

# MA-3 Sound Middleware Specification for Wav Playback API

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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
1.0.0	October 9, 2002	Newly release
1.1.0	April 22, 2003	<p>Addition</p> <p>1 Introduction the API table was corrected.</p> <p>2.1.7.5 MaSound_Control(Acquisition of Contents information)Change</p> <p>2.1.3 Fs limitation was changed in MaSound_Load().</p> <p>2.1.9 Flag setting in MaSound_Seek().</p> <p>2.1.12 The explanation of MaSound_Pause() was deleted.</p> <p>2.1.13 The explanation of MaSound_Restart() was deleted.</p> <p>The clerical error correction and the explanation change</p> <p>2.1 The explanation of the function definition was reviewed.</p> <p>2.1.X The treatment of ext_args in MaSoundAPI</p> <p>2.1.7 The number of the setting of Panpot was corrected from 15 to 14.</p> <p>2.1.7.6 The value of ctrl_num was corrected from 15 to 14.</p>
1.1.1	MAy 13, 2003	Modified MaSound_Create() valuable

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## 1 Introduction

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

	NON EXISTENT	IDLE	LOADED	OPENED	READY	PLAYING	PAUSE
MaSound_Create		×	×	×	×	×	-
MaSound_Load	×		×	×	×	×	-
MaSound_Open	×	×		×	×	×	-
MaSound_Control							-
MASMW_GET_STATE	×	×					-
MASMW_SET_VOLUME	×	×	×				-
MASMW_SET_PANPOT	×	×	×				-
MASMW_GET_POSITION	×	×	×				-
MASMW_GET_LENGTH	×	×					-
MASMW_GET_CONTENTSDATA	×	×					-
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,   : executable with reservation and -: non-support

## 2 Provisions for MaSound API

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

Function name	Description
MaSound_Create	Registration of MA-3 Stream Converter
MaSound_Load	Sequencer loading processing and registration of call back functions
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
MaSound_Restart	Sequencer restart-from-pause processing
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\_WAV.

Returned value

Non-negative              Function ID of WAV.

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 (return value of MaSound\_Create())

Returned value

0                                  Success

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 (return value of MaSound_Create())
file_ptr	Pointer for SMAF/Audio data storage domain.
file_size	Byte size of SMAF/Audio data
mode	0/1: Loading without error check 2/3: Performs only error 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	file_id,
non-negative	
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 (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
ext_args	NULL is set.

## Returned value

0	Success
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 (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
open_mode	Argument for extension of functions in the future. "0" is to be set.
ext_args	NULL is set.

**Returned value**

0	Success
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 (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
ext_args	NULL is set.

**Returned value**

0	Success
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 (Return value of MaSound_Create())
	file_id	File id (Return value of MaSound_Load())
	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)
		6: Acquires the present internal status.
		10: Acquires the contents information.
		14: Sets Panpot.
		27: Sets repeat count
	prm	Parameter needed for processing designated with ctrl_num
	ext_args	NULL is set.
Returned value	Non-negative	Success. When a value is returned, the value.
	Negative	Error code
		MASMW_ERROR (-1)

### 2.1.7.1 MaSound\_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] =  $40 * \text{Log}_{10}(X/127)$  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.

#### Argument

func_id	Function ID of (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
ctrl_num	0
prm	*((UINT8*)prm): Volume assignment (0 ~ 127) Default is 100.
ext_args	NULL IS SET.

#### Returned value

Non-negative	Success.
Negative	Error code

### 2.1.7.2 MaSound\_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 [ms].

Returns the play position by making the playback start position of data (When there is no playback start position information, it is to the head of data.) into time 0.

The time position on data is returned even if the setup of playback speed is changed.

Therefore, returns the same time, if a position is the same even if the playback speed is different.

The position at the natural ending becomes the data end. It is effective only in the state of READY/PLAYING.

#### Argument

func_id	Function ID of (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
ctrl_num	4
prm	NULL IS SET.
ext_args	NULL IS SET.

#### Returned value

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

**2.1.7.3MaSound\_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 of data (When there is no playback start position information, it is to 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 (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
ctrl_num	5
prm	NULL IS SET.
ext_args	NULL IS SET.

**Returned value**

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

**2.1.7.4MaSound\_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 (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
ctrl_num	6
prm	NULL IS SET.
ext_args	NULL IS SET.

**Returned value**

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

### 2.1.7.5MaSound\_Control(Acquisition of Contents Information)

SINT32 MaSound\_Control( SINT32 func\_id, SINT32 file\_id, UINT8 ctrl\_num, void \*prm, void \* ext\_args );

#### Description

Acquires the information designated from WAV data.  
This information acquisition can start from immediately after Load.

#### Argument

func_id	Function ID (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
ctrl_num	10
prm	Pointer to _MASMW_CONTENTSINFO structure.
ext_args	NULL IS SET.

#### Returned value

Non-negative	Success. (Data size copied to Buffer)
Negative	Error code.

Refer to the following data.

**Table 1 The Member list of \_MASMW\_CONTENTSINFO structure**

Member name	Type	Contents	Note
code	UINT16	Contents code type	Ignored (Sets 0)
tag[2]	UINT8	Information tag	Refer to 11. Acquires the congruous information.
buf	UINT8*	Pointer to the information storing place	Copies the information to this pointer.
size	UINT32	Size of storing place	Byte size which can be copied to Buffer. (Sets 4 or over)

**Table 2 The correspondence of Tag and information contents**

Information tag	Information contents
W0	Format type
W1	Channel number
W2	Sampling rate
W3	Sample number per 1 sec
W4	Byte number of 1 sample data
W5	Bit width
W6	wave data size

### 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 (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
ctrl_num	14
prm	*((UINT8*)prm)      Pnapot value (0..127) L[dB] = 20 * log(Cos(PI/2 * Pan/127), MUTE if Pan = 127 R[dB] = 20 * log(Sin(PI/2 * Pan/127) , MUTE if Pan = 0 Default is 64. It changes only at the pronunciation start.
ext_args	NULL IS SET.

#### Returned value

Non-negative	Success.
Negative	Error code

### 2.1.7.7 MaSound\_Control (Sets 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 status of SMW is Ready or Pause, and if this is set, the playback count designation of MaSound\_Start is ignored. And this setting is initialized into the state of Unset within MaSound\_Open processing.

#### Argument

func_id	Function ID of (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
ctrl_num	27
prm	*((UINT32*)prm):      playback count (0 to 255, '0' is interpreted as infinitely)
ext_args	NULL IS SET

#### Returned value

Non-negative	Success.
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 (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
ext_args	NULL is set.

## Returned value

0	Success
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

Changes playback position.

## Argument

func_id	Function ID of (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
pos	Reproduction starting position (ms).
flag	0 is set.
ext_args	NULL is set.

## Returned value

0	Success
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. Start() is always to be from a data head, when Seek() is not performed.

## Argument

func_id	Function ID of (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
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	NULL is set.

## Returned value

0	Success
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 (Return value of MaSound_Create())
file_id	File id (Return value of MaSound_Load())
ext_args	NULL is set.

## Returned value

0	Success
Negative	Error code
	MASMW_ERROR (-1)