

MA-3 Sound Middleware Specification for SMF API

Version 1.2.1

February 7, 2003

Yamaha Corporation

<p>[Notes]</p>
<p>This document is the specification of MA-3 Sound Middleware as sample source code. This explains the expected operation of Sound Middleware, but doesn't guarantee operation of sample middleware.</p>
<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 © 2001-2003 YAMAHA Corporation

All rights reserved

Note:

For explanation of definition of functions, the following formats are defined for use.

Definition format	Meaning	Definition format	Meaning
UINT8	8 bits without code	SINT8	8 bits with code
UINT16	16 bits without code	SINT16	16 bits with code
UINT32	32 bits without code	SINT32	32 bits with code

Revision

Version	Date	Description
0.8	May 18, 2001	Initial edition
1.0	June 28, 2001	API name was changed.
1.1.0	July 10, 2001	Specification of argument of Load() was extended.
1.1.1	September 10, 2001	Control() explanation was added.
1.1.2	September 19, 2001	API list was added.
1.1.3	November 26, 2001	The parameter definition of Seek() was changed.
1.1.4	November 30, 2001	The effective range of SET_STARTPOINT and SET_ENDPOINT was changed.
1.1.5	December 10, 2001	Description of MASMW_GET_LOADINFO and MASMW_SET_LOADINFO were added.
1.1.6	January 25, 2002	Miswritten word was corrected.
1.1.7	March.25, 2002	Miswritten word was corrected.
1.1.8	December 13, 2002	2.1.7 The setting of playback count was added to Playback control. Caution for using playback control. 2.1.7.10 The setting of playback count was added. 2.1.9 The operation specification of Seek was added.
1.2.0	December 15, 2002	1. Introduction The function table was changed. 2.1.7 The specification of MaSound_Control was changed (Acquisition of playback time).
1.2.1	February 7, 2003	2.1.7.10 The clerical error of Specification of MaSound_Control(Setup of playback count) was corrected.

Contents

1	INTRODUCTION.....	4
2	PROVISIONS FOR MASOUND API.....	5
2.1	DEFINITION OF FUNCTIONS.....	6
2.1.1	MaSound_Create.....	6
2.1.2	MaSound_Delete.....	6
2.1.3	MaSound_Load.....	7
2.1.4	MaSound_Unload.....	7
2.1.5	MaSound_Open.....	8
2.1.6	MaSound_Close.....	8
2.1.7	MaSound_Control.....	9
2.1.7.1	MaSound_Control (Setup of playback volume).....	10
2.1.7.2	MaSound_Control (Setup of playback speed).....	10
2.1.7.3	MaSound_Control (Setup of playback key).....	11
2.1.7.4	MaSound_Control (Acquisition of playback position).....	11
2.1.7.5	MaSound_Control (Acquisition of playback time).....	12
2.1.7.6	MaSound_Control (Acquisition of the status).....	12
2.1.7.7	MaSound_Control (Acquires the specified data of contents information).....	13
2.1.7.8	MaSound_Control (Setup of playback start position).....	14
2.1.7.9	MaSound_Control (Setup of playback end position).....	14
2.1.7.10	MaSound_Control (Setup of playback count).....	14
2.1.8	MaSound_Standby.....	15
2.1.9	MaSound_Seek.....	15
2.1.10	MaSound_Start.....	16
2.1.11	MaSound_Stop.....	16
2.1.12	MaSound_Pause.....	17
2.1.13	MaSound_Restart.....	17

1 Introduction

This document presents specifications of functions of API (Application Program Interface) when SMF is designated. For the details, refer to materials of MA-3 Sound Middleware.

	NON EXISTENT	IDLE	LOADED	OPENED	READY	PLAYING	PAUSE
MaSound_Create	○	×	×	×	×	×	×
MaSound_Load	×	○	×	×	×	×	×
MaSound_Open	×	×	○	×	×	×	×
MaSound_Control							
MASMW_SET_VOLUME	×	×	×	○	○	○	○
MASMW_SET_SPEED	×	×	×	○	○	○	○
MASMW_SET_KEYCONTROL	×	×	×	○	○	○	○
MASMW_GET_POSITION	×	×	×	○	○	○	○
MASMW_GET_LENGTH	×	△	○	○	○	○	○
MASMW_GET_STATE	×	×	○	○	○	○	○
MASMW_GET_CONTENTSDATA	×	△	○	○	○	○	○
MASMW_SET_STARTPOINT	×	×	×	○	×	×	×
MASMW_SET_ENDPOINT	×	×	×	○	×	×	×
MASMW_SET_PANPOT	×	×	×	○	○	○	○
MASMW_SET_REPEAT	×	×	×	×	○	×	○
MaSound_Standby	×	×	×	○	×	×	×
MaSound_Seek	×	×	×	×	○	×	○
MaSound_Start	×	×	×	×	○	×	×
MaSound_Pause	×	×	×	×	×	○	×
MaSound_Restart	×	×	×	×	×	×	○
MaSound_Stop	×	×	×	×	×	○	○
MaSound_Close	×	×	×	○	○	×	×
MaSound_Unload	×	×	○	×	×	×	×
MaSound_Delete	×	○	×	×	×	×	×

*The way of looking at this table. ○: executable, ×: impracticality and △: executable with reservation

2 Provisions for MaSound API

This chapter shows provisions for MaSound API at SMF reproduction. The group of functions that are covered here is as follows.

Function name	Description
MaSound_Create	MA-3 Stream Converter
MaSound_Load	Sequencer loading processing
MaSound_Open	Sequencer opening processing
MaSound_Control	Sets control value.
MaSound_Standby	Sequencer standby processing
MaSound_Seek	Sequencer seeking processing
MaSound_Start	Sequencer starting processing
MaSound_Pause	Sequencer pausing processing
MaSound_Restart	Sequencer restart-from-pause processing
MaSound_Stop	Sequencer stopping processing
MaSound_Close	Sequencer closing processing
MaSound_Unload	Sequencer unloading processing
MaSound_Delete	Deletes registration of MA-3 Stream Converter.

2.1 Definition of functions

2.1.1 MaSound_Create

SINT32 MaSound_Create(UINT8 srm_id);

Description

Sets MA-3 Stream Converter.

Argument

srm_id Designates MASMW_CNVID_MID.

Returned value

Non-negative Function ID of registered MA-3 Stream Converter
Negative Error code
 MASMW_ERROR_RESOURCE_OVER (-3)

2.1.2 MaSound_Delete

SINT32 MaSound_Delete(SINT32 func_id);

Description

Deletes MA-3 Stream Converter registered with func_id.

Argument

func_id Function ID of MA-3 Stream Converter to be released.

Returned value

0 Successful
Negative Error code
 MASMW_ERROR (-1)

2.1.3 MaSound_Load

SINT32 MaSound_Load(SINT8 func_id, UINT8 *file_ptr, UINT32 file_size, UINT8 mode, SINT32 (*func)(UINT8 id), void * ext_args);

Description

Loads SMF data.
 Secures tone generation resources needed for SMF reproduction.
 Checks main structure of the data to see if any problem exists.
 Max. one SMF data can be loaded at the same time.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed.
file_ptr	Pointer for SMF data storage domain
file_size	Byte size of SMF data
mode	0 : Loads without error check. 1 : Loads after error check. 2 : Performs only error check, and returns error code. 3 : Performs only contents information check, and returns error code. Makes one line possible without including 2/3 assignment Load in Load number limit. Since 2/3 is not actual load, it is not necessary to Unload it.
func	Call back function
ext_args	Extension argument. NULL is set.

Returned value

Integer	file_id
non-negative	When mode=2, 0 means NoError.
Negative	Error code MASMW_ERROR_RESOURCE_OVER (-3)

2.1.4 MaSound_Unload

SINT32 MaSound_Unload(SINT32 func_id, SINT32 file_id, void * ext_args);

Description

Performs unload processing of SMF data.
 Releases tone generation resources that are secured for SMF reproduction.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ext_args	Extension argument specific to each MA-3 Stream Converter. NULL is set.

Returned value

0	Successful
Negative	Error code MASMW_ERROR (-1)

2.1.5 MaSound_Open

SINT32 MaSound_Open(SINT32 func_id, SINT32 file_id, UINT16 open_mode, void * ext_args);

Description

Performs assignment of resources for reproduction of SMF data registered with Load.
 Max. one SMF data can be opened at the same time.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
open_mode	Future function extension argument. "0" is to be set.
ext_args	Extension argument specific to MA-3 Stream Converter. NULL is set.

Returned value

0	Successful
Negative	Error code MASMW_ERROR (-1)

2.1.6 MaSound_Close

SINT32 MaSound_Close(SINT32 func_id, SINT32 file_id, void * ext_args);

Description

Frees resources that are assigned with Open processing.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ext_args	Extended argument specific to each Stream Converter. NULL is set.

Returned value

0	Successful
Negative	Error code MASMW_ERROR (-1)

2.1.7 MaSound_Control

SINT32 MaSound_Control(SINT32 func_id, SINT32 file_id, UINT8 ctrl_num, void *prm, void * ext_args);

Description

Selects functions relevant to reproduction and executes them. In principle, it is valid when the state of SMW is Opened.

However, the acquisition of the designated data of contents information and music length becomes effective after Loaded, the designation of playback starting position and playback stopping position becomes effective at Opened, the acquisition of playback position becomes effective after Ready, and the setting of playback count becomes effective at Ready and Pause.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ctrl_num	Designates contents of processing. (Numbers that are not designated are not supported.)
	0: Sets reproduction volume.
	1: Sets reproduction speed.
	2: Sets reproduction key.
	4: Acquires reproduction position. (unit: ms)
	5: Acquires reproduction time. (unit: ms)
	6: Acquires the status.
	10: Acquires contents designated data of contents information.
	Valid when loaded.
	12: Designates reproduction starting position in [ms].
	13: Designates reproduction ending position in [ms].
	27: Sets the playback count.
prm	Parameter needed for processing designated with ctrl_num.
ext_args	Extension argument specific to each MA-3 Stream Converter. NULL is set.

Returned value

Non-negative	Successful. When a value is returned, the value.
Negative	Error code
	MASMW_ERROR (-1)

Pay attention to the following point to perform the above playback control.

Change of playback volume	After this change, the setting is reflected to the interpreted sequence data. However, this setting is not reflected to the data that finished interpretation and stored into H/W buffer or S/W buffer. Therefore, it needs time which depended on data in this section to reflect the setting to playback.
Change of the relative change of playback key	For the same reason with the change of playback volume, it needs time for reflection from the setting. And because of the reflection of the setting is performed by adding the setting value to key number in data, when the bottom line does not fall within the range (0 – 114), it is rounded. Moreover, this setting is not reflected to the StreamPCM tone generation.

Describe the interface and return value for every contents of processing as following.

2.1.7.1MaSound_Control (Setup of playback volume)

SINT32 MaSound_Control(SINT32 func_id, SINT32 file_id, UINT8 ctrl_num, void *prm, void *ext_args);

Description

Sets playback volume.
 Volume curve is volume [dB] =40 * Log10 (X/127) by setting value to X (0..127).
 Reproduces data as it is by 0dB.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ctrl_num	0
prm	*((UINT8*)prm): Volume assignment (0 ~ 127) Default is 100.

ext_args	NULL is set.
----------	--------------

Returned value

Non-negative	Successful.
Negative	Error code

2.1.7.2MaSound_Control (Setup of playback speed)

SINT32 MaSound_Control(SINT32 func_id, SINT32 file_id, UINT8 ctrl_num, void *prm, void *ext_args);

Description

Sets playback speed as data in the range 70% to 130%, using faithful playback as 100%.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ctrl_num	1
prm	*((UINT8*)prm): Playback speed (70 ~ 130) Default is 100 [%].

ext_args	NULL is set.
----------	--------------

Returned value

Non-negative	Successful.
Negative	Error code

2.1.7.3MaSound_Control (Setup of playback key)

SINT32 MaSound_Control(SINT32 func_id, SINT32 file_id, UINT8 ctrl_num, void *prm, void *ext_args);

Description

Changes the playback key per halftone (100[cent]).

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ctrl_num	2
prm	*((UINT8*)prm): Playback key assignment (-12 ~ +12) [100cent] Default is 0.

ext_args	NULL is set.
----------	--------------

Returned value

Non-negative	Successful.
Negative	Error code

2.1.7.4MaSound_Control (Acquisition of playback position)

SINT32 MaSound_Control(SINT32 func_id, SINT32 file_id, UINT8 ctrl_num, void *prm, void *ext_args);

Description

Acquires a playback position per [ms].

Returns a play position by making the play starting position (If there is no play starting-position information, data head) in data into time 0.

Returns the same time, if a position is the same even if the reproduction speed is different since the time position on data is returned even if a setup of a reproduction speed is changed.

The position at the normal end is to be data end.

It is not influenced by play start / end position setup by MaSound_Control().

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ctrl_num	4
prm	NULL is set.
ext_args	NULL is set.

Returned value

Non-negative	Successful, Playback position [ms]
Negative	Error code

2.1.7.5MaSound_Control (Acquisition of playback time)

SINT32 MaSound_Control(SINT32 func_id, SINT32 file_id, UINT8 ctrl_num, void *prm, void * ext_args);

Description

Acquires playback time per [ms].
 Returns the time to the playback end position in data by making the playback start position (If there is no playback start position information, data head) in data into time 0.
 It is not influenced by playback start / end position setup by MaSound_Control().

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ctrl_num	5
prm	NULL is set.
ext_args	NULL is set.

Returned value

Non-negative	Successful, Playback time [ms]
Negative	Error code

2.1.7.6MaSound_Control (Acquisition of the status)

SINT32 MaSound_Control(SINT32 func_id, SINT32 file_id, UINT8 ctrl_num, void *prm, void * ext_args);

Description

Acquires the status.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ctrl_num	6
prm	NULL is set.
ext_args	NULL is set.

Returned value

Non-negative	Successful, Status. MASMW_STATE_IDLE MASMW_STATE_LOADED MASMW_STATE_OPENED MASMW_STATE_READY MASMW_STATE_PLAYING MASMW_STATE_PAUSE
Negative	Error code

2.1.7.7MaSound_Control (Acquires the specified data of contents information)

SINT32 MaSound_Control(SINT32 func_id, SINT32 file_id, UINT8 ctrl_num, void *prm, void *ext_args);

Description

Acquires the assignment data of contents information.

About the MASMW_CONTENTSINFO structure, when the expected information classification is put into command and called, when the address of buffer is put into the return buffer and called, when the byte count of buffer is put into return buffer size and called, information will be returned to the return buffer. As for the information exceeding buffer size, only part for the size is returned.

Since character code form cannot be recognized by MIDI meta-event instruction, character code is unfixed. At the acquisition, you may specify any character code.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ctrl_num	10
prm	The pointer to the MASMW_CONTENTSINFO structure.
	<pre> struct _tag_MASMW_CONTENTSINFO { UINT16 code; // Character code form UINT8 tag[2]; // Series of commands UINT8* buf; // Return buffer UINT32 size; // Return buffer size } </pre>
	Effective series of commands (ASCII)
	"S","T" Acquires Title of music.
	"C","R" Acquires Copyright information.

Returned value

ext_args	NULL is set.
Non-negative	Successful.
Negative	Error code

2.1.7.8MaSound_Control (Setup of playback start position)

SINT32 MaSound_Control(SINT32 func_id, SINT32 file_id, UINT8 ctrl_num, void *prm, void *ext_args);

Description

Sets the playback start position per [ms].

Sets the time to the playback start position in data by making the playback start position (If there is no playback start position information, data head) in data into time 0.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ctrl_num	12
prm	*(UINT32*)prm: Playback start position [ms]
ext_args	NULL is set.

Returned value

Non-negative	Successful.
Negative	Error code

2.1.7.9MaSound_Control (Setup of playback end position)

SINT32 MaSound_Control(SINT32 func_id, SINT32 file_id, UINT8 ctrl_num, void *prm, void *ext_args);

Description

Sets the playback end position per [ms].

Sets the time to the playback end position in data by making the playback start position (If there is no playback start position information, data head) in data into time 0.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ctrl_num	13
prm	*(UINT32*)prm: Playback end position [ms]
ext_args	NULL is set.

Returned value

Non-negative	Successful.
Negative	Error code

2.1.7.10MaSound_Control (Setup of playback count)

SINT32 MaSound_Control(SINT32 func_id, SINT32 file_id, UINT8 ctrl_num, void *prm, void *ext_args);

Description

Sets the playback count.

This setting is valid when the state of SMW is Ready or Pause, and if it is set, the playback control of MaSound_Start is ignored. And initialize this setting to unset through MaSound_Open processing.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ctrl_num	27
prm	*(UINT8*)prm: playback count (0~255, '0' is considered as infinity)
ext_args	NULL is set.

Returned value

Non-negative	Successful.
Negative	Error code

2.1.8 MaSound_Standby

SINT32 MaSound_Standby(SINT32 func_id, SINT32 file_id, void * ext_args);

Description

Registers the necessary tones and sets the format initial value.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ext_args	Extension argument specific to each MA-3 Stream Converter. NULL is set.

Returned value

0	Successful
Negative	Error code MASMW_ERROR (-1)

2.1.9 MaSound_Seek

SINT32 MaSound_Seek(SINT32 func_id, SINT32 file_id, UINT32 pos, UINT8 flag, void * ext_args);

Description

Designates reproduction position based on time.

Seek cannot be performed during reproduction.

Because NoteOn information before playback position is not collected, when there is an event which generates tone before and after the playback position, that event does not generate tone.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
pos	Reproduction starting position (ms)
flag	Unused (Set up 0)
ext_args	Extension argument specific to each MA-3 Stream Converter. NULL is set when no extension argument is needed specifically.

Returned value

0	Successful
Negative	Error code MASMW_ERROR (-1)

2.1.10MaSound_Start

SINT32 MaSound_Start(SINT32 func_id, SINT32 file_id, UINT16 play_mode, void * ext_args);

Description

Performs starting of reproduction.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
play_mode	Reproduction mode. May take a value shown below.
0	Loop reproduction
1 to 255	Reproduction count
Other than above	Reserved
ext_args	Extension argument specific to each MA-3 Stream Converter. NULL is set.

Returned value

0	Successful
Negative	Error code
	MASMW_ERROR (-1)

2.1.11MaSound_Stop

SINT32 MaSound_Stop(SINT32 func_id, SINT32 file_id, void * ext_args);

Description

Performs stopping of reproduction.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ext_args	Extension argument of each MA-3 Stream Converter, NULL is set.

Returned value

0	Successful
Negative	Error code
	MASMW_ERROR (-1)

2.1.12MaSound_Pause

SINT32 MaSound_Pause(SINT32 func_id, SINT32 file_id, void * ext_args);

Description

Performs pause of reproduction.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ext_args	Extension argument specific to each MA-3 Stream Converter. NULL is set.

Returned value

0	Successful
Negative	Error code MASMW_ERROR (-1)

2.1.13MaSound_Restart

SINT32 MaSound_Restart(SINT32 func_id, SINT32 file_id, void * ext_args);

Description

Performs releasing of pause.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ext_args	Extension argument of each MA-3 Stream Converter, NULL is set.

Returned value

0	Successful
Negative	Error code MASMW_ERROR (-1)