@(#)midiimpe.txt 24.2 3/14/99

MIDI Implementation Model VS-1680 Version 1.10 Mar. 14 1999

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1. TRANSMITTED DATA AND RECOGNIZED RECEIVE DATA

[]Channel Voice Message

(o)Note On/Off

When "Metronome Out Mode(*1)" in the SYSTEM parameters is "MIDI", MIDI note number/velocity of MIDI channel number which is assigned to the Metronome is transmitted.
Received when the effect patch Voice Transformer effect (algorithm 27) is selected and MIDI Control SW is On.

Status	Second	Third
9nH	mmH	llH

n = MIDI Channel No. : 0H - FH (ch.1-ch.16) (*2)
: 0H - 3H (ch.1-ch.4) (*3)
mm = Note No. : 00H - 7FH (0 - 127) (*3)
ll = Velocity : 01H - 7FH (1 - 127) / 00H = NOTE OFF

(*1) See '2. Address Map for Data Transfer' section.
(*2) Only when transmitting Metronome.
(*3) Only when receiving with MIDI Control SW of Voice Transformer is On.

n = 0,2 (ch.1,3) : Voice Transformer : Chromatic Pitch
mm = 24H - 54H (C2 - C6)
ll = ignored

n = 1,3 (ch.2,4) : Voice Transformer : Chromatic Formant
mm = 24H - 3CH (C2 - C4)
ll = ignored

(o)Polyphonic Key Pressure

Transmits the level meter value of VS-1680 according to the value of "Level Meter Tx. via MIDI" (see "2. Data Transfer Address Map"). (MIDI ch. is fixed to 16.)
Ignored when received.
When VS-1680 is booted up, "Level Meter Tx. via MIDI" is set to Off. Level meter value is not transmitted until is it set to On with Data Set (DT1).

Status	Second	Third
AFH	mmH	llH

mm = Note No. : 00H - 27H (0 - 39) (*1)
ll = Level Meter Value : 00H - 36H (0 - 54) (*2)

Level Meter and Note No. (*1)

Level Meter Ch.	Note No.	Level Meter Ch.	Note No.
TRACK MIX CH. 1	0	EFX1 BUS Lch	26
TRACK MIX CH. 2	1	EFX1 BUS Rch	27
TRACK MIX CH. 3	2		
TRACK MIX CH. 4	3	EFX2 BUS Lch	28
TRACK MIX CH. 5	4	EFX2 BUS Rch	29
TRACK MIX CH. 6	5		
TRACK MIX CH. 7	6	EFX3(AUX1) BUS Lch	30
TRACK MIX CH. 8	7	EFX3(AUX1) BUS Rch	31
TRACK MIX CH. 9	8		
TRACK MIX CH.10	9	EFX4(AUX2) BUS Lch	32
TRACK MIX CH.11	10	EFX4(AUX2) BUS Rch	33
TRACK MIX CH.12	11		
TRACK MIX CH.13	12	AUX(AUX3) BUS Lch	34
TRACK MIX CH.14	13	AUX(AUX3) BUS Rch	35
TRACK MIX CH.15	14		
TRACK MIX CH.16	15	MONITOR Lch	36
		MONITOR Rch	37
INPUT MIX CH. 1	16		
INPUT MIX CH. 2	17	MASTER Lch	38
INPUT MIX CH. 3	18	MASTER Rch	39
INPUT MIX CH. 4	19		
INPUT MIX CH. 5	20		
INPUT MIX CH. 6	21		
INPUT MIX CH. 7	22		
INPUT MIX CH. 8	23		
INPUT MIX CH. 9	24		
INPUT MIX CH.10	25		

Level Meter Value and Level (*2)

Val	Level	Val	Level	Val	Level	Val	Level	Val	Level
0	- ™Ω dB	11	-30.0dB	22	-17.0dB	33	-8.00dB	44	-2.50dB
1	-51.0dB	12	-28.0dB	23	-16.0dB	34	-7.50dB	45	-2.25dB
2	-48.0dB	13	-26.0dB	24	-15.0dB	35	-7.00dB	46	-2.00dB
3	-46.0dB	14	-25.0dB	25	-14.0dB	36	-6.50dB	47	-1.75dB
4	-44.0dB	15	-24.0dB	26	-13.0dB	37	-6.00dB	48	-1.50dB
5	-42.0dB	16	-23.0dB	27	-12.5dB	38	-5.50dB	49	-1.25dB
6	-40.0dB	17	-22.0dB	28	-12.0dB	39	-5.00dB	50	-1.00dB
7	-38.0dB	18	-21.0dB	29	-11.0dB	40	-4.50dB	51	-0.75dB
8	-36.0dB	19	-20.0dB	30	-10.0dB	41	-4.00dB	52	-0.50dB
9	-34.0dB	20	-19.0dB	31	-9.00dB	42	-3.50dB	53	-0.25dB
10	-32.0dB	21	-18.0dB	32	-8.50dB	43	-3.00dB	54	-0.00dB

(o)Control Change

Parameters on the Mixer section can be received and transmitted by the control
change messages when 'MIDI Mixer Control Type (*1)' in the SYSTEM parameter is
set to 'C.C.'

Status	Second	Third
BnH	mmH	llH

n = MIDI Channel No. : 0H - FH (ch.1-ch.16 : see below)
mm = Mixer Parameter No. : (see below)
ll = Mixer Parameter Value : 00H - 7FH (0 - 127) (*1)

Mixer Parameter and MIDI Channel/Control Change No.

<Channel Strip>

TRACK MIX CH.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MIDI ch. ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TRACK STATUS(*3)	3	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
MIX Send Level	7	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
MIX Send Pan	10	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EQ L Freq.	12	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EQ L Gain	13	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EQ M Freq.	14	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EQ M Gain	15	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EQ M Q	16	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EQ H Freq.	17	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EQ H Gain	18	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EFF-1 SND Level	19	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EFF-1 SND Pan/Bal	20	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EFF-2 SND Level	21	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EFF-2 SND Pan/Bal	22	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EFF-3 SND Level	23	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EFF-3 SND Pan/Bal	24	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EFF-4 SND Level	25	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
EFF-4 SND Pan/Bal	26	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
AUX Send Level	27	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
AUX Send Pan/Bal	28	->	->	->	->	->	->	->	->	->	->	->	->	->	->	->
MIX Offset Level	29	--	->	--	->	--	->	--	->	--	->	--	->	--	->	--
MIX Offset Bal	30	--	->	--	->	--	->	--	->	--	->	--	->	--	->	--

INPUT MIX CH.	1	2	3	4	5	6	7	8	9	10
MIDI ch. ->	1	2	3	4	5	6	7	8	9	10
MIX Send Level	68	->	->	->	->	->	->	->	->	->
MIX Send Pan/Bal	70	->	->	->	->	->	->	->	->	->
EQ L Freq.	71	->	->	->	->	->	->	->	->	->
EQ L Gain	72	->	->	->	->	->	->	->	->	->
EQ M Freq.	73	->	->	->	->	->	->	->	->	->
EQ M Gain	74	->	->	->	->	->	->	->	->	->
EQ M Q	75	->	->	->	->	->	->	->	->	->
EQ H Freq.	76	->	->	->	->	->	->	->	->	->
EQ H Gain	77	->	->	->	->	->	->	->	->	->
EFF-1 SND Level	78	->	->	->	->	->	->	->	->	->
EFF-1 SND Pan/Bal	79	->	->	->	->	->	->	->	->	->
EFF-2 SND Level	80	->	->	->	->	->	->	->	->	->
EFF-2 SND Pan/Bal	81	->	->	->	->	->	->	->	->	->
EFF-3 SND Level	82	->	->	->	->	->	->	->	->	->

EFF-3 SND Pan/Bal	83	->	->	->	->	->	->	->	->
EFF-4 SND Level	84	->	->	->	->	->	->	->	->
EFF-4 SND Pan/Bal	85	->	->	->	->	->	->	->	->
AUX Send Level	86	->	->	->	->	->	->	->	->
AUX Send Pan/Bal	87	->	->	->	->	->	->	->	->
MIX Offset Level	88	--	->	--	->	--	->	--	->
MIX Offset Bal	89	--	->	--	->	--	->	--	->

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stereo in & effect return

	ST IN	EFX1	EFX2	EFX3	EFX4
MIDI ch. ->	11	12	13	14	15
		->	->	->	->
MIX Send Level	68	->	->	->	->
MIX Send Balance	70	->	->	->	->

<MASTER Block> MIDI ch.=16

Master Level	68
Master Balance	70
EFF-1 SND Level	78
EFF-1 SND Balance	79
EFF-2 SND Level	80
EFF-2 SND Balance	81
EFF-3 SND Level	82
EFF-3 SND Pan/Bal	83
EFF-4 SND Level	84
EFF-4 SND Pan/Bal	85
AUX Level	86
AUX Balance	87
Monitor Level	102
Monitor Balance	103

(*1) See '2. Address Map for Data Transfer' section.
(*2) Control Change of the odd number of channel is transmitted and received when Channel Link is On.
(*3) Value and switching Track status corresponds as follows.

(1) While VS-1680 stops

Value :	0-31	32-63	64-95	96-127
Status:	MUTE ->MUTE	MUTE ->PLAY	MUTE ->REC	MUTE ->SOURCE
	PLAY ->MUTE	PLAY ->PLAY	PLAY ->REC	PLAY ->SOURCE
	REC ->MUTE	REC ->PLAY	REC ->REC	REC ->SOURCE
	SOURCE->MUTE	SOURCE->PLAY	SOURCE->REC	SOURCE->SOURCE

(2) While playback/recording

Value :	0-31	32-63	64-95	96-127

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Status:  MUTE  -> X    MUTE  ->PLAY  MUTE  -> X     MUTE  -> X
         PLAY  ->MUTE  PLAY  ->PLAY  PLAY  -> X     PLAY  -> X
         REC   -> X    REC   -> X    REC   ->REC    REC   ->SOURCE(*)
         SOURCE->MUTE  SOURCE-> X    SOURCE->REC(*) SOURCE->SOURCE

(*) Impossible to switch while recording.
(*) X = ignored
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()Bank select (MSB/LSB)

Switches the effect bank of Preset/User.
VS-1680 never transmits this message.

Status	Second	Third
BnH	00H	mmH
BnH	20H	llH

n = MIDI Channel No. : 0H - 3H (ch.1 = EFX1 ch.2 = EFX2
ch.3 = EFX3 ch.4 = EFX4)
mm = upper byte of bank number : 00H
ll = lower byte of bank number : 00H - 04H (0 - 4)

Bank Select MSB	Bank Select LSB	Program Change	Patch Number
00H	00H	00H - 63H (0 - 99)	Preset #000 - #099
00H	01H	00H - 63H (0 - 99)	Preset #100 - #199
00H	02H	00H - 27H (0 - 39)	Preset #200 - #239
00H	03H	00H - 63H (0 - 99)	User #000 - #099
00H	04H	00H - 63H (0 - 99)	User #100 - #199

()NRPN(MSB/LSB)

Selects a parameter of the effect to be controlled.
VS-1680 never transmits this message.

Status	Second	Third
BnH	62H	llH
BnH	63H	mmH

n = MIDI Channel No. : 0H - 3H (ch.1 = EFX1 ch.2 = EFX2
ch.3 = EFX3 ch.4 = EFX4)
mm = upper byte of the parameter number to be assigned with NRPN : 00H
ll = lower byte of the parameter number to be assigned with NRPN : 00H - 2EH
(0 - 46)

()Data Entry (MSB/LSB)

Controls effect parameter assigned with NRPN.
VS-1680 never transmits this message.

Status	Second	Third
BnH	06H	mmH
BnH	26H	llH

```
n  = MIDI Channel No.      : 0H - 3H ( ch.1 = EFX1 ch.2 = EFX2
                                       ch.3 = EFX3 ch.4 = EFX4 )
mm = upper byte corresponding to the parameter assigned with NRPN
ll = lower byte corresponding to the parameter assigned with NRPN

<Ex>      mmH llH = 40H 00H = -8192
                  = 7FH 7FH = -1
                  = 00H 00H = 0
                  = 3FH 7FH = +8191


()Data Increment

Increments the effect parameter selected with NRPN.
VS-1680 never transmits this message.

Status      Second      Third
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BnH         60H         00H

n  = MIDI Channel No.      : 0H - 3H ( ch.1 = EFX1 ch.2 = EFX2
                                       ch.3 = EFX3 ch.4 = EFX4 )

Increment the effect parameter selected with NRPN.


()Data Decrement

Decrement the effect parameter selected with NRPN.
VS-1680 never transmits this message.

Status      Second      Third
----------  ----------  ----------
BnH         61H         00H

n  = MIDI Channel No.      : 0H - 3H ( ch.1 = EFX1 ch.2 = EFX2
                                       ch.3 = EFX3 ch.4 = EFX4 )

Decrement the effect parameter selected with NRPN.


------------------------------------------------------------------------
                NRPN and Effect parameters
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<>Algorithm 0 Reverb (EFX1 & EFX3 Only)

+-----------------------------------------------------------------------+
|  NRPN   | Data    |                                                   |
|         |   Entry |                                                   |
|=========+=========+===================================================|
| 00H 00H | mmH llH | EQ SW                                             |
|         |         |                                          0,1 = Off,On|
|---------+---------+---------------------------------------------------|
| 00H 01H | mmH llH | EQ: Low EQ Type                                   |
|         |         |                          0,1 = Shelving, Peaking|
|---------+---------+---------------------------------------------------|
| 00H 02H | mmH llH | EQ: Low EQ Gain                                   |
|         |         |                                        -12,,,12dB|
|---------+---------+---------------------------------------------------|
| 00H 03H | mmH llH | EQ: Low EQ Frequency                              |
```

		2,,,200 = 20,,,2000Hz
00H 04H	mmH llH	EQ: Low EQ Q
		3,,,100 = 0.3,,,10.0
00H 05H	mmH llH	EQ: Mid EQ Gain
		-12,,,12dB
00H 06H	mmH llH	EQ: Mid EQ Frequency
		20,,,800 = 200,,,8000Hz
00H 07H	mmH llH	EQ: Mid EQ Q
		3,,,100 = 0.3,,,10.0
00H 08H	mmH llH	EQ: High EQ Type
		0,1 = Shelving, Peaking
00H 09H	mmH llH	EQ: High EQ Gain
		-12,,,12dB
00H 0AH	mmH llH	EQ: High EQ Frequency
		14,,,200 = 1.4,,,20.0kHz
00H 0BH	mmH llH	EQ: High EQ Q
		3,,,100 = 0.3,,,10.0
00H 0CH	mmH llH	EQ: Out Level
		0,,,100
00H 0DH	mmH llH	Reverb: Room Size
		5,,,40m
00H 0EH	mmH llH	Reverb: Reverb Time
		1,,,320 = 0.1,,,32.0s
00H 0FH	mmH llH	Reverb: Pre Delay
		0,,,200 = 0,,,200ms
00H 10H	mmH llH	Reverb: Diffusion
		0,,,100
00H 11H	mmH llH	Reverb: Density
		0,,,100
00H 12H	mmH llH	Reverb: Early Reflection Level
		0,,,100
00H 13H	mmH llH	Reverb: LF Damp Frequency
		5,,,400 = 50,,,4000Hz
00H 14H	mmH llH	Reverb: LF Damp Gain
		-36,,,0dB
00H 15H	mmH llH	Reverb: HF Damp Frequency
		10,,,200 = 1.0,,,20.0kHz
00H 16H	mmH llH	Reverb: HF Damp Gain
		-36,,,0dB
00H 17H	mmH llH	Reverb: HI Cut Frequency
		2...200 = 0.2...20.0kHz

00H 18H	mmH llH	Reverb: Effect Level -100,,,100
00H 19H	mmH llH	Reverb: Direct Level -100,,,100
00H 1AH : 00H 7FH	00H 00H 00H 00H	(Reserved)

<>Algorithm 1 Delay

NRPN	Data Entry	
00H 00H	mmH llH	Delay SW 0,1 = Off,On
00H 01H	mmH llH	EQ SW 0,1 = Off,On
00H 02H	mmH llH	Delay: Delay Time 0,,,1200ms
00H 03H	mmH llH	Delay: Shift -1200,,,1200 = L1200,,,R1200ms
00H 04H	mmH llH	Delay: Lch Feedback Level -100,,,100
00H 05H	mmH llH	Delay: Rch Feedback Level -100,,,100
00H 06H	mmH llH	Delay: Lch Level -100,,,100
00H 07H	mmH llH	Delay: Rch Level -100,,,100
00H 08H	mmH llH	Delay: LF Damp Frequency 5,,,400 = 50,,,4000Hz
00H 09H	mmH llH	Delay: LF Damp Gain -36,,,0dB
00H 0AH	mmH llH	Delay: HF Damp Frequency 10,,,200 = 1.0,,,20.0kHz
00H 0BH	mmH llH	Delay: HF Damp Gain -36,,,0dB
00H 0CH	mmH llH	Delay: Direct Level -100,,,100
00H 0DH	mmH llH	EQ: Low EQ Type 0,1 = Shelving, Peaking

00H 0EH	mmH llH	EQ: Low EQ Gain -12,,,12dB
00H 0FH	mmH llH	EQ: Low EQ Frequency 2,,,200 = 20,,,2000Hz
00H 10H	mmH llH	EQ: Low EQ Q 3,,,100 = 0.3,,,10.0
00H 11H	mmH llH	EQ: Mid EQ Gain -12,,,12dB
00H 12H	mmH llH	EQ: Mid EQ Frequency 20,,,800 = 200,,,8000Hz
00H 13H	mmH llH	EQ: Mid EQ Q 3,,,100 = 0.3,,,10.0
00H 14H	mmH llH	EQ: High EQ Type 0,1 = Shelving, Peaking
00H 15H	mmH llH	EQ: High EQ Gain -12,,,12dB
00H 16H	mmH llH	EQ: High EQ Frequency 14,,,200 = 1.4,,,20.0kHz
00H 17H	mmH llH	EQ: High EQ Q 3,,,100 = 0.3,,,10.0
00H 18H	mmH llH	EQ: Out Level 0,,,100
00H 19H	00H 00H	(Reserved)
:	:	
00H 7FH	00H 00H	

™-(Delay Time) + (Absolute value of Shift) should be 1200 or less.

<>Algorithm 2 Stereo Delay Chorus

NRPN	Data Entry	
00H 00H	mmH llH	Delay SW 0,1 = Off,On
00H 01H	mmH llH	Chorus SW 0,1 = Off,On
00H 02H	mmH llH	EQ SW 0,1 = Off,On
00H 03H	mmH llH	Delay: Delay Time 0,,,500ms
00H 04H	mmH llH	Delay: Shift -500...500 = L500...R500ms

00H 05H	mmH llH	Delay: Lch Feedback Level -100,,,100
00H 06H	mmH llH	Delay: Rch Feedback Level -100,,,100
00H 07H	mmH llH	Delay: Lch Cross Feedback Level -100,,,100
00H 08H	mmH llH	Delay: Rch Cross Feedback Level -100,,,100
00H 09H	mmH llH	Delay: Effect Level -100,,,100
00H 0AH	mmH llH	Delay: Direct Level -100,,,100
00H 0BH	mmH llH	Chorus: Rate 1,,,100 = 0.1,,,10.0Hz
00H 0CH	mmH llH	Chorus: Depth 0,,,100
00H 0DH	mmH llH	Chorus: Pre Delay 0,,,50ms
00H 0EH	mmH llH	Chorus: Effect Level -100,,,100
00H 0FH	mmH llH	Chorus: Direct Level -100,,,100
00H 10H	mmH llH	Chorus: Lch Feedback Level -100,,,100
00H 11H	mmH llH	Chorus: Rch Feedback Level -100,,,100
00H 12H	mmH llH	Chorus: Lch Cross Feedback Level -100,,,100
00H 13H	mmH llH	Chorus: Rch Cross Feedback Level -100,,,100
00H 14H	mmH llH	EQ: Low EQ Type 0,1 = Shelving, Peaking
00H 15H	mmH llH	EQ: Low EQ Gain -12,,,12dB
00H 16H	mmH llH	EQ: Low EQ Frequency 2,,,200 = 20,,,2000Hz
00H 17H	mmH llH	EQ: Low EQ Q 3,,,100 = 0.3,,,10.0
00H 18H	mmH llH	EQ: Mid EQ Gain -12,,,12dB

00H 19H	mmH llH	EQ: Mid EQ Frequency 20,,,800 = 200,,,8000Hz
00H 1AH	mmH llH	EQ: Mid EQ Q 3,,,100 = 0.3,,,10.0
00H 1BH	mmH llH	EQ: High EQ Type 0,1 = Shelving, Peaking
00H 1CH	mmH llH	EQ: High EQ Gain -12,,,12dB
00H 1DH	mmH llH	EQ: High EQ Frequency 14,,,200 = 1.4,,,20.0kHz
00H 1EH	mmH llH	EQ: High EQ Q 3,,,100 = 0.3,,,10.0
00H 1FH	mmH llH	EQ: Out Level 0,,,100
00H 20H	00H 00H	(Reserved)
:	:	:
00H 7FH	00H 00H	

™- (Delay Time) + (Absolute value of Shift) should be 500 or less.

<>Algorithm 3 Stereo Pitch Shifter Delay

NRPN	Data Entry	
00H 00H	mmH llH	P.ShifterDelay SW 0,1 = Off,On
00H 01H	mmH llH	EQ SW 0,1 = Off,On
00H 02H	mmH llH	P.ShifterDelay: Lch Chromatic Pitch -12,,,12
00H 03H	mmH llH	P.ShifterDelay: Lch Fine Pitch -100,,,100
00H 04H	mmH llH	P.ShifterDelay: Lch Pre Delay 0,,,50ms
00H 05H	mmH llH	P.ShifterDelay: Lch Feedback Delay Time 0,,,500ms
00H 06H	mmH llH	P.ShifterDelay: Lch Feedback Level -100,,,100
00H 07H	mmH llH	P.ShifterDelay: Lch Cross Feedback Level -100,,,100
00H 08H	mmH llH	P.ShifterDelay: Rch Chromatic Pitch -12...12

00H 09H	mmH llH	P.ShifterDelay: Rch Fine Pitch	-100,,,100
00H 0AH	mmH llH	P.ShifterDelay: Rch Pre Delay	0,,,50ms
00H 0BH	mmH llH	P.ShifterDelay: Rch Feedback Delay Time	0,,,500ms
00H 0CH	mmH llH	P.ShifterDelay: Rch Feedback Level	-100,,,100
00H 0DH	mmH llH	P.ShifterDelay: Rch Cross Feedback Level	-100,,,100
00H 0EH	mmH llH	P.ShifterDelay: Effect Level	-100,,,100
00H 0FH	mmH llH	P.ShifterDelay: Direct Level	-100,,,100
00H 10H	mmH llH	EQ: Low EQ Type	0,1 = Shelving, Peaking
00H 11H	mmH llH	EQ: Low EQ Gain	-12,,,12dB
00H 12H	mmH llH	EQ: Low EQ Frequency	2,,,200 = 20,,,2000Hz
00H 13H	mmH llH	EQ: Low EQ Q	3,,,100 = 0.3,,,10.0
00H 14H	mmH llH	EQ: Mid EQ Gain	-12,,,12dB
00H 15H	mmH llH	EQ: Mid EQ Frequency	20,,,800 = 200,,,8000Hz
00H 16H	mmH llH	EQ: Mid EQ Q	3,,,100 = 0.3,,,10.0
00H 17H	mmH llH	EQ: High EQ Type	0,1 = Shelving, Peaking
00H 18H	mmH llH	EQ: High EQ Gain	-12,,,12dB
00H 19H	mmH llH	EQ: High EQ Frequency	14,,,200 = 1.4,,,20.0kHz
00H 1AH	mmH llH	EQ: High EQ Q	3,,,100 = 0.3,,,10.0
00H 1BH	mmH llH	EQ: Out Level	0,,,100
00H 1CH	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

<>Algorithm 4 Vocoder

NRPN	Data Entry	
00H 00H	mmH llH	Chorus SW 0,1 = Off,On
00H 01H	mmH llH	Vocoder: Voice Character 1 0,,,100
00H 02H	mmH llH	Vocoder: Voice Character 2 0,,,100
00H 03H	mmH llH	Vocoder: Voice Character 3 0,,,100
00H 04H	mmH llH	Vocoder: Voice Character 4 0,,,100
00H 05H	mmH llH	Vocoder: Voice Character 5 0,,,100
00H 06H	mmH llH	Vocoder: Voice Character 6 0,,,100
00H 07H	mmH llH	Vocoder: Voice Character 7 0,,,100
00H 08H	mmH llH	Vocoder: Voice Character 8 0,,,100
00H 09H	mmH llH	Vocoder: Voice Character 9 0,,,100
00H 0AH	mmH llH	Vocoder: Voice Character 10 0,,,100
00H 0BH	mmH llH	Chorus: Rate 1,,,100 = 0.1,,,10.0Hz
00H 0CH	mmH llH	Chorus: Depth 0,,,100
00H 0DH	mmH llH	Chorus: Pre Delay 0,,,50ms
00H 0EH	mmH llH	Chorus: Feedback Level -100,,,100
00H 0FH	mmH llH	Chorus: Effect Level -100,,,100
00H 10H	mmH llH	Chorus: Direct Level -100,,,100
00H 11H	00H 00H	(Reserved)

:	:	
00H 7FH	00H 00H	

<>Algorithm 5 2CH RSS

NRPN	Data Entry	
00H 00H	mmH llH	2CH RSS: Ach Azimuth -30,,,30 = -180,,,180
00H 01H	mmH llH	2CH RSS: Ach Elevation -15,,,15 = -90,,,90
00H 02H	mmH llH	2CH RSS: Bch Azimuth -30,,,30 = -180,,,180
00H 03H	mmH llH	2CH RSS: Bch Elevation -15,,,15 = -90,,,90
00H 04H	00H 00H	(Reserved)
:		:
00H 7FH	00H 00H	

<>Algorithm 6 Delay RSS

NRPN	Data Entry	
00H 00H	mmH llH	Delay RSS: Delay Time 0,,,1200ms
00H 01H	mmH llH	Delay RSS: Shift -1200,,,1200 = L1200,,,R1200ms
00H 02H	mmH llH	Delay RSS: Center Dealy Time 0,,,1200ms
00H 03H	mmH llH	Delay RSS: RSS Level 0,,,100
00H 04H	mmH llH	Delay RSS: Center Level 0,,,100
00H 05H	mmH llH	Delay RSS: Feedback Level -100,,,100
00H 06H	mmH llH	Delay RSS: LF Damp Frequency 5,,,400 = 50,,,4000Hz
00H 07H	mmH llH	Delay RSS: LF Damp Gain -36,,,0dB
00H 08H	mmH llH	Delay RSS: HF Damp Frequency 10...200 = 1.0...20.0kHz

00H 09H	mmH llH	Delay RSS: HF Damp Gain -36,,,0dB
00H 0AH	mmH llH	Delay RSS: Effect Level -100,,,100
00H 0BH	mmH llH	Delay RSS: Direct Level -100,,,100
00H 0CH : 00H 7FH	00H 00H 00H 00H	(Reserved)

<>Algorithm 7 Chorus RSS

NRPN	Data Entry	
00H 00H	mmH llH	Chorus RSS: Chorus Rate 1,,,100 = 0.1,,,10.0Hz
00H 01H	mmH llH	Chorus RSS: Chorus Depth 0,,,100
00H 02H	mmH llH	Chorus RSS: Effect Level -100,,,100
00H 03H	mmH llH	Chorus RSS: Direct Level -100,,,100
00H 04H : 00H 7FH	00H 00H 00H 00H	(Reserved)

<> Common for Algorithm 8,9,10 Guitar Multi 1, 2, 3

NRPN	Data Entry	
00H 00H	mmH llH	Compressor SW 0,1 = Off,On
00H 01H	mmH llH	Metal/Distortion/Over Drive SW 0,1 = Off,On
00H 02H	mmH llH	Noise Suppressor SW 0,1 = Off,On
00H 03H	mmH llH	Auto Wah SW 0,1 = Off,On
00H 04H	mmH llH	Guitar Amp Simulator SW 0,1 = Off,On

00H 05H	mmH llH	Flanger SW	0,1 = Off,On
00H 06H	mmH llH	Delay SW	0,1 = Off,On
00H 07H	mmH llH	Compressor: Attack	0,,,100
00H 08H	mmH llH	Compressor: Level	0,,,100
00H 09H	mmH llH	Compressor: Sustain	0,,,100
00H 0AH	mmH llH	Compressor: Tone	-50,,,-50
00H 0BH	mmH llH	Noise Suppressor: Threshold	0,,,100
00H 0CH	mmH llH	Noise Suppressor: Release	0,,,100
00H 0DH	mmH llH	Auto Wah: Mode	0,1 = LPF,BPF
00H 0EH	mmH llH	Auto Wah: Polarity	0,1 = Down,Up
00H 0FH	mmH llH	Auto Wah: Frequency	0,,,100
00H 10H	mmH llH	Auto Wah: Level	0,,,100
00H 11H	mmH llH	Auto Wah: Peak	0,,,100
00H 12H	mmH llH	Auto Wah: Sens	0,,,100
00H 13H	mmH llH	Auto Wah: Rate	1,,,100 = 0.1,,,10.0Hz
00H 14H	mmH llH	Auto Wah: Depth	0,,,100
00H 15H	mmH llH	Guitar Amp Simulator: Mode	0,,,3 = Small,BultIn,2Stack,3Stack
00H 16H	mmH llH	Flanger: Rate	1,,,100 = 0.1,,,10.0Hz
00H 17H	mmH llH	Flanger: Depth	0,,,100
00H 18H	mmH llH	Flanger: Manual	0,,,100
00H 19H	mmH llH	Flanger: Resonance	

			0,,,100
00H 1AH	mmH llH	Delay: Delay Time	
			0,,,1000ms
00H 1BH	mmH llH	Delay: Shift	
			-1000,,,1000 = L1000,,,R1000ms
00H 1CH	mmH llH	Delay: Feedback Time	
			0,,,1000ms
00H 1DH	mmH llH	Delay: Feedback Level	
			-100,,,100
00H 1EH	mmH llH	Delay: Effect Level	
			-100,,,100
00H 1FH	mmH llH	Delay: Direct Level	
			-100,,,100

™- (Delay Time) + (Absolute value of Shift) should be 1000 or less.

<>Individual for Algorithm 8 Guitar Multi1

00H 20H	mmH llH	Metal: Gain	
			0,,,100
00H 21H	mmH llH	Metal: Level	
			0,,,100
00H 22H	mmH llH	Metal: Hi Gain	
			-100,,,100
00H 23H	mmH llH	Metal: Mid Gain	
			-100,,,100
00H 24H	mmH llH	Metal: Low Gain	
			-100,,,100
00H 25H	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

<>Individual for Algorithm 9 Guitar Multi 2

00H 20H	mmH llH	Distortion: Gain	
			0,,,100
00H 21H	mmH llH	Distortion: Level	
			0,,,100
00H 22H	mmH llH	Distortion: Tone	
			0,,,100
00H 23H	00H 00H	(Reserved)	

:	:	
00H 7FH	00H 00H	

<>Individual for Algorithm 10 Guitar Multi 3

00H 20H	mmH llH	Over Drive: Gain	0,,,100
00H 21H	mmH llH	Over Drive: Level	0,,,100
00H 22H	mmH llH	Over Drive: Tone	0,,,100
00H 23H	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

<>Algorithm 11 Vocal Multi

NRPN	Data Entry		
00H 00H	mmH llH	Noise Suppressor SW	0,1 = Off,On
00H 01H	mmH llH	Limiter/De-esser SW	0,1 = Off,On
00H 02H	mmH llH	Enhancer SW	0,1 = Off,On
00H 03H	mmH llH	EQ SW	0,1 = Off,On
00H 04H	mmH llH	P.Shifter SW	0,1 = Off,On
00H 05H	mmH llH	Delay SW	0,1 = Off,On
00H 06H	mmH llH	Chorus SW	0,1 = Off,On
00H 07H	mmH llH	Limiter/De-essor Mode	0,1 = Limiter,De-essor
00H 08H	mmH llH	Noise Suppressor: Threshold	0,,,100
00H 09H	mmH llH	Noise Suppressor: Release	0,,,100
00H 0AH	mmH llH	Limiter: Threshold	0...100

00H 0BH	mmH llH	Limiter: Release	0,,,100
00H 0CH	mmH llH	Limiter: Level	0,,,100
00H 0DH	mmH llH	De-essor: Sens	0,,,100
00H 0EH	mmH llH	De-essor: Frequency	10,,,100 = 1.0,,,10.0kHz
00H 0FH	mmH llH	Enhancer: Sens	0,,,100
00H 10H	mmH llH	Enhancer: Frequency	10,,,100 = 1.0,,,10.0kHz
00H 11H	mmH llH	Enhancer: MIX Level	0,,,100
00H 12H	mmH llH	Enhancer: Level	0,,,100
00H 13H	mmH llH	EQ: Low EQ Type	0,1 = Shelving, Peaking
00H 14H	mmH llH	EQ: Low EQ Gain	-12,,,12dB
00H 15H	mmH llH	EQ: Low EQ Frequency	2,,,200 = 20,,,2000Hz
00H 16H	mmH llH	EQ: Low EQ Q	3,,,100 = 0.3,,,10.0
00H 17H	mmH llH	EQ: Mid EQ Gain	-12,,,12dB
00H 18H	mmH llH	EQ: Mid EQ Frequency	20,,,800 = 200,,,8000Hz
00H 19H	mmH llH	EQ: Mid EQ Q	3,,,100 = 0.3,,,10.0
00H 1AH	mmH llH	EQ: High EQ Type	0,1 = Shelving, Peaking
00H 1BH	mmH llH	EQ: High EQ Gain	-12,,,12dB
00H 1CH	mmH llH	EQ: High EQ Frequency	14,,,200 = 1.4,,,20.0kHz
00H 1DH	mmH llH	EQ: High EQ Q	3,,,100 = 0.3,,,10.0
00H 1EH	mmH llH	EQ: Out Level	0,,,100

00H 1FH	mmH llH	P.Shifter: Chromatic Pitch	-12,,,12
00H 20H	mmH llH	P.Shifter: Fine Pitch	-100,,,100
00H 21H	mmH llH	P.Shifter: Effect Level	-100,,,100
00H 22H	mmH llH	P.Shifter: Direct Level	-100,,,100
00H 23H	mmH llH	Delay: Delay Time	0,,,1000
00H 24H	mmH llH	Delay: Feedback Level	-100,,,100
00H 25H	mmH llH	Delay: Effect Level	-100,,,100
00H 26H	mmH llH	Delay: Direct Level	-100,,,100
00H 27H	mmH llH	Chorus: Rate	1,,,100 = 0.1,,,10.0Hz
00H 28H	mmH llH	Chorus: Depth	0,,,100
00H 29H	mmH llH	Chorus: Pre Delay	0,,,50ms
00H 2AH	mmH llH	Chorus: Effect Level	-100,,,100
00H 2BH	mmH llH	Chorus: Direct Level	-100,,,100
00H 2CH	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

<>Algorithm 12 Rotary

NRPN	Data Entry		
00H 00H	mmH llH	Noise Suppressor SW	0,1 = Off,On
00H 01H	mmH llH	Over Drive SW	0,1 = Off,On
00H 02H	mmH llH	Noise Suppressor: Threshold	0,,,100
00H 03H	mmH llH	Noise Suppressor: Release	

		0,,,100
00H 04H	mmH llH	Over Drive: Gain
		0,,,100
00H 05H	mmH llH	Over Drive: Level
		0,,,100
00H 06H	mmH llH	Rotary: Low Rate
		1,,,100 = 0.1,,,10.0Hz
00H 07H	mmH llH	Rotary: Hi Rate
		1,,,100 = 0.1,,,10.0Hz
00H 08H	00H 00H	(Reserved)
:	:	
00H 7FH	00H 00H	

<>Algorithm 13 Guitar AMP Simulator

NRPN	Data Entry	
00H 00H	mmH llH	Noise Suppressor SW
		0,1 = Off,On
00H 01H	mmH llH	Pre Amp SW
		0,1 = Off,On
00H 02H	mmH llH	Speaker SW
		0,1 = Off,On
00H 03H	mmH llH	Noise Suppressor: Threshold
		0,,,100
00H 04H	mmH llH	Noise Suppressor: Release
		0,,,100
00H 05H	mmH llH	Pre Amp: Mode
		0,,,13 = JC-120,Clean Twin,Match Drive,BG Lead, MS1959(I), MS1959(II), MS1959(I+II), SLDN Lead, Metal 5150, Metal Lead, OD-1, OD-2Turbo, Distortion, Fuzz
00H 06H	mmH llH	Pre Amp: Volume
		0,,,100
00H 07H	mmH llH	Pre Amp: Bass
		0,,,100
00H 08H	mmH llH	Pre Amp: Middle
		0,,,100
00H 09H	mmH llH	Pre Amp: Treble
		0,,,100
00H 0AH	mmH llH	Pre Amp: Presence
		0...100

00H 0BH	mmH llH	Pre Amp: Master 0,,,100
00H 0CH	mmH llH	Pre Amp: Bright 0,1 = Off,On
00H 0DH	mmH llH	Pre Amp: Gain 0,1,2 = Low,Middle,High
00H 0EH	mmH llH	Speaker: Type 0,,,11 = Small. Middle, JC-120, Built In 1, Built In 2,Built In 3, Built In 4, BG Stack 1, BG Stack 2, MS Stack 1, MS Stack 2, Metal Stack
00H 0FH	mmH llH	Speaker: MIC Setting 0,1,2 = 1,2,3
00H 10H	mmH llH	Speaker: MIC Level 0,,,100
00H 11H	mmH llH	Speaker: Direct Level 0,,,100
00H 12H	00H 00H	(Reserved)
:	:	:
00H 7FH	00H 00H	

™- Pre Amp Middle is invalid when the Mode = Match Drive.
™- When the Mode = Match Drive, Pre Amp Presence works counter to the value (-100,,,0).
™- Pre Amp Bright is available only when the Mode = JC-120, Clean Twin, or BG Lead.

<>Algorithm 14 Stereo Phaser

NRPN	Data Entry	
00H 00H	mmH llH	Phaser SW 0,1 = Off,On
00H 01H	mmH llH	EQ SW 0,1 = Off,On
00H 02H	mmH llH	Phaser: Mode 0,,,3 = 4.8.12.16stage
00H 03H	mmH llH	Phaser: Rate 1,,,100 = 0.1,,,10.0Hz
00H 04H	mmH llH	Phaser: Depth 0,,,100
00H 05H	mmH llH	Phaser: Polarity 0,1 = Inverse,Synchro

00H 06H	mmH llH	Phaser: Manual	0,,,100
00H 07H	mmH llH	Phaser: Resonance	0,,,100
00H 08H	mmH llH	Phaser: Cross Feedback	0,,,100
00H 09H	mmH llH	Phaser: Effect Level	-100,,,100
00H 0AH	mmH llH	Phaser: Direct Level	-100,,,100
00H 0BH	mmH llH	EQ: Low EQ Type	0,1 = Shelving, Peaking
00H 0CH	mmH llH	EQ: Low EQ Gain	-12,,,12dB
00H 0DH	mmH llH	EQ: Low EQ Frequency	2,,,200 = 20,,,2000Hz
00H 0EH	mmH llH	EQ: Low EQ Q	3,,,100 = 0.3,,,10.0
00H 0FH	mmH llH	EQ: Mid EQ Gain	-12,,,12dB
00H 10H	mmH llH	EQ: Mid EQ Frequency	20,,,800 = 200,,,8000Hz
00H 11H	mmH llH	EQ: Mid EQ Q	3,,,100 = 0.3,,,10.0
00H 12H	mmH llH	EQ: High EQ Type	0,1 = Shelving, Peaking
00H 13H	mmH llH	EQ: High EQ Gain	-12,,,12dB
00H 14H	mmH llH	EQ: High EQ Frequency	14,,,200 = 1.4,,,20.0kHz
00H 15H	mmH llH	EQ: High EQ Q	3,,,100 = 0.3,,,10.0
00H 16H	mmH llH	EQ: Out Level	0,,,100
00H 17H	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

<>Algorithm 15 Stereo Flanger

NRPN	Data	

	Entry	
00H 00H	mmH llH	Flanger SW 0,1 = Off,On
00H 01H	mmH llH	EQ SW 0,1 = Off,On
00H 02H	mmH llH	Flanger: Rate 1,,,100 = 0.1,,,10.0Hz
00H 03H	mmH llH	Flanger: Depth 0,,,100
00H 04H	mmH llH	Flanger: Polarity 0,1 = Inverse,Synchro
00H 05H	mmH llH	Flanger: Manual 0,,,100
00H 06H	mmH llH	Flanger: Resonance 0,,,100
00H 07H	mmH llH	Flanger: Cross Feedback Level 0,,,100
00H 08H	mmH llH	Flanger: Effect Level -100,,,100
00H 09H	mmH llH	Flanger: Direct Level -100,,,100
00H 0AH	mmH llH	EQ: Low EQ Type 0,1 = Shelving, Peaking
00H 0BH	mmH llH	EQ: Low EQ Gain -12,,,12dB
00H 0CH	mmH llH	EQ: Low EQ Frequency 2,,,200 = 20,,,2000Hz
00H 0DH	mmH llH	EQ: Low EQ Q 3,,,100 = 0.3,,,10.0
00H 0EH	mmH llH	EQ: Mid EQ Gain -12,,,12dB
00H 0FH	mmH llH	EQ: Mid EQ Frequency 20,,,800 = 200,,,8000Hz
00H 10H	mmH llH	EQ: Mid EQ Q 3,,,100 = 0.3,,,10.0
00H 11H	mmH llH	EQ: High EQ Type 0,1 = Shelving, Peaking
00H 12H	mmH llH	EQ: High EQ Gain -12,,,12dB
00H 13H	mmH llH	EQ: High EQ Frequency 14...200 = 1.4...20.0kHz

00H 14H	mmH llH	EQ: High EQ Q 3,,,100 = 0.3,,,10.0
00H 15H	mmH llH	EQ: Out Level 0,,,100
00H 16H : 00H 7FH	00H 00H	(Reserved) :

<>Algorithm 16 Dual Compressor/Limiter

NRPN	Data Entry	
00H 00H	mmH llH	Comp/Limit A SW 0,1 = Off,On
00H 01H	mmH llH	Noise Suppressor A SW 0,1 = Off,On
00H 02H	mmH llH	Comp/Limit B SW 0,1 = Off,On
00H 03H	mmH llH	Noise Suppressor B SW 0,1 = Off,On
00H 04H	mmH llH	Comp/Limit A: Detect 0,1,2 = A,B,Link
00H 05H	mmH llH	Comp/Limit A: Level -60,,,12dB
00H 06H	mmH llH	Comp/Limit A: Thresh -60,,,0dB
00H 07H	mmH llH	Comp/Limit A: Attack 0,,,100
00H 08H	mmH llH	Comp/Limit A: Release 0,,,100
00H 09H	mmH llH	Comp/Limit A: Ratio 0,,,3 = 1.5:1,2:1,4:1,100:1
00H 0AH	mmH llH	Noise Suppressor A: Detect 0,1,2 = A,B,Link
00H 0BH	mmH llH	Noise Suppressor A: Threshold 0,,,100
00H 0CH	mmH llH	Noise Suppressor A: Release 0,,,100
00H 0DH	mmH llH	Comp/Limit B: Detect 0,1,2 = A,B,Link

00H 0EH	mmH llH	Comp/Limit B: Level	-60,,,12dB
00H 0FH	mmH llH	Comp/Limit B: Thresh	-60,,,0dB
00H 10H	mmH llH	Comp/Limit B: Attack	0,,,100
00H 11H	mmH llH	Comp/Limit B: Release	0,,,100
00H 12H	mmH llH	Comp/Limit B: Ratio	0,,,3 = 1.5:1,2:1,4:1,100:1
00H 13H	mmH llH	Noise Suppressor B: Detect	0,1,2 = A,B,Link
00H 14H	mmH llH	Noise Suppressor B: Threshold	0,,,100
00H 15H	mmH llH	Noise Suppressor B: Release	0,,,100
00H 16H	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

<>Algorithm 17 Gate Reverb (EFX1 & EFX3 Only)

NRPN	Data Entry		
00H 00H	mmH llH	G.Reverb SW	0,1 = Off,On
00H 01H	mmH llH	EQ SW	0,1 = Off,On
00H 02H	mmH llH	G.Reverb: Gate Time	10,,,400ms
00H 03H	mmH llH	G.Reverb: Pre Delay	0,,,300ms
00H 04H	mmH llH	G.Reverb: Effect Level	-100,,,100
00H 05H	mmH llH	G.Reverb: Mode	0,,,4 = Normal,L->R,R->L,Reverse1,Reverse2
00H 06H	mmH llH	G.Reverb: Thickness	0,,,100
00H 07H	mmH llH	G.Reverb: Density	0,,,100
00H 08H	mmH llH	G.Reverb: Accent Delav	

		0,,,200ms
00H 09H	mmH llH	G.Reverb: Accent Level
		0,,,100
00H 0AH	mmH llH	G.Reverb: Accent Pan
		1,,,127 = L63,,,R63
00H 0BH	mmH llH	G.Reverb: Direct Level
		-100,,,100
00H 0CH	mmH llH	EQ: Low EQ Type
		0,1 = Shelving, Peaking
00H 0DH	mmH llH	EQ: Low EQ Gain
		-12,,,12dB
00H 0EH	mmH llH	EQ: Low EQ Frequency
		2,,,200 = 20,,,2000Hz
00H 0FH	mmH llH	EQ: Low EQ Q
		3,,,100 = 0.3,,,10.0
00H 10H	mmH llH	EQ: Mid EQ Gain
		-12,,,12dB
00H 11H	mmH llH	EQ: Mid EQ Frequency
		20,,,800 = 200,,,8000Hz
00H 12H	mmH llH	EQ: Mid EQ Q
		3,,,100 = 0.3,,,10.0
00H 13H	mmH llH	EQ: High EQ Type
		0,1 = Shelving, Peaking
00H 14H	mmH llH	EQ: High EQ Gain
		-12,,,12dB
00H 15H	mmH llH	EQ: High EQ Frequency
		14,,,200 = 1.4,,,20.0kHz
00H 16H	mmH llH	EQ: High EQ Q
		3,,,100 = 0.3,,,10.0
00H 17H	mmH llH	EQ: Out Level
		0,,,100
00H 18H	00H 00H	(Reserved)
:	:	
00H 7FH	00H 00H	

<>Algorithm 18 Multi Tap Delay

NRPN	Data Entry	
00H 00H	mmH llH	EQ SW
		0.1 = Off.On

00H 01H	mmH llH	M.Tap Delay: Time 1	0,,,1200ms
00H 02H	mmH llH	M.Tap Delay: Level 1	0,,,100
00H 03H	mmH llH	M.Tap Delay: Pan 1	1,,,127 = L63,,,R63
00H 04H	mmH llH	M.Tap Delay: Time 2	0,,,1200ms
00H 05H	mmH llH	M.Tap Delay: Level 2	0,,,100
00H 06H	mmH llH	M.Tap Delay: Pan 2	1,,,127 = L63,,,R63
00H 07H	mmH llH	M.Tap Delay: Time 3	0,,,1200ms
00H 08H	mmH llH	M.Tap Delay: Level 3	0,,,100
00H 09H	mmH llH	M.Tap Delay: Pan 3	1,,,127 = L63,,,R63
00H 0AH	mmH llH	M.Tap Delay: Time 4	0,,,1200ms
00H 0BH	mmH llH	M.Tap Delay: Level 4	0,,,100
00H 0CH	mmH llH	M.Tap Delay: Pan 4	1,,,127 = L63,,,R63
00H 0DH	mmH llH	M.Tap Delay: Time 5	0,,,1200ms
00H 0EH	mmH llH	M.Tap Delay: Level 5	0,,,100
00H 0FH	mmH llH	M.Tap Delay: Pan 5	1,,,127 = L63,,,R63
00H 10H	mmH llH	M.Tap Delay: Time 6	0,,,1200ms
00H 11H	mmH llH	M.Tap Delay: Level 6	0,,,100
00H 12H	mmH llH	M.Tap Delay: Pan 6	1,,,127 = L63,,,R63
00H 13H	mmH llH	M.Tap Delay: Time 7	0,,,1200ms
00H 14H	mmH llH	M.Tap Delay: Level 7	0,,,100

00H 15H	mmH llH	M.Tap Delay: Pan 7	1,,,127 = L63,,,R63
00H 16H	mmH llH	M.Tap Delay: Time 8	0,,,1200ms
00H 17H	mmH llH	M.Tap Delay: Level 8	0,,,100
00H 18H	mmH llH	M.Tap Delay: Pan 8	1,,,127 = L63,,,R63
00H 19H	mmH llH	M.Tap Delay: Time 9	0,,,1200ms
00H 1AH	mmH llH	M.Tap Delay: Level 9	0,,,100
00H 1BH	mmH llH	M.Tap Delay: Pan 9	1,,,127 = L63,,,R63
00H 1CH	mmH llH	M.Tap Delay: Time 10	0,,,1200ms
00H 1DH	mmH llH	M.Tap Delay: Level 10	0,,,100
00H 1EH	mmH llH	M.Tap Delay: Pan 10	1,,,127 = L63,,,R63
00H 1FH	mmH llH	M.Tap Delay: Feedback Delay Time	0,,,1200ms
00H 20H	mmH llH	M.Tap Delay: Feedback Level	-100,,,100
00H 21H	mmH llH	M.Tap Delay: Effect Level	-100,,,100
00H 22H	mmH llH	M.Tap Delay: Direct Level	-100,,,100
00H 23H	mmH llH	EQ: Low EQ Type	0,1 = Shelving, Peaking
00H 24H	mmH llH	EQ: Low EQ Gain	-12,,,12dB
00H 25H	mmH llH	EQ: Low EQ Frequency	2,,,200 = 20,,,2000Hz
00H 26H	mmH llH	EQ: Low EQ Q	3,,,100 = 0.3,,,10.0
00H 27H	mmH llH	EQ: Mid EQ Gain	-12,,,12dB
00H 28H	mmH llH	EQ: Mid EQ Frequency	20,,,800 = 200,,,8000Hz
00H 29H	mmH llH	EQ: Mid EQ Q	

		3,,,100 = 0.3,,,10.0
00H 2AH	mmH llH	EQ: High EQ Type
		0,1 = Shelving, Peaking
00H 2BH	mmH llH	EQ: High EQ Gain
		-12,,,12dB
00H 2CH	mmH llH	EQ: High EQ Frequency
		14,,,200 = 1.4,,,20.0kHz
00H 2DH	mmH llH	EQ: High EQ Q
		3,,,100 = 0.3,,,10.0
00H 2EH	mmH llH	EQ: Out Level
		0,,,100
00H 2FH	00H 00H	(Reserved)
:		:
00H 7FH	00H 00H	

<>Algorithm 19 Stereo Multi

NRPN	Data Entry	
00H 00H	mmH llH	Noise Suppressor SW
		0,1 = Off,On
00H 01H	mmH llH	Comp/Limit SW
		0,1 = Off,On
00H 02H	mmH llH	Enhancer SW
		0,1 = Off,On
00H 03H	mmH llH	EQ SW
		0,1 = Off,On
00H 04H	mmH llH	Noise Suppressor: Threshold
		0,,,100
00H 05H	mmH llH	Noise Suppressor: Release
		0,,,100
00H 06H	mmH llH	Comp/Limit: Level
		-60,,,12dB
00H 07H	mmH llH	Comp/Limit: Thresh
		-60,,,0dB
00H 08H	mmH llH	Comp/Limit: Attack
		0,,,100
00H 09H	mmH llH	Comp/Limit: Release
		0,,,100
00H 0AH	mmH llH	Comp/Limit: Ratio
		0...3 = 1.5:1,2:1,4:1,100:1

00H 0BH	mmH llH	Enhancer: Sens 0,,,100
00H 0CH	mmH llH	Enhancer: Frequency 10,,,100 = 1.0,,,10.0kHz
00H 0DH	mmH llH	Enhancer: MIX Level 0,,,100
00H 0EH	mmH llH	Enhancer: Level 0,,,100
00H 0FH	mmH llH	EQ: Low EQ Type 0,1 = Shelving, Peaking
00H 10H	mmH llH	EQ: Low EQ Gain -12,,,12dB
00H 11H	mmH llH	EQ: Low EQ Frequency 2,,,200 = 20,,,2000Hz
00H 12H	mmH llH	EQ: Low EQ Q 3,,,100 = 0.3,,,10.0
00H 13H	mmH llH	EQ: Mid EQ Gain -12,,,12dB
00H 14H	mmH llH	EQ: Mid EQ Frequency 20,,,800 = 200,,,8000Hz
00H 15H	mmH llH	EQ: Mid EQ Q 3,,,100 = 0.3,,,10.0
00H 16H	mmH llH	EQ: High EQ Type 0,1 = Shelving, Peaking
00H 17H	mmH llH	EQ: High EQ Gain -12,,,12dB
00H 18H	mmH llH	EQ: High EQ Frequency 14,,,200 = 1.4,,,20.0kHz
00H 19H	mmH llH	EQ: High EQ Q 3,,,100 = 0.3,,,10.0
00H 1AH	mmH llH	EQ: Out Level 0,,,100
00H 1BH	00H 00H	(Reserved)
:	:	
00H 7FH	00H 00H	

<>Algorithm 20 Reverb 2

NRPN	Data Entry	

00H 00H	mmH llH	Reverb SW	0,1 = Off,On
00H 01H	mmH llH	EQ SW	0,1 = Off,On
00H 02H	mmH llH	Reverb 2: Reverb Type	0,,,4 = Room1,Room2,Hall1,Hall2,Plate
00H 03H	mmH llH	Reverb 2: Reverb Time	1,,,100 = 0.1,,,10.0sec
00H 04H	mmH llH	Reverb 2: Pre Delay	0,,,200msec
00H 05H	mmH llH	Reverb 2: Density	0,,,100
00H 06H	mmH llH	Reverb 2: High Pass Filter	1,,,200 = Thru,20,,,2000Hz
00H 07H	mmH llH	Reverb 2: Low Pass Filter	10,,,201 = 1.0,,,20,0kHz,Thru
00H 08H	mmH llH	Reverb 2: Effect Level	0,,,100
00H 09H	mmH llH	Reverb 2: Direct Level	0,,,100
00H 0AH	mmH llH	Reverb 2: Gate SW	0,1 = Off,On
00H 0BH	mmH llH	Reverb 2: Gate Mode	0,1 = Gate,Ducking
00H 0CH	mmH llH	Reverb 2: Gate Threshold	0,,,100
00H 0DH	mmH llH	Reverb 2: Gate Attack Time	1,,,100
00H 0EH	mmH llH	Reverb 2: Gate Release Time	1,,,100
00H 0FH	mmH llH	Reverb 2: Gate Hold Time	1,,,100
00H 10H	mmH llH	EQ: Low EQ Type	0,1 = Shelving, Peaking
00H 11H	mmH llH	EQ: Low EQ Gain	-12,,,12dB
00H 12H	mmH llH	EQ: Low EQ Frequency	2,,,200 = 20,,,2000Hz
00H 13H	mmH llH	EQ: Low EQ Q	3,,,100 = 0.3,,,10.0
00H 14H	mmH llH	EQ: Mid EQ Gain	

			-12,,,12dB
00H 15H	mmH llH	EQ: Mid EQ Frequency	
			20,,,800 = 200,,,8000Hz
00H 16H	mmH llH	EQ: Mid EQ Q	
			3,,,100 = 0.3,,,10.0
00H 17H	mmH llH	EQ: High EQ Type	
			0,1 = Shelving, Peaking
00H 18H	mmH llH	EQ: High EQ Gain	
			-12,,,12dB
00H 19H	mmH llH	EQ: High EQ Frequency	
			14,,,200 = 1.4,,,20.0kHz
00H 1AH	mmH llH	EQ: High EQ Q	
			3,,,100 = 0.3,,,10.0
00H 1BH	mmH llH	EQ: Out Level	
			0,,,100
00H 1CH	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

<>Algorithm 21 Space Chorus

NRPN	Data Entry		
00H 00H	mmH llH	Chorus SW	
			0,1 = Off,On
00H 01H	mmH llH	Chorus: Input Mode	
			0,1 = Mono,Stereo
00H 02H	mmH llH	Chorus: Mode	
			0,,,6 = 1,2,3,4,1+4,2+4,3+4
00H 03H	mmH llH	Chorus: Mix Balance	
			0,,,100
00H 04H	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

<>Algorithm 22 Lo-Fi Processor

NRPN	Data Entry		
00H 00H	mmH llH	Lo-Fi Processor SW	
			0.1 = Off.On

00H 01H	mmH llH	Realtime Modify Filter SW 0,1 = Off,On
00H 02H	mmH llH	Lo-Fi Processor: Pre Filter SW 0,1 = Off,On
00H 03H	mmH llH	Lo-Fi Processor: Rate 0,,,31 = 0ff,1/2,,,1/32
00H 04H	mmH llH	Lo-Fi Processor: Number of Bit 0,,,15 = Off,15,,,1bit
00H 05H	mmH llH	Lo-Fi Processor: Post Filter SW 0,1 = Off,On
00H 06H	mmH llH	Lo-Fi Processor: Effect Level 0,,,100
00H 07H	mmH llH	Lo-Fi Processor: Direct Level 0,,,100
00H 08H	mmH llH	Realtime Modify Filter: Filter Type 0,,,2 = LPF,BPF,HPF
00H 09H	mmH llH	Realtime Modify Filter: Cut Off 0,,,100
00H 0AH	mmH llH	Realtime Modify Filter: Resonance 0,,,100
00H 0BH	mmH llH	Realtime Modify Filter: Gain 0,,,24dB
00H 0CH	mmH llH	Noise Suppressor: Threshold 0,,,100
00H 0DH	mmH llH	Noise Suppressor: Release 0,,,100
00H 0EH : 00H 7FH	00H 00H : 00H 00H	(Reserved)

<>Algorithm 23 4 Band Parametric EQ

NRPN	Data Entry	
00H 00H	mmH llH	Parametric EQ Link SW 0,1 = Off,On
00H 01H	mmH llH	Parametric EQ Ach SW 0,1 = Off,On
00H 02H	mmH llH	Parametric EQ Bch SW 0,1 = Off,On

00H 03H	mmH llH	EQ Ach: Input Gain -60,,,12dB
00H 04H	mmH llH	EQ Ach: Low EQ Type 0,1 = Shelving, Peaking
00H 05H	mmH llH	EQ Ach: Low EQ Gain -12,,,12dB
00H 06H	mmH llH	EQ Ach: Low EQ Frequency 2,,,200 = 20,,,2000Hz
00H 07H	mmH llH	EQ Ach: Low EQ Q 3,,,100 = 0.3,,,10.0
00H 08H	mmH llH	EQ Ach: Low Mid EQ Gain -12,,,12dB
00H 09H	mmH llH	EQ Ach: Low Mid EQ Frequency 20,,,800 = 200,,,8000Hz
00H 0AH	mmH llH	EQ Ach: Low Mid EQ Q 3,,,100 = 0.3,,,10.0
00H 0BH	mmH llH	EQ Ach: High Mid EQ Gain -12,,,12dB
00H 0CH	mmH llH	EQ Ach: High Mid EQ Frequency 20,,,800 = 200,,,8000Hz
00H 0DH	mmH llH	EQ Ach: High Mid EQ Q 3,,,100 = 0.3,,,10.0
00H 0EH	mmH llH	EQ Ach: High EQ Type 0,1 = Shelving, Peaking
00H 0FH	mmH llH	EQ Ach: High EQ Gain -12,,,12dB
00H 10H	mmH llH	EQ Ach: High EQ Frequency 14,,,200 = 1.4,,,20.0kHz
00H 11H	mmH llH	EQ Ach: High EQ Q 3,,,100 = 0.3,,,10.0
00H 12H	mmH llH	EQ Ach: Output Level -60,,,12dB
00H 13H	mmH llH	EQ Bch: Input Gain -60,,,12dB
00H 14H	mmH llH	EQ Bch: Low EQ Type 0,1 = Shelving, Peaking
00H 15H	mmH llH	EQ Bch: Low EQ Gain -12,,,12dB
00H 16H	mmH llH	EQ Bch: Low EQ Frequency 2,,,200 = 20,,,2000Hz
00H 17H	mmH llH	EO Bch: Low EO O

		3,,,100 = 0.3,,,10.0
00H 18H	mmH llH	EQ Bch: Low Mid EQ Gain
		-12,,,12dB
00H 19H	mmH llH	EQ Bch: Low Mid EQ Frequency
		20,,,800 = 200,,,8000Hz
00H 1AH	mmH llH	EQ Bch: Low Mid EQ Q
		3,,,100 = 0.3,,,10.0
00H 1BH	mmH llH	EQ Bch: High Mid EQ Gain
		-12,,,12dB
00H 1CH	mmH llH	EQ Bch: High Mid EQ Frequency
		20,,,800 = 200,,,8000Hz
00H 1DH	mmH llH	EQ Bch: High Mid EQ Q
		3,,,100 = 0.3,,,10.0
00H 1EH	mmH llH	EQ Bch: High EQ Type
		0,1 = Shelving, Peaking
00H 1FH	mmH llH	EQ Bch: High EQ Gain
		-12,,,12dB
00H 20H	mmH llH	EQ Bch: High EQ Frequency
		14,,,200 = 1.4,,,20.0kHz
00H 21H	mmH llH	EQ Bch: High EQ Q
		3,,,100 = 0.3,,,10.0
00H 22H	mmH llH	EQ Bch: Output Level
		-60,,,12dB
00H 23H	00H 00H	(Reserved)
:	:	
00H 7FH	00H 00H	

™-When Link SW = On, Bch corresponds to Ach.

<>Algorithm 24 10 Band Graphic EQ

NRPN	Data Entry	
00H 00H	mmH llH	Graphic EQ Link SW
		0,1 = Off,On
00H 01H	mmH llH	Graphic EQ Ach SW
		0,1 = Off,On
00H 02H	mmH llH	Graphic EQ Bch SW
		0,1 = Off,On
00H 03H	mmH llH	EQ Ach: Input Gain
		-60,,,12dB

00H 04H	mmH llH	EQ Ach: 31.25Hz Gain	-12,,,12dB
00H 05H	mmH llH	EQ Ach: 62.5Hz Gain	-12,,,12dB
00H 06H	mmH llH	EQ Ach: 125Hz Gain	-12,,,12dB
00H 07H	mmH llH	EQ Ach: 250Hz Gain	-12,,,12dB
00H 08H	mmH llH	EQ Ach: 500Hz Gain	-12,,,12dB
00H 09H	mmH llH	EQ Ach: 1.0kHz Gain	-12,,,12dB
00H 0AH	mmH llH	EQ Ach: 2.0kHz Gain	-12,,,12dB
00H 0BH	mmH llH	EQ Ach: 4.0kHz Gain	-12,,,12dB
00H 0CH	mmH llH	EQ Ach: 8.0kHz Gain	-12,,,12dB
00H 0DH	mmH llH	EQ Ach: 16.0kHz Gain	-12,,,12dB
00H 0EH	mmH llH	EQ Ach: Output Level	-60,,,12dB
00H 0FH	mmH llH	EQ Bch: Input Gain	-60,,,12dB
00H 10H	mmH llH	EQ Bch: 31.25Hz Gain	-12,,,12dB
00H 11H	mmH llH	EQ Bch: 62.5Hz Gain	-12,,,12dB
00H 12H	mmH llH	EQ Bch: 125Hz Gain	-12,,,12dB
00H 13H	mmH llH	EQ Bch: 250Hz Gain	-12,,,12dB
00H 14H	mmH llH	EQ Bch: 500Hz Gain	-12,,,12dB
00H 15H	mmH llH	EQ Bch: 1.0kHz Gain	-12,,,12dB
00H 16H	mmH llH	EQ Bch: 2.0kHz Gain	-12,,,12dB
00H 17H	mmH llH	EQ Bch: 4.0kHz Gain	-12,,,12dB
00H 18H	mmH llH	EO Bch: 8.0kHz Gain	

			-12,,,12dB
00H 19H	mmH llH	EQ Bch: 16.0kHz Gain	
			-12,,,12dB
00H 1AH	mmH llH	EQ Bch: Output Level	
			-60,,,12dB
00H 1BH	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

™-When Link SW = On, Bch corresponds to Ach.

<>Algorithm 25 Hum Canceler

NRPN	Data Entry		
00H 00H	mmH llH	Hum Canceler SW	0,1 = Off,On
00H 01H	mmH llH	Noise Suppressor SW	0,1 = Off,On
00H 02H	mmH llH	Hum Canceler: Freq	200,,,8000 = 20.0,,,800.0Hz
00H 03H	mmH llH	Hum Canceler: Width	10,,,40%
00H 04H	mmH llH	Hum Canceler: Depth	0,,,100
00H 05H	mmH llH	Hum Canceler: Threshold	0,,,100
00H 06H	mmH llH	Hum Canceler: Range Low	1,,,200 = Unlimit,20,,,2000Hz
00H 07H	mmH llH	Hum Canceler: Range High	10,,,201 = 1.0,,,20,0kHz,Unlimit
00H 08H	mmH llH	Noise Suppressor: Threshold	0,,,100
00H 09H	mmH llH	Noise Suppressor: Release	0,,,100
00H 0AH	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

<>Algorithm 26 Vocal Canceler

NRPN	Data Entry	
00H 00H	mmH llH	Vocal Canceler SW 0,1 = Off,On
00H 01H	mmH llH	EQ SW 0,1 = Off,On
00H 02H	mmH llH	Vocal Canceler: Balance 0,,,100
00H 03H	mmH llH	Vocal Canceler: Range Low 1,,,200 = Unlimit,20,,,2000Hz
00H 04H	mmH llH	Vocal Canceler: Range High 10,,,201 = 1.0,,,20,0kHz,Unlimit
00H 05H	mmH llH	EQ: Low EQ Type 0,1 = Shelving, Peaking
00H 06H	mmH llH	EQ: Low EQ Gain -12,,,12dB
00H 07H	mmH llH	EQ: Low EQ Frequency 2,,,200 = 20,,,2000Hz
00H 08H	mmH llH	EQ: Low EQ Q 3,,,100 = 0.3,,,10.0
00H 09H	mmH llH	EQ: Mid EQ Gain -12,,,12dB
00H 0AH	mmH llH	EQ: Mid EQ Frequency 20,,,800 = 200,,,8000Hz
00H 0BH	mmH llH	EQ: Mid EQ Q 3,,,100 = 0.3,,,10.0
00H 0CH	mmH llH	EQ: High EQ Type 0,1 = Shelving, Peaking
00H 0DH	mmH llH	EQ: High EQ Gain -12,,,12dB
00H 0EH	mmH llH	EQ: High EQ Frequency 14,,,200 = 1.4,,,20.0kHz
00H 0FH	mmH llH	EQ: High EQ Q 3,,,100 = 0.3,,,10.0
00H 10H	mmH llH	EQ: Out Level 0,,,100
00H 11H	00H 00H	(Reserved)
:	:	
00H 7FH	00H 00H	

<>Algorithm 27 Voice Transformer (EFX1 & EFX3 Only)

NRPN	Data Entry	
00H 00H	mmH llH	Voice Transfomer SW 0,1 = Off,On
00H 01H	mmH llH	Reverb SW 0,1 = Off,On
00H 02H	mmH llH	Fader Edit SW 0,1 = Off,On
00H 03H	mmH llH	MIDI Control SW 0,1 = Off,On
00H 04H	mmH llH	Voice Transfomer: Robot SW 0,1 = Off,On
00H 05H	mmH llH	Voice Transfomer: Chromatic Pitch -12,,,36
00H 06H	mmH llH	Voice Transfomer: Fine Pitch -100,,,100
00H 07H	mmH llH	Voice Transfomer: Chromatic Formant -12,,,12
00H 08H	mmH llH	Voice Transfomer: Fine Formant -100,,,100
00H 09H	mmH llH	Voice Transfomer: Mix Balance 0,,,100
00H 0AH	mmH llH	Reverb: Reverb Time 1,,,100 = 0.1,,,10.0sec
00H 0BH	mmH llH	Reverb: Pre Delay 0,,,200msec
00H 0CH	mmH llH	Reverb: Density 0,,,100
00H 0DH	mmH llH	Reverb: Effect Level 0,,,100
00H 0EH	mmH llH	MIDI Control: Bend Range 0,,,12 = 0ff,1,,,12
00H 0FH	mmH llH	MIDI Control: Portamento 0...100 = Off,1,,,100
00H 10H	00H 00H	(Reserved)
:	:	
00H 7FH	00H 00H	

<>Algorithm 28 Vocoder 2 (EFX1 & EFX3 Only)

NRPN	Data Entry	
00H 00H	mmH llH	Chorus SW 0,1 = Off,On
00H 01H	mmH llH	Vocoder: Envelope Mode 0,,,2 = Sharp,Soft,Long
00H 02H	mmH llH	Vocoder: Pan Mode 0,,,3 = Mono,Stereo,L->R,R->L
00H 03H	mmH llH	Vocoder: Hold 0,1 = Off,MIDI
00H 04H	mmH llH	Vocoder: Mic Sens 0,,,100
00H 05H	mmH llH	Vocoder: Synth Input Level 0,,,100
00H 06H	mmH llH	Vocoder: Voice Char Level 1 0,,,100
00H 07H	mmH llH	Vocoder: Voice Char Level 2 0,,,100
00H 08H	mmH llH	Vocoder: Voice Char Level 3 0,,,100
00H 09H	mmH llH	Vocoder: Voice Char Level 4 0,,,100
00H 0AH	mmH llH	Vocoder: Voice Char Level 5 0,,,100
00H 0BH	mmH llH	Vocoder: Voice Char Level 6 0,,,100
00H 0CH	mmH llH	Vocoder: Voice Char Level 7 0,,,100
00H 0DH	mmH llH	Vocoder: Voice Char Level 8 0,,,100
00H 0EH	mmH llH	Vocoder: Voice Char Level 9 0,,,100
00H 0FH	mmH llH	Vocoder: Voice Char Level 10 0,,,100
00H 10H	mmH llH	Vocoder: Voice Char Level 11 0,,,100
00H 11H	mmH llH	Vocoder: Voice Char Level 12 0,,,100
00H 12H	mmH llH	Vocoder: Voice Char Level 13 0,,,100

00H 13H	mmH llH	Vocoder: Voice Char Level 14	0,,,100
00H 14H	mmH llH	Vocoder: Voice Char Level 15	0,,,100
00H 15H	mmH llH	Vocoder: Voice Char Level 16	0,,,100
00H 16H	mmH llH	Vocoder: Voice Char Level 17	0,,,100
00H 17H	mmH llH	Vocoder: Voice Char Level 18	0,,,100
00H 18H	mmH llH	Vocoder: Voice Char Level 19	0,,,100
00H 19H	mmH llH	Vocoder: Mic High Pass Filter	9,,,200 = Thru,1.0,,,20.0kHz
00H 1AH	mmH llH	Vocoder: Mic High Pass Filter Pan	1,,,127 = L63,,,R63
00H 1BH	mmH llH	Vocoder: Mic Mix	0,,,100
00H 1CH	mmH llH	Vocoder: Noise Suppressor Threshold	0,,,100
00H 1DH	mmH llH	Chorus: Rate	1,,,100 = 0.1,,,10.0Hz
00H 1EH	mmH llH	Chorus: Depth	0,,,100
00H 1FH	mmH llH	Chorus: Pre Delay	0,,,50ms
00H 20H	mmH llH	Chorus: Mix Balance	0,,,100
00H 21H	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

<>Algorithm 29 Mic Simulator

NRPN	Data Entry		
00H 00H	mmH llH	Link SW	0,1 = Off,On
00H 01H	mmH llH	Mic Converter Ach SW	0,1 = Off,On
00H 02H	mmH llH	Bass Cut Ach SW	

		0,1 = Off,On
00H 03H	mmH llH	Distance Ach SW
		0,1 = Off,On
00H 04H	mmH llH	Limiter Ach SW
		0,1 = Off,On
00H 05H	mmH llH	Mic Converter Bch SW
		0,1 = Off,On
00H 06H	mmH llH	Bass Cut Bch SW
		0,1 = Off,On
00H 07H	mmH llH	Distance Bch SW
		0,1 = Off,On
00H 08H	mmH llH	Limiter Bch SW
		0,1 = Off,On
00H 09H	mmH llH	Mic Converter Ach: Input
		0,,,4 = DR-20,SmlDy,HedDy,MinCn,Flat
00H 0AH	mmH llH	Mic Converter Ach: Output
		0,,,6 = SmlDy,VocDy,LrgDy,SmlCn,LrgCn,VntCn,Flat
00H 0BH	mmH llH	Mic Converter Ach: Phase
		0,1 = Normal,Inverse
00H 0CH	mmH llH	Bass Cut Ach: Bass Cut Frequency
		1,,,200 = Thru,20,,,2000Hz
00H 0DH	mmH llH	Distance Ach: Proximity Effect
		-12,,,+12
00H 0EH	mmH llH	Distance Ach: Timelag
		0,,,1000 = 0,,,3000cm
00H 0FH	mmH llH	Limiter Ach: Detect HPF Frequency
		1,,,200 = Thru,20,,,2000Hz
00H 10H	mmH llH	Limiter Ach: Level
		-60,,,24dB
00H 11H	mmH llH	Limiter Ach: Threshold
		-60,,,0dB
00H 12H	mmH llH	Limiter Ach: Attack
		0,,,100
00H 13H	mmH llH	Limiter Ach: Release
		0,,,100
00H 14H	mmH llH	Mic Converter Bch: Input
		0,,,4 = DR-20,SmlDy,HedDy,MinCn,Flat
00H 15H	mmH llH	Mic Converter Bch: Output
		0,,,6 = SmlDy,VocDy,LrgDy,SmlCn,LrgCn,VntCn,Flat
00H 16H	mmH llH	Mic Converter Bch: Phase
		0.1 = Normal.Inverse

00H 17H	mmH llH	Bass Cut Bch: Bass Cut Frequency 1,,,200 = Thru,20,,,2000Hz
00H 18H	mmH llH	Distance Bch: Proximity Effect -12,,,+12
00H 19H	mmH llH	Distance Bch: Timelag 0,,,1000 = 0,,,3000cm
00H 1AH	mmH llH	Limiter Bch: Detect HPF Frequency 1,,,200 = Thru,20,,,2000Hz
00H 1BH	mmH llH	Limiter Bch: Level -60,,,24dB
00H 1CH	mmH llH	Limiter Bch: Threshold -60,,,0dB
00H 1DH	mmH llH	Limiter Bch: Attack 0,,,100
00H 1EH	mmH llH	Limiter Bch: Release 0,,,100
00H 1FH	00H 00H	(Reserved)
:	:	
00H 7FH	00H 00H	

™-When Mic Converter Input = MinCn, Output is fixed to SmlDy or LrgCn.
™-When Link SW = On, Bch corresponds to Ach.

<>Algorithm 30 3 Band Isolator

NRPN	Data Entry	
00H 00H	mmH llH	Isolator SW 0,1 = Off,On
00H 01H	mmH llH	Isolator High Volume -60,,,+4dB
00H 02H	mmH llH	Isolator Middle Volume -60,,,+4dB
00H 03H	mmH llH	Isolator Low Volume -60,,,+4dB
00H 04H	mmH llH	Isolator Anti Phase Middle Switch 0,1 = Off,On
00H 05H	mmH llH	Isolator Anti Phase Middle Level 0,,,100
00H 06H	mmH llH	Isolator Anti Phase Low Switch 0,1 = Off,On

00H 07H	mmH llH	Isolator Anti Phase Low Level	0,,,100
00H 08H	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

<>Algorithm 31 Tape Echo 201

NRPN	Data Entry		
00H 00H	mmH llH	Tape Echo SW	0,1 = Off,On
00H 01H	mmH llH	Tape Echo Mode Select	0,,,6 = 1,,,7
00H 02H	mmH llH	Tape Echo Repeat Rate	0,,,100
00H 03H	mmH llH	Tape Echo Intensity	0,,,100
00H 04H	mmH llH	Tape Echo Effect Level	0,,,100
00H 05H	mmH llH	Tape Echo Direct Level	0,,,100
00H 06H	mmH llH	Tape Echo Tone Bass	-100,,,100
00H 07H	mmH llH	Tape Echo Tone Treble	-100,,,100
00H 08H	mmH llH	Tape Echo Tape Head S Pan	1,,,127 = L63,,,R63
00H 09H	mmH llH	Tape Echo Tape Head M Pan	1,,,127 = L63,,,R63
00H 0AH	mmH llH	Tape Echo Tape Head L Pan	1,,,127 = L63,,,R63
00H 0BH	mmH llH	Tape Echo Tape Distortion	0,,,100
00H 0CH	mmH llH	Tape Echo Wah Flutter Rate	0,,,100
00H 0DH	mmH llH	Tape Echo Wah Flutter Depth	0,,,100
00H 0EH	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

<>Algorithm 32 Analog Flanger

NRPN	Data Entry	
00H 00H	mmH llH	Analog Flanger SW 0,1 = Off,On
00H 01H	mmH llH	Analog Flanger Mode 0,,,3 = FL1,FL2,FL3,CHO
00H 02H	mmH llH	Analog Flanger Feedback 0,,,100
00H 03H	mmH llH	Analog Flanger Modulation Rate 0,,,100
00H 04H	mmH llH	Analog Flanger Modulation Depth 0,,,100
00H 05H	mmH llH	Analog Flanger Modulation Frequency 0,,,100
00H 06H	mmH llH	Analog Flanger Channel B Modulation 0,1 = Nor,Inv
00H 07H	mmH llH	Analog Flanger Channel A Phase 0,1 = Nor,Inv
00H 08H	mmH llH	Analog Flanger Channel B Phase 0,1 = Nor,Inv
00H 09H	00H 00H	(Reserved)
:	:	
00H 7FH	00H 00H	

<>Algorithm 33 Analog Phaser

NRPN	Data Entry	
00H 00H	mmH llH	Analog Phaser SW 0,1 = Off,On
00H 01H	mmH llH	Analog Phaser Mode 0,1 = 4STAGE,8STAGE
00H 02H	mmH llH	Analog Phaser Frequency 0,,,100
00H 03H	mmH llH	Analog Phaser Resonance 0,,,100
00H 04H	mmH llH	Analog Phaser LFO 1 Rate 0...100

00H 05H	mmH llH	Analog Phaser LFO 1 Depth 0,,,100
00H 06H	mmH llH	Analog Phaser LFO 1 Channel B Mod 0,1 = Nor,Inv
00H 07H	mmH llH	Analog Phaser LFO 2 Rate 0,,,100
00H 08H	mmH llH	Analog Phaser LFO 2 Depth 0,,,100
00H 09H	mmH llH	Analog Phaser LFO 2 Channel B Mod 0,1 = Nor,Inv
00H 0AH : 00H 7FH	00H 00H : 00H 00H	(Reserved)

<>Algorithm 34 Speaker Modeling

NRPN	Data Entry	
00H 00H	mmH llH	Speaker Modeling SW 0,1 = Off,On
00H 01H	mmH llH	Bass Cut SW 0,1 = Off,On
00H 02H	mmH llH	Low Frequency Trimmer SW 0,1 = Off,On
00H 03H	mmH llH	High Frequency Trimmer SW 0,1 = Off,On
00H 04H	mmH llH	Limiter SW 0,1 = Off,On
00H 05H	mmH llH	(Reserved)
00H 06H	mmH llH	Speaker Modeling Model 0,,,11 = THRU,Super Flat,Powered GenBlk, Powered E-Bas,Powered Mack,Small Cube,White Cone, White C +tissue,Small Radio,Small TV,Boom Box, BoomBox LoBoost
00H 07H	mmH llH	Speaker Modeling Phase 0,1 = NRM,INV
00H 08H	mmH llH	Bass Cut Frequency 1,,,200 = Thru,20,,,2000Hz
00H 09H	mmH llH	Low Frequency Trimmer Gain -12,,,12dB

00H 0AH	mmH llH	Low Frequency Trimmer Frequency 2,,,200 = 20,,,2000Hz
00H 0BH	mmH llH	High Frequency Trimmer Gain -12,,,12dB
00H 0CH	mmH llH	High Frequency Trimmer Frequency 10,,,200 = 1.0,,,20.0kHz
00H 0DH	mmH llH	Limiter Threshold -60,,,0dB
00H 0EH	mmH llH	Limiter Release 0,,,100
00H 0FH	mmH llH	Limiter Level -60,,,24dB
00H 10H : 00H 7FH	00H 00H : 00H 00H	(Reserved) :

<>Algorithm 35 Mastering Tool Kit

NRPN	Data Entry	
00H 00H	mmH llH	EQ SW 0,1 = Off,On
00H 01H	mmH llH	Bass Cut SW 0,1 = Off,On
00H 02H	mmH llH	Enhancer SW 0,1 = Off,On
00H 03H	mmH llH	Expander SW 0,1 = Off,On
00H 04H	mmH llH	Compressor SW 0,1 = Off,On
00H 05H	mmH llH	Limiter SW 0,1 = Off,On
00H 06H	mmH llH	EQ: Input Gain -24,,,12dB
00H 07H	mmH llH	EQ: Low EQ Type 0,1 = Shelving, Peaking
00H 08H	mmH llH	EQ: Low EQ Gain -12,,,12dB
00H 09H	mmH llH	EQ: Low EQ Frequency 2,,,42 = 20,,,2000Hz(*1 Frequency Table)
00H 0AH	mmH llH	EQ: Low EQ Q

		0,,,31 = 0.3,,,16.0(*2 Q Table)
00H 0BH	mmH llH	EQ: Low Mid EQ Gain
		-12,,,12dB
00H 0CH	mmH llH	EQ: Low Mid EQ Frequency
		2,,,54 = 20,,,8000Hz(*1 Frequency Table)
00H 0DH	mmH llH	EQ: Low Mid EQ Q
		0,,,31 = 0.3,,,16.0(*2 Q Table)
00H 0EH	mmH llH	EQ: High Mid EQ Gain
		-12,,,12dB
00H 0FH	mmH llH	EQ: High Mid EQ Frequency
		2,,,54 = 20,,,8000Hz(*1 Frequency Table)
00H 10H	mmH llH	EQ: High Mid EQ Q
		0,,,31 = 0.3,,,16.0(*2 Q Table)
00H 11H	mmH llH	EQ: High EQ Type
		0,1 = Shelving, Peaking
00H 12H	mmH llH	EQ: High EQ Gain
		-12,,,12dB
00H 13H	mmH llH	EQ: High EQ Frequency
		39,,,62 = 1.4,,,20.0kHz(*1 Frequency Table)
00H 14H	mmH llH	EQ: High EQ Q
		0,,,31 = 0.3,,,16.0(*2 Q Table)
00H 15H	mmH llH	EQ: Level
		-24,,,12dB
00H 16H	mmH llH	Bass Cut Frequency
		1,,,42 = Off,20,,,2000Hz(*1 Frequency Table)
00H 17H	mmH llH	Enhancer Sens
		0,,,100
00H 18H	mmH llH	Enhancer Frequency
		36,,,56 = 1.0,,,10.0kHz(*1 Frequency Table)
00H 19H	mmH llH	Enhancer Mix Level
		-24,,,12dB
00H 1AH	mmH llH	Input Gain
		-24,,,12dB
00H 1BH	mmH llH	Input Detect Time
		0,,,10ms
00H 1CH	mmH llH	Input Low Split Point
		2,,,34 = 20,,,800Hz(*1 Frequency Table)
00H 1DH	mmH llH	Input High Split Point
		40,,,60 = 1.6,,,16.0kHz(*1 Frequency Table)
00H 1EH	mmH llH	Expander Low Threshold
		0...80 = -80...0dB

00H 1FH	mmH llH	Expander Mid Threshold 0,,,80 = -80,,,0dB
00H 20H	mmH llH	Expander High Threshold 0,,,80 = -80,,,0dB
00H 21H	mmH llH	Expander Low Ratio 0,,,13 = 1:1.0,,,1:INF(*3 Ratio Table)
00H 22H	mmH llH	Expander Mid Ratio 0,,,13 = 1:1.0,,,1:INF(*3 Ratio Table)
00H 23H	mmH llH	Expander High Ratio 0,,,13 = 1:1.0,,,1:INF(*3 Ratio Table)
00H 24H	mmH llH	Expander Low Attack 0,,,100ms
00H 25H	mmH llH	Expander Mid Attack 0,,,100ms
00H 26H	mmH llH	Expander High Attack 0,,,100ms
00H 27H	mmH llH	Expander Low Release 0,,,100 = 50,,,5000ms
00H 28H	mmH llH	Expander Mid Release 0,,,100 = 50,,,5000ms
00H 29H	mmH llH	Expander High Release 0,,,100 = 50,,,5000ms
00H 2AH	mmH llH	Compressor Low Threshold -24,,,0dB
00H 2BH	mmH llH	Compressor Mid Threshold -24,,,0dB
00H 2CH	mmH llH	Compressor High Threshold -24,,,0dB
00H 2DH	mmH llH	Compressor Low Ratio 0,,,13 = 1:1.0,,,1:INF(*3 Ratio Table)
00H 2EH	mmH llH	Compressor Mid Ratio 0,,,13 = 1:1.0,,,1:INF(*3 Ratio Table)
00H 2FH	mmH llH	Compressor High Ratio 0,,,13 = 1:1.0,,,1:INF(*3 Ratio Table)
00H 30H	mmH llH	Compressor Low Attack 0,,,100ms
00H 31H	mmH llH	Compressor Mid Attack 0,,,100ms
00H 32H	mmH llH	Compressor High Attack 0,,,100ms

00H 33H	mmH llH	Compressor Low Release	0,,,100 = 50,,,5000ms
00H 34H	mmH llH	Compressor Mid Release	0,,,100 = 50,,,5000ms
00H 35H	mmH llH	Compressor High Release	0,,,100 = 50,,,5000ms
00H 36H	mmH llH	Mixer Low Level	0,,,86 = -80,,,6dB
00H 37H	mmH llH	Mixer Mid Level	0,,,86 = -80,,,6dB
00H 38H	mmH llH	Mixer High Level	0,,,86 = -80,,,6dB
00H 39H	mmH llH	Limiter Threshold	-24,,,0dB
00H 3AH	mmH llH	Limiter Attack	0,,,100ms
00H 3BH	mmH llH	Limiter Release	0,,,100 = 50,,,5000ms
00H 3CH	mmH llH	Output Level	0,,,86 = -80,,,6dB
00H 3DH	mmH llH	Output Soft Clip	0,1 = Off,On
00H 3EH	mmH llH	Output Dither	0,,,17 = Off,24,,,8Bit
00H 3FH	00H 00H	(Reserved)	
:		:	
00H 7FH	00H 00H		

*1 Frequency Table

Data	Freq(Hz)	Data	Freq(Hz)	Data	Freq(Hz)	Date	Freq(Hz)
0	THRU	16	100	32	630	48	4.00k
1	THRU	17	112	33	710	49	4.50k
2	20.0	18	125	34	800	50	5.00k
3	22.4	19	140	35	900	51	5.60k
4	25.0	20	160	36	1.00k	52	6.30k
5	28.0	21	180	37	1.12k	53	7.10k
6	31.5	22	200	38	1.25k	54	8.00k
7	35.5	23	224	39	1.40k	55	9.00k
8	40.0	24	250	40	1.60k	56	10.0k
9	45.0	25	280	41	1.80k	57	11.2k
10	50.0	26	315	42	2.00k	58	12.5k
11	56.0	27	355	43	2.24k	59	14.0k
12	63.0	28	400	44	2.50k	60	16.0k
13	71.0	29	450	45	2.80k	61	18.0k
14	80.0	30	500	46	3.15k	62	20.0k
15	90.0	31	560	47	3.55k	63	22.4k

*2 Q Table

Data	Q	Data	Q
0	0.3	16	2.8
1	0.4	17	3.1
2	0.5	18	3.5
3	0.6	19	4.0
4	0.7	20	4.5
5	0.8	21	5.0
6	0.9	22	5.6
7	1.0	23	6.3
8	1.1	24	7.1
9	1.2	25	8.0
10	1.4	26	9.0
11	1.6	27	10.0
12	1.8	28	11.2
13	2.0	29	12.5
14	2.2	30	14.0
15	2.5	31	16.0

*3 Ratio Table

Data	RATIO	
0	1:1.0	(OFF)
1	1:1.1	
2	1:1.2	
3	1:1.4	
4	1:1.6	
5	1:1.8	
6	1:2.0	
7	1:2.5	
8	1:3.1	
9	1:4.0	
10	1:5.6	
11	1:8.0	
12	1:16	
13	1:INF	

(o)Program Change

Works as program change for the effects when MIDI channel number is set to 0H, 1H, 2H or 3H.
Works as scene switch when channel number is set to FH.
VS-1680 never transmits this message.

Status	Second
CnH	ppH

n = MIDI Channel No. : 0H - 3H (ch.1 = EFX1 ch.2 = EFX2 ch.3 = EFX3 ch.4 = EFX4)
FH (ch.16 = Scene Memory (*1))
pp = Program No. : 00H - 63H (0 - 99) n = 0H, 1H
pp = Program No. : 00H - 07H (0 - 7) n = EH

(*1) If received while VS-1680 is playing, playback stops, and then restarts after the scene switched. Never receives while recording.

(o)Pitch Bend Range

Receives when effect algorithm 27(Voice Transformer) is selected and MIDI Control SW is On.

Status	Second	Third
EnH	llH	mmH

n = MIDI Channel No. : 0H - 1H (ch.1-ch.2)
n = 0,2 (ch.1,3) : Voice Transformer : Chromatic Pitch
n = 1,3 (ch.2,4) : Voice Transformer : Chromatic Formant
mm,ll = value : 00H,00H - 40H,00H - 7FH,7FH
(-8192 - 0 - +8191)

[] System Common Messages

(o) MIDI Time Code Quarter Frame Messages

MIDI Time Code Quarter Frame Messages can be transmitted while the VS-1680 is
running (Playing or Recording) if the SYSTEM parameter "Syn:Source" is "INT" and "Syn:Gen." is "MTC" in the SYSTEM parameter. The transmitted time counts are summed to "SMPTE(MTC) Offset Time" as the song top is "00:00:00:00". The VS-1680 synchronizes with the time counts which are summed to "SMPTE (MTC)
Offset Time" as the song top is "00:00:00:00" if the SYSTEM parameter "Syn:Source" is "EXT"

Status	Second
F1H	mmH (= 0nnndddd)

nnn = Message type : 0 = Frame count LS nibble
1 = Frame count MS nibble
2 = Seconds count LS nibble
3 = Seconds count MS nibble
4 = Minutes count LS nibble
5 = Minutes count MS nibble
6 = Hours count LS nibble
7 = Hours count MS nibble
dddd = 4 bit nibble data : 0H - FH (0 - 15)

If the upper and lower 4 bits of the count are combined, these bit fields are
assigned as follows.

Frame Count xxxyyyyy
xxx Reserved (000)
yyyyy Frame No. (0-29)

Seconds Count xxyyyyyy
xx Reserved (00)
yyyyyy Seconds Count (0-59)

```
Minutes Count              xxyyyyyy
                            xx     Reserved  (00)
                            yyyyyy Minutes Count  (0-59)

Hours Count                xyyzzzzz
                            x      Reserved  (0)
                            yy      Time Code type
                             0 = 24 Frames / Sec
                             1 = 25 Frames / Sec
                             2 = 30 Frames / Sec (Drop Frame)
                             3 = 30 Frames / Sec (Non Drop Frame
                            zzzzz   Hours
```

(o)Song Position Pointer

The current position is transmitted with the Song Position Pointer Message before the VS-1680 starts to run or after the locate operation, when "Syn:Source" is "INT" and "Syn:Gen." is "MIDIclk" or "SyncTr".

Status	Second	Third
F2H	mmH	nnH

mm,nn = Song Position Point : 00H 00H - 7FH 7FH

[]System Realtime Message

Transmitted when "Syn:Source" is "INT" and "Syn:Gen." is "MIDIclk" or "SyncTr".

(o)Timing Clock

Status
F8H

(o)Start

Status
FAH

(o)Continue

Status
FBH

(o)Stop

Status
FCH

[]System Exclusive Message

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

Byte	Description
F0H	Status of System Exclusive Message
iiH	Manufacturer ID 41H Roland's Manufacturer ID 7EH Universal Non Realtime Message 7FH Universal Realtime Message
ddH	Data : 00H - 7FH (0-127)
:	:
eeH	Data
F7H	EOX (End of System Exclusive Message)

The VS-1680 can transfer and receive the internal parameters information using system exclusive messages, and also can be controlled by the external devices using system exclusive messages.
The VS-1680 can transmit and receive Universal System Exclusive messages, Data Request(RQ1) and Data set(DS1) as the System Exclusive message.

()About Model ID
For Data Request (RQ1) and Data Set (DT1), VS-1680 uses 00H 0EH as a Model ID.

()About Device ID

System Exclusive messages are not assigned to any particular MIDI channel. Instead, they have their own special control parameter called device ID. The Roland system exclusive messages use device IDs to specify multiple VS-1680
units.
The VS-1680 sends system exclusive messages using 00H - 1FH, and receives the
system exclusive messages whose device ID is same as its device ID and 7FH. The value of the device ID is the value set on the SYSTEM parameter "MID:DeviceID" minus one.

(o)Universal System Exclusive Message

()INQUIRY MESSAGE

<>Identity Request

Status	Data Byte	Status
F0H	7EH,Dev,06H,01H	F7H

Byte	Description
F0H	Status of System Exclusive Message
7EH	Universal System Exclusive Message Non Realtime Header
Dev	Device ID (or 7FH)
06H	General Information (sub ID #1)
01H	Identify Request (sub ID #2)
F7H	EOX (End of System Exclusive Message)

The message is used to request the particular information of the VS-1680. The VS-1680 does not transmit the message.

If the VS-1680 received the message and the device ID of the message is same as its device ID or 7FH, the VS-1680 transmits the following Identity Reply message.

<>Identity Reply

Status	Data Bytes	Status
F0H	7EH,Dev,06H,02H,41H,7CH,00H,00H,00H,00H,ssH,ssH	F7H

Byte	Description
F0H	Status of System Exclusive Message
7EH	Universal System Exclusive Message Non Realtime Header
Dev	Device ID
06H	General Information (sub ID #1)
02H	Identify Request (sub ID #2)
41H	Manufacturer ID (Roland)
0EH 01H	Device Family Code (VS-1680)
00H 00H	Device Family No.
00H	
00H	
ssH ssH	Software Revision Level
F7H	EOX (End of System Exclusive Message)

<>MIDI Machine Control Commands

<>MIDI Machine Control Commands

Status	Data Bytes	Status
F0H	7FH,Dev,06H,aaH, ..., bbH	F7H

Byte	Description
F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID (or 7FH)
06H	MMC Command Message
aaH	Command
:	:
bbH	Command
F7H	EOX (End of System Exclusive Message)

(*) see '3. MIDI Machine Control' section

<>MIDI Machine Control Responses

Status	Data Bytes	Status
F0H	7FH,Dev,07H,aaH, ..., bbH	F7H

Byte	Description
F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID

```
07H         MMC Response Message
aaH         Response
 :           :
bbH         Response
F7H         EOX (End of System Exclusive Message)

(*) see '3. MIDI Machine Control' section


(o)Data Transfer (RQ1, DT1)

()Data Request (RQ1)

Status      Data Bytes                                                  Status
----------  ------------------                                          ----------
F0H         41H,Dev,00H, 0EH,11H,aaH,bbH,ccH,ssH,ssH,ssH,Sum             F7H

Byte        Description
-------------------------------------------------------------------------------
F0H         Status of System Exclusive Message
41H         Manufacturer ID    (Roland)
Dev         Device ID
00H 0EH     ModelID                                          (VS-1680)
11H         Command ID         (RQ1)
aaH         Address MSB
bbH         Address
ccH         Address LSB
ssH         Size MSB
ssH         Size
ssH         Size LSB
Sum         Check Sum
F7H         EOX (End of System Exclusive Message)

The message is used to request data to the VS-1680.
The VS-1680 does not transmit this message.
The VS-1680 transmits the requested data using Data Set(DT1) under following
condition when it received the message.
  1. The requested address correspond to the specified parameter base
address
      of the VS-1680.
  2. The requested size is over 1 byte.


()Data Set (DT1)

Status      Data Bytes                                                  Status
----------  ------------------                                          ----------
F0H         41H,Dev,00H,0EH,12H,aaH,bbH,ccH,ddH, ..., eeH,Sum           F7H

Byte        Description
-------------------------------------------------------------------------------
F0H         Status of System Exclusive Message
41H         Manufacturer ID    (Roland)
Dev         Device ID
00H 0EH     Model ID            (VS-1680)
12H         Command ID         (DT1)
aaH         Address MSB
bbH         Address
ccH         Address LSB
ddH         Data
 :           :
```

eeH Data
Sum Check Sum
F7H EOX (End of System Exclusive Message)

<>The message is received under the following condition.

If the device ID on the message is same as that of the receive device, and the address on the message correspond to the specified parameter base address, the received data are stored from the specified parameter base address. If the interval of received messages is shorter than 25 msec, the VS-1680 can not work the receive message procedure correctly.

<>The message is transmitted under the following condition.

When the VS-1680 transmit the data on the requested parameter after receiving the Data Request message(RQ1).

see '2. Data Transfer Address Map'
for more details of the transfer parameters.

<>The message is transmitted under the following condition.

When the VS-1680 transmit the data on the requested parameter after receiving the Data Request message(RQ1).

see '2. Data Transfer Address Map'
for more details of the transfer parameters.

Address	MSB		LSB
Binary	0aaa aaaa	0bbb bbbb	0ccc cccc
7 Bit Hex	AA	BB	CC

[]Parameter Address Block

<Model ID = 00H 0EH>

Start address	Contents and remarks
00 00 00	System Parameter
01 00 00	Song Parameter
02 00 00	Mixer Parameter
03 00 00	Locate Parameter
04 00 00	Effect Parameter
05 00 00	Remote Operation

06 00 00	(Reserved)
07 00 00	
08 00 00	Sync Track Data
09 00 00	
0A 00 00	
0B 00 00	
0C 00 00	
0D 00 00	
0E 00 00	
0F 00 00	
10 00 00	(Reserved)
:	:
7F 7F 7F	

(o)System Parameter

Start address	Data	Contents and remarks
00 00 00	0aaaaaaa	SMPTE(MTC) Offset Time
00 00 01#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
00 00 02#	0ccccccc	0,,,268435455block (1block=16sample)
00 00 03#	0ddddddd	
00 00 04	0aaaaaaa	Vari Pitch
00 00 05#	0bbbbbbb	48kHz -241,,,23 (22.00,,,50.48kHz)
00 00 06#	0ccccccc	44.1kHz -202,,,58 (22.05,,,50.43kHz)
00 00 07#	0ddddddd	32kHz -93,,,172 (22.05,,,50.41kHz)
00 00 08	0aaaaaaa	(Reserved)
00 00 09#	0bbbbbbb	
00 00 0A	00 - 01	Vari Pitch Switch Off,On
00 00 0B	00 - 01	Marker Stop Switch Off,On
00 00 0C	00 - 05	Fade Length 2,10,20,30,40,50mS
00 00 0D	0A - 64	Preview From Length 1.0,,,10.0S
00 00 0E	0A - 64	Preview To Length 1.0,,,10.0S
00 00 0F	00 - 05	Foot Switch Assign Play/Stop,Record, TapMarker,Next,Previous
00 00 10	00 - 02	Metronome Out Mode Off,INT,MIDI
00 00 11	00 - 01	Metronome Out Type REConly,AnyTime
00 00 12	00 - 01	Master Clock DIGITAL1,INT,DIGITAL2
00 00 13	00 - 1F	MIDI System Exclusive Device ID (*1) 1,,,32
00 00 14	00 - 01	MIDI OUT/THRU Switch (*1) Out,Thru
00 00 15	00 - 01	MIDI System Exclusive RX Switch (*1) Off,On

00 00 16	00 - 01	MIDI System Exclusive TX Switch (*1)	Off,On
00 00 17	00 - 0F	MIDI Metronome Channel	1,,,16
00 00 18	0C - 7F	MIDI Metronome Accent Note	12,,,127
00 00 19	01 - 7F	MIDI Metronome Accent Velocity	1,,,127
00 00 1A	0C - 7F	MIDI Metronome Normal Note	12,,,127
00 00 1B	01 - 7F	MIDI Metronome Normal Velocity	1,,,127
00 00 1C	00 - 01	MIDI Mixer Control Local Switch	Off,On
00 00 1D	00 - 02	MIDI Mixer Control Type	Off,C.C.,Excl
00 00 1E	00 - 0A	Sync. Error Level	0,,,10
00 00 1F	00 - 01	Sync. Source	INT,EXT
00 00 20	00 - 03	Sync. Generate	Off,MTC,MIDIclk,SyncTr
00 00 21	00 - 03	Sync. SMPTE Format	24,25,29D,29N,30
00 00 22	01 - 1F	(Reserved)	
00 00 23	01 - 1F	(Reserved)	
00 00 24	00 - 01	Recording Monitor	Auto,Source
00 00 25	00 - 01	Time Disply	ABS,REL
00 00 26	00 - 7f	Internal Metronome Level	0-127
00 00 27	00 - 01	Undo Message	Off,On
00 00 28	0aaaaaaa	Tempo Map-1 Tempo Map Time	
00 00 29#	0bbbbbbb		
00 00 2A#	0ccccccc		
00 00 2B#	0ddddddd		
00 00 2C	0aaaaaaa	Tempo Map-1 Sync Track Time	
00 00 2D#	0bbbbbbb		
00 00 2E#	0ccccccc		
00 00 2F#	0ddddddd		
00 00 30	0aaaaaaa	Tempo Map-1 Tempo	
00 00 31#	0bbbbbbb	250 - 2500 = 25.0 - 250.0	
00 00 32	0aaaaaaa	Tempo Map-1 Meas	
00 00 33#	0bbbbbbb		1 - 999
00 00 34	00	Tempo Map-1 Beat 0 - 31 =	
00 00 35#	00 - 1F	1/1, 1/2, ..., 7/8, 8/8	
00 00 36	00	Tempo Map-1 (Reserved)	
00 00 37#	00		
00 00 38		Tempo Map-2 (See Tempo Map-1, 16bytes each)	
:		:	

00 06 47#		Tempo Map-50	
00 06 48	01 - 32	Total Tempo Map Number (*2)	1 - 50
00 06 49	00 - 4B	Scrub Loop Length	25 - 100 mS
00 06 4A	00 - 02	MMC Mode	Off, Master, Slave
00 06 4B	00 - 01	(Reserved)	
00 06 4C	00 - 01	Digital Output Copy Protect	Off,On
00 06 4D	00 - 01	Auto Mix Mode	Off,On
00 06 4E	00 - 01	Auto Mix Snap Shot Mode	ALL,MaskF
00 06 4F	00 - 03	Display Type of Remaining	Time,CapaMB,Capa%,Event
00 06 50	00 - 01	Fader Match Mode	Null,Jump
00 06 51	00 - 01	Peak Hold	Off,On
00 06 52	00 - 01	Scene Change by PG#	Off,On
00 06 53	00 - 01	Effect Change by PG#	Off,On
00 06 54	00 - 01	Effect Ctrl by Control Change	Off,On
00 06 55	00 - 01	Level Meter Tx. via MIDI	Off,On,Interval
00 06 56	00 - 01	Effector Board Available (*3)	Off,On(=01 or 03)
00 06 57	00 - 02	Mastering Track Status	Off,Rec,Play
00 06 58 00 06 59#	0000000a 0bbbbbbb	Mastering Track L (*4) (0,,,255 = Trk1-VTrk1,,,Trk16-VTrk16)	abbbbbbb = 0,,,255
00 06 5A 00 06 5B#	0000000a 0bbbbbbb	Mastering Track R (*4) (0,,,255 = Trk1-VTrk1,,,Trk16-VTrk16)	abbbbbbb = 0,,,255
00 06 5C	00 - 04	Mastering Track After Rec to Last Phrs: 0s,to Last Phrs: 2s, to Last Phrs: 4s,stay HERE	0,,,4 = to ZERO,
00 06 5D	00 - 01	Mastering Track Marker Add	Off,On

(*) The address marked by "#" are invalid. Transmit the Data Set(DT1) or Data Request(RQ1) message with the specified size to the address without "#" mark.

(*1) These parameters are read only. The setting is a panel operation only.

(*2) You must write to the parameter whenever you rewrite the Tempo Map Data.
The calculation will be begun when to write the parameter.

(*3) The flag shows that the Effect Board exists or not. It is a read only.

(o)Song Parameter

Start address	Data	Contents and remarks
01 00 00	20 - 7E	Current Song Name -1 (ASCII)
:	:	:
01 00 0B	20 - 7E	Current Song Name -12
01 00 0C	00 - 02	Current Song Sampling Frequency 48K,44.1K,32KHz
01 00 0D	00 - 03 05 - 06	Current Song R-DAC Mode MTP(5),MAS(3),MT1(0),MT2(1),LIV1(2),LIV2(6)
01 00 0E	00 - 3B	Current Song Created (second)
01 00 0F	00 - 3B	(minute)
01 00 10	00 - 17	(hour)
01 00 11	01 - 07	(a day of week)
01 00 12	01 - 1F	(day)
01 00 13	01 - 0C	(month)
01 00 14	0aaaaaaa	
01 00 15#	0bbbbbbb	(year)
01 00 16	00 - 3B	Current Song Saved (second)
01 00 17	00 - 3B	(minute)
01 00 18	00 - 17	(hour)
01 00 19	01 - 07	(a day of week)
01 00 1A	01 - 1F	(day)
01 00 1B	01 - 0C	(month)
01 00 1C	0aaaaaaa	
01 00 1D#	0bbbbbbb	(year)
01 00 1E	00	(Reserved)
01 00 1F	00	(Reserved)
01 00 20	00 - xx	Current Song Protect Off, On(=01 or 81)
01 00 21	00	(Reserved)
01 00 22	0000000a	Song List Length abbbbbbb = 1,,,200
01 00 23#	0bbbbbbb	
01 00 24	00	(Reserved)
:	:	:
01 00 7F	00	(Reserved)
01 01 00	20 - 7E	Current Song Comment - 1 (ASCII)
:	:	:
01 01 63	20 - 7E	Current Song Comment -100 (ASCII)
01 01 64	00	(Reserved)
:	:	:
01 01 7D	00	(Reserved)
01 02 00	00 -	Song- 1 (similar to 01 00 00 - 01 00 1F)
:	:	:
01 02 1F	00 -	

:	:	:
01 33 60	00 -	Song-200 (similar to 01 00 00 - 01 00 1F)
:	:	:
01 33 7F	00 -	

(*) The address marked by "#" are invalid. Request to Data Request(RQ1) message with the specified size to the address without "#" mark.

(*) Only the Data Set(DT1) message to the song nameand song comment is acceptable.

(o)Mixer Parameter

Start address	Data	Contents and remarks
02 00 00	00 -	Track Status -1 00=SOURCE,01=PLAY,02=REC 40=SOURCE_MUTE,41=PLAY_MUTE,22=REC_SOURCE
:	:	:
02 00 0F	00 -	Track Status -16
02 00 10	00 - 0f	V.Track -1 1,,,16
:	:	:
02 00 1F	00 - 0f	V.Track -16
02 00 20	00 -	(Reserved) 0
:	:	:
02 00 3F	00 -	(Reserved)
02 00 40	00 - 08	Track Channel ATT -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
:	:	:
02 00 4F	00 - 08	Track Channel ATT -16
02 00 50	00 - 08	Input Channel ATT -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
:	:	:
02 00 59	00 - 08	Input Channel ATT -10
02 00 5A	00 -	(dummy)
:	:	:
02 00 5F	00 -	
02 00 60	00 - 01	Track Channel Phase -1 Nor,Inv
:	:	:
02 00 6F	00 - 01	Track Channel Phase -16
02 00 70	00 - 01	Input Channel Phase -1 Nor,Inv
:	:	:
02 00 79	00 - 01	Input Channel Phase -10
02 00 7A	00 -	(dummy)
:	:	:
02 00 7F	00 -	
02 01 00	00 -	(Reserved) 0

02 01 1F	00 -	(Reserved)	
02 01 20	00 - 01	Track Channel EQ Switch -1	Off,On
02 01 2F	00 - 01	Track Channel EQ Switch -16	
02 01 30	00 - 01	Input Channel EQ Switch -1	Off,On
02 01 39	00 - 01	Input Channel EQ Switch -10	
02 01 3A	00 -	(dummy)	
02 01 3F	00 -		
02 01 40	00 - 7F	Track Channel EQ L Freq.-1	40,50,60, 70,80,90,100,120,140,160,180,200,300,400,500, 600,700,800,900,1K,1.1K,1.2K,1.3K,1.4K,1.5KHz
02 01 4F	00 - 7F	Track Channel EQ L Freq.-16	
02 01 50	00 - 7F	Input Channel EQ L Freq.-1	40,50,60, 70,80,90,100,120,140,160,180,200,300,400,500, 600,700,800,900,1K,1.1K,1.2K,1.3K,1.4K,1.5KHz
02 01 59	00 - 7F	Input Channel EQ L Freq.-10	
02 01 5A	00 -	(dummy)	
02 01 5F	00 -		
02 01 60	00 - 7F	Track Channel EQ L Gain -1	-12,,,+12dB
02 01 6F	00 - 7F	Track Channel EQ L Gain -16	
02 01 70	00 - 7F	Input Channel EQ L Gain -1	-12,,,+12dB
02 01 79	00 - 7F	Input Channel EQ L Gain -10	
02 01 7A	00 -	(dummy)	
02 01 7F	00 -		
02 02 00	00 - 7F	Track Channel EQ M Freq.-1	200,300, 400,500,600,700,800,900,1K,1.1K,1.2K,1.3K,1.4K, 1.5K,1.6K,1.7K,1.8K,1.9K,2K,3K,4K,5K,6K,7K,8KHz
02 02 0F	00 - 7F	Track Channel EQ M Freq.-16	
02 02 10	00 - 7F	Input Channel EQ M Freq.-1	200,300, 400,500,600,700,800,900,1K,1.1K,1.2K,1.3K,1.4K, 1.5K,1.6K,1.7K,1.8K,1.9K,2K,3K,4K,5K,6K,7K,8KHz
02 02 19	00 - 7F	Input Channel EQ M Freq.-16	
02 02 1A	00 -	(dummy)	
02 02 1F	00 -		
02 02 20	00 - 7F	Track Channel EQ M Gain -1	-12,,,+12dB

02 02 2F	00 - 7F	Track Channel EQ M Gain -16	
02 02 30	00 - 7F	Input Channel EQ M Gain -1	-12,,,+12dB
:	:	:	
02 02 39	00 - 7F	Input Channel EQ M Gain -10	
02 02 3A	00 -	(dummy)	
:	:	:	
02 02 3F	00 -		
02 02 40	00 - 7F	Track Channel EQ M Q -1	0.5,1,2,4,8,16
:	:	:	
02 02 4F	00 - 7F	Track Channel EQ M Q -16	
02 02 50	00 - 7F	Input Channel EQ M Q -1	0.5,1,2,4,8,16
:	:	:	
02 02 59	00 - 7F	Input Channel EQ M Q -10	
02 02 5A	00 -	(dummy)	
:	:	:	
02 02 5F	00 -		
02 02 60	00 - 7F	Track Channel EQ H Freq.-1	500,
		600,700,800,900,1K,1.2K,1.4K,1.6K,1.8K,2K,3K,	
		4K,5K,6K,7K,8K,9K,10K,11K,12K,13K,14K,16K,18KHz	
:	:	:	
02 02 6F	00 - 7F	Track Channel EQ H Freq.-16	
02 02 70	00 - 7F	Input Channel EQ H Freq.-1	500,
		600,700,800,900,1K,1.2K,1.4K,1.6K,1.8K,2K,3K,	
		4K,5K,6K,7K,8K,9K,10K,11K,12K,13K,14K,16K,18KHz	
:	:	:	
02 02 79	00 - 7F	Input Channel EQ H Freq.-10	
02 02 7A	00 -	(dummy)	
:	:	:	
02 02 7F	00 -		
02 03 00	00 - 7F	Track Channel EQ H Gain -1	-12,,,+12dB
:	:	:	
02 03 0F	00 - 7F	Track Channel EQ H Gain -16	
02 03 10	00 - 7F	Input Channel EQ H Gain -1	-12,,,+12dB
:	:	:	
02 03 19	00 - 7F	Input Channel EQ H Gain -10	
02 03 1A	00 -	(dummy)	
:	:	:	
02 03 1F	00 -		
02 03 20	00 - 04	Track Channel EFX1 Insert Switch -1	
		Off,Ins,InsL,InsR,InsS	
:	:	:	
02 03 2F	00 - 04	Track Channel EFX1 Insert Switch -16	
02 03 30	00 - 04	Input Channel EFX1 Insert Switch -1	
		Off,Ins,InsL,InsR,InsS	
:	:	:	
02 03 39	00 - 04	Input Channel EFX1 Insert Switch -10	
02 03 3A	00 -	(dummy)	

02 03 3F	00 -	
02 03 40	00 - 08	Track Channel EFX1 Insert Send Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
02 03 4F	00 - 08	Track Channel EFX1 Insert Send Level -16
02 03 50	00 - 08	Input Channel EFX1 Insert Send Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
02 03 59	00 - 08	Input Channel EFX1 Insert Send Level -10
02 03 5A	00 -	(dummy)
02 03 5F	00 -	
02 03 60	00 - 08	Track Channel EFX1 Insert Return Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
02 03 6F	00 - 08	Track Channel EFX1 Insert Return Level -16
02 03 70	00 - 08	Input Channel EFX1 Insert Return Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
02 03 79	00 - 08	Input Channel EFX1 Insert Return Level -10
02 03 7A	00 -	(dummy)
02 03 7F	00 -	
02 04 00	00 - 04	Track Channel EFX2 Insert Switch -1 Off,Ins,InsL,InsR,InsS
02 04 0F	00 - 04	Track Channel EFX2 Insert Switch -16
02 04 10	00 - 04	Input Channel EFX2 Insert Switch -1 Off,Ins,InsL,InsR,InsS
02 04 19	00 - 04	Input Channel EFX2 Insert Switch -10
02 04 1A	00 -	(dummy)
02 04 1F	00 -	
02 04 20	00 - 08	Track Channel EFX2 Insert Send Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
02 04 2F	00 - 08	Track Channel EFX2 Insert Send Level -16
02 04 30	00 - 08	Input Channel EFX2 Insert Send Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
02 04 39	00 - 08	Input Channel EFX2 Insert Send Level -10
02 04 3A	00 -	(dummy)
02 04 3F	00 -	
02 04 40	00 - 08	Track Channel EFX2 Insert Return Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB

02 04 4F	00 - 08	Track Channel EFX2 Insert Return Level -16
02 04 50	00 - 08	Input Channel EFX2 Insert Return Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
02 04 59	00 - 08	Input Channel EFX2 Insert Return Level -10
02 04 5A	00 -	(dummy)
02 04 5F	00 -	
02 04 60	00 - 04	Track Channel EFX3(AUX1) Insert Switch -1 Off,Ins,InsL,InsR,InsS
02 04 6F	00 - 04	Track Channel EFX3(AUX1) Insert Switch -16
02 04 70	00 - 04	Input Channel EFX3(AUX1) Insert Switch -1 Off,Ins,InsL,InsR,InsS
02 04 79	00 - 04	Input Channel EFX3(AUX1) Insert Switch -10
02 04 7A	00 -	(dummy)
02 04 7F	00 -	
02 05 00	00 - 08	Track Channel EFX3(AUX1) Insert Send Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
02 05 0F	00 - 08	Track Channel EFX3(AUX1) Insert Send Level -16
02 05 10	00 - 08	Input Channel EFX3(AUX1) Insert Send Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
02 05 19	00 - 08	Input Channel EFX3(AUX1) Insert Send Level -10
02 05 1A	00 -	(dummy)
02 05 1F	00 -	
02 05 20	00 - 08	Track Channel EFX3(AUX1) Insert Return Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
02 05 2F	00 - 08	Track Channel EFX3(AUX1) Insert Return Level -16
02 05 30	00 - 08	Input Channel EFX3(AUX1) Insert Return Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
02 05 39	00 - 08	Input Channel EFX3(AUX1) Insert Return Level -10
02 05 3A	00 -	(dummy)
02 05 3F	00 -	
02 05 40	00 - 04	Track Channel EFX4(AUX2) Insert Switch -1 Off,Ins,InsL,InsR,InsS
02 05 4F	00 - 04	Track Channel EFX4(AUX2) Insert Switch -16
02 05 50	00 - 04	Input Channel EFX4(AUX2) Insert Switch -1 Off,Ins,InsL,InsR,InsS

02 05 59	00 - 04	Input Channel EFX4(AUX2) Insert Switch -10
02 05 5A	00 -	(dummy)
:	:	:
02 05 5F	00 -	
02 05 60	00 - 08	Track Channel EFX4(AUX2) Insert Send Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
:	:	:
02 05 6F	00 - 08	Track Channel EFX4(AUX2) Insert Send Level -16
02 05 70	00 - 08	Input Channel EFX4(AUX2) Insert Send Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
:	:	:
02 05 79	00 - 08	Input Channel EFX4(AUX2) Insert Send Level -10
02 05 7A	00 -	(dummy)
:	:	:
02 05 7F	00 -	
02 06 00	00 - 08	Track Channel EFX4(AUX2) Insert Return Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
:	:	:
02 06 0F	00 - 08	Track Channel EFX4(AUX2) Insert Return Level -16
02 06 10	00 - 08	Input Channel EFX4(AUX2) Insert Return Level -1 -42,-36,-30,-24,-18,-12,-6,0,+6dB
:	:	:
02 06 19	00 - 08	Input Channel EFX4(AUX2) Insert Return Level -10
02 06 1A	00 -	(dummy)
:	:	:
02 06 1F	00 -	
02 06 20	00 - 7F	Track Channel Level -1 0,,,127
:	:	:
02 06 2F	00 - 7F	Track Channel Level -16
02 06 30	00 - 7F	Input Channel Level -1 0,,,127
:	:	:
02 06 39	00 - 7F	Input Channel Level -10
02 06 3A	00 -	(dummy)
:	:	:
02 06 3F	00 -	
02 06 40	00 -	(Reserved) 2
:	:	:
02 06 5F	00 -	(Reserved)
02 06 60	01 - 7F	Track Channel MIX & BUS Pan -1 L63 ,,, R63
:	:	:
02 06 6F	01 - 7F	Track Channel MIX & BUS Pan -16
02 06 70	01 - 7F	Input Channel MIX & BUS Pan -1 L63 ,,, R63
:	:	:
02 06 79	01 - 7F	Input Channel MIX & BUS Pan -10
02 06 7A	00 -	(dummy)
:	:	:

02 06 7F	00 -		
02 07 00	00 - 02	Track Channel MIX Switch -1	Off,On
:	:	:	
02 07 0F	00 - 02	Track Channel MIX Switch -16	
02 07 10	00 - 02	Input Channel MIX Switch -1	Off,On
:	:	:	
02 07 19	00 - 02	Input Channel MIX Switch -10	
02 07 1A	00 -	(dummy)	
:	:	:	
02 07 1F	00 -		
02 07 20	00 - 01	Track Channel BUS Send Switch -1 -1	Off,On
:	:	:	
02 07 2F	00 - 01	Track Channel BUS Send Switch -1 -16	
02 07 30	00 - 01	Track Channel BUS Send Switch -2 -1	Off,On
:	:	:	
02 07 3F	00 - 01	Track Channel BUS Send Switch -2 -16	
02 07 40	00 - 01	Track Channel BUS Send Switch -3 -1	Off,On
:	:	:	
02 07 4F	00 - 01	Track Channel BUS Send Switch -3 -16	
02 07 50	00 - 01	Track Channel BUS Send Switch -4 -1	Off,On
:	:	:	
02 07 5F	00 - 01	Track Channel BUS Send Switch -4 -16	
02 07 60	00 - 01	Track Channel BUS Send Switch -5 -1	Off,On
:	:	:	
02 07 6F	00 - 01	Track Channel BUS Send Switch -5 -16	
02 07 70	00 - 01	Track Channel BUS Send Switch -6 -1	Off,On
:	:	:	
02 07 7F	00 - 01	Track Channel BUS Send Switch -6 -16	
02 08 00	00 - 01	Track Channel BUS Send Switch -7 -1	Off,On
:	:	:	
02 08 0F	00 - 01	Track Channel BUS Send Switch -7 -16	
02 08 10	00 - 01	Track Channel BUS Send Switch -8 -1	Off,On
:	:	:	
02 08 1F	00 - 01	Track Channel BUS Send Switch -8 -16	
02 08 20	00 - 01	Track Channel BUS Send Switch -9 -1	Off,On
:	:	:	
02 08 2F	00 - 01	Track Channel BUS Send Switch -9 -16	
02 08 30	00 - 01	Track Channel BUS Send Switch -10 -1	Off,On
:	:	:	
02 08 3F	00 - 01	Track Channel BUS Send Switch -10 -16	
02 08 40	00 - 01	Track Channel BUS Send Switch -11 -1	Off,On
:	:	:	
02 08 4F	00 - 01	Track Channel BUS Send Switch -11 -16	
02 08 50	00 - 01	Track Channel BUS Send Switch -12 -1	Off,On
:	:	:	
02 08 5F	00 - 01	Track Channel BUS Send Switch -12 -16	

02 08 60	00 - 01	Track Channel BUS Send Switch -13 -1	Off,On
:	:	:	
02 08 6F	00 - 01	Track Channel BUS Send Switch -13 -16	
02 08 70	00 - 01	Track Channel BUS Send Switch -14 -1	Off,On
:	:	:	
02 08 7F	00 - 01	Track Channel BUS Send Switch -14 -16	
02 09 00	00 - 01	Track Channel BUS Send Switch -15 -1	Off,On
:	:	:	
02 09 0F	00 - 01	Track Channel BUS Send Switch -15 -16	
02 09 10	00 - 01	Track Channel BUS Send Switch -16 -1	Off,On
:	:	:	
02 09 1F	00 - 01	Track Channel BUS Send Switch -16 -16	
02 09 20	00 - 01	Input Channel BUS Send Switch -1 -1	Off,On
:	:	:	
02 09 2F	00 - 01	Input Channel BUS Send Switch -1 -16	
02 09 30	00 - 01	Input Channel BUS Send Switch -2 -1	Off,On
:	:	:	
02 09 3F	00 - 01	Input Channel BUS Send Switch -2 -16	
02 09 40	00 - 01	Input Channel BUS Send Switch -3 -1	Off,On
:	:	:	
02 09 4F	00 - 01	Input Channel BUS Send Switch -3 -16	
02 09 50	00 - 01	Input Channel BUS Send Switch -4 -1	Off,On
:	:	:	
02 09 5F	00 - 01	Input Channel BUS Send Switch -4 -16	
02 09 60	00 - 01	Input Channel BUS Send Switch -5 -1	Off,On
:	:	:	
02 09 6F	00 - 01	Input Channel BUS Send Switch -5 -16	
02 09 70	00 - 01	Input Channel BUS Send Switch -6 -1	Off,On
:	:	:	
02 09 7F	00 - 01	Input Channel BUS Send Switch -6 -16	
02 0A 00	00 - 01	Input Channel BUS Send Switch -7 -1	Off,On
:	:	:	
02 0A 0F	00 - 01	Input Channel BUS Send Switch -7 -16	
02 0A 10	00 - 01	Input Channel BUS Send Switch -8 -1	Off,On
:	:	:	
02 0A 1F	00 - 01	Input Channel BUS Send Switch -8 -16	
02 0A 20	00 - 01	Input Channel BUS Send Switch -9 -1	Off,On
:	:	:	
02 0A 2F	00 - 01	Input Channel BUS Send Switch -9 -16	
02 0A 30	00 - 01	Input Channel BUS Send Switch -10 -1	Off,On
:	:	:	
02 0A 3F	00 - 01	Input Channel BUS Send Switch -10 -16	
02 0A 40	00 -	(dummy)	
:	:	:	
02 0B 1F	00 -		

02 0B 20	00 - 02	Track Channel EFX1 Switch -1	Off,Pre,Post
:	:	:	
02 0B 2F	00 - 02	Track Channel EFX1 Switch -16	
02 0B 30	00 - 02	Input Channel EFX1 Switch -1	Off,Pre,Post
:	:	:	
02 0B 39	00 - 02	Input Channel EFX1 Switch -10	
02 0B 3A	00 -	(dummy)	
:	:	:	
02 0B 3F	00 -		
02 0B 40	00 - 7F	Track Channel EFX1 Level -1	0,,,127
:	:	:	
02 0B 4F	00 - 7F	Track Channel EFX1 Level -16	
02 0B 50	00 - 7F	Input Channel EFX1 Level -1	0,,,127
:	:	:	
02 0B 59	00 - 7F	Input Channel EFX1 Level -10	
02 0B 5A	00 -	(dummy)	
:	:	:	
02 0B 5F	00 -		
02 0B 60	01 - 7F	Track Channel EFX1 Pan -1	L63,,,R63
:	:	:	
02 0B 6F	01 - 7F	Track Channel EFX1 Pan -16	
02 0B 70	01 - 7F	Input Channel EFX1 Pan -1	L63,,,R63
:	:	:	
02 0B 79	01 - 7F	Input Channel EFX1 Pan -10	
02 0B 7A	00 -	(dummy)	
:	:	:	
02 0B 7F	00 -		
02 0C 00	00 - 02	Track Channel EFX2 Switch -1	Off,Pre,Post
:	:	:	
02 0C 0F	00 - 02	Track Channel EFX2 Switch -16	
02 0C 10	00 - 02	Input Channel EFX2 Switch -1	Off,Pre,Post
:	:	:	
02 0C 19	00 - 02	Input Channel EFX2 Switch -10	
02 0C 1A	00 -	(dummy)	
:	:	:	
02 0C 1F	00 -		
02 0C 20	00 - 7F	Track Channel EFX2 Level -1	0,,,127
:	:	:	
02 0C 2F	00 - 7F	Track Channel EFX2 Level -16	
02 0C 30	00 - 7F	Input Channel EFX2 Level -1	0,,,127
:	:	:	
02 0C 39	00 - 7F	Input Channel EFX2 Level -10	
02 0C 3A	00 -	(dummy)	
:	:	:	
02 0C 3F	00 -		
02 0C 40	01 - 7F	Track Channel EFX2 Pan -1	L63...R63

:	:	:	
02 0C 4F	01 - 7F	Track Channel EFX2 Pan -16	
02 0C 50	01 - 7F	Input Channel EFX2 Pan -1	L63,,,R63
:	:	:	
02 0C 59	01 - 7F	Input Channel EFX2 Pan -10	
02 0C 5A	00 -	(dummy)	
:	:	:	
02 0C 5F	00 -		
02 0C 60	00 - 02	Track Channel EFX3(AUX1) Switch -1	Off,Pre,Post
:	:	:	
02 0C 6F	00 - 02	Track Channel EFX3(AUX1) Switch -16	
02 0C 70	00 - 02	Input Channel EFX3(AUX1) Switch -1	Off,Pre,Post
:	:	:	
02 0C 79	00 - 02	Input Channel EFX3(AUX1) Switch -10	
02 0C 7A	00 -	(dummy)	
:	:	:	
02 0C 7F	00 -		
02 0D 00	00 - 7F	Track Channel EFX3(AUX1) Level -1	0,,,127
:	:	:	
02 0D 0F	00 - 7F	Track Channel EFX3(AUX1) Level -16	
02 0D 10	00 - 7F	Input Channel EFX3(AUX1) Level -1	0,,,127
:	:	:	
02 0D 19	00 - 7F	Input Channel EFX3(AUX1) Level -10	
02 0D 1A	00 -	(dummy)	
:	:	:	
02 0D 1F	00 -		
02 0D 20	01 - 7F	Track Channel EFX3(AUX1) Pan -1	L63,,,R63
:	:	:	
02 0D 2F	01 - 7F	Track Channel EFX3(AUX1) Pan -16	
02 0D 30	01 - 7F	Input Channel EFX3(AUX1) Pan -1	L63,,,R63
:	:	:	
02 0D 39	01 - 7F	Input Channel EFX3(AUX1) Pan -10	
02 0D 3A	00 -	(dummy)	
:	:	:	
02 0D 3F	00 -		
02 0D 40	00 - 02	Track Channel EFX4(AUX2) Switch -1	Off,Pre,Post
:	:	:	
02 0D 4F	00 - 02	Track Channel EFX4(AUX2) Switch -16	
02 0D 50	00 - 02	Input Channel EFX4(AUX2) Switch -1	Off,Pre,Post
:	:	:	
02 0D 59	00 - 02	Input Channel EFX4(AUX2) Switch -10	
02 0D 5A	00 -	(dummy)	
:	:	:	
02 0D 5F	00 -		
02 0D 60	00 - 7F	Track Channel EFX4(AUX2) Level -1	0,,,127
:	:	:	

02 0D 6F	00 - 7F	Track Channel EFX4(AUX2) Level -16	
02 0D 70	00 - 7F	Input Channel EFX4(AUX2) Level -1	0,,,127
:	:	:	
02 0D 79	00 - 7F	Input Channel EFX4(AUX2) Level -10	
02 0D 7A	00 -	(dummy)	
:	:	:	
02 0D 7F	00 -		
02 0E 00	01 - 7F	Track Channel EFX4(AUX2) Pan -1	L63,,,R63
:	:	:	
02 0E 0F	01 - 7F	Track Channel EFX4(AUX2) Pan -16	
02 0E 10	01 - 7F	Input Channel EFX4(AUX2) Pan -1	L63,,,R63
:	:	:	
02 0E 19	01 - 7F	Input Channel EFX4(AUX2) Pan -10	
02 0E 1A	00 -	(dummy)	
:	:	:	
02 0E 1F	00 -		
02 0E 20	00 - 02	Track Channel AUX(AUX3) Switch -1	Off,Pre,Post
:	:	:	
02 0E 2F	00 - 02	Track Channel AUX(AUX3) Switch -16	
02 0E 30	00 - 02	Input Channel AUX(AUX3) Switch -1	Off,Pre,Post
:	:	:	
02 0E 39	00 - 02	Input Channel AUX(AUX3) Switch -10	
02 0E 3A	00 -	(dummy)	
:	:	:	
02 0E 3F	00 -		
02 0E 40	00 - 7F	Track Channel AUX(AUX3) Level -1	0,,,127
:	:	:	
02 0E 4F	00 - 7F	Track Channel AUX(AUX3) Level -16	
02 0E 50	00 - 7F	Input Channel AUX(AUX3) Level -1	0,,,127
:	:	:	
02 0E 59	00 - 7F	Input Channel AUX(AUX3) Level -10	
02 0E 5A	00 -	(dummy)	
:	:	:	
02 0E 5F	00 -		
02 0E 60	01 - 7F	Track Channel AUX(AUX3) Pan -1	L63,,,R63
:	:	:	
02 0E 6F	01 - 7F	Track Channel AUX(AUX3) Pan -16	
02 0E 70	01 - 7F	Input Channel AUX(AUX3) Pan -1	L63,,,R63
:	:	:	
02 0E 79	01 - 7F	Input Channel AUX(AUX3) Pan -10	
02 0E 7A	00 -	(dummy)	
:	:	:	
02 0E 7F	00 -		
02 0F 00	00 -	(Reserved)	0
:	:	:	
02 0F 1F	00 -	(Reserved)	

02 0F 20	00 - 01	Track Channel Solo Switch -1	Off,On
:	:	:	
02 0F 2F	00 - 01	Track Channel Solo Switch -16	
02 0F 30	00 - 01	Input Channel Solo Switch -1	Off,On
:	:	:	
02 0F 39	00 - 01	Input Channel Solo Switch -10	
02 0F 3A	00 -	(dummy)	
:	:	:	
02 0F 3F	00 -		
02 0F 40	00 - 01	Track Channel Mute Switch -1	Off,On
:	:	:	
02 0F 4F	00 - 01	Track Channel Mute Switch -16	
02 0F 50	00 - 01	Input Channel Mute Switch -1	Off,On
:	:	:	
02 0F 59	00 - 01	Input Channel Mute Switch -10	
02 0F 5A	00 -	(dummy)	
:	:	:	
02 0F 5F	00 -		
02 0F 60	00 - 01	Track Channel Link Switch -1	Off,On
:	:	:	
02 0F 6F	00 - 01	Track Channel Link Switch -16	
02 0F 70	00 - 01	Input Channel Link Switch -1	Off,On
:	:	:	
02 0F 79	00 - 01	Input Channel Link Switch -10	
02 0F 7A	00 -	(dummy)	
:	:	:	
02 0F 7F	00 -		
02 10 00	00 - 7F	Track Channel Ofset Level -a	0,,,127
:	:	:	
02 10 07	00 - 7F	Track Channel Ofset Level -h	
02 10 08	00 - 7F	Input Channel Ofset Level -a	0,,,127
:	:	:	
02 10 0C	00 - 7F	Input Channel Ofset Level -e	
02 10 0D	00 -	(dummy)	
:	:	:	
02 10 0F	00 -		
02 10 10	00 - 7F	Track Channel Ofset Pan -a	L63,,,R63
:	:	:	
02 10 17	00 - 7F	Track Channel Ofset Pan -h	
02 10 18	00 - 7F	Input Channel Ofset Pan -a	L63,,,R63
:	:	:	
02 10 1C	00 - 7F	Input Channel Ofset Pan -e	
02 10 1D	00 -	(dummy)	
:	:	:	
02 10 1F	00 -		

02 10 20	00 -	(Reserved)	
:	:	:	
02 10 27	00 -	(Reserved)	
02 10 28	00 - 05	Stereo In Select	Off,Input12,Input34, Input56,Input78,DigitalIn
02 10 29	00 - 7F	Stereo In Level	0,,,127
02 10 2A	01 - 7F	Stereo In Balance	L63,,,R63
02 10 2B	00 -	(Reserved)	
02 10 2C	00 - 01	Stereo In Bus Send Switch -1	Off,On
:	:	:	
02 10 3B	00 - 01	Stereo In Bus Send Switch -16	
02 10 3C	00 - 01	Stereo In Solo Switch	Off,On
02 10 3D	00 - 01	Stereo In Mute Switch	Off,On
02 10 3E	00	(Reserved)	
02 10 3F	00 - 7F	EFX1 Return Level	0,,,127
02 10 40	01 - 7F	EFX1 Return Balance	L63,,,R63
02 10 41	00 -	(Reserved)	
02 10 42	00 - 01	EFX1 Return Bus Send Switch -1	Off,On
:	:	:	
02 10 51	00 - 01	EFX1 Return Bus Send Switch -16	
02 10 52	00 - 01	EFX1 Return Solo Switch	Off,On
02 10 53	00 - 01	EFX1 Return Mute Switch	Off,On
02 10 54	00	(Reserved)	
02 10 55	00 - 7F	EFX2 Return Level	0,,,127
02 10 56	01 - 7F	EFX2 Return Balance	L63,,,R63
02 10 57	00 -	(Reserved)	
02 10 58	00 - 01	EFX2 Return Bus Send Switch -1	Off,On
:	:	:	
02 10 67	00 - 01	EFX2 Return Bus Send Switch -16	
02 10 68	00 - 01	EFX2 Return Solo Switch	Off,On
02 10 69	00 - 01	EFX2 Return Mute Switch	Off,On
02 10 6A	00	(Reserved)	
02 10 6B	00 - 7F	EFX3 Return Level	0,,,127
02 10 6C	01 - 7F	EFX3 Return Balance	L63,,,R63
02 10 6D	00 -	(Reserved)	

02 10 6E	00 - 01	EFX3 Return Bus Send Switch -1	Off,On
:	:	:	
02 10 7D	00 - 01	EFX3 Return Bus Send Switch -16	
02 10 7E	00 - 01	EFX3 Return Solo Switch	Off,On
02 10 7F	00 - 01	EFX3 Return Mute Switch	Off,On
02 11 00	00	(Reserved)	
02 11 01	00 - 7F	EFX4 Return Level	0,,,127
02 11 02	01 - 7F	EFX4 Return Balance	L63,,,R63
02 11 03	00 -	(Reserved)	
02 11 04	00 - 01	EFX4 Return Bus Send Switch -1	Off,On
:	:	:	
02 11 13	00 - 01	EFX4 Return Bus Send Switch -16	
02 11 14	00 - 01	EFX4 Return Solo Switch	Off,On
02 11 15	00 - 01	EFX4 Return Mute Switch	Off,On
02 11 16	00 - 01	EFX1 Master Insert Sw	Off,Ins
02 11 17	00 - 08	EFX1 Master Send Level	
		-42,-36,-30,-24,-18,-12,-6,0,+6dB	
02 11 18	00 - 08	EFX1 Master Return Level	
		-42,-36,-30,-24,-18,-12,-6,0,+6dB	
02 11 19	00 - 01	EFX2 Master Insert Sw	Off,Ins
02 11 1A	00 - 08	EFX2 Master Send Level	
		-42,-36,-30,-24,-18,-12,-6,0,+6dB	
02 11 1B	00 - 08	EFX2 Master Return Level	
		-42,-36,-30,-24,-18,-12,-6,0,+6dB	
02 11 1C	00 - 01	EFX3 Master Insert Sw	Off,Ins
02 11 1D	00 - 08	EFX3 Master Send Level	
		-42,-36,-30,-24,-18,-12,-6,0,+6dB	
02 11 1E	00 - 08	EFX3 Master Return Level	
		-42,-36,-30,-24,-18,-12,-6,0,+6dB	
02 11 1F	00 - 01	EFX4 Master Insert Sw	Off,Ins
02 11 20	00 - 08	EFX4 Master Send Level	
		-42,-36,-30,-24,-18,-12,-6,0,+6dB	
02 11 21	00 - 08	EFX4 Master Return Level	
		-42,-36,-30,-24,-18,-12,-6,0,+6dB	
02 11 22	00 - 7F	Master Out Level	0,,,127
02 11 23	01 - 7F	Master Out Balance	L63,,,R63
02 11 24	00 - 7F	Master EFX1 Send Level	0...127

02 11 25	01 - 7F	Master EFX1 Send Balance	L63,,,R63
02 11 26	00 - 7F	Master EFX2 Send Level	0,,,127
02 11 27	01 - 7F	Master EFX2 Send Balance	L63,,,R63
02 11 28	00 - 7F	Master EFX3(AUX1) Send Level	0,,,127
02 11 29	01 - 7F	Master EFX3(AUX1) Send Balance	L63,,,R63
02 11 2A	00 - 7F	Master EFX4(AUX2) Send Level	0,,,127
02 11 2B	01 - 7F	Master EFX4(AUX2) Send Balance	L63,,,R63
02 11 2C	00 - 7F	Master AUX(AUX3) Send Level	0,,,127
02 11 2D	01 - 7F	Master AUX(AUX3) Send Balance	L63,,,R63
02 11 2E	00 - 07	Monitor Mode	Master,RecBus,EFX1, EFX2,EFX3(AUX1),EFX4(AUX2),AUX(AUX3),StereoIn
02 11 2F	00 - 7F	Monitor Out Level	0,,,127
02 11 30	01 - 7F	Monitor Out Balance	L63,,,R63
02 11 31	00 -	(Reserved)	
02 11 32	00 - 04	AUX A Output Select	EFX1,EFX2, EFX3(AUX1),EFX4(AUX2),AUX(AUX3)
02 11 33	00 - 04	AUX B Output Select	EFX1,EFX2, EFX3(AUX1),EFX4(AUX2),AUX(AUX3)
02 11 34	00 - 06	Digital 1 Output Select	Master,EFX1,EFX2, EFX3(AUX1),EFX4(AUX2),AUX(AUX3),Monitor
02 11 35	00 - 06	Digital 2 Output Select	Master,EFX1,EFX2, EFX3(AUX1),EFX4(AUX2),AUX(AUX3),Monitor
02 11 36	00 - 01	EQ Mode	2Band,3Band
02 11 37	00 -	(Reserved)	
02 11 38	00 -	(Reserved)	
02 11 39	00 - 01	Digital Input Select	0,1
02 11 3A	00 - 02	Direct Output Switch	Off,1-8,9-16
02 11 3B	00 -	(dummy)	
:	:	:	
02 11 3F	00 -		
02 11 40	00 - 7F	Track Channel Fader Group -1	0,,,8 = Off,1,,,8
:	:	:	
02 11 4F	00 - 7F	Track Channel Fader Group -16	
02 11 50	00 - 7F	Input Channel Fader Group -1	0,,,8 = Off,1,,,8
:	:	:	
02 11 59	00 - 7F	Input Channel Fader Group -10	

(o)Locate Parameter

Start address	Data	Contents and remarks
03 00 00	0aaaaaaa	LOCATE-1 (*1)
03 00 01#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
03 00 02#	0ccccccc	0,,,268435455block (1block=16sample)
03 00 03#	0ddddddd	
03 00 04	0aaaaaaa	LOCATE-2 (*1)
03 00 05#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
03 00 06#	0ccccccc	0,,,268435455block (1block=16sample)
03 00 07#	0ddddddd	
03 00 08	0aaaaaaa	LOCATE-3 (*1)
03 00 09#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
03 00 0A#	0ccccccc	0,,,268435455block (1block=16sample)
03 00 0B#	0ddddddd	
03 00 0C	0aaaaaaa	LOCATE-4 (*1)
03 00 0D#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
03 00 0E#	0ccccccc	0,,,268435455block (1block=16sample)
03 00 0F#	0ddddddd	
03 00 10	0aaaaaaa	LOCATE-5 (*1)
03 00 11#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
03 00 12#	0ccccccc	0,,,268435455block (1block=16sample)
03 00 13#	0ddddddd	
03 00 14	0aaaaaaa	LOCATE-6 (*1)
03 00 15#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
03 00 16#	0ccccccc	0,,,268435455block (1block=16sample)
03 00 17#	0ddddddd	
03 00 18	0aaaaaaa	LOCATE-7 (*1)
03 00 19#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
03 00 1A#	0ccccccc	0,,,268435455block (1block=16sample)
03 00 1B#	0ddddddd	
03 00 1C	0aaaaaaa	LOCATE-8 (*1)
03 00 1D#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
03 00 1E#	0ccccccc	0,,,268435455block (1block=16sample)
03 00 1F#	0ddddddd	
03 00 20	0aaaaaaa	Loop Start Point (*1,2)
03 00 21#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
03 00 22#	0ccccccc	0,,,268435455block (1block=16sample)
03 00 23#	0ddddddd	
03 00 24	0aaaaaaa	Loop End Point (*1,2)
03 00 25#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
03 00 26#	0ccccccc	0,,,268435455block (1block=16sample)
03 00 27#	0ddddddd	
03 00 28	0aaaaaaa	Punch In Point (*1,2)
03 00 29#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =

03 00 2A#	0ccccccc	0,,,268435455block (1block=16sample)
03 00 2B#	0ddddddd	
03 00 2C	0aaaaaaa	Punch Out Point (*1,2)
03 00 2D#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
03 00 2E#	0ccccccc	0,,,268435455block (1block=16sample)
03 00 2F#	0ddddddd	
03 01 00	0aaaaaaa	Marker Time or Marker Number (*1,3)
03 01 01#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
03 01 02#	0ccccccc	0,,,268435455block (1block=16sample)
03 01 03#	0ddddddd	or 0,,,999 Marker Number, >=1000 All
03 01 04	00 - 04	Marker/Locator Command 00=Marker Read (*3) 01=Marker Write (*3) 02=Marker Clear (*3) 03 = Get Locate Bank (*4) 04 = Set Locate Bank (*4)

(*) The address marked by "#" are invalid. Transmit the Data Set(DT1) or Data Request(RQ1) message with the specified size to the address without "#" mark.

(*) Time parameters are set to the relocated time(REL) that the time of song top is "00:00:00:00"

(*1) The VS-1680 treats the 16 samples as 1 block for managing internal time. Pay attention to the expression of the internal time changes respond to the sampling frequency of each song. And time parameter can not be set to over 24 hours.

Example 1) Set the time 00:01:00:00 (30 Non-Drop)
Sampling Frequency is 48 kHz :
2880000 sample = 180000 block = 00 0A 7E 20 (7bit Hex)

Sampling Frequency is 44.1 kHz :
2646000 sample = 165375 block = 00 0A 0B 7F (7bit Hex)

Sampling Frequency is 32 kHz :
1920000 sample = 120000 block = 00 07 29 40 (7bit Hex)

Example 2) Set the time 23:59:59:29 (30 Non-Drop)
Sampling Frequency is 48 kHz :
4147198400 sample = 259199900 block = 7B 4C 27 1C (7bit Hex)

Sampling Frequency is 44.1 kHz :
3810238530 sample = 238139908 block = 71 46 74 04 (7bit Hex)

Sampling Frequency is 32 kHz :
2764798933 sample = 172799933 block = 52 32 6F 3D (7bit Hex)

(*2) The Loop Start point must be before the Loop Stop point. The Auto Punch In point must be before the Auto Punch Out point. If the interval of each point is shorter than 1 sec, the VS-1680 does not work correctly.

(*3) Read/Write/Erase of the Mark points are done by writing operation mode to the Marker command. Set the value of the Marker Time and Marker

```
Number, before setting the value of the Marker command.

  Example 1) Delete all mark points ( DeviceID = 10 )

  (HOST)  =>  F0 41 10 00 0E 12 03 01 00 7F 7F 7F 7F 7A F7  =>  (VS-1680)
  (HOST)  =>  F0 41 10 00 0E 12 03 01 04 02 74 F7           =>  (VS-1680)
  (HOST)  <=  F0 41 10 00 0E 12 03 01 00 00 00 00 00 ss F7  <=  (VS-1680)

The return value "00000000" is a sum of mark points.

Example 2) Write the mark point ( DeviceID = 10 )

  (HOST)  =>  F0 41 10 00 0E 12 03 01 00 aa aa aa aa ss F7  =>  (VS-1680)
              aaaaaaaa = time of Marker
  (HOST)  =>  F0 41 10 00 0E 12 03 01 04 01 75 F7           =>  (VS-1680)
  (HOST)  <=  F0 41 10 00 0E 12 03 01 00 nn nn nn nn ss F7  <=  (VS-1680)
              nnnn = total marker number, ss = check sum

 If the total of mark point is over 1000, the VS-1680 ignores the
    writing and returns the total numbers of the mark points.
    If the mark point already exists 0.1 msec near the new mark point, the
    VS-1680 ignores the writing and returns the total numbers of the mark
    points.

  Example 3) Read the mark point #3 ( DeviceID = 10 )

  (HOST)  =>  F0 41 10 00 0E 12 03 01 00 00 00 00 03 75 F7  =>  (VS-1680)
  (HOST)  =>  F0 41 10 00 0E 12 03 01 04 00 76 F7           =>  (VS-1680)
  (HOST)  <=  F0 41 10 00 0E 12 03 01 00 nn nn nn nn ss F7  <=  (VS-1680)
              nnnnnnnn = total marker number, ss = check sum
  (HOST)  <=  F0 41 10 00 0E 12 03 01 00 aa aa aa aa ss F7  <=  (VS-1680)
              aaaaaaaa = time of Marker #3

If the mark point is less than 3, the VS-1680 does not return the block
    of "aaaaaaaa".

  Example 4) Read all mark points ( DeviceID = 10 )

  (HOST)  =>  F0 41 10 00 0E 12 03 01 00 7F 7F 7F 7F 7A F7  =>  (VS-1680)
              7F7F7F7F(>= 1000) means All marker
  (HOST)  =>  F0 41 10 00 0E 12 03 01 04 00 76 F7           =>  (VS-1680)
  (HOST)  <=  F0 41 10 00 0E 12 03 01 00 nn nn nn nn ss F7  <=  (VS-1680)
              nnnnnnnn = total marker number, ss = check sum
  (HOST)  <=  F0 41 10 00 0E 12 03 01 00 aa aa aa aa ss F7  <=  (VS-1680)
              aaaaaaaa = time of Marker #1
  (HOST)  <=  F0 41 10 00 0E 12 03 01 00 bb bb bb bb ss F7  <=  (VS-1680)
              bbbbbbbb = time of Marker #2
                       :
  (HOST)  <=  F0 41 10 00 0E 12 03 01 00 xx xx xx xx ss F7  <=  (VS-1680)
              xxxxxxxx = time of the last Marker#

If the mark point does not exist, the VS-1680 does not return blocks
    under "aaaaaaaa".

  Example 5) Delete the mark point ( DeviceID = 10 )

  (HOST)  =>  F0 41 10 00 0E 12 03 01 00 aa aa aa aa ss F7  =>  (VS-1680)
              aaaaaaaa = time of Marker
  (HOST)  =>  F0 41 10 00 0E 12 03 01 04 02 74 F7           =>  (VS-1680)
  (HOST)  <=  F0 41 10 00 0E 12 03 01 00 nn nn nn nn ss F7  <=  (VS-1680)
              nnnn = total marker number, ss = check sum
```

The VS-1680 deletes the mark point which includes specified time, and
    returns the total numbers of the mark points.

(*4) Write Locate data into a bank memory (Set Locate Bank), and read from
a bank memory (Get Locate Bank), according to the Locate Bank number (0-3)
set in Marker Number.

(o)Effect parameters

<>Basic Address

Start address	Contents and remarks
04 00 00	0aaaaaaa	Effector - 1 Algorithm aaaaaaabbbbbbb =
04 00 01#	0bbbbbbb	(0:Reverb *1)
		1:Delay
		2:Stereo Delay Chorus
		3:Stereo Pitch Shifter Delay
		4:Vocoder
		5:2ch RSS
		6:Delay RSS
		7:Chorus RSS
		8:Guitar Multi 1
		9:Guitar Multi 2
		10:Guitar Multi 3
		11:Vocal Multi
		12:Rotary
		13:Guitar Amp Simulator
		14:Stereo Phaser
		15:Stereo Flanger
		16:Dual Comp/Limiter
		(17:Gate Reverb *1)
		18:Multi Tap Delay
		19:Stereo Multi
		20:Reverb 2
		21:Space Chorus
		22:Lo-Fi Processor
		23:4Band Parametric Equalizer
		24:10Band Graphic Equalizer
		25:Hum Canceler
		26:Vocal Canceler
		(27:Voice Transfomer *1,*2)
		(28:Vocoder 2 *1,*2)
		29:Mic Simulater
		30:3Band Isolator
		31:Tape Echo 201
		32:Analog Flanger
		33:Analog Phaser
		34:Speaker Modeling
		(35:Mastering Tool Kit *1,*2)
04 00 02	20 - 7E	Effector - 1 Name -1 (ASCII)
:	:	:
04 00 0D	20 - 7E	Effector - 1 Name -12
04 00 0E	00 - 7F	Effector - 1 Parameter Area (See Below)
:	:	:

04 00 7F	00 - 7F	
04 01 00	0aaaaaaa	Effector - 2 Algorithm aaaaaaabbbbbbb =
04 01 01#	0bbbbbbb	(0:Reverb *1)
		1:Delay
		2:Stereo Delay Chorus
		3:Stereo Pitch Shifter Delay
		4:Vocoder
		5:2ch RSS
		6:Delay RSS
		7:Chorus RSS
		8:Guitar Multi 1
		9:Guitar Multi 2
		10:Guitar Multi 3
		11:Vocal Multi
		12:Rotary
		13:Guitar Amp Simulator
		14:Stereo Phaser
		15:Stereo Flanger
		16:Dual Comp/Limiter
		(17:Gate Reverb *1)
		18:Multi Tap Delay
		19:Stereo Multi
		20:Reverb 2
		21:Space Chorus
		22:Lo-Fi Processor
		23:4Band Parametric Equalizer
		24:10Band Graphic Equalizer
		25:Hum Canceler
		26:Vocal Canceler
		(27:Voice Transfomer *1,*2)
		(28:Vocoder 2 *1,*2)
		29:Mic Simulater
		30:3Band Isolator
		31:Tape Echo 201
		32:Analog Flanger
		33:Analog Phaser
		34:Speaker Modeling
		(35:Mastering Tool Kit *1,*2)
04 01 02	20 - 7E	Effector - 2 Name -1 (ASCII)
:	:	:
04 01 0D	20 - 7E	Effector - 2 Name -12
04 01 0E	20 - 7E	Effector - 2 Parameter Area (See Below)
:	:	:
04 01 7F	20 - 7E	
04 02 00	0aaaaaaa	Effector - 3 Algorithm aaaaaaabbbbbbb =
04 02 01#	0bbbbbbb	(0:Reverb *1)
		1:Delay
		2:Stereo Delay Chorus
		3:Stereo Pitch Shifter Delay
		4:Vocoder
		5:2ch RSS
		6:Delay RSS
		7:Chorus RSS
		8:Guitar Multi 1
		9:Guitar Multi 2
		10:Guitar Multi 3
		11:Vocal Multi

		12:Rotary	
		13:Guitar Amp Simulator	
		14:Stereo Phaser	
		15:Stereo Flanger	
		16:Dual Comp/Limiter	
		(17:Gate Reverb *1)	
		18:Multi Tap Delay	
		19:Stereo Multi	
		20:Reverb 2	
		21:Space Chorus	
		22:Lo-Fi Processor	
		23:4Band Parametric Equalizer	
		24:10Band Graphic Equalizer	
		25:Hum Canceler	
		26:Vocal Canceler	
		(27:Voice Transfomer *1,*2)	
		(28:Vocoder 2 *1,*2)	
		29:Mic Simulater	
		30:3Band Isolator	
		31:Tape Echo 201	
		32:Analog Flanger	
		33:Analog Phaser	
		34:Speaker Modeling	
		(35:Mastering Tool Kit *1,*2)	
04 02 02	20 - 7E	Effector - 3 Name -1 (ASCII)	
:	:	:	
04 02 0D	20 - 7E	Effector - 3 Name -12	
04 02 0E	20 - 7E	Effector - 3 Parameter Area (See Below)	
:	:	:	
04 02 7F	20 - 7E		
04 03 00	0aaaaaaa	Effector - 4 Algorithm aaaaaaabbbbbbb =	
04 03 01#	0bbbbbbb	(0:Reverb *1)	
		1:Delay	
		2:Stereo Delay Chorus	
		3:Stereo Pitch Shifter Delay	
		4:Vocoder	
		5:2ch RSS	
		6:Delay RSS	
		7:Chorus RSS	
		8:Guitar Multi 1	
		9:Guitar Multi 2	
		10:Guitar Multi 3	
		11:Vocal Multi	
		12:Rotary	
		13:Guitar Amp Simulator	
		14:Stereo Phaser	
		15:Stereo Flanger	
		16:Dual Comp/Limiter	
		(17:Gate Reverb *1)	
		18:Multi Tap Delay	
		19:Stereo Multi	
		20:Reverb 2	
		21:Space Chorus	
		22:Lo-Fi Processor	
		23:4Band Parametric Equalizer	
		24:10Band Graphic Equalizer	
		25:Hum Canceler	
		26:Vocal Canceler	

		(27:Voice Transfomer *1,*2)
		(28:Vocoder 2 *1,*2)
		29:Mic Simulater
		30:3Band Isolator
		31:Tape Echo 201
		32:Analog Flanger
		33:Analog Phaser
		34:Speaker Modeling
		(35:Mastering Tool Kit *1,*2)
04 03 02	20 - 7E	Effector - 4 Name -1 (ASCII)
:	:	:
04 03 0D	20 - 7E	Effector - 4 Name -12
04 03 0E	20 - 7E	Effector - 4 Parameter Area (See Below)
:	:	:
04 03 7F	20 - 7E	

(*1) can not select "0:Reverb", "17:Gate Reverb", "27:Voice Transformer" or "28:Vocoder2" on Effect-2,4

(*2) If 27:Voice Transformer or 28:Vocoder2 is selected at Effect-1, Effect-2
is invalid.

(*) Two same parameters exist with two system Effects.

(*) A meaning of the parameter area changes correspond with the top of parameter of Effect Algorithm. See the following tables. The address shows at Effect-1.

(*) If select the different Algorithm type from current one, all parameters will be copied from the preset patch data which selected Algorithm.

<>Algorithm 0 Reverb (EFX1 & EFX3 Only)

04 00 0E	0aaaaaaa	EQ SW
04 00 0F#	0bbbbbbb	0,1 = Off,On
04 00 10	0aaaaaaa	EQ: Low EQ Type
04 00 11#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 12	0aaaaaaa	EQ: Low EQ Gain
04 00 13#	0bbbbbbb	-12,,,12dB
04 00 14	0aaaaaaa	EQ: Low EQ Frequency
04 00 15#	0bbbbbbb	2,,,200 = 20,,,2000Hz
04 00 16	0aaaaaaa	EQ: Low EQ Q
04 00 17#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 18	0aaaaaaa	EQ: Mid EQ Gain
04 00 19#	0bbbbbbb	-12,,,12dB
04 00 1A	0aaaaaaa	EQ: Mid EQ Frequency
04 00 1B#	0bbbbbbb	20...800 = 200...8000Hz

04 00 1C	0aaaaaaa	EQ: Mid EQ Q
04 00 1D#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 1E	0aaaaaaa	EQ: High EQ Type
04 00 1F#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 20	0aaaaaaa	EQ: High EQ Gain
04 00 21#	0bbbbbbb	-12,,,12dB
04 00 22	0aaaaaaa	EQ: High EQ Frequency
04 00 23#	0bbbbbbb	14,,,200 = 1.4,,,20.0kHz
04 00 24	0aaaaaaa	EQ: High EQ Q
04 00 25#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 26	0aaaaaaa	EQ: Out Level
04 00 27#	0bbbbbbb	0,,,100
04 00 28	0aaaaaaa	Reverb: Room Size
04 00 29#	0bbbbbbb	5,,,40m
04 00 2A	0aaaaaaa	Reverb: Reverb Time
04 00 2B#	0bbbbbbb	1,,,320 = 0.1,,,32.0s
04 00 2C	0aaaaaaa	Reverb: Pre Dealy
04 00 2D#	0bbbbbbb	0,,,200 = 0,,,200ms
04 00 2E	0aaaaaaa	Reverb: Diffusion
04 00 2F#	0bbbbbbb	0,,,100
04 00 30	0aaaaaaa	Reverb: Density
04 00 31#	0bbbbbbb	0,,,100
04 00 32	0aaaaaaa	Reverb: Early Reflection Level
04 00 33#	0bbbbbbb	0,,,100
04 00 34	0aaaaaaa	Reverb: LF Damp Frequency
04 00 35#	0bbbbbbb	5,,,400 = 50,,,4000Hz
04 00 36	0aaaaaaa	Reverb: LF Damp Gain
04 00 37#	0bbbbbbb	-36,,,0dB
04 00 38	0aaaaaaa	Reverb: HF Damp Frequency
04 00 39#	0bbbbbbb	10,,,200 = 1.0,,,20.0kHz
04 00 3A	0aaaaaaa	Reverb: HF Damp Gain
04 00 3B#	0bbbbbbb	-36,,,0dB
04 00 3C	0aaaaaaa	Reverb: HI Cut Frequency
04 00 3D#	0bbbbbbb	2,,,200 = 0.2,,,20.0kHz
04 00 3E	0aaaaaaa	Reverb: Effect Level
04 00 3F#	0bbbbbbb	-100,,,100
04 00 40	0aaaaaaa	Reverb: Direct Level
04 00 41#	0bbbbbbb	-100,,,100
04 00 42	00	(Reserved)
:	:	
04 00 7F	00	

<>Algorithm 1 Delay

04 00 0E	0aaaaaaa	Delay SW
04 00 0F#	0bbbbbbb	0,1 = Off,On
04 00 10	0aaaaaaa	EQ SW
04 00 11#	0bbbbbbb	0,1 = Off,On
04 00 12	0aaaaaaa	Delay: Delay Time
04 00 13#	0bbbbbbb	0,,,1200ms
04 00 14	0aaaaaaa	Delay: Shift
04 00 15#	0bbbbbbb	-1200,,,1200 = L1200,,,R1200ms
04 00 16	0aaaaaaa	Delay: Lch Feedback Level
04 00 17#	0bbbbbbb	-100,,,100
04 00 18	0aaaaaaa	Delay: Rch Feedback Level
04 00 19#	0bbbbbbb	-100,,,100
04 00 1A	0aaaaaaa	Delay: Lch Level
04 00 1B#	0bbbbbbb	-100,,,100
04 00 1C	0aaaaaaa	Delay: Rch Level
04 00 1D#	0bbbbbbb	-100,,,100
04 00 1E	0aaaaaaa	Delay: LF Damp Frequency
04 00 1F#	0bbbbbbb	5,,,400 = 50,,,4000Hz
04 00 20	0aaaaaaa	Delay: LF Damp Gain
04 00 21#	0bbbbbbb	-36,,,0dB
04 00 22	0aaaaaaa	Delay: HF Damp Frequency
04 00 23#	0bbbbbbb	10,,,200 = 1.0,,,20.0kHz
04 00 24	0aaaaaaa	Delay: HF Damp Gain
04 00 25#	0bbbbbbb	-36,,,0dB
04 00 26	0aaaaaaa	Delay: Direct Level
04 00 27#	0bbbbbbb	-100,,,100
04 00 28	0aaaaaaa	EQ: Low EQ Type
04 00 29#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 2A	0aaaaaaa	EQ: Low EQ Gain
04 00 2B#	0bbbbbbb	-12,,,12dB
04 00 2C	0aaaaaaa	EQ: Low EQ Frequency
04 00 2D#	0bbbbbbb	2,,,200 = 20,,,2000Hz
04 00 2E	0aaaaaaa	EQ: Low EQ Q
04 00 2F#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 30	0aaaaaaa	EQ: Mid EQ Gain
04 00 31#	0bbbbbbb	-12,,,12dB
04 00 32	0aaaaaaa	EQ: Mid EQ Frequency

04 00 33#	0bbbbbbb		20,,,800 = 200,,,8000Hz
04 00 34	0aaaaaaa	EQ: Mid EQ Q	
04 00 35#	0bbbbbbb		3,,,100 = 0.3,,,10.0
04 00 36	0aaaaaaa	EQ: High EQ Type	
04 00 37#	0bbbbbbb		0,1 = Shelving, Peaking
04 00 38	0aaaaaaa	EQ: High EQ Gain	
04 00 39#	0bbbbbbb		-12,,,12dB
04 00 3A	0aaaaaaa	EQ: High EQ Frequency	
04 00 3B#	0bbbbbbb		14,,,200 = 1.4,,,20.0kHz
04 00 3C	0aaaaaaa	EQ: High EQ Q	
04 00 3D#	0bbbbbbb		3,,,100 = 0.3,,,10.0
04 00 3E	0aaaaaaa	EQ: Out Level	
04 00 3F#	0bbbbbbb		0,,,100
04 00 40	00	(Reserved)	
:		:	
04 00 7F	00		

™-(Delay Time) + (Absolute Shift) should be 1200 or less.

<>Algorithm 2 Stereo Delay Chorus

04 00 0E	0aaaaaaa	Delay SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Chorus SW	
04 00 11#	0bbbbbbb		0,1 = Off,On
04 00 12	0aaaaaaa	EQ SW	
04 00 13#	0bbbbbbb		0,1 = Off,On
04 00 14	0aaaaaaa	Delay: Delay Time	
04 00 15#	0bbbbbbb		0,,,500ms
04 00 16	0aaaaaaa	Delay: Shift	
04 00 17#	0bbbbbbb		-500,,,500 = L500,,,R500ms
04 00 18	0aaaaaaa	Delay: Lch Feedback Level	
04 00 19#	0bbbbbbb		-100,,,100
04 00 1A	0aaaaaaa	Delay: Rch Feedback Level	
04 00 1B#	0bbbbbbb		-100,,,100
04 00 1C	0aaaaaaa	Delay: Lch Cross Feedback Level	
04 00 1D#	0bbbbbbb		-100,,,100
04 00 1E	0aaaaaaa	Delay: Rch Cross Feedback Level	
04 00 1F#	0bbbbbbb		-100,,,100
04 00 20	0aaaaaaa	Delay: Effect Level	
04 00 21#	0bbbbbbb		-100...100

04 00 22	0aaaaaaa	Delay: Direct Level
04 00 23#	0bbbbbbb	-100,,,100
04 00 24	0aaaaaaa	Chorus: Rate
04 00 25#	0bbbbbbb	1,,,100 = 0.1,,,10.0Hz
04 00 26	0aaaaaaa	Chorus: Depth
04 00 27#	0bbbbbbb	0,,,100
04 00 28	0aaaaaaa	Chorus: Pre Delay
04 00 29#	0bbbbbbb	0,,,50ms
04 00 2A	0aaaaaaa	Chorus: Effect Level
04 00 2B#	0bbbbbbb	-100,,,100
04 00 2C	0aaaaaaa	Chorus: Direct Level
04 00 2D#	0bbbbbbb	-100,,,100
04 00 2E	0aaaaaaa	Chorus: Lch Feedback Level
04 00 2F#	0bbbbbbb	-100,,,100
04 00 30	0aaaaaaa	Chorus: Rch Feedback Level
04 00 31#	0bbbbbbb	-100,,,100
04 00 32	0aaaaaaa	Chorus: Lch Cross Feedback Level
04 00 33#	0bbbbbbb	-100,,,100
04 00 34	0aaaaaaa	Chorus: Rch Cross Feedback Level
04 00 35#	0bbbbbbb	-100,,,100
04 00 36	0aaaaaaa	EQ: Low EQ Type
04 00 37#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 38	0aaaaaaa	EQ: Low EQ Gain
04 00 39#	0bbbbbbb	-12,,,12dB
04 00 3A	0aaaaaaa	EQ: Low EQ Frequency
04 00 3B#	0bbbbbbb	2,,,200 = 20,,,2000Hz
04 00 3C	0aaaaaaa	EQ: Low EQ Q
04 00 3D#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 3E	0aaaaaaa	EQ: Mid EQ Gain
04 00 3F#	0bbbbbbb	-12,,,12dB
04 00 40	0aaaaaaa	EQ: Mid EQ Frequency
04 00 41#	0bbbbbbb	20,,,800 = 200,,,8000Hz
04 00 42	0aaaaaaa	EQ: Mid EQ Q
04 00 43#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 44	0aaaaaaa	EQ: High EQ Type
04 00 45#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 46	0aaaaaaa	EQ: High EQ Gain
04 00 47#	0bbbbbbb	-12,,,12dB
04 00 48	0aaaaaaa	EQ: High EQ Frequency
04 00 49#	0bbbbbbb	14,,,200 = 1.4,,,20.0kHz

04 00 4A	0aaaaaaa	EQ: High EQ Q	
04 00 4B#	0bbbbbbb	3,,,100 = 0.3,,,10.0	
04 00 4C	0aaaaaaa	EQ: Out Level	
04 00 4D#	0bbbbbbb	0,,,100	
04 00 4E	00	(Reserved)	
:		:	
04 00 7F	00		

™- (Delay Time) + (Absolute Shift) should be 500 or less.

<>Algorithm 3 Stereo Pitch Shifter Delay

04 00 0E	0aaaaaaa	P.ShifterDelay SW	
04 00 0F#	0bbbbbbb	0,1 = Off,On	
04 00 10	0aaaaaaa	EQ SW	
04 00 11#	0bbbbbbb	0,1 = Off,On	
04 00 12	0aaaaaaa	P.ShifterDelay: Lch Chromatic Pitch	
04 00 13#	0bbbbbbb	-12,,,12	
04 00 14	0aaaaaaa	P.ShifterDelay: Lch Fine Pitch	
04 00 15#	0bbbbbbb	-100,,,100	
04 00 16	0aaaaaaa	P.ShifterDelay: Lch Pre Delay	
04 00 17#	0bbbbbbb	0,,,50ms	
04 00 18	0aaaaaaa	P.ShifterDelay: Lch Feedback Delay Time	
04 00 19#	0bbbbbbb	0,,,500ms	
04 00 1A	0aaaaaaa	P.ShifterDelay: Lch Feedback Level	
04 00 1B#	0bbbbbbb	-100,,,100	
04 00 1C	0aaaaaaa	P.ShifterDelay: Lch Cross Feedback Level	
04 00 1D#	0bbbbbbb	-100,,,100	
04 00 1E	0aaaaaaa	P.ShifterDelay: Rch Chromatic Pitch	
04 00 1F#	0bbbbbbb	-12,,,12	
04 00 20	0aaaaaaa	P.ShifterDelay: Rch Fine Pitch	
04 00 21#	0bbbbbbb	-100,,,100	
04 00 22	0aaaaaaa	P.ShifterDelay: Rch Pre Delay	
04 00 23#	0bbbbbbb	0,,,50ms	
04 00 24	0aaaaaaa	P.ShifterDelay: Rch Feedback Delay Time	
04 00 25#	0bbbbbbb	0,,,500ms	
04 00 26	0aaaaaaa	P.ShifterDelay: Rch Feedback Level	
04 00 27#	0bbbbbbb	-100,,,100	
04 00 28	0aaaaaaa	P.ShifterDelay: Rch Cross Feedback Level	
04 00 29#	0bbbbbbb	-100,,,100	
04 00 2A	0aaaaaaa	P.ShifterDelay: Effect Level	
04 00 2B#	0bbbbbbb	-100...100	

04 00 2C	0aaaaaaa	P.ShifterDelay: Direct Level
04 00 2D#	0bbbbbbb	-100,,,100
04 00 2E	0aaaaaaa	EQ: Low EQ Type
04 00 2F#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 30	0aaaaaaa	EQ: Low EQ Gain
04 00 31#	0bbbbbbb	-12,,,12dB
04 00 32	0aaaaaaa	EQ: Low EQ Frequency
04 00 33#	0bbbbbbb	2,,,200 = 20,,,2000Hz
04 00 34	0aaaaaaa	EQ: Low EQ Q
04 00 35#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 36	0aaaaaaa	EQ: Mid EQ Gain
04 00 37#	0bbbbbbb	-12,,,12dB
04 00 38	0aaaaaaa	EQ: Mid EQ Frequency
04 00 39#	0bbbbbbb	20,,,800 = 200,,,8000Hz
04 00 3A	0aaaaaaa	EQ: Mid EQ Q
04 00 3B#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 3C	0aaaaaaa	EQ: High EQ Type
04 00 3D#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 3E	0aaaaaaa	EQ: High EQ Gain
04 00 3F#	0bbbbbbb	-12,,,12dB
04 00 40	0aaaaaaa	EQ: High EQ Frequency
04 00 41#	0bbbbbbb	14,,,200 = 1.4,,,20.0kHz
04 00 42	0aaaaaaa	EQ: High EQ Q
04 00 43#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 44	0aaaaaaa	EQ: Out Level
04 00 45#	0bbbbbbb	0,,,100
04 00 46	00	(Reserved)
:		:
04 00 7F	00	

<>Algorithm 4 Vocoder

04 00 0E	0aaaaaaa	Chorus SW
04 00 0F#	0bbbbbbb	0,1 = Off,On
04 00 10	0aaaaaaa	Vocoder: Voice Character 1
04 00 11#	0bbbbbbb	0,,,100
04 00 12	0aaaaaaa	Vocoder: Voice Character 2
04 00 13#	0bbbbbbb	0,,,100
04 00 14	0aaaaaaa	Vocoder: Voice Character 3
04 00 15#	0bbbbbbb	0,,,100

04 00 16	0aaaaaaa	Vocoder: Voice Character 4	
04 00 17#	0bbbbbbb		0,,,100
04 00 18	0aaaaaaa	Vocoder: Voice Character 5	
04 00 19#	0bbbbbbb		0,,,100
04 00 1A	0aaaaaaa	Vocoder: Voice Character 6	
04 00 1B#	0bbbbbbb		0,,,100
04 00 1C	0aaaaaaa	Vocoder: Voice Character 7	
04 00 1D#	0bbbbbbb		0,,,100
04 00 1E	0aaaaaaa	Vocoder: Voice Character 8	
04 00 1F#	0bbbbbbb		0,,,100
04 00 20	0aaaaaaa	Vocoder: Voice Character 9	
04 00 21#	0bbbbbbb		0,,,100
04 00 22	0aaaaaaa	Vocoder: Voice Character 10	
04 00 23#	0bbbbbbb		0,,,100
04 00 24	0aaaaaaa	Chorus: Rate	
04 00 25#	0bbbbbbb		1,,,100 = 0.1,,,10.0Hz
04 00 26	0aaaaaaa	Chorus: Depth	
04 00 27#	0bbbbbbb		0,,,100
04 00 28	0aaaaaaa	Chorus: Pre Delay	
04 00 29#	0bbbbbbb		0,,,50ms
04 00 2A	0aaaaaaa	Chorus: Feedback Level	
04 00 2B#	0bbbbbbb		-100,,,100
04 00 2C	0aaaaaaa	Chorus: Effect Level	
04 00 2D#	0bbbbbbb		-100,,,100
04 00 2E	0aaaaaaa	Chorus: Direct Level	
04 00 2F#	0bbbbbbb		-100,,,100
04 00 30	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 5 2CH RSS

04 00 0E	0aaaaaaa	2CH RSS: Ach Azimuth	
04 00 0F#	0bbbbbbb		-30,,,30 = -180,,,180
04 00 10	0aaaaaaa	2CH RSS: Ach Elevation	
04 00 11#	0bbbbbbb		-15,,,15 = -90,,,90
04 00 12	0aaaaaaa	2CH RSS: Bch Azimuth	
04 00 13#	0bbbbbbb		-30,,,30 = -180,,,180
04 00 14	0aaaaaaa	2CH RSS: Bch Elevation	
04 00 15#	0bbbbbbb		-15,,,15 = -90,,,90
04 00 16	00	(Reserved)	

:		:
04 00 7F	00	

<>Algorithm 6 Delay RSS

04 00 0E	0aaaaaaa	Delay RSS: Delay Time
04 00 0F#	0bbbbbbb	0,,,1200ms
04 00 10	0aaaaaaa	Delay RSS: Shift
04 00 11#	0bbbbbbb	-1200,,,1200 = L1200,,,R1200ms
04 00 12	0aaaaaaa	Delay RSS: Center Dealy Time
04 00 13#	0bbbbbbb	0,,,1200ms
04 00 14	0aaaaaaa	Delay RSS: RSS Level
04 00 15#	0bbbbbbb	0,,,100
04 00 16	0aaaaaaa	Delay RSS: Center Level
04 00 17#	0bbbbbbb	0,,,100
04 00 18	0aaaaaaa	Delay RSS: Feedback Level
04 00 19#	0bbbbbbb	-100,,,100
04 00 1A	0aaaaaaa	Delay RSS: LF Damp Frequency
04 00 1B#	0bbbbbbb	5,,,400 = 50,,,4000Hz
04 00 1C	0aaaaaaa	Delay RSS: LF Damp Gain
04 00 1D#	0bbbbbbb	-36,,,0dB
04 00 1E	0aaaaaaa	Delay RSS: HF Damp Frequency
04 00 1F#	0bbbbbbb	10,,,200 = 1.0,,,20.0kHz
04 00 20	0aaaaaaa	Delay RSS: HF Damp Gain
04 00 21#	0bbbbbbb	-36,,,0dB
04 00 22	0aaaaaaa	Delay RSS: Effect Level
04 00 23#	0bbbbbbb	-100,,,100
04 00 24	0aaaaaaa	Delay RSS: Direct Level
04 00 25#	0bbbbbbb	-100,,,100
04 00 26	00	(Reserved)
:		:
04 00 7F	00	

<>Algorithm 7 Chorus RSS

04 00 0E	0aaaaaaa	Chorus RSS: Chorus Rate
04 00 0F#	0bbbbbbb	1,,,100 = 0.1,,,10.0Hz
04 00 10	0aaaaaaa	Chorus RSS: Chorus Depth
04 00 11#	0bbbbbbb	0,,,100
04 00 12	0aaaaaaa	Chorus RSS: Effect Level
04 00 13#	0bbbbbbb	-100,,,100

04 00 14	0aaaaaaa	Chorus RSS: Direct Level
04 00 15#	0bbbbbbb	-100,,,100
04 00 16	00	(Reserved)
:		:
04 00 7F	00	

<>Common for Algorithm 8,9,10 Guitar Multi 1, 2, 3

04 00 0E	0aaaaaaa	Compressor SW
04 00 0F#	0bbbbbbb	0,1 = Off,On
04 00 10	0aaaaaaa	Metal/Distortion/Over Drive SW
04 00 11#	0bbbbbbb	0,1 = Off,On
04 00 12	0aaaaaaa	Noise Suppressor SW
04 00 13#	0bbbbbbb	0,1 = Off,On
04 00 14	0aaaaaaa	Auto Wah SW
04 00 15#	0bbbbbbb	0,1 = Off,On
04 00 16	0aaaaaaa	Guitar Amp Simulator SW
04 00 17#	0bbbbbbb	0,1 = Off,On
04 00 18	0aaaaaaa	Flanger SW
04 00 19#	0bbbbbbb	0,1 = Off,On
04 00 1A	0aaaaaaa	Delay SW
04 00 1B#	0bbbbbbb	0,1 = Off,On
04 00 1C	0aaaaaaa	Compressor: Attack
04 00 1D#	0bbbbbbb	0,,,100
04 00 1E	0aaaaaaa	Compressor: Level
04 00 1F#	0bbbbbbb	0,,,100
04 00 20	0aaaaaaa	Compressor: Sustain
04 00 21#	0bbbbbbb	0,,,100
04 00 22	0aaaaaaa	Compressor: Tone
04 00 23#	0bbbbbbb	-50,,,-50
04 00 24	0aaaaaaa	Noise Suppressor: Threshold
04 00 25#	0bbbbbbb	0,,,100
04 00 26	0aaaaaaa	Noise Suppressor: Release
04 00 27#	0bbbbbbb	0,,,100
04 00 28	0aaaaaaa	Auto Wah: Mode
04 00 29#	0bbbbbbb	0,1 = LPF,BPF
04 00 2A	0aaaaaaa	Auto Wah: Polarity
04 00 2B#	0bbbbbbb	0,1 = Down,Up
04 00 2C	0aaaaaaa	Auto Wah: Frequency
04 00 2D#	0bbbbbbb	0,,,100

04 00 2E	0aaaaaaa	Auto Wah: Level	
04 00 2F#	0bbbbbbb		0,,,100
04 00 30	0aaaaaaa	Auto Wah: Peak	
04 00 31#	0bbbbbbb		0,,,100
04 00 32	0aaaaaaa	Auto Wah: Sens	
04 00 33#	0bbbbbbb		0,,,100
04 00 34	0aaaaaaa	Auto Wah: Rate	
04 00 35#	0bbbbbbb		1,,,100 = 0.1,,,10.0Hz
04 00 36	0aaaaaaa	Auto Wah: Depth	
04 00 37#	0bbbbbbb		0,,,100
04 00 38	0aaaaaaa	Guitar Amp Simulator: Mode	
04 00 39#	0bbbbbbb		0,,,3 = Small,BultIn,2Stack,3Stack
04 00 3A	0aaaaaaa	Flanger: Rate	
04 00 3B#	0bbbbbbb		1,,,100 = 0.1,,,10.0Hz
04 00 3C	0aaaaaaa	Flanger: Depth	
04 00 3D#	0bbbbbbb		0,,,100
04 00 3E	0aaaaaaa	Flanger: Manual	
04 00 3F#	0bbbbbbb		0,,,100
04 00 40	0aaaaaaa	Flanger: Resonance	
04 00 41#	0bbbbbbb		0,,,100
04 00 42	0aaaaaaa	Delay: Delay Time	
04 00 43#	0bbbbbbb		0,,,1000ms
04 00 44	0aaaaaaa	Delay: Shift	
04 00 45#	0bbbbbbb		-1000,,,1000 = L1000,,,R1000ms
04 00 46	0aaaaaaa	Delay: Feedback Time	
04 00 47#	0bbbbbbb		0,,,1000ms
04 00 48	0aaaaaaa	Delay: Feedback Level	
04 00 49#	0bbbbbbb		-100,,,100
04 00 4A	0aaaaaaa	Delay: Effect Level	
04 00 4B#	0bbbbbbb		-100,,,100
04 00 4C	0aaaaaaa	Delay: Direct Level	
04 00 4D#	0bbbbbbb		-100,,,100

™- (Delay Time) + (Absolute Shift) should be 1000 or less.

<>Individual : Algorithm 8 Guitar Multi 1

04 00 4E	0aaaaaaa	Metal: Gain	
04 00 4F#	0bbbbbbb		0,,,100
04 00 50	0aaaaaaa	Metal: Level	
04 00 51#	0bbbbbbb		0,,,100

04 00 52	0aaaaaaa	Metal: Hi Gain	
04 00 53#	0bbbbbbb		-100,,,100
04 00 54	0aaaaaaa	Metal: Mid Gain	
04 00 55#	0bbbbbbb		-100,,,100
04 00 56	0aaaaaaa	Metal: Low Gain	
04 00 57#	0bbbbbbb		-100,,,100
04 00 58	00	(Reserved)	
:		:	
04 00 7F	00		

<>Individual : Algorithm 9 Guitar Multi 2

04 00 4E	0aaaaaaa	Distortion: Gain	
04 00 4F#	0bbbbbbb		0,,,100
04 00 50	0aaaaaaa	Distortion: Level	
04 00 51#	0bbbbbbb		0,,,100
04 00 52	0aaaaaaa	Distortion: Tone	
04 00 53#	0bbbbbbb		0,,,100
04 00 54	00	(Reserved)	
:		:	
04 00 7F	00		

<>Individual : Algorithm 10 Guitar Multi 3

04 00 4E	0aaaaaaa	Over Drive: Gain	
04 00 4F#	0bbbbbbb		0,,,100
04 00 50	0aaaaaaa	Over Drive: Level	
04 00 51#	0bbbbbbb		0,,,100
04 00 52	0aaaaaaa	Over Drive: Tone	
04 00 53#	0bbbbbbb		0,,,100
04 00 54	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 11 Vocal Multi

04 00 0E	0aaaaaaa	Noise Suppressor SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Limitter/De-esser SW	
04 00 11#	0bbbbbbb		0,1 = Off,On
04 00 12	0aaaaaaa	Enhancer SW	

04 00 13#	0bbbbbbb	0,1 = Off,On
04 00 14	0aaaaaaa	EQ SW
04 00 15#	0bbbbbbb	0,1 = Off,On
04 00 16	0aaaaaaa	P.Shifter SW
04 00 17#	0bbbbbbb	0,1 = Off,On
04 00 18	0aaaaaaa	Delay SW
04 00 19#	0bbbbbbb	0,1 = Off,On
04 00 1A	0aaaaaaa	Chorus SW
04 00 1B#	0bbbbbbb	0,1 = Off,On
04 00 1C	0aaaaaaa	Limiter/De-essor Mode
04 00 1D#	0bbbbbbb	0,1 = Limiter,De-essor
04 00 1E	0aaaaaaa	Noise Suppressor: Threshold
04 00 1F#	0bbbbbbb	0,,,100
04 00 20	0aaaaaaa	Noise Suppressor: Release
04 00 21#	0bbbbbbb	0,,,100
04 00 22	0aaaaaaa	Limiter: Threshold
04 00 23#	0bbbbbbb	0,,,100
04 00 24	0aaaaaaa	Limiter: Release
04 00 25#	0bbbbbbb	0,,,100
04 00 26	0aaaaaaa	Limiter: Level
04 00 27#	0bbbbbbb	0,,,100
04 00 28	0aaaaaaa	De-essor: Sens
04 00 29#	0bbbbbbb	0,,,100
04 00 2A	0aaaaaaa	De-essor: Frequency
04 00 2B#	0bbbbbbb	10,,,100 = 1.0,,,10.0kHz
04 00 2C	0aaaaaaa	Enhancer: Sens
04 00 2D#	0bbbbbbb	0,,,100
04 00 2E	0aaaaaaa	Enhancer: Frequency
04 00 2F#	0bbbbbbb	10,,,100 = 1.0,,,10.0kHz
04 00 30	0aaaaaaa	Enhancer: MIX Level
04 00 31#	0bbbbbbb	0,,,100
04 00 32	0aaaaaaa	Enhancer: Level
04 00 33#	0bbbbbbb	0,,,100
04 00 34	0aaaaaaa	EQ: Low EQ Type
04 00 35#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 36	0aaaaaaa	EQ: Low EQ Gain
04 00 37#	0bbbbbbb	-12,,,12dB
04 00 38	0aaaaaaa	EQ: Low EQ Frequency
04 00 39#	0bbbbbbb	2,,,200 = 20,,,2000Hz
04 00 3A	0aaaaaaa	EQ: Low EQ Q
04 00 3B#	0bbbbbbb	3...100 = 0.3...10.0

04 00 3C	0aaaaaaa	EQ: Mid EQ Gain
04 00 3D#	0bbbbbbb	-12,,,12dB
04 00 3E	0aaaaaaa	EQ: Mid EQ Frequency
04 00 3F#	0bbbbbbb	20,,,800 = 200,,,8000Hz
04 00 40	0aaaaaaa	EQ: Mid EQ Q
04 00 41#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 42	0aaaaaaa	EQ: High EQ Type
04 00 43#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 44	0aaaaaaa	EQ: High EQ Gain
04 00 45#	0bbbbbbb	-12,,,12dB
04 00 46	0aaaaaaa	EQ: High EQ Frequency
04 00 47#	0bbbbbbb	14,,,200 = 1.4,,,20.0kHz
04 00 48	0aaaaaaa	EQ: High EQ Q
04 00 49#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 4A	0aaaaaaa	EQ: Out Level
04 00 4B#	0bbbbbbb	0,,,100
04 00 4C	0aaaaaaa	P.Shifter: Chromatic Pitch
04 00 4D#	0bbbbbbb	-12,,,12
04 00 4E	0aaaaaaa	P.Shifter: Fine Pitch
04 00 4F#	0bbbbbbb	-100,,,100
04 00 50	0aaaaaaa	P.Shifter: Effect Level
04 00 51#	0bbbbbbb	-100,,,100
04 00 52	0aaaaaaa	P.Shifter: Direct Level
04 00 53#	0bbbbbbb	-100,,,100
04 00 54	0aaaaaaa	Delay: Delay Time
04 00 55#	0bbbbbbb	0,,,1000
04 00 56	0aaaaaaa	Delay: Feedback Level
04 00 57#	0bbbbbbb	-100,,,100
04 00 58	0aaaaaaa	Delay: Effect Level
04 00 59#	0bbbbbbb	-100,,,100
04 00 5A	0aaaaaaa	Delay: Direct Level
04 00 5B#	0bbbbbbb	-100,,,100
04 00 5C	0aaaaaaa	Chorus: Rate
04 00 5D#	0bbbbbbb	1,,,100 = 0.1,,,10.0Hz
04 00 5E	0aaaaaaa	Chorus: Depth
04 00 5F#	0bbbbbbb	0,,,100
04 00 60	0aaaaaaa	Chorus: Pre Delay
04 00 61#	0bbbbbbb	0,,,50ms
04 00 62	0aaaaaaa	Chorus: Effect Level
04 00 63#	0bbbbbbb	-100,,,100

04 00 64	0aaaaaaa	Chorus: Direct Level	
04 00 65#	0bbbbbbb		-100,,,100
04 00 66	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 12 Rotary

04 00 0E	0aaaaaaa	Noise Suppressor SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Over Drive SW	
04 00 11#	0bbbbbbb		0,1 = Off,On
04 00 12	0aaaaaaa	Noise Suppressor: Threshold	
04 00 13#	0bbbbbbb		0,,,100
04 00 14	0aaaaaaa	Noise Suppressor: Release	
04 00 15#	0bbbbbbb		0,,,100
04 00 16	0aaaaaaa	Over Drive: Gain	
04 00 17#	0bbbbbbb		0,,,100
04 00 18	0aaaaaaa	Over Drive: Level	
04 00 19#	0bbbbbbb		0,,,100
04 00 1A	0aaaaaaa	Rotary: Low Rate	
04 00 1B#	0bbbbbbb		1,,,100 = 0.1,,,10.0Hz
04 00 1C	0aaaaaaa	Rotary: Hi Rate	
04 00 1D#	0bbbbbbb		1,,,100 = 0.1,,,10.0Hz
04 00 1E	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 13 Guitar AMP Simulator

04 00 0E	0aaaaaaa	Noise Suppressor SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Pre Amp SW	
04 00 11#	0bbbbbbb		0,1 = Off,On
04 00 12	0aaaaaaa	Speaker SW	
04 00 13#	0bbbbbbb		0,1 = Off,On
04 00 14	0aaaaaaa	Noise Suppressor: Threshold	
04 00 15#	0bbbbbbb		0,,,100
04 00 16	0aaaaaaa	Noise Suppressor: Release	
04 00 17#	0bbbbbbb		0,,,100
04 00 18	0aaaaaaa	Pre Amp: Mode	

04 00 19#	0bbbbbbb	0,,,13 = JC-120,Clean Twin,Match Drive,BG Lead, MS1959(I), MS1959(II), MS1959(I+II), SLDN Lead, Metal 5150, Metal Lead, OD-1, OD-2Turbo, Distortion, Fuzz
04 00 1A	0aaaaaaa	Pre Amp: Volume
04 00 1B#	0bbbbbbb	0,,,100
04 00 1C	0aaaaaaa	Pre Amp: Bass
04 00 1D#	0bbbbbbb	0,,,100
04 00 1E	0aaaaaaa	Pre Amp: Middle
04 00 1F#	0bbbbbbb	0,,,100
04 00 20	0aaaaaaa	Pre Amp: Treble
04 00 21#	0bbbbbbb	0,,,100
04 00 22	0aaaaaaa	Pre Amp: Presence
04 00 23#	0bbbbbbb	0,,,100
04 00 24	0aaaaaaa	Pre Amp: Master
04 00 25#	0bbbbbbb	0,,,100
04 00 26	0aaaaaaa	Pre Amp: Bright
04 00 27#	0bbbbbbb	0,1 = Off,On
04 00 28	0aaaaaaa	Pre Amp: Gain
04 00 29#	0bbbbbbb	0,1,2 = Low,Middle,High
04 00 2A	0aaaaaaa	Speaker: Type
04 00 2B#	0bbbbbbb	0,,,11 = Small. Middle, JC-120, Built In 1, Built In 2,Built In 3, Built In 4, BG Stack 1, BG Stack 2, MS Stack 1, MS Stack 2, Metal Stack
04 00 2C	0aaaaaaa	Speaker: MIC Setting
04 00 2D#	0bbbbbbb	0,1,2 = 1,2,3
04 00 2E	0aaaaaaa	Speaker: MIC Level
04 00 2F#	0bbbbbbb	0,,,100
04 00 30	0aaaaaaa	Speaker: Direct Level
04 00 31#	0bbbbbbb	0,,,100
04 00 32	00	(Reserved)
:	:	
04 00 7F	00	

(*) The "Pre Amp Middle" is invalid when "Mode" is "Match Drive".

(*) The "Pre Amp Presence" works counter to the Value(-100,,,0) when "Mode" is "Match Drive".

(*) The "Pre Amp Bright" is valid when "Mode" is "JC-120", "Clean Twin" or "BG Lead".

<>Algorithm 14 Stereo Phaser

04 00 0E	0aaaaaaa	Phaser SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	EQ SW	
04 00 11#	0bbbbbbb		0,1 = Off,On
04 00 12	0aaaaaaa	Phaser: Mode	
04 00 13#	0bbbbbbb		0,,,3 = 4.8.12.16stage
04 00 14	0aaaaaaa	Phaser: Rate	
04 00 15#	0bbbbbbb		1,,,100 = 0.1,,,10.0Hz
04 00 16	0aaaaaaa	Phaser: Depth	
04 00 17#	0bbbbbbb		0,,,100
04 00 18	0aaaaaaa	Phaser: Polarity	
04 00 19#	0bbbbbbb		0,1 = Inverse,Synchro
04 00 1A	0aaaaaaa	Phaser: Manual	
04 00 1B#	0bbbbbbb		0,,,100
04 00 1C	0aaaaaaa	Phaser: Resonance	
04 00 1D#	0bbbbbbb		0,,,100
04 00 1E	0aaaaaaa	Phaser: Cross Feedback	
04 00 1F#	0bbbbbbb		0,,,100
04 00 20	0aaaaaaa	Phaser: Effect Level	
04 00 21#	0bbbbbbb		-100,,,100
04 00 22	0aaaaaaa	Phaser: Direct Level	
04 00 23#	0bbbbbbb		-100,,,100
04 00 24	0aaaaaaa	EQ: Low EQ Type	
04 00 25#	0bbbbbbb		0,1 = Shelving, Peaking
04 00 26	0aaaaaaa	EQ: Low EQ Gain	
04 00 27#	0bbbbbbb		-12,,,12dB
04 00 28	0aaaaaaa	EQ: Low EQ Frequency	
04 00 29#	0bbbbbbb		2,,,200 = 20,,,2000Hz
04 00 2A	0aaaaaaa	EQ: Low EQ Q	
04 00 2B#	0bbbbbbb		3,,,100 = 0.3,,,10.0
04 00 2C	0aaaaaaa	EQ: Mid EQ Gain	
04 00 2D#	0bbbbbbb		-12,,,12dB
04 00 2E	0aaaaaaa	EQ: Mid EQ Frequency	
04 00 2F#	0bbbbbbb		20,,,800 = 200,,,8000Hz
04 00 30	0aaaaaaa	EQ: Mid EQ Q	
04 00 31#	0bbbbbbb		3,,,100 = 0.3,,,10.0
04 00 32	0aaaaaaa	EQ: High EQ Type	
04 00 33#	0bbbbbbb		0,1 = Shelving, Peaking
04 00 34	0aaaaaaa	EQ: High EQ Gain	
04 00 35#	0bbbbbbb		-12,,,12dB
04 00 36	0aaaaaaa	EQ: High EQ Frequency	

04 00 37#	0bbbbbbb	14,,,200 = 1.4,,,20.0kHz
04 00 38	0aaaaaaa	EQ: High EQ Q
04 00 39#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 3A	0aaaaaaa	EQ: Out Level
04 00 3B#	0bbbbbbb	0,,,100
04 00 3C	00	(Reserved)
:	:	
04 00 7F	00	

<>Algorithm 15 Stereo Flanger

04 00 0E	0aaaaaaa	Flanger SW
04 00 0F#	0bbbbbbb	0,1 = Off,On
04 00 10	0aaaaaaa	EQ SW
04 00 11#	0bbbbbbb	0,1 = Off,On
04 00 12	0aaaaaaa	Flanger: Rate
04 00 13#	0bbbbbbb	1,,,100 = 0.1,,,10.0Hz
04 00 14	0aaaaaaa	Flanger: Depth
04 00 15#	0bbbbbbb	0,,,100
04 00 16	0aaaaaaa	Flanger: Polarity
04 00 17#	0bbbbbbb	0,1 = Inverse,Synchro
04 00 18	0aaaaaaa	Flanger: Manual
04 00 19#	0bbbbbbb	0,,,100
04 00 1A	0aaaaaaa	Flanger: Resonace
04 00 1B#	0bbbbbbb	0,,,100
04 00 1C	0aaaaaaa	Flanger: Cross Feedback Level
04 00 1D#	0bbbbbbb	0,,,100
04 00 1E	0aaaaaaa	Flanger: Effect Level
04 00 1F#	0bbbbbbb	-100,,,100
04 00 20	0aaaaaaa	Flanger: Direct Level
04 00 21#	0bbbbbbb	-100,,,100
04 00 22	0aaaaaaa	EQ: Low EQ Type
04 00 23#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 24	0aaaaaaa	EQ: Low EQ Gain
04 00 25#	0bbbbbbb	-12,,,12dB
04 00 26	0aaaaaaa	EQ: Low EQ Frequency
04 00 27#	0bbbbbbb	2,,,200 = 20,,,2000Hz
04 00 28	0aaaaaaa	EQ: Low EQ Q
04 00 29#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 2A	0aaaaaaa	EQ: Mid EQ Gain
04 00 2B#	0bbbbbbb	-12...12dB

04 00 2C	0aaaaaaa	EQ: Mid EQ Frequency
04 00 2D#	0bbbbbbb	20,,,800 = 200,,,8000Hz
04 00 2E	0aaaaaaa	EQ: Mid EQ Q
04 00 2F#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 30	0aaaaaaa	EQ: High EQ Type
04 00 31#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 32	0aaaaaaa	EQ: High EQ Gain
04 00 33#	0bbbbbbb	-12,,,12dB
04 00 34	0aaaaaaa	EQ: High EQ Frequency
04 00 35#	0bbbbbbb	14,,,200 = 1.4,,,20.0kHz
04 00 36	0aaaaaaa	EQ: High EQ Q
04 00 37#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 38	0aaaaaaa	EQ: Out Level
04 00 39#	0bbbbbbb	0,,,100
04 00 3A	00	(Reserved)
:	:	:
04 00 7F	00	

<>Algorithm 16 Dual Compressor/Limiter

04 00 0E	0aaaaaaa	Comp/Limit A SW
04 00 0F#	0bbbbbbb	0,1 = Off,On
04 00 10	0aaaaaaa	Noise Suppressor A SW
04 00 11#	0bbbbbbb	0,1 = Off,On
04 00 12	0aaaaaaa	Comp/Limit B SW
04 00 13#	0bbbbbbb	0,1 = Off,On
04 00 14	0aaaaaaa	Noise Suppressor B SW
04 00 15#	0bbbbbbb	0,1 = Off,On
04 00 16	0aaaaaaa	Comp/Limit A: Detect
04 00 17#	0bbbbbbb	0,1,2 = A,B,Link
04 00 18	0aaaaaaa	Comp/Limit A: Level
04 00 19#	0bbbbbbb	-60,,,12dB
04 00 1A	0aaaaaaa	Comp/Limit A: Thresh
04 00 1B#	0bbbbbbb	-60,,,0dB
04 00 1C	0aaaaaaa	Comp/Limit A: Attack
04 00 1D#	0bbbbbbb	0,,,100
04 00 1E	0aaaaaaa	Comp/Limit A: Release
04 00 1F#	0bbbbbbb	0,,,100
04 00 20	0aaaaaaa	Comp/Limit A: Ratio
04 00 21#	0bbbbbbb	0,,,3 = 1.5:1,2:1,4:1,100:1

04 00 22	0aaaaaaa	Noise Suppressor A: Detect	
04 00 23#	0bbbbbbb		0,1,2 = A,B,Link
04 00 24	0aaaaaaa	Noise Suppressor A: Threshold	
04 00 25#	0bbbbbbb		0,,,100
04 00 26	0aaaaaaa	Noise Suppressor A: Release	
04 00 27#	0bbbbbbb		0,,,100
04 00 28	0aaaaaaa	Comp/Limit B: Detect	
04 00 29#	0bbbbbbb		0,1,2 = A,B,Link
04 00 2A	0aaaaaaa	Comp/Limit B: Level	
04 00 2B#	0bbbbbbb		-60,,,12dB
04 00 2C	0aaaaaaa	Comp/Limit B: Thresh	
04 00 2D#	0bbbbbbb		-60,,,0dB
04 00 2E	0aaaaaaa	Comp/Limit B: Attack	
04 00 2F#	0bbbbbbb		0,,,100
04 00 30	0aaaaaaa	Comp/Limit B: Release	
04 00 31#	0bbbbbbb		0,,,100
04 00 32	0aaaaaaa	Comp/Limit B: Ratio	
04 00 33#	0bbbbbbb		0,,,3 = 1.5:1,2:1,4:1,100:1
04 00 34	0aaaaaaa	Noise Suppressor B: Detect	
04 00 35#	0bbbbbbb		0,1,2 = A,B,Link
04 00 36	0aaaaaaa	Noise Suppressor B: Threshold	
04 00 37#	0bbbbbbb		0,,,100
04 00 38	0aaaaaaa	Noise Suppressor B: Release	
04 00 39#	0bbbbbbb		0,,,100
04 00 3A	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 17 Gate Reverb (EFX1 & EFX3 Only)

04 00 0E	0aaaaaaa	G.Reverb SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	EQ SW	
04 00 11#	0bbbbbbb		0,1 = Off,On
04 00 12	0aaaaaaa	G.Reverb: Gate Time	
04 00 13#	0bbbbbbb		10,,,400ms
04 00 14	0aaaaaaa	G.Reverb: Pre Delay	
04 00 15#	0bbbbbbb		0,,,300ms
04 00 16	0aaaaaaa	G.Reverb: Effect Level	
04 00 17#	0bbbbbbb		-100,,,100
04 00 18	0aaaaaaa	G.Reverb: Mode	

04 00 19#	0bbbbbbb	0,,,4 = Normal,L->R,R->L,Reverse1,Reverse2
04 00 1A	0aaaaaaa	G.Reverb: Thickness
04 00 1B#	0bbbbbbb	0,,,100
04 00 1C	0aaaaaaa	G.Reverb: Density
04 00 1D#	0bbbbbbb	0,,,100
04 00 1E	0aaaaaaa	G.Reverb: Accent Delay
04 00 1F#	0bbbbbbb	0,,,200ms
04 00 20	0aaaaaaa	G.Reverb: Accent Level
04 00 21#	0bbbbbbb	0,,,100
04 00 22	0aaaaaaa	G.Reverb: Accent Pan
04 00 23#	0bbbbbbb	1,,,127 = L63,,,R63
04 00 24	0aaaaaaa	G.Reverb: Direct Level
04 00 25#	0bbbbbbb	-100,,,100
04 00 26	0aaaaaaa	EQ: Low EQ Type
04 00 27#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 28	0aaaaaaa	EQ: Low EQ Gain
04 00 29#	0bbbbbbb	-12,,,12dB
04 00 2A	0aaaaaaa	EQ: Low EQ Frequency
04 00 2B#	0bbbbbbb	2,,,200 = 20,,,2000Hz
04 00 2C	0aaaaaaa	EQ: Low EQ Q
04 00 2D#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 2E	0aaaaaaa	EQ: Mid EQ Gain
04 00 2F#	0bbbbbbb	-12,,,12dB
04 00 30	0aaaaaaa	EQ: Mid EQ Frequency
04 00 31#	0bbbbbbb	20,,,800 = 200,,,8000Hz
04 00 32	0aaaaaaa	EQ: Mid EQ Q
04 00 33#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 34	0aaaaaaa	EQ: High EQ Type
04 00 35#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 36	0aaaaaaa	EQ: High EQ Gain
04 00 37#	0bbbbbbb	-12,,,12dB
04 00 38	0aaaaaaa	EQ: High EQ Frequency
04 00 39#	0bbbbbbb	14,,,200 = 1.4,,,20.0kHz
04 00 3A	0aaaaaaa	EQ: High EQ Q
04 00 3B#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 3C	0aaaaaaa	EQ: Out Level
04 00 3D#	0bbbbbbb	0,,,100
04 00 3E	00	(Reserved)
:	:	
04 00 7F	00	

<>Algorithm 18 Multi Tap Delay

04 00 0E	0aaaaaaa	EQ SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	M.Tap Delay: Time 1	
04 00 11#	0bbbbbbb		0,,,1200ms
04 00 12	0aaaaaaa	M.Tap Delay: Level 1	
04 00 13#	0bbbbbbb		0,,,100
04 00 14	0aaaaaaa	M.Tap Delay: Pan 1	
04 00 15#	0bbbbbbb		1,,,127 = L63,,,R63
04 00 16	0aaaaaaa	M.Tap Delay: Time 2	
04 00 17#	0bbbbbbb		0,,,1200ms
04 00 18	0aaaaaaa	M.Tap Delay: Level 2	
04 00 19#	0bbbbbbb		0,,,100
04 00 1A	0aaaaaaa	M.Tap Delay: Pan 2	
04 00 1B#	0bbbbbbb		1,,,127 = L63,,,R63
04 00 1C	0aaaaaaa	M.Tap Delay: Time 3	
04 00 1D#	0bbbbbbb		0,,,1200ms
04 00 1E	0aaaaaaa	M.Tap Delay: Level 3	
04 00 1F#	0bbbbbbb		0,,,100
04 00 20	0aaaaaaa	M.Tap Delay: Pan 3	
04 00 21#	0bbbbbbb		1,,,127 = L63,,,R63
04 00 22	0aaaaaaa	M.Tap Delay: Time 4	
04 00 23#	0bbbbbbb		0,,,1200ms
04 00 24	0aaaaaaa	M.Tap Delay: Level 4	
04 00 25#	0bbbbbbb		0,,,100
04 00 26	0aaaaaaa	M.Tap Delay: Pan 4	
04 00 27#	0bbbbbbb		1,,,127 = L63,,,R63
04 00 28	0aaaaaaa	M.Tap Delay: Time 5	
04 00 29#	0bbbbbbb		0,,,1200ms
04 00 2A	0aaaaaaa	M.Tap Delay: Level 5	
04 00 2B#	0bbbbbbb		0,,,100
04 00 2C	0aaaaaaa	M.Tap Delay: Pan 5	
04 00 2D#	0bbbbbbb		1,,,127 = L63,,,R63
04 00 2E	0aaaaaaa	M.Tap Delay: Time 6	
04 00 2F#	0bbbbbbb		0,,,1200ms
04 00 30	0aaaaaaa	M.Tap Delay: Level 6	
04 00 31#	0bbbbbbb		0,,,100
04 00 32	0aaaaaaa	M.Tap Delay: Pan 6	
04 00 33#	0bbbbbbb		1,,,127 = L63,,,R63

04 00 34	0aaaaaaa	M.Tap Delay: Time 7	
04 00 35#	0bbbbbbb		0,,,1200ms
04 00 36	0aaaaaaa	M.Tap Delay: Level 7	
04 00 37#	0bbbbbbb		0,,,100
04 00 38	0aaaaaaa	M.Tap Delay: Pan 7	
04 00 39#	0bbbbbbb		1,,,127 = L63,,,R63
04 00 3A	0aaaaaaa	M.Tap Delay: Time 8	
04 00 3B#	0bbbbbbb		0,,,1200ms
04 00 3C	0aaaaaaa	M.Tap Delay: Level 8	
04 00 3D#	0bbbbbbb		0,,,100
04 00 3E	0aaaaaaa	M.Tap Delay: Pan 8	
04 00 3F#	0bbbbbbb		1,,,127 = L63,,,R63
04 00 40	0aaaaaaa	M.Tap Delay: Time 9	
04 00 41#	0bbbbbbb		0,,,1200ms
04 00 42	0aaaaaaa	M.Tap Delay: Level 9	
04 00 43#	0bbbbbbb		0,,,100
04 00 44	0aaaaaaa	M.Tap Delay: Pan 9	
04 00 45#	0bbbbbbb		1,,,127 = L63,,,R63
04 00 46	0aaaaaaa	M.Tap Delay: Time 10	
04 00 47#	0bbbbbbb		0,,,1200ms
04 00 48	0aaaaaaa	M.Tap Delay: Level 10	
04 00 49#	0bbbbbbb		0,,,100
04 00 4A	0aaaaaaa	M.Tap Delay: Pan 10	
04 00 4B#	0bbbbbbb		1,,,127 = L63,,,R63
04 00 4C	0aaaaaaa	M.Tap Delay: Feedback Delay Time	
04 00 4D#	0bbbbbbb		0,,,1200ms
04 00 4E	0aaaaaaa	M.Tap Delay: Feedback Level	
04 00 4F#	0bbbbbbb		-100,,,100
04 00 50	0aaaaaaa	M.Tap Delay: Effect Level	
04 00 51#	0bbbbbbb		-100,,,100
04 00 52	0aaaaaaa	M.Tap Delay: Direct Level	
04 00 53#	0bbbbbbb		-100,,,100
04 00 54	0aaaaaaa	EQ: Low EQ Type	
04 00 55#	0bbbbbbb		0,1 = Shelving, Peaking
04 00 56	0aaaaaaa	EQ: Low EQ Gain	
04 00 57#	0bbbbbbb		-12,,,12dB
04 00 58	0aaaaaaa	EQ: Low EQ Frequency	
04 00 59#	0bbbbbbb		2,,,200 = 20,,,2000Hz
04 00 5A	0aaaaaaa	EQ: Low EQ Q	
04 00 5B#	0bbbbbbb		3,,,100 = 0.3,,,10.0
04 00 5C	0aaaaaaa	EQ: Mid EQ Gain	

04 00 5D#	0bbbbbbb		-12,,,12dB
04 00 5E	0aaaaaaa	EQ: Mid EQ Frequency	
04 00 5F#	0bbbbbbb		20,,,800 = 200,,,8000Hz
04 00 60	0aaaaaaa	EQ: Mid EQ Q	
04 00 61#	0bbbbbbb		3,,,100 = 0.3,,,10.0
04 00 62	0aaaaaaa	EQ: High EQ Type	
04 00 63#	0bbbbbbb		0,1 = Shelving, Peaking
04 00 64	0aaaaaaa	EQ: High EQ Gain	
04 00 65#	0bbbbbbb		-12,,,12dB
04 00 66	0aaaaaaa	EQ: High EQ Frequency	
04 00 67#	0bbbbbbb		14,,,200 = 1.4,,,20.0kHz
04 00 68	0aaaaaaa	EQ: High EQ Q	
04 00 69#	0bbbbbbb		3,,,100 = 0.3,,,10.0
04 00 6A	0aaaaaaa	EQ: Out Level	
04 00 6B#	0bbbbbbb		0,,,100
04 00 6C	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 19 Stereo Multi

04 00 0E	0aaaaaaa	Noise Suppressor SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Comp/Limit SW	
04 00 11#	0bbbbbbb		0,1 = Off,On
04 00 12	0aaaaaaa	Enhancer SW	
04 00 13#	0bbbbbbb		0,1 = Off,On
04 00 14	0aaaaaaa	EQ SW	
04 00 15#	0bbbbbbb		0,1 = Off,On
04 00 16	0aaaaaaa	Noise Suppressor: Threshold	
04 00 17#	0bbbbbbb		0,,,100
04 00 18	0aaaaaaa	Noise Suppressor: Release	
04 00 19#	0bbbbbbb		0,,,100
04 00 1A	0aaaaaaa	Comp/Limit: Level	
04 00 1B#	0bbbbbbb		-60,,,12dB
04 00 1C	0aaaaaaa	Comp/Limit: Thresh	
04 00 1D#	0bbbbbbb		-60,,,0dB
04 00 1E	0aaaaaaa	Comp/Limit: Attack	
04 00 1F#	0bbbbbbb		0,,,100
04 00 20	0aaaaaaa	Comp/Limit: Release	
04 00 21#	0bbbbbbb		0...100

04 00 22	0aaaaaaa	Comp/Limit: Ratio
04 00 23#	0bbbbbbb	0,,,3 = 1.5:1,2:1,4:1,100:1
04 00 24	0aaaaaaa	Enhancer: Sens
04 00 25#	0bbbbbbb	0,,,100
04 00 26	0aaaaaaa	Enhancer: Frequency
04 00 27#	0bbbbbbb	10,,,100 = 1.0,,,10.0kHz
04 00 28	0aaaaaaa	Enhancer: MIX Level
04 00 29#	0bbbbbbb	0,,,100
04 00 2A	0aaaaaaa	Enhancer: Level
04 00 2B#	0bbbbbbb	0,,,100
04 00 2C	0aaaaaaa	EQ: Low EQ Type
04 00 2D#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 2E	0aaaaaaa	EQ: Low EQ Gain
04 00 2F#	0bbbbbbb	-12,,,12dB
04 00 30	0aaaaaaa	EQ: Low EQ Frequency
04 00 31#	0bbbbbbb	2,,,200 = 20,,,2000Hz
04 00 32	0aaaaaaa	EQ: Low EQ Q
04 00 33#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 34	0aaaaaaa	EQ: Mid EQ Gain
04 00 35#	0bbbbbbb	-12,,,12dB
04 00 36	0aaaaaaa	EQ: Mid EQ Frequency
04 00 37#	0bbbbbbb	20,,,800 = 200,,,8000Hz
04 00 38	0aaaaaaa	EQ: Mid EQ Q
04 00 39#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 3A	0aaaaaaa	EQ: High EQ Type
04 00 3B#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 3C	0aaaaaaa	EQ: High EQ Gain
04 00 3D#	0bbbbbbb	-12,,,12dB
04 00 3E	0aaaaaaa	EQ: High EQ Frequency
04 00 3F#	0bbbbbbb	14,,,200 = 1.4,,,20.0kHz
04 00 40	0aaaaaaa	EQ: High EQ Q
04 00 41#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 42	0aaaaaaa	EQ: Out Level
04 00 43#	0bbbbbbb	0,,,100
04 00 44	00	(Reserved)
:		:
04 00 7F	00	

<>Algorithm 20 Reverb 2

04 00 0E	0aaaaaaa	Reverb SW
04 00 0F#	0bbbbbbb	0,1 = Off,On
04 00 10	0aaaaaaa	EQ SW
04 00 11#	0bbbbbbb	0,1 = Off,On
04 00 12	0aaaaaaa	Reverb 2: Reverb Type
04 00 13#	0bbbbbbb	0,,,4 = Room1,Room2,Hall1,Hall2,Plate
04 00 14	0aaaaaaa	Reverb 2: Reverb Time
04 00 15#	0bbbbbbb	1,,,100 = 0.1,,,10.0sec
04 00 16	0aaaaaaa	Reverb 2: Pre Delay
04 00 17#	0bbbbbbb	0,,,200msec
04 00 18	0aaaaaaa	Reverb 2: Density
04 00 19#	0bbbbbbb	0,,,100
04 00 1A	0aaaaaaa	Reverb 2: High Pass Filter
04 00 1B#	0bbbbbbb	1,,,200 = Thru,20,,,2000Hz
04 00 1C	0aaaaaaa	Reverb 2: Low Pass Filter
04 00 1D#	0bbbbbbb	10,,,201 = 1.0,,,20,0kHz,Thru
04 00 1E	0aaaaaaa	Reverb 2: Effect Level
04 00 1F#	0bbbbbbb	0,,,100
04 00 20	0aaaaaaa	Reverb 2: Direct Level
04 00 21#	0bbbbbbb	0,,,100
04 00 22	0aaaaaaa	Reverb 2: Gate SW
04 00 23#	0bbbbbbb	0,1 = Off,On
04 00 24	0aaaaaaa	Reverb 2: Gate Mode
04 00 25#	0bbbbbbb	0,1 = Gate,Ducking
04 00 26	0aaaaaaa	Reverb 2: Gate Threshold
04 00 27#	0bbbbbbb	0,,,100
04 00 28	0aaaaaaa	Reverb 2: Gate Attack Time
04 00 29#	0bbbbbbb	1,,,100
04 00 2A	0aaaaaaa	Reverb 2: Gate Release Time
04 00 2B#	0bbbbbbb	1,,,100
04 00 2C	0aaaaaaa	Reverb 2: Gate Hold Time
04 00 2D#	0bbbbbbb	1,,,100
04 00 2E	0aaaaaaa	EQ: Low EQ Type
04 00 2F#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 30	0aaaaaaa	EQ: Low EQ Gain
04 00 31#	0bbbbbbb	-12,,,12dB
04 00 32	0aaaaaaa	EQ: Low EQ Frequency
04 00 33#	0bbbbbbb	2,,,200 = 20,,,2000Hz
04 00 34	0aaaaaaa	EQ: Low EQ Q
04 00 35#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 36	0aaaaaaa	EQ: Mid EQ Gain

04 00 37#	0bbbbbbb		-12,,,12dB
04 00 38	0aaaaaaa	EQ: Mid EQ Frequency	
04 00 39#	0bbbbbbb		20,,,800 = 200,,,8000Hz
04 00 3A	0aaaaaaa	EQ: Mid EQ Q	
04 00 3B#	0bbbbbbb		3,,,100 = 0.3,,,10.0
04 00 3C	0aaaaaaa	EQ: High EQ Type	
04 00 3D#	0bbbbbbb		0,1 = Shelving, Peaking
04 00 3E	0aaaaaaa	EQ: High EQ Gain	
04 00 3F#	0bbbbbbb		-12,,,12dB
04 00 40	0aaaaaaa	EQ: High EQ Frequency	
04 00 41#	0bbbbbbb		14,,,200 = 1.4,,,20.0kHz
04 00 42	0aaaaaaa	EQ: High EQ Q	
04 00 43#	0bbbbbbb		3,,,100 = 0.3,,,10.0
04 00 44	0aaaaaaa	EQ: Out Level	
04 00 45#	0bbbbbbb		0,,,100
04 00 46	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 21 Space Chorus

04 00 0E	0aaaaaaa	Chorus SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Chorus: Input Mode	
04 00 11#	0bbbbbbb		0,1 = Mono,Stereo
04 00 12	0aaaaaaa	Chorus: Mode	
04 00 13#	0bbbbbbb		0,,,6 = 1,2,3,4,1+4,2+4,3+4
04 00 14	0aaaaaaa	Chorus: Mix Balance	
04 00 15#	0bbbbbbb		0,,,100
04 00 16	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 22 Lo-Fi Processor

04 00 0E	0aaaaaaa	Lo-Fi Processor SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Realtime Modify Filter SW	
04 00 11#	0bbbbbbb		0,1 = Off,On
04 00 12	0aaaaaaa	Lo-Fi Processor: Pre Filter SW	
04 00 13#	0bbbbbbb		0,1 = Off,On

04 00 14	0aaaaaaa	Lo-Fi Processor: Rate
04 00 15#	0bbbbbbb	0,,,31 = 0ff,1/2,,,1/32
04 00 16	0aaaaaaa	Lo-Fi Processor: Number of Bit
04 00 17#	0bbbbbbb	0,,,15 = Off,15,,,1bit
04 00 18	0aaaaaaa	Lo-Fi Processor: Post Filter SW
04 00 19#	0bbbbbbb	0,1 = Off,On
04 00 1A	0aaaaaaa	Lo-Fi Processor: Effect Level
04 00 1B#	0bbbbbbb	0,,,100
04 00 1C	0aaaaaaa	Lo-Fi Processor: Direct Level
04 00 1D#	0bbbbbbb	0,,,100
04 00 1E	0aaaaaaa	Realtime Modify Filter: Filter Type
04 00 1F#	0bbbbbbb	0,,,2 = LPF,BPF,HPF
04 00 20	0aaaaaaa	Realtime Modify Filter: Cut Off
04 00 21#	0bbbbbbb	0,,,100
04 00 22	0aaaaaaa	Realtime Modify Filter: Resonance
04 00 23#	0bbbbbbb	0,,,100
04 00 24	0aaaaaaa	Realtime Modify Filter: Gain
04 00 25#	0bbbbbbb	0,,,24dB
04 00 26	0aaaaaaa	Noise Suppressor: Threshold
04 00 27#	0bbbbbbb	0,,,100
04 00 28	0aaaaaaa	Noise Suppressor: Release
04 00 29#	0bbbbbbb	0,,,100
04 00 2A	00	(Reserved)
:	:	
04 00 7F	00	

<>Algorithm 23 4 Band Parametric EQ

04 00 0E	0aaaaaaa	Parametric EQ Link SW
04 00 0F#	0bbbbbbb	0,1 = Off,On
04 00 10	0aaaaaaa	Parametric EQ Ach SW
04 00 11#	0bbbbbbb	0,1 = Off,On
04 00 12	0aaaaaaa	Parametric EQ Bch SW
04 00 13#	0bbbbbbb	0,1 = Off,On
04 00 14	0aaaaaaa	EQ Ach: Input Gain
04 00 15#	0bbbbbbb	-60,,,12dB
04 00 16	0aaaaaaa	EQ Ach: Low EQ Type
04 00 17#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 18	0aaaaaaa	EQ Ach: Low EQ Gain
04 00 19#	0bbbbbbb	-12,,,12dB

04 00 1A	0aaaaaaa	EQ Ach: Low EQ Frequency
04 00 1B#	0bbbbbbb	2,,,200 = 20,,,2000Hz
04 00 1C	0aaaaaaa	EQ Ach: Low EQ Q
04 00 1D#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 1E	0aaaaaaa	EQ Ach: Low Mid EQ Gain
04 00 1F#	0bbbbbbb	-12,,,12dB
04 00 20	0aaaaaaa	EQ Ach: Low Mid EQ Frequency
04 00 21#	0bbbbbbb	20,,,800 = 200,,,8000Hz
04 00 22	0aaaaaaa	EQ Ach: Low Mid EQ Q
04 00 23#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 24	0aaaaaaa	EQ Ach: High Mid EQ Gain
04 00 25#	0bbbbbbb	-12,,,12dB
04 00 26	0aaaaaaa	EQ Ach: High Mid EQ Frequency
04 00 27#	0bbbbbbb	20,,,800 = 200,,,8000Hz
04 00 28	0aaaaaaa	EQ Ach: High Mid EQ Q
04 00 29#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 2A	0aaaaaaa	EQ Ach: High EQ Type
04 00 2B#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 2C	0aaaaaaa	EQ Ach: High EQ Gain
04 00 2D#	0bbbbbbb	-12,,,12dB
04 00 2E	0aaaaaaa	EQ Ach: High EQ Frequency
04 00 2F#	0bbbbbbb	14,,,200 = 1.4,,,20.0kHz
04 00 30	0aaaaaaa	EQ Ach: High EQ Q
04 00 31#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 32	0aaaaaaa	EQ Ach: Output Level
04 00 33#	0bbbbbbb	-60,,,12dB
04 00 34	0aaaaaaa	EQ Bch: Input Gain
04 00 35#	0bbbbbbb	-60,,,12dB
04 00 36	0aaaaaaa	EQ Bch: Low EQ Type
04 00 37#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 38	0aaaaaaa	EQ Bch: Low EQ Gain
04 00 39#	0bbbbbbb	-12,,,12dB
04 00 3A	0aaaaaaa	EQ Bch: Low EQ Frequency
04 00 3B#	0bbbbbbb	2,,,200 = 20,,,2000Hz
04 00 3C	0aaaaaaa	EQ Bch: Low EQ Q
04 00 3D#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 3E	0aaaaaaa	EQ Bch: Low Mid EQ Gain
04 00 3F#	0bbbbbbb	-12,,,12dB
04 00 40	0aaaaaaa	EQ Bch: Low Mid EQ Frequency
04 00 41#	0bbbbbbb	20,,,800 = 200,,,8000Hz
04 00 42	0aaaaaaa	EO Bch: Low Mid EO O

04 00 43#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 44	0aaaaaaa	EQ Bch: High Mid EQ Gain
04 00 45#	0bbbbbbb	-12,,,12dB
04 00 46	0aaaaaaa	EQ Bch: High Mid EQ Frequency
04 00 47#	0bbbbbbb	20,,,800 = 200,,,8000Hz
04 00 48	0aaaaaaa	EQ Bch: High Mid EQ Q
04 00 49#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 4A	0aaaaaaa	EQ Bch: High EQ Type
04 00 4B#	0bbbbbbb	0,1 = Shelving, Peaking
04 00 4C	0aaaaaaa	EQ Bch: High EQ Gain
04 00 4D#	0bbbbbbb	-12,,,12dB
04 00 4E	0aaaaaaa	EQ Bch: High EQ Frequency
04 00 4F#	0bbbbbbb	14,,,200 = 1.4,,,20.0kHz
04 00 50	0aaaaaaa	EQ Bch: High EQ Q
04 00 51#	0bbbbbbb	3,,,100 = 0.3,,,10.0
04 00 52	0aaaaaaa	EQ Bch: Output Level
04 00 53#	0bbbbbbb	-60,,,12dB
04 00 54	00	(Reserved)
:	:	:
04 00 7F	00	

™- When Link SW = On, Bch corresponds to Ach.

<>Algorithm 24 10 Band Graphic EQ

04 00 0E	0aaaaaaa	Graphic EQ Link SW
04 00 0F#	0bbbbbbb	0,1 = Off,On
04 00 10	0aaaaaaa	Graphic EQ Ach SW
04 00 11#	0bbbbbbb	0,1 = Off,On
04 00 12	0aaaaaaa	Graphic EQ Bch SW
04 00 13#	0bbbbbbb	0,1 = Off,On
04 00 14	0aaaaaaa	EQ Ach: Input Gain
04 00 15#	0bbbbbbb	-60,,,12dB
04 00 16	0aaaaaaa	EQ Ach: 31.25Hz Gain
04 00 17#	0bbbbbbb	-12,,,12dB
04 00 18	0aaaaaaa	EQ Ach: 62.5Hz Gain
04 00 19#	0bbbbbbb	-12,,,12dB
04 00 1A	0aaaaaaa	EQ Ach: 125Hz Gain
04 00 1B#	0bbbbbbb	-12,,,12dB
04 00 1C	0aaaaaaa	EQ Ach: 250Hz Gain
04 00 1D#	0bbbbbbb	-12,,,12dB

04 00 1E	0aaaaaaa	EQ Ach: 500Hz Gain	
04 00 1F#	0bbbbbbb		-12,,,12dB
04 00 20	0aaaaaaa	EQ Ach: 1.0kHz Gain	
04 00 21#	0bbbbbbb		-12,,,12dB
04 00 22	0aaaaaaa	EQ Ach: 2.0kHz Gain	
04 00 23#	0bbbbbbb		-12,,,12dB
04 00 24	0aaaaaaa	EQ Ach: 4.0kHz Gain	
04 00 25#	0bbbbbbb		-12,,,12dB
04 00 26	0aaaaaaa	EQ Ach: 8.0kHz Gain	
04 00 27#	0bbbbbbb		-12,,,12dB
04 00 28	0aaaaaaa	EQ Ach: 16.0kHz Gain	
04 00 29#	0bbbbbbb		-12,,,12dB
04 00 2A	0aaaaaaa	EQ Ach: Output Level	
04 00 2B#	0bbbbbbb		-60,,,12dB
04 00 2C	0aaaaaaa	EQ Bch: Input Gain	
04 00 2D#	0bbbbbbb		-60,,,12dB
04 00 2E	0aaaaaaa	EQ Bch: 31.25Hz Gain	
04 00 2F#	0bbbbbbb		-12,,,12dB
04 00 30	0aaaaaaa	EQ Bch: 62.5Hz Gain	
04 00 31#	0bbbbbbb		-12,,,12dB
04 00 32	0aaaaaaa	EQ Bch: 125Hz Gain	
04 00 33#	0bbbbbbb		-12,,,12dB
04 00 34	0aaaaaaa	EQ Bch: 250Hz Gain	
04 00 35#	0bbbbbbb		-12,,,12dB
04 00 36	0aaaaaaa	EQ Bch: 500Hz Gain	
04 00 37#	0bbbbbbb		-12,,,12dB
04 00 38	0aaaaaaa	EQ Bch: 1.0kHz Gain	
04 00 39#	0bbbbbbb		-12,,,12dB
04 00 3A	0aaaaaaa	EQ Bch: 2.0kHz Gain	
04 00 3B#	0bbbbbbb		-12,,,12dB
04 00 3C	0aaaaaaa	EQ Bch: 4.0kHz Gain	
04 00 3D#	0bbbbbbb		-12,,,12dB
04 00 3E	0aaaaaaa	EQ Bch: 8.0kHz Gain	
04 00 3F#	0bbbbbbb		-12,,,12dB
04 00 40	0aaaaaaa	EQ Bch: 16.0kHz Gain	
04 00 41#	0bbbbbbb		-12,,,12dB
04 00 42	0aaaaaaa	EQ Bch: Output Level	
04 00 43#	0bbbbbbb		-60,,,12dB
04 00 44	00	(Reserved)	
:		:	
04 00 7F	00		

™- When Link SW = On, Bch corresponds to Ach.

<>Algorithm 25 Hum Canceler

04 00 0E	0aaaaaaa	Hum Canceler SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Noise Suppressor SW	
04 00 11#	0bbbbbbb		0,1 = Off,On
04 00 12	0aaaaaaa	Hum Canceler: Freq	
04 00 13#	0bbbbbbb		200,,,8000 = 20.0,,,800.0Hz
04 00 14	0aaaaaaa	Hum Canceler: Width	
04 00 15#	0bbbbbbb		10,,,40%
04 00 16	0aaaaaaa	Hum Canceler: Depth	
04 00 17#	0bbbbbbb		0,,,100
04 00 18	0aaaaaaa	Hum Canceler: Threshold	
04 00 19#	0bbbbbbb		0,,,100
04 00 1A	0aaaaaaa	Hum Canceler: Range Low	
04 00 1B#	0bbbbbbb		1,,,200 = Unlimit,20,,,2000Hz
04 00 1C	0aaaaaaa	Hum Canceler: Range High	
04 00 1D#	0bbbbbbb		10,,,201 = 1.0,,,20,0kHz,Unlimit
04 00 1E	0aaaaaaa	Noise Suppressor: Threshold	
04 00 1F#	0bbbbbbb		0,,,100
04 00 20	0aaaaaaa	Noise Suppressor: Release	
04 00 21#	0bbbbbbb		0,,,100
04 00 22	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 26 Vocal Canceler

04 00 0E	0aaaaaaa	Vocal Canceler SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	EQ SW	
04 00 11#	0bbbbbbb		0,1 = Off,On
04 00 12	0aaaaaaa	Vocal Canseler: Balance	
04 00 13#	0bbbbbbb		0,,,100
04 00 14	0aaaaaaa	Vocal Canceler: Range Low	
04 00 15#	0bbbbbbb		1,,,200 = Unlimit,20,,,2000Hz
04 00 16	0aaaaaaa	Vocal Canseler: Range High	
04 00 17#	0bbbbbbb		10,,,201 = 1.0,,,20,0kHz,Unlimit

04 00 18	0aaaaaaa	EQ: Low EQ Type	
04 00 19#	0bbbbbbb	0,1 = Shelving, Peaking	
04 00 1A	0aaaaaaa	EQ: Low EQ Gain	
04 00 1B#	0bbbbbbb	-12,,,12dB	
04 00 1C	0aaaaaaa	EQ: Low EQ Frequency	
04 00 1D#	0bbbbbbb	2,,,200 = 20,,,2000Hz	
04 00 1E	0aaaaaaa	EQ: Low EQ Q	
04 00 1F#	0bbbbbbb	3,,,100 = 0.3,,,10.0	
04 00 20	0aaaaaaa	EQ: Mid EQ Gain	
04 00 21#	0bbbbbbb	-12,,,12dB	
04 00 22	0aaaaaaa	EQ: Mid EQ Frequency	
04 00 23#	0bbbbbbb	20,,,800 = 200,,,8000Hz	
04 00 24	0aaaaaaa	EQ: Mid EQ Q	
04 00 25#	0bbbbbbb	3,,,100 = 0.3,,,10.0	
04 00 26	0aaaaaaa	EQ: High EQ Type	
04 00 27#	0bbbbbbb	0,1 = Shelving, Peaking	
04 00 28	0aaaaaaa	EQ: High EQ Gain	
04 00 29#	0bbbbbbb	-12,,,12dB	
04 00 2A	0aaaaaaa	EQ: High EQ Frequency	
04 00 2B#	0bbbbbbb	14,,,200 = 1.4,,,20.0kHz	
04 00 2C	0aaaaaaa	EQ: High EQ Q	
04 00 2D#	0bbbbbbb	3,,,100 = 0.3,,,10.0	
04 00 2E	0aaaaaaa	EQ: Out Level	
04 00 2F#	0bbbbbbb	0,,,100	
04 00 30	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 27 Voice Transfomer (EFX1 & EFX3 Only)

04 00 0E	0aaaaaaa	Voice Transfomer SW	
04 00 0F#	0bbbbbbb	0,1 = Off,On	
04 00 10	0aaaaaaa	Reverb SW	
04 00 11#	0bbbbbbb	0,1 = Off,On	
04 00 12	0aaaaaaa	Fader Edit SW	
04 00 13#	0bbbbbbb	0,1 = Off,On	
04 00 14	0aaaaaaa	MIDI Control SW	
04 00 15#	0bbbbbbb	0,1 = Off,On	
04 00 16	0aaaaaaa	Voice Transfomer: Robot SW	
04 00 17#	0bbbbbbb	0,1 = Off,On	
04 00 18	0aaaaaaa	Voice Transfomer: Chromatic Pitch	

04 00 19#	0bbbbbbb	-12,,,36
04 00 1A	0aaaaaaa	Voice Transfomer: Fine Pitch
04 00 1B#	0bbbbbbb	-100,,,100
04 00 1C	0aaaaaaa	Voice Transfomer: Chromatic Formant
04 00 1D#	0bbbbbbb	-12,,,12
04 00 1E	0aaaaaaa	Voice Transfomer: Fine Formant
04 00 1F#	0bbbbbbb	-100,,,100
04 00 20	0aaaaaaa	Voice Transfomer: Mix Balance
04 00 21#	0bbbbbbb	0,,,100
04 00 22	0aaaaaaa	Reverb: Reverb Time
04 00 23#	0bbbbbbb	1,,,100 = 0.1,,,10.0sec
04 00 24	0aaaaaaa	Reverb: Pre Delay
04 00 25#	0bbbbbbb	0,,,200msec
04 00 26	0aaaaaaa	Reverb: Density
04 00 27#	0bbbbbbb	0,,,100
04 00 28	0aaaaaaa	Reverb: Effect Level
04 00 29#	0bbbbbbb	0,,,100
04 00 2A	0aaaaaaa	MIDI Control: Bend Range
04 00 2B#	0bbbbbbb	0,,,12 = 0ff,1,,,12
04 00 2C	0aaaaaaa	MIDI Control: Portamento
04 00 2D#	0bbbbbbb	0...100 = Off,1,,,100
04 00 2E	00	(Reserved)
:	:	
04 00 7F	00	

<>Algorithm 28 Vocoder 2 (EFX1 & EFX3 Only)

04 00 0E	0aaaaaaa	Chorus SW
04 00 0F#	0bbbbbbb	0,1 = Off,On
04 00 10	0aaaaaaa	Vocoder: Envelope Mode
04 00 11#	0bbbbbbb	0,,,2 = Sharp,Soft,Long
04 00 12	0aaaaaaa	Vocoder: Pan Mode
04 00 13#	0bbbbbbb	0,,,3 = Mono,Stereo,L->R,R->L
04 00 14	0aaaaaaa	Vocoder: Hold
04 00 15#	0bbbbbbb	0,1 = Off,MIDI
04 00 16	0aaaaaaa	Vocoder: Mic Sens
04 00 17#	0bbbbbbb	0,,,100
04 00 18	0aaaaaaa	Vocoder: Synth Input Level
04 00 19#	0bbbbbbb	0,,,100
04 00 1A	0aaaaaaa	Vocoder: Voice Char Level 1
04 00 1B#	0bbbbbbb	0...100

04 00 1C	0aaaaaaa	Vocoder: Voice Char Level 2
04 00 1D#	0bbbbbbb	0,,,100
04 00 1E	0aaaaaaa	Vocoder: Voice Char Level 3
04 00 1F#	0bbbbbbb	0,,,100
04 00 20	0aaaaaaa	Vocoder: Voice Char Level 4
04 00 21#	0bbbbbbb	0,,,100
04 00 22	0aaaaaaa	Vocoder: Voice Char Level 5
04 00 23#	0bbbbbbb	0,,,100
04 00 24	0aaaaaaa	Vocoder: Voice Char Level 6
04 00 25#	0bbbbbbb	0,,,100
04 00 26	0aaaaaaa	Vocoder: Voice Char Level 7
04 00 27#	0bbbbbbb	0,,,100
04 00 28	0aaaaaaa	Vocoder: Voice Char Level 8
04 00 29#	0bbbbbbb	0,,,100
04 00 2A	0aaaaaaa	Vocoder: Voice Char Level 9
04 00 2B#	0bbbbbbb	0,,,100
04 00 2C	0aaaaaaa	Vocoder: Voice Char Level 10
04 00 2D#	0bbbbbbb	0,,,100
04 00 2E	0aaaaaaa	Vocoder: Voice Char Level 11
04 00 2F#	0bbbbbbb	0,,,100
04 00 30	0aaaaaaa	Vocoder: Voice Char Level 12
04 00 31#	0bbbbbbb	0,,,100
04 00 32	0aaaaaaa	Vocoder: Voice Char Level 13
04 00 33#	0bbbbbbb	0,,,100
04 00 34	0aaaaaaa	Vocoder: Voice Char Level 14
04 00 35#	0bbbbbbb	0,,,100
04 00 36	0aaaaaaa	Vocoder: Voice Char Level 15
04 00 37#	0bbbbbbb	0,,,100
04 00 38	0aaaaaaa	Vocoder: Voice Char Level 16
04 00 39#	0bbbbbbb	0,,,100
04 00 3A	0aaaaaaa	Vocoder: Voice Char Level 17
04 00 3B#	0bbbbbbb	0,,,100
04 00 3C	0aaaaaaa	Vocoder: Voice Char Level 18
04 00 3D#	0bbbbbbb	0,,,100
04 00 3E	0aaaaaaa	Vocoder: Voice Char Level 19
04 00 3F#	0bbbbbbb	0,,,100
04 00 40	0aaaaaaa	Vocoder: Mic High Pass Filter
04 00 41#	0bbbbbbb	9,,,200 = Thru,1.0,,,20.0kHz
04 00 42	0aaaaaaa	Vocoder: Mic High Pass Filter Pan
04 00 43#	0bbbbbbb	1,,,127 = L63,,,R63

04 00 44	0aaaaaaa	Vocoder: Mic Mix	
04 00 45#	0bbbbbbb		0,,,100
04 00 46	0aaaaaaa	Vocoder: Noise Suppressor Threshold	
04 00 47#	0bbbbbbb		0,,,100
04 00 48	0aaaaaaa	Chorus: Rate	
04 00 49#	0bbbbbbb		1,,,100 = 0.1,,,10.0Hz
04 00 4A	0aaaaaaa	Chorus: Depth	
04 00 4B#	0bbbbbbb		0,,,100
04 00 4C	0aaaaaaa	Chorus: Pre Delay	
04 00 4D#	0bbbbbbb		0,,,50ms
04 00 4E	0aaaaaaa	Chorus: Mix Balance	
04 00 4F#	0bbbbbbb		0,,,100
04 00 50	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 29 Mic Simulator

04 00 0E	0aaaaaaa	Link SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Mic Converter Ach SW	
04 00 11#	0bbbbbbb		0,1 = Off,On
04 00 12	0aaaaaaa	Bass Cut Ach SW	
04 00 13#	0bbbbbbb		0,1 = Off,On
04 00 14	0aaaaaaa	Distance Ach SW	
04 00 15#	0bbbbbbb		0,1 = Off,On
04 00 16	0aaaaaaa	Limiter Ach SW	
04 00 17#	0bbbbbbb		0,1 = Off,On
04 00 18	0aaaaaaa	Mic Converter Bch SW	
04 00 19#	0bbbbbbb		0,1 = Off,On
04 00 1A	0aaaaaaa	Bass Cut Bch SW	
04 00 1B#	0bbbbbbb		0,1 = Off,On
04 00 1C	0aaaaaaa	Distance Bch SW	
04 00 1D#	0bbbbbbb		0,1 = Off,On
04 00 1E	0aaaaaaa	Limiter Bch SW	
04 00 1F#	0bbbbbbb		0,1 = Off,On
04 00 20	0aaaaaaa	Mic Converter Ach: Input	
04 00 21#	0bbbbbbb		0,,,4 = DR-20,SmlDy,HedDy,MinCn,Flat
04 00 22	0aaaaaaa	Mic Converter Ach: Output	
04 00 23#	0bbbbbbb		0,,,6 = SmlDy,VocDy,LrgDy,SmlCn,LrgCn,VntCn,Flat
04 00 24	0aaaaaaa	Mic Converter Ach: Phase	

04 00 25#	0bbbbbbb	0,1 = Normal,Inverse
04 00 26	0aaaaaaa	Bass Cut Ach: Bass Cut Frequency
04 00 27#	0bbbbbbb	1,,,200 = Thru,20,,,2000Hz
04 00 28	0aaaaaaa	Distance Ach: Proximity Effect
04 00 29#	0bbbbbbb	-12,,,+12
04 00 2A	0aaaaaaa	Distance Ach: Timelag
04 00 2B#	0bbbbbbb	0,,,1000 = 0,,,3000cm
04 00 2C	0aaaaaaa	Limiter Ach: Detect HPF Frequency
04 00 2D#	0bbbbbbb	1,,,200 = Thru,20,,,2000Hz
04 00 2E	0aaaaaaa	Limiter Ach: Level
04 00 2F#	0bbbbbbb	-60,,,24dB
04 00 30	0aaaaaaa	Limiter Ach: Threshold
04 00 31#	0bbbbbbb	-60,,,0dB
04 00 32	0aaaaaaa	Limiter Ach: Attack
04 00 33#	0bbbbbbb	0,,,100
04 00 34	0aaaaaaa	Limiter Ach: Release
04 00 35#	0bbbbbbb	0,,,100
04 00 36	0aaaaaaa	Mic Converter Bch: Input
04 00 37#	0bbbbbbb	0,,,4 = DR-20,SmlDy,HedDy,MinCn,Flat
04 00 38	0aaaaaaa	Mic Converter Bch: Output
04 00 39#	0bbbbbbb	0,,,6 = SmlDy,VocDy,LrgDy,SmlCn,LrgCn,VntCn,Flat
04 00 3A	0aaaaaaa	Mic Converter Bch: Phase
04 00 3B#	0bbbbbbb	0,1 = Normal,Inverse
04 00 3C	0aaaaaaa	Bass Cut Bch: Bass Cut Frequency
04 00 3D#	0bbbbbbb	1,,,200 = Thru,20,,,2000Hz
04 00 3E	0aaaaaaa	Distance Bch: Proximity Effect
04 00 3F#	0bbbbbbb	-12,,,+12
04 00 40	0aaaaaaa	Distance Bch: Timelag
04 00 41#	0bbbbbbb	0,,,1000 = 0,,,3000cm
04 00 42	0aaaaaaa	Limiter Bch: Detect HPF Frequency
04 00 43#	0bbbbbbb	1,,,200 = Thru,20,,,2000Hz
04 00 44	0aaaaaaa	Limiter Bch: Level
04 00 45#	0bbbbbbb	-60,,,24dB
04 00 46	0aaaaaaa	Limiter Bch: Threshold
04 00 47#	0bbbbbbb	-60,,,0dB
04 00 48	0aaaaaaa	Limiter Bch: Attack
04 00 49#	0bbbbbbb	0,,,100
04 00 4A	0aaaaaaa	Limiter Bch: Release
04 00 4B#	0bbbbbbb	0,,,100
04 00 4C	00	(Reserved)
:		:

| 04 00 7F | 00 | |

™-When Mic Converter Input = MinCn, Output is fixed to SmlDy or LrgCn.
™- When Link SW = On, Bch corresponds to Ach.

<>Algorithm 30 3 Band Isolator

04 00 0E	0aaaaaaa	Isolator SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Isolator High Volume	
04 00 11#	0bbbbbbb		-60,,,+4dB
04 00 12	0aaaaaaa	Isolator Middle Volume	
04 00 13#	0bbbbbbb		-60,,,+4dB
04 00 14	0aaaaaaa	Isolator Low Volume	
04 00 15#	0bbbbbbb		-60,,,+4dB
04 00 16	0aaaaaaa	Isolator Anti Phase Middle Switch	
04 00 17#	0bbbbbbb		0,1 = Off,On
04 00 18	0aaaaaaa	Isolator Anti Phase Middle Level	
04 00 19#	0bbbbbbb		0,,,100
04 00 1A	0aaaaaaa	Isolator Anti Phase Low Switch	
04 00 1B#	0bbbbbbb		0,1 = Off,On
04 00 1C	0aaaaaaa	Isolator Anti Phase Low Level	
04 00 1D#	0bbbbbbb		0,,,100
04 00 1E	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 31 Tape Echo 201

04 00 0E	0aaaaaaa	Tape Echo SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Tape Echo Mode Select	
04 00 11#	0bbbbbbb		0,,,6 = 1,,,7
04 00 12	0aaaaaaa	Tape Echo Repeat Rate	
04 00 13#	0bbbbbbb		0,,,100
04 00 14	0aaaaaaa	Tape Echo Intensity	
04 00 15#	0bbbbbbb		0,,,100
04 00 16	0aaaaaaa	Tape Echo Effect Level	
04 00 17#	0bbbbbbb		0,,,100
04 00 18	0aaaaaaa	Tape Echo Direct Level	
04 00 19#	0bbbbbbb		0,,,100

04 00 1A	0aaaaaaa	Tape Echo Tone Bass	
04 00 1B#	0bbbbbbb		-100,,,100
04 00 1C	0aaaaaaa	Tape Echo Tone Treble	
04 00 1D#	0bbbbbbb		-100,,,100
04 00 1E	0aaaaaaa	Tape Echo Tape Head S Pan	
04 00 1F#	0bbbbbbb		1,,,127 = L63,,,R63
04 00 20	0aaaaaaa	Tape Echo Tape Head M Pan	
04 00 21#	0bbbbbbb		1,,,127 = L63,,,R63
04 00 22	0aaaaaaa	Tape Echo Tape Head L Pan	
04 00 23#	0bbbbbbb		1,,,127 = L63,,,R63
04 00 24	0aaaaaaa	Tape Echo Tape Distortion	
04 00 25#	0bbbbbbb		0,,,100
04 00 26	0aaaaaaa	Tape Echo Wah Flutter Rate	
04 00 27#	0bbbbbbb		0,,,100
04 00 28	0aaaaaaa	Tape Echo Wah Flutter Depth	
04 00 29#	0bbbbbbb		0,,,100
04 00 2A	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 32 Analog Flanger

04 00 0E	0aaaaaaa	Analog Flanger SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Analog Flanger Mode	
04 00 11#	0bbbbbbb		0,,,3 = FL1,FL2,FL3,CHO
04 00 12	0aaaaaaa	Analog Flanger Feedback	
04 00 13#	0bbbbbbb		0,,,100
04 00 14	0aaaaaaa	Analog Flanger Modulation Rate	
04 00 15#	0bbbbbbb		0,,,100
04 00 16	0aaaaaaa	Analog Flanger Modulation Depth	
04 00 17#	0bbbbbbb		0,,,100
04 00 18	0aaaaaaa	Analog Flanger Modulation Frequency	
04 00 19#	0bbbbbbb		0,,,100
04 00 1A	0aaaaaaa	Analog Flanger Channel B Modulation	
04 00 1B#	0bbbbbbb		0,1 = Nor,Inv
04 00 1C	0aaaaaaa	Analog Flanger Channel A Phase	
04 00 1D#	0bbbbbbb		0,1 = Nor,Inv
04 00 1E	0aaaaaaa	Analog Flanger Channel B Phase	
04 00 1F#	0bbbbbbb		0,1 = Nor,Inv
04 00 20	00	(Reserved)	

:		:	
04 00 7F	00		

<>Algorithm 33 Analog Phaser

04 00 0E	0aaaaaaa	Analog Phaser SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Analog Phaser Mode	
04 00 11#	0bbbbbbb		0,1 = 4STAGE,8STAGE
04 00 12	0aaaaaaa	Analog Phaser Frequency	
04 00 13#	0bbbbbbb		0,,,100
04 00 14	0aaaaaaa	Analog Phaser Resonance	
04 00 15#	0bbbbbbb		0,,,100
04 00 16	0aaaaaaa	Analog Phaser LFO 1 Rate	
04 00 17#	0bbbbbbb		0,,,100
04 00 18	0aaaaaaa	Analog Phaser LFO 1 Depth	
04 00 19#	0bbbbbbb		0,,,100
04 00 1A	0aaaaaaa	Analog Phaser LFO 1 Channel B Mod	
04 00 1B#	0bbbbbbb		0,1 = Nor,Inv
04 00 1C	0aaaaaaa	Analog Phaser LFO 2 Rate	
04 00 1D#	0bbbbbbb		0,,,100
04 00 1E	0aaaaaaa	Analog Phaser LFO 2 Depth	
04 00 1F#	0bbbbbbb		0,,,100
04 00 20	0aaaaaaa	Analog Phaser LFO 2 Channel B Mod	
04 00 21#	0bbbbbbb		0,1 = Nor,Inv
04 00 22	00	(Reserved)	
:		:	
04 00 7F	00		

<>Algorithm 34 Speaker Modeling

04 00 0E	0aaaaaaa	Speaker Modeling SW	
04 00 0F#	0bbbbbbb		0,1 = Off,On
04 00 10	0aaaaaaa	Bass Cut SW	
04 00 11#	0bbbbbbb		0,1 = Off,On
04 00 12	0aaaaaaa	Low Frequency Trimmer SW	
04 00 13#	0bbbbbbb		0,1 = Off,On
04 00 14	0aaaaaaa	High Frequency Trimmer SW	
04 00 15#	0bbbbbbb		0,1 = Off,On
04 00 16	0aaaaaaa	Limiter SW	
04 00 17#	0bbbbbbb		0,1 = Off,On

04 00 18	0aaaaaaa	(Reserved)
04 00 19#	0bbbbbbb	
04 00 1A	0aaaaaaa	Speaker Modeling Model
04 00 1B#	0bbbbbbb	0,,,11 = THRU,Super Flat,Powered GenBlk, Powered E-Bas,Powered Mack,Small Cube,White Cone, White C +tissue,Small Radio,Small TV,Boom Box, BoomBox LoBoost
04 00 1C	0aaaaaaa	Speaker Modeling Phase
04 00 1D#	0bbbbbbb	0,1 = NRM,INV
04 00 1E	0aaaaaaa	Bass Cut Frequency
04 00 1F#	0bbbbbbb	1,,,200 = Thru,20,,,2000Hz
04 00 20	0aaaaaaa	Low Frequency Trimmer Gain
04 00 21#	0bbbbbbb	-12,,,12dB
04 00 22	0aaaaaaa	Low Frequency Trimmer Frequency
04 00 23#	0bbbbbbb	2,,,200 = 20,,,2000Hz
04 00 24	0aaaaaaa	High Frequency Trimmer Gain
04 00 25#	0bbbbbbb	-12,,,12dB
04 00 26	0aaaaaaa	High Frequency Trimmer Frequency
04 00 27#	0bbbbbbb	10,,,200 = 1.0,,,20.0kHz
04 00 28	0aaaaaaa	Limiter Threshold
04 00 29#	0bbbbbbb	-60,,,0dB
04 00 2A	0aaaaaaa	Limiter Release
04 00 2B#	0bbbbbbb	0,,,100
04 00 2C	0aaaaaaa	Limiter Level
04 00 2D#	0bbbbbbb	-60,,,24dB
04 00 2E	00	(Reserved)
:		:
04 00 7F	00	

<>Algorithm 35 Mastering Tool Kit

04 00 0E	0aaaaaaa	EQ SW
04 00 0F#	0bbbbbbb	0,1 = Off,On
04 00 10	0aaaaaaa	Bass Cut SW
04 00 11#	0bbbbbbb	0,1 = Off,On
04 00 12	0aaaaaaa	Enhancer SW
04 00 13#	0bbbbbbb	0,1 = Off,On
04 00 14	0aaaaaaa	Expander SW
04 00 15#	0bbbbbbb	0,1 = Off,On
04 00 16	0aaaaaaa	Compressor SW
04 00 17#	0bbbbbbb	0,1 = Off,On

04 00 18	0aaaaaaa	Limiter SW	
04 00 19#	0bbbbbbb		0,1 = Off,On
04 00 1A	0aaaaaaa	EQ: Input Gain	-24,,,12dB
04 00 1B#	0aaaaaaa	EQ: Low EQ Type	0,1 = Shelving, Peaking
04 00 1C	0aaaaaaa	EQ: Low EQ Gain	-12,,,12dB
04 00 1D#	0aaaaaaa	EQ: Low EQ Frequency	2,,,42 = 20,,,2000Hz(*1)
04 00 1E	0aaaaaaa	EQ: Low EQ Q	0,,,31 = 0.3,,,16.0(*2)
04 00 1F#	0aaaaaaa	EQ: Low Mid EQ Gain	-12,,,12dB
04 00 20	0aaaaaaa	EQ: Low Mid EQ Frequency	2,,,54 = 20,,,8000Hz(*1)
04 00 21#	0aaaaaaa	EQ: Low Mid EQ Q	0,,,31 = 0.3,,,16.0(*2)
04 00 22	0aaaaaaa	EQ: High Mid EQ Gain	-12,,,12dB
04 00 23#	0aaaaaaa	EQ: High Mid EQ Frequency	2,,,54 = 20,,,8000Hz(*1)
04 00 24	0aaaaaaa	EQ: High Mid EQ Q	0,,,31 = 0.3,,,16.0(*2)
04 00 25#	0aaaaaaa	EQ: High EQ Type	0,1 = Shelving, Peaking
04 00 26	0aaaaaaa	EQ: High EQ Gain	-12,,,12dB
04 00 27#	0aaaaaaa	EQ: High EQ Frequency	39,,,62 = 1.4,,,20.0kHz(*1)
04 00 28	0aaaaaaa	EQ: High EQ Q	0,,,31 = 0.3,,,16.0(*2)
04 00 29#	0aaaaaaa	EQ: Level	-24,,,12dB
04 00 2A	0aaaaaaa	Bass Cut Frequency	1,,,42 = Off,20,,,2000Hz(*1)
04 00 2B#	0aaaaaaa	Enhancer Sens	0,,,100
04 00 2C	0aaaaaaa	Enhancer Frequency	36,,,56 = 1.0,,,10.0kHz(*1)
04 00 2D#	0aaaaaaa	Enhancer Mix Level	-24,,,12dB
04 00 2E	0aaaaaaa	Input Gain	-24,,,12dB
04 00 2F#	0aaaaaaa	Input Detect Time	0,,,10ms
04 00 30	0aaaaaaa	Input Low Split Point	2,,,34 = 20,,,800Hz(*1)
04 00 31#	0aaaaaaa	Input High Split Point	40,,,60 = 1.6,,,16.0kHz(*1)
04 00 32	0aaaaaaa	Expander Low Threshold	0,,,80 = -80,,,0dB
04 00 33#	0aaaaaaa	Expander Mid Threshold	0,,,80 = -80,,,0dB
04 00 34	0aaaaaaa	Expander High Threshold	0,,,80 = -80,,,0dB
04 00 35#	0aaaaaaa	Expander Low Ratio	0,,,13 = 1:1.0,,,1:INF(*3)
04 00 36	0aaaaaaa	Expander Mid Ratio	0,,,13 = 1:1.0,,,1:INF(*3)

04 00 37#	0aaaaaaa	Expander High Ratio	0,,,13 = 1:1.0,,,1:INF(*3)
04 00 38	0aaaaaaa	Expander Low Attack	0,,,100ms
04 00 39#	0aaaaaaa	Expander Mid Attack	0,,,100ms
04 00 3A	0aaaaaaa	Expander High Attack	0,,,100ms
04 00 3B#	0aaaaaaa	Expander Low Release	0,,,100 = 50,,,5000ms
04 00 3C	0aaaaaaa	Expander Mid Release	0,,,100 = 50,,,5000ms
04 00 3D#	0aaaaaaa	Expander High Release	0,,,100 = 50,,,5000ms
04 00 3E	0aaaaaaa	Compressor Low Threshold	-24,,,0dB
04 00 3F#	0aaaaaaa	Compressor Mid Threshold	-24,,,0dB
04 00 40	0aaaaaaa	Compressor High Threshold	-24,,,0dB
04 00 41#	0aaaaaaa	Compressor Low Ratio	0,,,13 = 1:1.0,,,1:INF(*3)
04 00 42	0aaaaaaa	Compressor Mid Ratio	0,,,13 = 1:1.0,,,1:INF(*3)
04 00 43#	0aaaaaaa	Compressor High Ratio	0,,,13 = 1:1.0,,,1:INF(*3)
04 00 44	0aaaaaaa	Compressor Low Attack	0,,,100ms
04 00 45#	0aaaaaaa	Compressor Mid Attack	0,,,100ms
04 00 46	0aaaaaaa	Compressor High Attack	0,,,100ms
04 00 47#	0aaaaaaa	Compressor Low Release	0,,,100 = 50,,,5000ms
04 00 48	0aaaaaaa	Compressor Mid Release	0,,,100 = 50,,,5000ms
04 00 49#	0aaaaaaa	Compressor High Release	0,,,100 = 50,,,5000ms
04 00 4A	0aaaaaaa	Mixer Low Level	0,,,86 = -80,,,6dB
04 00 4B#	0aaaaaaa	Mixer Mid Level	0,,,86 = -80,,,6dB
04 00 4C	0aaaaaaa	Mixer High Level	0,,,86 = -80,,,6dB
04 00 4D#	0aaaaaaa	Limiter Threshold	-24,,,0dB
04 00 4E	0aaaaaaa	Limiter Attack	0,,,100ms
04 00 4F#	0aaaaaaa	Limiter Release	0,,,100 = 50,,,5000ms
04 00 50	0aaaaaaa	Output Level	0,,,86 = -80,,,6dB
04 00 51#	0aaaaaaa	Output Soft Clip	0,1 = Off,On
04 00 52	0aaaaaaa	Output Dither	0,,,17 = Off,24,,,8Bit
04 00 53#	00	(Reserved)	
04 00 54	00	(Reserved)	
:		:	
04 00 7F	00		

(o)Remote Operation

Start address	Data	Contents and remarks
05 00 00	00 -	Remote Command / Response
05 00 01#	00 -	Parameter
:	:	:
05 nn mm#	00 -	Parameter

(*) The address marked by "#" are invalid. Transmit the Data Set(DT1) message with the specified size to the address without "#" mark. Data Request(RQ1) message is ignored.

(*) The commands require to set simultaneously the parameter which specified size.

<>Remote Operation Command List

Command	Remarks
00	NOP (No Operation)
01	Abort Command
02	Undo
03	Redo
04	Get Now Time
05	Preview From
06	Preview To
07	Preview Thru
08	Preview Scrub On
09	Preview Scrub Off
0A	Get Amplitude Profile
0B	Get Wave Data
0C	Get Track Name
0D	Set Track Name
0E	Get Event List (1) - Full Parameter Sequence
0F	Get Event List (2) - Event Number Sequence
10	Get Event List (3) - Event List Pointer: Top, Bottom, Count
11	Get Event Parameter
12	Set Event Name
13	Create New Event
14	Track Copy
15	Track Move
16	Track Exchange
17	Track Insert
18	Track Cut
19	Track Erase
1A	Track Time Comp/Exp.
1B	Track Exchange with Track Name

<>Remote Operation Response List

Response	Remarks
40	Complete (No Error)
41	Error
42	Now Time
43	Amplitude Profile
44	Wave Data
45	Track Name
46	Event List (1) - Full Parameter Sequence
47	Event List (2) - Event Number Sequence
48	Event List (3) - Event List Pointer: Top,Bottom,Count
49	Event Parameter

<>Command 00 NOP (No Operation)

Start address	Data	Contents and remarks
05 00 00	00	NOP (No Operation)

<>Command 01 Abort Command

Start address	Data	Contents and remarks
05 00 00	01	Abort Command

<>Command 02 Undo

Start address	Data	Contents and remarks
05 00 00	02	Undo
05 00 01#	000000aa	Undo Level
05 00 02#	0bbbbbbb	aabbbbbbbbccccccc = 1,,,999
05 00 03#	0ccccccc	

<>Command 03 Redo

Start address	Data	Contents and remarks
05 00 00	03	Redo

<>Command 04 Get Now Time

Start address	Data	Contents and remarks
05 00 00	04	Get Now Time

<>Command 05 Preview From

Start address	Data	Contents and remarks
05 00 00	05	Preview From

<>Command 06 Preview To

Start address	Data	Contents and remarks
05 00 00	06	Preview To

<>Command 07 Preview Thru

Start address	Data	Contents and remarks
05 00 00	07	Preview Thru

<>Command 08 Preview Scrub On

Start address	Data	Contents and remarks
05 00 00	08	Preview Scrub On
05 00 01#	00 - 0F	Target Track 1,,,16

<>Command 09 Preview Scrub Off

Start address	Data	Contents and remarks
05 00 00	09	Preview Scrub Off

<>Command 0A Get Amplitude Profile

Start address	Data	Contents and remarks
05 00 00	0A	Get Amplitude Profile
05 00 01#	0000000a	Target V.Tr.
05 00 02#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
05 00 03#	0aaaaaaa	From Time
05 00 04#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 05#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 06#	0ddddddd	
05 00 07#	0aaaaaaa	Length Time
05 00 08#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 09#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 0A#	0ddddddd	
05 00 0B#	0aaaaaaa	Resolution
05 00 0C#	0bbbbbbb	aaaaaaabbbbbbb = 1,,,(blocks)
05 00 0D#	0aaaaaaa	Packet Byte Length
05 00 0E#	0bbbbbbb	aaaaaaabbbbbbb = 6,,,16384(=00)

<>Command 0B Get Wave Data

Start address	Data	Contents and remarks
05 00 00	0B	Get Wave Data
05 00 01#	0000000a	Target V.Tr.
05 00 02#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
05 00 03#	0aaaaaaa	From Time
05 00 04#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 05#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 06#	0ddddddd	
05 00 07#	0aaaaaaa	Length Time
05 00 08#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 09#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 0A#	0ddddddd	
05 00 0B#	0aaaaaaa	Packet Byte Length
05 00 0C#	0bbbbbbb	aaaaaaabbbbbbb = 6,,,16384(=00)

<>Command 0C Get Track Name

Start address	Data	Contents and remarks
05 00 00	0C	Get Track Name

| 05 00 01#| 0000000a| Target V.Tr. |
| 05 00 02#| 0bbbbbbb| abbbbbbb = V.Tr.1-1,,,V.Tr.16-16 |

<>Command 0D Set Track Name

Start address	Data	Contents and remarks
05 00 00	0D	Set Track Name
05 00 01#	0000000a	Target V.Tr.
05 00 02#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
05 00 03#	20 - 7E	Name - 1 (ASCII)
05 00 04#	20 - 7E	Name - 2
:	:	
05 00 12#	20 - 7E	Name - 16

<>Command 0E Get Event List (1) - Full Parameter Sequence

Start address	Data	Contents and remarks
05 00 00	0E	Get Event List (1) - Full Parameter Sequence
05 00 01#	0aaaaaaa	Target V.Tr.
05 00 02#	0bbbbbbb	aaaaaaabbbbbbb = V.Tr.1-1,,,V.Tr.16-16, take(=3FFF)
05 00 03#	0aaaaaaa	Packet Byte Length
05 00 04#	0bbbbbbb	aaaaaaabbbbbbb = 6,,,16384(=00)

<>Command 0F Get Event List (2) - Event Number Sequence

Start address	Data	Contents and remarks
05 00 00	0F	Get Event List (2) - Event Number Sequence
05 00 01#	0aaaaaaa	Target V.Tr.
05 00 02#	0bbbbbbb	aaaaaaabbbbbbb = V.Tr.1-1,,,V.Tr.16-16, take(=3FFF)
05 00 03#	0aaaaaaa	Packet Byte Length
05 00 04#	0bbbbbbb	aaaaaaabbbbbbb = 6,,,16384(=00)

<>Command 10 Get Event List (3) - Event List Pointer: Top,Bottom,Count

| Start | | |

address	Data	Contents and remarks
05 00 00	10	Get Event List (3) - Event List Pointer: Top, Bottom, Count
05 00 01#	0aaaaaaa	Target V.Tr.
05 00 02#	0bbbbbbb	aaaaaaabbbbbbb = V.Tr.1-1,,,V.Tr.16-16, take(=3FFF)

<>Command 11 Get Event Parameter

Start address	Data	Contents and remarks
05 00 00	11	Get Event Parameter
05 00 01#	000000aa	Event Number
05 00 02#	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE
05 00 03#	0bbbbbbb	

<>Command 12 Set Event Name

Start address	Data	Contents and remarks
05 00 00	12	Set Event Name
05 00 01#	000000aa	Event Number
05 00 02#	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE
05 00 03#	0bbbbbbb	
05 00 04#	20 - 7E	Name - 1 (ASCII)
05 00 05#	20 - 7E	Name - 2
:	:	:
05 00 13#	20 - 7E	Name - 16

<>Command 13 Create New Event

Start address	Data	Contents and remarks
05 00 00	13	Create New Event
05 00 01#	0aaaaaaa	Target V.Tr.
05 00 02#	0bbbbbbb	aaaaaaabbbbbbb = V.Tr.1-1,,,V.Tr.16-16
05 00 03#	000000aa	Original Take Event Number
05 00 04#	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE
05 00 05#	0ccccccc	(silent event=FFFF)
00 00 06#	0aaaaaaa	Start Time
05 00 07#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =

05 00 08#	0ccccccc	0,,,268435455block (1block=16sample)
00 00 09#	0ddddddd	
00 00 0A#	0aaaaaaa	End Time
05 00 0B#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 0C#	0ccccccc	0,,,268435455block (1block=16sample)
00 00 0D#	0ddddddd	
00 00 0E#	0aaaaaaa	Offset Time
05 00 0F#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 10#	0ccccccc	0,,,268435455block (1block=16sample)
00 00 11#	0ddddddd	

<>Command 14 Track Copy

Start address	Data	Contents and remarks
05 00 00	14	Track Copy
05 00 01#	0aaaaaaa	Track Copy Start Time
05 00 02#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 03#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 04#	0ddddddd	
05 00 05#	0aaaaaaa	Track Copy End Time
05 00 06#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 07#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 08#	0ddddddd	
05 00 09#	0aaaaaaa	Track Copy From Time
05 00 0A#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 0B#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 0C#	0ddddddd	
05 00 0D#	0aaaaaaa	Track Copy To Time
05 00 0E#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 0F#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 10#	0ddddddd	
05 00 11#	01 - 63	Track Copy Time 1,,,99
05 00 12#	00 - 01	Track Copy +Insert Off,On
05 00 13#	000000aa	The Number Of Target aabbbbbbb = 1,,,256
05 00 14#	0bbbbbbb	
05 00 15#	0000000a	Source V.Tr.
05 00 16#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
05 00 17#	0000000c	Destination V.Tr.
05 00 18#	0ddddddd	cddddddd = V.Tr.1-1,,,V.Tr.16-16
:	:	:
	0000000a	Source V.Tr.
	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
	0000000c	Destination V.Tr.
05 nn mm#	0ddddddd	cddddddd = V.Tr.1-1,,,V.Tr.16-16
		(nn mm = 00 14 + The Number Of Target * 4)

<>Command 15 Track Move

Start address	Data	Contents and remarks
05 00 00	15	Track Move
05 00 01#	0aaaaaaa	Track Move Start Time
05 00 02#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
05 00 03#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 04#	0ddddddd	
05 00 05#	0aaaaaaa	Track Move End Time
05 00 06#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
05 00 07#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 08#	0ddddddd	
05 00 09#	0aaaaaaa	Track Move From Time
05 00 0A#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
05 00 0B#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 0C#	0ddddddd	
05 00 0D#	0aaaaaaa	Track Move To Time
05 00 0E#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
05 00 0F#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 10#	0ddddddd	
05 00 11#	00 - 01	Track Move +Insert Off,On
05 00 12#	000000aa	The Number Of Target aabbbbbbb = 1,,,256
05 00 13#	0bbbbbbb	
05 00 14#	0000000a	Source V.Tr.
05 00 15#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
05 00 16#	0000000c	Destination V.Tr.
05 00 17#	0ddddddd	cddddddd = V.Tr.1-1,,,V.Tr.16-16
:	:	:
	0000000a	Source V.Tr.
	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
	0000000c	Destination V.Tr.
05 nn mm#	0ddddddd	cddddddd = V.Tr.1-1,,,V.Tr.16-16
		(nn mm = 00 13 + The Number Of Target * 4)

<>Command 16 Track Exchange

Start address	Data	Contents and remarks
05 00 00	16	Track Exchange
05 00 01#	000000aa	The Number Of Target aabbbbbbb = 1,,,256
05 00 02#	0bbbbbbb	
05 00 03#	0000000a	Source V.Tr.
05 00 04#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16

05 00 05#	0000000c	Destination V.Tr.
05 00 06#	0ddddddd	cddddddd = V.Tr.1-1,,,V.Tr.16-16
:	:	:
	0000000a	Source V.Tr.
	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
	0000000c	Destination V.Tr.
05 nn mm#	0ddddddd	cddddddd = V.Tr.1-1,,,V.Tr.16-16
		(nn mm = 00 02 + The Number Of Target * 4)

<>Command 17 Track Insert

Start address	Data	Contents and remarks
05 00 00	17	Track Insert
05 00 01#	0aaaaaaa	Track Insert Start Time
05 00 02#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 03#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 04#	0ddddddd	
05 00 05#	0aaaaaaa	Track Insert To Time
05 00 06#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 07#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 08#	0ddddddd	
05 00 09#	000000aa	The Number Of Target aabbbbbbb = 1,,,256
05 00 0A#	0bbbbbbb	
05 00 0B#	0000000a	Insert V.Tr.
05 00 0C#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
:	:	:
	0000000a	Insert V.Tr.
05 nn mm#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
		(nn mm = 00 0A + The Number Of Target * 2)

<>Command 18 Track Cut

Start address	Data	Contents and remarks
05 00 00	18	Track Cut
05 00 01#	0aaaaaaa	Track Cut Start Time
05 00 02#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 03#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 04#	0ddddddd	
05 00 05#	0aaaaaaa	Track Cut End Time
05 00 06#	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 07#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 08#	0ddddddd	
05 00 09#	000000aa	The Number Of Target aabbbbbbb = 1,,,256
05 00 0A#	0bbbbbbb	

05 00 0B#	0000000a	Cut V.Tr.
05 00 0C#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
:	:	:
	0000000a	Cut V.Tr.
05 nn mm#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
		(nn mm = 00 0A + The Number Of Target * 2)

<>Command 19 Track Erase

Start address	Data	Contents and remarks
05 00 00	19	Track Erase
05 00 01#	0aaaaaaa	Track Erase Start Time
05 00 02#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
05 00 03#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 04#	0ddddddd	
05 00 05#	0aaaaaaa	Track Erase End Time
05 00 06#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
05 00 07#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 08#	0ddddddd	
05 00 09#	000000aa	The Number Of Target aabbbbbbb = 1,,,256
05 00 0A#	0bbbbbbb	
05 00 0B#	0000000a	Erase V.Tr.
05 00 0C#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
:	:	:
	0000000a	Erase V.Tr.
05 nn mm#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
		(nn mm = 00 0A + The Number Of Target * 2)

<>Command 1A Track Time Comp/Exp.

Start address	Data	Contents and remarks
05 00 00	1A	Track Time Comp/Exp.
05 00 01#	0aaaaaaa	Track Time Comp/Exp. Start Time
05 00 02#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
05 00 03#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 04#	0ddddddd	
05 00 05#	0aaaaaaa	Track Time Comp/Exp. End Time
05 00 06#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
05 00 07#	0ccccccc	0,,,268435455block (1block=16sample)
05 00 08#	0ddddddd	
05 00 09#	0aaaaaaa	Track Time Comp/Exp. To Time
05 00 0A#	0bbbbbbb	aaaaaaabbbbbbbccccccdddddddd =
05 00 0B#	0ccccccc	0,,,268435455block (1block=16sample)

05 00 0C#	0ddddddd	
05 00 0D#	00 - 01	Track Time Comp/Exp. Pitch Mode Fix,Vari
05 00 0E#	00 - 02	Track Time Comp/Exp. Type A,B,C
05 00 0F#	01 - 64	Track Time Comp/Exp. Amplitude 1,,,100%
05 00 10#	000000aa	The Number Of Target aabbbbbbb = 1,,,256
05 00 11#	0bbbbbbb	
05 00 0B#	0000000a	Comp/Exp V.Tr.
05 00 0C#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
:	:	:
	0000000a	Comp/Exp V.Tr.
05 nn mm#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
		(nn mm = 00 11 + The Number Of Target * 2)

<>Command 1B Track Exchange with Track Name

Start address	Data	Contents and remarks
05 00 00	1B	Track Exchange With Track Name
05 00 01#	000000aa	The Number Of Target aabbbbbbb = 1,,,256
05 00 02#	0bbbbbbb	
05 00 03#	0000000a	Source V.Tr.
05 00 04#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
05 00 05#	0000000c	Destination V.Tr.
05 00 06#	0ddddddd	cddddddd = V.Tr.1-1,,,V.Tr.16-16
:	:	:
	0000000a	Source V.Tr.
	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
	0000000c	Destination V.Tr.
05 nn mm#	0ddddddd	cddddddd = V.Tr.1-1,,,V.Tr.16-16
		(nn mm = 00 02 + The Number Of Target * 4)

<>Response 40 Complete (No Error)

Start address	Data	Contents and remarks
05 00 00	40	Complete (No Error)

<>Response 41 Error

Start address	Data	Contents and remarks
05 00 00	41	Error

05 00 01#	00 - 7F	Error Code (00=No Error(complete, end of data)) 01=Busy 02=Command Aborted 03=Illegal Command 04=Command Error 05=Command Rejected (song proteced)

<>Response 42 Now Time

Start address	Data	Contents and remarks
05 00 00	42	Now Time
05 00 01# 05 00 02# 05 00 03# 05 00 04#	0aaaaaaa 0bbbbbbb 0ccccccc 0ddddddd	Now Relative Time aaaaaaabbbbbbbccccccddddddd = 0,,,268435455block (1block=16sample)
05 00 05# 05 00 06# 05 00 07# 05 00 08#	0aaaaaaa 0bbbbbbb 0ccccccc 0ddddddd	Now Absolute Time aaaaaaabbbbbbbccccccddddddd = 0,,,268435455block (1block=16sample)

<>Response 43 Amplitude Profile

Start address	Data	Contents and remarks
05 00 00	43	Amplitude Profile
05 00 01# 05 00 02#	0000000a 0bbbbbbb	Target V.Tr. abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
05 00 03# 05 00 04#	0aaaaaaa 0bbbbbbb	Packet Number aaaaaaabbbbbbb = 0 - 16383
05 00 05# : 05 nn mm#	00 - 7F : 	Packet Data Buffer : (nn mm = Packet Byte Length - 1)

Data Sequence		
05 00 00	00 - 7F	Amplitude Data 0=-127dB, 1=-126dB,...,126=-1dB,127=0dB

<>Response 44 Wave Data

Start		

address	Data	Contents and remarks
05 00 00	44	Wave Data
05 00 01#	0000000a	Target V.Tr.
05 00 02#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
05 00 03#	0aaaaaaa	Packet Number
05 00 04#	0bbbbbbb	aaaaaaabbbbbbb = 0 - 16383
05 00 05#	00 - 7F	Packet Data Buffer
:	:	:
05 nn mm#		(nn mm = Packet Byte Length - 1)

Data Sequence		
05 00 00	000000aa	Wave Data
05 00 01	0bbbbbbb	aabbbbbbbccccccc = 16bit 2's Completemt data
05 00 02	0ccccccc	

<>Response 45 Track Name

Start address	Data	Contents and remarks
05 00 00	45	Track Name
05 00 01#	0000000a	Target V.Tr.
05 00 02#	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16
05 00 03#	20 - 7E	Name - 1 (ASCII)
05 00 04#	20 - 7E	Name - 2
:	:	
05 00 12#	20 - 7E	Name - 16

<>Response 46 Event List (1) - Full Parameter Sequence

Start address	Data	Contents and remarks
05 00 00	46	Event List (1) - Full Parameter Sequence
05 00 01#	0aaaaaaa	Target V.Tr.
05 00 02#	0bbbbbbb	aaaaaaabbbbbbb = V.Tr.1-1,,,V.Tr.16-16, take(=3FFF)
05 00 03#	0aaaaaaa	Packet Number
05 00 04#	0bbbbbbb	aaaaaaabbbbbbb = 0 - 16383
05 00 05#	00 - 7F	Packet Data Buffer
:	:	:
05 nn mm#		(nn mm = Packet Byte Length - 1)

Data Sequence (Event Parameter)			
00 00 00	000000aa	Event Number	
00 00 01	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE	
00 00 02	0ccccccc		
00 00 03	0aaaaaaa	Start Time	
00 00 04	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =	
00 00 05	0ccccccc	0,,,268435455block (1block=16sample)	
00 00 06	0ddddddd		
00 00 07	0aaaaaaa	End Time	
00 00 08	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =	
00 00 09	0ccccccc	0,,,268435455block (1block=16sample)	
00 00 0A	0ddddddd		
00 00 0B	0aaaaaaa	Offset Time	
00 00 0C	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =	
00 00 0D	0ccccccc	0,,,268435455block (1block=16sample)	
00 00 0E	0ddddddd		
00 00 0F	000000aa	Previous Event	
00 00 10	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE,	
00 00 11	0ccccccc	Termination(=FFFF)	
00 00 12	000000aa	Next Event	
00 00 13	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE,	
00 00 14	0ccccccc	Termination(=FFFF)	
00 00 15	000000aa	Archive Flag	
00 00 16	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFF	
00 00 17	0ccccccc		
00 00 18	000000aa	UNDO Level	
00 00 19	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFF	
00 00 1A	0ccccccc		
00 00 1B	0000000a	Target V.Tr.	
00 00 1C	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16,	
00 00 1D	00 - 01	Sub Take	ORG, SUB
00 00 1E	000000aa	From Original Event Number of Take List	
00 00 1F	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE	
00 00 20	0ccccccc		
00 00 21	00 - 3B	Time&Date (second)	0,,,59
00 00 22	00 - 3B	(minute)	0,,,59
00 00 23	00 - 17	(hour)	0,,,23
00 00 24	00 - 06	(day)	1,,,7
00 00 25	00 - 1E	(date)	1,,,31
00 00 26	00 - 0B	(month)	1,,,12
00 00 27	000000aa	(year) aabbbbbbbccccccc = 1980,,,2079	
00 00 28	0bbbbbbb		
00 00 29	0ccccccc		
00 00 2A	20 - 7e	Name - 1	ASCII
00 00 2B	20 - 7e	Name - 2	
:		:	

00 00 39	20 - 7e	Name - 16

<>Response 47 Event List (2) - Event Number Sequence

Start address	Data	Contents and remarks
05 00 00	47	Event List (2) - Event Number Sequence
05 00 01#	0aaaaaaa	Target V.Tr.
05 00 02#	0bbbbbbb	aaaaaaabbbbbbb = V.Tr.1-1,,,V.Tr.16-16, take(=3FFF)
05 00 03#	0aaaaaaa	Packet Number
05 00 04#	0bbbbbbb	aaaaaaabbbbbbb = 0 - 16383
05 00 05#	00 - 7F	Packet Data Buffer
:	:	:
05 nn mm#		(nn mm = Packet Byte Length - 1)

Data Sequence		
00 00 00	000000aa	Event Number
00 00 01	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE
00 00 02	0ccccccc	

<>Response 48 Event List (3) - Event List Pointer: Top,Bottom,Count

Start address	Data	Contents and remarks
05 00 00	48	Event List (3) - Event List Pointer: Top,Bottom,Count
05 00 01#	0aaaaaaa	Target V.Tr.
05 00 02#	0bbbbbbb	aaaaaaabbbbbbb = V.Tr.1-1,,,V.Tr.16-16, take(=3FFF)
00 00 03#	000000aa	Event List Top
00 00 04#	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE,
00 00 05#	0ccccccc	Termination(=FFFF)
00 00 06#	000000aa	Event List Bottom
00 00 07#	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE,
00 00 08#	0ccccccc	Termination(=FFFF)
00 00 09#	000000aa	Event List Count
00 00 0A#	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFF
00 00 0B#	0ccccccc	

<>Response 49 Event Parameter

Start address	Data	Contents and remarks
05 00 00	49	Event Parameter
05 00 01	000000aa	Event Number
05 00 02	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE
05 00 03	0ccccccc	
05 00 04	0aaaaaaa	Start Time
05 00 05	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 06	0ccccccc	0,,,268435455block (1block=16sample)
05 00 07	0ddddddd	
05 00 08	0aaaaaaa	End Time
05 00 09	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 0A	0ccccccc	0,,,268435455block (1block=16sample)
05 00 0B	0ddddddd	
05 00 0C	0aaaaaaa	Offset Time
05 00 0D	0bbbbbbb	aaaaaaabbbbbbbccccccddddddd =
05 00 0E	0ccccccc	0,,,268435455block (1block=16sample)
05 00 0F	0ddddddd	
05 00 10	000000aa	Previous Event
05 00 11	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE,
05 00 12	0ccccccc	Termination(=FFFF)
05 00 13	000000aa	Next Event
05 00 14	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE,
05 00 15	0ccccccc	Termination(=FFFF)
05 00 16	000000aa	Archive Flag
05 00 17	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFF
05 00 18	0ccccccc	
05 00 19	000000aa	UNDO Level
05 00 1A	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFF
05 00 1B	0ccccccc	
05 00 1C	0000000a	Target V.Tr.
05 00 1D	0bbbbbbb	abbbbbbb = V.Tr.1-1,,,V.Tr.16-16,
05 00 1E	00 - 01	Sub Take ORG, SUB
05 00 1F	000000aa	From Original Event Number of Take List
05 00 20	0bbbbbbb	aabbbbbbbccccccc = 0000,,,FFFE
05 00 21	0ccccccc	
05 00 22	00 - 3B	Time&Date (second) 0,,,59
05 00 23	00 - 3B	(minute) 0,,,59
05 00 24	00 - 17	(hour) 0,,,23
05 00 25	00 - 06	(day) 1,,,7
05 00 26	00 - 1E	(date) 1,,,31
05 00 27	00 - 0B	(month) 1,,,12
05 00 28	000000aa	(year) aabbbbbbbccccccc = 1980,,,2079
05 00 29	0bbbbbbb	
05 00 2A	0ccccccc	

05 00 2B	20 - 7e	Name - 1	ASCII
05 00 2C	20 - 7e	Name - 2	
:		:	
05 00 3A	20 - 7e	Name - 16	

(o)Sync Track Data

Start address	Data	Contents and remarks
08 00 00	0000aaaa	Sync Track Data 1
08 00 01	0000bbbb	aaaabbbbccccdddd
08 00 02	0000cccc	
08 00 03	0000dddd	
08 00 04	0000aaaa	Sync Track Data 2
08 00 05	0000bbbb	aaaabbbbccccdddd
08 00 06	0000cccc	
08 00 07	0000dddd	
08 00 08	0000aaaa	Sync Track Data 3
:	:	:
0F 7f 7B	0000dddd	Sync Track Data 32767
0F 7F 7C	0000aaaa	Sync Track Data 32768
0F 7F 7D	0000bbbb	aaaabbbbccccdddd
0F 7F 7E	0000cccc	
0F 7F 7F	0000dddd	

3. MIDI Machine Control

[]MIDI Machine Control Details

(o)STOP(MCS)

Status	Data Byte	Status
F0H	7FH,Dev,06H,01H	F7H

Byte	Description
F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID (or 7FH)
06H	MMC Command Message
01H	STOP (MCS)
F7H	EOX (End of System Exclusive Message)

If the device ID on the message was as same as that of the receiving device or 7FH, the VS-1680 stops immediately.
If the transport switch [STOP] was pressed, the VS-1680 transmits as the device ID 7FH.

(o)PLAY(MCS)

Status	Data Byte	Status
F0H	7FH,Dev,06H,02H	F7H

Byte	Description
F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID (or 7FH)
06H	MMC Command Message
02H	PLAY (MCS)
F7H	EOX (End of System Exclusive Message)

If the device ID on the message was as same as that of the receiving device or 7FH, the VS-1680 goes into the playback condition.
The VS-1680 does not transmit this message.

(o)DEFERRED PLAY(MCS)

Status	Data Bytes	Status
F0H	7FH,Dev,06H,03H	F7H

Byte	Description
F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID (or 7FH)
06H	MMC Command Message
03H	DEFERRED PLAY (MCS)
F7H	EOX (End of System Exclusive Message)

If the device ID on the message was as same as that of the receiving device or 7FH, the VS-1680 goes into the playback condition after the locate operation.
If the transport switch [PLAY] was pressed, the VS-1680 transmits as the device ID 7FH.

(o)FAST FORWARD(MCS)

Status	Data Bytes	Status
F0H	7FH,Dev,06H,03H	F7H

Byte	Description
F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID (or 7FH)
06H	MMC Command Message
03H	DEFERRED PLAY (MCS)
F7H	EOX (End of System Exclusive Message)

If the device ID on the message was as same as that of the receiving device or 7FH, the VS-1680 goes into the fast forward condition.
The VS-1680 does not transmit the message.

(o)REWIND(MCS)

Status	Data Bytes	Status
F0H	7FH,Dev,06H,05H	F7H

Byte	Description
F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID (or 7FH)
06H	MMC Command Message
05H	REWIND (MCS)
F7H	EOX (End of System Exclusive Message)

If the device ID on the message was as same as that of the receiving device or 7FH, the VS-1680 goes into the rewind condition.
The VS-1680 does not transmit the message.

(o)RECORD STROBE

Status	Data Bytes	Status
F0H	7FH,Dev,06H,06H	F7H

Byte	Description
F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID (or 7FH)
06H	MMC Command Message
06H	RECORD STROBE
F7H	EOX (End of System Exclusive Message)

If the device ID on the message was as same as that of the receiving device or 7FH, the VS-1680 goes into the following condition.

1. The VS-1680 is in the playback condition.
Start Recording the tracks that status are the record standby mode.

2. The VS-1680 is in the stop condition.
Start Playing back, and Start Recording the track that status are the record standby mode.

If the transport switch [REC] was pressed out of the recording condition, the VS-1680 transmits as the device ID 7FH.

(o)RECORD EXIT

Status	Data Bytes	Status
F0H	7FH,Dev,06H,07H	F7H

Byte	Description
F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID (or 7FH)

06H	MMC Command Message
07H	RECORD EXIT
F7H	EOX (End of System Exclusive Message)

If the device ID on the message was as same as that of the receiving device or 7FH, the VS-1680 exits from the record condition.
If the transport switch [REC] was pressed while recording, the VS-1680 transmits as the device ID 7FH.

(o)MMC RESET

Status	Data Bytes	Status
F0H	7FH,Dev,06H,0DH	F7H

Byte	Description
F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID (or 7FH)
06H	MMC Command Message
0DH	MMC RESET
F7H	EOX (End of System Exclusive Message)

If the device ID on the message was as same as that of the receiving device or 7FH, the VS-1680 resets all communication channels related with MMC.
When powered on the VS-1680 transmits as the device ID 7FH.

(o)WRITE

Status	Data Bytes	Status
F0H	7FH,Dev,06H,40H,ccH,ddH,eeH,,,ffH,,,	F7H

Byte	Description
F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID (or 7FH)
06H	MMC Command Message
40H	WRITE
ccH	Information Bytes follows the command
ddH	The name of the writable Information Field
eeH	Information Field Format
:	:
ffH	Field names and data
:	:
F7H	EOX (End of System Exclusive Message)

If the device ID on the message was as same as that of the receiving device or 7FH, the VS-1680 writes the data to the specified information field.
The VS-1680 does not transmit the message.

(o)MASKED WRITE

Status	Data Bytes	Status
F0H	7FH,Dev,06H,41H,04H,ddH,eeH,ffH,ggH	F7H

Byte Description

F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID (or 7FH)
06H	MMC Command Message
41H	MASKED WRITE
04H	Number of Bytes follows the command
ddH	The name of the masked type writable Information Field
eeH	Byte number to write in the Bit Map
ffH	Bit location of the bit map byte to change
ggH	New data to write to the specified bit map byte
F7H	EOX (End of System Exclusive Message)

If the device ID on the message was as same as that of the receiving device or 7FH, the VS-1680 writes the data to the specified bit map byte.
The VS-1680 does not transmit the message.

(o)LOCATE(MCP)

()Format 1 - LOCATE[I/F]

Status	Data Bytes	Status
F0H	7FH,Dev,06H,44H,02H,00H,nnH	F7H

Byte	Description
F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID (or 7FH)
06H	MMC Command Message
44H	LOCATE(MCP)
02H	Number of Bytes
00H	"I/F" sub command
nnH	Information Field (08H, 09H, 0AH, 0BH, 0CH, 0DH, 0EH, 0FH)
F7H	EOX (End of System Exclusive Message)

If the device ID on the message was as same as that of the receiving device or 7FH, the VS-1680 locates the selected time location stored to the specified
information field.
The VS-1680 does not transmit the message.

()Format 2 - LOCATE[TARGET]

Status	Data Bytes	Status
F0H	7FH,Dev,06H,44H,06H,01H,hrH,mnH,scH,frH,ffH	F7H

Byte	Description
F0H	Status of System Exclusive Message
7FH	Universal System Exclusive Message Realtime Header
Dev	Device ID (or 7FH)
06H	MMC Command Message
44H	LOCATE(MCP)
06H	Number of Bytes
01H	"TARGET" sub command
hrH, mnH, scH, frH, ffH	

```
            Standard Time with Sub Frame
F7H         EOX (End of System Exclusive Message)
```

If the device ID on the message was as same as that of the receiving device or 7FH, the VS-1680 locates the specified time location received from the command.
If the efficient locate switch [LOC?] or Marker switch [PREVIOUS][NEXT] is pressed, the VS-1680 transmits as the device ID 7FH.

(o)MOVE

Status	Data Bytes	Status
F0H	7FH,Dev,06H,4CH,02H,ddH,ssH	F7H

Byte	Description	
F0H	Status of System Exclusive Message	
7FH	Universal System Exclusive Message Realtime Header	
Dev	Device ID (or 7FH)	
06H	MMC Command Message	
4CH	MOVE	
02H	Number of Bytes	
ddH	Name of the Efficient Destination Information Field (08H,09H,0AH,0BH,0CH,0DH,0EH,0FH)	
ssH	Name of the Efficient Source Information Field	(01H)
F7H	EOX (End of System Exclusive Message)	

If the device ID on the message was as same as that of the receiving device or 7FH, the VS-1680 transfers the data on the selected source information field
to the destination Information Field, if the name of both information fields is efficient.
The VS-1680 does not transmit the message.

(o)The efficient Information Field

The followings are the efficient Information Field on the VS-1680.

The name of the efficient destination Information Field :
™@™@01H SELECTED TIME CODE
    08H GP0 / LOCATE POINT
™@™@09H GP1
™@™@0AH GP2
™@™@0BH GP3
™@™@0CH GP4
™@™@0DH GP5
™@™@0EH GP6
™@™@0FH GP7
    4FH TRACK RECORD READY

4. Appendices

(o) Decimal and Hexadecimal table
(Hexadecimal number is shown with H.)
In MIDI documentation, data values and addresses/sizes of system exclusive messages etc. are expressed as hexadecimal values for each 7 bits.
The following table shows how these correspond to decimal numbers.

dec	hex	dec	hex	dec	hex	dec	hex
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

* Decimal values such as MIDI channel, bank select, and program change are listed as one (1) greater than the values given in the above table.

* A 7-bit byte can express data in the range of 128 steps. For data where greater precision is required, we must use two or more bytes. For example, two hexadecimal numbers aa bbH expressing two 7-bit bytes would indicate a value of aa x 128 + bb.

* 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.

* Data marked "nibbled" 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.

<Ex.1> What is 5AH in decimal system?
5AH = 90 according to the above table.

<Ex.≠Q>What in decimal system is 12034H in hexadecimal of every 7 bit?
12H = 18, 34H = 52 according to the above table. So 18 x 128 + 52 = 2356.

<Ex.3> What in dicimal system is 0A 03 09 0D in nibble system?
0AH = 10, 03H = 3, 09H = 9, 0DH = 13 according to the table.

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

<Ex. 4> What in nibble system is 1258 in decimal system?

```
        ____
      16)1258
      16)  78 ... 10
      16)   4 ... 14
            0 ...  4
```

0 = 00H, 4 = 04H, 14 = 0EH, 10 = 0AH According to the table.
So it is 00 04 0E 0AH.

(o)Example of system exclusive message and Checksum calculation

On Roland system exclusive message (DT1), checksum is added at the end of transmitted
data (in front of F7) to check the message is received correctly. Value of checksum is defined by address and data (or size) of the system exclusive message to
be transmitted.

<>How to calculate checksum (Hexadecimal number is shown with H.)
Checksum is a value which lower 7 bit of the sum of address, size and checksum
itself turns to be 0.
If the address of the system exclusive message to be transmitted is aa bb ccH and
data or size is dd ee ffH,

aa + bb + cc + dd + ee + ff = sum
sum / 128 = quotient and odd
When odd is 0, 0 = checksum
When odd is other than 0, 128 - odd = checksum

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[Digital Studio Workstation] Date : Jan. 27 1998
Model VS-1680 MIDI Implementation Chart
Version : 0.00

	Transmitted	Recognized	Remarks
Function ...			
Basic Default	1-16	1-16	
Channel Changed	1-16 *1	**********	

	Default	Mode 3	Mode 3	
Mode	Messages	x	x	
	Altered	**********	x	
Note Number:		0-127 *1	o *10	
	True Voice	**********	36-84,36-60	
Velocity	Note On	1-127 *1	x	
	Note Off	x 9n, v = 0	x	
After Touch	Key's	o *12	x	
	Ch's	x	x	
Pitch Bender		x	o *10	

Control Change	0,32	x	o	Bank Select
	3	o	o	Track Status *2*
	6,38	x	o	Data Entry LSB,MSB *2*
	7,68	o	o	Mix Send/Master Level *2*
	10,70	o	o	Mix Send/Master Pan *2*
	12,71	o	o	EQ L Freq. *2*
	13,72	o	o	EQ L Gain *2*
	14,73	o	o	EQ M Freq. *2*
	15,74	o	o	EQ M Gain *2*
	16,75	o	o	EQ M Q *2*
	17,76	o	o	EQ H Freq. *2*
	18,77	o	o	EQ H Gain *2*
	19,78	o	o	EFX1 Send Level *2*
	20,79	o	o	EFX1 Send Pan *2*
	21,80	o	o	EFX2 Send Level *2*
	22.81	o	o	EFX2 Send

Pan *2				
	23,82	o	o	EFX3 Send Level *2
	24,83	o	o	EFX3 Send Pan *2
	25,84	o	o	EFX4 Send Level *2
	26,85	o	o	EFX4 Send Pan *2
	27,86	o	o	AUX Send Level *2
	28,87	o	o	AUX Send Pan *2
	29,88	o	o	Mix Offset Level *2
	30,89	o	o	Mix Offset Bal *2
	64	x	o	Hold *2 *11
	96,97	x	o	Data Inc,Dec *2
	98,99	x	o	NRPN LSB,MSB *2
	102	o	o	Monitor Level *2
	103	o	o	Monitor Bal *2
Program		x	o *3	
Change : True #		**********	0 - 99	Effect#0-#99
		**********	0 - 7	Scene#1-#8
System Exclusive		o *4	o *5	*6
Common	:Quarter Frame	o *7	o *7	
	:Song Position	o *8	x	
	:Song Select	x	x	
	:Tune	x	x	
Real Time	:Clock	o *8	o *9	
	:Commands	o	o	
	:All Sound Off	x	x	
	:Reset All Controllers	x	x	

|Aux :Local ON/OFF | x | x |
|
| :All Note Off | x | x |
|
| :Active Sense | x | x |
|
| :System Reset | x | x |
|
|---|---|---|---|
|Notes | *1 MIDI Metronome Only
|
| | *2 MID:CtrType=C.C. Only
|
| | *3 Effect when MIDI CH=1,2,3,4, Scene when MIDI CH=16. |
| | *4 MID:SysEx.Tx=On Only
|
| | *5 MID:SysEx.Rx=On Only
|
| | *6 When MID:CtrlType=Excl, MIXER Set and MMC. |
| | *7 Syn:Gen.=MTC Only
|
| | *8 Syn:Gen.=MIDIclk or SyncTr Only
|
| | *9 When Recording Sync Track Only
|
| | *10 When Algorithm27(Voice Transfomer) is selected, |
| | and MIDI Control Sw=ON
|
| | *11 When Algorithm28(Vocoder2) is selected,
|
| | and HOLD=MIDI
|
| | *12 Transmits Level Meter Value according to the value |
| | of Level Meter Tx. via MIDI. MIDI CH=16 (fixed) |
+---|---+

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO
o : Yes
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO
x : No

#Notes---

The mixer operation is transmitted and received through the MIDI Control Change.
Therefore, general MIDI Sequencers can record or play the mixer operation simply.
The VS-1680 uses some Control Change Number in order to original parameter controls
which is different from the MIDI standard.

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MIDI Machine Control (MMC) Command, Information Field / Response Reference

* Commands Recognized

™@Command	Action
01H STOP	STOP
02H PLAY	PLAY
03H DEFERRED PLAY	PLAY
04H FAST FORWARD	FF
05H REWIND	REW
06H RECORD STROBE	REC / PUNCH IN
07H RECORD EXIT	PUNCH OUT
0DH MMC RESET	RESET
40H WRITE	Write to Information Fields
41H MASKED WRITE	Set Track Status Information Fields
44H 00H LOCATE I/F	LOCATE (Read Locator)
44H 01H LOCATE TARGET	LOCATE (Designated Time)
4CH MOVE	Move between Information fields

* Commands Transmitted

™@Command	Action
01H STOP	STOP
03H DEFERRED PLAY	PLAY
06H RECORD STROBE	REC / PUNCH IN
07H RECORD EXIT	PUNCH OUT
0DH MMC RESET	RESET
44H 01H LOCATE TARGET	LOCATE

* Valid Information Fields / Response

Information Field	Interpret	Valid Commands
01H SELECTED TIME CODE	Current Time	MOVE(FROM)
08H GP0 / LOCATE POINT	Locator 1	MOVE(FROM), MOVE(TO), WRITE
09H GP1	Locator 2	MOVE(FROM), MOVE(TO), WRITE
0AH GP2	Locator 3	MOVE(FROM), MOVE(TO), WRITE
0BH GP3	Locator 4	MOVE(FROM), MOVE(TO), WRITE
0CH GP4	Locator 5	MOVE(FROM), MOVE(TO), WRITE
0DH GP5	Locator 6	MOVE(FROM), MOVE(TO), WRITE
0EH GP6	Locator 7	MOVE(FROM), MOVE(TO), WRITE
0FH GP7	Locator 8	MOVE(FROM), MOVE(TO), WRITE
4FH TRACK RECORD READY	Track Status	MASKED WRITE, WRITE