MIDI Implementation

Model: **JUNO-DS61/DS88**
Date: **Sep 15, 2015**
Version: **1.00**

1. Data Reception (Sound Source Section)

● Channel Voice Messages

* Not received in Performance mode when the Receive Switch parameter (PERFORM EDIT:LEVEL/CH:RxSw or PART EDIT:LEVEL/CH:Rx Switch) is OFF.

● Note off

Status	2nd byte	3rd byte	
8nH	kkH	vvH	
9nH	kkH	00H	
n = MIDI channel number:			0H - FH (ch.1 - 16)
kk = note number:			00H - 7FH (0 - 127)
vv = note off velocity:			00H - 7FH (0 - 127)

* Not received when the Tone Env Mode parameter (PATCH EDIT:CTRL:Env Mode or DRUM KIT EDIT:COMMON:Tone Env Mode) is NO-SUS.

● Note on

Status	2nd byte	3rd byte	
9nH	kkH	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
kk = note number:			00H - 7FH (0 - 127)
vv = note on velocity:			01H - 7FH (1 - 127)

● Polyphonic Key Pressure

Status	2nd byte	3rd byte	
AnH	kkH	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
kk = note number:			00H - 7FH (0 - 127)
vv = Polyphonic Key Pressure:			00H - 7FH (0 - 127)

* Not received in Performance mode when the Receive Polyphonic Key Pressure parameter (PERFORM EDIT:MIDI:PA or PART EDIT:MIDI:PAFT) is OFF.

● Control Change

* If the corresponding Controller number is selected for the Matrix Control 1-4 Source parameter (PATCH EDIT:MTRX CTRL1-4:Control 1-4 Source), the corresponding effect will occur.
* If a Controller number that corresponds to the System Control 1-4 Source parameter (SYSTEM:CONTROL:Sys Ctrl 1-4 Source) is selected, the specified effect will apply if the Matrix Control 1-4 Source parameter (PATCH EDIT:MTRX CTRL1-4:Control 1-4 Source) is set to SYS CTRL1, SYS CTRL2, SYS CTRL3 or SYS CTRL4.

○ 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)

* Not received in Performance mode when the Receive Bank Select parameter (PERFORM EDIT:MIDI:BS or PART EDIT:MIDI:BS) is OFF.

The Performances, Patterns, Patches, and Drum Kits corresponding to each Bank Select are as follows.

BANK SELECT MSB	BANK SELECT LSB	PROGRAM NUMBER	GROUP	NUMBER
000		001 - 128	GM Patch	0001 - 0256
:				
063		001 - 128	GM Patch	0001 - 0256
085	000	001 - 128	User Performance	001 - 128
	001	001 - 128	User Pattern	001 - 128
	064	001 - 064	Preset Performance	001 - 064
	065	001 - 032	Preset Pattern	001 - 032
086	000	001 - 008	User Drum	R501 - R508
	064	001 - 021	Preset Drum	0001 - 0021
	065	001 - 009	DS Drum	0001 - 0009

087	000	001 - 128	User Patch	0501 - 0628
	001	001 - 128	User Patch	0629 - 0756
	064	001 - 128	Preset Patch	0001 - 0128
	065	001 - 128	Preset Patch	0129 - 0256
	:		:	:
	072	001 - 064	Preset patch	1025 - 1088
	073	001 - 128	DS patch	0001 - 0128
	074	001 - 056	DS patch	0129 - 0184
092	000 -	001 -	Expansion Drum	0001 -
093	000 -	001 -	Expansion Patch	0001 -
120		001 - 057	GM Drum	0001 - 0009
121	000 -	001 - 128	GM Patch	0001 - 0256

The Expansion Sounds corresponding to each Bank Select are as follows.

BANK SELECT MSB	LSB	PROGRAM NUMBER	GROUP	NUMBER
093	001	001 - 050	Expansion Patch (EXP04)	0001 - 0050
093	002	001 - 128	Expansion Patch (EXP06)	0001 - 0128
092	002	001 - 012	Expansion Drum (EXP06)	0001 - 0012
093	003	001 - 128	Expansion Patch (EXP08)	0001 - 0128
093	007	001 - 128	Expansion Patch (EXP10)	0001 - 0128
	:	:		:
	010	001 - 065		0385 - 0449
092	007	001 - 005	Expansion Drum (EXP10)	0001 - 0005
093	011	001 - 128	Expansion Patch (EXP02)	0001 - 0128
	:	:		:
	014	001 - 022		0385 - 0406
093	015	001 - 128	Expansion Patch (EXP01)	0001 - 0128
	:	:		:
	017	001 - 105		0257 - 0361
092	015	001 - 016	Expansion Drum (EXP01)	0001 - 0016
093	019	001 - 128	Expansion Patch (EXP03)	0001 - 0128
	:	:		:
	022	001 - 023		0385 - 0407
092	019	001 - 010	Expansion Drum (EXP03)	0001 - 0010
093	023	001 - 100	Expansion Patch (EXP07)	0001 - 0100
093	024	001 - 042	Expansion Patch (EXP09)	0001 - 0042
093	026	001 - 050	Expansion Patch (EXP05)	0001 - 0050

○ Modulation (Controller number 1)

Status	2nd byte	3rd byte	
BnH	01H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Modulation depth:			00H - 7FH (0 - 127)

* Not received in Performance mode when the Receive Modulation parameter (PERFORM EDIT:MIDI:MD or PART EDIT:MIDI:MOD) is OFF.

○ Breath type (Controller number 2)

Status	2nd byte	3rd byte	
BnH	02H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Control value:			00H - 7FH (0 - 127)

○ Foot type (Controller number 4)

Status	2nd byte	3rd byte	
BnH	04H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Control value:			00H - 7FH (0 - 127)

○ Portamento Time (Controller number 5)

Status	2nd byte	3rd byte	
BnH	05H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Portamento Time:			00H - 7FH (0 - 127)

* In Performance mode, the Part Portamento Time parameter (PERFORM EDIT:PITCH:Time or PART EDIT:PITCH:Porta Time) will change.

○ 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 - 16)
mm, ll = the value of the parameter specified by RPN/NRPN
mm = MSB, ll = LSB

○ Volume (Controller number 7)

Status	2nd byte	3rd byte
BnH	07H	vvH

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

* Not received in Performance mode when the Receive Volume parameter (PERFORM EDIT:MIDI:VO or PART EDIT:MIDI:VOL) is OFF.
* In Performance mode, the Part Level parameter (PERFORM EDIT:LEVEL/CH:Level or PART EDIT:LEVEL/CH:Level) will change.

○ Panpot (Controller number 10)

Status	2nd byte	3rd byte
BnH	0AH	vvH

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

* Not received in Performance mode when the Receive Pan parameter (PERFORM EDIT:MIDI:PN or PART EDIT:MIDI:PAN) is OFF.
* In Performance mode, the Part Pan parameter (PERFORM EDIT:LEVEL/CH:Pan or PART EDIT:LEVEL/CH:Pan) will change.

○ 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)

* Not received when the Tone Receive Expression parameter (PATCH EDIT:CTRL:Rx Expression or DRUM KIT EDIT:COMMON:Tone Rx Expression) is OFF.
* Not received in Performance mode when the Receive Expression parameter (PERFORM EDIT:MIDI:EX or PART EDIT:MIDI:EXP) is OFF.

○ Hold 1 (Controller number 64)

Status	2nd byte	3rd byte
BnH	40H	vvH

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

* Not received when the Tone Receive Hold-1 parameter (PATCH EDIT:CTRL:Rx Hold-1 or DRUM KIT EDIT:COMMON:Tone Rx Hold-1) is OFF.
* Not received in Performance mode when the Receive Hold-1 parameter (PERFORM EDIT:MIDI:HD or PART EDIT:MIDI:HOLD) is OFF.
* When the Tone Redamper Switch parameter (PATCH EDIT:CTRL:Redamper Sw) is turned ON, 128 discrete steps are recognized for the value.

○ Portamento (Controller number 65)

Status	2nd byte	3rd byte
BnH	41H	vvH

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

* In Performance mode, the Part Portamento Switch parameter (PERFORM EDIT:PITCH:Porta or PART EDIT:PITCH:Porta Switch) will change.

○ Sostenuto (Controller number 66)

Status	2nd byte	3rd byte
BnH	42H	vvH

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

○ Soft (Controller number 67)

Status	2nd byte	3rd byte
BnH	43H	vvH

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

○ Legato Foot Switch (Controller number 68)

Status	2nd byte	3rd byte
BnH	44H	vvH

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

* In Performance mode, the Part Legato Switch parameter (PERFORM EDIT:PITCH:Legt or PART EDIT:PITCH:Legato Switch) will change.

○ Hold-2 (Controller number 69)

Status	2nd byte	3rd byte
BnH	45H	vvH

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

* A hold movement isn't done.

○ Resonance (Controller number 71)

Status	2nd byte	3rd byte
BnH	47H	vvH

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

* In Performance mode, the Part Resonance Offset parameter (PERFORM EDIT:OFFSET:Reso or PART EDIT:OFFSET:Reso Offset) will change.

○ Release Time (Controller number 72)

Status	2nd byte	3rd byte
BnH	48H	vvH

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

* In Performance mode, the Part Release Time Offset parameter (PERFORM EDIT:OFFSET:Release or PART EDIT:OFFSET:Release Offset) will change.

○ Attack time (Controller number 73)

Status	2nd byte	3rd byte
BnH	49H	vvH

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

* In Performance mode, the Part Attack Time Offset parameter (PERFORM EDIT:OFFSET:Attack or PART EDIT:OFFSET:Attack Offset) will change.

○ Cutoff (Controller number 74)

Status	2nd byte	3rd byte
BnH	4AH	vvH

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

* In Performance mode, the Part Cutoff Offset parameter (PERFORM EDIT:OFFSET:Cutoff or PART EDIT:OFFSET:Cutoff Offset) will change.

○ Decay Time (Controller number 75)

Status	2nd byte	3rd byte
BnH	4BH	vvH

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

* In Performance mode, the Part Decay Time Offset parameter (PERFORM EDIT:OFFSET:Decay or PART EDIT:OFFSET:Decay Offset) will change.

○ Vibrato Rate (Controller number 76)

Status	2nd byte	3rd byte
BnH	4CH	vvH

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

* In Performance mode, the Part Vibrato Rate parameter (PERFORM EDIT:VIBRATO:Rate or PART EDIT:VIBRATO:Vibrato Rate) will change.

○ Vibrato Depth (Controller number 77)

Status	2nd byte	3rd byte
BnH	4DH	vvH

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

* In Performance mode, the Part Vibrato Depth parameter (PERFORM EDIT:VIBRATO:Depth or PART EDIT:VIBRATO:Vibrato Depth) will change.

○ Vibrato Delay (Controller number 78)

Status	2nd byte	3rd byte
BnH	4EH	vvH

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

* In Performance mode, the Part Vibrato Delay parameter (PERFORM EDIT:VIBRATO:Delay or PART EDIT:VIBRATO:Vibrato Delay) will change.

○ General Purpose Controller 5 (Controller number 80)

Status	2nd byte	3rd byte
BnH	50H	vvH

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

* The Tone Level parameter (PATCH EDIT:TVA:Tone Level or SAMPLE EDIT:TVA:Tone Level) of Tone 1 will change.

○ General Purpose Controller 6 (Controller number 81)

Status	2nd byte	3rd byte
BnH	51H	vvH

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

* The Tone Level parameter (PATCH EDIT:TVA:Tone Level) of Tone 2 will change.

○ General Purpose Controller 7 (Controller number 82)

Status	2nd byte	3rd byte
BnH	52H	vvH

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

* The Tone Level parameter (PATCH EDIT:TVA:Tone Level) of Tone 3 will change.

○ General Purpose Controller 8 (Controller number 83)

Status	2nd byte	3rd byte
BnH	53H	vvH

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

* The Tone Level parameter (PATCH EDIT:TVA:Tone Level) of Tone 4 will change.

○ Portamento control (Controller number 84)

Status	2nd byte	3rd byte
BnH	54H	kkH

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

* A Note-on received immediately after a Portamento Control message will change continuously in pitch, starting from the pitch of the Source Note Number.
* If a voice is already sounding for a note number identical to the Source Note Number, this voice will continue sounding (i.e., legato) and will, when the next Note-on is received, smoothly change to the pitch of that Note-on.
* The rate of the pitch change caused by Portamento Control is determined by the Portamento Time value.

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

Status	2nd byte	3rd byte
BnH	5BH	vvH

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

* In Performance mode, the Part Reverb Send Level parameter (PERFORM EDIT:OUTPUT:Rev or PART EDIT:OUTPUT:Rev Send Level) will change.

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

Status	2nd byte	3rd byte
BnH	5DH	vvH

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

* In Performance mode, the Part Chorus Send Level parameter (PERFORM EDIT:OUTPUT:Cho or PART EDIT:OUTPUT:Cho Send Level) will change.

○ 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 - 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 MSB, LSB	Data entry MSB, LSB	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.

* In Performance mode, the Part Pitch Bend Range parameter (PERFORM EDIT:PITCH:Bend or PART EDIT:PITCH:Bend Range) will change.

00H, 01H	mmH, llH	Channel Fine Tuning mm, ll: 20 00H - 40 00H - 60 00H (-4096 x 100 / 8192 - 0 - +4096 x 100 / 8192 cent)

* In Performance mode, the Part Fine Tune parameter (PERFORM EDIT:PITCH:Fine or PART EDIT:PITCH:Fine Tune) will change.

00H, 02H	mmH, llH	Channel Coarse Tuning mm: 10H - 40H - 70H (-48 - 0 - +48 semitones) ll: ignored (processed as 00H)

* In Performance mode, the Part Coarse Tune parameter (PERFORM EDIT:PITCH:Crs or PART EDIT:PITCH:Coarse Tune) will change.

00H, 05H	mmH, llH	Modulation Depth Range mm, ll: 00 00H - 00 06H (0 - 16384 x 600 / 16384 cent)

* Not received in Patch mode.

7FH, 7FH	---, --- 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 - 16)
pp = Program number:		00H - 7FH (prog.1 - prog.128)

* Not received in Performance mode when the Receive Program Change parameter (PERFORM EDIT:MIDI:PC or PART EDIT:MIDI:PC) 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 in Performance mode when the Receive Channel Pressure parameter (PERFORM EDIT:MIDI:CA or PART EDIT:MIDI:CAFT) 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)

* Not received when the Tone Receive Bender parameter (PATCH EDIT:CTRL:Rx Bender) is OFF.
* Not received in Performance mode when the Receive Bender parameter (PERFORM EDIT:MIDI:PB or PART EDIT:MIDI:BEND) is OFF.

■ Channel Mode Messages

* Not received in Performance mode when the Receive Switch parameter (PERFORM EDIT:LEVEL/CH:RxSw or PART EDIT:LEVEL/CH:Rx Switch) is OFF.

● All Sounds Off (Controller number 120)

Status	2nd byte	3rd byte
BnH	78H	00H
n = MIDI channel number:		0H - FH (ch.1 - 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 - 16)

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

Controller	Reset value
Pitch Bend Change	+/-0 (center)
Polyphonic Key Pressure	0 (off)

Channel Pressure 0 (off)
Modulation 0 (off)
Breath Type 0 (min)
Expression 127 (max)
However the controller will be at minimum.
Hold 1 0 (off)
Sostenuto 0 (off)
RPN unset; previously set data will not change
NRPN unset; previously set data will not change

● All Notes Off (Controller number 123)

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

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

* The same processing will be carried out as when All Notes Off is received.
* In Performance mode, the Part Mono/Poly parameter (PERFORM EDIT:PITCH:Mono or PART EDIT:PITCH:Mono/Poly) will change.

● POLY (Controller number 127)

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

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

* The same processing will be carried out as when All Notes Off is received.
* In Performance mode, the Part Mono/Poly parameter (PERFORM EDIT:PITCH:Mono or PART EDIT:PITCH:Mono/Poly) will change.

■ 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 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 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

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: 10H, 7FH)
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 (p. 16) will be transmitted.

○ GM1 System On

Status	Data byte	Status
F0H	7EH, 7FH, 09H, 01H	F7H

Byte	Explanation
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)

* When this messages is received, this instrument will turn to the Performance mode.

○ GM2 System On

Status	Data byte	Status
F0H	7EH 7FH 09H 03H	F7H

Byte	Explanation
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)

* When this messages is received, this instrument will turn to the Performance mode.

○ GM System Off

Status	Data byte	Status
F0H	7EH, 7F, 09H, 02H	F7H

Byte	Explanation
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)
F7H	EOX (End Of Exclusive)

* When this messages is received, this instrument will return to the Performance mode.

● Universal Realtime System Exclusive Messages

○ Master Volume

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 01H, llH, mmH	F7H

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
04H	Sub ID#1 (Device Control)
01H	Sub ID#2 (Master Volume)
llH	Master Volume lower byte
mmH	Master Volume upper byte
F7H	EOX (End Of Exclusive)

* The lower byte (llH) of Master Volume will be handled as 00H.
* The Master Level parameter (SYSTEM:SOUND:Master Level) will change.

○ Master Fine Tuning

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 03H, llH, mmH	F7H

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
04H	Sub ID#1 (Device Control)
03H	Sub ID#2 (Master Fine Tuning)
llH	Master Fine Tuning LSB
mmH	Master Fine Tuning MSB
F7H	EOX (End Of Exclusive)

mm, ll: 00 00H - 40 00H - 7F 7FH (-100 - 0 - +99.9 [cents])

* The Master Tune parameter (SYSTEM:SOUND:Master Tune) will change.

○ Master Coarse Tuning

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 04H, llH, mmH	F7

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
04H	Sub ID#1 (Device Control)
04H	Sub ID#2 (Master Coarse Tuning)
llH	Master Coarse Tuning LSB
mmH	Master Coarse Tuning MSB
F7H	EOX (End Of Exclusive)

llH: ignored (processed as 00H)
mmH: 28H - 40H - 58H (-24 - 0 - +24 [semitones])

* The Master Key Shift parameter (SYSTEM:SOUND:Master Key Shift) will change.

● Global Parameter Control

* Not received in Patch mode.

○ Reverb Parameters

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 05H, 01H, 01H, 01H, 01H, 01H, ppH, vvH	F7H

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
04H	Sub ID#1 (Device Control)
05H	Sub ID#2 (Global Parameter Control)
01H	Slot path length
01H	Parameter ID width
01H	Value width
01H	Slot path MSB
01H	Slot path LSB (Effect 0101: Reverb)
ppH	Parameter to be controlled.
vvH	Value for the parameter.
	pp=0 Reverb Type
	vv=00H Small Room
	vv=01H Medium Room
	vv=02H Large Room
	vv=03H Medium Hall
	vv=04H Large Hall
	vv=08H Plate
	pp=1 Reverb Time
	vv=00H - 7FH 0 - 127
F7H	EOX (End Of Exclusive)

○ Chorus Parameters

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 05H, 01H, 01H, 01H, 01H, 02H, ppH, vvH	F7H

Byte	Explanation	
F0H	Exclusive status	
7FH	ID number (universal realtime message)	
7FH	Device ID (Broadcast)	
04H	Sub ID#1 (Device Control)	
05H	Sub ID#2 (Global Parameter Control)	
01H	Slot path length	
01H	Parameter ID width	
01H	Value width	
01H	Slot path MSB	
02H	Slot path LSB (Effect 0102: Chorus)	
ppH	Parameter to be controlled.	
vvH	Value for the parameter.	
	pp=0	Chorus Type
	vv=0	Chorus1
	vv=1	Chorus2
	vv=2	Chorus3
	vv=3	Chorus4
	vv=4	FB Chorus
	vv=5	Flanger
	pp=1	Mod Rate
	vv=00H - 7FH	0 - 127
	pp=2	Mod Depth
	vv=00H - 7FH	0 - 127
	pp=3	Feedback
	vv=00H - 7FH	0 - 127
	pp=4	Send To Reverb
	vv=00H - 7FH	0 - 127
F7H	EOX (End Of Exclusive)	

○ Channel Pressure

Status	Data byte	Status
F0H	7FH, 7FH, 09H, 01H, 0nH, ppH, rrH	F7H

Byte	Explanation	
F0H	Exclusive status	
7FH	ID number (universal realtime message)	
7FH	Device ID (Broadcast)	
09H	Sub ID#1 (Controller Destination Setting)	
01H	Sub ID#2 (Channel Pressure)	
0nH	MIDI Channel (00 - 0F)	
ppH	Controlled parameter	
rrH	Controlled range	
	pp=0	Pitch Control
	rr=28H - 58H	-24 - +24 [semitones]
	pp=1	Filter Cutoff Control
	rr=00H - 7FH	-9600 - +9450 [cents]
	pp=2	Amplitude Control
	rr=00H - 7FH	0 - 200%
	pp=3	LFO Pitch Depth
	rr=00H - 7FH	0 - 600 [cents]
	pp=4	LFO Filter Depth
	rr=00H - 7FH	0 - 2400 [cents]
	pp=5	LFO Amplitude Depth
	rr=00H - 7FH	0 - 100%
F7H	EOX (End Of Exclusive)	

○ Controller

Status	Data byte	Status
F0H	7FH, 7FH, 09H, 03H, 0nH, ccH, ppH, rrH	F7H

Byte	Explanation	
F0H	Exclusive status	
7FH	ID number (universal realtime message)	
7FH	Device ID (Broadcast)	
09H	Sub ID#1 (Controller Destination Setting)	
03H	Sub ID#2 (Control Change)	
0nH	MIDI Channel (00 - 0F)	
ccH	Controller number (01 - 1F, 40 - 5F)	
ppH	Controlled parameter	
rrH	Controlled range	
	pp=0	Pitch Control
	rr=28H - 58H	-24 - +24 [semitones]
	pp=1	Filter Cutoff Control
	rr=00H - 7FH	-9600 - +9450 [cents]
	pp=2	Amplitude Control
	rr=00H - 7FH	0 - 200%
	pp=3	LFO Pitch Depth
	rr=00H - 7FH	0 - 600 [cents]
	pp=4	LFO Filter Depth
	rr=00H - 7FH	0 - 2400 [cents]
	pp=5	LFO Amplitude Depth
	rr=00H - 7FH	0 - 100%
F7H	EOX (End Of Exclusive)	

○ Scale/Octave Tuning Adjust

Status	Data byte	Status
F0H	7EH, 7FH, 08H, 08H, ffH, ggH, hhH, ssH...	F7

Byte	Explanation
F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
7FH	Device ID (Broadcast)
08H	Sub ID#1 (MIDI Tuning Standard)
08H	Sub ID#2 (scale/octave tuning 1-byte form)
ffH	Channel/Option byte 1
	bits 0 to 1 = channel 15 to 16
	bit 2 to 6 = Undefined
ggH	Channel byte 2
	bits 0 to 6 = channel 8 to 14
hhH	Channel byte 3
	bits 0 to 6 = channel 1 to 7
ssH	12 byte tuning offset of 12 semitones from C to B
	00H = -64 [cents]
	40H = 0 [cents] (equal temperament)
	7FH = +63 [cents]
F7H	EOX (End Of Exclusive)

○ Key-based Instrument Controllers

Status	Data byte	Status
F0H	7FH, 7FH, 0AH, 01H, 0nH, kkH, nnH, vvH	F7H

Byte	Explanation	
F0H	Exclusive status	
7FH	ID number (universal realtime message)	
7FH	Device ID (Broadcast)	
0AH	Sub ID#1 (Key-Based Instrument Control)	
01H	Sub ID#2 (Controller)	
0nH	MIDI Channel (00 - 0FH)	
kkH	Key Number	
nnH	Control Number	
vvH	Value	
	nn=07H	Level
	vv=00H - 7FH	0 - 200% (Relative)
	nn=0AH	Pan
	vv=00H - 7FH	Left - Right (Absolute)
	nn=5BH	Reverb Send
	vv=00H - 7FH	0 - 127 (Absolute)
	nn=5D	Chorus Send
	vv=00H - 7FH	0 - 127 (Absolute)
:	:	
F7H	EOX (End Of Exclusive)	

* This parameter affects drum instruments only.

● 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 3AH.

○ 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.

Status	Data byte	Status
F0H	41H, dev, 00H, 00H, 3AH, 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, 7FH)
00H	model ID #1 (JUNO-DS61/DS88)
00H	model ID #2 (JUNO-DS61/DS88)
3AH	model ID #3 (JUNO-DS61/DS88)
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. 19).
* For the checksum, refer to p. 64.

○ Data set 1 (DT1)

Status	Data byte	Status
F0H	41H, dev, 00H, 00H, 3AH, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 10H, 7FH)
00H	Model ID #1 (JUNO-DS61/DS88)
00H	Model ID #2 (JUNO-DS61/DS88)
3AH	Model ID #3 (JUNO-DS61/DS88)
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)

* 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. 19).
* 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 p. 64.

Status	Data byte	Status
F0H	41H, dev, 42H, 12H, aaH, bbH, ccH, ddH, ... eeH, sum	F7H

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 10H, 7FH)
42H	Model ID (GS)
12H	Command ID (DT1)
aaH	Address MSB: upper byte of the starting address of the transmitted data

bbH Address: middle byte of the starting address of the transmitted data
ccH Address LSB: lower byte of the starting address of the transmitted data
ddH Data: the actual data to be transmitted. Multiple bytes of data are transmitted starting from the address.
:
eeH 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. 19).
* 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 p. 64.

2. Data Transmission (Sound Source Section)

■ Channel Voice Messages

● Note off

Status	2nd byte	3rd byte	
8nH	kkH	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
kk = note number:			00H - 7FH (0 - 127)
vv = note off velocity:			00H - 7FH (0 - 127)

● Note on

Status	2nd byte	3rd byte	
9nH	kkH	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
kk = note number:			00H - 7FH (0 - 127)
vv = note on velocity:			01H - 7FH (1 - 127)

● Control Change

* By selecting a controller number that corresponds to the setting of parameters of controllers, the JUNO-DS61/DS88 can transmit any control change message.

○ 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)

* These messages are transmitted when Patch, Drum Kit, Performance, or Pattern is selected.

○ Modulation (Controller number 1)

Status	2nd byte	3rd byte	
BnH	01H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Modulation depth:			00H - 7FH (0 - 127)

○ Breath type (Controller number 2)

Status	2nd byte	3rd byte	
BnH	02H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Control value:			00H - 7FH (0 - 127)

○ Portamento Time (Controller number 5)

Status	2nd byte	3rd byte	
BnH	05H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Portamento Time:			00H - 7FH (0 - 127)

○ 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 - 16)

mm, ll = the value of the parameter specified by RPN/NRPN
mm = MSB, ll = LSB

○ Volume (Controller number 7)

Status	2nd byte	3rd byte	
BnH	07H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 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 - 16)
vv = Panpot:			00H - 40H - 7FH (Left - Center - Right)

○ 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)

○ Hold 1 (Controller number 64)

Status	2nd byte	3rd byte	
BnH	40H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Control value:			00H - 7FH (0 - 127) 0-63 = OFF, 64-127 = ON

* If the Continuous Hold Pedal parameter (SYSTEM:PEDAL:Continuous Hold Pedal) is set to OFF on the JUNO-DS61/DS88, only 00H (OFF) or 7FH (ON) can be transmitted as the value of the control.

○ Portamento (Controller number 65)

Status	2nd byte	3rd byte	
BnH	41H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Control value:			00H - 7FH (0 - 127) 0 - 63 = OFF, 64 - 127 = ON

○ Resonance (Controller number 71)

Status	2nd byte	3rd byte	
BnH	47H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv= Resonance value (relative change):			00H - 40H - 7FH (-64 - 0 - +63)

○ Release Time (Controller number 72)

Status	2nd byte	3rd byte	
BnH	48H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Release Time value (relative change):			00H - 40H - 7FH (-64 - 0 - +63)

○ Attack time (Controller number 73)

Status	2nd byte	3rd byte	
BnH	49H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Attack time value (relative change):			00H - 40H - 7FH (-64 - 0 - +63)

○ Cutoff (Controller number 74)

Status	2nd byte	3rd byte	
BnH	4AH	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Cutoff value (relative change):			00H - 40H - 7FH (-64 - 0 - +63)

○ General Purpose Controller 5 (Controller number 80)

Status	2nd byte	3rd byte	
BnH	50H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Control value:			00H - 7FH (0 - 127)

○ General Purpose Controller 6 (Controller number 81)

Status	2nd byte	3rd byte	
BnH	51H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Control value:			00H - 7FH (0 - 127)

○ General Purpose Controller 7 (Controller number 82)

Status	2nd byte	3rd byte	
BnH	52H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Control value:			00H - 7FH (0 - 127)

○ General Purpose Controller 8 (Controller number 83)

Status	2nd byte	3rd byte	
BnH	53H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
vv = Control value:			00H - 7FH (0 - 127)

○ Portamento control (Controller number 84)

Status	2nd byte	3rd byte
BnH	54H	kkH

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

● Program Change

Status	2nd byte
CnH	ppH

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

* These messages are transmitted when Patch, Drum Kit, Performance, or Pattern is selected.

● Channel Pressure

Status	2nd byte
DnH	vvH

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

● Pitch Bend Change

Status	2nd byte	3rd byte
EnH	llH	mmH

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

■ Channel Mode Messages

○ MONO (Controller number 126)

Status	2nd byte	3rd byte
BnH	7EH	mmH

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

○ POLY (Controller number 127)

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

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

■ System Realtime Messages

● Timing Clock

Status
F8H

* Transmitted when the Sync Mode parameter (DAW CONTROL:DAW:Sync Mode) is set to SLAVE and the Sync Output parameter (DAW CONTROL:DAW:Sync Output) is set to ON.

● Continue

Status
FBH

* Transmitted when the Control Map parameter (DAW CONTROL:DAW:Control Map) is set to USER.

● Stop

Status
FCH

* Transmitted when the Control Map parameter (DAW CONTROL:DAW:Control Map) is set to USER.

● 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 JUNO-DS61/DS88.

● Universal Non-realtime System Exclusive Message

○ Identity Reply Message (JUNO-DS61/DS88)

Receiving Identity Request Message (p. 8), the JUNO-DS61/DS88 send this message.

Status	Data byte	Status
F0H	7EH, dev, 06H, 02H, 41H, 3AH, 02H, 00H, 00H, 00H, 03H, 00H, 00H	F7H

Byte	Explanation
F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
10H	Device ID (dev: 10H)
06H	Sub ID#1 (General Information)
02H	Sub ID#2 (Identity Reply)
41H	ID number (Roland)
3AH 02H	Device family code
02H 00H	Device family number code
00H 03H 00H 00H	Software revision level
F7H	EOX (End of Exclusive)

● Data Transmission

○ Data set 1 (DT1)

Status	Data byte	Status
F0H	41H, dev, 00H, 00H, 3AH, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 10H, 7FH)
00H	Model ID #1 (JUNO-DS61/DS88)
00H	Model ID #2 (JUNO-DS61/DS88)
3AH	Model ID #3 (JUNO-DS61/DS88)
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)

* 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. 19).
* 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. Data Reception (Sequencer Section)

3.1 Messages recorded during recording

■ Channel Voice Messages

● Note off

Status	2nd byte	3rd byte	
8nH	kkH	vvH	
9nH	kkH	00H	
n = MIDI channel number:			0H - FH (ch.1 - 16)
kk = note number:			00H - 7FH (0 - 127)
vv = note off velocity:			00H - 7FH (0 - 127)

● Note on

Status	2nd byte	3rd byte	
9nH	kkH	vvH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
kk = note number:			00H - 7FH (0 - 127)
vv = note on velocity:			01H - 7FH (1 - 127)

● Control Change

Status	2nd byte	3rd byte	
BnH	01H	vvH	
n = MIDI channel number:			0H - FH (ch.1 - ch.16)
kk = Control number:			00H - 78H (0 - 120)
vv = value:			00H - 7FH (0 - 127)

* kk = 00H and kk = 20H are not recorded.

● Channel Aftertouch

Status	2nd byte	
DnH	vvH	
n = MIDI channel number:		0H - FH (ch.1 - 16)
vv = Channel Aftertouch:		00H - 7FH (0 - 127)

● 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)

■ 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 - 16)

* The same processing will be done as when an All Note Off message is received.

● Reset All Controllers (Controller number 121)

Status	2nd byte	3rd byte	
BnH	79H	00H	
n = MIDI channel number:			0H - FH (ch.1 - 16)

● Omni Off (Controller number 124)

Status	2nd byte	3rd byte	
BnH	7CH	00H	
n = MIDI channel number:			0H - FH (ch.1 - 16)

* The same processing will be done as when an All Note Off message is received.

● Omni On (Controller number 125)

Status	2nd byte	3rd byte	
BnH	7DH	00H	
n = MIDI channel number:			0H - FH (ch.1 - 16)

* The same processing will be done as when an All Note Off message is received.

● Mono (Controller number 126)

Status	2nd byte	3rd byte	
BnH	7EH	mmH	
n = MIDI channel number:			0H - FH (ch.1 - 16)
mm = mono number:			00H - 10H (0 - 16)

* The same processing will be done as when an All Note Off message is received.

● Poly (Controller number 127)

Status	2nd byte	3rd byte	
BnH	7FH	00H	
n = MIDI channel number:			0H - FH (ch.1 - 16)

* The same processing will be done as when an All Note Off message is received.

■ System Exclusive Messages

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

F0H:	System Exclusive message status
ii=ID number:	This is the ID number (manufacturer ID) that specifies the manufacturer whose exclusive message this is. Roland's manufacturer ID is 41H. ID numbers 7EH and 7FH are defined in an expansion of the MIDI standard as Universal Non-real-time messages (7EH) and Universal Realtime Messages (7FH).
dd,..., ee = data:	00H - 7FH (0 - 127)
F7H:	EOX (End of System Exclusive)

* GM1 System On, GM2 System On and GM System Off is not recorded.
* MIDI Machine Control and MIDI Time code is not recorded.

3.2 Messages acknowledged for synchronization

■ System Realtime Messages

● Timing Clock

Status
F8H

* Received when the Sync Mode parameter (SYSTEM:SYNC/TEMPO:Sync Mode) is set to SLAVE.

● Start

Status
FAH

* Received when the Sync Mode parameter (SYSTEM:SYNC/TEMPO:Sync Mode) is set to SLAVE.

● Continue

Status
FBH

* The same processing will be carried out as when Start is received.
* Received when the Sync Mode parameter (SYSTEM:SYNC/TEMPO:Sync Mode) is set to SLAVE.

● Stop

Status
FCH

* Received when the Sync Mode parameter (SYSTEM:SYNC/TEMPO:Sync Mode) is set to SLAVE.

4. Data transmission (Sequencer Section)

There are no messages to be transmitted.

5. 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.

* “<*>” marked address or parameters are ignored when the JUNO-DS61/DS88 received them.

5.1 JUNO-DS61/DS88 (ModelID = 00H 00H 3AH)

Start Address	Description
01 00 00 00	Setup
02 00 00 00	System
10 00 00 00	Temporary Performance (Pattern)
11 00 00 00	Temporary Patch/Drum (Performance Mode Part 1)
11 20 00 00	Temporary Patch/Drum (Performance Mode Part 2)
:	
14 60 00 00	Temporary Patch/Drum (Performance Mode Part 16)
1E 00 00 00	Temporary Rhythm Pattern
1E 11 00 00	Temporary Arpeggio
1E 13 00 00	Temporary Rhythm Group
1E 15 00 00	Temporary Vocal Effect
1F 00 00 00	Temporary Patch/Drum (Patch Mode Part 1)
1F 20 00 00	Temporary Patch/Drum (Patch Mode Part 2)
20 00 00 00	User Performance (01)
20 01 00 00	User Performance (02)
:	
20 7F 00 00	User Performance (128)
21 00 00 00	User Pattern (01)
21 01 00 00	User Pattern (02)
:	
21 7F 00 00	User Pattern (128)
30 00 00 00	User Patch (001)
30 01 00 00	User Patch (002)
:	
31 7F 00 00	User Patch (256)
40 00 00 00	User Drum Kit (001)
40 10 00 00	User Drum Kit (002)
:	
40 70 00 00	User Drum Kit (008)
60 00 00 00	User Vocal Effect (001)
60 00 01 00	User Vocal Effect (002)
:	
60 00 13 00	User Vocal Effect (020)

* System

Offset Address	Description
00 00 00	System Common
00 40 00	System Controller

* Temporary Patch/Drum

Offset Address	Description
00 00 00	Temporary Patch
10 00 00	Temporary Drum

* Performance (Pattern)

Offset Address	Description
00 00 00	Performance Common
00 02 00	Performance Common MFX1
00 04 00	Performance Common Chorus
00 06 00	Performance Common Reverb
00 08 00	Performance Common MFX2
00 0A 00	Performance Common MFX3
00 10 00	Performance MIDI (Channel 1)
00 11 00	Performance MIDI (Channel 2)
:	
00 1F 00	Performance MIDI (Channel 16)
00 20 00	Performance Part (Part 1)
00 21 00	Performance Part (Part 2)
:	
00 2F 00	Performance Part (Part 16)
00 50 00	Performance Zone (Channel 1)
00 51 00	Performance Zone (Channel 2)
:	
00 5F 00	Performance Zone (Channel 16)
00 60 00	Performance Controller

* Patch

Offset Address	Description
00 00 00	Patch Common
00 02 00	Patch Common MFX
00 04 00	Patch Common Chorus
00 06 00	Patch Common Reverb
00 10 00	Patch TMT (Tone Mix Table)
00 20 00	Patch Tone (Tone 1)
00 22 00	Patch Tone (Tone 2)
00 24 00	Patch Tone (Tone 3)
00 26 00	Patch Tone (Tone 4)

* Drum

Offset Address	Description
00 00 00	Drum Common
00 02 00	Drum Common MFX
00 04 00	Drum Common Chorus
00 06 00	Drum Common Reverb
00 10 00	Drum Tone (Key # 21)
00 12 00	Drum Tone (Key # 22)
:	
01 3E 00	Drum Tone (Key # 108)

* Arpeggio (Rhythm Pattern)

Offset Address	Description
00 00 00	Arpeggio Common
00 10 00	Arpeggio Pattern (Note 1)
00 11 00	Arpeggio Pattern (Note 2)
:	
00 1F 00	Arpeggio Pattern (Note 16)

* Rhythm Group

Offset Address	Description
00 00 00	Rhythm Group

* Vocal Effect

Offset Address	Description	
00 00 00	Vocal Effect	

* Setup

Offset Address		Description	
00 00	0000 0aaa	Sound Mode	(0 - 4) PATCH, PERFORM, GM1, GM2, GS
00 01	0aaa aaaa	Performance Bank Select MSB (CC# 0)	(0 - 127)
00 02	0aaa aaaa	Performance Bank Select LSB (CC# 32)	(0 - 127)
00 03	0aaa aaaa	Performance Program Number (PC)	(0 - 127)
00 04	0aaa aaaa	Kbd Patch Bank Select MSB (CC# 0)	(0 - 127)
00 05	0aaa aaaa	Kbd Patch Bank Select LSB (CC# 32)	(0 - 127)
00 06	0aaa aaaa	Kbd Patch Program Number (PC)	(0 - 127)
00 07	0aaa aaaa	Rhy Patch Bank Select MSB (CC# 0)	(0 - 127)
00 08	0aaa aaaa	Rhy Patch Bank Select LSB (CC# 32)	(0 - 127)
00 09	0aaa aaaa	Rhy Patch Program Number (PC)	(0 - 127)
00 0A	0000 000a	MFX1 Switch	(0 - 1) BYPASS, ON
00 0B	0000 000a	MFX2 Switch	(0 - 1) BYPASS, ON
00 0C	0000 000a	MFX3 Switch	(0 - 1) BYPASS, ON
00 0D	0000 000a	Chorus Switch	(0 - 1) OFF, ON
00 0E	0000 000a	Reverb Switch	(0 - 1) OFF, ON
00 0F	0000 000a	(reserve) <*>	
00 10	0000 000a	(reserve) <*>	
00 11	0000 000a	(reserve) <*>	
00 12	0000 aaaa	Transpose Value	(59 - 70) -5 - +6
00 13	0000 0aaa	Octave Shift	(61 - 67) -3 - +3
00 14	0000 0aaa	(reserve) <*>	
00 15	0000 00aa	Knob Select	(0 - 2)
00 16	0000 000a	(reserve) <*>	
00 17	0aaa aaaa	Arp/Ptn Grid	(0 - 8) 04_, 08_, 08L, 08H, 08t, 16_, 16L, 16H, 16t
00 18	0aaa aaaa	Arp/Ptn Duration	(0 - 9) 30, 40, 50, 60, 70, 80, 90, 100, 120, FUL
00 19	0000 000a	Arpeggio Switch	(0 - 1) OFF, ON
00 1A	0aaa aaaa	(reserve) <*>	
00 1B	0aaa aaaa	Arpeggio Style	(0 - 127) 1 - 128
00 1C	0aaa aaaa	Arpeggio Motif	(0 - 11) UP/L, UP/H, UP/_, dn/L, dn/H, dn/_, Ud/L, Ud/H, Ud/_, rn/L, rn/_, PHRASE
00 1D	0000 0aaa	Arpeggio Octave Range	(61 - 67) -3 - +3
00 1E	0000 000a	Arpeggio Hold	(0 - 1) OFF, ON
00 1F	0aaa aaaa	Arpeggio Accent Rate	(0 - 100)
00 20	0aaa aaaa	Arpeggio Velocity	(0 - 127) REAL, 1 - 127
00 21	0000 000a	Rhythm Pattern Sw	(0 - 1) OFF, ON
00 22	0aaa aaaa	(reserve) <*>	
#00 23	0000 aaaa		
	0000 bbbb	Rhythm Pattern Style	(0 - 255) 1 - 256
00 25	0000 000a	(reserve) <*>	

	00 26	0aaa aaaa	Rhythm Pattern Group Number (0 - 29) / 1 - 30
	00 27	0aaa aaaa	Rhythm Pattern Accent Rate (0 - 100)
	00 28	0aaa aaaa	Rhythm Pattern Velocity (1 - 127)
	00 29	0000 000a	(reserve) <*>
	00 2A	0aaa aaaa	(reserve) <*>
	:		
	00 32	0000 00aa	(reserve) <*>
	00 33	00aa aaaa	Arpeggio Step (0 - 32) / AUTO, 1 - 32
00 00 00 34			Total Size

* System Common

Offset Address		Description
# 00 00	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	Master Tune (24 - 2024) / -100.0 - 100.0 [cent]
00 04	00aa aaaa	Master Key Shift (40 - 88) / -24 - +24
00 05	0aaa aaaa	Master Level (0 - 127)
00 06	0000 000a	Scale Tune Switch (0 - 1) / OFF, ON
00 07	0000 000a	Patch Remain (0 - 1) / OFF, ON
00 08	0000 000a	Mix/Parallel <*> / ---, PARALLEL
00 09	000a aaaa	Performance Control Channel (0 - 16) / 1 - 16, OFF
00 0A	0000 aaaa	Kbd Patch Rx/Tx Channel (0 - 15) / 1 - 16
00 0B	0000 aaaa	(reserve) <*>
00 0C	0aaa aaaa	Patch Scale Tune for C (0 - 127) / -64 - +63
00 0D	0aaa aaaa	Patch Scale Tune for C# (0 - 127) / -64 - +63
00 0E	0aaa aaaa	Patch Scale Tune for D (0 - 127) / -64 - +63
00 0F	0aaa aaaa	Patch Scale Tune for D# (0 - 127) / -64 - +63
00 10	0aaa aaaa	Patch Scale Tune for E (0 - 127) / -64 - +63
00 11	0aaa aaaa	Patch Scale Tune for F (0 - 127) / -64 - +63
00 12	0aaa aaaa	Patch Scale Tune for F# (0 - 127) / -64 - +63
00 13	0aaa aaaa	Patch Scale Tune for G (0 - 127) / -64 - +63
00 14	0aaa aaaa	Patch Scale Tune for G# (0 - 127) / -64 - +63
00 15	0aaa aaaa	Patch Scale Tune for A (0 - 127) / -64 - +63
00 16	0aaa aaaa	Patch Scale Tune for A# (0 - 127) / -64 - +63
00 17	0aaa aaaa	Patch Scale Tune for B (0 - 127) / -64 - +63
00 18	0aaa aaaa	System Control 1 Source (0 - 97) / OFF, CC01 - CC31, CC33 - CC95, BEND, AFT
00 19	0aaa aaaa	System Control 2 Source (0 - 97) / OFF, CC01 - CC31, CC33 - CC95, BEND, AFT
00 1A	0aaa aaaa	System Control 3 Source (0 - 97) / OFF, CC01 - CC31, CC33 - CC95, BEND, AFT
00 1B	0aaa aaaa	System Control 4 Source (0 - 97) / OFF, CC01 - CC31, CC33 - CC95, BEND, AFT

Offset Address		Description	
00 1C	0000 000a	Receive Program Change	(0 - 1) OFF, ON
00 1D	0000 000a	Receive Bank Select	(0 - 1) OFF, ON
00 00 00 1E	Total Size		

* System Controller

Offset Address		Description	
00 00	0000 000a	Transmit Program Change	(0 - 1) OFF, ON
00 01	0000 000a	Transmit Bank Select	(0 - 1) OFF, ON
00 02	0aaa aaaa	Keyboard Velocity	(0 - 127) REAL, 1 - 127
00 03	0000 00aa	Keyboard Velocity Curve	(1 - 3) LIGHT, MEDIUM, HEAVY
00 04	0aaa aaaa	(reserve) <*>	
00 05	0000 0aaa	Hold Pedal Polarity	(0 - 1) STANDARD, REVERSE
00 06	0000 000a	Continuous Hold Pedal	(0 - 1) OFF, ON
00 07	000a aaaa	Control Pedal Assign	(0 - 24) MODULATION, PORTA-TIME, VOLUME, PAN, EXPRESSION, HOLD, PORTAMENTO, SOSTENUTO, RESONANCE, RELEASE-TIME, ATTACK-TIME, CUTOFF, DECAY-TIME, VIB-RATE, VIB-DEPTH, VIB-DELAY, CHO-SEND-LEVEL, REV-SEND-LEVEL, AFTERTOUCH, START/STOP, TAP-TEMPO, PROG-UP, PROG-DOWN, FAV-UP, FAV-DOWN
00 08	0000 0aaa	Control Pedal Polarity	(0 - 1) STANDARD, REVERSE
00 09	0000 aaaa	(reserve) <*>	
00 0A	0aaa aaaa	(reserve) <*>	
:			
00 0F	0aaa aaaa	(reserve) <*>	
00 10	0aaa aaaa	Knob 1 Assign	(0 - 104) OFF, CC01 - CC31, OFF, CC33 - CC95, BEND, AFT, EQ-LOW-FREQ, EQ-LOW-GAIN, EQ-MID-FREQ, EQ-MID-GAIN, EQ-MID-Q, EQ-HIGH-FREQ, EQ-HIGH-GAIN
00 11	0aaa aaaa	Knob 2 Assign	(0 - 104) OFF, CC01 - CC31, OFF, CC33 - CC95, BEND, AFT, EQ-LOW-FREQ, EQ-LOW-GAIN, EQ-MID-FREQ, EQ-MID-GAIN, EQ-MID-Q, EQ-HIGH-FREQ, EQ-HIGH-GAIN
00 12	0aaa aaaa	Knob 3 Assign	(0 - 104) OFF, CC01 - CC31, OFF, CC33 - CC95, BEND, AFT, EQ-LOW-FREQ, EQ-LOW-GAIN, EQ-MID-FREQ, EQ-MID-GAIN, EQ-MID-Q, EQ-HIGH-FREQ, EQ-HIGH-GAIN
00 13	0aaa aaaa	Knob 4 Assign	(0 - 104) OFF, CC01 - CC31, OFF, CC33 - CC95, BEND, AFT, EQ-LOW-FREQ, EQ-LOW-GAIN, EQ-MID-FREQ, EQ-MID-GAIN, EQ-MID-Q, EQ-HIGH-FREQ, EQ-HIGH-GAIN
00 14	0aaa aaaa	(reserve) <*>	
00 15	0aaa aaaa	(reserve) <*>	
:			
00 4D	0000 000a	(reserve) <*>	
00 00 00 4E	Total Size		

* Performance Common

Offset Address		Description	
00 00	0aaa aaaa	Performance Name 1	(32 - 127) 32 - 127 [ASCII]
00 01	0aaa aaaa	Performance Name 2	(32 - 127) 32 - 127 [ASCII]
00 02	0aaa aaaa	Performance Name 3	(32 - 127) 32 - 127 [ASCII]
00 03	0aaa aaaa	Performance Name 4	(32 - 127) 32 - 127 [ASCII]
00 04	0aaa aaaa	Performance Name 5	(32 - 127) 32 - 127 [ASCII]
00 05	0aaa aaaa	Performance Name 6	(32 - 127) 32 - 127 [ASCII]
00 06	0aaa aaaa	Performance Name 7	(32 - 127) 32 - 127 [ASCII]
00 07	0aaa aaaa	Performance Name 8	(32 - 127) 32 - 127 [ASCII]
00 08	0aaa aaaa	Performance Name 9	(32 - 127) 32 - 127 [ASCII]
00 09	0aaa aaaa	Performance Name 10	(32 - 127) 32 - 127 [ASCII]
00 0A	0aaa aaaa	Performance Name 11	(32 - 127) 32 - 127 [ASCII]
00 0B	0aaa aaaa	Performance Name 12	(32 - 127) 32 - 127 [ASCII]
00 0C	00aa aaaa	Solo Part Select	(0 - 16) OFF, 1 - 16
00 0D	000a aaaa	MFX1 Control Channel	(0 - 16) 1 - 16, OFF
00 0E	0000 000a	(reserve) <*>	
00 0F	0000 000a	(reserve) <*>	
00 10	0aaa aaaa	Voice Reserve 1	(0 - 64) 0 - 63, FULL
00 11	0aaa aaaa	Voice Reserve 2	(0 - 64) 0 - 63, FULL
00 12	0aaa aaaa	Voice Reserve 3	(0 - 64) 0 - 63, FULL
00 13	0aaa aaaa	Voice Reserve 4	(0 - 64) 0 - 63, FULL
00 14	0aaa aaaa	Voice Reserve 5	(0 - 64) 0 - 63, FULL
00 15	0aaa aaaa	Voice Reserve 6	(0 - 64) 0 - 63, FULL
00 16	0aaa aaaa	Voice Reserve 7	(0 - 64) 0 - 63, FULL
00 17	0aaa aaaa	Voice Reserve 8	(0 - 64) 0 - 63, FULL
00 18	0aaa aaaa	Voice Reserve 9	(0 - 64) 0 - 63, FULL
00 19	0aaa aaaa	Voice Reserve 10	(0 - 64) 0 - 63, FULL
00 1A	0aaa aaaa	Voice Reserve 11	(0 - 64) 0 - 63, FULL
00 1B	0aaa aaaa	Voice Reserve 12	(0 - 64) 0 - 63, FULL
00 1C	0aaa aaaa	Voice Reserve 13	(0 - 64) 0 - 63, FULL
00 1D	0aaa aaaa	Voice Reserve 14	(0 - 64) 0 - 63, FULL
00 1E	0aaa aaaa	Voice Reserve 15	(0 - 64) 0 - 63, FULL
00 1F	0aaa aaaa	Voice Reserve 16	(0 - 64) 0 - 63, FULL
00 20	0aaa aaaa	(reserve) <*>	
00 21	0aaa aaaa	(reserve) <*>	
:			
00 2F	0aaa aaaa	(reserve) <*>	
00 30	00aa aaaa	MFX1 Source	(0 - 16) PERFORM, 1 - 16
00 31	00aa aaaa	MFX2 Source	(0 - 16) PERFORM, 1 - 16

	00 32	00aa aaaa	MFX3 Source (0 - 16) / PERFORM, 1 - 16
	00 33	00aa aaaa	Chorus Source (0 - 16) / PERFORM, 1 - 16
	00 34	00aa aaaa	Reverb Source (0 - 16) / PERFORM, 1 - 16
	00 35	00aa aaaa	MFX2 Control Channel (0 - 16) / 1 - 16, OFF
	00 36	00aa aaaa	MFX3 Control Channel (0 - 16) / 1 - 16, OFF
	00 37	0000 aaaa	MFX Structure (0 - 15) / 1 - 16
00 00 00 38			Total Size

* Performance Common MFX

Offset Address		Description	
	00 00	0aaa aaaa	MFX Type (0 - 80)
	00 01	0aaa aaaa	MFX Dry Send Level (0 - 127)
	00 02	0aaa aaaa	MFX Chorus Send Level (0 - 127)
	00 03	0aaa aaaa	MFX Reverb Send Level (0 - 127)
	00 04	0000 00aa	MFX Output Assign <*> A, ---, ---, ---
	00 05	0aaa aaaa	MFX Control 1 Source (0 - 101) / OFF, CC01 - CC31, CC33 - CC95, BEND, AFT, SYS1 - SYS4
	00 06	0aaa aaaa	MFX Control 1 Sens (1 - 127) / -63 - +63
	00 07	0aaa aaaa	MFX Control 2 Source (0 - 101) / OFF, CC01 - CC31, CC33 - CC95, BEND, AFT, SYS1 - SYS4
	00 08	0aaa aaaa	MFX Control 2 Sens (1 - 127) / -63 - +63
	00 09	0aaa aaaa	MFX Control 3 Source (0 - 101) / OFF, CC01 - CC31, CC33 - CC95, BEND, AFT, SYS1 - SYS4
	00 0A	0aaa aaaa	MFX Control 3 Sens (1 - 127) / -63 - +63
	00 0B	0aaa aaaa	MFX Control 4 Source (0 - 101) / OFF, CC01 - CC31, CC33 - CC95, BEND, AFT, SYS1 - SYS4
	00 0C	0aaa aaaa	MFX Control 4 Sens (1 - 127) / -63 - +63
	00 0D	000a aaaa	MFX Control Assign 1 (0 - 16) / OFF, 1 - 16
	00 0E	000a aaaa	MFX Control Assign 2 (0 - 16) / OFF, 1 - 16
	00 0F	000a aaaa	MFX Control Assign 3 (0 - 16) / OFF, 1 - 16
	00 10	000a aaaa	MFX Control Assign 4 (0 - 16) / OFF, 1 - 16
#	00 11	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MFX Parameter 1 (12768 - 52768) / -20000 - +20000
#	00 15	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MFX Parameter 2 (12768 - 52768) / -20000 - +20000
#	00 19	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MFX Parameter 3 (12768 - 52768) / -20000 - +20000
#	00 1D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MFX Parameter 4 (12768 - 52768) / -20000 - +20000

# 00 21	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 5 (12768 - 52768)
		-20000 - +20000
# 00 25	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 6 (12768 - 52768)
		-20000 - +20000
# 00 29	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 7 (12768 - 52768)
		-20000 - +20000
# 00 2D	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 8 (12768 - 52768)
		-20000 - +20000
# 00 31	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 9 (12768 - 52768)
		-20000 - +20000
# 00 35	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 10 (12768 - 52768)
		-20000 - +20000
# 00 39	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 11 (12768 - 52768)
		-20000 - +20000
# 00 3D	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 12 (12768 - 52768)
		-20000 - +20000
# 00 41	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 13 (12768 - 52768)
		-20000 - +20000
# 00 45	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 14 (12768 - 52768)
		-20000 - +20000
# 00 49	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 15 (12768 - 52768)
		-20000 - +20000
# 00 4D	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 16 (12768 - 52768)
		-20000 - +20000
# 00 51	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 17 (12768 - 52768)
		-20000 - +20000
# 00 55	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 18 (12768 - 52768)
		-20000 - +20000
# 00 59	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	MFX Parameter 19 (12768 - 52768)
		-20000 - +20000
# 00 5D	0000 aaaa	
	0000 bbbb	
	0000 cccc	

	0000 dddd	MFX Parameter 20	(12768 - 52768)
			-20000 - +20000
# 00 61	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 21	(12768 - 52768)
			-20000 - +20000
# 00 65	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 22	(12768 - 52768)
			-20000 - +20000
# 00 69	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 23	(12768 - 52768)
			-20000 - +20000
# 00 6D	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 24	(12768 - 52768)
			-20000 - +20000
# 00 71	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 25	(12768 - 52768)
			-20000 - +20000
# 00 75	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 26	(12768 - 52768)
			-20000 - +20000
# 00 79	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 27	(12768 - 52768)
			-20000 - +20000
# 00 7D	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 28	(12768 - 52768)
			-20000 - +20000
# 01 01	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 29	(12768 - 52768)
			-20000 - +20000
# 01 05	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 30	(12768 - 52768)
			-20000 - +20000
# 01 09	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 31	(12768 - 52768)
			-20000 - +20000
# 01 0D	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 32	(12768 - 52768)
			-20000 - +20000
00 00 01 11	Total Size		

* Performance Common Chorus

Offset Address		Description	
00 00	0000 aaaa	Chorus Type	(0 - 3)
00 01	0aaa aaaa	Chorus Level	(0 - 127)
00 02	0000 00aa	Chorus Output Assign <*>	A, ---, ---, ---
00 03	0000 00aa	Chorus Output Select	(0 - 2) MAIN, REV, MAIN+REV
#00 04	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 1	(12768 - 52768) -20000 - +20000
#00 08	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 2	(12768 - 52768) -20000 - +20000
#00 0C	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 3	(12768 - 52768) -20000 - +20000
#00 10	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 4	(12768 - 52768) -20000 - +20000
#00 14	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 5	(12768 - 52768) -20000 - +20000
#00 18	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 6	(12768 - 52768) -20000 - +20000
#00 1C	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 7	(12768 - 52768) -20000 - +20000
#00 20	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 8	(12768 - 52768) -20000 - +20000
#00 24	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 9	(12768 - 52768) -20000 - +20000
#00 28	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 10	(12768 - 52768) -20000 - +20000
#00 2C	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 11	(12768 - 52768) -20000 - +20000
#00 30	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 12	(12768 - 52768) -20000 - +20000
#00 34	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 13	(12768 - 52768) -20000 - +20000
#00 38	0000 aaaa		

	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 14	(12768 - 52768)
			-20000 - +20000
#	00 3C	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 15 (12768 - 52768)
			-20000 - +20000
#	00 40	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 16 (12768 - 52768)
			-20000 - +20000
#	00 44	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 17 (12768 - 52768)
			-20000 - +20000
#	00 48	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 18 (12768 - 52768)
			-20000 - +20000
#	00 4C	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 19 (12768 - 52768)
			-20000 - +20000
#	00 50	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 20 (12768 - 52768)
			-20000 - +20000
00 00 00 54		Total Size	

* Performance Common Reverb

Offset Address		Description	
00 00	0000 aaaa	Reverb Type	(0 - 5)
00 01	0aaa aaaa	Reverb Level	(0 - 127)
00 02	0000 00aa	Reverb Output Assign <*>	A, ---, ---, ---
#	00 03	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Reverb Parameter 1 (12768 - 52768)
			-20000 - +20000
#	00 07	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Reverb Parameter 2 (12768 - 52768)
			-20000 - +20000
#	00 0B	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Reverb Parameter 3 (12768 - 52768)
			-20000 - +20000
#	00 0F	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Reverb Parameter 4 (12768 - 52768)
			-20000 - +20000
#	00 13	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Reverb Parameter 5 (12768 - 52768)
			-20000 - +20000
#	00 17	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Reverb Parameter 6 (12768 - 52768)
			-20000 - +20000

#	00 1B	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 7	(12768 - 52768)
				-20000 - +20000
#	00 1F	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 8	(12768 - 52768)
				-20000 - +20000
#	00 23	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 9	(12768 - 52768)
				-20000 - +20000
#	00 27	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 10	(12768 - 52768)
				-20000 - +20000
#	00 2B	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 11	(12768 - 52768)
				-20000 - +20000
#	00 2F	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 12	(12768 - 52768)
				-20000 - +20000
#	00 33	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 13	(12768 - 52768)
				-20000 - +20000
#	00 37	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 14	(12768 - 52768)
				-20000 - +20000
#	00 3B	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 15	(12768 - 52768)
				-20000 - +20000
#	00 3F	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 16	(12768 - 52768)
				-20000 - +20000
#	00 43	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 17	(12768 - 52768)
				-20000 - +20000
#	00 47	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 18	(12768 - 52768)
				-20000 - +20000
#	00 4B	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 19	(12768 - 52768)
				-20000 - +20000
#	00 4F	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 20	(12768 - 52768)
				-20000 - +20000
00 00 00 53		Total Size		

* Performance MIDI

Offset Address		Description	
00 00	0000 000a	Receive Program Change	(0 - 1) OFF, ON
00 01	0000 000a	Receive Bank Select	(0 - 1) OFF, ON
00 02	0000 000a	Receive Bender	(0 - 1) OFF, ON
00 03	0000 000a	Receive Polyphonic Key Pressure	(0 - 1) OFF, ON
00 04	0000 000a	Receive Channel Pressure	(0 - 1) OFF, ON
00 05	0000 000a	Receive Modulation	(0 - 1) OFF, ON
00 06	0000 000a	Receive Volume	(0 - 1) OFF, ON
00 07	0000 000a	Receive Pan	(0 - 1) OFF, ON
00 08	0000 000a	Receive Expression	(0 - 1) OFF, ON
00 09	0000 000a	Receive Hold-1	(0 - 1) OFF, ON
00 0A	0000 000a	Phase Lock	(0 - 1) OFF, ON
00 0B	0000 0aaa	Velocity Curve Type	(0 - 4) OFF, 1 - 4
00 00 00 0C	Total Size		

* Performance Part

Offset Address		Description	
00 00	0000 aaaa	Receive Channel	(0 - 15) 1 - 16
00 01	0000 000a	Receive Switch	(0 - 1) OFF, ON
00 02	0000 0000	(reserve) <*>	
00 03	0000 0000	(reserve) <*>	
00 04	0aaa aaaa	Patch Bank Select MSB (CC# 0)	(0 - 127)
00 05	0aaa aaaa	Patch Bank Select LSB (CC# 32)	(0 - 127)
00 06	0aaa aaaa	Patch Program Number (PC)	(0 - 127)
00 07	0aaa aaaa	Part Level (CC# 7)	(0 - 127)
00 08	0aaa aaaa	Part Pan (CC# 10)	(0 - 127) L64 - 63R
00 09	0aaa aaaa	Part Coarse Tune (RPN# 2)	(16 - 112) -48 - +48
00 0A	0aaa aaaa	Part Fine Tune (RPN# 1)	(14 - 114) -50 - +50
00 0B	0000 00aa	Part Mono/Poly (MONO ON/POLY ON)	(0 - 2) MONO, POLY, PATCH
00 0C	0000 00aa	Part Legato Switch (CC# 68)	(0 - 2) OFF, ON, PATCH
00 0D	000a aaaa	Part Pitch Bend Range (RPN# 0)	(0 - 25) 0 - 24, PATCH
00 0E	0000 00aa	Part Portamento Switch (CC# 65)	(0 - 2) OFF, ON, PATCH
#00 0F	0000 aaaa		
	0000 bbbb	Part Portamento Time (CC# 5)	(0 - 128) 0 - 127, PATCH
00 11	0aaa aaaa	Part Cutoff Offset (CC# 74)	(0 - 127) -64 - +63
00 12	0aaa aaaa	Part Resonance Offset (CC# 71)	(0 - 127) -64 - +63
00 13	0aaa aaaa	Part Attack Time Offset (CC# 73)	(0 - 127) -64 - +63
00 14	0aaa aaaa	Part Release Time Offset (CC# 72)	(0 - 127) -64 - +63

	00 15	0000 0aaa	Part Octave Shift (61 - 67) -3 - +3
	00 16	0aaa aaaa	Part Velocity Sens Offset (1 - 127) -63 - +63
	00 17	0aaa aaaa	(reserve) <*>
	00 18	0aaa aaaa	(reserve) <*>
	:		
	00 1A	0aaa aaaa	(reserve) <*>
	00 1B	0000 000a	Mute Switch (0 - 1) OFF, MUTE
	00 1C	0aaa aaaa	Part Dry Send Level (0 - 127)
	00 1D	0aaa aaaa	Part Chorus Send Level (CC# 93) (0 - 127)
	00 1E	0aaa aaaa	Part Reverb Send Level (CC# 91) (0 - 127)
	00 1F	0000 aaaa	Part Output Assign (0 - 13) MFX, A, ---, ---, ---, 1, 2, ---, ---, ---, ---, ---, ---, PATCH
	00 20	0000 00aa	Part Output MFX Select (0 - 2) MFX1, MFX2, MFX3
	00 21	0aaa aaaa	Part Decay Time Offset (CC# 75) (0 - 127) -64 - +63
	00 22	0aaa aaaa	Part Vibrato Rate (CC# 76) (0 - 127) -64 - +63
	00 23	0aaa aaaa	Part Vibrato Depth (CC# 77) (0 - 127) -64 - +63
	00 24	0aaa aaaa	Part Vibrato Delay (CC# 78) (0 - 127) -64 - +63
	00 25	0aaa aaaa	Part Scale Tune for C (0 - 127) -64 - +63
	00 26	0aaa aaaa	Part Scale Tune for C# (0 - 127) -64 - +63
	00 27	0aaa aaaa	Part Scale Tune for D (0 - 127) -64 - +63
	00 28	0aaa aaaa	Part Scale Tune for D# (0 - 127) -64 - +63
	00 29	0aaa aaaa	Part Scale Tune for E (0 - 127) -64 - +63
	00 2A	0aaa aaaa	Part Scale Tune for F (0 - 127) -64 - +63
	00 2B	0aaa aaaa	Part Scale Tune for F# (0 - 127) -64 - +63
	00 2C	0aaa aaaa	Part Scale Tune for G (0 - 127) -64 - +63
	00 2D	0aaa aaaa	Part Scale Tune for G# (0 - 127) -64 - +63
	00 2E	0aaa aaaa	Part Scale Tune for A (0 - 127) -64 - +63
	00 2F	0aaa aaaa	Part Scale Tune for A# (0 - 127) -64 - +63
	00 30	0aaa aaaa	Part Scale Tune for B (0 - 127) -64 - +63
00 00 00 31	Total Size		

* Performance Zone

Offset Address		Description	
00 00	0000 0aaa	Zone Octave Shift	(61 - 67) -3 - +3
00 01	0000 000a	Zone Switch	(0 - 1) OFF, ON
00 02	0000 000a	(reserve) <*>	
#00 03	0000 aaaa		
	0000 bbbb	(reserve) <*>	
:			
#00 0A	0000 aaaa		
	0000 bbbb	(reserve) <*>	
00 0C	0aaa aaaa	Keyboard Range Lower	(0 - 127) C-1 - UPPER
00 0D	0aaa aaaa	Keyboard Range Upper	(0 - 127) LOWER - G9
00 0E	0000 000a	(reserve) <*>	
00 0F	0000 000a	(reserve) <*>	
:			
00 1A	0000 000a	(reserve) <*>	
00 00 00 1B	Total Size		

* Performance Controller

Offset Address		Description	
00 00	0000 000a	(reserve) <*>	
00 01	0aaa aaaa	(reserve) <*>	
:			
00 17	0aaa aaaa	(reserve) <*>	
00 18	0000 aaaa	Arpeggio Zone Number	(0 - 15) ZONE1 - ZONE16
00 19	0000 000a	(reserve) <*>	
00 1A	0aaa aaaa	(reserve) <*>	
:			
00 53	0aaa aaaa	(reserve) <*>	
#00 54	0000 aaaa		
	0000 bbbb	Recommended Tempo	(20 - 250)
00 56	0000 000a	(reserve) <*>	
00 57	0000 00aa	(reserve) <*>	
:			
00 59	0000 000a	(reserve) <*>	
00 00 00 5A	Total Size		

* Arpeggio Common

Offset Address		Description	
#00 00	0000 aaaa		
	0000 bbbb	End Step	(1 - 32)
00 02	0aaa aaaa	Arpeggio Name 1	(32 - 127)
00 03	0aaa aaaa	Arpeggio Name 2	(32 - 127)
00 04	0aaa aaaa	Arpeggio Name 3	(32 - 127)
00 05	0aaa aaaa	Arpeggio Name 4	(32 - 127)
00 06	0aaa aaaa	Arpeggio Name 5	(32 - 127)
00 07	0aaa aaaa	Arpeggio Name 6	(32 - 127)

00 08	0aaa aaaa	Arpeggio Name 7	(32 - 127)
00 09	0aaa aaaa	Arpeggio Name 8	(32 - 127)
00 0A	0aaa aaaa	Arpeggio Name 9	(32 - 127)
00 0B	0aaa aaaa	Arpeggio Name 10	(32 - 127)
00 0C	0aaa aaaa	Arpeggio Name 11	(32 - 127)
00 0D	0aaa aaaa	Arpeggio Name 12	(32 - 127)
00 0E	0aaa aaaa	Arpeggio Name 13	(32 - 127)
00 0F	0aaa aaaa	Arpeggio Name 14	(32 - 127)
00 10	0aaa aaaa	Arpeggio Name 15	(32 - 127)
00 11	0aaa aaaa	Arpeggio Name 16	(32 - 127)
00 00 00 12	Total Size		

* Arpeggio Pattern

Offset Address		Description	
# 00 00	0000 aaaa		
	0000 bbbb	Original Note	(0 - 128)
# 00 02	0000 aaaa		
	0000 bbbb	Step1 Data	(0 - 128)
# 00 04	0000 aaaa		
	0000 bbbb	Step2 Data	(0 - 128)
# 00 06	0000 aaaa		
	0000 bbbb	Step3 Data	(0 - 128)
# 00 08	0000 aaaa		
	0000 bbbb	Step4 Data	(0 - 128)
# 00 0A	0000 aaaa		
	0000 bbbb	Step5 Data	(0 - 128)
# 00 0C	0000 aaaa		
	0000 bbbb	Step6 Data	(0 - 128)
# 00 0E	0000 aaaa		
	0000 bbbb	Step7 Data	(0 - 128)
# 00 10	0000 aaaa		
	0000 bbbb	Step8 Data	(0 - 128)
# 00 12	0000 aaaa		
	0000 bbbb	Step9 Data	(0 - 128)
# 00 14	0000 aaaa		
	0000 bbbb	Step10 Data	(0 - 128)
# 00 16	0000 aaaa		
	0000 bbbb	Step11 Data	(0 - 128)
# 00 18	0000 aaaa		
	0000 bbbb	Step12 Data	(0 - 128)
# 00 1A	0000 aaaa		
	0000 bbbb	Step13 Data	(0 - 128)
# 00 1C	0000 aaaa		
	0000 bbbb	Step14 Data	(0 - 128)
# 00 1E	0000 aaaa		
	0000 bbbb	Step15 Data	(0 - 128)
# 00 20	0000 aaaa		
	0000 bbbb	Step16 Data	(0 - 128)
# 00 22	0000 aaaa		
	0000 bbbb	Step17 Data	(0 - 128)
# 00 24	0000 aaaa		
	0000 bbbb	Step18 Data	(0 - 128)
# 00 26	0000 aaaa		
	0000 bbbb	Step19 Data	(0 - 128)
# 00 28	0000 aaaa		
	0000 bbbb	Step20 Data	(0 - 128)
# 00 2A	0000 aaaa		
	0000 bbbb	Step21 Data	(0 - 128)
# 00 2C	0000 aaaa		
	0000 bbbb	Step22 Data	(0 - 128)
# 00 2E	0000 aaaa		
	0000 bbbb	Step23 Data	(0 - 128)

#	00 30	0000 aaaa	
		0000 bbbb	Step24 Data (0 - 128)
#	00 32	0000 aaaa	
		0000 bbbb	Step25 Data (0 - 128)
#	00 34	0000 aaaa	
		0000 bbbb	Step26 Data (0 - 128)
#	00 36	0000 aaaa	
		0000 bbbb	Step27 Data (0 - 128)
#	00 38	0000 aaaa	
		0000 bbbb	Step28 Data (0 - 128)
#	00 3A	0000 aaaa	
		0000 bbbb	Step29 Data (0 - 128)
#	00 3C	0000 aaaa	
		0000 bbbb	Step30 Data (0 - 128)
#	00 3E	0000 aaaa	
		0000 bbbb	Step31 Data (0 - 128)
#	00 40	0000 aaaa	
		0000 bbbb	Step32 Data (0 - 128)
00 00 00 42	Total Size		

* Rhythm Group

Offset Address		Description	
00 00	0aaa aaaa	Rhythm Group Name 1	(32 - 127)
00 01	0aaa aaaa	Rhythm Group Name 2	(32 - 127)
00 02	0aaa aaaa	Rhythm Group Name 3	(32 - 127)
00 03	0aaa aaaa	Rhythm Group Name 4	(32 - 127)
00 04	0aaa aaaa	Rhythm Group Name 5	(32 - 127)
00 05	0aaa aaaa	Rhythm Group Name 6	(32 - 127)
00 06	0aaa aaaa	Rhythm Group Name 7	(32 - 127)
00 07	0aaa aaaa	Rhythm Group Name 8	(32 - 127)
00 08	0aaa aaaa	Rhythm Group Name 9	(32 - 127)
00 09	0aaa aaaa	Rhythm Group Name 10	(32 - 127)
00 0A	0aaa aaaa	Rhythm Group Name 11	(32 - 127)
00 0B	0aaa aaaa	Rhythm Group Name 12	(32 - 127)
00 0C	0aaa aaaa	Rhythm Group Name 13	(32 - 127)
00 0D	0aaa aaaa	Rhythm Group Name 14	(32 - 127)
00 0E	0aaa aaaa	Rhythm Group Name 15	(32 - 127)
00 0F	0aaa aaaa	Rhythm Group Name 16	(32 - 127)
00 10	0aaa aaaa	Recommended Rhythm Bank Select MSB	(0 - 127)
00 11	0aaa aaaa	Recommended Rhythm Bank Select LSB	(0 - 127)
00 12	0aaa aaaa	Recommended Rhythm Program Number	(0 - 127)
00 13	0aaa aaaa	(reserve) <*>	
00 14	0aaa aaaa	(reserve) <*>	
00 15	0aaa aaaa	Pad 1 Velocity	(1 - 127)
00 16	0000 000a	(reserve) <*>	
# 00 17	0000 aaaa		
	0000 bbbb	Pad 1 Rhythm Pattern Number	(0 - 255)
00 19	0aaa aaaa	(reserve) <*>	
00 1A	0aaa aaaa	(reserve) <*>	
00 1B	0aaa aaaa	Pad 2 Velocity	(1 - 127)
00 1C	0000 000a	(reserve) <*>	
# 00 1D	0000 aaaa		
	0000 bbbb	Pad 2 Rhythm Pattern Number	(0 - 255)
00 1F	0aaa aaaa	(reserve) <*>	
00 20	0aaa aaaa	(reserve) <*>	

	00 21	0aaa aaaa	Pad 3 Velocity	(1 - 127)
	00 22	0000 000a	(reserve) <*>	
#	00 23	0000 aaaa		
		0000 bbbb	Pad 3 Rhythm Pattern Number	(0 - 255)
	00 25	0aaa aaaa	(reserve) <*>	
	00 26	0aaa aaaa	(reserve) <*>	
	00 27	0aaa aaaa	Pad 4 Velocity	(1 - 127)
	00 28	0000 000a	(reserve) <*>	
#	00 29	0000 aaaa		
		0000 bbbb	Pad 4 Rhythm Pattern Number	(0 - 255)
	00 2B	0aaa aaaa	(reserve) <*>	
	00 2C	0aaa aaaa	(reserve) <*>	
	00 2D	0aaa aaaa	Pad 5 Velocity	(1 - 127)
	00 2E	0000 000a	(reserve) <*>	
#	00 2F	0000 aaaa		
		0000 bbbb	Pad 5 Rhythm Pattern Number	(0 - 255)
	00 31	0aaa aaaa	(reserve) <*>	
	00 32	0aaa aaaa	(reserve) <*>	
	00 33	0aaa aaaa	Pad 6 Velocity	(1 - 127)
	00 34	0000 000a	(reserve) <*>	
#	00 35	0000 aaaa		
		0000 bbbb	Pad 6 Rhythm Pattern Number	(0 - 255)
	00 37	0aaa aaaa	(reserve) <*>	
	00 38	0aaa aaaa	(reserve) <*>	
	00 39	0aaa aaaa	Pad 7 Velocity	(1 - 127)
	00 3A	0000 000a	(reserve) <*>	
#	00 3B	0000 aaaa		
		0000 bbbb	Pad 7 Rhythm Pattern Number	(0 - 255)
	00 3D	0aaa aaaa	(reserve) <*>	
	00 3E	0aaa aaaa	(reserve) <*>	
	00 3F	0aaa aaaa	Pad 8 Velocity	(1 - 127)
	00 40	0000 000a	(reserve) <*>	
#	00 41	0000 aaaa		
		0000 bbbb	Pad 8 Rhythm Pattern Number	(0 - 255)
	00 43	0aaa aaaa	(reserve) <*>	
	00 44	0aaa aaaa	(reserve) <*>	
	:			
#	00 71	0000 aaaa		
		0000 bbbb	(reserve) <*>	
	00 00 00 73	Total Size		

* Vocal Effect

Offset Address		Description	
00 00	0aaa aaaa	Vocal Effect Name 1	(32 - 127)
00 01	0aaa aaaa	Vocal Effect Name 2	(32 - 127)
00 02	0aaa aaaa	Vocal Effect Name 3	(32 - 127)
00 03	0aaa aaaa	Vocal Effect Name 4	(32 - 127)
00 04	0aaa aaaa	Vocal Effect Name 5	(32 - 127)
00 05	0aaa aaaa	Vocal Effect Name 6	(32 - 127)
00 06	0aaa aaaa	Vocal Effect Name 7	(32 - 127)
00 07	0aaa aaaa	Vocal Effect Name 8	(32 - 127)
00 08	0aaa aaaa	Vocal Effect Name 9	(32 - 127)
00 09	0aaa aaaa	Vocal Effect Name 10	(32 - 127)
00 0A	0aaa aaaa	Vocal Effect Name 11	(32 - 127)
00 0B	0aaa aaaa	Vocal Effect Name 12	(32 - 127)
00 0C	0000 00aa	Vocal Effect Type	(0 - 1) Vocoder, Auto-Pitch
00 0D	0000 000a	(reserve) <*>	

00 0E	0aaa aaaa	Recommended Patch Bank Select MSB	(0 - 127)
00 0F	0aaa aaaa	Recommended Patch Bank Select LSB	(0 - 127)
00 10	0aaa aaaa	Recommended Patch Program Number	(0 - 127)
00 11	0aaa aaaa	Level	(0 - 127)
00 12	0aaa aaaa	Pan	(0 - 127) L64 - 63R
00 13	0aaa aaaa	(reserve) <*>	
00 14	0aaa aaaa	(reserve) <*>	
00 15	0000 0aaa	(reserve) <*>	
00 16	0000 0aaa	Auto Pitch Type	(0 - 4) SOFT, HARD, ELECTRIC1, ELECTRIC2, ROBOT
00 17	0000 000a	Auto Pitch Scale	(0 - 1) CHROMATIC, Maj(Min)
00 18	000a aaaa	Auto Pitch Key	(0 - 23) C, Db, D, Eb, E, F, F#, G, Ab, A, Bb, B, Cm, C#m, Dm, D#m, Em, Fm, F#m, Gm, G#m, Am, Bbm, Bm
00 19	0000 aaaa	Auto Pitch Note	(0 - 11) C, C#, D, D#, E, F, F#, G, G#, A, A#, B
00 1A	000a aaaa	Auto Pitch Gender	(0 - 20) -10 - +10
00 1B	0000 00aa	Auto Pitch Octave	(0 - 2) -1 - +1
00 1C	0aaa aaaa	Auto Pitch Balance	(0 - 100) D100:0W - D0:100W
00 1D	0000 00aa	Vocoder Envelope	(0 - 2) SHARP, SOFT, LONG
00 1E	0aaa aaaa	Vocoder Mic Sens	(0 - 127)
00 1F	0aaa aaaa	Vocoder Synth Level	(0 - 127)
00 20	0aaa aaaa	Vocoder Mic Mix Level	(0 - 127)
00 21	0000 aaaa	Vocoder Mic HPF	(0 - 13) BYPASS, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000, 12500, 16000 [Hz]
00 22	0aaa aaaa	Part Level	(0 - 127)
00 00 00 23	Total Size		

* Patch Common

Offset Address		Description	
00 00	0aaa aaaa	Patch Name 1	(32 - 127) 32 - 127 [ASCII]
00 01	0aaa aaaa	Patch Name 2	(32 - 127) 32 - 127 [ASCII]
00 02	0aaa aaaa	Patch Name 3	(32 - 127) 32 - 127 [ASCII]
00 03	0aaa aaaa	Patch Name 4	(32 - 127) 32 - 127 [ASCII]
00 04	0aaa aaaa	Patch Name 5	(32 - 127) 32 - 127 [ASCII]
00 05	0aaa aaaa	Patch Name 6	(32 - 127) 32 - 127 [ASCII]
00 06	0aaa aaaa	Patch Name 7	(32 - 127) 32 - 127 [ASCII]
00 07	0aaa aaaa	Patch Name 8	(32 - 127) 32 - 127 [ASCII]
00 08	0aaa aaaa	Patch Name 9	(32 - 127) 32 - 127 [ASCII]
00 09	0aaa aaaa	Patch Name 10	(32 - 127) 32 - 127 [ASCII]
00 0A	0aaa aaaa	Patch Name 11	(32 - 127) 32 - 127 [ASCII]
00 0B	0aaa aaaa	Patch Name 12	(32 - 127) 32 - 127 [ASCII]
00 0C	0aaa aaaa	Patch Category	(0 - 127)

	00 0D	0000 000a	(reserve) <*>
	00 0E	0aaa aaaa	Patch Level (0 - 127)
	00 0F	0aaa aaaa	Patch Pan (0 - 127) L64 - 63R
	00 10	0000 000a	Patch Priority (0 - 1) LAST, LOUDEST
	00 11	0aaa aaaa	Patch Coarse Tune (16 - 112) -48 - +48
	00 12	0aaa aaaa	Patch Fine Tune (14 - 114) -50 - +50
	00 13	0000 0aaa	Octave Shift (61 - 67) -3 - +3
	00 14	0000 00aa	Stretch Tune Depth (0 - 3) OFF, 1 - 3
	00 15	0aaa aaaa	Analog Feel (0 - 127)
	00 16	0000 000a	Mono/Poly (0 - 1) MONO, POLY
	00 17	0000 000a	Legato Switch (0 - 1) OFF, ON
	00 18	0000 000a	Legato Retrigger (0 - 1) OFF, ON
	00 19	0000 000a	Portamento Switch (0 - 1) OFF, ON
	00 1A	0000 000a	Portamento Mode (0 - 1) NORMAL, LEGATO
	00 1B	0000 000a	Portamento Type (0 - 1) RATE, TIME
	00 1C	0000 000a	Portamento Start (0 - 1) PITCH, NOTE
	00 1D	0aaa aaaa	Portamento Time (0 - 127)
	00 1E	0000 000a	(reserve) <*>
#	00 1F	0000 aaaa	
		0000 bbbb	(reserve) <*>
	00 21	0000 000a	(reserve) <*>
	00 22	0aaa aaaa	Cutoff Offset (1 - 127) -63 - +63
	00 23	0aaa aaaa	Resonance Offset (1 - 127) -63 - +63
	00 24	0aaa aaaa	Attack Time Offset (1 - 127) -63 - +63
	00 25	0aaa aaaa	Release Time Offset (1 - 127) -63 - +63
	00 26	0aaa aaaa	Velocity Sens Offset (1 - 127) -63 - +63
	00 27	0000 aaaa	Patch Output Assign (0 - 13) MFX, A, ---, ---, ---, 1, 2, ---, ---, ---, ---, ---, ---, TONE
	00 28	0000 000a	TMT Control Switch (0 - 1) OFF, ON
	00 29	00aa aaaa	Pitch Bend Range Up (0 - 48)
	00 2A	00aa aaaa	Pitch Bend Range Down (0 - 48)
	00 2B	0aaa aaaa	Matrix Control 1 Source (0 - 109) OFF, CC01 - CC31, CC33 - CC95, BEND, AFT, SYS1 - SYS4, VELOCITY, KEYFOLLOW, TEMPO, LFO1, LFO2, PIT-ENV, TVF-ENV, TVA-ENV
	00 2C	00aa aaaa	Matrix Control 1 Destination 1 (0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL, TMT, FXM, MFX1, MFX2, MFX3, MFX4
	00 2D	0aaa aaaa	Matrix Control 1 Sens 1 (1 - 127) -63 - +63
	00 2E	00aa aaaa	Matrix Control 1 Destination 2 (0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1,

		PIT-LFO2, TVF-LFO1, TVF-LFO2,
		TVA-LFO1, TVA-LFO2, PAN-LFO1,
		PAN-LFO2, LFO1-RATE, LFO2-RATE,
		PIT-ATK, PIT-DCY, PIT-REL,
		TVF-ATK, TVF-DCY, TVF-REL,
		TVA-ATK, TVA-DCY, TVA-REL,
		TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 2F	0aaa aaaa	Matrix Control 1 Sens 2 (1 - 127)
		-63 - +63
00 30	00aa aaaa	Matrix Control 1 Destination 3 (0 - 33)
		OFF, PCH, CUT, RES, LEV, PAN,
		DRY, CHO, REV, PIT-LFO1,
		PIT-LFO2, TVF-LFO1, TVF-LFO2,
		TVA-LFO1, TVA-LFO2, PAN-LFO1,
		PAN-LFO2, LFO1-RATE, LFO2-RATE,
		PIT-ATK, PIT-DCY, PIT-REL,
		TVF-ATK, TVF-DCY, TVF-REL,
		TVA-ATK, TVA-DCY, TVA-REL,
		TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 31	0aaa aaaa	Matrix Control 1 Sens 3 (1 - 127)
		-63 - +63
00 32	00aa aaaa	Matrix Control 1 Destination 4 (0 - 33)
		OFF, PCH, CUT, RES, LEV, PAN,
		DRY, CHO, REV, PIT-LFO1,
		PIT-LFO2, TVF-LFO1, TVF-LFO2,
		TVA-LFO1, TVA-LFO2, PAN-LFO1,
		PAN-LFO2, LFO1-RATE, LFO2-RATE,
		PIT-ATK, PIT-DCY, PIT-REL,
		TVF-ATK, TVF-DCY, TVF-REL,
		TVA-ATK, TVA-DCY, TVA-REL,
		TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 33	0aaa aaaa	Matrix Control 1 Sens 4 (1 - 127)
		-63 - +63
00 34	0aaa aaaa	Matrix Control 2 Source (0 - 109)
		OFF, CC01 - CC31, CC33 - CC95,
		BEND, AFT, SYS1 - SYS4, VELOCITY,
		KEYFOLLOW, TEMPO, LFO1, LFO2,
		PIT-ENV, TVF-ENV, TVA-ENV
00 35	00aa aaaa	Matrix Control 2 Destination 1 (0 - 33)
		OFF, PCH, CUT, RES, LEV, PAN,
		DRY, CHO, REV, PIT-LFO1,
		PIT-LFO2, TVF-LFO1, TVF-LFO2,
		TVA-LFO1, TVA-LFO2, PAN-LFO1,
		PAN-LFO2, LFO1-RATE, LFO2-RATE,
		PIT-ATK, PIT-DCY, PIT-REL,
		TVF-ATK, TVF-DCY, TVF-REL,
		TVA-ATK, TVA-DCY, TVA-REL,
		TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 36	0aaa aaaa	Matrix Control 2 Sens 1 (1 - 127)
		-63 - +63
00 37	00aa aaaa	Matrix Control 2 Destination 2 (0 - 33)
		OFF, PCH, CUT, RES, LEV, PAN,
		DRY, CHO, REV, PIT-LFO1,
		PIT-LFO2, TVF-LFO1, TVF-LFO2,
		TVA-LFO1, TVA-LFO2, PAN-LFO1,
		PAN-LFO2, LFO1-RATE, LFO2-RATE,
		PIT-ATK, PIT-DCY, PIT-REL,
		TVF-ATK, TVF-DCY, TVF-REL,
		TVA-ATK, TVA-DCY, TVA-REL,
		TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 38	0aaa aaaa	Matrix Control 2 Sens 2 (1 - 127)
		-63 - +63
00 39	00aa aaaa	Matrix Control 2 Destination 3 (0 - 33)
		OFF, PCH, CUT, RES, LEV, PAN,
		DRY, CHO, REV, PIT-LFO1,
		PIT-LFO2, TVF-LFO1, TVF-LFO2,
		TVA-LFO1, TVA-LFO2, PAN-LFO1,
		PAN-LFO2, LFO1-RATE, LFO2-RATE,
		PIT-ATK, PIT-DCY, PIT-REL,
		TVF-ATK, TVF-DCY, TVF-REL,
		TVA-ATK, TVA-DCY, TVA-REL,
		TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 3A	0aaa aaaa	Matrix Control 2 Sens 3 (1 - 127)
		-63 - +63
00 3B	00aa aaaa	Matrix Control 2 Destination 4 (0 - 33)
		OFF, PCH, CUT, RES, LEV, PAN,
		DRY, CHO, REV, PIT-LFO1,

		PIT-LFO2, TVF-LFO1, TVF-LFO2,
		TVA-LFO1, TVA-LFO2, PAN-LFO1,
		PAN-LFO2, LFO1-RATE, LFO2-RATE,
		PIT-ATK, PIT-DCY, PIT-REL,
		TVF-ATK, TVF-DCY, TVF-REL,
		TVA-ATK, TVA-DCY, TVA-REL,
		TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 3C	0aaa aaaa	Matrix Control 2 Sens 4 (1 - 127)
		-63 - +63
00 3D	0aaa aaaa	Matrix Control 3 Source (0 - 109)
		OFF, CC01 - CC31, CC33 - CC95,
		BEND, AFT, SYS1 - SYS4, VELOCITY,
		KEYFOLLOW, TEMPO, LFO1, LFO2,
		PIT-ENV, TVF-ENV, TVA-ENV
00 3E	00aa aaaa	Matrix Control 3 Destination 1 (0 - 33)
		OFF, PCH, CUT, RES, LEV, PAN,
		DRY, CHO, REV, PIT-LFO1,
		PIT-LFO2, TVF-LFO1, TVF-LFO2,
		TVA-LFO1, TVA-LFO2, PAN-LFO1,
		PAN-LFO2, LFO1-RATE, LFO2-RATE,
		PIT-ATK, PIT-DCY, PIT-REL,
		TVF-ATK, TVF-DCY, TVF-REL,
		TVA-ATK, TVA-DCY, TVA-REL,
		TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 3F	0aaa aaaa	Matrix Control 3 Sens 1 (1 - 127)
		-63 - +63
00 40	00aa aaaa	Matrix Control 3 Destination 2 (0 - 33)
		OFF, PCH, CUT, RES, LEV, PAN,
		DRY, CHO, REV, PIT-LFO1,
		PIT-LFO2, TVF-LFO1, TVF-LFO2,
		TVA-LFO1, TVA-LFO2, PAN-LFO1,
		PAN-LFO2, LFO1-RATE, LFO2-RATE,
		PIT-ATK, PIT-DCY, PIT-REL,
		TVF-ATK, TVF-DCY, TVF-REL,
		TVA-ATK, TVA-DCY, TVA-REL,
		TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 41	0aaa aaaa	Matrix Control 3 Sens 2 (1 - 127)
		-63 - +63
00 42	00aa aaaa	Matrix Control 3 Destination 3 (0 - 33)
		OFF, PCH, CUT, RES, LEV, PAN,
		DRY, CHO, REV, PIT-LFO1,
		PIT-LFO2, TVF-LFO1, TVF-LFO2,
		TVA-LFO1, TVA-LFO2, PAN-LFO1,
		PAN-LFO2, LFO1-RATE, LFO2-RATE,
		PIT-ATK, PIT-DCY, PIT-REL,
		TVF-ATK, TVF-DCY, TVF-REL,
		TVA-ATK, TVA-DCY, TVA-REL,
		TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 43	0aaa aaaa	Matrix Control 3 Sens 3 (1 - 127)
		-63 - +63
00 44	00aa aaaa	Matrix Control 3 Destination 4 (0 - 33)
		OFF, PCH, CUT, RES, LEV, PAN,
		DRY, CHO, REV, PIT-LFO1,
		PIT-LFO2, TVF-LFO1, TVF-LFO2,
		TVA-LFO1, TVA-LFO2, PAN-LFO1,
		PAN-LFO2, LFO1-RATE, LFO2-RATE,
		PIT-ATK, PIT-DCY, PIT-REL,
		TVF-ATK, TVF-DCY, TVF-REL,
		TVA-ATK, TVA-DCY, TVA-REL,
		TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 45	0aaa aaaa	Matrix Control 3 Sens 4 (1 - 127)
		-63 - +63
00 46	0aaa aaaa	Matrix Control 4 Source (0 - 109)
		OFF, CC01 - CC31, CC33 - CC95,
		BEND, AFT, SYS1 - SYS4, VELOCITY,
		KEYFOLLOW, TEMPO, LFO1, LFO2,
		PIT-ENV, TVF-ENV, TVA-ENV
00 47	00aa aaaa	Matrix Control 4 Destination 1 (0 - 33)
		OFF, PCH, CUT, RES, LEV, PAN,
		DRY, CHO, REV, PIT-LFO1,
		PIT-LFO2, TVF-LFO1, TVF-LFO2,
		TVA-LFO1, TVA-LFO2, PAN-LFO1,
		PAN-LFO2, LFO1-RATE, LFO2-RATE,
		PIT-ATK, PIT-DCY, PIT-REL,
		TVF-ATK, TVF-DCY, TVF-REL,
		TVA-ATK, TVA-DCY, TVA-REL,

		TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 48	0aaa aaaa	Matrix Control 4 Sens 1 (1 - 127) / -63 - +63
00 49	00aa aaaa	Matrix Control 4 Destination 2 (0 - 33) / OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL, TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 4A	0aaa aaaa	Matrix Control 4 Sens 2 (1 - 127) / -63 - +63
00 4B	00aa aaaa	Matrix Control 4 Destination 3 (0 - 33) / OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL, TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 4C	0aaa aaaa	Matrix Control 4 Sens 3 (1 - 127) / -63 - +63
00 4D	00aa aaaa	Matrix Control 4 Destination 4 (0 - 33) / OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL, TMT, FXM, MFX1, MFX2, MFX3, MFX4
00 4E	0aaa aaaa	Matrix Control 4 Sens 4 (1 - 127) / -63 - +63
00 4F	0000 000a	Part Modulation Switch (0 - 1) / OFF, ON
00 00 00 50	Total Size	

* Patch Common MFX

Offset Address		Description
00 00	0aaa aaaa	MFX Type (0 - 80)
00 01	0aaa aaaa	MFX Dry Send Level (0 - 127)
00 02	0aaa aaaa	MFX Chorus Send Level (0 - 127)
00 03	0aaa aaaa	MFX Reverb Send Level (0 - 127)
00 04	0000 00aa	MFX Output Assign <*> / A, ---, ---, ---
00 05	0aaa aaaa	MFX Control 1 Source (0 - 101) / OFF, CC01 - CC31, CC33 - CC95, BEND, AFT, SYS1 - SYS4
00 06	0aaa aaaa	MFX Control 1 Sens (1 - 127) / -63 - +63
00 07	0aaa aaaa	MFX Control 2 Source (0 - 101) / OFF, CC01 - CC31, CC33 - CC95, BEND, AFT, SYS1 - SYS4
00 08	0aaa aaaa	MFX Control 2 Sens (1 - 127) / -63 - +63
00 09	0aaa aaaa	MFX Control 3 Source (0 - 101) / OFF, CC01 - CC31, CC33 - CC95, BEND, AFT, SYS1 - SYS4
00 0A	0aaa aaaa	MFX Control 3 Sens (1 - 127) / -63 - +63
00 0B	0aaa aaaa	MFX Control 4 Source (0 - 101) / OFF, CC01 - CC31, CC33 - CC95, BEND, AFT, SYS1 - SYS4
00 0C	0aaa aaaa	MFX Control 4 Sens (1 - 127) / -63 - +63

	00 0D	000a aaaa	MFX Control Assign 1		(0 - 16)
					OFF, 1 - 16
	00 0E	000a aaaa	MFX Control Assign 2		(0 - 16)
					OFF, 1 - 16
	00 0F	000a aaaa	MFX Control Assign 3		(0 - 16)
					OFF, 1 - 16
	00 10	000a aaaa	MFX Control Assign 4		(0 - 16)
					OFF, 1 - 16
#	00 11	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 1		(12768 - 52768)
					-20000 - +20000
#	00 15	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 2		(12768 - 52768)
					-20000 - +20000
#	00 19	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 3		(12768 - 52768)
					-20000 - +20000
#	00 1D	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 4		(12768 - 52768)
					-20000 - +20000
#	00 21	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 5		(12768 - 52768)
					-20000 - +20000
#	00 25	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 6		(12768 - 52768)
					-20000 - +20000
#	00 29	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 7		(12768 - 52768)
					-20000 - +20000
#	00 2D	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 8		(12768 - 52768)
					-20000 - +20000
#	00 31	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 9		(12768 - 52768)
					-20000 - +20000
#	00 35	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 10		(12768 - 52768)
					-20000 - +20000
#	00 39	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 11		(12768 - 52768)
					-20000 - +20000
#	00 3D	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 12		(12768 - 52768)
					-20000 - +20000
#	00 41	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 13		(12768 - 52768)
					-20000 - +20000
#	00 45	0000 aaaa			
		0000 bbbb			
		0000 cccc			
		0000 dddd	MFX Parameter 14		(12768 - 52768)

			-20000 - +20000
# 00 49	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 15	(12768 - 52768)
			-20000 - +20000
# 00 4D	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 16	(12768 - 52768)
			-20000 - +20000
# 00 51	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 17	(12768 - 52768)
			-20000 - +20000
# 00 55	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 18	(12768 - 52768)
			-20000 - +20000
# 00 59	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 19	(12768 - 52768)
			-20000 - +20000
# 00 5D	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 20	(12768 - 52768)
			-20000 - +20000
# 00 61	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 21	(12768 - 52768)
			-20000 - +20000
# 00 65	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 22	(12768 - 52768)
			-20000 - +20000
# 00 69	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 23	(12768 - 52768)
			-20000 - +20000
# 00 6D	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 24	(12768 - 52768)
			-20000 - +20000
# 00 71	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 25	(12768 - 52768)
			-20000 - +20000
# 00 75	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 26	(12768 - 52768)
			-20000 - +20000
# 00 79	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 27	(12768 - 52768)
			-20000 - +20000
# 00 7D	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 28	(12768 - 52768)
			-20000 - +20000
# 01 01	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 29	(12768 - 52768)
			-20000 - +20000
# 01 05	0000 aaaa		
	0000 bbbb		

	0000 cccc		
	0000 dddd	MFX Parameter 30	(12768 - 52768) -20000 - +20000
#	01 09	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	MFX Parameter 31	(12768 - 52768) -20000 - +20000
#	01 0D	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	MFX Parameter 32	(12768 - 52768) -20000 - +20000
00 00 01 11		Total Size	

* Patch Common Chorus

Offset Address		Description	
00 00	0000 aaaa	Chorus Type	(0 - 3)
00 01	0aaa aaaa	Chorus Level	(0 - 127)
00 02	0000 00aa	Chorus Output Assign <*>	A, ---, ---, ---
00 03	0000 00aa	Chorus Output Select	(0 - 2) MAIN, REV, MAIN+REV
#	00 04	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 1	(12768 - 52768) -20000 - +20000
#	00 08	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 2	(12768 - 52768) -20000 - +20000
#	00 0C	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 3	(12768 - 52768) -20000 - +20000
#	00 10	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 4	(12768 - 52768) -20000 - +20000
#	00 14	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 5	(12768 - 52768) -20000 - +20000
#	00 18	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 6	(12768 - 52768) -20000 - +20000
#	00 1C	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 7	(12768 - 52768) -20000 - +20000
#	00 20	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 8	(12768 - 52768) -20000 - +20000
#	00 24	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 9	(12768 - 52768) -20000 - +20000
#	00 28	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 10	(12768 - 52768)

			-20000 - +20000
#	00 2C	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 11 (12768 - 52768)
			-20000 - +20000
#	00 30	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 12 (12768 - 52768)
			-20000 - +20000
#	00 34	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 13 (12768 - 52768)
			-20000 - +20000
#	00 38	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 14 (12768 - 52768)
			-20000 - +20000
#	00 3C	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 15 (12768 - 52768)
			-20000 - +20000
#	00 40	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 16 (12768 - 52768)
			-20000 - +20000
#	00 44	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 17 (12768 - 52768)
			-20000 - +20000
#	00 48	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 18 (12768 - 52768)
			-20000 - +20000
#	00 4C	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 19 (12768 - 52768)
			-20000 - +20000
#	00 50	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 20 (12768 - 52768)
			-20000 - +20000
00 00 00 54		Total Size	

* Patch Common Reverb

Offset Address		Description	
00 00	0000 aaaa	Reverb Type	(0 - 5)
00 01	0aaa aaaa	Reverb Level	(0 - 127)
00 02	0000 00aa	Reverb Output Assign <*>	
			A, ---, ---, ---
#	00 03	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Reverb Parameter 1 (12768 - 52768)
			-20000 - +20000
#	00 07	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Reverb Parameter 2 (12768 - 52768)
			-20000 - +20000
#	00 0B	0000 aaaa	
		0000 bbbb	
		0000 cccc	

		0000 dddd	Reverb Parameter 3	(12768 - 52768)
				-20000 - +20000
#	00 0F	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 4	(12768 - 52768)
				-20000 - +20000
#	00 13	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 5	(12768 - 52768)
				-20000 - +20000
#	00 17	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 6	(12768 - 52768)
				-20000 - +20000
#	00 1B	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 7	(12768 - 52768)
				-20000 - +20000
#	00 1F	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 8	(12768 - 52768)
				-20000 - +20000
#	00 23	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 9	(12768 - 52768)
				-20000 - +20000
#	00 27	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 10	(12768 - 52768)
				-20000 - +20000
#	00 2B	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 11	(12768 - 52768)
				-20000 - +20000
#	00 2F	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 12	(12768 - 52768)
				-20000 - +20000
#	00 33	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 13	(12768 - 52768)
				-20000 - +20000
#	00 37	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 14	(12768 - 52768)
				-20000 - +20000
#	00 3B	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 15	(12768 - 52768)
				-20000 - +20000
#	00 3F	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 16	(12768 - 52768)
				-20000 - +20000
#	00 43	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 17	(12768 - 52768)
				-20000 - +20000
#	00 47	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	Reverb Parameter 18	(12768 - 52768)
				-20000 - +20000
#	00 4B	0000 aaaa		

	0000 bbbb		
	0000 cccc		
	0000 dddd	Reverb Parameter 19	(12768 - 52768)
			-20000 - +20000
# 00 4F	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	Reverb Parameter 20	(12768 - 52768)
			-20000 - +20000
00 00 00 53	Total Size		

* Patch TMT (Tone Mix Table)

Offset Address		Description	
00 00	0000 aaaa	Structure Type 1 & 2	(0 - 9)
			1 - 10
00 01	0000 00aa	Booster 1 & 2	(0 - 3)
			0, +6, +12, +18 [dB]
00 02	0000 aaaa	Structure Type 3 & 4	(0 - 9)
			1 - 10
00 03	0000 00aa	Booster 3 & 4	(0 - 3)
			0, +6, +12, +18 [dB]
00 04	0000 00aa	TMT Velocity Control	(0 - 3)
			OFF, ON, RANDOM, CYCLE
00 05	0000 000a	TMT1 Tone Switch	(0 - 1)
			OFF, ON
00 06	0aaa aaaa	TMT1 Keyboard Range Lower	(0 - 127)
			C-1 - UPPER
00 07	0aaa aaaa	TMT1 Keyboard Range Upper	(0 - 127)
			LOWER - G9
00 08	0aaa aaaa	TMT1 Keyboard Fade Width Lower	(0 - 127)
00 09	0aaa aaaa	TMT1 Keyboard Fade Width Upper	(0 - 127)
00 0A	0aaa aaaa	TMT1 Velocity Range Lower	(1 - 127)
			1 - UPPER
00 0B	0aaa aaaa	TMT1 Velocity Range Upper	(1 - 127)
			LOWER - 127
00 0C	0aaa aaaa	TMT1 Velocity Fade Width Lower	(0 - 127)
00 0D	0aaa aaaa	TMT1 Velocity Fade Width Upper	(0 - 127)
00 0E	0000 000a	TMT2 Tone Switch	(0 - 1)
			OFF, ON
00 0F	0aaa aaaa	TMT2 Keyboard Range Lower	(0 - 127)
			C-1 - UPPER
00 10	0aaa aaaa	TMT2 Keyboard Range Upper	(0 - 127)
			LOWER - G9
00 11	0aaa aaaa	TMT2 Keyboard Fade Width Lower	(0 - 127)
00 12	0aaa aaaa	TMT2 Keyboard Fade Width Upper	(0 - 127)
00 13	0aaa aaaa	TMT2 Velocity Range Lower	(1 - 127)
			1 - UPPER
00 14	0aaa aaaa	TMT2 Velocity Range Upper	(1 - 127)
			LOWER - 127
00 15	0aaa aaaa	TMT2 Velocity Fade Width Lower	(0 - 127)
00 16	0aaa aaaa	TMT2 Velocity Fade Width Upper	(0 - 127)
00 17	0000 000a	TMT3 Tone Switch	(0 - 1)
			OFF, ON
00 18	0aaa aaaa	TMT3 Keyboard Range Lower	(0 - 127)
			C-1 - UPPER
00 19	0aaa aaaa	TMT3 Keyboard Range Upper	(0 - 127)
			LOWER - G9
00 1A	0aaa aaaa	TMT3 Keyboard Fade Width Lower	(0 - 127)
00 1B	0aaa aaaa	TMT3 Keyboard Fade Width Upper	(0 - 127)
00 1C	0aaa aaaa	TMT3 Velocity Range Lower	(1 - 127)
			1 - UPPER
00 1D	0aaa aaaa	TMT3 Velocity Range Upper	(1 - 127)
			LOWER - 127
00 1E	0aaa aaaa	TMT3 Velocity Fade Width Lower	(0 - 127)
00 1F	0aaa aaaa	TMT3 Velocity Fade Width Upper	(0 - 127)
00 20	0000 000a	TMT4 Tone Switch	(0 - 1)
			OFF, ON
00 21	0aaa aaaa	TMT4 Keyboard Range Lower	(0 - 127)

			C-1 - UPPER
00 22	0aaa aaaa	TMT4 Keyboard Range Upper	(0 - 127)
			LOWER - G9
00 23	0aaa aaaa	TMT4 Keyboard Fade Width Lower	(0 - 127)
00 24	0aaa aaaa	TMT4 Keyboard Fade Width Upper	(0 - 127)
00 25	0aaa aaaa	TMT4 Velocity Range Lower	(1 - 127)
			1 - UPPER
00 26	0aaa aaaa	TMT4 Velocity Range Upper	(1 - 127)
			LOWER - 127
00 27	0aaa aaaa	TMT4 Velocity Fade Width Lower	(0 - 127)
00 28	0aaa aaaa	TMT4 Velocity Fade Width Upper	(0 - 127)
00 00 00 29	Total Size		

* Patch Tone

Offset Address		Description	
00 00	0aaa aaaa	Tone Level	(0 - 127)
00 01	0aaa aaaa	Tone Coarse Tune	(16 - 112)
			-48 - +48
00 02	0aaa aaaa	Tone Fine Tune	(14 - 114)
			-50 - +50
00 03	000a aaaa	Tone Random Pitch Depth	(0 - 30)
		0, 1, 2, 3, 4, 5, 6, 7, 8, 9,	
		10, 20, 30, 40, 50, 60, 70, 80,	
		90, 100, 200, 300, 400, 500,	
		600, 700, 800, 900, 1000, 1100,	
			1200
00 04	0aaa aaaa	Tone Pan	(0 - 127)
			L64 - 63R
00 05	000a aaaa	Tone Pan Keyfollow	(54 - 74)
			-100 - +100
00 06	00aa aaaa	Tone Random Pan Depth	(0 - 63)
00 07	0aaa aaaa	Tone Alternate Pan Depth	(1 - 127)
			L63 - 63R
00 08	0000 000a	Tone Env Mode	(0 - 1)
			NO-SUS, SUSTAIN
00 09	0000 00aa	Tone Delay Mode	(0 - 3)
		NORMAL, HOLD, KEY-OFF-NORMAL,	
			KEY-OFF-DECAY
# 00 0A	0000 aaaa		
	0000 bbbb	Tone Delay Time	(0 - 149)
		0 - 127, MUSICAL-NOTES	
00 0C	0aaa aaaa	Tone Dry Send Level	(0 - 127)
00 0D	0aaa aaaa	Tone Chorus Send Level (MFX)	(0 - 127)
00 0E	0aaa aaaa	Tone Reverb Send Level (MFX)	(0 - 127)
00 0F	0aaa aaaa	Tone Chorus Send Level (non MFX)	(0 - 127)
00 10	0aaa aaaa	Tone Reverb Send Level (non MFX)	(0 - 127)
00 11	0000 aaaa	Tone Output Assign	(0 - 12)
		MFX, A, ---, ---, ---,	
		1, 2, ---, ---, ---, ---, ---, ---	
00 12	0000 000a	Tone Receive Bender	(0 - 1)
			OFF, ON
00 13	0000 000a	Tone Receive Expression	(0 - 1)
			OFF, ON
00 14	0000 000a	Tone Receive Hold-1	(0 - 1)
			OFF, ON
00 15	0000 000a	Tone Receive Pan Mode	(0 - 1)
			CONTINUOUS, KEY-ON
00 16	0000 000a	Tone Redamper Switch	(0 - 1)
			OFF, ON
00 17	0000 00aa	Tone Control 1 Switch 1	(0 - 2)
			OFF, ON, REVERSE
00 18	0000 00aa	Tone Control 1 Switch 2	(0 - 2)
			OFF, ON, REVERSE
00 19	0000 00aa	Tone Control 1 Switch 3	(0 - 2)
			OFF, ON, REVERSE
00 1A	0000 00aa	Tone Control 1 Switch 4	(0 - 2)
			OFF, ON, REVERSE
00 1B	0000 00aa	Tone Control 2 Switch 1	(0 - 2)
			OFF, ON, REVERSE
00 1C	0000 00aa	Tone Control 2 Switch 2	(0 - 2)

			OFF, ON, REVERSE
	00 1D	0000 00aa	Tone Control 2 Switch 3 (0 - 2)
			OFF, ON, REVERSE
	00 1E	0000 00aa	Tone Control 2 Switch 4 (0 - 2)
			OFF, ON, REVERSE
	00 1F	0000 00aa	Tone Control 3 Switch 1 (0 - 2)
			OFF, ON, REVERSE
	00 20	0000 00aa	Tone Control 3 Switch 2 (0 - 2)
			OFF, ON, REVERSE
	00 21	0000 00aa	Tone Control 3 Switch 3 (0 - 2)
			OFF, ON, REVERSE
	00 22	0000 00aa	Tone Control 3 Switch 4 (0 - 2)
			OFF, ON, REVERSE
	00 23	0000 00aa	Tone Control 4 Switch 1 (0 - 2)
			OFF, ON, REVERSE
	00 24	0000 00aa	Tone Control 4 Switch 2 (0 - 2)
			OFF, ON, REVERSE
	00 25	0000 00aa	Tone Control 4 Switch 3 (0 - 2)
			OFF, ON, REVERSE
	00 26	0000 00aa	Tone Control 4 Switch 4 (0 - 2)
			OFF, ON, REVERSE
	00 27	0000 00aa	(reserve) <*>
#	00 28	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	(reserve) <*>
#	00 2C	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Wave Number L (Mono) (0 - 16384)
			OFF, 1 - 16384
#	00 30	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Wave Number R (0 - 16384)
			OFF, 1 - 16384
	00 34	0000 00aa	Wave Gain (0 - 3)
			-6, 0, +6, +12 [dB]
	00 35	0000 000a	Wave FXM Switch (0 - 1)
			OFF, ON
	00 36	0000 00aa	Wave FXM Color (0 - 3)
			1 - 4
	00 37	000a aaaa	Wave FXM Depth (0 - 16)
	00 38	0000 000a	Wave Tempo Sync (0 - 1)
			OFF, ON
	00 39	00aa aaaa	Wave Pitch Keyfollow (44 - 84)
			-200 - +200
	00 3A	000a aaaa	Pitch Env Depth (52 - 76)
			-12 - +12
	00 3B	0aaa aaaa	Pitch Env Velocity Sens (1 - 127)
			-63 - +63
	00 3C	0aaa aaaa	Pitch Env Time 1 Velocity Sens (1 - 127)
			-63 - +63
	00 3D	0aaa aaaa	Pitch Env Time 4 Velocity Sens (1 - 127)
			-63 - +63
	00 3E	000a aaaa	Pitch Env Time Keyfollow (54 - 74)
			-100 - +100
	00 3F	0aaa aaaa	Pitch Env Time 1 (0 - 127)
	00 40	0aaa aaaa	Pitch Env Time 2 (0 - 127)
	00 41	0aaa aaaa	Pitch Env Time 3 (0 - 127)
	00 42	0aaa aaaa	Pitch Env Time 4 (0 - 127)
	00 43	0aaa aaaa	Pitch Env Level 0 (1 - 127)
			-63 - +63
	00 44	0aaa aaaa	Pitch Env Level 1 (1 - 127)
			-63 - +63
	00 45	0aaa aaaa	Pitch Env Level 2 (1 - 127)
			-63 - +63
	00 46	0aaa aaaa	Pitch Env Level 3 (1 - 127)
			-63 - +63
	00 47	0aaa aaaa	Pitch Env Level 4 (1 - 127)
			-63 - +63
	00 48	0000 0aaa	TVF Filter Type (0 - 6)
			OFF, LPF, BPF, HPF, PKG, LPF2, LPF3

	00 49	0aaa aaaa	TVF Cutoff Frequency	(0 - 127)
	00 4A	00aa aaaa	TVF Cutoff Keyfollow	(44 - 84) -200 - +200
	00 4B	0000 0aaa	TVF Cutoff Velocity Curve	(0 - 7) FIXED, 1 - 7
	00 4C	0aaa aaaa	TVF Cutoff Velocity Sens	(1 - 127) -63 - +63
	00 4D	0aaa aaaa	TVF Resonance	(0 - 127)
	00 4E	0aaa aaaa	TVF Resonance Velocity Sens	(1 - 127) -63 - +63
	00 4F	0aaa aaaa	TVF Env Depth	(1 - 127) -63 - +63
	00 50	0000 0aaa	TVF Env Velocity Curve	(0 - 7) FIXED, 1 - 7
	00 51	0aaa aaaa	TVF Env Velocity Sens	(1 - 127) -63 - +63
	00 52	0aaa aaaa	TVF Env Time 1 Velocity Sens	(1 - 127) -63 - +63
	00 53	0aaa aaaa	TVF Env Time 4 Velocity Sens	(1 - 127) -63 - +63
	00 54	000a aaaa	TVF Env Time Keyfollow	(54 - 74) -100 - +100
	00 55	0aaa aaaa	TVF Env Time 1	(0 - 127)
	00 56	0aaa aaaa	TVF Env Time 2	(0 - 127)
	00 57	0aaa aaaa	TVF Env Time 3	(0 - 127)
	00 58	0aaa aaaa	TVF Env Time 4	(0 - 127)
	00 59	0aaa aaaa	TVF Env Level 0	(0 - 127)
	00 5A	0aaa aaaa	TVF Env Level 1	(0 - 127)
	00 5B	0aaa aaaa	TVF Env Level 2	(0 - 127)
	00 5C	0aaa aaaa	TVF Env Level 3	(0 - 127)
	00 5D	0aaa aaaa	TVF Env Level 4	(0 - 127)
	00 5E	000a aaaa	Bias Level	(54 - 74) -100 - +100
	00 5F	0aaa aaaa	Bias Position	(0 - 127) C-1 - G9
	00 60	0000 00aa	Bias Direction	(0 - 3) LOWER, UPPER, LOWER&UPPER, ALL
	00 61	0000 0aaa	TVA Level Velocity Curve	(0 - 7) FIXED, 1 - 7
	00 62	0aaa aaaa	TVA Level Velocity Sens	(1 - 127) -63 - +63
	00 63	0aaa aaaa	TVA Env Time 1 Velocity Sens	(1 - 127) -63 - +63
	00 64	0aaa aaaa	TVA Env Time 4 Velocity Sens	(1 - 127) -63 - +63
	00 65	000a aaaa	TVA Env Time Keyfollow	(54 - 74) -100 - +100
	00 66	0aaa aaaa	TVA Env Time 1	(0 - 127)
	00 67	0aaa aaaa	TVA Env Time 2	(0 - 127)
	00 68	0aaa aaaa	TVA Env Time 3	(0 - 127)
	00 69	0aaa aaaa	TVA Env Time 4	(0 - 127)
	00 6A	0aaa aaaa	TVA Env Level 1	(0 - 127)
	00 6B	0aaa aaaa	TVA Env Level 2	(0 - 127)
	00 6C	0aaa aaaa	TVA Env Level 3	(0 - 127)
	00 6D	0000 aaaa	LFO1 Waveform	(0 - 12) SIN, TRI, SAW-UP, SAW-DW, SQR, RND, BEND-UP, BEND-DW, TRP, S&H, CHS, VSIN, STEP
#	00 6E	0000 aaaa		
		0000 bbbb	LFO1 Rate	(0 - 149) 0 - 127, MUSICAL-NOTES
	00 70	0000 0aaa	LFO1 Offset	(0 - 4) -100, -50, 0, +50, +100
	00 71	0aaa aaaa	LFO1 Rate Detune	(0 - 127)
	00 72	0aaa aaaa	LFO1 Delay Time	(0 - 127)
	00 73	000a aaaa	LFO1 Delay Time Keyfollow	(54 - 74) -100 - +100
	00 74	0000 00aa	LFO1 Fade Mode	(0 - 3) ON-IN, ON-OUT, OFF-IN, OFF-OUT
	00 75	0aaa aaaa	LFO1 Fade Time	(0 - 127)
	00 76	0000 000a	LFO1 Key Trigger	(0 - 1) OFF, ON
	00 77	0aaa aaaa	LFO1 Pitch Depth	(1 - 127) -63 - +63
	00 78	0aaa aaaa	LFO1 TVF Depth	(1 - 127) -63 - +63

	00 79	0aaa aaaa	LFO1 TVA Depth	(1 - 127)
				-63 - +63
	00 7A	0aaa aaaa	LFO1 Pan Depth	(1 - 127)
				-63 - +63
	00 7B	0000 aaaa	LFO2 Waveform	(0 - 12)
				SIN, TRI, SAW-UP, SAW-DW, SQR,
				RND, BEND-UP, BEND-DW, TRP, S&H,
				CHS, VSIN, STEP
#	00 7C	0000 aaaa		
		0000 bbbb	LFO2 Rate	(0 - 149)
				0 - 127, MUSICAL-NOTES
	00 7E	0000 0aaa	LFO2 Offset	(0 - 4)
				-100, -50, 0, +50, +100
	00 7F	0aaa aaaa	LFO2 Rate Detune	(0 - 127)
	01 00	0aaa aaaa	LFO2 Delay Time	(0 - 127)
	01 01	000a aaaa	LFO2 Delay Time Keyfollow	(54 - 74)
				-100 - +100
	01 02	0000 00aa	LFO2 Fade Mode	(0 - 3)
				ON-IN, ON-OUT, OFF-IN, OFF-OUT
	01 03	0aaa aaaa	LFO2 Fade Time	(0 - 127)
	01 04	0000 000a	LFO2 Key Trigger	(0 - 1)
				OFF, ON
	01 05	0aaa aaaa	LFO2 Pitch Depth	(1 - 127)
				-63 - +63
	01 06	0aaa aaaa	LFO2 TVF Depth	(1 - 127)
				-63 - +63
	01 07	0aaa aaaa	LFO2 TVA Depth	(1 - 127)
				-63 - +63
	01 08	0aaa aaaa	LFO2 Pan Depth	(1 - 127)
				-63 - +63
	01 09	0000 aaaa	LFO Step Type	(0 - 1)
	01 0A	0aaa aaaa	LFO Step1	(28 - 100)
				-36 - +36
	01 0B	0aaa aaaa	LFO Step2	(28 - 100)
				-36 - +36
	01 0C	0aaa aaaa	LFO Step3	(28 - 100)
				-36 - +36
	01 0D	0aaa aaaa	LFO Step4	(28 - 100)
				-36 - +36
	01 0E	0aaa aaaa	LFO Step5	(28 - 100)
				-36 - +36
	01 0F	0aaa aaaa	LFO Step6	(28 - 100)
				-36 - +36
	01 10	0aaa aaaa	LFO Step7	(28 - 100)
				-36 - +36
	01 11	0aaa aaaa	LFO Step8	(28 - 100)
				-36 - +36
	01 12	0aaa aaaa	LFO Step9	(28 - 100)
				-36 - +36
	01 13	0aaa aaaa	LFO Step10	(28 - 100)
				-36 - +36
	01 14	0aaa aaaa	LFO Step11	(28 - 100)
				-36 - +36
	01 15	0aaa aaaa	LFO Step12	(28 - 100)
				-36 - +36
	01 16	0aaa aaaa	LFO Step13	(28 - 100)
				-36 - +36
	01 17	0aaa aaaa	LFO Step14	(28 - 100)
				-36 - +36
	01 18	0aaa aaaa	LFO Step15	(28 - 100)
				-36 - +36
	01 19	0aaa aaaa	LFO Step16	(28 - 100)
				-36 - +36
	00 00 01 1A	Total Size		

* Drum Common

Offset Address		Description	
00 00	0aaa aaaa	Drum Name 1	(32 - 127)
			32 - 127 [ASCII]
00 01	0aaa aaaa	Drum Name 2	(32 - 127)
			32 - 127 [ASCII]
00 02	0aaa aaaa	Drum Name 3	(32 - 127)
			32 - 127 [ASCII]
00 03	0aaa aaaa	Drum Name 4	(32 - 127)
			32 - 127 [ASCII]
00 04	0aaa aaaa	Drum Name 5	(32 - 127)
			32 - 127 [ASCII]
00 05	0aaa aaaa	Drum Name 6	(32 - 127)
			32 - 127 [ASCII]
00 06	0aaa aaaa	Drum Name 7	(32 - 127)
			32 - 127 [ASCII]
00 07	0aaa aaaa	Drum Name 8	(32 - 127)
			32 - 127 [ASCII]
00 08	0aaa aaaa	Drum Name 9	(32 - 127)
			32 - 127 [ASCII]
00 09	0aaa aaaa	Drum Name 10	(32 - 127)
			32 - 127 [ASCII]
00 0A	0aaa aaaa	Drum Name 11	(32 - 127)
			32 - 127 [ASCII]
00 0B	0aaa aaaa	Drum Name 12	(32 - 127)
			32 - 127 [ASCII]
00 0C	0aaa aaaa	Drum Level	(0 - 127)
00 0D	0000 000a	(reserve) <*>	
# 00 0E	0000 aaaa		
	0000 bbbb	(reserve) <*>	
00 10	0000 000a	(reserve) <*>	
00 11	0000 aaaa	Drum Output Assign	(0 - 13)
			MFX, A, ---, ---, ---,
			1, 2, ---, ---, ---, ---, ---, ---,
			TONE
00 00 00 12	Total Size		

* Drum Common MFX

Offset Address		Description	
00 00	0aaa aaaa	MFX Type	(0 - 80)
00 01	0aaa aaaa	MFX Dry Send Level	(0 - 127)
00 02	0aaa aaaa	MFX Chorus Send Level	(0 - 127)
00 03	0aaa aaaa	MFX Reverb Send Level	(0 - 127)
00 04	0000 00aa	MFX Output Assign <*>	
			A, ---, ---, ---
00 05	0aaa aaaa	MFX Control 1 Source	(0 - 101)
			OFF, CC01 - CC31, CC33 - CC95,
			BEND, AFT, SYS1 - SYS4
00 06	0aaa aaaa	MFX Control 1 Sens	(1 - 127)
			-63 - +63
00 07	0aaa aaaa	MFX Control 2 Source	(0 - 101)
			OFF, CC01 - CC31, CC33 - CC95,
			BEND, AFT, SYS1 - SYS4
00 08	0aaa aaaa	MFX Control 2 Sens	(1 - 127)
			-63 - +63
00 09	0aaa aaaa	MFX Control 3 Source	(0 - 101)
			OFF, CC01 - CC31, CC33 - CC95,
			BEND, AFT, SYS1 - SYS4
00 0A	0aaa aaaa	MFX Control 3 Sens	(1 - 127)
			-63 - +63
00 0B	0aaa aaaa	MFX Control 4 Source	(0 - 101)
			OFF, CC01 - CC31, CC33 - CC95,
			BEND, AFT, SYS1 - SYS4
00 0C	0aaa aaaa	MFX Control 4 Sens	(1 - 127)
			-63 - +63
00 0D	000a aaaa	MFX Control Assign 1	(0 - 16)

			OFF, 1 - 16
00 0E	000a aaaa	MFX Control Assign 2	(0 - 16)
			OFF, 1 - 16
00 0F	000a aaaa	MFX Control Assign 3	(0 - 16)
			OFF, 1 - 16
00 10	000a aaaa	MFX Control Assign 4	(0 - 16)
			OFF, 1 - 16
# 00 11	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 1	(12768 - 52768)
			-20000 - +20000
# 00 15	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 2	(12768 - 52768)
			-20000 - +20000
# 00 19	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 3	(12768 - 52768)
			-20000 - +20000
# 00 1D	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 4	(12768 - 52768)
			-20000 - +20000
# 00 21	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 5	(12768 - 52768)
			-20000 - +20000
# 00 25	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 6	(12768 - 52768)
			-20000 - +20000
# 00 29	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 7	(12768 - 52768)
			-20000 - +20000
# 00 2D	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 8	(12768 - 52768)
			-20000 - +20000
# 00 31	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 9	(12768 - 52768)
			-20000 - +20000
# 00 35	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 10	(12768 - 52768)
			-20000 - +20000
# 00 39	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 11	(12768 - 52768)
			-20000 - +20000
# 00 3D	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 12	(12768 - 52768)
			-20000 - +20000
# 00 41	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 13	(12768 - 52768)
			-20000 - +20000
# 00 45	0000 aaaa		
	0000 bbbb		
	0000 cccc		
	0000 dddd	MFX Parameter 14	(12768 - 52768)
			-20000 - +20000
# 00 49	0000 aaaa		

		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 15	(12768 - 52768)
				-20000 - +20000
#	00 4D	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 16	(12768 - 52768)
				-20000 - +20000
#	00 51	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 17	(12768 - 52768)
				-20000 - +20000
#	00 55	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 18	(12768 - 52768)
				-20000 - +20000
#	00 59	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 19	(12768 - 52768)
				-20000 - +20000
#	00 5D	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 20	(12768 - 52768)
				-20000 - +20000
#	00 61	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 21	(12768 - 52768)
				-20000 - +20000
#	00 65	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 22	(12768 - 52768)
				-20000 - +20000
#	00 69	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 23	(12768 - 52768)
				-20000 - +20000
#	00 6D	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 24	(12768 - 52768)
				-20000 - +20000
#	00 71	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 25	(12768 - 52768)
				-20000 - +20000
#	00 75	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 26	(12768 - 52768)
				-20000 - +20000
#	00 79	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 27	(12768 - 52768)
				-20000 - +20000
#	00 7D	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 28	(12768 - 52768)
				-20000 - +20000
#	01 01	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 29	(12768 - 52768)
				-20000 - +20000
#	01 05	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	MFX Parameter 30	(12768 - 52768)

			-20000 - +20000
#	01 09	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	MFX Parameter 31 (12768 - 52768)
			-20000 - +20000
#	01 0D	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	MFX Parameter 32 (12768 - 52768)
			-20000 - +20000
	00 00 01 11	Total Size	

* Drum Common Chorus

Offset Address		Description	
	00 00	0000 aaaa	Chorus Type (0 - 3)
	00 01	0aaa aaaa	Chorus Level (0 - 127)
	00 02	0000 00aa	Chorus Output Assign <*>
			A, ---, ---, ---
	00 03	0000 00aa	Chorus Output Select (0 - 2)
			MAIN, REV, MAIN+REV
#	00 04	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 1 (12768 - 52768)
			-20000 - +20000
#	00 08	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 2 (12768 - 52768)
			-20000 - +20000
#	00 0C	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 3 (12768 - 52768)
			-20000 - +20000
#	00 10	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 4 (12768 - 52768)
			-20000 - +20000
#	00 14	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 5 (12768 - 52768)
			-20000 - +20000
#	00 18	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 6 (12768 - 52768)
			-20000 - +20000
#	00 1C	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 7 (12768 - 52768)
			-20000 - +20000
#	00 20	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 8 (12768 - 52768)
			-20000 - +20000
#	00 24	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 9 (12768 - 52768)
			-20000 - +20000
#	00 28	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 10 (12768 - 52768)
			-20000 - +20000
#	00 2C	0000 aaaa	

	0000 bbbb		
	0000 cccc		
	0000 dddd	Chorus Parameter 11	(12768 - 52768)
			-20000 - +20000
#	00 30	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 12	(12768 - 52768)
			-20000 - +20000
#	00 34	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 13	(12768 - 52768)
			-20000 - +20000
#	00 38	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 14	(12768 - 52768)
			-20000 - +20000
#	00 3C	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 15	(12768 - 52768)
			-20000 - +20000
#	00 40	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 16	(12768 - 52768)
			-20000 - +20000
#	00 44	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 17	(12768 - 52768)
			-20000 - +20000
#	00 48	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 18	(12768 - 52768)
			-20000 - +20000
#	00 4C	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 19	(12768 - 52768)
			-20000 - +20000
#	00 50	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Chorus Parameter 20	(12768 - 52768)
			-20000 - +20000
	00 00 00 54	Total Size	

* Drum Common Reverb

Offset Address		Description	
	00 00	0000 aaaa	Reverb Type	(0 - 5)
	00 01	0aaa aaaa	Reverb Level	(0 - 127)
	00 02	0000 00aa	Reverb Output Assign <*>	
			A, ---, ---, ---
#	00 03	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Reverb Parameter 1	(12768 - 52768)
			-20000 - +20000
#	00 07	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Reverb Parameter 2	(12768 - 52768)
			-20000 - +20000
#	00 0B	0000 aaaa	
		0000 bbbb	
		0000 cccc	
		0000 dddd	Reverb Parameter 3	(12768 - 52768)
			-20000 - +20000
#	00 0F	0000 aaaa	

	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 4	(12768 - 52768)	
			-20000 - +20000	
# 00 13	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 5	(12768 - 52768)	
			-20000 - +20000	
# 00 17	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 6	(12768 - 52768)	
			-20000 - +20000	
# 00 1B	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 7	(12768 - 52768)	
			-20000 - +20000	
# 00 1F	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 8	(12768 - 52768)	
			-20000 - +20000	
# 00 23	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 9	(12768 - 52768)	
			-20000 - +20000	
# 00 27	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 10	(12768 - 52768)	
			-20000 - +20000	
# 00 2B	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 11	(12768 - 52768)	
			-20000 - +20000	
# 00 2F	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 12	(12768 - 52768)	
			-20000 - +20000	
# 00 33	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 13	(12768 - 52768)	
			-20000 - +20000	
# 00 37	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 14	(12768 - 52768)	
			-20000 - +20000	
# 00 3B	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 15	(12768 - 52768)	
			-20000 - +20000	
# 00 3F	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 16	(12768 - 52768)	
			-20000 - +20000	
# 00 43	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 17	(12768 - 52768)	
			-20000 - +20000	
# 00 47	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 18	(12768 - 52768)	
			-20000 - +20000	
# 00 4B	0000 aaaa			
	0000 bbbb			
	0000 cccc			
	0000 dddd	Reverb Parameter 19	(12768 - 52768)	
			-20000 - +20000	
# 00 4F	0000 aaaa			
	0000 bbbb			

	0000 cccc		
	0000 dddd	Reverb Parameter 20	(12768 - 52768)
			-20000 - +20000
00 00 00 53	Total Size		

* Drum Tone

Offset Address		Description	
00 00	0aaa aaaa	Tone Name 1	(32 - 127)
			32 - 127 [ASCII]
00 01	0aaa aaaa	Tone Name 2	(32 - 127)
			32 - 127 [ASCII]
00 02	0aaa aaaa	Tone Name 3	(32 - 127)
			32 - 127 [ASCII]
00 03	0aaa aaaa	Tone Name 4	(32 - 127)
			32 - 127 [ASCII]
00 04	0aaa aaaa	Tone Name 5	(32 - 127)
			32 - 127 [ASCII]
00 05	0aaa aaaa	Tone Name 6	(32 - 127)
			32 - 127 [ASCII]
00 06	0aaa aaaa	Tone Name 7	(32 - 127)
			32 - 127 [ASCII]
00 07	0aaa aaaa	Tone Name 8	(32 - 127)
			32 - 127 [ASCII]
00 08	0aaa aaaa	Tone Name 9	(32 - 127)
			32 - 127 [ASCII]
00 09	0aaa aaaa	Tone Name 10	(32 - 127)
			32 - 127 [ASCII]
00 0A	0aaa aaaa	Tone Name 11	(32 - 127)
			32 - 127 [ASCII]
00 0B	0aaa aaaa	Tone Name 12	(32 - 127)
			32 - 127 [ASCII]
00 0C	0000 000a	Assign Type	(0 - 1)
			MULTI, SINGLE
00 0D	000a aaaa	Mute Group	(0 - 31)
			OFF, 1 - 31
00 0E	0aaa aaaa	Tone Level	(0 - 127)
00 0F	0aaa aaaa	Tone Coarse Tune	(0 - 127)
			C-1 - G9
00 10	0aaa aaaa	Tone Fine Tune	(14 - 114)
			-50 - +50
00 11	000a aaaa	Tone Random Pitch Depth	(0 - 30)
			0, 1, 2, 3, 4, 5, 6, 7, 8, 9,
			10, 20, 30, 40, 50, 60, 70, 80,
			90, 100, 200, 300, 400, 500,
			600, 700, 800, 900, 1000, 1100,
			1200
00 12	0aaa aaaa	Tone Pan	(0 - 127)
			L64 - 63R
00 13	00aa aaaa	Tone Random Pan Depth	(0 - 63)
00 14	0aaa aaaa	Tone Alternate Pan Depth	(1 - 127)
			L63 - 63R
00 15	0000 000a	Tone Env Mode	(0 - 1)
			NO-SUS, SUSTAIN
00 16	0aaa aaaa	Tone Dry Send Level	(0 - 127)
00 17	0aaa aaaa	Tone Chorus Send Level	(0 - 127)
00 18	0aaa aaaa	Tone Reverb Send Level	(0 - 127)
00 19	0aaa aaaa	Tone Chorus Send Level (non MFX)	(0 - 127)
00 1A	0aaa aaaa	Tone Reverb Send Level (non MFX)	(0 - 127)
00 1B	0000 aaaa	Tone Output Assign	(0 - 12)
			MFX, A, ---, ---, ---,
			1, 2, ---, ---, ---, ---, ---, ---
00 1C	00aa aaaa	Tone Pitch Bend Range	(0 - 48)
00 1D	0000 000a	Tone Receive Expression	(0 - 1)
			OFF, ON
00 1E	0000 000a	Tone Receive Hold-1	(0 - 1)
			OFF, ON
00 1F	0000 000a	Tone Receive Pan Mode	(0 - 1)
			CONTINUOUS, KEY-ON

	00 20	0000 00aa	WMT Velocity Control	(0 - 2)
				OFF, ON, RANDOM
	00 21	0000 000a	WMT1 Wave Switch	(0 - 1)
				OFF, ON
	00 22	0000 00aa	(reserve) <*>	
#	00 23	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	(reserve) <*>	
#	00 27	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	WMT1 Wave Number L (Mono)	(0 - 16384)
				OFF, 1 - 16384
#	00 2B	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	WMT1 Wave Number R	(0 - 16384)
				OFF, 1 - 16384
	00 2F	0000 00aa	WMT1 Wave Gain	(0 - 3)
				-6, 0, +6, +12 [dB]
	00 30	0000 000a	WMT1 Wave FXM Switch	(0 - 1)
				OFF, ON
	00 31	0000 00aa	WMT1 Wave FXM Color	(0 - 3)
				1 - 4
	00 32	000a aaaa	WMT1 Wave FXM Depth	(0 - 16)
	00 33	0000 000a	WMT1 Wave Tempo Sync	(0 - 1)
				OFF, ON
	00 34	0aaa aaaa	WMT1 Wave Coarse Tune	(16 - 112)
				-48 - +48
	00 35	0aaa aaaa	WMT1 Wave Fine Tune	(14 - 114)
				-50 - +50
	00 36	0aaa aaaa	WMT1 Wave Pan	(0 - 127)
				L64 - 63R
	00 37	0000 000a	WMT1 Wave Random Pan Switch	(0 - 1)
				OFF, ON
	00 38	0000 00aa	WMT1 Wave Alternate Pan Switch	(0 - 2)
				OFF, ON, REVERSE
	00 39	0aaa aaaa	WMT1 Wave Level	(0 - 127)
	00 3A	0aaa aaaa	WMT1 Velocity Range Lower	(1 - 127)
				1 - UPPER
	00 3B	0aaa aaaa	WMT1 Velocity Range Upper	(1 - 127)
				LOWER - 127
	00 3C	0aaa aaaa	WMT1 Velocity Fade Width Lower	(0 - 127)
	00 3D	0aaa aaaa	WMT1 Velocity Fade Width Upper	(0 - 127)
	00 3E	0000 000a	WMT2 Wave Switch	(0 - 1)
				OFF, ON
	00 3F	0000 00aa	(reserve) <*>	
#	00 40	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	(reserve) <*>	
#	00 44	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	WMT2 Wave Number L (Mono)	(0 - 16384)
				OFF, 1 - 16384
#	00 48	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	WMT2 Wave Number R	(0 - 16384)
				OFF, 1 - 16384
	00 4C	0000 00aa	WMT2 Wave Gain	(0 - 3)
				-6, 0, +6, +12 [dB]
	00 4D	0000 000a	WMT2 Wave FXM Switch	(0 - 1)
				OFF, ON
	00 4E	0000 00aa	WMT2 Wave FXM Color	(0 - 3)
				1 - 4
	00 4F	000a aaaa	WMT2 Wave FXM Depth	(0 - 16)
	00 50	0000 000a	WMT2 Wave Tempo Sync	(0 - 1)
				OFF, ON
	00 51	0aaa aaaa	WMT2 Wave Coarse Tune	(16 - 112)
				-48 - +48

	00 52	0aaa aaaa	WMT2 Wave Fine Tune	(14 - 114)
				-50 - +50
	00 53	0aaa aaaa	WMT2 Wave Pan	(0 - 127)
				L64 - 63R
	00 54	0000 000a	WMT2 Wave Random Pan Switch	(0 - 1)
				OFF, ON
	00 55	0000 00aa	WMT2 Wave Alternate Pan Switch	(0 - 2)
				OFF, ON, REVERSE
	00 56	0aaa aaaa	WMT2 Wave Level	(0 - 127)
	00 57	0aaa aaaa	WMT2 Velocity Range Lower	(1 - 127)
				1 - UPPER
	00 58	0aaa aaaa	WMT2 Velocity Range Upper	(1 - 127)
				LOWER - 127
	00 59	0aaa aaaa	WMT2 Velocity Fade Width Lower	(0 - 127)
	00 5A	0aaa aaaa	WMT2 Velocity Fade Width Upper	(0 - 127)
	00 5B	0000 000a	WMT3 Wave Switch	(0 - 1)
				OFF, ON
	00 5C	0000 00aa	(reserve) <*>	
#	00 5D	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	(reserve) <*>	
#	00 61	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	WMT3 Wave Number L (Mono)	(0 - 16384)
				OFF, 1 - 16384
#	00 65	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	WMT3 Wave Number R	(0 - 16384)
				OFF, 1 - 16384
	00 69	0000 00aa	WMT3 Wave Gain	(0 - 3)
				-6, 0, +6, +12 [dB]
	00 6A	0000 000a	WMT3 Wave FXM Switch	(0 - 1)
				OFF, ON
	00 6B	0000 00aa	WMT3 Wave FXM Color	(0 - 3)
				1 - 4
	00 6C	000a aaaa	WMT3 Wave FXM Depth	(0 - 16)
	00 6D	0000 000a	WMT3 Wave Tempo Sync	(0 - 1)
				OFF, ON
	00 6E	0aaa aaaa	WMT3 Wave Coarse Tune	(16 - 112)
				-48 - +48
	00 6F	0aaa aaaa	WMT3 Wave Fine Tune	(14 - 114)
				-50 - +50
	00 70	0aaa aaaa	WMT3 Wave Pan	(0 - 127)
				L64 - 63R
	00 71	0000 000a	WMT3 Wave Random Pan Switch	(0 - 1)
				OFF, ON
	00 72	0000 00aa	WMT3 Wave Alternate Pan Switch	(0 - 2)
				OFF, ON, REVERSE
	00 73	0aaa aaaa	WMT3 Wave Level	(0 - 127)
	00 74	0aaa aaaa	WMT3 Velocity Range Lower	(1 - 127)
				1 - UPPER
	00 75	0aaa aaaa	WMT3 Velocity Range Upper	(1 - 127)
				LOWER - 127
	00 76	0aaa aaaa	WMT3 Velocity Fade Width Lower	(0 - 127)
	00 77	0aaa aaaa	WMT3 Velocity Fade Width Upper	(0 - 127)
	00 78	0000 000a	WMT4 Wave Switch	(0 - 1)
				OFF, ON
	00 79	0000 00aa	(reserve) <*>	
#	00 7A	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	(reserve) <*>	
#	00 7E	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	WMT4 Wave Number L (Mono)	(0 - 16384)
				OFF, 1 - 16384
#	01 02	0000 aaaa		
		0000 bbbb		
		0000 cccc		
		0000 dddd	WMT4 Wave Number R	(0 - 16384)

			OFF, 1 - 16384
01 06	0000 00aa	WMT4 Wave Gain	(0 - 3)
			-6, 0, +6, +12 [dB]
01 07	0000 000a	WMT4 Wave FXM Switch	(0 - 1)
			OFF, ON
01 08	0000 00aa	WMT4 Wave FXM Color	(0 - 3)
			1 - 4
01 09	000a aaaa	WMT4 Wave FXM Depth	(0 - 16)
01 0A	0000 000a	WMT4 Wave Tempo Sync	(0 - 1)
			OFF, ON
01 0B	0aaa aaaa	WMT4 Wave Coarse Tune	(16 - 112)
			-48 - +48
01 0C	0aaa aaaa	WMT4 Wave Fine Tune	(14 - 114)
			-50 - +50
01 0D	0aaa aaaa	WMT4 Wave Pan	(0 - 127)
			L64 - 63R
01 0E	0000 000a	WMT4 Wave Random Pan Switch	(0 - 1)
			OFF, ON
01 0F	0000 00aa	WMT4 Wave Alternate Pan Switch	(0 - 2)
			OFF, ON, REVERSE
01 10	0aaa aaaa	WMT4 Wave Level	(0 - 127)
01 11	0aaa aaaa	WMT4 Velocity Range Lower	(1 - 127)
			1 - UPPER
01 12	0aaa aaaa	WMT4 Velocity Range Upper	(1 - 127)
			LOWER - 127
01 13	0aaa aaaa	WMT4 Velocity Fade Width Lower	(0 - 127)
01 14	0aaa aaaa	WMT4 Velocity Fade Width Upper	(0 - 127)
01 15	000a aaaa	Pitch Env Depth	(52 - 76)
			-12 - +12
01 16	0aaa aaaa	Pitch Env Velocity Sens	(1 - 127)
			-63 - +63
01 17	0aaa aaaa	Pitch Env Time 1 Velocity Sens	(1 - 127)
			-63 - +63
01 18	0aaa aaaa	Pitch Env Time 4 Velocity Sens	(1 - 127)
			-63 - +63
01 19	0aaa aaaa	Pitch Env Time 1	(0 - 127)
01 1A	0aaa aaaa	Pitch Env Time 2	(0 - 127)
01 1B	0aaa aaaa	Pitch Env Time 3	(0 - 127)
01 1C	0aaa aaaa	Pitch Env Time 4	(0 - 127)
01 1D	0aaa aaaa	Pitch Env Level 0	(1 - 127)
			-63 - +63
01 1E	0aaa aaaa	Pitch Env Level 1	(1 - 127)
			-63 - +63
01 1F	0aaa aaaa	Pitch Env Level 2	(1 - 127)
			-63 - +63
01 20	0aaa aaaa	Pitch Env Level 3	(1 - 127)
			-63 - +63
01 21	0aaa aaaa	Pitch Env Level 4	(1 - 127)
			-63 - +63
01 22	0000 0aaa	TVF Filter Type	(0 - 6)
			OFF, LPF, BPF, HPF, PKG, LPF2, LPF3
01 23	0aaa aaaa	TVF Cutoff Frequency	(0 - 127)
01 24	0000 0aaa	TVF Cutoff Velocity Curve	(0 - 7)
			FIXED, 1 - 7
01 25	0aaa aaaa	TVF Cutoff Velocity Sens	(1 - 127)
			-63 - +63
01 26	0aaa aaaa	TVF Resonance	(0 - 127)
01 27	0aaa aaaa	TVF Resonance Velocity Sens	(1 - 127)
			-63 - +63
01 28	0aaa aaaa	TVF Env Depth	(1 - 127)
			-63 - +63
01 29	0000 0aaa	TVF Env Velocity Curve Type	(0 - 7)
			FIXED, 1 - 7
01 2A	0aaa aaaa	TVF Env Velocity Sens	(1 - 127)
			-63 - +63
01 2B	0aaa aaaa	TVF Env Time 1 Velocity Sens	(1 - 127)
			-63 - +63
01 2C	0aaa aaaa	TVF Env Time 4 Velocity Sens	(1 - 127)
			-63 - +63
01 2D	0aaa aaaa	TVF Env Time 1	(0 - 127)
01 2E	0aaa aaaa	TVF Env Time 2	(0 - 127)
01 2F	0aaa aaaa	TVF Env Time 3	(0 - 127)
01 30	0aaa aaaa	TVF Env Time 4	(0 - 127)
01 31	0aaa aaaa	TVF Env Level 0	(0 - 127)
01 32	0aaa aaaa	TVF Env Level 1	(0 - 127)

01 33	0aaa aaaa	TVF Env Level 2	(0 - 127)
01 34	0aaa aaaa	TVF Env Level 3	(0 - 127)
01 35	0aaa aaaa	TVF Env Level 4	(0 - 127)
01 36	0000 0aaa	TVA Level Velocity Curve	(0 - 7) FIXED, 1 - 7
01 37	0aaa aaaa	TVA Level Velocity Sens	(1 - 127) -63 - +63
01 38	0aaa aaaa	TVA Env Time 1 Velocity Sens	(1 - 127) -63 - +63
01 39	0aaa aaaa	TVA Env Time 4 Velocity Sens	(1 - 127) -63 - +63
01 3A	0aaa aaaa	TVA Env Time 1	(0 - 127)
01 3B	0aaa aaaa	TVA Env Time 2	(0 - 127)
01 3C	0aaa aaaa	TVA Env Time 3	(0 - 127)
01 3D	0aaa aaaa	TVA Env Time 4	(0 - 127)
01 3E	0aaa aaaa	TVA Env Level 1	(0 - 127)
01 3F	0aaa aaaa	TVA Env Level 2	(0 - 127)
01 40	0aaa aaaa	TVA Env Level 3	(0 - 127)
01 41	0000 000a	One Shot Mode	(0 - 1) OFF, ON
01 42	0aaa aaaa	Relative Level	(0 - 127) -64 - +63
00 00 01 43	Total Size		

6. 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.

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 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.
* In the case of values which have a +/- 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 bbH - 40 00H = aa x 128+bb - 64 x 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 x 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 x 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 x 16+3) x 16+9) x 16+13 = 41885

<Example4> 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

<Example1> 92 3E 5F
9n is the Note-on status, and n is the MIDI channel number. Since 2H = 2, 3EH = 62, and 5FH = 95, this is a Note-on message with MIDI CH = 3, note number 62 (note name is D4), and velocity 95.

<Example2> 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.

<Example3> EA 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 11.

<Example4> 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). (On GS sound generators the LSB of Pitch Bend Sensitivity is ignored, but the LSB should be transmitted anyway (with a value of 0) so that operation will be correct on any device.)

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 checksum is calculated. We will assume that in the Exclusive message we are transmitting, the address is aabbccddH and the data or size is eeffH.

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

<Example> Setting CHORUS TYPE of PERFORMANCE COMMON to DELAY (DT1)

According to the "Parameter Address Map" (p. 19), the start address of Temporary Performance is 10 00 00 00H, the offset address of CHORUS at PERFORMANCE COMMON is 04 00H, and the address of CHORUS TYPE is 00 00H. Therefore the address of CHORUS TYPE of PERFORMANCE COMMON is;

```
   10 00 00 00H
         04 00H
+)       00 00H
---------------
   10 00 04 00H
```

DELAY has the value of 02H.

So the system exclusive message should be sent is;

F0	41	10	00 00 3A	12	10 00 04 00	02	??	F7
(1)	(2)	(3)	(4)	(5)	address	data	checksum	(6)

(1) Exclusive Status (2) ID (Roland) (3) Device ID (17)
(4) Model ID (JUNO-DS61/DS88) (5) Command ID (DT1) (6) End of Exclusive

Then calculate the checksum.

10H + 00H + 04H + 00H + 02H = 16 + 0 + 4 + 0 + 2 = 22 (sum)
22 (sum) / 128 = 0 (quotient) ... 22 (remainder)
checksum = 128 - 22 (remainder) = 106 = 6AH

This means that F0 41 10 00 00 3A 12 10 00 04 00 02 6A F7 is the message should be sent.

● The Scale Tune Feature (address: 40 1x 40)

The scale tune feature allows you to finely adjust the individual pitch of the notes from C through B. Though the settings are made while working with one octave, the fine adjustments will affect all octaves. By making the appropriate Scale Tune settings, you can obtain a complete variety of tuning methods other than equal temperament. As examples, three possible types of scale setting are explained below.

* The scale tune value received by the part 1 is used in Patch mode.

○ Equal Temperament

This method of tuning divides the octave into 12 equal parts. It is currently the most widely used form of tuning, especially in occidental music. On the JUNO-DS61/DS88, the default settings for the Scale Tune feature produce equal temperament.

○ Just Temperament (Tonic of C)

The principal triads resound much more beautifully than with equal temperament, but this benefit can only be obtained in one key. If transposed, the chords tend to become ambiguous.

The example given involves settings for a key in which C is the keynote.

○ Arabian Scale

By altering the setting for Scale Tune, you can obtain a variety of other tunings suited for ethnic music. For example, the settings introduced below will set the unit to use the Arabian Scale.

Example Settings

Note name	Equal Temperament	Just Temperament (Key-tone C)	Arabian Scale
C	0	0	-6
C#	0	-8	+45
D	0	+4	-2
Eb	0	+16	-12
E	0	-14	-51
F	0	-2	-8
F#	0	-10	+43
G	0	+2	-4
G#	0	+14	+47
A	0	-16	0
Bb	0	+14	-10
B	0	-12	-49

The values in the table are given in cents. Convert these values to hexadecimal, and transmit them as Exclusive data.

For example, to set the tune (C-B) of the Part 1 Arabian Scale, send the following data:

F0 41 10 42 12 40 11 40 3A 6D 3E 34 0D 38 6B 3C 6F 40 36 0F 76 F7

■ ASCII Code Table

Patch Name and Performance Name, etc., of MIDI data are described the ASCII code in the table below.

D	H	Char	D	H	Char	D	H	Char
32	20H	SP	64	40H	@	96	60H	`
33	21H	!	65	41H	A	97	61H	a
34	22H	“	66	42H	B	98	62H	b
35	23H	#	67	43H	C	99	63H	c
36	24H	$	68	44H	D	100	64H	d
37	25H	%	69	45H	E	101	65H	e
38	26H	&	70	46H	F	102	66H	f
39	27H	`	71	47H	G	103	67H	g
40	28H	(	72	48H	H	104	68H	h
41	29H	)	73	49H	I	105	69H	i
42	2AH	*	74	4AH	J	106	6AH	j
43	2BH	+	75	4BH	K	107	6BH	k
44	2CH	,	76	4CH	L	108	6CH	l
45	2DH	-	77	4DH	M	109	6DH	m
46	2EH	.	78	4EH	N	110	6EH	n
47	2FH	/	79	4FH	O	111	6FH	o
48	30H	0	80	50H	P	112	70H	p
49	31H	1	81	51H	Q	113	71H	q
50	32H	2	82	52H	R	114	72H	r
51	33H	3	83	53H	S	115	73H	s
52	34H	4	84	54H	T	116	74H	t
53	35H	5	85	55H	U	117	75H	u
54	36H	6	86	56H	V	118	76H	v
55	37H	7	87	57H	W	119	77H	w
56	38H	8	88	58H	X	120	78H	x
57	39H	9	89	59H	Y	121	79H	y
58	3AH	:	90	5AH	Z	122	7AH	z
59	3BH	;	91	5BH	[	123	7BH	{
60	3CH	<	92	5CH	\	124	7CH	|
61	3DH	=	93	5DH	]	125	7DH	}
62	3EH	>	94	5EH	^			
63	3FH	?	95	5FH	_			

D: decimal
H: hexadecimal

* “SP” is space.

SYNTHESIZER
Model: JUNO-DS61/DS88

MIDI Implementation Chart

Date: Sep. 15, 2015
Version: 1.00

(Sound Source Section)

Function...		**Transmitted**	**Recognized**	**Remarks**
Basic	Default	1–16	1–16	
Channel	Changed	1–16	1–16	Memorized
Mode	Default	Mode 3	Mode 3	
	Messages	Mono, Poly	Mode 3, 4 (M=1)	*2
	Altered	**********		
Note		0–127	0–127	
Number :	: True Voice	**********	0–127	
Velocity	Note On	o	o	
	Note Off	o	o	
After	Key's	x	o *1	
Touch	Channel's	o	o *1	
Pitch Bend		o	o *1	
Control	0, 32	o	o *1	Bank select
Change	1	o	o *1	Modulation
	2	o	o	Breath type
	4	o	o	Foot type
	5	o	o	Portamento time
	6, 38	o	o	Data entry
	7	o	o *1	Volume
	8	o	x	Balance
	10	o	o *1	Panpot
	11	o	o *1	Expression
	16	o	x	General purpose controller 1
	17	o	x	General purpose controller 2
	18	o	x	General purpose controller 3
	19	o	x	General purpose controller 4
	64	o	o *1	Hold 1
	65	o	o	Portamento
	66	o	o	Sostenuto
	67	o	o	Soft
	68	o	o	Legato foot switch
	69	o	o	Hold 2
	70	o	x	Sound variation
	71	o	o	Resonance
	72	o	o	Release time
	73	o	o	Attack time
	74	o	o	Cutoff
	75	o	o	Decay time
	76	o	o	Vibrate rate
	77	o	o	Vibrate depth
	78	o	o	Vibrate delay
	80	o	o (Tone 1 Level)	General purpose controller 5
	81	o	o (Tone 2 Level)	General purpose controller 6
	82	o	o (Tone 3 Level)	General purpose controller 7
	83	o	o (Tone 4 Level)	General purpose controller 8
	84	o	o	Portamento control
	91	o	o (Reverb)	General purpose effects 1
	92	o	x	Tremolo
	93	o	o (Chorus)	General purpose effects 3
	94	o	x	Celeste
	95	o	x	Phaser
	98, 99	x	x	NRPN LSB, MSB
	100, 101	x	o	RPN LSB, MSB
Program		o	o *1	
Change	: True Number	**********	0–127	
System		x *1	x	Program No.1-128
Exclusive				
System	: Song Position	x	x	
Common	: Song Select	x	x	
	: Tune Request	x	x	
System	: Clock	o *3	x	
Real Time	: Commands	o *3	x	
	: All Sound Off	o	o	
	: Reset All Controllers	x	o	
Aux	: Local On/Off	x	x	
Messages	: All Notes Off	x	o (123–127)	
	: Active Sensing	o	o	
	: System Reset	x	x	
Notes		*1 o x is selectable. *2 Recognized as M=1 even if M1. *3 o x is selectable only in the DAW CONTROL mode.		

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

O : Yes
X : No

SYNTHESIZER
Model: JUNO-DS61/DS88

MIDI Implementation Chart

Date: Sep. 15, 2015
Version: 1.00

(Sequencer Section)

Function...		**Transmitted**	**Recognized**	**Remarks**
Basic	Default	x	1–7, 10	There is not specific basic channel
Channel	Changed	x	x	
	Default	x	x	
Mode	Messages	x	x	
	Altered	**********		
Note		x	0–127	
Number :	: True Voice	**********	0–127	
Velocity	Note On	x	o	
	Note Off	x	o	
After	Key's	x	x	
Touch	Channel's	x	o	
Pitch Bend		x	o	
Control Change	0–119	x	o	
Program		x	x	
Change	: True Number	**********		
System Exclusive		x	o	
System Common	: Song Position	x	x	
	: Song Select	x	x	
	: Tune Request	x	x	
System	: Clock	x	o *1	
Real Time	: Commands	x	o *1	
	: All Sound Off	x	o *2	
	: Reset All Controllers	x	o	
	: Local On/Off	x	x	
	: All Notes Off	x	x *3	
Aux	: Omni Mode Off	x	o *2	
Messages	: Omni Mode On	x	o *2	
	: Mono Mode On	x	o *2	
	: Poly Mode On	x	o *2	
	: Active Sensing	x	o	
	: System Reset	x	x	
Notes		*1 o x is selectable. *2 First, a note-off message is recorded for each note that is currently on; then this message itself is recorded. *3 The All Notes Off message itself is not recorded; a note-off message is recorded for each note that is currently on.		

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

O : Yes
X : No