

COSMOSYNTHESIZER

CZ-1

PRESET TONE DATA

&

MIDI SYSTEM EXCLUSIVE

MIDI SYSTEM EXCLUSIVE

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CZ-1 MIDI SYSTEM EXCLUSIVE

The CZ-1 is capable of sending and receiving the system exclusive messages noted in the table below. The send/receive status of each message is also noted.

I. SYSTEM EXCLUSIVE MESSAGES

SYSTEM EXCLUSIVE MESSAGE	NORMAL				TONE MIX		KEY SPLIT		OPERATION MEMORY	
	POLY MODE		MULTI CH MODE		POLY MODE		POLY MODE		POLY MODE	
	RECEIVE	SEND	RECEIVE	SEND	RECEIVE	SEND	RECEIVE	SEND	RECEIVE	SEND
(1) SEND REQUEST 1	○	○			○	○	○	○	○	○
(2) RECEIVE REQUEST 1	○	○			○	○	○	○	○	○
(3) SEND REQUEST 2	○	○			○	○	○	○	○	○
(4) RECEIVE REQUEST 2	○	○			○	○	○	○	○	○
(5) SEND REQUEST 3	○	○			○	○	○	○	○	○
(6) RECEIVE REQUEST 3	○	○			○	○	○	○	○	○
(7) BEND RANGE	○		○		○		○		○	
(8) KEY TRANSPOSE	○		○		○		○		○	
(9) GLIDE NOTE	○		○		○		○		○	
(10) GLIDE TIME	○		○		○		○		○	
(11) MOD WHEEL DEPTH	○		○		○		○		○	
(12) LEVEL	○		○		○		○		○	
(13) GLIDE ON/OFF	○	○	○	○	○	○	○	○	○	○
(14) PORTAMENTO SWEEP	○		○		○		○		○	
(15) MODULATION ON/OFF	○	○	○	○	○	○	○	○	○	○
(16) MOD. AFTER TOUCH DEPTH	○				○		○		○	
(17) AMP. AFTER TOUCH RANGE	○				○		○		○	
(18) CARTRIDGE ON/OFF	○	○			○	○	○	○		
(19) CZ-1 MODE	○		○		○		○		○	
(20) CURSOR	○		○		○		○		○	
(21) PAGE	○				○		○			
(22) MULTI CHANNEL MODE	○		○		○		○		○	
(23) NUMBER OF POLY 1			○							
(24) NUMBER OF POLY 2			○							
(25) TONE 2 PITCH	○		○		○		○			
(26) SPLIT POINT	○		○		○		○			
(27) SUS. PEDAL ENA/DIS	○		○		○		○			
(28) OCT. SHIFT	○		○		○		○			
(29) CHORUS ON/OFF	○		○		○		○			
(30) TIME BREAK	○		○		○		○		○	
(31) KEY CODE SWEEP	○		○		○		○		○	

II. TONE DATA AND OPERATION MEMORY DATA EXCLUSIVE MESSAGES

The following six messages are used by the CZ-1 for the transmission of tone data and operation memory data.

- (1) SEND REQUEST 1
- (2) RECEIVE REQUEST 1
- (3) SEND REQUEST 2
- (4) RECEIVE REQUEST 2
- (5) SEND REQUEST 3
- (6) RECEIVE REQUEST 3

- * Messages (1) and (2) are used for transmission of tone data with such keyboards as the CZ-5000 and CZ-101 whose formats do not include VELOCITY (LINE 1, 2), LEVEL (DCA1, DCA2), NAME.
- * Messages (3) and (4) are used for the communication of CZ-1 operation memory data.
- * Details for each data format are included on pages 83 through 104.

(1) SEND REQUEST 1

The CZ-1 sends the specified number tone data (1 tone) when a SEND REQUEST 1 message is received. The SEND REQUEST 1 message is also sent from the CZ-1 when tone data are received from a CZ-5000 by CZ-1 key operation.

	Personal Computer → CZ-1 CZ-1 → CZ-5000	CZ-1 → Personal Computer CZ-5000 → CZ-1
1	F 0 4 4 0 0 0 0 7 N 1 0 d ₁ d ₂	
2		F 0 4 4 0 0 0 0 7 N 3 0
3	7 N 3 1	
4		Tone data F 7
5	F 7	

① (i) INTERNAL A-1 ~ H-8 → d₁d_{2H} = 00 ~ 3F_H

(ii) SOUND AREA → d₁d_{2H} = 60_H

- * SOUND AREA indicates the sound production area when the keyboard of the CZ-1 is pressed.
- * The transmission shown in the above table repeats 64₁₀ times when tone data are received from a CZ-5000 by CZ-1 key operation. (d₁d₂ take successive values from 00 through 3F_H).

② (i) BASIC CH - 1 = N (0_H ~ F_H) when the CZ-1 receives a SEND REQUEST 1 message.

(ii) KBOH - 1 = N (0_H ~ F_H) when the CZ-1 sends a SEND REQUEST 1 message.

③ Details on tone data are included on chapter IV.

(2) RECEIVE REQUEST 1

The CZ-1 stores the single tone data received following a RECEIVE REQUEST 1 message to the specified memory number. The SEND REQUEST 1 message is also sent from the CZ-1 when tone data are sent from the CZ-1 to a CZ-5000 by CZ-1 key operation.

	Personal Computer → CZ-1	CZ-1 → Personal Computer
	CZ-1 → CZ-5000	CZ-5000 → CZ-1
1	F 0 4 4 0 0 0 0 7 N 2 0 d ₁ d ₂	
2		F 0 4 4 0 0 0 0 7 N 3 0
3	Tone data F 7	
4		F 7

① (i) INTERNAL A-1 ~ H-8 → d₁d_{2H} = 00 ~ 3F_H

(ii) SOUND AREA + COMP/RECALL AREA → d₁d_{2H} = 60_H

* The transmission shown in the above table repeats 64 times when tone data are sent to a CZ-5000 from the CZ-1 by CZ-1 key operation. (d₁d₂ take successive values from 00 through 3F_H.)

In the case of a CZ-5000, 00_H through 1F_H are the preset areas (ROM), so 32 tones are actually sent into the area of d₁d₂ = 20_H ~ 3F_H.

② (i) BASIC CH - 1 = N (0_H ~ F_H) when the CZ-1 receives a RECEIVE REQUEST 1 message.

(ii) KBCH - 1 = N (0_H ~ F_H) when the CZ-1 sends a RECEIVE REQUEST 1 message.

③ Details on tone data are included on chapter IV.

(3) SEND REQUEST 2

The CZ-1 sends the specified number tone data (1 tone) when a SEND REQUEST 2 message is received. The SEND REQUEST 2 message is also sent from the CZ-1 (MASTER) when tone data are received from another CZ-1 (SLAVE) by CZ-1 (MASTER) key operation.

	Personal Computer → CZ-1	CZ-1 → Personal Computer
	CZ-1(MASTER) → CZ-1(SLAVE)	CZ-1(SLAVE) → CZ-1(MASTER)
1	F 0 4 4 0 0 0 0 7 N 1 1 d ₁ d ₂	
2		F 0 4 4 0 0 0 0 7 N 3 0
3	7 N 3 1	
4		Tone data F 7
5	F 7	

① (i) INTERNAL A-1 ~ H-8 → d₁d_{2H} = 00_H ~ 3F_H

(ii) SOUND AREA → d₁d_{2H} = 60_H

* The transmission shown in the above table repeats 64 times when tone data are received from a CZ-1 (SLAVE) by CZ-1 (MASTER) key operation. (d₁d₂ take successive values from 00_H through 3F_H.)

② (i) BASIC CH - 1 = N (0_H ~ F_H) when the CZ-1 receives a SEND REQUEST 2 message.

(ii) KBCH - 1 = N (0_H ~ F_H) when the CZ-1 sends a SEND REQUEST 2 message.

③ Details on tone data are included on chapter IV.

(4) RECEIVE REQUEST 2

The CZ-1 stores the single tone data received following a RECEIVE REQUEST 2 message to the specified memory number. The SEND REQUEST 2 message is also sent from the CZ-1 (MASTER) when tone data are sent from the CZ-1 (MASTER) to another CZ-1 (SLAVE) by CZ-1 (MASTER) key operation.

	Personal Computer → CZ-1	CZ-1 → Personal Computer
	CZ-1(MASTER) → CZ-1(SLAVE)	CZ-1(SLAVE) → CZ-1(MASTER)
1	F 0 4 4 0 0 0 0 7 N 2 1 d ₁ d ₂	
2		F 0 4 4 0 0 0 0 7 N 3 0
3	Tone data F 7	
4		F 7

① (i) INTERNAL A-1 ~ H-8 → 00_H ~ 3F_H

(ii) SOUND AREA + COMP/RECALL AREA → 60_H

- * The transmission shown in the above table repeats 64 times when 64 tone data are sent collectively (SAVE operation) to another CZ-1 (SLAVE) from the CZ-1 (MASTER) by CZ-1 (MASTER) key operation. (d₁d₂ take successive values from 00 through 3F_H.)
- * The transmission shown in the above table repeats once (d₁d₂ = 60_H) when a single tone data is sent by CZ-1 (MASTER) key operation to another CZ-1 (SLAVE).

② (i) BASIC CH - 1 = N (0_H ~ F_H) when the CZ-1 receives a RECEIVE REQUEST 2 message.

(ii) KBCH - 1 = N (0_H ~ F_H) when the CZ-1 sends a RECEIVE REQUEST 2 message.

③ Details on tone data are included on chapter IV.

(5) SEND REQUEST 3

The CZ-1 sends the specified operation memory data (1 area) when a SEND REQUEST 3 message is received. The SEND REQUEST 3 message is also sent from the CZ-1 (MASTER) when operation memory data are received from another CZ-1 (SLAVE) by CZ-1 (MASTER) key operation.

	Personal Computer → CZ-1	CZ-1 → Personal Computer
	CZ-1(MASTER) → CZ-1(SLAVE)	CZ-1(SLAVE) → CZ-1(MASTER)
1	F 0 4 4 0 0 0 0 7 N 1 2 d ₁ d ₂	
2		F 0 4 4 0 0 0 0 7 N 3 0
3	7 N 3 1	
4		Operation data F 7
5	F 7	

① OPERATION MEMORY

A-1 ~ H-8 → d₁d_{2H} = 00_H ~ 3F_H

- * The transmission shown in the above table repeats 64 times when operation memory data are received from a CZ-1 (SLAVE) by CZ-1 (MASTER) key operation. (d₁d_{2H} take successive values from 00_H through 3F_H.)

② (i) BASIC CH - 1 = N (0_H ~ F_H) when the CZ-1 receives a SEND REQUEST 3 message.

(ii) KBCH - 1 = N (0_H ~ F_H) when the CZ-1 sends a SEND REQUEST 3 message.

③ Details on operation memory data are included on chapter V.

(6) RECEIVE REQUEST 3

The CZ-1 stores the single area operation memory data received following a RECEIVE REQUEST 3 message to the specified memory number. The SEND REQUEST 3 message is also sent from the CZ-1 (MASTER) when operation memory data are sent from the CZ-1 (MASTER) to another CZ-1 (SLAVE) by CZ-1 (MASTER) key operation.

	Personal Computer → CZ-1	CZ-1 → Personal Computer
	CZ-1(MASTER) → CZ-1(SLAVE)	CZ-1(SLAVE) → CZ-1(MASTER)
1	F 0 4 4 0 0 0 0 7 N 2 2 d ₁ d ₂	
2		F 0 4 4 0 0 0 0 7 N 3 0
3	Operation data F 7	
4		F 7

① (i) OPERATION MEMORY

A-1 ~ H-8 → d₁d_{2H} = 00_H ~ 3F_H

- * The transmission shown in the above table repeats 64 times when 64 area data are sent collectively (SAVE operation) to another CZ-1 (SLAVE) from the CZ-1 (MASTER) by CZ-1 (MASTER) key operation. (d₁d₂ from 00_H through 3F_H + .)
- * The transmission shown in the above table repeats once when a single area data is sent by CZ-1 (MASTER) key operation to another CZ-1 (SLAVE). d₁d₂, in this case, take on a value in the range of 00_H through 3F_H, according to the CZ-1 (MASTER) key operation.

② (i) BASIC CH - 1 = N (0_H ~ F_H) when the CZ-1 receives a RECEIVE REQUEST 3 message.

(ii) KBCH - 1 = N (0_H ~ F_H) when the CZ-1 sends a RECEIVE REQUEST 3 message.

③ Details on operation memory data are included on chapter V.

III. OTHER EXCLUSIVE MESSAGES

(7) BEND RANGE

The bend range of the CZ-1 changes in accordance with BEND RANGE data received from a personal computer.

Personal Computer → CZ-1													
1	F	0	4	4	0	0	0	0	7	N	4	0	d ₁ d ₂ F 7

HEX

- ① BEND RANGE 0~12 → d₁d_{2H} = 0~C_H
- ② BASIC CHANNEL - 1 = N (0_H~F_H)

(8) KEY TRANSPOSE

The key transpose of the CZ-1 changes in accordance with KEY TRANSPOSE data received from a personal computer.

Personal Computer → CZ-1													
1	F	0	4	4	0	0	0	0	7	N	4	1	d ₁ d ₂ F 7

HEX

- ① KEY TRANSPOSE

KEY	G	A _b	A	B _b	B	C	C _#	D	E _b	E	F	F _#
d ₁ d ₂	4 5	4 4	4 3	4 2	4 1	0 0	0 1	0 2	0 3	0 4	0 5	0 6

HEX

- ② BASIC CHANNEL - 1 = N (0_H~F_H)

(9) GLIDE NOTE

The glide note of the CZ-1 changes in accordance with GLIDE NOTE data received from a personal computer.

Personal Computer → CZ-1													
1	F	0	4	4	0	0	0	0	7	N	4	3	d ₁ d ₂ F 7

HEX

- ① GLIDE NOTE
 - +1~+12 → d₁d₂ = 1_H~C_H
 - 1~-12 → d₁d₂ = 41_H~4C_H
 - 0 → d₁d₂ = 0_H

- ② BASIC CHANNEL - 1 = N (0_H~F_H)

(10) GLIDE TIME

The glide time of the CZ-1 changes in accordance with GLIDE TIME data received from a personal computer.

Personal Computer → CZ-5000													
1	F	0	4	4	0	0	0	0	7	N	4	4	d ₁ d ₂ F 7

HEX

- ① GLIDE TIME 0~99 → d₁d₂ = 0~63_H
- ② BASIC CHANNEL - 1 = N (0_H~F_H)

(11) MOD. WHEEL DEPTH

The mod wheel depth time of the CZ-1 changes in accordance with MOD WHEEL DEPTH data received from a personal computer.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	4	5	d ₁ d ₂	F	7

HEX

- ① MOD WHEEL DEPTH 0~99 → d₁d₂ = 0~63_H
- ② BASIC CHANNEL - 1 = N (0~F_H)

(12) LEVEL

The volume level of the CZ-1 changes in accordance with LEVEL data received from a personal computer.

	Personal Computer → CZ-1															
1	F	0	4	4	0	0	0	0	7	N	4	6	d ₁ d ₂	d ₃ d ₄	F	7

HEX

- ① LEVEL 01 ~ 15 → d₁d₂ = 01_H~0F_H
- ② BASIC CH-1 = d₃d₄(0_H~F_H)

* CHECK CH - 1 = d₃d₄ (0_H~F_H) when the CZ-1 is in the MULTI CHANNEL mode.

- ③ N → DON'T CARE

The following elements can be changed by LEVEL data.

① NORMAL mode

- (i) The level of each tone is set commonly for lines 1 and 2, regardless of the LINE VOLUME level in the PARAMETER SECTION.
- (ii) In the MULTI CHANNEL mode, the level of each CHECK CH can be set independently.

② TONE MIX mode

The levels of TONE 1 and TONE 2 can be set independently. The level can be changed at the current cursor position on the LCD of the CZ-1.

③ KEY SPLIT mode

The levels of UPPER and LOWER can be set independently. The level can be changed at the current cursor position on the LCD of the CZ-1.

④ OPERATION MEMORY mode

- (i) Same as (1)-(i) when NORMAL mode conditions are stored in memory.
- (ii) Same as (2) when TONE MIX mode conditions are stored in memory.
- (iii) Same as (3) when KEY SPLIT mode conditions are stored in memory.

(13) GLIDE ON/OFF

The GLIDE ON/OFF data are sent from the CZ-1 to external devices through the MIDI OUT terminal. CZ-1 GLIDE ON/OFF settings are also changed in accordance with received GLIDE ON/OFF data.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	4	7	d ₁ d ₂	F	7

HEX

- ① GLIDE ON → d₁ = 4_H
OFF → d₁ = 0_H
- ② (i) When CZ-1 receives GLIDE ON/OFF message: BASIC CH - 1 = d₂ (0_H ~ F_H)
* When CZ-1 is in the MULTI-CHANNEL mode: CHECK CH - 1 = d₂ (0_H ~ F_H)
N → DON'T CARE
- (ii) When the CZ-1 sends a GLIDE ON/OFF message: KBCH - 1 = N, d₂ (0_H ~ F_H)
* When CZ-1 is in the MULTI-CHANNEL mode: CHECK - 1 = N, d₂ (0_H ~ F_H)

(14) PORTAMENTO SWEEP

The portamento sweep of the CZ-1 is set in accordance with PORTAMENTO SWEEP data received from a personal computer.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	4	8	d ₁ d ₂	F	7

HEX

- ① PORTAMENTO SWEEP = 0 → d₁d₂ = 00_H
1 → d₁d₂ = 40_H
- ② BASIC CH - 1 = N (0 ~ F_H)

(15) MODULATION ON/OFF

MODULATION ON/OFF data is output through MIDI OUT when the MODULATION ON/OFF key of the CZ-1 is switched ON and OFF. Also, the MODULATION ON/OFF setting of the CZ-1 is set in accordance with MODULATION ON/OFF data sent from an external source.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	4	9	d ₁ d ₂	F	7

HEX

- ① MODULATION ON → d₁d₂ = 40_H
OFF → d₁d₂ = 00_H
- ② (i) BASIC CH - 1 = N (0_H ~ F_H) when the CZ-1 receives a MODULATION ON/OFF.
(ii) KBCH - 1 = N (0_H ~ F_H) when the CZ-1 sends a MODULATION ON/OFF message.
- * CHECK CH - 1 = (0_H ~ F_H) when CZ-1 is in the MULTI CHANNEL mode.
However, it is necessary to make the BASIC CH data value and CHECK CH data value correspond with each other.

BASIC CHANNEL	
MULTI CH = 03	PRG = ENA

CHECK CHANNEL	
CHECK CHANNEL = 03 POLY = 2	LEVEL = 15

(16) MOD. AFTER TOUCH DEPTH

The mod. after touch depth of the CZ-1 is set in accordance with MOD. AFTER TOUCH data received from a personal computer.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	4	A	d ₁ d ₂	F	7

HEX

- ① MOD. AFTER TOUCH
DEPTH = 00 ~ 99₁₀ → 00 ~ 63_H
- ② BASIC CH - 1 = N (0 ~ F_H)

(17) AMP. AFTER TOUCH RANGE

The amp. after touch range of the CZ-1 is set in accordance with AMP. AFTER TOUCH data received from a personal computer.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	4	B	d ₁ d ₂	F	7

HEX

- ① AMP. AFTER TOUCH
RANGE = 00 ~ 15₁₀ → d₁d₂

0															
---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

0_H ~ F_H
- ② BASIC CH - 1 = N (0 ~ F_H)

(18) CARTRIDGE ON/OFF

CARTRIDGE ON/OFF data is output through MIDI OUT when the CARTRIDGE key of the CZ-1 is switched ON and OFF. Also, the CARTRIDGE ON/OFF setting of the CZ-1 is set in accordance with CARTRIDGE ON/OFF data sent from an external source.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	4	C	d ₁ d ₂	F	7

HEX

HEX

- ① CARTRIDGE ON → d₁d₂ = 40_H
 OFF → d₁d₂ = 00_H
- ② (i) BASIC CH - 1 = N (0 ~ F_H) when the CZ-1 receives a CARTRIDGE ON/OFF.
 (ii) KBCH - 1 = N (0 ~ F_H) when the CZ-1 sends a CARTRIDGE ON/OFF message.

(19) CZ-1 MODE

The mode of the CZ-1 is set in accordance with MODE data received from a personal computer.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	4	D	d ₁ d ₂	F	7

HEX

HEX

- ① NORMAL MODE → d₁d₂ = 00_H
 TONE MIX MODE → d₁d₂ = 20_H
 KEY SPLIT MODE → d₁d₂ = 40_H
 OPERATION MEMORY MODE → d₁d₂ = 60_H
- ② BASIC CH - 1 = N (0 ~ F_H)

(20) CURSOR

The cursor position is set in accordance with CURSOR data received from a personal computer.

This message is used by the CZ-1 for movement of the cursor by an external source to set the two tone numbers, volume levels, and EFFECT ON/OFF for TONE MIX and KEY SPLIT tones.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	4	E	d ₁ d ₂	F	7

HEX

- ① Cursor position → d₁d₂ = 00 ~ 7F_H

Taking the leftmost position to which the cursor can move (or the upper leftmost position in the case that the cursor can move between two lines of the LCD) as the basic cursor position, the cursor movement range is from the basic cursor position to the last (extreme right) position on the display.

- d₁d₂ = 00 Move to the basic cursor position.
 d₁d₂ = 01 Move to the position reached when the cursor is at the basic cursor position and the CURSOR RIGHT key on the MX 154 is pressed once.
 d₁d₂ = xx Move to the position reached when the cursor is at the basic cursor position and the CURSOR RIGHT key is pressed xx times.

Example

T O N E M I X									
L E V 1 = 1 5	L E V 2 = 1 5								

Basic Cursor Position
(d₁d₂ = 00)

Last Position
(d₁d₂ = 01)

The cursor moves to the last position on the display when the value of d_1d_2 exceeds that of the last position on the display ($d_1d_2 \geq 02$ in the above example).

② BASIC CH - 1 = N (0 ~ F_H)

(21) PAGE

The LCD page changes in accordance with PAGE SELECT data received from a personal computer. This function is almost identical to the operation of the PAGE UP/PAGE DOWN keys of the CZ-1.

The PAGE SELECT message is used for page changes in the NORMAL, TONE MIX and KEY SPLIT modes by an external source followed by CHORUS ON/OFF settings.

Personal Computer → CZ-1												
1	F	0	4	4	0	0	0	0	7	N	4	F
											d_1d_2	F 7

HEX

① page 1-4 → $d_1d_2 = 00_H \sim 03_H$

The details of the PAGE that can be changed by the PAGE SELECT message is as follows:

(i) NORMAL mode page change

(LCD; TONE display)

PAGE 1
($d_1d_2 = 00_H$)

* I N T E R N A L * A - 1
B R A S S 1

(LCD; CHORUS display)

PAGE 2
($d_1d_2 = 01_H$)

C H O R U S
O N

(ii) TONE MIX mode page change

(LCD; LEVEL display)

PAGE 1
($d_1d_2 = 00_H$)

T O N E M I X
L E V 1 = 1 5 L E V 2 = 1 5

(LCD; TONE2 PITCH display)

PAGE 2
($d_1d_2 = 01_H$)

T O N E 2 (+) O C T = 2
N O T E = 1 0 F I N E = 0 3

(LCD; CHORUS ON/OFF display)

PAGE 3
($d_1d_2 = 02_H$)

C H O R U S
T N 1 = O N T N 2 = O F F

(iii) KEY SPLIT mode page change

(LCD; LEVEL display)

PAGE 1
($d_1d_2 = 00_H$)

S P	L O W E R	U P P E R
3 0	L E V = 1 5	L E V = 1 5

(LCD; SUS. PEDAL ENA/DIS display)

PAGE 2
($d_1d_2 = 01_H$)

S U S .	P E D A L
L O W = E N A	U P P = E N A

(LCD; OCT. SHIFT display)

PAGE 3
($d_1d_2 = 02_H$)

O C T .	S H I F T
L O W = + 1	U P P = - 1

(LCD; CHORUS ON/OFF display)

PAGE 4
($d_1d_2 = 03_H$)

C H O R U S
L O W = O N U P P = O F F

② BASIC CH - 1 = N (0 ~ F_H)

(22) MULTI CHANNEL MODE ON/OFF

The MULTI CHANNEL mode and POLY mode of the CZ-1 are switched in accordance with MULTI CHANNEL mode data sent from a personal computer.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	5	0	d ₁ d ₂	F	7

HEX

① MULTI CHANNEL MODE ON → $d_1d_2 = 40_H$
OFF → $d_1d_2 = 00_H$

NOTE: The MULTI CHANNEL mode of the CZ-1 switches OFF and the POLY mode switches on if data are received when $d_1d_2 = 00_H$.

② BASIC CH - 1 = N (0 ~ F_H)

(23) NUMBER OF POLY 1

The number of polyphonics for each CHECK channel in the MULTI CHANNEL mode of the CZ-1 is set in accordance with the NUMBER OF POLY 1 data sent from a personal computer.

The NUMBER OF POLY 1 message is only valid when the CZ-1 is in the MULTI CHANNEL mode.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	5	1	d ₁ d ₂	F	7

HEX

① NUMBER OF POLY 0 ~ 8₁₀ → $d_1d_2 = 00 \sim 08_H$

② CHECK CH - 1 → N (0 ~ F_H)

(24) NUMBER OF POLY 2

The following two numbers of polyphonics are set in the MULTI CHANNEL mode of the CZ-1 in accordance with the NUMBER OF POLY 2 data sent from a personal computer:

- (i) The number of polyphonics for the CHECK channel that equals the BASIC channel and channel number only.
- (ii) The number of polyphonics for all CHECK channels other than that notes in (i) are set to zero.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	5	1	d ₁ d ₂	F	7

HEX

HEX

- ① NUMBER OF POLY $0 \sim 8_{10} \rightarrow d_1d_2 = 40 \sim 48_H$
- ② BASIC CH - 1 = N ($0 \sim F_H$)

The NUMBER OF POLY 2 message is only valid when the CZ-1 is in the MULTI CHANNEL mode.

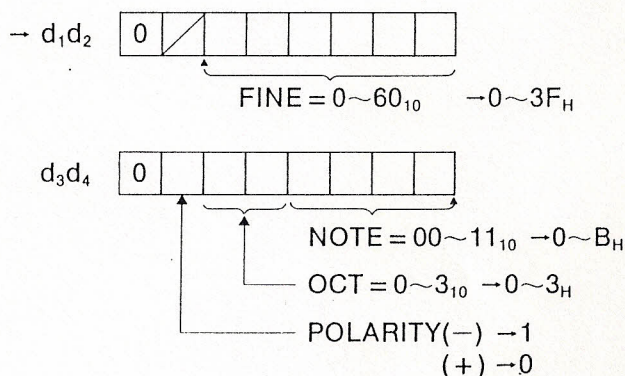
(25) TONE 2 PITCH

The TONE 2 pitch in the TONE MIX MODE of the CZ-1 is set in accordance with the TONE 2 PITCH data sent from a personal computer.

	Personal Computer → CZ-1															
1	F	0	4	4	0	0	0	0	7	N	5	2	d ₁ d ₂	d ₃ d ₄	F	7

HEX

- ① TONE 2 PITCH



- ② BASIC CH - 1 = N ($0 \sim F_H$)

NOTE: FINE data ($0 \sim 60_{10}$) are divided into 6-bit data ($0 \sim 3F_H$) and then sent. The division method is illustrated in the table below:

FINE DATA $0 \sim 60_{10}$	$0_{10} \sim 15_{10}$	$16_{10} \sim 30_{10}$	$31_{10} \sim 45_{10}$	$46_{10} \sim 60_{10}$
MIDI DATA $0_H \sim 3F_H$	$0_H \sim F_H$	$11_H \sim 1F_H$	$21_H \sim 2F_H$	$31_H \sim 3F_H$

(26) SPLIT POINT

The SPLIT POINT of the CZ-1 is set in accordance with SPLIT POINT data sent from a personal computer.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	5	3	d ₁ d ₂	F	7

HEX

- ① SPLIT POINT (SP) $1 \sim 60_{10} \rightarrow d_1d_2 = 24_H \sim 5F_H$

d ₁ d ₂	CZ-1 LOWER keyboard
0~23 _H	1
24 _H ~5F _H	d ₁ d ₂ - 23 _H
60 _H ~7F _H	3C _H

- ② BASIC CH - 1 = N (0~F_H)

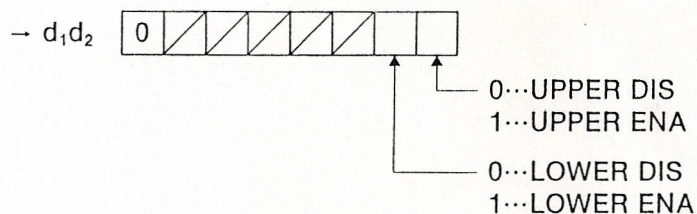
(27) SUS. PEDAL ENA/DIS

The SUS. PEDAL ENA/DIS in the KEY SPLIT mode of the CZ-1 is set in accordance with SUS PEDAL ENA/DIS data sent from a personal computer.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	5	4	d ₁ d ₂	F	7

HEX

- ① SUS. PEDAL ENA/DIS



- ② BASIC CH - 1 = N (0~F_H)

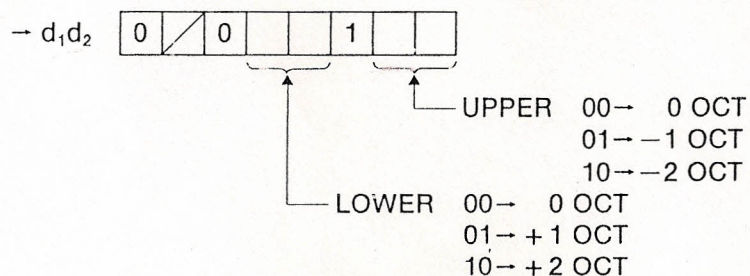
(28) OCT. SHIFT

The OCT. SHIFT in the KEY SPLIT mode of the CZ-1 is set in accordance with OCT. SHIFT data sent from a personal computer.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	5	5	d ₁ d ₂	F	7

HEX

- ① OCT. SHIFT



- ② BASIC CH - 1 = N (0~F_H)

(29) CHORUS ON/OFF

The CHORUS ON/OFF of the CZ-1 is set in accordance with CHORUS ON/OFF data sent from a personal computer.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	5	6	d ₁ d ₂	F	7

HEX

- ① CHORUS ON → d₁d₂ = 40_H
OFF → d₁d₂ = 00_H

- ② BASIC CH - 1 = N (0 ~ F_H)

(30) TIME BREAK

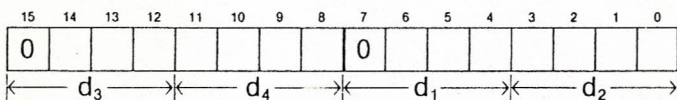
The TIME BREAK* of the CZ-1 is changed in accordance with TIME BREAK data sent from a personal computer.

	Personal Computer → CZ-1														
1	F	0	4	4	0	0	0	0	7	N	5	7	d ₁ d ₂	F	7

HEX

	Personal Computer → CZ-1														
2	F	0	4	4	0	0	0	0	7	N	5	8	d ₃ d ₄	F	7

HEX



The minimum time break for each LSB is approximately 8.192 msec and the value of d₃d₄d₁d₂ is greater than 1C₁₆ (approximately 230 msec). A value less than this is equivalent to a setting of 1C₁₆. The default value is 1C₁₆ when the power of the CZ-1 is switched ON.

* TIME BREAK

Time break occurs and exclusive message control ends when each data byte transmission exceeds the time set above (the time between data bytes) during input of exclusive messages in the CZ-1.

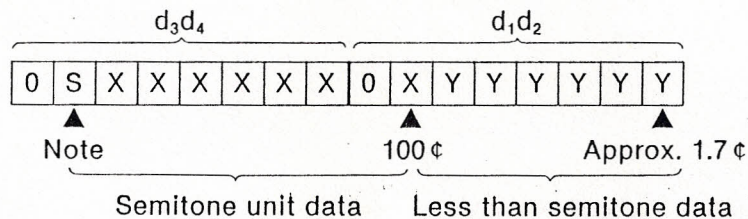
(31) KEY CODE SWEEP

The pitch of the CZ-1 is changed in accordance with KEY CODE SWEEP data sent from a personal computer.

	Personal Computer → CZ-1																
1	F	0	4	4	0	0	0	0	7	N	5	9	d ₁ d ₂	d ₃ d ₄	d ₅ d ₆	F	7

HEX

① Pitch



- (i) Note + → S = 0
 - → S = 1

- (ii) Semitone unit data (7 bit)
 LSB ; 100 ¢

- (iii) Less than semitone data (6 bit)
 LSB ; Approx. 1.7 ¢

② BASIC CH - 1 = d₅d₆ (0 ~ F_H)

* BASIC CH - 1 = N (0_H ~ F_H) when the CZ-1 enters the MULTI CHANNEL mode.

③ N → DON'T CARE

IV TONE DATA DETAILS

- ① In the following explanation, indicates 8-bit data, but actual MIDI output divides the data into the high order 4 bits and the low order 4 bits. Each of these is assigned to the low order 4 bits of 8-bit data and output in the sequence low order → high order.

For example, d₁d₂ is output as 0d₂ 0d₁.

- ② Tone data is always LINE 1/LINE 2 common data regardless of the LINE SELECT status. The format for all LINE 1 data and LINE 2 data is shown on the following page.

(1) TONE DATA

	DATA NAME	DATA FORMAT
1	PFLAG (LINE SELECT OCTAVE)	
2	PDS (DETUNE)	
3	PDEL, PDEH (DETUNE DATA LSB. MSB)	
4	PVK (VIBRATO WAVE)	
5	PVDLD, PVDLV (VIBRATO DELAY TIME)	
6	PVSD, PVSU (VIBRATO RATE)	
7	PVDD, PVDV (VIBRATO DEPTH)	
8	MFW (DCO1 WAVE FORM, MODULATION)	
* 9	MAMD, MAMV (DCA1 KEY FOLLOW, LEVEL)	
*10	MWMD, MWMV (DCW1 KEY FOLLOW)	
*11	PMAL (DCA1 ENVELOPE END STEP, LINE1 VELOCITY (AMP))	
12	PMA (DCA1 ENVELOPE RATE, LEVEL)	
*13	PMWL (DCW1 ENVELOPE END STEP, LINE1 VELOCITY (WAVE))	
14	PMP (DCW1 ENVELOPE RATE, LEVEL)	
*15	PMPL (DCO1 ENVELOPE END STEP, LINE1 VELOCITY (PITCH))	
16	PMW (DCO1 ENVELOPE RATE, LEVEL)	
17	SFW (DCO2 WAVE FORM)	
*18	SAMD, SAMV (DCA2 KEY FOLLOW, LEVEL)	
*19	SWMD, SWMV (DCW2 KEY FOLLOW)	
*20	PSAL (DCA2 ENVELOPE END STEP, LINE1 VELOCITY (AMP))	
21	PSA (DCA2 ENVELOPE RATE, LEVEL)	
*22	PSWL (DCW2 ENVELOPE END STEP, LINE2 VELOCITY (WAVE))	
23	PSW (DCW2 ENVELOPE RATE, LEVEL)	
*24	PSPL (DCO2 ENVELOPE END STEP, LINE 2 VELOCITY (PITCH))	
25	PSP (DCO2 ENVELOPE RATE, LEVEL)	
26	NAME (TONE NAME)	

- * Data contents differ according to the two transmission methods shown in (1) and (2) below. See the following pages for details on each data.

(1) Data transmission using SEND REQUEST 1/RECEIVE REQUEST 1 according to the CZ-5000/CZ-101 tone data format.

(2) Data transmission using SEND REQUEST 2/RECEIVE REQUEST 2 according to the CZ-1 tone data format.

- * #26 NAME data is only transmitted for method (2).

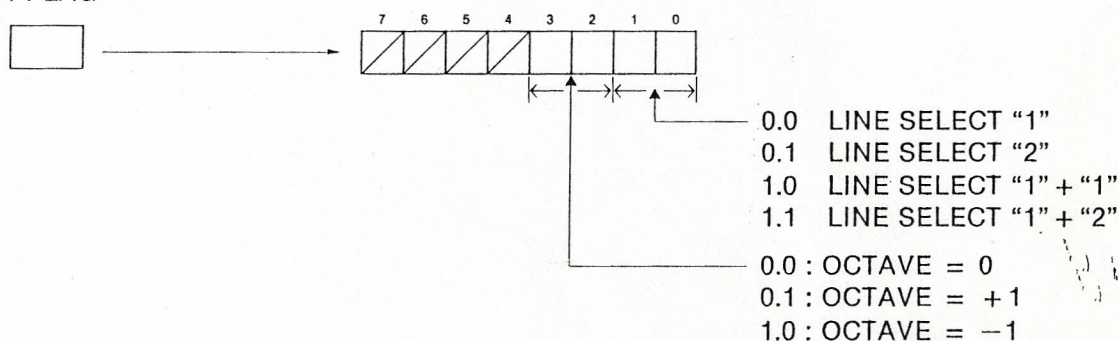
- * The number of tone data bytes transmitted is as follows for each method:

(1) 128 bytes/tone

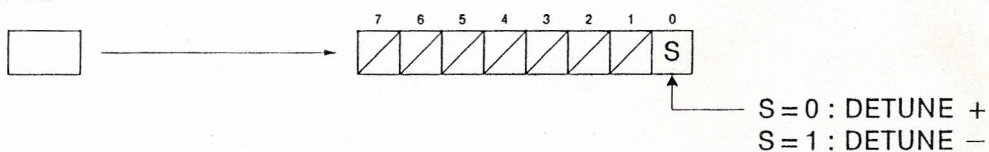
(2) 144 bytes/tone

(2) DETAILS OF DATA

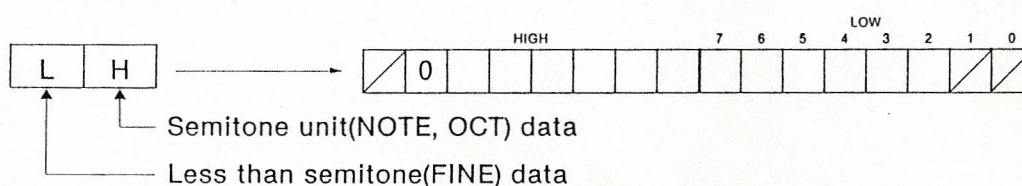
① PFLAG



② PDS



③ PDETL PDETH



(i) LOW (less than semitone data)

Less than semitone data (FINE) data (0~60₁₀) divided into 0~63₁₀ 6-bit data (bit 7~bit 2).

Less than semitone (FINE data)	conversion	MIDI send data
0 }	+0	0 (0) }
15		15 ₁₀ (F _H)
16 }	+1	17 (11) }
30		31 ₁₀ (1F _H)
31 }	+2	33 (21) }
45		47 ₁₀ (2F _H)
46 }	+3	49 (31) }
60 ₁₀		63 ₁₀ (3F _H)

(ii) HIGH data

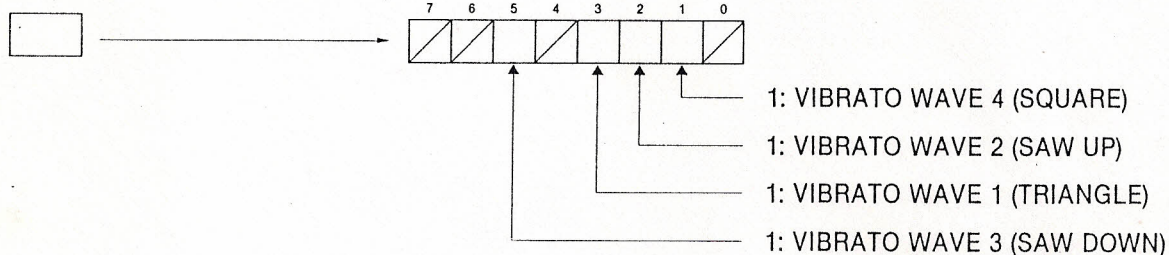
ALL NOTE and OCT. data are converted to semitone units, and made into 0 ~ 47₁₀ semitone HIGH data.

NOTE, OCT, DATA	MIDI DATA
0 NOTE 0 OCT }	0 }
11 ₁₀ NOTE 3 ₁₀ OCT	47 ₁₀ (2F _H)

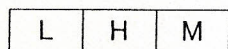
(Valid values 0 ~ 2F_H)

* Transmitted in the sequence LOW, HIGH.

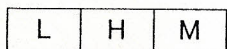
④ PVK



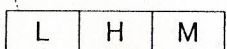
⑤ PVDLD, PVDLV → See Table 1



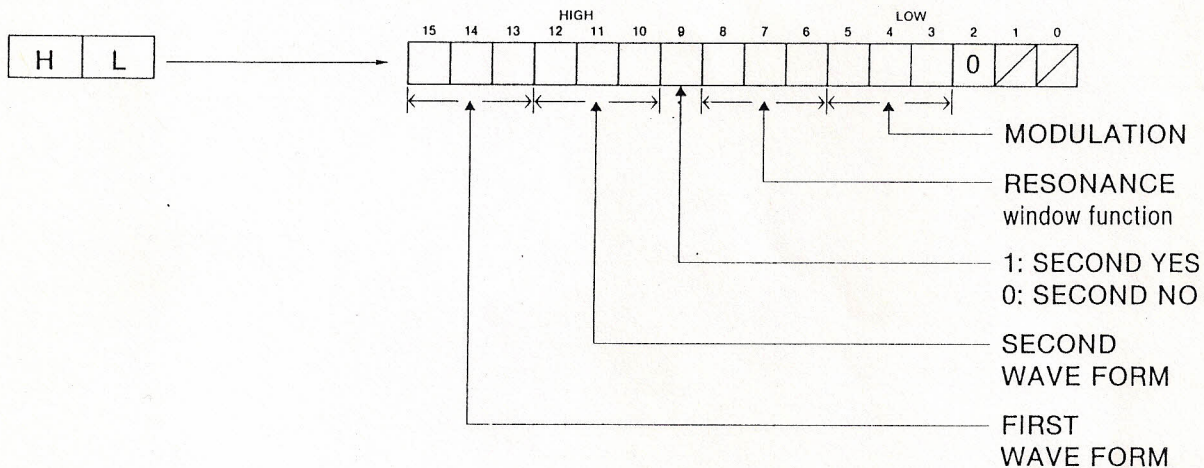
⑥ PVSD, PVSV → See Table 2



⑦ PVDD, PVDV → See Table 3



⑧ MFW



*Transmitted in the sequence LOW, HIGH.

WAVE FORM, MODULATION	16 bit DATA
FIRST=1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
FIRST=2	0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
FIRST=3	0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
FIRST=4	1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
FIRST=5	1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
FIRST=6	1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
FIRST=7	1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
FIRST=8	1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
SECOND=1	0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0
SECOND=2	0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0
SECOND=3	0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0
SECOND=4	1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0
SECOND=5	1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0
SECOND=6	1 1 0 1 0 0 0 1 0 0 0 0 0 0 0 0
SECOND=7	1 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0
SECOND=8	1 1 0 1 0 1 1 0 0 0 0 0 0 0 0 0
MODULATION OFF	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
RING ON	1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
NOISE ON	0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0

⑨-1 MAMD, MAMV (Tone data transmitted by SEND REQUEST 1, RECEIVE REQUEST 1 messages)

L	H
---	---

DCA 1 KEY FOLLOW	MAMD, MAMV (HEX)
0	0 0 0 0
1	0 1 0 8
2	0 2 1 1
3	0 3 1 A
4	0 4 2 4
5	0 5 2 F
6	0 6 3 A
7	0 7 4 5
8	0 8 5 2
9	0 9 5 F

⑨-2 MAMD, MAMV (Tone data transmitted by SEND REQUEST 2, RECEIVE REQUEST 2 messages)

L	H
---	---

DCA 1 KEY FOLLOW	MAMD, MAMV (HEX)
0	d 0 0 0
1	d 1 0 8
2	d 2 1 1
3	d 3 1 A
4	d 4 2 4
5	d 5 2 F
6	d 6 3 A
7	d 7 4 5
8	d 8 5 2
9	d 9 5 F

d; DCA1 LEVEL

DCA1 LEVEL = $01_{10} \sim 15_{10} \rightarrow d = E_H \sim 0_H$

⑩-1 MWMD, MWMV (Tone data transmitted by SEND REQUEST 1, RECEIVE REQUEST 1 messages)

L	H
---	---

DCW 1 KEY FOLLOW	MWMD, MWMV (HEX)
0	0 0 0 0
1	0 1 1 F
2	0 2 2 C
3	0 3 3 9
4	0 4 4 6
5	0 5 5 3
6	0 6 6 0
7	0 7 6 E
8	0 8 9 2
9	0 9 F F

- ⑩-2 MWMD, MWHV (Tone data transmitted by SEND REQUEST 2, RECEIVE REQUEST 2 messages)

L	H
---	---

DCW 1 KEY FOLLOW	MWMD, MWMV (HEX)
0	0 0 0 0
1	0 1 1 9
2	0 2 3 3
3	0 3 4 E
4	0 4 6 A
5	0 5 8 6
6	0 6 A 3
7	0 7 C 1
8	0 8 D F
9	0 9 F F

- ⑪-1 PMAL (Tone data transmitted by SEND REQUEST 1, RECEIVE REQUEST 1 messages)

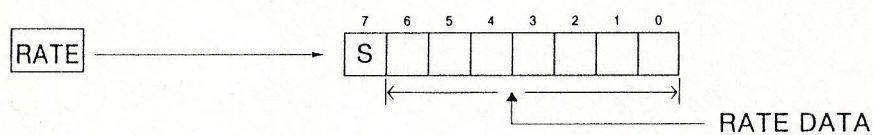
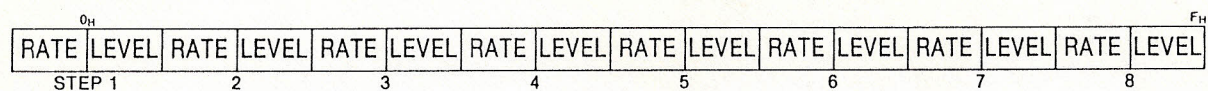
DCA 1 ENVELOPE END STEP	PMAL (HEX)
1	0 0
2	0 1
3	0 2
4	0 3
5	0 4
6	0 5
7	0 6
8	0 7

- ⑪-2 PMAL (Tone data transmitted by SEND REQUEST 2, RECEIVE REQUEST 2 messages)

DCA 1 ENVELOPE END STEP	PMAL (HEX)
1	d 0
2	d 1
3	d 2
4	d 3
5	d 4
6	d 5
7	d 6
8	d 7

d; LINE 1 VELOCITY (AMP)
AMP = 00₁₀ ~ 15₁₀ → d = F_H ~ 0_H

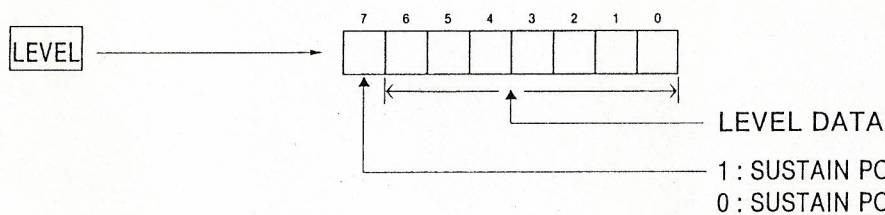
⑫ PMA



When STEP_n LEVEL is L_n:

S = 0: L_n ≥ L(n-1)

S = 1: L_n < L(n-1)



See Table 4 for details on RATE and LEVEL.

⑬-1 PMWL (Tone data transmitted by SEND REQUEST 1, RECEIVE REQUEST 1 messages)



DCW1 ENVELOPE END STEP	PMWL (HEX)
1	0 0
2	0 1
3	0 2
4	0 3
5	0 4
6	0 5
7	0 6
8	0 7

⑬-2 PMWL (Tone data transmitted by SEND REQUEST 2, RECEIVE REQUEST 2 messages)

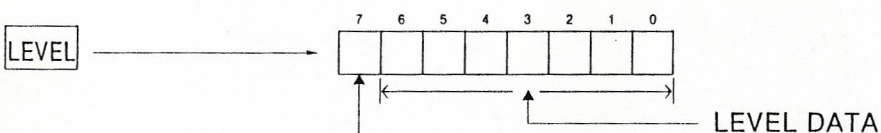
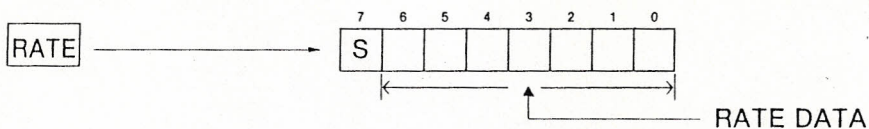


DCW1 ENVELOPE END STEP	PMWL (HEX)
1	d 0
2	d 1
3	d 2
4	d 3
5	d 4
6	d 5
7	d 6
8	d 7

d; LINE 1 VELOCITY (WAVE)

WAVE = 00₁₀ ~ 15₁₀ → d = F_H ~ 0_H

⑭ PMW



When STEP_n LEVEL is L_n:

S = 0: L_n ≥ L(n-1)

S = 1: L_n < L(n-1)

1 : SUSTAIN POINT specified STEP
0 : SUSTAIN POINT unspecified STEP

See Table 5 for details on RATE and LEVEL.

⑮-1 PMPL (Tone data transmitted by SEND REQUEST 1, RECEIVE REQUEST 1 messages)



DCO1 ENVELOPE END STEP	PMPL (HEX)
1	0 0
2	0 1
3	0 2
4	0 3
5	0 4
6	0 5
7	0 6
8	0 7

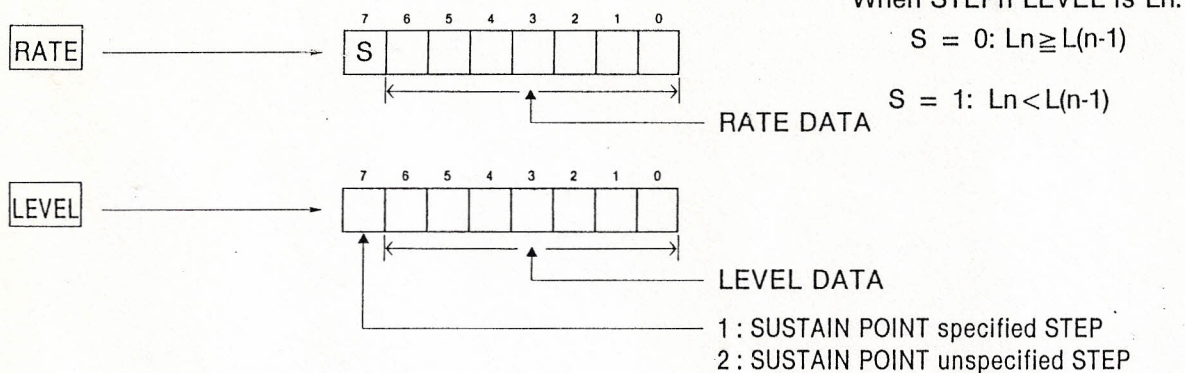
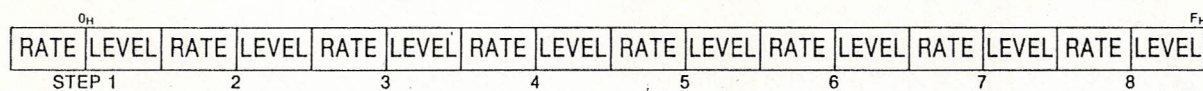
⑮-2 PMPL (Tone data transmitted by SEND REQUEST 2, RECEIVE REQUEST 2 messages)



DCO1 ENVELOPE END STEP	PMPL (HEX)
1	d 0
2	d 1
3	d 2
4	d 3
5	d 4
6	d 5
7	d 6
8	d 7

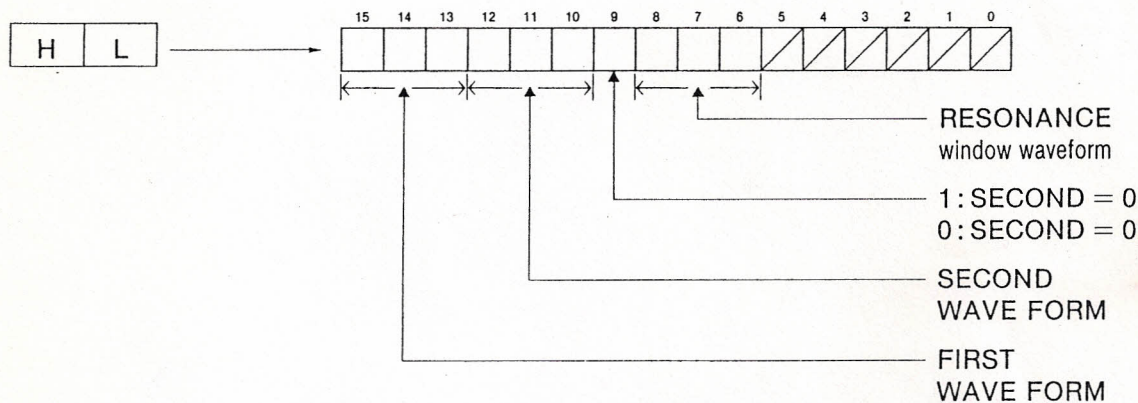
d; LINE 1 VELOCITY (PITCH)
PITCH = 00₁₀ ~ 15₁₀ → d = F_H ~ 0_H

⑩ PMP



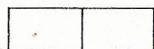
See Table 6 for details on RATE and LEVEL.

⑪ SFW



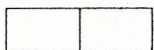
Waveform data format is the same as MFW.

⑫ SMAD, SAMV



DCA 2 KEY FOLLOW and LEVEL data format is the same as that for MAMD and MAMV (see ⑨-1, ⑨-2).

⑬ SWMD, SWMV



DCW 2 KEY FOLLOW format is the same as that for MWMD and MWMV (see ⑩-1, ⑩-2).

⑭ PSAL



DCA 2 ENVELOPE END STEP and LINE 2 VELOCITY (AMP) data format is the same as that for PMAL (see ⑪-1, ⑪-2).

⑮ PSA



DCA 2 ENVELOPE RATE AND LEVEL data format is the same as that for PMA (see ⑫).

②② PSWL

--

DCW 2 ENVELOPE END STEP and LINE 2 VELOCITY (WAVE) data format is the same as that for PMWL (see ⑬-1, ⑬-2).

②③ PSW

--	--

DCW 2 ENVELOPE RATE and LEVEL data format is the same as that for PMW (see ⑭).

②④ PSPL

--

DCO 2 ENVELOPE END STEP and LINE 2 VELOCITY (PITCH) data format is the same as that for PMPL (see ⑮-1, ⑮-2).

②⑤ PSP

--	--

DCO 2 ENVELOPE RATE and LEVEL data format is the same as that for PMP (see ⑯).

②⑥ NAME

0	1			E _H	F _H
---	---	--	--	----------------	----------------

16 byts

Timbre name and data are composed of a total of 16 bytes, with each byte corresponding to the 16 columns on the lower line of the LCD.

LCD (16 digits × 2 lines)

0	1	2													E _H	F _H
---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	----------------	----------------

The following lists the characters that can be used, and data contents are all ASCII characters.

- 1) 26 alphabetic characters
- 2) Numbers 0 ~ 9
- 3) • — / BLANK

VIBRATO DELAY TIME

Order wrong

DELAY TIME	PVDLD, PVDLV (HEX)	DELAY TIME	PVDLD, PVDLV (HEX)	DELAY TIME	PVDLD, PVDLV (HEX)	DELAY TIME	PVDLD, PVDLV (HEX)
0	0 0 0 0 0 0	25	1 9 0 0 1 9	50	3 2 0 0 4 B	75	4 B 0 0 D F
1	0 1 0 0 0 1	26	1 A 0 0 1 A	51	3 3 0 0 4 F	76	4 C 0 0 E 7
2	0 2 0 0 0 2	27	1 B 0 0 1 B	52	3 4 0 0 5 3	77	4 D 0 0 E F
3	0 3 0 0 0 3	28	1 C 0 0 1 C	53	3 5 0 0 5 7	78	4 E 0 0 F 7
4	0 4 0 0 0 4	29	1 D 0 0 1 D	54	3 6 0 0 5 B	79	4 F 0 0 F F
5	0 5 0 0 0 5	30	1 E 0 0 1 E	55	3 7 0 0 5 F	80	5 0 0 1 0 F
6	0 6 0 0 0 6	31	1 F 0 0 1 F	56	3 8 0 0 6 3	81	5 1 0 1 1 F
7	0 7 0 0 0 7	32	2 0 0 0 2 1	57	3 9 0 0 6 7	82	5 2 0 1 2 F
8	0 8 0 0 0 8	33	2 1 0 0 2 3	58	3 A 0 0 6 B	83	5 3 0 1 3 F
9	0 9 0 0 0 9	34	2 2 0 0 2 5	59	3 B 0 0 6 F	84	5 4 0 1 4 F
10	0 A 0 0 0 A	35	2 3 0 0 2 7	60	3 C 0 0 7 3	85	5 5 0 1 5 F
11	0 B 0 0 0 B	36	2 4 0 0 2 9	61	3 D 0 0 7 7	86	5 6 0 1 6 F
12	0 C 0 0 0 C	37	2 5 0 0 2 B	62	3 E 0 0 7 B	87	5 7 0 1 7 F
13	0 D 0 0 0 D	38	2 6 0 0 2 D	63	3 F 0 0 7 F	88	5 8 0 1 8 F
14	0 E 0 0 0 E	39	2 7 0 0 2 F	64	4 0 0 0 8 7	89	5 9 0 1 9 F
15	0 F 0 0 0 F	40	2 8 0 0 3 1	65	4 1 0 0 8 F	90	5 A 0 1 A F
16	1 0 0 0 1 0	41	2 9 0 0 3 3	66	4 2 0 0 9 7	91	5 B 0 1 B F
17	1 1 0 0 1 1	42	2 A 0 0 3 5	67	4 3 0 0 9 F	92	5 C 0 1 C F
18	1 2 0 0 1 2	43	2 B 0 0 3 7	68	4 4 0 0 A 7	93	5 D 0 1 D F
19	1 3 0 0 1 3	44	2 C 0 0 3 9	69	4 5 0 0 A F	94	5 E 0 1 E F
20	1 4 0 0 1 4	45	2 D 0 0 3 B	70	4 6 0 0 B 7	95	5 F 0 1 F F
21	1 5 0 0 1 5	46	2 E 0 0 3 D	71	4 7 0 0 B F	96	6 0 0 2 1 F
22	1 6 0 0 1 6	47	2 F 0 0 3 F	72	4 8 0 0 C 7	97	6 1 0 2 3 F
23	1 7 0 0 1 7	48	3 0 0 0 4 3	73	4 9 0 0 C F	98	6 2 0 2 5 F
24	1 8 0 0 1 8	49	3 1 0 0 4 7	74	4 A 0 0 D 7	99	6 3 0 2 7 F

VIBRATO RATE

adwong

RATE	PVSD, PVS (HEX)	RATE	PVSD, PVS (HEX)	RATE	PVSD, PVS (HEX)	RATE	PVSD, PVS (HEX)
0	0 0 0 0 2 0	25	1 9 0 3 4 0	50	3 2 0 9 E 0	75	4 B 1 C E 0
1	0 1 0 0 4 0	26	1 A 0 3 6 0	51	3 3 0 A 6 0	76	4 C 1 D E 0
2	0 2 0 0 6 0	27	1 B 0 3 8 0	52	3 4 0 A E 0	77	4 D 1 E E 0
3	0 3 0 0 8 0	28	1 C 0 3 A 0	53	3 5 0 B 6 0	78	4 E 1 F E 0
4	0 4 0 0 A 0	29	1 D 0 3 C 0	54	3 6 0 B E 0	79	4 F 2 0 E 0
5	0 5 0 0 C 0	30	1 E 0 3 E 0	55	3 7 0 C 6 0	80	5 0 2 3 E 0
6	0 6 0 0 E 0	31	1 F 0 4 0 0	56	3 8 0 C E 0	81	5 1 2 5 E 0
7	0 7 0 1 0 0	32	2 0 0 4 6 0	57	3 9 0 D 6 0	82	5 2 2 7 E 0
8	0 8 0 1 2 0	33	2 1 0 4 A 0	58	3 A 0 D E 0	83	5 3 2 9 E 0
9	0 9 0 1 4 0	34	2 2 0 4 E 0	59	3 B 0 E 6 0	84	5 4 2 B E 0
10	0 A 0 1 6 0	35	2 3 0 5 2 0	60	3 C 0 E E 0	85	5 5 2 D E 0
11	0 B 0 1 8 0	36	2 4 0 5 6 0	61	3 D 0 F 6 0	86	5 6 2 F E 0
12	0 C 0 1 A 0	37	2 5 0 5 A 0	62	3 E 0 F E 0	87	5 7 3 1 E 0
13	0 D 0 1 C 0	38	2 6 0 5 E 0	63	3 F 1 0 6 0	88	5 8 3 3 E 0
14	0 E 0 1 E 0	39	2 7 0 6 2 0	64	4 0 1 1 E 0	89	5 9 3 5 E 0
15	0 F 0 2 0 0	40	2 8 0 6 6 0	65	4 1 1 2 E 0	90	5 A 3 7 E 0
16	1 0 0 2 2 0	41	2 9 0 6 A 0	66	4 2 1 3 E 0	91	5 B 3 9 E 0
17	1 1 0 2 4 0	42	2 A 0 6 E 0	67	4 3 1 4 E 0	92	5 C 3 B E 0
18	1 2 0 2 6 0	43	2 B 0 7 2 0	68	4 4 1 5 E 0	93	5 D 3 D E 0
19	1 3 0 2 8 0	44	2 C 0 7 6 0	69	4 5 1 6 E 0	94	5 E 3 F E 0
20	1 4 0 2 A 0	45	2 D 0 7 A 0	70	4 6 1 7 E 0	95	5 F 4 1 E 0
21	1 5 0 2 C 0	46	2 E 0 7 E 0	71	4 7 1 8 E 0	96	6 0 4 7 E 0
22	1 6 0 2 E 0	47	2 F 0 8 2 0	72	4 8 1 9 E 0	97	6 1 4 B E 0
23	1 7 0 3 0 0	48	3 0 0 8 E 0	73	4 9 1 A E 0	98	6 2 4 F E 0
24	1 8 0 3 2 0	49	3 1 0 9 6 0	74	4 A 1 B E 0	99	6 3 5 3 E 0

VIBRATO DEPTH

DEPTH	PVDD, PVDV (HEX)	DEPTH	PVDD, PVDV (HEX)	DEPTH	PVDD, PVDV (HEX)	DEPTH	PVDD, PVDV (HEX)
0	0 0 0 0 0 1	25	1 9 0 0 1 A	50	3 2 0 0 4 F	75	4 B 0 0 E 7
1	0 1 0 0 0 2	26	1 A 0 0 1 B	51	3 3 0 0 5 3	76	4 C 0 0 E F
2	0 2 0 0 0 3	27	1 B 0 0 1 C	52	3 4 0 0 5 7	77	4 D 0 0 F 7
3	0 3 0 0 0 4	28	1 C 0 0 1 D	53	3 5 0 0 5 B	78	4 E 0 0 F F
4	0 4 0 0 0 5	29	1 D 0 0 1 E	54	3 6 0 0 5 F	79	4 F 0 1 0 7
5	0 5 0 0 0 6	30	1 E 0 0 1 F	55	3 7 0 0 6 3	80	5 0 0 1 1 F
6	0 6 0 0 0 7	31	1 F 0 0 2 0	56	3 8 0 0 6 7	81	5 1 0 1 2 F
7	0 7 0 0 0 8	32	2 0 0 0 2 3	57	3 9 0 0 6 B	82	5 2 0 1 3 F
8	0 8 0 0 0 9	33	2 1 0 0 2 5	58	3 A 0 0 6 F	83	5 3 0 1 4 F
9	0 9 0 0 0 A	34	2 2 0 0 2 7	59	3 B 0 0 7 3	84	5 4 0 1 5 F
10	0 A 0 0 0 B	35	2 3 0 0 2 9	60	3 C 0 0 7 7	85	5 5 0 1 6 F
11	0 B 0 0 0 C	36	2 4 0 0 2 B	61	3 D 0 0 7 B	86	5 6 0 1 7 F
12	0 C 0 0 0 E	37	2 5 0 0 2 D	62	3 E 0 0 7 F	87	5 7 0 1 8 F
13	0 D 0 0 0 E	38	2 6 0 0 2 F	63	3 F 0 0 8 3	88	5 8 0 1 9 F
14	0 E 0 0 0 F	39	2 7 0 0 3 1	64	4 0 0 0 8 F	89	5 9 0 1 A F
15	0 F 0 0 1 0	40	2 8 0 0 3 3	65	4 1 0 0 9 7	90	5 A 0 1 B F
16	1 0 0 0 1 1	41	2 9 0 0 3 5	66	4 2 0 0 9 F	91	5 B 0 1 C F
17	1 1 0 0 1 2	42	2 A 0 0 3 7	67	4 3 0 0 A 7	92	5 C 0 1 D F
18	1 2 0 0 1 3	43	2 B 0 0 3 9	68	4 4 0 0 A F	93	5 D 0 1 E F
19	1 3 0 0 1 4	44	2 C 0 0 3 B	69	4 5 0 0 B 7	94	5 E 0 1 F F
20	1 4 0 0 1 5	45	2 D 0 0 3 D	70	4 6 0 0 B F	95	5 F 0 2 0 F
21	1 5 0 0 1 6	46	2 E 0 0 3 F	71	4 7 0 0 C 7	96	6 0 0 2 3 F
22	1 6 0 0 1 7	47	2 F 0 0 4 1	72	4 8 0 0 C F	97	6 1 0 2 5 F
23	1 7 0 0 1 8	48	3 0 0 0 4 7	73	4 9 0 0 D 7	98	6 2 0 2 7 F
24	1 8 0 0 1 9	49	3 1 0 0 4 B	74	4 A 0 0 D F	99	6 3 0 3 0 0

AMP. ENVELOPE PMA, PSA

RATE	MIDI DATA (HEX)	RATE	MIDI DATA (HEX)	RATE	MIDI DATA (HEX)	RATE	MIDI DATA (HEX)	LEVEL	MIDI DATA (HEX)	LEVEL	MIDI DATA (HEX)	LEVEL	MIDI DATA (HEX)	LEVEL	MIDI DATA (HEX)
0	00	25	1E	50	3C	75	5A	0	00	25	35	50	4E	75	67
1	01	26	1F	51	3D	76	5B	1	1D	26	36	51	4F	76	68
2	02	27	20	52	3E	77	5C	2	1E	27	37	52	50	77	69
3	03	28	21	53	3F	78	5D	3	1F	28	38	53	51	78	6A
4	04	29	22	54	40	79	5E	4	20	29	39	54	52	79	6B
5	06	30	24	55	42	80	60	5	21	30	3A	55	53	80	6C
6	07	31	25	56	43	81	61	6	22	31	3B	56	54	81	6D
7	08	32	26	57	44	82	62	7	23	32	3C	57	55	82	6E
8	09	33	27	58	45	83	63	8	24	33	3D	58	56	83	6F
9	0A	34	28	59	46	84	64	9	25	34	3E	59	57	84	70
10	0C	35	2A	60	48	85	66	10	26	35	3F	60	58	85	71
11	0D	36	2B	61	49	86	67	11	27	36	40	61	59	86	72
12	0E	37	2C	62	4A	87	68	12	28	37	41	62	5A	87	73
13	0F	38	2D	63	4B	88	69	13	29	38	42	63	5B	88	74
14	10	39	2E	64	4C	89	6A	14	2A	39	43	64	5C	89	75
15	12	40	30	65	4E	90	6C	15	2B	40	44	65	5D	90	76
16	13	41	31	66	4F	91	6D	16	2C	41	45	66	5E	91	77
17	14	42	32	67	50	92	6E	17	2D	42	46	67	5F	92	78
18	15	43	33	68	51	93	6F	18	2E	43	47	68	60	93	79
19	16	44	34	69	52	94	70	19	2F	44	48	69	61	94	7A
20	18	45	36	70	54	95	72	20	30	45	49	70	62	95	7B
21	19	46	37	71	55	96	73	21	31	46	4A	71	63	96	7C
22	1A	47	38	72	56	97	74	22	32	47	4B	72	64	97	7D
23	1B	48	39	73	57	98	75	23	39	48	4C	73	65	98	7E
24	1C	49	3A	74	58	99	77	24	34	49	4D	74	66	99	7F

AMP. ENVELOPE RATE

- ① RATE DATA (α) to MIDI DATA (β) conversion:

$$\beta = 119_{10} * \alpha \div 99_{10}$$

- ② MIDI DATA (β) to RATE DATA (α) conversion:

When $\beta = 0$ $\alpha = 0$

When $\beta = 77_H$ $\alpha = 99_{10}$

In other cases:

$$\alpha = 99 * \beta \div 119_{10} + 1$$

AMP. ENVELOPE LEVEL

LEVEL

MIDI DATA

0

0

1

$29_{10}(1D_H)$

}

$\leftrightarrow$

}

99_{10}

$127_{10}(7F_H)$

Simple one-to-one conversion.

WAVE ENVELOPE PMW, PSW

RATE	MIDI DATA	RATE	MIDI DATA	RATE	MIDI DATA	RATE	MIDI DATA	LEVEL	MIDI DATA	LEVEL	MIDI DATA	LEVEL	MIDI DATA	LEVEL	MIDI DATA
0	08	25	26	50	44	75	62	0	00	25	20	50	40	75	60
1	09	26	27	51	45	76	63	1	01	26	21	51	41	76	61
2	0A	27	28	52	46	77	64	2	02	27	22	52	42	77	62
3	0B	28	29	53	47	78	65	3	03	28	23	53	43	78	64
4	0C	29	2A	54	48	79	66	4	05	29	25	54	45	79	65
5	0E	30	2C	55	4A	80	68	5	06	30	26	55	46	80	66
6	0F	31	2D	56	4B	81	69	6	07	31	27	56	47	81	67
7	10	32	2E	57	4C	82	6A	7	08	32	29	57	49	82	69
8	11	33	2F	58	4D	83	6B	8	0A	33	2A	58	4A	83	6A
9	12	34	30	59	4E	84	6C	9	0B	34	2B	59	4B	84	6B
10	14	35	32	60	50	85	6E	10	0C	35	2C	60	4C	85	6D
11	15	36	33	61	51	86	6F	11	0E	36	2E	61	4E	86	6E
12	16	37	34	62	52	87	70	12	0F	37	2F	62	4F	87	6F
13	17	38	35	63	53	88	71	13	10	38	30	63	50	88	70
14	18	39	36	64	54	89	72	14	11	39	32	64	52	89	72
15	1A	40	38	65	56	90	74	15	13	40	33	65	53	90	73
16	1B	41	39	66	57	91	75	16	14	41	34	66	54	91	74
17	1C	42	3A	67	58	92	76	17	15	42	35	67	55	92	76
18	1D	43	3B	68	59	93	77	18	17	43	37	68	57	93	77
19	1E	44	3C	69	5A	94	78	19	18	44	38	69	58	94	78
20	20	45	3E	70	5C	95	7A	20	19	45	39	70	59	95	79
21	21	46	3F	71	5D	96	7B	21	1A	46	3B	71	5B	96	7B
22	22	47	40	72	5E	97	7C	22	1C	47	3C	72	5C	97	7C
23	23	48	41	73	5F	98	7D	23	1D	48	3D	73	5D	98	7D
24	24	49	42	74	60	99	7F	24	1E	49	3E	74	5E	99	7F

WAVE ENVELOPE RATE

- ① RATE DATA (α) to MIDI DATA (β) conversion:

$$\beta = 119_{10} * \alpha \div 99_{10} + 8$$

- ② MIDI DATA (β) to RATE DATA (α) conversion:

$$\text{When } \beta' = \beta - 8$$

$$\text{When } \beta' = 0 \quad \alpha = 0$$

$$\text{When } \beta' = 77_H \quad \alpha = 99_H$$

In other cases:

$$\alpha' = 99_{10} * \beta' \div 119_{10} + 1$$

WAVE ENVELOPE LEVEL

- ① LEVEL DATA (α) to MIDI DATA (β) conversion:

$$\beta = 127_{10} * \alpha \div 99_{10}$$

- ② MIDI DATA (β) to LEVEL DATA (α) conversion:

$$\text{When } \beta = 0 \quad \alpha = 0$$

$$\text{When } \beta = 7F_H \quad \alpha = 99_{10}$$

In other cases:

$$\alpha = 99_{10} * \beta \div 127_{10} + 1$$

PITCH ENVELOPE PMP, PSP

RATE	MIDI DATA (HEX)	RATE	MIDI DATA (HEX)	RATE	MIDI DATA (HEX)	RATE	MIDI DATA (HEX)	LEVEL	MIDI DATA (HEX)	LEVEL	MIDI DATA (HEX)	LEVEL	MIDI DATA (HEX)	LEVEL	MIDI DATA (HEX)
0	00	25	20	50	40	75	60	0	00	25	19	50	32	75	4F
1	01	26	21	51	41	76	61	1	01	26	1A	51	33	76	50
2	02	27	22	52	42	77	62	2	02	27	1B	52	34	77	51
3	03	28	23	53	43	78	64	3	03	28	1C	53	35	☆78	52
4	05	29	25	54	45	79	65	4	04	29	1D	54	36	79	53
5	06	30	26	55	46	80	66	5	05	30	1E	55	37	80	54
6	07	31	27	56	47	81	67	6	06	31	2F	56	38	81	55
7	08	32	29	57	49	82	69	7	07	32	20	57	39	82	56
8	0A	33	2A	58	4A	83	6A	8	08	33	21	58	3A	83	57
9	0B	34	2B	59	4B	84	6B	9	09	34	22	59	3B	☆84	58
10	0C	35	2C	60	4C	85	6D	10	0A	35	23	60	3C	85	59
11	0E	36	2E	61	4E	86	6E	11	0B	36	24	61	3D	86	5A
12	0F	37	2F	62	4F	87	6F	12	0C	37	25	62	3E	87	5B
13	10	38	30	63	50	88	70	13	0D	38	23	63	3F	88	5C
14	11	39	32	64	52	89	72	14	0E	39	27	64	44	89	5D
15	13	40	33	65	53	90	73	15	0F	40	28	65	45	☆90	5E
16	14	41	34	66	54	91	74	16	10	41	29	☆66	46	91	5F
17	15	42	35	67	55	72	76	17	11	42	2A	67	47	92	60
18	17	43	37	68	57	93	77	18	12	43	2B	68	48	93	61
19	18	44	38	69	58	94	78	19	13	44	2C	69	49	94	62
20	19	45	39	70	59	95	79	20	14	45	2D	70	4A	95	63
21	1A	46	3B	71	5B	96	7B	21	15	46	2E	71	4B	☆96	64
22	1C	47	3C	72	5C	97	7C	22	16	47	2F	☆72	4C	97	65
23	1D	48	3D	73	5D	98	7D	23	17	48	30	73	4D	98	66
24	1E	49	3E	74	5E	99	7F	24	18	49	31	74	4E	99	67

PITCH ENVELOPE RATE

- ① RATE DATA (α) to MIDI DATA (β) conversion:

$$\beta = 127_{10} * \alpha \div 99_{10}$$

- ② MIDI DATA (β) to RATE DATA (α) conversion:

$$\text{When } \beta = 0 \quad \alpha = 0$$

$$\text{When } \beta = 7F_H \quad \alpha = 99_{10}$$

In other cases:

$$\alpha = 99_{10} * \beta \div 127_{10} + 1$$

PITCH ENVELOPE LEVEL

LEVEL DATA MIDI DATA

$$\left. \begin{array}{l} 0 \\ \vdots \\ 63_{10} \end{array} \right\} \longleftrightarrow \left\{ \begin{array}{l} 0 \\ \vdots \\ 63_{10} (3F_H) \end{array} \right.$$

$$\left. \begin{array}{l} 64_{10} \\ \vdots \\ 99_{10} \end{array} \right\} \longleftrightarrow \left\{ \begin{array}{l} 68_H (44_H) \\ \vdots \\ 103_{10} (67_H) \end{array} \right.$$

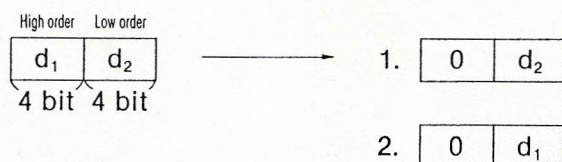
one-to-one

☆ indicates octaves from basic pitch of LEVEL = 0.

V. OPERATION MEMORY DATA

(1) Operation memory data

- ① As with the tone data in the previous section, operation memory data is also handled in 4-bit segments for MIDI OUT.



- ② Operation memory data takes on the form of NORMAL mode type, TONE MIX mode type or KEY SPLIT mode type. Each of these three forms of data is illustrated in the following pages. The messages SEND REQUEST 3 and RECEIVE REQUEST 3 are used to send/receive operation memory data.

NORMAL MODE FORM

	DATA NAME	DATA FORMAT
1	MODE NO.	0
2	PORTAMENTO TIME	
3	PORTAMENTO SWEEP	
4	GLIDE TIME	
5	GLIDE NOTE	
6	MODULATION DEPTH	
7	BEND RANGE	
8	MOD. AFTER TOUCH DEPTH	
9	MOD. AFTER TOUCH RANGE	
10	NORMAL EFFECT ON/OFF	
11	MODE FLAG	
12	NORMAL PROGRAM NO.	
13	_____	
14	_____	
15	_____	
16	_____	
17	_____	
18	_____	
19	_____	
20	_____	

All data formats are 1 byte.

TONE MIX MODE FORM

	DATA NAME	DATA FORMAT
1	MODE NO.	
2	PORTAMENTO TIME	
3	PORTAMENTO SWEEP	
4	GLIDE TIME	
5	GLIDE NOTE	
6	MODULATION DEPTH	
7	BEND RANGE	
8	MOD. AFTER TOUCH DEPTH	
9	MOD. AFTER TOUCH RANGE	
10	EFFECT ON/OFF	
11	MODE FLAG	
12	TONE 1 PROGRAM NO.	
13	TONE 2 PROGRAM NO.	
14	TONE 1 LEVEL	
15	TONE 2 LEVEL	
16	TONE 2 FINE	
17	TONE 2 OCT. NOTE	
18	_____	
19	_____	
20	_____	

All data formats are 1 byte.

KEY SPLIT MODE FORM

	DATA NAME	DATA FORMAT
1	MODE NO.	
2	PORTAMENTO TIME	
3	PORTAMENTO SWEEP	
4	GLIDE TIME	
5	GLIDE NOTE	
6	MODULATION DEPTH	
7	BEND RANGE	
8	MOD. AFTER TOUCH DEPTH	
9	MOD. AFTER TOUCH RANGE	
10	LOWER EFFECT ON/OFF	
11	MODE FLAG	
12	UPPER EFFECT ON/OFF	
13	MODE FLAG	
14	SPLIT POINT	
15	LOWER PROGRAM NO.	
16	UPPER PROGRAM NO.	
17	LOWER LEVEL	
18	UPPER LEVEL	
19	LOWER OCT. SHIFT	
20	UPPER OCT. SHIFT	

All data formats are 1 byte.

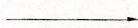
(2) DATA DETAILS

① MODE NO.



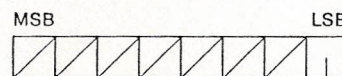
- 0 NORMAL MODE FORM
- 1 TONE MIX MODE FORM
- 2 KEY SPLIT MODE FORM

② PORTAMENTO TIME



0 ~ 99₁₀

③ PORTAMENTO SWEEP

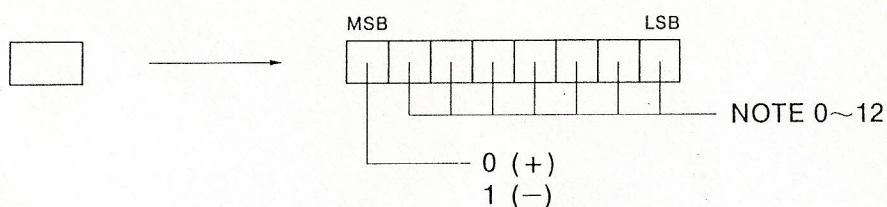


- 0 SWEEP 0
- 1 SWEEP 1

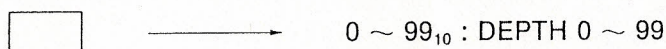
④ GLIDE TIME



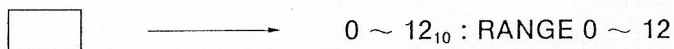
⑤ GLIDE NOTE



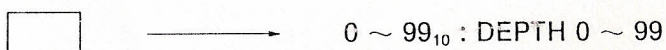
⑥ MODULATION DEPTH



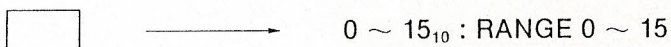
⑦ BEND RANGE



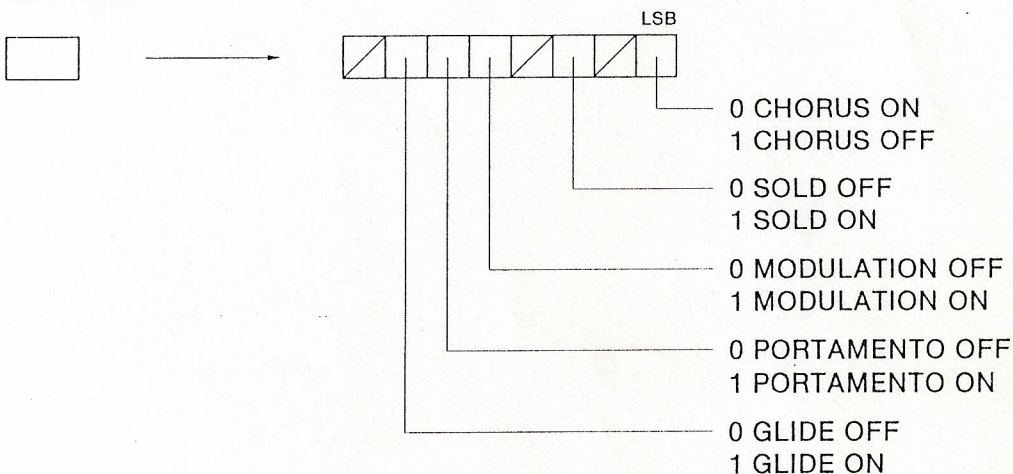
⑧ MOD. AFTER TOUCH DEPTH



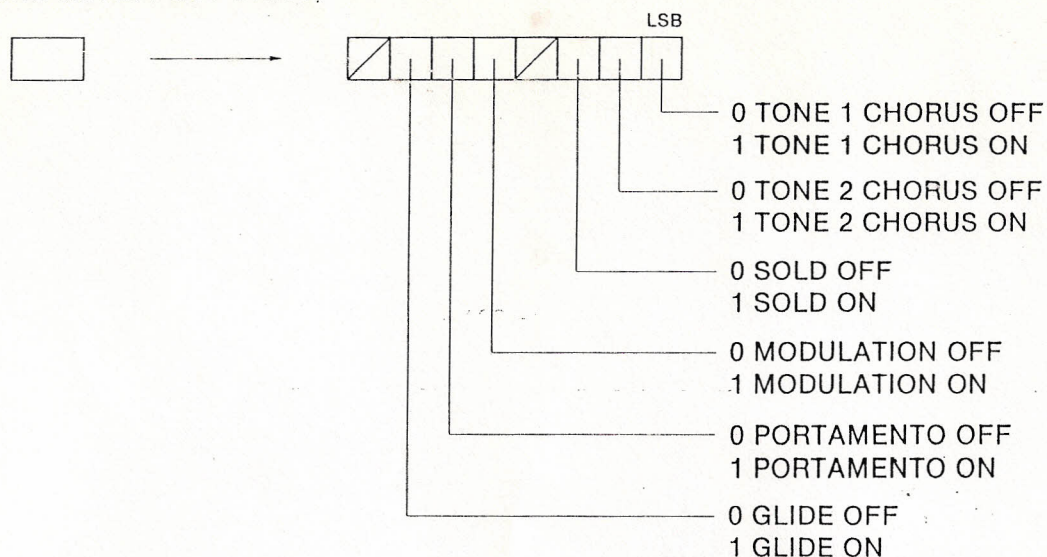
⑨ MOD. AFTER TOUCH RANGE



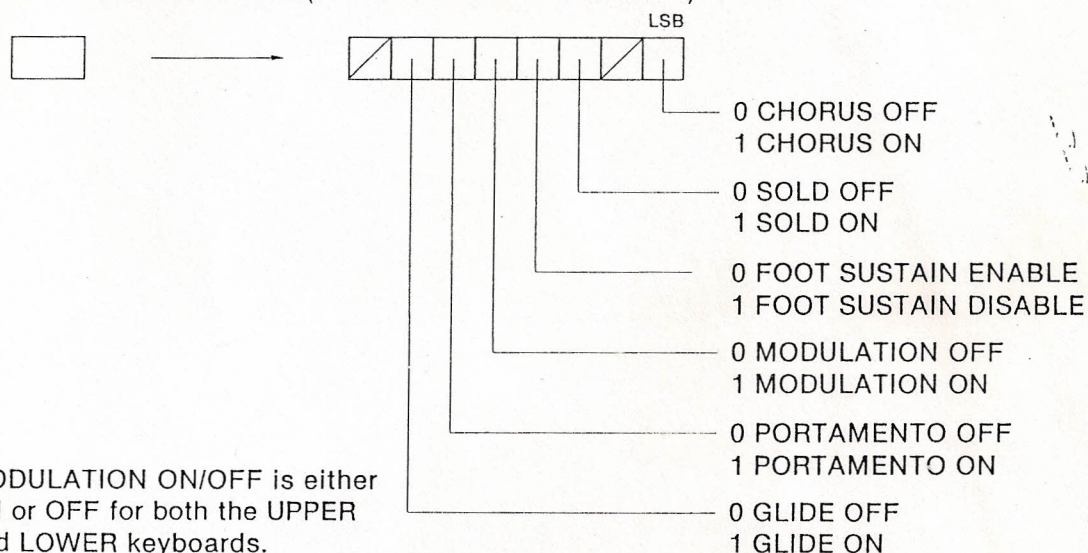
⑩ NORMAL EFFECT ON/OFF



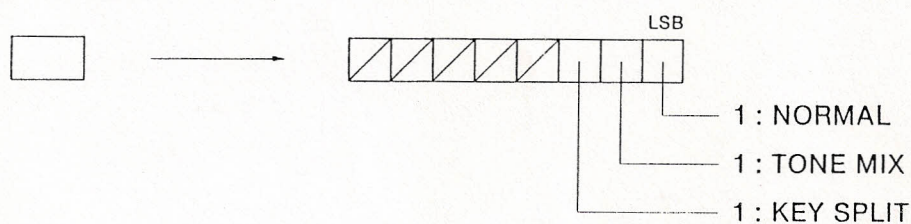
⑪ TONE MIX EFFECT ON/OFF



⑫ LOWER EFFECT ON/OFF (KEY SPLIT LOWER KEY SIDE)
UPPER EFFECT ON/OFF (KEY SPLIT UPPER KEY SIDE)



⑬ MODE FLAG



Any one of the three low order bits must be 1. The NORMAL mode is assumed when all three low order bits are 0.

- 11

0 ~ 7 ₁₀	CARTRIDGE BANK	A-1 ~ A-8
8 ~ 15 ₁₀	CARTRIDGE BANK	B-1 ~ B-8
16 ~ 23 ₁₀	CARTRIDGE BANK	C-1 ~ C-8
24 ~ 31 ₁₀	CARTRIDGE BANK	D-1 ~ D-8
32 ~ 39 ₁₀	CARTRIDGE BANK	E-1 ~ E-8
40 ~ 47 ₁₀	CARTRIDGE BANK	F-1 ~ F-8
48 ~ 55 ₁₀	CARTRIDGE BANK	G-1 ~ G-8
56 ~ 63 ₁₀	CARTRIDGE BANK	H-1 ~ H-8
64 ~ 71 ₁₀	INTERNAL BANK	A-1 ~ A-8
72 ~ 79 ₁₀	INTERNAL BANK	B-1 ~ B-8
80 ~ 87 ₁₀	INTERNAL BANK	C-1 ~ C-8
88 ~ 95 ₁₀	INTERNAL BANK	D-1 ~ D-8
96 ~ 103 ₁₀	INTERNAL BANK	E-1 ~ E-8
104 ~ 111 ₁₀	INTERNAL BANK	F-1 ~ F-8
112 ~ 119 ₁₀	INTERNAL BANK	G-1 ~ G-8
120 ~ 127 ₁₀	INTERNAL BANK	H-1 ~ H-8

- ⑮ TONE 1 LEVEL
TONE 2 LEVEL
LOWER LEVEL
UPPER LEVEL

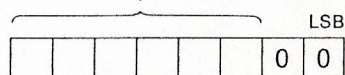


1~15₁₀ : LEVEL 1~15

- ⑩ TONE 2 FINE (TONE MIX)



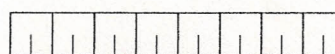
0~63₁₀ : FINE 0~60



The table below shows the relationship between the FINE 0~60₁₀ and MIDI send data 0~63₁₀.

FINE DATA 0~60 ₁₀	0 ₁₀ ~15 ₁₀	16 ₁₀ ~30 ₁₀	31 ₁₀ ~45 ₁₀	46 ₁₀ ~60 ₁₀
MIDI SENT DATA 0~63 ₁₀	0 ₁₀ ~15 ₁₀	17 ₁₀ ~31 ₁₀	33 ₁₀ ~47 ₁₀	49 ₁₀ ~63 ₁₀

- ⑪ TONE OCT. + NOTE (TONE MIX)



OCT. + NOTE

0 (+)

1 (—)

7 bits	OCT.	NOTE
0~11	0	0~11 ₁₀
12~23	1	0~11 ₁₀
24~35	2	0~11 ₁₀
36~47	3	0~11 ₁₀

(18) LOWER OCT. SHIFT (KEY SPLIT)



0~2 : OCT. SHIFT +0~+2

(19) UPPER OCT. SHIFT (KEY SPLIT)



0, 81(HEX), 82(HEX) : OCT. SHIFT +0, -1, -2

(20) SPLIT POINT



1~60₁₀ : SPLIT POINT 1~60₁₀