

# DIGITAL SAMPLER

Model S-760

# MIDI Implementation

Date : Nov. 18 1993

Version : 1.00

## 1. RECOGNIZED RECEIVE DATA

### [Channel Voice Messages]

#### (1) Note Off

Status	Second	Third
8nH	kkH	vvH
9nH	kkH	00H

n = MIDI channel No. : 0H - FH (0 - 15) 0 = ch.1 15 =ch.16  
 kk = Note No. : 15H - 6CH (21 - 108)  
 vv = Velocity : 00H - 7FH (0 - 127)

\* When the Velocity of the received Note On message is 0, the S-760 recognize it as a Note Off message and Velocity is 64.

#### (2) Note On

Status	Second	Third
9nH	kkH	vvH

n = MIDI channel No. : 0H - FH (0 - 15) 0 = ch.1 15 =ch.16  
 kk = Note No. : 15H - 6CH (21 - 108)  
 vv = Velocity : 01H - 7FH (1 - 127)

#### (3) Polyphonic Key Pressure

Status	Second	Third
AnH	kkH	vvH

n = MIDI channel No. : 0H - FH (0 - 15) 0 = ch.1 15 =ch.16  
 kk = Note No. : 15H - 6CH (21 - 108)  
 vv = Value : 00H - 7FH (0 - 127)

\* The S-760 accepts this message when the Aftertouch switch of the Performance parameter is set at POLY(P).

#### (4) Channel Pressure

Status	Second	Third
DnH	vvH	

n = MIDI channel No. : 0H - FH (0 - 15) 0 = ch.1 15 =ch.16  
 vv = Value : 00H - 7FH (0 - 127)

\* The S-760 accepts this message when the Aftertouch switch of the Performance parameter is set at Channel(C).

#### (5) Control Change

##### • Modulation

Status	Second	Third
BnH	01H	vvH

n = MIDI channel No. : 0H - FH (0 - 15) 0 = ch.1 15 =ch.16  
 vv = Modulation depth : 00H - 7FH (0 - 127)

\* Recognized when the modulation receive switch (performance parameter) is On(o).

##### • Main volume

Status	Second	Third
BnH	07H	vvH

n = MIDI channel No. : 0H - FH (0 - 15) 0 = ch.1 15 =ch.16  
 vv = Main volume : 00H - 7FH (0 - 127)

\* Adjusts the volume of the part corresponding to the receiving MIDI channel number.

\* Recognized when the volume receive switch (performance parameter) is On(o).

\* When the receiving MIDI channel No. matches the control channel No. (system parameter) the S-760 adjusts the master level (system parameter) but does not control the volume of the part (even if exists) corresponding to that MIDI channel number.

#### • Pan

Status	Second	Third
BnH	0AH	vvH

n = MIDI channel No. : 0H - FH (0 - 15) 0 = ch.1 15 =ch.16  
 vv = Pan : 00H - 7FH (0 - 127)

\* Adjusts the pan of the part corresponding to the receiving MIDI channel number.

\* Recognized when the pan receive switch (performance parameter) is On(o).

#### • Hold 1

Status	Second	Third
BnH	40H	vvH

n = MIDI channel No. : 0H - FH (0 - 15) 0 = ch.1 15 =ch.16  
 vv = Control value : 00H - 7FH (0 - 127) 0 - 63 = OFF  
 64 - 127 = ON

\* Holds or releases the part corresponding to the receiving MIDI channel number.

\* Recognized when the hold receive switch (performance parameter) is On(o).

#### • PRN MSB, LSB

Status	Second	Third
BnH	64H	mmH
BnH	65H	llH

n = MIDI channel No. : 0H - FH (0 - 15) 0 = ch.1 15 =ch.16  
 mm = Upper byte of the parameter No. designated by RPN.  
 ll = Lower byte of the parameter No. designated by RPN.

#### • Data entry MSB, LSB

Status	Second	Third
BnH	06H	mmH
BnH	26H	llH

n = MIDI channel No. : 0H - FH (0 - 15) 0 = ch.1 15 =ch.16  
 mm = Upper byte of the parameter data designated by RPN.  
 ll = Lower byte of the parameter data designated by RPN.

\*\* RPN \*\*

Control change includes RPNs (registered parameter numbers), functions which are defined by the MIDI standard. Each RPN may be used to change parameters of equipment.

To effect PRN, first designate the parameter to be controlled using PRN MSB and RPN LSB, and then specify the value of the designated parameter in the data entry.

The S-760 can recognize the two RPNs, pitch bend sensitivity (RPN#0) and master fine tune (RPN#1).

RPN	Data	Function
MSB LSB	MSB LSB	

00H 00H mmH llH Pitch bend sensitivity  
 \* Sets bender up/down of the patch parameter.

mm: 00H-30H (0-48 in unit of semitones)  
 \* Up to 4 octaves, common to bender up and down.

11: 00H-7FH (any value in this range)  
 \* mm becomes effective when 11 is received.

Example: Set bender range to 2.

MIDI DATA [HEX]	Description
B0 64 00	RPN LSB = 00H
B0 65 00	RPN MSB = 00H
B0 06 02	Data entry, MSB
B0 26 00	Data entry, LSB

00H 01H	mmH 11H	Master fine tune * Sets system master tune. Received on the S-760 system control channel.
		mm: 00H-7FH (0-127) MSB 11: 00H-7FH (0-127) LSB * e.g. Center 440Hz can be tuned up or down up to 50 cents in steps of 100/8192 cents. 100/8192 cents are translated into 1 cent in the S-760. A value below 27H 00H is translated into -50 cents, and value above 59H 00H into +50 cents.
		MSB LSB 27H 00H -50 cents : 40H 00H 0 cent : 59H 00H +50 cents
		Example: Set master tune to A = 440Hz.
	MIDI DATA [HEX]	Description
	BO 64 01	RPN LSB = 01H
	BO 65 00	RPN MSB = 00H
	BO 06 40	Data entry, MSB
	BO 26 00	Data entry, LSB

## \*\* Other control changes \*\*

Status	Second	Third
BnH	mmH	vvH
n = MIDI channel No.	: OH - FH (0 - 15)	0 = ch.1 15 =ch.16
mm = Control No.	: 00H - 5FH (0 - 95)	
vv = Control data	: 00H - 7FH (0 - 127)	

\* By selecting a control number (0-95) with Controller select (patch parameter), a control change can be recognized as a controller.

\* A control change can be received through the control channel (system parameter) to change settings of an EQ (equalizer, a performance parameter). The control number can be one of 1-95 and memorized.

\* The default allocation of control numbers is as shown in the table below (factory settings).

Default Control Change Number for EQ				
	Lo Gain	Lo Freq	Hi Gain	Hi Freq
EQ-1	16	70	24	78
EQ-2	17	71	25	79
EQ-3	18	72	26	80
EQ-4	19	73	27	81
EQ-5	20	74	28	82
EQ-6	21	75	29	83
EQ-7	22	76	30	84
EQ-8	23	77	31	85

When to keep an EQ independent of any control change, set the desired EQ to off.

\* The control data affect the following parameters.

vv	Lo/Hi Gain	Hi Freq	Lo Freq
0 - 5	-12dB	750	16
6 - 10	-11dB	1.0K	20
11 - 15	-10dB	1.3K	24
16 - 20	-9dB	1.5K	28
21 - 25	-8dB	1.8K	32
26 - 30	-7dB	2.0K	36
31 - 35	-6dB	2.3K	40
36 - 40	-5dB	2.5K	48
41 - 46	-4dB	3.0K	56
47 - 51	-3dB	3.5K	64
52 - 56	-2dB	4.0K	72
57 - 61	-1dB	5.0K	80
62 - 66	0dB	6.0K	120
67 - 71	1dB	7.0K	160
72 - 76	2dB	8.0K	200
77 - 81	3dB	9.0K	240
82 - 87	4dB	10K	280
88 - 92	5dB	11K	320
93 - 97	6dB	12K	360
98 - 102	7dB	13K	400
103 - 107	8dB	14K	440
108 - 112	9dB	15K	480
113 - 117	10dB	16K	520
118 - 122	11dB	17K	560
123 - 127	12dB	18K	600

## (6) Program Change

Status Second

BnH ppH

n = MIDI channel No. : OH - FH (0 - 15) 0 = ch.1 15 =ch.16  
pp = Program No. : 00H - 7FH (0 - 127)

\* The S-760 responds to a program change coming on the system control channel by performing the following process depending on the system control mode.

When the control mode = Perf Only,

pp = 0-63: Selects the performance being set in the program number matching the pp.

pp = 64-127: Selects the performance being set in the program number matching the pp-64.

When the control mode = Perf/Vol,

pp = 0 - 63: Selects the performance being set in the program number matching the pp.

pp = 64-127: Loads the volume file, being set in the program No. matching the pp and stored in the current drive.

\* A program change received on the MIDI channel of a part serves as a patch change. Any patch can be assigned a program number. A program change is recognized when the program change receive switch (performance parameter) is on(o).

## (7) Pitch Bend Change

Status Second Third

BnH 11H mmH

n = MIDI channel No. : OH - FH (0 - 15) 0 = ch.1 15 =ch.16  
mm,11 = Value : 00H,00H - 40H,00H - 7FH,7FH  
(-8192 - 0 - +8191)

\* Controls the pitch bend of the part corresponding to the receiving MIDI channel number.

\* Recognized when the pitch bend receive switch (performance parameter) is on(o).

## [Channel Mode Messages]

### (1) All Notes Off

Status Second Third

BnH 7BH 00H

n = MIDI channel No. : OH - FH (0 - 15) 0 = ch.1 15 =ch.16

\* The S-760 will turn off all MIDI-on notes on the receiving channel if it has not previously received the damper on; the S-760, if has received damper on, will turn off the notes upon receiving the damper off.

### (2) OMNI Off

Status Second Third

BnH 7CH 00H

n = MIDI channel No. : OH - FH (0 - 15) 0 = ch.1 15 =ch.16

\* With the S-760, this message serves as an All notes off.

### (3) OMNI On

Status Second Third

BnH 7DH 00H

n = MIDI channel No. : OH - FH (0 - 15) 0 = ch.1 15 =ch.16

\* With the S-760, this message serves as an All notes off.

### (4) MONO

Status Second Third

BnH 7EH mmH

n = MIDI channel No. : OH - FH (0 - 15) 0 = ch.1 15 =ch.16  
mm = Mono channel range : Ignored

\* With the S-760, this message serves as an All notes off.

## (5) POLY

Status	Second	Third
BnH	7FH	00H

n = MIDI channel No. : OH - FH (0 - 15) 0 = ch.1 15 = ch.16

\* With the S-760, this message serves as an All notes off.

### [System Exclusive Messages]

#### Status

F0H	: System exclusive
F7H	: EOX (End Of Exclusive)

\* For details, refer to "Roland Exclusive Messages" and Section 3.

### [System Real Time Messages]

#### (1) Active Sensing

#### Status

#### FEH

\* When the S-760 receives active sensing messages, it measures the time intervals between incoming messages. If no message (status, data) is received within 300 ms of the previous one, the S-760 turns off all MIDI note on messages and, returns to the normal mode. Monitoring of Active Sensing messages is terminated.

## 2. TRANSMITTED DATA

### [System Exclusive Messages]

#### Status

F0H	: System exclusive messages
F7H	: EOX (End Of Exclusive)

\* For details, refer to "Roland Exclusive Messages" and Section 3.

## 3. EXCLUSIVE COMMUNICATIONS

### [S-760 Exclusive Information]

The S-760 transfers the following information as exclusive information.

System Exclusive Messages(in Roland proprietary format)

Tone parameter information and others

Universal System Exclusive Messages(in MIDI common format)  
Sample dump standards(sampling data)

### [System Exclusive Messages]

#### (1) General Description

The S-760 can transfer tone parameters and other information using exclusive messages which are transferred in either of two communication formats: one way communications or handshaking communications.

#### (2) Terminology

##### • Model ID

The model ID of the S-760 is 34H.

##### • Control channel

The MIDI channel having control over the entire S-760. The control channel can be set to one of 1-16 channels.

##### • Device ID

Exclusive messages are not assigned to any particular MIDI channel. Instead, they have their own special control parameter called device ID. The Roland exclusive messages use device IDs to specify various devices. The S-760 has several basic channels which can be assigned to individual device IDs of value 00H-1FH.

#### (3) One Way Communications

##### • Request data RQ1 11H

On receiving this message, the S-760 checks to see that the specified address matches a parameter base address and that the specified size is 1 or larger. If the S-760 finds the required parameter, it will transmit it in a Data set 1 (DT1) message. The S-760 does not transmit this message.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
34H	Model ID
11H	Command ID (RQ1)
aaH	Address MSB *3-1
aaH	Address
aaH	Address
aaH	Address LSB
ssH	Size MSB
ssH	Size
ssH	Size
sum	Checksum
F7H	EOX (End Of Exclusive)

##### • Data set DT1 12H

The S-760 handles this message as outlined below.

The received device ID is legal and the address specified in the message is found in the parameter addresses. Then the S-760 stores the received data into memory location starting with the specified address.

The S-760 transmits this message in the following case.

Received a Request data (RQ1) and to send the specified parameter. Or, upon execution of Volume dump.

For parameters that may be transferred, see the parameter address map.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
34H	Model ID
12H	Command ID (DT1)
aaH	Address MSB *3-1
aaH	Address
aaH	Address
aaH	Address LSB
ddH	Data
:	
sum	Checksum
F7H	EOX (End Of Exclusive)

#### (4) Handshaking Communications

##### • Want to send data WSD 40H

On receiving this message, the S-760 returns an acknowledge (ACK) message and waits for a Data set (DAT) message.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
34H	Model ID
40H	Command ID (WSD)
aaH	Address MSB *3-1
aaH	Address
aaH	Address
aaH	Address LSB
ssH	Size MSB
ssH	Size
ssH	Size
ssH	Size LSB
sum	Checksum
F7H	EOX (End Of Exclusive)

##### • Request data RQD 41H

On receiving this message, the S-760 checks to see that the specified address matches a parameter base address and that the specified size is 1 or larger. If the S-760 finds the required parameter, it will transmit a Data set (DAT) message which contains the requested data. The S-760 does not transmit Request data message.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
34H	Model ID
41H	Command ID (RQ1)
aaH	Address MSB *3-1
aaH	Address
aaH	Address
aaH	Address LSB
ssH	Size MSB
ssH	Size
ssH	Size
ssH	Size LSB
sum	Checksum
F7H	EOX (End Of Exclusive)

**Data set**

DAT 42H

Upon receiving this message, the S-760 checks it to see that the designated address is a parameter base address. If correct, it stores the received data into a memory location starting with that address.

Upon receiving a Data request (RQD), the S-760 transmits the data whose length and addresses correspond to the ones specified in the Request data messages, together with the parameter base address.

Byte	Description
FOH	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
34H	Model ID
42H	Command ID (DAT)
aaH	Address MSB *3-1
aaH	Address
aaH	Address
aaH	Address LSB
ddH	Data
:	
sum	Checksum
F7H	EOX (End Of Exclusive)

**Acknowledge**

ACK 43H

When this message is returned in response to the sent Data set (DAT), the S-760 transmits another Data set (DAT) providing the data that follows the data it previously sent. When this message is returned in response to the last End of data (EOD) message, the S-760 terminates the current handshaking communication. The S-760 transmits this message upon receiving a Want to send data (WSD), End of data or Data set (DAT).

Byte	Description
FOH	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
34H	Model ID
43H	Command ID (ACK)
F7H	EOX (End Of Exclusive)

**End of data**

EOD 45H

On receiving this message the S-760 terminates the current handshaking communication by sending an acknowledge.

Also sends this message at the end of data in bulk dumping.

Byte	Description
FOH	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
34H	Model ID
45H	Command ID (BOD)
F7H	EOX (End Of Exclusive)

**Communications error**

ERR 4EH

The S-760 sends this message to indicate that a communications fault was encountered due to, for example, a checksum error. The S-760 terminates the current communication by sending a Rejection message upon receiving an ERR message.

Byte	Description
FOH	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
34H	Model ID
4EH	Command ID (ERR)
F7H	EOX (End Of Exclusive)

**Rejection**

RJC 4FH

When the S-760 receives a Communication error, it sends this message. When the S-760 receives this message, it immediately terminates the current communication.

Byte	Description
FOH	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
34H	Model ID
4FH	Command ID (RJC)
F7H	EOX (End Of Exclusive)

\*3-1 Address and size are illegal when no data exists in these locations.

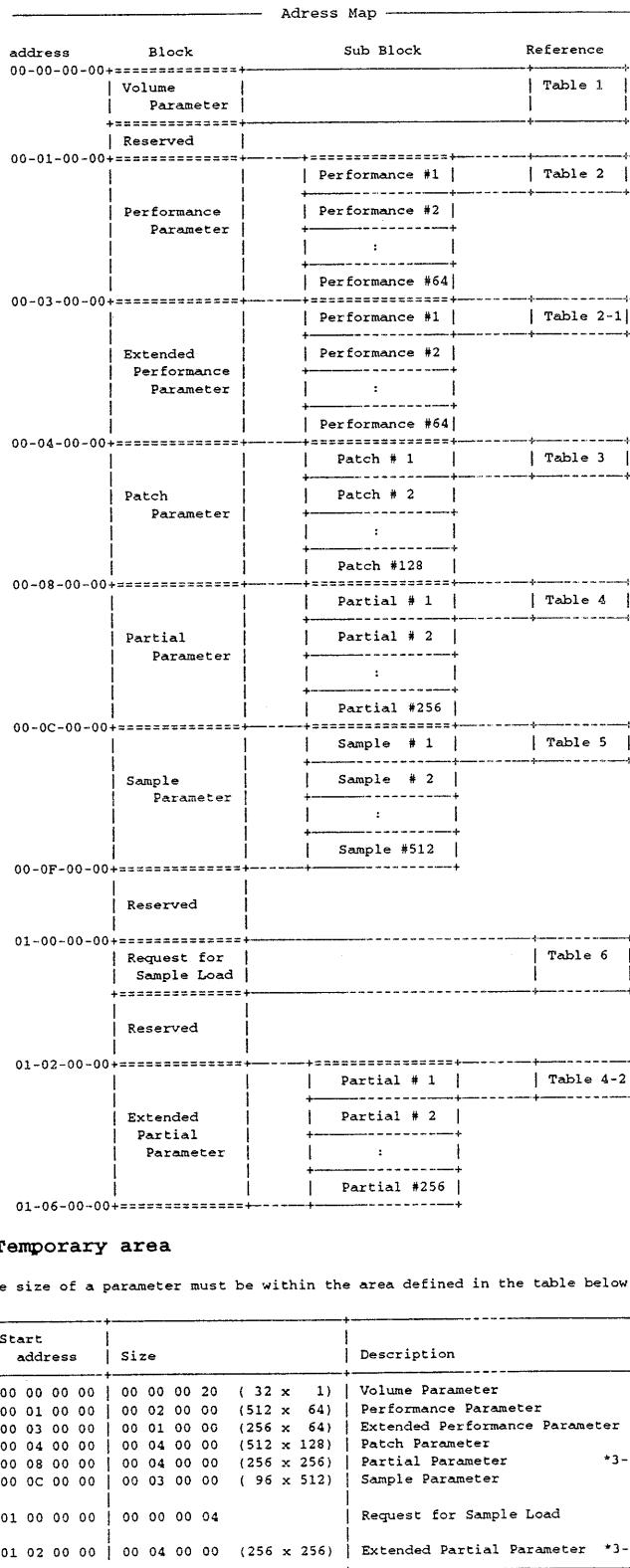
**(5) Parameter Address Mapping**

Addresses are expressed in 7-bit hexadecimal values.

Address	MSB		LSB
Binary	0aaa aaa	0bbb bbbb	0ccc cccc
7 bit Hex	AA	BB	CC

In the actual data, the value of the address is larger than the starting address of a block by the offset address.

**(6) Parameter base address**



\*3-2 Do not use a Data set for writing parameter data into the 256th slot of the Partial parameter area.

•Table 1: Volume Parameter.

Offset address	Description	
00 00H	0000 aaaa	Volume Name 1
00 01H	0000 bbbb	aaaa bbbb
:		
00 1EH	0000 aaaa	Volume Name 16
00 1FH	0000 bbbb	aaaa bbbb
Total size	00 00	20H

•Table 2: Performance Parameter.

Offset address	Description	
00 00H	0000 aaaa	Performance Name 1
00 01H	0000 bbbb	aaaa bbbb
:		
00 1EH	0000 aaaa	Performance Name 16
00 1FH	0000 bbbb	aaaa bbbb
00 20H	0000 aaaa	Part 1 Patch Select
00 21H	0000 bbbb	aaaa bbbb
:		
00 5EH	0000 aaaa	Part 32 Patch Select
00 5FH	0000 bbbb	aaaa bbbb
00 60H	0000 aaaa	Part' 2 MIDI Ch
00 61H	0000 aaaa	Part 1 MIDI Ch
:		
00 7EH	0000 aaaa	Part 32 MIDI Ch
00 7FH	0000 aaaa	Part 31 MIDI Ch
01 00H	0000 caaa	Part 1 Level
01 01H	0000 bbbb	caaa bbbb
:		
01 3EH	0000 caaa	Part 32 Level
01 3FH	0000 bbbb	caaa bbbb
01 40H	0000 aaaa	Part 1 Zone Range Lower
01 41H	0000 bbbb	aaaa bbbb
:		
01 7EH	0000 aaaa	Part 32 Zone Range Lower
01 7FH	0000 bbbb	aaaa bbbb
02 00H	0000 aaaa	Part 1 Zone Range Upper
02 01H	0000 bbbb	aaaa bbbb
:		
02 3EH	0000 aaaa	Part 32 Zone Range Upper
02 3FH	0000 bbbb	aaaa bbbb
02 40H	0000 aaaa	Part 1 Zone Fade Width Lower
02 41H	0000 bbbb	aaaa bbbb
:		
02 7EH	0000 aaaa	Part 32 Zone Fade Width Lower
02 7FH	0000 bbbb	aaaa bbbb
03 00H	0000 aaaa	Part 1 Zone Fade Width Upper
03 01H	0000 bbbb	aaaa bbbb
:		
03 3EH	0000 aaaa	Part 32 Zone Fade Width Upper
03 3FH	0000 bbbb	aaaa bbbb
03 40H	0000 hgfe	Program Change Switch
03 41H	0000 dcba	a Ch 1
03 42H	0000 ponm	:
03 43H	0000 lkji	p Ch 16
03 44H	0000 hgfe	Pitch Bender & Bend Range Switch
03 45H	0000 dcba	a Ch 1
03 46H	0000 ponm	:
03 47H	0000 lkji	p Ch 16
03 48H	0000 hgfe	Modulation Switch
03 49H	0000 dcba	a Ch 1
03 4AH	0000 ponm	:
03 4BH	0000 lkji	p Ch 16
03 4CH	0000 hgfe	Hold Pedal Switch
03 4DH	0000 dcba	a Ch 1
03 4EH	0000 ponm	:
03 4FH	0000 lkji	p Ch 16
03 50H	0000 hgfe	Phase Lock Switch
03 51H	0000 dcba	a Ch 1
03 52H	0000 ponm	:
03 53H	0000 lkji	p Ch 16
03 54H	0000 hgfe	MIDI Volume Switch
03 55H	0000 dcba	a Ch 1
03 56H	0000 ponm	:
03 57H	0000 lkji	p Ch 16
03 58H	0000 hgfe	After Touch Switch
03 59H	0000 dcba	a Ch 1

03 5AH	0000 ponm	:	0:Off 1:On
03 5BH	0000 lkji	p Ch 16	
03 5CH	0000 hgfe	After Touch Mode	
03 5DH	0000 dcba	a Ch 1	
03 5EH	0000 ponm	:	0:Channel(ExH) 1:Poly(AxH)
03 5FH	0000 lkji	p Ch 16	
03 60H	0000 aaaa	Velocity Curve Type Ch 1	
03 61H	0000 bbbb	aaaa bbbb	0 - 7
:			
03 7EH	0000 aaaa	Velocity Curve Type Ch 16	
03 7FH	0000 bbbb	aaaa bbbb	0 - 7
Total size	00 00	20H	
Total size	00 04	00H	

•Table 2-1: Extended Performance Parameter

Offset address	Description	
00 00H	0000 aaaa	EQ -1 High Gain
00 01H	0000 bbbb	aaaa bbbb
:		
00 0EH	0000 aaaa	EQ -8 High Gain
00 0FH	0000 bbbb	aaaa bbbb
00 10H	0000 aaaa	EQ -1 High Frequency
00 11H	0000 bbbb	aaaa bbbb
:		
00 1EH	0000 aaaa	EQ -8 High Frequency
00 1FH	0000 bbbb	aaaa bbbb
00 20H	0000 aaaa	EQ -1 Low Gain
00 21H	0000 bbbb	aaaa bbbb
:		
00 2EH	0000 aaaa	EQ -8 Low Gain
00 2FH	0000 bbbb	aaaa bbbb
00 30H	0000 aaaa	EQ -1 Low Frequency
00 31H	0000 bbbb	aaaa bbbb
:		
00 3EH	0000 aaaa	EQ -8 Low Frequency
00 3FH	0000 bbbb	aaaa bbbb
00 40H	0000 aaaa	Part -1 Output Assign
00 41H	0000 bbbb	aaaa bbbb
:		
00 7EH	0000 aaaa	Part -32 Output Assign
00 7FH	0000 bbbb	aaaa bbbb
01 00H	0000 aaaa	Part -1 Panning
01 01H	0000 bbbb	aaaa bbbb
:		
01 3EH	0000 aaaa	Part -32 Panning
01 3FH	0000 bbbb	aaaa bbbb
01 40H	0000 hgfe	Pan Switch
01 41H	0000 dcba	a Ch 1
01 42H	0000 ponm	:
01 43H	0000 lkji	p Ch 16
01 44H	0000 hgfe	Part Mode
01 45H	0000 dcba	a Ch 1
01 46H	0000 ponm	:
01 47H	0000 lkji	p Ch 16
01 48H	0000 hgfe	Part Solo (Part 1 - 16)
01 49H	0000 dcba	a Part 1
01 4AH	0000 ponm	:
01 4BH	0000 lkji	p Part 16
01 4CH	0000 hgfe	Part Solo (Part 17 - 32)
01 4DH	0000 dcba	a Part 17
01 4EH	0000 ponm	:
01 4FH	0000 lkji	p Part 32
01 50H	0000 hgfe	Part mute (Part 1 - 16)
01 51H	0000 dcba	a Part 1
01 52H	0000 ponm	:
01 53H	0000 lkji	p Part 16
01 54H	0000 hgfe	Part mute (Part 17 - 32)
01 55H	0000 dcba	a Part 17
01 56H	0000 ponm	:
01 57H	0000 lkji	p Part 32
01 58H	0000 aaaa	Dummy
01 59H	0000 bbbb	aaaa bbbb
:		
01 7EH	0000 aaaa	Dummy
01 7FH	0000 bbbb	aaaa bbbb
Total size	00 02	00H

\*1 These parameters are ignored when you use the S-760 SYSTEM DISK Ver.1.

•Table 3: Patch Parameter.

Offset address	Description	
00 00H	0000 aaaa	Patch Name 1
00 01H	0000 bbbb	aaaa bbbb
:		
00 1EH	0000 aaaa	Patch Name 16
00 1FH	0000 bbbb	aaaa bbbb
		32 - 127 (ASCII)
00 20H	0000 aaaa	Program Change #
00 21H	0000 bbbb	aaaa bbbb
		0 - 127
00 22H	0000 aaaa	Dummy
00 23H	0000 bbbb	aaaa bbbb
00 24H	0000 aaaa	Total Panning
00 25H	0000 bbbb	aaaa bbbb
		-31 - +32:L32 - R32
00 26H	0000 aaaa	Patch Level
00 27H	0000 bbbb	aaaa bbbb
		0 - 127
00 28H	0000 aaaa	Output Assign (stereo+6outs)
00 29H	0000 bbbb	aaaa bbbb
		-1:A, 0 - 5:3 - 8 6:Partial
00 2AH	0000 aaaa	Priority
00 2BH	0000 bbbb	aaaa bbbb
		0:OFF 1:On
00 2CH	0000 aaaa	Cutoff Offset
00 2DH	0000 bbbb	aaaa bbbb
		-63 - +63
00 2EH	0000 aaaa	Velocity Sensitivity Offset
00 2FH	0000 bbbb	aaaa bbbb
		-63 - +63
00 30H	0000 aaaa	Octave Shift
00 31H	0000 bbbb	aaaa bbbb
		-2 - +2
00 32H	0000 aaaa	Coarse Tune
00 33H	0000 bbbb	aaaa bbbb
		-48 - +48
00 34H	0000 aaaa	Fine Tune
00 35H	0000 bbbb	aaaa bbbb
		-50 - +50
00 36H	0000 aaaa	SMT Ctrl Select
00 37H	0000 bbbb	aaaa bbbb
		-1:Off, 0:Bend 1:A.T, 2:Mod, 3:Ctrl
00 38H	0000 aaaa	SMT Ctrl Sensitivity
00 39H	0000 bbbb	aaaa bbbb
		-63 - +63
00 3AH	0000 aaaa	Out Assign (8outs)
00 3BH	0000 bbbb	aaaa bbbb
		-1:A, 0 - 7:1 - 8 8:Partial
00 3CH	0000 aaaa	Analog Feel
00 3DH	0000 bbbb	aaaa bbbb
		0 - 127
00 3EH	0000 aaaa	Out Assign (4stereo)
00 3FH	0000 bbbb	aaaa bbbb
		0 - 3:A - D, 4 - 11:1 - 8 12:Partial
00 40H	0000 aaaa	Partial Select Key # 21
00 41H	0000 bbbb	aaaa bbbb
		-1(Off), 0 - 254
:		
01 6EH	0000 aaaa	Partial Select Key # 108
01 6FH	0000 bbbb	aaaa bbbb
		-1(Off), 0 - 254
01 70H	0000 aaaa	Dummy
01 71H	0000 bbbb	aaaa bbbb
:		
01 7EH	0000 aaaa	Dummy
01 7FH	0000 bbbb	aaaa bbbb
02 00H	0000 aaaa	Assign Type Key # 21
02 01H	0000 bbbb	aaaa bbbb
:		
03 2EH	0000 aaaa	Assign Type Key # 108
03 2FH	0000 bbbb	aaaa bbbb
		0:Poly 1:Mono 2 - 17:Ext 1 - Ext16
03 30H	0000 aaaa	Dummy
03 31H	0000 bbbb	aaaa bbbb
:		
03 3EH	0000 aaaa	Dummy
03 3FH	0000 bbbb	aaaa bbbb
03 40H	0000 aaaa	Bender Pitch Ctrl Up
03 41H	0000 bbbb	aaaa bbbb
		0 - +48
03 42H	0000 aaaa	Bender Pitch Ctrl Down
03 43H	0000 bbbb	aaaa bbbb
		0 - +48
03 44H	0000 aaaa	Bender TVA Ctrl
03 45H	0000 bbbb	aaaa bbbb
		-63 - +63
03 46H	0000 aaaa	Bender TVF Ctrl
03 47H	0000 bbbb	aaaa bbbb
		-63 - +63
03 48H	0000 aaaa	After Touch Pitch Ctrl
03 49H	0000 bbbb	aaaa bbbb
		-48 - +48
03 4AH	0000 aaaa	After Touch TVA Ctrl
03 4BH	0000 bbbb	aaaa bbbb
		-63 - +63
03 4CH	0000 aaaa	After Touch TVF Ctrl
03 4DH	0000 bbbb	aaaa bbbb
		-63 - +63
03 4EH	0000 aaaa	After Touch LFO Rate Ctrl
03 4FH	0000 bbbb	aaaa bbbb
		-63 - +63

03 50H	0000 aaaa	After Touch LFO Pitch Depth	-63 - +63
03 51H	0000 bbbb	aaaa bbbb	
03 52H	0000 aaaa	After Touch LFO TVA Depth	-63 - +63
03 53H	0000 bbbb	aaaa bbbb	
03 54H	0000 aaaa	After Touch LFO TVF Depth	-63 - +63
03 55H	0000 bbbb	aaaa bbbb	
03 56H	0000 aaaa	Modulation LFO Rate Ctrl	-63 - +63
03 57H	0000 bbbb	aaaa bbbb	
03 58H	0000 aaaa	Modulation LFO Pitch Depth	-63 - +63
03 59H	0000 bbbb	aaaa bbbb	
03 5AH	0000 aaaa	Modulation LFO TVA Depth	-63 - +63
03 5BH	0000 bbbb	aaaa bbbb	
03 5CH	0000 aaaa	Modulation LFO TVF Depth	-63 - +63
03 5DH	0000 bbbb	aaaa bbbb	
03 5EH	0000 aaaa	TVF Resonance Offset	-63 - +63
03 5FH	0000 bbbb	aaaa bbbb	
03 60H	0000 aaaa	Controller Select	0 - 95
03 61H	0000 bbbb	aaaa bbbb	
03 62H	0000 aaaa	Controller Pitch Ctrl	-48 - +48
03 63H	0000 bbbb	aaaa bbbb	
03 64H	0000 aaaa	Controller TVA Ctrl	-63 - +63
03 65H	0000 bbbb	aaaa bbbb	
03 66H	0000 aaaa	Controller TVF Ctrl	-63 - +63
03 67H	0000 bbbb	aaaa bbbb	
03 68H	0000 aaaa	Controller LFO Rate Ctrl	-63 - +63
03 69H	0000 bbbb	aaaa bbbb	
03 6AH	0000 aaaa	Controller LFO Pitch Depth	-63 - +63
03 6BH	0000 bbbb	aaaa bbbb	
03 6CH	0000 aaaa	Controller LFO TVA Depth	-63 - +63
03 6DH	0000 bbbb	aaaa bbbb	
03 6EH	0000 aaaa	Controller LFO TVF Depth	-63 - +63
03 6FH	0000 bbbb	aaaa bbbb	
03 70H	0000 aaaa	TVA Attack Offset	-63 - +63
03 71H	0000 bbbb	aaaa bbbb	
03 72H	0000 aaaa	TVA Release Offset	-63 - +63
03 73H	0000 bbbb	aaaa bbbb	
03 74H	0000 aaaa	After Touch LFO Pan Depth	(*1)
03 75H	0000 bbbb	aaaa bbbb	
03 76H	0000 aaaa	Modulation LFO Pan Depth	(*1)
03 77H	0000 bbbb	aaaa bbbb	
03 78H	0000 aaaa	Controller LFO Pan Depth	(*1)
03 79H	0000 bbbb	aaaa bbbb	
03 7AH	0000 aaaa	One Shot Mode	(*1)
03 7BH	0000 bbbb	aaaa bbbb	0:Off 1:On
03 7CH	0000 aaaa	Dummy	
03 7DH	0000 bbbb	aaaa bbbb	
03 7EH	0000 aaaa	Dummy	
03 7FH	0000 bbbb	aaaa bbbb	
Total size		00 04 00H	

\*1 This parameter is ignored when you use the S-760 SYSTEM DISK Ver. 1.

•Table 4: Partial Parameter

Offset address	Description	
00 00H	0000 aaaa	Partial Name 1
00 01H	0000 bbbb	aaaa bbbb
:		
00 1EH	0000 aaaa	Partial Name 16
00 1FH	0000 bbbb	aaaa bbbb
		32 - 127 (ASCII)
00 20H		SMT Slot -1 Parameter
00 35H		Table 4-1
00 36H	0000 aaaa	Dummy
00 37H	0000 bbbb	aaaa bbbb
00 38H	0000 aaaa	Output Assign (8outs)
00 39H	0000 bbbb	aaaa bbbb
		-1:A, 0 - 7:1 - 8
00 3AH	0000 aaaa	Dummy
00 3BH	0000 bbbb	aaaa bbbb
00 3CH	0000 aaaa	Partial Level
00 3DH	0000 bbbb	aaaa bbbb
		0 - 127
00 3EH	0000 aaaa	Output Assign (stereo+6outs)
00 3FH	0000 bbbb	aaaa bbbb
		-1:A, 0 - 5:3 - 8

00 40H		SMT Slot -2 Parameter	Table 4-1
:			
00 55H			
00 56H	0000 aaaa	Dummy	
00 57H	0000 bbbb	aaaa bbbb	
00 58H	0000 aaaa	Panning	
00 59H	0000 bbbb	aaaa bbbb	-32 - +32:L32 - R32
00 5AH	0000 aaaa	Coarse Tune	
00 5BH	0000 bbbb	aaaa bbbb	-48 - +48
00 5CH	0000 aaaa	Fine Tune	
00 5DH	0000 bbbb	aaaa bbbb	-50 - +50
00 5EH	0000 aaaa	SMT Velocity Ctrl	
00 5FH	0000 bbbb	aaaa bbbb	0:Off 1:On
00 60H		SMT Slot -3 Parameter	Table 4-1
:			
00 75H			
00 76H	0000 aaaa	Dummy	
00 77H	0000 bbbb	aaaa bbbb	
00 78H	0000 aaaa	Out Assign (4stereo)	
00 79H	0000 bbbb	aaaa bbbb	0 - 3:A - D, 4 - 11:1 - 8
00 7AH	0000 aaaa	Dummy	
00 7BH	0000 bbbb	aaaa bbbb	
:			
00 7EH	0000 aaaa	Dummy	
00 7FH	0000 bbbb	aaaa bbbb	
01 00H		SMT Slot -4 Parameter	Table 4-1
:			
01 15H			
01 16H	0000 aaaa	TVF Filter Mode	
01 17H	0000 bbbb	aaaa bbbb	-1:Off, 0:LPF, 1:BPF, 2:HPF
01 18H	0000 aaaa	TVF Cutoff	
01 19H	0000 bbbb	aaaa bbbb	0 - 127
01 1AH	0000 aaaa	TVF Resonance	
01 1BH	0000 bbbb	aaaa bbbb	0 - 127
01 1CH	0000 aaaa	TVF Velocity Curve Type	
01 1DH	0000 bbbb	aaaa bbbb	0 - 3
01 1EH	0000 aaaa	TVF Velocity Curve Ratio	
01 1FH	0000 bbbb	aaaa bbbb	-63 - +63
01 20H	0000 aaaa	TVF Time Velocity Sensitivity	
01 21H	0000 bbbb	aaaa bbbb	-63 - +63
01 22H	0000 aaaa	TVF Cutoff Velocity Sensitivity	
01 23H	0000 bbbb	aaaa bbbb	-63 - +63
01 24H	0000 aaaa	TVF Level 0.4	
01 25H	0000 bbbb	aaaa bbbb	0 - 127
01 26H	0000 aaaa	TVF Level 1	
01 27H	0000 bbbb	aaaa bbbb	0 - 127
01 28H	0000 aaaa	TVF Level 2	
01 29H	0000 bbbb	aaaa bbbb	0 - 127
01 2AH	0000 aaaa	TVF Level 3 (S)	
01 2BH	0000 bbbb	aaaa bbbb	0 - 127
01 2CH	0000 aaaa	TVF Time 1	
01 2DH	0000 bbbb	aaaa bbbb	0 - 127
01 2EH	0000 aaaa	TVF Time 2	
01 2FH	0000 bbbb	aaaa bbbb	0 - 127
01 30H	0000 aaaa	TVF Time 3	
01 31H	0000 bbbb	aaaa bbbb	0 - 127
01 32H	0000 aaaa	TVF Time 4 (R)	
01 33H	0000 bbbb	aaaa bbbb	0 - 127
01 34H	0000 aaaa	ENV TVF Depth	
01 35H	0000 bbbb	aaaa bbbb	-63 - +63
01 36H	0000 aaaa	ENV Pitch Depth	
01 37H	0000 bbbb	aaaa bbbb	-63 - +63
01 38H	0000 aaaa	TVF KF Point	
01 39H	0000 bbbb	aaaa bbbb	21 - 108
01 3AH	0000 aaaa	ENV Time KF	
01 3BH	0000 bbbb	aaaa bbbb	-63 - +63
01 3CH	0000 aaaa	ENV Depth KF	
01 3DH	0000 bbbb	aaaa bbbb	-63 - +63
01 3EH	0000 aaaa	TVF Cutoff KF	
01 3FH	0000 bbbb	aaaa bbbb	-63 - +63
01 40H	0000 aaaa	TVF Velocity Curve Type	
01 41H	0000 bbbb	aaaa bbbb	0 - 3
01 42H	0000 aaaa	TVF Velocity Curve Ratio	
01 43H	0000 bbbb	aaaa bbbb	-63 - +63

01 44H	0000 aaaa	TVA Time Velocity Sensitivity	
01 45H	0000 bbbb	aaaa bbbb	-63 - +63
01 46H	0000 aaaa	TVA Level 0.4	
01 47H	0000 bbbb	aaaa bbbb	0
01 48H	0000 aaaa	TVA Level 1	
01 49H	0000 bbbb	aaaa bbbb	0 - 127
01 4AH	0000 aaaa	TVA Level 2	
01 4BH	0000 bbbb	aaaa bbbb	0 - 127
01 4CH	0000 aaaa	TVA Level 3 (S)	
01 4DH	0000 bbbb	aaaa bbbb	0 - 127
01 4EH	0000 aaaa	TVA Time 1	
01 4FH	0000 bbbb	aaaa bbbb	0 - 127
01 50H	0000 aaaa	TVA Time 2	
01 51H	0000 bbbb	aaaa bbbb	0 - 127
01 52H	0000 aaaa	TVA Time 3	
01 53H	0000 bbbb	aaaa bbbb	0 - 127
01 54H	0000 aaaa	TVA Time 4 (R)	
01 55H	0000 bbbb	aaaa bbbb	0 - 127
01 56H	0000 aaaa	Dummy	
01 57H	0000 bbbb	aaaa bbbb	
01 58H	0000 aaaa	TVA KF Point	
01 59H	0000 bbbb	aaaa bbbb	21 - 108
01 5AH	0000 aaaa	TVA ENV Time KF	
01 5BH	0000 bbbb	aaaa bbbb	-63 - +63
01 5CH	0000 aaaa	Dummy	
01 5DH	0000 bbbb	aaaa bbbb	
01 5EH	0000 aaaa	TVA Level KF	
01 5FH	0000 bbbb	aaaa bbbb	21 - 108
01 60H	0000 aaaa	LFO Wave Form	0:Sin, 1:Tri, 2:Saw+, 3:Saw-
01 61H	0000 bbbb	aaaa bbbb	4:Squ, 5:Rnd, 6:Bend+, 7:Bend-
01 62H	0000 aaaa	LFO Rate	
01 63H	0000 bbbb	aaaa bbbb	0 - 127
01 64H	0000 aaaa	LFO Key Sync	
01 65H	0000 bbbb	aaaa bbbb	0:Off, 1:On
01 66H	0000 aaaa	LFO Delay	
01 67H	0000 bbbb	aaaa bbbb	0 - 127
01 68H	0000 aaaa	LFO Delay KF	
01 69H	0000 bbbb	aaaa bbbb	-63 - +63
01 6AH	0000 aaaa	LFO Detune	
01 6BH	0000 bbbb	aaaa bbbb	0 - 127
01 6CH	0000 aaaa	LFO Pitch Mod Depth	
01 6DH	0000 bbbb	aaaa bbbb	-63 - +63
01 6EH	0000 aaaa	LFO TVF Mod Depth	
01 6FH	0000 bbbb	aaaa bbbb	-63 - +63
01 70H	0000 aaaa	LFO TVA Mod Depth	
01 71H	0000 bbbb	aaaa bbbb	-63 - +63
01 72H	0000 aaaa	Dummy	
01 73H	0000 bbbb	aaaa bbbb	
01 74H	0000 aaaa	TVF Release Velocity Sensitivity	
01 75H	0000 bbbb	aaaa bbbb	-63 - +63
01 76H	0000 aaaa	TVA Release Velocity Sensitivity	
01 77H	0000 bbbb	aaaa bbbb	-63 - +63
01 78H	0000 aaaa	Slot -1 Sub-Sample Parameter enable	
01 79H	0000 bbbb	aaaa bbbb	0:disable 1:enable
01 7AH	0000 aaaa	Slot -2 Sub-Sample Parameter enable	
01 7BH	0000 bbbb	aaaa bbbb	0:disable 1:enable
01 7CH	0000 aaaa	Slot -3 Sub-Sample Parameter enable	
01 7DH	0000 bbbb	aaaa bbbb	0:disable 1:enable
01 7EH	0000 aaaa	Slot -4 Sub-Sample Parameter enable	
01 7FH	0000 bbbb	aaaa bbbb	0:disable 1:enable
Total size		00 02 00H	

•Table 4-1:SMT (Sample Mix Table) Parameter

Offset address	Description		
00 00H	0000 cccc	Sample Select	
00 01H	0000 dddd	aaaa bbbb cccc dddd	-1(Off), 0 - 511
00 02H	0000 aaaa		
00 03H	0000 bbbb		
00 04H	0000 aaaa	Pitch KF	
00 05H	0000 bbbb	aaaa bbbb	-16 - +16
00 06H	0000 aaaa	Level	
00 07H	0000 bbbb	aaaa bbbb	0 - 127
00 08H	0000 aaaa	Panning	-32 - +32:L32 - R32, 33:Random
00 09H	0000 bbbb	aaaa bbbb	34:Key+, 35:Key-, 36:LFO+(*1)
			37:LFO-(*1), 38:Alternate
00 0AH	0000 aaaa	Coarse Tune	
00 0BH	0000 bbbb	aaaa bbbb	-48 - +48
00 0CH	0000 aaaa	Fine Tune	
00 0DH	0000 bbbb	aaaa bbbb	-50 - +50
00 0EH	0000 aaaa	SMT Vel Lower	
00 0FH	0000 bbbb	aaaa bbbb	1 - 126
00 10H	0000 aaaa	SMT Lower Fade Width	
00 11H	0000 bbbb	aaaa bbbb	0 - 125
00 12H	0000 aaaa	SMT Vel Upper	
00 13H	0000 bbbb	aaaa bbbb	2 - 127
00 14H	0000 aaaa	SMT Upper Fade Width	
00 15H	0000 bbbb	aaaa bbbb	0 - 125
Total size	00 00 16H		

\*1 This value is ignored when you use the S-760 SYSTEM DISK Ver. 1.

•Table 4-2:Extended Partial Parameter

Offset address	Description		
00 00H			
00 01H			
:			
00 3EH		Slot -1 Sub-Sample Parameter	
00 3FH			
00 40H			
00 41H			
:		Slot -2 Sub-Sample Parameter	
00 7EH			
00 7FH			
01 00H			
01 01H			
:		Slot -3 Sub-Sample Parameter	
01 3EH			
01 3FH			
01 40H			
01 41H			
:		Slot -4 Sub-Sample Parameter	
01 7EH			
01 7FH			
Total size	00 02 00H		

•Table 5: Sample Parameter

Offset address	Description		
00 00H	0000 aaaa	Sample Name 1	
00 01H	0000 bbbb	aaaa bbbb	32 - 127 (ASCII)
:			
00 1EH	0000 aaaa	Sample Name 16	
00 1FH	0000 bbbb	aaaa bbbb	32 - 127 (ASCII)
00 20H	0000 gggg	Start Point	
00 21H	0000 hhhh		
00 22H	0000 eeee	aaaa bbbb cccc dddd eeee ffff. gggg hhhh	
00 23H	0000 ffff		
00 24H	0000 cccc		
00 25H	0000 dddd		000000.00H - FFFFFF.FFH
00 26H	0000 aaaa		
00 27H	0000 bbbb		
00 28H	0000 gggg	Sustine Loop Start Point	
00 29H	0000 hhhh		
00 2AH	0000 eeee	aaaa bbbb cccc dddd eeee ffff. gggg hhhh	
00 2BH	0000 ffff		
00 2CH	0000 cccc		
00 2DH	0000 dddd		000000.00H - FFFFFF.FFH
00 2EH	0000 aaaa		
00 2FH	0000 bbbb		

00 30H	0000 gggg	Sustine Loop End Point	
00 31H	0000 hhhh	aaaa bbbb cccc dddd eeee ffff. gggg hhhh	
00 32H	0000 eeee		000000.00H - FFFFFF.FFH
00 33H	0000 ffff		
00 34H	0000 cccc		
00 35H	0000 dddd		
00 36H	0000 aaaa		
00 37H	0000 bbbb		
00 38H	0000 gggg	Release Loop Start Point	
00 39H	0000 hhhh	aaaa bbbb cccc dddd eeee ffff. gggg hhhh	
00 3AH	0000 eeee		000000.00H - FFFFFF.FFH
00 3BH	0000 ffff		
00 3CH	0000 cccc		
00 3DH	0000 dddd		
00 3EH	0000 aaaa		
00 3FH	0000 bbbb		
00 40H	0000 gggg	Release Loop End Point	
00 41H	0000 hhhh	aaaa bbbb cccc dddd eeee ffff. gggg hhhh	
00 42H	0000 eeee		000000.00H - FFFFFF.FFH
00 43H	0000 ffff		
00 44H	0000 cccc		
00 45H	0000 dddd		
00 46H	0000 aaaa		
00 47H	0000 bbbb		
00 48H	0000 aaaa	Loop Mode	0:Forward, 1:Fwd+R, 2:OneShot
00 49H	0000 bbbb		3:Fwd+One, 4:Alt, 5:Rev One, 6:Rev
00 4AH	0000 aaaa	Dummy	
00 4BH	0000 bbbb		
00 4CH	0000 aaaa	Sustine Loop Tune	
00 4DH	0000 bbbb		-50 - +50
00 4EH	0000 aaaa	Release Loop Tune	
00 4FH	0000 bbbb		-50 - +50
00 50H	0000 cccc	Segment Top	
00 51H	0000 dddd		0 - 3637
00 52H	0000 aaaa		
00 53H	0000 bbbb		
00 54H	0000 cccc	Segment Length	
00 55H	0000 dddd	aaaa bbbb cccc dddd	0 - 3638
00 56H	0000 aaaa		
00 57H	0000 bbbb		
00 58H	0000 aaaa	Sampling Frequency	0:48k, 1:44.1k, 2:24k
			3:22.05k, 4:30k, 5:15k, 6:32k, 7:16k
00 59H	0000 aaaa	Dummy	
00 5AH	0000 aaaa	Original Key	
00 5BH	0000 bbbb		21 - 108
00 5CH	0000 aaaa	Dummy	
00 5DH	0000 bbbb	aaaa bbbb	
00 5EH	0000 aaaa	Dummy	
00 5FH	0000 bbbb	aaaa bbbb	
Total size	00 00 60H		

•Table 6:Request for Sample Load

Offset address	Description		
00 00H	0000 0010		
00 01H	0000 0000	Request for Sample Load	
00 02H	0000 0000		
00 03H	0000 0000		
Total size	00 00 04H		

\* Loads from the current drive the sample having the name as the one specified by the sound data stored in the current volume memory.

\* Since the loading takes a long time, the MIDI communications may not be correctly established during loading.

\* This message is valid only when it is sent using a Data set (DT1) in a one way communication procedure, and the designated address is 01 00 00 00H and size is 00 00 00 04H.

#### [Universal System Exclusive Messages]

##### (1) Sample Dump Standard

To transfer data using the Sample Dump Standard use the following messages.

##### •Dump request

This message is a command to request the dump of the sample by specifying its number. Upon receiving this message, the S-760 checks to see if the requested sample number falls in a legal range. If it is, the S-760 dumps the requested sample to the requesting equipment. If it is not within a legal range, the message is ignored.

The S-760 does not send this message.

Byte	Description
F0H	Exclusive status
7EH	Sample dump command
ccH	Channel No.
03H	Command ID (Dump Req)
ss ss	Request sample (LSB first)
F7H	EOX

\* For a system exclusive message transfer, use a device ID as a channel number.

#### • Dump header

The S-760 transmits a Dump header when it receives a Dump request or when it wants to start a Sample dump. It immediately aborts the dump upon receiving a Cancel. If it receives an ACK, it will start sending data. It will pause indefinitely upon receiving a Wait until another message is received. If the other party does not return any message within 2 seconds after the S-760 sent a Dump header, the S-760 will assume an open loop (one way communications) and begin sending data.

When the S-760 receives this message, it checks to see if the memory will be enough to accept the dump, and if the sustain loop start/end points are correct. If all is OK, the S-760 sends an ACK and waits a Data packet; if NG, sends a Cancel.

Byte	Description
F0H	Exclusive status
7EH	Sample dump command
ccH	Channel number
01H	Command ID (Dump head)
ss ss	Request sample (LSB first)
10H	Sample format (16 bits)
ff ff ff	Sample period (1/sampling rate nS)
gg gg gg	Data (word) length
hh hh hh	Sustain loop start point (word number)
ii ii ii	Sustain loop end point (word number)
jj	Loop type 00H = Forwards only (unidirectional) 01H = Backwards/Forwards (bi-directional) 7FH = Off
F7H	EOX

\* For a system exclusive message transfer, use a device ID as a channel number.

#### • Data packet

Each data byte consists of 7 bits. The unit of data transmission is three bytes/word (40 words/packet). The data is left-justified within the 7-bit bytes and sent with the upper byte first and the 5th lower bit of the 3rd byte filled with a zero.

The S-760 keeps a running checksum during reception of a Data packet and returns an ACK if the checksums match, and then waits for the next Data packet. If the checksums do not match, it sends a NAK and waits for retransmission of the packet.

The S-760 transmits the next Data packet upon receiving an ACK; or immediately aborts the dump upon receiving a Cancel. It pauses the dump if a Wait is returned and it waits for the next messages.

Byte	Description
F0H	Exclusive status
7EH	Sample dump command
ccH	Channel number
02H	Command ID (Data packet)
ppH	Packet number
:	}
:	}
:	}
120H	120-byte data
:	}
11H	Checksum
F7H	EOX

\* For a system exclusive message transfer, use a device ID as a channel number.

#### • ACK

This is a handshaking flag. It means "Last data packet was received correctly. Start sending the next one." The packet number represents the packet being acknowledged as correct.

Byte	Description
F0H	Exclusive status
7EH	Sample dump command
ccH	Channel number
7FH	Command ID(ACK)
ppH	Packet number
F7H	EOX

\* For a system exclusive message transfer, use a device ID as a channel number.

#### • NAK

This is a handshaking flag. It means "Last data packet was received incorrectly. Please re-send." The packet number represents the packet being rejected.

Byte	Description
F0H	Exclusive status
7EH	Sample dump command
ccH	Channel number
7EH	Command ID (NAK)
ppH	Packet number
F7H	EOX

\* For a system exclusive message transfer, use a device ID as a channel number.

#### • Cancel

This is a handshaking flag. It means "Abort dump." The packet number represents the packet on which the abort takes place. The receiver will send this message when its memory becomes full.

Byte	Description
F0H	Exclusive status
7EH	Sample dump command
ccH	Channel number
7DH	Command ID (Cancel)
ppH	Packet number
F7H	EOX

\* For a system exclusive message transfer, use a device ID as a channel number.

#### • Wait

This is a handshaking flag. It means "Do not send any more packets until told to do so." The packet number represents the last packet received. The receiver will send this message when it needs time before receiving the remainder of the dump. An ACK will continue the dump while a Cancel will abort the dump.

The S-760 does not transmit this message.

Byte	Description
F0H	Exclusive status
7EH	Sample dump command
ccH	Channel number
7CH	Command ID (Wait)
ppH	Packet number
F7H	EOX

\* For a system exclusive message transfer, use a device ID as a channel number.

## 4. References

### [Decimal VS hexadecimal]

With a MIDI system the data value and the addresses and sizes in an Exclusive message is expressed in 7-bit hexadecimal values. The table below shows decimal values and their hexadecimal counterparts.

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

### [Checksum in an exclusive message]

Any data contained in a Roland exclusive message should be followed by a checksum (just before F7) to ensure that the data is correctly received. The value of the checksum depends on the associated address, data (or size).

#### Calculating checksum

(hexadecimal value is followed by the suffix H)

The checksum bits must have the value which, when added to the address and size bits, will make the least significant 7 bits of the sum filled with zeroes.

The equation below shows an example of the calculation to determine the value of checksum bits assuming that the address of the exclusive message is aa bb cc ddH, and data or size is ee ff gg hhH.

```
aa + bb + cc + dd + ee + ff + gg + hh = sum
sum + 128 = quotient ... remainder
128 - remainder = checksum
```

# Roland Exclusive Messages

## 1. Data Format for Exclusive Messages

Roland's MIDI implementation uses the following data format for all exclusive messages (type IV):

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
CMD	Command ID
[BODY]	Main data
F7H	End of exclusive

### #MIDI status: F0H, F7H

An exclusive message must be flanked by a pair of status codes, starting with a Manufacturer-ID immediately after F0H (MIDI version 1.0).

### #Manufacturer-ID: 41H

The Manufacturer-ID identifies the manufacturer of a MIDI instrument that triggers an exclusive message. Value 41H represents Roland's Manufacturer-ID.

### #Device-ID: DEV

The Device-ID contains a unique value that identifies the individual device in the multiple implementation of MIDI instruments. It is usually set to 00H – 0FH, a value smaller by one than that of a basic channel, but value 00H – 1FH may be used for a device with multiple basic channels.

### #Model-ID: MDL

The Model-ID contains a value that uniquely identifies one model from another. Different models, however, may share an identical Model-ID if they handle similar data.

The Model-ID format may contain 00H in one or more places to provide an extended data field. The following are examples of valid Model-IDs, each representing a unique model:

01H  
02H  
03H  
00H, 01H  
00H, 02H  
00H, 00H, 01H

### #Command-ID: CMD

The Command-ID indicates the function of an exclusive message. The Command-ID format may contain 00H in one or more places to provide an extended data field. The following are examples of valid Command-IDs, each representing a unique function:

01H  
02H  
03H  
00H, 01H  
00H, 02H  
00H, 00H, 01H

### #Main data: BODY

This field contains a message to be exchanged across an interface. The exact data size and contents will vary with the Model-ID and Command-ID.

## 2. Address-mapped Data Transfer

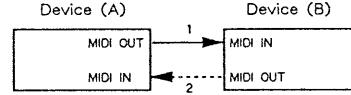
Address mapping is a technique for transferring messages conforming to the data format given in Section 1. It assigns a series of memory-resident records--waveform and tone data, switch status, and parameters, for example--to specific locations in a machine-dependent address space, thereby allowing access to data residing at the address a message specifies.

Address-mapped data transfer is therefore independent of models and data categories. This technique allows use of two different transfer procedures: one-way transfer and handshake transfer.

### # One-way transfer procedure (See Section 3 for details.)

This procedure is suited for the transfer of a small amount of data. It sends out an exclusive message completely independent of a receiving device status.

#### Connection Diagram

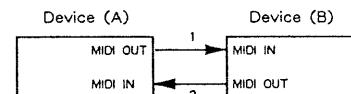


Connection at point 2 is essential for "Request data" procedures. (See Section 3.)

### #Handshake-transfer procedure (See Section 4 for details.)

This procedure initiates a predetermined transfer sequence (handshaking) across the interface before data transfer takes place. Handshaking ensures that reliability and transfer speed are high enough to handle a large amount of data.

#### Connection Diagram



Connection at points 1 and 2 is essential.

#### Notes on the above two procedures

\* There are separate Command-IDs for different transfer procedures.

\* Devices A and B cannot exchange data unless they use the same transfer procedure, share identical Device-ID and Model ID, and are ready for communication.

## 3. One-way Transfer Procedure

This procedure sends out data all the way until it stops and is used when the messages are so short that answerbacks need not be checked.

For long messages, however, the receiving device must acquire each message in time with the transfer sequence, which inserts intervals of at least 20 milliseconds in between.

#### Types of Messages

Message	Command ID
Request data 1	RQ1 (11H)
Data set 1	DT1 (12H)

### #Request data #1: RQ1 (11H)

This message is sent out when there is a need to acquire data from a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of data required.

On receiving an RQ1 message, the remote device checks its memory for the data address and size that satisfy the request.

If it finds them and is ready for communication, the device will transmit a "Data set 1 (DT1)" message, which contains the requested data. Otherwise, the device will send out nothing.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
11H	Command ID
aaH	Address MSB
...	LSB
ssH	Size MSB
...	LSB
sum	Check sum
F7H	End of exclusive

- \* The size of the requested data does not indicate the number of bytes that will make up a DT1 message, but represents the address fields where the requested data resides.
  - \* Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
  - \* The same number of bytes comprises address and size data, which, however, vary with the Model-ID.
  - \* The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

### #Data set 1: DT1 (12H)

This message corresponds to the actual data transfer process. Because every byte in the data is assigned a unique address, a DT1 message can convey the starting address of one or more data as well as a series of data formatted in an address-dependent order.

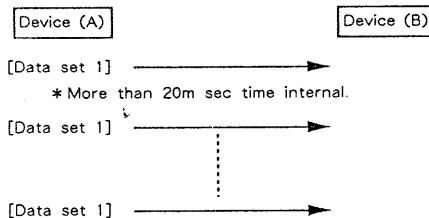
The MIDI standards inhibit non-real time messages from interrupting an exclusive one. This fact is inconvenient for the devices that support a "soft-through" mechanism. To maintain compatibility with such devices, Roland has limited the DT1 to 256 bytes so that an excessively long message is sent out in separate segments.

Byte	Description
F0H	Exclusive
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
12H	Command ID
aaH	Address MSB
..	..
..	..
ddH	Data
..	..
..	..
sum	Check sum
F7H	End of exclusive

- \* A DT1 message is capable of providing only the valid data among those specified by an RO1 message.
  - \* Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
  - \* The number of bytes comprising address data varies from one Model-ID to another.
  - \* The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

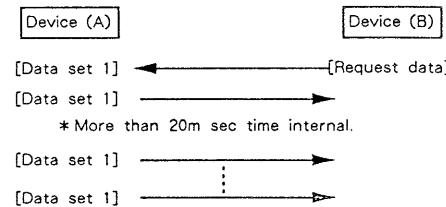
## #Example of Message Transactions

- Device A sending data to Device B  
Transfer of a DT1 message is all that takes place.



- #### Device B requesting data from Device A

Device B sends an RQ1 message to Device A. Checking the message, Device A sends a DT1 message back to Device B.



#### **4. Handshake-Transfer Procedure**

Handshaking is an interactive process where two devices exchange error checking signals before a message transaction takes place, thereby increasing data reliability. Unlike one-way transfer that inserts a pause between message transactions, handshake transfer allows much speedier transactions because data transfer starts once the receiving device returns a ready signal.

When it comes to handling large amounts of data--sampler waveforms and synthesizer tones over the entire range, for example--across a MIDI interface, handshaking transfer is more efficient than one-way transfer.

## **Types of Messages**

Message	Command ID
Want to send data	WSD (40H)
Request data	RQD (41H)
Data set	DAT (42H)
Acknowledge	ACK (43H)
End of data	EOD (45H)
Communication error	ERR (4EH)
Rejection	RJC (4FH)

#Want to send data: WSD (40H)

This message is sent out when data must be sent to a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of the data to be sent.

On receiving a WSD message, the remote device checks its memory for the specified data address and size which will satisfy the request. If it finds them and is ready for communication, the device will return an "Acknowledge (ACK)" message.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
40H	Command ID
aaH	Address MSB
..	
ssH	Size MSB
..	
sum	Check sum
F7H	End of exclusive

Otherwise, it will return a "Rejection (RJC)" message.

\* The size of the data to be sent does not indicate the number of bytes that make up a "Data set (DAT)" message, but represents the address fields where the data should reside.

\* Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.

\* The same number of b

- \* The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that

**#Request data: RQD (41H)**

This message is sent out when there is a need to acquire data from a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of data required.

On receiving an RQD message, the remote device checks its memory for the data address and size which satisfy the request. If it finds them and is ready for communication, the device will transmit a "Data set (DAT)" message, which contains the requested data. Otherwise, it will return a "Rejection (RJC)" message.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
41H	Command ID
aaH	Address MSB
⋮	⋮
ssH	Size MSB
⋮	⋮
sum	Check sum
F7H	End of exclusive

\* The size of the requested data does not indicate the number of bytes that make up a "Data set (DAT)" message, but represents the address fields where the requested data resides.

\* Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.

\* The same number of bytes comprises address and size data, which, however, vary with the Model-ID.

\* The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

**#Data set: DAT (42H)**

This message corresponds to the actual data transfer process.

Because every byte in the data is assigned a unique address, the message can convey the starting address of one or more data as well as a series of data formatted in an address-dependent order.

Although the MIDI standards inhibit non-real time messages from interrupting an exclusive one, some devices support a "soft-through" mechanism for such interrupts. To maintain compatibility with such devices, Roland has limited the DAT to 256 bytes so that an excessively long message is sent out in separate segments.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
42H	Command ID
aaH	Address MSB
⋮	⋮
ssH	LSB
ddH	Data
⋮	⋮
sum	Check sum
F7H	End of exclusive

\* A DAT message is capable of providing only the valid data among those specified by an ROD or WSD message.

\* Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.

\* The number of bytes comprising address data varies from one model ID to another.

\* The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

**#Acknowledge: ACK (43H)**

This message is sent out when no error was detected on reception of a WSD, DAT, "End of data (EOD)", or some other message and a requested setup or action is complete. Unless it receives an ACK message, the device at the other end will not proceed to the next operation.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
43H	Command ID
F7H	End of exclusive

**#End of data: EOD (45H)**

This message is sent out to inform a remote device of the end of a message. Communication, however, will not come to an end unless the remote device returns an ACK message even though an EOD message was transmitted.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
45H	Command ID
F7H	End of exclusive

**#Communications error: ERR (4EH)**

This message warns the remote device of a communications fault encountered during message transmission due, for example, to a checksum error. An ERR message may be replaced with a "Rejection (RJC)" one, which terminates the current message transaction in midstream.

When it receives an ERR message, the sending device may either attempt to send out the last message a second time or terminate communication by sending out an RJC message.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
4EH	Command ID
F7H	End of exclusive

**#Rejection: RJC (4FH)**

This message is sent out when there is a need to terminate communication by overriding the current message. An RJC message will be triggered when:

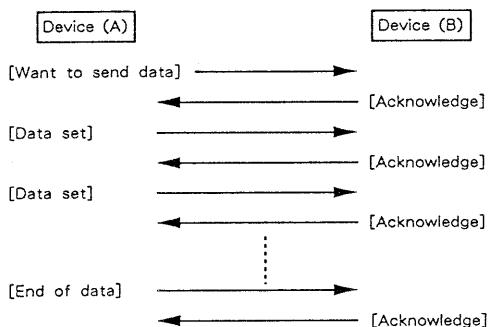
- a WSD or ROD message has specified an illegal data address or size.
- the device is not ready for communication.
- an illegal number of addresses or data has been detected.
- data transfer has been terminated by an operator.
- a communications error has occurred.

An ERR message may be sent out by a device on either side of the interface. Communication must be terminated immediately when either side triggers an ERR message.

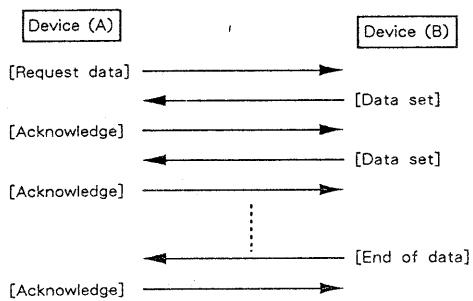
Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
4FH	Command ID
F7H	End of exclusive

**#Example of Message Transactions**

- Data transfer from device (A) to device (B).

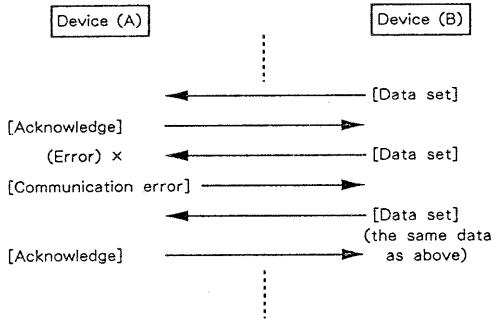


- Device (A) requests and receives data from device (B).

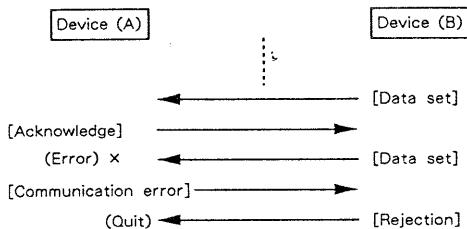


- Error occurs while device (A) is receiving data from device (B).

- 1) Data transfer from device (A) to device (B).



- 2) Device (B) rejects the data re-transmitted, and quits data transfer.



- 3) Device (A) immediately quits data transfer.

