

# MIDI Implementation

Model SD-90  
 Date December 12, 2001  
 Version 1.02

## 1. Receive data

### ■ 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)

\* Not received when the Envelope Mode parameter (PATCH/TONE and RHYTHM/TONE) is NO-SUS.

#### ● Note on

Status	2nd byte	3rd byte
9nH	kkH	vvH

n = MIDI channel number: 0H - FH (Ch.1 - 16)  
 kk = note number: 00H - 7FH (0 - 127)  
 vv = note on velocity: 01H - 7FH (1 - 127)

#### ● Polyphonic Key Pressure

Status	2nd byte	3rd byte
AnH	kkH	vvH

n = MIDI channel number: 0H - FH (Ch.1 - 16)  
 kk = note number: 00H - 7FH (0 - 127)  
 vv = Polyphonic Key Pressure: 00H - 7FH (0 - 127)

#### ● Control Change

- \* If the corresponding Controller number is selected for the Patch Control Source 1, 2, 3 or 4 parameter (PATCH COMMON), the corresponding effect will occur.
- \* If a Controller number that corresponds to the System Control Source 1, 2, 3 or 4 parameter (SYSTEM/COMMON) is selected, the specified effect will apply if Patch Control Source 1, 2, 3 or 4 parameter (PATCH/COMMON) is set to SYS-CTRL1, CTRL-2, CTRL-3 or CTRL-4.

#### ○ 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)

BANK MSB (mm)	GROUP
121	GM2 INSTRUMENT
120	GM2 DRUM SET
080	SD SPECIAL SET 1 INSTRUMENT
081	SD SPECIAL SET 2 INSTRUMENT
096	CLASSICAL SET INSTRUMENT
097	CONTEMPORARY SET INSTRUMENT
098	SOLO SET INSTRUMENT
099	ENHANCED SET INSTRUMENT
104	CLASSICAL SET DRUM SET
105	CONTEMPORARY SET DRUM SET
106	SOLO SET DRUM SET
107	ENHANCED SET DRUM SET

#### ○ 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)

#### ○ Portamento Time (Controller number 5)

Status	2nd byte	3rd byte
BnH	05H	vvH

n = MIDI channel number: 0H - FH (Ch.1 - 16)  
 vv = Portamento Time: 00H - 7FH (0 - 127)

#### ○ Data Entry (Controller number 6, 38)

Status	2nd byte	3rd byte
BnH	06H	mmH
BnH	26H	llH

n = MIDI channel number: 0H - FH (Ch.1 - 16)  
 mm, ll = the value of the parameter specified by RPN/NRPN  
 mm = MSB, ll = LSB

#### ○ Volume (Controller number 7)

Status	2nd byte	3rd byte
BnH	07H	vvH

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

#### ○ Panpot (Controller number 10)

Status	2nd byte	3rd byte
BnH	0AH	vvH

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

#### ○ Expression (Controller number 11)

Status	2nd byte	3rd byte
BnH	0BH	vvH

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

#### ○ Hold 1 (Controller number 64)

Status	2nd byte	3rd byte
BnH	40H	vvH

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

#### ○ 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) 0-63 = OFF, 64-127 = ON

#### ○ Legato Foot Switch (Controller number 68)

Status	2nd byte	3rd byte
BnH	44H	vvH

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

#### ○ 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 - 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 - 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 - 7FH (-64 - 0 - +63).

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## ○Cutoff (Controller number 74)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	4AH	vvH

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

## ○Decay Time (Controller number 75)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	4BH	vvH

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

## ○Vibrato Rate (Controller number 76)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	4CH	vvH

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

## ○Vibrato Depth (Controller number 77)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	4DH	vvH

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

## ○Vibrato Delay (Controller number 78)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	4EH	vvH

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

## ○General Purpose Controller 5 (Controller number 80)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	50H	vvH

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

\* The Tone Level parameter (PATCH/TONE) of Tone 1 will change.

## ○General Purpose Controller 6 (Controller number 81)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	51H	vvH

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

\* The Tone Level parameter (PATCH/TONE) of Tone 2 will change.

## ○General Purpose Controller 7 (Controller number 82)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	52H	vvH

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

\* The Tone Level parameter (PATCH/TONE) of Tone 3 will change.

## ○General Purpose Controller 8 (Controller number 83)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	53H	vvH

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

\* The Tone Level parameter (PATCH/TONE) of Tone 4 will change.

## ○Portamento control (Controller number 84)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	54H	kkH

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

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

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

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	5BH	vvH

n = MIDI channel number:0H - FH (Ch.1 - 16)  
 vv = Reverb Send Level:00H - 7FH (0 - 127)      Default Value = 28H (40)

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

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	5DH	vvH

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

## ○RPN MSB/LSB (Controller number 100, 101)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
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 the RPN (Controller numbers 100 and 101; they can be sent in any

This device receives the following RPNs.

RPN	Data entry	Notes
MSB, LSB	MSB, LSB	Pitch Bend Sensitivity
00H, 00H	mmH, llH	mm: 00H - 18H (0 - 24 semitones)
	ll:	ignored (processed as 00H)
		Up to 2 octave can be specified in semitone steps.
00H, 01H	mmH, llH	Master Fine Tuning
	mm, ll:	20 00H - 40 00H - 60 00H (-8192 - 50/ 8192 - 0 - +8192*50/8192 cent)

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

7FH, 7FH	---, ---	RPN null
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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

<u>Status</u>	<u>2nd byte</u>
CnH	ppH

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

## ●Channel Pressure

<u>Status</u>	<u>2nd byte</u>
DnH	vvH

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

## ●Pitch Bend Change

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
EnH	llH	mmH

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

## ■ Channel Mode Messages

### ● All Sounds Off (Controller number 120)

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

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

\* 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)
Expression	127 (max)
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.

### ● 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.

## ■ System Realtime Message

### ● 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: 00H - 1FH (1 - 32), the initial value is 10H (17).)

06H Sub ID#1 (General Information)

01H Sub ID#2 (Identity Request)

F7H EOX (End Of Exclusive)

\* When this message is received, **Identity Reply Message** (p. 6) will be transmitted.

### ○ GM1 System On

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

Byte Explanation

F0H Exclusive status

7EH ID number (Universal Non-realtime Message)

7FH Device ID (Broadcast)

09H Sub ID#1 (General MIDI Message)

01H Sub ID#2 (General MIDI 1 On)

F7H EOX (End Of Exclusive)

\* When this messages is received, this instrument will turn to the GM1 mode.

### ○ GM2 System On

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

Byte Explanation

F0H Exclusive status

7EH ID number (Universal Non-realtime Message)

7FH Device ID (Broadcast)

09H Sub ID#1 (General MIDI Message)

03H Sub ID#2 (General MIDI 2 On)

F7H EOX (End Of Exclusive)

\* When this messages is received, this instrument will turn to the GM2 mode.

### ○ GM System Off

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

Byte Explanation

F0H Exclusive status

7EH ID number (Universal Non-realtime Message)

7FH Device ID (Broadcast)

09H Sub ID#1 (General MIDI Message)

02H Sub ID#2 (General MIDI Off)

F7H EOX (End Of Exclusive)

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

## ●Universal System Exclusive Messages

### ○Master Volume

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 01H, 11H, mmH	F7H

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
04H	Sub ID#1 (Device Control messages)
01H	Sub ID#2 (Master Volume)
11H	Master Volume lower byte
mmH	Master Volume upper byte
F7H	EOX (End Of Exclusive)

\* The lower byte (11H) of Master Volume will be handled as 00H.

mmH: 00H - 40H - 7FH  
Default Value = 40H (64)

\* The Master Level parameter (SYSTEM/COMMON) will change.

### ○Master Fine Tuning

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 03H, 11H, 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)
11H	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])  
11H: Default Value = 40H (64)  
mmH: Default Value = 00H (0)

\* The Master Tune parameter (SYSTEM/COMMON) will change.

### ○Master Coarse Tuning

Status	Data byte	Status
F0H	7FH, 7FH, 04H, 04H, 11H, 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)
11H	Master Coarse Tuning LSB
mmH	Master Coarse Tuning MSB
F7H	EOX (End Of Exclusive)

11H : ignored (processed as 00H)  
Default Value = 40H (64)

mmH : 28H - 40H - 58H (-24 - 0 - +24 [semitones])  
Default Value = 00H (0)

\* The Master Key Shift parameter (SYSTEM/COMMON) will change.

## ●Reverb Parameter Control

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

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
04H	Sub ID#1 (Device Control)
05H	Sub ID#2 (Global Parameter Control)
01H	Slot path length
01H	Parameter ID width
01H	Value width

01H	Slot path MSB
01H	Slot path LSB (Effect 0101: Reverb)
ppH	Parameter to be controlled.
vvH	Value for the parameter. (Default Value = 4)
	pp=0 Reverb Type
	vv = 00H Small Room
	vv = 01H Medium Room
	vv = 02H Large Room
	vv = 03H Medium Hall
	vv = 04H Large Hall
	vv = 08H Plate
	pp=1 Reverb Time
	vv = 00H - 7FH 0 - 127
F7H	EOX (End Of Exclusive)

### ○Chorus Parameters

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

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

### ○Controller Destination Setting (Aftersoft)

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

Byte	Explanation
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
09H	Sub ID#1 (Controller Destination Setting)
01H	Sub ID#2 (Channel Pressure)
0nH	MIDI Channel (00 - 0F)
ppH	Controlled parameter
rrH	Controlled range
	pp=0 Pitch Control
	rr = 28H - 58H -24 - +24 [semitones] (Default Value = 40H)
	pp=1 Filter Cutoff Control
	rr = 00H - 7FH -9600 - +9450[cents] (Default Value = 40H)
	pp=2 Amplitude Control
	rr = 00H - 7FH 0 - 127 / 64 x 100% (Default Value = 40H)
	pp=3 LFO Pitch Depth
	rr = 00H - 7FH 0 - 600[cents] (Default Value = 0)
	pp=4 LFO Filter Depth
	rr = 00H - 7FH 0 - 2400[cents] (Default Value = 0)
	pp=5 LFO Amplitude Depth
	rr = 00H - 7FH 0 - 100% (Default Value = 0)
F7H	EOX (End Of Exclusive)

## ○Controller Destination Setting (Controller)

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

  

<u>Byte</u>	<u>Explanation</u>
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
09H	Sub ID#1 (Controller Destination Setting)
03H	Sub ID#2 (Control Change)
0nH	MIDI Channel (00 - 0F)
ccH	Controller number (01 - 1F, 40 - 5F)
ppH	Controlled parameter
rrH	Controlled range
	pp=0 Pitch Control
	rr = 28H - 58H -24 - +24[semitones] (Default Value = 40H)
	pp=1 Filter Cutoff Control
	rr = 00H - 7FH -9600 - +9450[cents] (Default Value = 40H)
	pp=2 Amplitude Control
	rr = 00H - 7FH 0 - 127 / 64 x 100% (Default Value = 40H)
	pp=3 LFO Pitch Depth
	rr = 00H - 7FH 0 - 600[cents] (Default Value = 0)
	pp=4 LFO Filter Depth
	rr = 00H - 7FH 0 - 2400[cents] (Default Value = 0)
	pp=5 LFO Amplitude Depth
	rr = 00H - 7FH 0 - 100 % (Default Value = 0)
F7H	EOX (End Of Exclusive)

## ○Scale/Octave Tuning Adjust

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	7EH,7FH,08H,08H,ffH,ggH,hhH,ssH...	F7H

  

<u>Byte</u>	<u>Explanation</u>
F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
7FH	Device ID (Broadcast)
08H	Sub ID#1 (MIDI Tuning Standard)
08H	Sub ID#2 (scale/octave tuning 1-byte form)
ffH	Channel/Option byte1
	bits 0 to 1 = channel 15 to 16
	bit 2 to 6 = Undefined
ggH	Channel byte2
	bits 0 to 6 = channel 8 to 14
hhH	Channel byte3
	bits 0 to 6 = channel 1 to 7
ssH	12 byte tuning offset of 12 semitones from C to B
	00H = -64 [cents]
	40H = 0 [cents] (equal temperament)
	7FH = +63 [cents]
F7H	EOX (End Of Exclusive)

## ○Key-Based Instrument Controllers

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	7FH,7FH,0AH,01H,0nH,kkH,nnH,vvH...	F7H

  

<u>Byte</u>	<u>Explanation</u>
F0H	Exclusive status
7FH	ID number (universal realtime message)
7FH	Device ID (Broadcast)
0AH	Sub ID#1 (Key-Based Instrument Control)
01H	Sub ID#2 (Controller)
0nH	MIDI Channel (00 - 0F)
kkH	Key Number
nnH	Control Number
vvH	Value
F7	EOX (End Of Exclusive)
nn=07H	Level
	vv = 00H - 7FH 0 - 127 / 64 x 100% (Relative) (Default Value = 40H)
nn=0AH	Pan
	vv = 00H - 7FH Left - Right (Absolute)
nn=5BH	Reverb Send
	vv = 00H - 7FH 0 - 127 (Absolute)
nn=5D	Chorus Send
	vv = 00H - 7FH 0 - 127 (Absolute)

\* This parameter affects drum instruments only.

## ●Data Transmission

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

The model ID of the exclusive messages used by this instrument is 00H 48H.

### ○Data Request 1RQ1 (11H)

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

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

<u>Status</u>	<u>Data Byte</u>	<u>Status</u>
F0H	41H, dev, 00H, 48H, 11H, aaH, bbH, ccH, ddH, ssH, ttH, uuH, vvH, sum	F7H

<u>Byte</u>	<u>Remarks</u>
F0H	Exclusive status
41H	ID number (Roland)
dev	device ID (dev: 10H - 1FH, 7FH)
00H	model ID #1 (SD-90)
48H	model ID #2 (SD-90)
11H	command ID (RQ1)
aaH	address MSB
bbH	address
ccH	address
ddH	address LSB
ssH	size MSB
ttH	size
uuH	size
vvH	size LSB
sum	checksum
F7H	EOX (End Of Exclusive)

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

\* For the checksum, refer to **Example of an Exclusive message and calculating a checksum** (p. 19).

### ○Data set 1DT1 (12H)

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	41H, dev, 00H, 48H, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H

  

<u>Byte</u>	<u>Explanation</u>
F0H	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 00H - 1FH, Initial value is 10H)
00H	Model ID #1 (SD-90)
48H	Model ID #2 (SD-90)
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
sent	
ccH	Address: lower middle byte of the starting address of the data to be sent
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 Section 2, "Parameter address map (p. 7)."

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

\* For the checksum, refer to **Example of an Exclusive message and calculating a checksum** (p. 19).

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
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# MIDI Implementation

F0H	41H, dev, 42H, 12H, aaH, bbH, ccH, ddH, ... eeH, sum	F7H
<u>Byte</u>	<u>Explanation</u>	
F0H	Exclusive status	
41H	ID number (Roland)	
dev	Device ID (dev: 10H)	
42H	Model ID (GS)	
12H	Command ID (DT1)	
aaH	Address MSB: upper byte of the starting address of the transmitted data	
bbH	Address: middle byte of the starting address of the transmitted data	
ccH	Address LSB: lower byte of the starting address of the transmitted data	
ddH	Data: the actual data to be transmitted. Multiple bytes of data are transmitted starting from the address.	
:	:	
eeH	Data	
sum	Checksum	
F7H	EOX (End Of Exclusive)	

- \* The amount of data that can be transmitted at one time depends on the type of data, and data will be transmitted from the specified starting address and size. Refer to the Address and Size given in Section 2, "Parameter address map (p. 7)."
- \* Data larger than 256 bytes will be divided into packets of 256 bytes or less, and each packet will be sent at an interval of about 20 ms.
- \* Regarding the checksum, please refer to p. 19.

## System Exclusive messages

Universal Non-realtime System Exclusive Message" and Data Set 1 (DT1) are the only System Exclusive messages transmitted by the SD-90.

### Universal Non-realtime System Exclusive Message

#### Identity Reply Message

Receiving Identity Request Message, the SD-90 send this message.

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	7EH, dev, 06H, 02H, 41H, 10H, 01H, 00H, F7H	
	00H, 00H, 00H, 00H, 00H	
<u>Byte</u>	<u>Explanation</u>	
F0H	Exclusive status	
7EH	ID number (Universal Non-realtime Message)	
dev	Device ID (use the same as the device ID of Roland)	
06H	Sub ID#1 (General Information)	
02H	Sub ID#2 (Identity Reply)	
41H	ID number (Roland)	
48H 01H	Device family code	
00H 00H	Device family number code	
00H 00H 00H 00H	Software revision level	
F7H	EOX (End of Exclusive)	

### Data Transmission

#### Data set 1DT1 (12H)

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	41H, dev, 00H, 48H, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H
<u>Byte</u>	<u>Explanation</u>	
F0H	Exclusive status	
41H	ID number (Roland)	
dev	Device ID (dev: 00H - 1FH, Initial value is 10H)	
00H	Model ID #1 (SD-90)	
48H	Model ID #2 (SD-90)	
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 Section 2, "Parameter address map (p. 7)."
- \* Data larger than 256 bytes will be divided into packets of 256 bytes or less, and each packet will be sent at an interval of about 20 ms.

## 2. 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.

### SD-90 (Model ID = 00H 48H)

Start Address	Description
00 00 00 00	Setup
01 00 00 00	System
02 00 00 00	Audio
10 00 00 00	Temporary Multitimbre
11 00 00 00	Temporary Patch/Rhythm (Multitimbre Mode Part 1)
12 20 00 00	Temporary Patch/Rhythm (Multitimbre Mode Part 2)
:	:
18 60 00 00	Temporary Patch/Rhythm (Multitimbre Mode Part 32)
* System	
Offset Address	Description
00 00 00	System Common
00 02 00	System EQ
* Audio	
Offset Address	Description
10 00 00	Audio Common
10 10 00	Audio Common Mixer Preset Mode
10 11 00	Audio Common Mixer Free Edit Mode
10 20 00	Audio Common AFX Parameter
* Temporary Patch/Rhythm	
Offset Address	Description
00 00 00	Temporary Patch
10 00 00	Temporary Rhythm
* Multitimbre	
Offset Address	Description
00 00 00	Multitimbre Common
00 02 00	Multitimbre Common Chorus
00 04 00	Multitimbre Common Reverb
00 06 00	Multitimbre Common MFX1
00 08 00	Multitimbre Common MFX2
00 0A 00	Multitimbre Common MFX3
00 20 00	Multitimbre Part (Part 1)
00 21 00	Multitimbre Part (Part 2)
:	:
00 3F 00	Multitimbre Part (Part 32)
00 40 00	Multitimbre MIDI (Port A/Channel 1)
00 41 00	Multitimbre MIDI (Port A/Channel 2)
:	:
00 4F 00	Multitimbre MIDI (Port A/Channel 16)
00 50 00	Multitimbre MIDI (Port B/Channel 1)
00 51 00	Multitimbre MIDI (Port B/Channel 2)
:	:
00 5F 00	Multitimbre MIDI (Port B/Channel 16)
* Patch	
Offset Address	Description
00 00 00	Patch Common
00 02 00	Patch Common Chorus
00 04 00	Patch Common Reverb
00 06 00	Patch Common MFX
00 10 00	Patch TWF (Tone Mix Table)
00 20 00	Patch Tone (Tone 1)
00 22 00	Patch Tone (Tone 2)
00 24 00	Patch Tone (Tone 3)
00 26 00	Patch Tone (Tone 4)
* Rhythm	
Offset Address	Description
00 00 00	Rhythm Common
00 02 00	Rhythm Common Chorus
00 04 00	Rhythm Common Reverb
00 06 00	Rhythm Common MFX
00 10 00	Rhythm Tone (Key # 21)
00 12 00	Rhythm Tone (Key # 22)
:	:
01 3E 00	Rhythm Tone (Key # 108)
* Setup	
Offset Address	Description
00 00	0aaa aaaa SD-90 Native ON -- Receive Only -- (0) 0: Native ON
00 00 00 01	Total Size
* System Common	
Offset Address	Description
# 00 00	0000 aaaa Master Tune (24 - 2024) -100.0 - 100.0 [cent] default: (1024) 0
00 04	00aa aaaa Master Key Shift (40 - 88) -24 - +24 default: (64) 0
00 05	0aaa aaaa Master Level (0 - 127) default: (127) 127
00 06	0aaa aaaa System Control 1 Source (0 - 97) OFF, CC01 - CC31, CC33 - CC95, BEND, AFT

00 07	0aaa aaaa	System Control 2 Source (0 - 97) OFF, CC01 - CC31, CC33 - CC95, BEND, AFT	default: (0) OFF
00 08	0aaa aaaa	System Control 3 Source (0 - 97) OFF, CC01 - CC31, CC33 - CC95, BEND, AFT	default: (0) OFF
00 09	0aaa aaaa	System Control 4 Source (0 - 97) OFF, CC01 - CC31, CC33 - CC95, BEND, AFT	default: (0) OFF
00 00 00 0A	Total Size		
* System EQ			
Offset Address	Description		
00 00	0000 000a	EQ Switch	(0 - 1) BYPASS, ON default: (1) ON
00 01	0000 000a	EQ-Left Low Frequency	(0 - 1) 200, 400 [Hz] default: (0) 200 [Hz]
00 02	000a aaaa	EQ-Left Low Gain	(0 - 30) -15 - +15 default: (15) 0
00 03	0000 00aa	EQ-Left High Frequency	(0 - 2) 2000, 4000, 8000 [Hz] default: (0) 2000 [Hz]
00 04	000a aaaa	EQ-Left High Gain	(0 - 30) -15 - +15 default: (15) 0
00 05	0000 000a	EQ-Right Low Frequency	(0 - 1) 200, 400 [Hz] default: (0) 200 [Hz]
00 06	000a aaaa	EQ-Right Low Gain	(0 - 30) -15 - +15 default: (15) 0
00 07	0000 00aa	EQ-Right High Frequency	(0 - 2) 2000, 4000, 8000 [Hz] default: (0) 2000 [Hz]
00 08	000a aaaa	EQ-Right High Gain	(0 - 30) -15 - +15 default: (15) 0
00 00 00 09	Total Size		
* Audio Common			
Offset Address	Description		
00 00	0aaa aaaa	Master Volume	(0 - 127) (-inf - +6dB) default: (100) +0dB
00 01	0aaa aaaa	Rec Vol	(0 - 127) (-inf - +6dB) default: (100) +0dB
00 02	0000 000a	Rec Monitor SW	(0 - 1) OFF, ON default: (0) OFF
00 03	0000 000a	Mixer Mute	(0 - 1) OFF, ON default: (0) OFF
00 00 00 04	Total Size		
* Audio Common Mixer Preset Mode			
Offset Address	Description		
00 00	000a aaaa	Mixer Preset	(0 - 18) 0x00-0x12 # 0x00:Default Mixer # 0x01:Default Ana Rec # 0x02:Default Dig Rec # 0x03:Default Wav Rec # 0x04:Default Syn Rec # 0x05:Send/Return AFX # 0x06:Mix to AFX # 0x07:Ins Ana, Mix Rec # 0x08:Ins Dig, Mix Rec # 0x09:Ins Wav, Mix Rec # 0x0A:Ins Syn, Mix Rec # 0x0B:Ins Ana, Src Rec # 0x0C:Ins Dig, Src Rec # 0x0D:Ins Wav, Src Rec # 0x0E:Ins Syn, Src Rec # 0x0F:Ins Ana, Dry Rec # 0x10:Ins Dig, Dry Rec # 0x11:Ins Wav, Dry Rec # 0x12:Ins Syn, Dry Rec default: (0) Default Mixer
00 00 00 01	Total Size		
* Audio Common Mixer Free Edit Mode			
Offset Address	Description		
00 00	0aaa aaaa	Analog Vol	(0 - 127) (-inf - +6dB) default: (100) +0dB
00 01	0aaa aaaa	Analog Send	(0 - 127) (-inf - +6dB) default: (0) -inf
00 02	0000 000a	Analog Mute	(0 - 1) OFF, ON default: (0) OFF
00 10	0aaa aaaa	Digital Vol	(0 - 127) (-inf - +6dB) default: (100) +0dB
00 11	0aaa aaaa	Digital Send	(0 - 127) (-inf - +6dB) default: (0) -inf
00 12	0000 000a	Digital Mute	(0 - 1) OFF, ON default: (0) OFF
00 20	0aaa aaaa	Wave Vol	(0 - 127) (-inf - +6dB) default: (100) +0dB
00 21	0aaa aaaa	Wave Send	(0 - 127) (-inf - +6dB) default: (0) -inf
00 22	0000 000a	Wave Mute	(0 - 1) OFF, ON default: (0) OFF
00 30	0aaa aaaa	Synth Vol	(0 - 127)

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00 31	0aaa aaaa	Synth Send	0 - 127 (-inf - +6dB) default: (100) +0dB (0 - 127)
00 32	0000 000a	Synth Mute	0 - 127 (-inf - +6dB) default: (0) -inf (0 - 1) OFF, ON default: (0) OFF
00 43	0000 000a	AFX SW	(0 - 1) OFF, ON default: (0) OFF
00 00 00 44	Total Size		

\* Audio Common AFX Parameter

Offset	Address	Description	
00 00	0aaa aaaa	AFX Type	(0 - 127) # 0x10:Space Multi (for Ins/Send/Mix) # 0x20:Guitar Multi (for Ins) # 0x30:Vocal/Bass Multi (for Ins) # 0x40:Groove Multi (for Ins/Mix) # 0x48:Isolator (for Ins/Mix) # 0x50:Center Canceler (for Ins/Mix) # 0x60:Lo-Fi Processor (for Ins/Mix) # 0x70:Surround RV (for Send/Mix) # 0x78:Mastering (for Ins/Mix) default: (16) Space Multi
00 01	0000 aaaa	AFX Time out	-- Receive Only -- (1 - 15) # 1: 2ms # 2: 4ms # 3: 7ms # 4: 10ms # 5: 20ms # 6: 40ms # 7: 70ms # 8: 100ms # 9: 200ms # 10: 400ms # 11: 700ms # 12: 1000ms # 13: 2000ms # 14: 4000ms # 15: 7000ms

# 00 11	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 1	(12768 - 52768) -20000 - +20000
# 00 15	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 2	(12768 - 52768) -20000 - +20000
# 00 19	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 3	(12768 - 52768) -20000 - +20000
# 00 1D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 4	(12768 - 52768) -20000 - +20000
# 00 21	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 5	(12768 - 52768) -20000 - +20000
# 00 25	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 6	(12768 - 52768) -20000 - +20000
# 00 29	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 7	(12768 - 52768) -20000 - +20000
# 00 2D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 8	(12768 - 52768) -20000 - +20000
# 00 31	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 9	(12768 - 52768) -20000 - +20000
# 00 35	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 10	(12768 - 52768) -20000 - +20000
# 00 39	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 11	(12768 - 52768) -20000 - +20000
# 00 3D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 12	(12768 - 52768) -20000 - +20000
# 00 41	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 13	(12768 - 52768) -20000 - +20000
# 00 45	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 14	(12768 - 52768) -20000 - +20000
# 00 49	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 15	(12768 - 52768) -20000 - +20000
# 00 4D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 16	(12768 - 52768) -20000 - +20000
# 00 51	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 17	(12768 - 52768) -20000 - +20000
# 00 55	0000 aaaa 0000 bbbb 0000 cccc		

# 00 59	0000 dddd 0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 18	(12768 - 52768) -20000 - +20000
# 00 5D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 19	(12768 - 52768) -20000 - +20000
# 00 61	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 20	(12768 - 52768) -20000 - +20000
# 00 65	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 21	(12768 - 52768) -20000 - +20000
# 00 69	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 22	(12768 - 52768) -20000 - +20000
# 00 6D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 23	(12768 - 52768) -20000 - +20000
# 00 71	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 24	(12768 - 52768) -20000 - +20000
# 00 75	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 25	(12768 - 52768) -20000 - +20000
# 00 79	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 26	(12768 - 52768) -20000 - +20000
# 00 7D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 27	(12768 - 52768) -20000 - +20000
# 01 01	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 28	(12768 - 52768) -20000 - +20000
# 01 05	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 29	(12768 - 52768) -20000 - +20000
# 01 09	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 30	(12768 - 52768) -20000 - +20000
# 01 0D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 31	(12768 - 52768) -20000 - +20000
# 01 11	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	AFX Parameter 32	(12768 - 52768) -20000 - +20000
00 00 01 11	Total Size		

\* Multitimbre Common

Offset	Address	Description	
00 00	0aaa aaaa	Multitimbre Name 1	(32 - 127) (32 - 127)
00 01	0aaa aaaa	Multitimbre Name 2	32 - 127 [ASCII] (32 - 127)
00 02	0aaa aaaa	Multitimbre Name 3	32 - 127 [ASCII] (32 - 127)
00 03	0aaa aaaa	Multitimbre Name 4	32 - 127 [ASCII] (32 - 127)
00 04	0aaa aaaa	Multitimbre Name 5	32 - 127 [ASCII] (32 - 127)
00 05	0aaa aaaa	Multitimbre Name 6	32 - 127 [ASCII] (32 - 127)
00 06	0aaa aaaa	Multitimbre Name 7	32 - 127 [ASCII] (32 - 127)
00 07	0aaa aaaa	Multitimbre Name 8	32 - 127 [ASCII] (32 - 127)
00 08	0aaa aaaa	Multitimbre Name 9	32 - 127 [ASCII] (32 - 127)
00 09	0aaa aaaa	Multitimbre Name 10	32 - 127 [ASCII] (32 - 127)
00 0A	0aaa aaaa	Multitimbre Name 11	32 - 127 [ASCII] (32 - 127)
00 0B	0aaa aaaa	Multitimbre Name 12	32 - 127 [ASCII] (32 - 127)
00 0C	00aa aaaa	Solo Part Select	(0 - 32) OFF, 1 - 32
00 10	0aaa aaaa	Voice Reserve 1	(0 - 64) 0 - 63, FULL default: (12) 12 (0 - 64)
00 11	0aaa aaaa	Voice Reserve 2	(0 - 64) 0 - 63, FULL default: (4) 4 (0 - 64)
00 12	0aaa aaaa	Voice Reserve 3	(0 - 64) 0 - 63, FULL default: (4) 4 (0 - 64)
00 13	0aaa aaaa	Voice Reserve 4	(0 - 64) 0 - 63, FULL default: (4) 4 (0 - 64)
00 14	0aaa aaaa	Voice Reserve 5	(0 - 64) 0 - 63, FULL default: (4) 4 (0 - 64)
00 15	0aaa aaaa	Voice Reserve 6	(0 - 64) 0 - 63, FULL default: (4) 4 (0 - 64)
00 16	0aaa aaaa	Voice Reserve 7	(0 - 64) 0 - 63, FULL default: (4) 4 (0 - 64)
00 17	0aaa aaaa	Voice Reserve 8	(0 - 64) 0 - 63, FULL default: (4) 4 (0 - 64)
00 18	0aaa aaaa	Voice Reserve 9	(0 - 64) 0 - 63, FULL default: (4) 4 (0 - 64)
00 19	0aaa aaaa	Voice Reserve 10	(0 - 64) 0 - 63, FULL default: (4) 4



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00 1A	0aaa aaaa	Voice Reserve 11	(0 - 64) 0 - 63, FULL default: ( 4 ) 4
00 1B	0aaa aaaa	Voice Reserve 12	(0 - 64) 0 - 63, FULL default: ( 4 ) 4
00 1C	0aaa aaaa	Voice Reserve 13	(0 - 64) 0 - 63, FULL default: ( 4 ) 4
00 1D	0aaa aaaa	Voice Reserve 14	(0 - 64) 0 - 63, FULL default: ( 4 ) 4
00 1E	0aaa aaaa	Voice Reserve 15	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 1F	0aaa aaaa	Voice Reserve 16	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 20	0aaa aaaa	Voice Reserve 17	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 21	0aaa aaaa	Voice Reserve 18	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 22	0aaa aaaa	Voice Reserve 19	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 23	0aaa aaaa	Voice Reserve 20	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 24	0aaa aaaa	Voice Reserve 21	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 25	0aaa aaaa	Voice Reserve 22	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 26	0aaa aaaa	Voice Reserve 23	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 27	0aaa aaaa	Voice Reserve 24	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 28	0aaa aaaa	Voice Reserve 25	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 29	0aaa aaaa	Voice Reserve 26	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 2A	0aaa aaaa	Voice Reserve 27	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 2B	0aaa aaaa	Voice Reserve 28	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 2C	0aaa aaaa	Voice Reserve 29	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 2D	0aaa aaaa	Voice Reserve 30	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 2E	0aaa aaaa	Voice Reserve 31	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 2F	0aaa aaaa	Voice Reserve 32	(0 - 64) 0 - 63, FULL default: ( 0 ) 0
00 30	00aa aaaa	MFX1 Source	(0 - 32) COMMON, 1 - 32 default: (1) 1
00 31	00aa aaaa	MFX2 Source	(0 - 32) COMMON, 1 - 32 default: (2) 2
00 32	00aa aaaa	MFX3 Source	(0 - 32) COMMON, 1 - 32 default: (3) 3
00 33	00aa aaaa	Chorus Source	(0 - 32) COMMON, 1 - 32 default: (0) COMMON
00 34	00aa aaaa	Reverb Source	(0 - 32) COMMON, 1 - 32 default: (0) COMMON
00 35	000a aaaa	MFX1 Control Channel	(0 - 16) 1 - 16, OFF default: (0) 1
00 36	0000 000a	MFX1 Control PORT	(0 - 1) PORT A, PORT B default: (0) PORT A
00 37	000a aaaa	MFX2 Control Channel	(0 - 16) 1 - 16, OFF default: (1) 2
00 38	0000 000a	MFX2 Control PORT	(0 - 1) PORT A, PORT B default: (0) PORT A
00 39	000a aaaa	MFX3 Control Channel	(0 - 16) 1 - 16, OFF default: (2) 3
00 3A	0000 000a	MFX3 Control PORT	(0 - 1) PORT A, PORT B default: (0) PORT A
00 00 00 3B	Total Size		

\* Multitimbre Common MFX

Offset	Address	Description	
00 00	0aaa aaaa	MFX Type	(0 - 127) default: (0) THROUGH
00 01	0aaa aaaa	MFX Dry Send Level	(0 - 127) default: (127) 127
00 02	0aaa aaaa	MFX Chorus Send Level	(0 - 127) default: ( 0 ) 0
00 03	0aaa aaaa	MFX Reverb Send Level	(0 - 127) default: ( 0 ) 0
00 05	0aaa aaaa	MFX Control 1 Source	(0 - 101) OFF, CC01 - CC31, CC33 - CC95, BEND, APT, SYS1 - SYS4 default: ( 0 ) OFF
00 06	0aaa aaaa	MFX Control 1 Sens	(1 - 127) -63 - +63 default: ( 63 ) 0
00 07	0aaa aaaa	MFX Control 2 Source	(0 - 101) OFF, CC01 - CC31, CC33 - CC95, BEND, APT, SYS1 - SYS4 default: ( 0 ) OFF
00 08	0aaa aaaa	MFX Control 2 Sens	(1 - 127) -63 - +63 default: ( 63 ) 0
00 09	0aaa aaaa	MFX Control 3 Source	(0 - 101) OFF, CC01 - CC31, CC33 - CC95, BEND, APT, SYS1 - SYS4 default: ( 0 ) OFF
00 0A	0aaa aaaa	MFX Control 3 Sens	(1 - 127) -63 - +63

00 0B	0aaa aaaa	MFX Control 4 Source	(0 - 101) OFF, CC01 - CC31, CC33 - CC95, BEND, APT, SYS1 - SYS4 default: ( 0 ) OFF
00 0C	0aaa aaaa	MFX Control 4 Sens	(1 - 127) -63 - +63 default: ( 63 ) 0
00 0D	000a aaaa	MFX Control Assign 1	(0 - 16) OFF, 1 - 16 default: ( 0 ) OFF
00 0E	000a aaaa	MFX Control Assign 2	(0 - 16) OFF, 1 - 16 default: ( 0 ) OFF
00 0F	000a aaaa	MFX Control Assign 3	(0 - 16) OFF, 1 - 16 default: ( 0 ) OFF
00 10	000a aaaa	MFX Control Assign 4	(0 - 16) OFF, 1 - 16 default: ( 0 ) OFF
# 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		

# MIDI Implementation

#	00 71	0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 24	(12768 - 52768) -20000 - +20000
#	00 75	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 25	(12768 - 52768) -20000 - +20000
#	00 79	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 26	(12768 - 52768) -20000 - +20000
#	00 7D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 27	(12768 - 52768) -20000 - +20000
#	01 01	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 28	(12768 - 52768) -20000 - +20000
#	01 05	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 29	(12768 - 52768) -20000 - +20000
#	01 09	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 30	(12768 - 52768) -20000 - +20000
#	01 0D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 31	(12768 - 52768) -20000 - +20000
#	01 0D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 32	(12768 - 52768) -20000 - +20000

00 00 01 11 | Total Size

\* Multitimbre Common Chorus

Offset	Address	Description		
	00 00	0000 aaaa	Chorus Type	(0 - 3) OFF, CHORUS, DELAY, GM2-CHORUS default: ( 1 ) CHORUS
	00 01	0aaa aaaa	Chorus Level	(0 - 127) default: (127) 127
	00 03	0000 00aa	Chorus Output Select	(0 - 2) MAIN, REV, MAIN+REV default: ( 0 ) MAIN
#	00 04	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 1	(12768 - 52768) -20000 - +20000
#	00 08	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 2	(12768 - 52768) -20000 - +20000
#	00 0C	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 3	(12768 - 52768) -20000 - +20000
#	00 10	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 4	(12768 - 52768) -20000 - +20000
#	00 14	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 5	(12768 - 52768) -20000 - +20000
#	00 18	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 6	(12768 - 52768) -20000 - +20000
#	00 1C	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 7	(12768 - 52768) -20000 - +20000
#	00 20	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 8	(12768 - 52768) -20000 - +20000
#	00 24	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 9	(12768 - 52768) -20000 - +20000
#	00 28	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 10	(12768 - 52768) -20000 - +20000
#	00 2C	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 11	(12768 - 52768) -20000 - +20000
#	00 30	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 12	(12768 - 52768) -20000 - +20000

00 00 00 34 | Total Size

\* Multitimbre Common Reverb

Offset	Address	Description		
	00 00	0000 aaaa	Reverb Type	(0 - 5) OFF, REVERB, SRV-ROOM, SRV-HALL, SRV-PLATE, GM2-REVERB default: ( 3 ) SRV-HALL
	00 01	0aaa aaaa	Reverb Level	(0 - 127) default: (100) 100
#	00 03	0000 aaaa 0000 bbbb		

#	00 07	0000 cccc 0000 dddd	Reverb Parameter 1	(12768 - 52768) -20000 - +20000
#	00 0B	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 2	(12768 - 52768) -20000 - +20000
#	00 0F	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 3	(12768 - 52768) -20000 - +20000
#	00 13	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 4	(12768 - 52768) -20000 - +20000
#	00 17	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 5	(12768 - 52768) -20000 - +20000
#	00 1B	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 6	(12768 - 52768) -20000 - +20000
#	00 1F	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 7	(12768 - 52768) -20000 - +20000
#	00 23	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 8	(12768 - 52768) -20000 - +20000
#	00 27	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 9	(12768 - 52768) -20000 - +20000
#	00 2B	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 10	(12768 - 52768) -20000 - +20000
#	00 2F	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 11	(12768 - 52768) -20000 - +20000
#	00 33	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 12	(12768 - 52768) -20000 - +20000
#	00 37	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 13	(12768 - 52768) -20000 - +20000
#	00 3B	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 14	(12768 - 52768) -20000 - +20000
#	00 3F	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 15	(12768 - 52768) -20000 - +20000
#	00 43	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 16	(12768 - 52768) -20000 - +20000
#	00 47	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 17	(12768 - 52768) -20000 - +20000
#	00 4B	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 18	(12768 - 52768) -20000 - +20000
#	00 4F	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 19	(12768 - 52768) -20000 - +20000
#	00 53	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 20	(12768 - 52768) -20000 - +20000

00 00 00 53 | Total Size

\* Multitimbre MIDI

Offset	Address	Description		
	00 00	0000 000a	Receive Program Change	(0 - 1) OFF, ON default: ( 1 ) ON
	00 01	0000 000a	Receive Bank Select	(0 - 1) OFF, ON default: ( 1 ) ON
	00 02	0000 000a	Receive Bender	(0 - 1) OFF, ON default: ( 1 ) ON
	00 03	0000 000a	Receive Polyphonic Key Pressure	(0 - 1) OFF, ON default: ( 1 ) ON
	00 04	0000 000a	Receive Channel Pressure	(0 - 1) OFF, ON default: ( 1 ) ON
	00 05	0000 000a	Receive Modulation	(0 - 1) OFF, ON default: ( 1 ) ON
	00 06	0000 000a	Receive Volume	(0 - 1) OFF, ON default: ( 1 ) ON
	00 07	0000 000a	Receive Pan	(0 - 1) OFF, ON default: ( 1 ) ON
	00 08	0000 000a	Receive Expression	(0 - 1) OFF, ON default: ( 1 ) ON
	00 09	0000 000a	Receive Hold-1	(0 - 1) OFF, ON default: ( 1 ) ON
	00 0A	0000 000a	Phase Lock	(0 - 1)

# MIDI Implementation

00 0B	0000 0aaa	Velocity Curve Type	OFF, ON default: ( 0 ) OFF ( 0 - 4 ) OFF, 1 - 4 default: ( 0 ) OFF
00 00 00 0C	Total Size		
* Multitimbre Part			
Offset	Address	Description	
00 00	0000 0aaa	Receive Channel	( 0 - 15 ) 1 - 16 default: PART 1: ( 0 ) 1 PART 2: ( 1 ) 2 : : PART 16: ( 15 ) 16 PART 17: ( 0 ) 1 PART 18: ( 1 ) 2 : : PART 32: ( 15 ) 16
00 01	0000 000a	Receive Switch	( 0 - 1 ) OFF, ON default: ( 1 ) ON
00 03	0000 000a	Receive MIDI Port	( 0 - 1 ) PORT A, PORT B default: PART 1 - 16: ( 0 ) PORT A PART 17 - 32: ( 1 ) PORT B
00 04	0aaa 0aaa	Patch Bank Select MSB (CC# 0)	( 0 - 127 ) default: PART 1: 80 PART 2: 81 PART 3: 99 PART 10: 105 PART 26: 105 OTHER: 97
00 05	0aaa 0aaa	Patch Bank Select LSB (CC# 32)	( 0 - 127 ) default: 0
00 06	0aaa 0aaa	Patch Program Number (PC)	( 0 - 127 ) default: 0
00 07	0aaa 0aaa	Part Level (CC# 7)	( 0 - 127 ) default: ( 100 ) 100
00 08	0aaa 0aaa	Part Pan (CC# 10)	( 0 - 127 ) L64 - 63R default: ( 0 ) CENTER
00 09	0aaa 0aaa	Part Coarse Tune (RPN# 2)	( 16 - 112 ) -48 +48 default: ( 64 ) 0
00 0A	0aaa 0aaa	Part Fine Tune (RPN# 1)	( 14 - 114 ) -50 +50 default: ( 64 ) 0
00 0B	0000 00aa	Part Mono/Poly (MONO ON/POLY ON)	( 0 - 2 ) MONO, POLY, PATCH default: ( 2 ) PATCH
00 0C	0000 00aa	Part Legato Switch (CC# 68)	( 0 - 2 ) OFF, ON, PATCH default: ( 64 ) 0
00 0D	000a 0aaa	Part Pitch Bend Range (RPN# 0)	( 0 - 25 ) 0 - 24, PATCH default: ( 25 ) 25
00 0E	0000 00aa	Part Portamento Switch (CC# 65)	( 0 - 2 ) OFF, ON, PATCH default: ( 64 ) 0
00 0F	0000 0aaa 0000 0bbb	Part Portamento Time (CC# 5)	( 0 - 128 ) 0 - 127, PATCH default: ( 128 ) PATCH
00 11	0aaa 0aaa	Part Cutoff Offset (CC# 74)	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 12	0aaa 0aaa	Part Resonance Offset (CC# 71)	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 13	0aaa 0aaa	Part Attack Time Offset (CC# 73)	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 14	0aaa 0aaa	Part Release Time Offset (CC# 72)	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 15	0000 0aaa	Part Octave Shift	( 61 - 67 ) -3 +3 default: ( 64 ) 0
00 16	0aaa 0aaa	Part Velocity Sens Offset	( 1 - 127 ) -63 +63 default: ( 64 ) 0
00 17	0aaa 0aaa	Keyboard Range Lower	( 0 - 127 ) C-1 - UPPER default: ( 0 ) 0
00 18	0aaa 0aaa	Keyboard Range Upper	( 0 - 127 ) LOWER - G9 default: ( 127 ) 127
00 19	0aaa 0aaa	Keyboard Fade Width Lower	( 0 - 127 ) default: ( 0 ) 0
00 1A	0aaa 0aaa	Keyboard Fade Width Upper	( 0 - 127 ) default: ( 0 ) 0
00 1B	0000 000a	Mute Switch	( 0 - 1 ) OFF, MUTE default: ( 0 ) OFF
00 1C	0aaa 0aaa	Part Dry Send Level	( 0 - 127 ) default: ( 127 ) 127
00 1D	0aaa 0aaa	Part Chorus Send Level (CC# 93)	( 0 - 127 ) default: ( 0 ) 0
00 1E	0aaa 0aaa	Part Reverb Send Level (CC# 91)	( 0 - 127 ) default: ( 40 ) 40
00 1F	0000 0aaa	Part Output Assign	( 0, 1, 13 ) MPX, A, PATCH default: PART 1- 3 ( 13 ) PATCH default: PART 4- 32 ( 1 ) A
00 20	0000 00aa	Part Output MPX Select	( 0 - 2 ) MPX1, MPX2, MPX3 default: PART 1 ( 0 ) MPX1 default: PART 2 ( 1 ) MPX2 default: PART 3 ( 2 ) MPX3 default: PART 4- 32 ( 0 ) MPX1
00 21	0aaa 0aaa	Part Decay Time Offset (CC# 75)	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 22	0aaa 0aaa	Part Vibrate Rate (CC# 76)	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 23	0aaa 0aaa	Part Vibrate Depth (CC# 77)	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 24	0aaa 0aaa	Part Vibrate Delay (CC# 78)	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 25	0aaa 0aaa	Mod LFO Pitch Depth	( 0 - 600 ) [cent] default: ( 10 ) 10

00 26	00aa 0aaa	CAF Pitch Control	( 40 - 88 ) -24 +24 [semitone] default: ( 64 ) 0
00 27	0aaa 0aaa	CAF TVF Cutoff Control	( 0 - 127 ) -9600 +9600 [cent] default: ( 64 ) 0
00 28	0aaa 0aaa	CAF Amplitude Control	( 0 - 127 ) -100.0 +100.0 [%] default: ( 64 ) 0
00 29	0aaa 0aaa	CAF LFO Pitch Depth	( 0 - 127 ) 0 - 600 [cent] default: ( 0 ) 0
00 2A	0aaa 0aaa	CAF LFO TVF Depth	( 0 - 127 ) 0 - 2400 [cent] default: ( 0 ) 0
00 2B	0aaa 0aaa	CAF LFO TVA Depth	( 0 - 127 ) 0 - 100.0 [%] default: ( 0 ) 0
00 2C	0aaa 0aaa	CC Controller No.	( 1 - 95 ) 1-31, 64-95 default: ( 16 ) 16
00 2D	00aa 0aaa	CC Pitch Control	( 40 - 88 ) -24 +24 [semitone] default: ( 64 ) 0
00 2E	0aaa 0aaa	CC TVF Cutoff Control	( 0 - 127 ) -9600 +9450 [cent] default: ( 64 ) 0
00 2F	0aaa 0aaa	CC Amplitude Control	( 0 - 127 ) -100.0 +100.0 [%] default: ( 64 ) 0
00 30	0aaa 0aaa	CC LFO Pitch Depth	( 0 - 127 ) 0 - 600 [cent] default: ( 0 ) 0
00 31	0aaa 0aaa	CC LFO TVF Depth	( 0 - 127 ) 0 - 2400 [cent] default: ( 0 ) 0
00 32	0aaa 0aaa	CC LFO TVA Depth	( 0 - 127 ) 0 - 100.0 [%] default: ( 0 ) 0
00 33	0aaa 0aaa	Part Scale Tune for C	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 34	0aaa 0aaa	Part Scale Tune for C#	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 35	0aaa 0aaa	Part Scale Tune for D	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 36	0aaa 0aaa	Part Scale Tune for D#	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 37	0aaa 0aaa	Part Scale Tune for E	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 38	0aaa 0aaa	Part Scale Tune for F	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 39	0aaa 0aaa	Part Scale Tune for F#	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 3A	0aaa 0aaa	Part Scale Tune for G	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 3B	0aaa 0aaa	Part Scale Tune for G#	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 3C	0aaa 0aaa	Part Scale Tune for A	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 3D	0aaa 0aaa	Part Scale Tune for A#	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 3E	0aaa 0aaa	Part Scale Tune for B	( 0 - 127 ) -64 +63 default: ( 64 ) 0
00 3F	0000 00aa	GM2 Instrument Set Select	( 0 - 3 ) Classical, Contemporary, Solo, Enhanced default: ( 1 ) Contemporary
00 00 00 40	Total Size		
* Patch Common			
Offset	Address	Description	
00 00	0aaa 0aaa	Patch Name 1	( 32 - 127 ) 32 - 127 [ASCII]
00 01	0aaa 0aaa	Patch Name 2	( 32 - 127 ) 32 - 127 [ASCII]
00 02	0aaa 0aaa	Patch Name 3	( 32 - 127 ) 32 - 127 [ASCII]
00 03	0aaa 0aaa	Patch Name 4	( 32 - 127 ) 32 - 127 [ASCII]
00 04	0aaa 0aaa	Patch Name 5	( 32 - 127 ) 32 - 127 [ASCII]
00 05	0aaa 0aaa	Patch Name 6	( 32 - 127 ) 32 - 127 [ASCII]
00 06	0aaa 0aaa	Patch Name 7	( 32 - 127 ) 32 - 127 [ASCII]
00 07	0aaa 0aaa	Patch Name 8	( 32 - 127 ) 32 - 127 [ASCII]
00 08	0aaa 0aaa	Patch Name 9	( 32 - 127 ) 32 - 127 [ASCII]
00 09	0aaa 0aaa	Patch Name 10	( 32 - 127 ) 32 - 127 [ASCII]
00 0A	0aaa 0aaa	Patch Name 11	( 32 - 127 ) 32 - 127 [ASCII]
00 0B	0aaa 0aaa	Patch Name 12	( 32 - 127 ) 32 - 127 [ASCII]
00 0C	0aaa 0aaa	Patch Category	( 0 - 127 )
00 0D	0000 000a	Tone Type	( 0 - 1 ) 4TONES, MULTI-PARTIAL
00 0E	0aaa 0aaa	Patch Level	( 0 - 127 )
00 0F	0aaa 0aaa	Patch Pan	( 0 - 127 ) L64 - 63R
00 10	0000 000a	Patch Priority	( 0 - 1 ) LAST, LOUDEST
00 11	0aaa 0aaa	Patch Coarse Tune	( 16 - 112 ) -48 +48
00 12	0aaa 0aaa	Patch Fine Tune	( 14 - 114 ) -50 +50
00 13	0000 0aaa	Octave Shift	( 61 - 67 ) -3 +3
00 14	0000 00aa	Stretch Tune Depth	( 0 - 3 ) OFF, 1 - 3
00 15	0aaa 0aaa	Analog Feel	( 0 - 127 )
00 16	0000 000a	Mono/Poly	( 0 - 1 ) MONO, POLY
00 17	0000 000a	Legato Switch	( 0 - 1 ) OFF, ON

# MIDI Implementation

00 18	0000 000a	Legato Retrigger	(0 - 1) OFF, ON						PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL
00 19	0000 000a	Portamento Switch	(0 - 1) OFF, ON						
00 1A	0000 000a	Portamento Mode	(0 - 1) NORMAL, LEGATO						
00 1B	0000 000a	Portamento Type	(0 - 1) RATE, TIME						
00 1C	0000 000a	Portamento Start	(0 - 1) PITCH, NOTE						
00 1D	0aaa aaaa	Portamento Time	(0 - 127)						
00 1E	0000 000a	Patch Clock Source	(0 - 1) PATCH, SYSTEM						
00 1F	0000 aaaa	Patch Tempo	(20 - 250)						
00 21	0000 bbbb	One Shot Mode	(0 - 1) OFF, ON						
00 22	0aaa aaaa	Cutoff Offset	(1 - 127)						
00 23	0aaa aaaa	Resonance Offset	(1 - 127)						
00 24	0aaa aaaa	Attack Time Offset	(1 - 127)						
00 25	0aaa aaaa	Release Time Offset	(1 - 127)						
00 26	0aaa aaaa	Velocity Sens Offset	(1 - 127)						
00 27	0000 aaaa	Patch Output Assign	(0, 1, 13) MFx, A, TONE						
00 28	0000 000a	TMT Control Switch	(0 - 1) OFF, ON						
00 29	0aaa aaaa	Pitch Bend Range Up	(- 48 - 48)						
00 2A	0aaa aaaa	Pitch Bend Range Down	(0 - 48)						
00 2B	0aaa aaaa	Matrix Control 1 Source	(0 - 109) OFF, CC01 - CC31, CC33 - CC95, BEND, APT, SYS1 - SYS4, VELOCITY, KEYFOLLOW, TEMPO, LFO1, LFO2, PIT-ENV, TVF-ENV, TVA-ENV						
00 2C	00aa aaaa	Matrix Control 1 Destination 1	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 2D	0aaa aaaa	Matrix Control 1 Sens 1	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 2E	00aa aaaa	Matrix Control 1 Destination 2	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 2F	0aaa aaaa	Matrix Control 1 Sens 2	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 30	00aa aaaa	Matrix Control 1 Destination 3	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 31	0aaa aaaa	Matrix Control 1 Sens 3	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 32	00aa aaaa	Matrix Control 1 Destination 4	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 33	0aaa aaaa	Matrix Control 1 Sens 4	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 34	0aaa aaaa	Matrix Control 2 Source	(0 - 109) OFF, CC01 - CC31, CC33 - CC95, BEND, APT, SYS1 - SYS4, VELOCITY, KEYFOLLOW, TEMPO, LFO1, LFO2, PIT-ENV, TVF-ENV, TVA-ENV						
00 35	00aa aaaa	Matrix Control 2 Destination 1	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 36	0aaa aaaa	Matrix Control 2 Sens 1	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 37	00aa aaaa	Matrix Control 2 Destination 2	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 38	0aaa aaaa	Matrix Control 2 Sens 2	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 39	00aa aaaa	Matrix Control 2 Destination 3	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 3A	0aaa aaaa	Matrix Control 2 Sens 3	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 3B	00aa aaaa	Matrix Control 2 Destination 4	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 3C	0aaa aaaa	Matrix Control 2 Sens 4	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 3D	0aaa aaaa	Matrix Control 3 Source	(0 - 109) OFF, CC01 - CC31, CC33 - CC95, BEND, APT, SYS1 - SYS4, VELOCITY, KEYFOLLOW, TEMPO, LFO1, LFO2, PIT-ENV, TVF-ENV, TVA-ENV						
00 3E	00aa aaaa	Matrix Control 3 Destination 1	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 3F	0aaa aaaa	Matrix Control 3 Sens 1	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 40	00aa aaaa	Matrix Control 3 Destination 2	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 41	0aaa aaaa	Matrix Control 3 Sens 2	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 42	00aa aaaa	Matrix Control 3 Destination 3	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 43	0aaa aaaa	Matrix Control 3 Sens 3	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 44	00aa aaaa	Matrix Control 3 Destination 4	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 45	0aaa aaaa	Matrix Control 3 Sens 4	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 46	0aaa aaaa	Matrix Control 4 Source	(0 - 109) OFF, CC01 - CC31, CC33 - CC95, BEND, APT, SYS1 - SYS4, VELOCITY, KEYFOLLOW, TEMPO, LFO1, LFO2, PIT-ENV, TVF-ENV, TVA-ENV						
00 47	00aa aaaa	Matrix Control 4 Destination 1	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 48	0aaa aaaa	Matrix Control 4 Sens 1	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 49	00aa aaaa	Matrix Control 4 Destination 2	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 4A	0aaa aaaa	Matrix Control 4 Sens 2	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 4B	00aa aaaa	Matrix Control 4 Destination 3	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 4C	0aaa aaaa	Matrix Control 4 Sens 3	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 4D	00aa aaaa	Matrix Control 4 Destination 4	(0 - 33) OFF, PCH, CUT, RES, LEV, PAN, DRY, CHO, REV, PIT-LFO1, PIT-LFO2, TVF-LFO1, TVF-LFO2, TVA-LFO1, TVA-LFO2, PAN-LFO1, PAN-LFO2, LFO1-RATE, LFO2-RATE, PIT-ATK, PIT-DCY, PIT-REL, TVF-ATK, TVF-DCY, TVF-REL, TVA-ATK, TVA-DCY, TVA-REL						
00 4E	0aaa aaaa	Matrix Control 4 Sens 4	(1 - 127) TMT, FXM, MFX1, MFX2, MFX3, MFX4						
00 4F	0000 0aaa	Vibrato Form	(0 - 6) SIN, TRI, SAW-UP, SAW-DW, SQR, RND, TRF						
00 50	0aaa aaaa	Vibrato Rate	(0 - 127)						
00 51	0aaa aaaa	Vibrato Delay Time	(0 - 127)						
00 52	0aaa aaaa	Vibrato Fade Time	(0 - 127)						
00 53	0aaa aaaa	Vibrato Pitch Depth	(1 - 127)						
00 54	0aaa aaaa	Vibrato TVF Depth	(1 - 127)						
00 55	0aaa aaaa	Vibrato TVA Depth	(1 - 127)						
00 00 00 56		Total Size							
* Patch Common MFX									
Offset									
Address Description									
00 01	0aaa aaaa	MFX Type	(0 - 127)						
00 02	0aaa aaaa	MFX Dry Send Level	(0 - 127)						
00 02	0aaa aaaa	MFX Chorus Send Level	(0 - 127)						

# MIDI Implementation

00 03	0aaa aaaa	MFX Reverb Send Level	(0 - 127)
00 05	0aaa aaaa	MFX Control 1 Source	(0 - 101)
		OFF, CC01 - CC31, CC33 - CC95, BEND, AFT, SYS1 - SYS4	(1 - 127)
00 06	0aaa aaaa	MFX Control 1 Sens	-63 - +63
00 07	0aaa aaaa	MFX Control 2 Source	(0 - 101)
		OFF, CC01 - CC31, CC33 - CC95, BEND, AFT, SYS1 - SYS4	(1 - 127)
00 08	0aaa aaaa	MFX Control 2 Sens	-63 - +63
00 09	0aaa aaaa	MFX Control 3 Source	(0 - 101)
		OFF, CC01 - CC31, CC33 - CC95, BEND, AFT, SYS1 - SYS4	(1 - 127)
00 0A	0aaa aaaa	MFX Control 3 Sens	-63 - +63
00 0B	0aaa aaaa	MFX Control 4 Source	(0 - 101)
		OFF, CC01 - CC31, CC33 - CC95, BEND, AFT, SYS1 - SYS4	(1 - 127)
00 0C	0aaa aaaa	MFX Control 4 Sens	-63 - +63
00 0D	000a aaaa	MFX Control Assign 1	(0 - 16)
		OFF, 1 - 16	(0 - 16)
00 0E	000a aaaa	MFX Control Assign 2	(0 - 16)
		OFF, 1 - 16	(0 - 16)
00 0F	000a aaaa	MFX Control Assign 3	(0 - 16)
		OFF, 1 - 16	(0 - 16)
00 10	000a aaaa	MFX Control Assign 4	(0 - 16)
		OFF, 1 - 16	(0 - 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		

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

\* Patch Common Chorus

	Offset	Address	Description	
	00 00	0000 aaaa	Chorus Type	(0 - 3)
	00 01	0aaa aaaa	Chorus Level	OFF, CHORUS, DELAY, GM2-CHORUS (0 - 127)
	00 03	0000 00aa	Chorus Output Select	(0 - 2) MAIN, REV, MAIN+REV
#	00 04	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 1	(12768 - 52768) -20000 - +20000
#	00 08	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 2	(12768 - 52768) -20000 - +20000
#	00 0C	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 3	(12768 - 52768) -20000 - +20000
#	00 10	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 4	(12768 - 52768) -20000 - +20000
#	00 14	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 5	(12768 - 52768) -20000 - +20000
#	00 18	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 6	(12768 - 52768) -20000 - +20000
#	00 1C	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 7	(12768 - 52768) -20000 - +20000
#	00 20	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 8	(12768 - 52768) -20000 - +20000
#	00 24	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 9	(12768 - 52768) -20000 - +20000
#	00 28	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 10	(12768 - 52768) -20000 - +20000
#	00 2C	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 11	(12768 - 52768) -20000 - +20000
#	00 30	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 12	(12768 - 52768) -20000 - +20000
00 00 00 34   Total Size				

\* Patch Common Reverb

	Offset	Address	Description	
	00 00	0000 aaaa	Reverb Type	(0 - 5) OFF, REVERB, SRV-ROOM, SRV-HALL,

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		SRV-PLATE, GM2-REVERB	
		(0 - 127)	
		default: (100) 100	
#	00 01	0aaa aaaa	Reverb Level
#	00 03	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 1 (12768 - 52768) -20000 - +20000
#	00 07	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 2 (12768 - 52768) -20000 - +20000
#	00 0B	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 3 (12768 - 52768) -20000 - +20000
#	00 0F	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 4 (12768 - 52768) -20000 - +20000
#	00 13	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 5 (12768 - 52768) -20000 - +20000
#	00 17	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 6 (12768 - 52768) -20000 - +20000
#	00 1B	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 7 (12768 - 52768) -20000 - +20000
#	00 1F	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 8 (12768 - 52768) -20000 - +20000
#	00 23	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 9 (12768 - 52768) -20000 - +20000
#	00 27	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 10 (12768 - 52768) -20000 - +20000
#	00 2B	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 11 (12768 - 52768) -20000 - +20000
#	00 2F	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 12 (12768 - 52768) -20000 - +20000
#	00 33	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 13 (12768 - 52768) -20000 - +20000
#	00 37	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 14 (12768 - 52768) -20000 - +20000
#	00 3B	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 15 (12768 - 52768) -20000 - +20000
#	00 3F	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 16 (12768 - 52768) -20000 - +20000
#	00 43	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 17 (12768 - 52768) -20000 - +20000
#	00 47	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 18 (12768 - 52768) -20000 - +20000
#	00 4B	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 19 (12768 - 52768) -20000 - +20000
#	00 4F	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 20 (12768 - 52768) -20000 - +20000
00 00 00 53		Total Size	

\* Patch TMT (Tone Mix Table)

Offset	Address	Description	
00 00	0000 aaaa	Structure Type 1 & 2	(0 - 9)
00 01	0000 00aa	Booster 1 & 2	(0 - 3)
00 02	0000 aaaa	Structure Type 3 & 4	(0 - 9)
00 03	0000 00aa	Booster 3 & 4	(0 - 3)
00 04	0000 00aa	TMT Velocity Control	(0 - 2) OFF, ON, RANDOM
00 05	0000 000a	TMT1 Tone Switch	(0 - 1) OFF, ON
00 06	0aaa aaaa	TMT1 Keyboard Range Lower	(0 - 127)
00 07	0aaa aaaa	TMT1 Keyboard Range Upper	C-1 - UPPER (0 - 127)
00 08	0aaa aaaa	TMT1 Keyboard Fade Width Lower	LOWER - G9 (0 - 127)
00 09	0aaa aaaa	TMT1 Keyboard Fade Width Upper	(0 - 127)
00 0A	0aaa aaaa	TMT1 Velocity Range Lower	(1 - 127) 1 - UPPER
00 0B	0aaa aaaa	TMT1 Velocity Range Upper	(1 - 127) LOWER - 127
00 0C	0aaa aaaa	TMT1 Velocity Fade Width Lower	(0 - 127)
00 0D	0aaa aaaa	TMT1 Velocity Fade Width Upper	(0 - 127)

00 0E	0000 000a	TMT2 Tone Switch	(0 - 1) OFF, ON
00 0F	0aaa aaaa	TMT2 Keyboard Range Lower	(0 - 127)
00 10	0aaa aaaa	TMT2 Keyboard Range Upper	C-1 - UPPER (0 - 127)
00 11	0aaa aaaa	TMT2 Keyboard Fade Width Lower	LOWER - G9 (0 - 127)
00 12	0aaa aaaa	TMT2 Keyboard Fade Width Upper	(0 - 127)
00 13	0aaa aaaa	TMT2 Velocity Range Lower	(1 - 127) 1 - UPPER
00 14	0aaa aaaa	TMT2 Velocity Range Upper	(1 - 127) LOWER - 127
00 15	0aaa aaaa	TMT2 Velocity Fade Width Lower	(0 - 127)
00 16	0aaa aaaa	TMT2 Velocity Fade Width Upper	(0 - 127)
00 17	0000 000a	TMT3 Tone Switch	(0 - 1) OFF, ON
00 18	0aaa aaaa	TMT3 Keyboard Range Lower	(0 - 127)
00 19	0aaa aaaa	TMT3 Keyboard Range Upper	C-1 - UPPER (0 - 127)
00 1A	0aaa aaaa	TMT3 Keyboard Fade Width Lower	LOWER - G9 (0 - 127)
00 1B	0aaa aaaa	TMT3 Keyboard Fade Width Upper	(0 - 127)
00 1C	0aaa aaaa	TMT3 Velocity Range Lower	(1 - 127) 1 - UPPER
00 1D	0aaa aaaa	TMT3 Velocity Range Upper	(1 - 127) LOWER - 127
00 1E	0aaa aaaa	TMT3 Velocity Fade Width Lower	(0 - 127)
00 1F	0aaa aaaa	TMT3 Velocity Fade Width Upper	(0 - 127)
00 20	0000 000a	TMT4 Tone Switch	(0 - 1) OFF, ON
00 21	0aaa aaaa	TMT4 Keyboard Range Lower	(0 - 127)
00 22	0aaa aaaa	TMT4 Keyboard Range Upper	C-1 - UPPER (0 - 127)
00 23	0aaa aaaa	TMT4 Keyboard Fade Width Lower	LOWER - G9 (0 - 127)
00 24	0aaa aaaa	TMT4 Keyboard Fade Width Upper	(0 - 127)
00 25	0aaa aaaa	TMT4 Velocity Range Lower	(1 - 127) 1 - UPPER
00 26	0aaa aaaa	TMT4 Velocity Range Upper	(1 - 127) LOWER - 127
00 27	0aaa aaaa	TMT4 Velocity Fade Width Lower	(0 - 127)
00 28	0aaa aaaa	TMT4 Velocity Fade Width Upper	(0 - 127)
00 00 00 29		Total Size	

\* Patch Tone

Offset	Address	Description	
00 00	0aaa aaaa	Tone Level	(0 - 127)
00 01	0aaa aaaa	Tone Coarse Tune	(16 - 112)
00 02	0aaa aaaa	Tone Fine Tune	-48 - +48 (14 - 114)
00 03	000a aaaa	Tone Random Pitch Depth	(0 - 30)
00 04	0aaa aaaa	Tone Pan	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200 (0 - 127)
00 05	000a aaaa	Tone Pan Keyfollow	L64 - 63R (54 - 74)
00 06	00aa aaaa	Tone Random Pan Depth	-100 - +100 (0 - 63)
00 07	0aaa aaaa	Tone Alternate Pan Depth	(1 - 127) L63 - 63R
00 08	0000 000a	Tone Env Mode	(0 - 1) NO-SUS, SUSTAIN
00 09	0000 00aa	Tone Delay Mode	(0 - 3) NORMAL, HOLD, KEY-OFF-NORMAL, KEY-OFF-DECAY
#	00 0A	0000 aaaa 0000 bbbb	Tone Delay Time (0 - 149) 0 - 127, MUSICAL-NOTES
00 0C	0aaa aaaa	Tone Dry Send Level	(0 - 127)
00 0D	0aaa aaaa	Tone Chorus Send Level (MFX)	(0 - 127)
00 0E	0aaa aaaa	Tone Reverb Send Level (MFX)	(0 - 127)
00 0F	0aaa aaaa	Tone Chorus Send Level (non MFX)	(0 - 127)
00 10	0aaa aaaa	Tone Reverb Send Level (non MFX)	(0 - 127)
00 11	000a aaaa	Tone Output Assign	(0 - 1) MFX, A
00 12	0000 000a	Tone Receive Bender	(0 - 1) OFF, ON
00 13	0000 000a	Tone Receive Expression	(0 - 1) OFF, ON
00 14	0000 000a	Tone Receive Hold-1	(0 - 1) OFF, ON
00 15	0000 000a	Tone Receive Pan Mode	(0 - 1) CONTINUOUS, KEY-ON
00 16	0000 000a	Tone Redamper Switch	(0 - 1) OFF, ON
00 17	0000 00aa	Tone Control 1 Switch 1	(0 - 2) OFF, ON, REVERSE
00 18	0000 00aa	Tone Control 1 Switch 2	(0 - 2) OFF, ON, REVERSE
00 19	0000 00aa	Tone Control 1 Switch 3	(0 - 2) OFF, ON, REVERSE
00 1A	0000 00aa	Tone Control 1 Switch 4	(0 - 2) OFF, ON, REVERSE
00 1B	0000 00aa	Tone Control 2 Switch 1	(0 - 2) OFF, ON, REVERSE
00 1C	0000 00aa	Tone Control 2 Switch 2	(0 - 2) OFF, ON, REVERSE
00 1D	0000 00aa	Tone Control 2 Switch 3	(0 - 2) OFF, ON, REVERSE
00 1E	0000 00aa	Tone Control 2 Switch 4	(0 - 2) OFF, ON, REVERSE
00 1F	0000 00aa	Tone Control 3 Switch 1	(0 - 2) OFF, ON, REVERSE
00 20	0000 00aa	Tone Control 3 Switch 2	(0 - 2) OFF, ON, REVERSE
00 21	0000 00aa	Tone Control 3 Switch 3	(0 - 2) OFF, ON, REVERSE
00 22	0000 00aa	Tone Control 3 Switch 4	(0 - 2) OFF, ON, REVERSE
00 23	0000 00aa	Tone Control 4 Switch 1	(0 - 2) OFF, ON, REVERSE
00 24	0000 00aa	Tone Control 4 Switch 2	(0 - 2) OFF, ON, REVERSE
00 25	0000 00aa	Tone Control 4 Switch 3	(0 - 2) OFF, ON, REVERSE
00 26	0000 00aa	Tone Control 4 Switch 4	(0 - 2) OFF, ON, REVERSE
00 27	0000 00aa	(Reserved)	
#	00 28	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Wave Group ID (0 - 16384)

# MIDI Implementation

#	00 2C	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Wave Number L (Mono)	OFF, 1 - 16384 (0 - 16384) OFF, 1 - 16384
#	00 30	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Wave Number R	(0 - 16384) OFF, 1 - 16384
	00 34	0000 00aa	Wave Gain	OFF, 1 - 16384
	00 35	0000 000a	Wave FXM Switch	-6, 0, +6, +12 [dB] (0 - 1)
	00 36	0000 00aa	Wave FXM Color	OFF, ON (0 - 3)
	00 37	000a aaaa	Wave FXM Depth	(0 - 16)
	00 38	0000 000a	Wave Tempo Sync	(0 - 1)
	00 39	00aa aaaa	Wave Pitch Keyfollow	OFF, ON (44 - 84) -200 - +200
	00 3A	000a aaaa	Pitch Env Depth	(52 - 76) -12 - +12
	00 3B	0aaa aaaa	Pitch Env Velocity Sens	(1 - 127) -63 - +63
	00 3C	0aaa aaaa	Pitch Env Time 1 Velocity Sens	(1 - 127) -63 - +63
	00 3D	0aaa aaaa	Pitch Env Time 4 Velocity Sens	(1 - 127) -63 - +63
	00 3E	000a aaaa	Pitch Env Time Keyfollow	(54 - 74) -100 - +100
	00 3F	0aaa aaaa	Pitch Env Time 1	(0 - 127)
	00 40	0aaa aaaa	Pitch Env Time 2	(0 - 127)
	00 41	0aaa aaaa	Pitch Env Time 3	(0 - 127)
	00 42	0aaa aaaa	Pitch Env Time 4	(0 - 127)
	00 43	0aaa aaaa	Pitch Env Level 0	(1 - 127) -63 - +63
	00 44	0aaa aaaa	Pitch Env Level 1	(1 - 127) -63 - +63
	00 45	0aaa aaaa	Pitch Env Level 2	(1 - 127) -63 - +63
	00 46	0aaa aaaa	Pitch Env Level 3	(1 - 127) -63 - +63
	00 47	0aaa aaaa	Pitch Env Level 4	(1 - 127) -63 - +63
	00 48	0000 0aaa	TVF Filter Type	(0 - 6) OFF, LPF, BPF, HPF, PKG, LPP2, LPP3
	00 49	0aaa aaaa	TVF Cutoff Frequency	(0 - 127)
	00 4A	00aa aaaa	TVF Cutoff Keyfollow	(44 - 84) -200 - +200
	00 4B	0000 0aaa	TVF Cutoff Velocity Curve	(0 - 7) FIXED, 1 - 7
	00 4C	0aaa aaaa	TVF Cutoff Velocity Sens	(1 - 127) -63 - +63
	00 4D	0aaa aaaa	TVF Resonance	(0 - 127)
	00 4E	0aaa aaaa	TVF Resonance Velocity Sens	(1 - 127) -63 - +63
	00 4F	0aaa aaaa	TVF Env Depth	(1 - 127) -63 - +63
	00 50	0000 0aaa	TVF Env Velocity Curve	(0 - 7) FIXED, 1 - 7
	00 51	0aaa aaaa	TVF Env Velocity Sens	(1 - 127) -63 - +63
	00 52	0aaa aaaa	TVF Env Time 1 Velocity Sens	(1 - 127) -63 - +63
	00 53	0aaa aaaa	TVF Env Time 4 Velocity Sens	(1 - 127) -63 - +63
	00 54	000a aaaa	TVF Env Time Keyfollow	(54 - 74) -100 - +100
	00 55	0aaa aaaa	TVF Env Time 1	(0 - 127)
	00 56	0aaa aaaa	TVF Env Time 2	(0 - 127)
	00 57	0aaa aaaa	TVF Env Time 3	(0 - 127)
	00 58	0aaa aaaa	TVF Env Time 4	(0 - 127)
	00 59	0aaa aaaa	TVF Env Level 0	(0 - 127)
	00 5A	0aaa aaaa	TVF Env Level 1	(0 - 127)
	00 5B	0aaa aaaa	TVF Env Level 2	(0 - 127)
	00 5C	0aaa aaaa	TVF Env Level 3	(0 - 127)
	00 5D	0aaa aaaa	TVF Env Level 4	(0 - 127)
	00 5E	000a aaaa	Bias Level	(54 - 74) -100 - +100
	00 5F	0aaa aaaa	Bias Position	(0 - 127) C-1 - G9
	00 60	0000 00aa	Bias Direction	(0 - 3) LOWER, UPPER, LOWER&UPPER, ALL
	00 61	0000 0aaa	TVA Level Velocity Curve	(0 - 7) FIXED, 1 - 7
	00 62	0aaa aaaa	TVA Level Velocity Sens	(1 - 127) -63 - +63
	00 63	0aaa aaaa	TVA Env Time 1 Velocity Sens	(1 - 127) -63 - +63
	00 64	0aaa aaaa	TVA Env Time 4 Velocity Sens	(1 - 127) -63 - +63
	00 65	000a aaaa	TVA Env Time Keyfollow	(54 - 74) -100 - +100
	00 66	0aaa aaaa	TVA Env Time 1	(0 - 127)
	00 67	0aaa aaaa	TVA Env Time 2	(0 - 127)
	00 68	0aaa aaaa	TVA Env Time 3	(0 - 127)
	00 69	0aaa aaaa	TVA Env Time 4	(0 - 127)
	00 6A	0aaa aaaa	TVA Env Level 1	(0 - 127)
	00 6B	0aaa aaaa	TVA Env Level 2	(0 - 127)
	00 6C	0aaa aaaa	TVA Env Level 3	(0 - 127)
	00 6D	0000 aaaa	LFO1 Wave Form	(0 - 10) SIN, TRI, SAW-UP, SAW-DW, SQR, RND, BEND-UP, BEND-DW, TRP, S&H, CHS
#	00 6E	0000 aaaa 0000 bbbb	LFO1 Rate	(0 - 149) 0 - 127, MUSICAL-NOTES
	00 70	0000 0aaa	LFO1 Offset	(0 - 4) -100, -50, 0, +50, +100
	00 71	0aaa aaaa	LFO1 Rate Detune	(0 - 127)
	00 72	0aaa aaaa	LFO1 Delay Time	(0 - 127)
	00 73	000a aaaa	LFO1 Delay Time Keyfollow	(54 - 74) -100 - +100
	00 74	0000 00aa	LFO1 Fade Mode	(0 - 3) ON-IN, ON-OUT, OFF-IN, OFF-OUT
	00 75	0aaa aaaa	LFO1 Fade Time	(0 - 127)
	00 76	0000 000a	LFO1 Key Trigger	(0 - 1) OFF, ON
	00 77	0aaa aaaa	LFO1 Pitch Depth	(1 - 127) -63 - +63
	00 78	0aaa aaaa	LFO1 TVF Depth	(1 - 127) -63 - +63
	00 79	0aaa aaaa	LFO1 TVA Depth	(1 - 127) -63 - +63
	00 7A	0aaa aaaa	LFO1 Pan Depth	(1 - 127) -63 - +63
	00 7B	0000 aaaa	LFO2 Wave Form	(0 - 10) SIN, TRI, SAW-UP, SAW-DW, SQR, RND, BEND-UP, BEND-DW, TRP, S&H, CHS

#	00 7C	0000 aaaa 0000 bbbb	LFO2 Rate	(0 - 149) 0 - 127, MUSICAL-NOTES
	00 7E	0000 0aaa	LFO2 Offset	(0 - 4) -100, -50, 0, +50, +100
	00 7F	0aaa aaaa	LFO2 Rate Detune	(0 - 127)
	01 00	0aaa aaaa	LFO2 Delay Time	(0 - 127)
	01 01	000a aaaa	LFO2 Delay Time Keyfollow	(54 - 74) -100 - +100
	01 02	0000 00aa	LFO2 Fade Mode	(0 - 3) ON-IN, ON-OUT, OFF-IN, OFF-OUT
	01 03	0aaa aaaa	LFO2 Fade Time	(0 - 127)
	01 04	0000 000a	LFO2 Key Trigger	(0 - 1) OFF, ON
	01 05	0aaa aaaa	LFO2 Pitch Depth	(1 - 127) -63 - +63
	01 06	0aaa aaaa	LFO2 TVF Depth	(1 - 127) -63 - +63
	01 07	0aaa aaaa	LFO2 TVA Depth	(1 - 127) -63 - +63
	01 08	0aaa aaaa	LFO2 Pan Depth	(1 - 127) -63 - +63
	00 00 01 09		Total Size	
* Rhythm Common				
	Offset	Address	Description	
	00 00	0aaa aaaa	Rhythm Name 1	(32 - 127)
	00 01	0aaa aaaa	Rhythm Name 2	32 - 127 [ASCII] (32 - 127)
	00 02	0aaa aaaa	Rhythm Name 3	32 - 127 [ASCII] (32 - 127)
	00 03	0aaa aaaa	Rhythm Name 4	32 - 127 [ASCII] (32 - 127)
	00 04	0aaa aaaa	Rhythm Name 5	32 - 127 [ASCII] (32 - 127)
	00 05	0aaa aaaa	Rhythm Name 6	32 - 127 [ASCII] (32 - 127)
	00 06	0aaa aaaa	Rhythm Name 7	32 - 127 [ASCII] (32 - 127)
	00 07	0aaa aaaa	Rhythm Name 8	32 - 127 [ASCII] (32 - 127)
	00 08	0aaa aaaa	Rhythm Name 9	32 - 127 [ASCII] (32 - 127)
	00 09	0aaa aaaa	Rhythm Name 10	32 - 127 [ASCII] (32 - 127)
	00 0A	0aaa aaaa	Rhythm Name 11	32 - 127 [ASCII] (32 - 127)
	00 0B	0aaa aaaa	Rhythm Name 12	32 - 127 [ASCII] (32 - 127)
	00 0C	0aaa aaaa	Rhythm Level	(0 - 127)
	00 0D	0000 000a	Rhythm Clock Source	(0 - 1) RHYTHM, SYSTEM
#	00 0E	0000 aaaa 0000 bbbb	Rhythm Tempo	(20 - 250)
	00 10	0000 000a	One Shot Mode	(0 - 1) OFF, ON
	00 11	0000 aaaa	Rhythm Output Assign	(0,1,13) MPX, A, TONE
	00 00 00 12		Total Size	
* Rhythm Common MPX				
	Offset	Address	Description	
	00 00	0aaa aaaa	MPX Type	(0 - 127)
	00 01	0aaa aaaa	MPX Dry Send Level	(0 - 127)
	00 02	0aaa aaaa	MPX Chorus Send Level	(0 - 127)
	00 03	0aaa aaaa	MPX Reverb Send Level	(0 - 127)
	00 05	0aaa aaaa	MPX Control 1 Source	(0 - 101) OFF, CC01 - CC31, CC33 - CC95, BEND, APT, SYS1 - SYS4
	00 06	0aaa aaaa	MPX Control 1 Sens	(1 - 127) -63 - +63
	00 07	0aaa aaaa	MPX Control 2 Source	(0 - 101) OFF, CC01 - CC31, CC33 - CC95, BEND, APT, SYS1 - SYS4
	00 08	0aaa aaaa	MPX Control 2 Sens	(1 - 127) -63 - +63
	00 09	0aaa aaaa	MPX Control 3 Source	(0 - 101) OFF, CC01 - CC31, CC33 - CC95, BEND, APT, SYS1 - SYS4
	00 0A	0aaa aaaa	MPX Control 3 Sens	(1 - 127) -63 - +63
	00 0B	0aaa aaaa	MPX Control 4 Source	(0 - 101) OFF, CC01 - CC31, CC33 - CC95, BEND, APT, SYS1 - SYS4
	00 0C	0aaa aaaa	MPX Control 4 Sens	(1 - 127) -63 - +63
	00 0D	000a aaaa	MPX Control Assign 1	(0 - 16) OFF, 1 - 16
	00 0E	000a aaaa	MPX Control Assign 2	(0 - 16) OFF, 1 - 16
	00 0F	000a aaaa	MPX Control Assign 3	(0 - 16) OFF, 1 - 16
	00 10	000a aaaa	MPX Control Assign 4	(0 - 16) OFF, 1 - 16
#	00 11	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPX Parameter 1	(12768 - 52768) -20000 - +20000
#	00 15	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPX Parameter 2	(12768 - 52768) -20000 - +20000
#	00 19	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPX Parameter 3	(12768 - 52768) -20000 - +20000
#	00 1D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPX Parameter 4	(12768 - 52768) -20000 - +20000
#	00 21	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPX Parameter 5	(12768 - 52768) -20000 - +20000
#	00 25	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPX Parameter 6	(12768 - 52768) -20000 - +20000
#	00 29	0000 aaaa		

# MIDI Implementation

#	00 2D	0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 7	(12768 - 52768) -20000 - +20000
#	00 31	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 8	(12768 - 52768) -20000 - +20000
#	00 35	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 9	(12768 - 52768) -20000 - +20000
#	00 39	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 10	(12768 - 52768) -20000 - +20000
#	00 3D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 11	(12768 - 52768) -20000 - +20000
#	00 41	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 12	(12768 - 52768) -20000 - +20000
#	00 45	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 13	(12768 - 52768) -20000 - +20000
#	00 49	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 14	(12768 - 52768) -20000 - +20000
#	00 4D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 15	(12768 - 52768) -20000 - +20000
#	00 51	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 16	(12768 - 52768) -20000 - +20000
#	00 55	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 17	(12768 - 52768) -20000 - +20000
#	00 59	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 18	(12768 - 52768) -20000 - +20000
#	00 5D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 19	(12768 - 52768) -20000 - +20000
#	00 61	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 20	(12768 - 52768) -20000 - +20000
#	00 65	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 21	(12768 - 52768) -20000 - +20000
#	00 69	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 22	(12768 - 52768) -20000 - +20000
#	00 6D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 23	(12768 - 52768) -20000 - +20000
#	00 71	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 24	(12768 - 52768) -20000 - +20000
#	00 75	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 25	(12768 - 52768) -20000 - +20000
#	00 79	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 26	(12768 - 52768) -20000 - +20000
#	00 7D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 27	(12768 - 52768) -20000 - +20000
#	01 01	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 28	(12768 - 52768) -20000 - +20000
#	01 05	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 29	(12768 - 52768) -20000 - +20000
#	01 09	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 30	(12768 - 52768) -20000 - +20000
#	01 0D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 31	(12768 - 52768) -20000 - +20000
#	01 11	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	MPFX Parameter 32	(12768 - 52768) -20000 - +20000
00 00 01 11		Total Size		

\* Rhythm Common Chorus

Offset	Address	Description	
00 00	0000 aaaa	Chorus Type	(0 - 3)

	00 01	0aaa aaaa	Chorus Level	OFF, CHORUS, DELAY, GM2-CHORUS (0 - 127)
	00 03	0000 00aa	Chorus Output Select	(0 - 2) MAIN, REV, MAIN+REV
#	00 04	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 1	(12768 - 52768) -20000 - +20000
#	00 08	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 2	(12768 - 52768) -20000 - +20000
#	00 0C	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 3	(12768 - 52768) -20000 - +20000
#	00 10	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 4	(12768 - 52768) -20000 - +20000
#	00 14	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 5	(12768 - 52768) -20000 - +20000
#	00 18	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 6	(12768 - 52768) -20000 - +20000
#	00 1C	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 7	(12768 - 52768) -20000 - +20000
#	00 20	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 8	(12768 - 52768) -20000 - +20000
#	00 24	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 9	(12768 - 52768) -20000 - +20000
#	00 28	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 10	(12768 - 52768) -20000 - +20000
#	00 2C	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 11	(12768 - 52768) -20000 - +20000
#	00 30	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Chorus Parameter 12	(12768 - 52768) -20000 - +20000
00 00 00 34		Total Size		

\* Rhythm Common 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 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)



# MIDI Implementation

#	00 33	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 13	(12768 - 52768) -20000 - +20000
#	00 37	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 14	(12768 - 52768) -20000 - +20000
#	00 3B	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 15	(12768 - 52768) -20000 - +20000
#	00 3F	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 16	(12768 - 52768) -20000 - +20000
#	00 43	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 17	(12768 - 52768) -20000 - +20000
#	00 47	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 18	(12768 - 52768) -20000 - +20000
#	00 4B	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 19	(12768 - 52768) -20000 - +20000
#	00 4F	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Reverb Parameter 20	(12768 - 52768) -20000 - +20000
00 00 00 53		Total Size		

\* Rhythm Tone

Offset	Address	Description	
	00 00	Tone Name 1	(32 - 127)
	00 01	Tone Name 2	32 - 127 [ASCII]
	00 02	Tone Name 3	(32 - 127)
	00 03	Tone Name 4	(32 - 127)
	00 04	Tone Name 5	(32 - 127)
	00 05	Tone Name 6	(32 - 127)
	00 06	Tone Name 7	(32 - 127)
	00 07	Tone Name 8	(32 - 127)
	00 08	Tone Name 9	(32 - 127)
	00 09	Tone Name 10	(32 - 127)
	00 0A	Tone Name 11	(32 - 127)
	00 0B	Tone Name 12	(32 - 127)
	00 0C	Assign Type	(0 - 1) MULTI, SINGLE
	00 0D	Mute Group	(0 - 31) OFF, 1 - 31
	00 0E	Tone Level	(0 - 127)
	00 0F	Tone Coarse Tune	(0 - 127)
	00 10	Tone Fine Tune	C-1 - G9 (14 - 114)
	00 11	Tone Random Pitch Depth	(0 - 30) 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200
	00 12	Tone Pan	(0 - 127) L64 - 63R
	00 13	Tone Random Pan Depth	(0 - 63)
	00 14	Tone Alternate Pan Depth	(1 - 127) L63 - 63R
	00 15	Tone Env Mode	(0 - 1) NO-SUS, SUSTAIN
	00 16	Tone Dry Send Level	(0 - 127)
	00 17	Tone Chorus Send Level	(0 - 127)
	00 18	Tone Reverb Send Level	(0 - 127)
	00 19	Tone Chorus Send Level (non MFX)	(0 - 127)
	00 1A	Tone Reverb Send Level (non MFX)	(0 - 127)
	00 1B	Tone Output Assign	(0 - 1) MFX, A
	00 1C	Tone Pitch Bend Range	(0 - 48)
	00 1D	Tone Receive Expression	(0 - 1) OFF, ON
	00 1E	Tone Receive Hold-1	(0 - 1) OFF, ON
	00 1F	Tone Receive Pan Mode	(0 - 1) CONTINUOUS, KEY-ON
	00 20	WMT Velocity Control	(0 - 2) OFF, ON, RANDOM
	00 21	WMT1 Wave Switch	(0 - 1) OFF, ON
#	00 22	(Reserved)	
#	00 23	WMT1 Wave Group ID	(0 - 16384) OFF, 1 - 16384
#	00 27	WMT1 Wave Number L (Mono)	(0 - 16384) OFF, 1 - 16384
#	00 2B	WMT1 Wave Number R	(0 - 16384) OFF, 1 - 16384
	00 2F	WMT1 Wave Gain	(0 - 16384) OFF, 1 - 16384 -6, 0, +6, +12 [dB]

	00 30	0000 000a	WMT1 Wave FXM Switch	(0 - 1) OFF, ON
	00 31	0000 00aa	WMT1 Wave FXM Color	(0 - 3) 1 - 4
	00 32	000a aaaa	WMT1 Wave FXM Depth	(0 - 16)
	00 33	0000 000a	WMT1 Wave Tempo Sync	(0 - 1) OFF, ON
	00 34	0aaa aaaa	WMT1 Wave Coarse Tune	(16 - 112) -48 - +48
	00 35	0aaa aaaa	WMT1 Wave Fine Tune	(14 - 114) -50 - +50
	00 36	0aaa aaaa	WMT1 Wave Pan	(0 - 127) L64 - 63R
	00 37	0000 000a	WMT1 Wave Random Pan Switch	(0 - 1) OFF, ON
	00 38	0000 00aa	WMT1 Wave Alternate Pan Switch	(0 - 2) OFF, ON, REVERSE
	00 39	0aaa aaaa	WMT1 Wave Level	(0 - 127)
	00 3A	0aaa aaaa	WMT1 Velocity Range Lower	(1 - 127) 1 - UPPER
	00 3B	0aaa aaaa	WMT1 Velocity Range Upper	(1 - 127) LOWER - 127
	00 3C	0aaa aaaa	WMT1 Velocity Fade Width Lower	(0 - 127)
	00 3D	0aaa aaaa	WMT1 Velocity Fade Width Upper	(0 - 127)
	00 3E	0000 000a	WMT2 Wave Switch	(0 - 1) OFF, ON
	00 3F	0000 00aa	(Reserved)	
#	00 40	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	WMT2 Wave Group ID	(0 - 16384) OFF, 1 - 16384
#	00 44	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	WMT2 Wave Number L (Mono)	(0 - 16384) OFF, 1 - 16384
#	00 48	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	WMT2 Wave Number R	(0 - 16384) OFF, 1 - 16384
	00 4C	0000 00aa	WMT2 Wave Gain	(0 - 3) OFF, 1 - 16384 -6, 0, +6, +12 [dB]
	00 4D	0000 000a	WMT2 Wave FXM Switch	(0 - 1) OFF, ON
	00 4E	0000 00aa	WMT2 Wave FXM Color	(0 - 3) 1 - 4
	00 4F	000a aaaa	WMT2 Wave FXM Depth	(0 - 16)
	00 50	0000 000a	WMT2 Wave Tempo Sync	(0 - 1) OFF, ON
	00 51	0aaa aaaa	WMT2 Wave Coarse Tune	(16 - 112) -48 - +48
	00 52	0aaa aaaa	WMT2 Wave Fine Tune	(14 - 114) -50 - +50
	00 53	0aaa aaaa	WMT2 Wave Pan	(0 - 127) L64 - 63R
	00 54	0000 000a	WMT2 Wave Random Pan Switch	(0 - 1) OFF, ON
	00 55	0000 00aa	WMT2 Wave Alternate Pan Switch	(0 - 2) OFF, ON, REVERSE
	00 56	0aaa aaaa	WMT2 Wave Level	(0 - 127)
	00 57	0aaa aaaa	WMT2 Velocity Range Lower	(1 - 127) 1 - UPPER
	00 58	0aaa aaaa	WMT2 Velocity Range Upper	(1 - 127) LOWER - 127
	00 59	0aaa aaaa	WMT2 Velocity Fade Width Lower	(0 - 127)
	00 5A	0aaa aaaa	WMT2 Velocity Fade Width Upper	(0 - 127)
	00 5B	0000 000a	WMT3 Wave Switch	(0 - 1) OFF, ON
	00 5C	0000 00aa	(Reserved)	
#	00 5D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	WMT3 Wave Group ID	(0 - 16384) OFF, 1 - 16384
#	00 61	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	WMT3 Wave Number L (Mono)	(0 - 16384) OFF, 1 - 16384
#	00 65	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	WMT3 Wave Number R	(0 - 16384) OFF, 1 - 16384
	00 69	0000 00aa	WMT3 Wave Gain	(0 - 3) OFF, 1 - 16384 -6, 0, +6, +12 [dB]
	00 6A	0000 000a	WMT3 Wave FXM Switch	(0 - 1) OFF, ON
	00 6B	0000 00aa	WMT3 Wave FXM Color	(0 - 3) 1 - 4
	00 6C	000a aaaa	WMT3 Wave FXM Depth	(0 - 16)
	00 6D	0000 000a	WMT3 Wave Tempo Sync	(0 - 1) OFF, ON
	00 6E	0aaa aaaa	WMT3 Wave Coarse Tune	(16 - 112) -48 - +48
	00 6F	0aaa aaaa	WMT3 Wave Fine Tune	(14 - 114) -50 - +50
	00 70	0aaa aaaa	WMT3 Wave Pan	(0 - 127) L64 - 63R
	00 71	0000 000a	WMT3 Wave Random Pan Switch	(0 - 1) OFF, ON
	00 72	0000 00aa	WMT3 Wave Alternate Pan Switch	(0 - 2) OFF, ON, REVERSE
	00 73	0aaa aaaa	WMT3 Wave Level	(0 - 127)
	00 74	0aaa aaaa	WMT3 Velocity Range Lower	(1 - 127) 1 - UPPER
	00 75	0aaa aaaa	WMT3 Velocity Range Upper	(1 - 127) LOWER - 127
	00 76	0aaa aaaa	WMT3 Velocity Fade Width Lower	(0 - 127)
	00 77	0aaa aaaa	WMT3 Velocity Fade Width Upper	(0 - 127)
	00 78	0000 000a	WMT4 Wave Switch	(0 - 1) OFF, ON
	00 79	0000 00aa	(Reserved)	
#	00 7A	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	WMT4 Wave Group ID	(0 - 16384) OFF, 1 - 16384
#	00 7E	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	WMT4 Wave Number L (Mono)	(0 - 16384) OFF, 1 - 16384
#	01 02	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	WMT4 Wave Number R	(0 - 16384) OFF, 1 - 16384
	01 06	0000 00aa	WMT4 Wave Gain	(0 - 3) OFF, 1 - 16384 -6, 0, +6, +12 [dB]

# MIDI Implementation

01 07	0000 000a	WMT4 Wave FXM Switch	(0 - 1) OFF, ON
01 08	0000 00aa	WMT4 Wave FXM Color	(0 - 3) 1 - 4
01 09	000a aaaa	WMT4 Wave FXM Depth	(0 - 16)
01 0A	0000 000a	WMT4 Wave Tempo Sync	(0 - 1) OFF, ON
01 0B	0aaa aaaa	WMT4 Wave Coarse Tune	(16 - 112) -48 - +48
01 0C	0aaa aaaa	WMT4 Wave Fine Tune	(14 - 114) -50 - +50
01 0D	0aaa aaaa	WMT4 Wave Pan	(0 - 127)
01 0E	0000 000a	WMT4 Wave Random Pan Switch	(0 - 1) OFF, ON
01 0F	0000 00aa	WMT4 Wave Alternate Pan Switch	(0 - 2) OFF, ON, REVERSE
01 10	0aaa aaaa	WMT4 Wave Level	(0 - 127)
01 11	0aaa aaaa	WMT4 Velocity Range Lower	(1 - 127) 1 - UPPER
01 12	0aaa aaaa	WMT4 Velocity Range Upper	(1 - 127) LOWER - 127
01 13	0aaa aaaa	WMT4 Velocity Fade Width Lower	(0 - 127)
01 14	0aaa aaaa	WMT4 Velocity Fade Width Upper	(0 - 127)
-----			
01 15	000a aaaa	Pitch Env Depth	(52 - 76) -12 - +12
01 16	0aaa aaaa	Pitch Env Velocity Sens	(1 - 127) -63 - +63
01 17	0aaa aaaa	Pitch Env Time 1 Velocity Sens	(1 - 127) -63 - +63
01 18	0aaa aaaa	Pitch Env Time 4 Velocity Sens	(1 - 127) -63 - +63
01 19	0aaa aaaa	Pitch Env Time 1	(0 - 127)
01 1A	0aaa aaaa	Pitch Env Time 2	(0 - 127)
01 1B	0aaa aaaa	Pitch Env Time 3	(0 - 127)
01 1C	0aaa aaaa	Pitch Env Time 4	(0 - 127)
01 1D	0aaa aaaa	Pitch Env Level 0	(1 - 127) -63 - +63
01 1E	0aaa aaaa	Pitch Env Level 1	(1 - 127) -63 - +63
01 1F	0aaa aaaa	Pitch Env Level 2	(1 - 127) -63 - +63
01 20	0aaa aaaa	Pitch Env Level 3	(1 - 127) -63 - +63
01 21	0aaa aaaa	Pitch Env Level 4	(1 - 127) -63 - +63
-----			
01 22	0000 0aaa	TVF Filter Type	(0 - 6) OFF, LPF, BPF, HPP, PKG, LFP2, LFP3
01 23	0aaa aaaa	TVF Cutoff Frequency	(0 - 127)
01 24	0000 0aaa	TVF Cutoff Velocity Curve	(0 - 7) FIXED, 1 - 7
01 25	0aaa aaaa	TVF Cutoff Velocity Sens	(1 - 127) -63 - +63
01 26	0aaa aaaa	TVF Resonance	(0 - 127)
01 27	0aaa aaaa	TVF Resonance Velocity Sens	(1 - 127) -63 - +63
01 28	0aaa aaaa	TVF Env Depth	(1 - 127) -63 - +63
01 29	0000 0aaa	TVF Env Velocity Curve Type	(0 - 7) FIXED, 1 - 7
01 2A	0aaa aaaa	TVF Env Velocity Sens	(1 - 127) -63 - +63
01 2B	0aaa aaaa	TVF Env Time 1 Velocity Sens	(1 - 127) -63 - +63
01 2C	0aaa aaaa	TVF Env Time 4 Velocity Sens	(1 - 127) -63 - +63
01 2D	0aaa aaaa	TVF Env Time 1	(0 - 127)
01 2E	0aaa aaaa	TVF Env Time 2	(0 - 127)
01 2F	0aaa aaaa	TVF Env Time 3	(0 - 127)
01 30	0aaa aaaa	TVF Env Time 4	(0 - 127)
01 31	0aaa aaaa	TVF Env Level 0	(0 - 127)
01 32	0aaa aaaa	TVF Env Level 1	(0 - 127)
01 33	0aaa aaaa	TVF Env Level 2	(0 - 127)
01 34	0aaa aaaa	TVF Env Level 3	(0 - 127)
01 35	0aaa aaaa	TVF Env Level 4	(0 - 127)
-----			
01 36	0000 0aaa	TVA Level Velocity Curve	(0 - 7) FIXED, 1 - 7
01 37	0aaa aaaa	TVA Level Velocity Sens	(1 - 127) -63 - +63
01 38	0aaa aaaa	TVA Env Time 1 Velocity Sens	(1 - 127) -63 - +63
01 39	0aaa aaaa	TVA Env Time 4 Velocity Sens	(1 - 127) -63 - +63
01 3A	0aaa aaaa	TVA Env Time 1	(0 - 127)
01 3B	0aaa aaaa	TVA Env Time 2	(0 - 127)
01 3C	0aaa aaaa	TVA Env Time 3	(0 - 127)
01 3D	0aaa aaaa	TVA Env Time 4	(0 - 127)
01 3E	0aaa aaaa	TVA Env Level 1	(0 - 127)
01 3F	0aaa aaaa	TVA Env Level 2	(0 - 127)
01 40	0aaa aaaa	TVA Env Level 3	(0 - 127)
-----			
00 00 01 41	Total Size		

## 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.

<Example 1> What is the decimal expression of 5AH ?

From the preceding table, 5AH = 90

<Example 2> 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

<Example 3> What is the decimal expression of the nibbled value 0A 03 09 0D ?

From the preceding table, since 0AH = 10, 03H = 3, 09H = 9, 0DH = 13

((10 x 16 + 3) x 16 + 9) x 16 + 13 = 41885

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

16) 1258

16) 78 ... 10

16) 4 ... 14

0 ... 4

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

## ● Examples of actual MIDI messages

<Example 1> 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.

<Example 2> CE 49

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

<Example 3> 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.

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

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

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

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

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

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

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

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

\* TPQN: Ticks Per Quarter Note

## ● Example of an Exclusive message and calculating a checksum

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

○How to calculate the checksum (hexadecimal numbers are indicated by "H")

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

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

$$\begin{aligned} aa + bb + cc + dd + ee + ff &= \text{sum} \\ \text{sum} \div 128 &= \text{quotient} \dots \text{remainder} \\ 128 - \text{remainder} &= \text{checksum} \end{aligned}$$

<Example 1> Setting CHORUS TYPE of MULTITIMBRE COMMON to DELAY (DT1).

According to the "Parameter Address Map (p. 7)", the start address of Temporary Multitimbre is 10 00 00 00H, the offset address of CHORUS at MULTITIMBRE COMMON is 04 00H, and the address of CHORUS TYPE is 00 00H. Therefore the address of CHORUS TYPE of MULTITIMBRE COMMON is:

$$\begin{array}{r} 10\ 00\ 00\ 00\text{H} \\ \quad\quad\quad 04\ 00\text{H} \\ +) \quad\quad\quad 00\ 00\text{H} \\ \hline 10\ 00\ 04\ 00\text{H} \end{array}$$

DELAY has the value of 02H.

So the system exclusive message should be sent is:

F0	41	10	00 48	12	10 00 04 00	02	??	F7
(1)	(2)	(3)	(4)	(5)	address	data	checksum	(6)

(1) Exclusive Status, (2) ID (Roland), (3) Device ID (17), (4) Model ID (SD-90), (5) Command ID (DT1), (6) End of Exclusive

Then calculate the checksum.

$$\begin{aligned} 10\text{H} + 00\text{H} + 04\text{H} + 00\text{H} + 02\text{H} &= 16 + 0 + 4 + 0 + 2 = 22 \text{ (sum)} \\ 22 \text{ (sum)} \div 128 &= 0 \text{ (quotient)} \dots 22 \text{ (remainder)} \\ \text{checksum} &= 128 - 22 \text{ (remainder)} = 106 = 6\text{AH} \end{aligned}$$

This means that F0 41 10 00 48 12 10 00 04 00 02 6A F7 is the message should be sent.

<Example 2> Getting Temporary Multitimbre data (RQ1);

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

10 00 00 00H	Temporary Multitimbre Common
:	
10 00 20 00H	Temporary Multitimbre Part 1
:	
10 00 2F 00H	Temporary Multitimbre Part 16

As the data size of Multitimbre Part is 00 00 00 31H, summation of the size and the start address of Part 16 at Temporary Multitimbre will be;

$$\begin{array}{r} 10\ 00\ 3F\ 00\text{H} \\ +) 00\ 00\ 00\ 31\text{H} \\ \hline 10\ 00\ 3F\ 31\text{H} \end{array}$$

And the size that have to be got should be;

$$\begin{array}{r} 10\ 00\ 3F\ 31\text{H} \\ -) 10\ 00\ 00\ 00\text{H} \\ \hline 00\ 00\ 3F\ 31\text{H} \end{array}$$

Therefore the system exclusive message should be sent is;

F0	41	10	00 48	11	10 00 00 00	00 00 3F 31	??	F7
(1)	(2)	(3)	(4)	(5)	address	data	checksum	(6)

(1) Exclusive Status, (2) ID (Roland), (3) Device ID (17), (4) Model ID (SD-90), (5) Command ID (RQ1), (6) End of Exclusive

This means that F0 41 10 00 48 11 10 00 00 00 00 00 3F 31 00 F7 is the message should be sent.

<Example 3> Getting data (RQ1) at once;

Tempera Multitimbre data,  
Temporary Patch data of whole part in Multitimbre mode,  
Temporary Rhythm data of whole part in Multitimbre mode.

# MIDI Implementation

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

10 00 00 00H	Temporary Multitimbre
11 20 00 00H	Temporary Patch (Multitimbre Mode Part 1)
11 30 00 00H	Temporary Rhythm (Multitimbre Mode Part 1)
:	
14 60 00 00H	Temporary Patch (Multitimbre Mode Part 32)
14 70 00 00H	Temporary Rhythm (Multitimbre Mode Part 32)

The offset address of Rhythm is also assigned as follows:

00 00 00H	Rhythm Common
:	
00 10 00H	Rhythm Tone 1
:	
01 3E 00H	Rhythm Tone 4

As the data size of Rhythm Tone is 00 00 01 41H, summation of the size and the start address of Tone 4 of Part 32 at Temporary Patch in Multitimbre mode will be;

```

14 70 00 00H
  01 3E 00H
+) 00 00 01 41H
14 71 3F 41H
    
```

And the size that have to be got should be;

```

14 71 3F 41H
-) 10 00 00 00H
  04 71 3F 41H
    
```

Therefore the system exclusive message should be sent is;

```

F0 41 10 00 48      11      10 00 00 00  04 71 3F 41  ??      F7
(1) (2) (3) (4)      (5)      address    data    checksum (6)
    
```

- (1) Exclusive Status, (2) ID (Roland), (3) Device ID (17),  
 (4) Model ID (SD-90), (5) Command ID (RQ1), (6) End of Exclusive

This means that F0 41 10 00 48 11 10 00 00 00 04 71 3F 41 7B F7 is the message should be sent.

## ●ASCII code table

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

(HEX) = hexadecimal  
 (DEC) = decimal

Character	(HEX)	(DEC)	Character	(HEX)	(DEC)	Character	(HEX)	(DEC)
SP	20H	32	@	40H	64	`	20H	96
!	21H	33	A	41H	65	a	61H	97
"	22H	34	B	42H	66	b	62H	98
#	23H	35	C	43H	67	c	63H	99
\$	24H	36	D	44H	68	d	64H	100
%	25H	37	E	45H	69	e	65H	101
&	26H	38	F	46H	70	f	66H	102
'	27H	39	G	47H	71	g	67H	103
(	28H	40	H	48H	72	h	68H	104
)	29H	41	I	49H	73	i	69H	105
*	2AH	42	J	4AH	74	j	6AH	106
+	2BH	43	K	4BH	75	k	6BH	107
,	2CH	44	L	4CH	76	l	6CH	108
-	2DH	45	M	4DH	77	m	6DH	109
.	2EH	46	N	4EH	78	n	6EH	110
/	2FH	47	O	4FH	79	o	6FH	111
0	30H	48	P	50H	80	p	70H	112
1	31H	49	Q	51H	81	q	71H	113
2	32H	50	R	52H	82	r	72H	114
3	33H	51	S	53H	83	s	73H	115
4	34H	52	T	54H	84	t	74H	116
5	35H	53	U	55H	85	u	75H	117
6	36H	54	V	56H	86	v	76H	118
7	37H	55	W	57H	87	w	77H	119
8	38H	56	X	58H	88	x	78H	120
9	39H	57	Y	59H	89	y	79H	121
:	3AH	58	Z	5AH	90	z	7AH	122
;	3BH	59	[	5BH	91	{	7BH	123
<	3CH	60	\	5CH	92	}	7CH	124
=	3DH	61	]	5DH	93	}	7CH	125
>	3EH	62	^	5EH	94			
?	3FH	63	_	5FH	95			

NOTE: "SP" is space.

## ●About the Tuning

In MIDI, individual Parts are tuned by sending RPN #1 (Master Fine Tuning) to the appropriate MIDI channel.

In MIDI, an entire device is tuned by either sending RPN #1 to all MIDI channels being used, or by sending a System Exclusive MASTER TUNE (address 40 00 00H).

RPN #1 allows tuning to be specified in steps of approximately 0.012 cents (to be precise, 100/8192 cent), and System Exclusive MASTER TUNE allows tuning in steps of 0.1 cent. One cent is 1/100th of a semitone.

The values of RPN #1 (Master Fine Tuning) and System Exclusive MASTER TUNE are added together to determine the actual pitch sounded by each Part.

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

Hz at A4	cents	RPN #1	Sys.Ex. 40 00 00
445.0	+19.56	4C 43 (+1603)	00 04 0C 04 (+196)
444.0	+15.67	4A 03 (+1283)	00 04 09 0D (+157)
443.0	+11.76	47 44 (+ 964)	00 04 07 06 (+118)
442.0	+ 7.85	45 03 (+ 643)	00 04 04 0F (+ 79)
441.0	+ 3.93	42 42 (+ 322)	00 04 02 07 (+ 39)
440.0	0	40 00 ( 0 )	00 04 00 00 ( 0 )
439.0	- 3.94	3D 3D (- 323)	00 03 0D 09 (- 39)
438.0	- 7.89	3A 7A (- 646)	00 03 0B 01 (- 79)

<Example> Setting the tuning of MIDI channel 3 to A4 = 442.0 Hz

Send RPN#1 to MIDI channel 3. From the above table, the value is 45 03H.

- B2 64 00 MIDI ch.3, lower byte of RPN parameter number: 00H  
 (B2) 65 01 (MIDI ch.3) upper byte of RPN parameter number: 01H  
 (B2) 06 45 (MIDI ch.3) upper byte of parameter value: 45H  
 (B2) 26 03 (MIDI ch.3) lower byte of parameter value: 03H  
 (B2) 64 7F (MIDI ch.3) lower byte of RPN parameter number: 7FH  
 (B2) 65 7F (MIDI ch.3) upper byte of RPN parameter number: 7FH

## ●The Scale Tune Feature (address: 40 00 2x 33)

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

### ○Equal Temperament

This method of tuning divides the octave into 12 equal parts. It is currently the most widely used form of tuning, especially in occidental music. On the SC-8820, the default settings for the Scale Tune feature produce equal temperament.

### ○Just Temperament (Tonic of C)

The principal triads resound much more beautifully than with equal temperament, but this benefit can only be obtained in one key. If transposed, the chords tend to become ambiguous. The example given involves settings for a key in which C is the keynote.

### ○Arabian Scale

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

Example Settings

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

The values in the table are given in cents. Refer to the explanation of Parameter address map on page 11 to convert these values to hexadecimal, and transmit them as Exclusive data.

For example, to set the tune (C-B) of the Part1 Arabian Scale, send the following data:

```
F0 41 10 00 48 12 10 00 20 33 3A 6D 3E 34 0D 38 6B 3C 6F 40 36 0F 24 F7
```