

1. Receive data

* The VR-700 has two MIDI IN connectors: MIDI IN and PEDAL IN. Messages input through the MIDI IN connector can be used to control specific Parts, according to the MIDI channel numbers of the MIDI messages. Messages input via the MIDI PEDAL IN connector are received as messages for the Pedal Part, regardless of the channel number.

■ 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)

* Some instruments are not received in Rhythm set.

● 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: 00H - 7FH (0 - 127)

* Not received by the Organ Part.

● Control Change

○ Bank Select (Controller number 0, 32)

Status	2nd byte	3rd byte
BnH	00H	mmH
BnH	20H	llH

n = MIDI channel number: 0H - FH (ch.1 - 16)
 mm, ll = Bank number: 00 00H - 7F 7FH (bank.1 - bank.16384)

* The Favorite, Rhythms, and Tones corresponding to each Bank Select are as follows.

BANK SELECT	PROGRAM	GROUP	NUMBER
MSB	LSB	NUMBER	NUMBER
000	001 - 128	GM Tone	
:			
032	001 - 128	GM Tone	
085	000 001 - 064	FAVORITE	001 - 064
086	064 001 - 005	Rhythm Set	006 - 010
087	064 001 - 010	Tone (PIANO)	001 - 010
	065 001 - 010	Tone (E.PIANO)	001 - 010
	066 001 - 005	Tone (STRINGS)	001 - 005
	067 001 - 005	Tone (CHOIR/SCAT)	001 - 005
	068 001 - 010	Tone (SYNTH LEAD)	001 - 010
	069 001 - 005	Tone (SYNTH PAD)	001 - 005
	070 001 - 005	Tone (GUITAR)	001 - 005
	071 001 - 005	Tone (BASS)	001 - 005
	072 001 - 005	Tone (BRASS)	001 - 005
	073 001 - 005	Tone (OTHERS)	001 - 005
:			
120	001 - 057	GM2 Rhythm	011 - 019
121	000- 001 - 128	GM2 Tone	020 - 275

○ 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)

* Not received by the Organ Part.

○ 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)

○ 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)

○ Panpot (Controller number 10)

Status	2nd byte	3rd byte
BnH	0AH	vvH

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

* Not received by the Organ Part.

○ Expression (Controller number 11)

Status	2nd byte	3rd byte
BnH	0BH	vvH

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

* Affect both Organ Part and Ensemble Part, when receive in Controller Part.

○ 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)

○ 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

* Not received by the Organ Part.

○ 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)

* Not received by the Organ Part.

○ Resonance (Controller number 71)

Status	2nd byte	3rd byte
BnH	47H	vvH

n = MIDI channel number: 0H - FH (ch.1 - ch.16)
 vv = Resonance value (relative change): 00H - 7FH (-64 - 0 - +63)

* Not received by the Organ Part.

○ Release Time (Controller number 72)

Status	2nd byte	3rd byte
BnH	48H	vvH

n = MIDI channel number: 0H - FH (ch.1 - ch.16)
 vv = Release Time value (relative change): 00H - 40H - 7FH (-64 - 0 - +63)

* Not received by the Organ Part.

○ Attack time (Controller number 73)

Status	2nd byte	3rd byte
BnH	49H	vvH

n = MIDI channel number: 0H - FH (ch.1 - ch.16)
 vv = Attack time value (relative change): 00H - 40H - 7FH (-64 - 0 - +63)

* Not received by the Organ Part.

○ Cutoff (Controller number 74)

Status	2nd byte	3rd byte
BnH	4AH	vvH

n = MIDI channel number: 0H - FH (ch.1 - ch.16)
 vv = Cutoff value (relative change): 00H - 40H - 7FH (-64 - 0 - +63)

* Not received by the Organ Part.

○ Decay Time (Controller number 75)

Status	2nd byte	3rd byte
BnH	4BH	vvH

n = MIDI channel number: 0H - FH (ch.1 - ch.16)
 vv = Decay Time value (relative change): 00H - 40H - 7FH (-64 - 0 - +63)

* Not received by the Organ Part.

○ Vibrato Rate (Controller number 76)

Status	2nd byte	3rd byte
BnH	4CH	vvH

n = MIDI channel number: 0H - FH (ch.1 - ch.16)
 vv = Vibrato Rate value (relative change): 00H - 40H - 7FH (-64 - 0 - +63)

* Not received by the Organ Part.

○ Vibrato Depth (Controller number 77)

Status	2nd byte	3rd byte
BnH	4DH	vvH

n = MIDI channel number: 0H - FH (ch.1 - ch.16)
 vv = Vibrato Depth Value (relative change): 00H - 40H - 7FH (-64 - 0 - +63)

* Not received by the Organ Part.

○ Vibrato Delay (Controller number 78)

Status	2nd byte	3rd byte
BnH	4EH	vvH

n = MIDI channel number: 0H - FH (ch.1 - ch.16)
 vv = Vibrato Delay value (relative change): 00H - 40H - 7FH (-64 - 0 - +63)

* Not received by the Organ Part.

○ Sound Controller 1-9 (Controller number 70-78) (Harmonic Bars)

Status	2nd byte	3rd byte
BnH	ccH	vvH

n = MIDI channel number: 0H - FH (ch.1 - ch.16)
 cc = control change number: 46H - 4EH (70-78)
 vv = control value: 00H - 7FH (0 - 127)

* Receives harmonic bar values.

* Received by the Organ Part.

* Not received when MIDI Sound Controllers Switch (Function:MIDI) is OFF.

* Controller numbers and harmonic bars are related as follows.

CC	Harmonic Bar Feet
46H (70)	16'
47H (71)	5 1/3'
48H (72)	8'
49H (73)	4'
4AH (74)	2 1/3'
4BH (75)	2'
4CH (76)	1 3/5'
4DH (77)	1 1/3'
4EH (78)	1'

* Control values and harmonic bars are related as follows.

vv	Harmonic Bar Level
00H - 0EH	0
0FH - 1CH	1
1DH - 2AH	2
2BH - 38H	3
39H - 47H	4
48H - 55H	5
56H - 63H	6
64H - 71H	7
72H - 7FH	8

○ General Purpose Controller 5 (Controller number 80) (Rotary Speed)

Status	2nd byte	3rd byte
BnH	50H	vvH

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

* Not received when MIDI General Controllers Switch (Function:MIDI) is OFF.

* Received by the Control Part.

○ General Purpose Controller 6 (Controller number 81) (Rotary Brake)

Status	2nd byte	3rd byte
BnH	51H	vvH

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

* Not received when MIDI General Controllers Switch (Function:MIDI) is OFF.

* Received by the Control Part.

○ General Purpose Controller 7 (Controller number 83) (Wheel Brake)

Status	2nd byte	3rd byte
BnH	52H	vvH

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

- * Not received when MIDI General Controllers Switch (Function:MIDI) is OFF.
- * Received by the Control Part.

○ 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 >>>

Control Changes include RPN (Registered Parameter Numbers), which are extended. When using RPNs, first RPN (Controller numbers 100 and 101; they can be sent in any order) should be sent in order to select the parameter, then Data Entry (Controller numbers 6 and 38) should be sent to set the value. Once RPN messages are received, Data Entry messages that is received at the same MIDI channel after that are recognized as changing toward the value of the RPN messages. In order not to make any mistakes, transmitting RPN Null is recommended after setting parameters you need.

This device receives the following RPNs.

RPN	Data entry	Notes
00H, 00H	mmH, llH	Pitch Bend Sensitivity mm: 00H - 18H (0 - 24 semitones) ll: ignored (processed as 00H) Up to 2 octave can be specified in semitone steps.
00H, 01H	mmH, llH	Master Fine Tuning mm, ll: 20 00H - 40 00H - 60 00H (-8192 x 50 / 8192 - 0 - +8192 x 50 / 8192 cent) * Not received by the Organ part.
00H, 02H	mmH, llH	Master Coarse Tuning mm: 10H - 40H - 70H (-48 - 0 - +48 semitones) ll: ignored (processed as 00H) * Not received by the Organ part.
7FH, 7FH	mmH, llH	RPN null RPN and NRPN will be set as "unspecified." Once this setting has been made, subsequent Parameter values that were previously set 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)

- * Not received by the Organ Part.
- * Not received when Receive Program Change Switch (Function:MIDI) is OFF.

● Channel Pressure

Status	2nd byte
DnH	vvH

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

- * Not received by the Organ Part.

● Pitch Bend Change

Status	2nd byte	3rd byte
EnH	llH	mmH

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

- * Not received by the Organ Part.

■ 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 notes currently sounding on the corresponding channel will be turned off.

● 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)
Modulation	0 (off)
Expression	127 (max)
Hold 1	0 (off)
Sostenuto	0 (off)
Soft	0 (off)
RPN	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. OMNI ON will not be turned 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 Notes Off is received.

● 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 Notes Off is received.

■ System Realtime Message

● Timing Clock

Status
F8H

* This message will be received if the Clock Source parameter (Function:SYSTEM) is MIDI.

● 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

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	iiH, ddH,, eeH	F7H

<u>Byte</u>	<u>Explanation</u>
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)

Of the System Exclusive messages received by this device, the Universal Non-realtime messages and the Universal Realtime messages and the Data Request (RQ1) messages and the Data Set (DT1) messages will be set automatically.

● Universal Non-realtime System Exclusive Messages

○ Identity Request Message

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	7EH, dev, 06H, 01H	F7H

<u>Byte</u>	<u>Explanation</u>
F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
dev	Device ID (dev: 00H - 1FH (1 - 32), the initial value is 10H (17).
06H	Sub ID #1 (General Information)
01H	Sub ID #2 (Identity Request)
F7H	EOX (End Of Exclusive)

* When this message is received, Identity Reply message will be transmitted.

○ GM1 System On

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	7EH, 7FH, 09H, 01H	F7H

<u>Byte</u>	<u>Explanation</u>
F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
7FH	Device ID (Broadcast)
09H	Sub ID #1 (General MIDI Message)
01H	Sub ID #2 (General MIDI 1 On)
F7H	EOX (End Of Exclusive)

* This message will be received if the MIDI/Player Mode parameter (Function:MIDI) is Mode2 or Mode4.

○ GM2 System On

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	7EH, 7FH, 09H, 03H	F7H

<u>Byte</u>	<u>Explanation</u>
F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
7FH	Device ID (Broadcast)
09H	Sub ID #1 (General MIDI Message)
03H	Sub ID #2 (General MIDI 2 On)
F7H	EOX (End Of Exclusive)

* This message will be received if the MIDI/Player Mode parameter (Function:MIDI) is Mode2 or Mode4.

○ GM System Off

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	7EH, 7FH, 09H, 02H	F7H

<u>Byte</u>	<u>Explanation</u>
F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
7FH	Device ID (Broadcast)
09H	Sub-ID #1 (General MIDI message)
02H	Sub-ID #2 (General MIDI Off)
40H	EOX (End of exclusive)

* This message will be received if the MIDI/Player Mode parameter (Function:MIDI) is Mode2 or Mode4.

● Data Transmission

This instrument can use exclusive messages to exchange many varieties of internal settings with other devices.

The model ID of the exclusive messages used by this instrument is 00H 00H 42H.

○ Data Request 1 (RQ1)

This message requests the other device to transmit data. The address and size indicate the type and amount of data that is requested.

When a Data Request message is received, if the device is in a state in which it is able to transmit data, and if the address and size are appropriate, the requested data is transmitted as a Data Set 1 (DT1) message. If the conditions are not met, nothing is transmitted.

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	41H, dev, 00H, 00H, 42H, 11H, aaH, bbH, ccH, ddH, ssH, ttH, uuH, vvH, sum	F7H

<u>Byte</u>	<u>Explanation</u>
F0H	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 10H - 1FH, 7FH)
00H	Model ID #1 (VR-700)
00H	Model ID #2 (VR-700)
42H	Model ID #3 (VR-700)
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)

* The size of data that can be transmitted at one time is fixed for each type of data. And data requests must be made with a fixed starting address and size. Refer to the address and size given in "Parameter Address Map" (p. 7).

* Regarding the checksum, please refer to "Example of an Exclusive Message and Calculating a Checksum" (p. 10).

○ 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
FOH	41H, dev, 00H, 00H, 42H, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H
Byte	Explanation	
FOH	Exclusive status	
41H	ID number (Roland)	
dev	Device ID (dev: 10H - 1FH, 7FH)	
00H	Model ID #1 (VR-700)	
00H	Model ID #2 (VR-700)	
42H	Model ID #3 (VR-700)	
12H	Command ID (DT1)	
aaH	Address MSB	
bbH	Address	
ccH	Address	
ddH	Address LSB	
eeH	data: The actual data to be transmitted. Multi-byte data is transmitted in the order of the address.	
:	:	
ffH	data	
sum	Checksum	
F7H	EOX (End of exclusive)	

- * The amount of data that can be transmitted at one time depends on the type of data, and data will be transmitted from the specified starting address and size. Refer to the address and size given in "Parameter Address Map" (p. 7).
- * Data larger than 256 bytes will be divided into packets of 256 bytes or less, and each packet will be sent at an interval of about 20 ms.
- * Regarding the checksum, please refer to "Example of an Exclusive Message and Calculating a Checksum" (p. 10).

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 = note off velocity: 00H - 7FH (0 - 127)

- * Note off message on the Organ Part is sent out with the velocity of 40H.

● 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 off velocity: 01H - 7FH (1 - 127)

- * Note off message on the Organ Part is sent out with the velocity of 64H.

● Control Change

○ Bank Select (Controller number 0, 32)

Status	2nd byte	3rd byte
BnH	00H	mmH
BnH	20H	llH

n = MIDI channel number: 0H - FH (ch.1 - ch.16)
 mm, ll = Bank number: 00 00H - 7F 7FH (bank.1 - bank.16384)

○ 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)

○ 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)

○ 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)

○ Sostenuato (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)

○ 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)

○ General Purpose Controller 5 (Controller number 80) (Rotary Speed)

Status	2nd byte	3rd byte
BnH	50H	vvH

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

* Not transmitted when MIDI General Controllers Switch (Function:MIDI) is OFF.

○ General Purpose Controller 6 (Controller number 81) (Rotary Brake)

Status	2nd byte	3rd byte
BnH	51H	vvH

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

* Not transmitted when MIDI General Controllers Switch (Function:MIDI) is OFF.

○ General Purpose Controller 7 (Controller number 82) (Wheel Brake)

Status	2nd byte	3rd byte
BnH	52H	vvH

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

* Not transmitted when MIDI General Controllers Switch (Function:MIDI) is OFF.

● 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)

* Not transmitted when Transmit Program Change Switch (Function:MIDI) is OFF.

● Pitch Bend Change

Status	2nd byte	3rd byte
EnH	llH	mmH

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

■ System Realtime Message

● Timing Clock

Status
F8H

* Not transmitted when Clock Out (Function:SYSTEM) is OFF.

● Active Sensing

Status
FEH

* This message is transmitted at intervals of approximately 250 msec.

■ System Exclusive Messages

"Universal Non-realtime System Exclusive Message" and Data Set 1 (DT1) are the only System Exclusive messages transmitted by the VR-700.

● Universal Non-realtime System Exclusive Message

○ Identity Reply Message

Receiving Identity Request Message, the VR-700 send this message.

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

Byte	Explanation
FOH	Exclusive status
7EH	ID number (Universal Non-realtime Message)
dev	Device ID (dev: 10H)
06H	Sub ID #1 (General Information)
02H	Sub ID #2 (Identity Reply)
41H	ID number (Roland)
42H 02H	Device family code (VR-700)
00H 00H	Device family number code (VR-700)
00H 01H 00H 00H	Software revision level
F7H	EOX (End of Exclusive)

● Data Transmission

○ Data set 1 (DT1)

Status	Data byte	Status
FOH	41H, dev, 00H, 00H, 42H, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H

Byte	Explanation
FOH	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 10H)
00H	Model ID #1 (VR-700)
00H	Model ID #2 (VR-700)
42H	Model ID #3 (VR-700)
12H	Command ID (DT1)
aaH	Address MSB
bbH	Address
ccH	Address
ddH	Address LSB
eeH	data: 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)

* The amount of data that can be transmitted at one time depends on the type of data, and data will be transmitted from the specified starting address and size. Refer to the address and size given in "Parameter Address Map" (p. 7).

* Data larger than 256 bytes will be divided into packets of 256 bytes or less, and each packet will be sent at an interval of about 20 ms.

3. Parameter Address Map

* Transmission of “#” marked address is divided to some packets. For example, ABH in hexadecimal notation will be divided to 0AH and 0BH, and is sent/received in this order.

■ VR-700 (Model ID = 00H 00H 42H)

Start Address	Description
00 00 00 00	System
10 00 00 00	Favorite (Temporary)

* System	
Offset Address	Description
00 00 00	System Common
00 02 00	System Equalizer
00 04 00	System V-Link
00 06 00	System Modify

* Favorite	
Offset Address	Description
00 00 00	Favorite Common
00 10 00	Favorite ToneWheel
00 12 00	Favorite ToneWheel Modify
00 20 00	Favorite Ensemble
00 20 00	Favorite Ensemble (Ensemble: 01)
00 21 32	Favorite Ensemble (Ensemble: 02)
00 30 00	Favorite Rhythm
00 42 00	Favorite Reverb

* System Common	
# Offset Address	Description
00 00	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd Master Tune (24 - 2024)
00 04	0aaa aaaa Master Level -100.0 - 100.0 [cent] (0 - 127)
00 05	0000 aaaa ToneWheel Upper Part Channel (0 - 15)
00 06	0000 aaaa ToneWheel Lower Part Channel (0 - 15)
00 07	0000 aaaa ToneWheel Pedal Part Channel (0 - 15)
00 08	0000 aaaa Ensemble1 Part Channel (0 - 15)
00 09	0000 aaaa Ensemble2 Part Channel (0 - 15)
00 0A	0000 aaaa Spring Shock Part Channel (0 - 15)
00 0B	0000 aaaa Rhythm Part Channel (0 - 15)
00 0C	0000 aaaa Control Channel (0 - 15)
00 0D	0000 000a MIDI Sound Controller Switch (0 - 1) OFF, ON
00 0E	0000 000a MIDI General Controllers Switch (0 - 1) OFF, ON
00 0F	0000 000a Clock Source (0 - 1) INT, MIDI
00 10	0000 000a Clock Out (0 - 1) OFF, ON
00 11	0000 000a Damper Polarity (0 - 1) STANDARD, REVERSE
00 12	0000 000a Control Pedal Polarity (0 - 1) STANDARD, REVERSE
00 13	0000 000a (reserved) (0 - 1)
00 14	0000 000a (reserved) (0 - 1)
00 15	0000 000a (reserved) (0 - 1)
00 16	0aaa aaaa Audio Level (0 - 127)
00 17	000a aaaa Control Pedal Assign (0 - 16) OFF, ROTARY SLOW/FAST, ROTARY SPEED, ROTARY BRAKE, ROTARY GAIN, WHEEL BRAKE, CRESCENDO, SOFT, SOSTENUTO, ENSEMBLE MFX ON/OFF, ENSEMBLE MFX CONTROL, BEND UP, BEND DOWN START/STOP, TAP-TEMPO, FAVORITE-UP, FAVORITE-DOWN
00 18	0aaa aaaa D Beam Sens (1 - 127)
00 19	0000 0aaa (reserved) (0 - 6)
00 1A	0aaa aaaa Key Touch Velocity (1 - 127)
00 1B	0000 0aaa Key Touch Curve Type (0 - 3) OFF, LIGHT, MEDIUM, HEAVY
00 1C	0000 000a ToneWheel Key Touch Mode (0 - 1) NORMAL, QUICK
00 00 00 1D	Total Size

* System Equalizer	
Offset Address	Description
00 00	0000 000a EQ Switch (0 - 1) OFF, ON
00 01	000a aaaa EQ Input Gain (0 - 30)
00 02	0000 000a EQ Low Type -15 - +15 [dB] (0 - 1) Shelving, Peaking
00 03	000a aaaa EQ Low Frequency (0 - 30) 16, 20, 25, 31, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000, 12500, 16000, [Hz] (4 - 124)
00 04	0aaa aaaa EQ Low Gain -12.0 - +12.0 [dB] (1step = 0.2dB) (0 - 4)
00 05	0000 0aaa EQ Low Q 0.5, 1.0, 2.0, 4.0, 8.0 (0 - 4)
00 06	000a aaaa EQ Mid Frequency (0 - 30) 16, 20, 25, 31, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000, 12500, 16000, [Hz] (4 - 124)
00 07	0aaa aaaa EQ Mid Gain -12.0 - +12.0 [dB] (1step = 0.2dB) (0 - 4)
00 08	0000 0aaa EQ Mid Q 0.5, 1.0, 2.0, 4.0, 8.0 (0 - 4)
00 09	000a aaaa EQ Mid Frequency (0 - 30) 16, 20, 25, 31, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000, 12500, 16000, [Hz] (4 - 124)
00 0A	0aaa aaaa EQ Mid Gain -12.0 - +12.0 [dB] (1step = 0.2dB) (0 - 4)
00 0B	0000 0aaa EQ Mid Q 0.5, 1.0, 2.0, 4.0, 8.0 (0 - 4)
00 0C	0000 000a EQ High Type (0 - 1) Shelving, Peaking
00 0D	000a aaaa EQ High Frequency (0 - 30) 16, 20, 25, 31, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000, 12500, 16000, [Hz] (4 - 124)
00 0E	0aaa aaaa EQ High Gain -12.0 - +12.0 [dB] (1step = 0.2dB) (0 - 4)
00 0F	0000 0aaa EQ High Q 0.5, 1.0, 2.0, 4.0, 8.0 (0 - 4)
00 00 00 10	Total Size

* System V-Link	
Offset Address	Description
00 00	0000 000a Switch (0 - 1) OFF, ON
00 01	0000 000a (reserved) (0 - 1)
00 02	0aaa aaaa (reserved) (0 - 127)
00 03	0000 aaaa Transmit Channel (0 - 15)
00 04	0aaa aaaa (reserved) (0 - 75)
00 05	0aaa aaaa (reserved) (0 - 75)
00 06	0000 000a (reserved) (0 - 1) OFF, ON
00 00 00 07	Total Size

* System Modify	
Offset Address	Description
00 00	0000 000a Wheel Brake (0 - 1) SPIN, STOP
00 01	0aaa aaaa ToneWheel Crescendo (0 - 127)
00 02	0000 000a ToneWheel Speed Up (0 - 1) OFF, ON
# 00 03	0000 000a 0000 bbbb 0000 cccc Tempo (10 - 500)
# 00 06	0000 aaaa 0000 bbbb Rhythm Pattern (0 - 50)
00 08	0aaa aaaa Rhythm Level (0 - 127)
00 00 00 09	Total Size

* Favorite Common	
Offset Address	Description
00 00	0aaa aaaa (reserved) (0 - 64)
00 01	0aaa aaaa (reserved) 0 - 63, FULL (0 - 64) 0 - 63, FULL
00 02	0000 000a Keyboard Split Switch (0 - 1) OFF, ON
00 03	0aaa aaaa Keyboard Split Point (0 - 75) E1 - 67
00 04	0000 aaaa Keyboard Transpose (58 - 69) -6 - 5
00 05	0000 000a Keyboard Layer Switch (0 - 1) OFF, ON
# 00 06	0000 000a 0000 bbbb 0000 cccc (reserved) (10 - 500)
00 09	0aaa aaaa Ensemble Level (0 - 127)
00 0A	0aaa aaaa Ensemble Balance (0 - 127) U64 - L63
# 00 0B	0000 000a 0000 bbbb 0000 cccc (reserved) (0 - 511)
# 00 26	0000 000a 0000 bbbb 0000 cccc (reserved) (0 - 511)
00 29	000a aaaa (reserved) (0 - 17)
00 2A	0000 0aaa D Beam State (0 - 6) OFF, PITCH, FILTER, VOLUME, WHEEL BRAKE, RING MODULATION, SPRING SHOCK
00 2B	0000 0aaa (reserved) (0 - 2)
00 2C	0aaa aaaa Rhythm Reverb Amount (0 - 127)

VR-700 MIDI Implementation

Offset	Address	Description	
00 00 00 2D	Total Size		
* Favorite ToneWheel			
00 00	0000 000a	Upper Part Switch	(0 - 1) OFF, ON
00 01	0000 000a	Lower Part Switch	(0 - 1) OFF, ON
00 02	0000 000a	Pedal Part Switch	(0 - 1) OFF, ON
00 03	0aaa aaaa	ToneWheel Part Level	(0 - 127)
00 04	0aaa aaaa	ToneWheel Reverb Amount	(0 - 127)
00 05	0aaa aaaa	ToneWheel Part Fine Tune	(14 - 114) -50 +50
00 06	0000 00aa	ToneWheel Type	(0 - 3)
00 07	0000 000a	(reserved) VINTAGE 1, VINTAGE 2, SOLID, CLEAN	(0 - 1)
00 08	000a aaaa	Key On Click Level	(0 - 31)
00 09	000a aaaa	Key Off Click Level	(0 - 31)
00 0A	0aaa aaaa	Leakage Level	(0 - 127)
00 0B	0000 aaaa	Percussion Soft Level	(0 - 15)
00 0C	0000 aaaa	Percussion Norm Level	(0 - 15)
00 0D	0aaa aaaa	Percussion Slow Time	(0 - 127)
00 0E	0aaa aaaa	Percussion Fast Time	(0 - 127)
00 0F	0000 aaaa	Percussion Recharge Time	(0 - 10)
00 10	0aaa aaaa	Percussion H.Bar Level	(0 - 127)
00 11	0000 00aa	Vibrato and Chorus Switch	(0 - 2) OFF, VIB ON, CHO ON
00 12	0000 00aa	Vibrato Type	(0 - 2)
00 13	0000 00aa	Chorus Type	(0 - 2) V-1, V-2, V-3 C-1, C-2, C-3
00 14	0000 0aaa	Amp and Speaker Type	(0 - 4) TYPE I, TYPE II, TYPE III, TYPE IV, TYPE V
00 15	0aaa aaaa	Overdrive	(0 - 127) OFF, 1 - 127
00 16	0000 000a	Rotary Switch	(0 - 1) OFF, ON
00 17	0000 aaaa	Rotary Woofer Spread	(0 - 10)
00 18	0000 aaaa	Rotary Tweeter Spread	(0 - 10)
00 19	0aaa aaaa	Rotary Woofer Level	(0 - 127)
00 1A	0aaa aaaa	Rotary Tweeter Level	(0 - 127)
00 1B	0aaa aaaa	Rotary Woofer Rise Time	(0 - 127)
00 1C	0aaa aaaa	Rotary Tweeter Rise Time	(0 - 127)
00 1D	0aaa aaaa	Rotary Woofer Fall Time	(0 - 127)
00 1E	0aaa aaaa	Rotary Tweeter Fall Time	(0 - 127)
00 1F	0aaa aaaa	Rotary Woofer Speed Slow	(0 - 127)
00 20	0aaa aaaa	Rotary Tweeter Speed Slow	(0 - 127)
00 21	0aaa aaaa	Rotary Woofer Speed Fast	(0 - 127)
00 22	0aaa aaaa	Rotary Tweeter Speed Fast	(0 - 127)
00 23	0000 aaaa	(reserve)	0
00 24	0000 aaaa	(reserve)	0
00 25	0000 aaaa	Rotary Brake Position	(0 - 1) FREE, FIX
00 26	0000 aaaa	Rotary Network Freq	(59 - 69) -5 +5
00 27	0000 aaaa	Rotary Com Filter	(59 - 69) -5 +5
00 28	0000 aaaa	Rotary Mic Distance	(0 - 10)
00 29	0000 aaaa	Rotary Speed Randomize	(0 - 10)
00 2A	0000 aaaa	EQ Bass Gain	(59 - 69) -5 +5
00 2B	0000 aaaa	EQ Middle Gain	(59 - 69) -5 +5
00 2C	0000 aaaa	EQ Treble Gain	(59 - 69) -5 +5
00 2D	0000 aaaa	(reserve)	(59 - 69) -5 +5
00 2E	0000 aaaa	(reserve)	(59 - 69) -5 +5
00 2F	0000 aaaa	(reserve)	(59 - 69) -5 +5
00 30	0000 aaaa	(reserve)	(59 - 69) -5 +5
00 31	0000 000a	Ring Modulator Switch	(0 - 1) OFF, ON
00 32	0000 000a	(reserved)	(0 - 1) OFF, ON
00 3B	0000 000a	(reserved)	(0 - 1) OFF, ON
00 3C	0000 000a	Keyboard Split Mode	(0 - 1) UPPER/LOWER, UPPER/PEDAL
00 3D	0000 000a	(reserved)	(0 - 1) OFF, ON
00 3E	0aaa aaaa	(reserved)	(1 - 127)
00 3F	0aaa aaaa	(reserved)	(0 - 127)
00 40	0000 000a	Active Amp Enhancer Switch	(0 - 1) OFF, ON
00 41	0aaa aaaa	(reserved)	(0 - 128)
00 00 00 42	Total Size		

* Favorite ToneWheel Modify

Offset	Address	Description	
00 00	0000 aaaa	Upper Harmonic Bar 16'	(0 - 8)
00 01	0000 aaaa	Upper Harmonic Bar 5-1/3'	(0 - 8)
00 02	0000 aaaa	Upper Harmonic Bar 8'	(0 - 8)
00 03	0000 aaaa	Upper Harmonic Bar 4'	(0 - 8)
00 04	0000 aaaa	Upper Harmonic Bar 2-2/3'	(0 - 8)
00 05	0000 aaaa	Upper Harmonic Bar 2'	(0 - 8)
00 06	0000 aaaa	Upper Harmonic Bar 1-3/5''	(0 - 8)
00 07	0000 aaaa	Upper Harmonic Bar 1-1/3'	(0 - 8)
00 08	0000 aaaa	Upper Harmonic Bar 1'	(0 - 8)
00 09	0000 aaaa	Lower Harmonic Bar 16'	(0 - 8)
00 0A	0000 aaaa	Lower Harmonic Bar 5-1/3'	(0 - 8)
00 0B	0000 aaaa	Lower Harmonic Bar 8'	(0 - 8)
00 0C	0000 aaaa	Lower Harmonic Bar 4'	(0 - 8)
00 0D	0000 aaaa	Lower Harmonic Bar 2-2/3'	(0 - 8)
00 0E	0000 aaaa	Lower Harmonic Bar 2'	(0 - 8)
00 0F	0000 aaaa	Lower Harmonic Bar 1-3/5''	(0 - 8)

00 10	0000 aaaa	Lower Harmonic Bar 1-1/3'	(0 - 8)
00 11	0000 aaaa	Lower Harmonic Bar 1'	(0 - 8)
00 12	0000 aaaa	Pedal Harmonic Bar 16'	(0 - 8)
00 13	0000 aaaa	Pedal Harmonic Bar 8'	(0 - 8)
00 14	0000 000a	Percussion Switch	(0 - 1) OFF, ON
00 15	0000 000a	Percussion Harmonic	(0 - 1) 2ND, 3RD
00 16	0000 000a	Percussion Decay	(0 - 1) FAST, SLOW
00 17	0000 000a	Percussion Soft	(0 - 1) NORM, SOFT
00 18	0aaa aaaa	Rotary Speed	(0 - 127)
00 19	0000 000a	Rotary Brake	(0 - 1) OFF, ON
00 1A	0aaa aaaa	Ring Modulator Frequency	(0 - 127)
00 00 00 1B	Total Size		

* Favorite Ensemble

Offset	Address	Description	
00 00	0000 000a	Part Switch	(0 - 1) OFF, ON
00 01	0000 00aa	Split Switch	(0 - 2) OFF, TO_LOWER, TO_PEDAL
00 02	0000 0aaa	Octave Shift	(62 - 66) -2 - +2
00 03	0aaa aaaa	Tone Bank Select MSB (CC# 0)	(0 - 127)
00 04	0aaa aaaa	Tone Bank Select LSB (CC# 32)	(0 - 127)
00 05	0aaa aaaa	Tone Program Change#	(0 - 127)
00 06	0aaa aaaa	Part Level (CC# 7)	(0 - 127)
00 07	0aaa aaaa	Part Pan (CC# 10)	(0 - 127) L64 - 63R
00 08	0aaa aaaa	Coarse Tune	(16 - 112) -48 +48
00 09	0aaa aaaa	Fine Tune	(14 - 114) -50 +50
00 0A	0000 00aa	Mono/Poly	(0 - 2) MONO, POLY, MONO/LEGATO
00 0B	000a aaaa	Pitch Bend Range	(0 - 24)
00 0C	0000 000a	Portamento Switch	(0 - 1) OFF, ON
# 00 0D	0000 aaaa	Portamento Time	(0 - 127)
00 0F	0aaa aaaa	(reserved)	(0 - 127) -63 +63
00 13	0aaa aaaa	(reserved)	(0 - 127) -63 +63
00 14	0aaa aaaa	(reserved)	(0 - 127)
00 15	0aaa aaaa	Reverb Amount	(0 - 127)
00 16	0000 0aaa	(reserved)	(0 - 7)
00 17	0000 aaaa	(reserved)	(0 - 11)
00 18	0000 000a	MPX Switch	(0 - 1) OFF, ON
# 00 19	0000 aaaa	MPX Type	(0 - 255)
00 1B	0aaa aaaa	MPX Control 1 Sens	(1 - 127) -63 +63
00 1C	0aaa aaaa	MPX Control 2 Sens	(1 - 127) -63 +63
00 1D	0aaa aaaa	MPX Control 3 Sens	(1 - 127) -63 +63
00 1E	0aaa aaaa	MPX Control 4 Sens	(1 - 127) -63 +63
00 1F	000a aaaa	MPX Control Assign 1	(0 - 16) OFF, 1 - 16
00 20	000a aaaa	MPX Control Assign 2	(0 - 16) OFF, 1 - 16
00 21	000a aaaa	MPX Control Assign 3	(0 - 16) OFF, 1 - 16
00 22	000a aaaa	MPX Control Assign 4	(0 - 16) OFF, 1 - 16
# 00 23	0000 aaaa	MPX Parameter 1	(12768 - 52768) -20000 - +20000
0000 cccc			
0000 dddd			
# 01 1F	0000 aaaa	MPX Parameter 32	(12768 - 52768) -20000 - +20000
0000 cccc			
0000 dddd			
01 23	0000 000a	(reserved)	(0 - 1) OFF, ON
01 24	0000 000a	Expression Switch Enable	(0 - 1) OFF, ON
01 25	0000 000a	(reserved)	(0 - 1) OFF, ON
01 31	0000 000a	(reserved)	(0 - 1) OFF, ON
00 00 01 32	Total Size		

* Favorite Rhythm

Offset	Address	Description	
00 00	0aaa aaaa	Rhythm Level	(0 - 127)
# 00 01	0000 aaaa	(reserved)	(0 - 50)
00 03	0aaa aaaa	Rhythm Accent	(0 - 100)
00 04	0000 aaaa	Rhythm Grid	(0 - 8) 1/4, 1/8, 1/8L, 1/8H, 1/12, 1/16, 1/16L, 1/16H
00 05	0000 aaaa	Rhythm Duration	(0 - 9) 30, 40, 50, 60, 70, 80, 90, 100, 120, FULL
00 00 00 06	Total Size		

* Favorite Reverb

Offset	Address	Description
	00 00	0000 aaaa Reverb Type (0 - 9) ---, ---, ROOM, HALL, ---, ---, CATHEDRAL, ---, ---, SPRING, (0 - 127) (0 - 3)
	00 01	0aaa aaaa Reverb Level
	00 02	0000 00aa (reserved) (0 - 3)
#	00 03	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd (reserved) (12768 - 52768) -20000 - +20000
#	: 00 4F	: 0000 aaaa 0000 bbbb 0000 cccc 0000 dddd (reserved) (12768 - 52768) -20000 - +20000
	00 00 00 53	Total Size

4. Supplementary material

■ Decimal and Hexadecimal Table

(An "H" is appended to the end of numbers in hexadecimal notation.)

In MIDI documentation, data values and addresses/sizes of Exclusive messages, etc. are expressed as hexadecimal values for each 7 bits.

The following table shows how these correspond to decimal numbers.

Dec.	Hex.	Dec.	Hex.	Dec.	Hex.	Dec.	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	59	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

* Dec. : decimal
Hex. : hexadecimal

- * Decimal values such as MIDI channel and program change are listed as one greater than the values given in the above table.
- * A 7-bit byte can express data in the range of 128 steps. For data where greater precision is required, we must use two or more bytes. For example, two hexadecimal numbers aa bbH expressing two 7-bit bytes would indicate a value of $aa \times 128 + bb$.
- * In the case of values which have a \pm sign, 00H = -64, 40H = ± 0 , and 7FH = +63, so that the decimal expression would be 64 less than the value given in the above chart. In the case of two types, 00 00H = -8192, 40 00H = ± 0 , and 7F 7FH = +8191. For example, if aa bbH were expressed as decimal, this would be $aa \text{ bbH} - 40 \text{ 00H} = aa \times 128 + bb - 64 \times 128$.
- * Data marked "Use nibbled data" is expressed in hexadecimal in 4-bit units. A value expressed as a 2-byte nibble 0a 0bH has the value of $a \times 16 + b$.

<Example1> What is the decimal expression of 5AH?

From the preceding table, 5AH = 90

<Example2> What is the decimal expression of the value 12 34H given as hexadecimal for each 7 bits?

From the preceding table, since 12H = 18 and 34H = 52
 $18 \times 128 + 52 = 2356$

<Example3> What is the decimal expression of the nibbled value 0A 03 09 0D?

From the preceding table, since 0AH = 10, 03H = 3, 09H = 9, 0DH = 13
 $((10 \times 16 + 3) \times 16 + 9) \times 16 + 13 = 41885$

<Example 4> What is the nibbled expression of the decimal value 1258?

```

16 ) 1258
-----
16 ) 78 ...10
-----
16 ) 4 ...14
-----
    0 ... 4
    
```

Since from the preceding table, 0 = 00H, 4 = 04H, 14 = 0EH, 10 = 0AH, the result is: 00 04 0E 0AH.

■ Examples of Actual MIDI Messages

<Example 1> 93 3E 5F

9n is the Note-on status, and n is the MIDI channel number. Since 3H = 3, 3EH = 62, and 5FH = 95, this is a Note-on message with MIDI CH = 4, note number 62 (note name is D4), and velocity 95.

<Example 2> CE 49

CnH is the Program Change status, and n is the MIDI channel number. Since EH = 14 and 49H = 73, this is a Program Change message with MIDI CH = 15, program number 74.

<Example 3> E3 00 28

EnH is the Pitch Bend Change status, and n is the MIDI channel number. The 2nd byte (00H = 0) is the LSB and the 3rd byte (28H = 40) is the MSB, but Pitch Bend Value is a signed number in which 40 00H (= 64 x 12 + 80 = 8192) is 0, so this Pitch Bend Value is 28 00H - 40 00H = 40 x 12 + 80 - (64 x 12 + 80) = 5120 - 8192 = -3072

If the Pitch Bend Sensitivity is set to 2 semitones, -8192 (00 00H) will cause the pitch to change -200 cents, so in this case -200 x (-3072) // (-8192) = -75 cents of Pitch Bend is being applied to MIDI channel 4.

<Example 4> B3 64 00 65 00 06 0C 26 00 64 7F 65 7F

BnH is the Control Change status, and n is the MIDI channel number. For Control Changes, the 2nd byte is the control number, and the 3rd byte is the value. In a case in which two or more messages consecutive messages have the same status, MIDI has a provision called "running status" which allows the status byte of the second and following messages to be omitted. Thus, the above messages have the following meaning.

B3 64 00	MIDI ch.4, lower byte of RPN parameter number: 00H
(B3) 65 00	MIDI ch.4, upper byte of RPN parameter number: 00H
(B3) 06 0C	MIDI ch.4, upper byte of parameter value: 0CH
(B3) 26 00	MIDI ch.4, lower byte of parameter value: 00H
(B3) 64 7F	MIDI ch.4, lower byte of RPN parameter number: 7FH
(B3) 65 7F	MIDI ch.4, upper byte of RPN parameter number: 7FH

In other words, the above messages specify a value of 0C 00H for RPN parameter number 00 00H on MIDI channel 4, and then set the RPN parameter number to 7F 7FH.

RPN parameter number 00 00H is Pitch Bend Sensitivity, and the MSB of the value indicates semitone units, so a value of 0CH = 12 sets the maximum pitch bend range to ±12 semitones (1 octave).

Once the parameter number has been specified for RPN or NRPN, all Data Entry messages transmitted on that same channel will be valid, so after the desired value has been transmitted, it is a good idea to set the parameter number to 7F 7FH to prevent accidents. This is the reason for the (B3) 64 7F (B3) 65 7F at the end.

It is not desirable for Performance data (such as Standard MIDI File data) to contain many events with running status as given in <Example 4>. This is because if playback is halted during the song and then rewound or fast-forwarded, the sequencer may not be able to transmit the correct status, and the sound generator will then misinterpret the data. Take care to give each event its own status.

It is also necessary that the RPN or NRPN parameter number setting and the value setting be done in the proper order. On some sequencers, events occurring in the same (or consecutive) clock may be transmitted in an order different than the order in which they were received. For this reason it is a good idea to slightly skew the time of each event (about 1 tick for TPQN = 96, and about 5 ticks for TPQN = 480).

* TPQN: Ticks Per Quarter Note

■ Example of an Exclusive Message and Calculating a Checksum

Roland Exclusive messages (RQ1, DT1) are transmitted with a checksum at the end (before F7) to make sure that the message was correctly received. The value of the checksum is determined by the address and data (or size) of the transmitted Exclusive message.

○ How to calculate the checksum

* Hexadecimal numbers are indicated by "H."

The checksum is a value derived by adding the address, size, and checksum itself and inverting the lower 7 bits.

Here's an example of how the check sum is calculated. We will assume that in the Exclusive message we are transmitting, the address is aa bb cc ddH and the data or size is ee ffH.

```

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

<Example 1> Setting the Percussion Switch parameter (Favorite ToneWheel Modify:Percussion Switch) to ON (DT1)

According to the "Parameter Address Map" (p. 7), the start address of "Temporary Favorite" is 10 00 00 00H, the offset address of "Favorite ToneWheel Modify" parameter is 00 12 00H, and the address of "Percussion Switch" is 00 14H. Therefore the address of "Percussion Switch" of Favorite is;

```

10 00 00 00H
   00 12 00H
+) 00 14H
-----
10 00 12 14H
    
```

ON has the value of 01H.

```

F0 41 10 00 00 42 12 10 00 12 14 01  ??  F7
(1) (2) (3) (4) (5) address  data  checksum (6)
    
```

(1) Exclusive Status, (2) ID (Roland), (3) Device ID (17),
(4) Model ID (VR-700), (5) Command ID (DT1), (6) End of Exclusive

Then calculate the checksum.

```

10H + 00H + 12H + 14H + 01H = 16 + 0 + 18 + 20 + 1 = 55 (sum)
55 (sum) ÷ 128 = 0 (quotient) ... 55 (remainder)
checksum = 128 - 55 (remainder) = 73 = 49H
    
```

This means that F0 41 10 00 00 42 12 10 00 12 14 01 49 F7 is the message should be sent.

<Example 2> Getting Temporary Favorite data (RQ1)

According to the "Parameter Address Map" (p. 7), the start address of Temporary Favorite is assigned as following:

```

10 00 00 00H  Temporary Favorite
   :
   00 00 00H  Favorite Common
   :
   00 10 00H  Favorite ToneWheel
   :
   00 42 00H  Favorite Reverb
   :
10 00 ?? ??H  End of Temporary Favorite
    
```

As the data size of "Favorite Reverb" is 00 00 00 53H, summation of the size and the start address of "Temporary Favorite Reverb" at "Temporary Favorite" will be;

```

10 00 42 00H
+) 00 00 00 53H
-----
10 00 42 53H
    
```

And the size that have to be got should be;

```

10 00 42 53H
-) 10 00 00 00H
-----
00 00 42 53H
    
```

```

F0 41 10 00 00 42 11 10 00 00 00 00 42 53 5B  ??  F7
(1) (2) (3) (4) (5) address  data  checksum (6)
    
```

(1) Exclusive Status, (2) ID (Roland), (3) Device ID (17),
(4) Model ID (VR-700), (5) Command ID (RQ1), (6) End of Exclusive

Calculating the checksum as shown in <Example 1>, we get a message of F0 41 10 00 00 42 11 10 00 00 00 00 42 53 5B F7 to be transmitted.

Combo Keyboard
 Model VR-700

Date : Jan. 1, 2010
 Version : 1.00

MIDI Implementation Chart

Function...		Transmitted	Recognized	Remarks
Basic Channel	Default Changed	1-16 1-16	1-16 1-16	Memorized
Mode	Default Messages Altered	Mode 3 Mono, Poly *****	Mode 3 Mode 3, 4 (M = 1)	* 1
Note Number	True Voice	0-127 *****	0-127 0-127	
Velocity	Note On Note Off	O O	O O	
After Touch	Key's Channel's	X X	X O	
Pitch Bend		O	O	
Control Change	0, 32 1 5 6, 38 7 10 11 18 19 64 66 67 70-78 *3 71 *4 72 *4 73 *4 74 *4 80 81 82 98, 99 100, 101	O *5 O O X O X O X X O O O X X X X X O O O X O	O *5 O	Bank select Modulation Portamento time Data entry Volume Panpot Expression General Purpose Controller 3 General Purpose Controller 4 Hold 1 Sostenuto Soft Sound Controller Resonance Release Time Attack Time Cutoff General Purpose Controller 5 General Purpose Controller 6 General Purpose Controller 7 NRPN LSB, MSB RPN LSB, MSB
Program Change	: True Number	O *5 *****	O *5 0-127	Program No. 1-128
System Exclusive		O	O	
System Common	: Song Position : Song Select : Tune Request	X X X	X X X	
System Real Time	: Clock : Commands	O *5 O	O *5 X	
Aux Messages	: All Sound Off : Reset All Controllers : Local On/Off : All Notes Off : Active Sensing : System Reset	X X X X O X	O (120, 126, 127) O X O (123-127) O X	
Notes	* 1 Recognized as M=1 even if M≠1. * 2 Harmonic bar (Not received when MIDI Sound Controllers Switch is OFF.) * 3 Organ part only. * 4 Ensemble part only. * 5 O X is selectable.			

Mode 1 : OMNI ON, POLY
 Mode 3 : OMNI OFF, POLY

Mode 2 : OMNI ON, MONO
 Mode 4 : OMNI OFF, MONO

O : Yes
 X : No