MIDI Implementation

Model: JUPITER-80
Date: June 30, 2011
Version: 1.00

1. Data Reception

■ Channel Voice Messages

● Note off

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

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

● 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 when the Receive Poly Key Press parameter (Live Set Layer/Rx Filter1) is OFF for UPPER/LOWER parts.
* Not received when the Receive Polyphonic Key Pressure parameter (Registration SOLO/PERC Part/Rx Filter1) is OFF for SOLO/PERC parts.

● Control Change

* If the corresponding Controller number is selected for the System Control Source 1, 2, 3 or 4 parameter (System Setup/System Control), the corresponding effect will occur.

❍ 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 when the Receive Bank Select (System Setup/MIDI Tx/Rx) is OFF.

The Registrations corresponding to each Bank Select are as follows.

BANK SELECT MSB	BANK SELECT LSB	PROGRAM NUMBER	GROUP	NUMBER
083	000	001 - 128	Registration	[01]A-1 - [04]D-8
	001	001 - 128	Registration	[05]A-1 - [08]D-8

The Live Sets of UPPER/LOWER parts corresponding to each Bank Select are as follows.

BANK SELECT MSB	BANK SELECT LSB	PROGRAM NUMBER	GROUP	NUMBER
084	000	001 - 128	Live Set	0001 - 0128
	001	001 - 128	Live Set	0129 - 0256
	:		:	
	019	001 - 128	Live Set	2433 - 2560

The Tones of SOLO part corresponding to each Bank Select are as follows.

BANK SELECT MSB	BANK SELECT LSB	PROGRAM NUMBER	GROUP	NUMBER
093	000	001 - 128	SN Synth Tone	0001 - 0128
	001	001 - 128	SN Synth Tone	0129 - 0256
	:		:	
	015	001 - 128	SN Synth Tone	1921 - 2048
—	—	— - —	SN Acoustic Tone	See attached table. (p. 26)

The Tones of PERC part corresponding to each Bank Select are as follows.

BANK SELECT MSB	BANK SELECT LSB	PROGRAM NUMBER	GROUP	NUMBER
086	064	001 - 16	Drum/SFX Tone	0001 - 0016
	065	001 - 8	Manual Perc Tone	0001 - 0008
093	000	001 - 128	SN Synth Tone	0001 - 0128
	001	001 - 128	SN Synth Tone	0129 - 0256
	:		:	
	015	001 - 128	SN Synth Tone	1921 - 2048
—	—	— - —	SN Acoustic Tone	See attached table. (p. 26)

❍ 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 when the Receive Modulation parameter (Live Set Layer/Rx Filter1) is OFF for UPPER/LOWER parts.
* Not received when the Receive Modulation parameter (Registration SOLO/PERC Part/Rx Filter1) is OFF for SOLO/PERC parts.

❍ 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)

* Not received when the Receive Breath Type parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* Not received when the Receive Breath Type parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ 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)

* Not received when the Receive Foot Type parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* Not received when the Receive Foot Type parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ 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)

* The Portamento Time parameter (Live Set Layer/Pitch) will change for UPPER/LOWER parts.
* Not received when the Receive Portamento parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* The Portamento Time parameter (Registration SOLO/PERC Part/Pitch) will change for SOLO/PERC parts.
* Not received when the Receive Portamento parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ 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)
* The Part Level parameter (Registration Part) 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)
* The Part Pan parameter (Registration Part) 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 Receive Expression parameter (Live Set Layer/Rx Filter1) is OFF for UPPER/LOWER parts.
* Not received when the Receive Expression parameter (Registration SOLO/PERC Part/Rx Filter1) is OFF for SOLO/PERC parts.

❍ General Purpose Controller 1 (Tone Modify 1) (Controller number 16)

Status	2nd byte	3rd byte
BnH	10H	vvH

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

* Not received when the Receive Modify parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* Not received when the Receive Modify parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ General Purpose Controller 2 (Tone Modify 2) (Controller number 17)

Status	2nd byte	3rd byte
BnH	11H	vvH

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

* Not received when the Receive Modify parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* Not received when the Receive Modify parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ General Purpose Controller 3 (Tone Modify 3) (Controller number 18)

Status	2nd byte	3rd byte
BnH	12H	vvH

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

* Not received when the Receive Modify parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* Not received when the Receive Modify parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ General Purpose Controller 4 (Tone Modify 4) (Controller number 19)

Status	2nd byte	3rd byte
BnH	13H	vvH

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

* Not received when the Receive Modify parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* Not received when the Receive Modify parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ 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 Receive Hold-1 parameter (Live Set Layer/Rx Filter1) is OFF for UPPER/LOWER parts.
* Not received when the Receive Hold-1 parameter (Registration SOLO/PERC Part/Rx Filter1) is OFF for SOLO/PERC parts.

❍ 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

* The Portamento Switch parameter (Live Set Layer/Pitch) will change for UPPER/LOWER parts.
* Not received when the Receive Portamento parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* The Portamento Switch parameter (Registration SOLO/PERC Part/Pitch) will change for SOLO/PERC parts.
* Not received when the Receive Portamento parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ 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)

❍ 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

* The Legato Switch parameter (Live Set LAYER/Mono/Poly/Misc) will change for UPPER/LOWER parts.
* The Legato Switch parameter (Registration SOLO/PERC Part/Mono/Poly/Misc) will change for SOLO/PERC parts.

❍ 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),

* The Resonance Offset parameter (Live Set Layer/Offset) will change for UPPER/LOWER parts.
* Not received when the Receive Filter Offset parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* The Resonance Offset parameter (Registration SOLO/PERC Part/Offset) will change for SOLO/PERC parts.
* Not received when the Receive Filter Offset parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ 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),

* The Release Time Offset parameter (Live Set Layer/Offset) will change for UPPER/LOWER parts.
* Not received when the Receive Envelope Offset parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* The Release Time Offset parameter (Registration SOLO/PERC Part/Offset) will change for SOLO/PERC parts.
* Not received when the Receive Envelope Offset parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ 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),

* The Attack Time Offset parameter (Live Set Layer/Offset) will change for UPPER/LOWER parts.
* Not received when the Receive Envelope Offset parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* The Attack Time Offset parameter (Registration SOLO/PERC Part/Offset) will change for SOLO/PERC parts.
* Not received when the Receive Envelope Offset parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ 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)

* The Cutoff Offset parameter (Live Set Layer/Offset) will change for UPPER/LOWER parts.
* Not received when the Receive Filter Offset parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* The Cutoff Offset parameter (Registration SOLO/PERC Part/Offset) will change for SOLO/PERC parts.
* Not received when the Receive Filter Offset parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ 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)

* The Decay Time Offset parameter (Live Set Layer/Offset) will change for UPPER/LOWER parts.
* Not received when the Receive Envelope Offset parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* The Decay Time Offset parameter (Registration SOLO/PERC Part/Offset) will change for SOLO/PERC parts.
* Not received when the Receive Envelope Offset parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ 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)

* The Vibrato Rate parameter (Live Set Layer/Vibrato) will change for UPPER/LOWER parts.
* The Vibrato Rate parameter (Registration SOLO/PERC Part/Vibrato) will change for SOLO/PERC parts.

❍ 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)

* The Vibrato Depth parameter (Live Set Layer/Vibrato) will change for UPPER/LOWER parts.
* The Vibrato Depth parameter (Registration SOLO/PERC Part/Vibrato) will change for SOLO/PERC parts.

❍ 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)

* The Vibrato Delay parameter (Live Set Layer/Vibrato) will change for UPPER/LOWER parts.
* The Vibrato Delay parameter (Registration SOLO/PERC Part/Vibrato) will change for SOLO/PERC parts.

❍ Tone Blender (Controller number 79)

Status	2nd byte	3rd byte
BnH	4FH	vvH

n = MIDI channel number: 0H - FH (ch.1 - 16)
vv = Control value: 00H - 40H - 7FH

❍ General Purpose Controller 5 (Tone Variation 1) (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)

* Not received when the Receive Variation parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* Not received when the Receive Variation parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ General Purpose Controller 6 (Tone Variation 2) (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)

* Not received when the Receive Variation parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* Not received when the Receive Variation parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ General Purpose Controller 7 (Tone Variation 3) (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)

* Not received when the Receive Variation parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* Not received when the Receive Variation parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ General Purpose Controller 8 (Tone Variation 4) (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)

* Not received when the Receive Variation parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* Not received when the Receive Variation parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ 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.

❍ General Purpose 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)

* The Reverb Send Level parameter (Live Set Layer/Effects Send) will change for UPPER/LOWER parts.
* Not received when the Receive Reverb Send parameter (Live Set Layer/Rx Filter2) is OFF for UPPER/LOWER parts.
* The Reverb Send Level parameter (Registration SOLO/PERC Part/Level/Pan/Output) will change for SOLO/PERC parts.
* Not received when the Receive Reverb Send parameter (Registration SOLO/PERC Part/Rx Filter2) is OFF for SOLO/PERC parts.

❍ 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.

* The Pitch Bend Range parameter (Live Set Layer/Pitch) will change for UPPER/LOWER parts.
* The Pitch Bend Range parameter (Registration SOLO/PERC Part/Pitch) will change for SOLO/PERC parts.

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)

* The Fine Tune parameter (Live Set Layer/Pitch) will change for UPPER/LOWER parts.
* The Fine Tune parameter (Registration SOLO/PERC Part/Pitch) will change for SOLO/PERC parts.

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

* The Coarse Tune parameter (Live Set Layer/Pitch) will change for UPPER/LOWER parts.
* The Coarse Tune parameter (Registration SOLO/PERC Part/Pitch) will change for SOLO/PERC parts.

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 when the Receive Program Change parameter (System Setup/MIDI Tx/Rx) 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 when the Receive Channel Pressure parameter (Live Set Layer/Rx Filter1) is OFF for UPPER/LOWER parts.
* Not received when the Receive Channel Pressure parameter (Registration SOLO/PERC Part/Rx Filter1) is OFF for SOLO/PERC parts.

● 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 Receive Bender parameter (Live Set Layer/Rx Filter1) is OFF for UPPER/LOWER parts.
* Not received when the Receive Bender parameter (Registration SOLO/PERC Part/Rx Filter1) is OFF for SOLO/PERC parts.

■ 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)

* 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)
Foot Type	0 (min)
Expression	127 (max) However the controller will be at minimum.
Hold 1	0 (off)
Sostenuto	0 (off)
Soft	0 (off)
Hold 2	0 (off)
RPN	unset; previously set data will not change
NRPN	unset; previously set data will not change

● All Notes Off (Controller number 123)

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

n = MIDI channel number: 0H - FH (ch.1 - 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.
* The Mono/Poly parameter (Live Set Layer/Mono/Poly/Misc) will change for UPPER/LOWER parts.
* The Mono/Poly parameter (Registration SOLO/PERC Part/Mono/Poly/Misc) will change for SOLO/PERC parts.

● 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.
* The Mono/Poly parameter (Live Set Layer/Mono/Poly/Misc) will change for UPPER/LOWER parts.
* The Mono/Poly parameter (Registration SOLO/PERC Part/Mono/Poly/Misc) will change for SOLO/PERC parts.

■ System Realtime Message

● Timing Clock

Status
F8H

* Received when Sync Mode parameter (System Setup/Sync) is set to SLAVE.

● 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 - 1FH, 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. 10) will be transmitted.

● 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 Setup/Sound) 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 Setup/Sound) 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 Setup/Sound) will change.

● 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 55H.

❍ 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, 55H, 11H, aaH, bbH, ccH, ddH, ssH, ttH, uuH, vvH, sum	F7H

Byte	Remarks
F0H	Exclusive status
41H	ID number (Roland)
dev	device ID (dev: 10H - 1FH, 7FH)
00H	model ID #1 (JUPITER-80)
00H	model ID #2 (JUPITER-80)
55H	model ID #3 (JUPITER-80)
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. 11).
* For the checksum, refer to p. 25.
* Not received when the Receive Exclusive parameter (System Setup/MIDI Tx/Rx) is OFF.

❍ Data set 1 (DT1)

Status	Data byte	Status
F0H	41H, dev, 00H, 00H, 55H, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H

Byte	Explanation	
F0H	Exclusive status	
41H	ID number (Roland)	
dev	Device ID (dev: 10H - 1FH, 7FH)	
00H	Model ID #1 (JUPITER-80)	
00H	Model ID #2 (JUPITER-80)	
55H	Model ID #3 (JUPITER-80)	
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. 11).
* 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. 25.
* Not received when the Receive Exclusive parameter (System Setup/MIDI Tx/Rx) is OFF.

2. Data Transmission

■ 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 JUPITER-80 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 Registration, Live Set (UPPER/LOWER parts), Tone (SOLO/PERC parts) is selected. But not transmitted when Transmit Program Change or Transmit Bank Select parameter (System Setup/MIDI Tx/Rx) is OFF.
* Be sure to refer to Bank Select and Program Change Correspondence Chart (p. 26) for the Bank Select messages transmitted when the JUPITER-80 is select a Registration, Live Set (UPPER/LOWER parts), Tone (SOLO/PERC parts).

❍ 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)

❍ 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)

❍ 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)

❍ General Purpose Controller 1 (Tone Modify 1) (Controller number 16)

Status	2nd byte	3rd byte
BnH	10H	vvH

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

❍ General Purpose Controller 2 (Tone Modify 2) (Controller number 17)

Status	2nd byte	3rd byte
BnH	11H	vvH

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

❍ General Purpose Controller 3 (Tone Modify 3) (Controller number 18)

Status	2nd byte	3rd byte
BnH	12H	vvH

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

❍ General Purpose Controller 4 (Tone Modify 4) (Controller number 19)

Status	2nd byte	3rd byte
BnH	13H	vvH

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

* When Continuous Hold Pedal parameter (System Setup/PEDAL) is OFF, just only 00H (0FF) and 7FH (0N) can be send as the control 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

❍ 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)

❍ 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

❍ 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)

❍ 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)

❍ 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)

❍ 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)

❍ 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)

❍ 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)

❍ Tone Blender (Controller number 79)

Status	2nd byte	3rd byte
BnH	4FH	vvH

n = MIDI channel number: 0H - FH (ch.1 - 16)
vv = Control value: 00H - 40H - 7FH

❍ General Purpose Controller 5 (Tone Variation 1) (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 (Tone Variation 2) (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 (Tone Variation 3) (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 (Tone Variation 4) (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)

❍ General Purpose 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)

❍ General Purpose 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)

● 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 Registration, Live Set (UPPER/LOWER parts), Tone (SOLO/PERC parts) is selected. But not transmitted when Transmit Program Change parameter (System Setup/MIDI Tx/Rx) 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)

● 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)

● 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

* Sent when Sync Output parameter (System Setup/Sync) is set to ON.

● Active Sensing

Status
FEH

* This message is transmitted at intervals of approximately 250 msec.
* This message is not sent when Transmit Active Sensing parameter (System Setup/MIDI Tx/Rx) is OFF.

■ System Exclusive Messages

Universal Non-realtime System Exclusive Message and Data Set 1 (DT1) are the only System Exclusive messages transmitted by the JUPITER-80.

● Universal Non-realtime System Exclusive Message

❍ Identity Reply Message (JUPITER-80)

Receiving Identity Request Message (p. 6), the JUPITER-80 send this message.

Status	Data byte	Status
F0H	7EH, dev, 06H, 02H, 41H, 55H, 02H, 00H, 00H, 00H, 01H, 00H, 00H	F7H

Byte	Explanation
F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
dev	Device ID (dev: 10H - 1FH)
06H	Sub ID#1 (General Information)
02H	Sub ID#2 (Identity Reply)
41H	ID number (Roland)
55H 02H	Device family code
00H 00H	Device family number code
00H 01H 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, 55H, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H

Byte	Explanation	
F0H	Exclusive status	
41H	ID number (Roland)	
dev	Device ID (dev: 00H - 1FH, 7FH)	
00H	Model ID #1 (JUPITER-80)	
00H	Model ID #2 (JUPITER-80)	
55H	Model ID #3 (JUPITER-80)	
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. 11).
* Data larger than 256 bytes will be divided into packets of 256 bytes or less, and each packet will be sent at an interval of about 20 ms.

3. Parameter Address Map

* Transmission of "#" marked address is divided to some packets. For example, ABH in hexadecimal notation will be divided to 0AH and 0BH, and is sent/received in this order.
* "<*>" marked address or parameters are ignored when the JUPITER-80 received them.

JUPITER-80 (ModelID = 00H 00H 55H)

Start Address	Description
01 00 00 00	Setup
02 00 00 00	System
10 00 00 00	Temporary Live Set (UPPER)
11 00 00 00	Temporary Tone (UPPER Layer 1)
11 20 00 00	Temporary Tone (UPPER Layer 2)
11 40 00 00	Temporary Tone (UPPER Layer 3)
11 60 00 00	Temporary Tone (UPPER Layer 4)
12 00 00 00	Temporary Live Set (LOWER)
13 00 00 00	Temporary Tone (LOWER Layer 1)
13 20 00 00	Temporary Tone (LOWER Layer 2)
13 40 00 00	Temporary Tone (LOWER Layer 3)
13 60 00 00	Temporary Tone (LOWER Layer 4)
14 00 00 00	Temporary Registration

* System

Offset Address	Description
00 00 00	System Common
00 02 00	System EQ
00 40 00	System Controller

* Temporary Tone

Offset Address	Description
01 00 00	Temporary Synth Tone

* Live Set

Offset Address	Description
00 00 00	Live Set Common
00 02 00	Live Set MFX1
00 06 00	Live Set Reverb
00 08 00	Live Set MFX2
00 0A 00	Live Set MFX3
00 0C 00	Live Set MFX4
00 20 00	Live Set Layer (Layer 1)
00 21 00	Live Set Layer (Layer 2)
00 22 00	Live Set Layer (Layer 3)
00 23 00	Live Set Layer (Layer 4)
00 30 00	Live Set Tone Offset (Layer 1)
00 31 00	Live Set Tone Offset (Layer 2)
00 32 00	Live Set Tone Offset (Layer 3)
00 33 00	Live Set Tone Offset (Layer 4)
00 40 00	Live Set Tone Modify (Layer 1)
00 41 00	Live Set Tone Modify (Layer 2)
00 42 00	Live Set Tone Modify (Layer 3)
00 43 00	Live Set Tone Modify (Layer 4)
00 50 00	Live Set Layer 2 (Layer 1)
00 51 00	Live Set Layer 2 (Layer 2)
00 52 00	Live Set Layer 2 (Layer 3)
00 53 00	Live Set Layer 2 (Layer 4)

* Registration

Offset Address	Description
00 00 00	Registration Common
00 10 00	Registration Part (UPPER)
00 11 00	Registration Part (LOWER)
00 12 00	Registration Part (SOLO)
00 13 00	Registration Part (PERC)
00 20 00	Registration Ext Part (Part 1)
00 21 00	Registration Ext Part (Part 2)
:	
00 2F 00	Registration Ext Part (Part 16)
00 30 00	Registration Controller
00 40 00	Registration Sub Part (SOLO)
00 41 00	Registration Sub Part (PERC)
00 50 00	Registration Sub Modify (SOLO)
00 51 00	Registration Sub Modify (PERC)
00 60 00	Registration Sub Effect (SOLO)

00 61 00	Registration Sub Effect (PERC)	
00 70 00	Registration Sub Reverb	

* Synth Tone

Offset Address	Description
00 00 00	Synth Tone Common
00 01 00	Synth Tone Partial (1)
00 02 00	Synth Tone Partial (2)
00 03 00	Synth Tone Partial (3)

* Setup

	Offset Address		Description	
	00 00	0aaa aaaa	Registration Bank Select MSB (CC# 0)	(0 - 127)
	00 01	0aaa aaaa	Registration Bank Select LSB (CC# 32)	(0 - 127)
	00 02	0aaa aaaa	Registration Program Number (PC)	(0 - 127)
	00 03	0000 000a	(reserve) <*>	
	00 04	0000 000a	(reserve) <*>	
	00 05	0000 000a	(reserve) <*>	
	00 06	0000 000a	(reserve) <*>	
	00 07	0000 000a	(reserve) <*>	
	00 08	0000 000a	(reserve) <*>	
	00 09	0000 000a	(reserve) <*>	
	00 0A	0000 000a	(reserve) <*>	
	00 0B	0000 000a	(reserve) <*>	
	00 0C	0000 000a	(reserve) <*>	
	00 0D	0000 000a	Reverb Switch	(0 - 1) OFF, ON
	00 0E	0000 000a	Metronome Click Switch	(0 - 1) OFF, ON
	00 0F	0000 000a	Recording Mode	(0 - 1) MIX, KEYBOARD
	00 10	0aaa aaaa	Recording Level	(0 - 127)
	00 11	0000 000a	Center Cancel	(0 - 1) OFF, ON
	00 12	0000 00aa	Center Cancel Type	(0 - 2) MID-HI, LOW, ALL
	00 13	0000 000a	Registration Button Lock	(0 - 1) OFF, ON
	00 00 00 14	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	Tone Remain	(0 - 1) OFF, ON
	00 08	0000 000a		
	00 09	000a aaaa	Registration Control Channel	(0 - 16) 1 - 16, OFF
	00 0A	0aaa aaaa	Scale Tune Type	(0 - 8) CUSTOM, EQUAL, JUST-MAJ, JUST-MIN, PYTHAGORE, KIRNBERGE, MEANTONE, WERCKMEIS, ARABIC
	00 0B	0aaa aaaa	Scale Tune Key	(0 - 11) C, C#, D, D#, E, F, F#, G, G#, A, A#, B
	00 0C	0aaa aaaa	Scale Tune for C	(0 - 127) -64 - +63
	00 0D	0aaa aaaa	Scale Tune for C#	(0 - 127) -64 - +63
	00 0E	0aaa aaaa	Scale Tune for D	(0 - 127) -64 - +63
	00 0F	0aaa aaaa	Scale Tune for D#	(0 - 127) -64 - +63
	00 10	0aaa aaaa	Scale Tune for E	(0 - 127) -64 - +63
	00 11	0aaa aaaa	Scale Tune for F	(0 - 127) -64 - +63
	00 12	0aaa aaaa	Scale Tune for F#	(0 - 127) -64 - +63
	00 13	0aaa aaaa	Scale Tune for G	(0 - 127) -64 - +63
	00 14	0aaa aaaa	Scale Tune for G#	(0 - 127) -64 - +63
	00 15	0aaa aaaa	Scale Tune for A	(0 - 127) -64 - +63
	00 16	0aaa aaaa	Scale Tune for A#	(0 - 127) -64 - +63
	00 17	0aaa aaaa	Scale Tune for B	(0 - 127) -64 - +63
	00 18	0aaa aaaa	System Control 1 Source	(0 - 97) OFF, CC01 - CC31, OFF, CC33 - CC95, BEND, AFT
	00 19	0aaa aaaa	System Control 2 Source	(0 - 97) OFF, CC01 - CC31, OFF, CC33 - CC95, BEND, AFT
	00 1A	0aaa aaaa	System Control 3 Source	(0 - 97) OFF, CC01 - CC31, OFF, CC33 - CC95, BEND, AFT
	00 1B	0aaa aaaa	System Control 4 Source	(0 - 97) OFF, CC01 - CC31, OFF, CC33 - CC95, BEND, AFT
	00 1C	0000 000a	(reserve) <*>	
	00 1D	0000 000a	System Clock Source	(0 - 1) MIDI, USB
#	00 1E	0000 aaaa 0000 bbbb	(reserve) <*>	
	00 20	0000 000a	(reserve) <*>	
	00 21	0000 000a	Receive Program Change	(0 - 1) OFF, ON
	00 22	0000 000a	Receive Bank Select	(0 - 1) OFF, ON
	00 00 00 23	Total Size		

* System Mastering

Offset Address		Description	
00 00	0000 000a	Master EQ Switch	(0 - 1) OFF, ON
00 01	0000 000a	Master EQ Low Freq	(0 - 1) 200, 400 [Hz]
00 02	000a aaaa	Master EQ Low Gain	(0 - 30) -15 - +15 [dB]
00 03	000a aaaa	Master EQ Mid1 Freq	(0 - 16) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000 [Hz]
00 04	000a aaaa	Master EQ Mid1 Gain	(0 - 30) -15 - +15 [dB]
00 05	0000 0aaa	Master EQ Mid1 Q	(0 - 4) 0.5, 1.0, 2.0, 4.0, 8.0
00 06	000a aaaa	Master EQ Mid2 Freq	(0 - 16) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000 [Hz]
00 07	000a aaaa	Master EQ Mid2 Gain	(0 - 30) -15 - +15 [dB]
00 08	0000 0aaa	Master EQ Mid2 Q	(0 - 4) 0.5, 1.0, 2.0, 4.0, 8.0
00 09	0000 00aa	Master EQ High Freq	(0 - 2) 2000, 4000, 8000 [Hz]
00 0A	000a aaaa	Master EQ High Gain	(0 - 30) -15 - +15 [dB]
00 0B	0aaa aaaa	Master EQ Level	(0 - 127)
00 0C	0000 000a	Song EQ Master Switch	(0 - 1) OFF, ON
00 0D	0000 000a	Song EQ Low Freq	(0 - 1) 200, 400 [Hz]
00 0E	000a aaaa	Song EQ Low Gain	(0 - 30) -15 - +15 [dB]
00 0F	000a aaaa	Song EQ Mid1 Freq	(0 - 16) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000 [Hz]
00 10	000a aaaa	Song EQ Mid1 Gain	(0 - 30) -15 - +15 [dB]
00 11	0000 0aaa	Song EQ Mid1 Q	(0 - 4) 0.5, 1.0, 2.0, 4.0, 8.0
00 12	000a aaaa	Song EQ Mid2 Freq	(0 - 16) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000 [Hz]
00 13	000a aaaa	Song EQ Mid2 Gain	(0 - 30) -15 - +15 [dB]
00 14	0000 0aaa	Song EQ Mid2 Q	(0 - 4) 0.5, 1.0, 2.0, 4.0, 8.0
00 15	0000 00aa	Song EQ High Freq	(0 - 2) 2000, 4000, 8000 [Hz]
00 16	000a aaaa	Song EQ High Gain	(0 - 30)

			-15 - +15 [dB]
00 17	0aaa aaaa	Song EQ Level	(0 - 127)
00 00 00 18	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 Sens	(0 - 2) LIGHT, MEDIUM, HEAVY
00 04	0aaa aaaa	Keyboard Velocity Sens	(1 - 127) -63 - +63
00 05	0aaa aaaa	Aftertouch Sens	(0 - 100)
00 06	0000 0aaa	Hold Pedal Polarity	(0 - 1) STANDARD, REVERSE
00 07	0000 000a	Continuous Hold Pedal	(0 - 1) OFF, ON
00 08	0000 000a	Control Padal 1 Assign Source	(0 - 1) SYS, REG
00 09	0aaa aaaa	Control Pedal 1 Assign	(0 - 103) OFF, CC01 - CC31, OFF, CC33 - CC95, AFT, BEND-UP, BEND-DOWN, REG-UP, REG-DOWN, PANEL-INC, PANEL-DEC, START/STOP
00 0A	0aaa aaaa	(reserve) <*>	
00 0B	0000 0aaa	Control Pedal 1 Polarity	(0 - 1) STANDARD, REVERSE
00 0C	0000 000a	Control Padal 2 Assign Source	(0 - 1) SYS, REG
00 0D	0aaa aaaa	Control Pedal 2 Assign	(0 - 103) OFF, CC01 - CC31, OFF, CC33 - CC95, AFT, BEND-UP, BEND-DOWN, REG-UP, REG-DOWN, PANEL-INC, PANEL-DEC, START/STOP
00 0E	0aaa aaaa	(reserve) <*>	
00 0F	0000 0aaa	Control Pedal 2 Polarity	(0 - 1) STANDARD, REVERSE
00 10	0000 aaaa	Beam Sens	(1 - 10)
00 11	0aaa aaaa	(reserve) <*>	
00 12	0aaa aaaa	(reserve) <*>	
00 13	0aaa aaaa	(reserve) <*>	
00 14	0aaa aaaa	(reserve) <*>	
00 15	0aaa aaaa	(reserve) <*>	
00 16	0aaa aaaa	(reserve) <*>	
00 17	0aaa aaaa	(reserve) <*>	
00 18	0aaa aaaa	(reserve) <*>	
00 19	0aaa aaaa	(reserve) <*>	
00 1A	0aaa aaaa	(reserve) <*>	
00 1B	0000 aaaa	Slider Mode	(0 - 1) DIRECT, CATCH
00 1C	0aaa aaaa	(reserve) <*>	
00 1D	0aaa aaaa	(reserve) <*>	
00 1E	0aaa aaaa	(reserve) <*>	
00 00 00 1F	Total Size		

* Live Set Common

Offset Address		Description	
00 00	0aaa aaaa	Live Set Name 1	(32 - 127) 32 - 127 [ASCII]
00 01	0aaa aaaa	Live Set Name 2	(32 - 127) 32 - 127 [ASCII]
00 02	0aaa aaaa	Live Set Name 3	(32 - 127) 32 - 127 [ASCII]
00 03	0aaa aaaa	Live Set Name 4	(32 - 127) 32 - 127 [ASCII]
00 04	0aaa aaaa	Live Set Name 5	(32 - 127) 32 - 127 [ASCII]
00 05	0aaa aaaa	Live Set Name 6	(32 - 127) 32 - 127 [ASCII]
00 06	0aaa aaaa	Live Set Name 7	(32 - 127) 32 - 127 [ASCII]
00 07	0aaa aaaa	Live Set Name 8	(32 - 127) 32 - 127 [ASCII]
00 08	0aaa aaaa	Live Set Name 9	(32 - 127) 32 - 127 [ASCII]
00 09	0aaa aaaa	Live Set Name 10	(32 - 127) 32 - 127 [ASCII]
00 0A	0aaa aaaa	Live Set Name 11	(32 - 127) 32 - 127 [ASCII]
00 0B	0aaa aaaa	Live Set Name 12	(32 - 127) 32 - 127 [ASCII]
00 0C	0aaa aaaa	Live Set Name 13	(32 - 127) 32 - 127 [ASCII]
00 0D	0aaa aaaa	Live Set Name 14	(32 - 127) 32 - 127 [ASCII]
00 0E	0aaa aaaa	Live Set Name 15	(32 - 127) 32 - 127 [ASCII]
00 0F	0aaa aaaa	Live Set Name 16	(32 - 127) 32 - 127 [ASCII]
00 10	0aaa aaaa	Live Set Category	(0 - 127)
00 11	0aaa aaaa	(reserve) <*>	
00 12	0aaa aaaa	(reserve) <*>	
00 13	0aaa aaaa	(reserve) <*>	
00 14	0aaa aaaa	(reserve) <*>	
00 15	0aaa aaaa	(reserve) <*>	
00 16	0aaa aaaa	(reserve) <*>	
00 17	0aaa aaaa	(reserve) <*>	
00 18	0aaa aaaa	(reserve) <*>	
00 19	0aaa aaaa	Live Set Level	(0 - 127)
00 1A	00aa aaaa	(reserve) <*>	
00 1B	00aa aaaa	(reserve) <*>	
00 1C	00aa aaaa	(reserve) <*>	
00 1D	0000 000a	(reserve) <*>	
00 1E	0000 000a	(reserve) <*>	
00 1F	0000 000a	(reserve) <*>	
00 20	0000 000a	(reserve) <*>	
00 21	0aaa aaaa	Voice Reserve 1	(0 - 64) 0 - 63, FULL
00 22	0aaa aaaa	Voice Reserve 2	(0 - 64) 0 - 63, FULL
00 23	0aaa aaaa	Voice Reserve 3	(0 - 64) 0 - 63, FULL
00 24	0aaa aaaa	Voice Reserve 4	(0 - 64) 0 - 63, FULL
00 25	0aaa aaaa	(reserve) <*>	
00 26	0aaa aaaa	(reserve) <*>	
00 27	0aaa aaaa	(reserve) <*>	
00 28	0aaa aaaa	(reserve) <*>	
00 29	0000 aaaa	(reserve) <*>	
00 2A	0aaa aaaa	(reserve) <*>	
00 2B	0aaa aaaa	(reserve) <*>	
00 2C	0aaa aaaa	(reserve) <*>	
00 2D	0aaa aaaa	(reserve) <*>	
# 00 2E	0000 aaaa 0000 bbbb	(reserve) <*>	
00 30	0000 000a	Phase Lock	(0 - 1) OFF, ON
# 00 31	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	(reserve) <*>	
00 35	0000 0aaa	(reserve) <*>	
00 36	0aaa aaaa	(reserve) <*>	
00 37	0aaa aaaa	Common Cutoff Offset	(0 - 127) -64 - +63
00 38	0aaa aaaa	Common Resonance Offset	(0 - 127) -64 - +63
00 39	0aaa aaaa	(reserve) <*>	
00 3A	0000 000a	MFX1 Switch	(0 - 1) BYPASS, ON
00 3B	0000 000a	MFX2 Switch	(0 - 1) BYPASS, ON
00 3C	0000 000a	MFX3 Switch	(0 - 1) BYPASS, ON
00 3D	0000 000a	MFX4 Switch	(0 - 1) BYPASS, ON
00 3E	0000 000a		(0 - 1)
00 3F	0000 000a	Reverb Switch	(0 - 1) OFF, ON
00 40	0000 000a		(0 - 1)

00 41	0aaa aaaa	(reserve) <*>
00 42	0aaa aaaa	(reserve) <*>
00 43	0aaa aaaa	(reserve) <*>
00 44	0aaa aaaa	(reserve) <*>
00 45	0aaa aaaa	(reserve) <*>
00 46	0aaa aaaa	(reserve) <*>
00 47	0aaa aaaa	(reserve) <*>
00 48	0aaa aaaa	(reserve) <*>
00 00 00 49	Total Size	

* Live Set MFX

Offset Address		Description	
00 00	0aaa aaaa	MFX Type	(0 - 76)
00 01	0aaa aaaa	MFX Output Level	(0 - 127)
00 02	0aaa aaaa		(0 - 127)
00 03	0aaa aaaa	MFX Reverb Send Level	(0 - 127)
00 04	0000 00aa	(reserve) <*>	
00 05	0aaa aaaa	MFX Control Source 1	(0 - 101) OFF, CC01 - CC31, OFF, CC33 - CC95, BEND, AFT, CTRL1, CTRL2, CTRL3, CTRL4
00 06	0aaa aaaa	MFX Control Sens 1	(1 - 127) -63 - +63
00 07	0aaa aaaa	MFX Control Source 2	(0 - 101) OFF, CC01 - CC31, OFF, CC33 - CC95, BEND, AFT, CTRL1, CTRL2, CTRL3, CTRL4
00 08	0aaa aaaa	MFX Control Sens 2	(1 - 127) -63 - +63
00 09	0aaa aaaa	MFX Control Source 3	(0 - 101) OFF, CC01 - CC31, OFF, CC33 - CC95, BEND, AFT, CTRL1, CTRL2, CTRL3, CTRL4
00 0A	0aaa aaaa	MFX Control Sens 3	(1 - 127) -63 - +63
00 0B	0aaa aaaa	MFX Control Source 4	(0 - 101) OFF, CC01 - CC31, OFF, CC33 - CC95, BEND, AFT, CTRL1, CTRL2, CTRL3, CTRL4
00 0C	0aaa aaaa	MFX Control Sens 4	(1 - 127) -63 - +63
00 0D	000a aaaa	MFX Control Destination 1	(0 - 16) OFF, 1 - 16
00 0E	000a aaaa	MFX Control Destination 2	(0 - 16) OFF, 1 - 16
00 0F	000a aaaa	MFX Control Destination 3	(0 - 16) OFF, 1 - 16
00 10	000a aaaa	MFX Control Destination 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	

* Live Set Reverb

Offset Address		Description
00 00	0000 aaaa	Reverb Type (0 - 5) OFF, REVERB, SRV ROOM, SRV HALL, SRV PLATE, GM2 REVERB
00 01	0aaa aaaa	Reverb Level (0 - 127)
00 02	0000 00aa	(reserve) <*>
# 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 53	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	Reverb Parameter 21 (12768 - 52768) -20000 - +20000
# 00 57	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	Reverb Parameter 22 (12768 - 52768) -20000 - +20000
# 00 5B	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	Reverb Parameter 23 (12768 - 52768) -20000 - +20000
# 00 5F	0000 aaaa	
	0000 bbbb	
	0000 cccc	
	0000 dddd	Reverb Parameter 24 (12768 - 52768) -20000 - +20000
00 00 00 63		Total Size

* Live Set Layer

Offset Address		Description
00 00	0000 0aaa	(reserve) <*>
00 01	0000 000a	Layer Switch (0 - 1) OFF, ON
00 02	0000 000a	(reserve) <*>
00 03	0000 000a	(reserve) <*>
00 04	0000 000a	(reserve) <*>
00 05	0000 000a	(reserve) <*>
00 06	0aaa aaaa	Tone Bank Select MSB (0 - 127)
00 07	0aaa aaaa	Tone Bank Select LSB (0 - 127)
00 08	0aaa aaaa	Tone Program Number (0 - 127)
00 09	0aaa aaaa	Layer Level (0 - 127)
00 0A	0aaa aaaa	Layer Pan (0 - 127) L64 - 63R
00 0B	0aaa aaaa	Layer Coarse Tune (16 - 112) -48 - +48
00 0C	0aaa aaaa	Layer Fine Tune (14 - 114) -50 - +50
00 0D	0000 0aaa	Layer Mono/Poly (0 - 4) MONO, POLY, TONE, SOLO1, SOLO2
00 0E	0000 00aa	Layer Legato Switch (0 - 2) OFF, ON, TONE
00 0F	000a aaaa	Layer Pitch Bend Range (0 - 25) 0 - 24, TONE
00 10	0000 00aa	Layer Portamento Switch (0 - 2) OFF, ON, TONE
# 00 11	0000 aaaa	
	0000 bbbb	Layer Portamento Time (0 - 128) 0 - 127, TONE
00 13	0aaa aaaa	Layer Cutoff Offset (0 - 127) -64 - +63
00 14	0aaa aaaa	Layer Resonance Offset (0 - 127) -64 - +63
00 15	0aaa aaaa	Layer Attack Time Offset (0 - 127) -64 - +63
00 16	0aaa aaaa	Layer Decay Time Offset (0 - 127) -64 - +63
00 17	0aaa aaaa	Layer Release Time Offset (0 - 127) -64 - +63
00 18	0aaa aaaa	Layer Vibrato Rate (0 - 127) -64 - +63
00 19	0aaa aaaa	Layer Vibrato Depth (0 - 127) -64 - +63
00 1A	0aaa aaaa	Layer Vibrato Delay (0 - 127) -64 - +63
00 1B	0000 0aaa	Layer Octave Shift (61 - 67) -3 - +3
00 1C	0aaa aaaa	Layer Velocity Sens Offset (1 - 127)

			-63 - +63
00 1D	0aaa aaaa	Keyboard Range Lower	(0 - 127) C-1 - UPPER
00 1E	0aaa aaaa	Keyboard Range Upper	(0 - 127) LOWER - G9
00 1F	0aaa aaaa	Keyboard Fade Width Lower	(0 - 127)
00 20	0aaa aaaa	Keyboard Fade Width Upper	(0 - 127)
00 21	0aaa aaaa	Velocity Range Lower	(1 - 127) 1 - UPPER
00 22	0aaa aaaa	Velocity Range Upper	(0 - 127) LOWER - 127
00 23	0aaa aaaa	Velocity Fade Width Lower	(0 - 127)
00 24	0aaa aaaa	Velocity Fade Width Upper	(0 - 127)
00 25	0000 000a	(reserve) <*>	
00 26	0aaa aaaa	Layer Output Level	(0 - 127)
00 27	0aaa aaaa		(0 - 127)
00 28	0aaa aaaa	Layer Reverb Send Level	(0 - 127)
00 29	0000 aaaa	Layer Output Assign	(0 - 1) MFX, A
00 2A	0000 00aa		(0 - 2)
00 2B	0000 000a	Receive Bender	(0 - 1) OFF, ON
00 2C	0000 000a	Receive Polyphonic Key Pressure	(0 - 1) OFF, ON
00 2D	0000 000a	Receive Channel Pressure	(0 - 1) OFF, ON
00 2E	0000 000a	Receive Modulation	(0 - 1) OFF, ON
00 2F	0000 000a	(reserve) <*>	
00 30	0000 000a	(reserve) <*>	
00 31	0000 000a	Receive Expression	(0 - 1) OFF, ON
00 32	0000 000a	Receive Hold-1	(0 - 1) OFF, ON
00 33	0000 0aaa	Velocity Curve Type	(0 - 4) OFF, 1 - 4
00 34	0000 000a	Receive Breath Type	(0 - 1) OFF, ON
00 35	0000 000a	Receive Foot Type	(0 - 1) OFF, ON
00 36	0000 000a	Receive Portamento	(0 - 1) OFF, ON
00 37	0000 000a	Receive Filter Offset	(0 - 1) OFF, ON
00 38	0000 000a	Receive Envelope Offset	(0 - 1) OFF, ON
00 39	0000 000a	Receive Reverb Send	(0 - 1) OFF, ON
00 3A	0000 000a	Receive Modify	(0 - 1) OFF, ON
00 3B	0000 000a	Receive Variation	(0 - 1) OFF, ON
00 3C	0aaa aaaa	(reserve) <*>	
00 3D	0aaa aaaa	Layer MFX1 Send Level	(0 - 127)
00 3E	0aaa aaaa	Layer MFX2 Send Level	(0 - 127)
00 3F	0aaa aaaa	Layer MFX3 Send Level	(0 - 127)
00 40	0aaa aaaa	Layer MFX4 Send Level	(0 - 127)
00 41	0000 000a	Layer Section Sw	(0 - 1) OFF, ON
00 00 00 42	Total Size		

* Live Set Layer 2

Offset Address		Description	
00 00	0aaa aaaa	(reserve) <*>	
00 01	0aaa aaaa	(reserve) <*>	
00 02	0aaa aaaa	(reserve) <*>	
00 03	0aaa aaaa	(reserve) <*>	
00 04	0000 000a	(reserve) <*>	
00 05	0000 000a	(reserve) <*>	
00 06	0000 000a	(reserve) <*>	
00 07	0000 000a	(reserve) <*>	
00 08	0aaa aaaa	Tone Blender Dest Level	(0 - 127)
00 09	0aaa aaaa	Tone Blender Dest Pan	(0 - 127) L64 - 63R
00 0A	0aaa aaaa	Tone Blender Dest MFX1 Send	(0 - 127)
00 0B	0aaa aaaa	Tone Blender Dest MFX2 Send	(0 - 127)
00 0C	0aaa aaaa	Tone Blender Dest MFX3 Send	(0 - 127)
00 0D	0aaa aaaa	Tone Blender Dest MFX4 Send	(0 - 127)
00 0E	0aaa aaaa	Tone Blender Dest Reverb Send	(0 - 127)
00 0F	0aaa aaaa	Tone Blender Dest Cutoff	(0 - 127) -64 - +63
00 10	0aaa aaaa	Tone Blender Dest Resonance	(0 - 127) -64 - +63
00 11	0aaa aaaa	Tone Blender Dest Attack	(0 - 127) -64 - +63
00 12	0aaa aaaa	Tone Blender Dest Decay	(0 - 127) -64 - +63
00 13	0aaa aaaa	Tone Blender Dest Release	(0 - 127) -64 - +63
00 14	0aaa aaaa	(reserve) <*>	
00 15	0aaa aaaa	(reserve) <*>	
00 16	0aaa aaaa	(reserve) <*>	
00 17	0aaa aaaa	(reserve) <*>	
00 18	0aaa aaaa	(reserve) <*>	
00 19	0aaa aaaa	(reserve) <*>	
00 1A	0aaa aaaa	(reserve) <*>	
00 1B	0aaa aaaa	(reserve) <*>	
00 1C	0aaa aaaa	(reserve) <*>	
00 1D	0aaa aaaa	(reserve) <*>	
00 1E	0aaa aaaa	(reserve) <*>	
00 1F	0aaa aaaa	(reserve) <*>	
00 20	0aaa aaaa	(reserve) <*>	
00 21	0aaa aaaa	(reserve) <*>	
00 22	0aaa aaaa	(reserve) <*>	
00 23	0aaa aaaa	(reserve) <*>	
00 24	0aaa aaaa	(reserve) <*>	
00 25	0aaa aaaa	(reserve) <*>	
00 26	0aaa aaaa	(reserve) <*>	
00 27	0aaa aaaa	(reserve) <*>	
00 00 00 28	Total Size		

* Live Set Tone Offset

Offset Address		Description	
00 00	000a aaaa	(reserve) <*>	
00 01	0000 00aa	(reserve) <*>	
00 02	0000 00aa	Layer Portamento Mode	(0 - 2) NORMAL, LEGATO, TONE
00 03	0000 00aa	(reserve) <*>	
00 04	0000 00aa	(reserve) <*>	
00 05	000a aaaa	Pitch Env Depth Offset	(52 - 76) -12 - +12
00 06	0aaa aaaa	Pitch Env Attack Time Offset	(1 - 127) -63 - +63
00 07	0aaa aaaa	(reserve) <*>	
00 08	0aaa aaaa	Pitch Env Decay Time Offset	(1 - 127) -63 - +63
00 09	0aaa aaaa	(reserve) <*>	
00 0A	0aaa aaaa	(reserve) <*>	
00 0B	0aaa aaaa	(reserve) <*>	
00 0C	0aaa aaaa	(reserve) <*>	
00 0D	0aaa aaaa	(reserve) <*>	
00 0E	0aaa aaaa	(reserve) <*>	
00 0F	0000 0aaa	FILTER Mode	(0 - 7) OFF, LPF, BPF, HPF, PKG, ---, ---, TONE
00 10	0aaa aaaa	FILTER Cutoff Frequency Offset	(1 - 127) -63 - +63
00 11	00aa aaaa	FILTER Cutoff Keyfollow Offset	(44 - 84) -200 - +200
00 12	0000 aaaa	(reserve) <*>	
00 13	0aaa aaaa	(reserve) <*>	
00 14	0aaa aaaa	FILTER Resonance Offset	(1 - 127) -63 - +63
00 15	0aaa aaaa	FILTER Env Depth Offset	(1 - 127) -63 - +63
00 16	0000 aaaa	(reserve) <*>	

	00 17	0aaa aaaa	FILTER Env Velocity Sens Offset (1 - 127) / -63 - +63
	00 18	0aaa aaaa	FILTER Env Attack Time Offset (1 - 127) / -63 - +63
	00 19	0aaa aaaa	(reserve) <*>
	00 1A	0aaa aaaa	FILTER Env Decay Time Offset (1 - 127) / -63 - +63
	00 1B	0aaa aaaa	FILTER Env Release Time Offset (1 - 127) / -63 - +63
	00 1C	0aaa aaaa	(reserve) <*>
	00 1D	0aaa aaaa	(reserve) <*>
	00 1E	0aaa aaaa	(reserve) <*>
	00 1F	0aaa aaaa	(reserve) <*>
	00 20	0aaa aaaa	FILTER Env Sustatin Level Offset (1 - 127) / -63 - +63
	00 21	000a aaaa	AMP Keyfollow Offset (54 - 75) / -100 - +100, TONE
#	00 22	0000 aaaa	
		0000 bbbb	Modulation Limit (0 - 127)
	00 24	0000 0aaa	(reserve) <*>
	00 25	0000 aaaa	(reserve) <*>
	00 26	0aaa aaaa	AMP Level Velocity Sens Offset (1 - 127) / -63 - +63
	00 27	0aaa aaaa	AMP Env Attack Time Offset (1 - 127) / -63 - +63
	00 28	0aaa aaaa	(reserve) <*>
	00 29	0aaa aaaa	AMP Env Decay Time Offset (1 - 127) / -63 - +63
	00 2A	0aaa aaaa	AMP Env Release Time Offset (1 - 127) / -63 - +63
	00 2B	0aaa aaaa	(reserve) <*>
	00 2C	0aaa aaaa	(reserve) <*>
	00 2D	0aaa aaaa	AMP Env Sustain Level Offset (1 - 127) / -63 - +63
	00 2E	0000 aaaa	LFO Shape (0 - 13) / SIN, TRI, SAW-UP, ---, SQR, RND, ---, ---, ---, S&H, ---, ---, ---, TONE
#	00 2F	0000 aaaa	
		0000 bbbb	LFO Rate (0 - 150) / 0 - 127, MUSICAL-NOTES, TONE
	00 31	0000 00aa	LFO Key Trigger (0 - 2) / OFF, ON, TONE
	00 32	0aaa aaaa	LFO Pitch Depth Offset (0 - 127) / OFF, -63 - +63
	00 33	0aaa aaaa	LFO FILTER Depth Offset (0 - 127) / OFF, -63 - +63
	00 34	0aaa aaaa	LFO AMP Depth Offset (0 - 127) / OFF, -63 - +63
	00 35	0aaa aaaa	LFO Pan Depth Offset (0 - 127) / OFF, -63 - +63
	00 36	0000 aaaa	Modulation LFO Shape (0 - 13) / SIN, TRI, SAW-UP, ---, SQR, RND, ---, ---, ---, S&H, ---, ---, ---, TONE
#	00 37	0000 aaaa	
		0000 bbbb	Modulation LFO Rate (0 - 150) / 0 - 127, MUSICAL-NOTES, TONE
	00 39	0000 00aa	Modulation LFO Key Trigger (0 - 2) / OFF, ON, TONE
	00 3A	0aaa aaaa	Modulation LFO Pitch Depth Offset (0 - 127) / OFF, -63 - +63
	00 3B	0aaa aaaa	Modulation LFO FILTER Depth Offset (0 - 127) / OFF, -63 - +63
	00 3C	0aaa aaaa	Modulation LFO AMP Depth Offset (0 - 127) / OFF, -63 - +63
	00 3D	0aaa aaaa	Modulation LFO Pan Depth Offset (0 - 127) / OFF, -63 - +63
	00 3E	0000 0aaa	(reserve) <*>
	00 3F	0000 0aaa	(reserve) <*>
#	00 40	0000 aaaa	
		0000 bbbb	(reserve) <*>
	00 42	0000 00aa	(reserve) <*>
	00 43	0000 000a	(reserve) <*>
	00 44	0000 000a	(reserve) <*>
	00 45	0000 000a	(reserve) <*>
	00 46	0000 000a	(reserve) <*>
	00 47	0000 000a	(reserve) <*>
	00 48	0aaa aaaa	(reserve) <*>
	00 49	00aa aaaa	(reserve) <*>
	00 4A	0aaa aaaa	(reserve) <*>
	00 4B	00aa aaaa	(reserve) <*>
	00 4C	0aaa aaaa	(reserve) <*>
	00 4D	00aa aaaa	(reserve) <*>
	00 4E	0aaa aaaa	(reserve) <*>
	00 4F	00aa aaaa	(reserve) <*>
	00 50	0aaa aaaa	(reserve) <*>
	00 51	0aaa aaaa	(reserve) <*>
	00 52	00aa aaaa	(reserve) <*>
	00 53	0aaa aaaa	(reserve) <*>
	00 54	00aa aaaa	(reserve) <*>
	00 55	0aaa aaaa	(reserve) <*>
	00 56	00aa aaaa	(reserve) <*>
	00 57	0aaa aaaa	(reserve) <*>
	00 58	00aa aaaa	(reserve) <*>
	00 59	0aaa aaaa	(reserve) <*>
	00 5A	0aaa aaaa	(reserve) <*>
	00 5B	00aa aaaa	(reserve) <*>
	00 5C	0aaa aaaa	(reserve) <*>
	00 5D	00aa aaaa	(reserve) <*>
	00 5E	0aaa aaaa	(reserve) <*>
	00 5F	00aa aaaa	(reserve) <*>
	00 60	0aaa aaaa	(reserve) <*>
	00 61	00aa aaaa	(reserve) <*>
	00 62	0aaa aaaa	(reserve) <*>
	00 63	0aaa aaaa	(reserve) <*>
	00 64	00aa aaaa	(reserve) <*>
	00 65	0aaa aaaa	(reserve) <*>
	00 66	00aa aaaa	(reserve) <*>
	00 67	0aaa aaaa	(reserve) <*>
	00 68	00aa aaaa	(reserve) <*>
	00 69	0aaa aaaa	(reserve) <*>
	00 6A	00aa aaaa	(reserve) <*>
	00 6B	0aaa aaaa	(reserve) <*>
	00 6C	0aaa aaaa	(reserve) <*>
00 00 00 6D	Total Size		

* Live Set Tone Modify

Offset Address		Description	
00 00	0aaa aaaa	Tone Modify Type (read only)	(0 - 16)
00 01	0aaa aaaa	Modify Parameter 1	(0 - 127)
00 02	0aaa aaaa	Modify Parameter 2	(0 - 127)
00 03	0aaa aaaa	Modify Parameter 3	(0 - 127)
00 04	0aaa aaaa	Modify Parameter 4	(0 - 127)
00 05	0aaa aaaa	Modify Parameter 5	(0 - 127)
00 06	0aaa aaaa	Modify Parameter 6	(0 - 127)
00 07	0aaa aaaa	Modify Parameter 7	(0 - 127)
00 08	0aaa aaaa	Modify Parameter 8	(0 - 127)
00 09	0aaa aaaa	Modify Parameter 9	(0 - 127)
00 0A	0aaa aaaa	Modify Parameter 10	(0 - 127)
00 0B	0aaa aaaa	Modify Parameter 11	(0 - 127)
00 0C	0aaa aaaa	Modify Parameter 12	(0 - 127)
00 0D	0aaa aaaa	Modify Parameter 13	(0 - 127)
00 0E	0aaa aaaa	Modify Parameter 14	(0 - 127)
00 0F	0aaa aaaa	Modify Parameter 15	(0 - 127)
00 10	0aaa aaaa	Modify Parameter 16	(0 - 127)
00 11	0aaa aaaa	Modify Parameter 17	(0 - 127)
00 12	0aaa aaaa	Modify Parameter 18	(0 - 127)

00 13	0aaa aaaa	Modify Parameter 19	(0 - 127)
00 14	0aaa aaaa	Modify Parameter 20	(0 - 127)
00 15	0aaa aaaa	Modify Parameter 21	(0 - 127)
00 16	0aaa aaaa	Modify Parameter 22	(0 - 127)
00 17	0aaa aaaa	Modify Parameter 23	(0 - 127)
00 18	0aaa aaaa	Modify Parameter 24	(0 - 127)
00 19	0aaa aaaa	Modify Parameter 25	(0 - 127)
00 1A	0aaa aaaa	Modify Parameter 26	(0 - 127)
00 1B	0aaa aaaa	Modify Parameter 27	(0 - 127)
00 1C	0aaa aaaa	Modify Parameter 28	(0 - 127)
00 1D	0aaa aaaa	Modify Parameter 29	(0 - 127)
00 1E	0aaa aaaa	Modify Parameter 30	(0 - 127)
00 1F	0aaa aaaa	Modify Parameter 31	(0 - 127)
00 20	0aaa aaaa	Modify Parameter 32	(0 - 127)
00 21	0aaa aaaa	(reserve) <*>	
00 22	0aaa aaaa	(reserve) <*>	
00 23	0aaa aaaa	(reserve) <*>	
00 24	0aaa aaaa	(reserve) <*>	
00 00 00 25	Total Size		

* Registration Common

Offset Address		Description	
00 00	0aaa aaaa	Registration Name 1	(32 - 127) 32 - 127 [ASCII]
00 01	0aaa aaaa	Registration Name 2	(32 - 127) 32 - 127 [ASCII]
00 02	0aaa aaaa	Registration Name 3	(32 - 127) 32 - 127 [ASCII]
00 03	0aaa aaaa	Registration Name 4	(32 - 127) 32 - 127 [ASCII]
00 04	0aaa aaaa	Registration Name 5	(32 - 127) 32 - 127 [ASCII]
00 05	0aaa aaaa	Registration Name 6	(32 - 127) 32 - 127 [ASCII]
00 06	0aaa aaaa	Registration Name 7	(32 - 127) 32 - 127 [ASCII]
00 07	0aaa aaaa	Registration Name 8	(32 - 127) 32 - 127 [ASCII]
00 08	0aaa aaaa	Registration Name 9	(32 - 127) 32 - 127 [ASCII]
00 09	0aaa aaaa	Registration Name 10	(32 - 127) 32 - 127 [ASCII]
00 0A	0aaa aaaa	Registration Name 11	(32 - 127) 32 - 127 [ASCII]
00 0B	0aaa aaaa	Registration Name 12	(32 - 127) 32 - 127 [ASCII]
00 0C	0aaa aaaa	Registration Name 13	(32 - 127) 32 - 127 [ASCII]
00 0D	0aaa aaaa	Registration Name 14	(32 - 127) 32 - 127 [ASCII]
00 0E	0aaa aaaa	Registration Name 15	(32 - 127) 32 - 127 [ASCII]
00 0F	0aaa aaaa	Registration Name 16	(32 - 127) 32 - 127 [ASCII]
# 00 10	0000 aaaa		
	0000 bbbb	Registration Tempo	(20 - 250)
00 12	0000 000a	(reserve) <*>	
00 13	0000 000a	MIDI Out Setting	(0 - 1) INT, EXT
00 14	0aaa aaaa	Voice Reserve SOLO	(0 - 64) 0 - 63, FULL
00 15	0aaa aaaa	Voice Reserve PERC	(0 - 64) 0 - 63, FULL
00 16	0aaa aaaa	Registration Level	(0 - 127)
00 17	0aaa aaaa		(0 - 127)
00 18	0aaa aaaa	(reserve) <*>	
00 19	0aaa aaaa	(reserve) <*>	
00 1A	0aaa aaaa	(reserve) <*>	
00 1B	0aaa aaaa	(reserve) <*>	
00 1C	0aaa aaaa	(reserve) <*>	
00 1D	0aaa aaaa	(reserve) <*>	
00 1E	0aaa aaaa	(reserve) <*>	
00 1F	0aaa aaaa	(reserve) <*>	
00 20	0aaa aaaa	(reserve) <*>	
00 21	0aaa aaaa	(reserve) <*>	
00 22	0aaa aaaa	(reserve) <*>	
00 23	0aaa aaaa	(reserve) <*>	
00 24	0aaa aaaa	(reserve) <*>	
00 25	0aaa aaaa	(reserve) <*>	
00 00 00 26	Total Size		

* Registration Part

Offset Address		Description	
00 00	0000 000a	Part Switch	(0 - 1) OFF, ON
00 01	0aaa aaaa	Part Bank Select MSB (CC# 0)	(0 - 127)
00 02	0aaa aaaa	Part Bank Select LSB (CC# 32)	(0 - 127)
00 03	0aaa aaaa	Part Program Number (PC)	(0 - 127)
00 04	0aaa aaaa	Level (CC# 7)	(0 - 127)
00 05	0aaa aaaa	Pan (CC# 10)	(0 - 127) L64 - 63R
00 06	0000 0aaa	Octave Shift	(61 - 67) -3 - +3
00 07	0000 000a	(reserve) <*>	
00 08	0000 000a	Control Sw Bender	(0 - 1) OFF, ON
00 09	0000 000a	Control Sw Modulation	(0 - 1) OFF, ON
00 0A	0000 000a	Control Sw Switch S1	(0 - 1) OFF, ON
00 0B	0000 000a	Control Sw Switch S2	(0 - 1) OFF, ON
00 0C	0000 000a	Control Sw Hold Pedal	(0 - 1) OFF, ON
00 0D	0000 000a	Control Sw Control Pedal 1	(0 - 1) OFF, ON
00 0E	0000 000a	Control Sw Control Pedal 2	(0 - 1) OFF, ON
00 0F	0000 000a	Control Sw Aftertouch	(0 - 1) OFF, ON
00 10	0000 000a	Control Sw D Beam	(0 - 1) OFF, ON
00 00 00 11	Total Size		

* Registration Ext Part

Offset Address		Description	
# 00 00	0000 aaaa		
	0000 bbbb	External Bank Select MSB (CC# 0)	(0 - 128) 0 - 127, NO-SEND
00 02	0aaa aaaa	External Bank Select LSB (CC# 32)	(0 - 127)
# 00 03	0000 aaaa		
	0000 bbbb	External Program Number (PC)	(0 - 128) 0 - 127, NO-SEND
# 00 05	0000 aaaa		
	0000 bbbb	External Level (CC# 7)	(0 - 128) 0 - 127, NO-SEND
# 00 07	0000 aaaa		
	0000 bbbb	External Pan (CC# 10)	(0 - 128) L64 - 63R, NO-SEND
00 09	0aaa aaaa	Keyboard Range Lower	(0 - 127) C-1 - UPPER
00 0A	0aaa aaaa	Keyboard Range Upper	(0 - 127) LOWER - G9
00 0B	0000 000a	Keyboard Switch	(0 - 1) OFF, ON
00 0C	0000 000a	(reserve) <*>	
00 0D	0000 000a	(reserve) <*>	
00 0E	0000 000a	(reserve) <*>	
00 0F	0000 000a	(reserve) <*>	
00 10	0000 000a	(reserve) <*>	
00 11	0000 000a	(reserve) <*>	
00 12	0aaa aaaa	Velocity Range Lower	(1 - 127) 1 - UPPER
00 13	0aaa aaaa	Velocity Range Upper	(1 - 127) LOWER - 127
00 14	0000 0aaa	Part Octave Shift	(61 - 67) -3 - +3
00 15	0000 aaaa	(reserve) <*>	
00 00 00 16	Total Size		

* Registration Controller

Offset Address		Description	
00 00	0000 aaaa	Transpose Value	(59 - 70)

			-5 - +6
00 01	0000 000a	Transpose Switch	(0 - 1)
			OFF, ON
00 02	0000 0aaa	Octave Shift	(61 - 67)
			-3 - +3
00 03	0000 000a	Lower Split	(0 - 1)
			OFF, ON
00 04	0aaa aaaa	Lower Split Point	(0 - 127)
			OFF, 1 - 127
00 05	0000 000a	Solo Split	(0 - 1)
			OFF, ON
00 06	0aaa aaaa	Solo Split Point	(0 - 127)
			OFF, 1 - 127
00 07	0000 000a	(reserve) <*>	
00 08	0aaa aaaa	(reserve) <*>	
00 09	0000 000a	(reserve) <*>	
00 0A	0000 000a	Harmony Switch	(0 - 1)
			OFF, ON
00 0B	0aaa aaaa	(reserve) <*>	
00 0C	0aaa aaaa	Harmony Type	(0 - 16)
			ORGAN, BIG_BAND, STRINGS, BLOCK, HYMN, TRADITIONAL, DUET, COMBO, COUNTRY, BROADWAY, GOSPEL, OCTAVE1, OCTAVE2, 1NOTE, 2NOTES, 3NOTES, 4NOTES
00 0D	0000 000a	(reserve) <*>	
00 0E	0000 000a	(reserve) <*>	
00 0F	0aaa aaaa	(reserve) <*>	
00 10	0000 000a	Arpeggio Switch Upper	(0 - 1)
			OFF, ON
00 11	0000 000a	Arpeggio Switch Lower	(0 - 1)
			OFF, ON
00 12	0000 000a	(reserve) <*>	
00 13	0000 000a	(reserve) <*>	
00 14	0000 000a	Arpeggio Hold	(0 - 1)
			OFF, ON
00 15	0aaa aaaa	Arpeggio Bank	(0 - 1)
			PRESET, USER
00 16	0aaa aaaa	Arpeggio Style	(0 - 127)
			1 - 128
00 17	0aaa aaaa	Arpeggio Variation	(0 - 127)
			1 - 128
00 18	0aaa aaaa	Arpeggio Motif	(0 - 9)
			UP, DOWN, UP&DOWN, RANDOM, NOTE-ORDER, GLISSANDO, CHORD, AUTO1, AUTO2, PHRASE
00 19	0aaa aaaa	Arpeggio Accent	(0 - 100)
00 1A	0aaa aaaa	Arpeggio Shuffle Rate	(0 - 100)
00 1B	0000 000a	Arpeggio Shuffle Resolution	(0 - 1)
			16TH, 8TH
00 1C	0aaa aaaa	Arpeggio Velocity	(0 - 127)
			REAL, 1 - 127
00 1D	0000 0aaa	Arpeggio Octave Range	(61 - 67)
			-3 - +3
00 1E	0000 000a	(reserve) <*>	
00 1F	0aaa aaaa	Control Pedal 1 Assign	(0 - 98)
			OFF, CC01 - CC31, OFF, CC33 - CC95, AFT, BEND-UP, BEND-DOWN
00 20	0aaa aaaa	(reserve) <*>	
00 21	0aaa aaaa	Control Pedal 2 Assign	(0 - 98)
			OFF, CC01 - CC31, OFF, CC33 - CC95, AFT, BEND-UP, BEND-DOWN
00 22	0aaa aaaa	(reserve) <*>	
00 23	0aaa aaaa	Switch S1 Assign	(0 - 97)
			OFF, CC01 - CC31, OFF, CC33 - CC95, AFT, MONO/POLY
00 24	0000 000a	Switch S1 Type	(0 - 1)
			LATCH, MOMENTARY
00 25	0aaa aaaa	Switch S2 Assign	(0 - 97)
			OFF, CC01 - CC31, OFF, CC33 - CC95, AFT, MONO/POLY
00 26	0000 000a	Switch S2 Type	(0 - 1)
			LATCH, MOMENTARY
00 27	0000 00aa	Beam Select	(0 - 3)
			OFF, 1, 2, 3
00 28	0000 000a	(reserve) <*>	
00 29	0000 000a	(reserve) <*>	
00 2A	0000 000a	(reserve) <*>	
00 2B	0aaa aaaa	Beam Assign	(0 - 98)
			OFF, CC01 - CC31, OFF, CC33 - CC95, AFT, BEND-UP, BEND-DOWN
00 2C	0aaa aaaa	(reserve) <*>	
00 2D	0aaa aaaa	(reserve) <*>	
00 2E	0aaa aaaa	(reserve) <*>	
00 2F	0aaa aaaa	(reserve) <*>	
00 30	0aaa aaaa	(reserve) <*>	
00 31	0aaa aaaa	(reserve) <*>	
00 32	0aaa aaaa	(reserve) <*>	
00 33	0aaa aaaa	(reserve) <*>	
00 34	0aaa aaaa	(reserve) <*>	
00 35	0aaa aaaa	(reserve) <*>	
00 36	0aaa aaaa	(reserve) <*>	
00 37	0aaa aaaa	(reserve) <*>	
00 38	0aaa aaaa	(reserve) <*>	
00 39	0aaa aaaa	(reserve) <*>	
00 3A	0aaa aaaa	(reserve) <*>	
00 3B	0aaa aaaa	(reserve) <*>	
00 3C	0aaa aaaa	(reserve) <*>	
00 3D	0aaa aaaa	(reserve) <*>	
00 3E	0aaa aaaa	(reserve) <*>	
00 3F	0aaa aaaa	(reserve) <*>	
00 40	0aaa aaaa	(reserve) <*>	
00 41	0aaa aaaa	(reserve) <*>	
00 42	0aaa aaaa	(reserve) <*>	
00 43	0aaa aaaa	(reserve) <*>	
00 44	0aaa aaaa	(reserve) <*>	
00 45	0aaa aaaa	(reserve) <*>	
00 46	0aaa aaaa	(reserve) <*>	
00 47	0aaa aaaa	(reserve) <*>	
00 48	0aaa aaaa	(reserve) <*>	
00 49	0aaa aaaa	(reserve) <*>	
00 4A	0aaa aaaa	(reserve) <*>	
00 4B	0aaa aaaa	(reserve) <*>	
00 4C	0aaa aaaa	(reserve) <*>	
00 4D	0aaa aaaa	(reserve) <*>	
00 4E	0aaa aaaa	(reserve) <*>	
00 4F	0aaa aaaa	(reserve) <*>	
00 50	0aaa aaaa	(reserve) <*>	
00 51	0aaa aaaa	(reserve) <*>	
00 52	0aaa aaaa	(reserve) <*>	
00 53	0aaa aaaa	(reserve) <*>	
00 54	0aaa aaaa	(reserve) <*>	
00 55	0aaa aaaa	(reserve) <*>	
00 56	0aaa aaaa	(reserve) <*>	
00 57	0aaa aaaa	(reserve) <*>	
00 58	0aaa aaaa	(reserve) <*>	
00 59	0aaa aaaa	(reserve) <*>	
00 5A	0aaa aaaa	(reserve) <*>	
00 5B	0aaa aaaa	(reserve) <*>	
00 5C	0aaa aaaa	(reserve) <*>	
00 5D	0aaa aaaa	(reserve) <*>	
00 5E	0aaa aaaa	(reserve) <*>	
00 5F	0aaa aaaa	(reserve) <*>	
00 60	0aaa aaaa	(reserve) <*>	
00 61	0aaa aaaa	(reserve) <*>	
00 62	0aaa aaaa	(reserve) <*>	
00 63	0aaa aaaa	(reserve) <*>	
00 64	0aaa aaaa	(reserve) <*>	
00 65	0aaa aaaa	(reserve) <*>	
00 66	0aaa aaaa	(reserve) <*>	
00 67	0aaa aaaa	(reserve) <*>	
00 68	0aaa aaaa	(reserve) <*>	
00 69	0aaa aaaa	(reserve) <*>	
00 6A	0aaa aaaa	(reserve) <*>	
00 6B	0aaa aaaa	(reserve) <*>	
00 6C	0aaa aaaa	(reserve) <*>	
00 6D	0aaa aaaa	(reserve) <*>	
00 6E	0aaa aaaa	(reserve) <*>	
00 6F	0aaa aaaa	(reserve) <*>	
00 70	0aaa aaaa	(reserve) <*>	
00 71	0aaa aaaa	(reserve) <*>	
00 72	0aaa aaaa	(reserve) <*>	
00 73	0aaa aaaa	(reserve) <*>	
00 74	0aaa aaaa	(reserve) <*>	
00 75	0aaa aaaa	(reserve) <*>	
00 76	0aaa aaaa	(reserve) <*>	
00 77	0aaa aaaa	(reserve) <*>	
00 78	0aaa aaaa	(reserve) <*>	
00 79	0aaa aaaa	(reserve) <*>	
00 7A	0aaa aaaa	(reserve) <*>	
00 7B	0aaa aaaa	(reserve) <*>	
00 7C	0aaa aaaa	(reserve) <*>	
00 7D	0aaa aaaa	(reserve) <*>	
00 7E	0aaa aaaa	(reserve) <*>	
00 7F	0aaa aaaa	(reserve) <*>	
01 00	0aaa aaaa	(reserve) <*>	
01 01	0aaa aaaa	(reserve) <*>	
01 02	0aaa aaaa	(reserve) <*>	
01 03	0aaa aaaa	(reserve) <*>	
01 04	0aaa aaaa	(reserve) <*>	
01 05	0aaa aaaa	(reserve) <*>	
01 06	0aaa aaaa	(reserve) <*>	
01 07	0aaa aaaa	(reserve) <*>	
01 08	0aaa aaaa	(reserve) <*>	
01 09	0aaa aaaa	(reserve) <*>	
01 0A	0aaa aaaa	(reserve) <*>	
01 0B	0aaa aaaa	(reserve) <*>	
01 0C	0aaa aaaa	(reserve) <*>	
01 0D	0aaa aaaa	(reserve) <*>	
01 0E	0aaa aaaa	(reserve) <*>	
01 0F	0aaa aaaa	(reserve) <*>	
01 10	0aaa aaaa	(reserve) <*>	
01 11	0aaa aaaa	(reserve) <*>	
01 12	0aaa aaaa	(reserve) <*>	
01 13	0aaa aaaa	(reserve) <*>	
01 14	0aaa aaaa	(reserve) <*>	
01 15	0aaa aaaa	(reserve) <*>	
01 16	0aaa aaaa	(reserve) <*>	
01 17	0aaa aaaa	(reserve) <*>	
01 18	0aaa aaaa	(reserve) <*>	
01 19	0aaa aaaa	(reserve) <*>	
01 1A	0aaa aaaa	(reserve) <*>	
01 1B	0aaa aaaa	(reserve) <*>	
01 1C	0aaa aaaa	(reserve) <*>	
01 1D	0aaa aaaa	(reserve) <*>	

	01 1E	0aaa aaaa	(reserve) <*>	
	01 1F	0aaa aaaa	(reserve) <*>	
	01 20	0aaa aaaa	(reserve) <*>	
	01 21	0aaa aaaa	(reserve) <*>	
	01 22	0aaa aaaa	(reserve) <*>	
	01 23	0aaa aaaa	(reserve) <*>	
	01 24	0aaa aaaa	(reserve) <*>	
	01 25	0aaa aaaa	(reserve) <*>	
	01 26	0aaa aaaa	(reserve) <*>	
	01 27	0aaa aaaa	(reserve) <*>	
	01 28	0aaa aaaa	(reserve) <*>	
	01 29	0aaa aaaa	(reserve) <*>	
	01 2A	0aaa aaaa	(reserve) <*>	
	01 2B	0aaa aaaa	(reserve) <*>	
	01 2C	0aaa aaaa	(reserve) <*>	
	01 2D	0aaa aaaa	(reserve) <*>	
	01 2E	0aaa aaaa	(reserve) <*>	
	01 2F	0aaa aaaa	(reserve) <*>	
	01 30	0aaa aaaa	(reserve) <*>	
	01 31	0aaa aaaa	(reserve) <*>	
	01 32	0aaa aaaa	(reserve) <*>	
	01 33	0aaa aaaa	(reserve) <*>	
	01 34	0aaa aaaa	(reserve) <*>	
	01 35	0aaa aaaa	(reserve) <*>	
	01 36	0aaa aaaa	(reserve) <*>	
	01 37	0aaa aaaa	(reserve) <*>	
	01 38	0aaa aaaa	(reserve) <*>	
	01 39	0aaa aaaa	(reserve) <*>	
	01 3A	0aaa aaaa	(reserve) <*>	
	01 3B	0aaa aaaa	(reserve) <*>	
	01 3C	0aaa aaaa	(reserve) <*>	
	01 3D	0aaa aaaa	(reserve) <*>	
	01 3E	0aaa aaaa	(reserve) <*>	
	01 3F	0aaa aaaa	(reserve) <*>	
	01 40	0aaa aaaa	(reserve) <*>	
	01 41	0aaa aaaa	(reserve) <*>	
	01 42	0aaa aaaa	(reserve) <*>	
	01 43	0aaa aaaa	(reserve) <*>	
	01 44	0aaa aaaa	(reserve) <*>	
	01 45	0aaa aaaa	(reserve) <*>	
	01 46	0aaa aaaa	(reserve) <*>	
	01 47	0aaa aaaa	(reserve) <*>	
	01 48	0aaa aaaa	(reserve) <*>	
	01 49	0aaa aaaa	(reserve) <*>	
	01 4A	0aaa aaaa	(reserve) <*>	
	01 4B	0aaa aaaa	(reserve) <*>	
	01 4C	0aaa aaaa	(reserve) <*>	
	01 4D	0aaa aaaa	(reserve) <*>	
	01 4E	0aaa aaaa	(reserve) <*>	
	01 4F	0aaa aaaa	(reserve) <*>	
	01 50	0aaa aaaa	(reserve) <*>	
	01 51	0aaa aaaa	(reserve) <*>	
	01 52	0aaa aaaa	(reserve) <*>	
	01 53	0aaa aaaa	(reserve) <*>	
	01 54	0aaa aaaa	(reserve) <*>	
	01 55	0aaa aaaa	(reserve) <*>	
	01 56	0aaa aaaa	(reserve) <*>	
	01 57	0aaa aaaa	(reserve) <*>	
	01 58	0aaa aaaa	(reserve) <*>	
	01 59	0aaa aaaa	(reserve) <*>	
	01 5A	0000 aaaa	Upper Live Set Button Number	(0 - 10)
	01 5B	0000 000a	Upper Live Set Alternate Switch	(0 - 1) OFF, ON
	01 5C	0000 aaaa	Lower Live Set Button Number	(0 - 8)
	01 5D	0000 000a	Lower Live Set Alternate Switch	(0 - 1) OFF, ON
	01 5E	0000 0aaa	Solo Tone Button Number	(0 - 6) 0 - 8
	01 5F	0000 000a	Solo Tone Alternate Switch	(0 - 1) OFF, ON
	01 60	0aaa aaaa	(reserve) <*>	
#	01 61	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Knob E1 Assign ID	(0 - 65535)
	01 65	0aaa aaaa	Knob E1 Assign Destination	(0 - 127)
	01 66	0aaa aaaa	(reserve) <*>	
	01 67	0aaa aaaa	(reserve) <*>	
	01 68	0aaa aaaa	(reserve) <*>	
#	01 69	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Knob E2 Assign ID	(0 - 65535)
	01 6D	0aaa aaaa	Knob E2 Assign Destination	(0 - 127)
	01 6E	0aaa aaaa	(reserve) <*>	
	01 6F	0aaa aaaa	(reserve) <*>	
	01 70	0aaa aaaa	(reserve) <*>	
#	01 71	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Knob E3 Assign ID	(0 - 65535)
	01 75	0aaa aaaa	Knob E3 Assign Destination	(0 - 127)
	01 76	0aaa aaaa	(reserve) <*>	
	01 77	0aaa aaaa	(reserve) <*>	
	01 78	0aaa aaaa	(reserve) <*>	
#	01 79	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Knob E4 Assign ID	(0 - 65535)
	01 7D	0aaa aaaa	Knob E4 Assign Destination	(0 - 127)
	01 7E	0aaa aaaa	(reserve) <*>	
	01 7F	0aaa aaaa	(reserve) <*>	
#	02 00	0000 aaaa 0000 bbbb 0000 cccc	(reserve) <*>	
	02 03	0000 000a	(reserve) <*>	
	02 04	0000 000a	(reserve) <*>	
	02 05	0000 aaaa	(reserve) <*>	
	02 06	0000 aaaa	(reserve) <*>	
	02 07	0aaa aaaa	(reserve) <*>	
#	02 08	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	(reserve) <*>	
	02 0C	0aaa aaaa	(reserve) <*>	
	02 0D	0aaa aaaa	(reserve) <*>	
	02 0E	0aaa aaaa	(reserve) <*>	
	02 0F	0000 000a	(reserve) <*>	
	02 10	0aaa aaaa	(reserve) <*>	
#	02 11	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	(reserve) <*>	
	02 15	0aaa aaaa	(reserve) <*>	
	02 16	0aaa aaaa	(reserve) <*>	
	02 17	0aaa aaaa	(reserve) <*>	
	02 18	0000 000a	(reserve) <*>	
	02 19	0aaa aaaa	(reserve) <*>	
#	02 1A	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	(reserve) <*>	
	02 1E	0aaa aaaa	(reserve) <*>	
	02 1F	0aaa aaaa	(reserve) <*>	
	02 20	0aaa aaaa	(reserve) <*>	
	02 21	0000 000a	(reserve) <*>	
	02 22	0aaa aaaa	(reserve) <*>	
#	02 23	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	(reserve) <*>	
	02 27	0aaa aaaa	(reserve) <*>	
	02 28	0aaa aaaa	(reserve) <*>	
	02 29	0aaa aaaa	(reserve) <*>	
	02 2A	0000 000a	(reserve) <*>	
	02 2B	0aaa aaaa	(reserve) <*>	
	02 2C	0aaa aaaa	(reserve) <*>	
	02 2D	0aaa aaaa	(reserve) <*>	
	02 2E	0aaa aaaa	(reserve) <*>	
	02 2F	0aaa aaaa	(reserve) <*>	
	02 30	0aaa aaaa	(reserve) <*>	
	02 31	0aaa aaaa	(reserve) <*>	
	02 32	0aaa aaaa	(reserve) <*>	
	02 33	0000 000a	V-Link Switch	(0 - 1) OFF, ON
00 00 02 34			Total Size	

* Registration Sub Part

Offset Address		Description	
00 00	0000 0aaa	(reserve) <*>	
00 01	0000 000a	(reserve) <*>	
00 02	0000 000a	(reserve) <*>	
00 03	0000 000a	(reserve) <*>	
00 04	0000 000a	(reserve) <*>	
00 05	0000 000a	(reserve) <*>	
00 06	0aaa aaaa	(reserve) <*>	
00 07	0aaa aaaa	(reserve) <*>	
00 08	0aaa aaaa	(reserve) <*>	
00 09	0aaa aaaa	Level	(0 - 127)
00 0A	0aaa aaaa	Pan	(0 - 127) L64 - 63R
00 0B	0aaa aaaa	Coarse Tune	(16 - 112) -48 - +48
00 0C	0aaa aaaa	Fine Tune	(14 - 114) -50 - +50
00 0D	0000 0aaa	Mono/Poly	(0 - 4) MONO, POLY, TONE, SOLO1, SOLO2

	00 0E	0000 00aa	Legato Switch	(0 - 2) OFF, ON, TONE
	00 0F	000a aaaa	Pitch Bend Range	(0 - 25) 0 - 24, TONE
	00 10	0000 00aa	Portamento Switch	(0 - 2) OFF, ON, TONE
#	00 11	0000 aaaa 0000 bbbb	Portamento Time	(0 - 128) 0 - 127, TONE
	00 13	0aaa aaaa	Cutoff Offset	(0 - 127) -64 - +63
	00 14	0aaa aaaa	Resonance Offset	(0 - 127) -64 - +63
	00 15	0aaa aaaa	Attack Time Offset	(0 - 127) -64 - +63
	00 16	0aaa aaaa	Decay Time Offset	(0 - 127) -64 - +63
	00 17	0aaa aaaa	Release Time Offset	(0 - 127) -64 - +63
	00 18	0aaa aaaa	Vibrato Rate	(0 - 127) -64 - +63
	00 19	0aaa aaaa	Vibrato Depth	(0 - 127) -64 - +63
	00 1A	0aaa aaaa	Vibrato Delay	(0 - 127) -64 - +63
	00 1B	0000 0aaa	Octave Shift	(61 - 67) -3 - +3
	00 1C	0aaa aaaa	Velocity Sens Offset	(1 - 127) -63 - +63
	00 1D	0aaa aaaa	Keyboard Range Lower	(0 - 127) C-1 - UPPER
	00 1E	0aaa aaaa	Keyboard Range Upper	(0 - 127) LOWER - G9
	00 1F	0aaa aaaa	Keyboard Fade Width Lower	(0 - 127)
	00 20	0aaa aaaa	Keyboard Fade Width Upper	(0 - 127)
	00 21	0aaa aaaa	Velocity Range Lower	(1 - 127) 1 - UPPER
	00 22	0aaa aaaa	Velocity Range Upper	(0 - 127) LOWER - 127
	00 23	0aaa aaaa	Velocity Fade Width Lower	(0 - 127)
	00 24	0aaa aaaa	Velocity Fade Width Upper	(0 - 127)
	00 25	0000 000a	(reserve) <*>	
	00 26	0aaa aaaa	Output Level	(0 - 127)
	00 27	0aaa aaaa	(reserve) <*>	
	00 28	0aaa aaaa	Reverb Send Level	(0 - 127)
	00 29	0000 aaaa	(reserve) <*>	
	00 2A	0000 00aa	(reserve) <*>	
	00 2B	0000 000a	Receive Bender	(0 - 1) OFF, ON
	00 2C	0000 000a	Receive Polyphonic Key Pressure	(0 - 1) OFF, ON
	00 2D	0000 000a	Receive Channel Pressure	(0 - 1) OFF, ON
	00 2E	0000 000a	Receive Modulation	(0 - 1) OFF, ON
	00 2F	0000 000a	(reserve) <*>	
	00 30	0000 000a	(reserve) <*>	
	00 31	0000 000a	Receive Expression	(0 - 1) OFF, ON
	00 32	0000 000a	Receive Hold-1	(0 - 1) OFF, ON
	00 33	0000 0aaa	Velocity Curve Type	(0 - 4) OFF, 1 - 4
	00 34	0000 000a	Receive Breath Type	(0 - 1) OFF, ON
	00 35	0000 000a	Receive Foot Type	(0 - 1) OFF, ON
	00 36	0000 000a	Receive Portamento	(0 - 1) OFF, ON
	00 37	0000 000a	Receive Filter Offset	(0 - 1) OFF, ON
	00 38	0000 000a	Receive Envelope Offset	(0 - 1) OFF, ON
	00 39	0000 000a	Receive Reverb Send	(0 - 1) OFF, ON
	00 3A	0000 000a	Receive Modify	(0 - 1) OFF, ON
	00 3B	0000 000a	Receive Variation	(0 - 1) OFF, ON
00 00 00 3C	Total Size			

* Registration Sub Modify

Offset Address	Description		
00 00	0aaa aaaa	Tone Modify Type (read only)	(0 - 16)
00 01	0aaa aaaa	Modify Parameter 1	(0 - 127)
00 02	0aaa aaaa	Modify Parameter 2	(0 - 127)
00 03	0aaa aaaa	Modify Parameter 3	(0 - 127)
00 04	0aaa aaaa	Modify Parameter 4	(0 - 127)
00 05	0aaa aaaa	Modify Parameter 5	(0 - 127)
00 06	0aaa aaaa	Modify Parameter 6	(0 - 127)
00 07	0aaa aaaa	Modify Parameter 7	(0 - 127)
00 08	0aaa aaaa	Modify Parameter 8	(0 - 127)
00 09	0aaa aaaa	Modify Parameter 9	(0 - 127)
00 0A	0aaa aaaa	Modify Parameter 10	(0 - 127)
00 0B	0aaa aaaa	Modify Parameter 11	(0 - 127)
00 0C	0aaa aaaa	Modify Parameter 12	(0 - 127)
00 0D	0aaa aaaa	Modify Parameter 13	(0 - 127)
00 0E	0aaa aaaa	Modify Parameter 14	(0 - 127)
00 0F	0aaa aaaa	Modify Parameter 15	(0 - 127)
00 10	0aaa aaaa	Modify Parameter 16	(0 - 127)
00 11	0aaa aaaa	Modify Parameter 17	(0 - 127)
00 12	0aaa aaaa	Modify Parameter 18	(0 - 127)
00 13	0aaa aaaa	Modify Parameter 19	(0 - 127)
00 14	0aaa aaaa	Modify Parameter 20	(0 - 127)
00 15	0aaa aaaa	Modify Parameter 21	(0 - 127)
00 16	0aaa aaaa	Modify Parameter 22	(0 - 127)
00 17	0aaa aaaa	Modify Parameter 23	(0 - 127)
00 18	0aaa aaaa	Modify Parameter 24	(0 - 127)
00 19	0aaa aaaa	Modify Parameter 25	(0 - 127)
00 1A	0aaa aaaa	Modify Parameter 26	(0 - 127)
00 1B	0aaa aaaa	Modify Parameter 27	(0 - 127)
00 1C	0aaa aaaa	Modify Parameter 28	(0 - 127)
00 1D	0aaa aaaa	Modify Parameter 29	(0 - 127)
00 1E	0aaa aaaa	Modify Parameter 30	(0 - 127)
00 1F	0aaa aaaa	Modify Parameter 31	(0 - 127)
00 20	0aaa aaaa	Modify Parameter 32	(0 - 127)
00 21	0aaa aaaa	(reserve) <*>	
00 22	0aaa aaaa	(reserve) <*>	
00 23	0aaa aaaa	(reserve) <*>	
00 24	0aaa aaaa	(reserve) <*>	
00 00 00 25	Total Size		

* Registration Sub Effect

Offset Address	Description		
00 00	0000 000a	Comp Switch	(0 - 1) OFF, ON
00 01	0aaa aaaa	Attack	(0 - 127)
00 02	0aaa aaaa	Threshold	(0 - 127)
00 03	000a aaaa	Post Gain	(0 - 18) 0 - +18 [dB]
00 04	000a aaaa	Low Gain	(0 - 30) -15 - +15 [dB]
00 05	000a aaaa	High Gain	(0 - 30) -15 - +15 [dB]
00 06	0aaa aaaa	Comp Level	(0 - 127)
00 07	0000 000a	EQ Switch	(0 - 1) OFF, ON
00 08	0000 000a	Low Freq	(0 - 1) 200, 400 [Hz]
00 09	000a aaaa	Low Gain	(0 - 30) -15 - +15 [dB]
00 0A	000a aaaa	Mid1 Freq	(0 - 16) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000 [Hz]
00 0B	000a aaaa	Mid1 Gain	(0 - 30) -15 - +15 [dB]
00 0C	0000 0aaa	Mid1 Q	(0 - 4) 0.5, 1.0, 2.0, 4.0, 8.0
00 0D	000a aaaa	Mid2 Freq	(0 - 16) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000 [Hz]
00 0E	000a aaaa	Mid2 Gain	(0 - 30) -15 - +15 [dB]
00 0F	0000 0aaa	Mid2 Q	(0 - 4) 0.5, 1.0, 2.0, 4.0, 8.0
00 10	0000 00aa	High Freq	(0 - 2) 2000, 4000, 8000 [Hz]
00 11	000a aaaa	High Gain	(0 - 30) -15 - +15 [dB]
00 12	0aaa aaaa	EQ Level	(0 - 127)
00 13	0000 000a	Delay Switch	(0 - 1) OFF, ON
00 14	0000 000a	Delay Left (num/note sw)	(0 - 1) OFF, ON
# 00 15	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Delay Left (msec)	(0 - 1300) 0 - 1300 [msec]
00 19	000a aaaa	Delay Left (note)	(0 - 21) MUSICAL-NOTES
00 1A	0000 000a	Delay Right (num/note sw)	(0 - 1) OFF, ON
# 00 1B	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Delay Right (msec)	(0 - 1300) 0 - 1300 [msec]
00 1F	000a aaaa	Delay Right (note)	(0 - 21)

			MUSICAL-NOTES
00 20	0000 000a	Phase Left	(0 - 1) NORMAL, INVERSE
00 21	0000 000a	Phase Right	(0 - 1) NORMAL, INVERSE
00 22	0000 000a	Feedback Mode	(0 - 1) NORMAL, CROSS
00 23	0aaa aaaa	Feedback	(0 - 98) -98 - +98 [%]
00 24	000a aaaa	HF Damp	(0 - 17) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, BYPASS [Hz]
00 25	000a aaaa	Low Gain	(0 - 30) -15 - +15 [dB]
00 26	000a aaaa	High Gain	(0 - 30) -15 - +15 [dB]
00 27	0aaa aaaa	Balance	(0 - 100) D100:0W - D0:100W
00 28	0aaa aaaa	Delay Level	(0 - 127)
00 29	0aaa aaaa	Reverb Send Level	(0 - 127)
00 2A	0aaa aaaa	Output Level	(0 - 127)
00 2B	0aaa aaaa	(reserve) <*>	
00 2C	0aaa aaaa	(reserve) <*>	
00 2D	0aaa aaaa	(reserve) <*>	
00 2E	0aaa aaaa	(reserve) <*>	
00 2F	0aaa aaaa	(reserve) <*>	
00 30	0aaa aaaa	(reserve) <*>	
00 31	0aaa aaaa	(reserve) <*>	
00 32	0aaa aaaa	(reserve) <*>	
00 00 00 33	Total Size		

* Registration Sub Reverb

Offset Address		Description	
00 00	0000 aaaa	Reverb Type	(0 - 5) OFF, REVERB, SRV ROOM, SRV HALL, SRV PLATE, GM2 REVERB
00 01	0aaa aaaa	Reverb Level	(0 - 127)
00 02	0000 00aa	(reserve) <*>	
# 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 53	0000 aaaa 0000 bbbb 0000 cccc		
	0000 dddd	Reverb Parameter 21	(12768 - 52768) -20000 - +20000
# 00 57	0000 aaaa 0000 bbbb 0000 cccc		
	0000 dddd	Reverb Parameter 22	(12768 - 52768) -20000 - +20000
# 00 5B	0000 aaaa 0000 bbbb 0000 cccc		
	0000 dddd	Reverb Parameter 23	(12768 - 52768) -20000 - +20000
# 00 5F	0000 aaaa 0000 bbbb 0000 cccc		
	0000 dddd	Reverb Parameter 24	(12768 - 52768) -20000 - +20000
00 00 00 63	Total Size		

* Tone Common

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]

	Offset Address		Description	
	00 0C	0aaa aaaa	Tone Level	(0 - 127)
#	00 0D	0000 aaaa 0000 bbbb 0000 cccc	(reserve) <*>	
	00 10	0000 000a	(reserve) <*>	
	00 11	0000 000a	(reserve) <*>	
	00 12	0000 000a	Portamento Switch	(0 - 1) OFF, ON
	00 13	0aaa aaaa	Portamento Time	(0 - 127)
	00 14	0000 00aa	Mono/Poly	(0 - 1) POLY, MONO
	00 15	0000 0aaa	Octave Shift	(61 - 67) -3 - +3
	00 16	000a aaaa	Pitch Bend Range Up	(0 - 24)
	00 17	000a aaaa	Pitch Bend Range Down	(0 - 24)
	00 18	0000 0aaa	(reserve) <*>	
	00 19	0000 000a	Partial1 Switch	(0 - 1) OFF, ON
	00 1A	0000 000a	Partial1 Select	(0 - 1) OFF, ON
	00 1B	0000 000a	Partial2 Switch	(0 - 1) OFF, ON
	00 1C	0000 000a	Partial2 Select	(0 - 1) OFF, ON
	00 1D	0000 000a	Partial3 Switch	(0 - 1) OFF, ON
	00 1E	0000 000a	Partial3 Select	(0 - 1) OFF, ON
	00 1F	0000 00aa	RING Switch	(0 - 2) OFF, ---, ON
	00 20	0000 000a	(reserve) <*>	
	00 21	0000 00aa	(reserve) <*>	
	00 22	0000 000a	(reserve) <*>	
	00 23	0000 000a	(reserve) <*>	
	00 24	00aa aaaa	(reserve) <*>	
	00 25	0000 000a	(reserve) <*>	
	00 26	0000 000a	(reserve) <*>	
	00 27	0000 000a	(reserve) <*>	
	00 28	0000 000a	(reserve) <*>	
	00 29	0000 000a	(reserve) <*>	
	00 2A	0000 000a	(reserve) <*>	
	00 2B	0000 000a	(reserve) <*>	
	00 2C	0000 000a	(reserve) <*>	
	00 2D	0000 000a	(reserve) <*>	
	00 2E	0000 000a	Unison Switch	(0 - 1) OFF, ON
	00 2F	0000 000a	(reserve) <*>	
	00 30	0000 000a	(reserve) <*>	
	00 31	0000 000a	Portamento Mode	(0 - 1) NORMAL, LEGATO
	00 32	0000 000a	Legato Switch	(0 - 1) OFF, ON
	00 33	0000 000a	(reserve) <*>	
	00 34	0aaa aaaa	Analog Feel	(0 - 127)
	00 35	0aaa aaaa	Wave Shape	(0 - 127)
	00 36	0aaa aaaa	Tone Category	(0 - 127)
#	00 37	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	(reserve) <*>	
	00 3B	0000 0aaa	(reserve) <*>	
	00 3C	0000 00aa	Unison Size	(0 - 3) 2, 4, 6, 8
	00 3D	0aaa aaaa	(reserve) <*>	
	00 3E	0aaa aaaa	(reserve) <*>	
	00 3F	0aaa aaaa	(reserve) <*>	
	00 00 00 40		Total Size	

* Tone Partial

	Offset Address		Description	
	00 00	0000 0aaa	OSC Wave	(0 - 7) SAW, SQR, PW-SQR, TRI, SINE, NOISE, SUPER-SAW, PCM
	00 01	00aa aaaa	OSC Wave Variation	(0 - 2) A, B, C
	00 02	0000 00aa	(reserve) <*>	
	00 03	00aa aaaa	OSC Pitch	(40 - 88) -24 - +24
	00 04	0aaa aaaa	OSC Detune	(14 - 114) -50 - +50
	00 05	0aaa aaaa	OSC Pulse Width Mod Depth	(0 - 127)
	00 06	0aaa aaaa	OSC Pulse Width	(0 - 127)
	00 07	0aaa aaaa	OSC Pitch Env Attack Time	(0 - 127)
	00 08	0aaa aaaa	OSC Pitch Env Decay	(0 - 127)
	00 09	0aaa aaaa	OSC Pitch Env Depth	(1 - 127) -63 - +63
	00 0A	0000 0aaa	FILTER Mode	(0 - 4) BYPASS, LPF, HPF, BPF, PKG
	00 0B	0000 000a	FILTER Slope	(0 - 1) -12, -24 [dB]
	00 0C	0aaa aaaa	FILTER Cutoff	(0 - 127)
	00 0D	00aa aaaa	FILTER Cutoff Keyfollow	(54 - 74) -100 - +100
	00 0E	0aaa aaaa	FILTER Env Velocity Sens	(1 - 127) -63 - +63
	00 0F	0aaa aaaa	FILTER Resonance	(0 - 127)
	00 10	0aaa aaaa	FILTER Env Attack Time	(0 - 127)
	00 11	0aaa aaaa	FILTER Env Decay Time	(0 - 127)
	00 12	0aaa aaaa	FILTER Env Sustain Level	(0 - 127)
	00 13	0aaa aaaa	FILTER Env Release Time	(0 - 127)
	00 14	0aaa aaaa	FILTER Env Depth	(1 - 127) -63 - +63
	00 15	0aaa aaaa	AMP Level	(0 - 127)
	00 16	0aaa aaaa	AMP Level Velocity Sens	(1 - 127) -63 - +63
	00 17	0aaa aaaa	AMP Env Attack Time	(0 - 127)
	00 18	0aaa aaaa	AMP Env Decay Time	(0 - 127)
	00 19	0aaa aaaa	AMP Env Sustain Level	(0 - 127)
	00 1A	0aaa aaaa	AMP Env Release Time	(0 - 127)
	00 1B	0aaa aaaa	AMP Pan	(0 - 127) L64 - 63R
	00 1C	0000 0aaa	LFO Shape	(0 - 5) TRI, SIN, SAW, SQR, S&H, RND
	00 1D	0aaa aaaa	LFO Rate	(0 - 127)
	00 1E	0000 000a	LFO Tempo Sync Switch	(0 - 1) OFF, ON
	00 1F	000a aaaa	LFO Tempo Sync Note	(0 - 19) 16, 12, 8, 4, 2, 1, 3/4, 2/3, 1/2, 3/8, 1/3, 1/4, 3/16, 1/6, 1/8, 3/32, 1/12, 1/16, 1/24, 1/32
	00 20	0aaa aaaa	LFO Fade Time	(0 - 127)
	00 21	0000 000a	LFO Key Trigger	(0 - 1) OFF, ON
	00 22	0aaa aaaa	LFO Pitch Depth	(1 - 127) -63 - +63
	00 23	0aaa aaaa	LFO FILTER Depth	(1 - 127) -63 - +63
	00 24	0aaa aaaa	LFO AMP Depth	(1 - 127) -63 - +63
	00 25	0aaa aaaa	LFO Pan Depth	(1 - 127) -63 - +63
	00 26	0000 0aaa	Modulation LFO Shape	(0 - 5) TRI, SIN, SAW, SQR, S&H, RND
	00 27	0aaa aaaa	Modulation LFO Rate	(0 - 127)
	00 28	0000 000a	Modulation LFO Tempo Sync Switch	(0 - 1) OFF, ON
	00 29	000a aaaa	Modulation LFO Tempo Sync Note	(0 - 19) 16, 12, 8, 4, 2, 1, 3/4, 2/3, 1/2, 3/8, 1/3, 1/4, 3/16, 1/6, 1/8, 3/32, 1/12, 1/16, 1/24, 1/32
	00 2A	0aaa aaaa	OSC Pulse Width Shift	(0 - 127)
	00 2B	0000 000a	(reserve) <*>	
	00 2C	0aaa aaaa	Modulation LFO Pitch Depth	(1 - 127) -63 - +63
	00 2D	0aaa aaaa	Modulation LFO FILTER Depth	(1 - 127) -63 - +63
	00 2E	0aaa aaaa	Modulation LFO AMP Depth	(1 - 127) -63 - +63
	00 2F	0aaa aaaa	Modulation LFO Pan Depth	(1 - 127) -63 - +63
	00 30	0aaa aaaa	Cutoff Aftertouch Sens	(1 - 127) -63 - +63
	00 31	0aaa aaaa	Level Aftertouch Sens	(1 - 127) -63 - +63
	00 32	0aaa aaaa	(reserve) <*>	
	00 33	0aaa aaaa	(reserve) <*>	
	00 34	0000 00aa	Wave Gain	(0 - 3) -6, 0, +6, +12 [dB]
#	00 35	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Wave Number	(0 - 16384) OFF, 1 - 16384
	00 39	0aaa aaaa	HPF Cutoff	(0 - 127)

00 3A	0aaa aaaa	Super Saw Detune	(0 - 127)
00 3B	0aaa aaaa	Modulation LFO Rate Control	(1 - 127) -63 - +63
00 3C	000a aaaa	AMP Level Keyfollow	(54 - 74) -100 - +100
00 00 00 3D	Total Size		

4. Supplementary Material

■ Decimal and Hexadecimal Table

(An "H" is appended to the end of numbers in hexadecimal notation.)
In MIDI documentation, data values and addresses/sizes of Exclusive messages, etc. are expressed as hexadecimal values for each 7 bits.
The following table shows how these correspond to decimal numbers.

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 = 9, 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 REVERB TYPE of UPPER LIVE SET to SRV REVERB (DT1)
According to the Parameter Address Map (p. 11), the start address of Temporary Live Set is 10 00 00 00H, the offset address of REVERB at UPPER LIVE SET is 06 00H, and the address of REVERB TYPE is 00 00H. Therefore the address of REVERB TYPE of UPPER LIVE SET is;

```
   10 00 00 00H
         06 00H
+)       00 00H
   10 00 06 00H
```

SRV REVERB has the value of 02H.
So the system exclusive message should be sent is;

F0	41	10	00 00 55	12	10 00 06 00	02	??	F7
(1)	(2)	(3)	(4)	(5)	address	data	checksum	(6)

(1) ExclusiveStatus (2) ID (Roland) (3) Device ID (17)
(4) Model ID (JUPITER-80) (5) Command ID (DT1) (6) End of Exclusive

Then calculate the checksum.

10H + 00H + 06H + 00H + 02H = 16 + 0 + 6 + 0 + 2 = 24 (sum)
24 (sum) ? 128 = 0 (quotient) ... 24 (remainder)
checksum = 128 - 24 (remainder) = 104 = 68H

This means that F0 41 10 00 00 55 12 10 00 06 00 02 68 F7 is the message should be sent.

■ ASCII Code Table

Live Set 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.

■ SuperNATURAL Acoustic (SOLO/PERC Parts) Bank Select and Program Change Correspondence Chart

Number	Tone Name	Bank Select MSB	Bank Select LSB	Program Number
0001	Concert Grand	90	67	1
0002	Grand Piano1	90	67	2
0003	Grand Piano2	90	67	3
0004	Grand Piano3	90	67	4
0005	Mellow Piano	90	67	5
0006	Bright Piano	90	67	6
0007	Upright Piano	90	67	7
0008	Concert Mono	90	67	8
0009	Honky-tonk	90	67	9
0010	Pure Vintage EP1	89	64	5
0011	Pure Vintage EP2	89	65	5
0012	Pure Wurly	89	66	5
0013	Pure Vintage EP3	89	67	5
0014	Tined EP1	89	68	5
0015	Tined EP2	89	69	5
0016	Old Hammer EP	89	70	5
0017	Dyno Piano	89	71	5
0018	Clav CB Flat	89	64	8
0019	Clav CA Flat	89	65	8
0020	Clav CB Medium	89	66	8
0021	Clav CA Medium	89	67	8
0022	Clav CB Brillia	89	68	8
0023	Clav CA Brillia	89	69	8
0024	Clav CB Combo	89	70	8
0025	Clav CA Combo	89	71	8
0026	Vibraphone	89	64	12
0027	Marimba	89	64	13
0029	French Accordion	89	64	22
0030	ItalianAccordion	89	65	22
0031	Harmonica	89	64	23
0032	Bandoneon	89	64	24
0033	Nylon Guitar	89	64	25
0034	Flamenco Guitar	89	65	25
0035	SteelStr Guitar	89	64	26
0036	Acoustic Bass	89	64	33
0037	Fingered Bass	89	64	34
0038	Fingered Bass 2	89	65	34
0039	Picked Bass	89	64	35
0040	Picked Bass 2	89	65	35
0041	Fretless Bass	89	64	36
0042	Violin	89	64	41
0043	Violin 2	89	65	41
0044	Viola	89	64	42
0045	Cello	89	64	43
0046	Cello 2	89	65	43
0047	Contrabass	89	64	44
0048	Harp	89	64	47
0049	Timpani	89	64	48
0050	Strings	89	64	49
0051	Trumpet	89	64	57
0052	Flugel Horn	89	66	57
0053	Trombone	89	64	58
0054	Trombone 2	89	65	58
0055	Bass Trombone	89	66	58
0056	Mute Trumpet	89	64	60
0057	French Horn	89	64	61
0058	Soprano Sax	89	64	65
0059	Alto Sax	89	64	66
0060	Tenor Sax	89	64	67
0061	Baritone Sax	89	64	68
0062	Oboe	89	64	69
0063	English Horn	89	64	70
0064	Bassoon	89	64	71
0065	Clarinet	89	64	72
0066	Bass Clarinet	89	65	72
0067	Piccolo	89	64	73
0068	Flute	89	64	74
0069	Flute 2	89	65	74
0070	Pan Flute	89	64	76
0071	Shakuhachi	89	64	78
0072	Ryuteki	89	65	78
0073	Sitar	89	64	105
0074	Uilleann Pipes	89	64	110
0075	Erhu	89	65	111
0076	Sarangi	89	66	111
0077	Steel Drums	89	64	115
0078	APS Vibraphone	89	80	12
0079	APS Marimba	89	80	13
0080	APS Accordion	89	80	22
0081	APS Harmonica	89	80	23
0082	APS Bandoneon	89	80	24
0083	APS Nylon Guitar	89	80	25
0084	APS SteelStr Gt.	89	80	26
0085	APS Acoustic Bs.	89	80	33
0086	APS Fingered Bs.	89	80	34
0087	APS Picked Bass	89	80	35
0088	APS Fretless Bs.	89	80	36
0089	APS Violin	89	80	41
0090	APS Viola	89	80	42
0091	APS Cello	89	80	43
0092	APS Contrabass	89	80	44
0093	APS Harp	89	80	47
0094	APS Timpani	89	80	48
0095	APS Strings	89	80	49
0096	APS Trumpet	89	80	57
0097	APS Trombone	89	80	58
0098	APS Mute Trumpet	89	80	60
0099	APS French Horn	89	80	61
0100	APS Soprano Sax	89	80	65
0101	APS Alto Sax	89	80	66
0102	APS Tenor Sax	89	80	67
0103	APS Baritone Sax	89	80	68
0104	APS Oboe	89	80	69
0105	APS English Horn	89	80	70
0106	APS Bassoon	89	80	71
0107	APS Clarinet	89	80	72
0108	APS Piccolo	89	80	73
0109	APS Flute	89	80	74
0110	APS Pan Flute	89	80	76
0111	APS Shakuhachi	89	80	78
0112	APS Ryuteki	89	81	78
0113	APS Sitar	89	80	105
0114	APS UilleannPipe	89	80	110
0115	APS Erhu	89	81	111
0116	APS Sarangi	89	82	111
0117	APS Steel Drums	89	80	115