

"Maple Bus 1.0"  
Function Type Specifications  
FT<sub>4</sub> : Audio input device Function  
Revision 1.0

Produced by  
CS Hardware Division 2  
Sega Enterprises, Inc.



**Revision:**

Rev0.1	1997/12/17	Preliminary Specifications
Rev0.3	1998/01/05	Partial change of Get_Sampling_Date subcommand Header data detail change for DataTransfer command to send Sampling data
Rev0.4	1998/01/11	Deleted AGC subcommand Added Test_Mode subcommand
Rev0.41	1998/01/17	Changed send frame of all commands Added EXTU_BIT subcommand Partially changed Test_Mode function description
Rev0.42	1998/01/26	Changed specifications title page and format Changed command frame configuration to actual transmission Added description to subcommand table
Rev0.8	1998/03/31	Errata correction, p. 12 $\mu$ -Low $\rightarrow$ $\mu$ -Law Revised description of function definition block
Rev0.9	1998/11/11	Ammended EXTU subcommand
Rev1.0	2000/03/15	Added 3.1.5 Volume_Mode Subcommand. Added 2.2, Explanation of 1st Function Definition Block. Added 2.3, Explanation of 2nd and 3rd Function Definition Blocks. Added explanation of subcommand 06H, p. 7.

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# 1 Audio Input Device Outline

## 1.1 Audio Input Device Definition

The audio input device serves to send digital data to the new-generation game machine (hereafter called "host"), based on the Maple Bus specifications. The audio input device performs this function according to the following two methods:

- Analog data (audio) are converted into digital data and sent to host without further processing
- Analog data (audio) are analyzed by the device, and the result only is sent to the host, using a special format

\* At this point, specifications for devices using the second method are not finalized. The current document therefore excludes this method from the definition of basic functions and treats it as a special function.

\* As of Mar 15, 2000, application peripherals are the mike device and the Dreameye mike device.

## 1.2 Basic Functions Definition

The audio input device for the new-generation game machine (belonging to FT<sub>4</sub> of the Maple Bus specifications) is defined by the following basic functions.

- A/D conversion capability using specified sampling frequency and quantization.  
→ Sampling frequency and quantization can be specified in up to four steps.
- Memory capacity to store a minimum of 1.3 INT worth of sampling data (digital data). (preliminary)

There is a possibility that the above basic functions may be handled as special functions in future.

## 1.3 Special Functions

Audio input devices for the new-generation game machine with functions to improve voice recognition, generate sampling data, perform automatic volume adjustment, etc. may be developed in future. A protocol for "Audio Input Devices With Special Functions" corresponding to the Maple Bus specifications allows for a maximum of 32 special (expanded) functions.

## 2 Audio Input Device ID Setting

### 2.1 Function Type

The audio input device belongs to the function type FT<sub>4</sub>, which is defined as shown in the table below.

Table 2-1 Function types

bit	7	6	5	4	3	2	1	0
1st Data	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
2nd Data	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
3rd Data	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
4th Data	Undefined	Undefined	Undefined	1	Undefined	Undefined	Undefined	Undefined

### 2.2 1st function definition block (command list)

The components of the 1st function definition block for the Dreameye mike device are as follows.

Table 2-2 1st function definition block for the Dreameye mike device

Bit	Corresponding subcommand	Setting value	Bit	Corresponding subcommand	Setting value
FD1 <sub>31</sub>	Reserved	0	FD1 <sub>15</sub>	Reserved	0
FD1 <sub>30</sub>	Reserved	0	FD1 <sub>14</sub>	Reserved	0
FD1 <sub>29</sub>	Reserved	0	FD1 <sub>13</sub>	Reserved	0
FD1 <sub>28</sub>	Reserved	0	FD1 <sub>12</sub>	Reserved	0
FD1 <sub>27</sub>	Reserved	0	FD1 <sub>11</sub>	Reserved	0
FD1 <sub>26</sub>	Reserved	0	FD1 <sub>10</sub>	Reserved	0
FD1 <sub>25</sub>	Reserved	0	FD1 <sub>9</sub>	Reserved	0
FD1 <sub>24</sub>	Reserved	0	FD1 <sub>8</sub>	Reserved	0
FD1 <sub>23</sub>	Reserved	0	FD1 <sub>7</sub>	Reserved	0
FD1 <sub>22</sub>	Reserved	0	FD1 <sub>6</sub>	Reserved	0
FD1 <sub>21</sub>	Reserved	0	FD1 <sub>5</sub>	Use prohibited (fixed)	1
FD1 <sub>20</sub>	Reserved	0	FD1 <sub>4</sub>	Volume_Mode	1
FD1 <sub>19</sub>	Reserved	0	FD1 <sub>3</sub>	EXTU_BIT	1
FD1 <sub>18</sub>	Reserved	0	FD1 <sub>2</sub>	AMP_GAIN	1
FD1 <sub>17</sub>	Reserved	0	FD1 <sub>1</sub>	Basic_Control	1
FD1 <sub>16</sub>	Reserved	0	FD1 <sub>0</sub>	Get_Sampling_Data	1

Table 2-3 1st function definition block

Bit	7	6	5	4	3	2	1	0
5th Data	0	0	0	0	0	0	0	0
6th Data	0	0	0	0	0	0	0	0
7th Data	0	0	0	0	0	0	0	0
8th Data	0	0	*	*	*	*	*	*

The subcommands supported by peripherals belonging to FT<sub>4</sub> can be determined by checking the above information with Device\_All\_Status. If an unsupported subcommand is used, Command\_Unknown is returned.

Example: When the Volume\_Mode subcommand is sent to the mike device (1st function definition block = 0Fh), Command\_Unknown is returned because the subcommand is not supported.

### **2.3 2nd, 3rd Function Definition Blocks of the Dreameye Mike Device**

The 2nd and 3rd function definition blocks of the Dreameye mike device are both 00H.

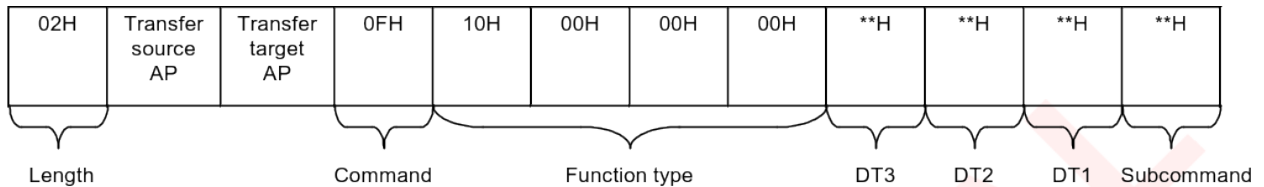
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### 3 Audio Input Device Command Configuration

The illustration below shows the frame configuration for commands sent by the host to the audio input device. (Start and end patterns are omitted.)

Note that the frame shown here represents the configuration in actual data transfer.

Table 3-1 Dedicated commands for audio input device



The function of the audio input device is determined by the "subcommand," "DT1", "DT2", and "DT3". Available subcommands are listed below.

Table 3-2 Subcommands

Issue privilege	Subcommand name	Subcommand	Response
Host	Undefined	00H	Command Unknown
	Get_Sampling_Data	01H	Data Transfer
	Basic_Control	02H	Device Reply
	AMP_GAIN	03H	Device Reply
	EXTU_BIT	04H	Device Reply
	Volume_Mode	05H	Device Reply
	Use prohibited	06H	-
	Undefined	07H - FBH	Undefined
Audio input device (preliminary)	Test_Mode	FCH	Data Transfer
	Undefined	FEH	-
	Undefined	FFH	-

- \* Up to 32 audio input device subcommand types can be registered. Subcommands from the host therefore range from 00H to 1FH.
- \* Various audio input devices will have different special functions. Therefore the host must obtain the 1st function definition block (device function subcommand list) from the audio input device connected with the "Device\_Request".
- \* Use of subcommand 06H is not permitted. Do not send subcommand 06H even if the FD1<sub>5</sub> bit of the 1st function definition block has been set to "1" with Device\_Status for a peripheral device belonging to FT<sub>4</sub>. This bit will not be allocated to new functions in any FT<sub>4</sub> peripheral devices to be developed in the future.

### 3.1 Audio Input Device Subcommands

In this document, a string that is returned by the audio input device in response to a command sent from the host is called "response". The subcommand table is assumed to be stored in the work RAM of the host. The left side is low-order address and the right side the high-order address.

#### 3.1.1 Get\_Sampling\_Data Subcommand

**Function:** Used by host to request sampling data and set AMP gain.

**Issue privilege:** Host

Table 3-3 Get\_Sampling\_Data subcommand

Subcommand	DT1	DT2	DT3
01H	AMP gain value	Reserved	Reserved

**DT1:** AMP gain setting

**DT2:** Reserved

**DT3:** Reserved

**Response:** See "DataTransfer Command To Send Sampling Data "



### 3.1.2 Basic\_Control Subcommand

**Function:** Sets the following functions.

- Start/stop sound sampling
- Select sampling frequency
- Select sampling bit count

**Issue privilege:** Host

Table 3-4 Basic\_Control subcommand

Subcommand	DT1	DT2	DT3
02H	See below	Reserved	Reserved

**DT1:**

bit	7	6	5	4	3	2	1	0
DT1	Sampling	0	0	0	Sampling frequency		Quantization	

**Sampling:**

Setting this bit to "1" starts sampling. Setting the bit to "0" stops sampling.

**Sampling frequency:**

The following four settings are available for the sampling frequency.

Setting value	Setting level
00	LEVEL0
01	LEVEL1
10	LEVEL2
11	LEVEL3

**Quantization:**

The following four settings are available for the sampling bit rate (quantization).

Setting value	Setting level
00	LEVEL0
01	LEVEL1
10	LEVEL2
11	LEVEL3

**DT2:** Reserved

**DT3:** Reserved

**Response:** Standard Maple Bus "Device Reply" is sent.

### 3.1.3 AMP\_Control Subcommand

**Function:** Sets the sound input AMP gain value.

**Issue privilege:** Host

Table 3-5 AMP\_Control subcommand

Subcommand	DT1	DT2	DT3
03H	See below	Reserved	Reserved

**DT1:** AMP gain setting value

bit	7	6	5	4	3	2	1	0
	256 possible settings from 00H - FFH							

**DT2:** Reserved

**DT3:** Reserved

**Response:** Standard Maple Bus "Device Reply" is sent.

### 3.1.4 EXTU\_BIT Subcommand

**Function:** Sampling data can be expanded in devices belonging to FT<sub>4</sub>.

The method used or expanding sampling data is specified using this command.

Table 3-6 Sampling data format

bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
D	MSB Sampling data													LSB	*	*

**Issue Privilege:** Host

Table 3-7 EXTU\_BIT subcommand

Subcommand	DT1	DT2	DT3
04H	See below	00H	00H

**DT1:** See table below

Setting value	Expansion contents
00H	Lower 2 bits are set at "00"
01H	LSB 2 bits are copied to "****"
02H	Lower 2 bits are set at "10"
03H	Use prohibited
...	.....
FFH	Use prohibited

\* If out-of-range values 03H - FFH are received, existing setting values are retained.  
In this case, the SIP returns the "Command Unknown" response.

**DT2:** 00H

**DT3:** 00H

**Response:** Standard Maple Bus "Device Reply" is sent.

### 3.1.5 Volume\_Mode Subcommand

**Function:**

- Changes the amplification reference.

**Issue privilege:** Host

Table 3-8 Volume\_Mode subcommand

Subcommand	DT1	DT2	DT3
04H	See below	00H	00H

**DT1:**

Setting value	Setting
00H	+30dB
01H	+12dB
02H	Reserved (status maintained)
...	....
FFH	Reserved (status maintained)

\* If out-of-range values 03H - FFH are received, existing setting values are retained. In this case, the SIP returns the "Command Unknown" response.

**Response:** Standard Maple Bus "Device Reply" is sent.

### 3.1.6 Test\_Mode Subcommand (Preliminary)

**Function:** Test mode for debugging. For information on the format, see the specifications for each device. The command is designed to be used only for debugging. It may not be used in an application.

**Issue privilege:** Host

Table 3-9 Test\_Mode subcommand

Subcommand	DT1	DT2	DT3
FCH	Reserved	Reserved	Reserved

**DT1:** Reserved

**DT2:** Reserved

**DT3:** Reserved

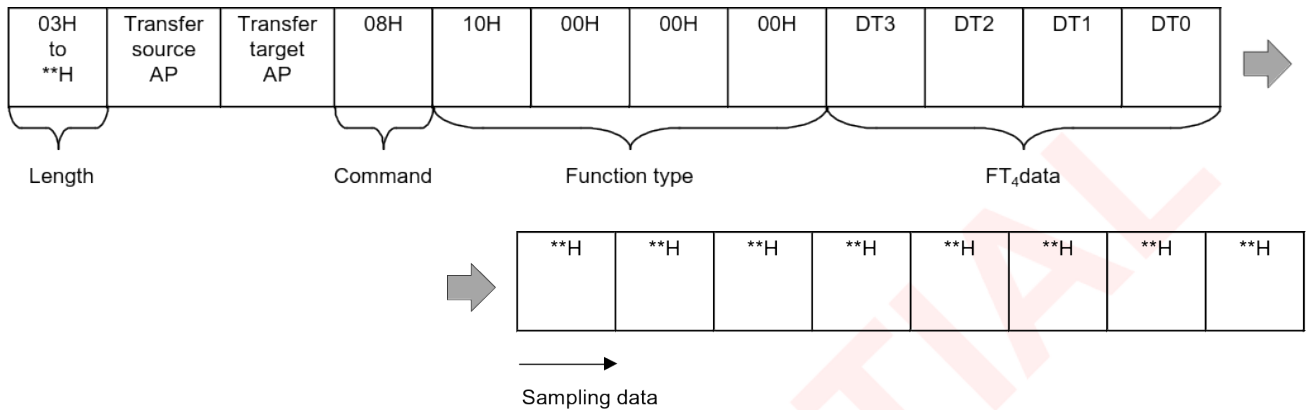
**Response:** Standard Maple Bus "Data Transfer" is sent.

### 3.1.7 DataTransfer Command To Send Sampling Data

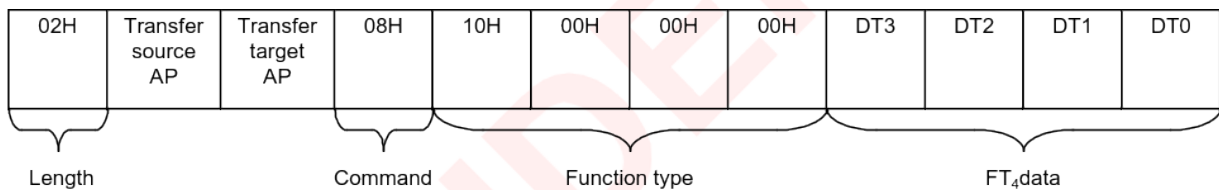
**Function:** Transfer of sampling data currently stored by audio input device.

**Issue privilege:** Device, extended device

\* Note that the frame shown here represents the configuration in actual data transfer.



If no sampling was carried out and a request for sampling data is received from the host, the frame shown below (no sampling data) is sent.



**Response:** When FT<sub>4</sub> data (sampling data) are sent, the frame is assembled as shown in the above illustration.

DT0	DT1	DT2	DT3
FT <sub>4</sub> status	AMP setting value	For expansion	Sampling count

- **Sampling count:** Number of times sampling has been carried out.
- **AMP setting value:** Currently selected input gain.
- **FT<sub>4</sub> status:** Shown below

BIT	7	6	5	4	3	2	1	0
NAME	EX_BIT	SBFOV	0	14LSB1	14LSB0	SMPL	μ-Law	Fs

**EX\_BIT:** Expansion bit for new functions. When this bit is "1", the connected peripheral incorporates another function besides the basic functions. "DT2" comprises the status data for the new function. Details are still pending.

**SBFOV:** Sampling data buffer overflow condition (0: normal, 1: overflow)

**14LSB1,0:** Linear sampling data expansion method flag

**SMPL:** Sampling operation start (0: stop, 1: Execute sampling)

**μ-Law:** CODEC conversion (0: 14 bit linear, 1: 8 bit μ-Law CODEC)

**Fs:** Sampling frequency setting (0:11.025 kHz, 1: 8.0 kHz)