされた場合

```
┌─────────────────────────────┐
│   13: Factory Set           │
│                       OK    │
└─────────────────────────────┘
```

ファクトリーセットされなかった場合

```
┌─────────────────────────────┐
│   13: Factory Set           │
│   not set                   │
└─────────────────────────────┘
```

テストの終了方法
判定結果を表示して終了します。
[F4]キーを押し、[+1]キーを押して次のテストに進みます。ファクトリーセットが実行されると、各データは次の様にセットされます。

```
* * * * * * * * *SYNTH* * * * * * * * *
```

MIDI SYNC	= INTERNAL
MIDI CONTROL	= OFF
XG PARAMETER OUT	= OFF
ECHO BACK	= REC MONITOR
PATTERN OUT CHANNEL	= OFF
LOCAL ON/OFF	= ON
MIDI FILTER IN	= ALL
INTERVAL TIME	= 100 ms
ABC ZONE LOW	= C1
ABC ZONE HIGH	= G8
ABC CHANNEL	= ALL
ABC FUNCTION	= OFF
REC PRE COUNT	= 1 BAR
METRONOME	= REC
CLICK BEAT	= QUARTER NOTE
CHORD SOUND	= ON
MASTER TUNE FINE	= 0

```
* * * * * * * * * * * * * * * * * * * * *
```

14. EXIT

最初の表示

```
┌─────────────────────────┐
│  14: Exit               │
└─────────────────────────┘
```

[ENTER]キーを押すと次の様にLCDに表示されます。

```
┌─────────────────────────┐
│  14: Exit               │
│     [NO] or [YES] ?      │
└─────────────────────────┘
```

[+1]キーを押すと、テストモードを抜けます。
[-1]キーを押すと、テストプログラム起動直後の画面
表示に戻ります。

テストモードを抜けて、プレイモードに戻ったら、
次の項目について検査を実行して下さい。

1. ノイズレベル

OUTPUT-L : -78 dBm 以下
OUTPUT-R : -78 dBm 以下

2. クリックノイズ

パワースイッチを ON/OFF したとき、各出力端子に
現れるクリックノイズが 0.5Vp-p 以下であること。

■ 初期化

QY70を工場出荷時の状態に戻す機能です。
ソングやユーザーパターンのデータはすべて消
えて空の状態になります。

【初期化の手順】

1. [OCT DOWN]と[OCT UP]とその横の[1/
   F#/Gb]の黒鍵を同時に押しながら、電源ス
   イッチを入れます。
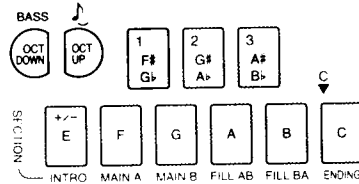
2. ディスプレイにQY70とロゴが表示された
   らボタンを離します。

■ SPECIFICATIONS

Sequencer block

Data capacity	approximately 32,000 notes
Note resolution	480 clocks per quarter note
Polyphony	64 notes
Tempo	25-300
Modes	SONG mode (SONG, SONG VOICE, SONG EFFECT)
	PATTERN mode (PATTERN, PATTERN VOICE, PATTERN EFFECT)
Record modes	Realtime replace, Realtime overdub, Step, Multi
Tracks	Song: 16 sequencer tracks, pattern track(Pt),
	chord track(Cd), tempo track(Tm)
	Pattern: 8 pattern phrase tracks
Songs	20 songs + 3 demo songs
Patterns	768 preset patterns (128 preset styles x 6 sections)
	384 user patterns (64 user styles x 6 sections)
	Sections: Intro, Main A, Main B, Fill AB, Fill BA, Ending
Phrases	4,167 preset phrases
	48 user phrases per user style
Chord types	26 types (including "non-ABC" type)
Chord templates	99 preset chord templates
	1 user chord progression per song
Play effect	Groove quantization, Drum table remapping

Tone generator block

Type	AWM2 tone generator
Maximum Polyphony	32 notes
Multi-timbral capability	24 timbres (last note priority with element reserve, DVA)
Preset voices	519 normal voices, 20 drum voices
Effects	3 blocks (Reverb, Chorus, Variation)
	Reverb: 11 types
	Chorus: 11 types
	Variation 43 types

Controllers & display

Micro keyboard	25 keys (2 octaves)
Octave keys	[OCT DOWN], [OCT UP]
Cursor keys	up, down, left, right
Sequencer keys	[▶], [■], [●], [◄], [◄◄], [▶▶]
	[SONG], [PATT], [SHIFT], [EXIT], [MENU], [-1(NO)], [+1(YES)], [ENTER], Function keys
Volume control	
Contrast control	
HOST SELECT switch	
Display	128 x 64 dots graphic LCD

Connectors

LINE OUT/PHONES	stereo mini jack x 1
MIDI	IN x1, OUT x1
TO HOST	
DC IN	for PA-3B

Power supply

Optional PA-3B AC adapter
Six 1.5v AA size (SUM-3 or R6P) or equivalent alkaline batteries

Dimensions

(W x D x H)　188 x 104 x 43 mm (7-3/8" x 4-1/8" x 1-11/16")

Weight

550g (1 lbs., 3 oz) without batteries

Included items

QY Data Filer	2HD floppy disk x 2
Audio cable	miniature stereo phone plug to dual RCA pin plugs
Owner's manual set	QY70 owner's manual, List book, QY Data Filer owner's manual
Creepers	

Output Level

Refer to the TEST PROGRAM section of this manual.

■ 総合仕様

1) シーケンサー部

メモリー容量(最大記憶発音数)	約32,000音	
音符分解能	4分音符＝480クロック	
最大同時発音数	64音	
テンポ	25〜300	
モード	ソングモード(ソングプレイ、ソングボイス、ソングエフェクト)	
	パターンモード(パターンプレイ、パターンボイス、パターンエフェクト)	
レコードモード	リアルタイムリプレース (シーケンス、パターン、コード、テンポトラック)	
	リアルタイムオーバーダブ (シーケンス、フレーズトラック)	
	ステップ (シーケンス、パターン、コード、フレーズトラック)	
	マルチ	
トラック数	ソング	シーケンストラック×16
		パターントラック(拍子含む)
		コードトラック
		テンポトラック
	パターン	フレーズトラック×8
ソング	20ソング+3デモソング	
パターン	プリセットパターン×768 (128スタイル×6セクション)	
	ユーザーパターン×384 (64スタイル×6セクション)	
	セクション　INTRO、MAIN A、MAIN B、FILL AB、FILL BA、ENDING	
フレーズ	プリセットフレーズ×4,167	
	ユーザーフレーズ×48 (1ユーザースタイルにつき)	
コードタイプ	26種類 (スルーを含む)	
コードテンプレート	プリセット×99	
	ユーザー×1 (1ソングにつき)	
プレイエフェクト	グルーブクオンタイズ、ドラムリマッピングテーブル	

2) 音源部

音源方式	AWM2音源	
最大同時発音数	32音	
最大同時発音色数	24マルチティンバー、エレメントリザーブ付後着優先、DVA付	
プリセット音色数	ノーマルボイス	519(XG)
	ドラムボイス	20キット(XG)
サウンドモジュールモード	XG(GMを含む)	

エフェクト　　　　　3系統(リバーブ、コーラス、バリエーション)
リバーブ　　　　　11タイプ
コーラス　　　　　11タイプ
バリエーション　43タイプ

3) コントローラー＆ディスプレイ

パネルスイッチ	鍵盤ボタン	25鍵(2オクターブ)、ナンバーボタン兼用
	オクターブボタン	[OCT DOWN]、[OCT UP]
	カーソルボタン	上、下、左、右
	シーケンサーボタン	[▶]、[■]、[●]、[◄]、[◄◄]、[▶▶]
		[SONG]、[PATT]、[SHIFT]、[EXIT]、[MENU]、[-1(NO)]、[+1(YES)]、[ENTER]、[F1]〜[F4](ファンクションボタン)
ボリュームスライダー		
コントラストコントロール		
HOST SELECTスイッチ		
ディスプレイ	128×64ドットグラフィック液晶ディスプレイ、21文字×8行	

4) 接続端子

LINE OUT/PHONES端子	ステレオミニジャック×1
MIDI端子	IN×1、OUT×1
TO HOST端子	
DC IN端子	PA3Bに適合

5) 電源

アルカリ単3乾電池×6本(約3時間の連続使用が可能)
またはACアダプター(PA3B)

6) 寸法 (W×D×H)

188×104×43 mm

7) 重量

550g(乾電池を除く本体のみ)

8) 付属品

アルカリ乾電池(単3×6本)
QYデータファイラー(2HDフロッピーディスク×2枚)
オーディオ変換ケーブル(ステレオミニ-RCAピンL/R)
取扱説明書セット(4冊)
　QY70取扱説明書: ベーシックガイド
　QY70取扱説明書: リファレンス編
　QY70リストブック
　QYデータファイラー取扱説明書
保証書・愛用者カード

9) 出力レベル

本文21ページのテストプログラムを参照下さい。

■ PANEL LAYOUT (パネルレイアウト)

● Front Panel (フロントパネル)
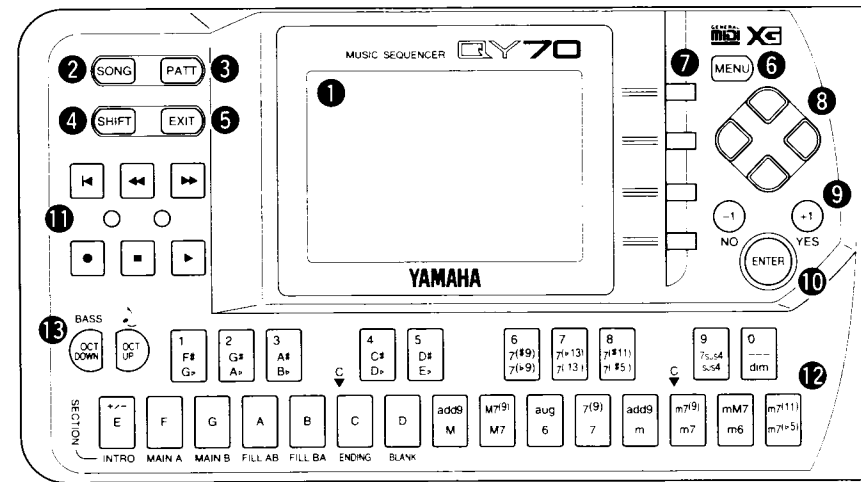
● Left Side Panel (左サイドパネル)
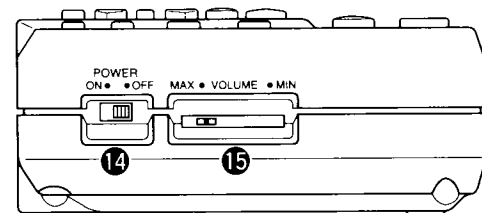
● Right Side Panel (右サイドパネル)

● Rear Panel (リアパネル)

❶ LCD Display	❶ ディスプレイ
❷ [SONG] Key	❷ [SONG] (ソング)キー
❸ [PATT] Key	❸ [PATT] (パターン)キー
❹ [SHIFT] Key	❹ [SHIFT] (シフト)キー
❺ [EXIT] Key	❺ [EXIT] (エグジット)キー
❻ [MENU] Key	❻ [MENU] (メニュー)キー
❼ Function Keys	❼ [F1] ～ [F4] (ファンクション1～4)キー
❽ Cursor Keys	❽ カーソル(▲▼◀▶)ボタン
❾ [-1/NO] and [+1/YES] Keys	❾ [+1] (YES)、[-1] (NO)キー
❿ [ENTER] Key	❿ [ENTER] キー
⓫ Sequencer Keys	⓫ シーケンサーボタン
⓬ Micro Keyboard	([●][■][▶][◀][◀◀][▶▶])
⓭ Octave Keys	⓬ 鍵盤(E2～E4)ボタン
⓮ POWER Switch	⓭ [OCT DOWN] [OCT UP]
⓯ VOLUME Control	(オクターブダウン/アップ)キー
⓰ HOST SELECT Switch	⓮ POWER ON/OFF(電源)スイッチ
⓱ TO HOST Connector	⓯ VOLUME(ボリューム)スライダー
⓲ MIDI IN & OUT Connectors	⓰ HOST SELECT
⓳ CONTRAST Control	(ホストセレクト)スイッチ
⓴ DC IN Jack	⓱ TO HOST(トゥーホスト)端子
㉑ LINE OUT/PHONES Jack	⓲ MIDI(ミディ)端子
	MIDI IN(ミディイン)端子
	MIDI OUT(ミディアウト)端子
	⓳ CONTRAST(コントラスト)コント
	ロール
	⓴ DC IN(電源アダプター接続)端子
	㉑ LINE OUT/PHONES(ラインアウ
	ト/ヘッドフォン)端子

■ ERROR MESSAGES

● Monitor

No Data | When a job is executed, this will appear if the selected track or area contains no data, making the job invalid. Re-select the area.

Illegal Input | This will appear in response to inappropriate operation or input. Check your input method.

Preset Phrase | This will appear when you attempt to edit a Preset Phrase. To edit a preset phrase, copy the phrase to a User Phrase and edit the User Phrase.

Preset Pattern | This will appear when you attempt to record to a Preset Pattern. You cannot record to Preset Patterns.

Preset Chord | This will appear when you attempt to change a Preset Chord Template with a Job (transpose, etc.) operation.

● System

Memory Full | This will appear when internal memory is full and it is not possible to record, edit, execute a job, receive MIDI, etc. Delete unneeded songs, user patterns, or user phrases, and try the operation once again.

Backup Batt. Low | This will appear when the internal backup battery of the QY70 has run down. Contact the nearest Yamaha dealer or the authorized distributor for your country to have the battery replaced.

Power Batt. Low | This will appear when the batteries (Size AA x6) powering the QY70 has run down. Replace the entire set of old batteries with a new set of batteries as soon as possible.

Factory Set | After the power is switched ON, a system diagnosis is run on the QY70's system. If the diagnosis finds the RAM to be defective, this message will appear and the memory will be reset to its original factory settings. Data for Song, User Patterns, and User Phrases will all be eliminated.

● MIDI

MIDI Data Error	This will appear when the received QY bulk data contains an error.
Now Running	This will appear when the QY70 is receiving bulk data. Other MIDI signals cannot be received at this time.
MIDI Buffer Full	This will appear when the MIDI reception buffer of the QY70 has filled up, and processing was not possible. Try decreasing the amount of data or increasing the interval time and transmit the data once again.
XG Data Error	This appears when the received XG parameter change contains a data size error
XG Adrs Error	This appears when the received XG data contains an address error.
XG Size Error	This appears when the received XG bulk data contains a data size error.
Checksum Error	This appears when the received XG data contains a Checksum error.
Host is OffLine	If the QY70 is connected to a computer, this appears when the computer's power is switched OFF. Switch the computer's power ON.

● Messages other than error messages

Can't Undo OK? (Yes/No)	If executing a job would fill up the internal memory so that Undo will not be available, this message will appear. If you are sure that you will not need to Undo this job, press "YES". To cancel without executing the job, press "NO".
Are You Sure? (Yes/No)	Before an operation is executed, this message will ask you for confirmation. To execute the operation press "YES". To cancel the operation press "NO".
Completed	This will appear when the current process has been completed.
Executing...	This message will appear while the job is being executed. Please wait.
Transmitting...	When transmitting MIDI bulk data, this message will appear.
Receiving...	When receiving MIDI bulk data, this message will appear.

■エラーメッセージ

●操作に関するエラー表示

No Data

ジョブを実行する際、選択したトラックや設定した範囲にデータがない場合に表示されます。
ジョブは無効となります。範囲を選び直してください。

Illegal Input

不当な操作や入力を行ったときに表示されます。
入力方法を確認してください。

Preset Phrase

プリセットフレーズをエディットで変更しようとしたときに表示されます。
プリセットフレーズをエディットしたい場合は、一度ユーザーフレーズにコピーし、それをエディットしてください。

Preset Pattern

プリセットパターンに録音をしようとしたときに表示されます。
プリセットパターンには録音できません。

Preset Chord

プリセットのコードテンプレートをジョブ(トランスポーズなど)で変更しようとしたときに表示されます。

●本体システムに関するエラー表示

Memory Full

内部メモリーが一杯で、レコーディングやエディット、ジョブの実行、MIDIの受信などができないときに表示されます。
不要なソングやユーザーパターン、ユーザーフレーズを消去してから操作をやりなおしてください。

Backup Batt.Low

本体内のバックアップバッテリーの電圧が下がったときに表示されます。お買い上げ店またはヤマハ電気音響製品サービス拠点に電池の交換をご依頼ください。

Power Batt.Low

電源用乾電池(単3乾電池×6本)の電圧が下がったときに表示されます。すぐに乾電池を6本共新しいものに交換してください。

Factory Set

QY70の電源ON時に自己診断を行った結果、RAMが破壊されていたために、ファクトリーセット(初期化)を行いました。ソングおよびユーザーパターン、ユーザーフレーズのデータはすべて消去されました。

●MIDIに関するエラー表示

MIDI Data Error

受信したQYバルクデータにエラーがあるときに表示されます。

Now Running

QYバルクデータ受信中のため、他のMIDI信号が受信不可能であることを表示します。

MIDI Buffer Full

一度に大量のMIDIデータが送信されたため、QY70の受信バッファーがフルになりました。データ量を減らすかインターバルタイムを長くしてもう一度送信し直してみてください。

XG Data Error

受信したXG Parameter Changeのデータサイズが間違っているときに表示されます。

XG Adrs Error

受信したXGデータに対応するアドレスがないときに表示されます。

XG Size Error

受信したXGバルクデータのデータサイズが間違っているときに表示されます。

Checksum Error

受信したXGデータにチェックサムエラーがあるときに表示されます。

Host is OffLine

QY70に接続されているホストコンピューターの電源がOFFになっています。電源をONにしてください。

●エラーメッセージ以外の表示

Can't Undo OK? (Yes/No)

そのジョブを実行すると内部メモリーが一杯になり、アンドゥーができなくなる場合に表示されます。アンドゥーができなくてもジョブを実行したい場合は、[+1(YES)]を押します。中止するときは[-1(NO)]を押します。

Are You Sure? (Yes/No)

各操作を実行したときの、確認を求める表示です。操作を実行しても良い場合は[+1(YES)]を押します。中止するときは[-1(NO)]を押します。

Completed

ジョブなどの処理が終了したときに表示されます。

Executing...

処理に時間のかかるジョブなどを実行中に表示されます。そのままお待ちください。

Transmitting...

MIDIのバルク送信中に表示されます。

Receiving...

MIDIのバルク受信中に表示されます。

■ MIDI DATA FORMAT

■ Tone generator part

(1) TRANSMIT FLOW

```
        SW1
MIDI ←——◻——┬—— NOTE ON/OFF              9nH
OUT        │
           ├—◻— PITCH BEND              EnH,
           │
           └—◻— MODURATION WHEEL        BnH,01H

           ┬—— SYSTEM EXCLUSIV MESSAGE
           │   <BULK DUMP>
           ├——— XG SYSTEM           FOH 43H 0nH 4CH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
           ├——— MULTI EFFECT        FOH 43H 0nH 4CH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
           ├——— MULTI PART          FOH 43H 0nH 4CH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
           ├——— DRUM SETUP          FOH 43H 0nH 4CH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
           ├——— SYSTEM INFOMATION   FOH 43H 1nH 4CH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
           │
           │   <PARAMETER CHANGE>
           ├——— MIDI MASTER TUNING  FOH 43H 1nH 27H 30H 00H 00H mmH 11H ccH F7H
           ├——— XG SYSTEM           FOH 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H
           ├——— MULTI EFFECT        FOH 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H
           ├——— MULTI PART          FOH 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H
           └——— DRUM SETUP          FOH 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H

           ┬—— SYSTEM EXCLUSIV MESSAGE
           └——— MIDI MASTER VOLUME   FOH 7FH 7FH 04H 01H 11H mmH F7H

           ———— ACTIVE SENSING        FEH


        SW1◻  MIDI Transmit Channel
              The MIDI Transmit Channel is selected with track select.
```

(2) RECEIVE FLOW

```
MIDI →—┬—— NOTE OFF                8nH
IN     │
       ├—— NOTE ON/OFF             9nH
       │
       ├—— CONTROL CHANGE
       │     BANK SEL MSB          BnH,00H
       │     BANK SEL LSB          BnH,20H
       │     MODULATION            BnH,01H
       │     PORTAMENTO TIME       BnH,05H
       │     DATA ENTRY MSB        BnH,06H
       │     DATA ENTRY LSB        BnH,26H
       │     MAIN VOLUME           BnH,07H
       │     PANPOT                BnH,0AH
       │     EXPRESSION            BnH,0BH
       │     AC1 CONTROLLER        BnH,10H
       │     SUSTAIN SWITCH        BnH,40H
       │     PORTAMENTO SWITCH     BnH,41H
       │     SOSTENUTO             BnH,42H
       │     SOFT PEDAL            BnH,43H
       │     HARMONIC CONTENT      BnH,47H
       │     RELEASE TIME          BnH,48H
       │     ATTACK TIME           BnH,49H
```

```
       │     BRIGHTNESS            BnH,4AH
       │     PORTAMENTO CONTROL    BnH,54H
       │     EFFECT SEND LEVEL 1   BnH,5BH
       │     EFFECT SEND LEVEL 3   BnH,5DH
       │     EFFECT SEND LEVEL 4   BnH,5EH
       │     DATA ENTRY INC        BnH,60H
       │     DATA ENTRY DEC        BnH,61H
       │     NRPN
       │       VIBRATO RATE        BnH,63H,01H,62H,08H,06H,mmH
       │       VIBRATO DEPTH       BnH,63H,01H,62H,09H,06H,mmH
       │       VIBRATO DELAY       BnH,63H,01H,62H,0AH,06H,mmH
       │       FILTER CUTOFF FREQ. BnH,63H,01H,62H,20H,06H,mmH
       │       FILTER RESONANCE    BnH,63H,01H,62H,21H,06H,mmH
       │       AEG ATTACK TIME     BnH,63H,01H,62H,63H,06H,mmH
       │       AEG DECAY TIME      BnH,63H,01H,62H,64H,06H,mmH
       │       AEG RELEASE TIME    BnH,63H,01H,62H,66H,06H,mmH
       │       DRUM INST
       │         CUTOFF FREQ.      BnH,63H,14H,62H,rrH,06H,mmH
       │         FILTER RESONANCE  BnH,63H,15H,62H,rrH,06H,mmH
       │         AEG ATTACK RATE   BnH,63H,16H,62H,rrH,06H,mmH
       │         AEG DECAY RATE    BnH,63H,17H,62H,rrH,06H,mmH
       │         PITCH COARSE      BnH,63H,18H,62H,rrH,06H,mmH
       │         LEVEL             BnH,63H,1AH,62H,rrH,06H,mmH
       │         PANPOT            BnH,63H,1CH,62H,rrH,06H,mmH
       │         REVERB SEND       BnH,63H,1DH,62H,rrH,06H,mmH
       │         CHORUS SEND       BnH,63H,1EH,62H,rrH,06H,mmH
       │         VARIATION SEND    BnH,63H,1FH,62H,rrH,06H,mmH
       │     RPN
       │       PITCH BEND SENS.    BnH,64H,00H,65H,00H,06H,mmH
       │       FINE TUNING         BnH,64H,01H,65H,00H,06H,mmH,26H,11H
       │       COARSE TUNING       BnH,64H,02H,65H,00H,06H,mmH
       │       RPN RESET           BnH,64H,7FH,65H,7FH
       │     ALL SOUND OFF         BnH,78H,00H
       │     RESET ALL CONTROLLERS BnH,79H,00H
       │     ALL NOTE OFF          BnH,7BH
       │     OMNI MODE OFF         BnH,7CH
       │     OMNI MODE ON          BnH,7DH
       │     MONO MODE             BnH,7EH
       │     POLY MODE             BnH,7FH
       │
       ├—— PROGRAM CHANGE          CnH
       │
       ├—— CHANNEL AFTER TOUCH     DnH
       │
       ├—— PITCH BEND CHANGE       EnH
       │
       └—— SYSTEM EXCLUSIV MESSAGE
           <BULK DUMP>
           ├——— XG SYSTEM           FOH 43H 0nH 4CH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
           ├——— MULTI EFFECT        FOH 43H 0nH 4CH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
           ├——— MULTI PART          FOH 43H 0nH 4CH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
           ├——— DRUM SETUP          FOH 43H 0nH 4CH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
           <PARAMETER CHANGE>
           ├——— MIDI MASTER TUNING  FOH 43H 1nH 27H 30H 00H 00H mmH 11H ccH F7H
           ├——— XG SYSTEM ON        FOH 43H 1nH 4CH 00H 00H 7EH 00H F7H
           ├——— XG SYSTEM           FOH 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H
           ├——— MULTI EFFECT        FOH 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H
           ├——— MULTI PART          FOH 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H
           ├——— DRUM SETUP          FOH 43H 1nH 4CH aaH aaH aaH ddH.....ddH F7H
           <BULK DUMP REQUEST>
           ├——— XG SYSTEM           FOH 43H 2nH 4CH aaH aaH aaH F7H
           ├——— MULTI EFFECT        FOH 43H 2nH 4CH aaH aaH aaH F7H
           ├——— MULTI PART          FOH 43H 2nH 4CH aaH aaH aaH F7H
           ├——— DRUM SETUP          FOH 43H 2nH 4CH aaH aaH aaH F7H
           └——— SYSTEM INFOMATION   FOH 43H 2nH 4CH aaH aaH aaH F7H
```

```
            <PARAMETER REQUEST>
      ┌──── XG SYSTEM           F0H 43H 3nH 4CH aaH aaH aaH F7H
      ├──── MULTI EFFECT        F0H 43H 3nH 4CH aaH aaH aaH F7H
      ├──── MULTI PART          F0H 43H 3nH 4CH aaH aaH aaH F7H
      └──── DRUM SETUP          F0H 43H 3nH 4CH aaH aaH aaH F7H
   │
   ├──── SYSTEM EXCLUSIV MESSAGE
   │       GM MODE ON           F0H 7EH 7FH 09H 01H F7H
   │       MIDI MASTER VOLUME   F0H 7FH 7FH 04H 01H 11H mmH F7H
   │
   └──── ACTIVE SENSING         FEH
```

(3) TRANSMIT/RECEIVE DATA

(3-1) CHANNEL VOICE MESSAGES

(3-1-1) NOTE OFF

STATUS	1000nnnn (8nH)	n = 0 ~ 15 VOICE CHANNEL NUMBER
NOTE NUMBER	0kkkkkkk	k = 0 (C-2) ~ 127 (G8)
VELOCITY	0vvvvvvv	v is ignored

Received only.

(3-1-2) NOTE ON/OFF

STATUS	1001nnnn (9nH)	n = 0 ~ 15 VOICE CHANNEL NUMBER
NOTE NUMBER	0kkkkkkk	k = 0 (C-2) ~ 127 (G8)
VELOCITY	0vvvvvvv	(v≠0) NOTE ON
	00000000	(v=0) NOTE OFF

(3-1-3) PROGRAM CHANGE

STATUS	1100nnnn (CnH)	n = 0 ~ 15 VOICE CHANNEL NUMBER
PROGRAM NUMBER	0ppppppp	p = 0 ~ 127

* The XG DRUM VOICE NUMBER corresponds to the PROGRAM NUMBER.

P = 1	DR1	Standard
P = 2	DR2	Standard2
P = 3	DR3	Dry
P = 4	DR4	bright
P = 9	DR5	Room
P = 10	DR6	Dark
P = 17	DR7	Rock
P = 18	DR8	Rock2
P = 25	DR9	Electro
P = 26	DR10	Analog
P = 27	DR11	Analog2
P = 28	DR12	Dance
P = 29	DR13	HipHop
P = 30	DR14	Jungle
P = 33	DR15	Jazz
P = 34	DR16	Jazz2
P = 41	DR17	Brush
P = 49	DR18	Symphonic

* The XG SFX KIT NUMBER corresponds to the PROGRAM NUMBER.

P = 1	DR19	SFX1
P = 2	DR20	SFX2

If while a Drum Voice being selected, a Program Change for a different Drum Voice is received, the Drum Setup that was currently being used by the Drum Voice will be reset to the setting of new Drum Voice.

(3-1-4) CHANNEL AFTER TOUCH

STATUS	1101nnnn (DnH)	n = 0 ~ 15 VOICE CHANNEL NUMBER
VALUE	0vvvvvvv	v = 0 ~ 127 AFTER TOUCH VALUE

(3-1-5) PITCH BEND CHANGE

STATUS	1110nnnn (EnH)	n = 0 ~ 15 VOICE CHANNEL NUMBER
LSB	0vvvvvvv	PITCH BEND CHANGE LSB
MSB	0vvvvvvv	PITCH BEND CHANGE MSB

14 bit resolution

MSB	
00000000B (00H)	minimum value
01000000B (40H)	center value
01111111B (7FH)	maximum Value

(3-1-6) CONTROL CHANGE

STATUS	1011nnnn (BnH)	n = 0 ~ 15 VOICE CHANNEL NUMBER
CONTROL NUMBER	0ccccccc	
CONTROL VALUE	0vvvvvvv	

* The CONTROL NUMBER to be transmitted.

c = 0	BANK SEL MSB	; v = 0 :XG NORMAL, 64 :SFX NORMAL, 126 :XG SFX KIT, 127 :XG DRUM	
c = 32	BANK SEL LSB	; v = 0 - 127	*3
c = 1	MODULATION	; v = 0 - 127	*2
c = 7	MAIN VOLUME	; v = 0 - 127	
c = 10	PANPOT	; v = 0 - 127	
c = 71	HARMONIC CONTENT	; v = 0:-64 - 64:0 - 127:+63	*2
c = 72	RELEASE TIME	; v = 0:-64 - 64:0 - 127:+63	*2
c = 73	ATTACK TIME	; v = 0:-64 - 64:0 - 127:+63	*2
c = 74	BRIGHTNESS	; v = 0:-64 - 64:0 - 127:+63	*2
c = 91	EFFECT SEND LEVEL 1	; v = 0 - 127	
c = 93	EFFECT SEND LEVEL 3	; v = 0 - 127	
c = 94	EFFECT SEND LEVEL 4	; v = 0 - 127 (Only when Connection = 1 (System))	

* The CONTROL NUMBER to be received.

c = 0	BANK SEL MSB	; v = 0 :XG NORMAL, 64 :SFX NORMAL, 126 :XG SFX KIT, 127 :XG DRUM	
c = 32	BANK SEL LSB	; v = 0 - 127	
c = 1	MODULATION	; v = 0 - 127	*2
c = 5	PORTAMENTO TIME	; v = 0 - 127	*2
c = 6	DATA ENTRY MSB	; v = 0 - 127	*1
c = 38	DATA ENTRY LSB	; v = 0 - 127	*1
c = 7	MAIN VOLUME	; v = 0 - 127	
c = 10	PANPOT	; v = 0 - 127	
c = 11	EXPRESSION	; v = 0 - 127	
c = 16	AC1 CONTROLLER	; v = 0 - 127	*2
c = 64	SUSTAIN SWITCH	; v = 0-63:OFF , 64-127:ON	*2
c = 65	PORTAMENTO SWITCH	; v = 0-63:OFF , 64-127:ON	*2
c = 66	SOSTENUTO	; v = 0-63:OFF , 64-127:ON	*2
c = 67	SOFT PEDAL	; v = 0-63:OFF , 64-127:ON	*2
c = 71	HARMONIC CONTENT	; v = 0:-64 - 64:0 - 127:+63	*2
c = 72	RELEASE TIME	; v = 0:-64 - 64:0 - 127:+63	*2
c = 73	ATTACK TIME	; v = 0:-64 - 64:0 - 127:+63	*2
c = 74	BRIGHTNESS	; v = 0:-64 - 64:0 - 127:+63	*2
c = 84	PORTAMENT CONTROL	; v = 0 - 127	*2
c = 91	EFFECT SEND LEVEL 1	; v = 0 - 127	
c = 93	EFFECT SEND LEVEL 3	; v = 0 - 127	
c = 94	EFFECT SEND LEVEL 4	; v = 0 - 127(Only when Connection = 1 (System))	
c = 96	DATA ENTRY INC	; v = 127	*1
c = 97	DATA ENTRY DEC	; v = 127	*1

*1 Used only to set the parameter specified by RPN
*2 Not valid for rhythm voices

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*3 When MSB is other than 0 or 127, this is 0.
   When MSB = 0, this is 0,1,3,5,8,12,14,16,17,18,19,20,24,25,27,28,32,33,34,35,36,37,38,39,40,
       41,42,43,45,64,65,66,67,68,69,70,71,72,73,96,97,98,99,100,101
   When MSB = 127, this is 0.

MODULATION controls the depth of vibrato.

PORTAMENTO TIME adjusts the speed of the pitch change if the Portamento Switch = ON. A setting of
0 produces the shortest portamento time, and 127 produces the longest portamento time.

For consistency with the GMx Portamento Control
Standard, this value is valid only for the Portamento Switch (Ctr#65).

PANPOT produces change relative to the preset value of the voice, both for melody voices and for rhythm
voices.

For PORTAMENTO CONTROL, the portamento time is always fixed at 0.

EFFECT SEND LEVEL 1 controls the Reverb send.
EFFECT SEND LEVEL 3 controls the Chorus send.
EFFECT SEND LEVEL 4 controls the Variation send.

HARMONIC CONTENT adjusts the resonance specified by the Voice. This is a relative parameter, and
specifies an increase or decrease centered at 64. Higher values will produce a more distinctive tone. For
some voices, the effective range maybe less than the range of the setting.

RELEASE TIME adjusts the envelope release time specified by the Voice. This is a relative parameter, and
specifies an increase or decrease centered at 64.

ATTACK TIME adjusts the envelope attack time specified by the Voice. This is a relative parameter, and
specifies an increase or decrease centered at 64.

BRIGHTNESS adjusts the cutoff frequency specified by the Voice. This is a relative parameter, and
specifies an increase or decrease centered at 64. Decreasing the value will make the sound more mellow.
For some voices, the effective range may be less than the range of the setting.

The following Bank Select related operations will all occur when a Program Change is received.
Bank Select MSB:60h-6Fh are not sounded on models which do not support GMx, but since on the QY70
these are for future expansion of melodic voices, they will be sounded for the present by MSB00h.
If Bank Select MSB is other than 0,40H, 60H-6FH, 7EH, or 7FH, voice Off will be selected.
If Bank Select MSB = 0,40H, 60H-60FH, 7EH or 7FH is selected, unsupported BANK SELECT LSB
numbers will be ignored.

(3-2) CHANNEL MODE MESSAGES

STATUS	1011nnnn (BnH)	n = 0 ~ 15 VOICE CHANNEL NUMBER
CONTROL NUMBER	0ccccccc	c = CONTROL NUMBER
CONTROL VALUE	0vvvvvvv	v = DATA VALUE

(3-2-1) ALL SOUND OFF (CONTROL NUMBER = 78H , DATA VALUE = 0)

Turns off the sound of all currently sounding notes on the corresponding channel. The status of channel
messages such as Note On and Hold On is also turned off.

(3-2-2) RESET ALL CONTROLLERS (CONTROL NUMBER = 79H , DATA VALUE = 0)

Resets the values of the following controllers.

PITCH BEND CHANGE	0 (center)
AFTER TOUCH	0 (minimum)
MODULATION	0 (off)
AC1 CONTROLLER	0 (minimum)
EXPRESSION	127 (maximum)
SUSTAIN SWITCH	0 (off)
PORTAMENTO SWITCH	1 (on)
SOSTENUTO SWITCH	0 (off)

SOFT PEDAL	0 (off)
NRPN	Un-set status. Internal data will not change.
RPN	Un-set status. Internal data will not change.
PORTAMENT CONTROL	reset

The following data will not change.
PROGRAM CHANGE, BANK SELECT MSB/LSB, VOLUME, PAN.
HARMONIC CONTENT, RELEASE TIME, ATTACK TIME, BRIGHTNESS, DRY SEND LEVEL,
EFFECT SEND LEVEL 1, EFFECT SEND LEVEL 3, EFFECT SEND LEVEL 4,
PITCH BEND SENSITIBITY, FINE TUNING, COURSE TUNING

(3-2-3) ALL NOTE OFF (CONTROL NUMBER = 7BH , DATA VALUE = 0)

Turns off all notes of the corresponding channel which are on. However if Sustain or Sostenuto are on,
the sound will continue until these are turned off.

(3-2-4) OMNI MODE OFF (CONTROL NUMBER = 7CH , DATA VALUE = 0)

Performs the same processing as when ALL NOTE OFF is received. Sets the VOICE RECEIVE CHANNEL
to OMNI OFF and CHANNEL = 1.

(3-2-5) OMNI MODE ON (CONTROL NUMBER = 7DH , DATA VALUE = 0)

Performs the same processing as when ALL NOTE OFF is received. Does not set OMNI ON. Sets the
VOICE RECEIVE CHANNEL to OMNI ON.

(3-2-6) MONO (CONTROL NUMBER = 7EH , DATA VALUE = 0)

Performs the same processing as when All SOUND OFF is received, and if the 3rd byte (mono number) is
in the range 0—16, sets the corresponding channel to Mode 4 (m=1).
If in the VOICE MODE, Mode 2 (m=1) is also possible, according to the VOICE RECEIVE CHANNEL.

(3-2-7) POLY (CONTROL NUMBER = 7FH , DATA VALUE = 0)

Performs the same processing as when ALL SOUND OFF is received, and sets the corresponding
channel to Mode 3.
When in the VOICE MODE, Mode 1 is also possible, according to the VOICE RECEIVE CHANNEL.

(3-3) REGISTERED PARAMETER NUMBER

STATUS	1011nnnn (BnH)	n = 0 ~ 15 VOICE CHANNEL NUMBER
LSB	01100100 (64H)	
RPN LSB	0ppppppp	p = RPN LSB (Refer to the table on the following page.)
MSB	01100101 (65H)	
RPN MSB	0qqqqqqq	q = RPN MSB (Refer to the table on the following page.)
DATA ENTRY MSB	00000110 (06H)	
DATA VALUE	0mmmmmmm	m = Data Value
DATA ENTRY LSB	00100110 (26H)	
DATA VALUE	0lllllll	l = Data Value

First transmit an RPN MSB and RPN LSB to specify the parameter that is to be controlled, then use Data
Entry to set the value of the specified parameter.

RPN LSB	MSB	D.ENTRY MSB	LSB	PARAMETER NAME	DATA RANGE
00H	00H	mmH	—	PITCH BEND SENSITIVITY	00H - 18H (0 - 24 semitones)
01H	00H	mmH	llH	MASTER FINE TUNE	(mmH,llH) = (00H,00H) - (40H,00H) - (7FH,7FH) (-8192*100/8192) - 0 - (+8192*100/8192)
02H	00H	mmH	—	MASTER COARSE TUNE	28H - 40H - 58H (-24 - 0 - +24 semitones)
7FH	7FH	—	—	RPN RESET	Set to a condition in which the RPN number is unspecified. Internal settings will not change.

(3-4) NON-REGISTERED PARAMETER NUMBER

STATUS	1011nnnn (BnH)	n = 0 ~ 15 VOICE CHANNEL NUMBER
LSB	01100010 (62H)	
RPN LSB	0ppppppp	p = NRPN LSB (Refer to the table on the following page.)
MSB	01100011 (63H)	
RPN MSB	0qqqqqqq	q = NRPN MSB (Refer to the table on the following page.)
DATA ENTRY MSB	00000110 (06H)	
DATA VALUE	0mmmmmmm	m = Data Value

First transmit an NRPN MSB and NRPN LSB to specify the parameter that is to be controlled, then use Data Entry to set the value of the specified parameter.

NRPN		D.ENTRY		PARAMETER NAME	DATA RANGE
MSB	LSB	MSB	LSB		
01H	08H	mmH	—	VIBRATO RATE	00H - 40H - 7FH (-64 - 0 - +63)
01H	09H	mmH	—	VIBRATO DEPTH	00H - 40H - 7FH (-64 - 0 - +63)
01H	0AH	mmH	—	VIBRATO DELAY	00H - 40H - 7FH (-64 - 0 - +63)
01H	20H	mmH	—	FILTER CUTOFF FREQUENCY	00H - 40H - 7FH (-64 - 0 - +63)
01H	21H	mmH	—	FILTER RESONANCE	00H - 40H - 7FH (-64 - 0 - +63)
01H	63H	mmH	—	EG ATTACK TIME	00H - 40H - 7FH (-64 - 0 - +63)
01H	64H	mmH	—	EG DECAY TIME	00H - 40H - 7FH (-64 - 0 - +63)
01H	66H	mmH	—	EG RELEASE TIME	00H - 40H - 7FH (-64 - 0 - +63)
14H	rrH	mmH	—	DRUM INST FILTER CUTOFF FREQ.	00H - 40H - 7FH (-64 - 0 - +63)
15H	rrH	mmH	—	DRUM INST FILTER RESONANCE	00H - 40H - 7FH (-64 - 0 - +63)
16H	rrH	mmH	—	DRUM INST AEG ATTACK RATE	00H - 40H - 7FH (-64 - 0 - +63)
17H	rrH	mmH	—	DRUM INST AEG DECAY RATE	00H - 40H - 7FH (-64 - 0 - +63)
18H	rrH	mmH	—	DRUM INST PITCH COARSE	00H - 40H - 7FH (-64 - 0 - +63)
19H	rrH	mmH	—	DRUM INST PITCH FINE	00H - 40H - 7FH (-64 - 0 - +63)
1AH	rrH	mmH	—	DRUM INST LEVEL	00H - 7FH (0 - maximum)
1CH	rrH	mmH	—	DRUM INST PANPOT	00H, 01H - 40H - 7FH (random, left - center - right)
1DH	rrH	mmH	—	DRUM INST REVERB SEND LEVEL	00H - 7FH (0 - maximum)
1EH	rrH	mmH	—	DRUM INST CHORUS SEND LEVEL	00H - 7FH (0 - maximum)
1FH	rrH	mmH	—	DRUM INST VARIATION SEND LEVEL	00H - 7FH (0 - maximum)

MSB 14h-1Fh (for drum) are valid only if the channel is set to Drum Set Mode.
rrH : drum instrument note number

(3-5) SYSTEM REAL TIME MESSAGES
(3-5-1) ACTIVE SENSING

STATUS	11111110	(FEH)

Transmitted at intervals of approximately 200 msec.

Once this message is received, SENSING will begin. If neither STATUS nor DATA messages are received for an interval longer that approximately 350 msec, the MIDI RECEIVE BUFFER will be cleared, and all sounding notes and SUSTAIN SWITCH will be forced off. Also, data for each of the controls will be reset to specific values.

(3-6) SYSTEM EXCLUSIVE MESSAGE
(3-6-1) UNIVERSAL NON REALTIME MESSAGE
(3-6-1-1) GENERAL MIDI MODE ON
F0H 7EH 7FH 09H 01H F7H

The following controller values will be reset.

VOLUME	100
PAN	Center
PROGRAM CHANGE	1 (Grandpno)
BANK SELECT MSB	0

REVERB DEPTH	4
PITCH BEND CHANGE	0 (center)
MODULATION	0 (off)
EXPRESSION	127 (maximum)
SUSTAIN SWITCH	0 (off)
SOSTENUTO SWITCH	0 (off)
RPN	Un-set status.
PORTAMENT CONTROL	reset
MIDI MASTER VOLUME	127 (maximum)
PITCH BEND SENSITIBITY	02 (2 semitones)
FINE TUNING	0
COURSE TUNING	0

(3-6-2) UNIVERSAL REALTIME MESSAGE
(3-6-2-1) MIDI MASTER VOLUME
F0H 7FH 7FH 04H 01H llH mmH F7H

Modifies the MASTER VOLUME value.
The value of mm is used as the MIDI Master Volume (the ll value is ignored).

(3-6-3) PARAMETER CHANGE
(3-6-3-1) MIDI MASTER TUNING
F0H 43H 1nH 27H 30H 00H 00H mmH llH ccH F7H

Modifies the MASTER TUNE value.
The values of mm and ll are used as the MIDI Master Tuning.
(n and cc values are ignored.)

$$T = M*200/256-100$$

Where T : actual tuning value (-99 — +99)
       M : a one-byte value with MSB of "mm" bits 0-3, and LSB of "ll" bits 0-3.

(3-6-3-2) XG SYSTEM ON

11110000	F0	Exclusive status
01000011	43	YAMAHA ID
0001nnnn	1n	device Number
01001100	4C	Model ID
0aaaaaaa	00	Address High
0aaaaaaa	00	Address Mid
0aaaaaaa	7E	Address Low
00000000	00	Data
11110111	F7	End of Exclusive

When On is received, the SYSTEM MODE will be changed to XG.
Since approximately 50 ms is required in order to execute this message, an appropriate interval must be allowed before the next message.
Controllers will be reset, and all Multi Part and Effect data of the attached table, together with the values of all data of All System that are noted as (XG), will be reset to the Default values.

(3-6-3-3) XG PARMETER CHANGE

11110000	F0	Exclusive status
01000011	43	YAMAHA ID
0001nnnn	1n	device Number
01001100	4C	Model ID
0aaaaaaa	aaaaaaa	Address High
0aaaaaaa	aaaaaaa	Address Mid
0aaaaaaa	aaaaaaa	Address Low
0ddddddd	ddddddd	Data
I	I	
11110111	F7	End of Exclusive

For parameters with a Data Size of 2 or 4, the corresponding amount of data will be transmitted.
For Addresses and Byte Counts, refer to the attached tables.

The following four types are transmitted and received. (Transmitted only if a Parameter Change Request is received.)

    System Data
    Multi Effect Data   (ignored in Voice Mode)
    Multi Part Data   (ignored in Voice Mode)
    Drums Setup Data

(3-6-4) BULK DUMP
(3-6-4-1) XG BULK DUMP

11110000	F0	Exclusive status
01000011	43	YAMAHA ID
0000nnnn	0n	device Number
01001100	4C	Model ID
0bbbbbbb	bbbbbbb	ByteCount
0bbbbbbb	bbbbbbb	ByteCount
0aaaaaaa	aaaaaaa	Address High
0aaaaaaa	aaaaaaa	Address Mid
0aaaaaaa	aaaaaaa	Address Low
00000000	00	.Data
|	|	
0ccccccc	ccccccc	Check-sum
11110111	F7	End of Exclusive

For Addresses and Byte Counts, refer to the attached tables.
Check sum is the value which produces a lower 7 bits of zero when the Byte Count, Start Address, Data, and the Check-sum itself are added.
513 bytes or more must not be transmitted at once. Thus, if a Dump Request for 513 or more bytes is received, the date will be divided into packets of 512 bytes or less, and transmitted at an appropriate timing interval (120 msec or longer).

The following five types are transmitted and received. (Transmitted only if a Bulk Dump Request is received.)

    System Data
    Multi Effect Data (for each module)
    Multi Part Data (for each part)
    Drums Setup Data (for each note)
    System Information (transmitted only)

(3-6-5) DUMP REQUEST
(3-6-5-1) XG DUMP REQUEST

11110000	F0	Exclusive status
01000011	43	YAMAHA ID
0010nnnn	2n	device Number
01001100	4C	Model ID
0aaaaaaa	aaaaaaa	Address High
0aaaaaaa	aaaaaaa	Address Mid
0aaaaaaa	aaaaaaa	Address Low
11110111	F7	End of Exclusive

For Addresses and Byte Counts, refer to the attached tables.

The following four types are received.
    System Data
    Multi Effect Data (for each module)
    Multi Part Data (for each part)
    Drums Setup Data (for each note)

(3-6-6) XG PARAMETER REQUEST

11110000	F0	Exclusive status
01000011	43	YAMAHA ID
0011nnnn	3n	device Number
01001100	4C	Model ID
0aaaaaaa	aaaaaaa	Address High
0aaaaaaa	aaaaaaa	Address Mid
0aaaaaaa	aaaaaaa	Address Low
11110111	F7	End of Exclusive

For Addresses and Byte Counts, refer to the attached tables.

The following four types are received.
    System Data
    Multi Effect Data
    Multi Part Data
    Drums Setup Data

(4) Diagram of connections between the Keyboard/ Switch block, Sequencer block, and Tone Generator block
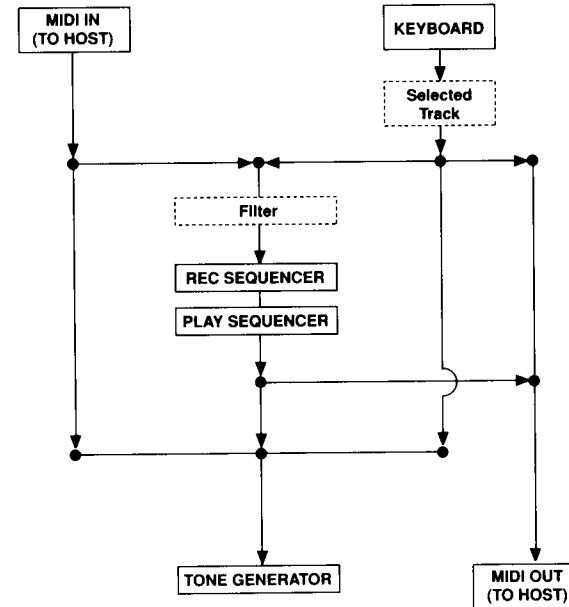
When PC1, PC2 or, Mac is selected with the HOST SELECT switch, data will be transmitted and received via the TO HOST connector.
In this case, MIDI data received via the MIDI IN connector will re-transmitted to the TO HOST connector, data received via the TO HOST connector will be re-transmitted to the MIDI OUT connector.

■ Sequencer part

(1) TRANSMIT FLOW

```
MIDI ◄──┬─── CHANNEL VOICE MESSAGE
OUT     │        NOTE ON/OFF              9nH
        │        KEY'S AFTER TOUCH        AnH
        │        CONTROL CHANGE           BnH
        │        PROGRAM CHANGE           CnH
        │        CHANNEL AFTER TOUCH      DnH
        │        PITCH BEND CHANGE        EnH
        │
        ├─── CHANNEL MODE MESSAGE
        │        ALL SOUND OFF            BnH 78H
        │        RESET ALL CONTROLLERS    BnH 79H
        │        LOCAL CONTROL            BnH 7AH
        │        OMNI MODE OFF            BnH 7CH
        │        OMNI MODE ON             BnH 7DH
        │        MONO MODE ON             BnH 7EH
        │        POLY MODE ON             BnH 7FH
        │
        ├─── SYSTEM EXCLUSIVE MESSAGE F0H ........ F7H
        │  SW1
        │  ─□─── SYSTEM REALTIME MESSAGE
        │          TIMING CLOCK           F8H
        │          START                  FAH
        │          CONTINUE               FBH
        │          STOPFCH
        │
        │       ─── SYSTEM COMMON MESSAGE
        │             SONG POSITION POINTER F2H
        │             SONG SELECT          F3H
        │
        ├─────── SYSTEM EXCLUSIVE MESSAGE
        ├─────── IDENTITY REPLY      F0H 7EH 7FH 06H 02H 43H 00H 41H ddH ddH 00H 00H 00H 01H F7
        │        <BULK DUMP>
        ├─────── SONG              F0H 43H 00H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        ├─────── PATTERN           F0H 43H 00H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        ├─────── SETUP             F0H 43H 00H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        ├─────── INFOMATION        F0H 43H 00H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        │        <PARAMATER CHANGE>
        └─────── SYSTEM            F0H 43H 10H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
```

SW1□ MIDI Control
        Transmission can be turned On/Off.

(2) RECEIVE FLOW

```
        SW1
MIDI ──►─□──┬── <CHANNEL VOICE MESSAGE>
IN          │      NOTE OFF               8nH
            │      NOTE ON/OFF            9nH
            │      KEY'S AFTER TOUCH      AnH
            │      CONTROL CHANGE         BnH
            │      PROGRAM CHANGE         CnH
            │      CHANNEL AFTER TOUCH    DnH
            │      PITCH BEND CHANGE      EnH
            │
            ├── CHANNEL MODE MESSAGE
            │      ALL SOUND OFF          BnH 78H
            │      RESET ALL CONTROLLERS  BnH 79H
            │      LOCAL CONTROL          BnH 7AH
            │      OMNI MODE OFF          BnH 7CH
            │      OMNI MODE ON           BnH 7DH
            │      MONO MODE ON           BnH 7EH
            │      POLY MODE ON           BnH 7FH
            │
            └── SYSTEM EXCLUSIVE MESSAGE F0H ........ F7H
   SW3
   ─□────── TIMING CLOCK             F8H

   SW2
   ─□────── SYSTEM REALTIME MESSAGE
                START                FAH
                CONTINUE             FBH
                STOP                 FCH

            ─── SYSTEM COMMON MESSAGE
                  SONG POSITION POINTER F2H
                  SONG SELECT        F3H

        ┌──── SYSTEM EXCLUSIVE MESSAGE
        ├──── IDENTITY REQUEST     F0H 7EH 0nH 06H 01H F7H
        │     <BULK DUMP>
        ├──── SONG                 F0H 43H 00H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        ├──── PATTERN              F0H 43H 00H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        ├──── SETUP                F0H 43H 00H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        ├──── INFOMATION           F0H 43H 00H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        │     <PARAMATER CHANGE>
        ├──── SYSTEM               F0H 43H 10H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        ├──── COMMAND              F0H 43H 10H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        │     <BULK DUMP REQUEST>
        ├──── SONG                 F0H 43H 20H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        ├──── PATTERN              F0H 43H 20H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        ├──── SETUP                F0H 43H 20H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        ├──── ALL                  F0H 43H 20H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        ├──── INFOMATION           F0H 43H 20H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        │     <PARAMATER REQUEST>
        ├──── SYSTEM               F0H 43H 30H 5FH bbH bbH aaH aaH aaH ddH.....ddH ccH F7H
        └──── SECTION CONTROL      F0H 43H 7EH 00H ssH ddH F7H
```

SW1□ Input Filter
        Reception can be turned on/off according to the Input Filter settings.

SW2□ MIDI Control
        Reception can be turned On/Off.

SW3□ MIDI Sync
        Select whether timing will be determined by the Internal clock, or by MIDI Clock
        messages received at MIDI IN.

(3) TRANSMIT/RECEIVE DATA

(3-1) CHANNEL VOICE MESSAGE

Transmitted only during recording and playback.
Transmission channel can be turned On/Off and the transmit channel set for each track.

Received only during recording. All Channel are always received.
During MULTI TRACK RECORD, data of MIDI CH 0-15 will be recorded separately onto tracks 1-16.

* In RECORD MODE, recording is normally omni on.
  However, during MULTI TRACK RECORD, this will be omni off, and data of MIDI CH 0-15 will be recorded separately onto tracks 1-16.

(3-1-1) NOTE OFF

STATUS	1000nnnn (8nH)	n = 0 ~ 15 TRACK CHANNEL NUMBER
NOTE NUMBER	0kkkkkkk	k = 0 (C-2) ~ 127 (G8)
VELOCITY	0vvvvvvv	v is ignored

Only recorded.
During playback, converted into 9nH kkH 00H.

(3-1-2) NOTE ON/OFF

STATUS	1001nnnn (9nH)	n = 0 ~ 15 TRACK CHANNEL NUMBER
NOTE NUMBER	0kkkkkkk	k = 0 (C-2) ~ 127 (G8)
VELOCITY	0vvvvvvv	(v≠0) NOTE ON
	00000000	(v=0) NOTE OFF

(3-1-3) POLYPHONIC KEY PRESSURE

STATUS	1010nnnn (AnH)	n = 0 ~ 15 TRACK CHANNEL NUMBER
NOTE NUMBER	0kkkkkkk	k = 0 (C-2) ~ 127 (G8)
VALUE	0vvvvvvv	v = 0 - 127

(3-1-4) CONTROL CHANGE

STATUS	1011nnnn (BnH)	n = 0 ~ 15 TRACK CHANNEL NUMBER
CONTROL NUMBER	0ccccccc	
CONTROL VALUE	0vvvvvvv	

All Control Change messages are recorded and played back.

(3-1-5) PROGRAM CHANGE

STATUS	1100nnnn (CnH)	n = 0 ~ 15 TRACK CHANNEL NUMBER
PROGRAM NUMBER	0ppppppp	p = 0 ~ 127

(3-1-6) CHANNEL PRESSURE

STATUS	1101nnnn (DnH)	n = 0 ~ 15 TRACK CHANNEL NUMBER
VALUE	0vvvvvvv	v = 0 ~ 127

(3-1-7) PITCH BEND CHANGE

STATUS	1110nnnn (EnH)	n = 0 ~ 15 TRACK CHANNEL NUMBER
LSB	0vvvvvvv	PITCH BEND LSB 0 ~ 127
MSB	0vvvvvvv	PITCH BEND MSB 0 ~ 127

(3-2) CHANNEL MODE MESSAGE

The following messages are recorded and played back.

RESET ALL CONTROLLERS	BnH 78H
LOCAL CONTROL	BnH 7AH
OMNI MODE OFF	BnH 7CH
OMNI MODE ON	BnH 7DH
MONO MODE ON	BnH 7EH
POLY MODE ON	BnH 7FH

(3-3) SYSTEM COMMON MESSAGE

These are transmitted and received as Control Messages for QY70 functions.
They are not recorded as SEQUENCE DATA.

(3-3-1) SONG POSITION POINTER

STATUS	11110010 (F2H)	
LSB	0vvvvvvv	SONG POSITION LSB
MSB	0vvvvvvv	SONG POSITION MSB

Transmitted when you move to a different measure in the SONG PLAY Mode.
Received when in SONG PLAY Standby.

(3-3-2) SONG SELECT

STATUS	11110011 (F3H)	
SONG NUMBER	0sssssss	SONG NUMBER (PATTERN NUMBER in the PATTERN Mode)

In the SONG PLAY Mode, this will be transmitted when a SONG is switched.
In the PATTERN PLAY Mode, this will be transmitted when a PATTERN is switched.
When in SONG PLAY Mode Standby, PATTERN PLAY Mode Standby, and PLAY, this message is received.
When received in the PATTERN PLAY Mode, the PATTERN will change.

(3-4) SYSTEM REAL TIME MESSAGE

Not recorded as Sequence Data.

(3-4-1) TIMING CLOCK

STATUS	11111000 (F8H)

You can select whether the internal clock will be used as the Timing Clock, or whether Timing Clock messages from the MIDI IN will be used.
Transmission and reception can be turned On/Off.

(3-4-2) START

STATUS	11111010 (FAH)

Transmission/Reception can be turned On/Off.

(3-4-3) CONTINUE

STATUS	11111011 (FBH)

Transmission/Reception can be turned On/Off.

(3-4-4) STOP

STATUS	11111100 (FCH)

Transmission/Reception can be turned On/Off.

(3-5) SYSTEM EXCLUSIVE MESSAGE

All System Exclusive Messages are recorded and played back.
Even if time intervals existed within the actual data that was received, the entire message between F0 and F7 will be recorded into one timing location.
For playback, an interval time can be specified for each 1K bytes.

(3-6) SYSTEM EXCLUSIVE MESSAGE

In the QY70, the following Exclusive Messages can be used.
The following data, during Standby for SONG MODE, PATTERN MODE, will be transmitted and received as the QY70's internal data.
When RECORDING, it will be recorded as Sequence Data.

(3-6-1) UNIVERSAL NON REALTIME MESSAGE

(3-6-1-1) IDENTITY REQUEST (Received only)

F0H 7EH 0nH 06H 01H F7H (n is device number however, the QY70 receives when in OMNI.)

(3-6-1-2) IDENTITY REPLY (Transmitted only)

F0H 7EH 7FH 06H 02H 43H 00H 41H ddH ddH 00H 00H 00H 01H F7H
dd;Device Number Code   QY70 = 02H,55H

(3-6-2) SECTION CONTROL

11110000	F0	Exclusive status
01000011	43	YAMAHA ID
01111110	7E	Style
00000000	00	Section Control
0sssssss	ss	Section
0ddddddd	dd	On/Off
11110111	F7	End of Exclusive

ss=08H-0EH, dd=on is received, and the PATTERN will be changed to the QY70's sections INTRO, MAIN A, MAIN B, FILL AB, FILL BA, ENDING, and BLANK respectively.

(3-6-3) BULK DUMP and PARAMATER CHANGE

The following 3 types of data are received and transmitted by the QY70.
(1) Bulk Dump SEQ Data	SONG DATA,PATTERN DATA
(2) Bulk Dump Data	SETUP DATA,SONG INFORMATION,PATTERN INFORMATION
(3) Parameter Change	BULK MODE ON/OFF,CLEAR SONG,CLEAR PATTERN

Requests are the following 2 types.
(4) Bulk Dump Request	SONG DATA,PATTERN DATA,SETUP DATA, SONG INFORMATION,PATTERN INFORMATION
(5) Parameter Change Request	BULK MODE ON/OFF,CLEAR SONG,CLEAR PATTERN

(3-6-3-1) Bulk Dump SEQ DATA

The format for transmission and reception of SONG DATA and PATTERN DATA.
The data size for one transmission or reception is 147 byte.
Long sequencer files will be divided before 147 bytes, separated, and transmitted.
8bit original data will be converted into 7bit MIDI data.
Refer to <Table 1-9 >for Address and Data size.

11110000	F0	Exclusive status
01000011	43	YAMAHA ID
00000000	00	substatus
01011111	5F	model ID
00000001	01	ByteCount MSB (The data size is fixed at 147 bytes.)
00010011	13	ByteCount LSB
0aaaaaaa	aaaaaaa	Address High
0aaaaaaa	aaaaaaa	Address Mid
0aaaaaaa	aaaaaaa	Address Low

0ddddddd	ddddddd	data
0ddddddd	ddddddd	data
0ccccccc	ccccccc	Check-sum
11110111	F7	End Of Exclusive

(3-6-3-2) Bulk Dump DATA

The format for transmission and reception of SETUP DATA, SONG INFORMATION and PATTERN INFORMATION.

Refer to <Table 1-9> for Address and Data size.

11110000	F0	Exclusive status
01000011	43	YAMAHA ID
00000000	00	substatus
01011111	5F	model ID
0bbbbbbb	bbbbbbb	ByteCount MSB
0bbbbbbb	bbbbbbb	ByteCount LSB
0aaaaaaa	aaaaaaa	Address High
0aaaaaaa	aaaaaaa	Address Mid
0aaaaaaa	aaaaaaa	Address Low
0ddddddd	ddddddd	data
0ddddddd	ddddddd	data
0ccccccc	ccccccc	Check-sum
11110111	F7	End Of Exclusive

(3-6-3-3) Parameter Change

The format for executing BULK MODE ON/OFF, CLEAR SONG and CLEAR PATTERN.

11110000	F0	Exclusive status
01000011	43	YAMAHA ID
00010000	10	substatus
01011111	5F	model ID
0aaaaaaa	aaaaaaa	Address High
0aaaaaaa	aaaaaaa	Address Mid
0aaaaaaa	aaaaaaa	Address Low
0ddddddd	ddddddd	data
11110111	F7	End Of Exclusive

(3-6-3-4) Bulk Dump Request

The Bulk Data request of SONG DATA, PATTERN DATA, SETUP DATA, SONG INFORMATION, and PATTERN INFORMATION.

11110000	F0	Exclusive status
01000011	43	YAMAHA ID
00100000	20	substatus
01011111	5F	model ID
0aaaaaaa	aaaaaaa	Address High
0aaaaaaa	aaaaaaa	Address Mid
0aaaaaaa	aaaaaaa	Address Low
11110111	F7	End Of Exclusive

(3-6-3-5) Parameter Change Request

Parameter request for BULK MODE ON/OFF.

11110000	F0	Exclusive status
01000011	43	YAMAHA ID
00110000	30	substatus
01011111	5F	model ID
0aaaaaaa	aaaaaaa	Address High
0aaaaaaa	aaaaaaa	Address Mid
0aaaaaaa	aaaaaaa	Address Low
11110111	F7	End Of Exclusive

<Table 1-1>

Parmeter Base Address

	Parameter Change Address (H) (M) (L)			Description
SYSTEM	00	00	00	System
	00	00	7D	Drum Setup Reset
	00	00	7E	XG System On
	00	00	7F	All Parameter Reset
INFORMATION	01	00	00	System Information
EFFECT 1	02	01	00	Effect1 (Reverb,Chorus,Variation)
	02	40	00	Reserved
	:	:	:	:
MULTI PART	08	00	00	Multi Part 1
	:	:	:	:
	08	0F	00	Multi Part 32
	08	10	00	Reserved
	:	:	:	:
DRUM	30	18	00	Drum Setup 1
	31	18	00	Drum Setup 2
	32	18	00	Reserved
	:	:	:	:
	3F	nn	nn	Reserved

→	Address	Parameter
	:	:
	3n 18 00	note number 24
	3n 19 00	note number 25
	:	:
	3n 54 00	note number 84

< Table 1-2 >

MIDI Parameter Change table (SYSTEM)

Address (H)	Size (H)	Data (H)	Prameter Name	Description	Default value (H)
00 00 00	4	0000	Master Tune	-102.4..+102.3[cent]	00 04 00 00
01		..07FF		1st bit3-0→bit15-12	(0400)
02				2nd bit3-0→bit11-8	(not reset by XG or GM on)
03				3rd bit3-0→bit7-4	
				4th bit3-0→bit3-0	
04	1	00..7F	Master Volume	0..127	7F
05	1	00..7F	Not Used		
06	1	28..58	Transpose	-24..+24[semitones]	40
7D	n		Drum Setup Reset	n=Drum Setup Number	
7E		00	XG System On	00=XG Sytem on (receive only)	
7F		00	All Parameter Reset	00=on (receive only)	

TOTAL SIZE 06

< Table 1-3 >

MIDI Parameter table (System information)

Address (H)	Size (H)	Data (H)	Prameter Name	Description	Default value (H)
01 00 00	E	20..7F	Model Name	("QY70　")	
:					
0E	1	00			
0F	1	00	XG Support Level	0..127	

TOTAL SIZE 10
(Transmitted in response to a Dump Request. Not received. Bulk Dump Only)

< Table 1-4 >

MIDI Parameter Change table (EFFECT 1)

Address (H)	Size (H)	Data (H)	Prameter Name	Description	Default value (H)
02 01 00	2	00..7F	Reverb Type MSB	Refer to Effect Type List	01 (=HALL1)
		00..7F	Reverb Type LSB	00 : basic type	00
02	1	00..7F	Reverb Parameter 1	Refer to Ef. Parameter List	depends on Reverb type
03	1	00..7F	Reverb Parameter 2	Refer to Ef. Parameter List	depends on Reverb type
04	1	00..7F	Reverb Parameter 3	Refer to Ef. Parameter List	depends on Reverb type
05	1	00..7F	Reverb Parameter 4	Refer to Ef. Parameter List	depends on Reverb type
06	1	00..7F	Reverb Parameter 5	Refer to Ef. Parameter List	depends on Reverb type
07	1	00..7F	Reverb Parameter 6	Refer to Ef. Parameter List	depends on Reverb type
08	1	00..7F	Reverb Parameter 7	Refer to Ef. Parameter List	depends on Reverb type
09	1	00..7F	Reverb Parameter 8	Refer to Ef. Parameter List	depends on Reverb type
0A	1	00..7F	Reverb Parameter 9	Refer to Ef. Parameter List	depends on Reverb type
0B	1	00..7F	Reverb Parameter 10	Refer to Ef. Parameter List	depends on Reverb type
0C	1	00..7F	Reverb Return	-∞..0..+6dB (0..96..127)	60
0D	1	01..7F	Reverb Pan	L63..C..R63 (1..64..127)	40

TOTAL SIZE 0E

Address (H)	Size (H)	Data (H)	Prameter Name	Description	Default value (H)
02 01 10	1	00..7F	Reverb Parameter 11	Refer to Ef. Parameter List	depends on Reverb type
11	1	00..7F	Reverb Parameter 12	Refer to Ef. Parameter List	depends on Reverb type
12	1	00..7F	Reverb Parameter 13	Refer to Ef. Parameter List	depends on Reverb type
13	1	00..7F	Reverb Parameter 14	Refer to Ef. Parameter List	depends on Reverb type
14	1	00..7F	Reverb Parameter 15	Refer to Ef. Parameter List	depends on Reverb type
15	1	00..7F	Reverb Parameter 16	Refer to Ef. Parameter List	depends on Reverb type

TOTAL SIZE 6

Address (H)	Size (H)	Data (H)	Prameter Name	Description	Default value (H)
02 01 20	2	00..7F	Chorus Type MSB	Refer to Effect Type List	41 (=Chorus1)
		00..7F	Chorus Type LSB	00 : basic type	00
22	1	00..7F	Chorus Parameter 1	Refer to Ef. Parameter List	depends on Chorus Type
23	1	00..7F	Chorus Parameter 2	Refer to Ef. Parameter List	depends on Chorus Type
24	1	00..7F	Chorus Parameter 3	Refer to Ef. Parameter List	depends on Chorus Type
25	1	00..7F	Chorus Parameter 4	Refer to Ef. Parameter List	depends on Chorus Type
26	1	00..7F	Chorus Parameter 5	Refer to Ef. Parameter List	depends on Chorus Type
27	1	00..7F	Chorus Parameter 6	Refer to Ef. Parameter List	depends on Chorus Type
28	1	00..7F	Chorus Parameter 7	Refer to Ef. Parameter List	depends on Chorus Type
29	1	00..7F	Chorus Parameter 8	Refer to Ef. Parameter List	depends on Chorus Type
2A	1	00..7F	Chorus Parameter 9	Refer to Ef. Parameter List	depends on Chorus Type
2B	1	00..7F	Chorus Parameter 10	Refer to Ef. Parameter List	depends on Chorus Type
2C	1	00..7F	Chorus Return	-∞..0..+6dB (0..96..127)	60
2D	1	01..7F	Chorus Pan	L63..C..R63 (1..64..127)	40
2E	1	00..7F	Send Chorus To Reverb	-∞..0..+6dB (0..96..127)	00

TOTAL SIZE 0F

Address (H)	Size (H)	Data (H)	Prameter Name	Description	Default value (H)
02 01 30	1	00..7F	Chorus Parameter 11	Refer to Ef. Parameter List	depends on Chorus Type
31	1	00..7F	Chorus Parameter 12	Refer to Ef. Parameter List	depends on Chorus Type
32	1	00..7F	Chorus Parameter 13	Refer to Ef. Parameter List	depends on Chorus Type
33	1	00..7F	Chorus Parameter 14	Refer to Ef. Parameter List	depends on Chorus Type
34	1	00..7F	Chorus Parameter 15	Refer to Ef. Parameter List	depends on Chorus Type
35	1	00..7F	Chorus Parameter 16	Refer to Ef. Parameter List	depends on Chorus Type

TOTAL SIZE 6

Address (H)	Size (H)	Data (H)	Prameter Name	Description	Default value (H)
02 01 40	2	00..7F	Variation Type MSB	Refer to Ef. Type List	05 (=DELAY L,C,R)
		00..7F	Variation Type LSB	00 : basic type	00
42	2	00..7F	Variation Param 1 MSB	Refer to Ef. Parameter List	depends on vari. type
		00..7F	Variation Param 1 LSB	Refer to Ef. Parameter List	depends on vari. type
44	2	00..7F	Variation Param 2 MSB	Refer to Ef. Parameter List	depends on vari. type
		00..7F	Variation Param 2 LSB	Refer to Ef. Parameter List	depends on vari. type
46	2	00..7F	Variation Param 3 MSB	Refer to Ef. Parameter List	depends on vari. type
		00..7F	Variation Param 3 LSB	Refer to Ef. Parameter List	depends on vari. type
48	2	00..7F	Variation Param 4 MSB	Refer to Ef. Parameter List	depends on vari. type
		00..7F	Variation Param 4 LSB	Refer to Ef. Parameter List	depends on vari. type
4A	2	00..7F	Variation Param 5 MSB	Refer to Ef. Parameter List	depends on vari. type
		00..7F	Variation Param 5 LSB	Refer to Ef. Parameter List	depends on vari. type
4C	2	00..7F	Variation Param 6 MSB	Refer to Ef. Parameter List	depends on vari. type
		00..7F	Variation Param 6 LSB	Refer to Ef. Parameter List	depends on vari. type

Address (H)	Size (H)	Data (H)	Prameter Name	Description	Default value (H)
4E	2	00..7F	Variation Param 7 MSB	Refer to Ef. Parameter List	depends on vari. type
		00..7F	Variation Param 7 LSB	Refer to Ef. Parameter List	depends on vari. type
50	2	00..7F	Variation Param 8 MSB	Refer to Ef. Parameter List	depends on vari. type
		00..7F	Variation Param 8 LSB	Refer to Ef. Parameter List	depends on vari. type
52	2	00..7F	Variation Param 9 MSB	Refer to Ef. Parameter List	depends on vari. type
		00..7F	Variation Param 9 LSB	Refer to Ef. Parameter List	depends on vari. type
54	2	00..7F	Variation Param 10 MSB	Refer to Ef. Parameter List	depends on vari. type
		00..7F	Variation Param 10 LSB	Refer to Ef. Parameter List	depends on vari. type
56	1	00..7F	Variation Return	-∞..0..+6dB (0..96..127)	60
57	1	01..7F	Variation Pan	L63..C..R63 (1..64..127)	40
58	1	00..7F	Send Variation To Rev.	-∞..0..+6dB (0..96..127)	00
59	1	00..7F	Send Variation To Cho.	-∞..0..+6dB (0..96..127)	00
5A	1	00..01	Variation Connection	0:insertion,1:system	00
5B	1	00..1F	Variation Part	part1..32 (0..31) ,off (127)	7F
5C	1	01..7F	MW Variation Ctrl Depth	-63..+63	00
5D	1	01..7F	PB Variation Ctrl Depth	-63..+63	00
5E	1	01..7F	AT Variation Ctrl Depth	-63..+63	00
5F	1	01..7F	AC1 Variation CtrlDepth	-63..+63	00
60	1	01..7F	AC2 Variation CtrlDepth	-63..+63	00

TOTAL SIZE 21

Address (H)	Size (H)	Data (H)	Prameter Name	Description	Default value (H)
02 01 70	1	00..7F	Variation Parameter 11	option Parameter	depends on vari. type
71	1	00..7F	Variation Parameter 12	option Parameter	depends on vari. type
72	1	00..7F	Variation Parameter 13	option Parameter	depends on vari. type
73	1	00..7F	Variation Parameter 14	option Parameter	depends on vari. type
74	1	00..7F	Variation Parameter 15	option Parameter	depends on vari. type
75	1	00..7F	Variation Parameter 16	option Parameter	depends on vari. type

TOTAL SIZE 6

< Table 1-5 >

MIDI Parameter Change table (DISPLAY DATA)

Address (H)	Size (H)	Data (H)	Prameter Name	Description	Default value (H)
06 00 00	20	20..7F	MESSAGE WINDOW	32..127 (ASCII CHARACTER)	
⋮ 1F					

TOTAL SIZE 20

07 00 00	30	00..7F	BITMAP WINDOW Data0	0..127 (ASCII CHARACTER)	
⋮ 2F			BITMAP WINDOW Data47		

TOTAL SIZE 30

The following shows the relationship of data and the display.
7 horizontally arranged elements are combined to create 1 byte of data.
When the elements are displayed, the "bit" that is displayed is 1, and the "bit" that is not displayed is 0.
The arrangement for the display's data is below.

Data 32-47 only uses bit 6 and bit 5.

< Table 1-6 >

MIDI Parameter Change table (MULTI PART)

Address (H)	Size (H)	Data (H)	Prameter Name	Description	Default value (H)
08 nn 00	1	00..20	Element Reserve	0..32	0 (Part10) ,2 (Others)
nn 01	1	00..7F	Bank Select MSB	0..127	7F (Part10) ,00 (Others)
nn 02	1	00..7F	Bank Select LSB	0..127	00
nn 03	1	00..7F	Program Number	1..128	00
nn 04	1	00..0F	Rcv Channel	0..15;1..16,127;off	Part No. 7F
nn 05	1	00..01	Mono/Poly Mode	0:mono,1:poly	01
nn 06	1	00..02	Same Note Number Key On Assign	0:single 1:multi 2:inst (for DRUM)	01
nn 07	1	00..02	Part Mode	0:normal 1..3:drum thru,drum1..2	00 (other than Part 10) 01 (Part10)
nn 08	1	28..58	Note Shift	-24..+24[semitones]	40
nn 09	2	00..FF	Detune	-12.8..+12.7[Hz] 1st bit3..0→bit7..4 2nd bit3..0→bit3..0	08 00 (80)
nn 0A					
nn 0B	1	00..7F	Volume	0..127	64
nn 0C	1	00..7F	Velocity Sense Depth	0..127	40
nn 0D	1	00..7F	Velocity Sense Offset	0..127	40
nn 0E	1	00..7F	Pan	0:random L63..C..R63 (1..64..127)	40
nn 0F	1	00..7F	Note Limit Low	C-2..G8	00
nn 10	1	00..7F	Note Limit High	C-2..G8	7F
nn 11	1	00..7F	Dry Level	0..127	7F
nn 12	1	00..7F	Chorus Send	0..127	00
nn 13	1	00..7F	Reverb Send	0..127	28
nn 14	1	00..7F	Variation Send	0..127	00
nn 15	1	00..7F	Vibrato Rate	-64..+63	40
nn 16	1	00..7F	Vibrato Depth	-64..+63	40
nn 17	1	00..7F	Vibrato Delay	-64..+63	40
nn 18	1	00..7F	Filter Cutoff Frequency	-64..+63	40
nn 19	1	00..7F	Filter Resonance	-64..+63	40
nn 1A	1	00..7F	EG Attack Time	-64..+63	40
nn 1B	1	00..7F	EG Decay Time	-64..+63	40
nn 1C	1	00..7F	EG Release Time	-64..+63	40
nn 1D	1	28..58	MW Pitch Control	-24..+24[semitones]	40
nn 1E	1	00..7F	MW Filter Control	-9600..+9450[cent]	40
nn 1F	1	00..7F	MW Amplitude Control	-64..+63	40
nn 20	1	00..7F	MW LFO PMod Depth	0..127	0A
nn 21	1	00..7F	MW LFO FMod Depth	0..127	00
nn 22	1	00..7F	MW LFO AMod Depth	0..127	00
nn 23	1	28..58	Bend Pitch Control	-24..+24[semitones]	42
nn 24	1	00..7F	Bend Filter Control	-9600..+9450[cent]	40
nn 25	1	00..7F	Bend Amplitude Control	-64..+63	40
nn 26	1	00..7F	Bend LFO PMod Depth	0..127	00
nn 27	1	00..7F	Bend LFO FMod Depth	0..127	00
nn 28	1	00..7F	Bend LFO AMod Depth	0..127	00

TOTAL SIZE 29

nn 30	1	00..01	Not Used		
nn 31	1	00..01	Not Used		
nn 32	1	00..01	Not Used		
nn 33	1	00..01	Not Used		
nn 34	1	00..01	Not Used		

QY70

Address (H)	Size (H)	Data (H)	Prameter Name	Description	Default value (H)
nn 35	1	00..01	Not Used		
nn 36	1	00..01	Not Used		
nn 37	1	00..01	Not Used		
nn 38	1	00..01	Not Used		
nn 39	1	00..01	Not Used		
nn 3A	1	00..01	Not Used		
nn 3B	1	00..01	Not Used		
nn 3C	1	00..01	Not Used		
nn 3D	1	00..01	Not Used		
nn 3E	1	00..01	Not Used		
nn 3F	1	00..01	Not Used		
nn 40	1	00..01	Not Used		
nn 41	1	00..7F	Not Used		
nn 42	1	00..7F	Not Used		
nn 43	1	00..7F	Not Used		
nn 44	1	00..7F	Not Used		
nn 45	1	00..7F	Not Used		
nn 46	1	00..7F	Not Used		
nn 47	1	00..7F	Not Used		
nn 48	1	00..7F	Not Used		
nn 49	1	00..7F	Not Used		
nn 4A	1	00..7F	Not Used		
nn 4B	1	00..7F	Not Used		
nn 4C	1	00..7F	Not Used		
nn 4D	1	28..58	Ch's AT Pitch Control	-24..+24[semitones]	40
nn 4E	1	00..7F	Ch's AT Filter Control	-9600..+9450[cent]	40
nn 4F	1	00..7F	Ch's AT Amp. Control	-100..+100[%]	40
nn 50	1	00..7F	Ch's AT LFO PMod Depth	0..127	00
nn 51	1	00..7F	Ch's AT LFO FMod Depth	0..127	00
nn 52	1	00	Ch's AT LFO AMod Depth	0..127	00
nn 53	1	28..58	Not Used		
nn 54	1	00..7F	Not Used		
nn 55	1	00..7F	Not Used		
nn 56	1	00..7F	Not Used		
nn 57	1	00..7F	Not Used		
nn 58	1	00	Not Used		
nn 59	1	00..5F	Not Used		
nn 5A	1	28..58	Not Used		
nn 5B	1	00..7F	Not Used		
nn 5C	1	00..7F	Not Used		
nn 5D	1	00..7F	Not Used		
nn 5E	1	00..7F	Not Used		
nn 5F	1	00..7F	Not Used		
nn 60	1	00..5F	Not Used		
nn 61	1	28..58	Not Used		
nn 62	1	00..7F	Not Used		
nn 63	1	00..7F	Not Used		
nn 64	1	00..7F	Not Used		
nn 65	1	00..7F	Not Used		
nn 66	1	00..7F	Not Used		
nn 67	1	00..01	Portamento Switch	off/on	00
nn 68	1	00..7F	Portamento Time	0..127	00
nn 69	1	00..7F	Pitch EG Initial Level	-64..+63	40
nn 6A	1	00..7F	Pitch EG Attack Time	-64..+63	40
nn 6B	1	00..7F	Pitch EG Release Level	-64..+63	40
nn 6C	1	00..7F	Pitch EG Release Time	-64..+63	40
nn 6D	1	00..7F	Not Used		
nn 6E	1	00..7F	Not Used		

TOTAL SIZE 3F

nn = PartNumber
For the Drum Part, the following parameters have no effect.
- Bank Select LSB
- Portamento
- Soft Pedal
- Mono/Poly
- Scale Tuning
- Pitch EG

< Table 1-7 >

MIDI Parameter Change table (DRUM SETUP)

Address (H)	Size (H)	Data (H)	Prameter Name	Description	Default value (H)
3n rr 00	1	00..7F	Pitch Coarse	-64..+63	relative effect 00
3n rr 01	1	00..7F	Pitch Fine	-64..+63[cent]	relative effect 00
3n rr 02	1	00..7F	Level	0..127	absolute effect XG Drum1
3n rr 03	1	00..7F	Alternate Group	0:off,1..127	absolute effect XG Drum1
3n rr 04	1	00..7F	Pan	0:random L63..C..R63 (1..64..127)	absolute effect XG Drum1
3n rr 05	1	00..7F	Reverb Send Level	0..127	absolute effect XG Drum1
3n rr 06	1	00..7F	Chorus Send Level	0..127	absolute effect XG Drum1
3n rr 07	1	00..7F	Variation Send Level	0..127	absolute effect XG Drum1
3n rr 08	1	00..01	Key Assign	0;single,1;multi	absolute effect XG Drum1
3n rr 09	1	00..01	Rcv Note Off	off/on (Invalid for voices for which GMx specifies Note-off recognition.)	absolute effect XG Drum1
3n rr 0A	1	00..01	Rcv Note On	off/on	absolute effect XG Drum1
3n rr 0B	1	00..7F	Filter Cutoff Frequency	-64..63	relative effect 00
3n rr 0C	1	00..7F	Filter Resonance	-64..63	relative effect 00
3n rr 0D	1	00..7F	EG Attack Rate	-64..63	relative effect 00
3n rr 0E	1	00..7F	EG Decay1 Rate	-64..63	relative effect 00
3n rr 0F	1	00..7F	EG Decay2 Rate	-64..63	relative effect 00

TOTAL SIZE 10

n:Drum Setup Number - 1
rr:note number (0D - 5B)
When XG SYSTEM ON or GM SYSTEM ON messages are received, all Drum Setup Parameters will be initialized.
Drum Setup Reset message allows individual Drum Setup Parameters to be initialized.

< Table 1-8 >

Effect Type List

REVERB TYPE   [ ] is the order of display

TYPE MSB		TYPE LSB		
DEC	HEX	00	01	02
000	0	[00]No Effect		
001	1	[01]Rev Hall 1	[02]Rev Hall 2	
002	2	[03]Rev Room1	[04]Rev Room 2	[05]Rev Room 3
003	3	[06]Rev Stage 1	[07]Rev Stage 2	
004	4	[08]Rev Plate		
005	5	No Effect		
:	:	:		
015	F	No Effect		
016	10	[09]Rev WhiteRm		
017	11	[10]Rev Tunnel		
018	12	No Effect		
019	13	[11]Rev Basement		
020	14	No Effect		
:	:	:		
127	7F	No Effect		

CHORUS TYPE

TYPE MSB DEC	HEX	TYPE LSB 00	01	02	08
000	0	[00]No Effect			
001	1	No Effect			
:	:	:			
064	40	No Effect			
065	41	[01]Chorus 1	[02]Chorus 2	[03]Chorus 3	[04]Chorus 4
066	42	[05]Celeste 1	[06]Celeste 2	[07]Celeste 3	[08]Celeste 4
067	43	[09]Flanger 1	[10]Flanger 2		[11]Flanger 3
068	46	No Effect			
069	45	No Effect			
:					
127	7F	No Effect			

VARIATION TYPE (0~63)

TYPE MSB DEC	HEX	TYPE LSB 00	01	02
000	0	[00]No Effect		
001	1	[01]Rev Hall 1	[02]Rev Hall 2	
002	2	[03]Rev Room 1	[04]Rev Room 2	[05]Rev Room 3
003	3	[06]Rev Stage1	[07]Rev Stage2	
004	4	[08]Rev Plate		
005	5	[09]DelayL,C,R		
006	6	[10]Delay L,R		
007	7	[11]Echo		
008	8	[12]CrossDelay		
009	9	[13]EarlyRef.1	[14]EarlyRef.2	
010	A	[15]GateReverb		
011	B	[16]ReversGate		
012	C	No Effect (sys) ,THRU (ins)		
:	:	:		
019	13	No Effect (sys) ,THRU (ins)		
020	14	[17]RevKaraok1	[18]RevKaraok2	[19]RevKaraok3
021	15	No Effect (sys) ,THRU (ins)		
:	:	:		
063	3F	No Effect (sys) ,THRU (ins)		

VARIATION TYPE (64~127)

TYPE MSB DEC	HEX	TYPE LSB 00	01	02	08
064	40	[43]THRU			
065	41	[20]Chorus 1	[21]Chorus 2	[22]Chorus 3	[23]Chorus 4
066	42	[24]Celeste 1	[25]Celeste 2	[26]Celeste 3	[27]Celeste 4
067	43	[28]Flanger 1	[29]Flanger 2	[30]Flanger 3	
068	44	[31]Symphonic			
069	45	[32]RotarySp.			
070	46	[33]Tremolo			
071	47	[34]Auto PAN			
072	48	[35]Phaser 1		[36]Phaser 2	
073	49	[37]Distortion			
074	4A	[38]Overdrive			
075	4B	[39]G-Amp.Sim.			
076	4C	[40]3 Band EQ			
077	4D	[41]2 Band EQ			
078	4E	[42]Auto Wah			
079	4F	THRU			
:	:	:			
127	7F	THRU			

< Table 1-9 >
SEQUENCER PARAMATER ADDRESS

	Address H	M	L	Size	Description	Recv	Trans	Req
SYSTEM	00	00	00	1	bulk mode on/off	O	O	O
BULK DUMP SONG	01	00	00	147	song 1	O	O	O
	:	:	:		:			
	01	13	00		song 20	O	O	O
	01	7f	00		song all	X	X	O
BULK DUMP PATTERN	02	00	00	147	use pattern 1	O	O	O
		:			:			
	02	3f	00		user pattern 64	O	O	O
	02	7f	00		user pattern all	X	X	O
BULK DUMP SETUP	03	00	00	32	setup parameter	O	O	O
BULK DUMP ALL	04	00	00	147	all data	X	X	O
INFORMATION	05	00	00	320	song	X	O	O
	05	01	00	512	pattern 1 - 32	X	O	O
	05	01	01	512	pattern 33 - 64	X	O	O
COMMAND	08	00	00	1	clear song	O	X	X
	08	01	00		clear pattern	O	X	X

O : Yes   X : No

Decimal↔Hexadecimal↔Binary Correspondence List

Many MIDI messages listed in the MIDI Data Format section are expressed in hexadecimal or binary numbers. Hexadecimal numbers may include the letter "H" as a suffix. The letter "n" indicates a certain whole number.
The chart below lists the corresponding decimal number for each hexadecimal/binary number.

Decimal	Hexadecimal	Binary	Decimal	Hexadecimal	Binary	Decimal	Hexadecimal	Binary	Decimal	Hexadecimal	Binary
0	00	0000 0000	32	20	0010 0000	64	40	0100 0000	96	60	0110 0000
1	01	0000 0001	33	21	0010 0001	65	41	0100 0001	97	61	0110 0001
2	02	0000 0010	34	22	0010 0010	66	42	0100 0010	98	62	0110 0010
3	03	0000 0011	35	23	0010 0011	67	43	0100 0011	99	63	0110 0011
4	04	0000 0100	36	24	0010 0100	68	44	0100 0100	100	64	0110 0100
5	05	0000 0101	37	25	0010 0101	69	45	0100 0101	101	65	0110 0101
6	06	0000 0110	38	26	0010 0110	70	46	0100 0110	102	66	0110 0110
7	07	0000 0111	39	27	0010 0111	71	47	0100 0111	103	67	0110 0111
8	08	0000 1000	40	28	0010 1000	72	48	0100 1000	104	68	0110 1000
9	09	0000 1001	41	29	0010 1001	73	49	0100 1001	105	69	0110 1001
10	0A	0000 1010	42	2A	0010 1010	74	4A	0100 1010	106	6A	0110 1010
11	0B	0000 1011	43	2B	0010 1011	75	4B	0100 1011	107	6B	0110 1011
12	0C	0000 1100	44	2C	0010 1100	76	4C	0100 1100	108	6C	0110 1100
13	0D	0000 1101	45	2D	0010 1101	77	4D	0100 1101	109	6D	0110 1101
14	0E	0000 1110	46	2E	0010 1110	78	4E	0100 1110	110	6E	0110 1110
15	0F	0000 1111	47	2F	0010 1111	79	4F	0100 1111	111	6F	0110 1111
16	10	0001 0000	48	30	0011 0000	80	50	0101 0000	112	70	0111 0000
17	11	0001 0001	49	31	0011 0001	81	51	0101 0001	113	71	0111 0001
18	12	0001 0010	50	32	0011 0010	82	52	0101 0010	114	72	0111 0010
19	13	0001 0011	51	33	0011 0011	83	53	0101 0011	115	73	0111 0011
20	14	0001 0100	52	34	0011 0100	84	54	0101 0100	116	74	0111 0100
21	15	0001 0101	53	35	0011 0101	85	55	0101 0101	117	75	0111 0101
22	16	0001 0110	54	36	0011 0110	86	56	0101 0110	118	76	0111 0110
23	17	0001 0111	55	37	0011 0111	87	57	0101 0111	119	77	0111 0111
24	18	0001 1000	56	38	0011 1000	88	58	0101 1000	120	78	0111 1000
25	19	0001 1001	57	39	0011 1001	89	59	0101 1001	121	79	0111 1001
26	1A	0001 1010	58	3A	0011 1010	90	5A	0101 1010	122	7A	0111 1010
27	1B	0001 1011	59	3B	0011 1011	91	5B	0101 1011	123	7B	0111 1011
28	1C	0001 1100	60	3C	0011 1100	92	5C	0101 1100	124	7C	0111 1100
29	1D	0001 1101	61	3D	0011 1101	93	5D	0101 1101	125	7D	0111 1101
30	1E	0001 1110	62	3E	0011 1110	94	5E	0101 1110	126	7E	0111 1110
31	1F	0001 1111	63	3F	0011 1111	95	5F	0101 1111	127	7F	0111 1111

- For example, 144 - 159(Decimal)/9nH/1001 0000 - 1001 1111(Binary) indicate the note-on messages for the channels 1 through 16 respectively. 176 - 191/BnH/1011 0000 - 1011 1111 indicate the control change messages for the channels 1 through 16 respectively. 192 - 207/CnH/1100 0000 - 1100 1111 indicate the program change messages for the channels 1 through 16 respectively. 240/F0H/1111 0000 is positioned at the beginning of data to indicate a system exclusive message. 247/F7H/1111 0111 is positioned at the end of the system exclusive message.
- aaH(Hexadecimal)/0aaaaaaa(Binary) indicates the data addresses. The data address consists of High, Mid and Low.
- bbH/0bbbbbbb indicates byte counts.
- ccH/0ccccccc indicates check sums.
- ddH/0ddddddd indicates data/value.

● Reverb Type

HALL1,2, ROOM1,2,3, STAGE1,2, PLATE

No.	Parameter	Range	Value	→Tbl	Control
1	Reverb Time	0.3 – 30.0s	0-69	table#4	
2	Diffusion	0 – 10	0-10		
3	Initial Delay	0 – 63	0-63	table#5	
4	HPF Cutoff	Thru – 8.0kHz	0-52	table#3	
5	LPF Cutoff	1.0k – Thru	34-60	table#3	
6					
7					
8					
9					
10	Dry/Wet	D63>W – D=W – D<W63	1-127		●
11	Rev Delay	0 – 63	0-63	table#5	
12	Density	0 – 3	0-3		
13	Er/ Rev Balance	E63>R – E=R – E<R63	1-127		
14					
15	Feedback Level	-63 – +63	1-127		
16					

WHITE ROOM, TUNNEL, BASEMENT

No.	Parameter	Range	Value	→Tbl	Control
1	Reverb Time	0.3 – 30.0s	0-69	table#4	
2	Diffusion	0 – 10	0-10		
3	Initial Delay	0 – 63	0-63	table#5	
4	HPF Cutoff	Thru – 8.0kHz	0-52	table#3	
5	LPF Cutoff	1.0k – Thru	34-60	table#3	
6	Width	0.5 – 10.2m	0-37	table#6	
7	Height	0.5 – 20.2m	0-73	table#6	
8	Depth	0.5 – 30.2m	0-104	table#6	
9	Wall Vary	0 – 30	0-30		
10	Dry/Wet	D63>W – D=W – D<W63	1-127		●
11	Rev Delay	0 – 63	0-63	table#5	
12	Density	0 – 3	0-3		
13	Er/ Rev Balance	E63>R – E=R – E<R63	1-127		
14					
15	Feedback Level	-63 – +63	1-127		
16					

● Chorus Type

CHORUS1,2,3,4, CELESTE1,2,3,4

No.	Parameter	Range	Value	→Tbl	Control
1	LFO Frequency	0.00 – 39.7Hz	0-127	table#1	
2	LFO PM Depth	0 – 127	0-127		
3	Feedback Level	-63 – +63	1-127		
4	Delay Offset	0 – 127	0-127	table#2	
5					
6	EQ Low Frequency	50Hz – 2.0kHz	8-40	table#3	
7	EQ Low Gain	-12 – +12dB	52-76		
8	EQ High Frequency	500Hz – 16.0kHz	28-58	table#3	
9	EQ High Gain	-12 – +12dB	52-76		
10	Dry/Wet	D63>W – D=W – D<W63	1-127		●
11					
12					
13					
14					
15	Input Mode	mono/stereo	0-1		
16					

FLANGER1,2,3

No.	Parameter	Range	Value	→Tbl	Control
1	LFO Frequency	0.00 – 39.7Hz	0-127	table#1	
2	LFO Depth	0 – 127	0-127		
3	Feedback Level	-63 – +63	1-127		
4	Delay Offset	0 – 63	0-63	table#2	
5					
6	EQ Low Frequency	50Hz – 2.0kHz	8-40	table#3	
7	EQ Low Gain	-12 – +12dB	52-76		
8	EQ High Frequency	500Hz – 16.0kHz	28-58	table#3	
9	EQ High Gain	-12 – +12dB	52-76		
10	Dry/Wet	D63>W – D=W – D<W63	1-127		●
11					
12					
13					
14	LFO Phase Difference	-180 – +180deg	4-124	resolution=3deg	
15					
16					

● Variation Type

HALL1,2, ROOM1,2,3, STAGE1,2, PLATE

No.	Parameter	Range	Value	→Tbl	Control
1	Reverb Time	0.3 – 30.0s	0-69	table#4	
2	Diffusion	0 – 10	0-10		
3	Initial Delay	0 – 63	0-63	table#5	
4	HPF Cutoff	Thru – 8.0kHz	0-52	table#3	
5	LPF Cutoff	1.0k – Thru	34-60	table#3	
6					
7					
8					
9					
10	Dry/Wet	D63>W – D=W – D<W63	1-127		●
11	Rev Delay	0 – 63	0-63	table#5	
12	Density	0 – 3	0-3		
13	Er/ Rev Balance	E63>R – E=R – E<R63	1-127		
14					
15	Feedback Level	-63 – +63	1-127		
16					

DELAY L,C,R

No.	Parameter	Range	Value	→Tbl	Control
1	Lch Delay	0.1 – 715.0ms	1-7150		
2	Rch Delay	0.1 – 715.0ms	1-7150		
3	Cch Delay	0.1 – 715.0ms	1-7150		
4	Feedback Delay	0.1 – 715.0ms	1-7150		
5	Feedback Level	-63 – +63	1-127		
6	Cch Level	0 – 127	0-127		
7	High Damp	0.1 – 1.0	1-10		
8					
9					
10	Dry/Wet	D63>W – D=W – D<W63	1-127		●
11					
12					
13	EQ Low Frequency	50Hz – 2.0kHz	8-40	table#3	
14	EQ Low Gain	-12 – +12dB	52-76		
15	EQ High Frequency	500Hz – 16.0kHz	28-58	table#3	
16	EQ High Gain	-12 – +12dB	52-76		

DELAY L,R

No.	Parameter	Range	Value	→Tbl	Control
1	Lch Delay	0.1 – 715.0ms	1-7150		
2	Rch Delay	0.1 – 715.0ms	1-7150		
3	Feedback Delay 1	0.1 – 715.0ms	1-7150		
4	Feedback Delay 2	0.1 – 715.0ms	1-7150		
5	Feedback Level	-63 – +63	1-127		
6	High Damp	0.1 – 1.0	1-10		
7					
8					
9					
10	Dry/Wet	D63>W – D=W – D<W63	1-127		●
11					
12					
13	EQ Low Frequency	50Hz – 2.0kHz	8-40	table#3	
14	EQ Low Gain	-12 – +12dB	52-76		
15	EQ High Frequency	500Hz – 16.0kHz	28-58	table#3	
16	EQ High Gain	-12 – +12dB	52-76		

ECHO

No.	Parameter	Range	Value	→Tbl	Control
1	Lch Delay1	0.1 – 355.0ms	1-3550		
2	Lch Feedback Level	-63 – +63	1-127		
3	Rch Delay1	0.1 – 355.0ms	1-3550		
4	Rch Feedback Level	-63 – +63	1-127		
5	High Damp	0.1 – 1.0	1-10		
6	Lch Delay2	0.1 – 355.0ms	1-3550		
7	Rch Delay2	0.1 – 355.0ms	1-3550		
8	Delay2 Level	0 – 127	0-127		
9					
10	Dry/Wet	D63>W – D=W – D<W63	1-127		●
11					
12					
13	EQ Low Frequency	50Hz – 2.0kHz	8-40	table#3	
14	EQ Low Gain	-12 – +12dB	52-76		
15	EQ High Frequency	500Hz – 16.0kHz	28-58	table#3	
16	EQ High Gain	-12 – +12dB	52-76		

* ● mark : Indicates that AC1 (Assignable Controller 1) can be used to control the parameter when VARIATION = INS.
* No.* : This number corresponds to the PARAMETER numbers in <Table 1-4> (→ page 41)
* →Tbl* : Refer to the "Data/Value Tables" on page 47.

REVERB

Exclusive		Effect Type	Description
MSB	LSB		
00	00	NO EFFECT	Effect turned off.
01	00	HALL1	Reverb simulating the resonance of a hall.
01	01	HALL2	Reverb simulating the resonance of a hall.
02	00	ROOM1	Reverb simulating the resonance of a room.
02	01	ROOM2	Reverb simulating the resonance of a room.
02	02	ROOM3	Reverb simulating the resonance of a room.
03	00	STAGE1	Reverb appropriate for a solo instrument.
03	01	STAGE2	Reverb appropriate for a solo instrument.
04	00	PLATE	Reverb simulating a metal plate reverb unit.
10	00	WHITE ROOM	A unique short reverb with a bit of initial delay.
11	00	TUNNEL	Simulation of a tunnel space expanding to left and right.
13	00	BASEMENT	A bit of initial delay followed by reverb with a unique resonance.

CHORUS

Exclusive		Effect Type	Description
MSB	LSB		
00	00	NO EFFECT	Effect turned off.
41	00	CHORUS1	Conventional chorus program that adds natural spaciousness.
41	01	CHORUS2	Conventional chorus program that adds natural spaciousness.
41	02	CHORUS3	Conventional chorus program that adds natural spaciousness.
41	08	CHORUS4	Chorus with stereo input. The pan setting specified for the Part will also apply to the effect sound.
42	00	CELESTE1	A 3-phase LFO adds modulation and spaciousness to the sound.
42	01	CELESTE2	A 3-phase LFO adds modulation and spaciousness to the sound.
42	02	CELESTE3	A 3-phase LFO adds modulation and spaciousness to the sound.
42	08	CELESTE4	Celeste with stereo input. The pan setting specified for the Part will also apply to the effect sound.
43	00	FLANGER1	Adds a jet-airplane effect to the sound.
43	01	FLANGER2	Adds a jet-airplane effect to the sound.
43	08	FLANGER3	Adds a jet-airplane effect to the sound.

VARIATION

Exclusive		Effect Type	Description
MSB	LSB		
00	00	NO EFFECT	Effect turned off.
01	00	HALL1	Reverb simulating the resonance of a hall.
01	01	HALL2	Reverb simulating the resonance of a hall.
02	00	ROOM1	Reverb simulating the resonance of a room.
02	01	ROOM2	Reverb simulating the resonance of a room.
02	02	ROOM3	Reverb simulating the resonance of a room.
03	00	STAGE1	Reverb appropriate for a solo instrument.
03	01	STAGE2	Reverb appropriate for a solo instrument.
04	00	PLATE	Reverb simulating a metal plate reverb unit.
05	00	DELAY L, C, R	A program that creates three delay sounds; L, R, and C (center).
06	00	DELAY L, R	A program that creates two delay sounds; L and R. Two feedback delays are provided.
07	00	ECHO	Two delays (L and R) and independent feedback delays for L and R.
08	00	CROSS DELAY	A program that crosses the feedback of two delays.
09	00	EARLY REF1	An effect that produces only the early reflection component of reverb.
09	01	EARLY REF2	An effect that produces only the early reflection component of reverb.
0A	00	GATE REVERB	A simulation of gated reverb.
0B	00	REVERSE GATE	A program that simulates gated reverb played backwards.
14	00	KARAOKE 1	A delay with feedback of the same types as used for karaoke reverb.
14	01	KARAOKE 2	A delay with feedback of the same types as used for karaoke reverb.
14	02	KARAOKE 3	A delay with feedback of the same types as used for karaoke reverb.
41	00	CHORUS1	Conventional chorus program that adds natural spaciousness.
41	01	CHORUS2	Conventional chorus program that adds natural spaciousness.
41	02	CHORUS3	Conventional chorus program that adds natural spaciousness.
41	08	CHORUS4	Chorus with stereo input.
42	00	CELESTE1	A 3-phase LFO adds modulation and spaciousness to the sound.
42	01	CELESTE2	A 3-phase LFO adds modulation and spaciousness to the sound.
42	02	CELESTE3	A 3-phase LFO adds modulation and spaciousness to the sound.
42	08	CELESTE4	Celeste with stereo input.
43	00	FLANGER1	Adds a jet-airplane effect to the sound.
43	01	FLANGER2	Adds a jet-airplane effect to the sound.
43	08	FLANGER3	Adds a jet-airplane effect to the sound.
44	00	SYMPHONIC	A multi-phase version of CELESTE.
45	00	ROTARY SPEAKER	A simulation of a rotary speaker. You can use AC1 (assignable controller) etc. to control the speed of rotation.
46	00	TREMOLO	An effect that cyclically modulates the volume.
47	00	AUTO PAN	A program that cyclically moves that sound image to left and right, front and back.
48	00	PHASER1	Cyclically changes the phase to add modulation to the sound.
48	08	PHASER2	Phaser with stereo input.
49	00	DISTORTION	Adds a sharp-edged distortion to the sound.
4A	00	OVER DRIVE	Adds mild distortion to the sound.
4B	00	AMP SIMULATOR	A simulation of a guitar amp.
4C	00	3BAND EQ(MONO)	A mono EQ with adjustable LOW, MID, and HIGH equalizing.
4D	00	2BAND EQ(STEREO)	A stereo EQ with adjustable LOW and HIGH. Ideal for drum Parts.
4E	00	AUTO WAH(LFO)	Cyclically modulates the center frequency of a wah filter. With an AC1 etc. this can function as a pedal wah.
40	00	THRU	Bypass without applying an effect.

* Both MSB, LSB are hexadecimal. * The effect for LSB=0 is the basic type.

● Variation Type

CROSS DELAY

No.	Parameter	Range	Value	→Tbl	Control
1	L->R Delay	0.1 - 355.0ms	1-3550		
2	R->L Delay	0.1 - 355.0ms	1-3550		
3	Feedback Level	-63 - +63	1-127		
4	Input Select	L,R,L&R	0-2		
5	High Damp	0.1 - 1.0	1-10		
6					
7					
8					
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13	EQ Low Frequency	50Hz - 2.0kHz	8-40	table#3	
14	EQ Low Gain	-12 - +12dB	52-76		
15	EQ High Frequency	500Hz - 16.0kHz	28-58	table#3	
16	EQ High Gain	-12 - +12dB	52-76		

EARLY REF1,2

No.	Parameter	Range	Value	→Tbl	Control
1	Type	S-H, L-H, Rdm, Rvs, Plt, Spr	0-5		
2	Room Size	0.1 - 7.0	0-44	table#6	
3	Diffusion	0 - 10	0-10		
4	Initial Delay	0 - 63	0-63	table#5	
5	Feedback Level	-63 - +63	1-127		
6	HPF Cutoff	Thru - 8.0kHz	0-52		
7	LPF Cutoff	1.0k - Thru	34-60		
8					
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11	Liveness	0 - 10	0-10		
12	Density	0 - 3	0-3		
13	High Damp	0.1 - 1.0	1-10		
14					
15					
16					

GATE REVERB, REVERSE GATE

No.	Parameter	Range	Value	→Tbl	Control
1	Type	TypeA,TypeB	0-1		
2	Room Size	0.1 - 7.0	0-44	table#6	
3	Diffusion	0 - 10	0-10		
4	Initial Delay	0 - 63	0-63	table#5	
5	Feedback Level	-63 - +63	1-127		
6	HPF Cutoff	Thru - 8.0kHz	0-52		
7	LPF Cutoff	1.0k - Thru	34-60		
8					
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11	Liveness	0 - 10	0-10		
12	Density	0 - 3	0-3		
13	High Damp	0.1 - 1.0	1-10		
14					
15					
16					

KARAOKE1,2,3

No.	Parameter	Range	Value	→Tbl	Control
1	Delay Time	0 - 127	0-127	table#7	
2	Feedback Level	-63 - +63	1-127		
3	HPF Cutoff	Thru - 8.0kHz	0-52		
4	LPF Cutoff	1.0k - Thru	34-60		
5					
6					
7					
8					
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13					
14					
15					
16					

CHORUS1,2,3,4, CELESTE1,2,3,4

No.	Parameter	Range	Value	→Tbl	Control
1	LFO Frequency	0.00 - 39.7Hz	0-127	table#1	
2	LFO PM Depth	0 - 127	0-127		
3	Feedback Level	-63 - +63	1-127		
4	Delay Offset	0 - 127	0-127	table#2	
5					
6	EQ Low Frequency	50Hz - 2.0kHz	8-40	table#3	
7	EQ Low Gain	-12 - +12dB	52-76		
8	EQ High Frequency	500Hz - 16.0kHz	28-58	table#3	
9	EQ High Gain	-12 - +12dB	52-76		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13					
14					
15	Input Mode	mono/stereo	0-1		
16					

FLANGER1,2,3

No.	Parameter	Range	Value	→Tbl	Control
1	LFO Frequency	0.00 - 39.7Hz	0-127	table#1	
2	LFO Depth	0 - 127	0-127		
3	Feedback Level	-63 - +63	1-127		
4	Delay Offset	0 - 63	0-63	table#2	
5					
6	EQ Low Frequency	50Hz - 2.0kHz	8-40	table#3	
7	EQ Low Gain	-12 - +12dB	52-76		
8	EQ High Frequency	500Hz - 16.0kHz	28-58	table#3	
9	EQ High Gain	-12 - +12dB	52-76		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13					
14	LFO Phase Difference	-180 - +180deg	4-124	resolution=3deg	
15					
16					

SYMPHONIC

No.	Parameter	Range	Value	→Tbl	Control
1	LFO Frequency	0.00 - 39.7Hz	0-127	table#1	
2	LFO Depth	0 - 127	0-127		
3	Delay Offset	0 - 127	0-127	table#2	
4					
5					
6	EQ Low Frequency	50Hz - 2.0kHz	8-40	table#3	
7	EQ Low Gain	-12 - +12dB	52-76		
8	EQ High Frequency	500Hz - 16.0kHz	28-58	table#3	
9	EQ High Gain	-12 - +12dB	52-76		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13					
14					
15					
16					

ROTARY SPEAKER

No.	Parameter	Range	Value	→Tbl	Control
1	LFO Frequency	0.00 - 39.7Hz	0-127	table#1	●
2	LFO Depth	0 - 127	0-127		
3					
4					
5					
6	EQ Low Frequency	50Hz - 2.0kHz	8-40	table#3	
7	EQ Low Gain	-12 - +12dB	52-76		
8	EQ High Frequency	500Hz - 16.0kHz	28-58	table#3	
9	EQ High Gain	-12 - +12dB	52-76		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11					
12					
13					
14					
15					
16					

TREMOLO

No.	Parameter	Range	Value	→Tbl	Control
1	LFO Frequency	0.00 - 39.7Hz	0-127	table#1	●
2	AM Depth	0 - 127	0-127		
3	PM Depth	0 - 127	0-127		
4					
5					
6	EQ Low Frequency	50Hz - 2.0kHz	8-40	table#3	
7	EQ Low Gain	-12 - +12dB	52-76		
8	EQ High Frequency	500Hz - 16.0kHz	28-58	table#3	
9	EQ High Gain	-12 - +12dB	52-76		
10					
11					
12					
13					
14	LFO Phase Difference	-180 - +180deg	4-124	resolution=3deg	
15	Input Mode	mono/stereo	0-1		
16					

AUTO PAN

No.	Parameter	Range	Value	→Tbl	Control
1	LFO Frequency	0.00 - 39.7Hz	0-127	table#1	●
2	L/R Depth	0 - 127	0-127		
3	F/R Depth	0 - 127	0-127		
4	PAN Direction	L<->R,L->R,L<-R,Lturn,Rturn,L/R	0-5		
5					
6	EQ Low Frequency	50Hz - 2.0kHz	8-40	table#3	
7	EQ Low Gain	-12 - +12dB	52-76		
8	EQ High Frequency	500Hz - 16.0kHz	28-58	table#3	
9	EQ High Gain	-12 - +12dB	52-76		
10					
11					
12					
13					
14					
15					
16					

PHASER1,2

No.	Parameter	Range	Value	→Tbl	Control
1	LFO Frequency	0.00 - 39.7Hz	0-127	table#1	
2	LFO Depth	0 - 127	0-127		
3	Phase Shift Offset	0 - 127	0-127		
4	Feedback Level	-63 - +63	1-127		
5					
6	EQ Low Frequency	50Hz - 2.0kHz	8-40	table#3	
7	EQ Low Gain	-12 - +12dB	52-76		
8	EQ High Frequency	500Hz - 16.0kHz	28-58	table#3	
9	EQ High Gain	-12 - +12dB	52-76		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		●
11	Stage	6 - 10(phaser1) / 3 - 5(phaser2)	3-10		
12	Diffusion	Mono/Stereo	0-1		
13	LFO Phase Difference	180 - +180deg	4-124	Phaser2 only	
14					
15					
16					

DISTORTION, OVERDRIVE

No.	Parameter	Range	Value	→Tbl	Control
1	Drive	0 - 127	0-127		●
2	EQ Low Frequency	50Hz - 2.0kHz	8-40	table#3	
3	EQ Low Gain	-12 - +12dB	52-76		
4	LPF Cutoff	1.0k - Thru	34-60		
5	Output Level	0 - 127	0-127		
6					
7	EQ Mid Frequency	500Hz - 10.0kHz	28-54	table#3	
8	EQ Mid Gain	-12 - +12dB	52-76		
9	EQ Mid Width	1.0 - 12.0	10-120		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		
11	Edge(Clip Curve)	0 - 127	0-127	mid - sharp	
12					
13					
14					
15					
16					

GUITAR AMP SIMULATOR

No.	Parameter	Range	Value	→Tbl	Control
1	Drive	0 - 127	0-127		●
2	AMP Type	Off,Stack,Combo,Tube	0-3		
3	LPF Cutoff	1.0k - Thru	34-60	table#3	
4	Output Level	0 - 127	0-127		
5					
6					
7					
8					
9					
10	Dry/Wet	D63>W - D=W - D<W63	1-127		
11	Edge(Clip Curve)	0 - 127	0-127	mid - sharp	
12					
13					
14					
15					
16					

3-BAND EQ

No.	Parameter	Range	Value	→Tbl	Control
1	EQ Low Gain	-12 - +12dB	52-76		
2	EQ Mid Frequency	500Hz - 10.0kHz	28-54	table#3	
3	EQ Mid Gain	-12 - +12dB	52-76		
4	EQ Mid Width	1.0 - 12.0	10-120		
5	EQ High Gain	-12 - +12dB	52-76		
6	EQ Low Frequency	50Hz - 2.0kHz	8-40	table#3	
7	EQ High Frequency	500Hz - 16.0kHz	28-58	table#3	
8					
9					
10					
11					
12					
13					
14					
15					
16					

2-BAND EQ

No.	Parameter	Range	Value	→Tbl	Control
1	EQ Low Frequency	50Hz - 2.0kHz	8-40	table#3	
2	EQ Low Gain	-12 - +12dB	52-76		
3	EQ High Frequency	500Hz - 16.0kHz	28-58	table#3	
4	EQ High Gain	-12 - +12dB	52-76		
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

AUTO WAH

No.	Parameter	Range	Value	→Tbl	Control
1	LFO Frequency	0.00 - 39.7Hz	0-127	table#1	
2	LFO Depth	0 - 127	0-127		
3	Cutoff Frequency Offset	0 - 127	0-127		●
4	Resonance	1.0 - 12.0	10-120		
5					
6	EQ Low Frequency	50Hz - 2.0kHz	8-40	table#3	
7	EQ Low Gain	-12 - +12dB	52-76		
8	EQ High Frequency	500Hz - 16.0kHz	28-58	table#3	
9	EQ High Gain	-12 - +12dB	52-76		
10	Dry/Wet	D63>W - D=W - D<W63	1-127		
11					
12					
13					
14					
15					
16					

* ● mark : Indicates that AC1 (Assignable Controller 1) can be used to control the parameter when VARIATION = INS.
* No.* : This number corresponds to the PARAMETER numbers in <Table 1-4> (-> page 41)
* →Tbl** : Refer to the "Data/Value Tables" on page 47.

● Data/Value/Tables

Table#1 — LFO Frequency (Hz)

Data	Value	Data	Value	Data	Value
0	0.00	43	1.81	86	5.38
1	0.04	44	1.85	87	5.55
2	0.08	45	1.89	88	5.72
3	0.13	46	1.94	89	6.06
4	0.17	47	1.98	90	6.39
5	0.21	48	2.02	91	6.73
6	0.25	49	2.06	92	7.07
7	0.29	50	2.10	93	7.40
8	0.34	51	2.15	94	7.74
9	0.38	52	2.19	95	8.08
10	0.42	53	2.23	96	8.41
11	0.46	54	2.27	97	8.75
12	0.51	55	2.31	98	9.08
13	0.55	56	2.36	99	9.42
14	0.59	57	2.40	100	9.76
15	0.63	58	2.44	101	10.10
16	0.67	59	2.48	102	10.80
17	0.72	60	2.52	103	11.40
18	0.76	61	2.57	104	12.10
19	0.80	62	2.61	105	12.80
20	0.84	63	2.65	106	13.50
21	0.88	64	2.69	107	14.10
22	0.93	65	2.78	108	14.80
23	0.97	66	2.86	109	15.50
24	1.01	67	2.94	110	16.20
25	1.05	68	3.03	111	16.80
26	1.09	69	3.11	112	17.50
27	1.14	70	3.20	113	18.20
28	1.18	71	3.28	114	19.50
29	1.22	72	3.37	115	20.90
30	1.26	73	3.45	116	22.20
31	1.30	74	3.53	117	23.60
32	1.35	75	3.62	118	24.90
33	1.39	76	3.70	119	26.20
34	1.43	77	3.87	120	27.60
35	1.47	78	4.04	121	28.90
36	1.51	79	4.21	122	30.30
37	1.56	80	4.37	123	31.80
38	1.60	81	4.54	124	33.00
39	1.64	82	4.71	125	34.30
40	1.68	83	4.88	126	37.00
41	1.72	84	5.05	127	39.70
42	1.77	85	5.22		

Table#2 — Modulation Delay Offset (ms)

Data	Value	Data	Value	Data	Value
0	0.0	43	4.3	86	8.6
1	0.1	44	4.4	87	8.7
2	0.2	45	4.5	88	8.8
3	0.3	46	4.6	89	8.9
4	0.4	47	4.7	90	9.0
5	0.5	48	4.8	91	9.1
6	0.6	49	4.9	92	9.2
7	0.7	50	5.0	93	9.3
8	0.8	51	5.1	94	9.4
9	0.9	52	5.2	95	9.5
10	1.0	53	5.3	96	9.6
11	1.1	54	5.4	97	9.7
12	1.2	55	5.5	98	9.8
13	1.3	56	5.6	99	9.9
14	1.4	57	5.7	100	10.0
15	1.5	58	5.8	101	11.1
16	1.6	59	5.9	102	12.2
17	1.7	60	6.0	103	13.3
18	1.8	61	6.1	104	14.4
19	1.9	62	6.2	105	15.5
20	2.0	63	6.3	106	17.1
21	2.1	64	6.4	107	18.6
22	2.2	65	6.5	108	20.2
23	2.3	66	6.6	109	21.8
24	2.4	67	6.7	110	23.3
25	2.5	68	6.8	111	24.9
26	2.6	69	6.9	112	26.5
27	2.7	70	7.0	113	28.0
28	2.8	71	7.1	114	29.6
29	2.9	72	7.2	115	31.2
30	3.0	73	7.3	116	32.8
31	3.1	74	7.4	117	34.3
32	3.2	75	7.5	118	35.9
33	3.3	76	7.6	119	37.5
34	3.4	77	7.7	120	39.0
35	3.5	78	7.8	121	40.6
36	3.6	79	7.9	122	42.2
37	3.7	80	8.0	123	43.7
38	3.8	81	8.1	124	45.3
39	3.9	82	8.2	125	46.9
40	4.0	83	8.3	126	48.4
41	4.1	84	8.4	127	50.0
42	4.2	85	8.5		

Table#3 — EQ Frequency (Hz)

Data	Value	Data	Value
0	THRU(20)	43	2.8k
1	22	44	3.2k
2	25	45	3.6k
3	28	46	4.0k
4	32	47	4.5k
5	36	48	5.0k
6	40	49	5.6k
7	45	50	6.3k
8	50	51	7.0k
9	56	52	8.0k
10	63	53	9.0k
11	70	54	10.0k
12	80	55	11.0k
13	90	56	12.0k
14	100	57	14.0k
15	110	58	16.0k
16	125	59	18.0k
17	140	60	THRU(20.0k)
18	160		
19	180		
20	200		
21	225		
22	250		
23	280		
24	315		
25	355		
26	400		
27	450		
28	500		
29	560		
30	630		
31	700		
32	800		
33	900		
34	1.0k		
35	1.1k		
36	1.2k		
37	1.4k		
38	1.6k		
39	1.8k		
40	2.0k		
41	2.2k		
42	2.5k		

Table#4 — Reverb Time (s)

Data	Value	Data	Value
0	0.3	43	4.6
1	0.4	44	4.7
2	0.5	45	4.8
3	0.6	46	4.9
4	0.7	47	5.0
5	0.8	48	5.5
6	0.9	49	6.0
7	1.0	50	6.5
8	1.1	51	7.0
9	1.2	52	7.5
10	1.3	53	8.0
11	1.4	54	8.5
12	1.5	55	9.0
13	1.6	56	9.5
14	1.7	57	10.0
15	1.8	58	11.0
16	1.9	59	12.0
17	2.0	60	13.0
18	2.1	61	14.0
19	2.2	62	15.0
20	2.3	63	16.0
21	2.4	64	17.0
22	2.5	65	18.0
23	2.6	66	19.0
24	2.7	67	20.0
25	2.8	68	25.0
26	2.9	69	30.0
27	3.0		
28	3.1		
29	3.2		
30	3.3		
31	3.4		
32	3.5		
33	3.6		
34	3.7		
35	3.8		
36	3.9		
37	4.0		
38	4.1		
39	4.2		
40	4.3		
41	4.4		
42	4.5		

Table#5 — Delay Time (ms)

Data	Value	Data	Value	Data	Value
0	0.1	43	67.8	86	135.5
1	1.7	44	69.4	87	137.0
2	3.2	45	70.9	88	138.6
3	4.8	46	72.5	89	140.2
4	6.4	47	74.1	90	141.8
5	8.0	48	75.7	91	143.3
6	9.5	49	77.2	92	144.9
7	11.1	50	78.8	93	146.5
8	12.7	51	80.4	94	148.1
9	14.3	52	81.9	95	149.6
10	15.8	53	83.5	96	151.2
11	17.4	54	85.1	97	152.8
12	19.0	55	86.7	98	154.4
13	20.6	56	88.2	99	155.9
14	22.1	57	89.8	100	157.5
15	23.7	58	91.4	101	159.1
16	25.3	59	93.0	102	160.6
17	26.9	60	94.5	103	162.2
18	28.4	61	96.1	104	163.8
19	30.0	62	97.7	105	165.4
20	31.6	63	99.3	106	166.9
21	33.2	64	100.8	107	168.5
22	34.7	65	102.4	108	170.1
23	36.3	66	104.0	109	171.7
24	37.9	67	105.6	110	173.2
25	39.5	68	107.1	111	174.8
26	41.0	69	108.7	112	176.4
27	42.6	70	110.3	113	178.0
28	44.2	71	111.9	114	179.5
29	45.7	72	113.4	115	181.1
30	47.3	73	115.0	116	182.7
31	48.9	74	116.6	117	184.3
32	50.5	75	118.2	118	185.8
33	52.0	76	119.7	119	187.4
34	53.6	77	121.3	120	189.0
35	55.2	78	122.9	121	190.6
36	56.8	79	124.4	122	192.1
37	58.3	80	126.0	123	193.7
38	59.9	81	127.6	124	195.3
39	61.5	82	129.2	125	196.9
40	63.1	83	130.7	126	198.4
41	64.6	84	132.3	127	200.0
42	66.2	85	133.9		

Table#6 — Room Size (m)

Data	Value	Data	Value
0	0.1	43	6.8
1	0.3	44	7.0
2	0.4		
3	0.6		
4	0.7		
5	0.9		
6	1.0		
7	1.2		
8	1.4		
9	1.5		
10	1.7		
11	1.8		
12	2.0		
13	2.1		
14	2.3		
15	2.5		
16	2.6		
17	2.8		
18	2.9		
19	3.1		
20	3.2		
21	3.4		
22	3.5		
23	3.7		
24	3.9		
25	4.0		
26	4.2		
27	4.3		
28	4.5		
29	4.6		
30	4.8		
31	5.0		
32	5.1		
33	5.3		
34	5.4		
35	5.6		
36	5.7		
37	5.9		
38	6.1		
39	6.2		
40	6.4		
41	6.5		
42	6.7		

Table#7 — Delay Time (ms)

Data	Value	Data	Value	Data	Value
0	0.1	43	135.5	86	270.9
1	3.2	44	138.6	87	274.0
2	6.4	45	141.8	88	277.2
3	9.5	46	144.9	89	280.3
4	12.7	47	148.1	90	283.5
5	15.8	48	151.2	91	286.6
6	19.0	49	154.4	92	289.8
7	22.1	50	157.5	93	292.9
8	25.3	51	160.7	94	296.1
9	28.4	52	163.8	95	299.2
10	31.6	53	167.0	96	302.4
11	34.7	54	170.1	97	305.5
12	37.9	55	173.3	98	308.7
13	41.0	56	176.4	99	311.8
14	44.2	57	179.6	100	315.0
15	47.3	58	182.7	101	318.1
16	50.5	59	185.9	102	321.3
17	53.6	60	189.0	103	324.4
18	56.8	61	192.2	104	327.6
19	59.9	62	195.3	105	330.7
20	63.1	63	198.5	106	333.9
21	66.2	64	201.6	107	337.0
22	69.4	65	204.8	108	340.2
23	72.5	66	207.9	109	343.3
24	75.7	67	211.1	110	346.5
25	78.8	68	214.2	111	349.6
26	82.0	69	217.4	112	352.8
27	85.1	70	220.5	113	355.9
28	88.3	71	223.7	114	359.1
29	91.4	72	226.8	115	362.2
30	94.6	73	230.0	116	365.4
31	97.7	74	233.1	117	368.5
32	100.9	75	236.3	118	371.7
33	104.0	76	239.4	119	374.8
34	107.2	77	242.6	120	378.0
35	110.3	78	245.7	121	381.1
36	113.5	79	248.9	122	384.3
37	116.6	80	252.0	123	387.4
38	119.8	81	255.2	124	390.6
39	122.9	82	258.3	125	393.7
40	126.1	83	261.5	126	396.9
41	129.2	84	264.6	127	400.0
42	132.4	85	267.7		

Table#8 — Reverb Width; Depth; Height (m)

Data	Value	Data	Value	Data	Value
0	0.5	43	11.8	86	24.2
1	0.8	44	12.1	87	24.5
2	1.0	45	12.3	88	24.9
3	1.3	46	12.6	89	25.2
4	1.5	47	12.9	90	25.5
5	1.8	48	13.1	91	25.8
6	2.0	49	13.4	92	26.1
7	2.3	50	13.7	93	26.5
8	2.6	51	14.0	94	26.8
9	2.8	52	14.2	95	27.1
10	3.1	53	14.5	96	27.5
11	3.3	54	14.8	97	27.8
12	3.6	55	15.1	98	28.1
13	3.9	56	15.4	99	28.5
14	4.1	57	15.6	100	28.8
15	4.4	58	15.9	101	29.2
16	4.6	59	16.2	102	29.5
17	4.9	60	16.5	103	29.9
18	5.2	61	16.8	104	30.2
19	5.4	62	17.1		
20	5.7	63	17.3		
21	5.9	64	17.6		
22	6.2	65	17.9		
23	6.5	66	18.2		
24	6.7	67	18.5		
25	7.0	68	18.8		
26	7.2	69	19.1		
27	7.5	70	19.4		
28	7.8	71	19.7		
29	8.0	72	20.0		
30	8.3	73	20.2		
31	8.6	74	20.5		
32	8.8	75	20.8		
33	9.1	76	21.1		
34	9.4	77	21.4		
35	9.6	78	21.7		
36	9.9	79	22.0		
37	10.2	80	22.4		
38	10.4	81	22.7		
39	10.7	82	23.0		
40	11.0	83	23.3		
41	11.2	84	23.6		
42	11.5	85	23.9		

YAMAHA [Music Sequencer ---   voice part]   Date:24-APR-1997
          Model QY70 MIDI Implementation Chart   Version : 1.0

Function ...	Transmitted	Recognized	Remarks
Basic Default Channel Changed	1 - 16 1 - 16	1 - 16 1 - 16	Memorized
Default Mode Messages Altered	3 x *************	1 1 - 4(m=1) *2 x	Memorized
Note Number : True voice	0 - 127 *************	0 - 127 0 - 127	Transpose
Velocity Note ON Note OFF	O 9nH,v=1-127 x 9nH,v=0	o v=1-127 x	
After Key's Touch Ch's	x x	x o *1	
Pitch Bender	x	o 0-24 semi	

0,32
        1,7,10
  5,11,64,65-67
        6,38
Control   16
      71-74
Change   84
    91,93,94
    96,97
    98,99
   100,101
     120
     121
	O
	O
	x
	x
	x
	O
	x
	O
	x
	x
	x
	x
	X
		o
		o
		o
		o
		o
		o
		o
		o
		o
		o
		o
		o
		O
			Bank Select
			
			Data Entry
			Assignable Cntrl
			Sound Controller
			Portamento Cont.
			Effect SendLevel
			Data INC,DEC
			NRPN LSB,MSB
			RPN LSB,MSB
			All Sound Off
			Reset All Cntrls

Prog Change : True #	O 0 - 127 *************	o 0 - 127 0 - 127	
System Exclusive	O	o	
System : Song Pos. : Song Sel. Common : Tune	x x x	x x x	
System :Clock Real Time :Commands	x x	x x	
Aux :Local ON/OFF :All Notes OFF Mes- :Active Sense sages:Reset	x x o x	x o(123-127) o x	

Notes: *1 receive if switch is on.
      *2 m is always treated as "1" regardless of its value.

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

QY70

Function ...	Transmitted	Recognized	Remarks
Basic Default	1 - 16	1 - 16	Memorized
Channel Changed	x	x	
Mode Default	x	x	
Mode Messages	x	x	
Altered	**************	x	
Note	0 - 127	0 - 127	
Number : True voice	**************		
Velocity Note ON	o 9nH,v=1-127	o v=1-127	
Note OFF	x 9nH,v=0	x	
After Key's	o	o	
Touch Ch's	o	o	
Pitch Bender	o	o	
0-121	o	o	
Control Change			
Prog	o 0 - 127	o 0 - 127	
Change : True #	**************		
System Exclusive	o	o	
System : Song Pos.	o *2	o *1	
: Song Sel.	o *2	o *1	
Common : Tune	x	x	
System :Clock	o *2	o *3	
Real Time :Commands	o *2	o *1	
Aux :Local ON/OFF	o	o	
:All Notes OFF	x	x	
Mes- :Active Sense	X	x	
sages :Reset	x	x	

Notes: *1 if MIDI control is in or in/out
       *2 if MIDI control is out or in/out
       *3 if MIDI sync is external

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

■ QY70 OVERALL CIRCUIT DIAGRAM (総回路図)

QY70

MUSIC SEQUENCER

QY70

PARTS LIST

■ CONTENTS （目次）

Notes: DESTINATION ABBREVITATIONS

A	:	Australian model	J	:	Japanese model
B	:	British model	U	:	U.S model
C	:	Canadian model	V	:	General export model (110 V)
E	:	European model	W	:	General export model (220 V)
I	:	Indonesian model	X	:	General export model
O	:	Chinese model	Y	:	Export model

・ The numbers in "QTY" shows quantities for each unit.
・ The parts with "--" in "Parts No." are not available as spare parts.

・部品価格ランクは、変更になることがあります。
・QTY 欄に記されている数字は、各ユニット当たりの使用個数です
・部品 No.が "--" の部品は、サービス用部品として準備されていません。

QY70

■ OVERALL ASSEMBLY (総組立)

1

REF NO.	PART NO.	DESCRIPTION		部　　品　　名	REMARKS	QTY	ランク
		OVERALL ASSEMBLY	QY70	総　　組　　立	(VY86940)		
10	--	Top Assembly		トップＡｓｓ'ｙ	(VY87130)		
20	VY837100	Bottom Cover		ボトムカバー			
30	VP011400	Battery Case		バッテリーケース			05
40	VP010900	Spring Terminal	A	接　点　バ　ネ　A			05
50	--	Connector Assembly	BATTERY BL	線　材　Ａ　ｓ　ｓ　ｙ	(VN95180)		
50a	VP011000	Spring Terminal	B	接　点　バ　ネ　B			05
60	--	Connector Assembly	BATTERY RE	線　材　Ａ　ｓ　ｓ'ｙ	(VN95170)		
60a	VP011100	Spring Terminal	C	接　点　バ　ネ　C			05
70	EP620160	Bind Head Tapping Screw-P	2.6X6 MFZN2BL	＋バインドPタイト		4	01
80	VY874700	Battery Cover		バッテリーカバー			
90	VY874800	LCD Cover		ＬＣＤカバー			
100	EP620120	Bind Head Tapping Screw-P	2.6X8 MFZN2BL	＋バインドPタイト		4	01
110	EP600980	Bind Head Tapping Screw-B	2.6X8 MFZN2Y	＋バインドBタイト			01
120	VN103500	Lithium Battery	CR2032	リチウム電池			03
130	VZ201400	Insulation Sheet		絶　縁　シ　ー　ト		2	
140	VA126100	Filament Tape	12X50	粘　着　テ　ー　プ			03
		ACCESSORIES		付　　属　　品			
--		Battery	LR6G-2ST 2pc	アルカリ電池 J	(VM53250)	3	
	VK743100	Audio Cable	1m	オーディオケーブル	(VK74310)		
	VQ290800	Foot Set	(4pc SET) U BAHCT	ゴム足セット	B,A,I,E,U,C		03
	XT821A00	FD → XT29A00	J Mac 3.5 1.0	書き込みFD	J		
	XT822A00	FD	J Win 3.5 1.0	書き込みFD	J		
	XT823A00	FD	Mac 3.5 1.0	書き込みFD	B,A,I,E,U,C		
	XT824A00	FD	Win 3.5 1.0	書き込みFD	B,A,I,E,U,C		
		TOP ASSEMBLY		トップＡｓｓ'ｙ	(VY87130)		
T10	VY837000	Top Cover		トップカバー			
T20	VY836900	Rubber Contact		ラバーコンタクト			
T30	VY867400	Circuit Board	PN	Ｐ　Ｎ　シ　ー　ト			
T40	EP620160	Bind Head Tapping Screw-P	2.6X6 MFZN2BL	＋バインドPタイト		7	01
T50	VY8862	Cable, PN	BNCD-P=1-K-20-100	Ｐ　Ｎ　ケ　ー　ブ　ル	(VY86680)		
T60	VY984400	LCD Assembly		ＬＣＤ　Ａｓｓ'ｙ			
T90	VY844600	Shield Plate		シ　ー　ル　ド　金　具			
T100	EP620160	Bind Head Tapping Screw-P	2.6X6 MFZN2BL	＋バインドPタイト		6	01
T110	VY867300	Circuit Board	DM	Ｄ　Ｍ　シ　ー　ト			
T120	EP620160	Bind Head Tapping Screw-P	2.6X6 MFZN2BL	＋バインドPタイト		2	01
T130	VA126100	Filament Tape	12X50	粘　着　テ　ー　プ			03
	VY984400	LCD ASSEMBLY		ＬＣＤ　Ａｓｓ'ｙ			
L10	VN990700	LCD	DMF50202N	液晶ディスプレイ			18
L20	--	Connector Assembly	8P-180	ＤＳ－ＫＲ束線	(VY86660)		
L30	--	Cloth	L	ベ　　フ　　L	(VP10350)	2	
L40	--	Cloth	S	ベ　　フ　　S	(VP10360)	2	

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■ ELECTRICAL PARTS (電気部品)

REF NO.	PART NO.	DESCRIPTION		部　　　品　　　名		REMARKS	QTY	ランク
		ELECTRICAL PARTS		電　気　部　品				
‡	VY867300	Circuit Board	DM	D M シ ー ト		(XS970B0)		01
	UB012680	Monolithic Ceramic Cap.	B 680P 50V K	チ ッ プ 積 層 セ ラ コ ン				01
	UB013220	Monolithic Ceramic Cap.	B 2200P 50V K	チ ッ プ 積 層 セ ラ コ ン				01
	UB013470	Monolithic Ceramic Cap.	B 4700P 50V K	チ ッ プ 積 層 セ ラ コ ン				01
	UB013680	Monolithic Ceramic Cap.	B 6800P 50V K	チ ッ プ 積 層 セ ラ コ ン				01
	UB051100	Monolithic Ceramic Cap.	SL 10P 50V D	チ ッ プ 積 層 セ ラ コ ン				01
	UB051120	Monolithic Ceramic Cap.	SL 12P 50V J	チ ッ プ 積 層 セ ラ コ ン				01
	UB051220	Monolithic Ceramic Cap.	SL 22P 50V J	チ ッ プ 積 層 セ ラ コ ン				01
	UB051390	Monolithic Ceramic Cap.	SL 39P 50V J	チ ッ プ 積 層 セ ラ コ ン				01
	UB052100	Monolithic Ceramic Cap.	SL 100P 50V J	チ ッ プ 積 層 セ ラ コ ン				01
	UB044100	Monolithic Ceramic Cap.	F 0.010 50V Z	チ ッ プ 積 層 セ ラ コ ン				01
	UB245100	Monolithic Ceramic Cap.	F 0.100 25V Z	チ ッ プ 積 層 セ ラ コ ン				01
	VJ927300	Monolithic Ceramic Cap.	1.500 16V F	チ ッ プ 積 層 セ ラ コ ン				01
	UJ838470	Electrolytic Cap.	470.00 16.0V	ケ ミ コ ン				01
	VH340400	Electrolytic Cap.	330.00 25.0V	ケ ミ コ ン R S				01
	UF037100	Electrolytic Cap. (chip)	10 16V	チ ッ プ ケ ミ コ ン				01
	UF037470	Electrolytic Cap. (chip)	47 16V	チ ッ プ ケ ミ コ ン				01
	UF038100	Electrolytic Cap. (chip)	100 16V	チ ッ プ ケ ミ コ ン				01
	UF066330	Electrolytic Cap. (chip)	3.3 50V	チ ッ プ ケ ミ コ ン				01
	VR579900	Chip Inductance	BK2125HS601-T	チ ッ プ イ ン ダ ク タ				01
	VU577000	Inductance	ELF1010RR-122K	イ ン ダ ク タ				03
‡	RD153390	Carbon Resistor (chip)	3.9 1/4 J	チ ッ プ 抵 抗				
	RD154470	Carbon Resistor (chip)	47.0 1/4 J	チ ッ プ 抵 抗				
	RD155470	Carbon Resistor (chip)	470.0 1/4 J	チ ッ プ 抵 抗				
‡	RD156180	Carbon Resistor (chip)	1.8K 1/4 J	チ ッ プ 抵 抗				
	RD250000	Carbon Resistor (chip)	0.0 0.0 J	チ ッ プ 抵 抗				01
	RD254560	Carbon Resistor (chip)	56.0 0.1 J	チ ッ プ 抵 抗				01
	RD255100	Carbon Resistor (chip)	100.0 0.1 J	チ ッ プ 抵 抗				01
	RD255150	Carbon Resistor (chip)	150.0 0.1 J	チ ッ プ 抵 抗				01
	RD255220	Carbon Resistor (chip)	220.0 0.1 J	チ ッ プ 抵 抗				01
	RD255330	Carbon Resistor (chip)	330.0 0.1 J	チ ッ プ 抵 抗				01
	RD255470	Carbon Resistor (chip)	470.0 0.1 J	チ ッ プ 抵 抗				01
	RD255680	Carbon Resistor (chip)	680.0 0.1 J	チ ッ プ 抵 抗				01
	RD256100	Carbon Resistor (chip)	1.0K 0.1 J	チ ッ プ 抵 抗				01
	RD256220	Carbon Resistor (chip)	2.2K 0.1 J	チ ッ プ 抵 抗				01
	RD256330	Carbon Resistor (chip)	3.3K 0.1 J	チ ッ プ 抵 抗				01
	RD256470	Carbon Resistor (chip)	4.7K 0.1 J	チ ッ プ 抵 抗				01
	RD256820	Carbon Resistor (chip)	8.2K 0.1 J	チ ッ プ 抵 抗				01
	RD257100	Carbon Resistor (chip)	10.0K 0.1 J	チ ッ プ 抵 抗				01
	RD257180	Carbon Resistor (chip)	18.0K 0.1 J	チ ッ プ 抵 抗				01
	RD257470	Carbon Resistor (chip)	47.0K 0.1 J	チ ッ プ 抵 抗				01
	RD257820	Carbon Resistor (chip)	82.0K 0.1 J	チ ッ プ 抵 抗				01
	RD258100	Carbon Resistor (chip)	100.0K 0.1 J	チ ッ プ 抵 抗				01
	RD259100	Carbon Resistor (chip)	1.0M 0.1 J	チ ッ プ 抵 抗				01
	RE047100	Resistor Array	10KX4	抵 抗 ア レ イ				01
	VQ200000	Resistor Array	EXBA10E103J	抵 抗 ア レ イ				01
	XF291A00	IC	UPC4570G2	I C		OP AMP		03
	XQ138A00	IC	NJM4556AMT1	I C		OP AMP		03
	XR925A00	IC	SI-8401L	I C		REGURATOR +5V		05
	XS516A00	IC	UPC2933T	I C		REGURATOR +3.3V		03
	XR858A00	IC	M5291FP-600C	I C		DC/DC CONVERTER		03
	XC725A00	IC	SN74HC14NSR	I C		INVERTER		03
	XC726A00	IC	SN74HC74NSR	I C		D-FF		01
	XC727A00	IC	SN74HC139NSR	I C		DECODER		02
	XD833A00	IC	SN74HC32NSR	I C		OR-GATE		01
	XD838A00	IC	SN74HC245NSR	I C		BUF		04
	XI348A00	IC	SC7SU04FEL	I C		INVERTER		01
	XM588A00	IC	TC7S32F	I C		OR-GATE		01
	XP881A00	IC	MC34051MEL	I C		LINE TRANSIEVER		05
	XQ042A00	IC	SN74HC374ANSR	I C		D-FF		03
	XL166A00	IC	T6963C	I C		LCD CONTROLLER		08
	XQ375A00	IC	HD6413002FP16	I C		CPU H8-3002		09
	XS724A00	IC	TC203C060AF-001	I C		SWP00M		09
	XM901B00	IC	HM628128BLFP-7SL	I C		SRAM 1M		12
	XN279C00	IC	M5M5256DFP-70LL	I C		SRAM 256K		07
	XS242A00	IC	LH64256CK-70	I C		DRAM 256K		08
‡	XT346A00	IC	UPD23C32000-12	I C		WAVE		
‡	XT344E00	IC	341MV030 OTP 16M	I C		MAIN		
‡	XT650A00	IC	MSM538022E MASK	I C		SUB		

‡ New Parts（新規部品）　　　　　　　　　　　　　　　　　　　　　　ランク：Japan only

REF NO.	PART NO.	DESCRIPTION		部　　品　　名		REMARKS	QTY	ランク
	XI686A00	IC	M62021FP	I	C	RESET		04
	XP867A00	IC	UPD63200GS-E1	I	C	D/A CONVERTER		07
	VN210700	Slide Switch	SSSF124-S06N-0	ス　ラ　イ　ド　S　W		HOST SELECT MIDI,PC-1,PC-2,Mac		03
	VN990400	Slide Switch	SSSF12302A	ス　ラ　イ　ド　S　W		POWER ON/OFF		02
	LB302010	Phone Jack	ST JACK HSJ0912	ホ　ー　ン　コ　ネ　ク　タ		LINE OUT/PHONES ✓		02
	VJ207400	DC-IN Connector	16V DC 3A HEC2305	D　C　ジ　ャ　ッ　ク		DC IN		01
	VU653300	DIN Connector	JACK 3P YKF51-5035	D　I　N　コ　ネ　ク　タ		MIDI IN, MIDI OUT		02
	VM761000	DIN Connector	DINJACK 8P MD-S8100	複　合　コ　ネ　ク　タ		TO HOST		03
	VB390400	Connector Base Post	PH- 8P TE	コネクタベースポスト				01
‡	VY866500	Connector, FFC	52852 20P SE	F　F　C　コ　ネ　ク　タ　ー				
	VK863100	IC Socket	DICF-42CS-E	I　C　ソ　ケ　ッ　ト				03
	VN103600	Battery Holder	CR2032	バ　ッ　テ　リ　ー　ホ　ル　ダ　ー				03
	VG238200	LC Filter	PLT2003C	L　C　フ　ィ　ル　タ　ー　E　M　I				04
	VR870700	Quartz Crystal Unit	10M SMD-49	水　晶　振　動　子				04
	VS294900	Quartz Crystal Unit	12M SMD-49	水　晶　振　動　子				04
	VT685200	Quartz Crystal Unit	33.8688M SMD-49	水　晶　振　動　子				04
	VN990200	Ceramic Resonator	4.915M CSAC4.91M	チップセラミック発振子				02
	VK350200	Slide Variable Resistor	A 10.0K RS15H12AD	二　連　ス　ラ　イ　ド　V　R		VOLUME MAX ,MIN		02
	VN990300	Rotary Variable Resistor	B1K RK09J11T0062A	ロ　ー　タ　リ　ー　V　R		CONTRAST		03
	VJ927200	Transistor	2SA1162 O,Y	ト　ラ　ン　ジ　ス　タ				01
	VD303700	Transistor	2SC3326 A,B TE85R	ト　ラ　ン　ジ　ス　タ				01
	VJ927100	Transistor	2SC2712 Y	ト　ラ　ン　ジ　ス　タ				01
‡	VZ092600	Transistor	2SA1567	ト　ラ　ン　ジ　ス　タ				
	VQ282500	Diode	MA737	ダ　イ　オ　ー　ド				02
	VS201100	Diode	D1F60	ダ　イ　オ　ー　ド				01
	VT332900	Diode	1SS355	ダ　イ　オ　ー　ド				01
	VU653000	Diode	SFPB59	ダ　イ　オ　ー　ド				01
‡	VV925900	Diode	RLS-73	ダ　イ　オ　ー　ド				
	VU171500	Zener Diode	UDZ 3.6BTE-17 3.6V	ツ　ェ　ナ　ー　ダ　イ　オ　ー　ド				01
‡	VV660300	Zener Diode	RLZ10C 10.0V	ツ　ェ　ナ　ー　ダ　イ　オ　ー　ド				
	VR903700	Photo Coupler	HCPL-M600	フ　ォ　ト　カ　プ　ラ				04
‡	VY867400	Circuit Board	PN	P　N　シ　ー　ト		(XS971B0)		
‡	VY866500	Connector, FFC	52852 20P SE	F　F　C　コ　ネ　ク　タ　ー				
	VT332900	Diode	1SS355 TE-17	ダ　イ　オ　ー　ド				01
	VU653100	LED	SEL2210R RE	L　E　D　（　赤　）				01
	VU653200	LED	SEL2410G GR	L　E　D　（　緑　）				01
‡	VY879300	LED Spacer	BL 2mm	L　E　D　ス　ペ　ー　サ　ー				

‡ New Parts（新規部品）

ランク : Japan only

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