HOHNER DIGITAL SYNTHESIZER

HS-2, HS-2/E

MIDI SYSTEM EXCLUSIVE

HOHNER

HS-2, HS-2/E MIDI SYSTEM EXCLUSIVE FORMAT

HS-2, HS-2/E MIDI System Exclusive Format

The HS-2, HS-2/E is capable of transmitting and receiving MIDI system exclusive messages as listed below. The transmit/receive status of each message is also noted.
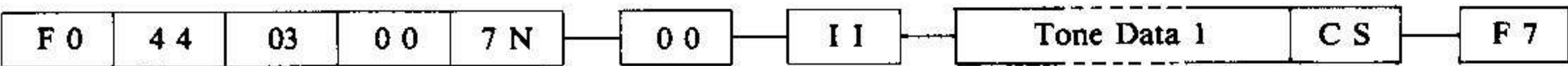
I. System Exclusive Messages Transmit/Receive

MESSAGE	OP.MEM		NORMAL		COMBI		MULTI	
	Transmit	Receive	Transmit	Receive	Transmit	Receive	Transmit	Receive
Tone Data 1		O	O	O	O	O		O
Operation Data 1	O	O						
Multi Channel mode data	O	O	O	O	O	O	O	O
Master Tune		O		O		O		O
Key Transpose		O		O		O		O
Mode Change		O		O		O		O
Card Bank Change	O	O	O	O	O	O	O	O
Save/Load	O	O	O	O	O	O	O	O

II. Message Formats

1. Tone Data 1

i) Data format

| F0 | 44 | 03 | 00 | 7N |—| 00 |—| I I |—| Tone Data 1 | C S |—| F 7 |

$N_{(H)}$: BASIC CH.
$I I_{(H)}$: Data receive area
* Basic channel is that set in MENU 3-03 (lowest voice of keyboard split).
        Display data $- 1 = N (0_H \sim F_H)$
* I I indicates range in which data is received by receiving device.

$I I_{(H)}$	Contents
40	Normal, C/R 0
41	Tone 1, C/R 1
42	Tone 2, C/R 2
43	Tone 3, C/R 3
44	Tone 4, C/R 4

* Refer to page 9 for information on internal format of Tone Data 1.
* CS: Check Sum (7 bit)
* C/R: Compare Recall

ii) Transmit/Receive status

	Transmit/Receive Validity Mode	MENU 3-04 EXCLUSIVE =
Transmitted	NORMAL, COMBI Play mode	ENA
Received	OP.MEM ~ MULTI Play mode	ENA

iii) Transmit/Receive Operations

    TRANSMIT: When tone selection is made in NORMAL or COMBI play modes or when C/R key is pressed, selected tone data is transmitted to receiving device.

    RECEIVE: When Tone Data 1 is received in play mode of OPERATION MEMORY or MULTI modes, data is transferred to play mode of NORMAL or COMBI mode according to value of I I. Operational status changes as follows:

        NORMAL: C/R LED lights and LCD point indicates C/R. Name of received tone is displayed and received tone is sounded.

   COMBI: Received data transferred to COMBI mode. When data corresponds to first flashing tone indicator, C/R indicator lights and pointer on LCD indicates C/R. Name of received tone is displayed.

        When data does not correspond to first flashing tone indicator, pointer indicates C/R however C/R indicator does not light. When cursor key is pressed, C/R indicator lights and tone name is displayed.

    NOTE) When Program Change and Tone Data 1 messages are sent in succession, receiving device executes only Program Change and an error message is displayed.

2. Operation Data 1

i) Data format
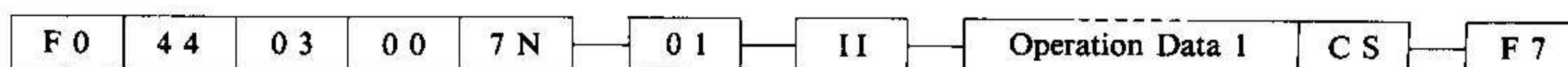
| F 0 | 4 4 | 0 3 | 0 0 | 7 N | — | 0 1 | — | I I | — | Operation Data 1 | C S | — | F 7 |

$N_{(H)}$: BASIC CH.
$I I_{(H)}$: Data receive area
* Basic channel is that set in MENU 3-03 (lowest voice of keyboard split).
        Display data $- 1 = N (O_H \sim F_H)$
* I I indicates range in which data is received by receiving device.

$I I_{(H)}$	Contents
40	Sound Area

* Refer to page 9 for information on internal format of Operation Data 1. 1.
* CS: Check Sum (7 bit)

ii) Transmit/Receive status

	Transmit/Receive Validity Mode	MENU 3-04 EXCLUSIVE =
Transmitted	OPERATION MEMORY Play mode	ENA
Received	OPERATION MEMORY Play mode	ENA

iii) Transmit/Receive Operations

   TRANSMIT: When Operation No. is selected in OPERATION MEMORY play mode, Operation Data called up to Sound Area is transmitted to Sound Area of receiving device.

    RECEIVE: When Operation Data 1 is received in OPERATION MEMORY play mode, data is written to operation memory Sound Area.

    LCD pointer remains in same state as before reception, while operation name and tone pointer are received. However, contents of Operation Data 1 include tone pointer as well as MENU 2 parameters. Because of this, tone which actually sounds depends on voice data of receiving device.

3. Multi Channel Mode Data

i) Data format

| F 0 | 4 4 | 0 3 | 0 0 | 7 N | — | 0 2 | — | 0 0 | — | Multi Channel Data | C S | — | F 7 |
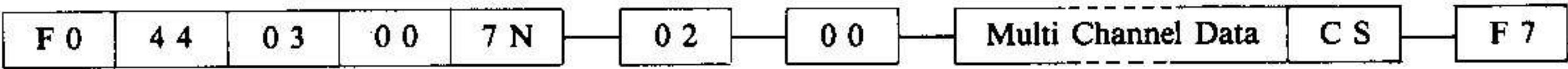
$N_{(H)}$: BASIC CH.
* Basic channel is that set in MENU 3-03 and is unrelated to AREA channel.
   Display data − 1 = N ($0_H \sim F_H$).
* Refer to page 25 for information on internal format of Multi Channel data.
* CS: Check Sum (7 bit)

ii) Transmit/Receive status

	Transmit/Receive Validity Mode	MENU 3-04 EXCLUSIVE =
Transmitted	MULTI Play mode, Menu mode	ENA
Received	OP. MEM ~ MULTI CH. Play mode	ENA

iii) Transmit/Receive Operations

TRANSMIT: When MULTI CH. mode key is pressed in OPERATION MEMORY ~ MULTI modes (PLAY or MENU), Multi Channel mode data is transferred to working area of receiving device and MULTI CH. mode is selected.

RECEIVE: When MULTI CH. mode data is received in play mode of OP. MEMORY ~ MULTI modes, MULTI CH. play mode is selected.
Displayed AREA corresponds to AREA last selected in MULTI CH. mode. MULTI CH. mode data contents include tone pointers for each AREA, polyphonic number, level and other PLAY DATA, as well as MENU 2 parameters. Because of this, tone which actually sounds depends on set voice data of receiving device.

4. Master Tune

## i) Data format

| F 0 | 4 4 | 0 3 | 0 0 | 7 N | — | 4 0 | — | 0 0 | — | 0 D_U | D_L | — | F 7 |

$N_{(H)}$: BASIC CH.
$D_U, D_{L(H)}$: DATA
* Basic channel is that set in MENU 3-03 (lowest voice of keyboard split)
         Display data − 1 = N ($0_H \sim F_H$)
* Internal format of D_U and D_L.
  Note number
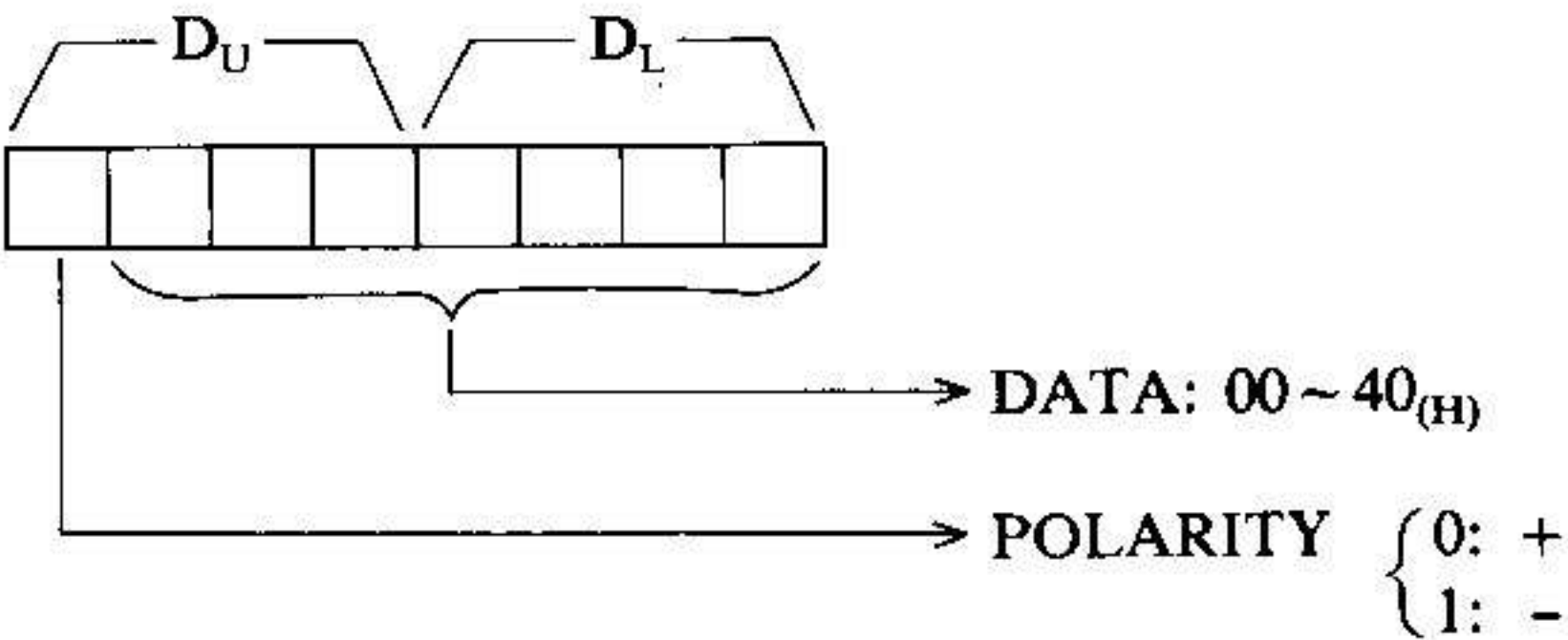
DATA: 00 ~ 40$_{(H)}$

POLARITY { 0: +
          { 1: −

ii) Transmit/Receive status

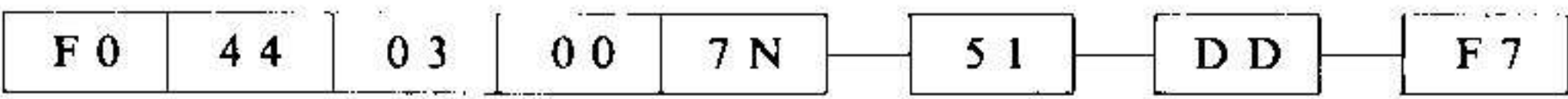|	Transmit/Receive Validity Mode	MENU 3-04 EXCLUSIVE =
Transmitted		
Received	OP. MEM ~ MULTI CH. Play mode, Menu mode	Don't Care

iii) Transmit/Receive Operations

TRANSMIT: None

RECEIVE: When MASTER TUNE data is received from a personal computer or other device while in the OP.MEM ~ MULTI modes (PLAY or MENU), operational status changes as follows:
In PLAY mode   : Status unchanged
In MENU mode   : Operation shifted to PLAY mode

5. Key Transpose

i) Data format

| F 0 | 4 4 | 0 3 | 0 0 | 7 N | — | 4 0 | — | 0 1 | — | 0 D_U | 0 D_L | — | F 7 |

$N_{(H)}$: BASIC CH.
D_U. $D_{L(H)}$: DATA

* Basic channel is that set in MENU 3-03 (lowest voice of keyboard split).
        Display data $- 1 = N$ $(0_H \sim F_H)$
* Internal format of D_U and D_L

DATA: 00 ~ { 06 (UP)
              { 05 (Down)
POLARITY { 0: +
          { 1: -
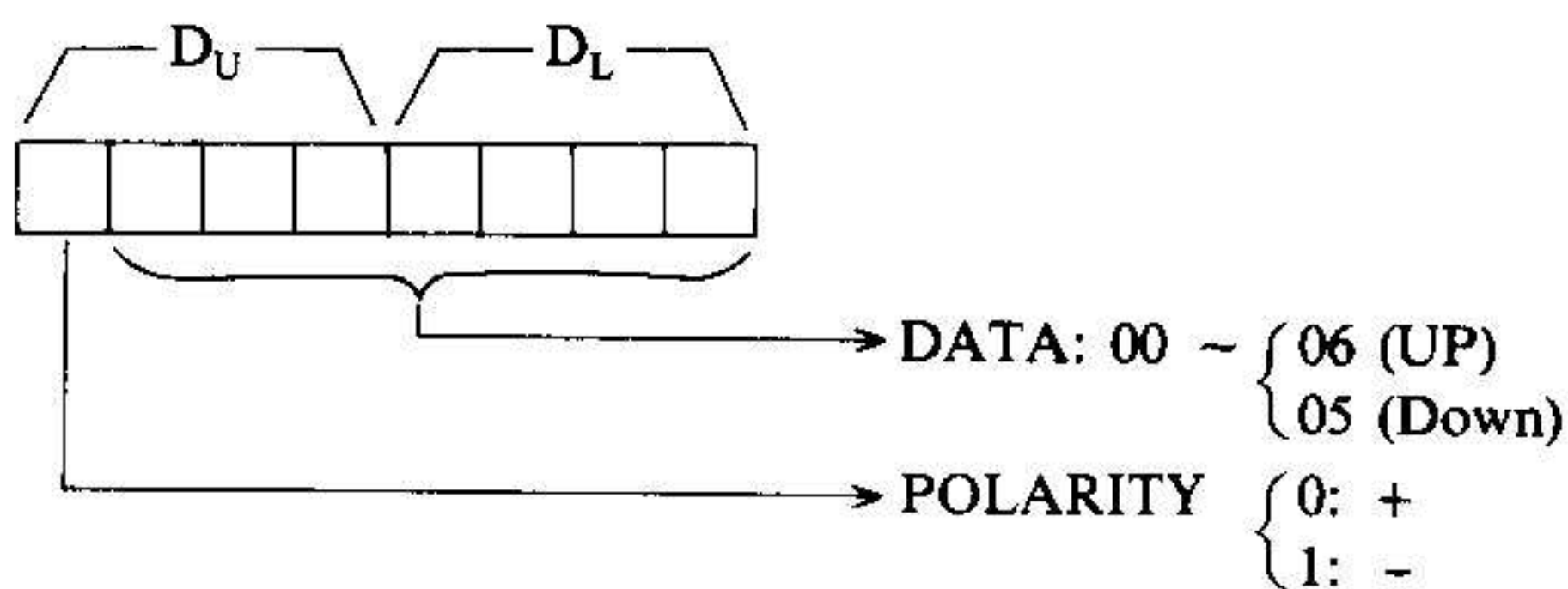
ii) Transmit/Receive status

	Transmit/Receive Validity Mode	MENU 3-04 EXCLUSIVE =
Transmitted		
Received	OP.MEM ~ MULTI CH. Play mode, Menu mode	Don't Care

iii) Transmit/Receive Operations

TRANSMIT: None

RECEIVE: When KEY TRANSPOSE data is received from a personal computer or other device while in the OP. MEM ~ MULTI modes (PLAY or MENU) operational status changes as follows:
In PLAY Mode   : Status unchanged
In MENU mode   : Operation shifted to PLAY mode
However, relationship between key position and MIDI Note No. is not changed when KEY TRANS-POSE message is received.

6. Mode Change

i) Data format

| F 0 | 4 4 | 0 3 | 0 0 | 7 N |—| 5 0 |—| D D |—| F 7 |

$N_{(H)}$: BASIC CH.

$D D_{(H)}$: Data

* Basic channel is that set in MENU 3-03 (lowest voice of keyboard split).

Display data - 1 = N ($0_H \sim F_H$)

* Contents of DD

$D D_{(H)}$	Contents
00	Normal Mode
01	Combination Mode
02	Operation Memory Mode
03	Multi CH. Mode
04	Multi CH. Poly = 0
05	Multi CH. Poly = 1

ii) Transmit/Receive status

	Transmit/Receive Validity Mode	MENU 3-04 EXCLUSIVE =
Transmitted		
Received	OP.MEM ~ MULTI CH. Play mode, Menu mode	Don't care

iii) Transmit/Receive Operations

TRANSMIT: None

RECEIVE: When MODE CHANGE data is received from a personal computer or other device while in the OP. MEM ~ MULTI modes (PLAY or MENU), operational status shifts to OP. MEM ~ MULTI play mode according to specifications of received data.

Display message and selected tone are those were last selected in the specified mode. However, when DD = $04_{(H)}$ or $05_{(H)}$ in MULTI CH. mode, POLY number changes as shown above.

7. Card Bank Change

i) Data format

| F 0 | 4 4 | 0 3 | 0 0 | 7 N |—| 5 1 |—| D D |—| F 7 |

$N_{(H)}$: BASIC CH.

$D D_{(H)}$: Data

* Basic channel is that set in MENU 3-03 (lowest voice of keyboard split).

Display data - 1 = N ($0_H \sim F_H$)

* DD contents

$D D_{(H)}$	Contents
00 ~ 03	Card Bank 1 ~ 4

ii) Transmit/Receive status

	Transmit/Receive Validity Mode	MENU 3-04 EXCLUSIVE =	MENU 3-04 PROG. NO =
Transmitted	OP. MEM ~ MULTI CH. Play mode	Don't care	0 ~ 64, 0 ~ 127
Received	OP. MEM ~ MULTI CH. Play mode	Don't care	0 ~ 64, 0 ~ 127

iii) Transmit/Receive Operations

TRANSMIT: When CARD BANK is changed by pressing the CARD key while CARD is already selected in OP. MEM ~ MULTI play mode, the selected CARD BANK No. is transmitted.

RECEIVE: When CARD BANK CHANGE data is received in OP. MEM ~ MULTI play mode, operational status changes as follows:

OP. MEM./NORMAL modes: Bank shifts to that specified by received data. Tone and Operation pointers (A-1 ~ H-8) are not altered.

COMBI mode: Received CARD BANK tone assigned to tone selector specified before data reception (corresponding LED flashing). When using other CARD tones, display changes however tone does not. By moving cursor or pressing the COMBI MODE key, selected tone changes to received CARD BANK tone.

MULTI mode: Received CARD BANK tone assigned to presently displayed AREA. Other AREAs utilizing CARD tones are not altered at this point, but are changed when called up on LCD display.

8. Save/Load

i) Data format

OPEN: | F 0 | 4 4 | 0 3 | 0 0 | 7 N | — | 7 0 | — | K K | — | F 7 |

CLOSE: | F 0 | 4 4 | 0 3 | 0 0 | 7 N | — | 7 1 | — | F 7 |

OK: | F 0 | 4 4 | 0 3 | 0 0 | 7 N | — | 7 2 | — | F 7 |

ERROR: | F 0 | 4 4 | 0 3 | 0 0 | 7 N | — | 7 3 | — | F 7 |

DATA: | F 0 | 4 4 | 0 3 | 0 0 | 7 N | — | 7 4 | — | [| C_S | | C_S | | C_S |] | — | F 7 |

— Data —

Tone data 1 or Operation data 1
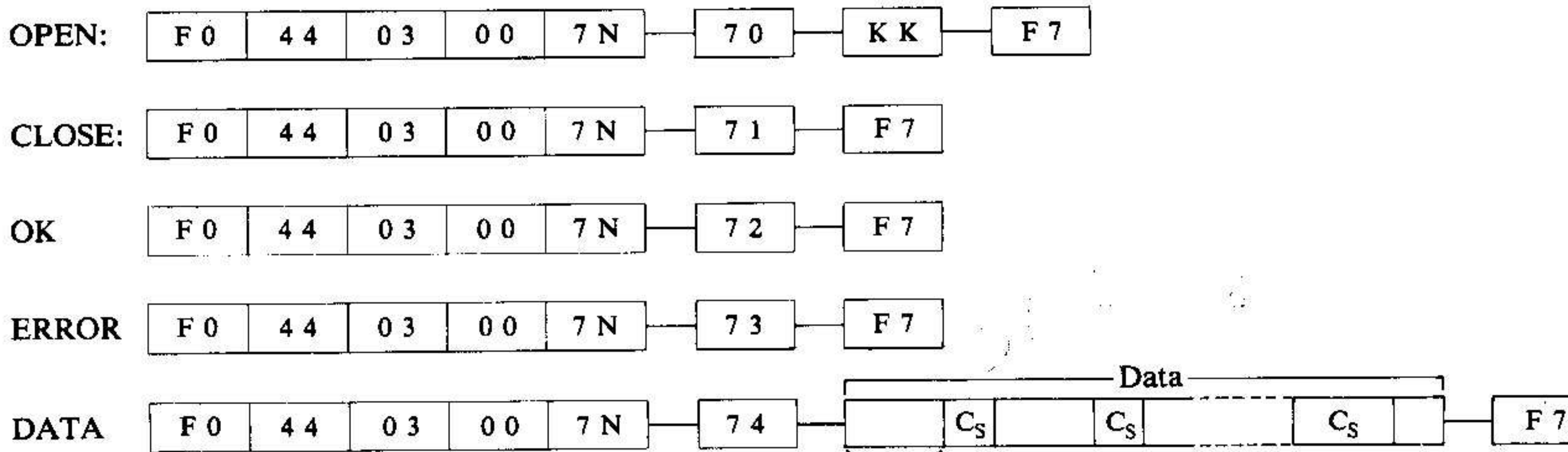
$N_{(H)}$: BASIC CH.
$K K_{(H)}$: Transmitted data

* Basic channel is that set in MENU 3-03 (lowest voice of keyboard split).

Display data − 1 = N (0_H ~ F_H)

* KK indicates contents of transmitted data.

$KK_{(H)}$	Contents
0 0	INT 64 tones
0 1	INT 64 operations
0 2	INT 64 tones + 64 operations

* Internal format of transmitted data is the same as Tone Data 1 and Operation Data 1, with 64 of each transmitted.

When "VC + OP" is selected, 64 tones are transmitted followed by 64 operation memories. At this time, a CHECK SUM (CS) is transmitted for each message. Refer to page 9 for details on internal format of Tone Data 1 and page 19 for details on Operation Data 1.

ii) Transmit/Receive status

	Transmit/Receive Validity Mode	MENU 3-4 EXCLUSIVE =
Transmitted	OP. MEM ~ MULTI CH. MENU 3-02	ENA
Received	OP. MEM ~ MULTI CH. MENU 3-02	ENA

iii) Transmit/Receive Operations

Parameters in MENU 3-02 must be correctly set for both the transmitting and sending devices. In this state the receiving device is set to receive standby status ("EXECUTING" message flashes), and the following procedure is executed.

(1) TRANSMITTING DEVICE: Press YES key in response to EXECUTE = "YES?" prompt. "OPEN" message is transmitted.

(2) RECEIVING DEVICE: "OK" message displayed if "OPEN" message is received without problem (*NOTE 1)

(3) TRANSMITTING DEVICE: Transmits 64 tone data messages and 64 operation data messages after receiving above "OK" message. (*NOTE 2)

(4) RECEIVING DEVICE: Begins receiving above data messages. (*NOTE 3)

(5) TRANSMITTING DEVICE: Transmits "CLOSE" message when all data has been transmitted. "SAVE OK!" message displayed on LCD.

(6) RECEIVING DEVICE: "CLOSE" message received, "LOAD OK!" message displayed on LCD.

NOTE 1) If status of transmitting and receiving devices differ (for example, if one is set to VOICE and the other is set to OP. MEM), receiving device transmits and displays an "ERROR" message. Transmitting device receives error message and error message appears on display.

NOTE 2) Transmission begins after a specified period of time even if OK message is not received by transmitting device (when devices are connected with only one MIDI cable, etc.).

NOTE 3) "OK" message transmitted after reception of each tone or operation with receiving device is another HS-2, HS-2/E.

NOTE 4) When devices are connected with only 1 cable, stop message is not transmitted to transmitting device even if operations are aborted by pressing MENU 3 key on receiving device. Because of this, transmitting device continues transmission.

III. Internal Format of Data

1. Transmission Format

The HS-2, HS-2/E transmits data in an 8-bit transmission format. This data is actually divided into 4 bits of high order data and 4 bits of low order data.

(1) Transmission Data

The iternal format of data indicated in this way is converted so that low order data is output first, followed by high order data, enabling analysis of each parameter according to transmitted MIDI data.

① 8 bit DATA   : 1 Byte

② Transmission DATA $0 \, D_U$ | $0 \, D_L$

Each piece of data is formatted as follows, and composes one byte of data.

The following composes two bytes of data.
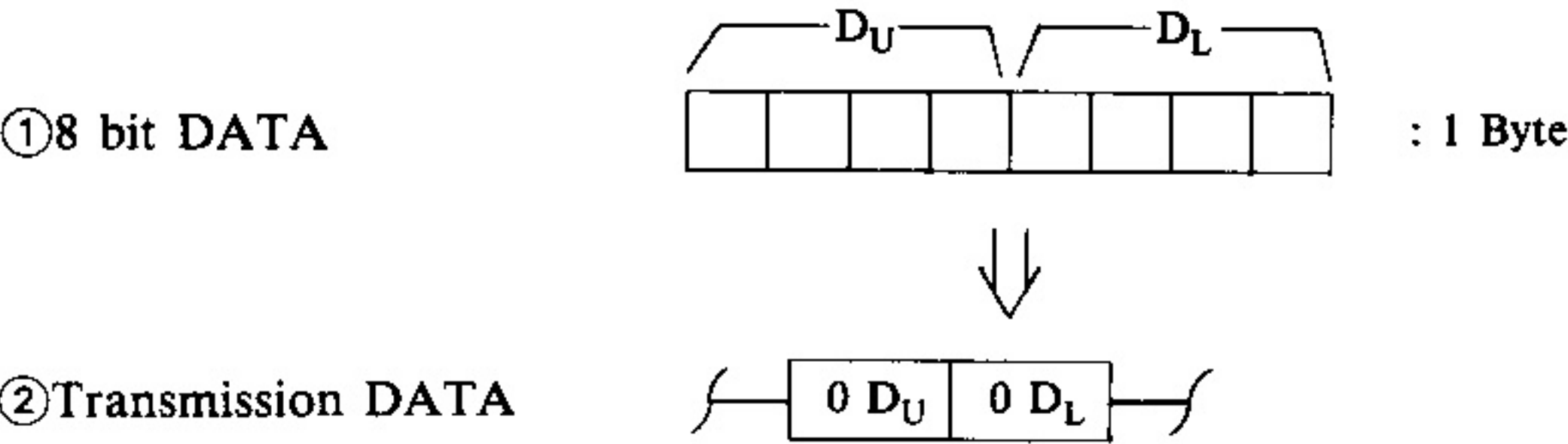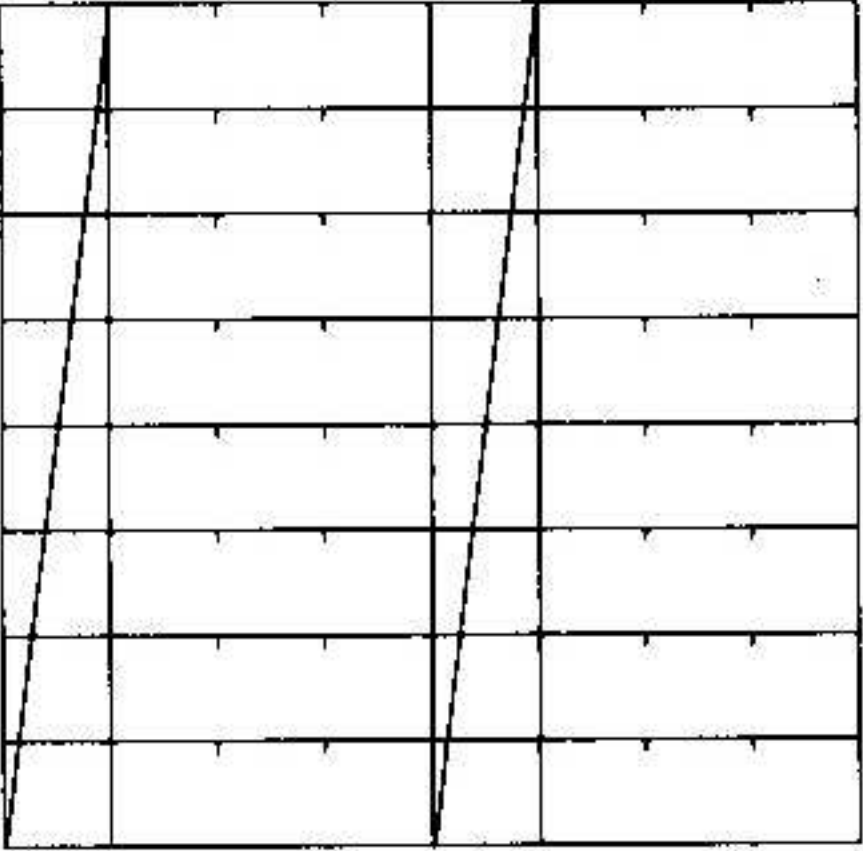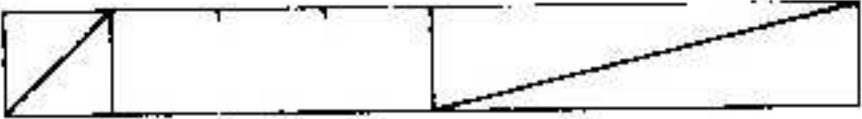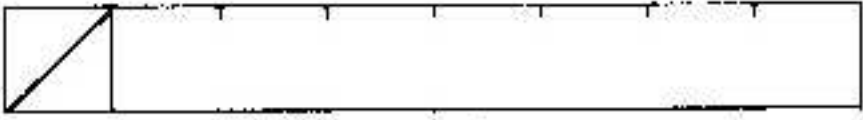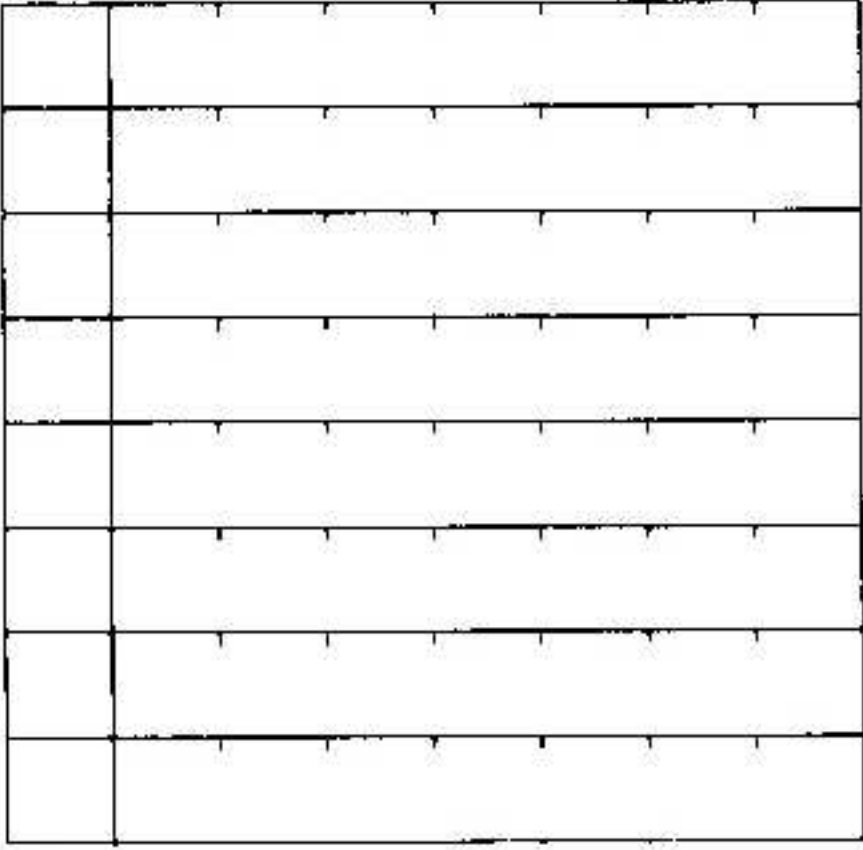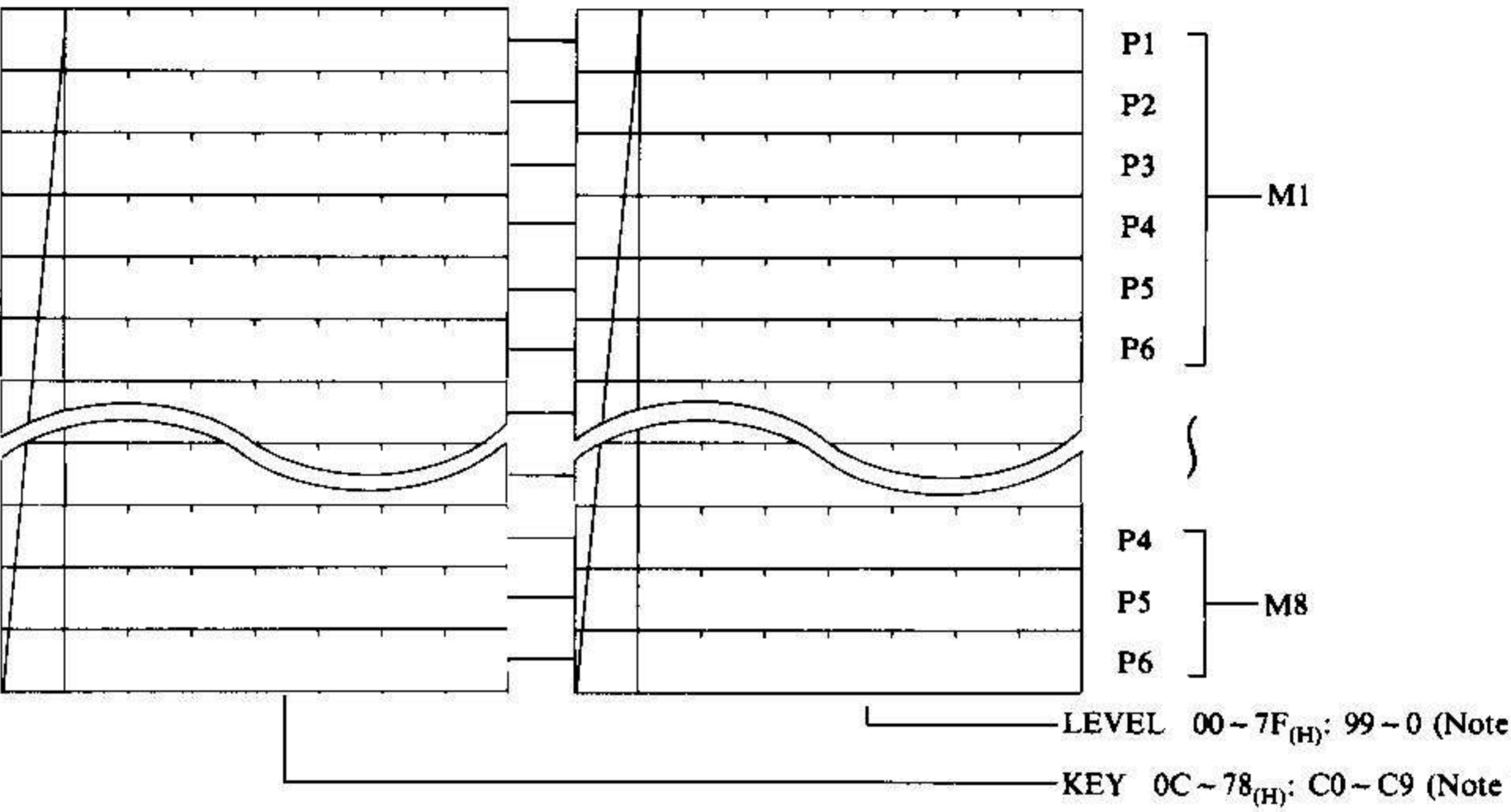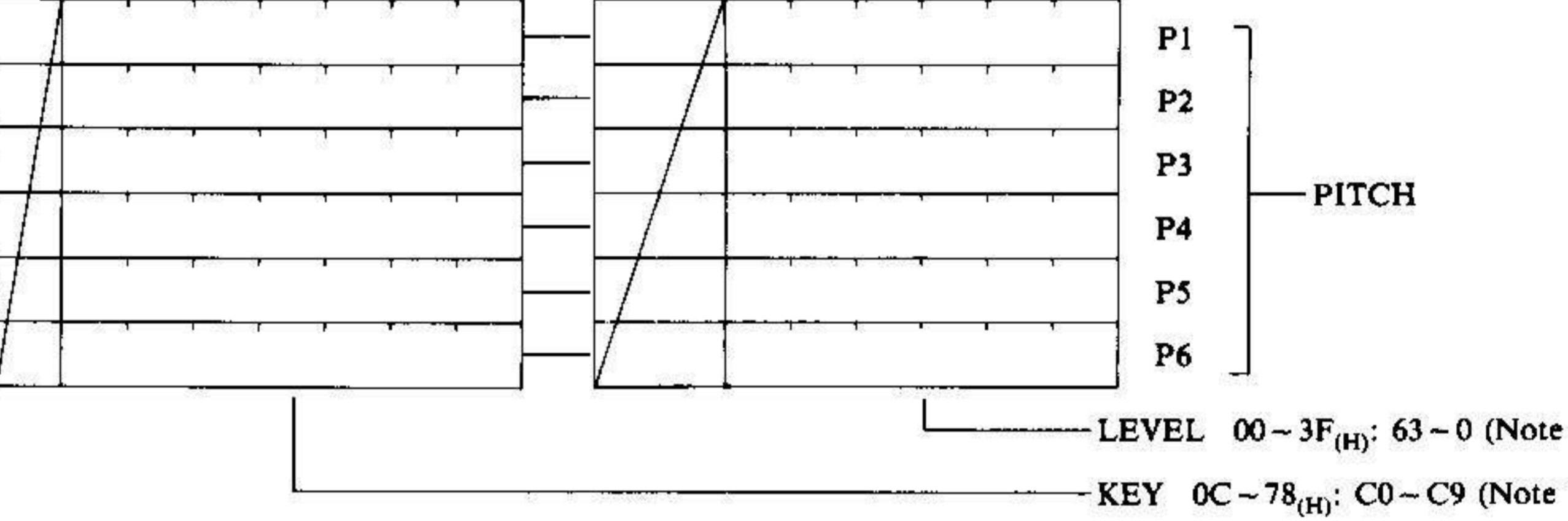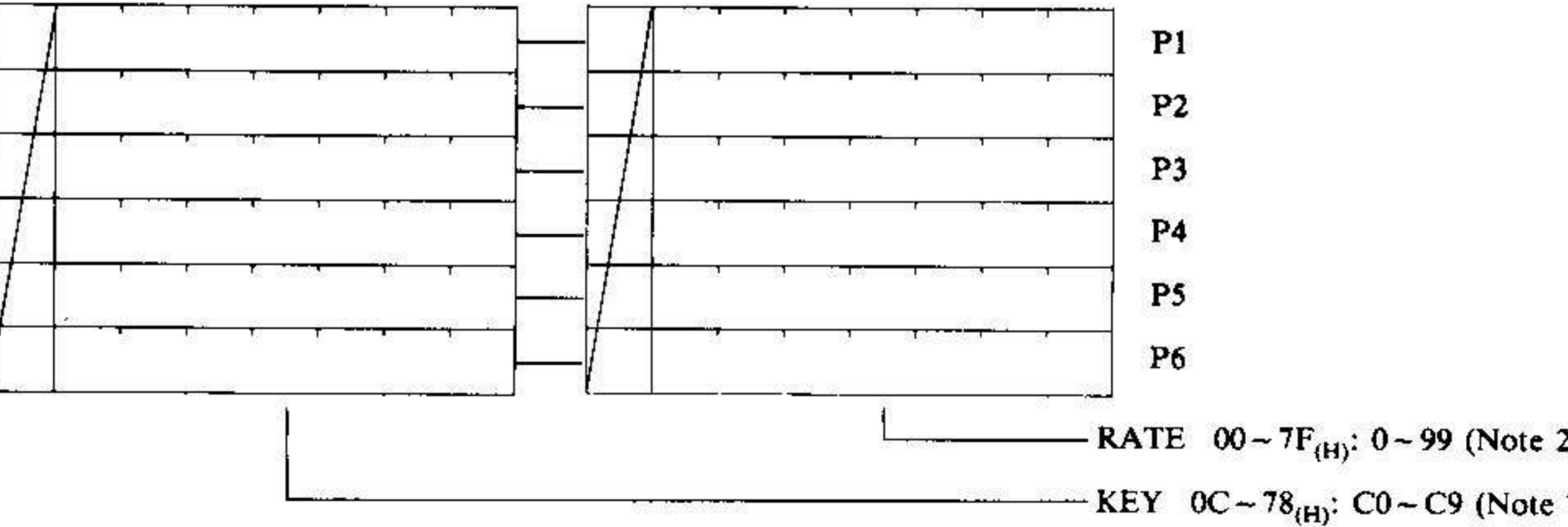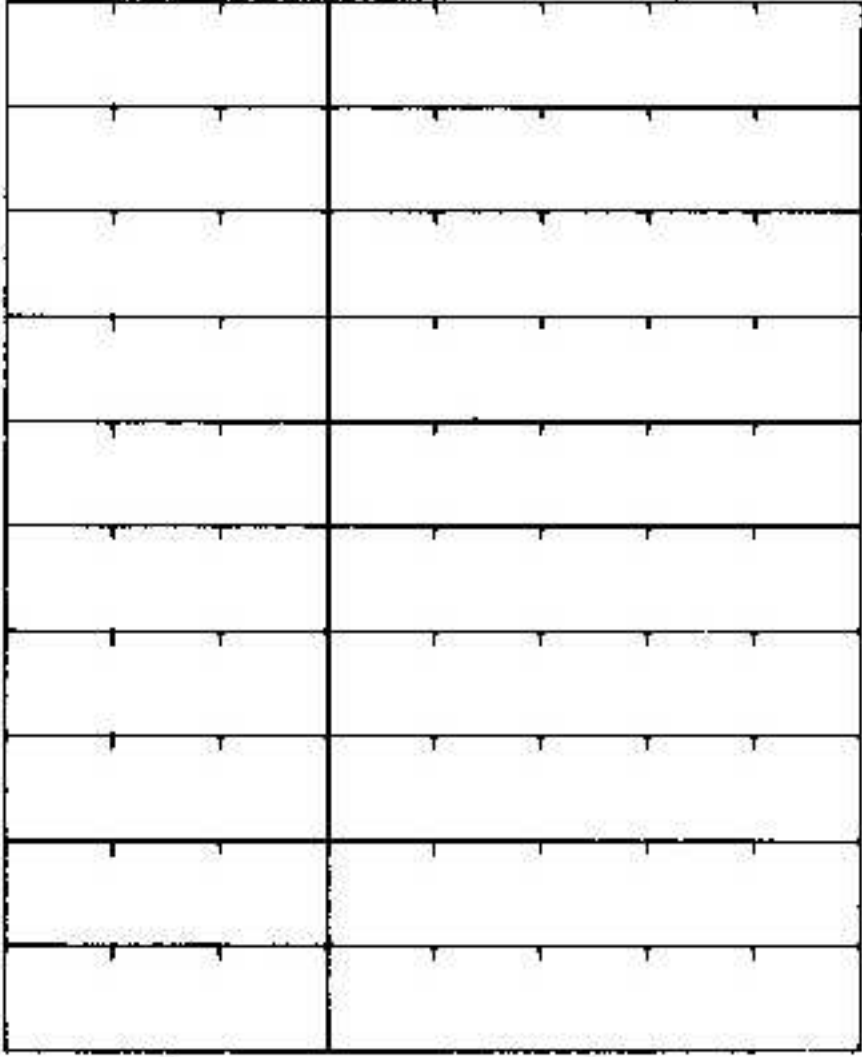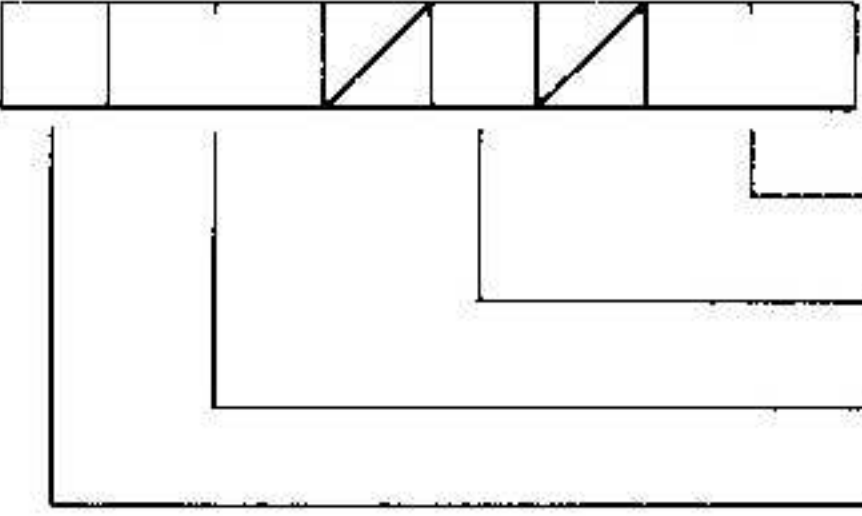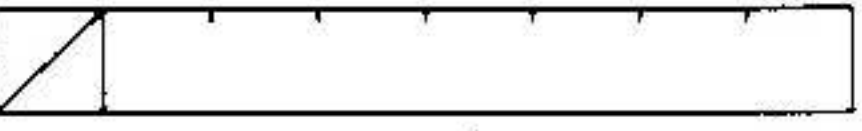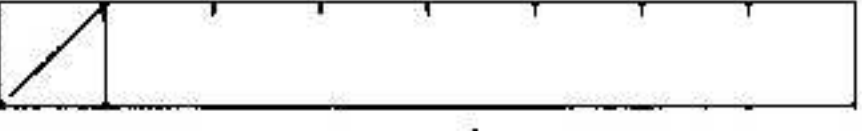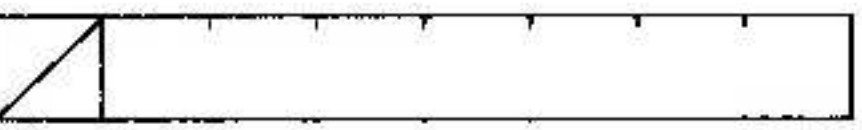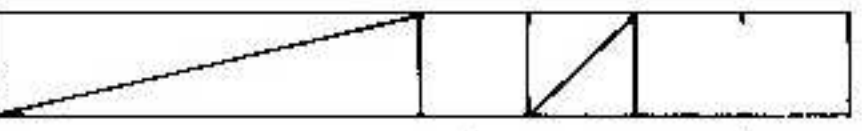
2. Tone Data 1

Tone Data 1 is composed of 336 bytes of data and is transmitted in the following order.
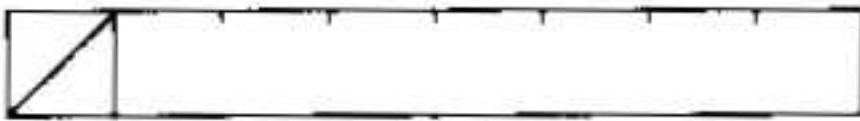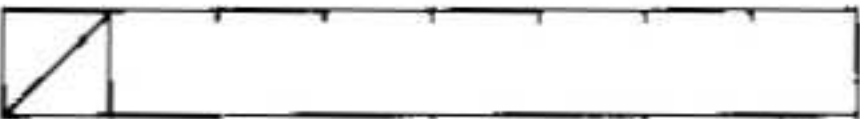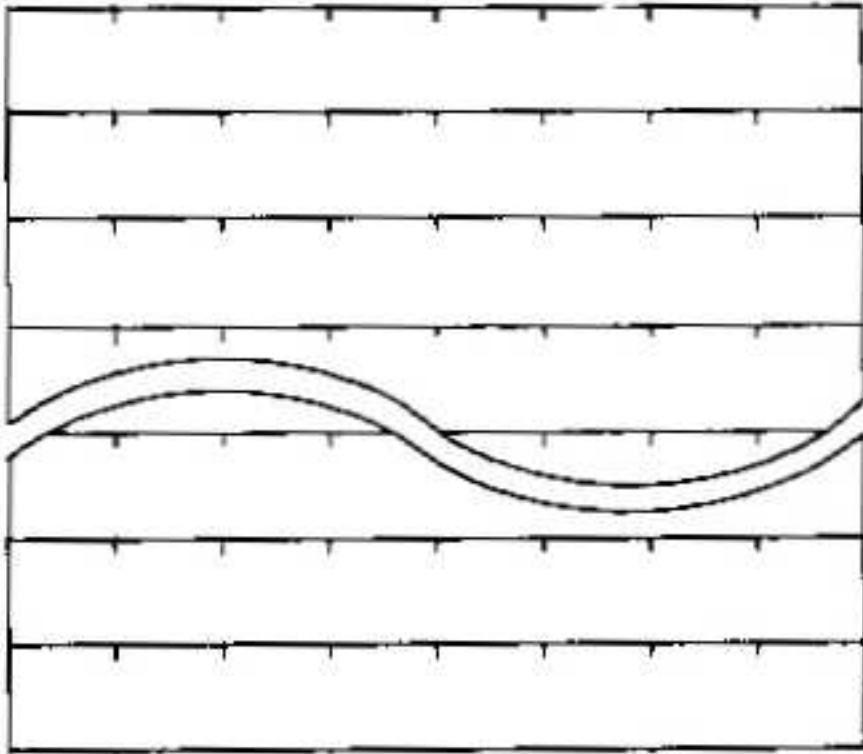
Byte No.	DATA
0	**EXT. PHASE (MENU 1-00)** MSB ... LSB M4 EXT. PHASE 0: off, 1:on M6 EXT. PHASE 0: off, 1:on M8 EXT. PHASE 0: off, 1:on
1 ~ 4	**LINE, WAVE FORM (1-00,01)** $M_1 M_2$ | M_2 | M_1 $M_3 M_4$ | M_4 | M_2 $M_5 M_6$ | M_6 | M_3 $M_7 M_8$ | M_8 | M_4 WAVE FORM $0_{(H)}$: SINE, $1 \sim 5_{(H)}$: SAW1~5, $6 \sim 7_{(H)}$: NOISE 1~2 WAVE FORM $0_{(H)}$: SINE, $1 \sim 5_{(H)}$: SAW1~5, $6 \sim 7_{(H)}$: NOISE 1~2 LINE $0_{(H)}$: MIX, $1_{(H)}$: PHASE, $2_{(H)}$: RING
5 ~ 20	**DETUNE (1-02)** M1 M2 M3 M4 M5 M6 M7 M8 OCT. & NOTE (Note 1) POL 0: −, 1: + RANGE 0: ×1, 1: 1/16 PITCH FIX 0: OFF, 1: ON FINE $00 \sim 3F_{(H)}$: $00 \sim 63$

Byte No.	DATA
21 ~ 164	ENVELOPE (PITCH, AMP), VEL RATE (1-03, 09, 17)

RATE 1

M1
M2
M3
M4
M5
M6
M7
M8
PITCH

RATE 1   00 ~ 7F$_{(H)}$: 00 ~ 99 (Note 2)

VEL RATE   0: DIS, 1: ENA

LEV 1

M1
M2
M3
M4
M5
M6
M7
M8
PITCH

LEVEL 1   00 ~ 7F$_{(H)}$: 0 ~ 99 (M1 ~ M8) (Note 3)

01 ~ 40 ~ 7F$_{(H)}$: ~ 63 ~ 0 ~ 163 (P) (Note 4)

SUSTAIN 0: NO   1: SUS

RATE 2

M1

∫

PITCH

RATE 2

VEL RATE

LEV 8

M1

∫

PITCH

LEVEL 8

SUSTAIN

Byte No.	DATA
165~172	**A ENV END STEP, AMP SENS (1-09, 14)** M1 M2 M3 M4 M5 M6 M7 M8 AMP SENS $0\sim7_{(H)}$: $0\sim7$ ENV END STEP $0\sim7_{(H)}$: STEP $1\sim8$
173	**P ENV END STEP (1-03)** PITCH END STEP $0\sim7_{(H)}$: STEP $1\sim8$
174	**TOTAL LEVEL (1-15)** TOTAL LEVEL $00\sim7F_{(H)}$: $99\sim0$ (Note 5)
175~182	**A NEW ENV DEPTH, MODULE ON/OFF (1-10)** M1 M2 M3 M4 M5 M6 M7 M8 ENV DEPTH $00\sim7F_{(H)}$: $99\sim0$ (Note 5) MODULE ON/OFF 0: ON, 1: OFF
183	**P ENV ENV DEPTH, RANGE (1-04)** PITCH ENV DEPTH $00\sim3F_{(H)}$: $63\sim0$ (Note 6) RANGE 0: NARROW, 1: WIDE

Byte No.	DATA
184~279	**LEVEL KF (AMP) (1-11)** P1 P2 P3 P4 — M1 P5 P6 P4 P5 — M8 P6 LEVEL 00~7F(H): 99~0 (Note KEY 0C~78(H): C0~C9 (Note
280~291	**LEVEL KF (PITCH) (1-05)** P1 P2 P3 P4 — PITCH P5 P6 LEVEL 00~3F(H): 63~0 (Note KEY 0C~78(H): C0~C9 (Note
292~303	**RATE KF (1~16)** P1 P2 P3 P4 P5 P6 RATE 00~7F(H): 0~99 (Note 2 KEY 0C~78(H): C0~C9 (Note

Byte No.	DATA
304~313	**VEL SENS (1-06, 12, 17)** M1 M2 M3 M4 M5 M6 M7 M8 PITCH RATE SENSITIVITY $00 \sim 1F_{(H)}$: $0 \sim 31$ CURVE $0 \sim 7_{(H)}$: CURVE $1 \sim 8$
314	**VIBRATO (WAVE, MULTI), OCTAVE (1-07, 08)** VIB WAVE 0: TRIANGLE, 1: SAW UP, 2: SAW DOWN, 3: SQUARE VIB MULTI 0: OFF, 1: ON OCTAVE $0 \sim 2_{(H)}$: $0 \sim 2$ OCTAVE 0: −, 1: +
315	**VIB (DEPTH) (1-07)** DEPTH $00 \sim 63_{(H)}$: $0 \sim 99$
316	**VIB (RATE) (1-07)** RATE $00 \sim 63_{(H)}$: $0 \sim 99$
317	**VIB (DELAY) (1-07)** DELAY $00 \sim 63_{(H)}$: $1 \sim 99$
318	**TREMOLO (WAVE, MULTI) (1-13)** WAVE 0: TRIANGLE, 1: SAW UP, 2: SAW DOWN, 3: SQUARE MULTI 0: OFF, 1: ON

Byte No.	DATA
319	TREM (DEPTH) (1-13) DEPTH 00~63(H): 0~99
320	TREM (RATE) (1-13) RATE 00~63(H): 0~99
321	TREM (DELAY) (1-13) DELAY 00~63(H): 0~99
322~335	VOICE NAME (1-18) 1st character 2nd character 3rd character { 10th character 11th character 12th character VOICE NAME (ASCII CODE)

NOTE 1)

MIDI Transmission Data (HEX)	LCD Display Data OCT	NOTE
00	0	00
01		01
∫		∫
0B		11
0C	1	00
0D		01
∫		∫
17		11
18	2	00
∫		∫
23		11
24	3	00
∫		∫
2F		11
30	4	00
∫		∫
3B		11
3C	5	00
∫		∫
47		11
⋮	⋮	⋮
6C	9	00
∫		∫
77		11
78	10	00
∫		∫
7F		07

PITCH FIX	
OFF	ON

—15—

NOTE 2)

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

NOTE 3)

MIDI Transmission Data (HEX)	LCD Display Data
00	0
1D	1
1E	2
1F	3
∫	∫
7E	98
7F	99

NOTE 4)

MIDI Transmission Data (HEX)	LCD Display Data
7F	+ 63
7E	+ 62
∫	∫
41	+ 1
40	0
3F	− 1
∫	∫
02	− 62
01	− 63

NOTE 5)

MIDI Transmission Data (HEX)	LCD Display Data
00	99
01	98
02	97
∫	∫
61	2
62	1
7F	0

NOTE 6)

MIDI Transmission Data (HEX)	LCD Display Data
00	63
01	62
$\int$	$\int$
3E	1
3F	0

NOTE 7)

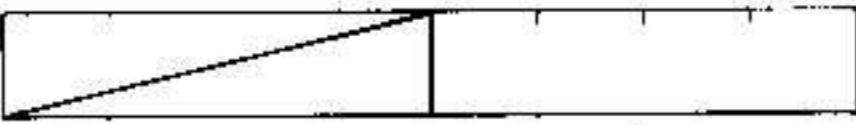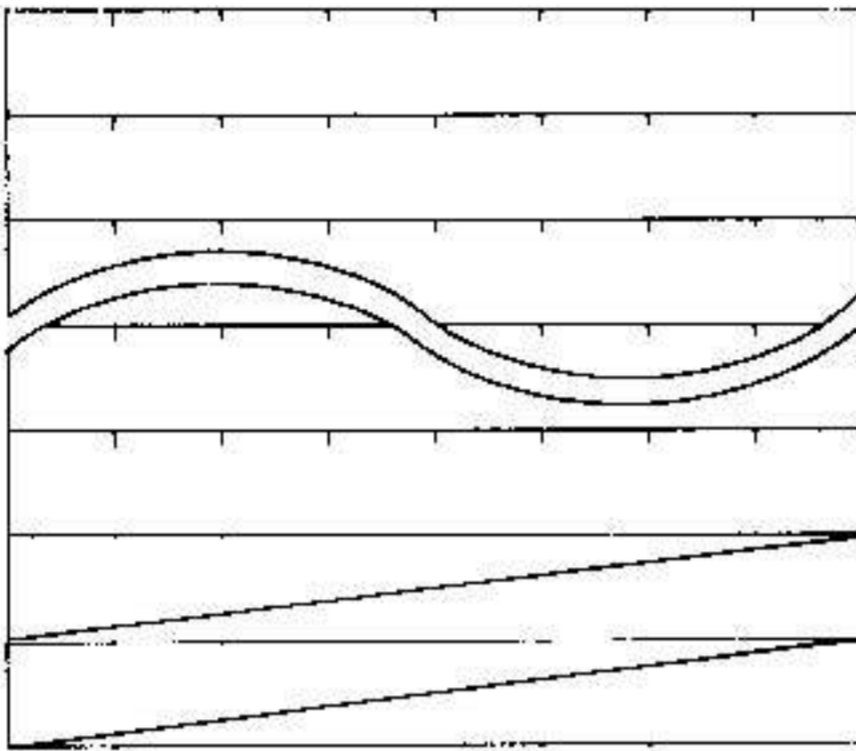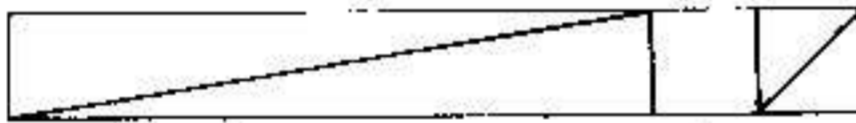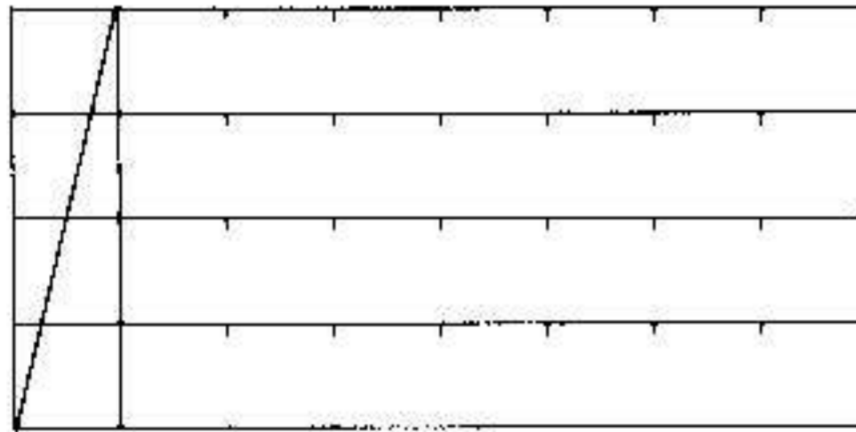| MIDI Transmission Data (HEX)	LCD Display Data
0C	C0
0D	C♯0
$\int$	$\int$
45	A4
$\int$	$\int$
77	B8
78	C9

Exceptions:
  i) Display data note name is "C2" (lowest note on HS-2, HS-2/E).
  ii) With regard to LEV KF (AMP, PITCH) and RATE KF, ranges within which data may be set varies for P1 ~ P6 as shown below.
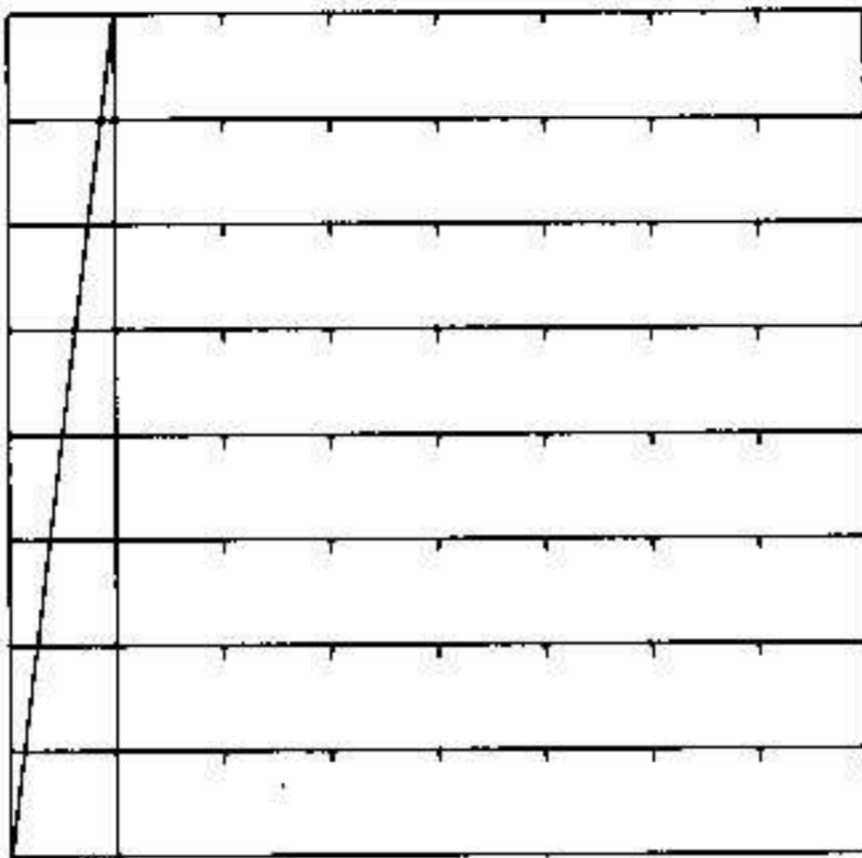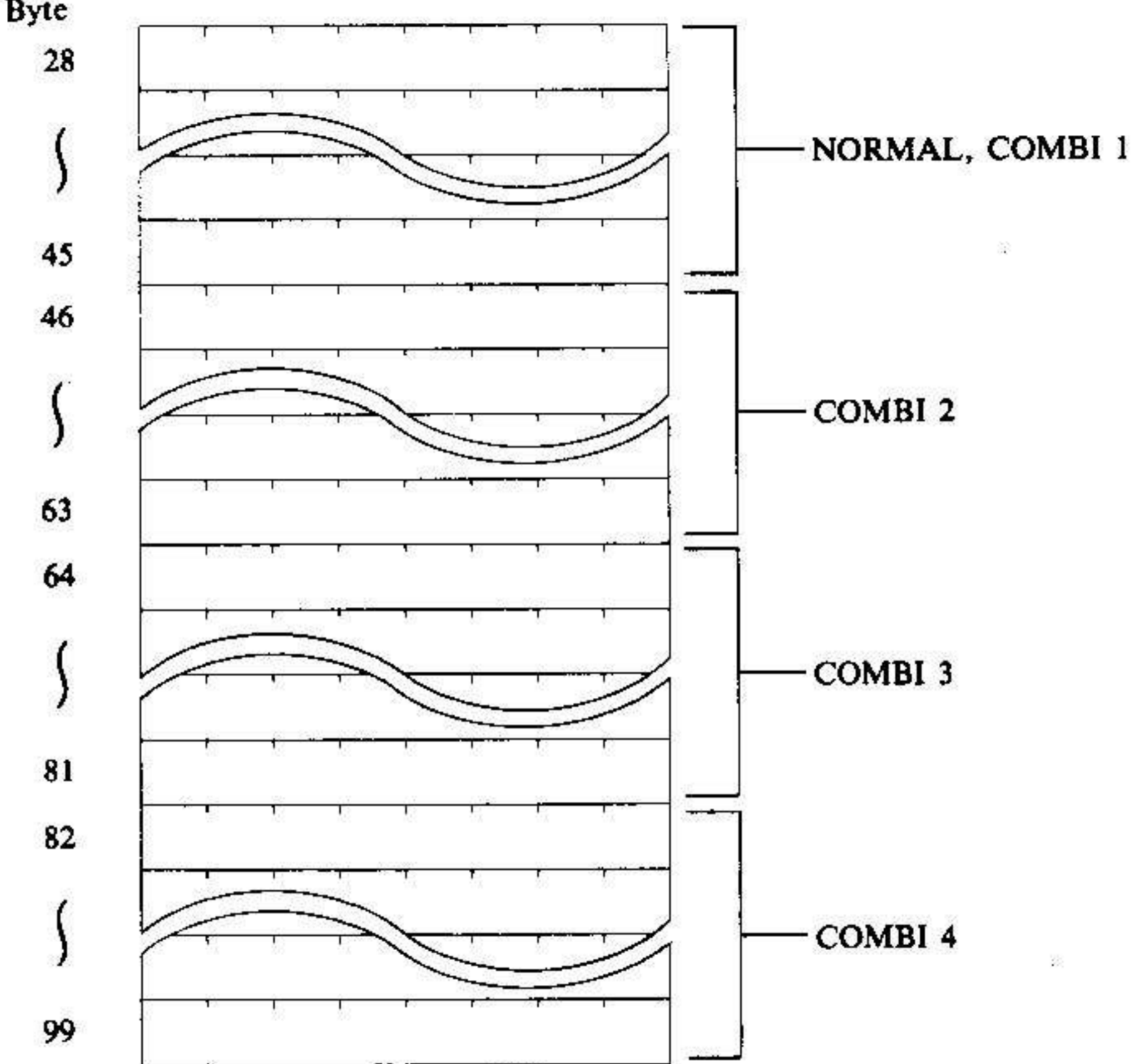
	MIDI Transmission Data (HEX)	LCD Display Data
P1	0C ~ 73	C0 ~ G8
P2	0D ~ 74	C♯0 ~ A♭8
P3	0E ~ 75	D0 ~ A8
P4	0F ~ 76	E♭0 ~ B♭8
P5	10 ~ 77	E0 ~ B8
P6	11 ~ 78	F0 ~ C9

  * Transmission data ranges for P1 ~ P6 do not match;
    P1 < P2 < P3 < P4 < P5 < P6
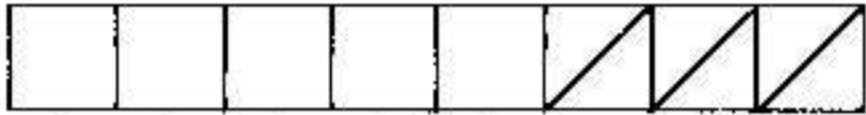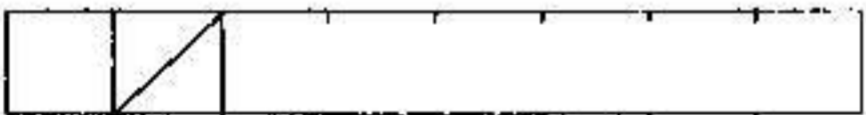
3. Operation Data 1
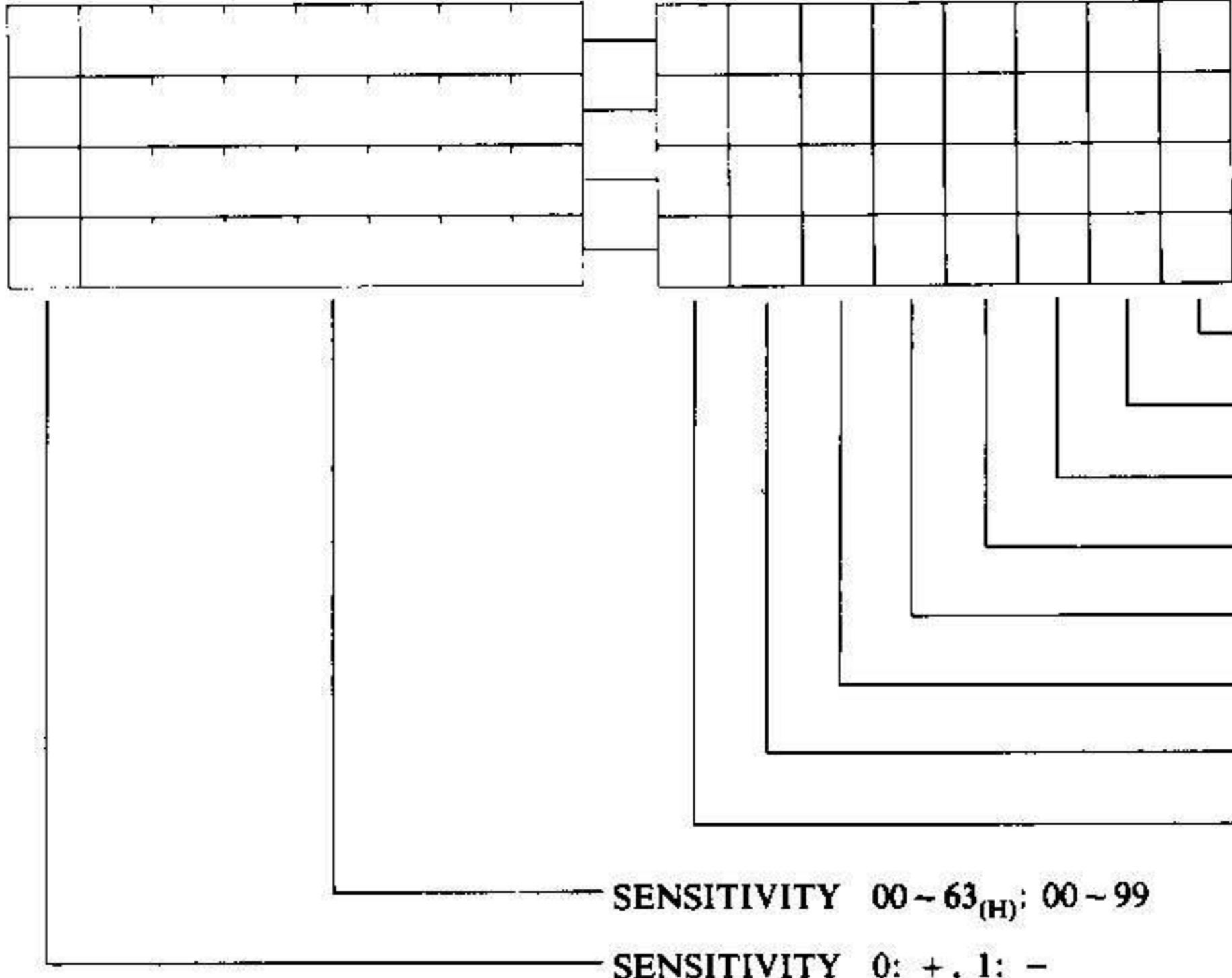Operation Data 1 is composed of 100 bytes of data and is transmitted in the following order.

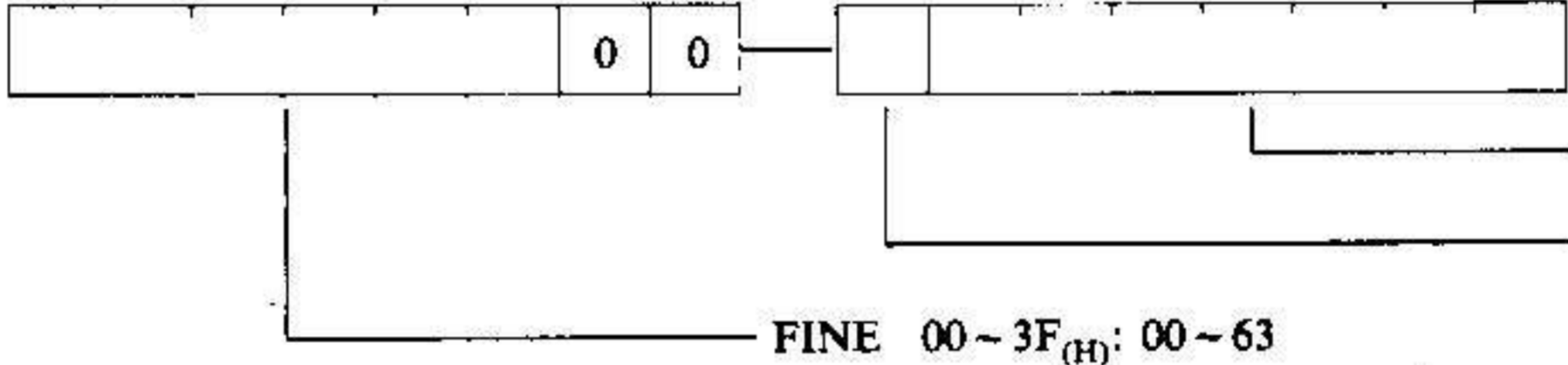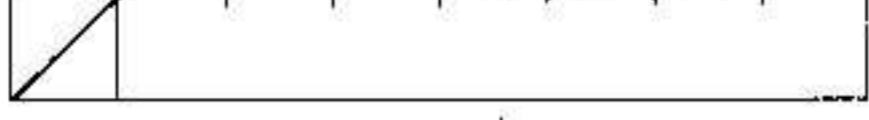| Byte No.	DATA
0	MODE, ASSIGN MODE & ASSIGN $0_{(H)}$: NORMAL $1_{(H)}$: COMBI 1 + 2 $2_{(H)}$: COMBI 3 + 4 $3_{(H)}$: COMBI 1 + 2 + 3 + 4 $4_{(H)}$: COMBI 1/3 $5_{(H)}$: COMBI 1/3 + 4 $6_{(H)}$: COMBI 1 + 2/3 $7_{(H)}$: COMBI 1 + 2/3 + 4 $8_{(H)}$: COMBI 1/2/3/4
1 ~ 14	OPERATION NAME 1st character 2nd character 12th character OPERATION NAME (ASCII CODE)
15	POS X-FADE (EFFECT) (MENU 2-13) EFFECT 0: OFF, 1: ON
16 ~ 19	SPLIT POINT (2-09) 1 POINT SPLIT 3 POINT SPLIT (LOW) 3 POINT SPLIT (MID) 3 POINT SPLIT (UPPER) SP POINT 0C ~ $78_{(H)}$: C0 ~ C9 (NOTE 8)

Byte No.	DATA
20 ~ 27	**POS X-FADE (POINT) (2-13)** 2 TONE MIX minimum 2 TONE MIX maximum 4 TONE MIX LOW minimum 4 TONE MIX LOW maximum 4 TONE MIX MID minimum 4 TONE MIX MID maximum 4 TONE MIX UPPER minimum 4 TONE MIX UPPER maximum POINT 0C ~ 78(H): C0 ~ C9 (NOTE 9)
28 ~ 99	**SOUND DATA** Byte 28 45 NORMAL, COMBI 1 46 63 COMBI 2 64 81 COMBI 3 82 99 COMBI 4 (See next page for cotents)

3-1. OPERATION MEMORY SOUND DATA

The contents of previous SOUND DATA are shown below.
The previous SOUND DATA area is composed of 18 bytes × 4 areas.
Note that byte No. has been reset to "0" for simplification.

Byte No.	DATA
0	**VOICE NO.** VOICE No. 00 ~ 3F$_{(H)}$: A-1 ~ H-8 VOICE No. 0: INTERNAL, 1: CARD
1	**SOLO, SUS PEDAL, VEL INV. VIB INV. TREM INV. (MENU 2-01, 10, 12, 15, 16)** SOLO 0: OFF, 1: ON SUS PEDAL 0: ENA, 1: DIS VEL INV 0: OFF, 1: ON VIB INV 0: OFF, 1: ON TREM INV 0: OFF, 1: ON
2	**PORTAMENTO (2-01)** TIME 00 ~ 63$_{(H)}$: 00 ~ 99 MODE 0: TIME CONST, 1: RATE CONST
3	**PITCH BEND (2-02)** RANGE 00 ~ 30$_{(H)}$: 00 ~ 48 RELEASE 0: ENA, 1: DIS

—21—

Byte No.	DATA
4~11	**AFTER TOUCH~FOOT VR (2-03, 04, 05, 06)** AFTER TOUCH DEF WHEEL 1 DEF WHEEL 2 FOOT VR VIB DEPTH 0: OFF, 1: ON VIB RATE 0: OFF, 1: ON PTICH + 0: OFF, 1: ON PITCH − 0: OFF, 1: ON PRTM TIME 0: OFF, 1: ON TREM DEPTH 0: OFF, 1: ON TREM RATE 0: OFF, 1: ON A NEW BIAS 0: OFF, 1: ON SENSITIVITY 00~63(H): 00~99 SENSITIVITY 0: +, 1: −
12	**LEVEL (2-07)** LEVEL 00~63(H): 00~99
13~14	**COMBI PITCH (2-08)** OCT, FINE (NOTE 10) POL 0: −, 1: + FINE 00~3F(H): 00~63
15~16	**VEL SPLIT (2-11)** maximum 00~7F(H): 000~127 (NOTE 11 minimum 00~7F(H): 000~127
17	**DELAY TRIG (2-14)** TIME 00~63(H): 00~99

NOTE 8)

MIDI Transmission Data (HEX)	LCD Display Data
0C	C0
0D	C♯0
⟩	⟩
45	A4
⟩	⟩
77	B8
78	C9

Exceptions:
   i) Display data note name is "C2" (lowest note on HS-2, HS-2/E).
   ii) Range in which 3 Point Split data may be set varies as shown below.

	MIDI Transmission Data (HEX)	LCD Display Data
LOW	0C ~ 76	C0 ~ B♭8
MID	0D ~ 77	C♯0 ~ B8
UPPER	0E ~ 75	D0 ~ C9

* Transmission data ranges for LOW, MID & UPPER do not match; LOW < MID < UPPER

NOTE 9)

MIDI Transmission Data (HEX)	LCD Display Data
0C	C0
0D	C♯0
⟩	⟩
45	A4
⟩	⟩
77	B8
78	C9

Exceptions:
   i) Display data note name is "C2" (lowest note on HS-2, HS-2/E).
   ii) Range in which 2 Tone Mix data may be set varies as shown below.

	MIDI Transmission Data (HEX)	LCD Display Data
Maximum	0C ~ 77	C0 ~ B8
Minimum	0D ~ 78	C♯0 ~ C9

* Minimum ≤ Maximum

iii) Range in which 4 Tone Mix data may be set varies as shown below.

	MIDI Transmission Data (HEX)	LCD Display Data
LOW Minimum	0C ~ 73	C0 ~ G8
LOW Maximum	0D ~ 74	C#0 ~ A♭8
MID Minimum	0E ~ 75	D0 ~ A8
MID Maximum	0F ~ 76	E♭0 ~ B♭8
UPPER Minimum	10 ~ 77	E0 ~ B8
UPPER Maximum	11 ~ 78	F0 ~ C9

* LOW Min ≦ LOW Max ≦ MID Min ≦ MID Max ≦ UPPER Min ≦ UPPER Max

NOTE 10)

MIDI Transmission Data (HEX)	LCD Display Data OCT	NOTE
00	0	00
01		01
∫		∫
0B		11
0C	1	00
0D		01
∫		∫
17		11
⋮	⋮	⋮
3C	5	00
3D		01
∫		∫
47		11

NOTE 11) VEL SPLIT Min ≦ VEL SPLIT Max
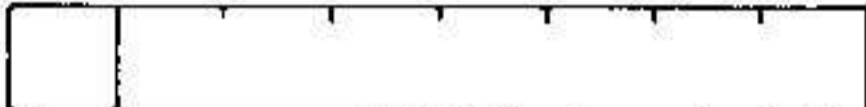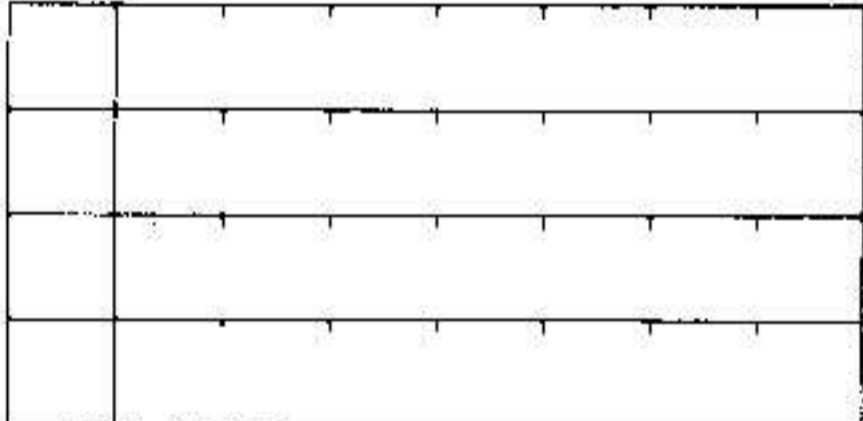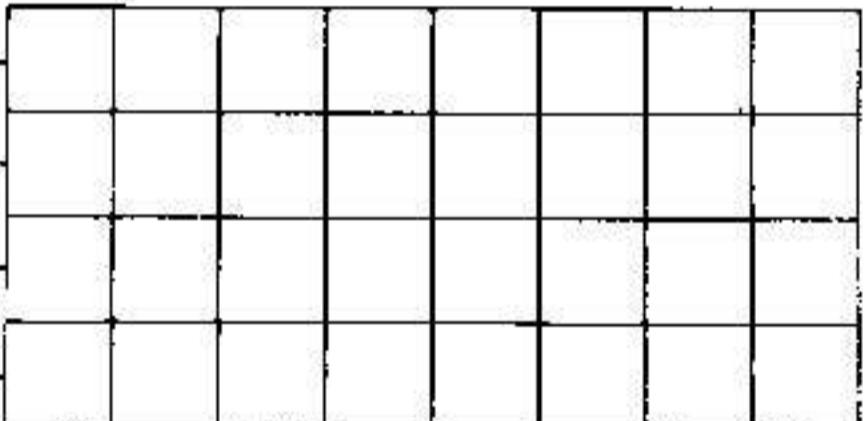
4. MULTI CHANNEL Mode Data

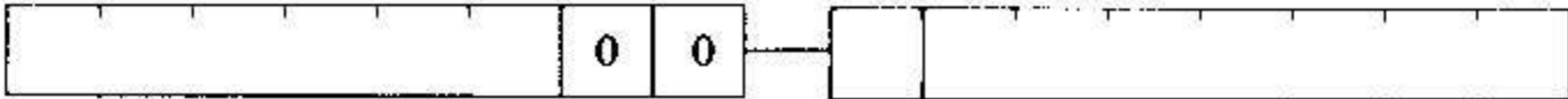MULTI CHANNEL Mode data is composed of 144 bytes of data and is transmitted in the following order.
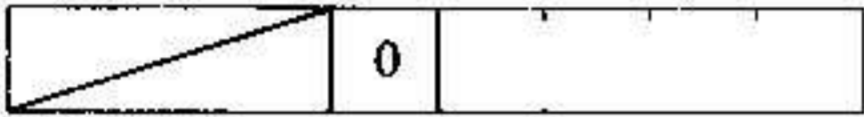
Byte No.	DATA
0 – 143	MULTI SOUND DATA

(See next page for contents.)

4-1 MULTI SOUND DATA

The contents of previous MULTI SOUND DATA are shown below. Multi Channel mode data is composed of 18 bytes × 8 areas.

Note that byte No. has been reset to "0" for simplification.

Byte No.	DATA
0	VOICE No. VOICE No. 00~3F(H): A-1~H-8 VOICE No. 0: INTERNAL, 1: CARD
1	SOLO (MENU 2-01) SOLO 0: OFF, 1: ON
2	PORTAMENTO (MENU 2-01) TIME 00~63(H): 00~99 MODE 0: TIME CONST 1: RATE CONST
3	PITCH BEND (2-02) RANGE 00~30(H): 00~48 RELEASE 0: ENA, 1: DIS
4~11	AFTER TOUCH~FOOT VR (2-03, 04, 05, 06) AFTER TOUCH DEF WHEEL 1 DEF WHEEL 2 FOOT VR VIB DEPTH 0: OFF, 1: ON VIB RATE 0: OFF, 1: ON PITCH + 0: OFF, 1: ON PITCH − 0: OFF, 1: ON PRTM TIME 0: OFF, 1: ON TREM DEPTH 0: OFF, 1: ON TREM RATE 0: OFF, 1: ON A ENV BIAS 0: OFF, 1: ON SENSITIVITY 00~63(H): 00~99 SENSITIVITY 0: +, 1: −

Byte No.	DATA
12	**LEVEL (2-07)** LEVEL $00 \sim 63_{(H)}$: $00 \sim 99$
13 ~ 14	**MULTI PITCH (2-18)** OCT. FINE (NOTE 12) POL 0: − , 1: + FINE $00 \sim 3F_{(H)}$: $00 \sim 63$
15	**POLY** POLY $0 \sim 8_{(H)}$: $0 \sim 8$ (NOTE 13)
16	**AREA CH.** CH. $0 \sim F_{(H)}$: $1 \sim 16$ ch
17	Not used

NOTE 12)

MIDI Transmission Data (HEX)	LCD Display Data	
	OCT	NOTE
00 01 (0B	0	00 01 (11
0C 0D (17	1	00 01 (11
⋮	⋮	⋮
3C 3D (47	5	00 01 (11

NOTE 13)

Polyphony of areas should be set as follows:
  AREA 1 ~ 4: 8-note polyphonic (max.)
  AREA 5 ~ 8: 8-note polyphonic (max.)
Multi-Channel mode data is note received if maximum polyphony is exceeded.