

Contents Authoring Guideline

For MA-5 Authoring Tool

< SMAF edition >

Version 1.4.0

2005/09/14

YAMAHA CORPORATION

| |
|--|
| <p>Copyright to this document is the property of Yamaha Corporation. Transfer or copying of this document in part or in whole requires the permission of Yamaha Corporation. The contents of this document are subject to change without notice.</p> |
|--|

Copyright© 2003-2005 YAMAHA CORPORATION

All rights reserved

<Contents>

| | | |
|-----------|---|----------|
| 1. | Outline of this document | 5 |
| 2. | Difference from MA-3 Authoring Tool | 6 |
| 2.1. | AL Voice Edit | 6 |
| 2.2. | HV Synchronous Playback and HV Voice Edit | 6 |
| 2.3. | Stereo Stream PCM | 6 |
| 2.4. | AL Channel Designation | 6 |
| 2.5. | Velocity Curve | 6 |
| 2.6. | 64 tones mode | 6 |
| 3. | Notes to the Authoring SMF | 7 |
| 3.1. | SMF Format | 7 |
| 3.2. | MIDI Channels | 7 |
| 3.3. | Synthesizer Mode and Number of Tones Generation | 7 |
| 3.3.1. | In case of AL channel is in unused | 7 |
| 3.3.2. | In case of AL channel is in used | 8 |
| 3.4. | Tempo | 8 |
| 3.5. | Time Base | 8 |
| 3.6. | Channel Attribution | 8 |
| 4. | Applicable MIDI Events | 9 |
| 4.1. | NoteOn | 10 |
| 4.2. | NoteOff | 11 |
| 4.3. | Program Change | 11 |
| 4.4. | Control Change | 12 |
| 4.4.1. | Bank Select | 12 |
| 4.4.2. | Modulation Depth | 14 |
| 4.4.3. | Channel Volume | 14 |
| 4.4.4. | Panpot | 15 |
| 4.4.5. | Expression | 15 |
| 4.4.6. | Hold 1 (Damper) | 16 |
| 4.4.7. | Filter Resonance | 16 |
| 4.4.8. | Brightness | 17 |
| 4.4.9. | Data Entry | 17 |
| 4.4.10. | RPN | 18 |
| 4.4.11. | All Sound Off | 18 |
| 4.4.12. | Reset all Controller | 19 |
| 4.4.13. | All Note Off | 19 |
| 4.4.14. | Mono Mode On | 20 |
| 4.5. | Pitch Bend | 20 |
| 4.6. | Meta Events | 21 |
| 4.6.1. | Tempo | 21 |

| | | |
|---------|---|----|
| 4.6.2. | Text | 21 |
| 4.6.3. | Display of Copyright | 21 |
| 4.6.4. | CuePoint | 22 |
| 4.6.5. | XF CuePoint | 23 |
| 4.6.6. | Channel Status Designation | 23 |
| 4.6.7. | MA-5 AL Channel Designation | 24 |
| 4.6.8. | MA-5 AL Channel Designation | 24 |
| 4.6.9. | Karaoke Guide Channel Designations | 24 |
| 4.6.10. | Karaoke Guide Scoring Section designations | 25 |
| 4.7. | Universal System Exclusive Message | 26 |
| 4.7.1. | Master Volume | 26 |
| 4.8. | Classified System Exclusive Message | 27 |
| 4.8.1. | MA-5 Stream PCM Wave Panpot | 27 |
| 4.8.2. | MA-5 User Event | 27 |
| 5. | Notes on Stream PCM Setting | 28 |
| 5.1. | Maximum Number of Tones Generation | 28 |
| 5.2. | Panpot | 28 |
| 5.3. | Limit of Unit byte Numbers (sampling frequency) | 29 |
| 6. | Note at the time of AL voice is in used | 29 |
| 7. | Notes at the time of HV Pronunciation in Used | 30 |
| 7.1. | Interval of HV Note On | 30 |
| 7.2. | Restriction Matter of HV-Script | 30 |
| 7.3. | HV Checking Operation when RAM Size is Over | 31 |
| 7.4. | Edit on HV Sequence Edit View | 31 |
| 8. | Other Notes | 32 |
| 8.1. | Vibration and LED | 32 |
| 8.2. | Volume Designation and Note Message | 32 |
| 8.3. | Event Density Limitation | 32 |
| 8.4. | Tone Generation Range in PCM Voice (WT synthesizer) | 33 |
| 8.5. | Caution in the case of creating the voice using the PCM user waveform | 34 |
| 8.6. | Total Length after Conversion | 35 |
| 8.7. | Key Control Status | 35 |
| 8.8. | Note-On in the Same Timing with Mono-Mode-On | 35 |
| 8.9. | All-Note-Off in ALL64 Mode | 35 |
| 9. | Appendix | 36 |
| 9.1. | XF Information Header (by language) | 36 |
| 9.1.1. | Information Items | 36 |
| 9.2. | XF rehearsal mark | 38 |

<Revision History>

| Ver. | Date | Description |
|-------|------------|--|
| 1.0.0 | 2003/4/25 | First edition. |
| 1.0.1 | 2003/6/13 | 7.5. The description about the cautions in the case of creating the voice using the PCM user waveform was added. 7.6. The description about the total length after conversion was added. 7.7. The description about key control status was added. |
| 1.0.2 | 2003/9/12 | 4.6.6 Addition of Channel Status. 4.7.1 Description about Master Volume Preference Setup was deleted. |
| 1.2.0 | 2004/01/19 | The title was changed to "Contents Authoring Guideline" Hexadecimal MIDI message was unified to be described with H, in whole document. Description of MIDI message value was described by not only decimal, but hexadecimal. The numerical value in description was unified into decimal number. 1 Contrast table of decimal/hexadecimal was described. 3.1 Format1 of SMF format was added. 3.5 Description about SMAF output was added. 4.1 Description about Note insertion with Stream PCM Edit View was added. [Note] of the same Note event in the same channel was changed. 4.3 Description about Note insertion with Stream PCM Edit View was added. 4.4.1 Bank Select Applicability Table was changed. 14bit value was added. Description about Note insertion with Stream PCM Edit View was added. 4.4.14 Described contents in [Note] was corrected. 5.1 Description was corrected. |
| 1.3.3 | 2004/11/9 | 2., 3., 4., and 7. Description about HV function was added. 3.3.1 Description about the preference setting when AL channel is not used was changed. 4. Clerical error in Table4 was corrected. 4.3 Description about Program Change under generating sound. [Note] was deleted. 4.4.1 Clerical error in Table 5 of Bank Select was corrected. 4.4.9 Note about NRPN of Data Entry was added. 5.3 Clerical error about Limitation of Unit byte Numbers was added. 8.2 Description about Volume Designation and Note Event Start Point were newly added. 8.4 The Range of Pronounceable Frequency in PCM Voice was added. 8.5 Notes in Voice Creating Using the PCM User Waveform was added. 8.8 Note-On in the Same Timing with Mono-Mode-On was added. 8.9 Description about All-Note-Off in ALL64 mode was added. |
| 1.4.0 | 2005/09/14 | 4. Table 4 Use MIDI Event Lists was corrected. 4.6.3 Form of "Display of Copyright" was corrected. 4.6.7 MA-5 AL Channel Designation Recommendation to place the message at the music head was added. 4.6.9 Karaoke Guide channel designation was added. 4.6.10 Karaoke Guide Scoring Section designation was added. |

1. Outline of this document

This document stipulates guideline for authoring SMF (Standard Midi File) that makes maximum data of Yamaha's synthesizer LSI for mobile phone, MA-5 when authoring the contents for terminals equipped with MA-5 by using Authoring Tool.

Authoring tool reads SMF in accordance with this document and converts into carrier format. Operations when reading SMF other than the one described in this document are not guaranteed. Although MIDI sequencer application software for authoring SMF in accordance with this document is not designated, the requirements include the capability of entry of events described here.

[Note] About the numerical notation

In this documentation, the data values are described using decimal numbers and hexadecimal numbers. In the case of using hexadecimal numbers, a letter "H" (Hexadecimal) follows the numerical value. Moreover, "n" expresses the arbitrary integers. When you input a data value, refer to the following table 1.

Table 1 Comparison between Decimal numbers and Hexadecimal numbers

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

2. Difference from MA-3 Authoring Tool

2.1. AL Voice Edit

AL voice can be edited. The edit of AL voice is not described in this guideline. Please refer to Users manual for it.

2.2. HV Synchronous Playback and HV Voice Edit

It is possible to synchronize the HV script with a channel sequence. Moreover, editing of HV voice is possible. The edit of HV script and HV voice is not indicated to this guideline. Please refer to the User's manual for the details.

2.3. Stereo Stream PCM

Stereo Stream PCM can be used.

2.4. AL Channel Designation

The message of AL channel designation was added.

2.5. Velocity Curve

For MA-3 authoring tool, the velocity curve was $20\log(\text{Vel}/127)$.

However, for MA-5 authoring tool, the velocity curve was changed to $40\log(\text{Vel}/127)$. The Dynamic range of volume which can express was extended by this change.

2.6. 64 tones mode

For 64 tone mode, FM32 tone + WT32 tone can be used.

Only 2-operator FM can be used.

At this mode, Stream PCM and AL voice cannot be used.

3. Notes to the Authoring SMF

3.1. SMF Format

Be sure to use SMF Format 0 or SMF Format 1.

3.2. MIDI Channels

MIDI channels from 1 to 16 can be used.

3.3. Synthesizer Mode and Number of Tones Generation

3.3.1. In case of AL channel is in unused

MA-5 Authoring Tool has three modes, FM 32 tone mode, FM 16 tone mode, and ALL64 mode. The number of the maximum simultaneous pronunciation in each mode is shown in Table 2.

Table 2 Number of the Maximum Simultaneous Pronunciation in each mode

| | FM synthesizer | WT synthesizer | Stream | HV | Total |
|----------------|-------------------|-------------------|--------|----|-------|
| FM16 tone mode | 16 | 16 | 2 | 1 | 35 |
| FM32 tone mode | 32 | 16 | 2 | 1 | 51 |
| ALL64 mode | 32 | 32 | 0 | 0 | 64 |

FM 16 tone mode can use a total of 35 voices, FM 32 tone mode can use a total of 51 voices, and ALL64 mode can use a total of 64 voices.

FM 16 tone mode can use 4 operators voice and 2 operators voice.

FM 32 tone mode and ALL64 mode can use 2 operators voice only.

Although data can be described with poly-mode in one MIDI channel, be careful that the maximum number of tones generated simultaneously is not exceeded in all MIDI channels. When tones exceeding the maximum number of tones generated simultaneously are inputted, MA-5 Authoring Tool silences notes of tones that are generated before by giving priority to the ones that arrives later.

These modes can be switched at Preference bar or Option Menu / Preference of MA-5 Authoring Tool.

3.3.2. In case of AL channel is in used

When AL channel is designated in AL channel designation, the number of tones generated is as follows.

Table 3 The number of the maximum pronunciation at the time of specifying AL channel

| | AL | FM synthesizer | WT synthesizer | Stream | HV | Total |
|----------------|----|----------------|----------------|--------|----|-------|
| FM16 tone mode | 1 | 15 | 15 | 2 | 1 | 34 |
| FM32 tone mode | 1 | 31 | 15 | 2 | 1 | 50 |

This is for using both FM synthesizer and WT synthesizer, when AL channel is used.

For ALL64 mode, AL channel cannot be used.

3.4. Tempo

Only the range of 5BH 8DH 80H (quarter notes of 10) to 00H EAH 60H (quarter notes of 1000) becomes valid for Set Tempo value. It corresponds with tempo changes in music.

MA-5 Authoring Tool corresponds to the tempo change in the music. Tempo cannot be changed after MA-5 Authoring Tool imports SMF. When tempo is not designated, MA-5 Authoring Tool treats quarter notes as 120.

3.5. Time Base

This is not stipulated specifically. For MA-5 Authoring Tool, time base and tempo information of SMF is converted to an event that defines time per one tick.

Moreover, when converting to SMAF, one of time base values can be selected from 4/5/10/20msec.

3.6. Channel Attribution

As the Channel attributes, normal channel and drum channel are provided. These attributes can be changed by bank select. (Refer to MA-5 Voice MAP/ MA-5 Drum Instrument MAP.)

When designation with bank select is not provided specifically, channel 10 is treated as drum channel, and other channels are treaded as normal channel.

Moreover, when HV is specified by the Preference of MA-5 Authoring Tool, arbitrary channels can be specified to HV channels.

Refer to 4.6.8 clause for the message to specify.

4. Applicable MIDI Events

MA-5 Authoring Tool covers the following MIDI events, and ignores other than these events. In addition, please be sure to insert Note event. The initial setting values that are described below are default values that MA-5 Authoring Tool handles when no events are designated in SMF.

The following table shows MIDI event which uses.

Table 4 Use MIDI Event List

| MIDI event name | Form |
|--|---|
| NoteOn | 9nH kkH vvH |
| NoteOff | 8nH kkH vvH |
| Program change | CnH ppH |
| Bank select | BnH 00H mmH (MSB) BnH 20H llH (LSB) |
| Modulation depth | BnH 01H vvH |
| Channel volume | BnH 07H vvH |
| Panpot | BnH 0AH vvH |
| Expression | BnH 0BH vvH |
| Hold1 (damper) | BnH 40H vvH |
| Filter Resonance | BnH 47H vvH |
| Brightness | BnH 4AH vvH |
| Data entry | BnH 06H mmH (MSB) BnH 26H llH (LSB) |
| RPN | BnH 64H llH (LSB) BnH 65H mmH (MSB) |
| All sound off | BnH 78H 00H |
| Reset all controller | BnH 79H 00H |
| All NoteOff | BnH 7BH 00H |
| Mono mode on | BnH 7EH 01H |
| Pitch bend | EnH llH mmH |
| Tempo | FFH 51H 03H ttH ttH ttH |
| Text | FFH 01H llH ddH...ddH |
| Display of copyright | FFH 02H llH ddH...ddH |
| CuePoint | FFH 07H 05H 53H 54H 41H 52H 54H (START) FFH 07H 04H 53H 54H 4FH 50H (STOP) |
| XF cue point | FFH 7FH 04H 43H 7BH 02H rrH |
| Channel Status designation | FFH 7FH 14H 43H 02H 00H 04H ddH...ddH |
| MA-5 AL channel designation | FFH 7FH 06H 43H 02H 01H 01H ccH ddH |
| MA-5 HV voice channel designations | FFH 7FH 06H 43H 02H 01H 02H ccH ddH |
| Karaoke Guide Scoring Channel Designations | FFH 7FH 06H 43H 02H 01H 05H ch1H ch2H |
| Karaoke Guide Scoring Section designations | FFH 07H 05H 43H 02H 01H 06H 00H (START) FFH 07H 05H 43H 02H 01H 06H 01H (STOP) |
| Master volume | F0H 7FH 7FH 04H 01H llH mmH F7H |
| StreamPCM wave panpot | F0H 43H 79H 06H 7FH 0BH llH eeH ddH F7H |
| User event | F0H 43H 79H 06H 7FH 10H ddH F7H |

4.1. NoteOn

9nH kkH vvH

- n: channel number 0 to 15 (0H to FH)
 kk: note number 0 to 114 (00H to 72H) 44Hz of A=69
 vv: key velocity: Interpreted as NoteOff when this is "0".

Performs starting of tones with keys of designated note numbers in applicable channels. When an applicable channel is drum/stream PCM channel, the keys of note numbers 0 to 12 and 92 to 110 mean the starting of stream PCM tones.

In addition, Note-event of Stream PCM can also be inserted from the authoring tool (Stream PCM Edit View of Piano Roll window).

When an applicable channel is a HV channel, the key of the note numbers 0 to 63 corresponds with ID of HV-Script, and means the pronunciation start of HV-Script.

Velocity curve becomes $40 \log (\text{vel}/127)$ [dB], and its graph is shown in Fig.1.

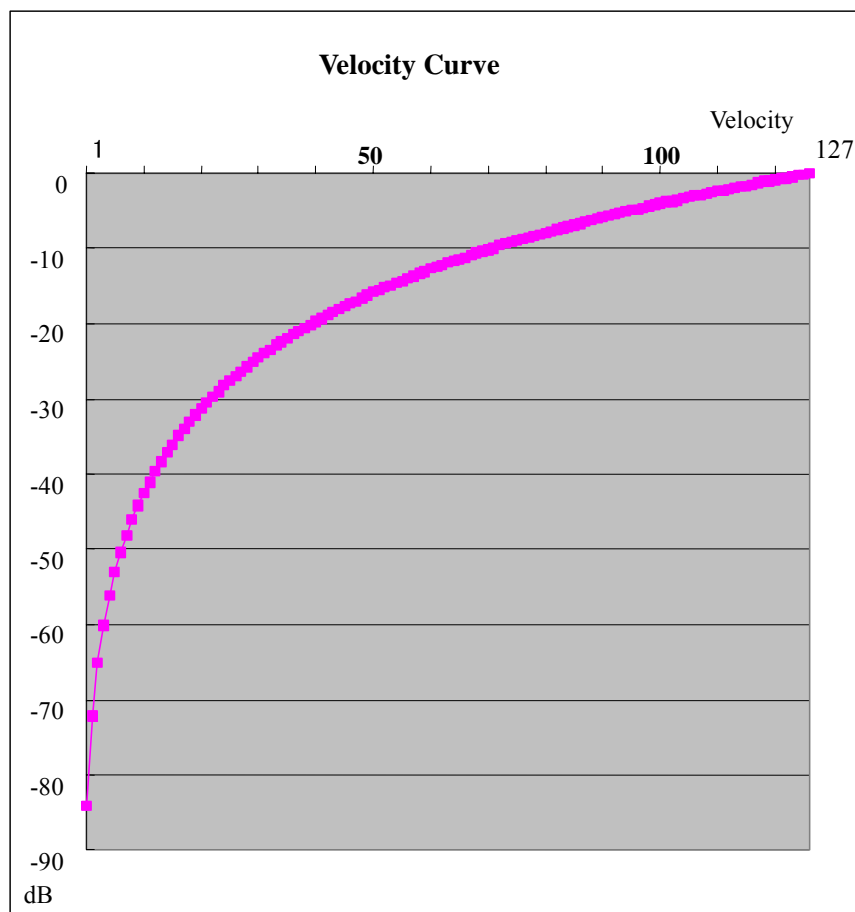


Figure 1 Velocity Curve

Note: Some temperaments are differed by the program change number. About the corresponding program change number, please refer to the Voice List of MA-5 Authoring Tool users manual.

When two or more notes are generated at the same timing in MA-5 Authoring tool, the latter output sound pronounced is delay about 115 μ s compared with the former output sound pronounced. Therefore for example, in the tone of the same timing of the same note, the sound may become worse depending on the frequency to reproduce.

In MA-5 Authoring Tool, two or more simultaneous pronunciation of the same note number in the same channel is not ensured. Pronunciation should not overlap by the same note number in the same channel.

If there is no note event in original SMF, conversion to internal data cannot be performed, and it may not operate normally. Please be sure to insert note event in original SMF.

4.2. NoteOff

8nH kkH vvH

n: channel number 0 to 15 (0H to FH)

kk: note number 0 to 114 (00H to 72H) 440Hz of A=69

vv: Key velocity is ignored.

Performs ending of tones with keys of designated note numbers in applicable channels. When an applicable channel is drum/stream PCM channel, the keys of note numbers 0 to 12 and 92 to 110 mean the ending of stream PCM tones.

When a relevant channel is a HV channel, Note-Off is ignored.

4.3. Program Change

CnH ppH

n: channel number 0 to 15 (0H to FH)

pp: program number 0 to 127 (00H to 7FH)

Initial setting value: 0

A voice of designated channels is setup. When an applicable channel is set for normal channel, a voice from designated banks by bank select is chosen. When an applicable channel is set as a drum channel, drum set is selected.

A program change is disregarded when the applicable channel is set as HV channel. Please specify a change of HV voice in HV-Script. Default voices of drum bank include mixture of PCM voices and FM voices.

A user voice can be assigned both FM voice and a PCM voice with MA-5 Authoring Tool.

Please insert a program change after a bank selection of each channel head. Since program change in music is not accepted, insert it in time point other than the tone generation period.

When Note event of Stream PCM is inserted on Authoring Tool (Stream PCM Edit View on Piano Roll window), the Program Change is automatically inserted into the top of the channel ("0"tick).

AL tone is attached in one music and can use only the number of a maximum of 16 tones. When you add AL voice by MA-5 Authoring Tool, please consider about it.

Note: About the voice can be set by program change, please refer to the VoiceList term of MA-5 Authoring Tool user's manual.

4.4. Control Change

4.4.1. Bank Select

BnH 00H mmH (MSB)

BnH 20H llH (LSB)

n: channel number 0 to 15 (0H to FH)

mm: MSB value of bank number 0 to 127 (00H to 7FH)

ll: LSB value of bank number 0 to 127 (00H to 7FH)

Initial setting value: 0/0

Sets bank of designated channel. It is recommended to use bank select MSB and bank select LSB as a set.

Table 5 shows bank select that is handled by MA-5 Authoring Tool.

Table 5 Bank select applicability table

| MSB | LSB | | | | | | | | | | | |
|-------------------------------|---|------------|---|---|---|---|---|---|---|---|------------------|---------------------------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 to 127 Un-specified |
| 0~121,126,127 Un-specified | When 10ch, it is replaced to MSB:125／LSB:0／Pch:2 When except 10ch, it is replaced to MSB:124／LSB:1 | | | | | | | | | | | |
| 122,124 (Normal) | Preset Voice | User Voice | | | | | | | | | Replace LSB to 1 | |
| 123,125 (Drum/StreamPCM) | Refer the following table | | | | | | | | | | | |

| MSB | LSB | Pch | | | | | | | | | | | | |
|-----------------------------|-----|-----------------|---|------------|---|---|---|---|---|---|---|------------------|---------------------------|--|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 to 127 Un-specified | |
| 123,125 (Drum/StreamPCM) | 0 | Preset Voice | | User Voice | | | | | | | | Replace Pch to 2 | | |

| MSB | LSB | 14 bit value |
|-----|-----|--------------|
| 124 | 0 | 15872 |
| | 1 | 15873 |
| | 2 | 15874 |
| | 3 | 15875 |
| | 4 | 15876 |
| | 5 | 15877 |
| | 6 | 15878 |
| | 7 | 15879 |
| | 8 | 15880 |
| | 9 | 15881 |
| 125 | 0 | 16000 |

Table 6 Bank select 14-bit notation value

The channel is made drum channel by designating drum bank and then by designating Program change. The channel is made FM normal channel by designating normal bank and then by designating Program change. Even though bank select is received, the voices of present Program change is valid until the next Program change is received.

When multiple bank selects exist, the latest message (last one on the time axis) is processed preferentially.

Note: For MA-5 Authoring Tool, when MSB is 122, it is replaced with 124, or when MSB is 123, it is replaced with 125, so that SMF made for MA-2 can be used.

Note: By the BankSelect setting, it decides whether the channel accepts the key-control or not.

In the channel which uses the voice of Normal bank, it accepts key control.

In the channel which used the voice of Drum bank, it does not accept key control.

By designating Bank MSB 125, the applicable channel is drum/stream PCM channel.

When drum set is changed with program change, the instrument of drum is changed to the one that corresponding to the voice map. As for stream PCM, the relationship between the note number and Stream Wave ID is to be unique as shown in Table 2. The maximum number of Stream Wave IDs that can be registered to SMAF is to be 32.

Table 7 Correspondence of Note# of drum/stream PCM bank

| Note # | Definition | Assign |
|--------|-----------------|--------------------|
| 0 | Stream PCM | Stream Wave ID :1 |
| 1 | | Stream Wave ID :2 |
| 2 | | Stream Wave ID :3 |
| : | | : |
| 12 | | Stream Wave ID :13 |
| 13 | Drum Instrument | No Instrument |
| 14 | | No Instrument |
| 15 | | No Instrument |
| : | | : |
| 91 | | No Instrument |
| 92 | Stream PCM | Stream Wave ID :14 |
| 93 | | Stream Wave ID :15 |
| 94 | | Stream Wave ID :16 |
| : | | : |
| 110 | | Stream Wave ID :32 |

When Note event of Stream PCM is inserted on Authoring Tool (Stream PCM Edit View on Piano Roll window), the Program Change is automatically inserted into the top of the channel ("0"tick).

Note: About the voice can be set by Bank select and program change, please refer to the Voice List term of MA-5 Authoring Tool users manual.

A bank selection is disregarded when the corresponding channel is set as HV channel.

4.4.2. Modulation Depth

BnH 01H vvH

n: channel number 0 to 15 (0H to FH)
 vv: vibrato value 0 to 127 (00H to 7FH)

Initial setting value: 0

Designates the depth of vibrato (LFO pitch modulation) of designated channels.

The relationship between the value and depth of vibrato is shown in Table 8. The depth of vibrato here shows the multiple for vibrato depth that is set for each voice.

Table 8 Relationship between vibrato value and depth

| Vibrato value | Depth of vibrato |
|---------------|------------------|
| 0 | OFF |
| 1 to 31 | x 1 |
| 32 to 63 | x 2 |
| 64 to 95 | x 4 |
| 96 to 127 | x 8 |

When the applicable channel is drum/stream PCM channel, it is invalid for note numbers 0 to 12 and 92 to 110.
 (Fixed to 0)

In the case of the channel specified by the HV channel, it becomes invalid at HV sound.

4.4.3. Channel Volume

BnH 07H vvH

n: channel number 0 to 15 (0H to FH)
 vv: control value 0 to 127 (00H to 7FH)

Initial setting value: 100 (64H)

Sets the balance of volume between channels for messages that designates volume of applicable channels.

Formula: $\text{Gain[dB]} = 20 \cdot \log((vv)^2 / 127^2)$

When the applicable channel is drum/stream PCM channel, it is invalid for note numbers 0 to 12 and 92 to 110.
 In the case of the channel specified by the HV channel, it is valid at HV sound, too.

Note: For the volume of individual waveforms that are assigned to Stream PCM, use velocity.

4.4.4. Panpot

BnH 0AH vvH

n: channel number 0 to 15 (0H to FH)

vv: control value 0 to 127 (00H to 7FH)

Initial setting value: 64 (40H) [Center]

Designates position in the stereophonic sound field of designated channels. The positioning is made between the left end (vv=0) and right end (vv=127) of the stereophonic sound field by using the following formulas.

When the applicable channel is drum/stream PCM channel, it is also valid for note numbers 0 to 12 and 92 to 110.

In the case of the channel specified by the HV channel, it is valid at HV sound, too.

Recommended formulas: Left Channel Gain[dB] = $20 \cdot \log(\cos(\pi/2 \cdot (vv)/127))$
 Right Channel Gain[dB] = $20 \cdot \log(\sin(\pi/2 \cdot (vv)/127))$

4.4.5. Expression

BnH 0BH vvH

n: channel number 0 to 15 (0H to FH)

vv: control value (00H to 7FH)

Initial setting value: 127 (7FH)

Designates the change of volume that is set with channel volume of applicable channel.

When the applicable channel is drum/stream PCM channel, it is invalid for note numbers 0 to 12 and 92 to 110.

In the case of the channel specified by the HV channel, it is valid at HV sound, too.

Note: Although both Channel volume and Expression are used to control the volume, their purposes are different.

The Channel volume was used for mix down with volume of overall music that are set before the reproduction of music data and the fader. And the expression is used to adjust the volume for music expression etc.

Formula: $\text{Exp[dB]} = 20 \cdot \log((vv)^2/127^2)$

4.4.6. Hold 1 (Damper)

BnH 40H vvH

n: channel number 0 to 15 (0H to FH)

vv: control value (00H to 7FH)

Initial setting value: 0

Designates on/off of damper (sustain pedal) of applicable channels. Off is designated when the value is 0 to 63, or on is designated when the value is 64 to 127.

When the applicable channel is drum/stream PCM channel, it is invalid for note numbers 0 to 12 and 92 to 110. (fixed to 0)

In the channel designated by AL channel designation, hold is invalid in the filter of AL voice.

In the case of the channel specified by the HV channel, it becomes invalid at HV sound.

Note: NoteOff is sustained when it is received with damper on. When the damper changes from on to off, the delayed NoteOff is executed, and volume envelope proceeds to release.

Note: Do not put NoteOff and Hold 1 on the same timing. In such a case, the playback sound set up with the voice parameter is not guaranteed in MA-5 authoring tool.

4.4.7. Filter Resonance

BnH 47H vvH

n: channel number 0 to 15 (0H to FH)

vv: control value 0 to 127 (00H to 7FH)

Initial setting value: 64(40H)

Designates the strength of filter resonance. It controls the resonance effect value set to voices through the relative change (Center '64'). The control value '0' is the weakest resonance effect and '127' is the strongest one.

When the applicable channel is Drum/Stream PCM channel, it is invalid for Note number 0 to 12 and 92 to 127 (fixed to 0).

In the case of the channel specified by the HV channel, it becomes invalid at HV sound.

4.4.8. Brightness

BnH 4AH vvH

n: channel number 0 to 15 (0H to FH)

vv: control value 0 to 127 (00H to 7FH)

Initial setting value: 64 (40H)

Designates the cutoff frequency of filter. It is valid when it is at the state (sustain) of Fc3 of filter EG. It controls the cutoff frequency set to voices through the relative change (Center '64'). Brightness value '0' is the lowest cutoff frequency and '127' is its peak.

When the applicable channel is Drum/Stream PCM channel, it is invalid for Note numbers 0 to 12 and 92 to 127 (fixed to 0).

In the case of the channel specified by the HV channel, it becomes invalid at HV sound.

4.4.9. Data Entry

BnH 06H mmH (MSB)

BnH 26H llH (LSB)

n: channel number 0 to 15 (0H to FH)

mm: MSB of data value 0 to 127 (00H to 7FH)

ll: LSB of data value 0 to 127 (00H to 7FH)

Initial setting value: 0/0

Used to enter the value of RPN (MSB/LSB). For the details, refer to the section of RPN.

[Note]: Data Entry is ignored when NRPN is positioned before it.

4.4.10. RPN

BnH 64H llH (LSB)

BnH 65H mmH (MSB)

n: channel number 0 to 15 (0H to FH)

ll: LSB of parameter number 0 to 127 (0H to 7FH)

mm: MSB of parameter number 0 to 127 (00H to 7FH)

Initial setting value: 127/127 (7FH/7FH)

Used to designate parameter number of RPN.

4.4.10.1. Pitch Bend Sensitivity

BnH 64H 00H / BnH 65H 00H (RPN parameter designation)

BnH 06H mmH / BnH 26H llH (data entry)

n: channel number 0 to 15 (0H to FH)

mm: MSB of data value 0 to 24 (00H to 18H)

ll: LSB of data value (fixed to 0)

Initial setting value: 2/0 (2 half-tones)

Performs setting of sensitivity of pitch bend. MSB of data entry shows the sensitivity in halftones, and LSB of data entry shows the sensitivity in cents. For example, when MSB=01 and LSB=00, the sensitivity becomes ± 1 halftones. (Overall ranges of change are 2 halftones.)

4.4.11. All Sound Off

BnH 78H 00H

n: channel number 0 to 15 (0H to FH)

Performs silencing of all voices during tone generation on applicable channel immediately after designating this message.

When the applicable channel is drum/stream PCM channel, it is also valid for note numbers 0 to 12 and 92 to 110.

In the case of the channel specified by the HV channel, it is valid at HV sound, too.

4.4.12. Reset all Controller

BnH 79H 00H

n: channel number 0 to 15 (0H to FH)

Resets the following controllers to their initial value immediately after designating this message.

Table 9The initial value of reset all controller

| Controller | Name | Value |
|------------|--------------|--------------|
| 1 | Modulation | 0 (OFF) |
| 11 | Expression | 127 (MAX) |
| 64 | Hold1 | 0 (OFF) |
| 100 | RPN LSB | 127 (NULL) |
| 101 | RPN MSB | 127(NULL) |
| - | Pitch Bend | MSB 64/LSB 0 |
| - | Key Velocity | 64 |

Program change, bank select, channel volume and pan are not reset.

Note: Please place the Reset all controller message before the Start Point.

The RPN.LSB/MSB may not be reset if the Reset all controller message was used in music.

4.4.13. All Note Off

BnH 7BH 00H

n: channel number 0 to 15 (0H to FH)

Turns off all voices during tone generation on applicable channel.

When the applicable channel is drum/stream PCM channel, it is also valid for note numbers 0 to 12 and 92 to 110.

In the case of the channel specified by the HV channel, it is ignored, it becomes invalid at HV sound,

4.4.14. Mono Mode On

BnH 7EH 01H

n: channel number 0 to 15 (0H to FH)

Changes applicable channel to mono mode.

When the applicable channel is drum/stream PCM channel, this message is invalid.

In the case of the channel specified by the HV channel, it becomes invalid at HV sound.

It is valid only when it exists before the first Note in the music. Mode change in the music is prohibited.

When a channel is in mono mode, notes of poly are subjected to slur (legato) processing. When a tone of note of the first tone in the slur processing is silenced by DVA, attack can be attached (retrigger) to the note of the second tone.

Note: In the channel which specified mono mode, when two or more Note-on exist at the same timing, only the last note is left and others are deleted. (This processing is applied also to the drum / stream PCM channel)

4.5. Pitch Bend

EnH llH mmH

n: channel number 0 to 16 (0H to FH)

ll: LSB of bend value 0 to 127 (00H to 7FH)

mm: MSB of bend value 0 to 127 (00H to 7FH)

Initial setting value: 0/64 (00H/40H) (center)

Changes the pitch of applicable channel up or down. The initial value of change width (pitch bend sensitivity) is ± 2 halftones. 0/0 makes the downward pitch bend maximum. 127/127 makes the upward pitch bend maximum. Pitch bend range can be set with 0/0 of RPN.

When the applicable channel is drum/stream PCM channel, it is invalid for note numbers 0 to 12 and 92 to 110.

In the case of the channel specified by the HV channel, it is valid at HV sound, too.

4.6. Meta Events

4.6.1. Tempo

FFH 51H 03H ttH ttH ttH

tt tt tt: length of quarter notes (μ sec)

MA-5 Authoring Tool accommodates to tempo change in the music. The tempo change designated to arbitrary positions is interpreted.

4.6.2. Text

FFH 01H llH ddH...ddH

ll : bytes number of text data (variable length presentation)

dd: text data

Title, composer, writer, arranger, player and singer can be inputted by describing XF information header (refer to <Appendix>) using this meta-event.

MA-5 Authoring Tool converts this event to each information of Optional Data Chunk of SMAF/MA-5.

Control codes for characters such as ”(“, “[“ and “/” that are defined with XF information header are displayed as they are on the MA-5 Authoring Tool.

4.6.3. Display of Copyright

FFH 02H llH ddH...ddH

ll : bytes number of text data (variable length presentation)

dd: text data

By describing copyright information, copyright can be inputted.

MA-5 Authoring Tool converts this event to Copyright of Optional Data Chunk of SMAF/MA-5.

4.6.4. CuePoint

| | | | | | | | | |
|------------|------------|------------|------------|------------|------------|------------|------------|----------------|
| FFH | 07H | 05H | 53H | 54H | 41H | 52H | 54H | (START) |
| FFH | 07H | 04H | 53H | 54H | 4FH | 50H | | (STOP) |

Describes the playing start and stop positions as CuePoint of meta-event.

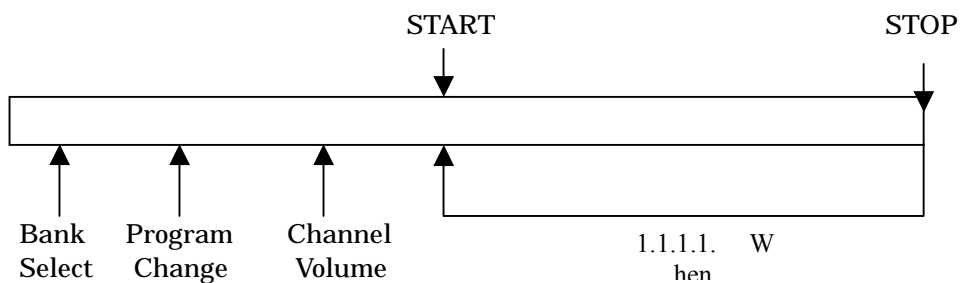
MA-5 Authoring Tool converts these events to Start Point and Stop Point of SMAF/MA-5.

4th to 8th bytes of START (53H, 54H, 41H, 52H and 54H) means “START”(capital letters) in ASCII.

4th to 7th bytes of STOP (53H, 54H, 4FH and 50H) means “STOP”(capital letters) in ASCII.

START is to be inserted into the position of the first NoteOn or before it, and STOP is to be inserted after the last NoteOff.

START and STOP are to be inserted into music as a pair.



As described above, when START is inserted after the control messages, these control messages are read also at repeating.

4.6.5. XF CuePoint

FFH 7FH 04H 43H 7BH 02H rrH

rr : Rehearsal Mark

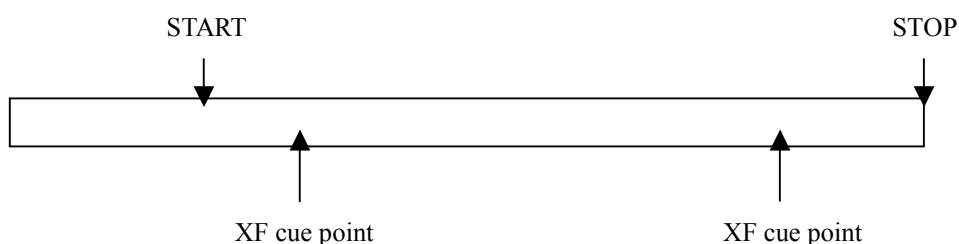
By describing rehearsal mark with XF-formatting (refer to <Appendix>), Loop playback of those sections can be carried out on MA-5 Authoring Tool at the time of playback. In addition, the interpretation of rehearsal mark is depended on mobile phone, and it is usually disregarded.

MA-5 Authoring Tool converts this event to Phrase List of SMAF/MA-5. For the conversion, refer to the following table.

Table 10The correspondence table of Rehearsal Mark and Phrase List

| XF Rehearsal Mark | Loop setting |
|-------------------|-------------------|
| Intro | Introduction (PI) |
| Ending | Ending (PE) |
| A | Melody A (PA) |
| B | Melody B (PB) |
| C | Sabi (PS) |
| D | Interlude (PK) |
| E | Refrain (PR) |

Insert this meta-event between START and STOP of the cue point (4.6.4) in time.



4.6.6. Channel Status Designation

FFH 7FH 14H 43H 7BH 02H 00H 04H ssHssH

ss: from channel 1 till 16 of VS/LED setup value (16 fixation)

Table 11 Channel Status Setting Value

| Setup Value | VS | LED |
|-------------|-----|-----|
| 0 | OFF | OFF |
| 1 | OFF | ON |
| 2 | ON | OFF |
| 3 | ON | ON |

Channel Status Information is specified. VS and LED of channels 1 to 16 are specified according to Table 11.

4.6.7. MA-5 AL Channel Designation

FFH 7FH 06H 43H 02H 01H 01H ccH ddH

ch: AL channel number 0 to 15 (0H to FH)

data: control value (1 [FIXED])

Designates the channel number which uses AL voice. The control value is fixed to 1 and the other value is ignored.

In the channel designated by this message, hold is invalid in the filter of AL voice.

Note: The channel designated by this message becomes being the same as that of mono mode, but in this channel, do not put two or more NoteOn on the same timing together. In such a case, playback is not guaranteed in MA-5 authoring tool.

We recommend to place this message at the position of music head (Tick=0) before a program change.

4.6.8. MA-5 AL Channel Designation

FFH 7FH 06H 43H 02H 01H 02H ccH ddH

cc: HV channel number 0 to 15 (0H to FH)

dd: control value (fixed to 1)

Designates the channel number which uses HV playback. The control value is fixed to 1 and the other value is ignored.

Note: The channel designated by this message becomes the same as that of mono mode, but in this channel, do not put two or more NoteOn on the same timing together. In such a case, playback is not guaranteed in MA-5 Authoring Tool. We recommend to place this message at the head of music (Tick=0), and before a program change.

4.6.9. Karaoke Guide Channel Designations

FFH 7FH 06H 43H 02H 01H 05H ch1H ch2H

Ch1: Karaoke Guide Scoring Channel Designations 1 (ch#15(MSB)~ch#08(LSB))

Ch2: Karaoke Guide Scoring Channel Designations 2 (ch#07(MSB)~ch#00(LSB))

Karaoke Guide channel is designed. (Two or more can be designed.)

Whether two or more channels are used as a Scoring channel is dependent on implementation of application.

0 to 15 channel is designed by using bit.

1: designed 0: Not designed

Table 12 Karaoke Guide designation channel

| Ch1 | | | | | | | | Ch2 | | | | | | | |
|-----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|
| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Ch | Ch | Ch | Ch | Ch | Ch | Ch | Ch | Ch | Ch | Ch | Ch | Ch | Ch | Ch | Ch |

In MA-5 authoring tool, this event information is written in the MD tag of Optional Data Chunk of SMAF/MA-5.

4.6.10. Karaoke Guide Scoring Section designations

| | | | | | | | |
|------------|------------|------------|------------|------------|------------|------------|--------------------|
| FFH | 7FH | 05H | 43H | 02H | 01H | 06H | 00H (START) |
| FFH | 7FH | 05H | 43H | 02H | 01H | 06H | 01H (STOP) |

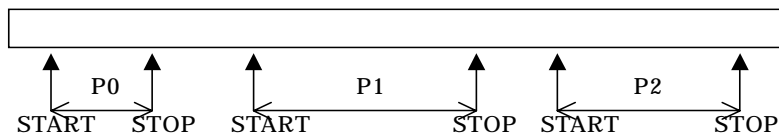
Karaoke Guide Scoring starting position and Karaoke Guide Scoring end position are designed.

Designation of all 16 sections is possible.

P0, P1, P2, P3, P4, P5, P6, P7, P8, P9, Pa, Pb, Pc, Pd, Pe, and Pf are assigned from the top section in order.

Duplication of the section is prohibited.

In MA-5 Authoring Tool, when starting position and end position overlap, it is considered as first-arrival priority.



The total of kinds of section designation tag names is 16.

In MA-5 Authoring Tool, this event is converted into Phrase List of SMAF/MA-5.

Conversion applicability refers to Table 13.

Table 13 Karaoke Guide section designation applicability table

| Section designation tag name | Karaoke Guide Scoring section designation |
|------------------------------|--|
| P0 | Karaoke Guide Scoring section designation 1 |
| P1 | Karaoke Guide Scoring section designation 2 |
| P2 | Karaoke Guide Scoring section designation 3 |
| P3 | Karaoke Guide Scoring section designation 4 |
| P4 | Karaoke Guide Scoring section designation 5 |
| P5 | Karaoke Guide Scoring section designation 6 |
| P6 | Karaoke Guide Scoring section designation 7 |
| P7 | Karaoke Guide Scoring section designation 8 |
| P8 | Karaoke Guide Scoring section designation 9 |
| P9 | Karaoke Guide Scoring section designation 10 |
| Pa | Karaoke Guide Scoring section designation 11 |
| Pb | Karaoke Guide Scoring section designation 12 |
| Pc | Karaoke Guide Scoring section designation 13 |
| Pd | Karaoke Guide Scoring section designation 14 |
| Pe | Karaoke Guide Scoring section designation 15 |
| Pf | Karaoke Guide Scoring section designation 16 |

4.7. Universal System Exclusive Message

4.7.1. Master Volume

| Message | Contents |
|-------------|--|
| F0H 7FH | Universal real time exclusive header |
| <device ID> | ID of unit that becomes target (127:ALL) |
| 04H | Sub-ID number #1 |
| 01H | Sub-ID number #2 |
| ll | Master Volume LSB |
| mm | Master Volume MSB |
| F7H | EOX |

Initial setting value: 100 (64H)

Performs volume setting of final stage of synthesizer output. "ll" is ignored. When the applicable channel is drum/stream PCM channel, it is invalid for note numbers 0 to 12 and 92 to 110.

In the case of the channel specified by the HV channel, it is valid at HV sound, too.

Formula: $\text{Gain[dB]} = 20 * \log((\text{Data})^2 / 127^2)$

Note: For the final adjustment of volume of the contents, it is recommended to increase the volume to the maximum acceptable level for preventing clip.

4.8. Classified System Exclusive Message

Performs definition of items such as voice setting and waveform setting specific to each device exclusively.

4.8.1. MA-5 Stream PCM Wave Panpot

F0H 43H 79H 06H 7FH 0BH iiH ccH ddH F7H

ii: WaveID 1 to 32 (1H to 20F)

cc: panpot designation(0), clear (1), pan off (2)

dd: panpot value 0 to 127(00H to 7FH)

Designates panpot of applicable stream PCM waveform. Data=0 shows left end, and 127 shows right end.

Reception of this message makes channel panpot invalid. (Waveforms that are not designated by this message uses the setting of channel panpot) After receiving this message, wave panpot designation is given priority only when clear is issued with this message.

By designating 1 for CL, all of wave panpot settings that have been received are returned to channel panpot. Moreover, by specifying 2 to CL, turns OFF pan pot assignment and pronounces by 0dB.

4.8.2. MA-5 User Event

F0H 43H 79H 06H 7FH 10H ddH F7H

dd: Interrupt classification 0 to 15 (0H to FH)

Specifies the setting position of the user event on sequence.

User can set up 16 kinds of events by this event and it is used in applications, such as JAVA and game.

This event does not affect the music play.

Note: When designates user event, designate after interval more than 100 msec surely from the front user event. If don't do it, it may not operate normally.

5. Notes on Stream PCM Setting

5.1. Maximum Number of Tones Generation

The maximum number of sound generation in Stream PCM is designated by MA-3 Authoring Tool (“Reserve setting” of Piano Roll/Stream PCM Edit View), and it is to two at the maximum.

In addition, the simultaneous pronunciation of the stream exceeding the reserve number was not guaranteed. The stream pronounced simultaneously should not exceed a setup of the reserve number.

Moreover, 1024 bytes of MA-3 RAM area (total 8176byte) is consumed by one stream (2048 bytes is consumed at the maximum).

5.2. Panpot

As means for setting panpot in stream PCM, two methods are available; setting it with channel panpot by using control change and setting it with MA-5 stream PCM wave panpot.

When the former method is used, when, for example, two stream PCM exist in one channel at the same time, panpot with the same value is set in both of them. When the instrumental sound of drum exists in an applicable channel, this is also set in the panpot with the same value. When panpot of only one stream PCM is set at the same time, it is necessary to assign one stream PCM to one channel. At this time, panpot can be changed during generation of tones (between NoteOn and NoteOff).

When the latter method is used, even when, for example, two stream PCM exist in one channel at the same time, panpot can be set for the stream PCM individually. It can be set individually even if instrumental sound of drum exists. At this time, change of panpot is prohibited during generation of tones (between NoteOn and NoteOff).

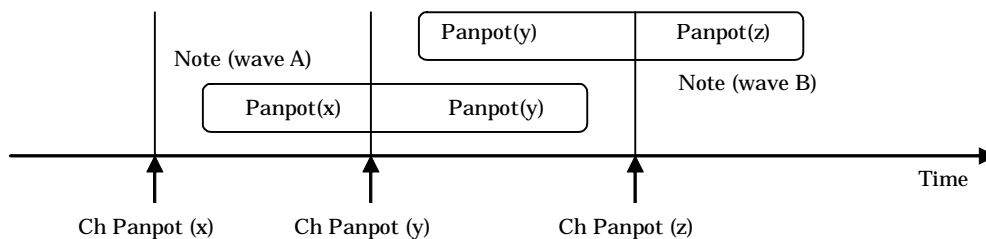


Figure 2 Setting with channel panpot

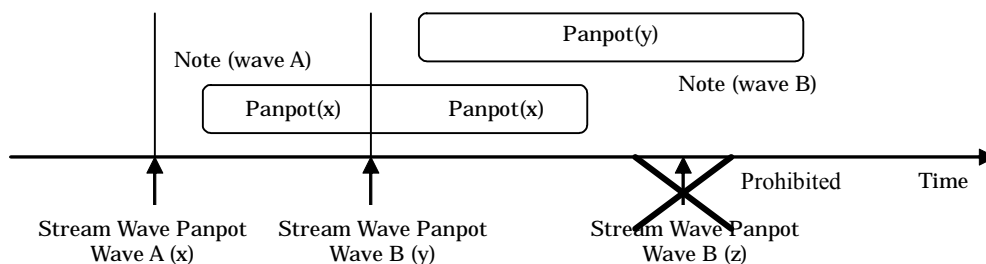


Figure 3 Setting with MA-5 stream PCM wave panpot

5.3. Limit of Unit byte Numbers (sampling frequency)

Since the number of stream PCM unit bytes (the number of following unit bytes) has made 12kByte/s the maximum, please create the sampling frequency of a sound file to fit in 12kByte/s or less. In MA-5 authoring tool, restriction is applied so that it cannot save if the number of unit bytes is more than 12kByte/s.

The number of unit bytes of the waveform of 4bits ADPCM Mono [Kbytes/s]

← Sampling frequency F_s [kHz] / 2

The number of unit bytes of the waveform of 8bits PCM Mono [Kbytes/s]

← Sampling frequency F_s [kHz]

The number of unit bytes of the waveform of 4bits ADPCM Stereo [Kbytes/s]

← Sampling frequency F_s [kHz]

The number of unit bytes of the waveform of 8bits PCM Stereo [Kbytes/s]

← Sampling frequency F_s [kHz] * 2

In the example of Fig. 3, in the time zone when reproduction of two waveforms has overlapped, since it is set to 14 [Kbyte/s], it be cannot saved.

[Example] When $F_s=8$ kHz of ADPCM stereo and a $F_s=6$ kHz PCM mono are used.

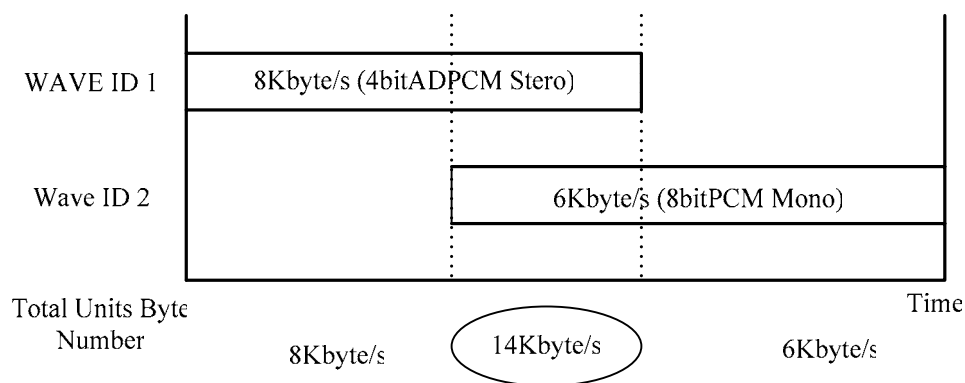


Figure 4 Example of a calculation of the Maximum Stream PCM unit bytes number

6. Note at the time of AL voice is in used

Please use AL voice in the designated MIDI channel by the AL channel designation.

If you use AL voice in the MIDI channel, which is other than AL channel designation, the tones are generated by the voice which is not filtered. And if AL voice is set to NOISE, it may become unexpected voice.

7. Notes at the time of HV Pronunciation in Used

7.1. Interval of HV Note On

Please prepare the time interval of different HV note-on from one HV note-on 100ms or more. In MA-5 Authoring Tool, the contents whose time interval is less than 100ms is restricted to be not saved.

7.2. Restriction Matter of HV-Script

There are following restrictions at the time of authoring a HV-Script.

1. The maximum byte number in one clause quoted by the clause bound symbols is setup to 100 byte.
 - A) In the clause bound symbols, both “?” and “*” are also contained besides punctuation marks.
 - B) The numerical value attached to “?” or “*” among a clause punctuation marks or a clause punctuation mark, and comment about a copyright information are contained in one clause.
 - C) When a clause punctuation mark exists continuously, it is calculated as a respectively different clause.
 - D) A header is not included in one clause. However, when clause mark does not exist, a header is included in a clause.
 - E) Although one byte character is used for Long-vowel symbol or Silent symbols, it is calculated as a two bytes character.
 - F) When a linefeed code exists in one clause, it is calculated as a one bytes character or two bytes character.
 - G) When the 100 bytes numbers of symbol is a head byte of full-size character, or it is a symbol which comes up with a number or “#” symbol, read operation is made possible to the low rank byte which a maximum of 105 bytes accompanies, a number, a mark, and etc.
2. The HV-Script Data which exceeds 2147483647 (7FFFFFFFH) bytes are un-reproducible.

In addition, be sure to pay an attention to the following points at the time of execution.

- 1) Please do not use the following, Speed “S”, Utterance length “L”, and Degree of rhythm change of a clause “W” during a long-vowel symbol.
- 2) The alphabet used in a control character sequence should use a full-size letter as much as possible.

In MA-5 Authoring Tool, when the maximum bytes in one clause surrounded by the clause punctuation mark was more than 101byte, HV-Script is restricted to be not created.

7.3. HV Checking Operation when RAM Size is Over

When under the status of RAM size is over or when RAM size becomes over by checking-out HV check box, HV check box can not be changed.

7.4. Edit on HV Sequence Edit View

In order to edit events on HV Sequence Edit View, it is necessary to specify the HV Channel at Score Window.
Insert the Note event into the applicable channel so that HV Channel can be specified on Score Window.

8. Other Notes

8.1. Vibration and LED

In MA-5 Authoring Tool, vibration and LED are controllable for every track.

We recommend you to use this function at track which note is not pronounced more moderately than track which note is always pronounced. And, please create the track which inputted only the specified note to use this vibration and LED effectively especially (For example, the track of only the high hat portion of drum).

About vibration, when the gate time of the note of synchronous assignment channel is short, the effect may be unable to be seen. And when the interval of note and note is short, it may be unable to check that the swing has stopped. These are based on the response characteristic of the vibrating motor. The length of gate time and the interval of notes should be set up in consideration of this.

Please check the operation of vibration and LED by actual playback.

8.2. Volume Designation and Note Message

Do not set a note message at the same time of volume designation in MA-5 Authoring Tool.

Noise may occur and the attack of sound may be lost. In order to avoid them, note message should be set with the interval more than 22 mSec after volume designation.

Noise may be generated by the timing of first time Note-on in a playback which is later than second repeat playback when an interval between Start Point and first Note-on is similarly short.

The target messages of volume designation are Master Volume, Channel Volume, Expression, and Pan pot. When especially volume discrepancy is large, it becomes easy to occur this problem.

8.3. Event Density Limitation

Event density means the number of events of the unit time. It is calculated by Note event (6Byte), Program change (2Byte), Control change (3Byte), Pitch bend (3Byte), and Exclusive message (Byte number of data part and 2(F0, F7) Byte). Unit is [Byte/sec].

The kind of event density and each criterion value of MA-5 authoring tool are described in Table 14.

Table 14 The kind and criterion value of event density

| Event density | Definition | Criterion value [Byte/s] |
|-----------------------|--|-----------------------------|
| Average event density | Averaged event density in the music. | 500 |
| Maximum event density | The highest event density in the music | 1000 |

In MA-5 authoring tool, restriction is prepared so that data higher than the criterion value of Table 14 cannot be saved.

8.4. Tone Generation Range in PCM Voice (WT synthesizer)

The range of playback frequency is 1500Hz ~ 48000Hz.

When it exceeds 48000Hz, the voice from 48000Hz to 96000Hz is played as 48000Hz, the voice over 96000Hz is not guaranteed its playback.

Playback frequency, it means the frequency in which the note key, pitch-bend, and LFO are reflected to the Fs (frequency of Note No.60 (C-key))

8.5. Caution in the case of creating the voice using the PCM user waveform

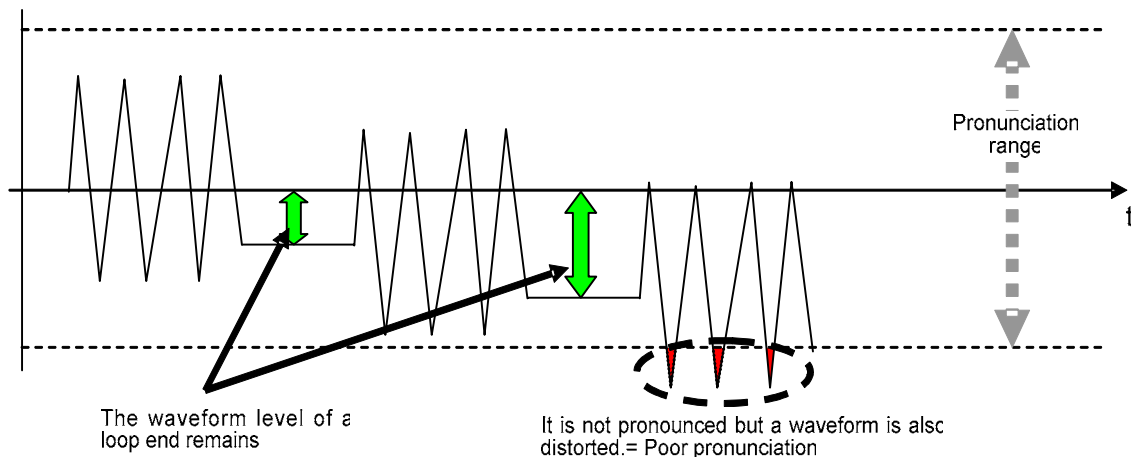
When you create the voice using the PCM user waveform, be careful of below according to the specification of MA-5 hardware

When there is no waveform loop (a loop point and a loop end are the same value), the waveform value is read continuously according to the specification of MA-5 hardware in the place where read-out of a waveform reached the loop end.

Therefore, if a voice parameter is set as “XOF = 1 and SR = 0 (or setup with long decay time)”, or “XOF = 0 and RR = 0 (or setup with long decay time)”, this value will be maintained continuously after note-off also.

In this state, when many note-on of big volume overlaps, sound becomes easy to be distorted.

Moreover, if the voice of such a waveform is pronounced repeatedly, the value maintained after note-off also becomes large by the number of pronounced times, and becomes easy to be distorted much more.



In order to prevent such a condition, we recommend you to set the waveform level at loop end as "0", or to adjust a envelope so that pronunciation may be completed before a loop end.

Please create PCM voice according to Table 13.

| With/Without waveform loop | What voice | waveform level at loop end | XOF | DR | SR | RR | SUS | Comment |
|----------------------------|--------------------|----------------------------|------|-------|-------|-----------------------------|------|--|
| None | One shot or Chunk | 0 | free | free | free | free | free | No problem occurs. |
| | | not 0 | on | not 0 | not 0 | free | off | A problem may occur. Please adjust DR and SR so that pronunciation is completed before a loop end. |
| | | | off | free | free | not 0 Shorter is better. | off | A problem may occur. Please adjust RR so that pronunciation is completed before a loop end. |
| | Sustaining | 0 | off | free | 0 | not 0 | free | No problem occurs. |
| | | not 0 | off | free | 0 | not 0 | free | No problem occurs. |
| | With loop Decaying | 0 | free | free | free | free | free | No problem occurs. |
| | | not 0 | free | free | free | free | free | No problem occurs. |

free : You may do any setup.

Table 15 PCM voice authoring guideline

8.6. Total Length after Conversion

When total length becomes below 20msec, it is not converted to SMAF as an error.

Please be sure to create a SMF so that total length exceeds 20msec.

8.7. Key Control Status

The key control status of the channel concerned sets to "OFF" on condition that either of the followings.

- 1) The value of an existing bank select MSB is only "125(7DH)", and there is a program change after that.
- 2) In 10 (09H) channel, the value of bank selection MSB "124 (7CH)" (or "122 (7AH)") are not existed.
- 3) There are no Note events existing.

These judge it as a Drum / Stream PCM channel in MA-5 Authoring Tool. By the other channel, key control status becomes "non-appointed."

8.8. Note-On in the Same Timing with Mono-Mode-On

With the Mono-Mode-On using channel, please do not set multiple Note-On in the same timing (Duration=0).

With the Mono-Mode-On using channel, when multiple Note-On are set in the same timing, the latest Note is pronounced. But the volume may not be raise to the total-level (which means volume may become smaller).

8.9. All-Note-Off in ALL64 Mode

In the case of ALL64 mode, All-Note-Off sometimes may not affect at WT voice.

Please do not use All-Note-Off in ALL64 mode.

9. Appendix

9.1. XF Information Header (by language)

Sets information of features and attributes of music by using the form of text meta-event in the format of SMF.

FFH 01H len <text>

The information items are divided by an 8 bit colon, “:”, and listed.

No data is placed in the information items that are not described.

New items are to be added after the last item. When no text exists, the processing system places blanks in the following information items even when an 8 bit colon is not found.

8.1.1.1. and 8.1.1.2. of information items and various control codes are described with ASCII.

9.1.1. Information Items

9.1.1.1. XF Information Header -- Language Specific -- ID XF information header (by language) ID

XF Information Header -- ID indicating Language Specific (characters) "XFln"

9.1.1.2. Language

Information that designate the code system of characters that are used for XF information header (by language).

It does not designate the character code system that is used for words. The character code system for words is designated with XF words header. It does not show the place of composition.

The Authoring Tool only the following languages.

| Symbol | Character code | Applicable languages |
|--------|-----------------------------------|---|
| L1 | Latin 1(ASCII(7bit) + ISO 8859-1) | English, French, German, Italian, Spanish, Portuguese, etc. |
| JP | Shift-JIS | Japanese |
| KR | EUC-KR | Korean |

9.1.1.3. Song Name

Expression of time by language

When using two or more lines to express a title, place an 8 bit slush, "/", in the place a linefeed is to be made.

9.1.1.4. Composer

Name of composer of original music

Divide the family name and given name with an 8 bit space, " ".

When two or more composers are written, divide them with an 8 bit slush, "/".

9.1.1.5. Lyricist

Name of writer when words are given to the original music.

The format is the same as the one for the composer.

9.1.1.6. Arranger

Name of a person who arranged original music or music data.

The format is the same as the one for the composer.

9.1.1.7. Performer Player / Singer

Name of a person or a group of persons who plays or sings original music.

The format is the same as the one for the composer.

9.1.1.8. Programmer Author of music data

Name of a person who authored music data.

The format is the same as the one for the composer.

9.2. XF rehearsal mark

For XF format, rehearsal marks are defined as the style message as described below.

FFH 7FH 04H 43H 7BH 02H rrH Rehearsal Mark

rr Rehearsal Mark 0yyyxxxx

Lower 4 bits (xxxx)

0000: Intro

0001: Ending

0010: Fill-in

0011: A

0100: B

:

1111: M

Upper 3 bits (yyy)

000-111: individual variation

001 : it is ' A', B' , etc.

010 : it is " A", B" , etc.

Used for designation of an end of the so-called individual sections.

It is placed in between measures.

Music that does not have some rehearsal marks may exist.

The number of measure placed between rehearsal marks can be determined arbitrarily.