MIDI Implementation

MC-09 (Phrase Lab)
Date: May 21, 2002
Version: 1.00

Symbol	Description	Range
n	MIDI Channel	0H-FH (ch.1-ch.16)
vv	Control value	00H-7FH (0-127)
kk	Note Number	00H-7FH (0-127)
xx	ON / OFF	00H-3FH (0-63:OFF), 40H-7FH (64-127:ON)

1. Data Reception (DSP Synth. Section)

■Channel Voice Messages

●Note Off

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

vv = Note Off velocity: 00H - 7FH (0 - 127)

●Note On

Status	2nd byte	3rd byte
9nH	kkH	vvH

vv = Note On velocity: 01H - 7FH (1 - 127)

●Control Change

❍Bank Select (Controller number 0, 32)

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

mm, ll = Bank number: 00 00H - 7F 7FH (bank.1 - bank.16384)

* Not received when Receive Program Change switch parameter is OFF.
* The Patterns corresponding to each Bank Select are as follows.

Bank Select MSB	Bank Select LSB	Program No.	Group	Pattern No.
81	0	001 - 040	Preset Lead	001 - 040
81	1	001 - 060	Preset Bass	001 - 060
81	2	001 - 100	Preset Rhythm	001 - 100
81	3	001 - 030	Preset Effects	001 - 030
85	0	001 - 020	User	001 - 020
86	0	001 - 050	Card	001 - 050

❍Modulation (Controller number 1)

Status	2nd byte	3rd byte
BnH	01H	vvH

❍Volume (Controller number 7)

Status	2nd byte	3rd byte
BnH	07H	vvH

* The Level parameter will change.

❍Panpot (Controller number 10)

Status	2nd byte	3rd byte
BnH	0AH	vvH

vv = Panpot: 00H - 40H - 7FH (Left - Center - Right)

* The DSP Synth Pan parameter will change.

❍General Purpose Controller 1 (Controller number 16)

Status	2nd byte	3rd byte
BnH	10H	vvH

* The C1 parameter will change.

❍General Purpose Controller 2 (Controller number 17)

Status	2nd byte	3rd byte
BnH	11H	vvH

* The C2 parameter will change.

❍General Purpose Controller 3 (Controller number 18)

Status	2nd byte	3rd byte
BnH	12H	vvH

* The C3 parameter will change.

❍Portamento (Controller number 65)

Status	2nd byte	3rd byte
BnH	41H	xxH

xx = Control value: 00H - 7FH (0 - 127) 0 - 63 = OFF, 64 - 127 = ON

❍Resonance (Controller number 71)

Status	2nd byte	3rd byte
BnH	47H	vvH

vv = Resonance value: 00H - 7FH (0 - 127)

* The RESO parameter will change.

❍Cutoff (Controller number 74)

Status	2nd byte	3rd byte
BnH	4AH	vvH

vv = Cutoff value: 00H - 7FH (0 - 127)

* The CUTOFF parameter will change.

❍General Purpose Controller 8 (Controller number 83)

Status	2nd byte	3rd byte
BnH	53H	vvH

* The DECAY parameter will change.

●Program Change

Status	2nd byte
CnH	ppH

pp = Program number: 00H - 7FH (prog.1 - prog.128)

* Not received when Receive Program Change switch parameter is OFF.

●Pitch Bend Change

Status	2nd byte	3rd byte
EnH	llH	mmH

mm, ll = Pitch Bend value: 00 00H - 40 00H - 7F 7FH (-8192 - 0 - +8191)

* Not received when Receive Pitch Bend switch parameter is OFF.

■Channel Mode Messages

●All Sounds Off (Controller number 120)

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

* 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

* 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)

●All Notes Off (Controller number 123)

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

* When All Notes Off is received, all notes on the corresponding channel will be turned off.

●OMNI OFF (Controller number 124)

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

* 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

* 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

* 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

* 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 Sync Mode parameter is SLAVE. Settings can be made to synchronize the LFO rate.

●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)

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

●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.
The model ID of the exclusive messages used by this instrument is 00 4FH.

Status	Data Byte	Status
F0H	41H, dev, 00H, 4FH, 11H, aaH, bbH, ccH, ddH, ssH, ttH, uuH, vvH, sum	F7H

Byte	Remarks
F0H	Exclusive status
41H	ID number (Roland)
dev	device ID (dev: 10H - 1FH)
00H	model ID #1 (MC-09)
4FH	model ID #2 (MC-09)
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)

* For the checksum, refer to (p. 6).
* Not received when Receive System Exclusive switch parameter is OFF.

●Data Set 1 (DT1)

Status	Data byte	Status
F0H	41H, dev, 00H, 4FH, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	device ID (dev: 10H - 1FH)
00H	model ID #1 (MC-09)
4FH	model ID #2 (MC-09)
12H	Command ID (DT1)
aaH	Address MSB: upper byte of the starting address of the data to be sent.
bbH	Address: upper middle byte of the starting address of the data to be sent.
ccH	Address: lower middle byte of the starting address of the data to be sent.
ddH	Address LSB: lower byte of the starting address of the data to be sent.
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)

* For the checksum, refer to (p. 6).
* Data larger than 128 bytes will be divided into packets of 128 bytes or less, and each packet will be sent at an interval of about 20 ms.
* Not received when Receive System Exclusive switch parameter is OFF.

2. Data Transmission (DSP Synth. Section)

■Channel Voice Messages

●Note Off

Status	2nd byte	3rd byte
8nH	kkH	vvH

vv = note off velocity: 40H (64)

●Note On

Status	2nd byte	3rd byte
9nH	kkH	vvH

vv = note on velocity: 01H - 7FH (1 - 127)

●Control Change

❍Bank Select (Controller number 0, 32)

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

mm, ll = Bank number: 00 00H - 7F 7FH (bank.1 - bank.16384)

* Not transmitted when Transmite Program Change switch parameter is OFF.
* For the Bank Select that corresponds to each Pattern, refer to section 1.

❍Volume (Controller number 7)

Status	2nd byte	3rd byte
BnH	07H	vvH

* When the Level parameter is changed, the corresponding value will be transmitted.

❍Panpot (Controller number 10)

Status	2nd byte	3rd byte
BnH	0AH	vvH

vv = Panpot: 00H - 40H - 7FH (Left - Center - Right)

* When the DSP Synth Pan parameter is changed, the corresponding value will be transmitted.

❍General Purpose Controller 1 (Controller number 16)

Status	2nd byte	3rd byte
BnH	10H	vvH

* When the C1 parameter is changed, the corresponding value will be transmitted.

❍General Purpose Controller 2 (Controller number 17)

Status	2nd byte	3rd byte
BnH	11H	vvH

* When the C2 parameter is changed, the corresponding value will be transmitted.

❍General Purpose Controller 3 (Controller number 18)

Status	2nd byte	3rd byte
BnH	12H	vvH

* When the C3 parameter is changed, the corresponding value will be transmitted.

❍Resonance (Controller number 71)

Status	2nd byte	3rd byte
BnH	47H	vvH

vv = Resonance value: 00H - 7FH (0 - 127)

* When the RESO parameter is changed, the corresponding value will be transmitted.

❍Cutoff (Controller number 74)

Status	2nd byte	3rd byte
BnH	4AH	vvH

vv = Cutoff value: 00H - 7FH (0 - 127)

* When the CUTOFF parameter is changed, the corresponding value will be transmitted.

❍General Purpose Controller 8 (Controller number 83)

Status	2nd byte	3rd byte
BnH	53H	vvH

* When the DECAY parameter is changed, the corresponding value will be transmitted.

●Program Change

Status	2nd byte
CnH	ppH

pp = Program number: 00H - 7FH (prog.1 - prog.128)

* Not transmitted when Transmit Program Change switch parameter is OFF.

■System Realtime Messages

●Active Sensing

Status
FEH

* Transmitted at intervals of approximately 250 ms.

■System Exclusive Messages

Data Set 1 (DT1) are the only System Exclusive messages transmitted by the MC-09.

●Data Set 1 (DT1)

Status	Data byte	Status
F0H	41H, dev, 00H, 4FH, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	device ID (dev: 10H - 1FH)
00H	model ID #1 (MC-09)
4FH	model ID #2 (MC-09)
12H	Command ID (DT1)
aaH	Address MSB: upper byte of the starting address of the data to be sent.
bbH	Address: upper middle byte of the starting address of the data to be sent.
ccH	Address: lower middle byte of the starting address of the data to be sent.
ddH	Address LSB: lower byte of the starting address of the data to be sent.
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)

* For the checksum, refer to (p. 6).
* Data larger than 128 bytes will be divided into packets of 128 bytes or less, and each packet will be sent at an interval of about 20 ms.

3. Data Reception (Sequencer Section)

■System Realtime Message

●Timing Clock

Status
F8H

* This message will be received if the Sync Mode parameter is SLAVE.

●Start

Status
FAH

* This message will be received if the Sync Mode parameter is SLAVE or REMOTE.

●Stop

Status
FCH

* This message will be received if the Sync Mode parameter is SLAVE or REMOTE.

4. Data Transmission (Sequencer Section)

4.1 Messages transmitted during playback.

■Channel Voice Messages

●Note Off

Status	2nd byte	3rd byte
8nH	kkH	vvH

vv = note off velocity: 40H (64)

●Note On

Status	2nd byte	3rd byte
9nH	kkH	vvH

vv = note on velocity: 01H - 7FH (1 - 127)

●Control Change

Status	2nd byte	3rd byte
BnH	kkH	vvH

kk = controller number: 10H - 12H, 41H (16 - 18, 65)

4.2 If the Through parameter is ON, messages received (except for System Common messages and System Realtime messages) will be transmitted.

4.3 Messages that are generated and transmitted

4.3.1 Messages automatically generated by the system

■Channel Mode Messages

●Omni Off (Controller number 124)

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

* At start-up, this message is transmitted to all channels.

●Poly (Controller number 127)

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

* At start-up, this message is transmitted to all channels.

4.3.2 Messages generated and transmitted when the Sync Out is ON

■System Realtime Messages

●Timing Clock

Status
F8H

* This message is transmitted if the Sync out is ON.

●Start

Status
FAH

* This message is transmitted if the Sync out is ON.

●Stop

Status
FCH

* This message is transmitted if the Sync out is ON.

5. Parameter Address Map

* Addresses for which the Description field is listed as “Reserved” have no meaning for the MC-09. They will be ignored.

1. MC-09 (Model ID=00H 4FH)

Start Address	Description	
00 00 00 00	System	1–1
01 00 00 00	Temporary Pattern	1–2
02 00 00 00	User Pattern 1	1–2
02 01 00 00	User Pattern 2	
:		
02 13 00 00	User Pattern 20	
03 00 00 00	Process Patch	1–3
04 00 00 00	Memory Save Request	1–4

* When MC-09 receive Memory Save Request after receiving System parameters, User parameters or Process Patch parameters, Parameter data is saved to a memory of MC-09.

❍1-1. System

Offset Address		Description	
00 00	0aaa aaaa	Master Tune	0 – 126 (427.4 – 452.6)
00 01	0000 000a	Receive Program Change	0 – 1 (OFF, ON)
00 02	0000 000a	Reserve	0 – 1 (——)
00 03	0000 000a	Receive Control Change	0 – 1 (OFF, ON)
00 04	0000 000a	Reserve	0 – 1 (——)
00 05	0000 000a	Reserve	0 – 1 (——)
00 06	0000 000a	Receive Pitch Bend	0 – 1 (OFF, ON)
00 07	0000 000a	Reserve	0 – 1 (——)
00 08	000a aaaa	MIDI Channel	0 – 16 (1 – 16, OFF)
00 09	0000 000a	Transmit Program Change	0 – 1 (OFF, ON)
00 0A	0000 000a	Reserve	0 – 1 (OFF, ON)
00 0B	0000 000a	Reserve	0 – 1 (OFF, ON)
00 0C	000a aaaa	Transpose	0 – 24 (–12 – +12)
Total size	00 00 00 0D		

❍1-2. Pattern

Offset Address		Description	
00 00	000a aaaa	Master Tempo(H)	0 – 18 (40.0 – 240.0(TEMPO_H))
00 01	0aaa aaaa	Master Tempo(L)	0 – 127 (40.0 – 240.0(TEMPO_L))
00 02	0000 000a	Pattern LengtH	0 – 1 (1, 2)
00 03	0000 000a	Pattern Scale	0 – 1 (12, 16)
00 04	0000 00aa	Loop Ctrl	0 – 3 (OFF, PITCH, TRIG, DIVIDE TIMES 16)
00 05	00aa aaaa	Synth/Effect Type	0 – 7 (LINE, LEAD, BASS, RHYTHM, FILTER, ISOLATOR, PHASER, SLICER)
00 06	0aaa aaaa	Synth/Effect Parameter 1	0 – 127
00 07	0aaa aaaa	Synth/Effect Parameter 2	0 – 127
00 08	0aaa aaaa	Synth/Effect Parameter 3	0 – 127
00 09	0aaa aaaa	Synth/Effect Parameter 4	0 – 127
00 0A	0aaa aaaa	Synth/Effect Parameter 5	0 – 127
00 0B	0aaa aaaa	Synth/Effect Parameter 6	0 – 127
00 0C	0aaa aaaa	Synth/Effect Parameter 7	0 – 127
00 0D	0aaa aaaa	Synth/Effect Parameter 8	0 – 127
00 0E	0aaa aaaa	Synth/Effect Parameter 9	0 – 127
00 0F	0aaa aaaa	Synth/Effect Parameter 10	0 – 127
00 10	0aaa aaaa	Synth/Effect Parameter 11	0 – 127
00 11	0aaa aaaa	Synth/Effect Parameter 12	0 – 127
00 12	0aaa aaaa	Synth/Effect Parameter 13	0 – 127
00 13	0aaa aaaa	Synth/Effect Parameter 14	0 – 127
00 14	0aaa aaaa	Synth/Effect Parameter 15	0 – 127
00 15	0aaa aaaa	Synth/Effect Parameter 16	0 – 127
00 16	0aaa aaaa	Synth/Effect Parameter 17	0 – 127
00 17	0aaa aaaa	Synth/Effect Parameter 18	0 – 127
00 18	0aaa aaaa	Synth/Effect Parameter 19	0 – 127
00 19	0aaa aaaa	Synth/Effect Parameter 20	0 – 127
00 1A	0aaa aaaa	Synth/Effect Parameter 21	0 – 127
00 1B	0aaa aaaa	Synth/Effect Parameter 22	0 – 127
00 1C	0aaa aaaa	Synth/Effect Parameter 23	0 – 127
00 1D	0aaa aaaa	Synth/Effect Parameter 24	0 – 127
00 1E	0aaa aaaa	Synth/Effect Parameter 25	0 – 127
00 1F	0aaa aaaa	Step1 Note/Value	0 – 127
00 20	0aaa aaaa	Step2 Note/Value	0 – 127
00 21	0aaa aaaa	Step3 Note/Value	0 – 127
00 22	0aaa aaaa	Step4 Note/Value	0 – 127
00 23	0aaa aaaa	Step5 Note/Value	0 – 127
00 24	0aaa aaaa	Step6 Note/Value	0 – 127
00 25	0aaa aaaa	Step7 Note/Value	0 – 127
00 26	0aaa aaaa	Step8 Note/Value	0 – 127
00 27	0aaa aaaa	Step9 Note/Value	0 – 127
00 28	0aaa aaaa	Step10 Note/Value	0 – 127
00 29	0aaa aaaa	Step11 Note/Value	0 – 127
00 2A	0aaa aaaa	Step12 Note/Value	0 – 127
00 2B	0aaa aaaa	Step13 Note/Value	0 – 127
00 2C	0aaa aaaa	Step14 Note/Value	0 – 127
00 2D	0aaa aaaa	Step15 Note/Value	0 – 127
00 2E	0aaa aaaa	Step16 Note/Value	0 – 127
00 2F	0aaa aaaa	Step17 Note/Value	0 – 127
00 30	0aaa aaaa	Step18 Note/Value	0 – 127

00 31	0aaa aaaa	Step19 Note/Value	0 – 127
00 32	0aaa aaaa	Step20 Note/Value	0 – 127
00 33	0aaa aaaa	Step21 Note/Value	0 – 127
00 34	0aaa aaaa	Step22 Note/Value	0 – 127
00 35	0aaa aaaa	Step23 Note/Value	0 – 127
00 36	0aaa aaaa	Step24 Note/Value	0 – 127
00 37	0aaa aaaa	Step25 Note/Value	0 – 127
00 38	0aaa aaaa	Step26 Note/Value	0 – 127
00 39	0aaa aaaa	Step27 Note/Value	0 – 127
00 3A	0aaa aaaa	Step28 Note/Value	0 – 127
00 3B	0aaa aaaa	Step29 Note/Value	0 – 127
00 3C	0aaa aaaa	Step30 Note/Value	0 – 127
00 3D	0aaa aaaa	Step31 Note/Value	0 – 127
00 3E	0aaa aaaa	Step32 Note/Value	0 – 127
00 3F	0aaa aaaa	Step1 Velocity	0 – 127
00 40	0aaa aaaa	Step2 Velocity	0 – 127
00 41	0aaa aaaa	Step3 Velocity	0 – 127
00 42	0aaa aaaa	Step4 Velocity	0 – 127
00 43	0aaa aaaa	Step5 Velocity	0 – 127
00 44	0aaa aaaa	Step6 Velocity	0 – 127
00 45	0aaa aaaa	Step7 Velocity	0 – 127
00 46	0aaa aaaa	Step8 Velocity	0 – 127
00 47	0aaa aaaa	Step9 Velocity	0 – 127
00 48	0aaa aaaa	Step10 Velocity	0 – 127
00 49	0aaa aaaa	Step11 Velocity	0 – 127
00 4A	0aaa aaaa	Step12 Velocity	0 – 127
00 4B	0aaa aaaa	Step13 Velocity	0 – 127
00 4C	0aaa aaaa	Step14 Velocity	0 – 127
00 4D	0aaa aaaa	Step15 Velocity	0 – 127
00 4E	0aaa aaaa	Step16 Velocity	0 – 127
00 4F	0aaa aaaa	Step17 Velocity	0 – 127
00 50	0aaa aaaa	Step18 Velocity	0 – 127
00 51	0aaa aaaa	Step19 Velocity	0 – 127
00 52	0aaa aaaa	Step20 Velocity	0 – 127
00 53	0aaa aaaa	Step21 Velocity	0 – 127
00 54	0aaa aaaa	Step22 Velocity	0 – 127
00 55	0aaa aaaa	Step23 Velocity	0 – 127
00 56	0aaa aaaa	Step24 Velocity	0 – 127
00 57	0aaa aaaa	Step25 Velocity	0 – 127
00 58	0aaa aaaa	Step26 Velocity	0 – 127
00 59	0aaa aaaa	Step27 Velocity	0 – 127
00 5A	0aaa aaaa	Step28 Velocity	0 – 127
00 5B	0aaa aaaa	Step29 Velocity	0 – 127
00 5C	0aaa aaaa	Step30 Velocity	0 – 127
00 5D	0aaa aaaa	Step31 Velocity	0 – 127
00 5E	0aaa aaaa	Step32 Velocity	0 – 127
00 5F	0aaa aaaa	Step1 Gate Time	0 – 105 (0 – 105 (%))
00 60	0aaa aaaa	Step2 Gate Time	0 – 105 (0 – 105 (%))
00 61	0aaa aaaa	Step3 Gate Time	0 – 105 (0 – 105 (%))
00 62	0aaa aaaa	Step4 Gate Time	0 – 105 (0 – 105 (%))
00 63	0aaa aaaa	Step5 Gate Time	0 – 105 (0 – 105 (%))
00 64	0aaa aaaa	Step6 Gate Time	0 – 105 (0 – 105 (%))
00 65	0aaa aaaa	Step7 Gate Time	0 – 105 (0 – 105 (%))
00 66	0aaa aaaa	Step8 Gate Time	0 – 105 (0 – 105 (%))
00 67	0aaa aaaa	Step9 Gate Time	0 – 105 (0 – 105 (%))
00 68	0aaa aaaa	Step10 Gate Time	0 – 105 (0 – 105 (%))
00 69	0aaa aaaa	Step11 Gate Time	0 – 105 (0 – 105 (%))
00 6A	0aaa aaaa	Step12 Gate Time	0 – 105 (0 – 105 (%))
00 6B	0aaa aaaa	Step13 Gate Time	0 – 105 (0 – 105 (%))
00 6C	0aaa aaaa	Step14 Gate Time	0 – 105 (0 – 105 (%))
00 6D	0aaa aaaa	Step15 Gate Time	0 – 105 (0 – 105 (%))
00 6E	0aaa aaaa	Step16 Gate Time	0 – 105 (0 – 105 (%))
00 6F	0aaa aaaa	Step17 Gate Time	0 – 105 (0 – 105 (%))
00 70	0aaa aaaa	Step18 Gate Time	0 – 105 (0 – 105 (%))
00 71	0aaa aaaa	Step19 Gate Time	0 – 105 (0 – 105 (%))
00 72	0aaa aaaa	Step20 Gate Time	0 – 105 (0 – 105 (%))
00 73	0aaa aaaa	Step21 Gate Time	0 – 105 (0 – 105 (%))
00 74	0aaa aaaa	Step22 Gate Time	0 – 105 (0 – 105 (%))
00 75	0aaa aaaa	Step23 Gate Time	0 – 105 (0 – 105 (%))
00 76	0aaa aaaa	Step24 Gate Time	0 – 105 (0 – 105 (%))
00 77	0aaa aaaa	Step25 Gate Time	0 – 105 (0 – 105 (%))
00 78	0aaa aaaa	Step26 Gate Time	0 – 105 (0 – 105 (%))
00 79	0aaa aaaa	Step27 Gate Time	0 – 105 (0 – 105 (%))
00 7A	0aaa aaaa	Step28 Gate Time	0 – 105 (0 – 105 (%))
00 7B	0aaa aaaa	Step29 Gate Time	0 – 105 (0 – 105 (%))
00 7C	0aaa aaaa	Step30 Gate Time	0 – 105 (0 – 105 (%))
00 7D	0aaa aaaa	Step31 Gate Time	0 – 105 (0 – 105 (%))
00 7E	0aaa aaaa	Step32 Gate Time	0 – 105 (0 – 105 (%))
00 7F	0000 0aaa	Step1 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 00	0000 0aaa	Step2 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 01	0000 0aaa	Step3 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 02	0000 0aaa	Step4 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 03	0000 0aaa	Step5 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 04	0000 0aaa	Step6 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 05	0000 0aaa	Step7 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 06	0000 0aaa	Step8 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 07	0000 0aaa	Step9 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 08	0000 0aaa	Step10 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 09	0000 0aaa	Step11 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 0A	0000 0aaa	Step12 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 0B	0000 0aaa	Step13 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 0C	0000 0aaa	Step14 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 0D	0000 0aaa	Step15 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 0E	0000 0aaa	Step16 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 0F	0000 0aaa	Step17 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 10	0000 0aaa	Step18 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 11	0000 0aaa	Step19 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 12	0000 0aaa	Step20 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 13	0000 0aaa	Step21 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 14	0000 0aaa	Step22 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 15	0000 0aaa	Step23 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 16	0000 0aaa	Step24 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 17	0000 0aaa	Step25 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 18	0000 0aaa	Step26 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 19	0000 0aaa	Step27 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 1A	0000 0aaa	Step28 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 1B	0000 0aaa	Step29 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 1C	0000 0aaa	Step30 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 1D	0000 0aaa	Step31 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
01 1E	0000 0aaa	Step32 Status	0 – 4 (NORMAL, TIE, SLIDE, REST, ACCENT)
Total size	00 00 01 1F		

Synth/Effect Parameter	Value	Disp
TYPE 0:Line In		
prm8 LEVEL	0 - 127	0 - 127
TYPE 1:Lead		
prm1 TONE	0 - 127	1 - 128
prm2 EFX_PRM1	0 - 127	0 - 127
prm3 EFX_PRM2	0 - 127	0 - 127
prm4 EFX_PRM3	0 - 127	0 - 127
prm5 CUTOFF	0 - 127	0 - 127
prm6 RESONANCE	0 - 127	0 - 127
prm7 DECAY	0 - 127	0 - 127
prm8 LEVEL	0 - 127	0 - 127
prm9 PAN	0 - 127	L64 - R63
prm10 LFO_RATE	0 - 127	0 - 120, 16n, 8n, 4n, 2n, 1-b, 2-b, 4-b
prm11 LFO_WAVE	0 - 3	TRI, SQR, SAW, S-H
prm12 OSC_WAVE	0 - 10	TRI, SAW, P10, P20, P30, P1S, P2S, P3S, P1D, P2D, P3D
prm13 OSC_VIB_DEPTH	0 - 127	0 - 127
prm14 FIL_TYPE	0 - 5	LP1, BP1, HP1, LP2, BP2, HP2
prm15 FIL_ATTACK	0 - 127	0 - 127
prm16 FIL_SUSTAIN	0 - 127	0 - 127
prm17 FIL_RELEASE	0 - 127	0 - 127
prm18 FIL_LFO_DEPTH	0 - 127	0 - 127
prm19 AMP_ENV_DEPTH	0 - 127	0 - 127
prm20 AMP_ATTACK	0 - 127	0 - 127
prm21 AMP_DECAY	0 - 127	0 - 127
prm22 AMP_SUSTAIN	0 - 127	0 - 127
prm23 AMP_RELEASE	0 - 127	0 - 127
prm24 AMP_LFO_DEPTH	0 - 127	0 - 127
prm25 EFX_TYPE	0 - 10	OD1, OD2, DS1, DS2, PH1, PH2, PH3, PH4, SL1, SL2, OFF
TYPE 2:Bass		
prm1 TONE	0 - 127	1 - 128
prm2 TUNE	0 - 127	-64 - 63
prm3 ENV_MOD	0 - 127	0 - 127
prm4 ACCENT	0 - 127	0 - 127
prm5 CUTOFF	0 - 127	0 - 127
prm6 RESONANCE	0 - 127	0 - 127
prm7 DECAY	0 - 127	0 - 127
prm8 LEVEL	0 - 127	0 - 127
prm9 PAN	0 - 127	L64 - R63
prm10 LFO_RATE	0 - 127	0 - 120, 16n, 8n, 4n, 2n, 1-b, 2-b, 4-b
prm11 LFO_WAVE	0 - 3	TRI, SQR, SAW, S-H
prm12 OSC_WAVE	0 - 10	TRI, SAW, P10, P20, P30, P1S, P2S, P3S, P1D, P2D, P3D
prm13 OSC_VIB_DEPTH	0 - 127	0 - 127
prm14 FIL_TYPE	0 - 5	LP1, BP1, HP1, LP2, BP2, HP2
prm15 FIL_ATTACK	0 - 127	0 - 127
prm16 FIL_SUSTAIN	0 - 127	0 - 127
prm17 FIL_RELEASE	0 - 127	0 - 127
prm18 FIL_LFO_DEPTH	0 - 127	0 - 127
prm19 AMP_ENV_DEPTH	0 - 127	0 - 127
prm20 AMP_ATTACK	0 - 127	0 - 127
prm21 AMP_DECAY	0 - 127	0 - 127
prm22 AMP_SUSTAIN	0 - 127	0 - 127
prm23 AMP_RELEASE	0 - 127	0 - 127
prm24 AMP_LFO_DEPTH	0 - 127	0 - 127
prm25 TB_MODE	0 - 1	OFF, ON
TYPE 3:Rhythm		
prm1 DRUM_KIT	0 - 9	1 - 10
prm5 BD_LEVEL	0 - 127	0 - 127
prm6 SD_LEVEL	0 - 127	0 - 127
prm7 HH_LEVEL	0 - 127	0 - 127
prm8 LEVEL	0 - 127	0 - 127
prm9 PAN	0 - 127	L64 - R63
TYPE 4:Filter---		
prm1 EFFECT_TYPE	0 - 7	F-1 - F-8
prm2 RATE	0 - 127	0 - 127
prm3 DEPTH	0 - 127	0 - 127
prm4 RESONANCE	0 - 127	0 - 127
TYPE 5:Isolator		
prm1 EFFECT_TYPE	0 - 6	I-1 - I-7
prm2 LOW	0 - 127	0 - 127
prm3 MIDDLE	0 - 127	0 - 127
prm4 HIGH	0 - 127	0 - 127
TYPE 6:Phaser		
prm1 EFFECT_TYPE	0 - 7	P-1 - P-8
prm2 RATE	0 - 127	0 - 127
prm3 DEPTH	0 - 127	0 - 127
prm4 RESONANCE	0 - 127	0 - 127
TYPE 7:Slicer		
prm1 EFFECT_TYPE	0 - 6	S-1 - S-7
prm2 RATE	0 - 127	0 - 127
prm3 GATE_TIME	0 - 127	0 - 127
prm4 PAN	0 - 127	L64 - R63

❍1-3.Process Patch

Offset Address	Description		
00 00 :	0aaa aaaa :	Process Patch :	0 – 127
Total size	00 00 10 00		

❍1-4.Memory Save Request

Offset Address	Description		
00 00	0000 0000	Memory Save Request	0
Total size	00 00 00 01		

* When MC-09 receive Memory Save Request after receiving System parameters, User parameters or Process Patch parameters, Parameter data is saved to a memory of MC-09.

6. Supplementary Material

■Calculating a checksum of an Exclusive message

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 checksum 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

Phrase Lab

Date : MAR. 28 , 2002

Model MC-09

MIDI Implementation Chart

Version : 1.00

Function...		Transmitted	Recognized	Remarks
Basic Channel	Default	1–16 *1	1–16	
	Changed	1–16	1–16	
Mode	Default	Mode 3	Mode 3	
	Messages	OMNI OFF, POLY	Mode 3	
	Altered	**********		
Note Number :		0–127	0–127	
	True Voice	**********	0–127	
Velocity	Note On	O	O	
	Note Off	X	X	
After Touch	Key's	X	X	
	Channel's	X	X	
Pitch Bend		X	O *1	
Control Change	0, 32	O	O	Bank select
	1	X	O *1	Modulation
	7	O	O *1	Volume
	10	O	O *1	Panpot
	65	O	O *1	Portament
	16–19	O	X	Step Sequencer
	16	O	O *1	General purpose controller (C1)
	17	O	O *1	General purpose controller (C2)
	18	O	O *1	General purpose controller (C3)
	74	O	O *1	General purpose controller (CUTOFF)
	71	O	O *1	General purpose controller (RESO)
	83	O	O *1	General purpose controller (DECAY)
Program Change		O	O *1	
	: True Number	**********	0–127	Program No. 1–128
System Exclusive		O	O *1	
System Common	: Song Position	X	X	
	: Song Select	X	X	
	: Tune Request	X	X	
System Real Time	: Clock	O	O *1 *2	
	: Commands	O	O *1 *3	
Aux Messages	: All Sound Off	X	X	
	: Reset All Controllers	X	O	
	: Local On/Off	X	X	
	: All Notes Off	X	O (123–127) *4	
	: Active Sensing	O	O	
	: System Reset	X	X	
Notes		* 1 O X is selectable. * 2 When Sync Mode is SLAVE. * 3 When Sync Mode is SLAVE or REMOTE. * 4 Mode messages (123–127) are stored/transmitted after All Note Off processing is performed.		

Mode 1 : OMNI ON, POLY
Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY
Mode 4 : OMNI OFF, MONO

O : Yes
X : No