A-70

EXPANDABLE CONTROLLER

MIDI implementation

Roland

1. Receive data

* The A-70/A-70EX has two MIDI IN connectors, MIDI IN 1 (REMOTE) and MIDI IN 2. MIDI messages fed into the device through MIDI IN 1 (REMOTE) are sent to each Zone according to the IN 1 (REMOTE) Assign's setting, then are treated as performance messages on the A-70. That is, MIDI messages sent to the external Zones will be assigned to MIDI OUT 1, 2, 3 and 4 according to the settings of the external Zones, then sent out again on the MIDI channels set in the relevant Zones. The MIDI messages sent to an internal Zone will respond to the Part on the Voice Expansion Board specified in each internal Zone, when the Voice Expansion Board is installed. MIDI message fed through IN 2 will be assigned to the MIDI OUT 1, 2, 3, 4 or INT (Voice Expansion Board) according to the IN 2 Assign's setting, then sent out again. The explanation here (receive data), however, applies only to the A-70/A-70EX with the Voice Expansion Board VE-RD1 installed.

■ Channel Voice Messages

● Note off

Status	2nd byte	3rd byte
8nH	kkH	vvH
9nH	kkH	00H

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
kk=note number : 00H - 7FH (0 - 127)
vv=note off velocity : 00H - 7FH (0 - 127)

● Note on

Status	2nd byte	3rd byte
9nH	kkH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
kk=note number : 00H - 7FH (0 - 127)
vv=note on velocity : 01H - 7FH (1 - 127)

* The Note On/Off message sent to each Zone through the IN 1 (REMOTE), if it is within the Key Range of each Zone, will be transposed, then re-sent on the MIDI channel of the relevant Zone, after calculating the velocity value using the velocity curve, velocity sensitivity and velocity max.
* Each Zone allows the transposition to ± 36 semi tones.
* Note message transposed exceeding 0–127 range will be converted to the Note message of the closest octave that is out of the range.

● Polyphonic Key Pressure

Status	2nd byte	3rd byte
AnH	kkH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
kk=note number : 00H - 7FH (0 - 127)
vv=key pressure : 00H - 7FH (0 - 127)

● Control Change

O Modulation (Controller number 1)

Status	2nd byte	3rd byte
BnH	01H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Modulation depth : 00H - 7FH (0 - 127)

O Breath type (Controller number 2)

Status	2nd byte	3rd byte
BnH	02H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127)

O Foot type (Controller number 4)

Status	2nd byte	3rd byte
BnH	04H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127)

O Portamento Time (Controller number 5)

Status	2nd byte	3rd byte
BnH	05H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Portamento Time : 00H - 7FH (0 - 127) Initial value = 00H (0)

O Data Entry (Controller number 6,38)

Status	2nd byte	3rd byte
BnH	06H	mmH
BnH	26H	llH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm,ll= the value of the parameter specified by RPN/NRPN
mm = upper byte (MSB), ll = lower byte (LSB)

O Volume (Controller number 7)

Status	2nd byte	3rd byte
BnH	07H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Volume : 00H - 7FH (0 - 127) Initial value = 64H (100)

O Balance (Controller number 8)

Status	2nd byte	3rd byte
BnH	08H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=balance : 00H - 7FH

O Pan (Controller number 10)

Status	2nd byte	3rd byte
BnH	0AH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=pan : 00H - 40H - 7FH (Left - Center - Right)
Initial value = 40H (Center)

O Expression (Controller number 11)

Status	2nd byte	3rd byte
BnH	0BH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Expression : 00H - 7FH (0 - 127) Initial value = 7FH (127)

O Hold 1 (Controller number 64)

Status	2nd byte	3rd byte
BnH	40H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

O Portamento (Controller number 65)

Status	2nd byte	3rd byte
BnH	41H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

O Sostenuto (Controller number 66)

Status	2nd byte	3rd byte
BnH	42H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

O Soft (Controller number 67)

Status	2nd byte	3rd byte
BnH	43H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

○ Hold 2 (Controller number 69)

Status	2nd byte	3rd byte
BnH	45H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

○ Portamento control (Controller number 84)

Status	2nd byte	3rd byte
BnH	54H	kkH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
kk=Source note number : 00H - 7FH (0 - 127)

* This applies to the Zone on the receiving ch. The on-note glides to the pitch of the note turned on next.

○ Effect 1 (Reverb Send Level) (Controller number 91)

Status	2nd byte	3rd byte
BnH	5BH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Reverb send level : 00H - 7FH (0 - 127) Initial value = 28H (40)

* This message adjusts the Reverb Send Level of each Zone.

○ Effect 3 (Chorus Send Level) (Controller number 93)

Status	2nd byte	3rd byte
BnH	5DH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Chorus send level : 00H - 7FH (0 - 127) Initial value = 00H (0)

* This message adjusts the Chorus Send Level of each Zone.

○ NRPN MSB/LSB (Controller number 98,99)

Status	2nd byte	3rd byte
BnH	63H	mmH
BnH	62H	llH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm=upper byte (MSB) of the parameter number specified by NRPN
ll=lower byte (LSB) of the parameter number specified by NRPN

"NRPN"

The NRPN (Non Registered Parameter Number) message allows an extended range of control changes to be used.
To use these messages, you must first use NRPN MSB and NRPN LSB messages to specify the parameter to be controlled, and then use Data Entry messages to specify the value of the specified parameter. Once an NRPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter. To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH/7Fh) when you have finished setting the value of the desired parameter.

On the A-70 / A-70 EX, NRPN can be used to modify the following parameters.

NRPN MSB LSB	Data entry MSB	Description
01H 20H	mmH mm: 0EH - 40H - 72H (-50 - 0 - +50)	Bright (relative change)
01H 63H	mmH mm: 0EH - 40H - 72H (-50 - 0 - +50)	Attack time (relative change)
01H 64H	mmH mm: 0EH - 40H - 72H (-50 - 0 - +50)	Decay time (relative change)
01H 66H	mmH mm: 0EH - 40H - 72H (-50 - 0 - +50)	Release time(relative change)

* Parameters marked "relative change" will change relative to the preset value(40H).

○ RPN MSB/LSB (Controller number 100,101)

Status	2nd byte	3rd byte
BnH	65H	mmH
BnH	64H	llH

n= MIDI channel number: 0H - FH (ch.1 - ch.16)
mm= upper byte(MSB) of parameter number specified by RPN
ll= lower byte(LSB) of parameter number specified by RPN

"RPN"

The RPN (Registered Parameter Number) messages are expanded control changes, and each function of an RPN is described by the MIDI Standard.
To use these messages, you must first use RPN MSB and RPN LSB messages to specify the parameter to be controlled, and then use Data Entry messages to specify the value of the specified parameter. Once an RPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter. To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH/7Fh) when you have finished setting the value of the desired parameter.

RPN MSB LSB	Data entry MSB LSB	Description
00H 00H	mmH —	Pitch Bend Sensitivity mm: 00H - 1CH (0 - 12 semitones) Initial value = 02H (2 semitones) ll: ignored (processed as 00H) specify up to 1 octaves in semitone steps
00H 01H	mmH llH	Master Fine Tuning mm,ll: 20 00H - 40 00H - 60 00H (-8192*50/8192 - 0 - +8192*50/8192 cents)
00H 02H	mmH —	Master Coarse Tuning mm: 10H - 40H - 70H (-48 - 0 - +48 semitones) ll: ignored (processed as 00H)
7FH 7FH	— —	RPN null Set condition where RPN and NRPN are unspecified. The data entry messages after set RPN null will be ignored. (No Data entry messages are required after RPN null). Settings already made will not change. mm,ll: ignored

● Program Change

Status	2nd byte
CnH	ppH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
pp=Program number : 00H - 7FH (prog.1 - prog.128)

* The A-70 performance changes, when the A-70 received on the control channel specified the A-70.

● Channel Pressure

Status	2nd byte
DnH	vvH

n=MIDI channel number :0H - FH (ch.1 - ch.16)
vv=Channel Pressure :00H - 7FH (0 - 127)

● Pitch Bend Change

Status	2nd byte	3rd byte
EnH	llH	mmH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm,ll=Pitch Bend value : 00 00H - 40 00H - 7F 7FH (-8192 - 0 - +8191)

■ Channel Mode Messages

● All Sounds Off (Controller number 120)

Status	2nd byte	3rd byte
BnH	78H	00H

n=MIDI channel number :0H - FH (ch.1 - ch.16)

* When this message is received, all currently-sounding notes on the corresponding channel will be turned off immediately.

● Reset All Controllers (Controller number 121)

Status	2nd byte	3rd byte
BnH	79H	00H

n=MIDI channel number :0H - FH (ch.1 - ch.16)

* When this message is received, the following controllers will be set to their reset values.

Controller	Reset value
Pitch Bend Change	+/-0 (center)
Polyphonic Key Pressure	0 (off)
Channel Pressure	0 (off)
Modulation	0 (off)
Expression	0 (min) However, the volume becomes maximum.
Hold 1	0 (off)
Portamento	0 (off)
Sostenuto	0 (off)
Soft	0 (off)
Hold 2	0 (off)
RPN	unset; previously set data will not change
NRPN	unset; previously set data will not change

● All Notes Off (Controller number 123)

Status	2nd byte	3rd byte
BnH	7BH	00H

n=MIDI channel number : 0H - FH (ch.1 - ch.16)

* When All Notes Off is received, all notes on the corresponding channel will be turned off. However if Hold 1 or Sostenuto is ON, the sound will be continued until these are turned off.

● OMNI OFF (Controller number 124)

Status	2nd byte	3rd byte
BnH	7CH	00H

n=MIDI channel number : 0H - FH (ch.1 - ch.16)

* The same processing will be carried out as when All Notes Off is received.

● OMNI ON (Controller number 125)

Status	2nd byte	3rd byte
BnH	7DH	00H

n=MIDI channel number : 0H - FH (ch.1 - ch.16)

* The same processing will be carried out as when All Notes Off is received. The Mode doesn't change OMNI ON.

● MONO (Controller number 126)

Status	2nd byte	3rd byte
BnH	7EH	mmH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm=mono number : 00H - 10H (0 - 16)

* The same processing will be carried out as when All Sounds Off and All Notes Off is received, and the corresponding channel will be set to Mode 4 (M=1) regardless of the value of "mono number".

● POLY (Controller number 127)

Status	2nd byte	3rd byte
BnH	7FH	00H

n=MIDI channel number : 0H - FH (ch.1 - ch.16)

* The same processing will be carried out as when All Sounds Off and All Notes Off is received, and the corresponding channel will be set to Mode 3.

■ System Realtime Message

● Active Sensing

Status
FEH

* When Active Sensing is received, the unit will begin monitoring the intervals of all further messages. While monitoring, if the interval between messages exceeds 420 ms, the same processing will be carried out as when All Sounds Off, All Notes Off and Reset All Controllers are received, and message interval monitoring will be halted.

■ System Exclusive Message

Status	Data byte	Status
F0H	iiH, ddH, ...,eeH	F7H

F0H : System Exclusive Message status
ii = ID number : an ID number (manufacturer ID) to indicate the manufacturer whose Exclusive message this is. Roland's manufacturer ID is 41H.
ID numbers 7EH and 7FH are extensions of the MIDI standard; Universal Non-realtime Messages (7EH) and Universal Realtime Messages (7FH).
dd,...,ee = data : 00H - 7FH (0 - 127)
F7H : EOX (End Of Exclusive)

The System Exclusive Messages received by the A-70/A-70EX are Universal Realtime System Exclusive messages, Data Requests (RQ1), and Data Set (DT1).

■ Universal Non-realtime System Exclusive Messages

● Inquiry Request

Status	Data byte	Status
F0H	7EH,dev,06H,01H	F7H

Byte	Explanation
F0H	Exclusive status
7EH	ID number (universal non-realtime message)
dev	Device ID (dev:UNIT#-1)
06H,01H	Inquiry request
F7H	EOX (End Of Exclusive)

- Even if the Device ID is 7FH(Broadcast), Inquiry Reply message will be transmitted.
- When Inquiry Request is received, Inquiry Reply message will be transmitted.

● Data transmission

A-70 / A-70EX can transmit and receive the various parameters using System Exclusive messages.
The exclusive message for using the data transmission has a model ID of 7DH and a device ID of 10H. (A-70 / A-70EX can change the setting of the device ID.)

○ Request data 1 RQ1

This message requests the other device to send data. The Address and Size determine the type and amount of data to be sent.

Status	Data byte	Status
F0H	41H, dev, 7DH, 11H, aaH, bbH, ccH, ddH, ssH, ttH, uuH, vvh, sum	F7H

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 00H - 1FH Initial value is 10H)
7DH	Model ID (A-70)
11H	Command ID (RQ1)
aaH	Address MSB
bbH	Address
ccH	Address
ddH	Address LSB
ssH	Size MSB
ttH	Size
uuH	Size
vvH	Size LSB
sum	Checksum
F7H	EOX (End Of Exclusive)

○ Data set 1 DT1

This is the message that actually performs data transmission, and is used when you wish to transmit the data.

Status	Data byte	Status
F0H	41H, dev, 7DH, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 00H - 1FH Initial value is 10H)
7DH	Model ID (A-70)
12H	Command ID (DT1)
aaH	Address MSB
bbH	Address
ccH	Address
ddH	Address LSB
eeH	Data: the actual data to be transmitted. Multiple bytes of data are transmitted starting from the address.
:	:
ffH	Data
sum	Checksum
F7H	EOX (End Of Exclusive)

2. Transmit data

■ Channel Voice Messages

● Note off

Status	2nd byte	3rd byte
8nH	kkH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
kk=note number : 00H - 7FH (0 - 127)
vv=velocity : 00H - 7FH (0 - 127)

● Note on

Status	2nd byte	3rd byte
9nH	kkH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
kk=note number : 00H - 7FH (0 - 127)
vv=velocity : 01H - 7FH (1 - 127)

- If you play the key within the range of a Zone, the Note On/Off message will be sent with the MIDI channel set to the Zone.
- The value figured out with the strength of playing keyboard, velocity curve of the Zone, velocity sensitivity and velocity max. is transmitted as "Velocity".
- Each Zone allows the transposition to ± 36 semi tones.
- Note message transposed exceeding 0–127 range will be converted to the Note message of the closest octave that is out of the range.

● Polyphonic After Touch

Status	2nd byte	3rd byte
AnH	kkH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
kk=note number : 00H - 7FH (0 - 127)
vv=polyphonic after touch : 00H - 7FH (0 - 127)

- You can transmit this message by assigning to the Controller.

● Control Change

Status	2nd byte	3rd byte
BnH	ccH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
cc=note number : 0H - C7H (0 - 199)
vv=control value : 00H - 7FH (0 - 127)

- You can transmit this message by assigning to the Controller.

● Program Change

Status	2nd byte
CnH	ppH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
pp=Program number : 00H - 7FH (prog.1 - prog.128)

● Channel After Touch

Status	2nd byte
DnH	vvH

n=MIDI channel number :0H - FH (ch.1 - ch.16)
vv=value :00H - 7FH (0 - 127)

- You can transmit this message by assigning to the Controller.

● Pitch Bend Change

Status	2nd byte	3rd byte
EnH	llH	mmH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm,ll=value : 00H,00H - 7FH,7FH (-8192 - +8191)

- You can transmit this message by assigning to the Controller.

■ Channel Mode Messages

● All Sounds Off (Controller number 120)

Status	2nd byte	3rd byte
BnH	78H	00H

n=MIDI channel number :0H - FH (ch.1 - ch.16)

* You can transmit this message by assigning to the Controller.

● Reset All Controllers (Controller number 121)

Status	2nd byte	3rd byte
BnH	79H	00H

n=MIDI channel number :0H - FH (ch.1 - ch.16)
vv=value :00H, 7F (0, 127) 0=OFF 127=ON

* You can transmit this message by assigning to the Controller.

● All Notes Off (Controller number 123)

Status	2nd byte	3rd byte
BnH	7BH	00H

n=MIDI channel number : 0H - FH (ch.1 - ch.16)

* You can transmit this message by assigning to the Controller.

● OMNI OFF (Controller number 124)

Status	2nd byte	3rd byte
BnH	7CH	00H

n=MIDI channel number : 0H - FH (ch.1 - ch.16)

* You can transmit this message by assigning to the Controller.

● OMNI ON (Controller number 125)

Status	2nd byte	3rd byte
BnH	7DH	00H

n=MIDI channel number : 0H - FH (ch.1 - ch.16)

* You can transmit this message by assigning to the Controller.

● MONO (Controller number 126)

Status	2nd byte	3rd byte
BnH	7EH	mmH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm=mono number : 00H - 10H (0 - 16)

* You can transmit this message by assigning to the Controller.

● POLY (Controller number 127)

Status	2nd byte	3rd byte
BnH	7FH	00H

n=MIDI channel number : 0H - FH (ch.1 - ch.16)

* You can transmit this message by assigning to the Controller.

■ System Common Message

● Song select

Status	2nd byte
F3H	ssH

ss=Song Number :0H-7F (0 - 127)

■ System Realtime Message

● Active sensing

Status
FEH

* This will be transmitted constantly at intervals of approximately 250ms.

● Timing clock

Status
F8H

● Start

Status
FAH

● Continue

Status
FBH

● Stop

Status
FCH

■ System exclusive messages

When an appropriate "Data Request 1 (RQ1)" message is received, the requested internal data will be transmitted.

○ Data set 1 DT1

Status	Data byte	Status
F0H	41H, dev, 7DH, 12H, aaH, bbH, ccH, ddH, eeH,... ffH, sum	F7H

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 00H - 1FH Initial value is 10H)
7DH	Model ID (A-70)
12H	Command ID (DT1)
aaH	Address MSB
bbH	Address
ccH	Address
ddH	Address LSB
eeH	Data: the actual data to be sent. Multiple bytes of data are transmitted in order starting from the address.
:	:
ffH	Data
sum	Checksum
F7H	EOX (End Of Exclusive)

■ Universal Non-realtime System Exclusive Messages

○ Inquiry Reply

Status	Data byte	Status
F0H	7EH,dev,06H,02H,41H,1AH,00H, 00H,02H,ssH,01H,00H,00H	F7H

Byte	Explanation
F0H	Exclusive status
7EH	ID number (universal non-realtime message)
dev	Device ID (dev:UNIT#-1)
06H,02H	Inquiry reply
41H	Manufacture's ID(Roland)
7DH,00H	Device family code
00H,ssH	Device family number code ss : 00(A-70) 01: (A-70 EX : A-70 equipped with a VE-RD 1)
00H,01H,00H,00H	Software revision level
F7H	EOX (End Of Exclusive)

* When Inquiry Request is received, Inquiry Reply message will be transmitted.

* When the VE-GS1 is installed to the A-70, it will transmit the following Inquiry Reply message when receiving the Inquiry Request.

Status	Data byte	Status
F0H	7EH,dev,06H,02H,41H,42H,00H, 02H,01H,03H,01H,01H,00H	F7H

* When the VE-JV1 is installed to the A-70, it will transmit the following Inquiry Reply message when receiving the Inquiry Request.

Status	Data byte	Status
F0H	7EH,dev,06H,02H,41H,46H,00H, 00H,00H,00H,01H,01H,00H	F7H

3. Parameter address map

Address and size are configured in 7 bits, and expressed in hexadecimal.

Address	MSB			LSB
Binary	0aaa aaaa	0bbb bbbb	0ccc cccc	0ddd dddd
7-bit hex	AA	BB	CC	DD

Size	MSB			LSB
Binary	0sss ssss	0ttt tttt	0uuu uuuu	0vvv vvvv
7-bit hex	SS	TT	UU	VV

■ Parameter base address

All data sent in exclusive message are given particular addresses to identify parameters. These addresses are the sum of the base address and offset address. Some parameters are defined using multiple offsets.
The address included in the message of a data set or a data request must be within the value shown in the table below.

Note:A pair of two addresses preceded by the symbol # represents a divided-by-two data. e.g. the data ABH (hex) is divided into 0AH and 0BH and sent in that order.

Example of exclusive data
To set the External Zone A MIDI Channel of the temporary performance to "Ch.=4", send the following data to the A-70.

F0H	41H	10H	7DH	12H	00H	00H	22H	06H	03H	55H	F7H
1	2	3	4	5			6		7	8	9

1. Exclusive status
2. Manufacturer ID: Roland=41H.
3. Device ID: the unit number of the system common parameter minus 1. In this example, the unit number is 17: 17 - 1=16 which is expressed as 10H in hexadecimal notation.
4. Model ID of the A-70 is &DH.
5. Command ID: data set 1=12H.
6. Addresses: by referring to Table 1, the start address of the temporary performance=00H 00H 20H 00H; from Table 1-3, offset address of External Zone A=02H 00H; from Table 1-3-2, offset address of MIDI Channel=06H. These addresses are added together:

```
  00H 00H 20H 00H
          02H 00H
+)            06H
------------------
  00H 00H 22H 06H = target address
```

7. The number of MIDI Channel = 4 is 3 : 03H in hexadecimal.
8. Check sum
   The error checking process use a checksum and provides a bit pattern where the last significant 7 bits are zero, when values for an address, data (or size) and the checksum are summed.

<Example>
80H - {(00H + 00H + 22H + 06H + 03H) & 7FH } = 55H
Addresses Data

9. End of exclusive

4. Parameter address map

1 A-70 (Model ID=7DH)

Start address	Description	
00 00 00 00	System Common	*1-1
00 00 10 00	Controller Assign	*1-2
00 00 20 00	Temporary Performance	*1-3
00 00 30 00	Temporary Chain	*1-4
00 01 20 00	Manual Performance	*1-3
01 00 20 00	Internal Performance I11	*1-3
01 01 20 00	Internal Performance I12	
:	:	
01 3F 20 00	Internal Performance I88	
01 40 30 00	Internal Chain 01	*1-4
01 41 30 00	Internal Chain 02	
:	:	
01 49 30 00	Internal Chain 10	
01 4A 40 00	Internal User PGM Name map 1	*1-5
01 4B 40 00	Internal User PGM Name map 2	
01 4C 40 00	Internal User PGM Name map 3	
01 4D 40 00	Internal User PGM Name map 4	

*1-1 System Common

Offset address		Description
00 00	0000 000a	Panel mode 0 - 2 (Performance, Manual, Chain)
00 01	0aaa aaaa	Performance number 0 - 127 (Internal 1 - 64, CARD 1 - 64)
00 02	0aaa aaaa	Chain number 0 - 9, 64-73 (Internal 1 - 10, CARD 1 - 10)
00 03	0000 000a	Control channel switch 0 - 1 (OFF, ON)
00 04	0000 aaaa	Control channel 0 - 15 (1 - 16 Ch.)
00 05	0000 000a	MIDI out 1 switch 0 - 1 (OFF, ON)
00 06	0000 000a	MIDI out 2 0 - 1 (OFF, ON)
00 07	0000 000a	MIDI out 3 0 - 1 (OFF, ON)
00 08	0000 000a	MIDI out 4 0 - 1 (OFF, ON)
00 09	0000 000a	MIDI out 1 Sequencer control output sw 0 - 1 (OFF, ON)
00 0A	0000 000a	MIDI out 2 Sequencer control output sw 0 - 1 (OFF, ON)
00 0B	0000 000a	MIDI out 3 Sequencer control output sw 0 - 1 (OFF, ON)
00 0C	0000 000a	MIDI out 4 Sequencer control output sw 0 - 1 (OFF, ON)
00 0D	0aaa aaaa	Global key transpose Value 28 - 64 - 100 (-36 - 0 - +36)
00 0E	0000 000a	V-EXP enable switch 0 - 1 (Enable, Disable)
00 0F	0000 aaaa	Ext zone A PGM Name map assign 0 - 15 (OFF,JV-80,jv-90,JV-1080,JD-990,SC-55, P-88,P-55,M-SE1,M-OC1,M-VS1,M-DC1, USR 1,USR 2,USR 3,USR 4)
00 10	0000 aaaa	: B :
00 11	0000 aaaa	: C :
00 12	0000 aaaa	: D :
00 13	0000 aaaa	Int zone A :
00 14	0000 aaaa	: B :
00 15	0000 aaaa	: C :
00 16	0000 aaaa	: D :
00 17	0000 aaaa	Ext zone A PGM Name map assign for W-EXP 1 0 - 10 (None, Pop, Orchestral, Piano, Vintage Synth, World, Dance, Super Sound Set, 60 & 70 Keys Bass & Drum
00 18	0000 aaaa	: B :
00 19	0000 aaaa	: C :
00 1A	0000 aaaa	: D :
00 1B	0000 aaaa	Int zone A :
00 1C	0000 aaaa	: B :
00 1D	0000 aaaa	: C :
00 1E	0000 aaaa	: D :
00 1F	0000 aaaa	Ext zone A PGM Name map assign for W-EXP 2 0 -10 (None, Pop, Orchestral, Piano, Vintage Synth, World, Dance, Super Sound Set, 60 & 70 Keys Bass & Drum
00 20	0000 aaaa	: B :
00 21	0000 aaaa	: C :
00 22	0000 aaaa	: D :
00 23	0000 aaaa	Int zone A :
00 24	0000 aaaa	: B :
00 25	0000 aaaa	: C :
00 26	0000 aaaa	: D :
00 27	0000 aaaa	Ext zone A PGM Name map assign for W-EXP 3 0 -10 (None, Pop, Orchestral, Piano, Vintage Synth, World, Dance, Super Sound Set, 60 & 70 Keys Bass & Drum
00 28	0000 aaaa	: B :
00 29	0000 aaaa	: C :
00 2A	0000 aaaa	: D :
00 2B	0000 aaaa	Int zone A :
00 2C	0000 aaaa	: B :
00 2D	0000 aaaa	: C :
00 2E	0000 aaaa	: D :
00 2F	0000 aaaa	Ext zone A PGM Name map assign for W-EXP 4 0 -10 (None, Pop, Orchestral, Piano, Vintage Synth, World, Dance, Super Sound Set, 60 & 70 Keys Bass & Drum
00 30	0000 aaaa	: B :
00 31	0000 aaaa	: C :
00 32	0000 aaaa	: D :
00 33	0000 aaaa	Int zone A :
00 34	0000 aaaa	: B :
00 35	0000 aaaa	: C :
00 36	0000 aaaa	: D :
00 37	0000 aaaa	Voice Expansion Board Master Tune 1 -127 (427.4 - 452.6)
00 38	0000 aaaa	Ext zone A PGM Name map assign for W-EXP5 0 - 10 (None, Pop, Orchestral, Piano, Vintage Synth, World, Dance, Super Sound Set, 60&70 Keys, Bass&Drums)
00 39	0000 aaaa	: B :
00 3A	0000 aaaa	: C :
00 3B	0000 aaaa	: D :
00 3C	0000 aaaa	Int zone A :
00 3D	0000 aaaa	: B :
00 3E	0000 aaaa	: C :
00 3F	0000 aaaa	: D :
00 40	0000 aaaa	Ext zone A PGM Name map assign for W-EXP6 0 - 10 (None, Pop, Orchestral, Piano, Vintage Synth, World, Dance, Super Sound Set, 60&70 Keys, Bass&Drums)
00 41	0000 aaaa	: B :
00 42	0000 aaaa	: C :
00 43	0000 aaaa	: D :
00 44	0000 aaaa	Int zone A :
00 45	0000 aaaa	: B :
00 46	0000 aaaa	: C :
00 47	0000 aaaa	: D :
00 48	0000 aaaa	Ext zone A PGM Name map assign for W-EXP7 0 - 10 (None, Pop, Orchestral, Piano, Vintage Synth, World, Dance, Super Sound Set, 60&70 Keys, Bass&Drums)
00 49	0000 aaaa	: B :
00 4A	0000 aaaa	: C :
00 4B	0000 aaaa	: D :
00 4C	0000 aaaa	Int zone A :
00 4D	0000 aaaa	: B :
00 4E	0000 aaaa	: C :
00 4F	0000 aaaa	: D :
00 50	0000 aaaa	Ext zone A PGM Name map assign for W-EXP8 0 - 10 (None, Pop, Orchestral, Piano, Vintage Synth, World, Dance, Super Sound Set, 60&70 Keys, Bass&Drums)
00 51	0000 aaaa	: B :
00 52	0000 aaaa	: C :
00 53	0000 aaaa	: D :
00 54	0000 aaaa	Int zone A :
00 55	0000 aaaa	: B :
00 56	0000 aaaa	: C :
00 57	0000 aaaa	: D :
Total Size	00 00 00 58	

* The settings of Int zone A PGM Name map assign, Int zone B PGM name map assign, Int zone C PGM name map assign, Int zone D PGM Name map assign will be made invalid when the Voice Expansion Board is installed.

*1-2 Controller Assign

Offset address		Description
00 00	0000 00aa	Breath slider assign type 0 - 3 (OFF, CC, Ch-Mess, Others)
00 01	0aaa aaaa	: CC number 0 - 119
00 02	0000 00aa	: Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 03	0000 00aa	: Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 04	0000 00aa	: Others 0 - 2 (Tempo, Program Up, Program Down)
00 05	0000 00aa	A.T slider assign type 0 - 3 (OFF, CC, Ch-Mess, Others)
00 06	0aaa aaaa	: CC number 0 - 119
00 07	0000 00aa	: Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 08	0000 00aa	: Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 09	0000 00aa	: Others 0 - 2 (Tempo, Program Up, Program Down)
00 0A	0000 00aa	Expr slider assign type 0 - 3 (OFF, CC, Ch-Mess, Others)
00 0B	0aaa aaaa	: CC number 0 - 119
00 0C	0000 00aa	: Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 0D	0000 00aa	: Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 0E	0000 00aa	: Others 0 - 2 (Tempo, Program Up, Program Down)
00 0F	0000 00aa	P.T slider assign type 0 - 3 (OFF, CC, Ch-Mess, Others)
00 10	0aaa aaaa	: CC number 0 - 119
00 11	0000 00aa	: Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 12	0000 00aa	: Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 13	0000 00aa	: Others 0 - 2 (Tempo, Program Up, Program Down)
00 14	0000 00aa	FC 1 assign type 0 - 3 (OFF, CC, Ch-Mess, Others)

00 15	0aaa aaaa	:	CC number 0 - 119
00 16	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 17	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 18	0000 00aa	:	Others 0 - 2 (Tempo, Program Up, Program Down)
00 1E	0000 00aa	FS 1	assign type 0 - 3 (OFF, CC, Ch-Mess, Others)
00 1F	0aaa aaaa	:	CC number 0 - 119
00 20	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 21	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 22	0000 00aa	:	Others 0 - 2 (Tempo, Program Up, Program Down)
00 28	0000 00aa	Aftertouch assign type	0 - 3 (OFF, CC, Ch-Mess, Others)
00 29	0aaa aaaa	:	CC number 0 - 119
00 2A	0000 00aa	:	Ch-Mess number 0 - 3 (Ch-Aft, Poly-Aft, Pitch bend up/down)
00 2B	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 2C	0000 00aa	:	Others 0 - 2 (Tempo, Program Up, Program Down)
00 2D	0000 00aa	Wheel 1	assign type 0 - 3 (OFF, CC, Ch-Mess, Others)
00 2E	0aaa aaaa	:	CC number 0 - 119
00 2F	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 30	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 31	0000 00aa	:	Others 0 - 2 (Tempo, Program Up, Program Down)
00 32	0000 00aa	Wheel 2	assign type 0 - 3 (OFF, CC, Ch-Mess, Others)
00 33	0aaa aaaa	:	CC number 0 - 119
00 34	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 35	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 36	0000 00aa	:	Others 0 - 2 (Tempo, Program Up, Program Down)
00 37	0000 00aa	Bend lever	assign type 0 - 3 (OFF, CC, Ch-Mess, Others)
00 38	0aaa aaaa	:	CC number 0 - 119
00 39	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 3A	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 3B	0000 00aa	:	Others 0 - 2 (Tempo, Program Up, Program Down)
00 3C	0000 00aa	Mod lever	assign type 0 - 3 (OFF, CC, Ch-Mess, Others)
00 3D	0aaa aaaa	:	CC number 0 - 119
00 3E	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 3F	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 40	0000 00aa	:	Others 0 - 2 (Tempo, Program Up, Program Down)
00 46	0000 00aa	Mono switch	assign type 0 - 4 (OFF, CC, Ch-Mess, Mood-Mess, Others)
00 47	0aaa aaaa	:	CC number 0 - 119
00 48	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 49	0000 0aaa	:	Mode-Mess number 0 - 5 (All Sound Off, Reset All Controllers, Local Control, All Note Off, Omni on/off, Mono/Poly)
00 4A	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 4B	0000 00aa	:	Others 0 - 3 (Tempo, Program Up, Program Down, Auto Fadeout)
00 4C	000a aaaa	:	Auto Fade Out Time 5 - 30 (5 - 30 sec)
00 4D	0000 00aa	Portamento	switch assign type 0 - 4 (OFF, CC, Ch-Mess, Mood-Mess, Others)
00 4E	0aaa aaaa	:	CC number 0 - 119
00 4F	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 50	0000 0aaa	:	Mode-Mess number 0 - 5 (All Sound Off, Reset All Controllers, Local Control, All Note Off, Omni on/off, Mono/Poly)
00 51	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 52	0000 0aaa	:	Others 0 - 3 (Tempo, Program Up, Program Down, Auto Fadeout)
00 53	000a aaaa	:	Auto Fade Out Time 5 - 30 (5 - 30 sec)
00 54	0000 0aaa	AUX 1 ext zone A	slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
00 55	0aaa aaaa	:	CC number 0 - 119
00 56	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 57	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 58	0000 00aa	:	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)
00 59	0aaa aaaa	:	Free RPN MSB 0 - 127
00 5A	0aaa aaaa	:	Free RPN LSB 0 - 127
00 5B	0000 aaaa	:	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)
00 5C	0aaa aaaa	:	Free NRPN MSB 0 - 127
00 5D	0aaa aaaa	:	Free NRPN LSB 0 - 127
00 5E	0aaa aaaa	:	SysExcl Header length 0 - 15
00 5F	0aaa aaaa	:	SysExcl Header 1 0 - 127
00 60	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:	:	:
00 6D	0aaa aaaa	:	SysExcl Header 15 0 - 127
00 6E	0000 0aaa	AUX 1 ext zone B	slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
00 6F	0aaa aaaa	:	CC number 0 - 119
00 70	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
00 71	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
00 72	0000 00aa	:	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)
00 73	0aaa aaaa	:	Free RPN MSB 0 - 127
00 74	0aaa aaaa	:	Free RPN LSB 0 - 127
00 75	0000 aaaa	:	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)
00 76	0aaa aaaa	:	Free NRPN MSB 0 - 127
00 77	0aaa aaaa	:	Free NRPN LSB 0 - 127
00 78	0aaa aaaa	:	SysExcl Header length 0 - 15
00 79	0aaa aaaa	:	SysExcl Header 1 0 - 127
00 7A	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:	:	:
01 07	0aaa aaaa	:	SysExcl Header 15 0 - 127
01 08	0000 0aaa	AUX 1 ext zone C	slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
01 09	0aaa aaaa	:	CC number 0 - 119
01 0A	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
01 0B	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
01 0C	0000 00aa	:	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)
01 0D	0aaa aaaa	:	Free RPN MSB 0 - 127
01 0E	0aaa aaaa	:	Free RPN LSB 0 - 127
01 0F	0000 aaaa	:	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)
01 10	0aaa aaaa	:	Free NRPN MSB 0 - 127
01 11	0aaa aaaa	:	Free NRPN LSB 0 - 127
01 12	0aaa aaaa	:	SysExcl Header length 0 - 15
01 13	0aaa aaaa	:	SysExcl Header 1 0 - 127
01 14	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:	:	:
01 21	0aaa aaaa	:	SysExcl Header 15 0 - 127
01 22	0000 0aaa	AUX 1 ext zone D	slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
01 23	0aaa aaaa	:	CC number 0 - 119
01 24	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
01 25	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
01 26	0000 00aa	:	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)
01 27	0aaa aaaa	:	Free RPN MSB 0 - 127
01 28	0aaa aaaa	:	Free RPN LSB 0 - 127
01 29	0000 aaaa	:	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)
01 2A	0aaa aaaa	:	Free NRPN MSB 0 - 127
01 2B	0aaa aaaa	:	Free NRPN LSB 0 - 127
01 2C	0aaa aaaa	:	SysExcl Header length 0 - 15
01 2D	0aaa aaaa	:	SysExcl Header 1 0 - 127
01 2E	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:	:	:
01 3B	0aaa aaaa	:	SysExcl Header 15 0 - 127
01 3C	0000 0aaa	AUX 1 int zone A	slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
01 3D	0aaa aaaa	:	CC number 0 - 119
01 3E	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
01 3F	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
01 40	0000 00aa	:	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)
01 41	0aaa aaaa	:	Free RPN MSB 0 - 127
01 42	0aaa aaaa	:	Free RPN LSB 0 - 127
01 43	0000 aaaa	:	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth, GS Vibrate delay, GS TVF cutoff freq, GS TVF resonance, GS TVF&TVA Env. Attack Time, GS TVF&TVA Env. Decay Time, GS TVF&TVA Env. Release Time, Free)
01 44	0aaa aaaa	:	Free NRPN MSB 0 - 127
01 45	0aaa aaaa	:	Free NRPN LSB 0 - 127
01 46	0aaa aaaa	:	SysExcl Header length 0 - 15
01 47	0aaa aaaa	:	SysExcl Header 1 0 - 127
01 48	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:	:	:
01 55	0aaa aaaa	:	SysExcl Header 15 0 - 127
01 56	0000 0aaa	AUX 1 int zone B	slider asgn type 0 - 5 (OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
01 57	0aaa aaaa	:	CC number 0 - 119
01 58	0000 00aa	:	Ch-Mess number 0 - 2 (Ch-Aft, Poly-Aft, Pitch bend)
01 59	0000 00aa	:	Poly-Aft trigger 0 - 3 (High, Low, First, Last)
01 5A	0000 00aa	:	RPN 0 - 3 (Pitch Bend sense, Fine Tune, Course Tune, Free)
01 5B	0aaa aaaa	:	Free RPN MSB 0 - 127
01 5C	0aaa aaaa	:	Free RPN LSB 0 - 127
01 5D	0000 aaaa	:	NRPN 0 - 8 (GS Vibrate rate, GS Vibrate depth,

			GS Vibrate delay, GS TVF cutoff freq,
			GS TVF resonance,
			GS TVF&TVA Env. Attack Time,
			GS TVF&TVA Env. Decay Time,
			GS TVF&TVA Env. Release Time, Free)
01 5E	0aaa aaaa	:	Free NRPN MSB 0 - 127
01 5F	0aaa aaaa	:	Free NRPN LSB 0 - 127
01 60	0aaa aaaa	:	SysExcl Header length 0 - 15
01 61	0aaa aaaa	:	SysExcl Header 1 0 - 127
01 62	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:		:
01 6F	0aaa aaaa	:	SysExcl Header 15 0 - 127
01 70	0000 0aaa	AUX 1 int zone C slider asgn type	0 - 5
			(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
01 71	0aaa aaaa	:	CC number 0 - 119
01 72	0000 00aa	:	Ch-Mess number 0 - 2
			(Ch-Aft, Poly-Aft, Pitch bend)
01 73	0000 00aa	:	Poly-Aft trigger 0 - 3
			(High, Low, First, Last)
01 74	0000 00aa	:	RPN 0 - 3
			(Pitch Bend sense, Fine Tune,
			Course Tune, Free)
01 75	0aaa aaaa	:	Free RPN MSB 0 - 127
01 76	0aaa aaaa	:	Free RPN LSB 0 - 127
01 77	0000 aaaa	:	NRPN 0 - 8
			(GS Vibrate rate, GS Vibrate depth,
			GS Vibrate delay, GS TVF cutoff freq,
			GS TVF resonance,
			GS TVF&TVA Env. Attack Time,
			GS TVF&TVA Env. Decay Time,
			GS TVF&TVA Env. Release Time, Free)
01 78	0aaa aaaa	:	Free NRPN MSB 0 - 127
01 79	0aaa aaaa	:	Free NRPN LSB 0 - 127
01 7A	0aaa aaaa	:	SysExcl Header length 0 - 15
01 7B	0aaa aaaa	:	SysExcl Header 1 0 - 127
01 7C	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:		:
02 09	0aaa aaaa	:	SysExcl Header 15 0 - 127
02 0A	0000 0aaa	AUX 1 int zone D slider asgn type	0 - 5
			(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
02 0B	0aaa aaaa	:	CC number 0 - 119
02 0C	0000 00aa	:	Ch-Mess number 0 - 2
			(Ch-Aft, Poly-Aft, Pitch bend)
02 0D	0000 00aa	:	Poly-Aft trigger 0 - 3
			(High, Low, First, Last)
02 0E	0000 00aa	:	RPN 0 - 3
			(Pitch Bend sense, Fine Tune,
			Course Tune, Free)
02 0F	0aaa aaaa	:	Free RPN MSB 0 - 127
02 10	0aaa aaaa	:	Free RPN LSB 0 - 127
02 11	0000 aaaa	:	NRPN 0 - 8
			(GS Vibrate rate, GS Vibrate depth,
			GS Vibrate delay, GS TVF cutoff freq,
			GS TVF resonance,
			GS TVF&TVA Env. Attack Time,
			GS TVF&TVA Env. Decay Time,
			GS TVF&TVA Env. Release Time, Free)
02 12	0aaa aaaa	:	Free NRPN MSB 0 - 127
02 13	0aaa aaaa	:	Free NRPN LSB 0 - 127
02 14	0aaa aaaa	:	SysExcl Header length 0 - 15
02 15	0aaa aaaa	:	SysExcl Header 1 0 - 127
02 16	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:		:
02 23	0aaa aaaa	:	SysExcl Header 15 0 - 127
02 24	0000 0aaa	AUX 2 ext zone A slider asgn type	0 - 5
			(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
02 25	0aaa aaaa	:	CC number 0 - 119
02 26	0000 00aa	:	Ch-Mess number 0 - 2
			(Ch-Aft, Poly-Aft, Pitch bend)
02 27	0000 00aa	:	Poly-Aft trigger 0 - 3
			(High, Low, First, Last)
02 28	0000 00aa	:	RPN 0 - 3
			(Pitch Bend sense, Fine Tune,
			Course Tune, Free)
02 29	0aaa aaaa	:	Free RPN MSB 0 - 127
02 2A	0aaa aaaa	:	Free RPN LSB 0 - 127
02 2B	0000 aaaa	:	NRPN 0 - 8
			(GS Vibrate rate, GS Vibrate depth,
			GS Vibrate delay, GS TVF cutoff freq,
			GS TVF resonance,
			GS TVF&TVA Env. Attack Time,
			GS TVF&TVA Env. Decay Time,
			GS TVF&TVA Env. Release Time, Free)
02 2C	0aaa aaaa	:	Free NRPN MSB 0 - 127
02 2D	0aaa aaaa	:	Free NRPN LSB 0 - 127
02 2E	0aaa aaaa	:	SysExcl Header length 0 - 15
02 2F	0aaa aaaa	:	SysExcl Header 1 0 - 127
02 30	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:		:
02 3D	0aaa aaaa	:	SysExcl Header 15 0 - 127
02 3E	0000 0aaa	AUX 2 ext zone B slider asgn type	0 - 5
			(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
02 3F	0aaa aaaa	:	CC number 0 - 119
02 40	0000 00aa	:	Ch-Mess number 0 - 2
			(Ch-Aft, Poly-Aft, Pitch bend)
02 41	0000 00aa	:	Poly-Aft trigger 0 - 3
			(High, Low, First, Last)
02 42	0000 00aa	:	RPN 0 - 3
			(Pitch Bend sense, Fine Tune,
			Course Tune, Free)
02 43	0aaa aaaa	:	Free RPN MSB 0 - 127
02 44	0aaa aaaa	:	Free RPN LSB 0 - 127
02 45	0000 aaaa	:	NRPN 0 - 8
			(GS Vibrate rate, GS Vibrate depth,
			GS Vibrate delay, GS TVF cutoff freq,
			GS TVF resonance,
			GS TVF&TVA Env. Attack Time,
			GS TVF&TVA Env. Decay Time,
			GS TVF&TVA Env. Release Time, Free)
02 46	0aaa aaaa	:	Free NRPN MSB 0 - 127
02 47	0aaa aaaa	:	Free NRPN LSB 0 - 127
02 48	0aaa aaaa	:	SysExcl Header length 0 - 15
02 49	0aaa aaaa	:	SysExcl Header 1 0 - 127
02 4A	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:		:
02 57	0aaa aaaa	:	SysExcl Header 15 0 - 127
02 58	0000 0aaa	AUX 2 ext zone C slider asgn type	0 - 5
			(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
02 59	0aaa aaaa	:	CC number 0 - 119
02 5A	0000 00aa	:	Ch-Mess number 0 - 2
			(Ch-Aft, Poly-Aft, Pitch bend)
02 5B	0000 00aa	:	Poly-Aft trigger 0 - 3
			(High, Low, First, Last)
02 5C	0000 00aa	:	RPN 0 - 3
			(Pitch Bend sense, Fine Tune,
			Course Tune, Free)
02 5D	0aaa aaaa	:	Free RPN MSB 0 - 127
02 5E	0aaa aaaa	:	Free RPN LSB 0 - 127
02 5F	0000 aaaa	:	NRPN 0 - 8
			(GS Vibrate rate, GS Vibrate depth,
			GS Vibrate delay, GS TVF cutoff freq,
			GS TVF resonance,
			GS TVF&TVA Env. Attack Time,
			GS TVF&TVA Env. Decay Time,
			GS TVF&TVA Env. Release Time, Free)
02 60	0aaa aaaa	:	Free NRPN MSB 0 - 127
02 61	0aaa aaaa	:	Free NRPN LSB 0 - 127
02 62	0aaa aaaa	:	SysExcl Header length 0 - 15
02 63	0aaa aaaa	:	SysExcl Header 1 0 - 127
02 64	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:		:
02 71	0aaa aaaa	:	SysExcl Header 15 0 - 127
02 72	0000 0aaa	AUX 2 ext zone D slider asgn type	0 - 5
			(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
02 73	0aaa aaaa	:	CC number 0 - 119
02 74	0000 00aa	:	Ch-Mess number 0 - 2
			(Ch-Aft, Poly-Aft, Pitch bend)
02 75	0000 00aa	:	Poly-Aft trigger 0 - 3
			(High, Low, First, Last)
02 76	0000 00aa	:	RPN 0 - 3
			(Pitch Bend sense, Fine Tune,
			Course Tune, Free)
02 77	0aaa aaaa	:	Free RPN MSB 0 - 127
02 78	0aaa aaaa	:	Free RPN LSB 0 - 127
02 79	0000 aaaa	:	NRPN 0 - 8
			(GS Vibrate rate, GS Vibrate depth,
			GS Vibrate delay, GS TVF cutoff freq,
			GS TVF resonance,
			GS TVF&TVA Env. Attack Time,
			GS TVF&TVA Env. Decay Time,
			GS TVF&TVA Env. Release Time, Free)
02 7A	0aaa aaaa	:	Free NRPN MSB 0 - 127
02 7B	0aaa aaaa	:	Free NRPN LSB 0 - 127
02 7C	0aaa aaaa	:	SysExcl Header length 0 - 15
02 7D	0aaa aaaa	:	SysExcl Header 1 0 - 127
02 7E	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:		:
03 0B	0aaa aaaa	:	SysExcl Header 15 0 - 127
03 0C	0000 0aaa	AUX 2 int zone A slider asgn type	0 - 5
			(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
03 0D	0aaa aaaa	:	CC number 0 - 119
03 0E	0000 00aa	:	Ch-Mess number 0 - 2
			(Ch-Aft, Poly-Aft, Pitch bend)
03 0F	0000 00aa	:	Poly-Aft trigger 0 - 3
			(High, Low, First, Last)
03 10	0000 00aa	:	RPN 0 - 3
			(Pitch Bend sense, Fine Tune,
			Course Tune, Free)
03 11	0aaa aaaa	:	Free RPN MSB 0 - 127
03 12	0aaa aaaa	:	Free RPN LSB 0 - 127
03 13	0000 aaaa	:	NRPN 0 - 8
			(GS Vibrate rate, GS Vibrate depth,
			GS Vibrate delay, GS TVF cutoff freq,
			GS TVF resonance,
			GS TVF&TVA Env. Attack Time,
			GS TVF&TVA Env. Decay Time,
			GS TVF&TVA Env. Release Time, Free)
03 14	0aaa aaaa	:	Free NRPN MSB 0 - 127
03 15	0aaa aaaa	:	Free NRPN LSB 0 - 127
03 16	0aaa aaaa	:	SysExcl Header length 0 - 15
03 17	0aaa aaaa	:	SysExcl Header 1 0 - 127
03 18	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:		:
03 25	0aaa aaaa	:	SysExcl Header 15 0 - 127
03 26	0000 0aaa	AUX 2 int zone B slider asgn type	0 - 5
			(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
03 27	0aaa aaaa	:	CC number 0 - 119
03 28	0000 00aa	:	Ch-Mess number 0 - 2
			(Ch-Aft, Poly-Aft, Pitch bend)
03 29	0000 00aa	:	Poly-Aft trigger 0 - 3
			(High, Low, First, Last)
03 2A	0000 00aa	:	RPN 0 - 3
			(Pitch Bend sense, Fine Tune,
			Course Tune, Free)
03 2B	0aaa aaaa	:	Free RPN MSB 0 - 127
03 2C	0aaa aaaa	:	Free RPN LSB 0 - 127
03 2D	0000 aaaa	:	NRPN 0 - 8
			(GS Vibrate rate, GS Vibrate depth,
			GS Vibrate delay, GS TVF cutoff freq,
			GS TVF resonance,
			GS TVF&TVA Env. Attack Time,
			GS TVF&TVA Env. Decay Time,
			GS TVF&TVA Env. Release Time, Free)
03 2E	0aaa aaaa	:	Free NRPN MSB 0 - 127
03 2F	0aaa aaaa	:	Free NRPN LSB 0 - 127
03 30	0aaa aaaa	:	SysExcl Header length 0 - 15
03 31	0aaa aaaa	:	SysExcl Header 1 0 - 127
03 32	0aaa aaaa	:	SysExcl Header 2 0 - 127
:	:		:
03 3F	0aaa aaaa	:	SysExcl Header 15 0 - 127
03 40	0000 0aaa	AUX 2 int zone C slider asgn type	0 - 5
			(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)
03 41	0aaa aaaa	:	CC number 0 - 119
03 42	0000 00aa	:	Ch-Mess number 0 - 2
			(Ch-Aft, Poly-Aft, Pitch bend)
03 43	0000 00aa	:	Poly-Aft trigger 0 - 3
			(High, Low, First, Last)
03 44	0000 00aa	:	RPN 0 - 3
			(Pitch Bend sense, Fine Tune,
			Course Tune, Free)
03 45	0aaa aaaa	:	Free RPN MSB 0 - 127
03 46	0aaa aaaa	:	Free RPN LSB 0 - 127
03 47	0000 aaaa	:	NRPN 0 - 8

			(GS Vibrate rate, GS Vibrate depth,	
			GS Vibrate delay, GS TVF cutoff freq,	
			GS TVF resonance,	
			GS TVF&TVA Env. Attack Time,	
			GS TVF&TVA Env. Decay Time,	
			GS TVF&TVA Env. Release Time, Free)	
03 48	0aaa aaaa	:	Free NRPN MSB	0 - 127
03 49	0aaa aaaa	:	Free NRPN LSB	0 - 127
03 4A	0aaa aaaa	:	SysExcl Header length	0 - 15
03 4B	0aaa aaaa	:	SysExcl Header 1	0 - 127
03 4C	0aaa aaaa	:	SysExcl Header 2	0 - 127
:	:		:	
03 59	0aaa aaaa	:	SysExcl Header 15	0 - 127
03 5A	0000 0aaa	AUX 2 int zone D slider asgn type		0 - 5
		(OFF, CC, Ch-Mess, RPN, NRPN, SysExcl)		
03 5B	0aaa aaaa	:	CC number	0 - 119
03 5C	0000 00aa	:	Ch-Mess number	0 - 2
			(Ch-Aft, Poly-Aft, Pitch bend)	
03 5D	0000 00aa	:	Poly-Aft trigger	0 - 3
			(High, Low, First, Last)	
03 5E	0000 00aa	:	RPN	0 - 3
		(Pitch Bend sense, Fine Tune,		
		Course Tune, Free)		
03 5F	0aaa aaaa	:	Free RPN MSB	0 - 127
03 60	0aaa aaaa	:	Free RPN LSB	0 - 127
03 61	0000 aaaa	:	NRPN	0 - 8
		(GS Vibrate rate, GS Vibrate depth,		
		GS Vibrate delay, GS TVF cutoff freq,		
		GS TVF resonance,		
		GS TVF&TVA Env. Attack Time,		
		GS TVF&TVA Env. Decay Time,		
		GS TVF&TVA Env. Release Time, Free)		
03 62	0aaa aaaa	:	Free NRPN MSB	0 - 127
03 63	0aaa aaaa	:	Free NRPN LSB	0 - 127
03 64	0aaa aaaa	:	SysExcl Header length	0 - 15
03 65	0aaa aaaa	:	SysExcl Header 1	0 - 127
03 66	0aaa aaaa	:	SysExcl Header 2	0 - 127
:	:		:	
03 73	0aaa aaaa	:	SysExcl Header 15	0 - 127
Total Size	00 00 03 74			

*1-3 Performance

Offset address	Description	
00 00	Performance common	*1-3-1
02 00	Performance ext zone A	*1-3-2
03 00	Performance ext zone B	
04 00	Performance ext zone C	
05 00	Performance ext zone D	
06 00	Performance int zone A	*1-3-3
07 00	Performance int zone B	
08 00	Performance int zone C	
09 00	Performance int zone D	

*1-3-1 Performance Common

Offset address		Description		
00	0aaa aaaa	Performance name 1		32 - 127
01	0aaa aaaa	Performance name 2		32 - 127
:	:	:		
0B	0aaa aaaa	Performance name 12		32 - 127
0C	0000 000a	Tempo change switch		0 - 1
				(OFF, ON)
# 0D	0000 aaaa	Default Tempo		20 - 250
0E	0000 bbbb			
0F	0000 000a	Song change switch		0 - 1
				(OFF, ON)
10	0aaa aaaa	Song Number		0 - 127
				(1 - 128)
11	0000 000a	Ext zone A remote sw		0 - 1
				(OFF, ON)
12	0000 000a	Ext zone B remote sw		0 - 1
				(OFF, ON)
13	0000 000a	Ext zone C remote sw		0 - 1
				(OFF, ON)
14	0000 000a	Ext zone D remote sw		0 - 1
				(OFF, ON)
15	0000 000a	Int zone A remote sw		0 - 1
				(OFF, ON)
16	0000 000a	Int zone B remote sw		0 - 1
				(OFF, ON)
17	0000 000a	Int zone C remote sw		0 - 1
				(OFF, ON)
18	0000 000a	Int zone D remote sw		0 - 1
				(OFF, ON)
19	0000 000a	IN 2 to int assign sw		0 - 1
				(OFF, ON)
1A	0000 000a	IN 2 to out 1 assign sw		0 - 1
				(OFF, ON)
1B	0000 000a	IN 2 to out 2 assign sw		0 - 1
				(OFF, ON)
1C	0000 000a	IN 2 to out 3 assign sw		0 - 1
				(OFF, ON)
1D	0000 000a	IN 2 to out 4 assign sw		0 - 1
				(OFF, ON)
1E	0000 0aaa	VE-RD 1	reverb type	0 - 7
			(ROOM 1, ROOM 2, STAGE 1, STAGE 2,	
			HALL 1, HALL 2, DELAY, PAN-DLY)	
1F	0aaa aaaa	:	reverb level	0 - 127
20	0aaa aaaa	:	reverb time	0 - 127
21	000a aaaa	:	reverb HF damp	0 - 17
			(200, 250, 315, 400, 500, 630,	
			800, 1000, 1250, 1600, 2000,	
			2500, 3150, 4000, 5000, 6300,	
			8000, BYPASS)	
22	0aaa aaaa	:	reverb feed back	0 - 127
23	0aaa aaaa	VE-RD 1	chorus level	0 - 127
24	0aaa aaaa	:	chorus rate	0 - 127
25	0aaa aaaa	:	chorus depth	0 - 127
26	0aaa aaaa	:	chorus pre delay	0 - 127
27	0aaa aaaa	:	chorus feedback	0 - 127
28	0000 000a	:	chorus output	0 - 2
				(MIX, REV, MIX+REV)
29	0aaa aaaa	VE-RD 1	eq low gain	49 - 79
				(-15 - 15)
2A	0aaa aaaa	:	eq mid gain	49 - 79
				(-15 - 15)
2B	0aaa aaaa	:	eq high gain	49 - 79
				(-15 - 15)
2C	0aaa aaaa	:	eq mid freq.	0 - 16
			(200, 250, 315, 400, 500, 630,	
			800, 1000, 1250, 1600, 2000,	
			2500, 3150, 4000, 5000, 6300,	
			8000, BYPASS)	
2D	000a aaaa	Effector 1 MIDI channel		0 - 16
				(1 - 16)
2E	0000 000a	:	Bank select send sw	0 - 1
				(OFF, ON)
2F	0aaa aaaa	:	Bank select MSB	0 - 127
30	0aaa aaaa	:	Bank select LSB	0 - 127
31	0000 000a	:	Program change send sw	0 - 1
				(OFF, ON)
32	0aaa aaaa	:	Program change	0 - 127
33	0000 000a	:	Key send sw	0 - 1
				(OFF, ON)
34	0aaa aaaa	:	Local key number	0 - 127
35	0aaa aaaa	:	Send key number	0 - 127
36	0000 000a	:	MIDI out 1 output	0 - 1
				(OFF, ON)
37	0000 000a	:	MIDI out 2 output	0 - 1
				(OFF, ON)
38	0000 000a	:	MIDI out 3 output	0 - 1
				(OFF, ON)
39	0000 000a	:	MIDI out 4 output	0 - 1
				(OFF, ON)
3A	000a aaaa	Effector 2 MIDI channel		0 - 16
				(1 - 16)
3B	0000 000a	:	Bank select send sw	0 - 1
				(OFF, ON)
3C	0aaa aaaa	:	Bank select MSB	0 - 127
3D	0aaa aaaa	:	Bank select LSB	0 - 127
3E	0000 000a	:	Program change send sw	0 - 1
				(OFF, ON)
3F	0aaa aaaa	:	Program change	0 - 127
40	0000 000a	:	Key send sw	0 - 1
				(OFF, ON)
41	0aaa aaaa	:	Local key number	0 - 127
42	0aaa aaaa	:	Send key number	0 - 127
43	0000 000a	:	MIDI out 1 output	0 - 1
				(OFF, ON)
44	0000 000a	:	MIDI out 2 output	0 - 1
				(OFF, ON)
45	0000 000a	:	MIDI out 3 output	0 - 1
				(OFF, ON)
46	0000 000a	:	MIDI out 4 output	0 - 1
				(OFF, ON)
47	000a aaaa	Effector 3 MIDI channel		0 - 16
				(1 - 16)
48	0000 000a	:	Bank select send sw	0 - 1
				(OFF, ON)
49	0aaa aaaa	:	Bank select MSB	0 - 127
4A	0aaa aaaa	:	Bank select LSB	0 - 127
4B	0000 000a	:	Program change send sw	0 - 1
				(OFF, ON)
4C	0aaa aaaa	:	Program change	0 - 127
4D	0000 000a	:	Key send sw	0 - 1
				(OFF, ON)
4E	0aaa aaaa	:	Local key number	0 - 127
4F	0aaa aaaa	:	Send key number	0 - 127
50	0000 000a	:	MIDI out 1 output	0 - 1
				(OFF, ON)
51	0000 000a	:	MIDI out 2 output	0 - 1
				(OFF, ON)
52	0000 000a	:	MIDI out 3 output	0 - 1
				(OFF, ON)
53	0000 000a	:	MIDI out 4 output	0 - 1
				(OFF, ON)
54	000a aaaa	Effector 4 MIDI channel		0 - 15
				(1 - 16)
55	0000 000a	:	Bank select send sw	0 - 1
				(OFF, ON)
56	0aaa aaaa	:	Bank select MSB	0 - 127
57	0aaa aaaa	:	Bank select LSB	0 - 127
58	0000 000a	:	Program change send sw	0 - 1
				(OFF, ON)
59	0aaa aaaa	:	Program change	0 - 127
5A	0000 000a	:	Key send sw	0 - 1
				(OFF, ON)
5B	0aaa aaaa	:	Local key number	0 - 127
5C	0aaa aaaa	:	Send key number	0 - 127
5D	0000 000a	:	MIDI out 1 output	0 - 1
				(OFF, ON)
5E	0000 000a	:	MIDI out 2 output	0 - 1
				(OFF, ON)
5F	0000 000a	:	MIDI out 3 output	0 - 1
				(OFF, ON)
60	0000 000a	:	MIDI out 4 output	0 - 1
				(OFF, ON)
# 61	0000 aaaa	Breath slider	Tempo Min	20 - 250
62	0000 bbbb			
# 63	0000 aaaa	:	Tempo Max	20 - 250
64	0000 bbbb			
# 65	0000 aaaa	A.T slider	Tempo Min	20 - 250
66	0000 bbbb			
# 67	0000 aaaa	:	Tempo Max	20 - 250
68	0000 bbbb			
# 69	0000 aaaa	Expr slider	Tempo Min	20 - 250
6A	0000 bbbb			
# 6B	0000 aaaa	:	Tempo Max	20 - 250
6C	0000 bbbb			

*	6D	0000 aaaa	P.T slider	Tempo Min	20 - 250
	6E	0000 bbbb			
*	6F	0000 aaaa	:	Tempo Max	20 - 250
	70	0000 bbbb			
*	71	0000 aaaa	FC 1	Tempo Min	20 - 250
	72	0000 bbbb			
*	73	0000 aaaa	:	Tempo Max	20 - 250
	74	0000 bbbb			
*	79	0000 aaaa	FS 1	Tempo Min	20 - 250
	7A	0000 bbbb			
*	7B	0000 aaaa	:	Tempo Max	20 - 250
	7C	0000 bbbb			
*	01 01	0000 aaaa	Mono switch	Tempo Min	20 - 250
	01 02	0000 bbbb			
*	01 03	0000 aaaa	:	Tempo Max	20 - 250
	01 04	0000 bbbb			
*	01 05	0000 aaaa	P.T switch	Tempo Min	20 - 250
	01 06	0000 bbbb			
*	01 07	0000 aaaa	:	Tempo Max	20 - 250
	01 08	0000 bbbb			
*	01 09	0000 aaaa	Aftertouch	Tempo Min	20 - 250
	01 0A	0000 bbbb			
*	01 0B	0000 aaaa	:	Tempo Max	20 - 250
	01 0C	0000 bbbb			
*	01 0D	0000 aaaa	Wheel 1	Tempo Min	20 - 250
	01 0E	0000 bbbb			
*	01 0F	0000 aaaa	:	Tempo Max	20 - 250
	01 10	0000 bbbb			
*	01 11	0000 aaaa	Wheel 2	Tempo Min	20 - 250
	01 12	0000 bbbb			
*	01 13	0000 aaaa	:	Tempo Max	20 - 250
	01 14	0000 bbbb			
*	01 15	0000 aaaa	Bend lever	Tempo Min	20 - 250
	01 16	0000 bbbb			
*	01 17	0000 aaaa	:	Tempo Max	20 - 250
	01 18	0000 bbbb			
*	01 19	0000 aaaa	Mod lever	Tempo Min	20 - 250
	01 1A	0000 bbbb			
*	01 1B	0000 aaaa	:	Tempo Max	20 - 250
	01 1C	0000 bbbb			
Total Size		00 00 01 21			

* The Parameters of the VE-RD1 is valid only when the Voice Expansion Board is installed.

*1-3-2 Performance external zone

Offset address		Description	
00	0000 000a	Zone switch	0 - 1 (OFF, ON)
01	0000 000a	Local keyboard switch	0 - 1 (OFF, ON)
02	0000 000a	MIDI out 1 output assign	0 - 1 (OFF, ON)
03	0000 000a	MIDI out 2 output assign	0 - 1 (OFF, ON)
04	0000 000a	MIDI out 3 output assign	0 - 1 (OFF, ON)
05	0000 000a	MIDI out 4 output assign	0 - 1 (OFF, ON)
06	000a aaaa	MIDI channel	0 - 15 (1 - 16)
07	0aaa aaaa	Key range lower	0 - 127
08	0aaa aaaa	Key range upper	0 - 127
09	0aaa aaaa	Key transpose	28 - 64 - 100 (-32 - 0 - +32)
0A	0000 0aaa	Velocity curve	0 - 6
0B	0aaa aaaa	Velocity sense	1 - 127
0C	0aaa aaaa	Velocity max	1 - 127
0D	0aaa aaaa	Volume value	0 - 127
0E	0000 000a	: send switch	0 - 1 (OFF, ON)
0F	0aaa aaaa	Pan value	0 - 127
10	0000 000a	: send switch	0 - 1 (OFF, ON)
11	0aaa aaaa	Reverb send level	0 - 127
12	0000 000a	: send switch	0 - 1 (OFF, ON)
13	0aaa aaaa	Chorus send level	0 - 127
14	0000 000a	: send switch	0 - 1 (OFF, ON)
15	0aaa aaaa	Program change number	0 - 127
16	0000 000a	: send switch	0 - 1 (OFF, ON)
17	0aaa aaaa	Bank select MSB number	0 - 127
18	0aaa aaaa	Bank select LSB number	0 - 127
19	0000 000a	Bank select send switch	0 - 1 (OFF, ON)
1A	0aaa aaaa	AUX 1 value	0 - 127
1B	0000 000a	: send switch	0 - 1 (OFF, ON)
1C	0aaa aaaa	AUX 2 value	0 - 127
1D	0000 000a	: send switch	0 - 1 (OFF, ON)
1E	0000 000a	Breath slider switch	0 - 1 (OFF, ON)
1F	0aaa aaaa	: low value	0 - 127
20	0aaa aaaa	: high value	0 - 127
21	0000 000a	A.T slider switch	0 - 1 (OFF, ON)
22	0aaa aaaa	: low value	0 - 127
23	0aaa aaaa	: high value	0 - 127
24	0000 000a	Expr slider switch	0 - 1 (OFF, ON)
25	0aaa aaaa	: low value	0 - 127
26	0aaa aaaa	: high value	0 - 127
27	0000 000a	P.T slider switch	0 - 1 (OFF, ON)
28	0aaa aaaa	: low value	0 - 127
29	0aaa aaaa	: high value	0 - 127
2A	0000 000a	FC 1 switch	0 - 1 (OFF, ON)
2B	0aaa aaaa	: low value	0 - 127
2C	0aaa aaaa	: high value	0 - 127
30	0000 000a	FS 1 switch	0 - 1 (OFF, ON)
31	0aaa aaaa	: off value	0 - 127
32	0aaa aaaa	: on value	0 - 127
36	0000 000a	Mono switch switch	0 - 1 (OFF, ON)
37	0aaa aaaa	: off value	0 - 127
38	0aaa aaaa	: on value	0 - 127
39	0000 000a	P.T switch switch	0 - 1 (OFF, ON)
3A	0aaa aaaa	: off value	0 - 127
3B	0aaa aaaa	: on value	0 - 127
3C	0000 000a	Aftertouch	0 - 1 (OFF, ON)
3D	0aaa aaaa	: low value	0 - 127
3E	0aaa aaaa	: high value	0 - 127
3F	0000 000a	Wheel 1 switch	0 - 1 (OFF, ON)
40	0aaa aaaa	: low value	0 - 127
41	0aaa aaaa	: high value	0 - 127
42	0000 000a	Wheel 2 switch	0 - 1 (OFF, ON)
43	0aaa aaaa	: low value	0 - 127
44	0aaa aaaa	: high value	0 - 127
45	0000 000a	Bend lever switch	0 - 1 (OFF, ON)
46	0aaa aaaa	: low value	0 - 127
47	0aaa aaaa	: high value	0 - 127
48	0000 000a	Mod lever switch	0 - 1 (OFF, ON)
49	0aaa aaaa	: low value	0 - 127
4A	0aaa aaaa	: high value	0 - 127
4E	0000 000a	Global Transpose switch	0 - 1 (OFF, ON)
4F	0000 000a	Total volume slider switch	0 - 1 (OFF, ON)
50	0000 000a	Total volume pedal switch	0 - 1 (OFF, ON)
51	0000 000a	Hold pedal switch	0 - 1 (OFF, ON)
52	0aaa aaaa	Modulation value	0 - 127
53	0000 000a	: send switch	0 - 1 (OFF, ON)
54	0aaa aaaa	Aftertouch value	0 - 127
55	0000 000a	: send switch	0 - 1 (OFF, ON)
56	0aaa aaaa	Expression value	0 - 127
57	0000 000a	: send switch	0 - 1 (OFF, ON)
58	0aaa aaaa	Portamento time	0 - 127
59	0000 000a	: send switch	0 - 1 (OFF, ON)
Total Size	00 00 00 5A		

* The values of key range upper must be greater than or equal to values of the key range lower.

*1-3-3 Performance internal zone

Offset address		Description	
00	0000 000a	Zone switch	0 - 1 (OFF, ON)
01	0000 000a	Local keyboard switch	0 - 1 (OFF, ON)
02	0000 000a	MIDI out 1 output assign	0 - 1 (OFF, ON)
03	0000 000a	MIDI out 2 output assign	0 - 1 (OFF, ON)
04	0000 000a	MIDI out 3 output assign	0 - 1 (OFF, ON)
05	0000 000a	MIDI out 4 output assign	0 - 1 (OFF, ON)
06	000a aaaa	MIDI channel	0 - 15 (1 - 16)
07	0aaa aaaa	Key range lower	0 - 127
08	0aaa aaaa	Key range upper	0 - 127
09	0aaa aaaa	Key transpose	28 - 64 - 100 (-32 - 0 - +32)
0A	0000 0aaa	Velocity curve	0 - 6
0B	0aaa aaaa	Velocity sense	1 - 127
0C	0aaa aaaa	Velocity max	1 - 127
0D	0aaa aaaa	Volume value	0 - 127
0E	0000 000a	: send switch	0 - 1 (OFF, ON)
0F	0aaa aaaa	Pan value	0 - 127
10	0000 000a	: send switch	0 - 1 (OFF, ON)
11	0aaa aaaa	Reverb send level	0 - 127
12	0000 000a	: send switch	0 - 1 (OFF, ON)
13	0aaa aaaa	Chorus send level	0 - 127
14	0000 000a	: send switch	0 - 1 (OFF, ON)
15	0aaa aaaa	Program change number	0 - 127
16	0000 000a	: send switch	0 - 1 (OFF, ON)
17	0aaa aaaa	Bank select MSB number	0 - 127
18	0aaa aaaa	Bank select LSB number	0 - 127
19	0000 000a	Bank select send switch	0 - 1 (OFF, ON)
1A	0aaa aaaa	AUX 1 value	0 - 127
1B	0000 000a	: send switch	0 - 1 (OFF, ON)

1C	0aaa aaaa	AUX 2 value	0 - 127
1D	0000 000a	: send switch	0 - 1 (OFF, ON)
21	0000 000a	A.T slider switch	0 - 1 (OFF, ON)
22	0aaa aaaa	: low value	0 - 127
23	0aaa aaaa	: high value	0 - 127
24	0000 000a	Expr slider switch	0 - 1 (OFF, ON)
25	0aaa aaaa	: low value	0 - 127
26	0aaa aaaa	: high value	0 - 127
27	0000 000a	P.T slider switch	0 - 1 (OFF, ON)
28	0aaa aaaa	: low value	0 - 127
29	0aaa aaaa	: high value	0 - 127
2A	0000 000a	FC 1 switch	0 - 1 (OFF, ON)
2B	0aaa aaaa	: low value	0 - 127
2C	0aaa aaaa	: high value	0 - 127
30	0000 000a	FS 1 switch	0 - 1 (OFF, ON)
31	0aaa aaaa	: off value	0 - 127
32	0aaa aaaa	: on value	0 - 127
36	0000 000a	Mono switch switch	0 - 1 (OFF, ON)
37	0aaa aaaa	: off value	0 - 127
38	0aaa aaaa	: on value	0 - 127
39	0000 000a	P.T switch switch	0 - 1 (OFF, ON)
3A	0aaa aaaa	: off value	0 - 127
3B	0aaa aaaa	: on value	0 - 127
3C	0000 000a	Aftertouch	0 - 1 (OFF, ON)
3D	0aaa aaaa	: low value	0 - 127
3E	0aaa aaaa	: high value	0 - 127
3F	0000 000a	Wheel 1 switch	0 - 1 (OFF, ON)
40	0aaa aaaa	: low value	0 - 127
41	0aaa aaaa	: high value	0 - 127
42	0000 000a	Wheel 2 switch	0 - 1 (OFF, ON)
43	0aaa aaaa	: low value	0 - 127
44	0aaa aaaa	: high value	0 - 127
45	0000 000a	Bend lever switch	0 - 1 (OFF, ON)
46	0aaa aaaa	: low value	0 - 127
47	0aaa aaaa	: high value	0 - 127
48	0000 000a	Mod lever switch	0 - 1 (OFF, ON)
49	0aaa aaaa	: low value	0 - 127
4A	0aaa aaaa	: high value	0 - 127
4E	0000 000a	Global Transpose switch	0 - 1 (OFF, ON)
4F	0000 000a	Total volume slider switch	0 - 1 (OFF, ON)
50	0000 000a	Total volume pedal switch	0 - 1 (OFF, ON)
51	0000 000a	Hold pedal switch	0 - 1 (OFF, ON)
52	0aaa aaaa	Attack time	14 - 114
53	0aaa aaaa	Decay time	14 - 114
54	0aaa aaaa	Release time	14 - 114
55	0aaa aaaa	Bright value	14 - 114
56	0aaa aaaa	Fine Tune	14 - 64 - 114 (-50 - 0 - +50)
57	0aaa aaaa	Modulation value	0 - 127
58	0000 000a	: send switch	0 - 1 (OFF, ON)
59	0aaa aaaa	Aftertouch value	0 - 127
5A	0000 000a	: send switch	0 - 1 (OFF, ON)
5B	0aaa aaaa	Expression value	0 - 127
5C	0000 000a	: send switch	0 - 1 (OFF, ON)
5D	0aaa aaaa	Portamento time	0 - 127
5E	0000 000a	: send switch	0 - 1 (OFF, ON)
Total Size	00 00 00 5F		

- The values of key range upper must be greater than or equal to values of the key range lower.
- Attack time, Decay time, Release time and Bright are valid only to the Internal zones with the Voice Expansion Board installed.

*1-4 Chain

Offset address		Description	
00	0000 000a	Chain mode	0 - 1 (One-way, Loop)
01	00aa aaaa	Chain length	0 - 63 (1 - 64)
02	0aaa aaaa	Chain link 1 patch's number	0 - 63
:	:	:	
41	0aaa aaaa	Chain link 64 patch's number	0 - 63
Total Size	00 00 00 42		

*1-5 PGM Name map

Offset address		Description	
00 00	0aaa aaaa	Program change number 1 name 1	32 - 127
00 01	0aaa aaaa	Program change number 1 name 2	32 - 127
:	:	:	
00 0B	0aaa aaaa	Program change number 1 name 12	32 - 127
:	:	:	
:	:	:	
:	:	:	
01 34	0aaa aaaa	Program change number 16 name 1	32 - 127
01 35	0aaa aaaa	Program change number 16 name 2	32 - 127
:	:	:	
01 3F	0aaa aaaa	Program change number 16 name 12	32 - 127
01 40	0aaa aaaa	Program change number 17 name 1	32 - 127
01 41	0aaa aaaa	Program change number 17 name 2	32 - 127
:	:	:	
01 4B	0aaa aaaa	Program change number 17 name 12	32 - 127
:	:	:	
:	:	:	
:	:	:	
02 74	0aaa aaaa	Program change number 32 name 1	32 - 127
02 75	0aaa aaaa	Program change number 32 name 2	32 - 127
:	:	:	
02 7F	0aaa aaaa	Program change number 32 name 12	32 - 127
03 00	0aaa aaaa	Program change number 33 name 1	32 - 127
03 01	0aaa aaaa	Program change number 33 name 2	32 - 127
:	:	:	
03 0B	0aaa aaaa	Program change number 33 name 12	32 - 127
:	:	:	
:	:	:	
:	:	:	
04 34	0aaa aaaa	Program change number 48 name 1	32 - 127
04 35	0aaa aaaa	Program change number 48 name 2	32 - 127
:	:	:	
04 3F	0aaa aaaa	Program change number 48 name 12	32 - 127
04 40	0aaa aaaa	Program change number 49 name 1	32 - 127
04 41	0aaa aaaa	Program change number 49 name 2	32 - 127
:	:	:	
04 4B	0aaa aaaa	Program change number 49 name 12	32 - 127
:	:	:	
:	:	:	
:	:	:	
05 74	0aaa aaaa	Program change number 64 name 1	32 - 127
05 75	0aaa aaaa	Program change number 64 name 2	32 - 127
:	:	:	
05 7F	0aaa aaaa	Program change number 64 name 12	32 - 127
06 00	0aaa aaaa	Program change number 65 name 1	32 - 127
06 01	0aaa aaaa	Program change number 65 name 2	32 - 127
:	:	:	
06 0B	0aaa aaaa	Program change number 65 name 12	32 - 127
:	:	:	
:	:	:	
:	:	:	
07 34	0aaa aaaa	Program change number 80 name 1	32 - 127
07 35	0aaa aaaa	Program change number 80 name 2	32 - 127
:	:	:	
07 3F	0aaa aaaa	Program change number 80 name 12	32 - 127
07 40	0aaa aaaa	Program change number 81 name 1	32 - 127
07 41	0aaa aaaa	Program change number 81 name 2	32 - 127
:	:	:	
07 4B	0aaa aaaa	Program change number 81 name 12	32 - 127
:	:	:	
:	:	:	
:	:	:	
08 74	0aaa aaaa	Program change number 96 name 1	32 - 127
08 75	0aaa aaaa	Program change number 96 name 2	32 - 127
:	:	:	
08 7F	0aaa aaaa	Program change number 96 name 12	32 - 127
09 00	0aaa aaaa	Program change number 97 name 1	32 - 127
09 01	0aaa aaaa	Program change number 97 name 2	32 - 127
:	:	:	
09 0B	0aaa aaaa	Program change number 97 name 12	32 - 127
:	:	:	
:	:	:	
:	:	:	
0A 34	0aaa aaaa	Program change number 112 name 1	32 - 127
0A 35	0aaa aaaa	Program change number 112 name 2	32 - 127
:	:	:	
0A 3F	0aaa aaaa	Program change number 112 name 12	32 - 127
0A 40	0aaa aaaa	Program change number 113 name 1	32 - 127
0A 41	0aaa aaaa	Program change number 113 name 2	32 - 127
:	:	:	
0A 4B	0aaa aaaa	Program change number 113 name 12	32 - 127
:	:	:	
:	:	:	
:	:	:	
0B 74	0aaa aaaa	Program change number 128 name 1	32 - 127
0B 75	0aaa aaaa	Program change number 128 name 2	32 - 127
:	:	:	
0B 7F	0aaa aaaa	Program change number 128 name 12	32 - 127
0C 00	0000 000a	PGM name map bank select MSB switch	0 - 1 (OFF, ON)
0C 01	0aaa aaaa	PGM name map bank select MSB	0 - 127
0C 02	0000 000a	PGM name map bank select LSB switch	0 - 1 (OFF, ON)
0C 03	0aaa aaaa	PGM name map bank select LSB	0 - 127
Total Size	00 00 0C 04		

Address Map

Address	Block	Sub Block	Reference
00 00 00 00	System Common		1-1
00 00 10 00	Controller Asgn		1-2
00 00 20 00	Temporary Performance	Common	1-2-1
		Ext zone A	1-2-2
		:	
		Ext zone D	
		Int zone A	1-2-3
		:	
		Int zone D	
00 00 30 00	Temporary Chain		1-3
00 01 20 00	Manual Performance	Common	1-2-1
		Ext zone A	1-2-2
		:	
		Ext zone D	
		Int zone A	1-2-3
		:	
		Int zone D	
01 00 20 00	Internal Memory Performance	I11	1-2-1
		:	
		I88	1-2-2
		Common	
		Ext Zone A	
		:	
		Ext Zone D	
		Int Zone A	
		:	
		Int Zone D	
01 40 30 00	Internal Memory Chain	01	1-3
		:	
		10	
01 4A 40 00	Internal Memory PGM Name map	Map 1	1-4
		:	
		Map 4	

4. Reference materials

● Table A-1:Decimal to Hexadecimal

The MIDI messages are expressed in hexadecimal configured in 7 bits.
This table is useful when you read or write MIDI messages.

(D)=decimal
(H)=hexadecimal

(D)	(H)	(D)	(H)	(D)	(H)	(D)	(H)
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

- The decimal value of MIDI channel, bank select, program change, etc is the decimal number in the table plus 1.
- In the hexadecimal notation in configured 7 bits, the maximum data of 1 byte is 128. If the data is mode than 128, used plural bytes.
- The signed value is 00H=-64, 40H=±0, 7FH=+63. In decimal notation, the value is the decimal number in the table minus 64.
  The signed value of dual bytes is 00 00H=-8192, 40 40H=±0, 7F 7FH=8191. For example, converted aaH bbH (hex) to decimal to the following:aa bbH-40H 00H=aa x 128 + bb - 64 x 128.

● table A-2:ASCII code

Patch Name and Performance Name of MIDI data are described the ASCII code in the table below.
(H)=hexadecimal

Character	(H)	Character	(H)	Character	(H)
SP	20H				
A	41H	a	61H	1	31H
B	42H	b	62H	2	32H
C	43H	c	63H	3	33H
D	44H	d	64H	4	34H
E	45H	e	65H	5	35H
F	46H	f	66H	6	36H
G	47H	g	67H	7	37H
H	48H	h	68H	8	38H
I	49H	i	69H	9	39H
J	4AH	j	6AH	0	30H
K	4BH	k	6BH	+	2BH
L	4CH	l	6CH	-	2DH
M	4DH	m	6DH	*	2AH
N	4EH	n	6EH	/	2FH
O	4FH	o	6FH	#	23H
P	50H	p	70H	!	21H
Q	51H	q	71H	,	2CH
R	52H	r	72H	.	2EH
S	53H	s	73H		
T	54H	t	74H		
U	55H	u	75H		
V	56H	v	76H		
W	57H	w	77H		
X	58H	x	78H		
Y	59H	y	79H		
Z	5AH	z	7AH		

Note:"SP" is space.

Expandable Controller
Model A-70

MIDI Implementation Chart

Date : June 1997
Version : 1.00

Function...		Transmitted	Recognized	Remarks
Basic	Default	1–16	1–16	
Channel	Changed	1–16	1–16	Memorized
Mode	Default	Mode 3	Mode 3	
	Messages	x	Mode 3, 4(M=1)	* 3
	Altered	**********		
Note Number :	True Voice	0–127	0–127 * 2	
		**********	0–127 * 2	
Velocity	Note ON	O	O * 2	
	Note OFF	O	O * 2	
After Touch	Key's	O * 1	O * 2	
	Ch's	O * 1	O * 2	
Pitch Bend		O * 1	O * 2	
Control Change	0–119	O *1		
	1		O *2	Modulation
	2		O *2	Breath Type
	4		*2	Foot Type
	5		O *2	Portamento time
	6, 38		O *2	Data entry
	7		O *2	Volume
	8		O *2	balance
	10		O *2	Panpot
	11		O *2	Expression
	64		O *2	Hold 1
	65		O *2	Portamento
	66		O *2	Sostenuto
	67		O *2	Soft
	69		O *2	Hold 2
	84		O *2	Portamento control
	91		O (Reverb) *2	Effect1 depth
	93		O (Chorus) *2	Effect3 depth
	98, 99		O *2	NRPN LSB, MSB
	100, 101		O *2	RPN LSB, MSB
Prog Change	: True #	O	O	
		**********	0–127	Prog. 1–128
System Exclucive		O	O	
System Common	: Song Pos	x	x	
	: Song Sel	O	x	
	: Tune	x	x	
System Real Time	: Clock	O	x	
	: Commands	O	x	
Aux Message	: All sound off	O *1	O *2	
	: Reset all controllers	O *1	O *2	
	: Local ON/OFF	O *1	x	
	: All Notes OFF	O *1	O (123–127) *2	
	: Active Sense	O *1	O	
	: Reset	x	x	
Notes		* 1 O x is selectable. * 2 Indicates an A-70 Equipped with VE-RD1. * 3 Recognized as M=1 even if M≠1.		

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO O : Yes
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO X : No

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A-70

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