

“Maple Bus 1.0” Function Type Specifications

FT₁₁ : Camera Device Function

Revision 0.71

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Rev0.67	1999. 9.20	Restrictions added to [Data Transfer] command
Rev0.68	1999. 9.22	Items added to [Get Condition] command
Rev0.70	2000. 3. 2	Details added to movie related commands
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Contents

1.	Overview.....	4
1.1.	Definition of camera device.....	4
1.2.	Subcommands.....	4
2.	Device IDs.....	5
2.1.	Device ID configuration.....	5
2.2.	Function types.....	6
2.3.	Function definition block.....	6
3.	Data format.....	6
4.	Supported commands.....	7
4.1.	Standard commands.....	7
4.1.1.	Device Request.....	7
4.1.2.	All Status Request.....	7
4.1.3.	Device Reset.....	7
4.1.4.	Device Kill.....	8
4.1.5.	Device Status.....	8
4.1.6.	Device All Status.....	9
4.1.7.	Device Reply.....	9
4.1.8.	Data Transfer.....	9
4.1.9.	Get Condition.....	10
4.1.10.	Set Condition.....	14
4.1.11.	Camera Command.....	15
4.1.12.	Function Type Unknown.....	16
4.1.13.	Command Unknown.....	16
4.1.14.	Transmit Again.....	16
4.2.	Subcommands.....	17
4.2.1.	Capture Start.....	17
4.2.2.	Capture Stop.....	18
4.2.3.	Stream Request.....	18
4.2.4.	Still Image Request.....	19
4.2.5.	Data Erase.....	20
4.2.6.	Data Write.....	21
4.2.7.	Data Read.....	23
4.2.8.	Camera Error.....	24
4.3.	Data Transfer command.....	25
4.3.1.	Data transfers in response to the [Get Condition] command.....	27
4.3.2.	Data Transfer in response to [Stream Request], [Still Image Request], or [Data Read] command.....	30
5.	Camera device function information.....	32
5.1.	Types.....	32
5.2.	Fixed Device Status.....	32
5.3.	Free Device Status.....	35
6.	Afterword.....	35

1. Overview

1.1. Definition of camera device

The camera device for Dreamcast allows image data to be transferred digitally through the Maple Bus with the Dreamcast unit (referred to as the host).

The definition of a camera device is as follows.

- It has a function for converting analog video data to digital data, and transmitting this to the host.
- There are no particular restrictions on the data format. (RGB, YUV, various compression formats, etc.)
- It complies with the Maple Bus 1.0 Standard Specifications.

1.2. Subcommands

In order for this function to be able to support various camera devices, each having different special functions, special commands can be provided as subcommands. A maximum of 255 subcommands can be created.

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2. Device IDs

The device IDs comply with the device ID stipulations in the Maple Bus 1.0 Standard Specifications.
The notation used is the memory image in the host.

2.1. Device ID configuration

In Maple Bus 1.0, device IDs are configured as shown below.

bit	7	6	5	4	3	2	1	0
1st Data	FT ₃₁	FT ₃₀	FT ₂₉	FT ₂₈	FT ₂₇	FT ₂₆	FT ₂₅	FT ₂₄
2 nd Data	FT ₂₃	FT ₂₂	FT ₂₁	FT ₂₀	FT ₁₉	FT ₁₈	FT ₁₇	FT ₁₆
3 rd Data	FT ₁₅	FT ₁₄	FT ₁₃	FT ₁₂	FT ₁₁	FT ₁₀	FT ₉	FT ₈
4 th Data	FT ₇	FT ₆	FT ₅	FT ₄	FT ₃	FT ₂	FT ₁	FT ₀
5 th Data	FD1 ₃₁	FD1 ₃₀	FD1 ₂₉	FD1 ₂₈	FD1 ₂₇	FD1 ₂₆	FD1 ₂₅	FD1 ₂₄
6 th Data	FD1 ₂₃	FD1 ₂₂	FD1 ₂₁	FD1 ₂₀	FD1 ₁₉	FD1 ₁₈	FD1 ₁₇	FD1 ₁₆
7 th Data	FD1 ₁₅	FD1 ₁₄	FD1 ₁₃	FD1 ₁₂	FD1 ₁₁	FD1 ₁₀	FD1 ₉	FD1 ₈
8 th Data	FD1 ₇	FD1 ₆	FD1 ₅	FD1 ₄	FD1 ₃	FD1 ₂	FD1 ₁	FD1 ₀
9 th Data	FD2 ₃₁	FD2 ₃₀	FD2 ₂₉	FD2 ₂₈	FD2 ₂₇	FD2 ₂₆	FD2 ₂₅	FD2 ₂₄
10th Data	FD2 ₂₃	FD2 ₂₂	FD2 ₂₁	FD2 ₂₀	FD2 ₁₉	FD2 ₁₈	FD2 ₁₇	FD2 ₁₆
11th Data	FD2 ₁₅	FD2 ₁₄	FD2 ₁₃	FD2 ₁₂	FD2 ₁₁	FD2 ₁₀	FD2 ₉	FD2 ₈
12th Data	FD2 ₇	FD2 ₆	FD2 ₅	FD2 ₄	FD2 ₃	FD2 ₂	FD2 ₁	FD2 ₀
13th Data	FD3 ₃₁	FD3 ₃₀	FD3 ₂₉	FD3 ₂₈	FD3 ₂₇	FD3 ₂₆	FD3 ₂₅	FD3 ₂₄
14th Data	FD3 ₂₃	FD3 ₂₂	FD3 ₂₁	FD3 ₂₀	FD3 ₁₉	FD3 ₁₈	FD3 ₁₇	FD3 ₁₆
15th Data	FD3 ₁₅	FD3 ₁₄	FD3 ₁₃	FD3 ₁₂	FD3 ₁₁	FD3 ₁₀	FD3 ₉	FD3 ₈
16th Data	FD3 ₇	FD3 ₆	FD3 ₅	FD3 ₄	FD3 ₃	FD3 ₂	FD3 ₁	FD3 ₀

Fig. 2-1 Device IDs

FT : Indicates the peripheral function type.
 FD1 : First function definition block.
 FD2 : Second function definition block.
 FD3 : Third function definition block.

- ① FT₃₁ to FT₀ : function type
 Indicates the function types supported by the peripheral device.
 There are a total of 32 function types defined.
- ② FD₃₁ to FD₀ : Function definition block
 This block defines the individual elements that comprise a function.

2.2. Function types

This section describes the function type (FT) within the device ID.
For the camera device function, this is FT₁₁="1".

bit	7	6	5	4	3	2	1	0
1st Data	FT ₃₁	FT ₃₀	FT ₂₉	FT ₂₈	FT ₂₇	FT ₂₆	FT ₂₅	FT ₂₄
2nd Data	FT ₂₃	FT ₂₂	FT ₂₁	FT ₂₀	FT ₁₉	FT ₁₈	FT ₁₇	FT ₁₆
3rd Data	FT ₁₅	FT ₁₄	FT ₁₃	FT ₁₂	1	FT ₁₀	FT ₉	FT ₈
4th Data	FT ₇	FT ₆	FT ₅	FT ₄	FT ₃	FT ₂	FT ₁	FT ₀

Fig. 2-2 Camera device / function type

2.3. Function definition block

This section describes the function definition block (FD) within the device ID.
The camera device function definition block indicates which functions are supported. (Supported functions are shown by a bit setting of "1".)

bit	7	6	5	4	3	2	1	0
1st Data	Jang Gu	JPEG	GIF	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	Other still image compression
2nd Data	MPEG 1	MPEG 2	MPEG 4	H.261	H.263	0 (reserved)	0 (reserved)	Other movie compression
3rd Data	QSIF	QCIF	SIF	CIF	VGA	SVGA	0 (reserved)	Other size
4th Data	Voice input	Strobe	Save	Write program	0 (reserved)	0 (reserved)	0 (reserved)	Other function

Fig. 2-3 Camera device / function definition block

3. Data format

The camera device function data format is different for different commands. (See next chapter)

When requesting button data from a camera device equipped with buttons, issue the command to the controller function (FT0).

When sending data to a camera device equipped with an LCD, issue the command to the B/W LCD function (FT2).

4. Supported commands

This section lists the commands from those stipulated in the Maple Bus 1.0 Standard Specifications which are supported by the camera device function. If commands other than these are sent, the camera device function returns an error.

4.1. Standard commands

4.1.1. Device Request

Issuing authority : Host
Command code : 01h
Data size : 00h
Data field : None
Expected return value : [Device Status]
Description : This command requests [Device Status] for the camera device function specified by the transfer destination AP.
This is used as a connection check for each port.
After function initialization, until this command is sent the camera device function does not respond to any other command.

4.1.2. All Status Request

Issuing authority : Host
Command code : 02h
Data size : 00h
Data field : None
Expected return value : [Device All Status]
Description : This command requests [Device All Status] for the camera device function specified by the transfer destination AP.

4.1.3. Device Reset

Issuing authority : Host
Command code : 03h
Data size : 00h
Data field : None
Expected return value : [Device Reply]
Description : This command requests a reset for the camera device specified by the transfer destination AP.
After issuing a [Device Reply] to the host the camera device is reset.

4.1.4. Device Kill

Issuing authority	: Host
Command code	: 04h
Data size	: 00h
Data field	: None
Expected return value	: [Device Reply]
Description	: The operation of the camera device function specified by the transfer destination AP is not supported. The camera device switches to the standby current consumption, and absolutely no commands are accepted. To restart operation a hardware reset or power off-on sequence is required. The camera device issues a [Device Reply] to the host, then stops operation.

4.1.5. Device Status

Issuing authority	: Camera device
Command code	: 05h
Data size	: 1Ch (28 × 4 = 112 bytes)
Data field	: Fixed Device Status (112 bytes)
	Device ID 16 bytes
	Region code 1 byte
	Connection direction 1 byte
	Manufacturer's name 30 bytes
	License 60 bytes
	Standby current consumption 2 bytes
	Maximum current consumption 2 bytes
Description	: This returns Fixed Device Status in response to a [Device Request] from the host. * See Section 5.2, "Fixed Device Status"

4.1.6. Device All Status

Issuing authority	: Camera device
Command code	: 06h
Data size	: 1Ch+(n/4) (28×4+n = 112 + n bytes)
Data field	: Fixed Device Status (112 bytes)
	Device ID 16 bytes
	Region code 1 byte
	Connection direction 1 byte
	Manufacturer's name 30 bytes
	License 60 bytes
	Standby current consumption 2 bytes
	Maximum current consumption 2 bytes
	Free Device Status (n bytes)
Description	: This returns Fixed Device Status and Free Device Status Host in response to [All Status Request] from the host.
	* See Sections 5.2, "Fixed Device Status" and 5.3, "Free Device Status"

4.1.7. Device Reply

Issuing authority	: Camera device
Command code	: 07h
Data size	: 00h
Data field	: None
Description	: This is used as a reply.

4.1.8. Data Transfer

Issuing authority	: Camera device
Command code	: 08h
Data size	: n (01h ≤ n ≤ FFh)
Data field	: Function type : 4 bytes
	Data : (n - 1) × 4 bytes
Description	: This is used to respond with the camera device status and function related information in response to a [Get Condition] command, and for transmitting image data.
	* See Section 4.3, "Data Transfer command"

4.1.9. Get Condition

Issuing authority : Host
 Command code : 09h
 Data size : 01h + n
 Data field : Function type : 4 bytes
 Requested items : 4 × n bytes (1 ≤ n ≤ 253)
 Expected return value : [Data Transfer]
 Description : Requests camera device status or function related information.
 The camera device returns the status or function related information as a [Data Transfer] command.
 * See Section 4.3, "Data Transfer command"
 With a single issue of the [Get Condition] command, up to 253 items can be requested.
 Each requested item is represented by four bytes.
 When requesting a second item, an example command is shown in the following table.

Data address	Data	Setting example	Setting explanation
+0000h	Command code	09h	[Get Condition] command
+0001h	Transfer destination AP	01h	For extension device 1
+0002h	Transfer source AP	00h	From port A
+0003h	Data size	03h	When there are two requested items, the data size is 12 bytes
+0004h	Function type	00h	Function type is camera device function 00-00-08-00h
+0005h		00h	
+0006h		08h	
+0007h		00h	
+0008h	Parameter 1	10h	See Fig. 4-2 (E.g.: ISP)
+0009h	Parameter 2	80h	See specification of IC (E.g.: address 80h)
+000Ah	Not used	00h	00h (fixed value)
+000Bh	Not used	00h	00h (fixed value)
+000Ch	Parameter 1	92h	See Fig. 4-2 (E.g.: compression support)
+000Dh	Parameter 2	00h	See Figs. 4-3 to 4-11 (E.g.: still image)
+000Eh	Not used	00h	00h (fixed value)
+000Fh	Not used	00h	00h (fixed value)

Fig. 4-1 Get Condition command

Parameter 1 :

This specifies the item requested.

With values "00h" to "7Fh", a request to transfer a value to an IC register can be made.

Values "80h" to "FFh" allow a request for camera device status or function related information.

* The register address and request details are specified by parameter 2.

If the specified item is not provided in the camera device, the camera device returns a [Camera Error] command, and the error code is "02-00-00h" (Unsupported).

* See section 4.2.8, "Camera Error"

Item		Parameter 1	Explanation		
Imaging element		00h	Requests an imaging element register value.		
		01h to 0Fh	Reserved area for other imaging elements.		
ISP (Image Signal Processor)		10h	Requests an ISP register value.		
		11h to 1Fh	Reserved area for other ISPs.		
Still image Compression Engine	Jang Gu	20h	Requests register value from Jang Gu compression engine.		
	JPEG	21h	Requests register value from JPEG compression engine.		
	GIF	22h	Requests register value from GIF compression engine.		
	Reserved	23h to 2Fh	Reserved area for other still image compression engines.		
Movie Compression Engine	MPEG 1	30h	Requests register value from MPEG 1 compression engine.		
	MPEG 2	31h	Requests register value from MPEG 2 compression engine.		
	MPEG 4	32h	Requests register value from MPEG 4 compression engine.		
	H.261	33h	Requests register value from H.261 compression engine.		
	H.263	34h	Requests register value from H.263 compression engine.		
	Reserved	35h to 3Fh	Reserved area for other movie compression engines.		
Custom IC		40h	Requests register value from custom IC.		
CPU		50h	Requests register value from CPU.		
		51h to 5Fh	Reserved area for other CPUs.		
		Still image Saving	Image saving capacity	80h	Requests maximum number of still images that can be saved.
			Number of images saved	81h	Requests number of still images saved.
			Image size	82h	Requests size (resolution) of still images saved.
			Data size	83h	Requests data size of still images saved.
			Format	84h	Requests format (compression method) of still images saved.
			Reserved	85h to 8Fh	Reserved area for other still image information.
Hardware Information	Clock frequency	90h	Requests clock frequency supplied to ICs, and Maple Bus bitrate.		
	Resolution	91h	Requests imaging element resolution.		
	Compression support	92h	Requests the compression methods supported by the camera device. Use format (84h) to request the compression actually used for images.		
	Sampling bits	93h	Requests the imaging element sampling bits.		
	RAM capacity	94h	Requests the RAM capacity available to each application.		
	Transfer rate	95h	Requests the setting of the stream data transfer rate.		
	Remaining RAM capacity	96h	Requests the remaining RAM capacity for each application.		
	Number of P pictures	97h	Requests the number of P pictures (difference data) following each I picture when transferring movie data.		
	Reserved	98h to 9Fh	Reserved area for other hardware information.		
Reserved		Other	Reserved area for other items.		

Fig. 4-2 Get Condition command / parameter 1

Parameter 2 :

When parameter 1 is specified in the range "00h" to "7Fh", this specifies the requested register address.

When parameter 1 is specified in the range "80h" to "FFh", this specifies the detailed item according to Figs. 4-3 to 4-11.

If the specified item is not available in the camera device, the camera device returns a [Camera Error] command, and the error code is "02-00-00h" (Unsupported).

* See Section 4.2.8, "Camera Error"

Item details	Parameter 2	Description
QSIF	00h	Requests the image saving capacity for QSIF size still images.
QCIF	01h	Requests the image saving capacity for QCIF size still images.
SIF	02h	Requests the image saving capacity for SIF size still images.
CIF	03h	Requests the image saving capacity for CIF size still images.
VGA	04h	Requests the image saving capacity for VGA size still images.
SVGA	05h	Requests the image saving capacity for SVGA size still images.
上記以外	FFh	Requests the image saving capacity for other still images.
Reserved	Other	Reserved area for other sizes.

Fig. 4-3 Get Condition command / parameter 2 (Image saving capacity : 80h)

Item details	Parameter 2	Description
QSIF	00h	Requests the number of currently saved QSIF size still images.
QCIF	01h	Requests the number of currently saved QCIF size still images.
SIF	02h	Requests the number of currently saved SIF size still images.
CIF	03h	Requests the number of currently saved CIF size still images.
VGA	04h	Requests the number of currently saved VGA size still images.
SVGA	05h	Requests the number of currently saved SVGA size still images.
上記以外	FFh	Requests the number of currently saved other size still images.
Reserved	Other	Reserved area for other sizes.

Fig. 4-4 Get Condition command / parameter 2 (Number of images saved : 81h)

Item details	Parameter 2	Description
Image No	00h to FEh	Specifies the image No, of the requested still image.

Fig. 4-5 Get Condition command / parameter 2 (image size, data size, and format : 82h 83h 84h)

Item details	Parameter 2	Description
Imaging element	00h	Requests the clock frequency supplied to the imaging element.
ISP	10h	Requests the clock frequency supplied to the ISP.
Custom IC	40h	Requests the clock frequency supplied to the custom IC.
CPU	50h	Requests the clock frequency supplied to the CPU.
Maple Bus	90h	Requests the Maple Bus bitrate.
Reserved	Other	Reserved area for other frequencies.

Fig. 4-6 Get Condition command / parameter 2 (clock frequency : 90h)

Item details	parameter 2	Description
Horizontal	00h	Requests the imaging element horizontal resolution.
Vertical	01h	Requests the imaging element vertical resolution.
Reserved	Other	Reserved area for other items.

Fig. 4-7 Get Condition command / parameter 2 (imaging element resolution : 91h)

Item details	Parameter 2	Description
Still image	00h	Requests the supported still image compression method.
Movie	01h	Requests the supported movie compression method.
Voice	40h	Requests the supported voice compression method.
Reserved	Other	Reserved area for other compression.

Fig. 4-8 Get Condition command / parameter 2 (compression support : 92h)

Item details	Parameter 2	Description
Not used	00h	00h (fixed value)

Fig. 4-9 Get Condition command / Parameter 2 (sampling bits : 93h)

Item details	Parameter 2	Description
Still image saving	00h	Requests the RAM area (remaining capacity) for still image saving.
Movie saving	01h	Requests the RAM area (remaining capacity) for movie saving.
Voice saving	40h	Requests the RAM area (remaining capacity) for voice saving.
Work area	80h	Requests the RAM work area (remaining capacity) .
プログラム	C1h	Requests the RAM area (remaining capacity) for storing program.
Reserved	Other	Reserved area for other purposes.

Fig. 4-10 Get Condition command / Parameter 2 (RAM capacity and remaining RAM capacity : 94h 96h)

Item details	Parameter 2	Description
Not used	00h	00h (fixed value)

Fig. 4-11 Get Condition command / Parameter 2 (Transfer rate : 95h).

4.1.10. Set Condition

Issuing authority : Host
 Command code : 0Eh
 Data size : 01h + n
 Data field : Function type : 4 bytes

Setting value : $4 \times n$ bytes ($1 \leq n \leq 253$)

Expected return value : [Device Reply]

Description : This is used for setting camera device register values or parameters.
 With a single issue of the [Set Condition] command, up to 253 items can be requested.
 Each requested item is represented by four bytes.
 When requesting a second item, an example command is shown in the following table.

Data address	Data	Setting example	Setting explanation
+0000h	Command code	0Eh	[Set Condition] command
+0001h	Transfer destination AP	02h	For extension device 2
+0002h	Transfer source AP	00h	From port A
+0003h	Data size	03h	When there are two requested items, the data size is 12 bytes
+0004h	Function type	00h	Function type is camera device function 00-00-08-00h
+0005h		00h	
+0006h		08h	
+0007h		00h	
+0008h	Parameter 1	10h	See Fig. 4-2 (E.g.: ISP)
+0009h	Parameter 2	80h	See specification of IC (E.g.: address 80h)
+000Ah	Setting value	3Ah	Setting value (E.g.: 3Ah)
+000Bh		00h	Not used for an 8-bit register.
+000Ch	Parameter 1	90h	Fig. 4-2 (E.g.: clock frequency)
+000Dh	Parameter 2	90h	See Figs. 4-3 to 4-11 (E.g.: Maple Bus)
+000Eh	Setting value	0Fh	See Fig. 4-15 (E.g.: 4 MHz)
+000Fh		A0h	

Fig. 4-12 Set Condition command

parameter 1 :

This specifies the item to be set.

The item codes are the same as for the [Get Condition] command (see Fig. 4-2).

With values "00h" to "7Fh", a request to set a value in an IC register can be made.

* The register address is specified by parameter 2.

Values "80h" to "FFh" allow a parameter setting other than a register value in the camera device.

* The request details are specified by parameter 2.

If the specified item is not available in the camera device, the camera device returns a [Camera Error] command, and the error code is "02-00-00h" (Unsupported).

* See Section 4.2.8, "Camera Error"

Parameter 2 :

When parameter 1 is specified in the range "00h" to "7Fh", this specifies the register address to be set; when in the range "80h" to "FFh", this specifies the detailed item to be set according to Figs. 4-3 to 4-11.

If the specified item is not available in the camera device, the camera device returns a [Camera Error] command, and the error code is "02-00-00h" (Unsupported).

If a fixed value item is specified, the camera device returns a [Camera Error] command, and the error code is "02-00-01h"(Fixed Value).

* See Section 4.2.8, "Camera Error"

Setting value :

Enter the value to be set.

For details of the setting values, see the IC specifications.

When setting an 8-bit register, enter the register value in data 1, and "00h" in data 2.

To input the Maple Bus bitrate, the transfer rate of stream data, and the number of P picture, refer to the following figure.

Item details	Data format	Example
Bitrate	Indicates Maple Bus bitrate in units of 1 kbps.	0F-A0h (4 Mbps)
Transfer rate	Shows the amount of compressed movie data (excluding the header and valid bit count data) in bytes transferred in a single [Data Transfer] command. The setting must be a positive integer not exceeding 1006 (03-EEh).	01-00h (256 bytes of data transferred in each command)
Number of P pictures	Shows the number of pictures. When only I pictures are requested, this is 00-00h. To request indefinite P pictures, enter FF-FFh.	00-09h (After each I picture, transmit 9 P pictures)

Fig. 4-13 Set Condition command / data format and setting examples

4.1.11. Camera Command

Issuing authority	: Host / camera device	
Command code	: 11h	
Data size	: n ($02h \leq n \leq FFh$)	* Except when the [Data Write] command, "02h"
Data field	: Function type	: 4 bytes
	: Subcommand	: 1 byte
	: Parameter 1-3	: 3 bytes
	: Data	: $(n - 1) \times 4$ bytes
Expected return value	: See section 4.3, "Subcommands"	
Description	: In order for the camera device function to be able to support various camera devices, each having different special functions, special commands can be provided as subcommands. A maximum of 255 subcommands can be created. For command details, see Section 4.2, "Subcommand".	

4.1.12. Function Type Unknown

Issuing authority : Camera device
command code : FEh
Data size : 00h
Data field : None
Description : If the function sent from the host is not the camera device function, this error code is returned.

4.1.13. Command Unknown

Issuing authority : Camera device
command code : FDh
Data size : 00h
Data field : None
Description : If the command sent from the host is not supported by the camera device function, this error code is returned.

4.1.14. Transmit Again

Issuing authority : Host / camera device
Command code : FCh
Data size : 00h
Data field : None
Description : When there is an error in transmitted data, this is used to request a retransmission.

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4.2. Subcommands

This function provides support for various camera devices, each having different special functions, by allowing special commands to be provided as subcommands. A maximum of 255 subcommands can be created.

Example commands are shown in the following table.

This command comprises the function type, parameters 1 to 3, and data field.

* The data field is used in the [Data Write] command, but not used in other commands.

Data address	Data	Setting example	Setting explanation
+0000h	Command code	11h	[Camera Command] command
+0001h	Transfer destination AP	04h	For extension device 3
+0002h	Transfer source AP	00h	From port A
+0003h	Data size	02h	Data size is 8 bytes
+0004h	Function type	00h	Function type is camera device function 00-00-08-00h
+0005h		00h	
+0006h		08h	
+0007h		00h	
+0008h	Subcommand code	04h	See Sections 4.2.1. to 4.2.8. (E.g.: [Still Image Request])
+0009h	Parameter 1	00h	Image No (E.g.: "00h" specified)
+000Ah	Parameter 2	00h	Not used in [Still Image Request]
+000Bh	Parameter 3	00h	Not used in [Still Image Request]

Fig. 4-14 Camera Command

The following sections 4.2.1. to 4.2.8. describe the subcommands of the [Camera Command].

4.2.1. Capture Start

Issuing authority : Host
 Subcommand code : 01h
 Parameter 1 : 00h
 Parameter 2 : 00h
 Parameter 3 : 00h

Expected return value : [Device Reply]

Description : Requests the imaging element in the camera device to start image capture.

The camera device returns [Device Reply], then begins image capture.

If this command is issued to a camera which has already started image capture, the camera device returns [Camera Error], and the error code is "01-00-00" (Capturing Already).

* See Section 4.2.8, "Camera Error"

The camera device continues image capture until the [Capture Stop] command is received.

* Depending on the peripheral device, this request is also possible with the [Set Condition] command. For details, see the respective peripheral device specification.

4.2.2. Capture Stop

Issuing authority : Host
 Subcommand code : 02h
 Parameter 1 : 00h
 Parameter 2 : 00h
 Parameter 3 : 00h
 Expected return value : [Device Reply]
 Description : Requests the imaging element in the camera device to stop image capture.
 The camera device returns [Device Reply], then stops image capture.
 If this command is issued to a camera which is not already capturing images, the camera device returns [Camera Error], and the error code is "01-00-01"(Not Capturing Now).
 * See Section 4.2.8, "Camera Error"
 * Depending on the peripheral device, this request is also possible with the [Set Condition] command. For details, see the respective peripheral device specification.

4.2.3. Stream Request

Issuing authority : Host
 subcommand code : 03h
 Parameter 1 : 00h
 Parameter 2 : Retransmission
 Parameter 3 : Counter value for starting retransmission [Data transfer] (when parameter 2 is "80h")
 * See [Data Transfer] counter on page 27
 Expected return value : [Data Transfer]
 Description : Requests real-time movie data transmission from the camera device.
 When requesting continuous still images as a movie, use [Still Image Request] below.
 The camera device transmits movie data to the host with the [Data Transfer] command.
 Movie data is large-volume, and cannot be transmitted in a single [Data Transfer] command.
 Therefore, when requesting movie data spread across a number of [Data Transfer] commands, it is necessary to issue this command repeatedly to the camera device.

bit	7	6	5	4	3	2	1	0
Parameter 1	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)
Parameter 2	Retransmission		0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)
Parameter 3	Counter value for starting retransmission [Data Transfer] (when parameter 2 is "80h")							

Fig. 4-15 Stream Request command / parameters 1 to 3

Retransmission :

When an error occurs in data transfer, and a data retransmission is requested from the camera device, set this as in the following table.

* This is used only when an error has occurred; normally set to "00".

bit 7	bit 6	Description
0	0	This is the normal setting.
0	1	This is the setting to retransmit the movie data from the beginning of the file.
1	0	This is the setting to request retransmission from a particular [Data Transfer] counter value. * Set the [Data Transfer] counter value to begin the retransmission in parameter 3.
1	1	Not used.

Fig. 4-16 Stream Request command / parameter 2

Counter value for starting retransmission [Data Transfer] :

By setting parameter 2 to "80h", and parameter 3 to the [Data Transfer] counter value to begin the retransmission, a [Data Transfer] retransmission can be requested for the last 256 commands.

For details of the [Data Transfer] counter see page 27.

* This is used only when an error has occurred; normally set to "00".

4.2.4. Still Image Request

Issuing authority : Host
 subcommand code : 04h
 Parameter 1 : Image No. (00h to FEh)
 Parameter 2 : Retransmission
 Parameter 3 : [Data Transfer] counter value to begin the retransmission (when parameter 2 is "80h")
 * See page 27: [Data Transfer] counter

Expected return value : [Data Transfer]
 Description : Requests the transmission of still image data saved in the camera device.
 Use this command when requesting continuous still images as a movie.
 Set parameter 1 to the requested image number.
 The camera device transmits the still image data to the host with the [Data Transfer] command.
 Still image data is large-volume, and cannot be transmitted in a single [Data Transfer] command. Therefore, when requesting still image data spread across a number of [Data Transfer] commands, it is necessary to issue this command repeatedly to the camera device.

bit	7	6	5	4	3	2	1	0
Parameter 1	Image No.							
Parameter 2	Retransmission		0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)
Parameter 3	[Data Transfer] counter value to begin the retransmission (when parameter 2 is "80h")							

Fig. 4-17 Still Image Request command / parameters 1 to 3

Retransmission :

When an error occurs in data transfer, and a data retransmission is requested from the camera device, set this as in the following table.

* This is used only when an error has occurred; normally set to "00".

bit 7	bit 6	Description
0	0	This is the normal setting.
0	1	This is the setting to retransmit the movie data from the beginning of the file.
1	0	This is the setting to request retransmission from a particular [Data Transfer] counter value. * Set the [Data Transfer] counter value to begin the retransmission in parameter 3.
1	1	Not used.

Fig. 4-18 Still Image Request command / parameter 2

Counter value for starting retransmission [Data Transfer] :

By setting parameter 2 to "80h", and parameter 3 to the [Data Transfer] counter value to begin the retransmission, a [Data Transfer] retransmission can be requested for the last 256 commands.

For details of the [Data Transfer] counter see page 27.

* This is used only when an error has occurred; normally set to "00".

4.2.5. Data Erase

Issuing authority : Host
 Subcommand code : 05h
 Parameter 1 : Data type
 Parameter 2 : Image No. (when parameter 1 specifies still image)
 Parameter 3 : 00h
 Expected return value : [Device Reply]
 Description : Requests erasing data in the camera device.
 When requesting still image data to be erased, specify the image No. in parameter 2.
 The parameter details are as follows.

bit	7	6	5	4	3	2	1	0
Parameter 1	Still image	Movie	Voice	Program	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)
Parameter 2	File No. (00h to FEh)				"FFh": erase all images			
Parameter 3	0 (reserved)	0 (reserved)	Confirm	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)

Fig. 4-19 Data Erase command / parameters 1 to 3

Data Type (parameter 1) :

Set a "1" in the bit corresponding to the data to be erased.

By setting more than one bit to "1", multiple data types can be erased with a single command.

File No. (Parameter 2) :

Specify the file No. to be erased.

* For details of the file No. see the peripheral device specifications.

If "FFh" is specified, this requests erasing all of the images in a single operation.

Confirm (parameter 3) :

Set this bit to "1" when requesting a confirmation of erasing the data from the peripheral device.

Use this only when requesting confirmation; normally set to "0".

With parameters 1 and 2 specify the data for which confirmation is requested.

The peripheral device issues a confirmation with respect to the data specified by parameters 1 and 2, and if there is an error returns [Camera Error] (error code : "04-00-00h"), and if no error returns [Device Reply].

4.2.6. Data Write

Issuing authority : Host
 Subcommand code : 06h
 Parameter 1 : Data Type
 Parameter 2 : File No.
 Parameter 3 : Start / End / Confirm
 Data : Data transmitted
 Expected return value : [Device Reply]
 Description : This command is used for transmitting data from the host to the camera device.
 An example of the command and the parameter details are as follows.

Data address	Data	Setting example	Setting explanation
+0000h	Command code	11h	[Camera Command] command
+0001h	Transfer destination AP	04h	For extension device 3
+0002h	Transfer source AP	00h	From port A
+0003h	Data size	FFh	Data size is 1020 bytes
+0004h	Function type	00h	Function type is camera device function 00-00-08-00h
+0005h		00h	
+0006h		08h	
+0007h		00h	
+0008h	Subcommand code	06h	[Data Write] command
+0009h	Parameter 1	10h	Specify program data
+000Ah	Parameter 2	00h	File No. "00h"
+000Bh	Parameter 3	80h	Start of data
+000Ch	Data	81h	Program data
+03FFh	Data	22h	Program data

Fig. 4-20 Data Write command

bit	7	6	5	4	3	2	1	0
Parameter 1	Still image	Movie	Voice	Program	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)
Parameter 2	File No. (00h to FFh)							
Parameter 3	Start	End	Confirm	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)

Fig. 4-21 Data Write command / parameters 1 to 3

Data Type (Parameter 1):

Set a bit to "1" corresponding to the type of data to be sent.
It is not possible to set more than one bit to "1".

Start :

When this bit is "1", this [Data Write] command indicates the first set of data.
When this bit is "0", this [Data Write] command indicates intermediate or final data.

End :

When this bit is "1", this [Data Write] command indicates the end of the data.
When this bit is "0", this [Data Write] command indicates initial or intermediate data.

Start	End	Description
0	0	When the data requires three or more [Data Write] command transmissions, set this value when the current [Data Write] command refers to intermediate data.
0	1	When the data requires two or more [Data Write] command transmissions, set this value when the current [Data Write] command refers to the last set of data.
1	0	When the data requires two or more [Data Write] command transmissions, set this value when the current [Data Write] command refers to the first set of data.
1	1	Use this setting when the data can be transmitted with a single [Data Write] command, and for confirmation.

Fig. 4-22 Data Write command / header (Start / End)

Confirmation :

When requesting confirmation of the transmitted data from the peripheral device, set this bit to "1".
Use this only when requesting confirmation, and normally set it to "0".
Specify the data for which the confirmation is requested in parameters 1 and 2.
For both start and end, specify "1".
The peripheral device issues a confirmation with respect to the data specified by parameters 1 and 2, and if there is an error returns [Camera Error] (error code: "04-00-00h"); if there is no error, it returns [Device Reply].

Data :

Enter the data to be transmitted.
For each issued command 1 to 1012 bytes of data can be sent.
If the data size is not a multiple of four bytes, pad out to a multiple of four with null bytes.

4.2.7. Data Read

Issuing authority : Host
 Subcommand code : 07h
 Parameter 1 : Data Type
 Parameter 2 : File No.
 Parameter 3 : 00h
 Expected return value : [Data Transfer]
 Description : This command is used when requesting a data transmission from the host camera device.
 For still images and movie data it is also possible to make the request with the [Still Image Request] or [Stream Request] command.
 * Except when making special specifications, use the [Still Image Request] and [Stream Request] commands.
 An example of the command and the parameter details are as follows.

Data address	Data	Setting example	Setting explanation
+0000h	Command code	11h	[Camera Command] command
+0001h	Transfer destination AP	04h	For extension device 3
+0002h	Transfer source AP	00h	From port A
+0003h	Data size	02h	Data size is 8 bytes
+0004h	Function type	00h	Function type is camera device function 00-00-08-00h
+0005h		00h	
+0006h		08h	
+0007h		00h	
+0008h	Subcommand code	07h	[Data Read] command
+0009h	Parameter 1	10h	Specify program data
+000Ah	Parameter 2	00h	File No. "00h"
+000Bh	Parameter 3	00h	Not used

Fig. 4-23 Data Read command

bit	7	6	5	4	3	2	1	0
Parameter 1	Still image	Movie	Voice	Program	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)
Parameter 2	file No. (00h to FFh)							
Parameter 3	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)

Fig. 4-24 Data Read command / parameters 1 to 3

Data Type (Parameter 1):

Set a bit to "1" corresponding to the type of data to be sent.
 It is not possible to set more than one bit to "1".

4.2.8. Camera Error

Issuing authority : Camera device
 Subcommand code : FFh
 Parameter 1 : Error code
 Parameter 2 : Error code
 Parameter 3 : Error code
 Description : The camera device returns this error command when an error specific to the camera device function has occurred.

The error codes are shown in the table below.

- * When multiple items are specified, if any one is an unsupported item, the camera device returns Unsupported (02-00-00h).
- * When multiple items are specified, if any one has a fixed value and cannot be set, the camera device returns Fixed Value (02-00-00h).
- * When multiple items are specified, if both an unsupported item and a fixed value item which cannot be set are present, the camera device returns unsupported (02-00-00h).
- * In these cases, to get the details of the error, specify the items individually, and reissue the commands.

Error	Error code	Description
Image Not Ready	00-00-00h	This error code is returned when for some reason occurring during exposure, for example, the requested image data is not available.
Image Not Found	00-00-01h	This error code is returned when requested image data cannot be found.
Camera Not Found	00-00-02h	For a peripheral device in which the Maple communications and imaging functions are provided by separate modules, this error code is returned when the imaging module connection cannot be confirmed.
Capturing Already	01-00-00h	This error code is returned when the [Capture Start] command is received during capture.
Not Capturing Now	01-00-01h	This error code is returned when the [Capture Stop] command is received other than during capture.
Unsupported	02-00-00h	This error code is returned when the specified item within the command is an unsupported item.
Fixed Value	02-00-01h	This error code is returned when the specified item in the [Set Condition] command has a fixed value and cannot be set.
System Busy	03-00-00h	This error code is returned when a command request cannot be executed because of a System Busy state.
Data Write Error (Verify)	04-00-00h	This error code is returned when a verify error occurred in respect of a [Data Write] command confirmation.
Data Write Error (Broken)	04-00-01h	This error code is returned when the write destination area was invalid in respect of a [Data Write] command confirmation.

Fig. 4-25 Camera Error command / error codes

Due to various conditions, 3-00-01h has become a permanent number.

4.3. Data Transfer command

The image data transferred from the camera device to the host is too bulky to be transferred in a single [Data Transfer] command, and therefore in the camera device function the [Data Transfer] command is used in the following special format.

Issuing authority : Camera device

Command code : 08h

Data size : 02h to FFh

Data field : Function type : 4 bytes
Header : 4 bytes
Data : 1 to 1012 bytes
Null data : 0 to 3 bytes

Description : A four-byte header is attached to the front of the data. (For more details, see Fig. 4-27.)

If the data size is not a multiple of four bytes, pad out to a multiple of four with null bytes.

Example commands are shown in the following table.

* When a data file is transmitted spread across multiple [Data Transfer] commands, except for the [Data Transfer] command for the last data, all data sizes must be the same.

Data address	Data	Setting example	Setting explanation
+0000h	Command code	08h	[Data Transfer]
+0001h	Transfer destination AP	00h	For port A
+0002h	Transfer source AP	01h	From extension device 1
+0003h	Data size	FFh	When data size is 1020 bytes
+0004h	Function type	00h	Function type is camera device function 00-00-08-00h
+0005h		00h	
+0006h		08h	
+0007h		00h	
+0008h		Header 1	
+0009h	Header 2	00h	See Fig. 4-27 (E.g.: [Data Transfer] number "00h")
+000Ah	Header 3	01h	May be stipulated later for peripheral devices.
+000Bh	Header 4	00h	When not used, enter "00h".
+000Ch	Data	53h	See Section 4.3.1. and following
+03FFh	Data	C2h	See Section 4.3.1. and following

Fig. 4-26 Data Transfer command

bit	7	6	5	4	3	2	1	0
Header 1	Start	End	Data Type					
Header 2	[Data Transfer] counter							
Header 3	Used for special header specific to a peripheral device. (When not used, enter "00h".)							
Header 4	Used for special header specific to a peripheral device. (When not used, enter "00h".)							

Fig. 4-27 Data Transfer command / header

Start :

When this bit is "1", this [Data Transfer] command indicates the first set of data.
When this bit is "0", this [Data Transfer] command indicates intermediate or final data.

End :

When this bit is "1", this [Data Transfer] command indicates the end of the data.
When this bit is "0", this [Data Transfer] command indicates initial or intermediate data.

Start	End	Description
0	0	When the data requires three or more [Data Transfer] command transmissions, set this value when the current [Data Transfer] command refers to intermediate data.
0	1	When the data requires two or more [Data Transfer] command transmissions, set this value when the current [Data Transfer] command refers to the last set of data.
1	0	When the data requires two or more [Data Transfer] command transmissions, set this value when the current [Data Transfer] command refers to the first set of data.
1	1	Use this setting when the data can be transmitted with a single [Data Transfer] command.

Fig. 4-28 Data Transfer command / header (Start / End)

Data Type :

Specifies the type of data to be transferred, as shown in the following table.

Data Type	Description
00-00-00	Still image
00-00-01	Movie
00-01-00	Voice
01-00-00	Response to [Get Condition] command
11-00-00	Program data
Other (up to 3Fh)	Reserved

Fig. 4-29 Data Transfer command / header (Data Type)

[Data Transfer] counter :

When transferring a single data file spread across multiple [Data Transfer] commands, enter here the number of the [Data Transfer] command.

The [Data Transfer] counter starts from 00h.

When moving to the next data file (for example the next still image), the [Data Transfer] counter value is reset to 00h.

When transferring a data file which requires 256 or more [Data Transfer] commands, after FFh the [Data Transfer] counter returns to 00h.

By using this counter value, if an error of any sort occurs in a data transfer, a resend can be requested from the host going back over the last 256 [Data Transfer] commands.

4.3.1. Data transfers in response to the [Get Condition] command

Issuing authority : Camera device
 Command code : 08h
 Data size : 03h to FFh
 Data field : Function type : 4 bytes
 Header : 4 bytes
 Response : $4 \times n$ bytes ($1 \leq n \leq 253$)

Description : This is the response to a request for the camera device status or function related information with the [Get Condition] command.

A four-byte header is attached.

For the Data Type, the response "01-00-00" to the [Get Condition] command is set.

Since all data can be transmitted in a single [Data Transfer] command, both Start and End are set to "1".

When setting an 8-bit register, as for the [Set Condition] command, the register value is entered in data 1, and "00h" in data 2.

The response parameters 1 and 2 contain the same values as those requested in the [Get Condition] command.

Data address	Data	Setting example	Setting explanation
+0000h	Command code	08h	[Data Transfer]
+0001h	Transfer destination AP	10h	For extension device 5
+0002h	Transfer source AP	00h	From port A
+0003h	Data size	04h	When two items are requested, data size is 16 bytes
+0004h	Function type	00h	Function type is camera device function 00-00-08-00h
+0005h		00h	
+0006h		08h	
+0007h		00h	
+0008h	Header 1	D0h	Both Start and End are set to "1". Data Type is the response to [Get Condition].
+0009h	Header 2	00h	This is always [Data Transfer] number "00h".
+000Ah	Header 3	00h	"00h" (fixed)
+000Bh	Header 4	00h	"00h" (fixed)
+000Ch	Parameter 1	10h	Response to the first request (up to address +000Fh) In parameters 1 and 2, the same settings as [Get Condition], register value response (Example: FCh) For an 8-bit register, data 2 contains "00h".
+000Dh	Parameter 2	80h	
+000Eh	Data 1	FCh	
+000Fh	Data 2	00h	
+0010h	Parameter 1	92h	Response to the second request (up to address +0013h) In parameters 1 and 2, the same settings as [Get Condition], I hardware information (Example: compression support) response (Example: Jang Gu and JPEG support)
+0011h	Parameter 2	00h	
+0012h	Data 1	C0h	
+0013h	Data 2	00h	

Fig. 4-30 Data transfer in response to [Get Condition] command
 (Example of response to [Get Condition] command in Figure4-1 on page 10)

In a response giving the camera device status or function related information, the response is according to the following table.

Item "Parameter 1"	Data format	Example response
Image saving capacity "80h"	Number of images. (FF-FFh: not specified)	00-0Eh (14 images)
Number of images saved "81h"	Number of images.	00-01h (1 image)
Image size "82h"	See Fig. 4-32.	00-00h (QSIF)
Data size "83h"	Shows the number of [Data Transfer] commands to transfer data.	00-10h (16 commands)
Format "84h"	See Fig. 4-32.	00-00h (JPEG)
Fequency/bitrate "90h"	Shown in 1 kHz units.	3E-80h (16.0 MHz)
Resolution "91h"	Shown in pixels.	02-80h (640 pixels)
Compression support "92h"	See Figs. 4-34 to 4-36; bits for supported compression methods set to "1".	40-00h (JPEG only) <When still image requested>
Sampling bits "93h"	Count of bits.	00-08h (8 bits)
RAM size "94h" "96h"	Shown in 1 Kbyte units.	08-00h (2M bytes)
Transfer rate "95h"	Shown in bytes.	01-00h (256 bytes)
Number of P pictures "97"	Shown as number of pictures.	00-04h (4 pictures)

Fig. 4-31 Data transfer data format and example response to [Get Condition] command

Data 1 - 2	Image size
00-00h	QSIF
00-01h	QCIF
00-02h	SIF
00-03h	CIF
00-04h	VGA
00-05h	SVGA
FF-FFh	Other than the above
Other	Reserved area for other sizes

Fig. 4-32 Data transfer data format in response to [Get Condition] command (image size)

Data 1 - 2	Image size
00-00h	JPEG
00-01h	GIF
00-02h	BMP
00-03h to 00-FFh	Reserved area for other standard formats
01-00h	RGB 24-bit
01-01h	YUV 4:4:4
01-02h	YUV 4:2:2
01-03h	YUV4:2:0
01-04h	Gray scale
01-07h to 01-FFh	Reserved area for other specially defined formats
02-00h to 02-FFh	Jang Gu (specific compression) data 2 upper bits Y Lossy, lower bits C Lossy.
FF-FFh	Special compression formats other than the above
Other	Reserved area for other compression formats

Fig. 4-33 Data transfer data format in response to [Get Condition] command (format)

bit	7	6	5	4	3	2	1	0
Data 1	Jang Gu	JPEG	GIF	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)
Data 2	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)

Fig. 4-34 Data transfer data format in response to [Get Condition] command (compression support : still image)

bit	7	6	5	4	3	2	1	0
Data 1	MPEG 1	MPEG 2	MPEG 4	H.261	H.263	0 (reserved)	0 (reserved)	0 (reserved)
Data 2	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)

Fig. 4-35 Data transfer data format in response to [Get Condition] command (compression support : movie)

bit	7	6	5	4	3	2	1	0
Data 1	G.723.1	ADPCM	MP3	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)
Data 2	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)	0 (reserved)

Fig. 4-36 Data transfer data format in response to [Get Condition] command (compression support : Voice)

4.3.2. Data Transfer in response to [Stream Request], [Still Image Request], or [Data Read] command

Issuing authority	: Camera device
Command code	: 08h
Data size	: 02h to FFh
Data field	: Function type : 4 bytes Header : 4 bytes Null data : 4 bytes Data : 1 to 1008 bytes Null data : 0 to 3 bytes
Description	: This is the response to a request for image, voice, or program data. A four-byte data header and four bytes of null data are appended in front of the data. To add special header information for a particular peripheral device, header 3 and 4 or part of the data field can be freely used. * When not used, set header 3 and 4 to "00h". If the data size is not a multiple of four bytes, pad out to a multiple of four with null bytes. When a single file is transmitted spread across multiple [Data Transfer] commands, the header for the second and subsequent [Data Transfer] command is as shown in Fig. 4-38. Similarly, the header of the last [Data Transfer] command for the file is as shown in Fig. 4-39. Example commands are shown in the following table. * When a single data file is transmitted spread across multiple [Data Transfer] commands, except for the last [Data Transfer] command of the data, all data sizes must be the same.

Data address	Data	Setting example	Setting explanation
+0000h	Command code	08h	[Data Transfer] command
+0001h	Transfer destination AP	01h	For extension device 1
+0002h	Transfer source AP	00h	From port A
+0003h	Data size	FFh	Data size is 1020 bytes
+0004h	Function type	00h	Function type is camera device function 00-00-08-00h
+0005h		00h	
+0006h		08h	
+0007h		00h	
+0008h	Header 1	80h	Beginning of still image data
+0009h	Header 2	00h	[Data Transfer] command number "00h"
+000Ah	Header 3	00h	Normally contains "00h"
+000Fh	Null data	00h	"00h" (fixed)
+0010h	Image data	8Ch	Still image data
+03FFh	Image data	C2h	Still image data

**Fig. 4-37 Data Transfer in response to [Stream Request], [Still Image Request], or [Data Read] command
(First [Data Transfer] command)**

Data address	Data	Setting example	Setting explanation
+0000h	Command code	08h	[Data Transfer] command
+0001h	Transfer destination AP	01h	For extension device 1
+0002h	Transfer source AP	00h	From port A
+0003h	Data size	FFh	For second and subsequent [Data Transfer] commands, data size must be the same as first time
+0008h	Header 1	00h	Intermediate still image data
+0009h	Header 2	01h	[DataTransfer] command number 01h+256Xn (n a positive integer)
+03FFh	Image data	21h	Still image data

**Fig. 4-38 Data Transfer in response to [Stream Request], [Still Image Request], or [Data Read] command
(Second and subsequent [Data Transfer] commands)**

Data address	Data	Setting example	Setting explanation
+0000h	Command code	08h	[Data Transfer] command
+0001h	Transfer destination AP	01h	For extension device 1
+0002h	Transfer source AP	00h	From port A
+0003h	Data size	12h	Data size is 72 bytes
+0008h	Header 1	40h	Last still image data
+0009h	Header 2	3Ah	[DataTransfer] command number 3Ah+256Xn (n a positive integer)
+0046h	Image data	86h	Last still image data
+0047h	Image data (null data)	00h	Padded with null data to a multiple of four bytes

**Fig. 4-39 Data Transfer in response to [Stream Request], [Still Image Request], or [Data Read] command
(Last [Data Transfer] command)**

5. Camera device function information

This device describes the specific information (device status).

The device status can be set to be rewritable or non-erasable, and the data recorded as is.

5.1. Types

Fixed Device Status

This is the fixed format 112-byte device status, which must be present.

If all of the items are not written, operation and connections are not guaranteed.

Free Device Status

This is a device status which can be freely used for a particular device.

The maximum size is 908 bytes.

5.2. Fixed Device Status

Fixed Device Status must contain all of the following items.

① Device ID

Size : 16 bytes

Description : Shows the function and function definition を示します.

② Region

Size : 1 bytes

Description : Shows the product region (marketing destination).

* Worldwide:DES='11111111'=FFh

bit	7	6	5	4	3	2	1	0
data	DES ₇	DES ₆	DES ₅	DES ₄	DES ₃	DES ₂	DES ₁	DES ₀

Fig. 6-1 Region bit layout

Region	Bit set
North America	DES ₀ ='1'
Japan	DES ₁ ='1'
Asia	DES ₂ ='1'
Europe	DES ₃ ='1'
Reserved zone 1	DES ₄ ='1'
Reserved zone 2	DES ₅ ='1'
Reserved zone 3	DES ₆ ='1'
Reserved zone 4	DES ₇ ='1'

Fig. 6-2 Region bit settings

③ Connection direction

Size : 1byte

Description : For a device

Shows the direction of the extension socket when an extension device is connected.

For an extension device

Shows the direction of the connected to which the device is connected.

bit	7	6	5	4	3	2	1	0
data	SD ₄ ₁	SD ₄ ₀	SD ₃ ₁	SD ₃ ₀	SD ₂ ₁	SD ₂ ₀	SD ₁ ₁	SD ₁ ₀

Fig. 6-3 Connection direction bit layout

• For a device

Specifies the extension socket direction.

For an extension socket not present, specify "00".

Direction	SD _x ₁	SD _x ₀
Up	0	0
Down	0	1
Left	1	0
Right	1	1

x=1 to 4: Socket Nos

Fig. 6-4 Socket direction settings

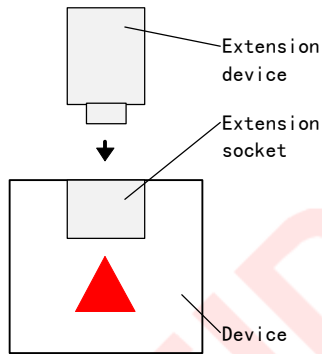


Fig. 6-5 Socket direction (Up)

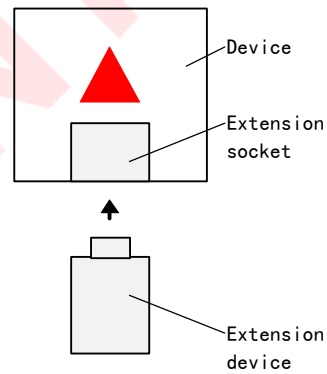


Fig. 6-6 Socket direction (Down)

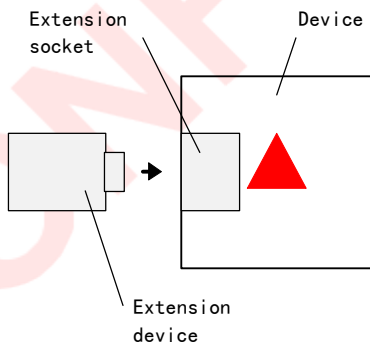


Fig. 6-7 Socket direction (Left)

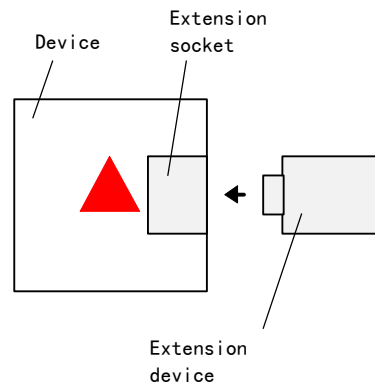


Fig. 6-8 Socket direction (Right)

- For an extension device
This shows the connector direction.

bit	7	6	5	4	3	2	1	0
Up direction	0	0	0	0	0	0	0	0
Down direction	0	0	0	0	0	0	1	0
Left direction	0	0	0	0	0	1	0	0
Right direction	0	0	0	0	1	0	0	0

Fig. 6-9 Connector direction settings

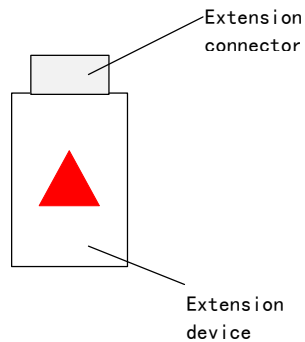


Fig. 6-10 Connector direction (Up)

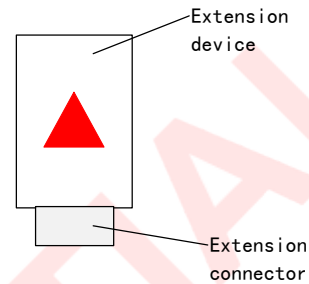


Fig. 6-11 Connector direction (Down)

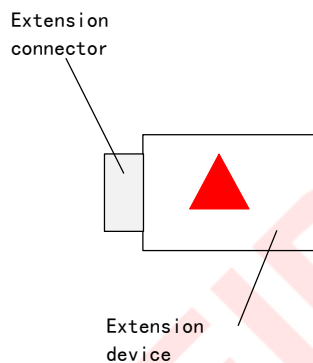


Fig. 6-12 Connector direction (Left)

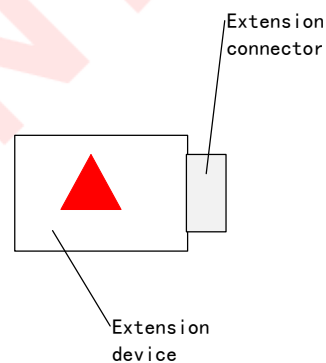


Fig. 6-13 Connector direction (Right)

④ Manufacturer's name

Size : 30 bytes

Description : Contains the manufacturer's name for the product, in the Latin alphabet. ASCII characters or Japanese two-byte Roman letters may be used. Remaining space is padded with space codes (20h). This manufacturer's name must be previously registered.

⑤ License information

Size : 60 bytes

Description : The product license information, in the Latin alphabet using ASCII code. Remaining space is padded with space codes (20h). Generally this will read "Produced By or Under License From SEGA ENTERPRISES,LTD."

⑥ Standby current consumption

Size : 2 bytes

Description : This contains the current consumption when paused (minimum power consumption) in units of 0.1 mA, in hexadecimal. For example, for 10.5 mA this is 00-69h.

⑦ Maximum current consumption

Size : 2 bytes

Description : This contains the maximum current consumption in units of 0.1 mA, in hexadecimal. For example, for 127.9 mA this is 04-FFh.

5.3. Free Device Status

The Free Device Status is an area whose contents can be freely determined by the product planner, developer, designer, programmer, or other such person, and is obtained by the host with an [All Device Request]. When used by an application program, data array support or the like is required.

Except where there are special circumstances, the following 40 bytes of information are initially present.

Version (ROM, logic, etc.) : 13 bytes E.g. "Version 1.000"

Recommendation: The version number should be as in the example, with three digits after the decimal point, and an initial release of 1.000.

Release date : 10 bytes E.g. "1998/05/11"

Recommendation: Year (4 digits), month (2 digits), day (2 digits)

C part number : 14 bytes E.g. "315-6125-AB "

Recommendation: Fill unused space with space codes (20h).

The fields should be comma separated.

E.g. "Version 1.000,1998/05/11,315-6125-AB ,"

6. Afterword

Up to the definitive version (Rev. 1.0), all or part of the content will change.