

# CTK-671 MIDI Implementation

CASIO Computer Electronical Musical Instrument Division

August 1, 2001

Contents

\* 1. MIDI Message Send and Receive

- o 1.1 Note Off/On
  - + 1.1.1 Note Off
  - + 1.1.2 Note On
- o 1.2 Control Change
  - +1.2.1 Bank Select
    - + Bank Select MSB
    - + Bank Select LSB
  - + 1.2.2 Modulation
  - + 1.2.3 Data Entry
    - + Data Entry MSB
    - + Data Entry LSB
  - + 1.2.4 Volume
  - + 1.2.5 Pan
  - + 1.2.6 Expression
  - + 1.2.7 DSP Parameter
    - + DSP Parameter 0
    - + DSP Parameter 1
    - + DSP Parameter 2
    - + DSP Parameter 3
    - + DSP Parameter 4
    - + DSP Parameter 5
    - + DSP Parameter 6
    - + DSP Parameter 7
  - + 1.2.8 Hold1
  - + 1.2.9 Sostenuto
  - + 1.2.10 Soft
  - + 1.2.11 Filter Resonance
  - + 1.2.12 Release Time
  - + 1.2.13 Attack Time
  - + 1.2.14 Filter Cutoff
  - + 1.2.15 Vibrato Rate
  - + 1.2.16 Vibrato Depth
  - + 1.2.17 Vibrato Delay
  - + 1.2.18 Reverb Send
  - + 1.2.19 Chorus Send
  - + 1.2.20 NRPN
    - + NRPN LSB
    - + NRPN MSB
    - + 1.2.20.1 Filter Cutoff
    - + 1.2.20.2 Filter Resonance
  - + 1.2.21 RPN
    - + RPN LSB
    - + RPN MSB
    - + 1.2.21.1 Pitch Bend Sensitivity
    - + 1.2.21.2 Fine Tune
    - + 1.2.21.3 Coarse Tune
    - + 1.2.21.4 Modulation Depth
    - + 1.2.21.5 Null
  - + 1.2.22 All Sound Off
  - + 1.2.23 Reset All Controllers
- o 1.3 Mode Message
  - + 1.3.1 All Notes Off
  - + 1.3.2 Omni Off
  - + 1.3.3 Omni On
  - + 1.3.4 Mono
  - + 1.3.5 Poly
- o 1.4 Program Change

- o 1.5 Channel Aftertouch
- o 1.6 Pitch Bend
- o 1.7 Active Sensing
- o 1.8 System Exclusive
  - + 1.8.1 Universal Realtime
    - + 1.8.1.1 Master Volume
    - + 1.8.1.2 Master Balance
    - + 1.8.1.3 Master Fine Tuning
    - + 1.8.1.4 Master Coarse Tuning
    - + 1.8.1.5 Reverb Parameter
      - + Type
      - + Time
    - + 1.8.1.6 Chorus Parameter
      - + Type
      - + Rate
      - + Depth
      - + Feedback
      - + Send To Reverb
    - + 1.8.1.7 GM System Message
      - + GM System On
      - + GM System Off
      - + GM2 System On
  - + 1.8.2 CTK-671 Format System Exclusive Message

\* 2. CTK-671 System Exclusive Message Format

- o 2.1 Format
  - + 2.1.1 CTK-671 System Exclusive Message
  - + 2.1.2 Message Structure
- o 2.2 Individual Parameter Operations
- o 2.3 Parameter Set Transfer Modes
  - + 2.3.1 Communication Modes
  - + 2.3.2 One-way Mode Communication Flow
  - + 2.3.3 Handshake Mode Communication Flow

\* 3. Parameter List

- o 3.1 Command Parameter
  - + 3.1.1 Parameter Set Overview
  - + 3.1.2 Command Parameter List
    - + 3.1.2.1 System Exclusive Format
    - + 3.1.2.2 Parameter List
  - + 3.1.3 Song / Rhythm Pattern Command Parameter List
    - + 3.1.3.1 System Exclusive Format
    - + 3.1.3.2 Parameter List
- o 3.2 Patch Parameter
  - + 3.2.1 Parameter Set Overview
  - + 3.2.2 Patch Common Parameter List
    - + 3.2.2.1 System Exclusive Format
    - + 3.2.2.2 Parameter List
      - + MIDI Parameter
      - + Tune / Mix Parameter
      - + System Chorus
      - + System Reverb
      - + Master Equalizer
      - + DSP Patch Parameter
      - + DSP Type parameter
  - + 3.2.3 Patch Part Parameter List
    - + 3.2.3.1 System Exclusive Format
    - + 3.2.3.2 Parameter List
      - + Basic parameter
      - + Tune / Mix parameter
      - + Tone parameter
      - + LFO Parameter
      - + About the Part Mode

- \* 4. Parameter Set List
  - o 4.1 User Tone Parameter Set
    - + System Exclusive Format
  - o 4.2 User DSP Parameter Set
    - + System Exclusive Format
  - o 4.3 Song Data
    - + System Exclusive Format
  - o 4.4 User Rhythm Pattern
    - + System Exclusive Format
  - o 4.5 Registration Data
    - + System Exclusive Format
- \* 5. DSP Parameter List
- \* 6. Setting Values and Send/Receive Values
  - 6.1.1.1 Off/On Setting Value Table
  - 6.1.1.2 Slow/Fast Setting Value Table
  - 6.1.1.3 Rotate/Break Setting Value Table
  - 6.1.1.4 -24 - 0 - 24 Setting Value Table
  - 6.1.1.5 -64 - 0 - 63 Setting Value Table
  - 6.1.1.6 Pan Setting Value Table
  - 6.1.1.7 -99 - 0 - 99 Setting Value Table
  - 6.1.1.8 Type 0 to Type 7 Setting Value Table
  - 6.1.1.9 Master EQ Type Setting Value Table
  - 6.1.1.10 Reverb Type Setting Value Table
  - 6.1.1.11 Chorus Type Setting Value Table
  - 6.1.1.12 Equalizer Low Frequency Setting Value Table
  - 6.1.1.13 Equalizer Mid Frequency Setting Value Table
  - 6.1.1.14 Equalizer High Frequency Setting Value Table
  - 6.1.1.15 Equalizer Gain Setting Value Table
  - 6.1.1.16 DSP Algorithm ID Table
- \* 7. MIDI Implementation Notation

## 1. MIDI Message Send and Receive

Send: MIDI messages are not sent in the demo mode.

Receive: MIDI messages are not received in the demo and song mode.

### 1.1 Note Off/On

#### 1.1.1 Note Off

Format: 9nH kkH 00H  
 8nH kkH \*\*H (receive only)  
 n: MIDI Channel Number  
 kk: Key Number

#### 1.1.2 Note On

Format: 9nH kkH vvH  
 n: MIDI Channel Number  
 kk: Key Number  
 vv: Velocity

Send: When the keyboard is played, when Auto Accompaniment is played, and when song data is played back. In the case of accompaniment data, this message is sent only when Accomp MIDI Out is turned on.

Receive: This message is received over the MIDI channels that correspond to each of the parts.  
 Any part whose mixer channel is turned off is not received.

### 1.2 Control Change

Format: BnH ccH vvH  
 n: MIDI Channel Number  
 cc: Control Number  
 vv: Value

Send: When the CTK-671 pedal is operated and when a parameter is changed by a control panel operation.  
 Also sent when the same parameter is changed by an accompaniment function or song function.

Receive: Changes the CTK-671 setup or corresponding parameter.

#### 1.2.1 Bank Select

- Bank Select MSB

Format: BnH 00H vvH  
 n: MIDI Channel Number  
 vv: Value

- Bank Select LSB

Format: BnH 20H \*\*H  
 n: MIDI Channel Number

Send: When a tone is selected.  
 See the "Tone List" of the CTK-671 User's Guide for details.

Receive: Switches the CTK-671 tone bank number, but the tone is not actually changed until Program Change is received.  
 See the section titled "1.4 Program Change" in this document, and the "Tone List" in the CTK-671 User's Guide.

### 1.2.2 Modulation

Format: BnH 01H vvH  
 n: MIDI Channel Number  
 vv: Value

Send: This message is never sent.

Receive: Adds to the currently sounding voice vibrato of a depth specified by the value. In the case of a tone that already has vibrato applied, receipt of this message increases the vibrato depth.

### 1.2.3 Data Entry

#### • Data Entry MSB

Format: BnH 06H vvH  
 n: MIDI Channel Number  
 vv: Value

#### • Data Entry LSB

Format: BnH 26H vvH  
 n: MIDI Channel Number  
 vv: Value

Send: When there is a change in the parameters allocated to NRPN and RPN.

Receive: Changes the parameters allocated to NRPN and RPN.

### 1.2.4 Volume

Format: BnH 07H vvH  
 n: MIDI Channel Number  
 vv: Value

The setting value is the same as the value that is sent and received.

Send: When there is a change in Part Volume.

Receive: Changes Part Volume.

### 1.2.5 Pan

Format: BnH 0AH vvH  
 n: MIDI Channel Number  
 vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.6 Pan Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When there is a change in Part Pan.

Receive: Changes Part Pan.

### 1.2.6 Expression

Format: BnH 0BH vvH  
 n: MIDI Channel Number  
 vv: Value

The setting value is the same as the value that is sent and received.

Send: When there is a change in the Expression value caused by accompaniment.

Receive: Changes the Expression value.

### 1.2.7 DSP Parameter

- DSP Parameter 0  
 Format: BnH 10H vvH

- DSP Parameter 1  
 Format: BnH 11H vvH

- DSP Parameter 2  
 Format: BnH 12H vvH

- DSP Parameter 3  
 Format: BnH 13H vvH

- DSP Parameter 4  
 Format: BnH 50H vvH

- DSP Parameter 5  
 Format: BnH 51H vvH

- DSP Parameter 6  
 Format: BnH 52H vvH

- DSP Parameter 7  
 Format: BnH 53H vvH

n: MIDI Channel Number  
 The MIDI channel that manipulates a DSP parameter by a control change is called the "Global Channel." The initial factory default Global Channel setting is 0 (MIDI Channel 1).

The Global Channel cannot be changed by a control panel operation. You need to use a System Exclusive Message to change the Global Channel. For more information, see the explanation about the Global Channel in the section of this document titled "System Exclusive Message."

vv: Value  
 The range for a value that can be sent and received by any of the parameters is 0 to 127. Note, however, that the parameter values that can actually be set and the corresponding send value differs according to parameter.

The same values are used for DSP parameter operations using System Exclusive Messages. For more information, see the explanation about DSP parameters in the section of this document titled "System Exclusive Messages."

Send: When the DSP Parameter value is changed.

Receive: Changes the DSP Parameter value.  
 Any received message corresponding to a parameter whose number exceeds the currently selected number of DSP parameters is ignored.

### 1.2.8 Hold1

Format: BnH 40H vvH  
 n: MIDI Channel Number  
 vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.1 Off/On Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When the sustain operation is assigned to the assignable jack and the pedal connected to the assignable jack is operated, or when song data containing a sustain operation is played back.

Receive: Performs an operation equivalent to a sustain pedal operation.

### 1.2.9 Sostenuto

Format: BnH 42H vvH  
 n: MIDI Channel Number  
 vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.1 Off/On Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When the sostenuto operation is assigned to the assignable jack and the pedal connected to the assignable jack is operated, or when song data containing a sostenuto is played back.

Receive: Performs an operation equivalent to a sostenuto pedal operation.

### 1.2.10 Soft

Format: BnH 43H vvH

n: MIDI Channel Number  
vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.1 Off/On Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When the soft operation is assigned to the assignable jack and the pedal connected to the assignable jack is operated, or when song data containing a soft operation is played back.

Receive: Performs an operation equivalent to a soft pedal operation.

### 1.2.11 Filter Resonance

Format: BnH 47H vvH

n: MIDI Channel Number  
vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.5 -64 - 0 - 63 Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When Filter Resonance is changed.

Receive: Changes Filter Resonance.

### 1.2.12 Release Time

Format: BnH 48H vvH

n: MIDI Channel Number  
vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.5 -64 - 0 - 63 Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When Release Time is changed.

Receive: Changes Release Time.

### 1.2.13 Attack Time

Format: BnH 49H vvH

n: MIDI Channel Number  
vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.5 -64 - 0 - 63 Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When Attack Time is changed.

Receive: Changes Attack Time.

### 1.2.14 Filter Cutoff

Format: BnH 4AH vvH

n: MIDI Channel Number  
vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.5 -64 - 0 - 63 Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When Filter Cutoff is changed.

Receive: Changes Filter Cutoff.

### 1.2.15 Vibrato Rate

Format: BnH 4CH vvH

n: MIDI Channel Number  
vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.5 -64 - 0 - 63 Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When Vibrato Rate is changed.

Receive: Changes Vibrato Rate.

### 1.2.16 Vibrato Depth

Format: BnH 4DH vvH

n: MIDI Channel Number  
vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.5 -64 - 0 - 63 Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When Vibrato Depth is changed.

Receive: Changes Vibrato Depth.

### 1.2.17 Vibrato Delay

Format: BnH 4EH vvH

n: MIDI Channel Number  
vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.5 -64 - 0 - 63 Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When Vibrato Delay is changed.

Receive: Changes Vibrato Delay.

### 1.2.18 Reverb Send

Format: BnH 5BH vvH

n: MIDI Channel Number  
vv: Value

The setting value is the same as the value that is sent and received.

Send: When Reverb Send is changed.

Receive: Changes Reverb Send.

### 1.2.19 Chorus Send

Format: BnH 5DH vvH

n: MIDI Channel Number  
vv: Value

The setting value is the same as the value that is sent and received.

Send: When Chorus Send is changed.

Receive: Changes Chorus Send.

### 1.2.20 NRPN

#### • NRPN LSB

Format: BnH 62H vvH

n: MIDI Channel Number  
vv: Value

#### • NRPN MSB

Format: BnH 63H vvH  
 n: MIDI Channel Number  
 vv: Value

1.2.20.1 Filter Cutoff

Format: BnH 62H 20H 63H 01H 06H mmH 26H \*\*H  
 n: MIDI Channel Number  
 mm: Value

For information about the relationship between setting values and receive values, see the "6.1.1.5 -64 - 0 - 63 Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: This message is never sent.

Receive: Changes Filter Cutoff.

1.2.20.2 Filter Resonance

Format: BnH 62H 21H 63H 01H 06H mmH 26H \*\*H  
 n: MIDI Channel Number  
 mm: Value

For information about the relationship between setting values and receive values, see the "6.1.1.5 -64 - 0 - 63 Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: This message is never sent.

Receive: Changes Filter Resonance.

1.2.21 RPN

• RPN LSB

Format: BnH 64H vvH  
 n: MIDI Channel Number  
 vv: Value

• RPN MSB

Format: BnH 65H vvH  
 n: MIDI Channel Number  
 vv: Value

1.2.21.1 Pitch Bend Sensitivity

Format: BnH 64H 00H 65H 00H 06H mmH 26H \*\*H  
 n: MIDI Channel Number  
 mm: Value 0 - 24

The setting value is the same as the value that is sent and received.

Send: This message is never sent.

Receive: Changes Pitch Bend Sensitivity.

1.2.21.2 Fine Tune

Format: BnH 64H 01H 65H 00H 06H mmH 26H IIH  
 n: MIDI Channel Number  
 mm: Value MSB  
 II: Value LSB

For information about the relationship between setting values and send/receive values, see the "6.1.1.7 -99 - 0 - 99 Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When Channel Fine Tune is changed.

Receive: Changes Channel Fine Tune.

1.2.21.3 Coarse Tune

Format: BnH 64H 02H 65H 00H 06H mmH 26H 00H  
 n: MIDI Channel Number  
 mm: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.4 -24 - 0 - 24 Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When Channel Coarse Tune is changed.

Receive: Changes Channel Coarse Tune.

1.2.21.4 Modulation Depth

Format: BnH 64H 05H 65H 00H 06H mmH 26H 00H  
 n: MIDI Channel Number  
 mm: Value

The setting value is the same as the value that is sent and received.

Send: This message is never sent.

Receive: Changes Modulation depth.

1.2.21.5 Null

Format: BnH 64H 7FH 65H 7FH  
 n: MIDI Channel Number

Send: This message is never sent.

Receive: Deselects RPN.

1.2.22 All Sound Off

Format: BnH 78H 00H  
 n: MIDI Channel Number

Send: This message is never sent.

Receive: Stops all voices that are sounding.

1.2.23 Reset All Controllers

Format: BnH 79H 00H  
 n: MIDI Channel Number

Send: When the song function is used.

Receive: Sets initial controller values shown below.

Message	Controller	Values
Control Change	01H	Modulation 00H
	0BH	Expression 00H
	40H	Hold1 00H
	42H	Sostenuto 00H
	43H	Soft 00H
	65H/64H	RPN MSB/LSB 7FH-7FH
	63H/62H	NRPN MSB/LSB 7FH-7FH
Channel Pressure		00H
Pitch Bend Change		40H/00H

1.3 Mode Message

1.3.1 All Notes Off

Format: BnH 7BH 00H  
 n: MIDI Channel Number

### 1.3.2 Omni Off

Format: BnH 7CH 00H  
n: MIDI Channel Number

### 1.3.3 Omni On

Format: BnH 7DH 00H  
n: MIDI Channel Number

### 1.3.4 Mono

Format: BnH 7EH 00H  
n: MIDI Channel Number

### 1.3.5 Poly

Format: BnH 7FH 00H  
n: MIDI Channel Number

Send: These messages are never sent.

Receive: Receipt of any of these messages releases (same as releasing the keyboard key) the currently sounding voice.

## 1.4 Program Change

Format: CnH ppH  
n: MIDI Channel Number  
pp: Program Number

Send: When a tone is selected.  
See the "Tone List" of the CTK-671 User's Guide for details.

Receive: Changes the tone and Part Mode (explained below) of the part corresponding to the MIDI channel.

The selected tone is determined by the program value of this message and the Bank Select message value received prior to this message.  
See the "Tone List" in the CTK-671 User's Guide for information about actually selecting tones, etc.

Also note that receipt of this message can also change the Part Mode parameter at the same time. For details, see "About the Part Mode," which is located in the section of this document named "3.2.3 Patch Part Parameter List."

## 1.5 Channel Aftertouch

Format: DnH vvH  
n: MIDI Channel Number  
vv: Value

Send: This message is never sent.

Receive: Receipt of this message adds vibrato to the voice that is sounding. Details of the effect differ according to the tone setting.

## 1.6 Pitch Bend

Format: EnH llH mmH  
n: MIDI Channel Number  
ll: Value LSB  
mm: Value MSB

Send: This message is never sent.

Receive: Receipt of this message changes the pitch of the currently sounding voice.  
The range of the change depends on the Pitch Bend Sensitivity set by RPN.

## 1.7 Active Sensing

Format: FEH

Send: This message is never sent.

Receive: If some MIDI message is not received within a preset amount of time after this message is received, all currently sounding CTK-671 voices are released and the controller is reset.

## 1.8 System Exclusive

Format: F0H....F7H

### 1.8.1 Universal Realtime

Format: F0H 7FH....F7H

#### 1.8.1.1 Master Volume

Format: F0H 7FH 7FH 04H 01H llH mmH F7H  
mm: Value MSB  
The setting value is the same as the value that is sent and received.

Send: This message is never sent.

Receive: Changes the Master Volume parameter.  
Note that the Master Volume parameter cannot be changed on the CTK-671.

#### 1.8.1.2 Master Balance

Format: F0H 7FH 7FH 04H 02H llH mmH F7H  
mm: Value MSB  
For information about the relationship between setting values and send/receive values, see the "6.1.1.6 Pan Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: This message is never sent.

Receive: Changes the Master Pan parameter.  
Note that the Master Pan parameter cannot be changed by a control panel operation.

#### 1.8.1.3 Master Fine Tuning

Format: F0H 7FH 7FH 04H 03H 00H mmH F7H  
mm: Value MSB  
For information about the relationship between setting values and send/receive values, see the "6.1.1.7 -99 - 0 - 99 Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When the Fine Tune parameter is changed.

Receive: Changes the Fine Tune parameter.

#### 1.8.1.4 Master Coarse Tuning

Format: F0H 7FH 7FH 04H 04H llH mmH F7H  
mm: Value MSB  
For information about the relationship between setting values and send/receive values, see the "6.1.1.4 -24 - 0 - 24 Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When the Transpose parameter is changed.

Receive: Changes the Transpose parameter.

#### 1.8.1.5 Reverb Parameter

Format: F0H 7FH 7FH 04H 05H 01H 01H 01H 01H ppH vvH F7H  
pp: Parameter

• Type

Format: F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 00H vvH F7H

vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.10 Reverb Type Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When the Reverb Type parameter is changed.

Receive: Changes the Reverb Type parameter.

• Time

Format: F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 01H vvH F7H

vv: Value

The setting value is the same as the value that is sent and received.

Send: When the Reverb Time parameter is changed.

Receive: Changes the Reverb Time parameter.

1.8.1.6 Chorus Parameter

Format: F0H 7FH 7FH 04H 05H 01H 01H 01H 02H ppH vvH F7H

pp: Parameter

• Type

Format: F0H 7FH 7FH 04H 05H 01H 01H 01H 02H 00H vvH F7H

vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.11 Chorus Type Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When the Chorus Time parameter is changed.

Receive: Changes the Chorus Time parameter.

• Rate

Format: F0H 7FH 7FH 04H 05H 01H 01H 01H 02H 01H vvH F7H

vv: Value

For information about the relationship between setting values and send/receive values, see the "6.1.1.11 Chorus Type Setting Value Table" in the section of this document titled "6. Setting Values and Send/Receive Values."

Send: When the Chorus Rate parameter is changed.

Receive: Changes the Chorus Rate parameter.

• Depth

Format: F0H 7FH 7FH 04H 05H 01H 01H 01H 02H 02H vvH F7H

vv: Value

The setting value is the same as the value that is sent and received.

Send: When the Chorus Depth parameter is changed.

Receive: Changes the Chorus Depth parameter.

• Feedback

Format: F0H 7FH 7FH 04H 05H 01H 01H 01H 02H 03H vvH F7H

vv: Value

The setting value is the same as the value that is received.

Send: This message is never sent.

Receive: Changes the Chorus Feedback parameter.

The Chorus Feedback parameter cannot be changed by a control panel operation.

• Send To Reverb

Format: F0H 7FH 7FH 04H 05H 01H 01H 01H 02H 04H vvH F7H

vv: Value

The setting value is the same as the value that is received.

Send: This message is never sent.

Receive: Changes the Chorus Send To Reverb parameter.

The Chorus Send to Reverb parameter cannot be changed by a control panel operation.

1.8.1.7 GM System Message

• GM System On

Format: F0H 7FH 7FH 09H 01H F7H

Send: This message is never sent.

Receive: Puts the sound source into a preset GM sound source mode.

• GM System Off

Format: F0H 7FH 7FH 09H 02H F7H

Send: This message is never sent.

Receive: Returns the sound source to the CTK-671 mode.

• GM2 System On

Format: F0H 7FH 7FH 09H 03H F7H

Send: This message is never sent.

Receive: Though the CTK-671 does not support GM2, receipt of the GM2 System On message has the same result as receipt of the GM System On message.

1.8.2 CTK-671 Format System Exclusive Message

Format: F0H 44H 11H 01H...F7H

For more information, see the section of this document titled "2. CTK-671 System Exclusive Message Format."

## 2. CTK-671 System Exclusive Message Format

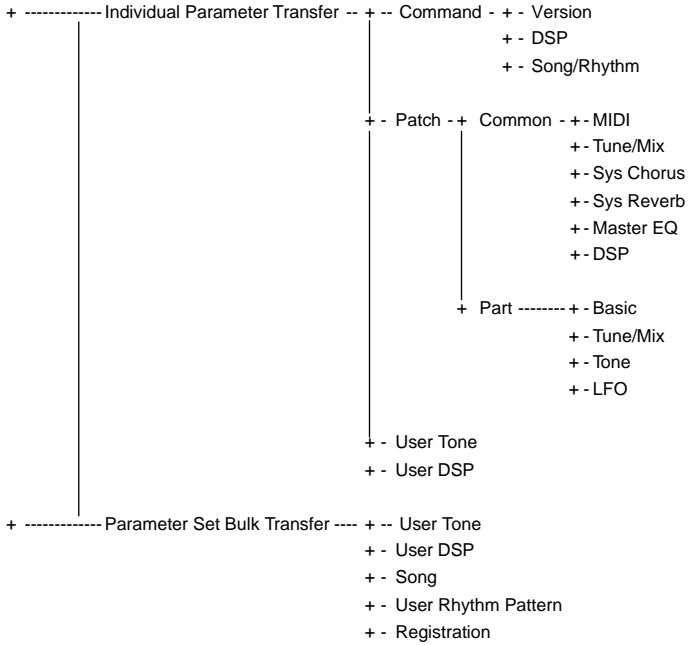
### 2.1 Format

CTK-671 SysEx operations are classified as Parameter type for send and receive of an individual parameter, and Parameter Set type for bulk send and receive of a set of parameters.

These SysEx types can be further broken down into parameter categories according to the item being transferred.



2.1.1 CTK-671 System Exclusive Message



The operation type of a message is determined in accordance with the value of the "Action" field of the CTK-671 SysEx message. The basic format for all operation type messages is described in "2.1.2 Message Structure," below.

2.1.2 Message Structure

The CTK-671 System Exclusive Message Format is formed using the 14 fields described below.

Whether or not a particular field is included in a message and the length of each field depends on the message.

SYSEX	MAN	MOD	dev	act/cat	prm	ilen/dlen	ps	<index>	<data>	<sum>	EOX		
1	2	3	4	5	6	7	8	9	10	11	12	13	14

The act field describes the action that the message performs. The meanings of the <index> and <data> fields differ according to the value of the act field. The following describes each of the fields in detail.

1 ..... SYSEX : System Exclusive message Status  
 Format : 11110000  
 System Exclusive message Status = F0H

2 ..... MAN : Manufacturer's ID  
 Format : 01000100  
 CASIO Manufacturer's ID = 44H

3 ..... MOD : Model ID  
 Format : 00010001, 00000001 (MSB, LSB)  
  
 This field contains a two-byte value (MSB, LSB) that indicates the keyboard model ID.  
 CTK-671 Model ID MSB = 11H  
 LSB = 01H

4 ..... dev : MIDI DeviceID 00H - 1FH,7FH  
 Format : 0ddddd  
  
 The contents of this field in a received message are compared with the CTK-671 MIDI Device ID, and the incoming message is recognized only when the two IDs match.  
 The default value for this field is 10H.  
 When a message containing 7FH is received, the message is always recognized regardless of the CTK-671 ID setting.

MIDI Device ID is a Patch Parameter data item, and it can be changed using a System Exclusive Message. In such a case, the Device ID of the MIDI System Exclusive Message must be set to 7FH before it is sent.

5/6 .... act/cat : Action/Category  
 Format : 0aaacccc

aaa = Action (3bit)  
 This field indicates the action being performed by the System Exclusive Message.  
 0H.....IPC Individual Parameter Change  
 1H.....IPR Individual Parameter Request  
 2H.....BDS Oneway Parameter Set Bulk Send  
 3H.....BDR Oneway Parameter Set Bulk Request  
 4H.....HDS Handshake Parameter Set Bulk Send  
 5H.....HDR Handshake Parameter Set Bulk Request  
 6H.....Reserved  
 7H.....HDA,HDJ,HDE,NOP Communication Control (for Handshake)

cccc = Category (4bit)  
 Categories indicate the type of data handled by the System Exclusive Message. The Model ID numbers on the left correspond to the categories, and the applicable communication operation (Action) is shown on the right.

ID	Category	Action							
		act = 0	1	2	3	4	5	6	7
0H .... Command		A	A	-	-	-	-	-	-
1H .... Patch		A	A	-	-	-	-	-	-
2H .... User Tone		-	-	A	A	A	A	-	A
9H .... User DSP		A	A	A	A	A	A	-	A
AH .... Song Data		-	-	A	A	A	A	-	A
BH .... Rhythm Pattern		-	-	A	A	A	A	-	A
CH ... Registration		-	-	A	A	A	A	-	A

A ..... Available  
 - ..... Not Available

7 ..... prm : Parameter ID  
 Format : 0ppppppp

The Parameter ID field indicates the parameter type. See the "Parameter List" below for details about parameter types. When transferring individual parameters individually (as opposed to bulk transfer), this field is used to identify the parameter by its parameter ID. In any other case, this field is filled with the value 00H.

8/9 .... ilen/dlen : index length / data length  
 Format : 0iiddddd

This field indicates the size of the subsequent <index> field (11) and <data> field (12).

The index length (ii) indicates the index field length, which is always the following, regardless of the act (action) value.

ii : index byte size - 1 (3 when index is 4 bytes)

dddd indicates the size of each data unit (parameter) of the <data> field. In the case of the Request and Control messages, which do not contain any data, this value becomes 0.

• When act = 3(BDR), 5(HDR), or 7(Control)  
 dddd .... 0

• When act = 0 (Individual Parameter Change)  
 dddd: data bit size - 1 (00000 when data is 1 bit; 11111 when data is 32 bits)

• When act = 2 or 4 (Parameter Set Bulk Send)  
 16-bit unit transfer, always as shown below.

dddd .... data bit size - 1 = 01111

10 ..... ps : Parameter Set Number

Format : 0nnnnnnn, 0mmmmmmm (LSB, MSB)

This field is a 2-byte (LSB, MSB) value indicating the Parameter Set number (00mmmmmmnnnnnn) being transferred.

11 ..... <index> Parameter Index Number (option)

- When act = 0 (IPC) or 1 (IPR)  
This field contains a supplementary number that points to data when parameters are arrayed.  
An <index> can be anywhere from one to four bytes long, and its role is defined on a case-by-case basis in accordance with the category indicated by cat and the song number indicated by Parameter ID.

In the case of preset number, part number, and key number parameters that all have the same ID, for example, these <index> values would be used to specify each of the parameters.

- When act = 2 (BDS) or 4 (HDS)  
In this case, <index> is a 3-byte fixed field that shows a packet number (sequential number starting from 00) identifying the packet into which the Parameter Set is divided for transfer, and the size of the <data> field that follows the <index> field.

i[0] ... 0nnnnnnn Packet Number LSB (NNNNNNNnnnnnn = Packet Number)  
i[1] ... 0NNNNNNN Packet Number MSB

As explained in the <data> field section, 128 bytes can be send per packet, so received data can contain <Parameter Set start address> + <Packet Number> \* 128.

i[2] ... 0LLLLLLL data length / 3

As mentioned in the explanation of the <data> field, the length of the <data> field is always a multiple of 3, so the length value is divided by 3.

- When act = 3 (BDR) or 5 (HDR)  
This field is always empty.
- When act = 7 (HDA, HDJ, HDE, NOP)  
In this case, the <index> field length is fixed at 1 byte, and it indicates the control messages used for handshaking as shown below.  
See "Bulk Dump" for information about this operation.

i[0] = 0000cccc

cccc	Control Message
-----	
0000	EOD Oneway/Handshake Bulk Dump End of Data (End of Data)
0001	HDA Handshake Bulk Dump Acknowledge (Handshake Data Receive Successful)
0010	HDR Handshake Bulk Dump Reject (Handshake Data Rejected)
0011	HDE Handshake Bulk Dump Error (Handshake Data Error)
:	
1111	NOP (No Operation)

12 ..... <data> Parameter Data (when action = Parameter Change/Send)

- When act = 1 (IPR), 3 (BDR), 5 (HDR), or 7 (HDA, HDJ, HDE, NOP)  
This field is always empty.
- When act = 0 (IPC)  
Indicates the parameter itself. The length varies in accordance with the data size indicated by the dlen field, as shown below.  
This field is not included in a parameter request.

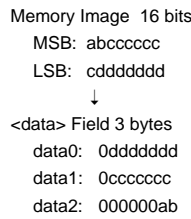
dddd + 1	<data> fields
1 - 7	1
8 - 14	2
15 - 21	3
22 - 28	4
29 - 32	5

Each block of data is packed from the lowest order byte first. In the case of multiple-byte data, the lowest weighted bit is the LSB of the first <data> block, and the highest weighted bit is the MSB of the final <data> block. The following shows an example of how data would be divided for transfer in the case of 32-bit data.

	7	6	5	4	3	2	1	0
-----								
data0:	0	[bit06]	[bit05]	[bit04]	[bit03]	[bit02]	[bit01]	[bit00]
data1:	0	[bit13]	[bit12]	[bit11]	[bit10]	[bit09]	[bit08]	[bit07]
data2:	0	[bit20]	[bit19]	[bit18]	[bit17]	[bit16]	[bit15]	[bit14]
data3:	0	[bit27]	[bit26]	[bit25]	[bit24]	[bit23]	[bit22]	[bit21]
data4:	0	0	0	0	[bit31]	[bit30]	[bit29]	[bit28]

- When act = 2 (BDS) or 4 (HDS)  
When a bulk data transfer operation is performed, the Parameter Set data to be transferred is read sequentially in 16-bit units starting from the top address. Read values are divided into 3-byte segments as shown below, and then sent in sequence.

The following is the conversion format, which is the same as individual parameter 16-bit transfer explained above.



Note, however, that a Parameter Set of 128 bytes or less can be sent using a single packet, and anything greater than 128 bytes is divided among multiple packets.

This means the maximum length of a <data> field is as shown below.  
128/2 \* 3 = 192 bytes

Only one Parameter Set can be transferred per session, and data from different Parameter Sets cannot be mixed within a single packet, even when sending multiple Parameter Sets.  
Different Parameter Sets are always divided into separate packets.

13 ..... <sum> Check Sum

- When act = 0 (IPC), 1 (IPR), 3 (BDR), 5 (HDR), or 7 (HDA, HDJ, HDE, NOP)  
This field is always empty.
- When act = 2 (BDS) or 4 (HDS)  
In this case, the <sum> field contains a value, which, when added to the total value of the <data> field, makes the lower seven bits 0.  
The receiving side checks if this is true, and performs error handling (re-request, etc.) if it is not.

14 ..... EOX : End of System Exclusive Message

Format : 11110111  
End of System Exclusive message Status = F7H

## 2.2 Individual Parameter Operations

There are two individual parameter operations: Individual Parameter Transfer and Individual Parameter Request.

During a single session, an Individual Parameter Request (IPR) can be responded to by returning an Individual Parameter Change (IPC) or by simply sending an IPC. Receipt of an IPR causes the corresponding parameter IPC to be sent back. Receipt of an IPC causes a change of the corresponding parameter value.

An Individual Parameter Change can also be used to issue some command to the CTK-671, and the Individual Parameter Request can be used to check CTK-671 status information.

Receiving Device	Sending Device	Operation
IPR →		Send Request (Optional)
	← IPC	Data Transfer

See "Parameter List" in this document for information about which parameters can actually be sent.

## 2.3 Parameter Set Transfer Modes

### 2.3.1 Communication Modes

Parameter Sets can be transferred by bulk dump, using the types of message exchanges described below.

- One-way mode Parameter Set send/receive
- One-way mode Parameter Set send request send/receive
- Handshake mode Parameter Set send/receive
- Handshake mode Parameter Set send request, receive rejected, error notification send/receive

With the One-way mode, the sending device sends data and ends the session without paying any attention to the response of the receiving device. This mode is best for one-way transfers from a sequencer or similar device.

With the Handshake mode, after the sending device sends the data, it confirms response from the receiving device and then advances to the next session. This is a high-speed mode in which there is no time wasted waiting.

See "Parameter Set" in this document for information about how Parameter Sets are actually allocated.

In order to ensure maximum speed for bulk dumping of a Parameter Set, the data format used is different from that used for Individual Parameter Change. Data is transferred as-is, using the CTK-671 memory image.

One Parameter Set can be transferred per session. A large Parameter Set can be divided into multiple packets for transfer. In this case, <index> field packet numbers are used.

When transferring multiple groups of small Parameter Sets, each Parameter Set must be allocated to its own packet. Multiple Parameter Sets cannot be included within the same packet.

### 2.3.2 One-way Mode Communication Flow

A session starts with the receiving device sending a request using a BDR, or with the sending device sending BDS data. The session ends after transfer of all of the data in the Parameter Set being transferred by the sending device is complete.

When the CTK-671 receives a BDR, it sends back the applicable Set as a BDS. When the CTK-671 receives a BDS, it changes the corresponding Parameter Set value. Data is divided into multiple packets of 256 bytes or less each, and transfers them at fixed intervals (20 msec).

A final EOD informs the receiving device that the session is ended.

Receiving Device	Sending Device	Operation
BDR →		Send Request (Optional)
	← BDS	Data Transfer
20 msec or greater interval	← BDS	Data Transfer
20 msec or greater interval	← BDS	Data Transfer
20 msec or greater interval	← BDS	Data Transfer
:		
:		
← EOD		Data Transfer

### 2.3.3 Handshake Mode Communication Flow

A session starts with the receiving device sending a request using an HDR, or with the sending device sending HDS data.

The sending device does not send the next packet until it receives an ACK from the receiving device. The maximum wait time is at least 100 msec. Failure of a response to arrive within the wait time (at least 100 msec) is treated as a timeout error, and data communication is terminated.

The sending device resends the last data if the receiving device returns an HDE (error) due to checksum mismatch, incompatible data structure, or some other reason. If an error repeats a number of times (undefined), either the sending device or the receiving device sends an HDJ to terminate the session.

A session ends after the sending device sends all the Parameter Sets, and sends a final EOD in response to an HAD (ACK) from the sending device.

Receiving Device	Sending Device	Operation
HDR →		Send Request (Optional)
	← HDS	Data Send
HDA →		Acknowledge
	← HDS	Data Send
HDA →		Acknowledge
:		
:		
HDA →	Acknowledge	
	← EOD	End Of Data

The same packet is resent when a checksum mismatch or incompatible data structure error is detected.

Receiving Device	Sending Device	Operation
HDR →		Send Request (Optional)
	← HDS	Data Send
HDA →		Acknowledge
	← HDS	Data Send
HDE →		Acknowledge
	← HDS	Data Re-send
:		
:		
HDE →		Acknowledge
	← EOD	End Of Data

Data send is canceled when ACK is not received.

Receiving Device	Sending Device	Operation
HDR →		Send Request (Optional)
	← HDS	Data Send
HDA →		Acknowledge
	← HDS	Data Send
HDJ →		Rejection
		(Send Canceled)

The session can be canceled for any reason by sending an HDJ. The HDJ can be sent by the sending device or the receiving device. The bulk dump session is terminated immediately upon receipt of an HDJ.

Receiving Device	Sending Device	Operation
HDR →		Send Request (Optional)
	← HDS	Data Send
HDA →		Acknowledge
	← HDS	Data Send
:		
:		
HDJ →		Data Receive Rejected
		(Send Canceled)

Receiving Device	Sending Device	Operation
HDR	→	Send Request (Optional)
HDA	→	Acknowledge
	← HDS	Data Send
HDA	→	Acknowledge
	← HDS	Data Send
	:	
	← HDJ	Data Send Rejected

See "4. Parameter Set List" in this document for information about how Parameter Sets can actually be sent.

### 3. Parameter List

This list shows the parameters that can be transferred individually using System Exclusive Messages.

- Note 1  
Any parameter that has "r" to the right of its Parameter ID number is a read-only parameter that can be used for obtaining status information only. A parameter with "w" next to its Parameter ID is a write-only parameter, which is used for commands, etc.
- Note 2  
All values in the Parameter List are hexadecimal, unless specifically noted otherwise.
- Note 3  
Receipt of a value outside a specified range causes the value marked "Default" to be used instead.

#### 3.1 Command Parameter

##### 3.1.1 Parameter Set Overview

The parameters defined here mainly execute commands and indicate statuses. Values indicate the pointer to a command or a status.

##### 3.1.2 Command Parameter List

###### 3.1.2.1 System Exclusive Format

Field	Value	
01	SYSEX	F0
02	MAN	44
03	MOD	11, 01
04	dev	00 to 1F, or 7F
05	act	0(IPC), 1(IPR)
06	cat	Command = 0
07	prm	00 - 7F
08	ilen	0
09	dlen	bit size - 1
10	ps	LSB,MSB = 00, 00
11	<index>	00
12	<data>	See "2.1 Format."
13	<sum>	None
14	EOX	F7

###### 3.1.2.2 Parameter List

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
00r	Model Version ID	8	00	0	00 = CTK671

This is the version number of models with the same System Exclusive Model ID = 11-01. This value is used to specify the model for a parameter send request from an external source.

03w Part	DSP	Cancel	10	0000 - FFFF	0	Bit0....Part1
						Bit1....Part2
						:
						Bit15...Part16
						0...Nop
						1...DSP cancel

This is a request to look up and cancel the tone status of parts whose bits are set. It does this by canceling the DSP Line selection of the parts whose corresponding bit is 1.

If the selected tone is an Advanced Tone, receipt of a DSP Line Cancel changes the tone to its corresponding Normal Tone and then turns off the DSP Line. When a Normal Tone or User Tone is selected, the tone is not changed, but if the DSP Line is on the DSP side, it is changed to Thru.

##### 3.1.3 Song / Rhythm Pattern Command Parameter List

###### 3.1.3.1 System Exclusive Format

Field	Value	
01	SYSEX	F0
02	MAN	44
03	MOD	11, 01
04	dev	00 to 1F, or 7F
05	act	0(IPC), 1(IPR)
06	cat	Command = 0
07	prm	00 - 7F
08	ilen	0
09	dlen	bit size - 1
10	ps	LSB,MSB = 00, 00
11	<index>	Song Number 0000 to 0001 or Rhythm Number 0000 to 0003 00 when not needed
12	<data>	See "2.1 Format."
13	<sum>	None
14	EOX	F7

###### 3.1.3.2 Parameter List

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
---- Sequencer and Rhythm Pattern Data Command					
21w	Song Delete	8	0 - 1	0	Song Number
22w	Rhythm Delete	8	0 - 3	0	Rhythm Number
23r	Free Size	20	0 - FFFFFFFF	0	Free size (bytes)
This parameter reserves rhythm pattern and song memory space. The Song Number and Rhythm Number specifications are not necessary.					
--- Rhythm Information Parameter (index = Rhythm Number 0 - 3)					
24r	Rhythm Size	20	0 - FFFFFFFF	0	Rhythm size (bytes)
25r	Rhythm Name A	20	0 - FFFFFFFF	556e7469	MSB is first character.
26r	Rhythm Name B	20	0 - FFFFFFFF	746c6564	MSB is first character.
--- Song Information Parameter (index = Song Number 0 - 1)					
27r	Song Size	20	0 - FFFFFFFF	0	Song size (bytes)
28r	Song Name A	20	0 - FFFFFFFF	556e7469	MSB is first character.
29r	Song Name B	20	0 - FFFFFFFF	746c6564	MSB is first character.

### 3.2 Patch Parameter

#### 3.2.1 Parameter Set Overview

The patch parameter is a temporary area that controls the operational status of the sound source.

Mixer settings, synthesizer function, DSP function and other editable parameters are also included in this function.

The contents of this area are rewritten whenever preset data or user data is selected. The parameters in this area are written into the user area whenever data is written into the user data area.

### 3.2.2 Patch Common Parameter List

This list shows parameters that are common for each part.

#### 3.2.2.1 System Exclusive Format

Field		Value
01	SYSEX	F0
02	MAN	44
03	MOD	11, 01
04	dev	00 to 1F, or 7F
05	act	0(IPC), 1(IPR)
06	cat	Patch = 1
07	prm	00 - 7F
08	ilen	0
09	dlen	bit size - 1
10	ps	LSB,MSB = 00, 00
11	<index>	00
12	<data>	See "2.1 Format."
13	<sum>	None
14	EOX	F7

#### 3.2.2.2 Parameter List

##### • MIDI Parameter

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
00	MIDI Device ID	7	00 - 1F	10	0 - 31

This parameter sets the SysEx Device ID.

01	MIDI Global Ch	4	00 - 0F	00	1 - 16
----	----------------	---	---------	----	--------

##### • Tune / Mix Parameter

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
04	Master Fine Tune	8	00 - FF	80	-100 - 0 - 99cent

See the "6.1.1.7 -99 - 0 - 99 Setting Value Table."

05	Master Coarse Tune	7	28 - 58	40	-24 - 0 - 24semi
----	--------------------	---	---------	----	------------------

See the "6.1.1.4 -24 - 0 - 24 Setting Value Table."

08	Master Volume	7	00 - 7F	7F	0 - 127
09	Master Pan	7	00 - 7F	40	-64 - 0 - 64

See the "6.1.1.6 Pan Setting Value Table."

0A	Chorus Send To Reverb	7	00 - 7F	00	0 - 127
----	-----------------------	---	---------	----	---------

This specifies the volume of data sent from System Chorus to System Reverb.

0B	DSP Line Cancel	1	0 - 1	0	0...Normal 1...DSP Cancel
----	-----------------	---	-------	---	------------------------------

DSP Cancel corresponds to the control panel's DSP Off/On setting. Specifying "Cancel" for this value forces disabling of DSP input for all voices, and produces sounds through the system.

Note, however, that voices that are already sounding are maintained.

Since this parameter has virtually no affect on DSP output, reverberating sound within the DSP and the LoFi noise generator signal continue to be output, even when the "Cancel" setting is selected.

##### • System Chorus

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
10	Chorus Macro Num	5	00 - 0F	02	0 - 15

Selects the System Chorus preset type.

Receipt of GM On selects Chorus3.

Operation of this type value is also linked with the following parameters, and changes them to prescribed values.

See "6.1.1.11 Chorus Type Setting Value Table."

11	Chorus Level	7	00 - 7F	40	0 - 127
12	Chorus Rate	7	00 - 7F	03	0 - 127
13	Chorus Depth	7	00 - 7F	13	0 - 127
14	Chorus Feedback	7	00 - 7F	00	0 - 127

Sets System Chorus feedback amount.

15	Chorus Tone	7	00 - 7F	7F	0 - 127
----	-------------	---	---------	----	---------

Adjusts the System Chorus timbre.

##### • System Reverb

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
18	Reverb Macro Num	5	00 - 0F	04	0 - 15

Selects the System Reverb preset type.

Receipt of GM On selects Hall2.

Operation of this type value is also linked with the following parameters, and changes them to prescribed values.

See "6.1.1.10 Reverb Type Setting Value Table."

19	Reverb Level	7	00 - 7F	40	0 - 127
1A	Reverb Time/Del Feedback	7	00 - 7F	40	0 - 127
1B	Reverb ER Level	7	00 - 7F	40	0 - 127
1C	Reverb Hi Damp	7	00 - 7F	40	0 - 127
1D	Reverb Tone	7	00 - 7F	7F	0 - 127

##### • Master Equalizer

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
20	Master EQ Macro Num	5	00 - 13	00	

Selects the Master EQ preset type.

Receipt of GM On selects Standard.

Operation of this type value is also linked with the following parameters, and changes them to prescribed values.

See "6.1.1.9 Master EQ Type Setting Value Table."

21	MasEq Lo Freq	7	00 - 7F	40	0 - 2
----	---------------	---	---------	----	-------

Selects the Master EQ low-range cutoff frequency.

See the "6.1.1.12 Equalizer Low Frequency Setting Value Table."

22	MasEq Lo Gain	7	00 - 40 - 7F	40	-12 - 0 - +12
----	---------------	---	--------------	----	---------------

Selects the Master EQ low-range gain.

See the "6.1.1.15 Equalizer Gain Setting Value Table."

23	MasEq Mid-Lo Freq	7	00 - 7F	40	0 - 7
----	-------------------	---	---------	----	-------

Selects the Master EQ mid frequency.

See the "6.1.1.13 Equalizer Low Frequency Setting Value Table."

24 MasEq Mid-Lo Gain 7 00 - 40 - 7F 40 -12 - 0 - +12

Selects the Master EQ mid-range gain.  
See the "6.1.1.15 Equalizer Gain Setting Value Table."

25 MasEq Mid-Hi Freq 7 00 - 7F 40 0 - 7

Selects the Master EQ mid-high frequency type.  
See the "6.1.1.13 Equalizer Mid Frequency Setting Value Table."

26 MasEq Mid-Hi Gain 7 00 - 40 - 7F 40 -12 - 0 - +12

Selects the Master EQ mid-high range gain.  
See the "6.1.1.15 Equalizer Gain Setting Value Table."

27 MasEq Hi Freq 7 00 - 7F 40 0 - 2

Selects the Master EQ high-range cutoff frequency.  
See the "6.1.1.14 Equalizer High Frequency Setting Value Table."

28 MasEq Hi Gain 7 00 - 40 - 7F 40 -12 - 0 - +12

Selects the Master EQ high-range gain.  
See the "6.1.1.15 Equalizer Gain Setting Value Table."

• DSP Patch Parameter

This block also stores values when the DSP Type or Tone is changed.

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
2C	DSP Type Number	7	00 - 7F	00	0 - 99 Preset 100 - 109 User

Selects the DSP Type.  
Receipt of GM On selects "014 Delay."  
127 is stored when a tone-associated DSP is read into the DSP area.

2D DSP Hold 1 0 - 1 0 0...Off  
1...On

2E DSP Level 7 00 - 7F 64 0 - 127

2F DSP Pan 7 00 - 7F 40 -64 - 0 - 63

See the "6.1.1.6 Pan Setting Value Table."

• DSP Type parameter

The value of this parameter is rewritten whenever the DSP Type or Tone is changed.

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
30	DSP Name A	20	0 - FFFFFFFF	556e7469	MSB is first character.
31	DSP Name B	20	0 - FFFFFFFF	746c6564	MSB is first character.

These parameters change the DSP name. One character is indicated by each byte.

32r DSP Algorithm ID 7 00 - 3F 00 0 - 63

This value is the DSP algorithm ID, which cannot be changed at the user level.  
Changing the DSP Type or Tone Number causes the algorithm ID of the main DSP to be copied automatically to this area.  
See "6.1.1.16 DSP Algorithm ID Table."

33 DSP Chorus Send 7 00 - 7F 40 0 - 127  
34 DSP Reverb Send 7 00 - 7F 40 0 - 127

DSP Type Independent Parameters

The eight parameters listed below are DSP User Parameters that can be set from the control panel, while the next 16 parameters are Internal Parameters that cannot be edited on the control panel. The range of these parameter values is 0 to 127, regardless of the DSP algorithm. However, the parameters that are available depend on the DSP algorithm, which means that not all User Parameters and Internal Parameters are necessarily available as a particular DSP's parameters.

See the "DSP Parameter List" for details about parameters and their contents.

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
38	DSP User Parameter0	7	00 - 7F	-	0 - 127
39	DSP User Parameter1	7	00 - 7F	-	0 - 127
3A	DSP User Parameter2	7	00 - 7F	-	0 - 127
3B	DSP User Parameter3	7	00 - 7F	-	0 - 127
3C	DSP User Parameter4	7	00 - 7F	-	0 - 127
3D	DSP User Parameter5	7	00 - 7F	-	0 - 127
3E	DSP User Parameter6	7	00 - 7F	-	0 - 127
3F	DSP User Parameter7	7	00 - 7F	-	0 - 127
40	DSP Internal Param00	7	00 - 7F	-	0 - 127
41	DSP Internal Param01	7	00 - 7F	-	0 - 127
42	DSP Internal Param02	7	00 - 7F	-	0 - 127
43	DSP Internal Param03	7	00 - 7F	-	0 - 127
44	DSP Internal Param04	7	00 - 7F	-	0 - 127
45	DSP Internal Param05	7	00 - 7F	-	0 - 127
46	DSP Internal Param06	7	00 - 7F	-	0 - 127
47	DSP Internal Param07	7	00 - 7F	-	0 - 127
48	DSP Internal Param08	7	00 - 7F	-	0 - 127
49	DSP Internal Param09	7	00 - 7F	-	0 - 127
4A	DSP Internal Param10	7	00 - 7F	-	0 - 127
4B	DSP Internal Param11	7	00 - 7F	-	0 - 127
4C	DSP Internal Param12	7	00 - 7F	-	0 - 127
4D	DSP Internal Param13	7	00 - 7F	-	0 - 127
4E	DSP Internal Param14	7	00 - 7F	-	0 - 127
4F	DSP Internal Param15	7	00 - 7F	-	0 - 127

3.2.3 Patch Part Parameter List

This list shows parameters that are specific for each part.

3.2.3.1 System Exclusive Format

Field	Value
01	SYSEX F0
02	MAN 44
03	MOD 11, 01
04	dev 00 to 1F, or 7F
05	act 0(IPC), 1(IPR)
06	cat Patch = 1
07	prm 00 - 7F
08	ilen 0
09	dlen bit size - 1
10	ps Parameter Set Number LSB,MSB = 00, 00
11	<index> Part Number(00-0F)
12	<data> See "2.1 Format."
13	<sum> None
14	EOX F7

3.2.3.2 Parameter List

• Basic parameter

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
50	Tone Number	E	000 - 189		Tone Number

This value is the tone number allocated to this part.

000 - 063	Panel Normal Tone
064 - 0C7	Panel DSP Tone
0C8 - 147	Panel GM Tone
148 - 151	Drum
180 - 189	User Tone

51 Part Octave Shift	3	2 - 6	4	-2 - 0 - 2 Oct
52 Part Enable	1	0 - 1	1	0...Disable (Off) 1...Enable (On)
53 Part Mode	1	0 - 1	0	0...Melody 1...Rhythm

Sets the melody and rhythm modes of the part play operation.

• Tune / Mix parameter

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
54	Pitch Fine Tune	8	00 - FF	80	-99 - 0 - 99cent
55	Pitch Coarse Tune	7	28 - 58	40	-24 - 0 - 24semi
56	Volume	7	00 - 7F	7F	0 - 127
57	Accomp Volume	7	00 - 7F	7F	0 - 127
58	Bend Range	7	00 - 18	02	0 - +24
59	Pan	7	00 - 7F	40	-64 - 0 - 63

• Tone parameter

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
60	Tone Name A	20	0 - FFFFFFFF	556e7469	MSB is first character.
61	Tone Name B	20	0 - FFFFFFFF	746c6564	MSB is first character.

These parameters change the tone name. One character is indicated by each byte.

64 Line Select	1	0 - 1	0	0...Thru 1...DSP
65 Tone Octave Shift	3	2 - 6	4	-2 - 0 - +2 Oct
66 Tone Attack Time	7	00 - 7F	40	-64 - 0 - +63
67 Tone Release Rate	7	00 - 7F	40	-64 - 0 - +63
68 Tone DCF Cutoff	7	00 - 7F	40	-64 - 0 - +63
69 Tone DCF Resonance	7	00 - 7F	40	-64 - 0 - +63
6A Chorus Send	7	00 - 7F	00	0 - 127
6B Reverb Send	7	00 - 7F	32	0 - 127
6C Tone Level	7	00 - 7F	7F	0 - 127
6D Tone Touch Sens	7	00 - 7F	40	-64 - 0 - +63

• LFO Parameter

ParamID	Parameter	bit	Value	Default	Setting Value (Decimal)
7A LFO Wave	4	0 - 3	0	LFO Waveform 0...Triangle 1...Saw Up 2...Square 3...Sin	
7B LFO Delay	7	00 - 7F	40	-64 - 0 - 64	
7C LFO Rate	7	00 - 7F	40	-64 - 0 - 64	
7D LFO Pitch Depth	7	00 - 7F	40	-64 - 0 - 64	
7E LFO Modulation Sens	7	00 - 7F	00	0 - 127	

This parameter adjusts the depth of the LFO effect when the Modulation MIDI Control Change is received.

7F LFO Aftertouch Sens	7	00 - 7F	00	0 - 127
------------------------	---	---------	----	---------

This parameter adjusts the depth of the LFO effect when MIDI Channel Aftertouch is received.

• About the Part Mode

Each of the CTK-671 parts has a parameter called "Part Mode," which can be set to either Melody mode or Rhythm mode. Melody tones must be set to the Melody mode, while drum maps used for rhythm tones must be set to the Rhythm mode.

The Part Mode parameter can be changed using a System Exclusive message (see the section of this document titled "CTK-671 System Exclusive Format"). The Part Mode parameter can also be changed by receipt of a Program Change message in accordance with the Bank number specified by a Bank Select message.

Operation at this time depends on the receiving MIDI channel, as indicated below.

Operation when Bank Select/Program change is received over channel other than Channel 10

If the Bank Select MSB is 78H, 7EH, or 7FH, receipt of Program Change switches to the Rhythm mode.

For any other Bank Select MSB, receipt of the Program Change message changes to the Melody mode.

Operation when Bank Select/Program change is received over Channel 10

If the Bank Select MSB is 78H, 7EH, or 7FH, receipt of Program Change message switches to the Rhythm mode.

If the Bank Select MSB is 41H, 42H, 43H, 44H, 45H, 46H, or 79H, receipt of Program Change changes to the Melody mode.

For any other Bank Select MSB, receipt of the Program Change message does not change the Play Mode.

## 4. Parameter Set List

This list shows the Parameter Sets that can be transferred using System Exclusive Message Bulk Dump.

### 4.1 User Tone Parameter Set

• System Exclusive Format

Field	Value
01	SYSEX F0
02	MAN 44
03	MOD 11, 01
04	dev 00 to 1F, or 7F
05	act 2(BDS), 3(BDR), 4(HDS), 5(HDR), 7(Control)
06	cat Tone = 2
07	prm 00 - 7F
08	ilen See "2.1 Format."
09	dlen See "2.1 Format."
10	ps Indicates the tone number being transferred. User Tones 01 to 10 correspond to 0180H to 0189H. See "Tone Number" in the "3.2.3 Patch Part Parameter List."
11	<index> See "2.1 Format."
12	<data> See "2.1 Format."
13	<sum> See "2.1 Format."
14	EOX F7

### 4.2 User DSP Parameter Set

• System Exclusive Format

Field	Value	
01	SYSEX	F0
02	MAN	44
03	MOD	11, 01
04	dev	00 to 1F, or 7F
05	act	2(BDS), 3(BDR), 4(HDS), 5(HDR), 7(Control)
06	cat	DSP = 9
07	prm	00 - 7F
08	ilen	See "2.1 Format."
09	dlen	See "2.1 Format."
10	ps	Indicates the DSP number being transferred. User DSP 01 to 10 correspond to 0064H to 006DH. See "DSP Type Number" in the "3.2.3 Patch Part Parameter List."
11	<index>	See "2.1 Format."
12	<data>	See "2.1 Format."
13	<sum>	See "2.1 Format."
14	EOX	F7

### 4.3 Song Data

• System Exclusive Format

Field	Value	
01	SYSEX	F0
02	MAN	44
03	MOD	11, 01
04	dev	00 to 1F, or 7F
05	act	2(BDS), 3(BDR), 4(HDS), 5(HDR), 7(Control)
06	cat	Song = A
07	prm	00
08	ilen	See "2.1 Format."
09	dlen	See "2.1 Format."
10	ps	Indicates the song number being transferred. Song 0 and 1 correspond to 0000H and 0001H. See "DSP Type Number" in the "3.2.3 Patch Part Parameter List."
11	<index>	See "2.1 Format."
12	<data>	See "2.1 Format."
13	<sum>	See "2.1 Format."
14	EOX	F7

### 4.4 User Rhythm Pattern

• System Exclusive Format

Field	Value	
01	SYSEX	F0
02	MAN	44
03	MOD	11, 01
04	dev	00 to 1F, or 7F
05	act	2(BDS), 3(BDR), 4(HDS), 5(HDR), 7(Control)
06	cat	DSP = B
07	prm	00 - F
08	ilen	See "2.1 Format."
09	dlen	See "2.1 Format."
10	ps	Indicates the rhythm number being transferred. User Rhythms 01 to 04 correspond to 0000H to 0003H. See "DSP Type Number" in the "3.2.3 Patch Part Parameter List."
11	<index>	See "2.1 Format."
12	<data>	See "2.1 Format."
13	<sum>	See "2.1 Format."
14	EOX	F7

### 4.5 Registration Data

• System Exclusive Format

Field	Value	
01	SYSEX	F0
02	MAN	44
03	MOD	11, 01
04	dev	00 to 1F, or 7F
05	act	2(BDS), 3(BDR), 4(HDS), 5(HDR), 7(Control)
06	cat	DSP = C
07	prm	00 - 7F
08	ilen	See "2.1 Format."
09	dlen	See "2.1 Format."
10	ps	Indicates the Registration number being transferred. Registration 0-1 to 3-4 correspond to 0000H to 000FH. See "DSP Type Number" in the "3.2.3 Patch Part Parameter List."
11	<index>	See "2.1 Format."
12	<data>	See "2.1 Format."
13	<sum>	See "2.1 Format."
14	EOX	F7

### 5. DSP Parameter List

This list shows the parameters for each of the DSP algorithms.

- U0 to U7 indicate User Parameters 0 to 7, while I00 to I15 indicate Internal Parameters 00 to 15.
- In the case of parameters for which no setting range is indicated, receipt of a value from 0 to 127 is assigned as-is to the parameter.

Algorithm 00 (00H) : Auto Pan

- U0 Rate
- U1 Depth

Algorithm 01 (01H) : Tremolo

- U0 Rate
- U1 Depth

Algorithm 02 (02H) : 2BandEQ

- U0 Low Frequency - See the "6.1.1.12 Equalizer Low Frequency Setting Value Table."
- U1 Low Gain - See the "6.1.1.15 Equalizer Gain Setting Value Table."
- U2 High Frequency - See the "6.1.1.14 Equalizer High Frequency Setting Value Table."
- U3 High Gain - See the "6.1.1.15 Equalizer Gain Setting Value Table."

Algorithm 03 (03H) : 3BandEQ

- U0 Low Frequency - See the "6.1.1.12 Equalizer Low Frequency Setting Value Table."
- U1 Low Gain - See the "6.1.1.15 Equalizer Gain Setting Value Table."
- U2 Mid Frequency - See the "6.1.1.13 Equalizer Mid Frequency Setting Value Table."
- U3 Mid Gain - See the "6.1.1.15 Equalizer Gain Setting Value Table."
- U4 High Frequency - See the "6.1.1.14 Equalizer High Frequency Setting Value Table."
- U5 High Gain - See the "6.1.1.15 Equalizer Gain Setting Value Table."

Algorithm 04 (04H) : LFO Wah

- U0 Input Level
- U1 Resonance
- U2 Manual
- U3 LFO Rate
- U4 LFO Depth



Algorithm 05 (05H) : Auto Wah

- U0 Input Level
- U1 Resonance
- U2 Manual
- U3 Depth                See the "6.1.1.5 -64 - 0 - 63 Setting Value Table."
- I00 Sensitivity

Algorithm 06 (06H) : Compressor

- U0 Depth
- U1 Attack
- U2 Release
- U3 Level
- I00 Threshold        Adjusts the Compressor threshold level.

Algorithm 07 (07H) : Limiter

- U0 Limit
- U1 Attack
- U2 Release
- U3 Level

Algorithm 08 (08H) : Distortion

- U0 Gain
- U1 Low
- U2 High
- U3 Level

Algorithm 09 (09H) : Stereo Phaser

- U0 Resonance
- U1 Manual             See the "6.1.1.5 -64 - 0 - 63 Setting Value Table."
- U2 Rate
- U3 Depth
- U4 Wet Level

Algorithm 10 (0AH) : Phaser

- U0 Resonance
- U1 Manual             See the "6.1.1.5 -64 - 0 - 63 Setting Value Table."
- U2 Rate
- U3 Depth
- U4 Wet Level

Algorithm 11 (0BH) : Rotary

- U0 Speed
- U1 Break              See the "6.1.1.3 Rotate/Break Setting Value Table."
- U2 Fall Accel
- U3 Rise Accel
- U4 Slow Rate
- U5 Fast Rate

Algorithm 12 (0CH) : Drive - Rotary

- U0 Overdrive Gain
- U1 Overdrive Level
- U2 Speed              See the "6.1.1.2 Slow/Fast Setting Value Table."
- U3 Break              See the "6.1.1.3 Rotate/Break Setting Value Table."
- U4 Fall Accel
- U5 Rise Accel
- U6 Slow Rate
- U7 Fast Rate

Algorithm 13 (0DH) : Enhancer

- U0 Low Frequency
- U1 Low Gain
- U2 High Frequency
- U3 High Gain

Algorithm 14 (0EH) : Ring Modulator

- U0 OSC Frequency
- U1 LFO Rate
- U2 LFO Depth
- U3 Wet Level
- U4 Dry Level

Algorithm 15 (0FH) : LoFi

- U0 Noise Level 1
- U1 Noise Density 1
- U2 Noise Level 2
- U3 Noise Density 2
- U4 Tone
- U5 Resonance
- U6 Bass                See the "6.1.1.5 -64 - 0 - 63 Setting Value Table."
- U7 Level

Algorithm 16 (10H) : 1 Phase Chorus

- U0 LFO Rate
- U1 LFO Depth
- U2 Feedback         See the "6.1.1.5 -64 - 0 - 63 Setting Value Table."
- U3 Wet Level

Algorithm 17 (11H) : Sin 2-Phase Chorus

- U0 LFO Rate
- U1 LFO Depth
- U2 Feedback         See the "6.1.1.5 -64 - 0 - 63 Setting Value Table."
- U3 Wet Level

Algorithm 18 (12H) : 3-Phase Chorus

- U0 Rate1
- U1 Depth1
- U2 Rate2
- U3 Depth2
- U4 Wet Level

Algorithm 19 (13H) : Tri 2-Phase Chorus

- U0 LFO Rate
- U1 LFO Depth
- U2 Feedback         See the "6.1.1.5 -64 - 0 - 63 Setting Value Table."
- U3 Wet Level

Algorithm 20 (14H) : Stereo Delay 1

- U0 Delay Time
- U1 Wet Level
- U2 Feedback
- U3 High Damp
- U4 Ratio L
- U5 Ratio R

Algorithm 21 (15H) : Stereo Delay 2

- U0 Delay Time
- U1 Wet Level
- U2 Feedback
- U3 High Damp
- U4 Ratio L
- U5 Ratio R

Algorithm 22 (16H) : 3-Tap Delay

- U0 Delay Time
- U1 Wet Level
- U2 Feedback
- U3 High Damp
- U4 Ratio L
- U5 Ratio C
- U6 Ratio R

Algorithm 23 (17H) : Gate Reverb

- U0 LPF
- U1 HPF
- U2 Feedback
- U3 High-Damp
- U4 Diffusion
- U5 Wet Level
- U6 Dry Level

Algorithm 24 (18H) : Reverse Gate Reverb

- U0 LPF
- U1 HPF
- U2 Feedback
- U3 High-Damp
- U4 Diffusion
- U5 Wet Level
- U6 Dry Level

Algorithm 25 (19H) : Reflection

- U0 Type                    See the 6.1.1.8 "Type 0 to Type 7 Setting Value Table."
- U1 Wet Level
- U2 Feedback
- U3 Tone

Algorithm 26 (1AH) : Flanger

- U0 LFO Rate
- U1 LFO Depth
- U2 Feedback            See the "6.1.1.5 -64 - 0 - 63 Setting Value Table."
- U3 Wet Level

Algorithm 27 (1BH) : Reverb

- U0 Tone
- U1 Time
- U2 High-Damp
- U3 ER Level
- U4 Wet Level

Algorithm 28 (1CH) : 2-Tap Delay

- U0 Delay Time
- U1 Wet Level
- U2 Feedback
- U3 High-Damp
- U4 Ratio L
- U5 Ratio R

◆ The multi algorithms (M00 to M31) listed below are combinations of the algorithms described above. Parameter operations and other details are the same as the previous algorithms, so there is no separate explanation provided here.

Algorithm M00 (20H) : Multi00

- U0 Chorus Rate
- U1 Chorus Depth
- U2 Chorus Feedback
- U3 Chorus Wet Level
- U4 Delay Time
- U5 Delay Wet Level
- U6 Delay Feedback
- U7 Delay High-Damp
- I06 Delay Ratio L
- I07 Delay Ratio R

Algorithm M01 (21H) : Multi01

- U0 Chorus Fast Rate
- U1 Chorus Fast Depth
- U2 Chorus Slow Rate
- U3 Chorus Slow Depth
- U4 Chorus Wet Level
- U5 Delay Time
- U6 Delay Wet Level
- U7 Delay Feedback
- I03 Delay High-Damp
- I04 Delay Ratio L
- I05 Delay Ratio C
- I06 Delay Ratio R

Algorithm M02 (22H) : Multi02

- U0 Phaser Resonance
- U1 Phaser Manual
- U2 Phaser Rate
- U3 Phaser Depth
- U4 Chorus Rate 1
- U5 Chorus Depth 1
- U6 Chorus Rate 2
- U7 Chorus Depth 2
- I03 Phaser Wet Level
- I06 Chorus Wet Level

Algorithm M03 (23H) : Multi03

- U0 Flanger LFO Rate
- U1 Flanger LFO Depth
- U2 Flanger Feedback
- U3 Flanger Wet Level
- U4 Delay Time
- U5 Delay Wet Level
- U6 Delay Feedback
- U7 Delay High-Damp
- I06 Delay Ratio L
- I07 Delay Ratio R

Algorithm M04 (24H) : Multi04

- U0 Phaser Resonance
- U1 Phaser Manual
- U2 Phaser Rate
- U3 Phaser Depth
- U4 Phaser Wet Level
- U5 Delay Time
- U6 Delay Wet Level
- U7 Delay Feedback
- I05 Delay High-Damp
- I06 Delay Ratio L
- I07 Delay Ratio R

Algorithm M05 (25H) : Multi05

- U0 Enhancer Low Frequency
- U1 Enhancer Low Gain
- U2 Enhancer High Frequency
- U3 Enhancer High Gain
- U4 Chorus LFO Rate
- U5 Chorus LFO Depth
- U6 Chorus Feedback
- U7 Chorus Wet Level

Algorithm M06 (26H) : Multi06

- U0 Enhancer Low Frequency
- U1 Enhancer Low Gain
- U2 Enhancer High Frequency
- U3 Enhancer High Gain
- U4 Delay Time
- U5 Delay Wet Level
- U6 Delay Feedback
- U7 Delay High-Damp
- I06 Delay Ratio L
- I07 Delay Ratio R

Algorithm M07 (27H) : Multi07

- U0 Enhancer Low Frequency
- U1 Enhancer Low Gain
- U2 Enhancer High Frequency
- U3 Enhancer High Gain
- U4 Flanger LFO Rate
- U5 Flanger LFO Depth
- U6 Flanger Feedback
- U7 Flanger Wet Level
- I06 Flanger Delay Time L
- I07 Flanger Delay Time R

Algorithm M08 (28H) : Multi08

- U0 Chorus LFO Rate
- U1 Chorus LFO Depth
- U2 Chorus Feedback
- U3 Chorus Wet Level
- U4 Flanger LFO Rate
- U5 Flanger LFO Depth
- U6 Flanger Feedback
- U7 Flanger Wet Level

Algorithm M09 (29H) : Multi09

- U0 Chorus LFO Rate
- U1 Chorus LFO Depth
- U2 Chorus Feedback
- U3 Chorus Wet Level
- U4 Tremolo Rate
- U5 Tremolo Depth

Algorithm M10 (2AH) : Multi10

- U0 Phaser Resonance
- U1 Phaser Manual
- U2 Phaser Rate
- U3 Phaser Depth
- U4 Phaser Wet Level
- U5 Auto Pan Rate
- U6 Auto Pan Depth

Algorithm M11 (2BH) : Multi11

- U0 Compressor Depth
- U1 Compressor Attack
- U2 Compressor Level
- U3 Lo-Fi Noise 1
- U4 Lo-Fi Noise 2
- U5 Lo-Fi Tone
- U6 Lo-Fi Resonance
- U7 Lo-Fi Bass
- I00 Compressor Threshold
- I01 Compressor Release
- I02 Lo-Fi Noi1 Thrs
- I03 Lo-Fi Noi2 Thrs
- I04 Lo-Fi Level

Algorithm M12 (2CH) : Multi12

- U0 Ring OSC Frequency
- U1 Ring LFO Rate
- U2 Ring LFO Depth
- U3 Ring Wet Level
- U4 Ring Dry Level
- U5 Chorus LFO Depth
- U6 Delay Time
- U7 Delay Wet Level
- I00 Chorus LFO Rate
- I01 Chorus Feedback
- I02 Chorus Wet Level
- I09 Delay Feedback
- I10 Delay High-Damp
- I11 Delay Ratio L
- I12 Delay Ratio R

Algorithm M13 (2DH) : Multi13

- U0 Ring OSC Frequency
- U1 Ring LFO Rate
- U2 Ring LFO Depth
- U3 Ring Wet Level
- U4 Ring Dry Level
- U5 Distortion Gain
- U6 Distortion Tone
- U7 Distortion Level

Algorithm M14 (2EH) : Multi14

- U0 Lo-Fi Noise1
- U1 Lo-Fi Noise2
- U2 Lo-Fi Tone
- U3 Lo-Fi Resonance
- U4 Reflection Type
- U5 Reflection Wet Level
- U6 Reflection Feedback
- U7 Reflection Tone
- I00 Lo-Fi Noi1 Dens
- I01 Lo-Fi Noi2 Dens
- I02 Lo-Fi Bass
- I03 Lo-Fi Level

Algorithm M15 (2FH) : Multi15

- U0 Distortion Gain
- U1 Distortion Low
- U2 Distortion Tone
- U3 Distortion Level
- U4 Lo-Fi Noise1
- U5 Lo-Fi Noise2
- U6 Lo-Fi Tone
- U7 Lo-Fi Resonance
- I12 Lo-Fi Noi1 Dens
- I13 Lo-Fi Noi2 Dens
- I14 Lo-Fi Bass
- I15 Lo-Fi Level

Algorithm M16 (30H) : Multi16

- U0 Od Gain
- U1 Od Level
- U2 Rot Speed
- U3 Rot Slow Rate
- U4 Rot Fast Rate
- U5 Reflection Wet Level
- U6 Reflection Feedback
- U7 Reflection Tone
- I09 Rot Fall Accel
- I10 Rot Rise Accel
- I11 Rot Break
- I12 Reflection Type

Algorithm M17 (31H) : Multi17

- U0 Rot Speed
- U1 Rot Break
- U2 Rot Slow Rate
- U3 Rot Fast Rate
- U4 Reflection Wet Level
- U5 Reflection Feedback
- U6 Reflection Tone
- I10 Rot Fall Accel
- I11 Rot Rise Accel
- I12 Reflection Type

Algorithm M18 (32H) : Multi18

- U0 Compressor Depth
- U1 Compressor Attack
- U2 Compressor Level
- U3 Enhancer Low Gain
- U4 Enhancer High Gain
- U5 Delay Time
- U6 Delay Wet Level
- U7 Delay Feedback
- I00 Compressor Threshold
- I01 Compressor Release
- I06 Enhancer Low Frequency
- I07 Enhancer High Frequency
- I10 Delay High-Damp
- I11 Delay Ratio L
- I12 Delay Ratio R

- Algorithm M19 (33H) : Multi19
- U0 Compressor Depth
  - U1 Compressor Attack
  - U2 Compressor Release
  - U3 Compressor Level
  - U4 Delay Time
  - U5 Delay Wet Level
  - U6 Delay Feedback
  - U7 Delay High-Damp
  - I00 Compressor Threshold
  - I03 Delay Ratio L
  - I04 Delay Ratio R

- Algorithm M20 (34H) : Multi20
- U0 Phaser Resonance
  - U1 Phaser Manual
  - U2 Phaser Rate
  - U3 Phaser Depth
  - U4 Chorus LFO Rate
  - U5 Chorus LFO Depth
  - U6 Auto Pan Rate
  - U7 Auto Pan Depth
  - I03 Phaser Wet Level
  - I04 Chorus Feedback

- Algorithm M21 (35H) : Multi21
- U0 Wah Resonance
  - U1 Wah Manual
  - U2 Wah Depth
  - U3 Chorus LFO Rate
  - U4 Chorus LFO Depth
  - U5 Delay Time
  - U6 Delay Wet Level
  - U7 Delay Feedback
  - I00 Wah Sens
  - I04 Chorus Feedback
  - I05 Chorus Wet Level
  - I10 Delay High-Damp
  - I11 Delay Ratio L
  - I12 Delay Ratio R

- Algorithm M22 (36H) : Multi22
- U0 Wah Resonance
  - U1 Wah Manual
  - U2 Wah LFO Rate
  - U3 Wah LFO Depth
  - U4 Chorus LFO Depth
  - U5 Delay Time
  - U6 Delay Wet Level
  - U7 Delay Feedback
  - I02 Chorus Feedback
  - I03 Chorus Wet Level
  - I06 Chorus LFO Rate
  - I09 Delay High-Damp
  - I10 Delay Ratio L
  - I11 Delay Ratio R

- Algorithm M23 (37H) : Multi23
- U0 Compressor Depth
  - U1 Compressor Attack
  - U2 Compressor Level
  - U3 Chorus LFO Rate
  - U4 Chorus LFO Depth
  - U5 Reflection Wet Level
  - U6 Reflection Feedback
  - U7 Reflection Tone
  - I00 Compressor Threshold
  - I01 Compressor Release
  - I02 Chorus Feedback
  - I16 Reflection Type

- Algorithm M24 (38H) : Multi24
- U0 Distortion Gain
  - U1 Distortion Low
  - U2 Distortion Hi
  - U3 Distortion Level
  - U4 Chorus LFO Depth
  - U5 Delay Time
  - U6 Delay Wet Level
  - U7 Delay Feedback
  - I01 Chorus LFO Rate
  - I02 Chorus Feedback
  - I09 Delay High-Damp
  - I10 Delay Ratio L
  - I11 Delay Ratio R

- Algorithm M25 (39H) : Multi25
- U0 Compressor Depth
  - U1 Distortion Gain
  - U2 Distortion Low
  - U3 Distortion Hi
  - U4 Distortion Level
  - U5 Delay Time
  - U6 Delay Wet Level
  - U7 Delay Feedback
  - I00 Compressor Threshold
  - I01 Compressor Attack
  - I02 Compressor Release
  - I03 Compressor Level
  - I07 Delay High-Damp
  - I08 Delay Ratio L
  - I09 Delay Ratio R

- Algorithm M26 (3AH) : Multi26
- U0 Wah Manual
  - U1 Wah Depth
  - U2 Distortion Gain
  - U3 Distortion Tone
  - U4 Distortion Level
  - U5 Delay Time
  - U6 Delay Wet Level
  - U7 Delay Feedback
  - I00 Wah Sens
  - I04 Wah Resonance
  - I06 Distortion Low
  - I09 Delay High-Damp
  - I10 Delay Ratio L
  - I11 Delay Ratio R

- Algorithm M27 (3BH) : Multi27
- U0 Wah Manual
  - U1 Wah LFO Rate
  - U2 Wah LFO Depth
  - U3 Distortion Gain
  - U4 Distortion Level
  - U5 Delay Time
  - U6 Delay Wet Level
  - U7 Delay Feedback
  - I02 Wah Resonance
  - I04 Distortion Low
  - I05 Distortion Hi
  - I08 Delay High-Damp
  - I09 Delay Ratio L
  - I10 Delay Ratio R

Algorithm M28 (3CH) : Multi28

- U0 Distortion Gain
- U1 Distortion Low
- U2 Distortion Tone
- U3 Distortion Level
- U4 Delay Time
- U5 Delay Wet Level
- U6 Delay Feedback
- U7 Delay High-Damp
- I12 Delay Ratio L
- I13 Delay Ratio C
- I14 Delay Ratio R

Algorithm M29 (3DH) : Multi29

- U0 Distortion Gain
- U1 Distortion Low
- U2 Distortion Tone
- U3 Distortion Level
- U4 Phaser Resonance
- U5 Phaser Manual
- U6 Phaser Rate
- U7 Phaser Depth
- I12 Phaser Input Level
- I15 Phaser Wet Level

Algorithm M30 (3EH) : Multi30

- U0 Distortion Gain
- U1 Distortion Low
- U2 Distortion Tone
- U3 Distortion Level
- U4 Chorus LFO Rate
- U5 Chorus LFO Depth
- U6 Chorus Feedback
- U7 Chorus Wet Level

Algorithm M31 (3FH) : Multi31

- U0 Distortion Gain
- U1 Distortion Low
- U2 Distortion Tone
- U3 Distortion Level
- U4 Flanger LFO Rate
- U5 Flanger LFO Depth
- U6 Flanger Feedback
- U7 Flanger Wet Level

## 6. Setting Values and Send/Receive Values

### 6.1.1.1 Off/On Setting Value Table

Value	Transmit	Receive
Off	00H	00H - 3FH
On	7FH	40H - 7FH

### 6.1.1.2 Slow/Fast Setting Value Table

Value	Transmit	Receive
Slow	00H	00H - 3FH
Fast	7FH	40H - 7FH

### 6.1.1.3 Rotate/Break Setting Value Table

Value	Transmit	Receive
Rotate	00H	00H - 3FH
Break	7FH	40H - 7FH

### 6.1.1.4 -24 - 0 - 24 Setting Value Table

Value	Transmit/Receive
-24	28H
:	:
0	40H
:	:
24	58H

### 6.1.1.5 -64 - 0 - 63 Setting Value Table

Value	Transmit/Receive
-64	00H
-63	01H
:	:
0	40H
:	:
62	7EH
63	7FH

### 6.1.1.6 Pan Setting Value Table

Value	Transmit/Receive
Left	00H
:	:
Center	40H
:	:
Right	7FH

### 6.1.1.7 -99 - 0 - 99 Setting Value Table

Value	Transmit/Receive (MSB-LSB)
-99	00H-40H
:	:
0	40H-00H
:	:
99	7FH-00H

6.1.1.8 Type 0 to Type 7 Setting Value Table

Value	Transmit	Receive
Type 0	00H	00H - 0FH
Type 1	10H	10H - 1FH
Type 2	20H	20H - 2FH
Type 3	30H	30H - 3FH
Type 4	40H	40H - 4FH
Type 5	50H	50H - 5FH
Type 6	60H	60H - 6FH
Type 7	70H	70H - 7FH

6.1.1.9 Master EQ Type Setting Value Table

Value	Transmit/Receive
Standard	00H
Bass +	01H
Treble +	02H
Loudness	03H
Mellow	04H
Bright	05H
Rock	06H
Dance	07H
Jazz	08H
Classic	09H

6.1.1.10 Reverb Type Setting Value Table

Value	Transmit/Receive
Room1	00H
Room2	01H
Room3	02H
Hall1	03H
Hall2	04H
Plate1	05H
Delay	06H
Panning Delay	07H
Plate2	08H
Plate3	09H
Large Room1	0AH
Large Room2	0BH
Stadium1	0CH
Stadium2	0DH
Long Delay	0EH
Long Panning Delay	0FH

6.1.1.11 Chorus Type Setting Value Table

Value	Transmit/Receive
Chorus1	00H
Chorus2	01H
Chorus3	02H
Chorus4	03H
Feedback Chorus	04H
Flanger1	05H
Short Delay	06H
Short Delay FB	07H
Soft Chorus	08H
Bright Chorus	09H
Deep Chorus	0AH
Flanger2	0BH
Flanger3	0CH
Flanger4	0DH
Short Delay Modulation	0EH
Short Delay Modulation FB	0FH

6.1.1.12 Equalizer Low Frequency Setting Value Table

Value	Transmit	Receive
0(200Hz)	00H	00H - 2AH
1(400Hz)	40H	2BH - 55H
2(800Hz)	7FH	56H - 7FH

6.1.1.13 Equalizer Mid Frequency Setting Value Table

Value	Transmit	Receive
0(1.0KHz)	00H	00H - 0FH
1(1.3KHz)	10H	10H - 1FH
2(1.6KHz)	20H	20H - 2FH
3(2.0KHz)	30H	30H - 3FH
4(3.0KHz)	40H	40H - 4FH
5(4.0KHz)	50H	50H - 5FH
6(6.0KHz)	60H	60H - 6FH
7(8.0KHz)	70H	70H - 7FH

6.1.1.14 Equalizer High Frequency Setting Value Table

Value	Transmit	Receive
0(6.0KHz)	00H	00H - 2AH
1(8.0KHz)	40H	2BH - 55H
2(10.0KHz)	7FH	56H - 7FH

6.1.1.15 Equalizer Gain Setting Value Table

Value	Transmit	Receive
-12	00H	00H - 04H
-11	05H	05H - 09H
-10	0AH	0AH - 0EH
-9	0FH	0FH - 13H
-8	14H	14H - 18H
-7	19H	19H - 1DH
-6	1EH	1EH - 22H
-5	23H	23H - 27H
-4	28H	28H - 2CH
-3	2DH	2DH - 31H
-2	32H	32H - 36H
-1	37H	37H - 3BH
0	3CH	3CH - 43H
+1	44H	44H - 48H
+2	49H	49H - 4DH
+3	EH	4EH - 52H
+4	53H	53H - 57H
+5	58H	58H - 5CH
+6	5DH	5DH - 61H
+7	62H	62H - 66H
+8	67H	67H - 6BH
+9	6CH	6CH - 70H
+10	71H	71H - 75H
+11	76H	76H - 7AH
+12	7BH	7BH - 7FH

Note: The parameter value is not equivalent to dB (decibels).

6.1.1.16 DSP Algorithm ID Table

Algorithm	ID
00	00H
01	01H
02	02H
03	03H
:	:
28	1CH
M00	20H
M01	21H
M02	22H
M03	23H
:	:
M31	3FH

## 7. MIDI Implementation Notation

### 1) Hexadecimal Notation

When a MIDI implementation data value is expressed in hexadecimal, the letter "H" (for "hexadecimal") is affixed at the end of the value. The hexadecimal equivalents of decimal values 10 through 15 are expressed as the letters A through F.

DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX
0	0H	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

### 2) Ignored Values

"\*\*H" within a message indicates digits where any value can be substituted without affecting operation.