MIDI Implementation

Model: FP-9 (DIGITAL PIANO)
Date: Jun.15, 1998
Version: 1.00

1. Data reception

■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)

* The velocity values of Note Off messages are ignored.

●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)

* Transpose or Octave Shift function does not affect the recognized note numbers.

●Control Change

* The value specified by a Control Change message will not be reset even by a Program Change, etc.

○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 mm=MSB, ll=LSB

* The value for the MIDI channel number in the data entry area is the same as that for the MIDI transmit and receive channel (upper part).
* Signals received via any MIDI channel numbers other than the above have no effect.

○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)

* Volume messages are used to adjust the volume balance of each Part.
* Received volume messages affect received note event levels (Rx ch/Part), and cannot affect internal keyboard notes.

○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)

* These message can affect only MIDI notes.

○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)

* Hold 1 (damper) is not a switch (ON/OFF) but a continuously valiable controller.
* These message can affect only MIDI notes.

○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

* Sostenuto is an ON/OFF switch.
* These messages can affect only MIDI notes.

○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)

* Soft is not a switch (ON/OFF) but a continuously valiable controller.
* These messages can affect only MIDI notes.

○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=Control value: 00H–7FH (0–127) 0–63 = OFF 64–127 = ON

* Reverb message reception takes place on channels 1–16. Reverb can be applied individually, on a per channel basis.
* Upon reception of reverb messages, the relevant channel's part, and what is played on the keyboard will have the effect applied to them.

○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=Control value: 00H–7FH (0–127) 0–63 = OFF 64–127 = ON

* Chorus message reception takes place on channels 1–16. Chorus can be applied individually, on a per channel basis.
* Upon reception of chorus messages, the relevant channel's part, and what is played on the keyboard will have the effect applied to them.

○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=MSB of the parameter number specified by RPN
ll=LSB of the parameter number specified by RPN

* The value specified by RPN will not be reset even by messages such as Program Change or Reset All Controllers.
* The value for the RPN MIDI channel number is the same as that for the MIDI transmit and receive channel (upper part).
* Signals received via any MIDI channel numbers other than the above have no effect.

** 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.

On the FP-9, RPN can be used to modify the following parameters.

RPN	Data entry	
MSB LSB	MSB LSB	Explanation
00H 01H	mmH llH	Master Fine Tuning mm, ll: 00 00H–40 00H–7F 7FH (-100–0–+99.9 cents)
7FH 7FH	— —	RPN null Set condition where RPN is unspecified. 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–17H (prog.1–24)

Received program change message are assigned as follows.

program number	tone
1	Full Grand 1
2	Full Grand 2
3	Honky-Tonk
4	Pop Piano
5	Classic Piano
6	Rock Piano
7	Stage Rhodes
8	SA Rhodes
9	FM E.Piano
10	Harpsichord
11	Clav 1
12	Clav 2
13	Vibraphone
14	Marimba
15	Glockenspiel
16	Ac.Bass
17	Finger Bass
18	Voice Bass
19	Orch. Strings
20	Synth Strings 1
21	Synth Strings 2
22	Jazz Scat
23	Choir 1
24	Choir 2

* Any other program number will be ignored.
* After a Program Change message is received, the sound will change beginning with the next Note-on. Voices already sounding when the Program Change message was received will not be affected.
* Received program change messages through channel 1-16 affect each part individually.
* When the program change is received, the tone of this channel part and the tone selected by the panel shall be changed to the designated tone.
* Received program change messages affect part on the corresponding channel and internal keyboard notes.

■Channel Mode messages

●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
Expression	127 (max)
Hold 1	0 (off)
Sostenuto	0 (off)
Soft	0 (off)

●Local Control (Controller number 122)

Status	2nd byte	3rd byte
BnH	7AH	vvH

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

●All Note Off (Controller number 123)

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

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

* When All Note 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 Note Off is received. *1

●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 Note Off is received. *1

●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–7FH (0–127)

* The same processing will be carried out as when All Note Off is received. *1

●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 Note Off is received. *1

Note:
*1 The Mode doesn't change (OMNI OFF, POLY remains).

■System Realtime messages

●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 380 ms, the same processing will be carried out as when All Notes Off and Reset All Controllers are received, and message interval monitoring will be halted.

■System Exclusive messages

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 FP-9 are; Data Set (DT1), and Universal Non-realtime System Exclusive messages (Identity request).

●Universal Non-realtime System Exclusive messages

○Identity 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	Sub ID#1	(General Information)

01H	Sub ID#2	(Identity Request)
F7H	EOX	(End Of Exclusive)

* When Identity Request is received, Identity Reply message will be transmitted.
* Even if the Device ID is 7FH (Broadcast), Identity Reply message will be transmitted.
* UNIT NUMBER is always the same as the current MIDI Rx,Tx channel (Upper Part).

●Data transmission

FP-9 can transmit and receive the various parameters using System Exclusive messages.
The exclusive message of FP-9 data has a model ID of 1AH, and device ID is defined by MIDI UNIT NUMBER. UNIT NUMBER is always the same as the current MIDI Rx,Tx channel (Upper Part).
UNIT NUMBER is always the same as the current MIDI Rx,Tx channel(Upper Part).

○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, 1AH, 12H, aaH, bbH, ccH, sum	F7H

Byte	Explanation	
F0H	Exclusive status	
41H	ID number	(Roland)
dev	Device ID	(dev: UNIT#-1)
1AH	Model ID	(FP-9)
12H	Command ID	(DT1)
aaH	Address MSB:	upper byte of the starting address of the trans-
mitted data		
bbH	Address LSB:	lower byte of the starting address of the trans-
mitted data		
ccH	Data:	the actual data to be transmitted.
sum	Checksum	
F7H	EOX	(End Of Exclusive)

* If "Data Set 1" is transmitted successively, there must be an interval of at least 20 ms between packets.
* Regarding the address please refer to section 3 (Parameter Address Map).
* Regarding the checksum please refer to section 4 (Supplementary material).

2. Data transmission

■Channel Voice messages

●Note off

Status	2nd byte	3rd byte
8nH	kkH	40H

n=MIDI channel number:	0H–FH (ch.1–ch.16)
kk=note number:	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)

* Note number's range can be changed with Key Transpose or Octave Shift.

●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:	00H, 00H–7FH, 7FH (bank.1–bank.16384)
mm=MSB, ll=LSB	

○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	
mm=MSB, ll=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:	30H–7FH (48–127)

* Transmitted when the volume balance is changed.

○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)

* Transmitted when pedals work "Expression Pedal" is selected.

○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)

* Continuous value is transmitted.

○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=OFF 127=ON

* Transmitted when pedals work "Sostenuto Pedal" is selected.
* ON or OFF is transmitted.

○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)

* Transmitted when pedals work "Soft Pedal" is selected.
* Continuous value is transmitted.

○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=Control value:	00H, 7FH (0, 127)	0=OFF 127=ON

○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=Control value:	00H, 7FH (0, 127)	0=OFF 127=ON

○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=MSB of the parameter number specified by RPN (MSB)	
ll=LSB of the parameter number specified by RPN (LSB)	

** RPN **

FP-9 can transmit Master fine tuning (RPN #1) and RPN null. After sending the master fine tune, immediately the RPN Null shall be sent.

RPN	Data entry	
MSB LSB	MSB LSB	Explanation
00H 01H	mmH llH	Master Fine Tuning mm, ll: 20 00H–40 00H–5F 7FH (-50–0–+49.9 cents)
7FH 7FH	— —	RPN null

●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)

* For more on Program Change numbers and tones, please see "1. Data reception '● Program Change.'"

■System Realtime messages

●Active sensing

Status
FEH

* Transmitted constantly at intervals of approximately 240ms.

■System Exclusive messages

FP-9 can transmit and receive the various parameters using System Exclusive messages. The exclusive message of FP-9 data has a model ID of 1AH, and device ID is defined by MIDI UNIT NUMBER. UNIT NUMBER is always the same as the current MIDI Rx, Tx channel (Upper Part).

The System Exclusive Messages transmitted by the FP-9 are; Data Set (DT1), and Universal Non-realtime System Exclusive messages (Identity Reply).

●Universal Non-realtime System Exclusive Messages

○Identity Reply

Status	Data byte	Status
F0H	7EH, dev, 06H, 02H, 41H, 1AH, 00H, 00H, 04H, 00H, 01H, 00H, 00H	F7H

Byte	Explanation	
F0H	Exclusive status	
7EH	ID number	(Universal Non-realtime Message)
dev	Device ID	(dev:UNIT#-1)
06H	Sub ID#1	(General Information)
02H	Sub ID#2	(Identity Reply)
41H	Manufacture's ID	(Roland)
1AH, 00H	Device family code	
00H, 04H	Device family number code	
00H, 01H, 00H, 00H	Software revision level	
F7H	EOX	(End Of Exclusive)

* When Identity Request is received, Identity Reply message will be transmitted.
* When Identity Request is received with the Broadcast, Identity Reply message will be transmitted by MIDI UNIT NUMBER.

●Data transmission

○Data set 1 DT1

Status	Data byte	Status
F0H	41H, dev, 1AH, 12H, aaH, bbH, ddH, sum	F7H

Byte	Explanation	
F0H	Exclusive status	
41H	ID number	(Roland)
dev	Device ID	(dev: UNIT#-1)
1AH	Model ID	(FP-9)
12H	Command ID	(DT1)
aaH	Address MSB:	upper byte of the starting address of the transmitted data
bbH	Address LSB:	lower byte of the starting address of the transmitted data
ddH	Data:	the actual data to be transmitted.
sum	Checksum	
F7H	EOX	(End Of Exclusive)

* Regarding the address please refer to section 3 (Parameter Address Map).
* Regarding the checksum please refer to section 4 (Supplementary material).

3. Parameter address map FP-9 (Model ID = 1AH)

■Parameter base address

Address and data descriptions are all in hexadecimal format.

address(H)	data(H)	Description
01 01	00-7F	Chorus Type
		00H - 0FH : Type 1
		10H - 1FH : Type 2
		20H - 2FH : Type 3
		30H - 3FH : Type 4
		40H - 4FH : Type 5
		50H - 5FH : Type 6
		60H - 6FH : Type 7
		70H - 7FH : Type 8
01 03	00-7F	Reverb Type
		00H - 0FH : Type 1
		10H - 1FH : Type 2
		20H - 2FH : Type 3
		30H - 3FH : Type 4
		40H - 4FH : Type 5
		50H - 5FH : Type 6
		60H - 6FH : Type 7
		70H - 7FH : Type 8
01 06	00-7F	Resonance Type
		00H - 0FH : OFF
		10H - 1FH : Type 1
		20H - 2FH : Type 2
		30H - 3FH : Type 3
		40H - 4FH : Type 4
		50H - 5FH : Type 5
		60H - 6FH : Type 6
		70H - 7FH : Type 7

4. Supplementary material

●Decimal/Hexadecimal table

In MIDI documentation, data values and addresses of exclusive messages etc. are expressed as hexadecimal values for each 7 bits.
The following table shows how these correspond to decimal numbers.

* Hexadecimal values are indicated by a following 'H'.

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	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

D:decimal
H:hexadecimal

* Decimal values such as MIDI channel, bank select, and program change are listed as one(1) 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 x 128 + bb.

<Example 1> What is the decimal expression of 5AH?
From the above table, 5AH = 90

<Example 2> What is the decimal expression of the value 12 34H given as hexadecimal for each 7 bits?
From the above table, 12H = 18 and 34H = 52
Thus, 18 x 128 + 52 = 2356

●Examples of actual MIDI messages

<Example 1> 91 3E 5F
9n is the Note on status, and 'n' is the MIDI channel number. Since 1H = 1, 3EH = 62, and 5FH = 95, this is a Note on message with MIDI CH = 2, note number 62 (note name D4), and velocity 95.

<Example 2> C0 08
CnH is the Program Change status, and 'n' is the MIDI channel number. Since 0H = 0 and 08H = 8, this is a Program Change message with MIDI CH = 1, program number 9 (FM E.Piano).

<Example 3> B0 64 01 65 00 06 40 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.

B0 64 01	MIDI ch.1, lower byte of RPN parameter number: 01H
(B0) 65 00	MIDI ch.1, upper byte of RPN parameter number: 00H
(B0) 06 40	MIDI ch.1, upper byte of parameter value: 40H
(B0) 26 00	MIDI ch.1, lower byte of parameter value: 00H
(B0) 64 7F	MIDI ch.1, lower byte of RPN parameter number: 7FH
(B0) 65 7F	MIDI ch.1, upper byte of RPN parameter number: 7FH

In other words, the above messages specify a value of 40 00H (440.0[Hz]) for RPN parameter number 00 01H (Master Fine Tuning) on MIDI channel 1, and then set the RPN parameter number to 7F 7FH (RPN null).
Once the parameter number has been specified for RPN, 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 (B0) 64 7F (B0) 65 7F at the end.

* The RPN MIDI channel number has the same value as the MIDI transmit and receive channels (upper part) (with 1 selected as the MIDI channel in the above example).

It is not desirable for performance data (such as Standard MIDI File data) to contain many events with running status as given in <Example 3>. 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 source will then misinterpret the data. Take care to give each event its own status.
It is also necessary that the RPN 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

●Examples of system exclusive messages and calculating the checksum

Roland System Exclusive messages (DT1) are transmitted with a checksum at the end of the data (before F7) to check that the data was received correctly. The value of the checksum is determined by the address and data of the exclusive message.

○How to calculate the checksum ("H" indicates Hexadecimal.)

The checksum consists of a value whose lower 7 bits are 0 when the address, data and checksum itself are added.
The following formula shows how to calculate the checksum when the exclusive message to be transmitted has an address of aa bbH, and data of ccH.

aa + bb + cc = total
total ÷ 128 = quotient ... remainder
128 - remainder = checksum
However, if the remainder is 0, a checksum of 0 results.

<Example> Set "Reverb Type" to "Type 4"

According to the Parameter Address Map, the Address of Reverb Type is 01 03H, and the Value corresponding to Type 4 is 30H. So, the message should be :

F0	41	00	1A	12	01 03	30	??	F7
(1)	(2)	(3)	(4)	(5)	address	data	checksum	(6)

(1) Exclusive Status
(2) ID (Roland)
(3) Device ID (UNIT#-1)
(4) Model ID (FP-9)
(5) Command ID (DT1)
(6) End of Exclusive

* UNIT# is always the same as the current basic channel. In this example, the MIDI receive channel is 1.

The Checksum is:
01H + 03H + 30H = 1 + 3 + 48 = 52 (sum)
52 (sum) / 128 = 0 (quotient) ... 52 (remainder)
checksum = 128 - 52 (remainder) = 76 = 4CH

Therefore, the message to send is: F0 41 00 1A 12 01 03 30 4C F7

●About tuning

In MIDI, FP-9 is tuned by sending RPN #1 (Master Fine Tuning) to the appropriate MIDI channel.
RPN #1 allows tuning to be specified in steps of approximately 0.012 cents (to be precise, 100/8192 cent). One cent is 1/100th of a semitone.
The values of RPN #1 (Master Fine Tuning) are added together to determine the actual pitch sounded.

Frequently used tuning values are given in the following table for your reference. Values are in hexadecimal (decimal in parentheses).

Hz at A4	cent	RPN #1
445.0	+19.56	4C 43 (+1603)
444.0	+15.67	4A 03 (+1283)
443.0	+11.76	47 44 (+ 964)
442.0	+ 7.85	45 03 (+ 643)
441.0	+ 3.93	42 42 (+ 322)
440.0	0	40 00 (0)
439.0	- 3.94	3D 3D (- 323)
438.0	- 7.89	3A 7A (- 646)

<Example> Set the tuning of FP-9 to A4 = 442.0 Hz
Send RPN#1 to MIDI Tx,Rx channel. From the above table, the value is 45 03H.

B0 64 01	MIDI ch.1, lower byte of RPN parameter number: 01H
(B0) 65 00	MIDI ch.1, upper byte of RPN parameter number: 00H
(B0) 06 45	MIDI ch.1, upper byte of parameter value: 45H
(B0) 26 03	MIDI ch.1, lower byte of parameter value: 03H
(B0) 64 7F	MIDI ch.1, lower byte of RPN parameter number: 7FH
(B0) 65 7F	MIDI ch.1, upper byte of RPN parameter number: 7FH

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