MA-3 Sound Middleware
Specification
for
SMAF/Audio API

Version 1.3.1

April 22, 2003

Yamaha Corporation

[Notes]
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.
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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
0.9	June 5, 2001	Initial edition
1.0	June 28, 2001	Name of API was changed.
1.1.0	July 10, 2001	Specification of Load() argument was extended. SetPanpot was added Control().
1.1.1	August 28, 2001	Open() argument mode specification was changed. Seek() specification was changed.
1.1.2	September 10, 2001	The detail of Control() was added.
1.1.3	September 18, 2001	The API list was added.
1.1.4	November 15, 2001	SMAF/Phrase in the function list of Chapter 1 was deleted. Clerical error of MaSound_Control() explanation was corrected.
1.2.0	November 26, 2001	Non-corresponding function was specified in Chapter 2 Ma3Sound API convention table. The explanation of setting function of playback volume was added. The explanation of acquisition function of playback position was corrected. The explanation of acquisition function of playback time was corrected. The explanation of setting function of pan pot was corrected. Seek() argument flag was changed to unused. 0 fixed. The explanation of non-correspondence Pause() and Restart() functions were deleted.
1.2.1	December 4, 2001	Clerical error of Chapter 2 MaSound API convention table was corrected. Clerical error of Load() explanation was correctd. Clerical error of Unload() explanation was correctd
1.2.2	January 29, 2002	The MaSound_Control correspondence list of Chapter 1 was changed. Explanation of the return value of MaSound_Load was corrected. Explanation of MaSound_Control (acquisition of playback position) was corrected. Explanation of MaSound_Control (acquisition of playback time) was corrected. Explanation of MaSound_Control (acquisition of contents information) was corrected.
1.3.0	January 16, 2003	Explanation of MaSound_Control (setting of playback volume) was added. The operation Specification of MaSound_Control (Acquisition of playback time) was changed. The setting of the playback count was added to MaSound_Control.

1.3.1	April 22, 2003	2.1.7	The Command number of MaSounc_Control(the setting of
		2.1.7.6	Panpot) was corrected.

Contents

1   Introduction

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

Function name	SMAF	SMAF/ Audio	SMF	Realtime MIDI
MaSound_Create	○	○	○	○
MaSound_Load	○	○	○	○
MaSound_Open	○ Up to one	○ Up to one	○ Up to one	○ Up to one
MaSound_Standby	○	○	○	○
MaSound_Seek	○	△ Only 0	○	△ No effect
MaSound_Start	○	○	○	○
MaSound_Pause	○	×	○	×
MaSound_Restart	○	×	○	×
MaSound_Stop	○	○	○	○
MaSound_Close	○	○	○	○
MaSound_Unload	○	○	○	○
MaSound_Delete	○	○	○	○

Function Name	SMAF	SMAF/ Audio	SMF	Realtime MIDI
MaSound_Control				
MASMW_SET_VOLUME	○	○	○	○
MASMW_SET_SPEED	○	×	○	×
MASMW_SET_KEYCONTROL	○	×	○	×
MASMW_GET_TIMEERROR	○	×	○	○
MASMW_GET_POSITION	○	○	○	×
MASMW_GET_LENGTH	○	○	○	×
MASMW_GET_STATE	○	○	○	○
MASMW_SEND_MIDIMSG	×	×	×	○
MASMW_SEND_SYSEXMIDIMSG	×	×	×	○
MASMW_GET_CONTENTSDATA	○	○	○	×
MASMW_GET_PHRASELIST	○	×	×	×
MASMW_SET_STARTPOINT	○	×	○	×
MASMW_SET_ENDPOINT	○	×	○	×
MASMW_SET_PANPOT	×	○	×	×
MASMW_GET_LOADINFO	○	×	×	×
MASMW_SET_LOADINFO	○	×	×	×
MASMW_SET_REPEAT	○	○	○	×

2   Provisions for MASOUND API

This chapter presents provisions for Ma3Sound that are applied at reproduction of SMAF/Audio. The group of functions that is covered here is as follows.

Function name	Description
MaSound_Create	Registration of MA-3 Stream Converter and call back functions.
MaSound_Load	Sequencer loading processing
MaSound_Open	Sequencer opening processing
MaSound_Control	Setting control values
MaSound_Standby	Sequencer standby processing
MaSound_Seek	Sequencer seeking processing
MaSound_Start	Sequencer starting processing
MaSound_Pause	Sequencer pausing processing (Non-correspondence)
MaSound_Restart	Sequencer restart-from-pause processing (Non-correspondence)
MaSound_Stop	Sequencer stopping processing
MaSound_Close	Sequencer closing processing
MaSound_Unload	Sequencer unloading processing
MaSound_Delete	Deletion of 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_AUD (4).

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 SMAF/Audio data.	
	Checks main structure of data to see if there is any problem.	
	Max. one SMAF/Audio data can be loaded simultaneously.	
Argument		
	func_id	Function ID of MA-3 Stream Converter to be directed.
	file_ptr	Pointer for SMAF/Audio data storage domain.
	file_size	Byte size of SMAF/Audio data
	mode	0 : Loading without error check
		1 : Loading after error check
		2 : Performs only error check, and returns an error code.
		3 : Performs only contents information check and returns an error code.
		Makes on 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.
	func	Call back function
	ext_args	Extended argument. NULL is set.
Returned value		
	Integer non-negative	file_id
	Negative	Error code

	MASMW_ERROR	(-1)
	MASMW_ERROR_ARGUMENT	(-2)
	MASMW_ERROR_FILE	(-16)
	MASMW_ERROR_CONTENTS_CLASS	(-17)
	MASMW_ERROR_CONTENTS_TYPE	(-18)
	MASMW_ERROR_CHUNK_SIZE	(-19)
	MASMW_ERROR_CHUNK	(-20)
	MASMW_ERROR_SHORT_LENGTH	(-22)

2.1.4 MaSound_Unload

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

Description		
	Performs SMAF/Audio data Unload 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 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 regeneration of SMAF/Audio data that registered with Load.

Max. one SMAF/Audio data can be opened simultaneously.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
open_mode	Argument for extension of functions in the future. 1 is set.
ext_args	Extended argument specific to each 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 after they 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 MA-3 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 related to reproduction and executes them. This is valid only in between Open-Close, in principle.

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.
	4:	Acquires reproduction position. (unit: ms)
	5:	Acquires reproduction time. (unit: ms)
		Valid after Load(mode-0,1,2)
	6:	Acquires the present internal status.
	10:	Acquires designated data of contents information.
		Valid at any time after Load.
	14:	Sets Panpot.
	27:	Sets the playback count.
		Only Ready and Pause are valid.
prm	Parameter needed for processing designated with ctrl_num.	
ext_args	Extended 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)

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. The setup by this instruction is effective between OPEN-CLOSE. Since the volume setup does not exist in SMAF/Audio format, volume is determined by playback volume setup and pan pot setup at here.	
	This setting is reflected to the time of tone generation. Therefore, if you set it during playback, the setting is reflected from next playback start, but not from now.	
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 (Acquisition of a 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 20 [ms].	
	Returns the play position by making the head of data into time 0. The position at thenatural ending becomes the data end. It is not influenced to play start / end position setup by MaSound_Control().	
	It is effective only in the state of READY/PLAYING.	
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

2.1.7.3 MaSound_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]. Fraction is raised.
    Returns the time to the play end by making the head of data into time 0. It is not influenced to 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	5
prm	NULL IS SET.
ext_args	NULL IS SET.

Returned value

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

2.1.7.4 MaSound_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   (0)
        MASMW_STATE_LOADED (1)
        MASMW_STATE_OPENED (2)
        MASMW_STATE_READY   (3)
        MASMW_STATE_PLAYING (4)
        MASMW_STATE_PAUSE   (5)

Negative	Error code

2.1.7.5 MaSound_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.
        When character code form of the data acquired is put into the character code form of the MASMW_CONTENTSINFO structure and called, 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.

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.

```
struct _tag_MASMW_CONTENTSINFO
{
        UINT16  code;      // Character code form
        UINT8   tag[2];    // Series of commands
        UINT8*  buf;       // Return buffer
        UINT32  size;      // Return buffer size
}
```

Effective series of commands (ASCII)

"C","0"	Acquires ContentsClass.
"C","1"	Acquires ContentsTypet.
"C","2"	Acquires CopyStatus.
"C","3"	Acquires CopyCount.
"V","N"	Acquires Vender name.
"C","N"	Acquires Career name.
"C","A"	Acquires Category name.
"S","T"	Acquires Title of music.
"A","N"	Acquires Artist name.
"W","W"	Acquires Writer information.
"S","W"	Acquires Composer information.
"A","W"	Acquires Arranger information.
"C","R"	Acquires Copyright information.
"C","D"	Acquires Creation dates information.
"U","D"	Acquires Update date information
"M","I"	Acquires copyright management information.
"G","R"	Acquires copyright management organization information

        ext_args   NULL IS SET.

Returned value

        Non-negative   Successful.
        Negative   Error code

2.1.7.6 MaSound_Control (Setup of panpot)

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

Description

Sets the panpot value. It is changed at the play start time, and when set up during playback, it becomes effective from the next data head. Also in repeat playback, it is changed at the data head.

The setup by this instruction is effective between OPEN-CLOSE.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ctrl_num	14
prm	*((UINT8*)prm) Pnapot value (0..127)
	L[dB] = 20 * log(Cos(PAI/2 * Pan/127), MUTE if Pan = 127
	R[dB] = 20 * log(Sin(PAI/2 * Pan/127) , MUTE if Pan = 0
	Default is 64.
ext_args	NULL IS SET.

Returned value

Non-negative	Successful.
Negative	Error code

2.1.7.7 MaSound_Control(setting of playback count)

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

Description

Set the playback count.

This setting is valid when the state of SMW is Ready or Pause. When this is set, the playback count designated in the argument of MaSound_Start is ignored.

This setting is initialized to unset in MaSound_Open.

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 infinity)
	The initial value is not set. (Adopt the repeat count designated in MaSound_Start)
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

　　　　Performs registration of necessary tones and setting of format initial value.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
ext_args	Extended 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

　　　　Since Seek() is not supported in the audio system, when positions other than zero are specified, it becomes an error.

　　　　All setup here is disregarded and Start() is always to be from a data head.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
pos	Reproduction starting position (ms)。
flag	Designates wait. (0: No wait before reproduction, 1: Wait for 20[ms] before reproduction)
ext_args	Extended argument specific to each MA-3 Stream Converter. When extended argument is not needed, NULL is set.

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 reprodujction. Start() is always to be from a data head.

Argument

func_id	Function ID of MA-3 Stream Converter to be directed
file_id	File id
play_mode	Reproduction mode that may take the following value

0	Loop reproduction
1 to 255	Reproduction count
Other than the above	reserved

ext_args	Extended 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 or reproduction.

Argument

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

Returned value

0	Successful
Negative	Error code
	MASMW_ERROR (-1)