CT-S500/CT-S1000V
MIDI Implementation

CASIO COMPUTER CO., LTD.

Contents

Part I
Overview

1 Product Configuration as a MIDI Device

As a MIDI device, this Instrument consists of the System Section, Sound Generator Section, and Performance Controller Section described below. Each of these sections can send and receive specific MIDI Messages in accordance with its function.

1.1 System Section

The System Section manages the Instrument status and user data.

1.2 Performance Controller Section

The Performance Controller Section performs keyboard play and controller operations, and generates performance messages. Basically, generated performance messages are sent to external destinations while also being transmitted to the Sound Generator Section. The channel number of the sent channel message is in accordance with the Instrument's MIDI setting. For details about the MIDI setting, see the Instrument's User's Guide.

1.3 Sound Generator Section

The Sound Generator Section mainly performs receive of performance information and sound source setting information. It consists of a common part that does not depend on the channel and a musical instrument part that is independent of each channel.

1.3.1 Sound Generator Common Block

The common block consists of system effects, master control, etc. These can be controlled effect function, general universal system exclusive messages, or the Instrument's system exclusive messages or all.

1.3.2 Instrument Part Block

The instrument part section is devided into A, B, C group for every 16 parts, and it consists of a total of 48 parts. The settings of each part can be changed using channel messages or Instrument's system exclusive messages or all. Of these, only the C group can be controlled by external channel messages.

The functions assigned to each part are shown below.

Port	Part number	MIDI Receive Ch	MIDI Transmit ch	Assigned Function	Details
A	01	-	1-16	Upper1	-
A	02	-	1-16	Upper2	-
A	03	-	1-16	Lower	-
A	04	-	-	-	-
A	05	-	1-16	Auto Harmonize	-
A	06	-	6	-	-
A	07	-	7	-	-
A	08	-	8	Metronome	-
A	09	-	9	Accomp	Percussion
A	10	-	10	Accomp	Drum
A	11	-	11	Accomp	Bass
A	12	-	12	Accomp	Chord1
A	13	-	13	Accomp	Chord2
A	14	-	14	Accomp	Chord3
A	15	-	15	Accomp	Chord4
A	16	-	16	Accomp	Chord5

Port	Part number	MIDI Receive Ch	MIDI Transmit Ch	Assigned Function	Details
B	17	-	-	Recorder	System Track Upper1
B	18	-	-	Recorder	System Track Upper2
B	19	-	-	Recorder	System Track Lower
B	20	-	-	-	-
B	21	-	-	Recorder	System Track Auto Harmonize
B	22	-	-	-	-
B	23	-	-	-	-
B	24	-	-	Precount	-
B	25	-	-	-	-
B	26	-	-	-	-
B	27	-	-	-	-
B	28	-	-	-	-
B	29	-	-	-	-
B	30	-	-	-	-
B	31	-	-	-	-
B	32	-	-	-	-

Port	Part number	MIDI Receive Ch	MIDI Transmit Ch	Assigned Function	Details
C	33	1	-	MIDI/Auto Play/Recorder	Recorder Solo Track1
C	34	2	-	MIDI/Auto Play/Recorder	Recorder Solo Track2
C	35	3	-	MIDI/Auto Play/Recorder	Recorder Solo Track3
C	36	4	-	MIDI/Auto Play/Recorder	Recorder Solo Track4
C	37	5	-	MIDI/Auto Play/Recorder	Recorder Solo Track5
C	38	6	-	MIDI/Auto Play/Recorder	Recorder Solo Track6
C	39	7	-	MIDI/Auto Play	-
C	40	8	-	MIDI/Auto Play	-
C	41	9	-	MIDI/Auto Play	-
C	42	10	-	MIDI/Auto Play	-
C	43	11	-	MIDI/Auto Play	-
C	44	12	-	MIDI/Auto Play	-
C	45	13	-	MIDI/Auto Play	-
C	46	14	-	MIDI/Auto Play	-
C	47	15	-	MIDI/Auto Play	-
C	48	16	-	MIDI/Auto Play	-

2 Timbre Type Specific Operation

The sound source operation performed for a sound generator instrument receive message may depend on the value of the Timbre Type (see “About the Timbre Type” in “8 Program Change”) of each part’s operation mode. For details, see the explanation for each message.

3 Controlling Send/Receive of MIDI Messages in Each Instrument Part

Send and receive of MIDI messages for each instrument part can be controlled by global Instrument MIDI settings and Instrument-specific system exclusive messages. See the Instrument’s User’s Guide for details.

4 Conditions that Disable Message Send and Receive

No MIDI messages at all can be sent or received while the instrument starts up, shuts down, ”Wait” is on the display, etc.

Part II
Channel Message

5 Note Off

Format

Message Format:	8nH kkH vvH
	9nH kkH 00H(receive only)
n:	MIDI Channel Number
kk:	Key Number
vv:	velocity

Transmit Sent when something is played on the keyboard or when play is performed using an arpeggio, etc. The key number changes in accordance with on the Transpose function and Octave Shift function.

Receive Receipt stops a note being sounded by a note on message.

6 Note On

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

Transmit Sent when something is played on the keyboard or when play is performed using an arpeggio, etc. The key number changes in accordance with on the Transpose function and Octave Shift function.

Receive Receipt sounds a note of the corresponding instrument part.

7 Control Change

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

For details about messages, see each section of this manual that covers them.

7.1 Bank Select (00H,20H)

Message Format:	BnH 00H mmH (MSB)
	BnH 20H llH (LSB)
n:	MIDI Channel Number
mm:	MSB Value(Note1)
ll:	LSB Value(Transmit:40H, Receive:00H/40H)

Note1: For details about the relationship between the MSB value and the tone, see the Tone List that comes with the Instrument.

Transmit Sent when a tone setup number is selected.

Receive Receipt causes a change in the tone bank number stored in Instrument memory, but the tone is not actually changed until a Program Change message is received. For details, see "8 Program Change". If LSB is specified as 40H, the type of reverb, chorus, and delay will change according to the tone when the tone is changed in the Program Change message.

7.2 Modulation wheel or lever (01H)

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

Transmit Sent when the knob is operated by setting.

Receive Receipt adds, to the tone being sounded, modulation of a depth specified by the value. In the case of a tone that already has modulation applied, receipt of this message increases the modulation depth. The modulation effect differs according to the tone being used.

7.3 Portamento Time (05H)

Message Format:	BnH 05H vvH
n:	MIDI Channel Number
vv:	Value

Transmit Sent when portament time is used. Sent when the knob is operated by setting.

Receive Receipt changes the portamento application time.

7.4 Data Entry (06H,26H)

Message Format:	BnH 06H mmH (MSB) BnH 26H llH (LSB)
n:	MIDI Channel Number
mm:	MSB Value
ll:	LSB Value

Transmit Sent when there is a change to the parameter assigned to RPN, NRPN.

Receive Receipt changes the parameter assigned to RPN, NRPN.

7.5 Channel Volume (07H)

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

Transmit Sent when part volume is used. Sent when the knob is operated by setting.

Receive Receipt changes the part volume.

7.6 Pan (0AH)

Message Format:	BnH 0AH vvH
n:	MIDI Channel Number
vv:	Value(Note1)

Note1: For information about the relationship between setting values and send/receive values, see "14.5 Pan Setting Value Table" in "IV Setting Values and Send/Receive Values".

Transmit Sent when part pan is used. Sent when the knob is operated by setting.

Receive Receipt changes the pan of the corresponding part.

7.7 Expression Controller (0BH)

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

Transmit Transmitted by setting when expression pedal is connected to this Instrument.

Receive Receipt changes the expression value.

7.8 Damper pedal (sustain) (40H)

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

Transmit Sent when a pedal that has a sustain function is operated.

Receive Receipt performs an operation equivalent to a sustain pedal operation.

Timbre Type Specific Operation This operation differs in accordance with the Timbre Type (see "About the Timbre Type" in "8 Program Change") setting.

- Timbre Type: Melody,Hex Layer
  Sustain off/on control is performed in accordance with the value of the received message. For information about the relationship between setting values and send/receive values, see the "14.2 Off/On Setting Value Table" in "IV Setting Values and Send/Receive Values".

- Timbre Type: Piano
  Continuous control of the following is performed in accordance with the value of the received message.

  – Piano note decay rate

  For information about the relationship between setting values and send/receive values, see "14.3 Sustain Pedal Setting Value Table" in "IV Setting Values and Send/Receive Values."

- Timbre Type: LM (Linear Morphing) Piano
  Continuous control of the following is performed in accordance with the value of the received message.

  – Piano note decay rate
  – Resonance characteristics and decay rate of Damper Resonance effect resonance note

  see "14.3 Sustain Pedal Setting Value Table" in "IV Setting Values and Send/Receive Values."

- Timbre Type: Drum The received message does not affect sound source operation.

7.9 Portamento On/Off (41H)

Message Format:	BnH 41H vvH
n:	MIDI Channel Number
vv:	Value (Note1)

Note1: For information about the relationship between setting values and send/receive values, see the "14.2 Off/On Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Transmit Sent when the portament on/off is changed.

Receive Receipt changes the portamento on/off setting.

7.10 Sostenuto (42H)

Message Format:	BnH 42H vvH
n:	MIDI Channel Number
vv:	Value (Note1)

Note1: For information about the relationship between setting values and send/receive values, see the "14.2 Off/On Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Transmit Sent when a pedal that has a sostenuto function is operated.

Receive Receipt performs an operation equivalent to a sostenuto pedal operation.

7.11 Soft Pedal (43H)

Message Format:	BnH 43H vvH
n:	MIDI Channel Number
vv:	Value (Note1)

Note1: For information about the relationship between setting values and send/receive values, see the "14.2 Off/On Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Transmit Sent when a pedal that has a soft pedal function is operated.

Receive Receipt performs an operation equivalent to a soft pedal operation.

7.12 Filter Resonance (47H)

Message Format:	BnH 47H vvH
n:	MIDI Channel Number
vv:	Value

Transmit Sent when the knob is operated by setting.

Receive Receipt changes the filter resonance intensity.

7.13 Release Time (48H)

Message Format:	BnH 48H vvH
n:	MIDI Channel Number
vv:	Value (Note1)

Note1: For information about the relationship between setting values and send/receive values, see the "14.4 –64 - 0 - +63 Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Transmit It will be changed when sustain is used and when setting is changed. Sent when the knob is operated by setting.

Receive Receipt makes a relative change in the time it takes for a note to decay to zero after a key is released.

7.14 Attack Time (49H)

Message Format:	BnH 49H vvH
n:	MIDI Channel Number
vv:	Value (Note1)

Note1: For information about the relationship between setting values and send/receive values, see the “14.4 –64 - 0 - +63 Setting Value Table” in “IV Setting Values and Send/Receive Values” of this document.

Transmit Sent when the knob is operated by setting.

Receive Receipt makes a relative change in the time it takes for a note to rise to its maximum level.

7.15 Filter Cutoff Frequency (4AH)

Message Format:	BnH 4AH vvH
n:	MIDI Channel Number
vv:	Value (Note1)

Note1: For information about the relationship between setting values and send/receive values, see the “14.4 –64 - 0 - +63 Setting Value Table” in “IV Setting Values and Send/Receive Values” of this document.

Transmit Sent when the knob is operated by setting.

Receive Receipt changes the filter cutoff frequency.

7.16 Vibrato Rate (4CH)

Message Format:	BnH 4CH vvH
n:	MIDI Channel Number
vv:	Value (Note1)

Note1: For information about the relationship between setting values and send/receive values, see the “14.4 –64 - 0 - +63 Setting Value Table” in “IV Setting Values and Send/Receive Values” of this document.

Transmit Sent when the knob is operated by setting.

Receive Receipt changes the rate of vibrato.

7.17 Vibrato Depth (4DH)

Message Format:	BnH 4DH vvH
n:	MIDI Channel Number
vv:	Value (Note1)

Note1: For information about the relationship between setting values and send/receive values, see the “14.4 –64 - 0 - +63 Setting Value Table” in “IV Setting Values and Send/Receive Values” of this document.

Transmit Sent when the knob is operated by setting.

Receive Receipt changes the depth of vibrato.

7.18 Vibrato Delay (4EH)

Message Format:	BnH 4EH vvH
n:	MIDI Channel Number
vv:	Value (Note1)

Note1: For information about the relationship between setting values and send/receive values, see the "14.4 –64 - 0 - +63 Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Transmit Sent when the knob is operated by setting.

Receive Receipt changes the delay time of vibrato.

7.19 Portamento Control (54H)

Message Format:	BnH 54H vvH
n:	MIDI Channel Number
vv:	Source Key Number

Receive Receipt of this message first stores the Source Note Number for the next note. When the next Note On is received, the portamento effect is applied to the note using this Source Note Number as the pitch start point and the Note On event key number as the end point. If there already is a note being sounded by Source Note Number at this time, the new note on is not performed and the portamento effect is applied to the pitch of the note being sounded. That is to say that legato play is performed.

7.20 Reverb Send Level (5BH)

Message Format:	BnH 5BH vvH
n:	MIDI Channel Number
vv:	Value

Transmit Sent when the knob is operated by setting. Sent when GM tone is selected.

Receive Receipt changes the reverb send of the corresponding part.

7.21 Chorus Send Level (5DH)

Message Format:	BnH 5DH vvH
n:	MIDI Channel Number
vv:	Value

Transmit Sent when the knob is operated by setting. Sent when Chorus type or GM tone is selected.

Receive Receipt changes the chorus send of the corresponding part.

7.22 Delay Send Level (5EH)

Message Format:	BnH 5EH vvH
n:	MIDI Channel Number
vv:	Value

Transmit Sent when the knob is operated by setting. Sent when Delay type or GM tone is selected.

Receive Receipt changes the delay send of the corresponding part.

7.23 RPN (64H,65H)

Message Format:	BnH 64H llH (LSB) BnH 65H mmH (MSB)
n:	MIDI Channel Number
ll:	LSB Value
mm:	MSB Value

7.23.1 Pitch Bend Sensitivity

Message Format:	BnH 64H 00H BnH 65H 00H BnH 06H mmH BnH 26H llH
n:	MIDI Channel Number
mm:	MSB Value(00H - 18H)
ll:	LSB Value(Transmit:00H, Receive:Ignored)

Transmit Sent when calling Registration. Sent when the bend range is changed.

Receive Receipt changes bend range of the corresponding part.

7.23.2 Channel Fine Tuning

Message Format:	BnH 64H 01H BnH 65H 00H BnH 06H mmH BnH 26H llH
n:	MIDI Channel Number
mm:	MSB Value
ll:	LSB Value

Transmit Sent when calling Registration.

Receive Receipt changes the fine tune of the corresponding part.

7.23.3 Channel Coarse Tune

Message Format:	BnH 64H 02H
	BnH 65H 00H
	BnH 06H mmH
	BnH 26H llH
n:	MIDI Channel Number
mm:	MSB Value(28H - 58H)
ll:	LSB Value(Transmit:00H, Receive:Ignored)

Transmit Sent when calling Registration.

Receive Receipt changes the coarse tune of the corresponding part. Does not affect sound source operation when the Timbre Type (see "About the Timbre Type" in "8 Program Change") is Drum.

7.23.4 Null

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

Transmit Sent when there is a change to the parameter assigned to RPN, NRPN.

Receive Receipt de-selects RPN, NRPN.

7.24 All Sound Off (78H)

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

Transmit Sent when MIDI send related settings are changed.

Receive Receipt stops all voices that are sounding.

7.25 Reset All Controllers (79H)

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

Transmit Sent when MIDI send related settings are changed.

Receive Receipt initializes each performance controller.

7.26 All Notes Off (7BH)

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

Receive Receipt releases (key release) all voices that are sounding.

7.27 Omni Mode Off (All Notes Off) (7CH)

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

Receive Receipt performs the same operation as when All Notes Off is received.

7.28 Omni Mode On (All Notes Off) (7DH)

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

Note: This Instrument always operates in Omni Mode Off.

Receive Receipt performs the same operation as when All Notes Off is received.

7.29 Mono Mode On (Poly Mode Off) (All Notes Off) (7EH)

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

Note: This Instrument always operates in Poly Mode On.

Receive Receipt performs the same operation as when All Notes Off is received.

7.30 Poly Mode On (Mono Mode Off) (All Notes Off) (7FH)

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

Receive Receipt performs the same operation as when All Notes Off is received.

8 Program Change

Message Format:	CnH ppH
n:	MIDI Channel Number
pp:	Program Number (Note1)

Note1: For details about the relationship between the program number and the tone, see the Tone List that comes with the Instrument.

Transmit Sent when a tone number is selected.

Receive Receipt changes the tone of the corresponding part. The selected tone is determined by the program value of this message and the Bank Select message value received prior to this message. Also note that receipt of this message also may change the Timbre Type that corresponds to the selected tone. For more information, see "About the Timbre Type" below.

About the Timbre Type Tones that are selected by each Instrument part have an attribute that depends on the sound source operation type. This attribute is called the "timbre type," which is one of the types described below.

- Melody

  This timbre type optimizes for normal melody tones. The damper pedal performs on/off operations.

- Piano

  This Timbre Type is for piano tones. The decay rate of the voice being sounded is seamlessly altered in accordance with the damper pedal position. The method for producing sound in response to the note messages also is different from that of the melody Timbre Type, and operation is optimized for piano.

- LMPiano

  This Timbre Type is for Linear Morphing piano tones. The decay rate of the voice being sounded and Damper Resonance effect characteristics are seamlessly altered in accordance with the damper pedal position. The method for producing sound in response to the note messages also is different from that of the melody Timbre Type, and operation is optimized for piano.

- Drum

  This setting optimizes for drum sounds. The damper pedal does not function. The Hold1, Channel Coarse Tune, and Master Coarse Tune messages are ignored if they are received.

9 Channel Pressure (Aftertouch)

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

Receive Receipt adds, to the tone being sounded, modulation of a depth specified by the value. In the case of a tone that already has modulation applied, receipt of this message increases the modulation depth. The modulation effect differs according to the tone being used.

10 Pitch Bend Change

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

Transmit Sent when the pitch bend wheel is operated.

Receive Receipt changes the pitch of the currently sounding note. The range of the pitch change depends on the bend range value setting.

Part III
System Message

11 Timing Clock

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Message Format:  F8H
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Transmit Sent periodically when the MIDI sync mode is master.

Receive Receipt while the MIDI sync mode is slave causes tempo to be synced based in timing clock information.

12 Active Sensing

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Message Format:  FEH
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Receive Once this message is received, the Active Sensing mode is entered. If no MIDI message is received for a specified amount of time, voices being sounded by this Instrument's sound source are released, the controller is reset, and the Active Sensing mode is exited.

13 System Exclusive Message

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Message Format:  F0H iiH....F7H
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            ii:  ID Number
```

The Instrument sends and receives standard universal system exclusive messages, and system exclusive messages that have Instrument-specific formats.

ID Number The ID numbers handed by this Instrument are shown below.

ID Number	ID Name
44H	Casio Computer Co. Ltd
7EH	Non Real Time System Exclusive Message
7FH	Real Time System Exclusive Message

13.1 Universal Real Time System Exclusive Message

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Message Format:  F0H 7FH 7FH....F7H
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13.1.1 Master Volume

```
Message Format:  F0H 7FH 7FH 04H 01H llH mmH F7H
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            ll:  LSB Value(Receive:Ignored)
            mm:  MSB Value
```

Receive Receipt changes the song volume.

13.1.2 Master Fine Tuning

Message Format:	F0H 7FH 7FH 04H 03H llH mmH F7H
ll:	LSB Value(Note1)
mm:	MSB Value(Note1)

Note1: For information about the relationship between setting values and send/receive values, see "14.6 Fine Tuning Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Transmit Sent when the tuning setting is changed.

Receive Receipt changes the tuning setting.

13.1.3 Master Coarse Tuning

Message Format:	F0H 7FH 7FH 04H 04H llH mmH F7H
ll:	LSB Value(Transmit:00H,Receive:Ignored)
mm:	MSB Value(28H - 58H)

Receive Receipt changes the Master Coarse Tuning parameter.

13.1.4 Reverb Type

Message Format:	F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 01H 00H vvH F7H
vv:	Value(Note1)

Note1: For information about the relationship between setting values and send/receive values, see "14.7 Reverb Type Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Receive Receipt changes the reverb type.

13.1.5 Reverb Time

Message Format:	F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 01H 01H vvH F7H
vv:	Value

Receive Receipt changes the reverb duration.

13.1.6 Chorus Type

Message Format:	F0H 7FH 7FH 04H 05H 01H 01H 01H 01H 02H 00H vvH F7H
vv:	Value(Note1)

Note1: For information about the relationship between setting values and send/receive values, see "14.8 Chorus Type Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Receive Receipt changes the chorus type.

13.1.7 Mod Rate

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

Receive Receipt changes the modulation rate of chorus setting.

13.1.8 Mod Depth

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

Receive Receipt changes the modulation depth of chorus setting.

13.1.9 Send to Reverb

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

Receive Receipt changes the Chorus Send to Reverb setting.

13.2 Universal Non Real Time System Exclusive Message

Message Format:	F0H 7EH 7FH....F7H

13.2.1 GM System On

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

Receive Receipt puts the sound source into a GM sound source mode.

13.2.2 GM System Off

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

Receive Receipt changes the sound source setting to the Instrument presetting.

13.2.3 GM2 System On

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

Receive Though the Instrument does not support GM2, receipt of the GM2 System On message has the same result as receipt of the GM System On message.

13.3 CASIO General System Exclusive

Message Format:	F0H 44H 7EH 7FH iiH ccH ssH ggH ppH ddH ... F7H
ii:	Device ID (7FH)
cc:	Category ID
ss:	Sub Category ID
gg:	Group ID (00H)
pp:	Parameter ID
dd ...:	Data

This message can be used to perform sound source parameter operations.

13.3.1 Reverb Type

Message Format:	F0H 44H 7EH 7FH 7FH 04H 00H 00H 00H ccH ttH F7H
cc:	Channel(Note1)
tt:	Type(Note2)

Note1: For information about the relationship between setting values and send/receive values, see “MIDI Receive Ch” in “1.3.2 Instrument Part Block” of this document.

Note2: For information about the relationship between setting values and send/receive values, see “14.9 Reverb Type (CASIO General System Exclusive) Setting Value Table” in “IV Setting Values and Send/Receive Values” of this document.

Transmit Sent when the reverb type is changed.

Receive Receipt changes the reverb type.

13.3.2 Chorus Type

Message Format:	F0H 44H 7EH 7FH 7FH 04H 01H 00H 00H ccH ttH F7H
cc:	Channel(Note1)
tt:	Type(Note2)

Note1: For information about the relationship between setting values and send/receive values, see “MIDI Receive Ch” in “1.3.2 Instrument Part Block” of this document.

Note2: For information about the relationship between setting values and send/receive values, see “14.10 Chorus Type (CASIO General System Exclusive) Setting Value Table” in “IV Setting Values and Send/Receive Values” of this document.

Transmit Sent when the chorus type is changed.

Receive Receipt changes the chorus type.

13.3.3 Delay Type

Message Format:	F0H 44H 7EH 7FH 7FH 04H 02H 00H 00H ccH ttH F7H
cc:	Channel(Note1)
tt:	Type(Note2)

Note1: For information about the relationship between setting values and send/receive values, see "MIDI Receive Ch" in "1.3.2 Instrument Part Block" of this document.

Note2: For information about the relationship between setting values and send/receive values, see "14.11 Delay Type (CASIO General System Exclusive) Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Transmit Sent when the delay type is changed.

Receive Receipt changes the delay type.

13.3.4 Lyric Play Mode (CT-S1000V only)

Message Format:	F0H 44H 7EH 7FH 7FH 06H 00H 00H 00H ccH vvH F7H
cc:	Channel(Note1)
vv:	Value (00H : Note Mode, 01H : Phrase Mode)

Note1: For information about the relationship between setting values and send/receive values, see "MIDI Receive Ch" in "1.3.2 Instrument Part Block" of this document.

Transmit Sent when the Lyric Tone Play Mode of Vocal Synthesis is changed.

Receive Receipt changes the Lyric Tone Play Mode. The settings of this instrument are changed regardless of the Channel.

13.3.5 Lyric Pedal Hold Type (CT-S1000V only)

Message Format:	F0H 44H 7EH 7FH 7FH 06H 00H 00H 01H ccH vvH F7H
cc:	Channel(Note1)
vv:	Value (00H : Off, 01H : On)

Note1: For information about the relationship between setting values and send/receive values, see "MIDI Receive Ch" in "1.3.2 Instrument Part Block" of this document.

Transmit Sent when the Lyric Tone Hold of Vocal Synthesis is changed.

Receive Receipt changes the Lyric Tone Hold. The settings of this instrument are changed regardless of the Channel.

13.3.6 Syllable Position Control (CT-S1000V only)

Message Format:	F0H 44H 7EH 7FH 7FH 06H 00H 00H 02H ccH vvH ppH F7H
cc:	Channel(Note1)
vv:	Value (00H : Off, 01H : On)
pp:	Syllable Position (00H : 1st syllable, 01H : 2nd syllable, ...)

Note1: For information about the relationship between setting values and send/receive values, see "MIDI Receive Ch" in "1.3.2 Instrument Part Block" of this document.

Transmit Sent when the Syllable Position of Vocal Synthesis is set/canceled.

Receive Receipt sets/cancels the Syllable Position. The settings of this instrument are changed regardless of the Channel.

13.3.7 Lyric Attack (CT-S1000V only)

Message Format:	F0H 44H 7EH 7FH 7FH 06H 01H 00H 00H ccH vvH F7H
cc:	Channel(Note1)
vv:	Value (00H-1EH)

Note1: For information about the relationship between setting values and send/receive values, see "MIDI Receive Ch" in "1.3.2 Instrument Part Block" of this document.

Transmit Sent when the Lyric Tone Attack of Vocal Synthesis is changeed.

Receive Receipt changes the Lyric Tone Attack. The settings of this instrument are changed regardless of the Channel.

13.3.8 Lyric Attack Balancer (CT-S1000V only)

Message Format:	F0H 44H 7EH 7FH 7FH 06H 01H 00H 01H ccH vvH F7H
cc:	Channel(Note1)
vv:	Value(00H : Off, 01H : On)

Note1: For information about the relationship between setting values and send/receive values, see "MIDI Receive Ch" in "1.3.2 Instrument Part Block" of this document.

Transmit Sent when the Lyric Tone Attack Balancer of Vocal Synthesis is changeed.

Receive Receipt changes the Lyric Tone Attack Balancer. The settings of this instrument are changed regardless of the Channel.

13.3.9 Lyric Speed (CT-S1000V only)

Message Format:	F0H 44H 7EH 7FH 7FH 06H 01H 00H 02H ccH ddH ddH ddH ddH F7H
cc:	Channel(Note1)
dd:	Data(Note2)

Note1: For information about the relationship between setting values and send/receive values, see “MIDI Receive Ch” in “1.3.2 Instrument Part Block” of this document.

Note2: The microsecond per quarter note of tempo is expressed in 24 bits and divided into 4 Bytes of 3 bits, 7 bits, 7 bits, and 7 bits.
For information about the relationship between setting values and send/receive values, see “14.12 Lyric Speed Setting Value Table” in “IV Setting Values and Send/Receive Values” of this document.

Transmit Sent when the Lyric Tone Speed of Vocal Synthesis is changeed.

Receive Receipt changes the Lyric Tone Speed. The settings of this instrument are changed regardless of the Channel.

13.3.10 Gender (CT-S1000V only)

Message Format:	F0H 44H 7EH 7FH 7FH 06H 02H 00H 00H ccH vvH F7H
cc:	Channel(Note1)
vv:	Value(Note2)

Note1: For information about the relationship between setting values and send/receive values, see “MIDI Receive Ch” in “1.3.2 Instrument Part Block” of this document.

Note2: For information about the relationship between setting values and send/receive values, see “14.13 Gender Setting Value Table” in “IV Setting Values and Send/Receive Values” of this document.

Transmit Sent when the Gender of a Vocalist in Vocal Synthesis is changeed.

Receive Receipt changes the Gender of a Vocalist. The settings of this instrument are changed regardless of the Channel.

13.3.11 Age (CT-S1000V only)

Message Format:	F0H 44H 7EH 7FH 7FH 06H 02H 00H 01H ccH vvH F7H
cc:	Channel(Note1)
vv:	Value(Note2)

Note1: For information about the relationship between setting values and send/receive values, see “MIDI Receive Ch” in “1.3.2 Instrument Part Block” of this document.

Note2: For information about the relationship between setting values and send/receive values, see “14.14 Age Setting Value Table” in “IV Setting Values and Send/Receive Values” of this document.

Transmit Sent when the Age of a Vocalist in Vocal Synthesis is changeed.

Receive Receipt changes the Age of a Vocalist. The settings of this instrument are changed regardless of the Channel.

13.3.12 Vocalist Number (CT-S1000V only)

Message Format:	F0H 44H 7EH 7FH 7FH 06H 02H 00H 02H ccH nnH F7H
cc:	Channel(Note1)
nn:	Number(00H - 16H)

Note1: For information about the relationship between setting values and send/receive values, see "MIDI Receive Ch" in "1.3.2 Instrument Part Block" of this document.

Transmit Sent when the Vocalist of Vocal Synthesis is changeed.

Receive Receipt changes the Vocalist. The settings of this instrument are changed regardless of the Channel.

13.3.13 Vocalist Single Parameter (CT-S1000V only)

Message Format:	F0H 44H 7EH 7FH 7FH 06H 02H 00H 03H ccH 00H iiH vvH F7H
cc:	Channel(Note1)
ii:	ID(Note2)
vv:	Value(Note2)

Note1: For information about the relationship between setting values and send/receive values, see "MIDI Receive Ch" in "1.3.2 Instrument Part Block" of this document.

Note2: For information about the relationship between setting values and send/receive values, see "14.15 Vocalist Single Parameter Setting Value Table" in "IV Setting Values and Send/Receive Values" of this document.

Transmit Sent when the following Vocalist Parameters in Vocal synthesis changed.
Attack Time, Release Time, Modulation Range, Vibrato Depth, Vibrato Rate, Vibrato Delay, Cutoff, Portamento, Portamento Time, Octave Shift

Receive Receipt changes various settings of the Vocalist. The settings of this instrument are changed regardless of the Channel.

Part IV
Setting Values and Send/ Receive Values

14 Setting Value Tables

14.1 0 - 127 Setting Value Table

Receive Value	DSP Parameter Value	Parameter
00H - 00H	00H	0
:	:	:
7FH - 7FH	7FH	127

14.2 Off/On Setting Value Table

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

14.3 Sustain Pedal Setting Value Table

Transmit Value	Receive Value	Parameter
-	00H	Off
:	:	(continuous)
-	7FH	Full

14.4 –64 - 0 - +63 Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H	-64
:	:	:
40H	40H	0
:	:	:
7FH	7FH	+63

14.5 Pan Setting Value Table

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

14.6 Fine Tuning Setting Value Table

Transmit Value (LSB, MSB)	Receive Value	Parameter
(43H, 00H)	(00H, 00H) - (5FH, 00H)	415.5 Hz
(65H, 00H)	(60H, 00H) - (7FH, 00H)	415.6 Hz
(07H, 01H)	(00H, 01H) - (1FH, 01H)	415.7 Hz
(29H, 01H)	(20H, 01H) - (3FH, 01H)	415.8 Hz
:	:	:
(40H, 3FH)	(30H, 3FH) - (4FH, 3FH)	439.8 Hz
(60H, 3FH)	(50H, 3FH) - (6FH, 3FH)	439.9 Hz
(00H, 40H)	(70H, 3FH) - (1FH, 40H)	440.0 Hz
(20H, 40H)	(20H, 40H) - (3FH, 40H)	440.1 Hz
(40H, 40H)	(40H, 40H) - (5FH, 40H)	440.2 Hz
:	:	:
(54H, 7EH)	(50H, 7EH) - (6FH, 7EH)	465.6 Hz
(73H, 7EH)	(70H, 7EH) - (0FH, 7FH)	465.7 Hz
(11H, 7FH)	(10H, 7FH) - (2FH, 7FH)	465.8 Hz
(30H, 7FH)	(30H, 7FH) - (7FH, 7FH)	465.9 Hz

14.7 Reverb Type Setting Value Table

Transmit Value	Receive Value	Parameter
-	00H	Small Room
-	01H	Medium Room
-	02H	Large Room
-	03H	Medium Hall
-	04H	Large Hall
-	08H	Plate

14.8 Chorus Type Setting Value Table

Transmit Value	Receive Value	Parameter
-	00H	Chorus1
-	01H	Chorus2
-	02H	Chorus3
-	03H	Chorus4
-	04H	FB Chorus
-	05H	Flanger

14.9 Reverb Type (CASIO General System Exclusive) Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H	Room1
01H	01H	Room2
02H	02H	Room3
03H	03H	Hall1
04H	04H	Hall2
05H	05H	Plate1
06H	06H	Delay
07H	07H	Pan Delay
08H	08H	Plate2
0AH	0AH	Large Room1
0BH	0BH	Large Room2
0CH	0CH	Stadium1
0DH	0DH	Stadium2
0EH	0EH	Long Delay1
0FH	0FH	Long Delay2
10H	10H	Room4
11H	11H	Room5
16H	16H	Church
17H	17H	Hall3
18H	18H	Hall4
19H	19H	Hall5
1AH	1AH	Hall6
1EH	1EH	Cathedral
1FH	1FH	Stadium3
20H	20H	Off
2DH	2DH	Tone

14.10 Chorus Type (CASIO General System Exclusive) Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H	Chorus1
01H	01H	Chorus2
02H	02H	Chorus3
03H	03H	Chorus4
04H	04H	FB Chorus
05H	05H	Flanger4
06H	06H	Flanger3
07H	07H	Flanger2
08H	08H	Flanger1
09H	09H	Short Delay1
0AH	0AH	Short Delay2
0FH	0FH	Deep Chorus
10H	10H	Tone

14.11 Delay Type (CASIO General System Exclusive) Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H	Short1
01H	01H	Short2
02H	02H	Echo
03H	03H	Tempo Sync Short
04H	04H	Tempo Sync Middle
05H	05H	Tempo Sync Long
06H	06H	Ambience
07H	07H	Middle1
08H	08H	Middle2
09H	09H	Long1
0AH	0AH	Long2
10H	10H	Middle Pan
11H	11H	Long Pan1
12H	12H	Long Pan2
13H	13H	Long Pan3
14H	14H	Tone

14.12 Lyric Speed Setting Value Table

Transmit/Receive Value (ddH,ddH,ddH,ddH)	Parameter
(01H, 37H, 0DH, 40H)	20
(01H, 2EH, 31H, 36H)	21
(01H, 26H, 3AH, 68H)	22
(01H, 1FH, 1CH, 37H)	23
:	:
(00H, 17H, 16H, 62H)	158
(00H, 17H, 04H, 0EH)	159
(00H, 16H, 71H, 58H)	160
(00H, 16H, 5FH, 3EH)	161
(00H, 16H, 4DH, 42H)	162
:	:
(00H, 0EH, 44H, 0FH)	252
(00H, 0EH, 3CH, 62H)	253
(00H, 0EH, 35H, 3CH)	254
(00H, 0EH, 2EH, 1EH)	255

14.13 Gender Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H	Male
:	:	:
32H	32H	Female

14.14 Age Setting Value Table

Transmit Value	Receive Value	Parameter
00H	00H	Child
:	:	:
32H	32H	Adult

14.15 Vocalist Single Parameter Setting Value Table

ID(iiH)	Transmit/Receive Value(vvH)	Parameter
09H	00H-40H-7FH	Attack Time (-64 - 0 - +63)
0AH	00H-40H-7FH	Release Time (-64 - 0 - +63)
0BH	00H-7FH	Modulation Range (0 - 63)
0CH	00H-40H-7FH	Vibrato Depth (-64 - 0 - +63)
0DH	00H-40H-7FH	Vibrato Rate (-64 - 0 - +63)
0EH	00H-40H-7FH	Vibrato Delay (-64 - 0 - +63)
0FH	00H-40H-7FH	Cutoff (-64 - 0 - +63)
10H	00H,7FH / 00H-3FH,40H-7FH	Portamento (Off,On)
11H	00H-7FH	Portamento Time (0 - 127)
12H	00H-03H-06H	Octave Shift (-3 - 0 - +3)

Part V
MIDI Implementation Notation

15 Value Notation

15.1 Hexadecimal Notation

MIDI implementation sometimes requires that data be expressed in hexadecimal format. Hexadecimal values are indicated by the letter "H" after the value. The hexadecimal equivalents of decimal values 10 through 15 are expressed as the letters A through F.

The table below shows the hexadecimal equivalents for decimal values 0 through 127, which are often used in MIDI messages.

Decimal	Hexadecimal	Decimal	Hexadecimal	Decimal	Hexadecimal	Decimal	Hexadecimal
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

15.2 Binary Notation

When a MIDI implementation data value is expressed in binary, the letter "B" (for "binary") is affixed at the end of the value. The table below shows the binary equivalents for the decimal values 0 through 127, which are often used for settings.

Decimal	Hexadecimal	Binary
0	00H	00000000B
1	01H	00000001B
2	02H	00000010B
3	03H	00000011B
4	04H	00000100B
5	05H	00000101B
6	06H	00000110B
7	07H	00000111B
8	08H	00001000B
9	09H	00001001B
10	0AH	00001010B
11	0BH	00001011B
12	0CH	00001100B
13	0DH	00001101B
14	0EH	00001110B
15	0FH	00001111B
16	10H	00010000B
:	:	
125	7DH	01111101B
126	7EH	01111110B
127	7FH	01111111B

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