

MIDI Implementation

Model: DD-500

Date: September 28, 2017

Version: 2.00

1. Recognized data

Received messages are transmitted without change according to the "MIDI: MIDI IN->OUT" and "MIDI: USB IN->OUT" settings.

■Channel Voice Message

These messages are received if the "MIDI: Rx CHANNEL" setting matches the MIDI channel number of the incoming message.

●Control Change

○Bank Select

Status	2nd Byte	3rd Byte
BnH	00H	mmH
BnH	20H	00H

n = MIDI Channel Number: 0H - FH (0 - 15) 0=ch.1 15=ch.16

mm = Bank Number (MSB) : 00H - 02H (0 - 2)

* After this unit starts up, it operates with 00H as the bank number until a bank select message is received.

○Control Change Number #1~#31 (MSB), #33 - #63 (LSB), #64~#95

Status	2nd Byte	3rd Byte
BnH	ccH	vvH

n = MIDI Channel Number: 0H - FH (0 - 15) 0=ch.1 15=ch.16

cc = Control Change Number: 01H - 1FH (MSB), 20H - 3FH (LSB), 40H - 5FH (1 - 31, 32 - 63, 64-95)

vv = Value : 00H - 7FH (0 - 127)

* Recognized if "MIDI CC IN" = ON.

* Recognized if the "Assign: SRC" setting is CC#1--#31 or CC#64--#95.

Target value = (parameter min) + (((cc value) - (act range low)) * (parameter range)) / ((act range High) - (act range Low))

* When a CC# matching the CC# that is specified as "MIDI: EFFECT SW," "MIDI: EFFECT A," "MIDI: EFFECT B," "MIDI: TIME CC," "MIDI: FEEDBACK CC," "MIDI: E.LEVEL CC," "MIDI: TONE CC," "MIDI: MOD DEPTH CC," "MIDI: CTL1 CC," "MIDI: CTL2 CC," "MIDI: EXP CC," "MIDI: LOOP ON/OFF," "MIDI: LOOP REC/DUB," "MIDI: LOOP PLAY," "MIDI: LOOP STOP," "MIDI: LOOP CLEAR" is received, that controller is controlled.

* LSB (#33 - #63) is received when "TIME CC" set to CC #1 - #31

CC #1 - #31

MSB value = 0

Parameter value = parameter min

MSB value = 127

Parameter value = parameter max

Others

Parameter value = (((cc MSB+LSB value) * (parameter range)) / 16383)

cc MSB+LSB value = (MSB value) * 128 + (LSB value)

CC #64 - #95

Parameter value = (((cc value) * (parameter range)) / 127)

* "FEEDBACK CC," "E.LEVEL CC," "TONE CC," "MOD DEPTH CC"

Parameter value = (((cc value) * (parameter range)) / 127)

Parameter range = (parameter max) - (parameter min)

●Program Change

Status	2nd Byte
CnH	ppH

n = MIDI Channel Number : 0H - FH (0 - 15) 0 = ch.1, 15 = ch.16

pp = Program Number : 00H - 7FH (0 - 127)

* This message switches to the patch that is specified by "MIDI PC MAP."

■System Realtime Messages

●Timing Clock

Status
F8H

* Recognized if the "MIDI: SYNC" setting is other than INTERNAL.

●Active Sensing

Status

FEH

* When an Active Sensing message is received, the interval of all subsequent messages will begin to be monitored.

When the message interval is being monitored, and the interval exceeds 400 ms, the display indicates "MIDI OFFLINE" and the unit returns to a state in which message interval is not monitored.

■System Exclusive Messages

Status	Data Byte	Status
F0H,	iiH, dev, ddH, ..., eeH,	F7H

Byte	Explanation
F0H:	System Exclusive Message status
iiH:	ID number
41H:	Roland's manufacturer ID
7EH:	Universal Non-realtime message
dev:	Device ID (dev: 00H-1FH, 7FH) * 7FH = Broadcast
dd,...,ee = data:	00H-7FH(0-127)
F7H:	EOX (End of Exclusive)

●Universal Non-Realtime System Exclusive Messages

oIdentity Request Message (Device Inquiry)

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

Byte	Explanation
F0H:	System Exclusive Message status
7EH:	Universal Non-realtime Message
dev:	Device ID (dev: 00H-1FH, 7FH) * 7FH = Broadcast
06H:	Sub ID # 1 (General Information)
01H:	Sub ID # 2 (Identity Request)
F7H:	EOX (End of Exclusive)

When this message is received, this unit transmits the prescribed identity reply message (see transmitted data).

●One Way Communication

oRequest Data 1 RQ1 (11H)

Status	Data Byte	Status
F0H,	41H, dev, 00H, 00H, 00H, 4DH, 11H, aaH, bbH, cCH, ddH, ssH, ttH, uuH, vvH, sum,	F7H

Byte	Explanation
F0H:	System Exclusive Message status
41H:	Manufacturer ID (Roland)
dev:	Device ID (00H-1FH, 7FH) * 7FH = Broadcast
00H:	Model ID # 1 (DD-500 Ver.2)
00H:	Model ID # 2 (DD-500 Ver.2)
00H:	Model ID # 3 (DD-500 Ver.2)
4DH:	Model ID # 4 (DD-500 Ver.2)
11H:	Command ID (RQ1)
aaH:	Address MSB
bbH:	Address
cCH:	Address
ddH:	Address LSB
ssH:	Size MSB
ttH:	Size
uuH:	Size
vvH:	Size LSB
sum:	Checksum
F7H:	EOX (End of Exclusive)

oData Set 1 DT1 (12H)

Status	Data Byte	Status
F0H,	41H, dev, 00H, 00H, 00H, 4DH, 12H, aaH, bbH, ccH, ddH, eeH, ... hhH, sum,	F7H

Byte	Explanation
F0H:	System Exclusive Message status
41H:	Manufacturer ID (Roland)
dev:	Device ID (00H-1FH, 7FH) * 7FH = Broadcast
00H:	Model ID # 1 (DD-500 Ver.2)
00H:	Model ID # 2 (DD-500 Ver.2)
00H:	Model ID # 3 (DD-500 Ver.2)
4DH:	Model ID # 4 (DD-500 Ver.2)
12H:	Command ID (DT1)
aaH:	Address MSB
bbH:	Address
ccH:	Address
ddH:	Address LSB
eeH:	Data
:	
ffH:	Data
sum:	Checksum
F7H:	EOX (End of Exclusive)

2. Transmitted data

■Channel Voice Messages

* Set the channel voice message transmit MIDI channel number to "MIDI: Tx CHANNEL."

●Control Change

oBank Select

Status	2nd Byte	3rd Byte
BnH	00H	mmH
BnH	20H	00H

n = MIDI Channel Number: 0H - FH (0 - 15) 0=ch.1 15=ch.16

mm = Bank Number (MSB): 00H - 02H (0 - 2)

* If the "MIDI: PC OUT" setting is ON, this message is transmitted when you switch patches. If the "BANK SEL OUT" setting is MSB, only BnH 00H mmH (MSB) is transmitted.

oControl Change Number #1~#31 (MSB), #33-#63 (LSB), #64~#95

Status	2nd Byte	3rd Byte
BnH	ccH	vvH

n = MIDI Channel Number: 0H - FH (0 - 15) 0=ch.1 15=ch.16

cc = Control Change Number: 01H - 1FH, 20H - 3FH, 40H - 5FH (1 - 31, 32 - 63, 64 - 95)

vv = Value : 00H - 7FH (0 - 127)

* Transmitted if "MIDI CC OUT" = ON.

* When you operate a controller, the CC# specified by "MIDI: EFFECT CC," "MIDI: EFFECT A," "MIDI: EFFECT B," "MIDI: TIME CC," "MIDI: FEEDBACK CC," "MIDI: E.LEVEL CC," "MIDI: TONE CC," "MIDI: MOD DEPTH CC," "MIDI: CTL1 CC," "MIDI: CTL2 CC," "MIDI: EXP CC" is transmitted.

* LSB (#33 - #63) is transmitted when "MIDI: TIME CC" set to CC #1 - #31

CC #1 - #31

Parameter value = min

vv (MSB) = 0

vv (LSB) = 0

Parameter value = max

vv (MSB) = 127

vv (LSB) = 127

Others

vv (MSB) = (((parameter value) * 16383) / (time range)) / 128

vv (LSB) = (((parameter value) * 16383) / (time range)) - (vv (MSB) * 128)

CC #64 - #9

vv = (((parameter value) * 127) / (time range))

* "FEEDBACK CC," "E.LEVEL CC," "TONE CC," "MOD DEPTH CC"

vv = (((parameter value) * 127) / (parameter range))

Parameter range = (parameter max) - (parameter min)

●Program Change

Status	2nd Byte
CnH	ppH

n = MIDI Channel Number: 0H - FH (0 - 15) 0 = ch.1 15 = ch.16
pp = Program Number: 00H - 7FH (0 - 127)

* If the "MIDI: PC OUT" setting is ON, this message is transmitted when you switch patches.
* Patch numbers correspond to program numbers as follows.

BANK SEL.		
PATCH#	MSB LSB	PROG#
01A	00H 00H	00H
:	:	:
43B	00H 00H	7FH
43C	01H 00H	00H
:	:	:
86A	01H 00H	7FH
86B	02H 00H	00H
:	:	:
99C	02H 00H	28H

■System Realtime Message

●Timing Clock

Status
F8H

* If both "MIDI: SYNC" = INTERNAL and "MIDI: REALTIME SRC" = INT, this message is transmitted at intervals corresponding to the tempo.
* If the "MIDI: REALTIME SRC" setting is other than INT, this message is transmitted when timing clock messages corresponding to the setting are received.

●Active Sensing

Status
FEH

* This message is always transmitted at intervals of approximately 250 ms.

■System Exclusive Message

Status	Data Byte	Status
F0H	41H, ddH, ..., eeH,	F7H

Byte	Explanation
F0H:	System Exclusive Message status
41H:	Roland's manufacturer ID
dd,...,ee = data:	00H-7FH(0-127)
F7H:	EOX (End of Exclusive)

●Universal Non-realtime System Exclusive Message

○Identity Reply Message

Status	Data Byte	Status
F0H,	7EH, dev, 06H, 02H, 41H, 4DH, 03H, 00H, 00H, 00H, 00H, 01H,	F7

Byte	Explanation
F0H:	System Exclusive Message status
7EH:	ID Number (Universal Non-realtime Message)
dev:	Device ID (dev: 00H - 1FH)
06H:	Sub ID # 1 (General Information)
02H:	Sub ID # 2 (Identity Reply)
41H:	Roland's manufacturer ID
4DH:	03H Device family code # 1 (DD-500 Ver.2)
00H:	00H Device family code # 2 (DD-500 Ver.2)
00H:	Software revision level # 1
00H:	Software revision level # 2
00H:	Software revision level # 3
01H:	Software revision level # 4
F7H:	EOX (End of Exclusive)

* This message is transmitted when an identity request message is received.

●One Way Communication

oData Set 1 DT1 (12H)

Status	Data Byte	Status
F0H,	41H, dev, 00H, 00H, 00H, 4DH, 12H, aaH, bbH, cCH, ddH, eeH, ... hhH, sum,	F7H

Byte	Explanation
F0H:	System Exclusive Message status
41H:	Roland's manufacturer ID
dev:	Device ID (00H-1FH)
00H:	Model ID # 1 (DD-500 Ver.2)
00H:	Model ID # 2 (DD-500 Ver.2)
00H:	Model ID # 3 (DD-500 Ver.2)
4DH:	Model ID # 4 (DD-500 Ver.2)
12H:	Command ID (DT1)
aaH:	Address MSB
bbH:	Address
cCH:	Address
ddH:	Address LSB
eeH:	Data
:	
ffH:	Data
sum:	Checksum
F7H:	EOX (End of Exclusive)

3. System Exclusive Address Map

DD-500 Ver.2 (Model ID : 00H 00H 00H 4DH)

Start	
Address	Description

00 00 00 00	Setup
10 00 00 00	System
20 00 00 00	MIDI PC MAP
30 00 00 00	BANK (Temporary)
30 04 00 00	BANK (BANK 1)
:	:
33 0C 00 00	BANK (BANK 99)

* Setup

Offset	
Address	Description

00 00 00	Setup Common
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* System

Offset	
Address	Description

00 00 00	System Common
00 10 00	System CTL

* MIDI PC MAP

Offset	
Address	Description

00 00 00	MIDI PC MAP
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* BANK

Offset	
Address	Description

00 00 00	BANK BANK
00 10 00	BANK PATCH (patch A)
00 20 00	BANK PATCH (patch B)
00 30 00	BANK PATCH (patch C)

* Setup Common Parameters Offset Address

Offset			
Address		Description	
00 00	0000 000a	Current Patch Number	(0 - 296)
			PATCH 01A - PATCH 99C
	0000 bbbb		
	0000 cccc		

* System Common Parameters Offset Address

Offset			
Address		Description	
00 00	0000 00dd	Global Output Mode	(0 - 2)
			STEREO, A:DIR B:EFX, DIRECT MUTE
00 01	0000 000d	Bank wait mode	(0 - 1)
			WAIT, IMMEDIATE
00 02	0ddd dddd	Bank Extent Begin	(0 - 98)
			01 - 99
00 03	0ddd dddd	Bank Extent End	(0 - 98)
			01 - 99
00 04	0000 000d	Global Knob Lock Switch	(0 - 1)
			OFF, ON
00 05	0000 000d	Global Knob Mode	(0 - 1)
			IMMEDIATE, HOOK
00 06	0000 00dd	Phrase Loop Mode	(0 - 2)
			96k MONO, 48k ST, 48k MONO
00 07	0000 000d	Global Bypass Mode	(0 - 1)
			BUFFERED, TRUE
00 08	0000 000d	Global Pedal Action	(0 - 1)
			PUSH, RELEASE
00 09	0000 00dd	Foot Switch Hold Time	(0 - 4)
			1sec, 2sec, 3sec, 4sec, 5sec
00 0A	0000 00dd	Foot Switch Mode	(0 - 3)
			NORMAL, A/B/C, A/B SIMUL, SW DN/UP
00 0B	0000 00dd	Global Display Type	(0 - 3)
			DISP_TIME, DISP_BPM, DISP_PATCH, DISP_PARAM
00 0C	000d dddd	MIDI Rx Channel	(0 - 16)
			Ch.1, Ch.2, Ch.3, Ch.4, Ch.5, Ch.6, Ch.7, Ch.8, Ch.9, Ch.10, Ch.11, Ch.12, Ch.13, Ch.14, Ch.15, Ch.16, OFF
00 0D	000d dddd	MIDI Tx Channel	(0 - 17)
			Ch.1, Ch.2, Ch.3, Ch.4, Ch.5, Ch.6, Ch.7, Ch.8, Ch.9, Ch.10, Ch.11, Ch.12, Ch.13, Ch.14, Ch.15, Ch.16, Rx, OFF
00 0E	0000 000d	MIDI Program Change IN	(0 - 1)
			OFF, ON
00 0F	0000 000d	MIDI Program Change OUT	(0 - 1)
			OFF, ON
00 10	0000 000d	MIDI Bank Select OUT	(0 - 1)
			MSB, M+L
00 11	0000 000d	MIDI Control Change IN	(0 - 1)
			OFF, ON
00 12	0000 000d	MIDI Control Change OUT	(0 - 1)
			OFF, ON
00 13	00dd dddd	MIDI Effect A Control Change	(0 - 63)
			OFF, CC#1, CC#2, CC#3, CC#4, CC#5, CC#6, CC#7, CC#8, CC#9, CC#10, CC#11, CC#12, CC#13, CC#14, CC#15, CC#16, CC#17, CC#18, CC#19, CC#20, CC#21, CC#22, CC#23, CC#24, CC#25, CC#26, CC#27, CC#28, CC#29, CC#30, CC#31, CC#64, CC#65, CC#66, CC#67, CC#68, CC#69, CC#70, CC#71, CC#72, CC#73, CC#74, CC#75, CC#76, CC#77, CC#78, CC#79, CC#80, CC#81, CC#82, CC#83, CC#84, CC#85, CC#86, CC#87, CC#88, CC#89, CC#90, CC#91, CC#92, CC#93, CC#94, CC#95(*A)
00 14	00dd dddd	MIDI Effect B Control Change	(*A)
00 15	00dd dddd	MIDI TAP/CTL Switch Control Change	(*A)
00 16	00dd dddd	MIDI Feedback Control Change	(*A)
00 17	00dd dddd	MIDI Effect Level Control Change	(*A)
00 18	00dd dddd	MIDI Tone Control Change	(*A)
00 19	00dd dddd	MIDI Mod Depth Control Change	(*A)
00 1A	00dd dddd	MIDI CTL1 Control Change	(*A)
00 1B	00dd dddd	MIDI CTL2 Control Change	(*A)
00 1C	00dd dddd	MIDI EXP Control Change	(*A)
00 1D	00dd dddd	MIDI EFFECT ON/OFF Control Change	(*A)
00 1E	00dd dddd	MIDI LOOPER ON/OFF Control Change	(*A)
00 1F	00dd dddd	MIDI LOOPER [REC/DUB] Control Change	(*A)
00 20	00dd dddd	MIDI LOOPER [PLAY] Control Change	(*A)

Offset				
Address				Description
00 21	00dd dddd	MIDI LOOPER [STOP] Control Change	(*A)	
00 22	00dd dddd	MIDI LOOPER [CLEAR] Control Change	(*A)	
00 23	0000 00dd	MIDI Sync	(0 - 3)	
			INTERNAL, EXT (USB), EXT (MIDI), AUTO	
00 24	0000 00dd	MIDI source of realtime message to output	(0 - 2)	
			INT, USB, MIDI	
00 25	0000 00dd	MIDI In THRU into Out	(0 - 3)	
			OFF, USB, MIDI, U+M	
00 26	0000 00dd	USB In THRU into Out	(0 - 3)	
			OFF, USB, MIDI, U+M	
00 27	0000 000d	effect sw	(0 - 1)	(*1)
			OFF, ON	
00 28	0000 000d	effect sw2	(0 - 1)	(*1)
			OFF, ON	
00 29	0ddd dddd	LOOP Level	(0 - 100)	
			0 - 100	
00 2A	00dd dddd	MIDI Time Control Change	(*A)	
00 2B	0000 000d	Feedback loop sw	(0 - 1)	
			OFF, ON	

* System CTL Parameters Offset Address

Offset				
Address				Description
00 00	0000 000d	TAP/CTL preference	(0 - 1)	
			PATCH, SYSTEM	
00 01	0000 dddd	TAP/CTL Function	(0 - 9)	
			OFF, TAP, HOLD, WARP, TWIST, MOMENT, ROLL 1/2, ROLL 1/4, ROLL 1/8, FADE	
00 02	0000 000d	CTL1 preference	(0 - 1)	
			PATCH, SYSTEM	
00 03	0000 dddd	CTL1 Function	(0 - 14)	
			OFF, TAP, HOLD, WARP, TWIST, MOMENTARY, ROLL 1/2, ROLL 1/4, ROLL 1/8, FADE, EFFECT SW, BANK UP, BANK DOWN, LOOPonOff,	
			LOOP CLR	
00 04	0000 000d	CTL1 Mode	(0 - 1)	
			MOMENT, TOGGLE	
00 05	0000 000d	CTL2 preference	(0 - 1)	
			PATCH, SYSTEM	
00 06	0000 dddd	CTL2 Function	(0 - 14)	
			OFF, TAP, HOLD, WARP, TWIST, MOMENTARY, ROLL 1/2, ROLL 1/4, ROLL 1/8, FADE, EFFECT SW, BANK UP, BANK DOWN, LOOPonOff,	
			LOOP CLR	
00 07	0000 000d	CTL2 Mode	(0 - 1)	
			MOMENT, TOGGLE	
00 08	0000 000d	EXP preference	(0 - 1)	
			PATCH, SYSTEM	
00 09	0000 00dd	Exp Pedal Function	(0 - 6)	
			OFF, TIME, FEEDBACK, TONE, E.LEVEL, MOD DEPTH, MOD RATE	
00 0A	0000 0aaa	Exp target min	(0 - 23000)	
			0 - 23000	
	0000 bbbb			
	0000 cccc			
	0000 dddd			
00 0E	0000 0aaa	Exp target max	(0 - 23000)	
			0 - 23000	
	0000 bbbb			
	0000 cccc			
	0000 dddd			
00 12	0000 000d	TAP/CTL Mode	(0 - 1)	
			MOMENT, TOGGLE	
00 13	0ddd dddd	TAP/CTL Rise time	(0 - 100)	
			0 - 100	
00 14	0ddd dddd	TAP/CTL Fall time	(0 - 100)	
			0 - 100	
00 15	0ddd dddd	CTL1 Rise time	(0 - 100)	
			0 - 100	
00 16	0ddd dddd	CTL1 Fall time	(0 - 100)	
			0 - 100	

Offset			
Address	Description		
00 17	0ddd dddd	CTL2 Rise time	(0 - 100)
			0 - 100
00 18	0ddd dddd	CTL2 Fall time	(0 - 100)
			0 - 100
00 19	0ddd dddd	TAP/CTL Hold level	(0 - 120)
			0 - 120
00 1A	0ddd dddd	TAP/CTL Warp level	(0 - 120)
			0 - 120
00 1B	0ddd dddd	TAP/CTL Twist level	(0 - 120)
			0 - 120
00 1C	0ddd dddd	CTL1 Hold level	(0 - 120)
			0 - 120
00 1D	0ddd dddd	CTL1 Warp level	(0 - 120)
			0 - 120
00 1E	0ddd dddd	CTL1 Twist level	(0 - 120)
			0 - 120
00 1F	0ddd dddd	CTL2 Hold level	(0 - 120)
			0 - 120
00 20	0ddd dddd	CTL2 Warp level	(0 - 120)
			0 - 120
00 21	0ddd dddd	CTL2 Twist level	(0 - 120)
			0 - 120

* MIDI PC MAP Parameters Offset Address

Offset			
Address	Description		
00 00	0000 000a	BANK: #1 PC: #001	(0 - 296)
			PATCH 01A - PACH 99C ____(*B)
	0000 bbbb		
	0000 cccc		
00 03	0000 000a	BANK: #1 PC: #002	(*B)
	0000 bbbb		
	0000 cccc		
00 06	0000 000a	BANK: #1 PC: #003	(*B)
	0000 bbbb		
	0000 cccc		
00 09	0000 000a	BANK: #1 PC: #004	(*B)
	0000 bbbb		
	0000 cccc		
00 0C	0000 000a	BANK: #1 PC: #005	(*B)
	0000 bbbb		
	0000 cccc		
00 0F	0000 000a	BANK: #1 PC: #006	(*B)
	0000 bbbb		
	0000 cccc		
:	:		
:	:		
00 7E	0000 000a	BANK: #1 PC: #043	(*B)
	0000 bbbb		
	0000 cccc		
01 01	0000 000a	BANK: #1 PC: #044	(*B)
	0000 bbbb		
	0000 cccc		
:	:		
:	:		
01 7F	0000 000a	BANK: #1 PC: #086	(*B)
	0000 bbbb		
	0000 cccc		
02 02	0000 000a	BANK: #1 PC: #087	(*B)
	0000 bbbb		
	0000 cccc		
:	:		
:	:		
02 7D	0000 000a	BANK: #1 PC: #128	(*B)
	0000 bbbb		
	0000 cccc		

Offset			
Address	Description		
03 00	0000 000a	BANK: #2 PC: #001	(*B)
	0000 bbbb		
	0000 cccc		
:	:		
:	:		
05 7D	0000 000a	BANK: #2 PC: #128	(*B)
	0000 bbbb		
	0000 cccc		
06 00	0000 000a	BANK: #3 PC: #001	(*B)
	0000 bbbb		
	0000 cccc		
:	:		
:	:		
08 7D	0000 000a	BANK: #3 PC: #128	(*B)
	0000 bbbb		
	0000 cccc		

* BANK BANK Parameters Offset Address

Offset			
Address	Description		
00 00	0000 000d	Structure	(0 - 1)
			SERIES, PARALLEL
00 01	0000 000d	Output mode	(0 - 1)
			MIX, A/B
00 02	0000 000d	Sync	(0 - 1)
			OFF, ON
00 03	0000 00dd	Feedback loop select	(0 - 2)
			OFF, PATCH A, PATCH B
00 04	0000 aaaa	Direct level adjust	(0 - 150)
			50% - 200%
	0000 bbbb		

* BANK PATCH Parameters Offset Address

Offset			
Address	Description		
00 00	0ddd dddd	Patch Name1	(32 - 126)
			32 - 126 [ASCII]
00 01	0ddd dddd	Patch Name2	(32 - 126)
			32 - 126 [ASCII]
:	:		
:	:		
00 0F	0ddd dddd	Patch Name16	(32 - 126)
			32 - 126 [ASCII]
00 10	0000 dddd	Delay MODE	(0 - 11)
			STANDARD, TERA ECHO, SLOW ATTACK, FILTER, SHIMMER, SFX, REVERSE, PATTERN, DUAL, VINT. DIGITAL,
			TAPE, ANALOG
00 11	0000 00aa	Delay Time	(1 - 10000)
			1ms - 10.0s
	0000 bbbb		
	0000 cccc		
	0000 dddd		
00 15	0000 00aa	BPM	(15 - 2400000)
			Quarter Note=1.5 --=240000.0
	0000 bbbb		
	0000 cccc		
	0000 dddd		
	0000 eeee		
	0000 ffff		
00 1B	0000 dddd	Note	(0 - 12)
			16th, 8th triplet, dotted 16th, 8th, quarter triplet, dotted 8th, quarter, half triplet,
			dotted quarter, half, whole triplet, dotted half, whole
00 1C	0ddd dddd	Feedback	(0 - 100)
			0 - 100
00 1D	0ddd dddd	Tone	(0 - 100)
			-50 - +50

Offset	Address	Description	
00 1E	0ddd dddd	Effect Level	(0 - 120)
			0 - 120
00 1F	0ddd dddd	Direct Level	(0 - 100)
			0 - 100
00 20	0ddd dddd	Modulation Depth	(0 - 100)
			0 - 100
00 21	0ddd dddd	Modulation Rate	(0 - 113)
			0 - 100, whole, dotted half, whole triplet, half, dotted quarter, triplet half, quarter, dotted 8th, triplet quarter, 8th, dotted 16th, triplet 8th, 16th
00 22	0000 000d	Carryover OFF/ON	(0 - 1)
			OFF, ON
00 23	0000 00dd	EQ ON/OFF	(0 - 3)
			OFF, PRE, FEEDBACK LOOP, POST
00 24	00dd dddd	EQ Total Level	(0 - 40)
			-20dB - +20dB
00 25	000d dddd	EQ Low Cut Filter Freq	(0 - 17)
			FLAT, 20.0Hz, 25.0Hz, 31.5Hz, 40.0Hz, 50.0Hz, 63.0Hz, 80.0Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz
00 26	00dd dddd	EQ Low Gain	(0 - 40)
			-20dB - +20dB
00 27	00dd dddd	EQ Low Mid Gain	(0 - 40)
			-20dB - +20dB
00 28	000d dddd	EQ Low Mid Freq	(0 - 27)
			20.0Hz, 25.0Hz, 31.5Hz, 40.0Hz, 50.0Hz, 63.0Hz, 80.0Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1.00kHz, 1.25kHz, 1.60kHz, 2.00kHz, 2.50kHz, 3.15kHz, 4.00kHz, 5.00kHz, 6.30kHz, 8.00kHz, 10.0kHz
00 29	0000 00dd	EQ Low Mid Q	(0 - 5)
			0.5, 1, 2, 4, 8, 16
00 2A	00dd dddd	EQ High Mid Gain	(0 - 40)
			-20dB - +20dB
00 2B	000d dddd	EQ High Mid Freq	(0 - 27)
			20.0Hz, 25.0Hz, 31.5Hz, 40.0Hz, 50.0Hz, 63.0Hz, 80.0Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1.00kHz, 1.25kHz, 1.60kHz, 2.00kHz, 2.50kHz, 3.15kHz, 4.00kHz, 5.00kHz, 6.30kHz, 8.00kHz, 10.0kHz
00 2C	0000 00dd	EQ High Mid Q	(0 - 5)
			0.5, 1, 2, 4, 8, 16
00 2D	00dd dddd	High EQ Gain	(0 - 40)
			-20dB - +20dB
00 2E	0000 dddd	High Cut Filter Freq	(0 - 15)
			630Hz, 800Hz, 1.00kHz, 1.25kHz, 1.60kHz, 2.00kHz, 2.50kHz, 3.15kHz, 4.00kHz, 5.00kHz, 6.30kHz, 8.00kHz, 10.0kHz, 12.5kHz, 16.0kHz, FLAT
00 2F	000d dddd	Low DAMP	(0 - 20)
			-20dB - +0dB
00 30	000d dddd	Low DAMP FREQ	(0 - 16)
			20.0Hz, 25.0Hz, 31.5Hz, 40.0Hz, 50.0Hz, 63.0Hz, 80.0Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz
00 31	000d dddd	Hi Damp GAIN	(0 - 20)
			-20dB - +0dB
00 32	0000 dddd	Hi Damp FREQ	(0 - 14)
			630Hz, 800Hz, 1.00kHz, 1.25kHz, 1.60kHz, 2.00kHz, 2.50kHz, 3.15kHz, 4.00kHz, 5.00kHz, 6.30kHz, 8.00kHz, 10.0kHz, 12.5kHz, 16.0kHz
00 33	0ddd dddd	DUCK Sens	(0 - 100)
			0 - 100
00 34	0ddd dddd	DUCK Pre Depth	(0 - 100)
			0 - 100
00 35	0ddd dddd	DUCK Post Depth	(0 - 100)
			0 - 100
00 36	0ddd dddd	Effect Pan	(0 - 100)
			L50 - CENTER - R50
00 37	0ddd dddd	Direct Pan	(0 - 100)
			L50 - CENTER - R50
00 38	0000 dddd	TAP/CTL Function	(0 - 9)
			OFF, TAP, HOLD, WARP, TWIST, MOMENT, ROLL 1/2, ROLL 1/4, ROLL 1/8, FADE
00 39	0000 dddd	CTL1 Function	(0 - 14)
			OFF, TAP, HOLD, WARP, TWIST, MOMENTARY, ROLL 1/2, ROLL 1/4, ROLL 1/8, FADE, EFFECT SW, BANK UP, BANK DOWN, LOOPonOff, LOOP CLR
00 3A	0000 000d	CTL1 Mode	(0 - 1)
			MOMENT, TOGGLE

Offset	Address	Description	
	00 3B	0000 dddd	CTL2 Function
			(0 - 14)
			OFF, TAP, HOLD, WARP, TWIST, MOMENTARY, ROLL 1/2, ROLL 1/4, ROLL 1/8, FADE, EFFECT SW, BANK UP,
			BANK DOWN, LOOPonOff, LOOP CLR
	00 3C	0000 000d	CTL2 Mode
			(0 - 1)
			MOMENT, TOGGLE
	00 3D	0000 00dd	Exp Pedal Function
			(0 - 6)
			OFF, TIME, FEEDBACK, TONE, E.LEVEL, MOD DEPTH, MOD RATE
	00 3E	0000 00aa	Exp target min
			(0 - 10000)
			0 - 10000
		0000 bbbb	
		0000 cccc	
		0000 dddd	
	00 42	0000 00aa	Exp target max
			(0 - 10000)
			0 - 10000
		0000 bbbb	
		0000 cccc	
		0000 dddd	
	00 46	0000 000d	ASSIGN1 sw
			(0 - 1)
			OFF, ON
	00 47	0ddd dddd	ASSIGN1 source
			(0 - 69)
			TAP/CTL, EXP PDL, CTL1 PDL, CTL2 PDL, INT PDL, WAVE PDL, INPUT, CC#1, CC#2, CC#3, CC#4, CC#5,
			CC#6, CC#7, CC#8, CC#9, CC#10, CC#11, CC#12, CC#13, CC#14, CC#15, CC#16, CC#17, CC#18, CC#19,
			CC#20, CC#21, CC#22, CC#23, CC#24, CC#25, CC#26, CC#27, CC#28, CC#29, CC#30, CC#31, CC#64, CC#65,
			CC#66, CC#67, CC#68, CC#69, CC#70, CC#71, CC#72, CC#73, CC#74, CC#75, CC#76, CC#77, CC#78, CC#79,
			CC#80, CC#81, CC#82, CC#83, CC#84, CC#85, CC#86, CC#87, CC#88, CC#89, CC#90, CC#91, CC#92, CC#93,
			CC#94, CC#95
	00 48	0000 000d	ASSIGN1 source mode
			(0 - 1)
			MOMENT, TOGGLE
	00 49	0000 aaaa	ASSIGN1 target
			(0 - 205)
			EFFECT SW, MODE, TIME, BPM, NOTE, FEEDBACK, TONE, EFFECT LEVEL, FEEDBACK DAMP, MOD DEPTH,
			MOD RATE, MOD MODE, CARRYOVER, DIRECT LEVEL, INPUT LEVEL, EQ SW, EQ LEVEL, EQ LO.CUT, EQ LO.GAIN,
			EQ LM.GAIN, EQ LM.FREQ, EQ LM.Q, EQ HM.GAIN, EQ HM.FREQ, EQ HM.Q, EQ HI.GAIN, EQ HI.CUT, LO DAMP,
			LO DAMP F, HI DAMP, HI DAMP F, DUCK SENS, DUCK PreDepth, DUCK PostDepth, EFFECT PAN, DIRECT PAN,
			TERA RESO, TERA EQ SW, SLOW TRG, SLOW SENS, SLOW RISE TIME, SLOW CURVE, FILTER MODE, LFO TYPE,
			LFO RATE, LFO DEPTH, FILTER TYPE, CUTOFF, RESONANCE, FILTER POS, TOUCH POLARITY, TOUCH SENS,
			TOUCH PEAK, TOUCH FREQ, TOUCH DECAY, SHIMMER TYPE, PITCH MODE, PS CHAR, PITCH SHIFT, PITCH FINE,
			PITCH2 SHIFT, PITCH2 FINE, PITCH BAL, DIRECT FB, PITCH FB, PITCH2 FB, PITCH RISE, OVERTONE UPR,
			OVERTONE LWR, OVERTONE DIR, SFX TYPE, SFX LOFI BIT, SFX LOFI RATE, SFX LOFI BAL, SFX TREM WAVE,
			SFX TREM RATE, SFX TREM DEPTH, SFX TREM POS, SFX PHSR RATE, SFX PHSR DEPTH, SFX PHSR RESO,
			SFX PHSR MANU, PATTERN NOTE, PATTERN TYPE, PATTERN, DELAY1 TIME, DELAY1 LEVEL, DELAY1 PAN,
			DELAY2 TIME, DELAY2 LEVEL, DELAY2 PAN, DELAY3 TIME, DELAY3 LEVEL, DELAY3 PAN, DELAY4 TIME,
			DELAY4 LEVEL, DELAY4 PAN, DELAY5 TIME, DELAY5 LEVEL, DELAY5 PAN, DELAY6 TIME, DELAY6 LEVEL,
			DELAY6 PAN, DELAY7 TIME, DELAY7 LEVEL, DELAY7 PAN, DELAY8 TIME, DELAY8 LEVEL, DELAY8 PAN,
			DELAY9 TIME, DELAY9 LEVEL, DELAY9 PAN, DELAY10 TIME, DELAY10 LEVEL, DELAY10 PAN, DELAY11 TIME,
			DELAY11 LEVEL, DELAY11 PAN, DELAY12 TIME, DELAY12 LEVEL, DELAY12 PAN, DELAY13 TIME, DELAY13 LEVEL,
			DELAY13 PAN, DELAY14 TIME, DELAY14 LEVEL, DELAY14 PAN, DELAY15 TIME, DELAY15 LEVEL, DELAY15 PAN,
			DELAY16 TIME, DELAY16 LEVEL, DELAY16 PAN, PATTERN STEP, STEP1 LEN, STEP1 LEVEL, STEP2 LEN,
			STEP2 LEVEL, STEP3 LEN, STEP3 LEVEL, STEP4 LEN, STEP4 LEVEL, STEP5 LEN, STEP5 LEVEL, STEP6 LEN,
			STEP6 LEVEL, STEP7 LEN, STEP7 LEVEL, STEP8 LEN, STEP8 LEVEL, STEP9 LEN, STEP9 LEVEL, STEP10 LEN,
			STEP10 LEVEL, STEP11 LEN, STEP11 LEVEL, STEP12 LEN, STEP12 LEVEL, STEP13 LEN, STEP13 LEVEL,
			STEP14 LEN, STEP14 LEVEL, STEP15 LEN, STEP15 LEVEL, STEP16 LEN, STEP16 LEVEL, STEP17 LEN,
			STEP17 LEVEL, STEP18 LEN, STEP18 LEVEL, STEP19 LEN, STEP19 LEVEL, STEP20 LEN, STEP20 LEVEL,
			STEP21 LEN, STEP21 LEVEL, STEP22 LEN, STEP22 LEVEL, STEP23 LEN, STEP23 LEVEL, STEP24 LEN,
			STEP24 LEVEL, DUAL MODE, D1 TYPE, D1 E.LEVEL, DUAL LINK, D2 TYPE, D2 TIME, D2 FEEDBACK,
			D2 TIME LINK, D2 FB LINK, D2 E.LEVEL, V. DIGI TYPE, FILTER, TIMEx2, DELAY PHASE, FEEDBACK PHASE,
			TAPE TYPE, TAPE W0N&FLUTR, TAPE HEAD, EchoR HEAD, EchoR SELECTOR, TAPE MOD RATE, STAGE,
			FEEDBACK LP, TAP/CTL LED
		0000 bbbb	
	00 4B	0000 00aa	ASSIGN1 target min
			(0 - 2400000)
			0 - 2400000
		0000 bbbb	
		0000 cccc	
		0000 dddd	
		0000 eeee	
		0000 ffff	

Offset				
Address			Description	
00 51	0000 00aa	ASSIGN1 target max	(0 - 2400000)	
			0 - 2400000	
	0000 bbbb			
	0000 cccc			
	0000 dddd			
	0000 eeee			
	0000 ffff			
00 57	0ddd dddd	ASSIGN1 Active Range LO	(0 - 126)	
			0 - 126	
00 58	0ddd dddd	ASSIGN1 Active Range HI	(1 - 127)	
			1 - 127	
00 59	0ddd dddd	ASSIGN1 Wave Rate	(0 - 113)	
			0 - 100, whole, dotted half, whole triplet, half, dotted quarter, triplet half, quarter,	
			dotted 8th, triplet quarter, 8th, dotted 16th, triplet 8th, 16th	
00 5A	0000 00dd	ASSIGN1 Wave Form	(0 - 2)	
			SAW, TRI, SIN	
00 5B	0ddd dddd	ASSIGN1 Internal Pedal Trigger	(0 - 68)	
			PAT CNG, EXP LO, EXP MID, EXP HI, CTL1 PDL, CTL2 PDL, CC#1, CC#2, CC#3, CC#4, CC#5, CC#6, CC#7,	
			CC#8, CC#9, CC#10, CC#11, CC#12, CC#13, CC#14, CC#15, CC#16, CC#17, CC#18, CC#19, CC#20, CC#21,	
			CC#22, CC#23, CC#24, CC#25, CC#26, CC#27, CC#28, CC#29, CC#30, CC#31, CC#64, CC#65, CC#66, CC#67,	
			CC#68, CC#69, CC#70, CC#71, CC#72, CC#73, CC#74, CC#75, CC#76, CC#77, CC#78, CC#79, CC#80, CC#81,	
			CC#82, CC#83, CC#84, CC#85, CC#86, CC#87, CC#88, CC#89, CC#90, CC#91, CC#92, CC#93, CC#94, CC#95	
00 5C	0ddd dddd	ASSIGN1 Internal Pedal Time	(0 - 100)	
			0 - 100	
00 5D	0000 00dd	ASSIGN1 Internal Pedal Curve	(0 - 2)	
			LINEAR, SLOW, FAST	
00 5E	0000 000d	ASSIGN2 sw	(0 - 1)	
			OFF, ON	
:	:			
:	:			
00 76	0000 000d	ASSIGN3 sw	(0 - 1)	
			OFF, ON	
:	:			
:	:			
01 0E	0000 000d	ASSIGN4 sw	(0 - 1)	
			OFF, ON	
:	:			
:	:			
01 26	0000 000d	ASSIGN5 sw	(0 - 1)	
			OFF, ON	
:	:			
:	:			
01 3E	0000 000d	ASSIGN6 sw	(0 - 1)	
			OFF, ON	
:	:			
:	:			
01 56	0000 000d	ASSIGN7 sw	(0 - 1)	
			OFF, ON	
:	:			
:	:			
01 6E	0000 000d	ASSIGN8 sw	(0 - 1)	
			OFF, ON	
:	:			
:	:			
02 06	0ddd dddd	Assign Input Sens	(0 - 100)	
			0 - 100	
02 07	0000 000d	LED status	(0 - 1) (*)	
			OFF, ON	
02 08	0ddd dddd	Input level	(0 - 100)	
			0 - 100	
02 09	0ddd dddd	Tera Echo Resonance	(0 - 100)	
			0 - 100	
02 0A	0ddd dddd	Slow Attack Sens	(0 - 100)	
			0 - 100	
02 0B	0ddd dddd	Slow Attack Rise Time	(0 - 100)	
			0 - 100	
02 0C	0000 00dd	Filter LFO Type	(0 - 2)	
			TRI, SIN, SQR	
02 0D	0ddd dddd	Filter LFO Rate	(0 - 113)	
			0 - 100, whole, dotted half, whole triplet, half, dotted quarter, triplet half, quarter,	
			dotted 8th, triplet quarter, 8th, dotted 16th, triplet 8th, 16th	

Offset				
Address				Description
02 0E	0ddd dddd	Filter LFO Depth	(0 - 100)	
			0 - 100	
02 0F	0000 00dd	Filter Type	(0 - 2)	
			LPF, BPF, HPF	
02 10	000d dddd	Filter Cutoff Frequency	(0 - 19)	
			100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1.00kHz, 1.25kHz, 1.60kHz, 2.00kHz, 2.50kHz, 3.15kHz, 4.00kHz, 5.00kHz, 6.30kHz, 8.00kHz, 10.0kHz	
02 11	0ddd dddd	Filter Resonance	(0 - 100)	
			0 - 100	
02 12	0000 000d	Filter Position	(0 - 1)	
			PRE, POST	
02 13	00dd dddd	Pitch Pitch	(0 - 48)	
			-24 - +24	
02 14	0ddd dddd	Pitch Pitch Fine	(0 - 100)	
			-50 - +50	
02 15	0ddd dddd	Pitch/Direct Balance	(0 - 100)	
			0 - 100	
02 16	0ddd dddd	Direct Feedback	(0 - 100)	
			0% - 100%	
02 17	0000 dddd	SFX LoFi Bit Depth	(0 - 15)	
			OFF, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1	
02 18	000d dddd	SFX LoFi Sample Rate	(0 - 31)	
			OFF, 1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8, 1/9, 1/10, 1/11, 1/12, 1/13, 1/14, 1/15, 1/16, 1/17, 1/18, 1/19, 1/20, 1/21, 1/22, 1/23, 1/24, 1/25, 1/26, 1/27, 1/28, 1/29, 1/30, 1/31, 1/32	
02 19	0ddd dddd	SFX LoFi Balance	(0 - 100)	
			0 - 100	
02 1A	0ddd dddd	SFX Tremolo Wave	(0 - 100)	
			0 - 100	
02 1B	0ddd dddd	SFX Tremolo Rate	(0 - 113)	
			0 - 100, whole, dotted half, whole triplet, half, dotted quarter, triplet half, quarter, dotted 8th, triplet quarter, 8th, dotted 16th, triplet 8th, 16th	
02 1C	0ddd dddd	SFX Tremolo Depth	(0 - 100)	
			0 - 100	
02 1D	0000 000d	SFX Tremolo Position	(0 - 1)	
			PRE, POST	
02 1E	0000 dddd	Pattern	(0 - 10)	
			PAT1, PAT2, PAT3, PAT4, PAT5, PAT6, PAT7, PAT8, PAT9, PAT10, USER	
02 1F	0000 aaaa	Delay1 Delay Time	(0 - 188)	
			0% - 100%, 0/16 - 16/16, 0/12 - 12/12, 0/32 - 32/32, 0/24 - 24/24	
	0000 bbbb			
02 21	0ddd dddd	Delay1 Level	(0 - 100)	
			0 - 100	
02 22	0ddd dddd	Delay1 Pan	(0 - 100)	
			L50 - CENTER - R50	
02 23	0000 aaaa	Delay2 Delay Time	(0 - 188)	
			0% - 100%, 0/16 - 16/16, 0/12 - 12/12, 0/32 - 32/32, 0/24 - 24/24	
	0000 bbbb			
:	:			
:	:			
02 5D	0ddd dddd	Delay16 Level	(0 - 100)	
			0 - 100	
02 5E	0ddd dddd	Delay16 Pan	(0 - 100)	
			L50 - CENTER - R50	
02 5F	0000 dddd	PATTERN NOTE	(0 - 12)	
			16th, 8th triplet, dotted 16th, 8th, quarter triplet, dotted 8th, quarter, half triplet, dotted quarter, half, whole triplet, dotted half, whole	
02 60	0000 00dd	Dual Mode	(0 - 4)	
			SERIES, PARALLEL, A/B, A/B SERIS, A/B PARA	
02 61	0000 00dd	Dual D1 Type	(0 - 2)	
			STANDARD, ANALOG, TAPE	
02 62	0ddd dddd	Dual D1 Effect Level	(0 - 100)	
			0 - 100	
02 63	0000 000d	Dual Link	(0 - 1)	
			OFF, ON	
02 64	0000 000a	Dual D2 Time	(1 - 5000)	
			1 - 5000	
	0000 bbbb			
	0000 cccc			
	0000 dddd			
02 68	0ddd dddd	Dual D2 Time (LINK=ON)	(1 - 100)	
			1% - 100%	

Offset				
Address	Description			
02 69	0ddd dddd	Dual D2 Feedback	(0 - 100)	
			0 - 100	
02 6A	0ddd dddd	Dual D2 Feedback (LINK=ON)	(0 - 100)	
			0% - 100%	
02 6B	0ddd dddd	Dual D2 Effect Level	(0 - 100)	
			0 - 100	
02 6C	0000 00dd	Vintage Type	(0 - 2)	
			SDE-2000, SDE-3000, DD-2	
02 6D	0000 000d	Vintage Filter Switch	(0 - 1)	
			OFF, ON	
02 6E	0000 000d	Vintage TIME x 2 Switch	(0 - 1)	
			OFF, ON	
02 6F	0000 00dd	Tape Type	(0 - 2)	
			RE-201, EchoP, EchoR	
02 70	0000 00dd	Analog Stage	(0 - 2)	
			4096, 4096x2, 4096x4	
02 71	0000 000d	Vintage Delay Phase	(0 - 1)	
			NOR, INV	
02 72	0000 000d	Vintage Feedback Phase	(0 - 1)	
			NOR, INV	
02 73	0000 00dd	Tape Number of Head	(0 - 6)	
			1, 2, 3, 1+2, 1+3, 2+3, 1+2+3	
02 74	0000 dddd	Feedback damp	(0 - 10)	
			0 - 10	
02 75	0000 000d	Slow attack target	(0 - 1)	
			EFFECT, ALL	
02 76	0ddd dddd	Slow attack curve	(0 - 100)	
			-50 - +50	
02 77	0000 000d	Filter Mode	(0 - 1)	
			AUTO, TOUCH	
02 78	0000 000d	Filter touch polarity	(0 - 1)	
			DOWN, UP	
02 79	0000 aaaa	Filter touch sens	(0 - 200)	
			-100 - 100	
	0000 bbbb			
02 7B	0ddd dddd	Filter touch peak	(0 - 100)	
			0 - 100	
02 7C	0ddd dddd	Filter touch frequency	(0 - 100)	
			0 - 100	
02 7D	0ddd dddd	Filter touch decay	(0 - 100)	
			0 - 100	
02 7E	0000 dddd	Shimmer rise time	(0 - 10)	
			0 - 10	
02 7F	0000 000d	Shimmer type	(0 - 1)	
			PITCH, OVERTONE	
03 00	0ddd dddd	Shimmer overtone upper	(0 - 100)	
			0 - 100	
03 01	0ddd dddd	Shimmer overtone lower	(0 - 100)	
			0 - 100	
03 02	0ddd dddd	Shimmer overtone direct	(0 - 100)	
			0 - 100	
03 03	0000 000d	Shimmer pitch shifter mode	(0 - 1)	
			MONO, STEREO	
03 04	0ddd dddd	Shimmer pitch shifter feedback	(0 - 100)	
			0 - 100	
03 05	0ddd dddd	Shimmer pitch shifter2 feedback	(0 - 100)	
			0 - 100	
03 06	00dd dddd	Shimmer Pitch2 Pitch	(0 - 48)	
			-24 - +24	
03 07	0ddd dddd	Shimmer Pitch2 Pitch Fine	(0 - 100)	
			-50 - +50	
03 08	0000 000d	Shimmer Pitch shifter character	(0 - 1)	
			1 - 2	
03 09	0000 000d	SFX type	(0 - 1)	
			TREMOLO, PHASER	
03 0A	0ddd dddd	SFX phaser rate	(0 - 113)	
			0 - 100, whole, dotted half, whole triplet, half, dotted quarter, triplet half, quarter,	
			dotted 8th, triplet quarter, 8th, dotted 16th, triplet 8th, 16th	
03 0B	0ddd dddd	SFX phaser depth	(0 - 100)	
			0 - 100	

Offset				
Address	Description			
03 0C	0ddd dddd	SFX phaser resonance	(0 - 100)	
			0 - 100	
03 0D	0ddd dddd	SFX phaser manual	(0 - 100)	
			0 - 100	
03 0E	0000 000d	Pattern type	(0 - 1)	
			DELAY, GATE	
03 0F	0000 00dd	Pattern Step number	(0 - 3)	
			8, 12, 16, 24	
03 10	0ddd dddd	Pattern STEP1 length	(0 - 100)	
			0 - 100	
03 11	0ddd dddd	Pattern STEP1 Level	(0 - 100)	
			0 - 100	
:	:			
:	:			
03 3E	0ddd dddd	Pattern STEP24 length	(0 - 100)	
			0 - 100	
03 3F	0ddd dddd	Pattern STEP24 Level	(0 - 100)	
			0 - 100	
03 40	0000 00dd	Dual D2 Type	(0 - 2)	
			STANDARD, ANALOG, TAPE	
03 41	0ddd dddd	Tape wow and flutter	(0 - 100)	
			0 - 100	
03 42	0ddd dddd	Tape Modulation rate	(0 - 100)	
			0 - 100	
03 43	0000 dddd	TAPE EchoR head	(0 - 11)	
			1, 2, 3, 4, 1+2, 2+3, 3+4, 1+3, 2+4, 1+2+3, 2+3+4, 1+2+3+4	
03 44	0000 00dd	TAPE EchoR selector	(0 - 2)	
			ECHO, REPEAT, SWELL	
03 45	0000 000d	Modulation mode	(0 - 1)	
			SINGLE, BI-PHASE	
03 46	0000 000d	Input mode	(0 - 1)	
			A/B, MIX	
03 47	0000 000d	Tempo hold	(0 - 1)	
			OFF, ON	
03 48	0000 dddd	Output gain	(0 - 12)	
			-6dB - +6dB	
03 49	0000 000d	Feedback loop sw	(0 - 1)	
			OFF, ON	
03 4A	0000 00dd	Tera Echo EQ sw	(0 - 2)	
			OFF, PRE, POST	
03 4B	0000 000d	TAP/CTL Mode	(0 - 1)	
			MOMENT, TOGGLE	
03 4C	0ddd dddd	TAP/CTL Rise time	(0 - 100)	
			0 - 100	
03 4D	0ddd dddd	TAP/CTL Fall time	(0 - 100)	
			0 - 100	
03 4E	0ddd dddd	CTL1 Rise time	(0 - 100)	
			0 - 100	
03 4F	0ddd dddd	CTL1 Fall time	(0 - 100)	
			0 - 100	
03 50	0ddd dddd	CTL2 Rise time	(0 - 100)	
			0 - 100	
03 51	0ddd dddd	CTL2 Fall time	(0 - 100)	
			0 - 100	
03 52	0ddd dddd	TAP/CTL Hold level	(0 - 120)	
			0 - 120	
03 53	0ddd dddd	TAP/CTL Warp level	(0 - 120)	
			0 - 120	
03 54	0ddd dddd	TAP/CTL Twist level	(0 - 120)	
			0 - 120	
03 55	0ddd dddd	CTL1 Hold level	(0 - 120)	
			0 - 120	
03 56	0ddd dddd	CTL1 Warp level	(0 - 120)	
			0 - 120	
03 57	0ddd dddd	CTL1 Twist level	(0 - 120)	
			0 - 120	
03 58	0ddd dddd	CTL2 Hold level	(0 - 120)	
			0 - 120	
03 59	0ddd dddd	CTL2 Warp level	(0 - 120)	
			0 - 120	

Offset			
Address	Description		

	03 5A	0ddd dddd	CTL2 Twist level (0 - 120)
			0 - 120
	03 5B	0000 000d	FADE IN/OUT (0 - 1)
			FADE OUT - FADE IN

(*1) EFFECT ON/OFF status when FOOT SW MODE set to A/B SIMUL

(*2) LED ON/Off status when ASSIGN target set to LED

Function...		Transmitted	Recognized	Remarks
Basic	Default	1-16, OFF	1-16, OFF	Memorized
Channel	Changed	1-16, OFF	1-16, OFF	
	Default	Mode 3	Mode 3	
Mode	Messages	x	x	
	Altered	*****	x	
Note		x	x	
Number:	True Voice	*****	*****	
Velocity	Note On	x	x	
	Note Off	x	x	
After	Key's	x	x	
touch	Ch's	x	x	
Pitch	Bend	x	x	
	0	o (0 - 2)	o (0 - 2)	Bank select (MSB)
	32	o (always 0) *3	o	Bank select (LSB)
	1 - 31	o *1	o *2	
	64 - 95	o *1	o *2	
Control				
Change				
Prog		o 0-127	o 0-127	
Change	:True Number	*****	0-127	Program Number 1-128
System	Exclusive	o	o	
System	: Song Pos	x	x	
Common	: Song Sel	x	x	
	: Tune	x	x	
	: Clock	o	o	
System	: Start	x	x	
Realtime	: Continue	x	x	
	: Stop	x	x	
	: All sound off	x	x	
Aux	: Reset All controllers	x	x	
Message	: Local On/Off	x	x	
	: All notes Off	x	x	
	: Active Sense	o	o	
	: Reset	x	x	
Notes		*1 Transmitted with the CC# set by MIDI CC# parameter		
		*2 Recognized with the CC# set by MIDI CC# parameter# or ASSIGN SRC		
		*3 Transmitted when "MIDI: BANK SEL OUT" = M+L		

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO o : Yes

Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO x : No