

# SMF to SMAF Converter for MA-1 Incoming Melody Creation Guideline

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## 1 Outline

This document describes guideline for creation of SMF files that is given as an input when creating SMAF files by using SMAF conversion tool.

## 2 Guideline for creation of SMF files

### 2.1 SMF format

Use Standard MIDI File Format 0 (the same chunk as XF).

### 2.2 File size

Generally, the size of SMAF files that can be distribute is limited. Therefore, it is necessary to be careful of the size of SMAF files that are obtained by conversion from SMF. Therefore, the conversion tool is provided with a function that display the size of SMAF files that have been created.

Since the size of SMAF files after the conversion is equal to approximately a half of original SMF files, the target file size of SMF can be calculated by using the size data to use it as the standard for the creation of SMF.

### 2.3 Number of MIDI channels

To perform the conversion for designated four channels out of 16 channels of SMF from channel 1 to channel 16, create SMF so that the total number channels becomes four.

### 2.4 Number of generated tones

Maximum of four tones can be generated. For SMF, create the file by using mono tones. For the corresponding conversion tool when using polytones for creation of SMF files, refer to Chapter 4.

### 2.5 Range of notes

The compass that can be generated is fixed to three octaves that begin with C# and ends with C. The notes exceeding the three octave range are replaced with pauses. Since the three octave range that can be generated varies among the tones, refer to Appendix.A.

## 2.6 Resolution

As for the format of SMAF, the resolution is represented with real time, and any of the four times, 1ms, 2ms, 4ms and 5ms, can be selected. However the time is fixed to 4ms for SMAF that is created by the conversion tool. Moreover, the conversion tool quantizes the events of SMF to resolution of 24 ticks per one beat, and then converts it to the time unit of SMAF. Therefore, since the resolution of SMAF that is eventually created is 24, it is recommended to create the file with resolution of 24 at the stage of SMF.

## 2.7 Tempo

For MA-1, the value of tempo that can be designated is defined according to the resolution. Therefore, for the value of tempo that is designed for SMF, the value nearest to the one specified by SMF is selected from the values described in Appendix.D that are available. Therefore, it is recommended to use only the values described in Appendix.D that are available for creation of SMF.

## 2.8 Play section

The time of silence that is placed before the initial note of SMF is converted to SMAF as a pause. When playing tones at the start of a play or designating a pause time, create the file by taking into consideration the time from the head of the first measure.

A play can be started or ended from a certain time by using a cue point that is described later in this document.

### 3 Guideline for SMF events

#### 3.1 Program Change

When changing a tone, insert Program Change into the head of each channel (0 Tick). The tone number on SMF is used as a tone number of SMAF.

Although Program Change is inserted into other than the head of each channel (0 Tick), the conversion tool moves it to the head. Even when there are several events per each channel, the conversion tool judges only initial event.

#### 3.2 Control Change #1(Modulation)

To obtain vibrato effect, use Control Change #1(Modulation). It is converted to Modulation of Control Message #3 of Control Message.

The values of SMF are related with vibrato as described in the Table 3-1.

Modulation	Vibrato effect of MA-1
0 to 63	OFF
64 to 127	ON

Table 3 1 Control Change #1

For the placement of events, refer to Vibrato in Chapter 4.

#### 3.3 Control Change #7(Volume)

When designating volume of each channel, insert Control Change into 0 Tick of the head of each channel.

Control Change #7 is converted to the volume of SMAF in accordance with the volume conversion table in Appendix.C. When this volume value does not exist in SMF, the volume of SMAF becomes 127.

For SMF and SMAF, although it is possible to put the volume of channel during a play, MA-1 does not allow the change during a play.

#### 3.4 Note velocity

For SMAF, velocity is not presented. The conversion tool interprets the state as Note On for any velocity for SMF that is equal to or more than “1”. However, it is recommended to fix Velocity to 127 for Note On, or to “0” for Note Off.

### 3.5 Meta event #1(Text)

Title information can be put in SMAF by utilizing XF information header (refer to Appnedix.B).

The conversion tool writes the information of XF information header to an applicable place in Contents Info Chunk of SMAF.

SMF XF Information	SMAF Contents Info Chunk
Title	ST: Title
Composer	SW: composition
Writer	WW: song writing
Arranger	AW: arrangement
Player / singer	AN: name of artist

Table 3 2 Correspondence of XF information header

### 3.6 Meta event #2( indication of copyright)

Meta Event 02 is utilized to set Copyright(c) of Copy Status and Contents Info Chunk of SMAF. The conversion tool writes the contents of Meta Event 02 into Copyright(c) when it is present on SMF and sets Copy Status to "Save:OK, Copy:No".

### 3.7 Meta event #7(cue point)

Since it is possible to input the Start Point and Stop Point on SMAF by utilizing this meta event, a play starting time and play ending time can be set at any points. When the words "START" and "STOP" as shown in the following table are present, Start Point and Stop Point are inserted respectively into SMAF.

However, if there is a note before Start Point or Stop Point, it is kept in SMAF. Therefore, it is necessary to delete notes that are placed before and after it when making the file size smaller.

SMF Cue Point	SMAF
START	Start Point
STOP	Stop Point

Table 3 3 Correspondence of cue point

When only one of the designations of Start Point and Stop Point is present, the absent one is supplemented automatically so that both Start Point and Stop Point are inserted into SMAF. The place where it is supplemented is the head time when inserting Start Point. When inserting Stop Point, it is supplemented in the ending time of tone generation if the last event is note message, or in the event time if it is Control Change #1.

## 4 Musical presentation for SMF/SMAF/MA-1

### 4.1 Slur

When creating a phrase of slur, present note event the generation of a tone is started before previous tone generation ends as described in Figure 4 1. The conversion tool changes such data by advancing the ending time of the previous tone generation so that that part where the notes with slur presentation overlap becomes one tick as shown in Figure 4 1. For MA-1, the two tones presented as described in the Figure 4 1 are generated with slur (the tones are coupled into legato).

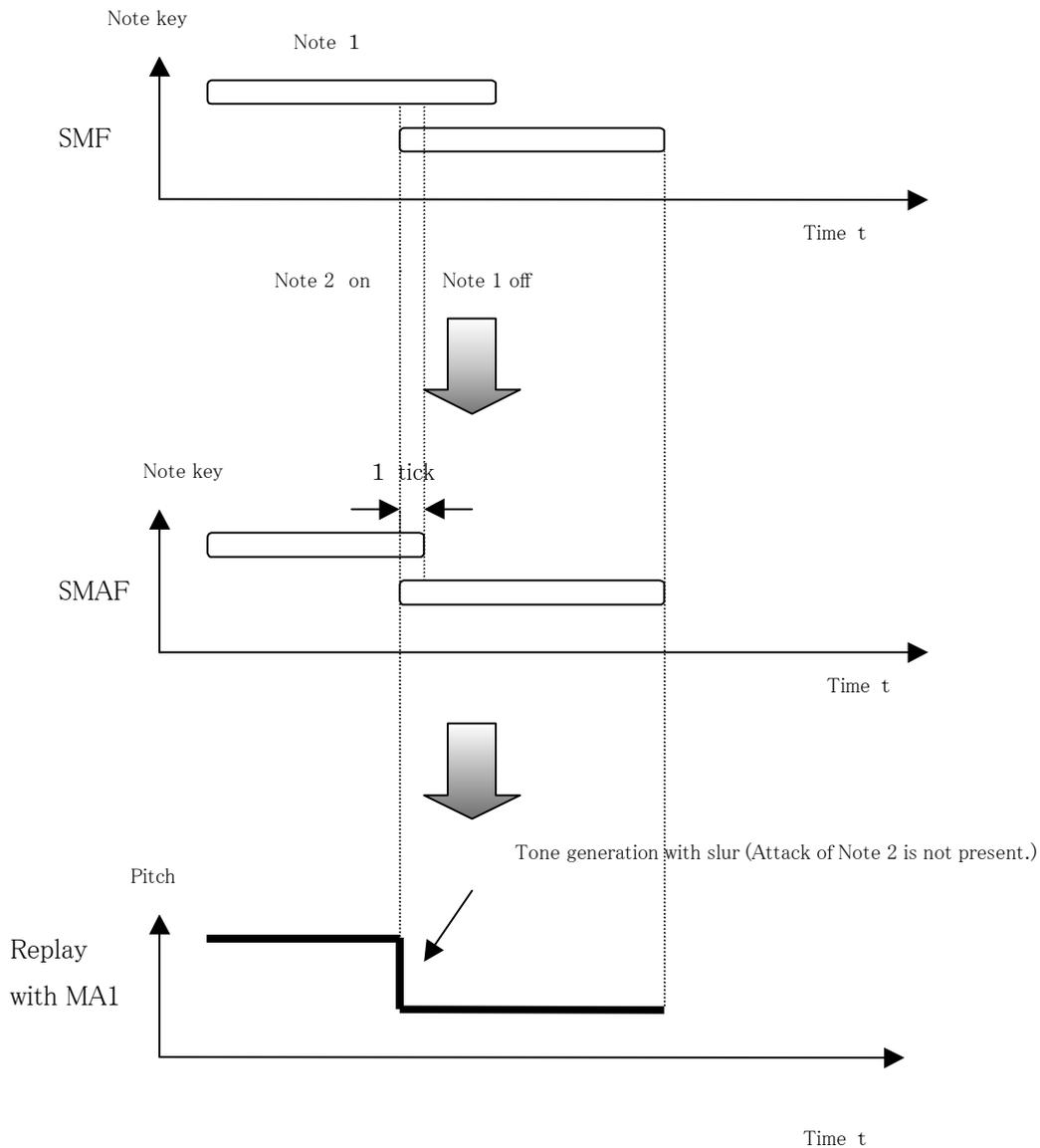


Figure 4 1 Processing of tones when performing slur presentation on SMF

Figure 4 2 describes a case when the generation time of a tone overlaps completely with that of another tone. For MA-1 where monaural tone generation is performed, do not create such data at the stage of SMF in principle.

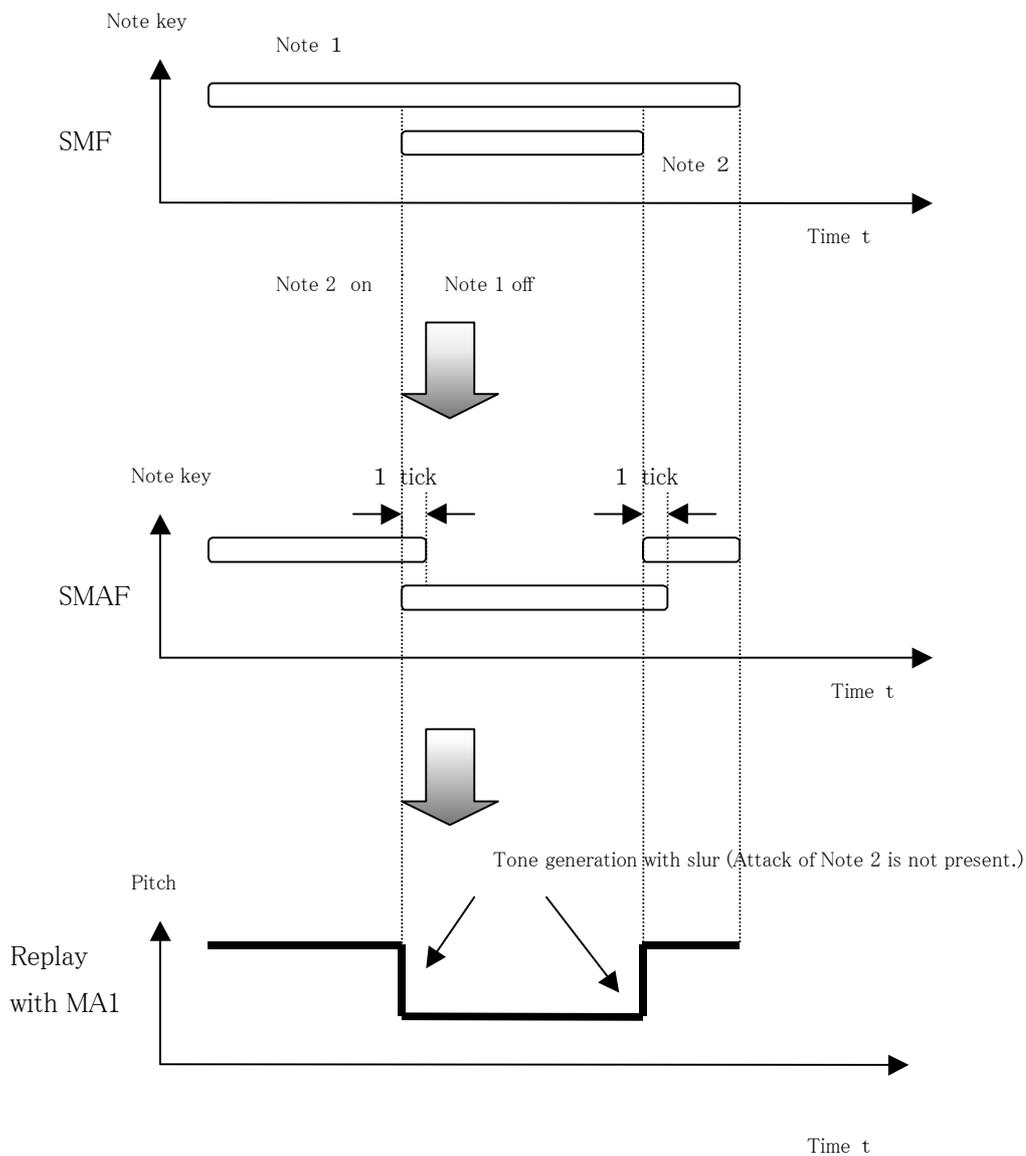


Figure 4 2 An example of processing at simultaneous tone generation

### 4.2 Tie

When the same notes overlap for SMF, the conversion tool converts the two notes into one note.

(Figure 4 3) Do not create such data in the stage of SMF by taking monaural tone generation into consideration in principle.

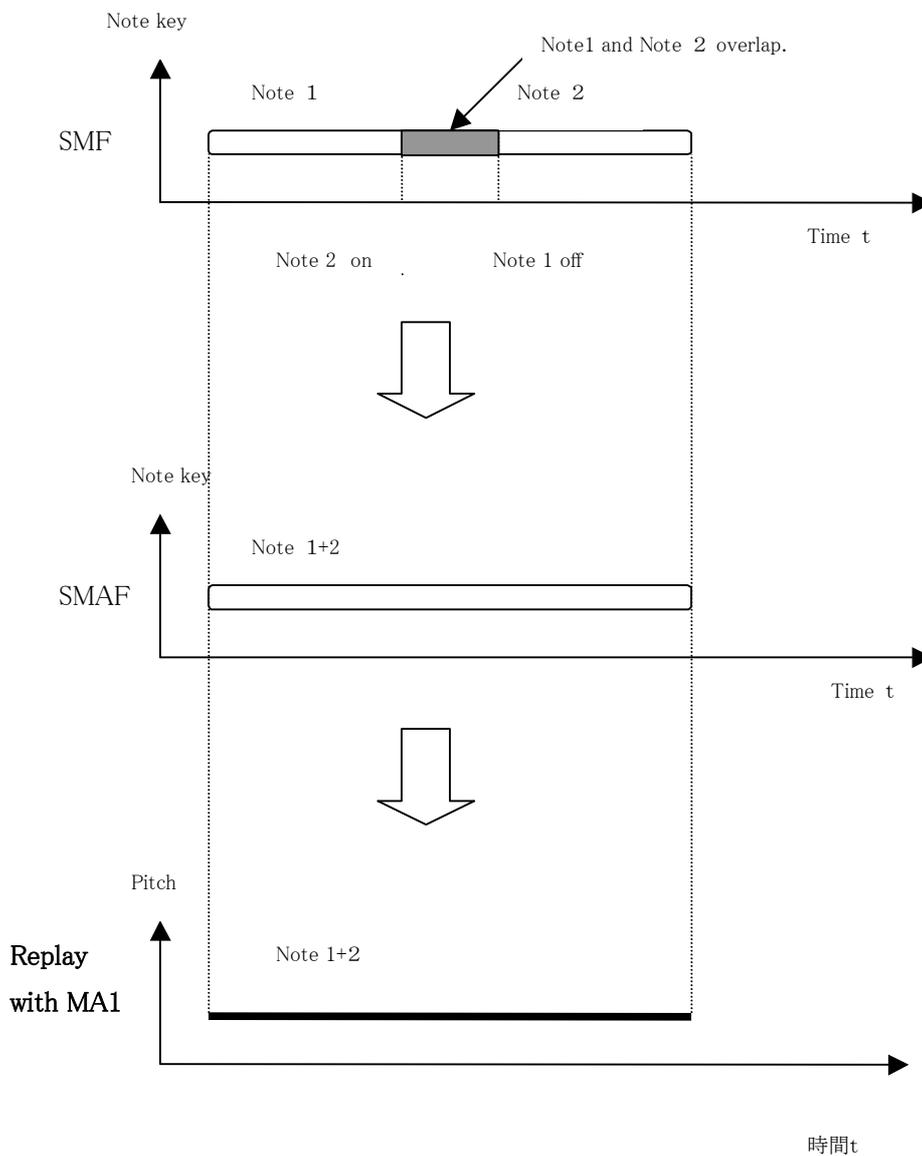


Figure 4 3 Processing of tones when performing tie presentation on SMF

### 4.3 Vibrato

Vibrato is presented by using Control Change #1(Modulation). For MA-1, control of vibrate is ON/OFF, where a value ranging from 0 to 63 is OFF, and a value ranging from 64 to 127 is ON.

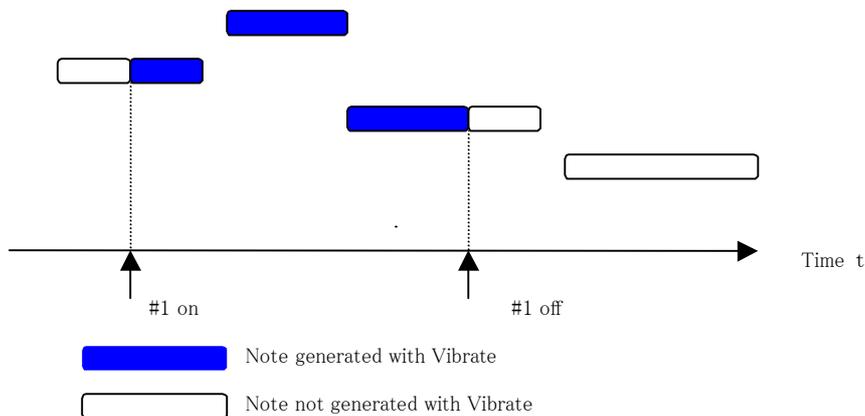


Figure 4 4 An example of vibrato representation with SMF

As shown in Figure 4 1, vibrato is enabled at the point of time of reception when it is received during generation of notes. The operations are the same for both ON and OFF.

SMF to SMAF converter of the conversion tool divides the note at the point of time of reception of vibrato and inserts Control Message #3 on SMAF.

## 5 Appendix A: Compass

For MA-1, the compass of notes that can be generated in one part is limited to three octaves. The limitation is that the tone can be generated by selecting one of three-octave ranges, C#2 to C5, C#3 to C6, C#4 to C7, and C#5 to C8.

This tool has built-in tone parameters of tones of GM128 for MA-1, and has fixed compass of one three-octave compasses per each tone, and the parameters are written also into MAF files that are created with this tool.

The following table shows the compass of tones that can be generated by tones of GM128.

The compasses marked with ○ in this table can be generated.

A4(Note#69) = 440Hz

PC	name	C#2- C5	C#3- C6	C#4- C7	C#5- C8	P C	name	C#2- C5	C#3- C6	C#4- C7	C#5- C8
1	GrandPno		○			65	SprnoSax			○	
2	BritePno		○			66	AltoSax		○		
3	E.GrandP		○			67	TenorSax		○		
4	HnkyTonk		○			68	Bari.Sax	○			
5	E.Piano1		○			69	Oboe		○		
6	E.Piano2		○			70	Eng.Horn		○		
7	Harpsi			○		71	Bassoon	○			
8	Clavi		○			72	Clarinet		○		
9	Celesta				○	73	Piccolo				○
10	Glocken				○	74	Flute			○	
11	MusicBox			○		75	Recorder			○	
12	Vibes		○			76	PanFlute			○	
13	Marimba			○		77	Bottle		○		
14	Xylophon				○	78	Shakhchi		○		
15	TubulBel		○			79	Whistle			○	
16	Dulcimar		○			80	Ocarina			○	
17	DrawOrgn		○			81	SquareLd			○	
18	PercOrgn		○			82	SawLead		○		
19	RockOrgn		○			83	CaliopLd		○		
20	ChrchOrg			○		84	ChiffLd		○		
21	ReedOrgn			○		85	CharanLd		○		
22	Acordion			○		86	VoiceLd		○		
23	Harmnica			○		87	FifthLd		○		
24	TangoAcd		○			88	Bass&Ld		○		
25	NylonGtr		○			89	NewAgePd		○		
26	SteelGtr		○			90	WarmPad		○		
27	JazzGtr		○			91	PolySyPd		○		
28	CleanGtr		○			92	ChoirPad		○		
29	Mute.Gtr		○			93	BowedPad		○		
30	Ovrdrive		○			94	MetalPad		○		
31	Dist.Gtr		○			95	HaloPad		○		
32	GtrHarmo				○	96	SweepPad		○		
33	AcoBass	○				97	Rain		○		
34	FngrBass	○				98	SoundTrk		○		
35	PickBass	○				99	Crystal			○	
36	Fretless	○				100	Atmosphr		○		
37	SlapBas1	○				101	Bright		○		
38	SlapBas2	○				102	Goblins		○		
39	SynBass1	○				103	Echoes		○		
40	SynBass2	○				104	Sci-Fi		○		
41	Violin			○		105	Sitar		○		
42	Viola		○			106	Banjo		○		
43	Cello	○				107	Shamisen			○	
44	Contrabs	○				108	Koto		○		
45	TremStr		○			109	Kalimba		○		
46	PizzStr			○		110	Bagpipe		○		
47	Harp		○			111	Fiddle		○		
48	Timpani	○				112	Shanai		○		
49	Strings1			○		113	TnklBell		○		
50	Strings2			○		114	Agogo			○	
51	Syn.Str1			○		115	SteelDrm		○		
52	Syn.Str2			○		116	WoodBlk			○	
53	ChoirAah		○			117	TaikoDrm	○			
54	VoiceOoh		○			118	TaikoDrm		○		
55	SynVoice		○			119	Syn.Drum	○			
56	Orch.Hit		○			120	RevCymb1	○			
57	Trumpet			○		121	FretNoiz		○		
58	Trombone		○			122	BrthNoiz		○		
59	Tuba	○				123	SeaShore		○		
60	Mute.Trp		○			124	Tweet		○		
61	Fr.Horn		○			125	Telephone		○		
62	BrasSect		○			126	Helicptr		○		
63	SynBras1		○			127	Applause		○		
64	SynBras2		○			128	Gunshot		○		

## 6 Appendix B:XF Information

XF Information is information about music that is buried by utilizing text meta event of SMF. The format is as described below.

Information about features and attribute of music is set by using the type of text meta event in the format of SMF.

FF 01 len <text>

The information items are separated individually by 8 bit colon ":" and listed.

No data is inputted in information items that are not described.

New items are to be inserted after the last item, and information items after no text are blanked out even if no 8 bit colon can be found in the processing system.

1) and 2) of information items are various control codes are described with ASCII.

XF Information Header -- Language Specific by using Japanese is described below.

< Information items >

1) XF Information Header --Language Specific --ID XFinformation header (by language) ID  
XF Information Header – ID (4 letters) that means "Language Specific" "XFIn"

2) Language language information

Information that designates character code system used for XFinformation header (by language).

It does not designate character code system used for words. The character code system of words is designated with XF words header. It does not present the place of creation of music.

Authoring tool supports the following languages.

Code	Character code	Compatible languages
L1	Latin 1(ASCII(7bit) + ISO 8859-1)	English, French, German, Italian, Spanish, Portuguese, etc.
JP	Shift-JIS	Japanese

3) Song Name Title

Presents the language of the Title.

When using alphabet, use 16 bit (2 byte) characters.

For referencing, reading with 16 bit hiragana that is enclosed by 8 bit parentheses "(" ")" is attached. Katakana is not used for the reading.

kana enclosed by 8 bit brackets "[" "]" is attached.

kana has to be attached to each character to which it is attached.

When presenting Title in several lines, place 8 bit slush "/" in the place of carriage return.

Example :それいけ！ Y[わい]マン/元[げん]気[き]いっぱい(それいけわいまん げんきいっぱい)

They are displayed as follows.:

```

        わい
    それいけ！ Yマン
    げんき
    元気いっぱい
    
```

When displaying Title in the processing system, interpret the control codes as described in the above example.

4) Composer Composer

Name of composer of original music

Separate family name and given name by 8 bit space " ".

When describing a plurality of names, separate them with 8 bit slush "/".

When using alphabet, use 16 bit letters.

For referencing, reading with 16 bit hiragana that is enclosed by 8 bit parentheses "(" ") " can be attached.

Katakana is not used for the reading.

When describing a plurality of names, attach reading to each of them.

Example: 曲作 太郎(きょくづくり たろう)/曲作 次郎(きょくづくり じろう)

5) Lyricist Writer

The name of the writer when original music has words.

The format is the same as that of the composer.

6) Arranger Arranger

The name of person who arranges original music or music data

The format is the same as that of the composer.

7) Performer Player / Singer

The name of a person or a group who plays or sings original music

The format is the same as that of the composer.

8) Programmer Music data creator

The name of person who creates music data

The format is the same as that of the composer.

Example:

Title is “楽しい日曜日 (Tanoshii nichiyoubi)”, a Japanese eight beat pops music released in September 28, 1994.

In the music data, the melody is lead by a saxophone.

Vocal is female, solo, composer is “山葉太郎(Yamaha Taro)”, writer is “浜松花子’Hamamatsu Hanako”, and no arranger.

Player / singer is “中沢町子(Nakazawa Machiko)”, and music data creator is “豊岡次郎(Toyooka Jiro)”.

XFinformation header (by language) An example of header in Japanese:

FF 01 len <XFln:JP:楽しい日曜日(たのしいにちようび):山葉 太郎(やまは たろう):

浜松 花子(はままつ はなこ)::中沢 町子(なかざわ まちこ):豊岡 次郎(とよおか じろう)>

## 7 Appendix C: Volume conversion table

MA-1		SMAF value	SMF Control #7
Volume (dB)	SMAF conversion value		
0.00	127	127	127
0.00	127	126	126
0.00	127	125	125
-0.75	122	124	124
-0.75	122	123	123
-0.75	122	122	122
-0.75	122	121	121
-0.75	122	120	120
-1.50	116	119	119
-1.50	116	118	118
-1.50	116	117	117
-1.50	116	116	116
-1.50	116	115	115
-2.25	112	114	114
-2.25	112	113	113
-2.25	112	112	112
-2.25	112	111	111
-2.25	112	110	110
-3.00	107	109	109
-3.00	107	108	108
-3.00	107	107	107
-3.00	107	106	106
-3.00	107	105	105
-3.75	102	104	104
-3.75	102	103	103
-3.75	102	102	102
-3.75	102	101	101
-4.50	98	100	100
-4.50	98	99	99
-4.50	98	98	98
-4.50	98	97	97
-4.50	98	96	96
-5.25	94	95	95
-5.25	94	94	94
-5.25	94	93	93
-5.25	94	92	92
-6.00	90	91	91
-6.00	90	90	90
-6.00	90	89	89
-6.00	90	88	88
-6.75	86	87	87
-6.75	86	86	86
-6.75	86	85	85
-7.50	82	84	84
-7.50	82	83	83
-7.50	82	82	82
-7.50	82	81	81
-8.25	79	80	80
-8.25	79	79	79

MA-1		SMAF value	SMF Control #7
Volume (dB)	SMAF conversion value		
-12.00	64	63	63
-12.75	61	62	62
-12.75	61	61	61
-12.75	61	60	60
-13.50	58	59	59
-13.50	58	58	58
-14.25	56	57	57
-14.25	56	56	56
-14.25	56	55	55
-15.00	54	54	54
-15.00	54	53	53
-15.75	51	52	52
-15.75	51	51	51
-16.50	49	50	50
-16.50	49	49	49
-17.25	47	48	48
-17.25	47	47	47
-18.00	45	46	46
-18.00	45	45	45
-18.75	43	44	44
-18.75	43	43	43
-19.50	41	42	42
-19.50	41	41	41
-20.25	40	40	40
-20.25	40	39	39
-21.00	38	38	38
-21.75	36	37	37
-21.75	36	36	36
-22.50	35	35	35
-23.25	33	34	34
-23.25	33	33	33
-24.00	32	32	32
-24.75	31	31	31
-24.75	31	30	30
-25.50	29	29	29
-26.25	28	28	28
-27.00	27	27	27
-27.75	26	26	26
-28.50	25	25	25
-29.25	24	24	24
-30.00	23	23	23
-30.75	22	22	22
-31.50	21	21	21
-32.25	20	20	20
-33.00	19	19	19
-33.75	18	18	18
-34.50	17	17	17
-35.25			
-36.00	16	16	16

MA-1		SMAF value	SMF Control #7
Volume (dB)	SMAF conversion value		
-8.25	79	78	78
-9.00	76	77	77
-9.00	76	76	76
-9.00	76	75	75
-9.75	72	74	74
-9.75	72	73	73
-9.75	72	72	72
-9.75	72	71	71
-10.50	69	70	70
-10.50	69	69	69
-10.50	69	68	68
-11.25	66	67	67
-11.25	66	66	66
-12.00	64	65	65
-12.00	64	64	64

MA-1		SMAF value	SMF Control #7
Volume (dB)	SMAF conversion value		
-36.75	15	15	15
-37.50			
-38.25	14	14	14
-39.00	13	13	13
-39.75			
-40.50	12	12	12
-41.25			
-42.00	11	11	11
-42.75			
-43.50	10	10	10
-44.25			
-45.00			
-45.75	9	9	9
-46.50			
-47.25	8	8	8
-47.25	8	7	7
-47.25	8	6	6
-47.25	8	5	5
-47.25	8	4	4
-47.25	8	3	3
-47.25	8	2	2
-47.25	8	1	1
-47.25	8	0	0

## 8 Appendix D:Tempo

SMAF does not use the idea of tempo. However, it uses ExclusiveMessage to bury tempo for MA-1 in SMAF files. At this time, a tempo near to that of SMF is selected from the following table because tempo that can be played on MA-1 is limited.

MA-1 register value	Actual tempo	MA-1 register value	Actual tempo
4	437	51	42
5	364	52	41
6	312	54	40
7	273	55	39
8	243	56	38
9	218	58	37
10	199	60	36
11	182	61	35
12	168	63	34
13	156	65	33
14	146	67	32
15	137	69	31
16	129	72	30
17	121	74	29
18	115	77	28
19	109	80	27
20	104	83	26
21	99	86	25
22	95	90	24
23	91	94	23
24	87	98	22
25	84	103	21
26	81	108	20
27	78	114	19
28	75	120	18
29	73	128	17
30	70	136	16
31	68	145	15
32	66	155	14
33	64	167	13
34	62	181	12
35	61	198	11
36	59	217	10
37	57	242	9
38	56		
39	55		
40	53		
41	52		
42	51		
43	50		
44	49		
45	47		
46	46		
48	45		
49	44		
50	43		