

\* In this implementation, the order in which the TD-50's buttons should be pressed is indicated in the following way. For example, [KIT]-[MENU]-[MIDI CH] means "press the [KIT] button, then press the [MENU] button, then press the PAGE [DOWN] button to access the page 4 (KIT PAD MIDI), and then press the [MIDI CH] button."

The KIT MENU screen consists of the four pages "KIT SETTINGS," "KIT SETTINGS 2," "KITPAD CTRL," and "KIT PAD MIDI"; you can switch between these four pages by pressing the PAGE [UP] [DOWN] buttons. For details, refer to the TD-50 owner's manual (Quick Start).

\* The "Data List" referred to in this document can be obtained via the Roland website.

## 1. Receive Data

### ■ Channel Voice Messages

\* Following Channel Voice Messages can be received in [KIT]-[MENU]-[MIDI CH] MIDI CH.

\* Not received when [SETUP]-[MIDI]-[BASIC] MIDI Tx/Rx Sw is set to "OFF."

#### ● Note On

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

\* Messages are received only on the channel that is assigned to the pad whose note number matches the message.

For details on note numbers, refer to the PAD MIDI page of "TD-50 Data List" (PDF).

\* When the [KIT]-[MENU]-[BRUSH] Brush Switch is set to "ON," the note number set by means of [KIT]-[MENU]-[NOTE] Note No. (SNARE<BRUSH>) is received on the channel to which the SNARE<HEAD> is assigned (when an instrument compatible with brush performances is selected for the Snare pad head).

\* The note number set by means of [KIT]-[MENU]-[NOTE] Note No. (SNARE<XSTICK>) is received on the channel to which the SNARE<RIM> is assigned (when an instrument compatible with cross-sticking is selected for the Snare pad rim).

\* When recording, this is recorded in the sequencer data itself.

#### ● Polyphonic Key Pressure

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

\* Messages are received only on the channel that is assigned to the pad whose note number matches the message.

For details on note numbers, refer to the PAD MIDI page of "TD-50 Data List" (PDF).

\* If the value is greater than 1, the decay of the note sounded by the received note number will be shortened based on the value (Used in choking).

\* When recording, this is recorded in the sequencer data itself.

#### ● Control Change

##### ○ Modulation (Controller number 1)

Status	2nd byte	3rd byte
BnH	01H	vvH
n = MIDI channel number:		0H-FH (ch.1-ch.16)
Modulation depth:		00H-7FH (0-127)
	Pedal position:	open to closed
	Head strike position:	center to perimeter
	Rim strike position:	deep to shallow

\* In the channel to which the HI-HAT<BOW> is assigned, setting [SETUP]-[MIDI]-[CONTROL] HH Pedal CC to "MODULATION (1)" changes the hi-hat control pedal position.

\* The strike position of the pad corresponding to the note number received changes immediately after [SETUP]-[MIDI]-[CONTROL] Snare CC (for the SNARE pad head and rim), Ride CC (for the RIDE pad bow), or Toms/AUXs CC (for head and rim of TOM 1-4, AUX 1-4 pads) is set to "MODULATION (1)."

\* During recording, the sequencer data is recorded to the TD-50 in accordance with the above settings as "HH Pedal CC messages," "Snare CC messages," "Ride CC messages," and "Toms/AUXs CC messages."

##### ○ Breath Controller (Controller number 2)

Status	2nd byte	3rd byte
BnH	02H	vvH
n = MIDI channel number:		0H-FH (ch.1-ch.16)
vv = Control value:		00H-7FH (0-127)
	Pedal position:	open to closed
	Head strike position:	center to perimeter
	Rim strike position:	deep to shallow

\* In the channel to which the HI-HAT<BOW> is assigned, setting [SETUP]-[MIDI]-[CONTROL] HH Pedal CC to "BREATH (2)" changes the hi-hat control pedal position.

\* The strike position of the pad corresponding to the note number received changes immediately after [SETUP]-[MIDI]-[CONTROL] Snare CC (for the SNARE pad head and rim), Ride CC (for the RIDE pad bow), or Toms/AUXs CC (for head and rim of TOM 1-4, AUX 1-4 pads) is set to "BREATH (2)."

\* During recording, the sequencer data is recorded to the TD-50 in accordance with the above settings as "HH Pedal CC messages," "Snare CC messages," "Ride CC messages," and "Toms/AUXs CC messages."

##### ○ Foot Controller (Controller number 4)

Status	2nd byte	3rd byte
BnH	04H	vvH
n = MIDI channel number:		0H-FH (ch.1-ch.16)
vv = Control value:		00H-7FH (0-127)
	Pedal position:	open to closed
	Head strike position:	center to perimeter
	Rim strike position:	deep to shallow

\* In the channel to which the HI-HAT<BOW> is assigned, setting [SETUP]-[MIDI]-[CONTROL] HH Pedal CC to "FOOT (4)" changes the hi-hat control pedal position.

\* The strike position of the pad corresponding to the note number received changes immediately after [SETUP]-[MIDI]-[CONTROL] Snare CC (for the SNARE pad head and rim), Ride CC (for the RIDE pad bow), or Toms/AUXs CC (for head and rim of TOM 1-4, AUX 1-4 pads) is set to "FOOT (4)."

\* During recording, the sequencer data is recorded to the TD-50 in accordance with the above settings as "HH Pedal CC messages," "Snare CC messages," "Ride CC messages," and "Toms/AUXs CC messages."

##### ○ Expression (Controller number 11)

Status	2nd byte	3rd byte
BnH	0BH	vvH
n = MIDI channel number:		0H-FH (ch.1-ch.16)
vv = Expression:		00H-7FH (0-127)
	Pedal position:	open to closed
	Head strike position:	center to perimeter
	Rim strike position:	deep to shallow

\* In the channel to which the HI-HAT<BOW> is assigned, setting [SETUP]-[MIDI]-[CONTROL] HH Pedal CC to "EXPRESSION (11)" changes the hi-hat control pedal position.

\* The strike position of the pad corresponding to the note number received changes immediately after [SETUP]-[MIDI]-[CONTROL] Snare CC (for the SNARE pad head and rim), Ride CC (for the RIDE pad bow), or Toms/AUXs CC (for head and rim of TOM 1-4, AUX 1-4 pads) is set to "EXPRESSION (11)."

\* During recording, the sequencer data is recorded to the TD-50 in accordance with the above settings as "HH Pedal CC messages," "Snare CC messages," "Ride CC messages," and "Toms/AUXs CC messages."

##### ○ General Purpose Controller 1 (Controller number 16)

Status	2nd byte	3rd byte
BnH	10H	vvH
n = MIDI channel number:		0H-FH (ch.1-ch.16)
vv = Control value:		00H-7FH (0-127)
	Pedal position:	open to closed
	Head strike position:	center to perimeter
	Rim strike position:	deep to shallow

\* In the channel to which the HI-HAT<BOW> is assigned, setting [SETUP]-[MIDI]-[CONTROL] HH Pedal CC to "GENERAL1 (16)" changes the hi-hat control pedal position.

\* The strike position of the pad corresponding to the note number received changes immediately after [SETUP]-[MIDI]-[CONTROL] Snare CC (for the SNARE pad head and rim), Ride CC (for the RIDE pad bow), or Toms/AUXs CC (for head and rim of TOM 1-4, AUX 1-4 pads) is set to "GENERAL1 (16)."

\* During recording, the sequencer data is recorded to the TD-50 in accordance with the above settings as "HH Pedal CC messages," "Snare CC messages," "Ride CC messages," and "Toms/AUXs CC messages."

# MIDI Implementation

## ○ General Purpose Controller 2 (Controller number 17)

Status	2nd byte	3rd byte
BnH	11H	vvH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
vv = Control value:		00H–7FH (0–127)
		Pedal position: open to closed
		Head strike position: center to perimeter
		Rim strike position: deep to shallow

- \* In the channel to which the HI-HAT<BOW> is assigned, setting [SETUP]–[MIDI]–[CONTROL] HH Pedal CC to “GENERAL2 (17)” changes the hi-hat control pedal position.
- \* The strike position of the pad corresponding to the note number received changes immediately after [SETUP]–[MIDI]–[CONTROL] Snare CC (for the SNARE pad head and rim), Ride CC (for the RIDE pad bow), or Toms/AUXs CC (for head and rim of TOM 1–4, AUX 1–4 pads) is set to “GENERAL2 (17).”
- \* During recording, the sequencer data is recorded to the TD-50 in accordance with the above settings as “HH Pedal CC messages,” “Snare CC messages,” “Ride CC messages,” and “Toms/AUXs CC messages.”

## ○ General Purpose Controller 3 (Controller number 18)

Status	2nd byte	3rd byte
BnH	12H	vvH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
vv = Control value:		00H–7FH (0–127)
		Pedal position: open to closed
		Head strike position: center to perimeter
		Rim strike position: deep to shallow

- \* In the channel to which the HI-HAT<BOW> is assigned, setting [SETUP]–[MIDI]–[CONTROL] HH Pedal CC to “GENERAL3 (18)” changes the hi-hat control pedal position.
- \* The strike position of the pad corresponding to the note number received changes immediately after [SETUP]–[MIDI]–[CONTROL] Snare CC (for the SNARE pad head and rim), Ride CC (for the RIDE pad bow), or Toms/AUXs CC (for head and rim of TOM 1–4, AUX 1–4 pads) is set to “GENERAL3 (18).”
- \* During recording, the sequencer data is recorded to the TD-50 in accordance with the above settings as “HH Pedal CC messages,” “Snare CC messages,” “Ride CC messages,” and “Toms/AUXs CC messages.”

## ○ General Purpose Controller 4 (Controller number 19)

Status	2nd byte	3rd byte
BnH	13H	vvH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
vv = Control value:		00H–7FH (0–127)
		Pedal position: open to closed
		Head strike position: center to perimeter
		Rim strike position: deep to shallow

- \* In the channel to which the HI-HAT<BOW> is assigned, setting [SETUP]–[MIDI]–[CONTROL] HH Pedal CC to “GENERAL4 (19)” changes the hi-hat control pedal position.
- \* The strike position of the pad corresponding to the note number received changes immediately after [SETUP]–[MIDI]–[CONTROL] Snare CC (for the SNARE pad head and rim), Ride CC (for the RIDE pad bow), or Toms/AUXs CC (for head and rim of TOM 1–4, AUX 1–4 pads) is set to “GENERAL4. (19)”
- \* During recording, the sequencer data is recorded to the TD-50 in accordance with the above settings as “HH Pedal CC messages,” “Snare CC messages,” “Ride CC messages,” and “Toms/AUXs CC messages.”

## ○ High Resolution Velocity Prefix (Controller number 88)

Status	2nd byte	3rd byte
BnH	58H	kkH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
kk = High resolution velocity prefix:		00H–40H (0–64)

- \* If a note-on message is received immediately thereafter on the same note channel, the force (velocity) of the pad strike is expressed as follows according to the values of the note-on velocity and the high resolution velocity prefix.
  - **When the note-on velocity is less than 127 and the high resolution velocity prefix is less than 64**  
The velocity is the same as the note-on velocity.
  - **When the note-on velocity is less than 127 and the high resolution velocity prefix is 64**  
If we let the note-on velocity be “x,” the velocity is expressed as “x+0.5.”
  - **When the note-on velocity is 127**  
If we let the high resolution velocity prefix be “y,” the velocity is expressed as “127 +(0.5 \* y).”

- \* Velocity values below the decimal point are not expressed in the screen of the TD-50. If we let the velocity be “x,” velocities above 127 are expressed as “127 + (x-127).”
- \* If a note-off is received immediately thereafter on the same note channel, the high resolution velocity prefix is reset.
- \* Not Received when [SETUP]–[MIDI]–[CONTROL] HI-Reso Velocity is set to “OFF.”
- \* If a message whose high resolution velocity prefix value of 65 or greater is received, it is received as a value of 64.

## ● Program Change

Status	2nd byte
CnH	ppH
n = MIDI channel number:	0H–FH (ch.1–ch.16)
pp = Program number:	00H–7FH (prog.1–prog.128)

- \* Not Received when [SETUP]–[MIDI]–[BASIC] program Change Rx is set to “OFF.”
- \* The sound will change beginning with the next Note-On after the Program Change is received. Voices which were already sounding before the Program Change was received will not be affected.
- \* Only the program number set with [SETUP]–[MIDI]–[BASIC] is received.
- \* The sound changes starting with a new note-on that follows program change reception. A voice that was already sounding before the program change was received is not affected.
- \* Not recorded in the sequencer.

## ■ Channel Mode Messages

- \* Following Channel Voice Messages can be received in [KIT]–[MENU]–[MIDI CH] MIDI CH.
- \* Not received when [SETUP]–[MIDI]–[BASIC] Tx/Rx Sw is set to “OFF.”

## ● All Sounds Off (Controller number 120)

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

- \* When this message is received, all currently-sounding notes on the corresponding channel will be silenced. However, the status of channel messages will not change.

## ● Reset All Controllers (Controller number 121)

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

- \* When this message is received, polyphonic key pressure for all pads assigned to the same channel number is reset to 0.
- \* If the channel number is the same as the channel that is assigned for HI-HAT<BOW>, the controller that is assigned by [SETUP]–[MIDI]–[CONTROL] HH Pedal CC is reset to 0.

## ● All Notes Off (Controller number 123)

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

- \* The same processing will be carried out as when All Sounds Off is received.

## ● OMNI OFF (Controller number 124)

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

- \* The same processing will be carried out as when All Sounds Off is received.

## ● OMNI ON (Controller number 125)

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

- \* The same processing will be carried out as when All Sounds Off is received.

## ● MONO (Controller number 126)

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

- \* The same processing will be carried out as when All Sounds Off is received.

## ● POLY (Controller number 127)

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

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

\* The same processing will be carried out as when All Sounds Off is received.

## ■ System Realtime Message

\* Following System Realtime Messages cannot be recorded in the sequencer.

### ● Timing Clock

Status
F8H

\* Recognized only when the [SETUP]–[MIDI]–[SYNC] Sync Mode is set at “EXTERNAL.”

### ● Start

Status
FAH

\* If a START message is received while the song is stopped, the click playback is reset. The song does not play.

\* Recognized only when the [SETUP]–[MIDI]–[SYNC] Sync Mode is set at “EXTERNAL.”

### ● Active Sensing

Status
FEH

\* When Active Sensing is received, the unit will begin monitoring the intervals of all further messages. While monitoring, if the interval between messages exceeds about 500 ms, the same processing will be carried out as when All Sounds Off, All Notes Off and Reset All Controllers are received, and message interval monitoring will be halted.

## ■ System Exclusive Message

\* Following System Exclusive Messages cannot be recorded in the sequencer.

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

F0H:	System Exclusive Message status
ii= ID number:	An ID number (manufacturer ID) to indicate the manufacturer whose Exclusive message this is. Roland’s manufacturer ID is 41H. ID numbers 7EH and 7FH are extensions of the MIDI standard; Universal Non-realtime Messages (7EH) and Universal Realtime Messages (7FH).
dd, ..., ee= data:	00H–7FH (0–127)
F7H:	EOX (End Of Exclusive)

The System Exclusive Messages received by this device are Universal Non-realtime System Exclusive Messages.

This device receives the following system exclusive messages: universal non-realtime system exclusive messages, data request (RQ1), and data set (DT1).

## ● Universal Non-realtime System Exclusive Messages

### ○ Identity Request Message

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

Byte	Explanation
F0H	Exclusive status
7EH	ID number (Universal Non-realtime Message)
dev	Device ID ( (10H–1FH (17–32), 7FH Initial value is 10H (17)
06H	Sub ID#1 (General Information)
01H	Sub ID#2 (Identity Request)
F7H	EOX (End Of Exclusive)

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

\* The [SETUP]–[MIDI]–[BASIC] Device ID setting is used as the Device ID.

## ● Data Transmission

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

The model ID of the exclusive messages used by this instrument is 00H 00H 00H 24H.

### ○ Data Request 1 (RQ1)

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

Status	Data byte	Status
F0H	41H, dev, 00H, 00H, 00H, 24H, 11H, aaH, bbH, ccH, ddH, ssH, ttH, uuH, vvH, sum	F7H

byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	device ID (dev: 10H–1FH, 7FH)
00H	Model ID#1 (TD-50)
00H	Model ID#2 (TD-50)
00H	Model ID#3 (TD-50)
24H	Model ID#4 (TD-50)
11H	Command ID (RQ1)
aaH	Address MSB
bbH	Address
ccH	Address
ddH	Address LSB
ssH	Size MSB
ttH	Size
uuH	Size
vvH	Size LSB
sum	Checksum
F7H	EOX (End Of Exclusive)

\* The size of data that can be transmitted at one time is fixed for each type of data. And data requests must be made with a fixed starting address and size. Refer to the address and size given in “3. Parameter Address Map” (p. 7).

\* For the checksum, refer to p. 28.

### ○ Data Set 1 (DT1)

Status	Data byte	Status
F0H	41H, dev, 00H, 00H, 00H, 24H, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H

Byte	Explanation
F0H	Exclusive status
41H	ID number (Roland)
dev	Model ID (dev: 10H–1FH, 7FH)
00H	Model ID#1 (TD-50)
00H	Model ID#2 (TD-50)
00H	Model ID#3 (TD-50)
24H	Model ID#4 (TD-50)
12H	Command ID (DT1)
aaH	Address MSB
bbH	Address
ccH	Address
ddH	Address LSB
eeH	Data: the actual data to be sent. Multiple bytes of data are transmitted in order starting from the address.
:	:
ffH	Data
sum	Checksum
F7H	EOX (End Of Exclusive)

\* The amount of data that can be transmitted at one time depends on the type of data, and data will be transmitted from the specified starting address and size. Refer to the address and size given in “3. Parameter Address Map” (p. 7).

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

\* Regarding the checksum, please refer to p. 28.

## 2. Transmit Data

\* When [SETUP]–[MIDI]–[BASIC] Soft Thru MIDI In/Soft Thru USB MIDI In is set to “ON”, messages received in addition to the following messages are also sent.

### ■ Channel Voice Messages

\* The following channel voice messages are transmitted on the channel specified as the [KIT]–[MENU]–[MIDI CH] MIDI CH.

\* Not transmitted when [SETUP]–[MIDI]–[BASIC] MIDI Tx/Rx Sw is set to “OFF.”

#### ● Note Off

Status	2nd byte	3rd byte
8nH	kkH	vvH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
kk = note number:		00H–7FH (0–127)
vv = Note off velocity:		40H (64) fixed

\* In the channel assigned to the pad, after a pad is struck or the hi-hat control pedal is in the foot closed (splash) position, Note Off is transmitted after the interval set in Gate Time ([KIT]–[MENU]–[GATE]).

#### ● Note On

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

\* In the channel assigned to the pad, after a pad is struck or the hi-hat control pedal is in the foot closed (splash) position, the note number set for the drum kit is transmitted.

\* For a channel to which SNARE<HEAD> is assigned, when [KIT]–[MENU]–[BRUSH] Brush Switch is “ON,” the note number specified by [KIT]–[MENU]–[NOTE] NOTE NO. (SNARE<BRUSH>) is transmitted.

\* For a channel to which SNARE<RIM> is assigned, when an instrument that supports cross-stick technique is assigned to the rim of the SNARE pad, and either the [KIT] - [XSTICK] XStick Switch is “ON” or a digitally-connected pad that supports cross-stick technique (such as the PD-140DS) is assigned to the snare, then playing cross-stick technique on the SNARE pad will transmit the note number specified by [KIT]–[MENU]–[NOTE] NOTE NO. (SNARE<XSTICK>) after the Gate Time has elapsed.

\* In the channel to which the HI-HAT<BOW> is assigned, the note number transmitted when the hi-hat pad is struck (open, closed) switches with the value set with [SETUP]–[MIDI]–[CONTROL] HH Note# Border setting (the HH Pedal CC Control value) in accordance with the degree to which the hi-hat pedal is pressed.

\* If the recorded sequencer data itself includes note-on messages, they are transmitted during performance.

#### ● Polyphonic Key Pressure

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

\* On the channel to which the pad is assigned, 7FH will be transmitted when the rim of the pad is pressed and 00H will be transmitted when the rim is released, for the note number specified for the head and rim. (When using a choking compatible pad and [TRIGGER]–[SENS] Trig Type is set to the corresponding pad.)

\* In the case of a digitally-connected pad that supports choking technique (such as the CY-18DR), a value in the range of 7FH through 00H is transmitted according to the strength of choking.

\* In the case of a digitally-connected pad that supports choking technique (such as the CY-18DR), polyphonic key pressure is also transmitted when you place your hand on the sensor.

\* If the recorded sequencer data itself includes polyphonic key pressure messages, they are transmitted during performance.

#### ● Control Change

##### ○ Modulation (Controller number 1)

Status	2nd byte	3rd byte
BnH	01H	vvH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
vv = Modulation depth:		00H–7FH (0–127)
	Pedal position:	open to closed
	Head strike position:	center to perimeter
	Rim strike position:	deep to shallow

\* In the channel to which the HI-HAT<BOW> is assigned, when [SETUP]–[MIDI]–[CONTROL] HH Pedal CC is set to “MODULATION (1),” this is transmitted when the hi-hat control pedal is adjusted. When the HI-HAT pad is struck, this is transmitted as a pedal position message before Note On.

\* When the following three things are set, strike position data will be transmitted before the note-on data when a pad is struck.

- When, under [SETUP]–[MIDI]–[CONTROL], any of the following is set to “MODULATION (1)” Snare CC (for head and rim of SNARE pad), Ride CC (for bow of RIDE pad), or Toms/AUXs CC (for head and rim of TOM 1–4, AUX 1–4 pads).
- When the [TRIGGER]–[SENS] Trig Type is set to a type that can detect the strike position, or a digitally-connected pad that can detect strike position is assigned.
- When Head and Rim for Position Detect for [TRIGGER]–[POSITION] are set to “ON.”

\* If the recorded sequencer data itself includes “HH Pedal CC messages,” “Snare CC messages,” “Ride CC messages,” or “Toms/AUXs CC messages,” they are transmitted during performance according to the settings described above.

##### ○ Breath Controller (Controller number 2)

Status	2nd byte	3rd byte
BnH	02H	vvH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
vv = Modulation depth:		00H–7FH (0–127)
	Pedal position:	open to closed
	Head strike position:	center to perimeter
	Rim strike position:	deep to shallow

\* In the channel to which the HI-HAT<BOW> is assigned, when [SETUP]–[MIDI]–[CONTROL] HH Pedal CC is set to “BREATH (2),” this is transmitted when the hi-hat control pedal is adjusted. When the HI-HAT pad is struck, this is transmitted as a pedal position message before Note On.

\* When the following three things are set, strike position data will be transmitted before the note-on data when a pad is struck.

- When, under [SETUP]–[MIDI]–[CONTROL], any of the following is set to “BREATH (2)” Snare CC (for head and rim of SNARE pad), Ride CC (for bow of RIDE pad), or Toms/AUXs CC (for head and rim of TOM 1–4, AUX 1–4 pads).
- When the [TRIGGER]–[SENS] Trig Type is set to a type that can detect the strike position, or a digitally-connected pad that can detect strike position is assigned.
- When Head and Rim for Position Detect for [TRIGGER]–[POSITION] are set to “ON.”

\* If the recorded sequencer data itself includes “HH Pedal CC messages,” “Snare CC messages,” “Ride CC messages,” or “Toms/AUXs CC messages,” they are transmitted during performance according to the settings described above.

##### ○ Foot Controller (Controller number 4)

Status	2nd byte	3rd byte
BnH	04H	vvH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
vv = Modulation depth:		00H–7FH (0–127)
	Pedal position:	open to closed
	Head strike position:	center to perimeter
	Rim strike position:	deep to shallow

\* In the channel to which the HI-HAT<BOW> is assigned, when [SETUP]–[MIDI]–[CONTROL] HH Pedal CC is set to “FOOT (4),” this is transmitted when the hi-hat control pedal is adjusted. When the HI-HAT pad is struck, this is transmitted as a pedal position message before Note On.

\* When the following four things are set, strike position data will be transmitted before the note-on data when a pad is struck.

- When, under [SETUP]–[MIDI]–[CONTROL], any of the following is set to “FOOT (4)” Snare CC (for head and rim of SNARE pad), Ride CC (for bow of RIDE pad), or Toms/AUXs CC (for head and rim of TOM 1–4, AUX 1–4 pads).
- When the [TRIGGER]–[SENS] Trig Type is set to a type that can detect the strike position, or a digitally-connected pad that can detect strike position is assigned.
- When Head and Rim for Position Detect for [TRIGGER]–[POSITION] are set to “ON.”

\* If the recorded sequencer data itself includes “HH Pedal CC messages,” “Snare CC messages,” “Ride CC messages,” or “Toms/AUXs CC messages,” they are transmitted during performance according to the settings described above.

### ○ Expression (Controller number 11)

Status	2nd byte	3rd byte
BnH	0BH	vvH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
vv = Expression:		00H–7FH (0–127)
	Pedal position:	open to closed
	Head strike position:	center to perimeter
	Rim strike position:	deep to shallow

- \* In the channel to which the HI-HAT<BOW> is assigned, when [SETUP]–[MIDI]–[CONTROL] HH Pedal CC is set to “EXPRESSION (11),” this is transmitted when the hi-hat control pedal is adjusted. When the HI-HAT pad is struck, this is transmitted as a pedal position message before Note On.
- \* When the following three things are set, strike position data will be transmitted before the note-on data when a pad is struck.
  - When, under [SETUP]–[MIDI]–[CONTROL], any of the following is set to “EXPRESSION (11)” Snare CC (for head and rim of SNARE pad), Ride CC (for bow of RIDE pad), or Toms/AUXs CC (for head and rim of TOM 1–4, AUX 1–4 pads).
  - When the [TRIGGER]–[SENS] Trig Type is set to a type that can detect the strike position, or a digitally-connected pad that can detect strike position is assigned.
  - When Head and Rim for Position Detect for [TRIGGER]–[POSITION] are set to “ON.”
- \* If the recorded sequencer data itself includes “HH Pedal CC messages,” “Snare CC messages,” “Ride CC messages,” or “Toms/AUXs CC messages,” they are transmitted during performance according to the settings described above.

### ○ General Purpose Controller 1 (Controller number 16)

Status	2nd byte	3rd byte
BnH	10H	vvH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
vv = Control value:		00H–7FH (0–127)
	Pedal position:	open to closed
	Head strike position:	center to perimeter
	Rim strike position:	deep to shallow

- \* In the channel to which the HI-HAT<BOW> is assigned, when [SETUP]–[MIDI]–[CONTROL] HH Pedal CC is set to “GENERAL1 (16),” this is transmitted when the hi-hat control pedal is adjusted. When the HI-HAT pad is struck, this is transmitted as a pedal position message before Note On.
- \* When the following three things are set, strike position data will be transmitted before the note-on data when a pad is struck.
  - When, under [SETUP]–[MIDI]–[CONTROL], any of the following is set to “GENERAL1 (16)” Snare CC (for head and rim of SNARE pad), Ride CC (for bow of RIDE pad), or Toms/AUXs CC (for head and rim of TOM 1–4, AUX 1–4 pads).
  - When the [TRIGGER]–[SENS] Trig Type is set to a type that can detect the strike position, or a digitally-connected pad that can detect strike position is assigned.
  - When Head and Rim for Position Detect for [TRIGGER]–[POSITION] are set to “ON.”
- \* If the recorded sequencer data itself includes “HH Pedal CC messages,” “Snare CC messages,” “Ride CC messages,” or “Toms/AUXs CC messages,” they are transmitted during performance according to the settings described above.

### ○ General Purpose Controller 2 (Controller number 17)

Status	2nd byte	3rd byte
BnH	11H	vvH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
vv = Control value:		00H–7FH (0–127)
	Pedal position:	open to closed
	Head strike position:	center to perimeter
	Rim strike position:	deep to shallow

- \* In the channel to which the HI-HAT<BOW> is assigned, when [SETUP]–[MIDI]–[CONTROL] HH Pedal CC is set to “GENERAL2 (17),” this is transmitted when the hi-hat control pedal is adjusted. When the HI-HAT pad is struck, this is transmitted as a pedal position message before Note On.
- \* When the following three things are set, strike position data will be transmitted before the note-on data when a pad is struck.
  - When, under [SETUP]–[MIDI]–[CONTROL], any of the following is set to “GENERAL2 (17)” Snare CC (for head and rim of SNARE pad), Ride CC (for bow of RIDE pad), or Toms/AUXs CC (for head and rim of TOM 1–4, AUX 1–4 pads).
  - When the [TRIGGER]–[SENS] Trig Type is set to a type that can detect the strike position, or a digitally-connected pad that can detect strike position is assigned.
  - When Head and Rim for Position Detect for [TRIGGER]–[POSITION] are set to “ON.”
- \* If the recorded sequencer data itself includes “HH Pedal CC messages,” “Snare CC messages,” “Ride CC messages,” or “Toms/AUXs CC messages,” they are transmitted during performance according to the settings described above.

### ○ General Purpose Controller 3 (Controller number 18)

Status	2nd byte	3rd byte
BnH	12H	vvH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
vv = Control value:		00H–7FH (0–127)
	Pedal position:	open to closed
	Head strike position:	center to perimeter
	Rim strike position:	deep to shallow

- \* In the channel to which the HI-HAT<BOW> is assigned, when [SETUP]–[MIDI]–[CONTROL] HH Pedal CC is set to “GENERAL3 (18),” this is transmitted when the hi-hat control pedal is adjusted. When the HI-HAT pad is struck, this is transmitted as a pedal position message before Note On.
- \* When the following three things are set, strike position data will be transmitted before the note-on data when a pad is struck.
  - When, under [SETUP]–[MIDI]–[CONTROL], any of the following is set to “GENERAL3 (18)” Snare CC (for head and rim of SNARE pad), Ride CC (for bow of RIDE pad), or Toms/AUXs CC (for head and rim of TOM 1–4, AUX 1–4 pads).
  - When the [TRIGGER]–[SENS] Trig Type is set to a type that can detect the strike position, or a digitally-connected pad that can detect strike position is assigned.
  - When Head and Rim for Position Detect for [TRIGGER]–[POSITION] are set to “ON.”
- \* If the recorded sequencer data itself includes “HH Pedal CC messages,” “Snare CC messages,” “Ride CC messages,” or “Toms/AUXs CC messages,” they are transmitted during performance according to the settings described above.

### ○ General Purpose Controller 4 (Controller number 19)

Status	2nd byte	3rd byte
BnH	13H	vvH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
vv = Control value:		00H–7FH (0–127)
	Pedal position:	open to closed
	Head strike position:	center to perimeter
	Rim strike position:	deep to shallow

- \* In the channel to which the HI-HAT<BOW> is assigned, when [SETUP]–[MIDI]–[CONTROL] HH Pedal CC is set to “GENERAL4 (19),” this is transmitted when the hi-hat control pedal is adjusted. When the HI-HAT pad is struck, this is transmitted as a pedal position message before Note On.
- \* When the following three things are set, strike position data will be transmitted before the note-on data when a pad is struck.
  - When, under [SETUP]–[MIDI]–[CONTROL], any of the following is set to “GENERAL4 (19)” Snare CC (for head and rim of SNARE pad), Ride CC (for bow of RIDE pad), or Toms/AUXs CC (for head and rim of TOM 1–4, AUX 1–4 pads).
  - When the [TRIGGER]–[SENS] Trig Type is set to a type that can detect the strike position, or a digitally-connected pad that can detect strike position is assigned.
  - When Head and Rim for Position Detect for [TRIGGER]–[POSITION] are set to “ON.”
- \* If the recorded sequencer data itself includes “HH Pedal CC messages,” “Snare CC messages,” “Ride CC messages,” or “Toms/AUXs CC messages,” they are transmitted during performance according to the settings described above.

### ○ High Resolution Velocity Prefix (Controller number 88)

Status	2nd byte	3rd byte
BnH	58H	kkH
n = MIDI channel number:		0H–FH (ch.1–ch.16)
kk = High resolution velocity prefix		00H–40H (0–64)

- \* Not transmitted when [SETUP]–[MIDI]–[CONTROL] HI-Reso Velocity is set to “OFF.”
- \* When you strike a digitally-connected pad, the strike strength (velocity) is expressed in 0.5 steps across 317 levels (1, 1.5, . . . , 158.5, 159), and is transmitted before the note-on as follows according to the velocity.
  - **When the velocity is less than 127 and the decimal portion is 0**  
The high resolution velocity prefix is 0.
  - **When the velocity is less than 127 and the decimal portion is 0.5**  
The high resolution velocity prefix is 64.
  - **When the velocity is 127 or more**  
If we let the high resolution velocity be “x,” high resolution velocity prefix is (x–127)/0.5.
- \* Velocity values below the decimal point are not expressed in the screen of the TD-50. If we let the velocity be “x,” velocities above 127 are expressed as “127 + (x–127).”

# MIDI Implementation

## ● Program Change

Status                      2nd byte  
CnH                              ppH

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

- \* Not transmitted when [SETUP]–[MIDI]–[BASIC] Program Change TX is set to “OFF.”
- \* When a drum kit is selected, the corresponding program number ([SETUP]–[MIDI]–[PROG]) is transmitted.

## ■ System Realtime Messages

### ● Timing Clock

Status  
F8H

- \* Not transmitted when [SETUP]–[MIDI]–[SYNC] Sync Out is set to “OFF.”

### ● Active Sensing

Status  
FEH

- \* This message is transmitted at intervals of approximately 250 msec.

## ■ System Exclusive Message

Identity Reply and Data Set (DT1) are the only System Exclusive messages transmitted by this device.

### ● Universal Non-realtime System Exclusive Message

#### ○ Identity Reply

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
FOH	7EH, dev, 06H, 02H, 41H, 24H, 03H, 00H, 00H, 00H, 01H, 00H, 00H	F7H

<u>Byte</u>	<u>Explanation</u>
FOH	Exclusive status
7EH	ID number (Universal Non-realtime Message)
dev	Device ID (10H–1FH (17–32), 7FH) Initial value is 10H (17)
06H	Sub ID#1 (General Information)
02H	Sub ID#2 (Identity Reply)
41H	ID number (Roland)
24H 03H	Device family code
00H 00H	Device family number code
00H 01H 00H 00H	Software revision level
F7H	EOX (End of Exclusive)

- \* When Identity Request (p. 3) is received, Identity Reply message will be transmitted.

- \* The [SETUP]–[MIDI]–[GLOBAL] Device ID setting is used as the Device ID.

#### ○ Data Set 1 (DT1)

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
FOH	41H, dev, 00H, 00H, 00H, 24H, 12H, aaH, bbH, ccH, ddH, eeH, ... ffH, sum	F7H

<u>Byte</u>	<u>Explanation</u>
FOH	Exclusive status
41H	ID number (Roland)
dev	Device ID (dev: 10H–1FH, 7FH)
00H	Model ID#1 (TD-50)
00H	Model ID#2 (TD-50)
00H	Model ID#3 (TD-50)
24H	Model ID#4 (TD-50)
12H	Command ID (DT1)
aaH	Address MSB
bbH	Address
ccH	Address
ddH	Address LSB
eeH	Data: the actual data to be sent. Multiple bytes of data are transmitted in order starting from the address.
:	:
ffH	Data
sum	Checksum
F7H	EOX (End Of Exclusive)

- \* The amount of data that can be transmitted at one time depends on the type of data, and data will be transmitted from the specified starting address and size. Refer to the address and size given in “3. Parameter Address Map” (p. 7).

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

### 3. Parameter Address Map

\* Transmission of “#” marked address is divided to some packets. For example, ABH in hexadecimal notation will be divided to 0AH and 0BH, and is sent/received in this order.

\* Trigger 1–8 corresponds to the TRIGGER BANK No.1–8 parameters.

Start Address	Description	
00 00 00	Current	[Current]
01 00 00	Setup	[Setup]
02 00 00	Trigger 1	[Trigger]
02 01 00	Trigger 2	[Trigger]
:	:	:
02 07 00	Trigger 8	[Trigger]
03 00 00	SetList 1	[SetListParams]
03 00 10	SetList 2	[SetListParams]
:	:	:
03 03 70	SetList 32	[SetListParams]
04 00 00	Kit 1	[Kit]
04 02 00	Kit 2	[Kit]
:	:	:
05 46 00	Kit 100	[Kit]

**\* [Kit]**

The assignments to each head within the [Kit] are as follows.

[KitPadCommon], [KitPadInst], [KitPadVEdit]

KICK HEAD	1	HI-HAT HEAD	12	AUX2 HEAD	23
SNARE HEAD	2	HI-HAT RIM	13	AUX2 RIM	24
SNARE RIM	3	CRASH1 HEAD	14	AUX3 HEAD	25
TOM1 HEAD	4	CRASH1 RIM	15	AUX3 RIM	26
TOM1 RIM	5	CRASH2 HEAD	16	AUX4 HEAD	27
TOM2 HEAD	6	CRASH2 RIM	17	AUX4 RIM	28
TOM2 RIM	7	RIDE HEAD	18		
TOM3 HEAD	8	RIDE RIM	19		
TOM3 RIM	9	RIDE BELL	20		
TOM4 HEAD	10	AUX1 HEAD	21		
TOM4 RIM	11	AUX1 RIM	22		

[KitPad]

KICK	1	HI-HAT	7	AUX3	13
SNARE	2	CRASH1	8	AUX4	14
TOM1	3	CRASH2	9		
TOM2	4	RIDE	10		
TOM3	5	AUX1	11		
TOM4	6	AUX2	12		

Offset Address	Description	
00 00 00	Kit Common	[KitCommon]
00 01 00	Kit MIDI	[KitMidi]
00 03 00	Kit Room	[KitRoom]
00 04 00	Kit Reverb	[KitReverb]
00 05 00	Kit Stereo Enhancer	[KitStereoEnhancer]
00 06 00	Kit Master Comp	[KitMasterComp]
00 07 00	Kit Master EQ	[KitMasterEQ]
00 10 00	Kit MFX 1	[KitMfx]
00 12 00	Kit MFX 2	[KitMfx]
00 14 00	Kit MFX 3	[KitMfx]
00 20 00	Kit Pad Common 1	[KitPadCommon]
00 21 00	Kit Pad Common 2	[KitPadCommon]
:	:	:
00 3B 00	Kit Pad Common 28	[KitPadCommon]
00 40 00	Kit Pad Main 1	[KitPadInst]
00 41 00	Kit Pad Main 2	[KitPadInst]
:	:	:
00 5B 00	Kit Pad Main 28	[KitPadInst]
00 60 00	Kit Pad Sub 1	[KitPadInst]
00 61 00	Kit Pad Sub 2	[KitPadInst]
:	:	:
00 7B 00	Kit Pad Sub 28	[KitPadInst]
01 00 00	Kit Pad VEdit Main 1	[KitPadVEdit]
01 01 00	Kit Pad VEdit Main 2	[KitPadVEdit]
:	:	:
01 1B 00	Kit Pad VEdit Main 28	[KitPadVEdit]
01 20 00	Kit Pad VEdit Sub 1	[KitPadVEdit]

01 21 00	Kit Pad VEdit Sub 2	[KitPadVEdit]
:	:	:
01 3B 00	Kit Pad VEdit Sub 28	[KitPadVEdit]
01 40 00	Kit Pad 1	[KitPad]
01 41 00	Kit Pad 2	[KitPad]
:	:	:
01 4D 00	Kit Pad 14	[KitPad]

**\* [Setup]**

Offset Address	Description	
00 00 00	Output	[SetupOutput]
00 01 00	Control	[SetupControl]
00 02 00	Click	[Click]
00 03 00	Misc	[SetupMisc]

**\* [Trigger]**

The assignments to each trigger within the [TrigAnalog] are as follows.

KICK	1	HI-HAT	7	AUX3	13
SNARE	2	CRASH1	8	AUX4	14
TOM1	3	CRASH2	9		
TOM2	4	RIDE	10		
TOM3	5	AUX1	11		
TOM4	6	AUX2	12		

[TrigDigital]

These are the trigger parameters for a digitally-connected pad. Digitally-connected pads detected by the TD-50 are assigned in the order in which they are recognized. Normally you should edit these parameters from within the TD-50 itself.

Offset Address	Description	
00 00 00	Trigger Misc	[TrigMisc]
00 01 00	Trigger Analog 1	[TrigAnalog]
00 02 00	Trigger Analog 2	[TrigAnalog]
:	:	:
00 0E 00	Trigger Analog 14	[TrigAnalog]
00 0F 00	Trigger Digital 1	[TrigDigital]
00 10 00	Trigger Digital 2	[TrigDigital]
:	:	:
00 1C 00	Trigger Digital 14	[TrigDigital]

**\* [Current]**

Offset Address	Description	
00 00	0aaa aaaa   Drum Kit Number	(0 - 99) 1 - 100
00 00 00 01	Total Size	

# MIDI Implementation

## \* [KitCommon]

Some characters are not displayed for Kit Name and Kit Sub Name.

Offset	Address	Description
00 00	0aaa aaaa	Kit Name 1 (1 - 126)
00 01	0aaa aaaa	Kit Name 2 1 - 126 [ASCII] (1 - 126)
00 02	0aaa aaaa	Kit Name 3 1 - 126 [ASCII] (1 - 126)
00 03	0aaa aaaa	Kit Name 4 1 - 126 [ASCII] (1 - 126)
00 04	0aaa aaaa	Kit Name 5 1 - 126 [ASCII] (1 - 126)
00 05	0aaa aaaa	Kit Name 6 1 - 126 [ASCII] (1 - 126)
00 06	0aaa aaaa	Kit Name 7 1 - 126 [ASCII] (1 - 126)
00 07	0aaa aaaa	Kit Name 8 1 - 126 [ASCII] (1 - 126)
00 08	0aaa aaaa	Kit Name 9 1 - 126 [ASCII] (1 - 126)
00 09	0aaa aaaa	Kit Name 10 1 - 126 [ASCII] (1 - 126)
00 0A	0aaa aaaa	Kit Name 11 1 - 126 [ASCII] (1 - 126)
00 0B	0aaa aaaa	Kit Name 12 1 - 126 [ASCII] (1 - 126)
00 0C	0aaa aaaa	Kit Sub Name 1 1 - 126 [ASCII] (1 - 126)
00 0D	0aaa aaaa	Kit Sub Name 2 1 - 126 [ASCII] (1 - 126)
00 0E	0aaa aaaa	Kit Sub Name 3 1 - 126 [ASCII] (1 - 126)
00 0F	0aaa aaaa	Kit Sub Name 4 1 - 126 [ASCII] (1 - 126)
00 10	0aaa aaaa	Kit Sub Name 5 1 - 126 [ASCII] (1 - 126)
00 11	0aaa aaaa	Kit Sub Name 6 1 - 126 [ASCII] (1 - 126)
00 12	0aaa aaaa	Kit Sub Name 7 1 - 126 [ASCII] (1 - 126)
00 13	0aaa aaaa	Kit Sub Name 8 1 - 126 [ASCII] (1 - 126)
00 14	0aaa aaaa	Kit Sub Name 9 1 - 126 [ASCII] (1 - 126)
00 15	0aaa aaaa	Kit Sub Name 10 1 - 126 [ASCII] (1 - 126)
00 16	0aaa aaaa	Kit Sub Name 11 1 - 126 [ASCII] (1 - 126)
00 17	0aaa aaaa	Kit Sub Name 12 1 - 126 [ASCII] (1 - 126)
00 18	0aaa aaaa	Kit Sub Name 13 1 - 126 [ASCII] (1 - 126)
00 19	0aaa aaaa	Kit Sub Name 14 1 - 126 [ASCII] (1 - 126)
00 1A	0aaa aaaa	Kit Sub Name 15 1 - 126 [ASCII] (1 - 126)
00 1B	0aaa aaaa	Kit Sub Name 16 1 - 126 [ASCII] (1 - 126)
# 00 1C	0000 aaaa	Volume (-601 - 60) -INF, -60.0 - +6.0 [dB]
00 1D	0000 bbbb	
00 1E	0000 cccc	
00 1F	0000 dddd	
# 00 20	0000 aaaa	Pedal HH Volume (-601 - 60) -INF, -60.0 - +6.0 [dB]
00 21	0000 bbbb	
00 22	0000 cccc	
00 23	0000 dddd	
00 24	0000 000a	Xstick Switch (0 - 1) OFF, ON
00 25	0aaa aaaa	Xstick Inst (0 - 4) 1 - 5
# 00 26	0000 aaaa	Xstick Inst Volume (-601 - 60) -INF, -60.0 - +6.0 [dB]
00 27	0000 bbbb	
00 28	0000 cccc	
00 29	0000 dddd	
00 2A	0000 000a	Brush Switch (0 - 1) OFF, ON
00 2B	0000 aaaa	Color (0 - 9) 1 - 10
00 2C	0000 000a	Favorite (0 - 1) OFF, ON
00 2D	0000 000a	Kit Tempo (0 - 1) OFF, ON
# 00 2E	0000 aaaa	Tempo (20 - 260) 20 - 260
00 2F	0000 bbbb	
00 30	0000 cccc	
00 31	0000 dddd	
00 00 00 32	Total Size	

## \* [KitMidi]

Offset	Address	Description
# 00 00	0000 aaaa	Note KICK (0 - 128) 0 - 127, OFF
00 01	0000 bbbb	
00 02	0000 cccc	
00 03	0000 dddd	
# 00 04	0000 aaaa	Note SNARE (HEAD) (0 - 128) 0 - 127, OFF
00 05	0000 bbbb	
00 06	0000 cccc	
00 07	0000 dddd	
# 00 08	0000 aaaa	Note SNARE (RIM) (0 - 128) 0 - 127, OFF
00 09	0000 bbbb	
00 0A	0000 cccc	
00 0B	0000 dddd	
# 00 0C	0000 aaaa	Note SNARE (BRUSH) (0 - 128) 0 - 127, OFF
00 0D	0000 bbbb	
00 0E	0000 cccc	
00 0F	0000 dddd	
# 00 10	0000 aaaa	Note SNARE (XSTICK) (0 - 128) 0 - 127, OFF
00 11	0000 bbbb	
00 12	0000 cccc	
00 13	0000 dddd	
# 00 14	0000 aaaa	Note TOM1 (HEAD) (0 - 128) 0 - 127, OFF
00 15	0000 bbbb	
00 16	0000 cccc	
00 17	0000 dddd	
# 00 18	0000 aaaa	Note TOM1 (RIM) (0 - 128) 0 - 127, OFF
00 19	0000 bbbb	
00 1A	0000 cccc	
00 1B	0000 dddd	
# 00 1C	0000 aaaa	Note TOM2 (HEAD) (0 - 128) 0 - 127, OFF
00 1D	0000 bbbb	
00 1E	0000 cccc	
00 1F	0000 dddd	
# 00 20	0000 aaaa	Note TOM2 (RIM) (0 - 128) 0 - 127, OFF
00 21	0000 bbbb	
00 22	0000 cccc	
00 23	0000 dddd	
# 00 24	0000 aaaa	Note TOM3 (HEAD) (0 - 128) 0 - 127, OFF
00 25	0000 bbbb	
00 26	0000 cccc	
00 27	0000 dddd	
# 00 28	0000 aaaa	Note TOM3 (RIM) (0 - 128) 0 - 127, OFF
00 29	0000 bbbb	
00 2A	0000 cccc	
00 2B	0000 dddd	
# 00 2C	0000 aaaa	Note TOM4 (HEAD) (0 - 128) 0 - 127, OFF
00 2D	0000 bbbb	
00 2E	0000 cccc	
00 2F	0000 dddd	
# 00 30	0000 aaaa	Note TOM4 (RIM) (0 - 128) 0 - 127, OFF
00 31	0000 bbbb	
00 32	0000 cccc	
00 33	0000 dddd	
# 00 34	0000 aaaa	Note HI-HAT OPEN (BOW) (0 - 128) 0 - 127, OFF
00 35	0000 bbbb	
00 36	0000 cccc	
00 37	0000 dddd	
# 00 38	0000 aaaa	Note HI-HAT OPEN (EDGE) (0 - 128) 0 - 127, OFF
00 39	0000 bbbb	
00 3A	0000 cccc	
00 3B	0000 dddd	
# 00 3C	0000 aaaa	Note HI-HAT CLOSE (BOW) (0 - 128) 0 - 127, OFF
00 3D	0000 bbbb	
00 3E	0000 cccc	
00 3F	0000 dddd	
# 00 40	0000 aaaa	Note HI-HAT CLOSE (EDGE) (0 - 128) 0 - 127, OFF
00 41	0000 bbbb	
00 42	0000 cccc	
00 43	0000 dddd	
# 00 44	0000 aaaa	Note HI-HAT PEDAL (0 - 128) 0 - 127, OFF
00 45	0000 bbbb	
00 46	0000 cccc	
00 47	0000 dddd	
# 00 48	0000 aaaa	Note CRASH 1 (BOW) (0 - 128) 0 - 127, OFF
00 49	0000 bbbb	
00 4A	0000 cccc	
00 4B	0000 dddd	
# 00 4C	0000 aaaa	Note CRASH 1 (EDGE) (0 - 128) 0 - 127, OFF
00 4D	0000 bbbb	
00 4E	0000 cccc	
00 4F	0000 dddd	
# 00 50	0000 aaaa	
00 51	0000 bbbb	



	00 52	0000 cccc		
	00 53	0000 dddd	Note CRASH 2 (BOW)	(0 - 128)
#	00 54	0000 aaaa		0 - 127, OFF
	00 55	0000 bbbb		
	00 56	0000 cccc		
	00 57	0000 dddd	Note CRASH 2 (EDGE)	(0 - 128)
#	00 58	0000 aaaa		0 - 127, OFF
	00 59	0000 bbbb		
	00 5A	0000 cccc		
	00 5B	0000 dddd	Note RIDE (BOW)	(0 - 128)
#	00 5C	0000 aaaa		0 - 127, OFF
	00 5D	0000 bbbb		
	00 5E	0000 cccc		
	00 5F	0000 dddd	Note RIDE (EDGE)	(0 - 128)
#	00 60	0000 aaaa		0 - 127, OFF
	00 61	0000 bbbb		
	00 62	0000 cccc		
	00 63	0000 dddd	Note RIDE (BELL)	(0 - 128)
#	00 64	0000 aaaa		0 - 127, OFF
	00 65	0000 bbbb		
	00 66	0000 cccc		
	00 67	0000 dddd	Note AUX1 (HEAD)	(0 - 128)
#	00 68	0000 aaaa		0 - 127, OFF
	00 69	0000 bbbb		
	00 6A	0000 cccc		
	00 6B	0000 dddd	Note AUX1 (RIM)	(0 - 128)
#	00 6C	0000 aaaa		0 - 127, OFF
	00 6D	0000 bbbb		
	00 6E	0000 cccc		
	00 6F	0000 dddd	Note AUX2 (HEAD)	(0 - 128)
#	00 70	0000 aaaa		0 - 127, OFF
	00 71	0000 bbbb		
	00 72	0000 cccc		
	00 73	0000 dddd	Note AUX2 (RIM)	(0 - 128)
#	00 74	0000 aaaa		0 - 127, OFF
	00 75	0000 bbbb		
	00 76	0000 cccc		
	00 77	0000 dddd	Note AUX3 (HEAD)	(0 - 128)
#	00 78	0000 aaaa		0 - 127, OFF
	00 79	0000 bbbb		
	00 7A	0000 cccc		
	00 7B	0000 dddd	Note AUX3 (RIM)	(0 - 128)
#	00 7C	0000 aaaa		0 - 127, OFF
	00 7D	0000 bbbb		
	00 7E	0000 cccc		
	00 7F	0000 dddd	Note AUX4 (HEAD)	(0 - 128)
#	01 00	0000 aaaa		0 - 127, OFF
	01 01	0000 bbbb		
	01 02	0000 cccc		
	01 03	0000 dddd	Note AUX4 (RIM)	(0 - 128)
	01 04	0aaa aaaa	Gate Time KICK	(1 - 80)
	01 05	0aaa aaaa	Gate Time SNARE (HEAD)	0.1 - 8.0
	01 06	0aaa aaaa	Gate Time SNARE (RIM)	(1 - 80)
	01 07	0aaa aaaa	Gate Time TOM1 (HEAD)	0.1 - 8.0
	01 08	0aaa aaaa	Gate Time TOM1 (RIM)	(1 - 80)
	01 09	0aaa aaaa	Gate Time TOM2 (HEAD)	0.1 - 8.0
	01 0A	0aaa aaaa	Gate Time TOM2 (RIM)	(1 - 80)
	01 0B	0aaa aaaa	Gate Time TOM3 (HEAD)	0.1 - 8.0
	01 0C	0aaa aaaa	Gate Time TOM3 (RIM)	(1 - 80)
	01 0D	0aaa aaaa	Gate Time TOM4 (HEAD)	0.1 - 8.0
	01 0E	0aaa aaaa	Gate Time TOM4 (RIM)	(1 - 80)
	01 0F	0aaa aaaa	Gate Time HI-HAT (BOW)	0.1 - 8.0
	01 10	0aaa aaaa	Gate Time HI-HAT (EDGE)	(1 - 80)
	01 11	0aaa aaaa	Gate Time CRASH1 (BOW)	0.1 - 8.0
	01 12	0aaa aaaa	Gate Time CRASH1 (EDGE)	(1 - 80)
	01 13	0aaa aaaa	Gate Time CRASH2 (BOW)	0.1 - 8.0
	01 14	0aaa aaaa	Gate Time CRASH2 (EDGE)	(1 - 80)
	01 15	0aaa aaaa	Gate Time RIDE (BOW)	0.1 - 8.0
	01 16	0aaa aaaa	Gate Time RIDE (EDGE)	(1 - 80)
	01 17	0aaa aaaa	Gate Time RIDE (BELL)	0.1 - 8.0
	01 18	0aaa aaaa	Gate Time AUX1 (HEAD)	(1 - 80)
	01 19	0aaa aaaa	Gate Time AUX1 (RIM)	0.1 - 8.0

	01 1A	0aaa aaaa	Gate Time AUX2 (HEAD)	(1 - 80)
	01 1B	0aaa aaaa	Gate Time AUX2 (RIM)	0.1 - 8.0
	01 1C	0aaa aaaa	Gate Time AUX3 (HEAD)	(1 - 80)
	01 1D	0aaa aaaa	Gate Time AUX3 (RIM)	0.1 - 8.0
	01 1E	0aaa aaaa	Gate Time AUX4 (HEAD)	(1 - 80)
	01 1F	0aaa aaaa	Gate Time AUX4 (RIM)	0.1 - 8.0
	01 20	000a aaaa	MIDI Ch KICK	(0 - 16)
	01 21	000a aaaa	MIDI Ch SNARE (HEAD)	1 - 15, GLOBAL
	01 22	000a aaaa	MIDI Ch SNARE (RIM)	(0 - 16)
	01 23	000a aaaa	MIDI Ch TOM1 (HEAD)	1 - 15, GLOBAL
	01 24	000a aaaa	MIDI Ch TOM1 (RIM)	(0 - 16)
	01 25	000a aaaa	MIDI Ch TOM2 (HEAD)	1 - 15, GLOBAL
	01 26	000a aaaa	MIDI Ch TOM2 (RIM)	(0 - 16)
	01 27	000a aaaa	MIDI Ch TOM3 (HEAD)	1 - 15, GLOBAL
	01 28	000a aaaa	MIDI Ch TOM3 (RIM)	(0 - 16)
	01 29	000a aaaa	MIDI Ch TOM4 (HEAD)	1 - 15, GLOBAL
	01 2A	000a aaaa	MIDI Ch TOM4 (RIM)	(0 - 16)
	01 2B	000a aaaa	MIDI Ch HI-HAT (BOW)	1 - 15, GLOBAL
	01 2C	000a aaaa	MIDI Ch HI-HAT (EDGE)	(0 - 16)
	01 2D	000a aaaa	MIDI Ch CRASH1 (BOW)	1 - 15, GLOBAL
	01 2E	000a aaaa	MIDI Ch CRASH1 (EDGE)	(0 - 16)
	01 2F	000a aaaa	MIDI Ch CRASH2 (BOW)	1 - 15, GLOBAL
	01 30	000a aaaa	MIDI Ch CRASH2 (EDGE)	(0 - 16)
	01 31	000a aaaa	MIDI Ch RIDE (BOW)	1 - 15, GLOBAL
	01 32	000a aaaa	MIDI Ch RIDE (EDGE)	(0 - 16)
	01 33	000a aaaa	MIDI Ch RIDE (BELL)	1 - 15, GLOBAL
	01 34	000a aaaa	MIDI Ch AUX1 (HEAD)	(0 - 16)
	01 35	000a aaaa	MIDI Ch AUX1 (RIM)	1 - 15, GLOBAL
	01 36	000a aaaa	MIDI Ch AUX2 (HEAD)	(0 - 16)
	01 37	000a aaaa	MIDI Ch AUX2 (RIM)	1 - 15, GLOBAL
	01 38	000a aaaa	MIDI Ch AUX3 (HEAD)	(0 - 16)
	01 39	000a aaaa	MIDI Ch AUX3 (RIM)	1 - 15, GLOBAL
	01 3A	000a aaaa	MIDI Ch AUX4 (HEAD)	(0 - 16)
	01 3B	000a aaaa	MIDI Ch AUX4 (RIM)	1 - 15, GLOBAL
	00 00 01 3C	Total Size		

## \* [KitRoom]

Offset	Address	Description	
	00 00	0000 000a	Switch (0 - 1)
			OFF, ROOM ON
	00 01	000a aaaa	Room Type (0 - 24)
			BEACH, LIVING ROOM, BATH ROOM, STUDIO, GARAGE, LOCKER ROOM, THEATER, CAVE, GYMNASIUM, DOME STADIUM, BOOTH A, BOOTH B, STUDIO A, STUDIO B, BASEMENT, JAZZ CLUB, ROCK CLUB, BALLROOM, GATE, CONCERT HALL, SPORTS ARENA, EXPO HALL, BOTTLE, CITY, SPIRAL
	00 02	0000 0aaa	Room Size (0 - 4)
			TINY, SMALL, MEDIUM, LARGE, HUGE
	00 03	0aaa aaaa	Room Shape (0 - 100)
			0 - 100
	00 04	0000 0aaa	Wall Type (0 - 5)
			CURTAIN, CLOTH, WOOD, PLASTER, CONCRETE, GLASS
	00 05	0000 aaaa	Mic Position (0 - 8)
			NEXT DOOR, LOW FLOOR, LOW, MID LOW, MID, MID HIGH, HIGH, CEILING A, CEILING B
#	00 06	0000 aaaa	
	00 07	0000 bbbb	
	00 08	0000 cccc	
	00 09	0000 dddd	Level (-601 - 60)
			-INF, -60.0 - +6.0 [dB]
	00 00 00 0A	Total Size	

# MIDI Implementation

## \* [KitReverb]

Offset	Address	Description	
	00 00	Switch	(0 - 1) OFF, REV ON
	00 01	Type	(0 - 4) ROOM1, ROOM2, HALL1, HALL2, PLATE
	00 02	Pre Delay	(0 - 100) 0 - 100 [msec]
	00 03	Time	(1 - 100) 0.1 - 10 [sec]
	00 04	Density	(0 - 127) 0 - 127
	00 05	Diffusion	(0 - 127) 0 - 127
	00 06	LF Damp	(0 - 100) 0 - 100
	00 07	HF Damp	(0 - 100) 0 - 100
	00 08	Spread	(0 - 127) 0 - 127
	00 09	Tone	(0 - 127) 0 - 127
#	00 0A	0000 aaaa	Level (-601 - 60) -INF, -60.0 - +6.0 [dB]
	00 0B	0000 bbbb	
	00 0C	0000 cccc	
	00 0D	0000 dddd	
	00 00 00 0E	Total Size	

## \* [KitStereoEnhancer]

Offset	Address	Description	
	00 00	Switch	(0 - 1) OFF, ENHNC ON
	00 01	Color	(0 - 5) 1 - 6
#	00 02	0000 aaaa	Level (-601 - 60) -INF, -60.0 - +6.0 [dB]
	00 03	0000 bbbb	
	00 04	0000 cccc	
	00 05	0000 dddd	
	00 06	0000 0aaa	Width (0 - 4) MONO, 1 - 4
	00 00 00 07	Total Size	

## \* [KitMasterComp]

Offset	Address	Description	
	00 00	Switch	(0 - 1) OFF, COMP ON
	00 01	Type	(0 - 5) SINGLE SOFT COMP, SINGLE HARD COMP, SINGLE LIMITER, 2BAND SOFT COMP, 2BAND HARD COMP, 2BAND LIMITER
#	00 02	0000 aaaa	Split Freq (0 - 1600) SINGLE, 10 - 16000[Hz]
	00 03	0000 bbbb	
	00 04	0000 cccc	
	00 05	0000 dddd	
#	00 06	0000 aaaa	Lo Gain (-48 - 48) -24.0 - +24.0 [dB]
	00 07	0000 bbbb	
#	00 08	0000 aaaa	Hi Gain (-48 - 48) -24.0 - +24.0 [dB]
	00 09	0000 bbbb	
#	00 0A	0000 aaaa	Lo Threshold (-48 - 0) -48 - 0 [dB]
	00 0B	0000 bbbb	
#	00 0C	0000 aaaa	Hi Threshold (-48 - 0) -48 - 0 [dB]
	00 0D	0000 bbbb	
	00 0E	0000 0aaa	Lo Ratio (0 - 7) 1:1, 2:1, 3:1, 4:1, 8:1, 16:1, 32:1, 100:1
	00 0F	0000 0aaa	Hi Ratio (0 - 7) 1:1, 2:1, 3:1, 4:1, 8:1, 16:1, 32:1, 100:1
	00 10	0000 00aa	Lo Knee (0 - 3) HARD, SOFT 1 - 3
	00 11	0000 00aa	Hi Knee (0 - 3) HARD, SOFT 1 - 3
	00 12	0aaa aaaa	Lo Attack (0 - 100) 0.1 - 100 [ms]
	00 13	0aaa aaaa	Hi Attack (0 - 100) 0.1 - 100 [ms]
	00 14	0aaa aaaa	Lo Release (0 - 99) 10 - 1000 [ms]
	00 15	0aaa aaaa	Hi Release (0 - 99) 10 - 1000 [ms]
	00 00 00 16	Total Size	

## \* [KitMasterEQ]

Offset	Address	Description	
	00 00	0000 000a	Switch (0 - 1) OFF, ON
	00 01	0000 000a	
	00 02	000a aaaa	Low Eq Type (0 - 1) SHELV, PEAK
	00 03	0000 0aaa	Low Freq (0 - 17) 20Hz, 25Hz, 31.5Hz, 40Hz, 50Hz, 63Hz, 80Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1kHz
#	00 04	0000 aaaa	Low Q (0 - 4) 0.5, 1.0, 2.0, 4.0, 8.0
	00 05	0000 bbbb	
	00 06	000a aaaa	Mid 1 Freq (0 - 29) 20Hz, 25Hz, 31.5Hz, 40Hz, 50Hz, 63Hz, 80Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1kHz, 1.25kHz, 1.6kHz, 2kHz, 2.5kHz, 3.15kHz, 4kHz, 5kHz, 6.3kHz, 8kHz, 10kHz, 12.5kHz, 16kHz
#	00 07	0000 0aaa	Mid 1 Q (0 - 4) 0.5, 1.0, 2.0, 4.0 8.0
	00 08	0000 aaaa	
	00 09	0000 bbbb	Mid 1 Gain (-12 - 12) -12 - +12 [dB]
	00 0A	000a aaaa	Mid 2 Freq (0 - 29) 20Hz, 25Hz, 31.5Hz, 40Hz, 50Hz, 63Hz, 80Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1kHz, 1.25kHz, 1.6kHz, 2kHz, 2.5kHz, 3.15kHz, 4kHz, 5kHz, 6.3kHz, 8kHz, 10kHz, 12.5kHz, 16kHz
#	00 0B	0000 0aaa	Mid 2 Q (0 - 4) 0.5, 1.0, 2.0, 4.0, 8.0
	00 0C	0000 aaaa	
	00 0D	0000 bbbb	Mid 2 Gain (-12 - 12) -12 - +12 [dB]
	00 0E	0000 000a	High Eq Type (0 - 1) SHELV, PEAK
	00 0F	0000 aaaa	High Freq (0 - 12) 1kHz, 1.25kHz, 1.6kHz, 2kHz, 2.5kHz, 3.15kHz, 4kHz, 5kHz, 6.3kHz, 8kHz, 10kHz, 12.5kHz, 16kHz
	00 10	0000 0aaa	High Q (0 - 4) 0.5, 1.0, 2.0, 4.0, 8.0
#	00 11	0000 aaaa	High Gain (-12 - 12) -12 - +12 [dB]
	00 12	0000 bbbb	
	00 00 00 13	Total Size	

## \* [KitPadInst]

Offset	Address	Description	
#	00 00	0000 aaaa	Instrument (0 - )
	00 01	0000 bbbb	
	00 02	0000 cccc	
	00 03	0000 dddd	
#	00 04	0000 aaaa	Volume (-601 - 60) -INF, -60.0 - +6.0 [dB]
	00 05	0000 bbbb	
	00 06	0000 cccc	
	00 07	0000 dddd	
	00 08	0000 000a	Inst Bank (0 - 1) PRESET, USER SAMPLE
#	00 09	0000 aaaa	Mic Position (0 - 8) OUTSIDE4 - 1, STANDARD, INSIDE1 - 4
#	00 0A	0000 aaaa	Mic Element Overhead Volume (-601 - 60) -INF, -60.0 - +6.0 [dB]
	00 0B	0000 bbbb	
	00 0C	0000 cccc	
	00 0D	0000 dddd	
#	00 0E	0000 aaaa	Mic Element Room Volume (-601 - 60) -INF, -60.0 - +6.0 [dB]
	00 0F	0000 bbbb	
	00 10	0000 cccc	
	00 11	0000 dddd	
#	00 12	0000 aaaa	Ambience Stereo Enhancer Send Level (-601 - 60) -INF, -60.0 - +6.0 [dB]
	00 13	0000 bbbb	
	00 14	0000 cccc	
	00 15	0000 dddd	
#	00 16	0000 aaaa	Mic Width (-5 - 5) -5 - +5
	00 17	0000 bbbb	
	00 18	0000 000a	Transient Switch (0 - 1) OFF, TRANSIENT ON
	00 19	0000 aaaa	Transient Time (1 - 10) 1 - 10
#	00 1A	0000 aaaa	Transient Attack (-100 - 100) -100 - 100
	00 1B	0000 bbbb	
#	00 1C	0000 aaaa	Transient Release (-100 - 100) -100 - 100
	00 1D	0000 bbbb	
#	00 1E	0000 aaaa	Transient Gain (-120 - 60) -12.0 - +6.0 [dB]
	00 1F	0000 bbbb	
	00 20	0000 000a	Dynamic Enhancer Switch (0 - 1) OFF, ON

	00 21	0aaa aaaa	Decay	(1 - 100) 1 - 100
#	00 22	0000 aaaa		
	00 23	0000 bbbb		
	00 24	0000 cccc		
	00 25	0000 dddd	Pitch	(-4800 - 4800) -4800 - 4800
#	00 26	0000 aaaa		
	00 27	0000 bbbb	Pitch Sweep	(-100 - 100) -100 - 100
-----				
	00 00 00 28	Total Size		

## \* [KitPadCommon]

Offset	Address	Description		
#	00 00	0000 aaaa		
	00 01	0000 bbbb	Pan	(-30 - 30) L30 - 1, CTR, R1 - 30
	00 02	0000 aaaa	Minimum Volume	(0 - 15) 0 - 15
#	00 03	0000 aaaa		
	00 04	0000 bbbb	Maximum Volume	(-5 - 0) -5 - 0
	00 05	0000 aaaa	Mute Group SEND	(0 - 8) OFF, 1 - 8
	00 06	0000 aaaa	Mute Group RECEIVE	(0 - 8) OFF, 1 - 8
-----				
	00 07	0000 000a	Sub Inst Switch	(0 - 1) OFF, SUB ON
	00 08	0000 0aaa	Layer Type	(0 - 4) MIX, FADE1 - 3, SWITCH
#	00 09	0aaa aaaa	(reserve)	
	00 0A	0000 aaaa		
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd	Fade Point	(1 - 159) 1 - 127, 127+1 - 127+32
-----				
	00 0E	0000 000a	Eq Switch	(0 - 1) OFF, EQ ON
	00 0F	000a aaaa	Eq Low Freq	(0 - 17) 20Hz, 25Hz, 31.5Hz, 40Hz, 50Hz, 63Hz, 80Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1kHz
#	00 10	0000 aaaa		
	00 11	0000 bbbb	Eq Low Gain	(-15 - 15) -15 - +15 [dB]
	00 12	000a aaaa	Eq Mid Freq	(0 - 29) 20Hz, 25Hz, 31.5Hz, 40Hz, 50Hz, 63Hz, 80Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1kHz, 1.25kHz, 1.6kHz, 2kHz, 2.5kHz, 3.15kHz, 4kHz, 5kHz, 6.3kHz, 8kHz, 10kHz, 12.5kHz, 16kHz
	00 13	0000 0aaa	Eq Mid Q	(0 - 4) 0.5, 1.0, 2.0, 4.0, 8.0
#	00 14	0000 aaaa		
	00 15	0000 bbbb	Eq Mid Gain	(-15 - 15) -15 - +15 [dB]
	00 16	0000 aaaa	Eq High Freq	(0 - 12) 1kHz, 1.25kHz, 1.6kHz, 2kHz, 2.5kHz, 3.15kHz, 4kHz, 5kHz, 6.3kHz, 8kHz, 10kHz, 12.5kHz, 16kHz
#	00 17	0000 aaaa		
	00 18	0000 bbbb	Eq High Gain	(-15 - 15) -15 - +15 [dB]
-----				
#	00 19	0000 aaaa		
	00 1A	0000 bbbb		
	00 1B	0000 cccc		
	00 1C	0000 dddd	Ambience Room Send Level	(-601 - 60) -INF, -60.0 - +6.0 [dB]
#	00 1D	0000 aaaa		
	00 1E	0000 bbbb		
	00 1F	0000 cccc		
	00 20	0000 dddd	Ambience Reverb Send Level	(-601 - 60) -INF, -60.0 - +6.0 [dB]
-----				
#	00 21	0000 aaaa		
	00 22	0000 bbbb		
	00 23	0000 cccc		
	00 24	0000 dddd	MFX Send Level	(-601 - 60) -INF, -60.0 - +6.0 [dB]
	00 25	0000 00aa	MFX Assign	(1 - 3) MFX1, MFX2, MFX3
-----				
#	00 26	0000 aaaa		
	00 27	0000 bbbb	Pedal Bend Range	(-24 - 24) -24 - 24
	00 28	0000 000a	Position Control	(0 - 1) OFF, ON
	00 29	0000 aaaa	Position Area	(0 - 10) INSIDE-5 - -1, DEFAULT, OUTSIDE+1 - +5
-----				
	00 00 00 2A	Total Size		

## \* [KitPad]

Offset	Address	Description		
	00 00	0000 000a	MFX DRY+WET	(0 - 1) MFX ONLY, DRY+MFX
	00 01	0000 000a	Comp Switch	(0 - 1) OFF, COMP ON
	00 02	0000 aaaa	CompType	(0 - 10) KICK 1, KICK 2, SNARE 1, SNARE 2, TOM 1, TOM 2, CYMBAL 1, CYMBAL 2, SOFT COMP, HARD COMP, LIMITER
#	00 03	0000 aaaa		
	00 04	0000 bbbb	Gain	(-48 - 48) -24.0 - +24.0 [dB]
#	00 05	0000 aaaa		
	00 06	0000 bbbb	Threshold	(-48 - 0) -48 - 0 [dB]
	00 07	0000 0aaa	Ratio	(0 - 7) 1:1, 2:1, 3:1, 4:1, 8:1, 16:1, 32:1, 100:1
	00 08	0000 00aa	Knee	(0 - 3) HARD, SOFT1 - 3
	00 09	0aaa aaaa	Attack	(0 - 100) 0.1 - 100 [ms]
	00 0A	0aaa aaaa	Release	(0 - 99) 10 - 1000 [ms]
-----				
	00 00 00 0B	Total Size		

## \* [SetListParams]

Some characters are not displayed for SetList Name.

Offset	Address	Description		
#	00 00	0000 aaaa		
	00 01	0000 bbbb	SetList Name 1	(1 - 126) 1 - 126 [ASCII]
#	00 02	0000 aaaa		
	00 03	0000 bbbb	SetList Name 2	(1 - 126) 1 - 126 [ASCII]
#	00 04	0000 aaaa		
	00 05	0000 bbbb	SetList Name 3	(1 - 126) 1 - 126 [ASCII]
#	00 06	0000 aaaa		
	00 07	0000 bbbb	SetList Name 4	(1 - 126) 1 - 126 [ASCII]
#	00 08	0000 aaaa		
	00 09	0000 bbbb	SetList Name 5	(1 - 126) 1 - 126 [ASCII]
#	00 0A	0000 aaaa		
	00 0B	0000 bbbb	SetList Name 6	(1 - 126) 1 - 126 [ASCII]
#	00 0C	0000 aaaa		
	00 0D	0000 bbbb	SetList Name 7	(1 - 126) 1 - 126 [ASCII]
#	00 0E	0000 aaaa		
	00 0F	0000 bbbb	SetList Name 8	(1 - 126) 1 - 126 [ASCII]
#	00 10	0000 aaaa		
	00 11	0000 bbbb	SetList Name 9	(1 - 126) 1 - 126 [ASCII]
#	00 12	0000 aaaa		
	00 13	0000 bbbb	SetList Name 10	(1 - 126) 1 - 126 [ASCII]
#	00 14	0000 aaaa		
	00 15	0000 bbbb	SetList Name 11	(1 - 126) 1 - 126 [ASCII]
#	00 16	0000 aaaa		
	00 17	0000 bbbb	SetList Name 12	(1 - 126) 1 - 126 [ASCII]
-----				
#	00 18	0000 aaaa		
	00 19	0000 bbbb	Step 1 KitNum	(-1 - 99) END(*1), 1 - 100
#	00 1A	0000 aaaa		
	00 1B	0000 bbbb	Step 2 KitNum	(-1 - 99) END(*1), 1 - 100
#	00 1C	0000 aaaa		
	00 1D	0000 bbbb	Step 3 KitNum	(-1 - 99) END(*1), 1 - 100
#	00 1E	0000 aaaa		
	00 1F	0000 bbbb	Step 4 KitNum	(-1 - 99) END(*1), 1 - 100
#	00 20	0000 aaaa		
	00 21	0000 bbbb	Step 5 KitNum	(-1 - 99) END(*1), 1 - 100
#	00 22	0000 aaaa		
	00 23	0000 bbbb	Step 6 KitNum	(-1 - 99) END(*1), 1 - 100
#	00 24	0000 aaaa		
	00 25	0000 bbbb	Step 7 KitNum	(-1 - 99) END(*1), 1 - 100
#	00 26	0000 aaaa		
	00 27	0000 bbbb	Step 8 KitNum	(-1 - 99) END(*1), 1 - 100
#	00 28	0000 aaaa		
	00 29	0000 bbbb	Step 9 KitNum	(-1 - 99) END(*1), 1 - 100

# MIDI Implementation

#	00 2A	0000 aaaa	Step 10 KitNum	(-1 - 99)
	00 2B	0000 bbbb		END(*1), 1 - 100
#	00 2C	0000 aaaa	Step 11 KitNum	(-1 - 99)
	00 2D	0000 bbbb		END(*1), 1 - 100
#	00 2E	0000 aaaa	Step 12 KitNum	(-1 - 99)
	00 2F	0000 bbbb		END(*1), 1 - 100
#	00 30	0000 aaaa	Step 13 KitNum	(-1 - 99)
	00 31	0000 bbbb		END(*1), 1 - 100
#	00 32	0000 aaaa	Step 14 KitNum	(-1 - 99)
	00 33	0000 bbbb		END(*1), 1 - 100
#	00 34	0000 aaaa	Step 15 KitNum	(-1 - 99)
	00 35	0000 bbbb		END(*1), 1 - 100
#	00 36	0000 aaaa	Step 16 KitNum	(-1 - 99)
	00 37	0000 bbbb		END(*1), 1 - 100
#	00 38	0000 aaaa	Step 17 KitNum	(-1 - 99)
	00 39	0000 bbbb		END(*1), 1 - 100
#	00 3A	0000 aaaa	Step 18 KitNum	(-1 - 99)
	00 3B	0000 bbbb		END(*1), 1 - 100
#	00 3C	0000 aaaa	Step 19 KitNum	(-1 - 99)
	00 3D	0000 bbbb		END(*1), 1 - 100
#	00 3E	0000 aaaa	Step 20 KitNum	(-1 - 99)
	00 3F	0000 bbbb		END(*1), 1 - 100
#	00 40	0000 aaaa	Step 21 KitNum	(-1 - 99)
	00 41	0000 bbbb		END(*1), 1 - 100
#	00 42	0000 aaaa	Step 22 KitNum	(-1 - 99)
	00 43	0000 bbbb		END(*1), 1 - 100
#	00 44	0000 aaaa	Step 23 KitNum	(-1 - 99)
	00 45	0000 bbbb		END(*1), 1 - 100
#	00 46	0000 aaaa	Step 24 KitNum	(-1 - 99)
	00 47	0000 bbbb		END(*1), 1 - 100
#	00 48	0000 aaaa	Step 25 KitNum	(-1 - 99)
	00 49	0000 bbbb		END(*1), 1 - 100
#	00 4A	0000 aaaa	Step 26 KitNum	(-1 - 99)
	00 4B	0000 bbbb		END(*1), 1 - 100
#	00 4C	0000 aaaa	Step 27 KitNum	(-1 - 99)
	00 4D	0000 bbbb		END(*1), 1 - 100
#	00 4E	0000 aaaa	Step 28 KitNum	(-1 - 99)
	00 4F	0000 bbbb		END(*1), 1 - 100
#	00 50	0000 aaaa	Step 29 KitNum	(-1 - 99)
	00 51	0000 bbbb		END(*1), 1 - 100
#	00 52	0000 aaaa	Step 30 KitNum	(-1 - 99)
	00 53	0000 bbbb		END(*1), 1 - 100
#	00 54	0000 aaaa	Step 31 KitNum	(-1 - 99)
	00 55	0000 bbbb		END(*1), 1 - 100
#	00 56	0000 aaaa	Step 32 KitNum	(-1 - 99)
	00 57	0000 bbbb		END(*1), 1 - 100
00 00 00 58		Total Size		

(\*1) The last step of each set list (shown as END on the actual unit) has a value of "-1."

## \* [Click]

Offset	Address	Description	
	00 00	00aa aaaa	Sound (0 - 13) METRONOME, CLICK, VOICE, BEEP 1, BEEP 2, TEK CLICK, STICKS, CLAVES, WOOD BLOCK, COWBELL, TRIANGLE, TOMBOURINE, MARACAS, CABASA
#	00 01	0000 aaaa	Click Pan (-30 - 30) L30 - 1, CTR, R1 - 30
	00 02	0000 bbbb	
#	00 03	0000 aaaa	Level (-601 - 60) -INF, -60.0 - +6.0 [dB]
	00 04	0000 bbbb	
	00 05	0000 cccc	
	00 06	0000 dddd	
#	00 07	0000 aaaa	Amb(Reverb) Send (-601 - 60) -INF, -60.0 - +6.0 [dB]
	00 08	0000 bbbb	
	00 09	0000 cccc	
	00 0A	0000 dddd	
00 00 00 0B		Total Size	

## \* [TrigMisc]

Some characters are not displayed for Trigger Bank Name.

Offset	Address	Description	
#	00 00	0000 aaaa	Trigger Bank Name 1 (1 - 126) 1 - 126 [ASCII]
	00 01	0000 bbbb	
#	00 02	0000 aaaa	Trigger Bank Name 2 (1 - 126) 1 - 126 [ASCII]
	00 03	0000 bbbb	
#	00 04	0000 aaaa	Trigger Bank Name 3 (1 - 126) 1 - 126 [ASCII]
	00 05	0000 bbbb	
#	00 06	0000 aaaa	Trigger Bank Name 4 (1 - 126) 1 - 126 [ASCII]
	00 07	0000 bbbb	
#	00 08	0000 aaaa	Trigger Bank Name 5 (1 - 126) 1 - 126 [ASCII]
	00 09	0000 bbbb	
#	00 0A	0000 aaaa	Trigger Bank Name 6 (1 - 126) 1 - 126 [ASCII]
	00 0B	0000 bbbb	
#	00 0C	0000 aaaa	Trigger Bank Name 7 (1 - 126) 1 - 126 [ASCII]
	00 0D	0000 bbbb	
#	00 0E	0000 aaaa	Trigger Bank Name 8 (1 - 126) 1 - 126 [ASCII]
	00 0F	0000 bbbb	
#	00 10	0000 aaaa	Trigger Bank Name 9 (1 - 126) 1 - 126 [ASCII]
	00 11	0000 bbbb	
#	00 12	0000 aaaa	Trigger Bank Name 10 (1 - 126) 1 - 126 [ASCII]
	00 13	0000 bbbb	
#	00 14	0000 aaaa	Trigger Bank Name 11 (1 - 126) 1 - 126 [ASCII]
	00 15	0000 bbbb	
#	00 16	0000 aaaa	Trigger Bank Name 12 (1 - 126) 1 - 126 [ASCII]
	00 17	0000 bbbb	
#	00 18	0000 aaaa	Trigger Bank Name 13 (1 - 126) 1 - 126 [ASCII]
	00 19	0000 bbbb	
#	00 1A	0000 aaaa	Trigger Bank Name 14 (1 - 126) 1 - 126 [ASCII]
	00 1B	0000 bbbb	
#	00 1C	0000 aaaa	Trigger Bank Name 15 (1 - 126) 1 - 126 [ASCII]
	00 1D	0000 bbbb	
#	00 1E	0000 aaaa	Trigger Bank Name 16 (1 - 126) 1 - 126 [ASCII]
	00 1F	0000 bbbb	
#	00 20	0000 aaaa	HI-HAT VH-12 Offset (-100 - 100) -100 - 100
	00 21	0000 bbbb	
	00 22	0000 cccc	
	00 23	0000 dddd	
#	00 24	0000 aaaa	HI-HAT VH-13 Offset (-100 - 100) -100 - 100
	00 25	0000 bbbb	
	00 26	0000 cccc	
	00 27	0000 dddd	
#	00 28	0000 aaaa	HI-HAT VH-12 Foot Splash Sens (-10 - 10) -10 - 10
	00 29	0000 bbbb	
#	00 2A	0000 aaaa	HI-HAT VH-13 Foot Splash Sens (-10 - 10) -10 - 10
	00 2B	0000 bbbb	
#	00 2C	0000 aaaa	HI-HAT FD Foot Splash Sens (-10 - 10) -10 - 10
	00 2D	0000 bbbb	
	00 2E	0000 00aa	HI-HAT VH-12 Noise Cancel (0 - 2) 1 - 3
	00 2F	0000 00aa	HI-HAT VH-13 Noise Cancel (0 - 2) 1 - 3
	00 30	0000 000a	HI-HAT CC MAX (0 - 1) 90, 127
	00 31	0aaa aaaa	Analog XStick Threshold (0 - 127) 0 - 127
	00 32	0aaa aaaa	XTalk Cancel Rate 1 (KICK) (0 - 80) 0 - 80
	00 33	0aaa aaaa	XTalk Cancel Rate 2 (SNARE) (0 - 80) 0 - 80
	00 34	0aaa aaaa	XTalk Cancel Rate 3 (TOM 1) (0 - 80) 0 - 80
	00 35	0aaa aaaa	XTalk Cancel Rate 4 (TOM 2) (0 - 80) 0 - 80
	00 36	0aaa aaaa	XTalk Cancel Rate 5 (TOM 3) (0 - 80) 0 - 80
	00 37	0aaa aaaa	XTalk Cancel Rate 6 (TOM 4) (0 - 80) 0 - 80
	00 38	0aaa aaaa	XTalk Cancel Rate 7 (HI-HAT) (0 - 80) 0 - 80
	00 39	0aaa aaaa	XTalk Cancel Rate 8 (CRASH 1) (0 - 80) 0 - 80
	00 3A	0aaa aaaa	XTalk Cancel Rate 9 (CRASH 2) (0 - 80) 0 - 80
	00 3B	0aaa aaaa	XTalk Cancel Rate 10 (RIDE) (0 - 80) 0 - 80
	00 3C	0aaa aaaa	XTalk Cancel Rate 11 (AUX 1) (0 - 80) 0 - 80
	00 3D	0aaa aaaa	XTalk Cancel Rate 12 (AUX 2) (0 - 80) 0 - 80
	00 3E	0aaa aaaa	XTalk Cancel Rate 13 (AUX 3) (0 - 80) 0 - 80
	00 3F	0aaa aaaa	XTalk Cancel Rate 14 (AUX 4) (0 - 80) 0 - 80
00 00 00 40		Total Size	

## \* [TrigAnalog]

This area is valid for a pad that is connected to a TRIGGER IN jack.

Offset Address	Description
00 00	00aa aaaa Trig Type (0 - 40) KDA22, KD140, KD120, KD85, KD9, KDB, KD7, KT10, PD128, PD125X, PD125, PD108, PD105X, PD105, PD85, PDX100, PDX8, PDX6, PD8, VH13, VH12, VH11, CY15R, CY14C, CY13R, CY12C, CY12R/C, CY8, CY5, BT1, BT1 SENS, PAD1, PAD2, PAD3, RT30K, RT30HR, RT30H SN, RT30H TM, RT10K, RT10S, RT10T
00 01	00aa aaaa Sensitivity (0 - 62) 1.0 - 32.0
00 02	00aa aaaa Rim Gain (0 - 32) 0 - 3.2
00 03	000a aaaa Threshold (0 - 31) 0 - 31
00 04	0000 0aaa Curve (0 - 7) LINEAR, EXP1, EXP2, LOG1, LOG2, SPLINE, LOUD1, LOUD2
00 05	0000 0aaa ExtNoiseCancel (0 - 5) OFF, 1 - 5
00 06	0aaa aaaa Head/Rim Adjust (0 - 80) 0 - 80
00 07	00aa aaaa Scan Time (0 - 40) 0 - 4.0
00 08	0aaa aaaa Mask Time (0 - 64) 0 - 64
00 09	0000 aaaa Retrigger Cancel (0 - 15) 1 - 16
00 0A	0000 000a Position Detect Head (0 - 1) OFF, ON
00 0B	0000 000a Position Detect Rim (0 - 1) OFF, ON
00 00 00 0C	Total Size

## \* [SetupOutput]

Offset Address	Description
00 00	0000 000a Master Assign (KICK) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 01	0000 000a Master Assign (SNARE) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 02	0000 000a Master Assign (TOM 1) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 03	0000 000a Master Assign (TOM 2) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 04	0000 000a Master Assign (TOM 3) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 05	0000 000a Master Assign (TOM 4) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 06	0000 000a Master Assign (HI-HAT) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 07	0000 000a Master Assign (CRASH 1) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 08	0000 000a Master Assign (CRASH 2) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 09	0000 000a Master Assign (RIDE) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 0A	0000 000a Master Assign (AUX 1) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 0B	0000 000a Master Assign (AUX 2) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 0C	0000 000a Master Assign (AUX 3) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 0D	0000 000a Master Assign (AUX 4) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 0E	0000 aaaa Direct Assign (KICK) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R)
00 0F	0000 aaaa Direct Assign (SNARE) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R)
00 10	0000 aaaa Direct Assign (TOM 1) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R)

00 11	0000 aaaa MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R Direct Assign (TOM 2) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R)
00 12	0000 aaaa MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R Direct Assign (TOM 3) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R)
00 13	0000 aaaa MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R Direct Assign (TOM 4) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R)
00 14	0000 aaaa MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R Direct Assign (HI-HAT) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R)
00 15	0000 aaaa MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R Direct Assign (CRASH 1) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R)
00 16	0000 aaaa MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R Direct Assign (CRASH 2) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R)
00 17	0000 aaaa MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R Direct Assign (RIDE) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R)
00 18	0000 aaaa MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R Direct Assign (AUX 1) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R)
00 19	0000 aaaa MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R Direct Assign (AUX 2) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R)
00 1A	0000 aaaa MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R Direct Assign (AUX 3) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R)
00 1B	0000 aaaa MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R Direct Assign (AUX 4) (0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R)
00 1C	0000 000a Master Assign (AMBIENCE) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 1D	0000 000a (reserve)
00 1E	0000 000a Master Assign (MXF 1) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 1F	0000 000a Master Assign (MXF 2) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 20	0000 000a Master Assign (MXF 3) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 21	0000 000a Master Assign (SONG) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 22	0000 000a Master Assign (CLICK) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 23	0000 000a Master Assign (MIX IN) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 24	0000 000a Master Assign (USB IN MAIN) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)
00 25	0000 000a Master Assign (USB IN SUB) (0 - 1) PHONES ONLY, PHONES+MASTER(L+R)

# MIDI Implementation

00 26	0000 aaaa	Direct Assign (AMBIENCE)	(0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R), MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R
00 27	0000 aaaa	(reserve)	
00 28	0000 aaaa	Direct Assign (MFX 1)	(0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R), MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R
00 29	0000 aaaa	Direct Assign (MFX 2)	(0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R), MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R
00 2A	0000 aaaa	Direct Assign (MFX 3)	(0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R), MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R
00 2B	0000 aaaa	Direct Assign (SONG)	(0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R), MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R
00 2C	0000 aaaa	Direct Assign (CLICK)	(0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R), MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R
00 2D	0000 aaaa	Direct Assign (MIX IN)	(0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R), MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R
00 2E	0000 aaaa	Direct Assign (USB IN MAIN)	(0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R), MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R
00 2F	0000 aaaa	Direct Assign (USB IN SUB)	(0 - 15) OFF, DIRECT 1, DIRECT 2, DIRECT 1+2(L+R), DIRECT 3, DIRECT 4, DIRECT 3+4(L+R), DIRECT 5, DIRECT 6, DIRECT 5+6(L+R), DIRECT 7, DIRECT 8, DIRECT 7+8(L+R), MASTER DIRECT L, MASTER DIRECT R, MASTER DIRECT L+R
00 30	0000 000a	Master Output Mode	(0 - 1) MASTER, DIRECT
00 31	0000 000a	PadEq/Comp to Direct	(0 - 1) OFF, ON
00 32	0000 000a	PadComp to Phones	(0 - 1) OFF, ON
00 33	0000 000a	Fader to Direct	(0 - 1) OFF, ON
00 34	0000 00aa	Direct Out Att	(0 - 2) -12, -6, 0[dB]
00 35	0000 aaaa	LoCut Frequency	(0 - 10) 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200[Hz]
00 36	0000 000a	Master Output LoCut Switch	(0 - 1) OFF, ON
00 37	0000 000a	Phones Output LoCut Switch	(0 - 1) OFF, ON
00 38	0000 000a	Direct Output LoCut Switch	(0 - 1) OFF, ON
00 00 00 39	Total Size		

## \* [SetupControl]

Offset	Address	Description	
00 00	0000 0aaa	Trig Bank Number	(0 - 7) 1 - 8
00 00 00 01	Total Size		

## \* [SetupMisc]

Offset	Address	Description	
00 00	0000 00aa	Mix In Input	(0 - 2) L+R, L ONLY, R ONLY
00 01	0000 000a	Mix In Mode	(0 - 1) STEREO, MONO
00 02	0000 00aa	Mix In Gain	(0 - 2) 0, +6, +12[dB]
00 03	0000 00aa	USB Audio Volume Select Input MAIN	(0 - 2) OFF, SONG, CLICK
00 04	0000 00aa	USB Audio Volume Select Input SUB	(0 - 2) OFF, SONG, CLICK
# 00 05	0000 aaaa	USB Audio Input Gain	(-36 - 12) -36 - +12[dB]
00 06	0000 bbbb		
# 00 07	0000 aaaa	USB Audio Output Gain	(-24 - 24) -24 - +24[dB]
00 08	0000 bbbb		
00 00 00 09	Total Size		

## \* [KitMfx]

Offset	Address	Description	
00 00	000a aaaa	Type	(0 - 29) DELAY, TAPE ECHO, REVERSE DELAY, 3TAP PAN DELAY, OD->DELAY, DS->DELAY, CHORUS, SPACE-D, OD->CHORUS, DS->CHORUS, PHASER A, PHASER B, STEP PHASER, FLANGER, REVERB, LONG REVERB, SUPER FILTER, FILTER+DRIVE, AUTO WAH, OD/DS->TWAH, LOFI COMPRESS, DISTORTION, OVERDRIVE, SATURATOR, T-SCREAM, BIT CRUSHER, ISOLATOR, RING MODULATOR, PITCH SHIFTER, AUTO PAN
00 01	0000 000a	Switch	(0 - 1) OFF, ON
# 00 02	0000 aaaa	Level	(-601 - 60) -INF, -60.0 - +6.0 [dB]
00 03	0000 bbbb		
00 04	0000 cccc		
00 05	0000 dddd		
# 00 06	0000 aaaa	MFX Parameter 1	(*2)
00 07	0000 bbbb		
00 08	0000 cccc	MFX Parameter 2	(*2)
00 09	0000 dddd		
# 00 0A	0000 aaaa	MFX Parameter 3	(*2)
00 0B	0000 bbbb		
00 0C	0000 cccc	MFX Parameter 4	(*2)
00 0D	0000 dddd		
# 00 0E	0000 aaaa	MFX Parameter 5	(*2)
00 0F	0000 bbbb		
00 10	0000 cccc	MFX Parameter 6	(*2)
00 11	0000 dddd		
# 00 12	0000 aaaa	MFX Parameter 7	(*2)
00 13	0000 bbbb		
00 14	0000 cccc	MFX Parameter 8	(*2)
00 15	0000 dddd		
# 00 16	0000 aaaa	MFX Parameter 9	(*2)
00 17	0000 bbbb		
00 18	0000 cccc	MFX Parameter 10	(*2)
00 19	0000 dddd		
# 00 1A	0000 aaaa	MFX Parameter 11	(*2)
00 1B	0000 bbbb		
00 1C	0000 cccc	MFX Parameter 12	(*2)
00 1D	0000 dddd		
# 00 1E	0000 aaaa	MFX Parameter 13	(*2)
00 1F	0000 bbbb		
00 20	0000 cccc	MFX Parameter 14	(*2)
00 21	0000 dddd		
# 00 22	0000 aaaa	MFX Parameter 15	(*2)
00 23	0000 bbbb		
00 24	0000 cccc	MFX Parameter 16	(*2)
00 25	0000 dddd		
# 00 26	0000 aaaa	MFX Parameter 17	(*2)
00 27	0000 bbbb		
00 28	0000 cccc	MFX Parameter 18	(*2)
00 29	0000 dddd		
# 00 2A	0000 aaaa	MFX Parameter 19	(*2)
00 2B	0000 bbbb		
00 2C	0000 cccc	MFX Parameter 20	(*2)
00 2D	0000 dddd		
# 00 2E	0000 aaaa	MFX Parameter 21	(*2)
00 2F	0000 bbbb		
00 30	0000 cccc	MFX Parameter 22	(*2)
00 31	0000 dddd		
# 00 32	0000 aaaa	MFX Parameter 23	(*2)
00 33	0000 bbbb		
00 34	0000 cccc	MFX Parameter 24	(*2)
00 35	0000 dddd		
# 00 36	0000 aaaa	MFX Parameter 25	(*2)
00 37	0000 bbbb		
00 38	0000 cccc	MFX Parameter 26	(*2)
00 39	0000 dddd		
# 00 3A	0000 aaaa	MFX Parameter 27	(*2)
00 3B	0000 bbbb		
00 3C	0000 cccc	MFX Parameter 28	(*2)
00 3D	0000 dddd		
# 00 3E	0000 aaaa	MFX Parameter 29	(*2)
00 3F	0000 bbbb		
00 40	0000 cccc	MFX Parameter 30	(*2)

#	00 41	0000 dddd	MFX Parameter 15	(*2)
#	00 42	0000 aaaa		
#	00 43	0000 bbbb		
#	00 44	0000 cccc		
#	00 45	0000 dddd	MFX Parameter 16	(*2)
#	00 46	0000 aaaa		
#	00 47	0000 bbbb		
#	00 48	0000 cccc		
#	00 49	0000 dddd	MFX Parameter 17	(*2)
#	00 4A	0000 aaaa		
#	00 4B	0000 bbbb		
#	00 4C	0000 cccc		
#	00 4D	0000 dddd	MFX Parameter 18	(*2)
#	00 4E	0000 aaaa		
#	00 4F	0000 bbbb		
#	00 50	0000 cccc		
#	00 51	0000 dddd	MFX Parameter 19	(*2)
#	00 52	0000 aaaa		
#	00 53	0000 bbbb		
#	00 54	0000 cccc		
#	00 55	0000 dddd	MFX Parameter 20	(*2)
#	00 56	0000 aaaa		
#	00 57	0000 bbbb		
#	00 58	0000 cccc		
#	00 59	0000 dddd	MFX Parameter 21	(*2)
#	00 5A	0000 aaaa		
#	00 5B	0000 bbbb		
#	00 5C	0000 cccc		
#	00 5D	0000 dddd	MFX Parameter 22	(*2)
#	00 5E	0000 aaaa		
#	00 5F	0000 bbbb		
#	00 60	0000 cccc		
#	00 61	0000 dddd	MFX Parameter 23	(*2)
#	00 62	0000 aaaa		
#	00 63	0000 bbbb		
#	00 64	0000 cccc		
#	00 65	0000 dddd	MFX Parameter 24	(*2)
#	00 66	0000 aaaa		
#	00 67	0000 bbbb		
#	00 68	0000 cccc		
#	00 69	0000 dddd	MFX Parameter 25	(*2)
#	00 6A	0000 aaaa		
#	00 6B	0000 bbbb		
#	00 6C	0000 cccc		
#	00 6D	0000 dddd	MFX Parameter 26	(*2)
#	00 6E	0000 aaaa		
#	00 6F	0000 bbbb		
#	00 70	0000 cccc		
#	00 71	0000 dddd	MFX Parameter 27	(*2)
#	00 72	0000 aaaa		
#	00 73	0000 bbbb		
#	00 74	0000 cccc		
#	00 75	0000 dddd	MFX Parameter 28	(*2)
#	00 76	0000 aaaa		
#	00 77	0000 bbbb		
#	00 78	0000 cccc		
#	00 79	0000 dddd	MFX Parameter 29	(*2)
#	00 7A	0000 aaaa		
#	00 7B	0000 bbbb		
#	00 7C	0000 cccc		
#	00 7D	0000 dddd	MFX Parameter 30	(*2)
#	00 7E	0000 aaaa		
#	00 7F	0000 bbbb		
#	01 00	0000 cccc		
#	01 01	0000 dddd	MFX Parameter 31	(*2)
#	01 02	0000 aaaa		
#	01 03	0000 bbbb		
#	01 04	0000 cccc		
#	01 05	0000 dddd	MFX Parameter 32	(*2)
-----				
	00 00 01 06	Total Size		

(\*2) This area is assigned as follows according to the selected MFX Type.  
Addresses for which the MFX Type has no assignment are ignored.

### MFX Type: DELAY

Offset	Address	Description	
#	00 06	0000 aaaa	
#	00 07	0000 bbbb	
#	00 08	0000 cccc	
#	00 09	0000 dddd	Tempo Sync Left (0 - 1) OFF, ON
#	00 0A	0000 aaaa	
#	00 0B	0000 bbbb	
#	00 0C	0000 cccc	
#	00 0D	0000 dddd	Delay Left Time (msec) (1 - 1300) 1 - 1300 [msec]
#	00 0E	0000 aaaa	
#	00 0F	0000 bbbb	
#	00 10	0000 cccc	
#	00 11	0000 dddd	Delay Left Time (note) (0 - 21) MUSICAL-NOTES
#	00 12	0000 aaaa	
#	00 13	0000 bbbb	
#	00 14	0000 cccc	
#	00 15	0000 dddd	Tempo Sync Right (0 - 1) OFF, ON
#	00 16	0000 aaaa	
#	00 17	0000 bbbb	
#	00 18	0000 cccc	
#	00 19	0000 dddd	Delay Right Time (msec) (1 - 1300) 1 - 1300 [msec]

#	00 1A	0000 aaaa		
#	00 1B	0000 bbbb		
#	00 1C	0000 cccc		
#	00 1D	0000 dddd	Delay Right Time (note) (0 - 21) MUSICAL-NOTES	
#	00 1E	0000 aaaa		
#	00 1F	0000 bbbb		
#	00 20	0000 cccc		
#	00 21	0000 dddd	Phase Left (0 - 1) NORMAL, INVERSE	
#	00 22	0000 aaaa		
#	00 23	0000 bbbb		
#	00 24	0000 cccc		
#	00 25	0000 dddd	Phase Right (0 - 1) NORMAL, INVERSE	
#	00 26	0000 aaaa		
#	00 27	0000 bbbb		
#	00 28	0000 cccc		
#	00 29	0000 dddd	Feedback Mode (0 - 1) NORMAL, CROSS	
#	00 2A	0000 aaaa		
#	00 2B	0000 bbbb		
#	00 2C	0000 cccc		
#	00 2D	0000 dddd	Feedback (0 - 98) -98 - +98 [%]	
#	00 2E	0000 aaaa		
#	00 2F	0000 bbbb		
#	00 30	0000 cccc		
#	00 31	0000 dddd	HF Damp (0 - 17) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, BYPASS[Hz]	
#	00 32	0000 aaaa		
#	00 33	0000 bbbb		
#	00 34	0000 cccc		
#	00 35	0000 dddd	Low Gain (0 - 30) -15 - +15 [dB]	
#	00 36	0000 aaaa		
#	00 37	0000 bbbb		
#	00 38	0000 cccc		
#	00 39	0000 dddd	High Gain (0 - 30) -15 - +15 [dB]	
#	00 3A	0000 aaaa		
#	00 3B	0000 bbbb		
#	00 3C	0000 cccc		
#	00 3D	0000 dddd	dummy (ignored)	
#	00 3E	0000 aaaa		
#	00 3F	0000 bbbb		
#	00 40	0000 cccc		
#	00 41	0000 dddd	Level (0 - 127) 0 - 127	

### MFX Type: TAPE ECHO

Offset	Address	Description	
#	00 06	0000 aaaa	
#	00 07	0000 bbbb	
#	00 08	0000 cccc	
#	00 09	0000 dddd	Mode (0 - 6) S, M, L, S+M, S+L, M+L, S+M+L
#	00 0A	0000 aaaa	
#	00 0B	0000 bbbb	
#	00 0C	0000 cccc	
#	00 0D	0000 dddd	Repeat Rate (0 - 127) 0 - 127
#	00 0E	0000 aaaa	
#	00 0F	0000 bbbb	
#	00 10	0000 cccc	
#	00 11	0000 dddd	Intensity (0 - 127) 0 - 127
#	00 12	0000 aaaa	
#	00 13	0000 bbbb	
#	00 14	0000 cccc	
#	00 15	0000 dddd	Bass (0 - 30) -15 - +15 [dB]
#	00 16	0000 aaaa	
#	00 17	0000 bbbb	
#	00 18	0000 cccc	
#	00 19	0000 dddd	Treble (0 - 30) -15 - +15 [dB]
#	00 1A	0000 aaaa	
#	00 1B	0000 bbbb	
#	00 1C	0000 cccc	
#	00 1D	0000 dddd	Head S Pan (0 - 127) L64 - 63R
#	00 1E	0000 aaaa	
#	00 1F	0000 bbbb	
#	00 20	0000 cccc	
#	00 21	0000 dddd	Head M Pan (0 - 127) L64 - 63R
#	00 22	0000 aaaa	
#	00 23	0000 bbbb	
#	00 24	0000 cccc	
#	00 25	0000 dddd	Head L Pan (0 - 127) L64 - 63R
#	00 26	0000 aaaa	
#	00 27	0000 bbbb	
#	00 28	0000 cccc	
#	00 29	0000 dddd	Tape Distortion (0 - 5) 0 - 5
#	00 2A	0000 aaaa	
#	00 2B	0000 bbbb	
#	00 2C	0000 cccc	
#	00 2D	0000 dddd	W/F Rate (0 - 127)

# MIDI Implementation

#	00 2E	0000 aaaa		0 - 127
	00 2F	0000 bbbb		
	00 30	0000 cccc		
	00 31	0000 dddd	W/F Depth	(0 - 127)
#	00 32	0000 aaaa		0 - 127
	00 33	0000 bbbb		
	00 34	0000 cccc		
	00 35	0000 dddd	dummy (ignored)	
#	00 36	0000 aaaa		
	00 37	0000 bbbb		
	00 38	0000 cccc		
	00 39	0000 dddd	dummy (ignored)	
#	00 3A	0000 aaaa		
	00 3B	0000 bbbb		
	00 3C	0000 cccc		
	00 3D	0000 dddd	Level	(0 - 127)

## MFX Type: REVERSE DELAY

Offset	Address	Description		
#	00 06	0000 aaaa		
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd	Threshold	(0 - 127)
#	00 0A	0000 aaaa		0 - 127
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd	Tempo Sync Rev	(0 - 1)
#	00 0E	0000 aaaa		OFF, ON
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd	Rev Delay Time (msec)	(1 - 1300)
#	00 12	0000 aaaa		1 - 1300 [msec]
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd	Rev Delay Time (note)	(0 - 21)
#	00 16	0000 aaaa		MUSICAL-NOTES
	00 17	0000 bbbb		
	00 18	0000 cccc		
	00 19	0000 dddd	Rev Delay Feedback	(0 - 98)
#	00 1A	0000 aaaa		-98 - +98 [%]
	00 1B	0000 bbbb		
	00 1C	0000 cccc		
	00 1D	0000 dddd	Rev Delay HF Damp	(0 - 17)
#	00 1E	0000 aaaa		200, 250, 315, 400, 500, 630, 800,
	00 1F	0000 bbbb		1000, 1250, 1600, 2000, 2500, 3150,
	00 20	0000 cccc		4000, 5000, 6300, 8000, BYPASS[Hz]
	00 21	0000 dddd	Rev Delay Pan	(0 - 127)
#	00 22	0000 aaaa		L64 - 63R
	00 23	0000 bbbb		
	00 24	0000 cccc		
	00 25	0000 dddd	Rev Delay Level	(0 - 127)
#	00 26	0000 aaaa		0 - 127
	00 27	0000 bbbb		
	00 28	0000 cccc		
	00 29	0000 dddd	Tempo Sync Delay1	(0 - 1)
#	00 2A	0000 aaaa		OFF, ON
	00 2B	0000 bbbb		
	00 2C	0000 cccc		
	00 2D	0000 dddd	Delay1 Time (msec)	(1 - 1300)
#	00 2E	0000 aaaa		1 - 1300 [msec]
	00 2F	0000 bbbb		
	00 30	0000 cccc		
	00 31	0000 dddd	Delay1 Time (note)	(0 - 21)
#	00 32	0000 aaaa		MUSICAL-NOTES
	00 33	0000 bbbb		
	00 34	0000 cccc		
	00 35	0000 dddd	Tempo Sync Delay2	(0 - 1)
#	00 36	0000 aaaa		OFF, ON
	00 37	0000 bbbb		
	00 38	0000 cccc		
	00 39	0000 dddd	Delay2 Time (msec)	(1 - 1300)
#	00 3A	0000 aaaa		1 - 1300 [msec]
	00 3B	0000 bbbb		
	00 3C	0000 cccc		
	00 3D	0000 dddd	Delay2 Time (note)	(0 - 21)
#	00 3E	0000 aaaa		MUSICAL-NOTES
	00 3F	0000 bbbb		
	00 40	0000 cccc		
	00 41	0000 dddd	Tempo Sync Delay3	(0 - 1)
#	00 42	0000 aaaa		OFF, ON
	00 43	0000 bbbb		
	00 44	0000 cccc		
	00 45	0000 dddd	Delay3 Time (msec)	(1 - 1300)

#	00 46	0000 aaaa		
	00 47	0000 bbbb		
	00 48	0000 cccc		
	00 49	0000 dddd	Delay3 Time (note)	(0 - 21)
#	00 4A	0000 aaaa		MUSICAL-NOTES
	00 4B	0000 bbbb		
	00 4C	0000 cccc		
	00 4D	0000 dddd	Delay 3 Feedback	(0 - 98)
#	00 4E	0000 aaaa		-98 - +98 [%]
	00 4F	0000 bbbb		
	00 50	0000 cccc		
	00 51	0000 dddd	Delay HF Damp	(0 - 17)
#	00 52	0000 aaaa		200, 250, 315, 400, 500, 630, 800,
	00 53	0000 bbbb		1000, 1250, 1600, 2000, 2500, 3150,
	00 54	0000 cccc		4000, 5000, 6300, 8000, BYPASS[Hz]
	00 55	0000 dddd	Delay 1 Pan	(0 - 127)
#	00 56	0000 aaaa		L64 - 63R
	00 57	0000 bbbb		
	00 58	0000 cccc		
	00 59	0000 dddd	Delay 2 Pan	(0 - 127)
#	00 5A	0000 aaaa		L64 - 63R
	00 5B	0000 bbbb		
	00 5C	0000 cccc		
	00 5D	0000 dddd	Delay 1 Level	(0 - 127)
#	00 5E	0000 aaaa		0 - 127
	00 5F	0000 bbbb		
	00 60	0000 cccc		
	00 61	0000 dddd	Delay 2 Level	(0 - 127)
#	00 62	0000 aaaa		0 - 127
	00 63	0000 bbbb		
	00 64	0000 cccc		
	00 65	0000 dddd	Low Gain	(0 - 30)
#	00 66	0000 aaaa		-15 - +15 [dB]
	00 67	0000 bbbb		
	00 68	0000 cccc		
	00 69	0000 dddd	High Gain	(0 - 30)
#	00 6A	0000 aaaa		-15 - +15 [dB]
	00 6B	0000 bbbb		
	00 6C	0000 cccc		
	00 6D	0000 dddd	dummy (ignored)	
#	00 6E	0000 aaaa		
	00 6F	0000 bbbb		
	00 70	0000 cccc		
	00 71	0000 dddd	Level	(0 - 127)

## MFX Type: 3TAP PAN DELAY

Offset	Address	Description		
#	00 06	0000 aaaa		
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd	Tempo Sync Left	(0 - 1)
#	00 0A	0000 aaaa		OFF, ON
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd	Delay Left Time (msec)	(1 - 2600)
#	00 0E	0000 aaaa		1 - 2600 [msec]
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd	Delay Left Time (note)	(0 - 21)
#	00 12	0000 aaaa		MUSICAL-NOTES
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd	Tempo Sync Right	(0 - 1)
#	00 16	0000 aaaa		OFF, ON
	00 17	0000 bbbb		
	00 18	0000 cccc		
	00 19	0000 dddd	Delay Right Time (msec)	(1 - 2600)
#	00 1A	0000 aaaa		1 - 2600 [msec]
	00 1B	0000 bbbb		
	00 1C	0000 cccc		
	00 1D	0000 dddd	Delay Right Time (note)	(0 - 21)
#	00 1E	0000 aaaa		MUSICAL-NOTES
	00 1F	0000 bbbb		
	00 20	0000 cccc		
	00 21	0000 dddd	Tempo Sync Center	(0 - 1)
#	00 22	0000 aaaa		OFF, ON
	00 23	0000 bbbb		
	00 24	0000 cccc		
	00 25	0000 dddd	Delay Center Time (msec)	(1 - 2600)
#	00 26	0000 aaaa		1 - 2600 [msec]
	00 27	0000 bbbb		
	00 28	0000 cccc		
	00 29	0000 dddd	Delay Center Time (note)	(0 - 21)



#	00 2A	0000 aaaa		
	00 2B	0000 bbbb		
	00 2C	0000 cccc		
	00 2D	0000 dddd	Center Feedback	(0 - 98) -98 - +98 [%]
#	00 2E	0000 aaaa		
	00 2F	0000 bbbb		
	00 30	0000 cccc		
	00 31	0000 dddd	HF Damp	(0 - 17) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, BYPASS[Hz]
#	00 32	0000 aaaa		
	00 33	0000 bbbb		
	00 34	0000 cccc		
	00 35	0000 dddd	Left Level	(0 - 127) 0 - 127
#	00 36	0000 aaaa		
	00 37	0000 bbbb		
	00 38	0000 cccc		
	00 39	0000 dddd	Right Level	(0 - 127) 0 - 127
#	00 3A	0000 aaaa		
	00 3B	0000 bbbb		
	00 3C	0000 cccc		
	00 3D	0000 dddd	Center Level	(0 - 127) 0 - 127
#	00 3E	0000 aaaa		
	00 3F	0000 bbbb		
	00 40	0000 cccc		
	00 41	0000 dddd	Low Gain	(0 - 30) -15 - +15 [dB]
#	00 42	0000 aaaa		
	00 43	0000 bbbb		
	00 44	0000 cccc		
	00 45	0000 dddd	High Gain	(0 - 30) -15 - +15 [dB]
#	00 46	0000 aaaa		
	00 47	0000 bbbb		
	00 48	0000 cccc		
	00 49	0000 dddd	dummy (ignored)	
#	00 4A	0000 aaaa		
	00 4B	0000 bbbb		
	00 4C	0000 cccc		
	00 4D	0000 dddd	Level	(0 - 127) 0 - 127

## MFX Type: OD -> DELAY

Offset	Address	Description		
#	00 06	0000 aaaa		
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd	Overdrive Drive	(0 - 127) 0 - 127
#	00 0A	0000 aaaa		
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd	Overdrive Pan	(0 - 127) L64 - 63R
#	00 0E	0000 aaaa		
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd	Tempo Sync	(0 - 1) OFF, ON
#	00 12	0000 aaaa		
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd	Delay Time (msec)	(1 - 2600) 1 - 2600 [msec]
#	00 16	0000 aaaa		
	00 17	0000 bbbb		
	00 18	0000 cccc		
	00 19	0000 dddd	Delay Time (note)	(0 - 21) MUSICAL-NOTES
#	00 1A	0000 aaaa		
	00 1B	0000 bbbb		
	00 1C	0000 cccc		
	00 1D	0000 dddd	Delay Feedback	(0 - 98) -98 - +98 [%]
#	00 1E	0000 aaaa		
	00 1F	0000 bbbb		
	00 20	0000 cccc		
	00 21	0000 dddd	Delay HF Damp	(0 - 17) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, BYPASS[Hz]
#	00 22	0000 aaaa		
	00 23	0000 bbbb		
	00 24	0000 cccc		
	00 25	0000 dddd	Delay Balance	(0 - 100) D100:0W - D0:100W
#	00 26	0000 aaaa		
	00 27	0000 bbbb		
	00 28	0000 cccc		
	00 29	0000 dddd	Level	(0 - 127) 0 - 127

## MFX Type: DS -> DELAY

Offset	Address	Description		
#	00 06	0000 aaaa		
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd	Distortion Drive	(0 - 127) 0 - 127
#	00 0A	0000 aaaa		
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd	Distortion Pan	(0 - 127) L64 - 63R
#	00 0E	0000 aaaa		
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd	Tempo Sync	(0 - 1) OFF, ON
#	00 12	0000 aaaa		
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd	Delay Time (msec)	(1 - 2600) 1 - 2600 [msec]
#	00 16	0000 aaaa		
	00 17	0000 bbbb		
	00 18	0000 cccc		
	00 19	0000 dddd	Delay Time (note)	(0 - 21) MUSICAL-NOTES
#	00 1A	0000 aaaa		
	00 1B	0000 bbbb		
	00 1C	0000 cccc		
	00 1D	0000 dddd	Delay Feedback	(0 - 98) -98 - +98 [%]
#	00 1E	0000 aaaa		
	00 1F	0000 bbbb		
	00 20	0000 cccc		
	00 21	0000 dddd	Delay HF Damp	(0 - 17) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, BYPASS[Hz]
#	00 22	0000 aaaa		
	00 23	0000 bbbb		
	00 24	0000 cccc		
	00 25	0000 dddd	Delay Balance	(0 - 100) D100:0W - D0:100W
#	00 26	0000 aaaa		
	00 27	0000 bbbb		
	00 28	0000 cccc		
	00 29	0000 dddd	Level	(0 - 127) 0 - 127

## MFX Type: CHORUS

Offset	Address	Description		
#	00 06	0000 aaaa		
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd	Filter Type	(0 - 2) OFF, LPF, HPF
#	00 0A	0000 aaaa		
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd	Cutoff Freq	(0 - 16) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000[Hz]
#	00 0E	0000 aaaa		
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd	Pre Delay	(0 - 125) 0.0 - 100 [msec]
#	00 12	0000 aaaa		
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd	Tempo Sync	(0 - 1) OFF, ON
#	00 16	0000 aaaa		
	00 17	0000 bbbb		
	00 18	0000 cccc		
	00 19	0000 dddd	Rate (Hz)	(1 - 200) 0.05 - 10.00 [Hz]
#	00 1A	0000 aaaa		
	00 1B	0000 bbbb		
	00 1C	0000 cccc		
	00 1D	0000 dddd	Rate (note)	(0 - 21) MUSICAL-NOTES
#	00 1E	0000 aaaa		
	00 1F	0000 bbbb		
	00 20	0000 cccc		
	00 21	0000 dddd	Depth	(0 - 127) 0 - 127
#	00 22	0000 aaaa		
	00 23	0000 bbbb		
	00 24	0000 cccc		
	00 25	0000 dddd	Phase	(0 - 90) 0 - 180 [deg]
#	00 26	0000 aaaa		
	00 27	0000 bbbb		
	00 28	0000 cccc		
	00 29	0000 dddd	Low Gain	(0 - 30) -15 - +15 [dB]
#	00 2A	0000 aaaa		

# MIDI Implementation

	00 2B	0000 bbbb		
	00 2C	0000 cccc		
	00 2D	0000 dddd	High Gain	(0 - 30) -15 - +15 [dB]
#	00 2E	0000 aaaa		
	00 2F	0000 bbbb		
	00 30	0000 cccc		
	00 31	0000 dddd	dummy (ignored)	
#	00 32	0000 aaaa		
	00 33	0000 bbbb		
	00 34	0000 cccc	Level	(0 - 127) 0 - 127
	00 35	0000 dddd		

## MFX Type: SPACE-D

Offset	Address	Description		
#	00 06	0000 aaaa		
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd	Pre Delay	(0 - 125) 0.0 - 100 [msec]
#	00 0A	0000 aaaa		
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd	Tempo Sync	(0 - 1) OFF, ON
#	00 0E	0000 aaaa		
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd	Rate (Hz)	(1 - 200) 0.05 - 10.00 [Hz]
#	00 12	0000 aaaa		
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd	Rate (note)	(0 - 21) MUSICAL-NOTES
#	00 16	0000 aaaa		
	00 17	0000 bbbb		
	00 18	0000 cccc		
	00 19	0000 dddd	Depth	(0 - 127) 0 - 127
#	00 1A	0000 aaaa		
	00 1B	0000 bbbb		
	00 1C	0000 cccc		
	00 1D	0000 dddd	Phase	(0 - 90) 0 - 180 [deg]
#	00 1E	0000 aaaa		
	00 1F	0000 bbbb		
	00 20	0000 cccc		
	00 21	0000 dddd	Low Gain	(0 - 30) -15 - +15 [dB]
#	00 22	0000 aaaa		
	00 23	0000 bbbb		
	00 24	0000 cccc		
	00 25	0000 dddd	High Gain	(0 - 30) -15 - +15 [dB]
#	00 26	0000 aaaa		
	00 27	0000 bbbb		
	00 28	0000 cccc		
	00 29	0000 dddd	dummy (ignored)	
#	00 2A	0000 aaaa		
	00 2B	0000 bbbb		
	00 2C	0000 cccc	Level	(0 - 127) 0 - 127
	00 2D	0000 dddd		

## MFX Type: OD -> CHORUS

Offset	Address	Description		
#	00 06	0000 aaaa		
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd	Overdrive Drive	(0 - 127) 0 - 127
#	00 0A	0000 aaaa		
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd	Overdrive Pan	(0 - 127) L64 - 63R
#	00 0E	0000 aaaa		
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd	Chorus Pre Delay	(0 - 125) 0.0 - 100 [msec]
#	00 12	0000 aaaa		
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd	Tempo Sync	(0 - 1) OFF, ON
#	00 16	0000 aaaa		
	00 17	0000 bbbb		
	00 18	0000 cccc		
	00 19	0000 dddd	Rate (Hz)	(1 - 200) 0.05 - 10.00 [Hz]
#	00 1A	0000 aaaa		
	00 1B	0000 bbbb		
	00 1C	0000 cccc		
	00 1D	0000 dddd	Rate (note)	(0 - 21) MUSICAL-NOTES
#	00 1E	0000 aaaa		
	00 1F	0000 bbbb		
	00 20	0000 cccc		
	00 21	0000 dddd	Chorus Depth	(0 - 127) 0 - 127
#	00 22	0000 aaaa		
	00 23	0000 bbbb		
	00 24	0000 cccc		
	00 25	0000 dddd	Chorus Balance	(0 - 100) D100:0W - D0:100W
#	00 26	0000 aaaa		
	00 27	0000 bbbb		
	00 28	0000 cccc		
	00 29	0000 dddd	Level	(0 - 127) 0 - 127

## MFX Type: DS -> CHORUS

Offset	Address	Description		
#	00 06	0000 aaaa		
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd	Distortion Drive	(0 - 127) 0 - 127
#	00 0A	0000 aaaa		
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd	Distortion Pan	(0 - 127) L64 - 63R
#	00 0E	0000 aaaa		
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd	Chorus Pre Delay	(0 - 125) 0.0 - 100 [msec]
#	00 12	0000 aaaa		
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd	Tempo Sync	(0 - 1) OFF, ON
#	00 16	0000 aaaa		
	00 17	0000 bbbb		
	00 18	0000 cccc		
	00 19	0000 dddd	Chorus Rate (Hz)	(1 - 200) 0.05 - 10.00 [Hz]
#	00 1A	0000 aaaa		
	00 1B	0000 bbbb		
	00 1C	0000 cccc		
	00 1D	0000 dddd	Rate (note)	(0 - 21) MUSICAL-NOTES
#	00 1E	0000 aaaa		
	00 1F	0000 bbbb		
	00 20	0000 cccc		
	00 21	0000 dddd	Chorus Depth	(0 - 127) 0 - 127
#	00 22	0000 aaaa		
	00 23	0000 bbbb		
	00 24	0000 cccc		
	00 25	0000 dddd	Chorus Balance	(0 - 100) D100:0W - D0:100W
#	00 26	0000 aaaa		
	00 27	0000 bbbb		
	00 28	0000 cccc		
	00 29	0000 dddd	Level	(0 - 127) 0 - 127

## MFX Type: PHASER A

Offset	Address	Description	
#	00 06	0000 aaaa	Mode (0 - 2) 4-STAGE, 8-STAGE, 12-STAGE
	00 07	0000 bbbb	
	00 08	0000 cccc	
	00 09	0000 dddd	
#	00 0A	0000 aaaa	Manual (0 - 127) 0 - 127
	00 0B	0000 bbbb	
	00 0C	0000 cccc	
	00 0D	0000 dddd	
#	00 0E	0000 aaaa	Tempo Sync (0 - 1) OFF, ON
	00 0F	0000 bbbb	
	00 10	0000 cccc	
	00 11	0000 dddd	
#	00 12	0000 aaaa	Rate (Hz) (1 - 200) 0.05 - 10.00 [Hz]
	00 13	0000 bbbb	
	00 14	0000 cccc	
	00 15	0000 dddd	
#	00 16	0000 aaaa	Rate (note) (0 - 21) MUSICAL-NOTES
	00 17	0000 bbbb	
	00 18	0000 cccc	
	00 19	0000 dddd	
#	00 1A	0000 aaaa	Depth (0 - 127) 0 - 127
	00 1B	0000 bbbb	
	00 1C	0000 cccc	
	00 1D	0000 dddd	
#	00 1E	0000 aaaa	Polarity (0 - 1) INVERSE, SYNCHRO
	00 1F	0000 bbbb	
	00 20	0000 cccc	
	00 21	0000 dddd	
#	00 22	0000 aaaa	Resonance (0 - 127) 0 - 127
	00 23	0000 bbbb	
	00 24	0000 cccc	
	00 25	0000 dddd	
#	00 26	0000 aaaa	Cross Feedback (0 - 98) -98 - +98 [%]
	00 27	0000 bbbb	
	00 28	0000 cccc	
	00 29	0000 dddd	
#	00 2A	0000 aaaa	dummy (ignored)
	00 2B	0000 bbbb	
	00 2C	0000 cccc	
	00 2D	0000 dddd	
#	00 2E	0000 aaaa	Low Gain (0 - 30) -15 - +15 [dB]
	00 2F	0000 bbbb	
	00 30	0000 cccc	
	00 31	0000 dddd	
#	00 32	0000 aaaa	High Gain (0 - 30) -15 - +15 [dB]
	00 33	0000 bbbb	
	00 34	0000 cccc	
	00 35	0000 dddd	
#	00 36	0000 aaaa	Level (0 - 127) 0 - 127
	00 37	0000 bbbb	
	00 38	0000 cccc	
	00 39	0000 dddd	

## MFX Type: PHASER B

Offset	Address	Description	
#	00 06	0000 aaaa	Speed (0 - 100) 0 - 100
	00 07	0000 bbbb	
	00 08	0000 cccc	
	00 09	0000 dddd	
#	00 0A	0000 aaaa	Depth (0 - 127) 0 - 127
	00 0B	0000 bbbb	
	00 0C	0000 cccc	
	00 0D	0000 dddd	
#	00 0E	0000 aaaa	Low Gain (0 - 30) -15 - +15 [dB]
	00 0F	0000 bbbb	
	00 10	0000 cccc	
	00 11	0000 dddd	
#	00 12	0000 aaaa	High Gain (0 - 30) -15 - +15 [dB]
	00 13	0000 bbbb	
	00 14	0000 cccc	
	00 15	0000 dddd	
#	00 16	0000 aaaa	Level (0 - 127) 0 - 127
	00 17	0000 bbbb	
	00 18	0000 cccc	
	00 19	0000 dddd	

## MFX Type: STEP PHASER

Offset	Address	Description	
#	00 06	0000 aaaa	Mode (0 - 2) 4-STAGE, 8-STAGE, 12-STAGE
	00 07	0000 bbbb	
	00 08	0000 cccc	
	00 09	0000 dddd	
#	00 0A	0000 aaaa	Manual (0 - 127) 0 - 127
	00 0B	0000 bbbb	
	00 0C	0000 cccc	
	00 0D	0000 dddd	
#	00 0E	0000 aaaa	Tempo Sync(Rate) (0 - 1) OFF, ON
	00 0F	0000 bbbb	
	00 10	0000 cccc	
	00 11	0000 dddd	
#	00 12	0000 aaaa	Rate (Hz) (1 - 200) 0.05 - 10.00 [Hz]
	00 13	0000 bbbb	
	00 14	0000 cccc	
	00 15	0000 dddd	
#	00 16	0000 aaaa	Rate (note) (0 - 21) MUSICAL-NOTES
	00 17	0000 bbbb	
	00 18	0000 cccc	
	00 19	0000 dddd	
#	00 1A	0000 aaaa	Depth (0 - 127) 0 - 127
	00 1B	0000 bbbb	
	00 1C	0000 cccc	
	00 1D	0000 dddd	
#	00 1E	0000 aaaa	Polarity (0 - 1) INVERSE, SYNCHRO
	00 1F	0000 bbbb	
	00 20	0000 cccc	
	00 21	0000 dddd	
#	00 22	0000 aaaa	Resonance (0 - 127) 0 - 127
	00 23	0000 bbbb	
	00 24	0000 cccc	
	00 25	0000 dddd	
#	00 26	0000 aaaa	Cross Feedback (0 - 98) -98 - +98 [%]
	00 27	0000 bbbb	
	00 28	0000 cccc	
	00 29	0000 dddd	
#	00 2A	0000 aaaa	Tempo Sync(Step Rate) (0 - 1) OFF, ON
	00 2B	0000 bbbb	
	00 2C	0000 cccc	
	00 2D	0000 dddd	
#	00 2E	0000 aaaa	Step Rate (Hz) (1 - 200) 0.10 - 20.00 [Hz]
	00 2F	0000 bbbb	
	00 30	0000 cccc	
	00 31	0000 dddd	
#	00 32	0000 aaaa	Step Rate (note) (0 - 21) MUSICAL-NOTES
	00 33	0000 bbbb	
	00 34	0000 cccc	
	00 35	0000 dddd	
#	00 36	0000 aaaa	dummy (ignored)
	00 37	0000 bbbb	
	00 38	0000 cccc	
	00 39	0000 dddd	
#	00 3A	0000 aaaa	Low Gain (0 - 30) -15 - +15 [dB]
	00 3B	0000 bbbb	
	00 3C	0000 cccc	
	00 3D	0000 dddd	
#	00 3E	0000 aaaa	High Gain (0 - 30) -15 - +15 [dB]
	00 3F	0000 bbbb	
	00 40	0000 cccc	
	00 41	0000 dddd	
#	00 42	0000 aaaa	Level (0 - 127) 0 - 127
	00 43	0000 bbbb	
	00 44	0000 cccc	
	00 45	0000 dddd	

# MIDI Implementation

## MFX Type: FLANGER

Offset	Address	Description	
#	00 06 00 07 00 08 00 09	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Filter Type (0 - 2) OFF, LPF, HPF
#	00 0A 00 0B 00 0C 00 0D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Cutoff Freq (0 - 16) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000[Hz]
#	00 0E 00 0F 00 10 00 11	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Pre Delay (0 - 125) 0.0 - 100 [msec]
#	00 12 00 13 00 14 00 15	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Tempo Sync (0 - 1) OFF, ON
#	00 16 00 17 00 18 00 19	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Rate (Hz) (1 - 200) 0.05 - 10.00 [Hz]
#	00 1A 00 1B 00 1C 00 1D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Rate (note) (0 - 21) MUSICAL-NOTES
#	00 1E 00 1F 00 20 00 21	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Depth (0 - 127) 0 - 127
#	00 22 00 23 00 24 00 25	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Phase (0 - 90) 0 - 180 [deg]
#	00 26 00 27 00 28 00 29	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Feedback (0 - 98) -98 - +98 [%]
#	00 2A 00 2B 00 2C 00 2D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Low Gain (0 - 30) -15 - +15 [dB]
#	00 2E 00 2F 00 30 00 31	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	High Gain (0 - 30) -15 - +15 [dB]
#	00 32 00 33 00 34 00 35	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	dummy (ignored)
#	00 36 00 37 00 38 00 39	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Level (0 - 127) 0 - 127

## MFX Type: REVERB

Offset	Address	Description	
#	00 06 00 07 00 08 00 09	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Type (0 - 5) ROOM1, ROOM2, STAGE1, STAGE2, HALL1, HALL2
#	00 0A 00 0B 00 0C 00 0D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Pre Delay (0 - 125) 0.0 - 100 [msec]
#	00 0E 00 0F 00 10 00 11	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Time (0 - 127) 0 - 127
#	00 12 00 13 00 14 00 15	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	HF Damp (0 - 17) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, BYPASS[Hz]
#	00 16 00 17 00 18 00 19	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Low Gain (0 - 30) -15 - +15 [dB]

#	00 1A 00 1B 00 1C 00 1D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	High Gain (0 - 30) -15 - +15 [dB]
#	00 1E 00 1F 00 20 00 21	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	dummy (ignored)
#	00 22 00 23 00 24 00 25	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Level (0 - 127) 0 - 127

## MFX Type: LONG REVERB

Offset	Address	Description	
#	00 06 00 07 00 08 00 09	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Depth (0 - 127) 0 - 127
#	00 0A 00 0B 00 0C 00 0D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Time (0 - 127) 0 - 127
#	00 0E 00 0F 00 10 00 11	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Pre LPF (1 - 32) 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000, 12500, 15000, BYPASS[Hz]
#	00 12 00 13 00 14 00 15	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Pre HPF (0 - 31) BYPASS, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000, 12500, 15000[Hz]
#	00 16 00 17 00 18 00 19	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Peaking Freq (0 - 16) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000[Hz]
#	00 1A 00 1B 00 1C 00 1D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Peaking Gain (0 - 30) -15 - +15 [dB]
#	00 1E 00 1F 00 20 00 21	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Peaking Q (0 - 4) 0.5, 1.0, 2.0, 4.0, 8.0
#	00 22 00 23 00 24 00 25	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	HF Damp (1 - 32) 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000, 12500, 15000, BYPASS[Hz]
#	00 26 00 27 00 28 00 29	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	LF Damp (0 - 31) BYPASS, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000, 12500, 15000[Hz]
#	00 2A 00 2B 00 2C 00 2D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Character (0 - 5) 1 - 6
#	00 2E 00 2F 00 30 00 31	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	EQ Low Freq (0 - 1) 200, 400[Hz]
#	00 32 00 33 00 34 00 35	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	EQ Low Gain (0 - 30) -15 - +15 [dB]
#	00 36 00 37 00 38 00 39	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	EQ High Freq (0 - 2) 2000, 4000, 8000[Hz]

#	00 3A	0000 aaaa	EQ High Gain	(0 - 30) -15 - +15 [dB]
	00 3B	0000 bbbb		
	00 3C	0000 cccc		
	00 3D	0000 dddd		
#	00 3E	0000 aaaa	Level	(0 - 127) 0 - 127
	00 3F	0000 bbbb		
	00 40	0000 cccc		
	00 41	0000 dddd		

## MFX Type: SUPER FILTER

Offset	Address	Description		
#	00 06	0000 aaaa	Filter Type	(0 - 3) LPF, BPF, HPF, NOTCH
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd		
#	00 0A	0000 aaaa	Filter Slope	(0 - 2) -12, -24, -36[dB]
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd		
#	00 0E	0000 aaaa	Filter Cutoff	(0 - 127) 0 - 127
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd		
#	00 12	0000 aaaa	Filter Resonance	(0 - 127) 0 - 127
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd		
#	00 16	0000 aaaa	Filter Gain	(0 - 12) 0 - +12[dB]
	00 17	0000 bbbb		
	00 18	0000 cccc		
	00 19	0000 dddd		
#	00 1A	0000 aaaa	Modulation Sw	(0 - 1) OFF, ON
	00 1B	0000 bbbb		
	00 1C	0000 cccc		
	00 1D	0000 dddd		
#	00 1E	0000 aaaa	Modulation Wave	(0 - 4) TRI, SQR, SIN, SAW1, SAW2
	00 1F	0000 bbbb		
	00 20	0000 cccc		
	00 21	0000 dddd		
#	00 22	0000 aaaa	Tempo Sync	(0 - 1) OFF, ON
	00 23	0000 bbbb		
	00 24	0000 cccc		
	00 25	0000 dddd		
#	00 26	0000 aaaa	Rate (Hz)	(1 - 200) 0.05 - 10.00 [Hz]
	00 27	0000 bbbb		
	00 28	0000 cccc		
	00 29	0000 dddd		
#	00 2A	0000 aaaa	Rate (note)	(0 - 21) MUSICAL-NOTES
	00 2B	0000 bbbb		
	00 2C	0000 cccc		
	00 2D	0000 dddd		
#	00 2E	0000 aaaa	Depth	(0 - 127) 0 - 127
	00 2F	0000 bbbb		
	00 30	0000 cccc		
	00 31	0000 dddd		
#	00 32	0000 aaaa	Attack	(0 - 127) 0 - 127
	00 33	0000 bbbb		
	00 34	0000 cccc		
	00 35	0000 dddd		
#	00 36	0000 aaaa	Level	(0 - 127) 0 - 127
	00 37	0000 bbbb		
	00 38	0000 cccc		
	00 39	0000 dddd		

## MFX Type: FILTER+DRIVE

Offset	Address	Description		
#	00 06	0000 aaaa	Cutoff	(0 - 127) 0 - 127
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd		
#	00 0A	0000 aaaa	Resonance	(0 - 127) 0 - 127
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd		
#	00 0E	0000 aaaa	Drive	(0 - 127) 0 - 127
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd		
#	00 12	0000 aaaa	Level	(0 - 127) 0 - 127
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd		

## MFX Type: AUTO WAH

Offset	Address	Description		
#	00 06	0000 aaaa	Filter Type	(0 - 1) LPF, BPF
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd		
#	00 0A	0000 aaaa	Manual	(0 - 127) 0 - 127
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd		
#	00 0E	0000 aaaa	Peak	(0 - 127) 0 - 127
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd		
#	00 12	0000 aaaa	Sens	(0 - 127) 0 - 127
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd		
#	00 16	0000 aaaa	Polarity	(0 - 1) UP, DOWN
	00 17	0000 bbbb		
	00 18	0000 cccc		
	00 19	0000 dddd		
#	00 1A	0000 aaaa	Tempo Sync	(0 - 1) OFF, ON
	00 1B	0000 bbbb		
	00 1C	0000 cccc		
	00 1D	0000 dddd		
#	00 1E	0000 aaaa	Rate (Hz)	(1 - 200) 0.05 - 10.00 [Hz]
	00 1F	0000 bbbb		
	00 20	0000 cccc		
	00 21	0000 dddd		
#	00 22	0000 aaaa	Rate (note)	(0 - 21) MUSICAL-NOTES
	00 23	0000 bbbb		
	00 24	0000 cccc		
	00 25	0000 dddd		
#	00 26	0000 aaaa	Depth	(0 - 127) 0 - 127
	00 27	0000 bbbb		
	00 28	0000 cccc		
	00 29	0000 dddd		
#	00 2A	0000 aaaa	Phase	(0 - 90) 0 - 180 [deg]
	00 2B	0000 bbbb		
	00 2C	0000 cccc		
	00 2D	0000 dddd		
#	00 2E	0000 aaaa	Low Gain	(0 - 30) -15 - +15 [dB]
	00 2F	0000 bbbb		
	00 30	0000 cccc		
	00 31	0000 dddd		
#	00 32	0000 aaaa	High Gain	(0 - 30) -15 - +15 [dB]
	00 33	0000 bbbb		
	00 34	0000 cccc		
	00 35	0000 dddd		
#	00 36	0000 aaaa	Level	(0 - 127) 0 - 127
	00 37	0000 bbbb		
	00 38	0000 cccc		
	00 39	0000 dddd		

# MIDI Implementation

## MFX Type: OD/DS -> TWAH

Offset	Address	Description	
#	00 06 00 07 00 08 00 09	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Drive Switch (0 - 1) OFF, ON
#	00 0A 00 0B 00 0C 00 0D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Drive Type (0 - 1) OVERDRIVE, DISTORTION
#	00 0E 00 0F 00 10 00 11	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Drive (0 - 127) 0 - 127
#	00 12 00 13 00 14 00 15	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Tone (0 - 127) 0 - 127
#	00 16 00 17 00 18 00 19	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Amp Switch (0 - 1) OFF, ON
#	00 1A 00 1B 00 1C 00 1D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Amp Type (0 - 3) SMALL, BUILT-IN, 2-STACK, 3-STACK
#	00 1E 00 1F 00 20 00 21	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Touch Wah Switch (0 - 1) OFF, ON
#	00 22 00 23 00 24 00 25	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Touch Wah Mode (0 - 1) LPF, BPF
#	00 26 00 27 00 28 00 29	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Touch Wah Polarity (0 - 1) DOWN, UP
#	00 2A 00 2B 00 2C 00 2D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Touch Wah Sens (0 - 127) 0 - 127
#	00 2E 00 2F 00 30 00 31	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Touch Wah Manual (0 - 127) 0 - 127
#	00 32 00 33 00 34 00 35	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Touch Wah Peak (0 - 127) 0 - 127
#	00 36 00 37 00 38 00 39	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Touch Wah Balance (0 - 100) D100:0W - D0:100W
#	00 3A 00 3B 00 3C 00 3D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Low Gain (0 - 30) -15 - +15 [dB]
#	00 3E 00 3F 00 40 00 41	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	High Gain (0 - 30) -15 - +15 [dB]
#	00 42 00 43 00 44 00 45	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Level (0 - 127) 0 - 127

## MFX Type: LOFI COMPRESS

Offset	Address	Description	
#	00 06 00 07 00 08 00 09	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Pre Filter Type (0 - 5) 1, 2, 3, 4, 5, 6
#	00 0A 00 0B 00 0C 00 0D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	LoFi Type (0 - 8) 1, 2, 3, 4, 5, 6, 7, 8, 9
#	00 0E 00 0F 00 10 00 11	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Post Filter Type (0 - 2) OFF, LPF, HPF
#	00 12 00 13 00 14 00 15	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Post Filter Cutoff (0 - 16) 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000[Hz]
#	00 16 00 17 00 18 00 19	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Low Gain (0 - 30) -15 - +15 [dB]
#	00 1A 00 1B 00 1C 00 1D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	High Gain (0 - 30) -15 - +15 [dB]
#	00 1E 00 1F 00 20 00 21	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	dummy (ignored)
#	00 22 00 23 00 24 00 25	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Level (0 - 127) 0 - 127

## MFX Type : DISTORTION

Offset	Address	Description	
#	00 06 00 07 00 08 00 09	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Drive (0 - 127) 0 - 127
#	00 0A 00 0B 00 0C 00 0D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Tone (0 - 127) 0 - 127
#	00 0E 00 0F 00 10 00 11	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Amp Sw (0 - 1) OFF, ON
#	00 12 00 13 00 14 00 15	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Amp Type (0 - 3) SMALL, BUILT-IN, 2-STACK, 3-STACK
#	00 16 00 17 00 18 00 19	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Low Gain (0 - 30) -15 - +15 [dB]
#	00 1A 00 1B 00 1C 00 1D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	High Gain (0 - 30) -15 - +15 [dB]
#	00 1E 00 1F 00 20 00 21	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Pan (0 - 127) L64 - 63R
#	00 22 00 23 00 24 00 25	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	Level (0 - 127) 0 - 127

## MFX Type: OVERDRIVE

Offset	Address	Description	
#	00 06	0000 aaaa	Drive (0 - 127)
	00 07	0000 bbbb	
	00 08	0000 cccc	
	00 09	0000 dddd	
#	00 0A	0000 aaaa	Tone (0 - 127)
	00 0B	0000 bbbb	
	00 0C	0000 cccc	
	00 0D	0000 dddd	
#	00 0E	0000 aaaa	Amp Sw (0 - 1)
	00 0F	0000 bbbb	
	00 10	0000 cccc	
	00 11	0000 dddd	
#	00 12	0000 aaaa	Amp Type (0 - 3)
	00 13	0000 bbbb	
	00 14	0000 cccc	
	00 15	0000 dddd	
#	00 16	0000 aaaa	Low Gain (0 - 30)
	00 17	0000 bbbb	
	00 18	0000 cccc	
	00 19	0000 dddd	
#	00 1A	0000 aaaa	High Gain (0 - 30)
	00 1B	0000 bbbb	
	00 1C	0000 cccc	
	00 1D	0000 dddd	
#	00 1E	0000 aaaa	Pan (0 - 127)
	00 1F	0000 bbbb	
	00 20	0000 cccc	
	00 21	0000 dddd	
#	00 22	0000 aaaa	Level (0 - 127)
	00 23	0000 bbbb	
	00 24	0000 cccc	
	00 25	0000 dddd	

## MFX Type: SATURATOR

Offset	Address	Description	
#	00 06	0000 aaaa	Saturator Gain (0 - 127)
	00 07	0000 bbbb	
	00 08	0000 cccc	
	00 09	0000 dddd	
#	00 0A	0000 aaaa	Saturator Drive (0 - 127)
	00 0B	0000 bbbb	
	00 0C	0000 cccc	
	00 0D	0000 dddd	
#	00 0E	0000 aaaa	Saturator Level (0 - 127)
	00 0F	0000 bbbb	
	00 10	0000 cccc	
	00 11	0000 dddd	
#	00 12	0000 aaaa	Comp Depth (0 - 127)
	00 13	0000 bbbb	
	00 14	0000 cccc	
	00 15	0000 dddd	
#	00 16	0000 aaaa	Comp Level (0 - 127)
	00 17	0000 bbbb	
	00 18	0000 cccc	
	00 19	0000 dddd	
#	00 1A	0000 aaaa	Hi Gain (3 - 21)
	00 1B	0000 bbbb	
	00 1C	0000 cccc	
	00 1D	0000 dddd	
#	00 1E	0000 aaaa	Level (0 - 127)
	00 1F	0000 bbbb	
	00 20	0000 cccc	
	00 21	0000 dddd	

## MFX Type: T-SCREAM

Offset	Address	Description	
#	00 06	0000 aaaa	Distortion (0 - 127)
	00 07	0000 bbbb	
	00 08	0000 cccc	
	00 09	0000 dddd	
#	00 0A	0000 aaaa	Tone (0 - 127)
	00 0B	0000 bbbb	
	00 0C	0000 cccc	
	00 0D	0000 dddd	
#	00 0E	0000 aaaa	Level (0 - 127)
	00 0F	0000 bbbb	
	00 10	0000 cccc	
	00 11	0000 dddd	

## MFX Type: BIT CRUSHER

Offset	Address	Description	
#	00 06	0000 aaaa	Sample Rate (0 - 127)
	00 07	0000 bbbb	
	00 08	0000 cccc	
	00 09	0000 dddd	
#	00 0A	0000 aaaa	Bit Down (0 - 18)
	00 0B	0000 bbbb	
	00 0C	0000 cccc	
	00 0D	0000 dddd	
#	00 0E	0000 aaaa	Filter (0 - 127)
	00 0F	0000 bbbb	
	00 10	0000 cccc	
	00 11	0000 dddd	
#	00 12	0000 aaaa	Low Gain (0 - 30)
	00 13	0000 bbbb	
	00 14	0000 cccc	
	00 15	0000 dddd	
#	00 16	0000 aaaa	High Gain (0 - 30)
	00 17	0000 bbbb	
	00 18	0000 cccc	
	00 19	0000 dddd	
#	00 1A	0000 aaaa	Level (0 - 127)
	00 1B	0000 bbbb	
	00 1C	0000 cccc	
	00 1D	0000 dddd	

## MFX Type: ISOLATOR

Offset	Address	Description	
#	00 06	0000 aaaa	Boost/Cut Low (0 - 64)
	00 07	0000 bbbb	
	00 08	0000 cccc	
	00 09	0000 dddd	
#	00 0A	0000 aaaa	Boost/Cut Mid (0 - 64)
	00 0B	0000 bbbb	
	00 0C	0000 cccc	
	00 0D	0000 dddd	
#	00 0E	0000 aaaa	Boost/Cut High (0 - 64)
	00 0F	0000 bbbb	
	00 10	0000 cccc	
	00 11	0000 dddd	
#	00 12	0000 aaaa	Anti Phase Low Sw (0 - 1)
	00 13	0000 bbbb	
	00 14	0000 cccc	
	00 15	0000 dddd	
#	00 16	0000 aaaa	Anti Phase Low Level (0 - 127)
	00 17	0000 bbbb	
	00 18	0000 cccc	
	00 19	0000 dddd	
#	00 1A	0000 aaaa	Anti Phase Mid Sw (0 - 1)
	00 1B	0000 bbbb	
	00 1C	0000 cccc	
	00 1D	0000 dddd	
#	00 1E	0000 aaaa	Anti Phase Mid Level (0 - 127)
	00 1F	0000 bbbb	
	00 20	0000 cccc	
	00 21	0000 dddd	
#	00 22	0000 aaaa	Low Boost Sw (0 - 1)
	00 23	0000 bbbb	
	00 24	0000 cccc	
	00 25	0000 dddd	

# MIDI Implementation

#	00 26	0000 aaaa		
	00 27	0000 bbbb		
	00 28	0000 cccc		
	00 29	0000 dddd	Low Boost Level	(0 - 127) 0 - 127
#	00 2A	0000 aaaa		
	00 2B	0000 bbbb		
	00 2C	0000 cccc		
	00 2D	0000 dddd	Level	(0 - 127) 0 - 127

## MFX Type: RING MODULATOR

Offset	Address	Description		
#	00 06	0000 aaaa		
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd	Frequency	(0 - 127) 0 - 127
#	00 0A	0000 aaaa		
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd	Sens	(0 - 127) 0 - 127
#	00 0E	0000 aaaa		
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd	Polarity	(0 - 1) UP, DOWN
#	00 12	0000 aaaa		
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd	Low Gain	(0 - 30) -15 - +15 [dB]
#	00 16	0000 aaaa		
	00 17	0000 bbbb		
	00 18	0000 cccc		
	00 19	0000 dddd	High Gain	(0 - 30) -15 - +15 [dB]
#	00 1A	0000 aaaa		
	00 1B	0000 bbbb		
	00 1C	0000 cccc		
	00 1D	0000 dddd	dummy (ignored)	
#	00 1E	0000 aaaa		
	00 1F	0000 bbbb		
	00 20	0000 cccc		
	00 21	0000 dddd	Level	(0 - 127) 0 - 127

## MFX Type: AUTO PAN

Offset	Address	Description		
#	00 06	0000 aaaa		
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd	Mod Wave	(0 - 5) TRI, SQR, SIN, SAW1, SAW2, TRP
#	00 0A	0000 aaaa		
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd	Tempo Sync	(0 - 1) OFF, ON
#	00 0E	0000 aaaa		
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd	Rate (Hz)	(1 - 200) 0.05 - 10.00 [Hz]
#	00 12	0000 aaaa		
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd	Rate (note)	(0 - 21) MUSICAL-NOTES
#	00 16	0000 aaaa		
	00 17	0000 bbbb		
	00 18	0000 cccc		
	00 19	0000 dddd	Depth	(0 - 127) 0 - 127
#	00 1A	0000 aaaa		
	00 1B	0000 bbbb		
	00 1C	0000 cccc		
	00 1D	0000 dddd	Low Gain	(0 - 30) -15 - +15 [dB]
#	00 1E	0000 aaaa		
	00 1F	0000 bbbb		
	00 20	0000 cccc		
	00 21	0000 dddd	High Gain	(0 - 30) -15 - +15 [dB]
#	00 22	0000 aaaa		
	00 23	0000 bbbb		
	00 24	0000 cccc		
	00 25	0000 dddd	Level	(0 - 127) 0 - 127

## MFX Type: PITCH SHIFTER

Offset	Address	Description		
#	00 06	0000 aaaa		
	00 07	0000 bbbb		
	00 08	0000 cccc		
	00 09	0000 dddd	Coarse	(0 - 36) -24 - +12 [semi]
#	00 0A	0000 aaaa		
	00 0B	0000 bbbb		
	00 0C	0000 cccc		
	00 0D	0000 dddd	Fine	(0 - 100) -100 - +100 [cent]
#	00 0E	0000 aaaa		
	00 0F	0000 bbbb		
	00 10	0000 cccc		
	00 11	0000 dddd	Tempo Sync	(0 - 1) OFF, ON
#	00 12	0000 aaaa		
	00 13	0000 bbbb		
	00 14	0000 cccc		
	00 15	0000 dddd	Delay Time (msec)	(1 - 1300) 1 - 1300 [msec]
#	00 16	0000 aaaa		
	00 17	0000 bbbb		
	00 18	0000 cccc		
	00 19	0000 dddd	Delay Time (note)	(0 - 21) MUSICAL-NOTES
#	00 1A	0000 aaaa		
	00 1B	0000 bbbb		
	00 1C	0000 cccc		
	00 1D	0000 dddd	Feedback	(0 - 98) -98 - +98 [%]
#	00 1E	0000 aaaa		
	00 1F	0000 bbbb		
	00 20	0000 cccc		
	00 21	0000 dddd	Low Gain	(0 - 30) -15 - +15 [dB]
#	00 22	0000 aaaa		
	00 23	0000 bbbb		
	00 24	0000 cccc		
	00 25	0000 dddd	High Gain	(0 - 30) -15 - +15 [dB]
#	00 26	0000 aaaa		
	00 27	0000 bbbb		
	00 28	0000 cccc		
	00 29	0000 dddd	dummy (ignored)	
#	00 2A	0000 aaaa		
	00 2B	0000 bbbb		
	00 2C	0000 cccc		
	00 2D	0000 dddd	Level	(0 - 127) 0 - 127



## \* [KitPadVEdit]

Offset	Address	Description
	00 00	0000 0000 (reserve)
#	00 01	0000 aaaa
	00 02	0000 bbbb V-Edit Parameter 1 (*3)
#	00 03	0000 aaaa
	00 04	0000 bbbb V-Edit Parameter 2 (*3)
#	00 05	0000 aaaa
	00 06	0000 bbbb V-Edit Parameter 3 (*3)
#	00 07	0000 aaaa
	00 08	0000 bbbb V-Edit Parameter 4 (*3)
#	00 09	0000 aaaa
	00 0A	0000 bbbb V-Edit Parameter 5 (*3)
#	00 0B	0000 aaaa
	00 0C	0000 bbbb V-Edit Parameter 6 (*3)
#	00 0D	0000 aaaa
	00 0E	0000 bbbb V-Edit Parameter 7 (*3)
#	00 0F	0000 aaaa
	00 10	0000 bbbb V-Edit Parameter 8 (*3)
#	00 11	0000 aaaa
	00 12	0000 bbbb V-Edit Parameter 9 (*3)
#	00 13	0000 aaaa
	00 14	0000 bbbb V-Edit Parameter 10 (*3)
#	00 15	0000 aaaa
	00 16	0000 bbbb V-Edit Parameter 11 (*3)
#	00 17	0000 aaaa
	00 18	0000 bbbb V-Edit Parameter 12 (*3)
#	00 19	0000 aaaa
	00 1A	0000 bbbb V-Edit Parameter 13 (*3)
#	00 1B	0000 aaaa
	00 1C	0000 bbbb V-Edit Parameter 14 (*3)
#	00 1D	0000 aaaa
	00 1E	0000 bbbb V-Edit Parameter 15 (*3)
#	00 1F	0000 aaaa
	00 20	0000 bbbb V-Edit Parameter 16 (*3)
00 00 00 21   Total Size		

(\*3) This area is assigned as follows according to the instrument that is assigned. Addresses for which the instrument has no assignment are ignored.

## INSTRUMENT GROUP: KICK A

Offset	Address	Description
	00 00	0000 0000 (reserve)
#	00 01	0000 aaaa
	00 02	0000 bbbb Shell Depth (0 - 58) 1.0 - 30.0
#	00 03	0000 aaaa
	00 04	0000 bbbb Head Type (0 - 2) CLEAR, COATED, PINSTRIPE
#	00 05	0000 aaaa
	00 06	0000 bbbb Tuning (-100 - 100) -100 - 100
#	00 07	0000 aaaa
	00 08	0000 bbbb Muffling (0 - 9) OFF, TAPE1, TAPE2, TAPE3, TAPE4, BLANKET1, BLANKET2, BLANKET3, WEIGHT1, WEIGHT2
#	00 09	0000 aaaa
	00 0A	0000 bbbb Beater Type (0 - 4) FELT1, FELT2, WOOD, PLASTIC2, PLASTIC2
#	00 0B	0000 aaaa
	00 0C	0000 bbbb Snare Buzz (0 - 8) OFF, 1 - 8
#	00 0D	0000 aaaa
	00 0E	0000 bbbb Low Level (0 - 10) -5 - -1, NORMAL, +1 - +5
#	00 0F	0000 aaaa
	00 10	0000 bbbb Low Decay (0 - 4) -2, -1, NORMAL, +1, +2
#	00 11	0000 aaaa
	00 12	0000 bbbb Kit Resonance (0 - 8) OFF, 1 - 8
00 00 00 21   Total Size		

\* PINSTRIPE is registered trademark of REMO Inc. U.S.A.

## INSTRUMENT GROUP: SNARE A

Offset	Address	Description
	00 00	0000 0000 (reserve)
#	00 01	0000 aaaa
	00 02	0000 bbbb Shell Depth (0 - 58) 1.0 - 30.0
#	00 03	0000 aaaa
	00 04	0000 bbbb Head Type (0 - 2) CLEAR, COATED, PINSTRIPE
#	00 05	0000 aaaa
	00 06	0000 bbbb Tuning (-100 - 100) -100 - 100
#	00 07	0000 aaaa
	00 08	0000 bbbb Muffling (0 - 9) OFF, TAPE1, TAPE2, TAPE3, TAPE4, TAPES, TAPE6, TAPE7, DONUT1, DONUT2
#	00 09	0000 aaaa
	00 0A	0000 bbbb Overtone (-5 - 5) -5 - +5
#	00 0B	0000 aaaa
	00 0C	0000 bbbb Strainer Adjust (0 - 8) LOOSE1 - 3, MEDIUM1 - 3, TIGHT1 - 3
#	00 0D	0000 aaaa
	00 0E	0000 bbbb Wire Type (0 - 2) TYPE1 - 3
#	00 0F	0000 aaaa
	00 10	0000 bbbb Wire Level (1 - 10) -4 - -1, NORMAL, +1 - +5
00 00 00 21   Total Size		

## INSTRUMENT GROUP: CROSS STICK

Offset	Address	Description
	00 00	0000 0000 (reserve)
#	00 01	0000 aaaa
	00 02	0000 bbbb dummy (ignored)
#	00 03	0000 aaaa
	00 04	0000 bbbb dummy (ignored)
#	00 05	0000 aaaa
	00 06	0000 bbbb Tuning (-100 - 100) -100 - 100
#	00 07	0000 aaaa
	00 08	0000 bbbb Muffling (0 - 9) OFF, TAPE1, TAPE2, TAPE3, TAPE4, TAPES, TAPE6, TAPE7, DONUT1, DONUT2
#	00 09	0000 aaaa
	00 0A	0000 bbbb dummy (ignored)
#	00 0B	0000 aaaa
	00 0C	0000 bbbb Strainer Adjust (0 - 8) LOOSE1 - 3, MEDIUM1 - 3, TIGHT1 - 3
#	00 0D	0000 aaaa
	00 0E	0000 bbbb Wire Type (0 - 2) TYPE1 - 3
#	00 0F	0000 aaaa
	00 10	0000 bbbb Wire Level (1 - 10) -4 - -1, NORMAL, +1 - +5
00 00 00 21   Total Size		

## INSTRUMENT GROUP: TOM A

Offset	Address	Description
	00 00	0000 0000 (reserve)
#	00 01	0000 aaaa
	00 02	0000 bbbb Shell Depth (0 - 58) 1.0 - 30.0
#	00 03	0000 aaaa
	00 04	0000 bbbb Head Type (0 - 2) CLEAR, COATED, PINSTRIPE
#	00 05	0000 aaaa
	00 06	0000 bbbb Tuning (-100 - 100) -100 - 100
#	00 07	0000 aaaa
	00 08	0000 bbbb Muffling (0 - 9) OFF, TAPE1, TAPE2, TAPE3, TAPE4, TAPES, FELT1, FELT2, FELT3, FELT4
#	00 09	0000 aaaa
	00 0A	0000 bbbb Snare Buzz (0 - 8) OFF, 1 - 8
00 00 00 21   Total Size		

# MIDI Implementation

## INSTRUMENT GROUP: HI-HAT

Offset	Address	Description	
#	00 00	0000 0000	(reserve)
	00 01	0000 aaaa	
	00 02	0000 bbbb	Size (0 - 78) 1.0 - 40.0
#	00 03	0000 aaaa	
	00 04	0000 bbbb	Fixed (0 - 4) NORMAL, PRESS, CLOSE, HALF, OPEN
#	00 05	0000 aaaa	
	00 06	0000 bbbb	Thickness (-5 - 5) THIN-5 - -1, STANDARD, THICK+1 - +5
	00 00 00 21	Total Size	

## INSTRUMENT GROUP: CRASH, CHINA, SPLASH, STACKED CYMBAL

Offset	Address	Description	
#	00 00	0000 0000	(reserve)
	00 01	0000 aaaa	
	00 02	0000 bbbb	Size (0 - 78) 1.0 - 40.0
#	00 03	0000 aaaa	
	00 04	0000 bbbb	Thickness (-5 - 5) THIN-5 - -1, STANDARD, THICK+1 - +5
#	00 05	0000 aaaa	
	00 06	0000 bbbb	Muffling (0 - 19) OFF, TAPE1 - 19
#	00 07	0000 aaaa	
	00 08	0000 bbbb	Sizzle Type (0 - 3) OFF, RIVET, CHAIN, BEADS
#	00 09	0000 aaaa	
	00 0A	0000 bbbb	Sizzle Amount (-3 - +3) -3 - +3
	00 00 00 21	Total Size	

## INSTRUMENT GROUP: RIDE

Offset	Address	Description	
#	00 00	0000 0000	(reserve)
	00 01	0000 aaaa	
	00 02	0000 bbbb	Size (0 - 78) 1.0 - 40.0
#	00 03	0000 aaaa	
	00 04	0000 bbbb	Thickness (-5 - 5) THIN-5 - -1, STANDARD, THICK+1 - +5
#	00 05	0000 aaaa	
	00 06	0000 bbbb	Muffling (0 - 19) OFF, TAPE1 - 19
#	00 07	0000 aaaa	
	00 08	0000 bbbb	Sizzle Type (0 - 3) OFF, RIVET, CHAIN, BEADS
#	00 09	0000 aaaa	
	00 0A	0000 bbbb	Sizzle Amount (-3 - +3) -3 - +3
#	00 0B	0000 aaaa	
	00 0C	0000 bbbb	Ping Color (*4) (0 - 4) LIGHT2, LIGHT1, STANDARD, HEAVY1, HEAVY2
#	00 0D	0000 aaaa	
	00 0E	0000 bbbb	Ping Level (*4) (1 - 10) -4 - -1, NORMAL, +1 - +5
	00 00 00 21	Total Size	

(\*4) This area is not valid for the RIDE edge sound instrument.

## INSTRUMENT GROUP: Others

Offset	Address	Description	
#	00 00	0000 0000	(reserve)
	00 01	0000 aaaa	
	00 02	0000 bbbb	dummy (ignored)
#	00 03	0000 aaaa	
	00 04	0000 bbbb	dummy (ignored)
#	00 05	0000 aaaa	
	00 06	0000 bbbb	dummy (ignored)
#	00 07	0000 aaaa	
	00 08	0000 bbbb	dummy (ignored)
#	00 09	0000 aaaa	
	00 0A	0000 bbbb	dummy (ignored)
#	00 0B	0000 aaaa	
	00 0C	0000 bbbb	dummy (ignored)
#	00 0D	0000 aaaa	
	00 0E	0000 bbbb	dummy (ignored)
#	00 0F	0000 aaaa	
	00 10	0000 bbbb	dummy (ignored)
#	00 11	0000 aaaa	
	00 12	0000 bbbb	dummy (ignored)
#	00 13	0000 aaaa	
	00 14	0000 bbbb	dummy (ignored)
#	00 15	0000 aaaa	
	00 16	0000 bbbb	dummy (ignored)
#	00 17	0000 aaaa	
	00 18	0000 bbbb	dummy (ignored)
#	00 19	0000 aaaa	
	00 1A	0000 bbbb	dummy (ignored)
#	00 1B	0000 aaaa	
	00 1C	0000 bbbb	dummy (ignored)
#	00 1D	0000 aaaa	
	00 1E	0000 bbbb	dummy (ignored)
#	00 1F	0000 aaaa	
	00 20	0000 bbbb	dummy (ignored)
	00 00 00 21	Total Size	

**\* [TrigDigital]**

This area is valid for a pad that is connected to a TRIGGER IN jack.  
Normally you should edit these parameters from within the TD-50 itself.

Offset	Address	Description	
00 00	00aa aaaa	(reserve)	
00 01	00aa aaaa	Sensitivity	(0 - 62) 1.0 - 32.0
00 02	00aa aaaa	Rim Gain	(0 - 32) 0 - 3.2
00 03	000a aaaa	Threshold	(0 - 31) 0 - 31
00 04	0000 0aaa	Curve	(0 - 7) LINEAR, EXP1, EXP2, LOG1, LOG2, SPLINE, LOUD1, LOUD2
00 05	0000 0aaa	ExtNoiseCancel	(0 - 5) OFF, 1 - 5
00 06	0aaa aaaa	Head/Rim Adjust	(0 - 80) 0 - 80
00 07	00aa aaaa	Scan Time	(0 - 40) 0 - 4.0
00 08	0aaa aaaa	Mask Time	(0 - 64) 0 - 64
00 09	0000 aaaa	Retrigger Cancel	(0 - 15) 1 - 16
00 0A	0000 000a	Posititon Detect Head	(0 - 1) OFF, ON
00 0B	0000 000a	Posititon Detect Rim	(0 - 1) OFF, ON
#	00 0C	0000 aaaa	Digital Trigger Advanced Parameter 1
#	00 0D	0000 bbbb	(*)5
#	00 0E	0000 aaaa	Digital Trigger Advanced Parameter 2
#	00 0F	0000 bbbb	(*)5
#	00 10	0000 aaaa	Digital Trigger Advanced Parameter 3
#	00 11	0000 bbbb	(*)5
#	00 12	0000 aaaa	Digital Trigger Advanced Parameter 4
#	00 13	0000 bbbb	(*)5
#	00 14	0000 aaaa	Digital Trigger Advanced Parameter 5
#	00 15	0000 bbbb	(*)5
#	00 16	0000 aaaa	Digital Trigger Advanced Parameter 6
#	00 17	0000 bbbb	(*)5
#	00 18	0000 aaaa	Digital Trigger Advanced Parameter 7
#	00 19	0000 bbbb	(*)5
#	00 1A	0000 aaaa	Digital Trigger Advanced Parameter 8
#	00 1B	0000 bbbb	(*)5
00 00 00	1C	Total Size	

(\*)5 Depending on the pad assignments that are saved within the TD-50 for digitally-connected pads, this area will be as follows.  
Addresses for which the digitally-connected pad has no assignment are ignored.  
Normally you should edit these parameters from within the TD-50 itself.

**Digital Pad: PD-140DS**

Offset	Address	Description	
#	00 0C	0000 aaaa	
	00 0D	0000 bbbb	Position Adjust (0 - 9) 1 - 10
#	00 0E	0000 aaaa	
	00 0F	0000 bbbb	XStick Detect Sens (0 - 5) OFF, 1 - 5
#	00 10	0000 aaaa	dummy (ignored)
#	00 11	0000 bbbb	dummy (ignored)
#	00 12	0000 aaaa	dummy (ignored)
#	00 13	0000 bbbb	dummy (ignored)
#	00 14	0000 aaaa	dummy (ignored)
#	00 15	0000 bbbb	dummy (ignored)
#	00 16	0000 aaaa	dummy (ignored)
#	00 17	0000 bbbb	dummy (ignored)
#	00 18	0000 aaaa	dummy (ignored)
#	00 19	0000 bbbb	dummy (ignored)
#	00 1A	0000 aaaa	dummy (ignored)
#	00 1B	0000 bbbb	dummy (ignored)

**Digital Pad: CY-18DR**

Offset	Address	Description	
#	00 0C	0000 aaaa	
	00 0D	0000 bbbb	Position Adjust (0 - 9) 1 - 10
#	00 0E	0000 aaaa	
	00 0F	0000 bbbb	Choke Sens (0 - 5) OFF, 1 - 5
#	00 10	0000 aaaa	
	00 11	0000 bbbb	Bell Gain (0 - 32) 0 - 3.2
#	00 12	0000 aaaa	dummy (ignored)
#	00 13	0000 bbbb	dummy (ignored)
#	00 14	0000 aaaa	dummy (ignored)
#	00 15	0000 bbbb	dummy (ignored)
#	00 16	0000 aaaa	dummy (ignored)
#	00 17	0000 bbbb	dummy (ignored)
#	00 18	0000 aaaa	dummy (ignored)
#	00 19	0000 bbbb	dummy (ignored)
#	00 1A	0000 aaaa	dummy (ignored)
#	00 1B	0000 bbbb	dummy (ignored)

## 4. Supplementary Material

### ● Decimal and Hexadecimal Table

(An "H" is appended to the end of numbers in hexadecimal notation.)

In MIDI documentation, data values and addresses/sizes of exclusive messages etc. are expressed as hexadecimal values for each 7 bits.

The following table shows how these correspond to decimal numbers. (in the case of hexadecimal values for each 7 bits, or positive hexadecimal values for each 4 bits.)

D	H	D	H	D	H	D	H
0	00H	32	20H	64	40H	96	60H
1	01H	33	21H	65	41H	97	61H
2	02H	34	22H	66	42H	98	62H
3	03H	35	23H	67	43H	99	63H
4	04H	36	24H	68	44H	100	64H
5	05H	37	25H	69	45H	101	65H
6	06H	38	26H	70	46H	102	66H
7	07H	39	27H	71	47H	103	67H
8	08H	40	28H	72	48H	104	68H
9	09H	41	29H	73	49H	105	69H
10	0AH	42	2AH	74	4AH	106	6AH
11	0BH	43	2BH	75	4BH	107	6BH
12	0CH	44	2CH	76	4CH	108	6CH
13	0DH	45	2DH	77	4DH	109	6DH
14	0EH	46	2EH	78	4EH	110	6EH
15	0FH	47	2FH	79	4FH	111	6FH
16	10H	48	30H	80	50H	112	70H
17	11H	49	31H	81	51H	113	71H
18	12H	50	32H	82	52H	114	72H
19	13H	51	33H	83	53H	115	73H
20	14H	52	34H	84	54H	116	74H
21	15H	53	35H	85	55H	117	75H
22	16H	54	36H	86	56H	118	76H
23	17H	55	37H	87	57H	119	77H
24	18H	56	38H	88	58H	120	78H
25	19H	57	39H	89	59H	121	79H
26	1AH	58	3AH	90	5AH	122	7AH
27	1BH	59	3BH	91	5BH	123	7BH
28	1CH	60	3CH	92	5CH	124	7CH
29	1DH	61	3DH	93	5DH	125	7DH
30	1EH	62	3EH	94	5EH	126	7EH
31	1FH	63	3FH	95	5FH	127	7FH

D: decimal

H: hexadecimal

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

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

\* In the case of data to which multiple addresses are assigned, a hexadecimal value is used for each four bits. A value 0a 0bH expressed as two-byte nibbles will be a x 16+b.

\* For signed values with a ± symbol, positive values are expressed as a hexadecimal value for each four bits, and negative values are expressed as the two's complement of the hexadecimal value for each four bits. As some example expressions for negative values, two bytes would be 0F 0FH=-1, and four bytes would be 0F 0F 09 0C=-100.

<Example 1>

**What is the decimal expression of 5AH?**

From the preceding table, 5AH = 90

<Example 2>

**What is the decimal expression of the value 12 34H given as hexadecimal for each 7 bits?**

From the preceding table, since 12H = 18 and 34H = 52  
18 x 128 + 52 = 2356

<Example 3>

**What is the decimal expression of the nibbled value 01 02 0C 00?**

From the preceding table, since 01H = 1, 02H = 2, 0CH = 12, 00H = 0  
(1 x 16 + 2) x 16 + 12) x 16 + 0 = 4800

<Example 4>

**What is the nibbled expression of the decimal value 1258?**

$$\begin{array}{r} 16) 1258 \\ \underline{16) 78} \quad \dots 10 \\ \underline{16) 4} \quad \dots 14 \\ 0 \quad \dots 4 \end{array}$$

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

# MIDI Implementation

## ● Examples of Actual MIDI Messages

### <Example 1> 92 3E 5F

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

### <Example 2> C9 20

CnH is the Program Change status, and n is the MIDI channel number. Since 9H = 9 and 20H = 32, this is a Program Change message with MIDI CH = 10, program number 33.

### <Example 3> 99 2C 7F B9 04 7F 04 40

9n is the Note-on status, and n is the MIDI channel number. BnH is the Control Change status, and n is the MIDI channel number. Thus, the above messages have the following meaning.

99 2C 7F MIDI ch. 10, Note On message

B9 04 7F MIDI ch. 10, foot controller: 7FH

(B9) 04 40 (MIDI ch. 10), foot controller: 40H

In other words, with these messages a Note On message with a note number of 44 (G#2) and velocity of 127 is transmitted on MIDI Channel 10, and then the foot controller value is set from 127 to 64.

According to the settings made at the factory, the drum part is assigned to MIDI Channel 10, Note Number 44 is assigned to the pedal hi-hat, and the foot controller is set to Pedal CC; in this case, the TD-50 plays a foot splash when the message is received.

## ● How to calculate the checksum

(An "H" is appended to the end of numbers in hexadecimal notation.)

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

Here's an example of how the checksum is calculated. We will assume that in the exclusive message we are transmitting, the address is aa bb cc ddH and the data is ee ff gg hhH.

aa + bb + cc + dd + ee + ff + gg + hh = sum

sum / 128 = quotient ... remainder

128 - remainder = checksum

(However, the checksum will be 0 if the remainder is 0.)

### <Example 1>

#### Specifying 3.5 as the shell depth of the instrument assigned to the snare head of drum kit number 1

"Parameter address map" indicates that the start address of drum kit 1 is 04 00 00 00H, the offset address of the VEdit parameters of the instrument assigned to the snare head is 01 01 00H, and the offset address of the shell depth (V-Edit Parameter 1) is 00 01H; therefore, the address is

```

04 00 00 00H
  01 01 00H
+)      00 01H
-----
04 01 01 01H
    
```

Since 3.5 is the parameter value 00 05H

```

F0 41 10 00 00 00 24 12 04 01 01 01 00 05 ?? F7
(1) (2) (3) (4) (5) address data checksum (6)
    
```

(1) Exclusive Status

(2) ID (Roland)

(3) Device ID (17)

(4) Model ID (TD-50)

(5) Command ID (DT1)

(6) EOX

Then calculate the checksum.

04H + 01H + 01H + 01H + 00H + 05H = 4 + 1 + 1 + 1 + 0 + 5 = 12 (sum)

12 (sum) ÷ 128 = 0 (quotient)... 12 (remainder) checksum = 128 - 12 (remainder) =

116 = 74H

This means that F0 41 10 00 00 00 24 12 04 01 01 01 00 05 74 F7 is the message should be sent.

### <Example 2>

#### Requesting transmission of the pad compressor switch for the snare of drum kit number 1

"Parameter address map" indicates that the start address of drum kit 1 is 04 00 00 00H, the offset address of the snare pad parameters is 01 41 00H, and the offset address of the pad compressor switch is 00 01H; therefore, the address is

```

04 00 00 00H
  01 41 00H
+)      00 01H
-----
04 01 41 01H
    
```

Since the size is 00 00 00 01H

```

F0 41 10 00 00 00 24 11 04 01 41 01 00 00 00 01 ?? F7
(1) (2) (3) (4) (5) address data checksum (6)
    
```

(1) Exclusive Status

(2) ID (Roland)

(3) Device ID (17)

(4) Model ID (TD-50)

(5) Command ID (RQ1)

(6) EOX

Then calculate the checksum.

04H + 01H + 41H + 01H + 00H + 00H + 00H + 01H = 4 + 1 + 65 + 1 + 0 + 0 + 0 + 1 = 72 (sum)

72 (sum) ÷ 128 = 0 (quotient)... 72 (remainder) checksum = 128 - 72 (remainder) = 56 = 38H

This means that F0 41 10 00 00 00 24 11 04 01 41 01 00 00 00 01 38 F7 is the message should be sent.

# MIDI Implementation Chart

Function...	Transmitted	Recognized	Remarks
<b>Basic Channel</b> Default Changed	1-16, OFF 1-16, OFF	1-16, OFF 1-16, OFF	Memorized
<b>Mode</b> Default Messages Altered	Mode 3 × *****	Mode 3 × *****	
<b>Note Number</b> : True Voice	0-127 *****	0-127 0-127	
<b>Velocity</b> Note On Note Off	○ 9nH, v=1-127 ○ 8nH, v=64	○ ×	
<b>After Touch</b> Key's Channel's	○ ×	○ ×	
<b>Pitch Bend</b>	×	×	
<b>Control Change</b>	1 ○ (Pad, Pedal) *1 *2 2 ○ (Pad, Pedal) *1 *2 4 ○ (Pad, Pedal) *1 *2 11 ○ (Pad, Pedal) *1 *2 16-19 ○ (Pad, Pedal) *1 *2 88 ○ v=0-64 *3	○ *1 *2 ○ *1 *2 ○ *1 *2 ○ *1 *2 ○ *1 *2 ○ v=0-64 *3	Modulation Breath Controller Foot Controller Expression General Purpose Controller 1-4 High Resolution Velocity Prefix
<b>Program Change</b> : True Number	○ 0-127 *3 *****	○ 0-127 *3 0-127	Program No. 1-128
<b>System Exclusive</b>	○ *6	○ *3	
<b>System Common</b> : Song Position : Song Select : Tune Request	× × ×	× × ×	
<b>System Real Time</b> : Clock : Commands	× ×	○ *4 ×	
<b>Aux Messages</b> : All Sound Off : Reset All Controllers : Local On/Off : All Notes Off : Active Sensing : System Reset	○ × × × ○ ×	○ (120, 123-127) ○ × ○ *5 ○ ×	
<b>Notes</b>	*1 One is selected as the strike position. *2 One is selected as the hi-hat control pedal. *3 ○ × is selectable. *4 Receives when Sync Mode setting is "EXTERNAL" *5 The same result as All Sound Off. *6 Transmitted if Transmit Edit Data is on, or when RQ1 is received.		

Mode 1 : OMNI ON, POLY  
 Mode 3 : OMNI OFF, POLY

Mode 2 : OMNI ON, MONO  
 Mode 4 : OMNI OFF, MONO

○ : Yes  
 × : No

# MIDI Implementation Chart

Function...	Transmitted	Recognized	Remarks
<b>Basic Channel</b> Default Changed	1-16, OFF 1-16, OFF	1-16, OFF 1-16, OFF	Memorized
<b>Mode</b> Default Messages Altered	Mode 3 × *****	Mode 3 × *****	
<b>Note Number</b> : True Voice	0-127 *****	0-127 0-127	
<b>Velocity</b> Note On Note Off	○ 9nH, v=1-127 ○ 8nH, v=64	○ ×	
<b>After Touch</b> Key's Channel's	○ ×	○ ×	
<b>Pitch Bend</b>	×	×	
<b>Control Change</b>	1 ○ (Pad, Pedal) *1 *2 2 ○ (Pad, Pedal) *1 *2 4 ○ (Pad, Pedal) *1 *2 11 ○ (Pad, Pedal) *1 *2 16-19 ○ (Pad, Pedal) *1 *2 88 ○ v=0-64 *3	○ *1 *2 ○ *1 *2 ○ *1 *2 ○ *1 *2 ○ *1 *2 ○ v=0-64 *3	Modulation Breath Controller Foot Controller Expression General Purpose Controller 1-4 High Resolution Velocity Prefix
<b>Program Change</b> : True Number	× *****	×	
<b>System Exclusive</b>	×	×	
<b>System Common</b> : Song Position : Song Select : Tune Request	× × ×	× × ×	
<b>System Real Time</b> : Clock : Commands	○ *3 ×	○ *4 *5 ○ *4 *6	
<b>Aux Messages</b> : All Sound Off : Reset All Controllers : Local On/Off : All Notes Off : Active Sensing : System Reset	× × × × × ×	× × × × × ×	
<b>Notes</b>	*1 One is selected as the strike position. *2 One is selected as the hi-hat control pedal. *3 ○ × is selectable. *4 Receives when Sync Mode setting is "EXTERNAL." *5 Applies to the tempo when the song is stopped. Does not apply to the tempo when the song is playing. *6 The song does not play/stop. When the START message is received while the song is stopped, the click playback is reset.		

Mode 1 : OMNI ON, POLY  
 Mode 3 : OMNI OFF, POLY

Mode 2 : OMNI ON, MONO  
 Mode 4 : OMNI OFF, MONO

○ : Yes  
 × : No