

Camera Control SDK for Windows User's Manual

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2. Introduction

This manual describes the precautions required to use Camera Control SDK in Windows OS.

2-1. Precautions and Trademarks

Precautions

- No part of this user's manual may be reproduced in any form without permission.
- The contents in this user's manual are subject to change without prior notice.
- The specifications and performance of the product are subject to change without prior notice.
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3. How to Use Camera Control SDK

This chapter describes the supported development environment and usage instructions of Camera Control SDK.

3-1. Supported Development Environment

Supported IDE: Visual Studio 2017 Professional
Supported operating system: Windows10 64bit

3-2. Supported Cameras

SIGMA fp version 2.00 or later

3-3. Software Configuration

The file configuration provided by Camera Control SDK is as follows.

• 3-3-1. File Configuration

DLL/Library file name	Header file name	Function name
Common	SIGMA_SDK_COMMON.h	--
SIGMA_cmd.dll/.lib	SIGMA_cmd.h	sgm_CamOpen
		sgm_CamClose
		sgm_FreeArrayMemory
		sgm_GetLastCommandData
SIGMA_ConfigAPI.dll/.lib	SIGMA_ConfigAPIExp.h	sgm_ConfigAPI
SIGMA_GetCamDataGrp1.dll/.lib	SIGMA_GetCamDataGrp1Exp.h	sgm_GetCamDataGrp1
SIGMA_SetCamDataGrp1.dll/.lib	SIGMA_SetCamDataGrp1Exp.h	sgm_SetCamDataGrp1
SIGMA_GetCamDataGrp2.dll/.lib	SIGMA_GetCamDataGrp2Exp.h	sgm_GetCamDataGrp2
SIGMA_SetCamDataGrp2.dll/.lib	SIGMA_SetCamDataGrp2Exp.h	sgm_SetCamDataGrp2
SIGMA_GetCamDataGrp3.dll/.lib	SIGMA_GetCamDataGrp3Exp.h	sgm_GetCamDataGrp3
SIGMA_SetCamDataGrp3.dll/.lib	SIGMA_SetCamDataGrp3Exp.h	sgm_SetCamDataGrp3
SIGMA_GetCamDataGrp4.dll/.lib	SIGMA_GetCamDataGrp4Exp.h	sgm_GetCamDataGrp4
SIGMA_SetCamDataGrp4.dll/.lib	SIGMA_SetCamDataGrp4Exp.h	sgm_SetCamDataGrp4
SIGMA_GetCamDataGrp5.dll/.lib	SIGMA_GetCamDataGrp5Exp.h	sgm_GetCamDataGrp5
SIGMA_SetCamDataGrp5.dll/.lib	SIGMA_SetCamDataGrp5Exp.h	sgm_SetCamDataGrp5
SIGMA_GetCamDataGroupFocus.dll/.lib	SIGMA_GetCamDataGroupFocusExp.h	sgm_GetCamDataGroupFocus
SIGMA_SetCamDataGroupFocus.dll/.lib	SIGMA_SetCamDataGroupFocusExp.h	sgm_SetCamDataGroupFocus
SIGMA_GetCamDataGroupMovie.dll/.lib	SIGMA_GetCamDataGroupMovieExp.h	sgm_GetCamDataGroupMovie
SIGMA_SetCamDataGroupMovie.dll/.lib	SIGMA_SetCamDataGroupMovieExp.h	sgm_SetCamDataGroupMovie
SIGMA_GetCamCanSetInfo5.dll/.lib	SIGMA_GetCamCanSetInfo5Exp.h	sgm_GetCamCanSetInfo5
SIGMA_SetCamClockAdj.dll/.lib	SIGMA_SetCamClockAdjExp.h	sgm_SetCamClockAdj
SIGMA_GetCamStatus2.dll/.lib	SIGMA_GetCamStatus2Exp.h	sgm_GetCamStatus2
SIGMA_GetCamViewFrame.dll/.lib	SIGMA_GetCamViewFrameExp.h	sgm_GetCamViewFrame
SIGMA_SnapCommand.dll/.lib	SIGMA_SnapCommandExp.h	sgm_SnapCommand
SIGMA_GetCamCaptStatus.dll/.lib	SIGMA_GetCamCaptStatusExp.h	sgm_GetCamCaptStatus
SIGMA_ClearImageDBSingle.dll/.lib	SIGMA_ClearImageDBSingleExp.h	sgm_ClearImageDBSingle
SIGMA_GetPictFileInfo2Exp.dll/.lib	SIGMA_GetPictFileInfo2Exp.h	sgm_GetPictFileInfo2
SIGMA_GetBigPartialPictFile.dll/.lib	SIGMA_GetBigPartialPictFileExp.h	sgm_GetBigPartialPictFile
SIGMA_GetMovieFileInfo.dll/.lib	SIGMA_GetMovieFileInfoExp.h	sgm_GetMovieFileInfo
SIGMA_GetPartialMovieFile.dll/.lib	SIGMA_GetPartialMovieFileExp.h	sgm_GetPartialMovieFile
SIGMA_CloseApplication.dll/.lib	SIGMA_CloseApplicationExp.h	sgm_CloseApplication

Select the appropriate DLL/library file and header file according to the function used.

3-4. Usage Instructions

To start camera control, execute the function for each camera control command after connecting to the camera using the `sgm_CamOpen()` function.

To complete camera control, execute the `sgm_CamClose()` function.

```
SDK_INFO sdkInfo;
memset(&sdkInfo, 0x00, sizeof(sdkInfo));

/*! @brief Camera open */
HRESULT hResult = sgm_CamOpen("<Serial No. of the camera>", &sdkInfo);
/*! @brief GetCamDataGroupMovie execution*/
DataGroupMovie dataGroupMovie = { 0 };
hResult = sgm_GetCamDataGroupMovie(&sdkInfo, &dataGroupMovie);
//
// Reference or update the acquired data as needed.
// => The following procedure is recommended to configure the setting from the data structure of the
//      command.
//      ☐ Acquire data using "GetCamDataGroupMovie".
//      ☐ Change the parameter only for the update part in the structure.
//      ☐ Configure the setting using "SetCamDataGroupMovie".
//
/*! @brief SetCamDataGroupMovie execution */
hResult = sgm_SetCamDataGroupMovie(&sdkInfo, &dataGroupMovie);
/*! @brief Free memory */
hResult = sgm_FreeArrayMemory(&dataGroupMovie);
/*! @brief Camera close*/
hResult = sgm_CamClose(&sdkInfo);
```

4. API Reference

This chapter describes the details of Camera Control SDK API.

4-1. sgm_CamOpen

Description

This function is executed to start camera control.

If one of the functions defined below is executed while this function is not executed, an error occurs.

Syntax

```
HRESULT WINAPI sgm_CamOpen (const char * serialNumber, LPSDK_INFO lpInfo);
```

Parameter

serialNumber : [Input] Serial No. of camera body

lpInfo : [Output] SDK management information. Used to execute each of the functions below.

• 4-1-1. LPSDK_INFO Structure

Component	Type	Description
lpInterface	void *	This information does not need editing, so the detail is omitted.
hMultipleOpenSync	HANDLE	This information does not need editing, so the detail is omitted.
lpDataIn	void *	This information does not need editing, so the detail is omitted.
lpDataOut	void *	This information does not need editing, so the detail is omitted.
lpDataInBig	void *	This information does not need editing, so the detail is omitted.
lpDataOutBig	void *	This information does not need editing, so the detail is omitted.
dwDataInSize	DWORD	This information does not need editing, so the detail is omitted.
dwDataOutSize	DWORD	This information does not need editing, so the detail is omitted.
dwLastSendSize	DWORD	This information does not need editing, so the detail is omitted.
dwLastRecvSize	DWORD	This information does not need editing, so the detail is omitted.
bLastUseBugBuffer	BOOL	This information does not need editing, so the detail is omitted.
bUseBuffer	BOOL	This information does not need editing, so the detail is omitted.
dwDataInSizeBig	DWORD	This information does not need editing, so the detail is omitted.
dwDataOutSizeBig	DWORD	This information does not need editing, so the detail is omitted.

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).

For details, refer to "6. Error Codes".

4-2. sgm_CamClose

Description

This function is executed to end camera control.

Syntax

```
HRESULT WINAPI sgm_CamClose(LPSDK_INFO lpInfo);
```

Parameter

lpInfo : [Input] SDK management information

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

4-3. sgm_ConfigAPI

Description

This is the first instruction issued to the camera by the application that uses API.
After this instruction has been received, another custom command can be received until the USB connection is shut down or the sgm_CloseApplication instruction is received.
When this function is executed, API resets the camera setting to the default.
(When API connection is closed, the camera setting returns to the setting value which the user specified before using API. However, the movie/still image setting is synchronized with the switch status.)
Furthermore, API does not accept any operation other than the power-off operation.
The data to be handled is based on the IFD structure.

Syntax

HRESULT WINAPI sgm_ConfigAPI(LPSDK_INFO lpInfo, APIConfigTag *apiConfigTag);

Parameter

lpInfo : [Input] SDK management information

apiConfigTag : [Output] Config information

- 4-3-1. APIConfigTag Structure

Component	Type	Description
dwDirectoryCount	DWORD	Number of directories
imageFileDirectory	ImageFileDirectory *	Entry to directory structure (1 to N) Refer to "5. ImageFileDirectory Structure". For information about the setting value, refer to "5.4. APIConfig Tag List".

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-4. sgm_GetCamDataGrp1

Description

This instruction acquires DataGroup1 status information from the camera.

Syntax

HRESULT WINAPI sgm_GetCamDataGrp1(LPSDK_INFO lpInfo, DataGroup1 *dataGroup1);

Parameter

lpInfo : [Input] SDK management information

dataGroup1: [Output] DataGroup1 status information acquired from the camera

• 4-4-1. DataGroup1 Structure

Component	Type	Description
FieldPresent1	BYTE	Identifies which field exists in the message. b0 : ShutterSpeed b1 : Aperture b2 : ProgramShift b3 : ISOAuto b4 : ISOSpeed b5 : ExpCompensation b6 : ABValue b7 : ABSetting
FieldPresent2	BYTE	Identifies which field exists in the message. b0 : FrameBufferState b1 : MediaFreeSpace b2 : MediaStatus b3 : CurrentLensFocalLength b4 : BatteryState b5 : AB Shot Number b6 : ExpComp Exclude AB b7 : Reserved
ShutterSpeed	char	0x00 : Uninitialized 0x08 : Bulb 0x10-0xA0 : 30sec – 1/8000sec Refer to "7-1. 8bit APEX step". (other values reserved)
Aperture	char	0x00 : Uninitialized 0x08-0x72: F1.0 – F91 (F98.70149) Refer to "7-1. 8bit APEX step". (other values reserved)
ProgramShift	char	8-bit signed integer The dial operation amount in the camera side is not reflected. 0x01 : PShift Plus (L_click) 0xFF : PShift Minus (R_click)
ISOAuto	char	0x00 : Uninitialized / ISO Manual 0x01 : ISO Auto (other values reserved)
ISOSpeed	char	0x00 : Uninitialized 0x1F-0x50 : ISO 100 – 6400 Refer to "7-1.8bit APEX step". (other values reserved)
ExpCompensation	char	When the exposure mode is P, S, or A, the exposure compensation value is output. If it is M, a difference from the correct exposure of AE is output. If the exposure bracket is provided, the exposure compensation value is output, including the exposure bracket compensation value. (cf. "ExpComp Exclude AB" in DataGroup1) 0xCD-0x33 : -6.3-+6.3 Refer to "7-1.8bit APEX step". (other values reserved)
ABValue	char	0x00-0x19 : 0-+3.0 Refer to "7-1.8bit APEX step". For AB5, 0x00-0x0E: 0-+1.7 (other values reserved) If no value is set (0x00), turn off the exposure bracket.
ABSetting	char	0x00 : Uninitialized 0x01 : AB3: 0 → - → + 0x02 : AB3: - → 0 → + 0x03 : AB3: + → 0 → - 0x04 : AB5: 0 → - → + 0x05 : AB5: - → 0 → + 0x06 : AB5: + → 0 → - (other values reserved)

FrameBufferState	char	Free space of FrameBuffer (in camera) (Maximum number of shots)
MediaFreeSpace	WORD	Free space of recording media (Maximum number of shots) (16bit)
MediaStatus	char	0x00 : Uninitialized 0x01 : OK 0x02 : Card Door Open 0x04 : No Media 0x06 : (Card Door Open No Media) 0x08 : Card Error (other values reserved)
CurrentLensFocalLength	WORD	16-bit focal length in mm (The high-order 12 bits indicate an integer, and the low-order 4 bits indicate a decimal number.)
BatteryState	char	0x00 : Uninitialized 0x01 : Full 0x02 : 2/3 0x03 : 1/3 0x04 : Low (0/3) (* At this timing, exit the CCS application.) 0x05 : Empty 0x06 : Warning 0x07 : PowerOff 0x08 : AC 0x09 : Initial (measurement initialization in progress in the camera) 0x0A : 4/5 0x0B : 3/5 0x0C : Disconnect (other values reserved)
ABShotRemainNumber	char	Remaining number of shots for Auto Bracket shooting * Set "0" in a mode other than AB shooting mode.
ExpCompExcludeAB	char	When the exposure mode is P, S, or A, the exposure compensation value is output. If it is M, a difference from the correct exposure of AE is output. If the exposure bracket is provided, the exposure compensation value is output without the exposure bracket compensation value. (cf. "ExpCompensation" in DataGroup1) 0xE8-0x18 : -3.0-+3.0 Refer to "7-1.8bit APEX step". (other values reserved)
Reserved	char	Reserved

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-5. sgm_SetCamDataGrp1

Description

This instruction changes DataGroup1 status information of the camera.

Syntax

```
HRESULT WINAPI sgm_SetCamDataGrp1(LPSDK_INFO lpInfo, DataGroup1 *dataGroup1);
```

Parameter

lpInfo : [Input] SDK management information

dataGroup1: [Input] Status information of DataGroup1 sent to the camera

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-6. sgm_GetCamDataGrp2

Description

This instruction acquires DataGroup2 status information from the camera.

Syntax

HRESULT WINAPI sgm_GetCamDataGrp2(LPSDK_INFO lpInfo, DataGroup2 *dataGroup2);

Parameter

lpInfo : [Input] SDK management information

dataGroup2: [Output] DataGroup2 status information acquired from the camera

• 4-6-1. DataGroup2 Structure

Component	Type	Description
FieldPresent1	BYTE	Identifies which field exists in the message. b0 : DriveMode b1 : SpecialMode b2 : ExposureMode b3 : AEMeteringMode b4 : Reserved b5 : Reserved b6 : Reserved b7 : Reserved
FieldPresent2	BYTE	Identifies which field exists in the message. b0 : FlashType b1 : Reserved b2 : FlashMode b3 : FlashSetting b4 : Reserved b5 : WhiteBalance b6 : Resolution b7 : ImageQuality
DriveMode	char	0x00 : Uninitialized 0x01 : Single Capture 0x02 : Continuous Capture 0x03 : 2s Self Timer 0x04 : 10s Self Timer 0x07 : Interval Timrer (other values reserved)
SpecialMode	char	0x00 : Uninitialized / None 0x02 : Live View Mode Displays the live view in the PC side. (other values reserved)
ExposureMode	char	0x00 : Uninitialized 0x01 : P 0x02 : A 0x03 : S 0x04 : M The following bit patterns are used together with the setting values above. 0x10 : C1 0x20 : C2 0x40 : C3 0x80 : ★(Read Only) (other values reserved)
AEMeteringMode	char	0x00 : Uninitialized 0x01 : Evaluative 0x02 : Center-weighted Average 0x03 : Center Area 0x04 : Spot (other values reserved)
Reserved	char	Reserved
Reserved	char	Reserved
Reserved	char	Reserved
Reserved	char	Reserved
FlashType (* Read Only)	char	0x00 : Uninitialized / None 0x01 : Internal pop-up flash 0x02 : External Flash (SIGMA products Flash) (other values reserved)
Reserved	char	Reserved

FlashMode	char	0b0000-0000 : Uninitialized / Normal 0b0000-0001 : Red-eye reduction 0b0000-0010 : FP emission 0b0000-0100 : Multi-flash 0b0000-1000 : Wireless flash 1 0b0001-0000 : Wireless flash 2 0b0010-0000 : Wireless flash 3 0b0100-0000 : Slow synchronization (other values reserved)
FlashSetting	char	0x00 : Uninitialized 0x01 : TTL-Auto 0x02 : TTL-Manual 0x80 : Emission disabled (charging in progress) * Read Only 0x81 : Exposure warning (The strobe mark flashes.) * Read Only (other values reserved)
Reserved	char	Reserved
WhiteBalance	char	0x00 : Uninitialized 0x01 : Auto 0x02 : Sunlight 0x03 : Shade 0x04 : Overcast 0x05 : Incandescent 0x06 : Fluorescent 0x07 : Flash 0x08 : Custom 1 0x09 : CustomCapture 1 0x0A : Custom 2 0x0B : CustomCapture 2 0x0C : Custom 3 0x0D : CustomCapture 3 0x0E : Color Temperature 0x0F : Auto (Light Source Priority) (other settings reserved)
Resolution	char	0x00 : Uninitialized 0x01 : High 0x03 : Medium 0x04 : Low (other settings reserved)
ImageQuality	char	Set the image quality using a bit pattern as shown below. 0x02 : JPEG FINE 0x04 : JPEG NOMAL 0x08 : JPEG BASIC 0x10 : DNG For RAW+ JPEG, make a combination as shown below. 0x12 : DNG + FINE

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-7. sgm_SetCamDataGrp2

Description

This instruction changes DataGroup2 status information of the camera.

Syntax

```
HRESULT WINAPI sgm_SetCamDataGrp2(LPSDK_INFO lpInfo, DataGroup2 *dataGroup2);
```

Parameter

lpInfo : [Input] SDK management information

dataGroup2: [Input] Status information of DataGroup2 sent to the camera

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-8. sgm_GetCamDataGrp3

Description

This instruction acquires DataGroup3 status information from the camera.

Syntax

HRESULT WINAPI sgm_GetCamDataGrp3(LPSDK_INFO lpInfo, DataGroup3 *dataGroup3);

Parameter

lpInfo : [Input] SDK management information

dataGroup3: [Output] DataGroup3 status information acquired from the camera

• 4-8-1. DataGroup3 Structure

Component	Type	Description
FieldPresent1	BYTE	Identifies which field exists in the message. b0 : Reserved b1 : Reserved b2 : Reserved b3 : ColorSpace b4 : ColorMode b5 : BatteryKind b6 : LensWideFocalLength b7 : LensTeleFocalLength
FieldPresent2	BYTE	Identifies which field exists in the message. b0 : AFAuxiliaryLight b1 : AFBeep b2 : Reserved b3 : Reserved b4 : Reserved b5 : TimerSound b6 : Reserved b7 : Destination to Save
Reserved	char	Reserved
Reserved	char	Reserved
Reserved	char	Reserved
ColorSpace	char	0x00 : Uninitialized 0x01 : sRGB 0x02 : AdobeRGB (other settings reserved)
ColorMode	char	0x00 : Uninitialized / Normal 0x01 : Sepia 0x02 : White and Black 0x03 : Standard 0x04 : Vivid 0x05 : Neutral 0x06 : Portrait 0x07 : Landscape 0x08 : Fov Classic Blue 0x09 : Sunset 0x0A : Forest 0x0B : Cinema 0x0C : Fov Classic Yellow (other settings reserved)
BatteryKind (* Read Only)	char	0x00 : Uninitialized 0x01 : Body battery 0x02 : AC adapter (other values reserved)
LensWideFocalLength (* Read Only)	WORD	16-bit focal length in mm (Wide end) (The high-order 12 bits indicate an integer, and the low-order 4 bits indicate a decimal number.)
LensTeleFocalLength (* Read Only)	WORD	16-bit focal length in mm (Tele end) (The high-order 12 bits indicate an integer, and the low-order 4 bits indicate a decimal number.)
AFAuxiliaryLight	char	AF Auxiliary light 0x00 : Uninitialized 0x01 : ON 0x02 : OFF (other settings reserved)
AFBeep	char	AF beep sound <For ON/OFF setting>

		0x00 : Uninitialized 0x01 : ON 0x02 : OFF (other settings reserved) <For 5-level setting> 0x00 : Uninitialized 0x02 : 0 0x03 : 1 0x04 : 2 0x05 : 3 0x06 : 4 0x07 : 5 (other settings reserved)
Reserved	char	Reserved
Reserved	char	Reserved
Reserved	char	Reserved
TimerSound	char	Timer Volume <For ON/OFF setting> 0x00 : Uninitialized 0x01 : ON 0x02 : OFF (other settings reserved) <For 5-level setting> 0x00 : Uninitialized 0x02 : 0 0x03 : 1 0x04 : 2 0x05 : 3 0x06 : 4 0x07 : 5 (other settings reserved)
Reserved	char	Reserved
Destination to Save	char	Storage location of images 0x00 : Uninitialized 0x01 : In-camera media 0x02 : Drive in PC side 0x03 : In-camera media + Drive in PC side (other settings reserved)

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-9. sgm_SetCamDataGrp3

Description

This instruction changes DataGroup3 status information of the camera.

Syntax

```
HRESULT WINAPI sgm_SetCamDataGrp3(LPSDK_INFO lpInfo, DataGroup3 *dataGroup3);
```

Parameter

lpInfo : [Input] SDK management information

dataGroup3: [Input] Status information of DataGroup3 sent to the camera

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-10. sgm_GetCamDataGrp4

Description

This instruction acquires DataGroup4 status information from the camera.

Syntax

HRESULT WINAPI sgm_GetCamDataGrp4(LPSDK_INFO lpInfo, DataGroup4 * dataGroup4);

Parameter

lpInfo : [Input] SDK management information

dataGroup4: [Output] DataGroup4 status information acquired from the camera

• 4-10-1. DataGroup4 Structure

Component	Type	Description
FieldPresent1	BYTE	Identifies which field exists in the message. b0 : Reserved b1 : Reserved b2 : Reserved b3 : Reserved b4 : DC Crop Mode b5 : LV Magnify Ratio b6 : High-sensitivity ISO extension b7 : Continuous shooting speed
FieldPresent2	BYTE	Identifies which field exists in the message. b0 : HDR b1 : DNG image quality b2 : Fill Light b3 : Lens Optics Compensation b4 : Electronic Image Stabilization b5 : Shutter sound / Recording start and end sound
Reserved	char	Reserved
Reserved	char	Reserved
Reserved	char	Reserved
Reserved	char	Reserved
DcCropMode	char	The DC Crop setting value and AUTO are judged depending on the attached lens. 0x00 : Uninitialized / AUTO 0x01 : OFF 0x02 : ON (other values reserved)
LVMagnifyRatio	char	0x00 : Uninitialized 0x01 : x1.0 (Normal LiveView) 0x02 : x4.0 0x03 : x8.0 (other values reserved)
High-sensitivity ISO extension	BYTE	Setting value of high-sensitivity ISO extension 0x00 : Uninitialized 0x01 : OFF 0x02 : ON (other values reserved)
Continuous shooting speed	BYTE	Setting value of continuous shooting speed 0x00: Uninitialized 0x01: High Speed 0x02: Medium Speed 0x03: Low Speed (other values reserved)
HDR	BYTE	HDR setting value 0x00: Uninitialized 0xFF:OFF 0xFE:AUTO 0x01:±1.0 0x02:±2.0 0x03:±3.0 (other values reserved)
DNG image quality	BYTE	Setting value of DNG image quality 12: 12bit 14: 14bit (other values reserved)
FillLight	BYTE	Setting value of Fill Light Set the ±5.0 range in 0.1 increments, and enter 10 times the UI display value.

Lens Optics Compensation Distortion	BYTE	Lens Optics Compensation - Distortion setting value 0x00 : Uninitialized 0x01 : AUTO 0x02 : OFF (other values reserved)
Lens Optics Compensation Chromatic Aberration	BYTE	Lens Optics Compensation - Chromatic Aberration setting value 0x00 : Uninitialized 0x01 : AUTO 0x02 : OFF (other values reserved)
Lens Optics Compensation Diffraction	BYTE	Lens Optics Compensation - Diffraction setting value 0x00 : Uninitialized 0x01 : ON 0x02 : OFF (other values reserved)
Lens Optics Compensation Vignetting	BYTE	Lens Optics Compensation - Vignetting setting value 0x00 : Uninitialized 0x01 : AUTO 0x02 : OFF (other values reserved)
Lens Optics Compensation Color Shading setting value	BYTE	Lens Optics Compensation - Color Shading setting value 0x00 : Uninitialized 0xFF: AUTO 0xFE: OFF 0x01: #1 0x02: #2 0x03: #3 0x04: #4 0x05: #5 0x06: #6 0x07: #7 0x08: #8 0x09: #9 0x0A: #10 (other values reserved)
Lens Optics Compensation Color Shading setting acquirement	BYTE	Lens Optics Compensation - Color Shading compensation value acquirement Leave it ON from the time you entered the compensation value capture menu using the camera or application operation until the time you exit the menu. 0x00 : Uninitialized 0x01: ON 0x02: OFF (other values reserved)
Electronic Image Stabilization	BYTE	Setting value of Electronic Image Stabilization 0x00 : Uninitialized 0x01 : ON 0x02 : OFF (other values reserved)
Shutter Sound Recording start/stop sound	BYTE	Shutter sound / Recording start/stop sound 0x00 : Uninitialized 0x02 = 0 0x03 = 1 0x04 = 2 0x05 = 3 0x06 = 4 0x07 = 5 (other settings reserved)

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-11. sgm_SetCamDataGrp4

Description

This instruction changes DataGroup4 status information of the camera.

Syntax

```
HRESULT WINAPI sgm_SetCamDataGrp4(LPSDK_INFO lpInfo, DataGroup4 *dataGroup4);
```

Parameter

lpInfo : [Input] SDK management information

dataGroup4: [Input] Status information of DataGroup4 sent to the camera

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-12. sgm_GetCamDataGrp5

Description

This instruction acquires DataGroup5 status information from the camera.

Syntax

HRESULT WINAPI sgm_GetCamDataGrp5(LPSDK_INFO lpInfo, DataGroup4 *5);

Parameter

lpInfo : [Input] SDK management information

dataGroup5: [Output] DataGroup5 status information acquired from the camera

• 4-12-1. DataGroup5 Structure

Component	Type	Description
FieldPresent	BYTE	Identifies which field exists in the message. b0 : Interval Timer b1 : Color Temperature b2 : Reserved b3 : Aspect Ratio b4 : Reserved b5 : Tone Effect b6 : Reserved b7 : Reserved b8 : Reserved b9 : Reserved b10 : Reserved b11 : Reserved b12 : Reserved b13 : Reserved b14 : Reserved b15 : AFAuxiliaryLight [EF]
IntervalTimerSecond	BYTE	Shooting interval in Interval Timer mode Unit in seconds
IntervalTimerFrame	WORD	Number of shots in Interval Timer mode "00.h" indicates the infinite, and other numeric values indicate the specified number of shots.
IntervalTimerSecond_Remain (* Read Only)	BYTE	Remaining time required to start the next shooting in Interval Timer mode Unit in seconds
IntervalTimerFrame_Remain (* Read Only)	WORD	Remaining time required to end shooting in Interval Timer mode
ColorTemp	BYTE	User setting value of color temperature white balance Unit in kelvin
Reserved	WORD	Reserved
Reserved	char	Reserved
AspectRatio	char	Aspect Ratio setting value 00.h : Uninitialized 01.h : 21:9 02.h : 16:9 03.h : 3:2 04.h : 4:3 05.h : 7:6 06.h : 1:1 07.h : √2:1
Reserved	BYTE	Reserved
ToneEffect	BYTE	Tone setting value in Monochrome mode 00.h : Uninitialized 01.h : B&W
Reserved	BYTE	Reserved
Reserved	BYTE	Reserved
Reserved	BYTE	Reserved
Reserved	BYTE	Reserved
Reserved	BYTE	Reserved
Reserved	BYTE	Reserved
Reserved	BYTE	Reserved
Reserved	BYTE	Reserved
Reserved	BYTE	Reserved
Reserved	BYTE	Reserved
Reserved	BYTE	Reserved
Reserved	BYTE	Reserved
Reserved	BYTE	Reserved

Reserved	BYTE	Reserved
Reserved	BYTE	Reserved
Reserved	BYTE	Reserved
AFAuxiliaryLight	BYTE	Auxiliary light activation setting for external flash 00.h : Uninitialized 01.h : ON 02.h : OFF

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-13. sgm_SetCamDataGrp5

Description

This instruction changes DataGroup5 status information of the camera.

Syntax

```
HRESULT WINAPI sgm_SetCamDataGrp5(LPSDK_INFO lpInfo, DataGroup5 *dataGroup5);
```

Parameter

lpInfo : [Input] SDK management information

dataGroup5: [Input] Status information of DataGroup5 sent to the camera

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-14. sgm_GetCamDataGroupFocus

Description

This function notifies the PC of the camera setting value.
The data to be handled is based on the IFD structure.

Syntax

```
HRESULT WINAPI sgm_GetCamDataGroupFocus(  
    LPSDK_INFO    lpInfo,  
    DataGroupFocus *dataGroupFocus  
);
```

Parameter

lpInfo : [Input] SDK management information

dataGroupFocus : [Output] DataGroupFocus status information acquired from the camera

• 4-14-1. DataGroupFocus Structure

Component	Type	Description
dwDirectoryCount	DWORD	Number of directories
imageFileDirectory	ImageFileDirectory *	Entry to directory structure (1 to N) Refer to "5. ImageFileDirectory Structure". For information about the setting value, refer to "5.3 DataGroupFocus".

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-15. sgm_SetCamDataGroupFocus

Description

This function changes the camera setting value from the PC.
The data to be handled is based on the IFD structure.

Syntax

```
HRESULT WINAPI sgm_SetCamDataGroupFocus(  
    LPSDK_INFO      lpInfo,  
    DataGroupFocus  *dataGroupFocus  
);
```

Parameter

lpInfo : [Input] SDK management information

dataGroupFocus :[Input] DataGroupFocus status information sent to the camera

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-16. sgm_GetCamDataGroupMovie

Description

This function notifies the PC of the camera setting value.
The data to be handled is based on the IFD structure.

Syntax

```
HRESULT WINAPI sgm_GetCamDataGroupMovie(  
    LPSDK_INFO      lpInfo,  
    DataGroupFocus   *dataGroupMovie  
);
```

Parameter

lpInfo : [Input] SDK management information

dataGroupMovie : [Output] DataGroupMovie status information acquired from the camera

• 4-16-1. DataGroupMovie Structure

Component	Type	Description
dwDirectoryCount	DWORD	Number of directories
imageFileDirectory	ImageFileDirectory *	Entry to directory structure (1 to N) Refer to "5. ImageFileDirectory Structure". For information about the setting value, refer to "5.4 DataGroupMovie".

inCameraHandle : Camera handle acquired from the system

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-17. sgm_SetCamDataGroupMovie

Description

This function changes the camera setting value from the PC.
The data to be handled is based on the IFD structure.

Syntax

```
HRESULT WINAPI sgm_SetCamDataGroupMovie(  
    LPSDK_INFO      lpInfo,  
    DataGroupMovie  *dataGroupMovie  
);
```

Parameter

lpInfo : [Input] SDK management information

dataGroupMovie : [Output] DataGroupMovie status information acquired from the camera

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-18. sgm_GetCamCanSetInfo5

Description

This instruction acquires the setting items, which can be changed through the PC, from the camera. The data including all the tags corresponding to the valid settings need to be returned only when this function is first issued after either sgm_GetAPIConfig or sgm_GetAdjustmentConfig was received. After this, only the tags with a difference may be notified.

Syntax

```
HRESULT WINAPI sgm_GetCamCanSetInfo5( LPSDK_INFO lpInfo, CanSetInfo5 *canSetInfo5);
```

Parameter

lpInfo : [Input] SDK management information

canSetInfo5: [Output] CanSetInfo5 status information acquired from the camera

• 4-20-1. CanSetInfo5 Structure

Component	Type	Description
dwDirectoryCount	DWORD	Number of directories
imageFileDirectory	ImageFileDirectory *	Entry to directory structure (1 to N) Refer to "5. ImageFileDirectory Structure". For information about the setting value, refer to "5.2 CanSetInfo5".

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-19. sgm_SetCamClockAdj

Description

This instruction sets the camera time to the PC time.

Syntax

```
HRESULT WINAPI sgm_SetCamClockAdj(LPSDK_INFO lpInfo, ClockData *clockData);
```

Parameter

lpInfo : [Input] SDK management information

clockData : [Input] Time information that is set to the camera

• 4-19-1. ClockData Structure

Component	Type	Description
TimeSecond	char	Second data. 8bit Second Data
TimeMinute	char	Minute data. 8bit Minute Data
TimeHour	char	Hour data. 8bit Hour Data
DateDate	char	Date data. 8bit Date Data
DateMonth	char	Month data. 8bit Month Data
DateYear	char	Year data. 8bit Year Data (Last two digits only moved)

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-20. sgm_GetCamStatus2

Description

The PC periodically sends this function to acquire the camera status.

This function can acquire status information together with the data acquired using other functions such as sgm_GetCamDataGroup1, so it is effective for performance improvement such as frame rate enhancement of Live View.

This function has three arguments. The data acquired with another specified function can be acquired only using this function.

Describe Checksum at the offset position written in the tag of Id=0001.h. In this case, never include the subsequent data in the Checksum calculation value.

When embedding the data acquired using another function, describe the data length in Count, and the data following FieldPresent in Value_Offset. Then, omit Checksum at the end of the embedded data.

(Substitute with Checksum of sgm_GetCamStatus2.)

Syntax

```
HRESULT WINAPI sgm_GetCamStatus2 (  
    LPSDK_INFO      lpInfo,  
    DWORD           OpeCodeCanSet,  
    DWORD           OpeCodeGrp,  
    DWORD           OpeCodeOther,  
    CamStatus2      *camStatus2,  
    Int             buffLength,  
    int             *recvLength  
);
```

Parameter

lpInfo : [Input] SDK management information

OpeCodeCanSet : [Input] Required information specification 1

Bit	Code	Content
4	2030.h	sgm_GetCamCanSetInfo5

OpeCodeGrp : [Input] Required information specification 2

Bit	Code	Content
7	9033.h	sgm_GetCamDataGroupMovie
6	9031.h	sgm_GetCamDataGroupFocus
4	9027.h	sgm_GetCamDataGroup5
3	9023.h	sgm_GetCamDataGroup4
2	9014.h	sgm_GetCamDataGroup3
1	9013.h	sgm_GetCamDataGroup2
0	9012.h	sgm_GetCamDataGroup1

OpeCodeOther: [Input] Required information specification 3

Bit	Code	Content
0	902B.h	sgm_GetCamViewFrame

camStatus2: [Output] Camera change status information acquired from the camera

• 4-20-1. CamStatus2 Structure

Component	Type	Description
DataLength	DWORD	Data length N [Byte]
NumberOfDirectoryEntries	DWORD	Number of directories
directoryEntry	ImageFileDirectory *	Entry to directory structure (1 to N) Refer to "5. ImageFileDirectory Structure". For information about the setting value, refer to "5.1 GetCamStatus Data2".

buffLength : [Output] Reserved memory size

recvLength : [Output] Size of acquired information

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-21. sgm_GetCamViewFrame

Description

This function acquires image data when displaying LiveView.

When LiveView or QuickView can be prepared, the camera transfers image data to the PC; otherwise, it transfers data, which means that the target image is not found, to the PC.

This function does not ensure checksum data to display LiveView images as much as possible.

Syntax

```
HRESULT WINAPI sgm_GetCamViewFrame (  
    LPSDK_INFO lpInfo,  
    BYTE      **buffer,  
    DWORD     *ActualSize  
);
```

Parameter

lpInfo : [Input] SDK management information

buffer : [Output] Image data

ActualSize : [Output] Image data size

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).

For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-22. sgm_SnapCommand

Description

This command issues shooting instructions from the PC to the camera.

Syntax

```
HRESULT WINAPI sgm_SnapCommand(LPSDK_INFO lpInfo, SnapState *snapState);
```

Parameter

lpInfo : [Input] SDK management information

snapState : [Input] Shooting parameter

- 4-22-1. SnapState Structure

Component	Type	Description
CaptureMode	char	0x00 : Uninitialized 0x01 : General Capture (practically operates in the same way as 0x02 when MF is specified.) 0x02 : Non-AF Capture 0x03 : AF Drive Only 0x04 : Start AF 0x05 : Stop AF 0x06 : Start Capture 0x07 : Stop Capture 0x10 : Start Recording Movie with AF 0x20 : Start Recording Movie without AF 0x30 : Stop Recording Movie (other values reserved)
CaptureAmount	char	Number of continuous shots (* For single shooting, "0x01" is set in WB Capture mode.

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-23. sgm_GetCamCaptStatus

Description

This instruction acquires the shooting result from the camera.

Syntax

```
HRESULT WINAPI sgm_GetCamCaptStatus(  
    LPSDK_INFO lpInfo,  
    DWORD      ImageID,  
    CaptStatus *captStatus  
);
```

Parameter

lpInfo : [Input] SDK management information

ImageID : [Input] Code used to identify a shooting operation (image) to be acquired.

captStatus : [Output] Acquires CaptStatus status information from the camera.

• 4-23-1. CaptStatus Structure

Component	Type	Description
ImageID	char	ID of the specified image in the CaptStatus database in the camera
ImageDBHead	char	Head ID of the parts used in the CaptStatus database in the camera
ImageDBTail	char	Head ID of the free space in the CaptStatus database in the camera
Capt Status	WORD	16bit CaptStatus Code 0x0000 : Uninitialized / Cleared [Processing] 0x0001 : Shooting standby / In operation 0x0002 : Shooting succeeded (Shooting sequence without image generation sequence) 0x0004 : Image generation or custom white balance processing in progress 0x0005 : Image data (file) generation completed 0x0006 : Preparation for stopping the movie recording 0x0007 : Movie file generation completed (other values reserved) [Exit: Success] 0x8001 : AF success (AFOnly mode only) 0x8002 : Custom white balance acquirement succeeded (CWB Capture mode only). 0x8003 : Image data storage completed 0x8004 : Other interrupt or exit without error (other values reserved) [Exit: Failure] 0x6001 : AF failure (in all shooting modes that use AF) 0x6002 : Buffer full 0x6003 : Custom white balance image acquirement failed. 0x6004 : Image generation failed due to an error occurred during image generation. 0x6005 : General failure (other than any of the above-mentioned failures.) (other values reserved)
Destination to Save	BYTE	Storage location of the specified image (same as DataGroup3) 0x00 : Uninitialized 0x01 : In-camera media 0x02 : Drive in PC side 0x03 : In-camera media + Drive in PC side (other settings reserved)

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.
2	sgm_GetCamStatus2	This function is executed to acquire the camera status.

4-24. sgm_ClearImageDBSingle

Description

This instruction requests to clear the shooting result of the CaptStatus database in the camera.

Syntax

```
HRESULT WINAPI sgm_ClearImageDBSingle(LPSDK_INFO lpInfo, int ImageID);
```

Parameter

lpInfo : [Input] SDK management information

ImageID : [Input] Code used to identify a shooting operation (image) to be acquired.

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-25. sgm_GetPictFileInfo2

Description

This function requests information of the data (image file) that is shot in Camera Control mode.

Syntax

```
HRESULT WINAPI sgm_GetPictFileInfo2(  
    LPSDK_INFO        lpInfo,  
    PictFileInfoData2Ex PictInfo[],  
    DWORD              MaxCount,  
    DWORD              *ActualCount,  
    BYTE               **buffer,  
    int                *data_len  
);
```

Parameter

lpInfo : [Input] SDK management information

PictInfo : [Output] PictureFileInfoData2 status information acquired from the camera

• 4-25-1. PictFileInfoData2Ex Structure

Component	Type	Description
PictureFormat	WORD	Image format of image file
FileExt[4]	BYTE	Header creation information
SizeX	WORD	Image size of image file (X: Units: pixels)
SizeY	WORD	Image size of image file (Y: Units: pixels)
PathName[SZ_MIDDLE]	BYTE	Path name of image file
FileName[SZ_MIDDLE]	BYTE	File name of image file (must be suffixed by a null character.)
FileSize	DWORD	File size of image file (units: bytes) <Theoretical maximum value>
FileAddress	DWORD	Image storage location address of image file

MaxCount : [Input] Maximum number of acquired image information items

ActualCount : [Output] Number of acquired items

buffer : [Output] Buffer address

data_len : [Output] Acquired data size

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-26. sgm_GetBigPartialPictFile

Description

This function downloads image data (image file) shot by the camera in pieces.

Syntax

```
HRESULT WINAPI sgm_GetBigPartialPictFile (  
LPSDK_INFO lpInfo,  
DWORD StoreAddress,  
DWORD StartAddress,  
DWORD Length,  
BYTE **PictureFileData,  
DWORD *PictureFileSize  
);
```

Parameter

lpInfo : [Input] SDK management information

StoreAddress : [Input] Image file storage location address (head address)

StartAddress : [Input] Image file transfer starting position (offset address)

Length : [Input] Image file transfer size (units: bytes / Maximum value: 0x8000000)

PictureFileData : [Output] Image data

PictureFileSize : [Output] Image data size (return)

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.
2	sgm_GetPictFileInfo2	This function requests information of the data (image file) that is shot in Camera Control mode.

4-27. sgm_GetMovieFileInfo

Description

This function requests information of the data (movie file) that is shot in Camera Control mode.

Syntax

```
HRESULT WINAPI sgm_GetMovieFileInfo (  
LPSDK_INFO      lpInfo,  
MovieFileInfo    movieInfo[],  
DWORD           MaxCount,  
DWORD           *ActualCount,  
MovieFileInfoExt movieInfoExt[],  
BYTE            **buffer,  
int              *data_len  
);
```

Parameter

lpInfo : [Input] SDK management information

movieInfo : [Output] Movie file information (array)

• 4-27-1. MovieFileInfo Structure

Component	Type	Description
FileFormat[4]	byte	File format "MOV" : MOV format
FileHandle	DWORD32	Handle of movie file
FileSize	DWORD64	File size (byte)
PathName[SGM_SZ_MIDDLE]	BYTE	File Name

MaxCount : [Input] Maximum number of acquired movie information items

ActualCount : [Output] Number of acquired items

movieInfoExt : [Output] Movie file extension information (array)

• 4-27-2. MovieFileInfoEx Structure

Component	Type	Description
FileFormat[4]	byte	File format "MOV" : MOV format
FileHandle	DWORD32	Handle of movie file
FileSize	DWORD64	File size (byte)
PathName[SGM_SZ_MIDDLE]	BYTE	Offset to directory name
FileName[SGM_SZ_MIDDLE]	BYTE	Offset to file name

buffer : [Output] Buffer address

dala_len : [Output] Acquired data size

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-28. sgm_GetPartialMovieFile

Description

Movie version for GetBigPartialPictFile

This function downloads movie data (movie file) shot by the camera in pieces.

Syntax

```
HRESULT WINAPI sgm_GetPartialMovieFile(  
LPSDK_INFO  IpInfo,  
DWORD32     FileHandle,  
DWORD64     OffsetByte,  
DWORD64     Length,  
BYTE        **buffer,  
DWORD       *ActualSize  
);
```

Parameter

IpInfo : [Input] SDK management information

FileHandle : [Input] Movie file storage location address (head address)

OffsetByte : [Input] Movie file acquirement starting position (offset address)

The 32-bit parameter is internally divided into two parts and transferred to the communication parameter.

Length : [Input] Movie file transfer size (units: bytes)

The 32-bit parameter is internally divided into two parts and transferred to the communication parameter.

buffer : [Output] Buffer (This area is reserved in the API side.)

ActualSize : [Output] Actually acquired size (including the data header and checksum)

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).

For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.
2	sgm_GetMovieFileInfo	This function requests information of the shot data (movie file).

4-29. sgm_CloseApplication

Description

This instruction informs the camera that the session is closed when the application exits.

Syntax

```
HRESULT WINAPI sgm_CloseApplication(LPSDK_INFO lpInfo);
```

Parameter

lpInfo : Camera handle acquired from the system

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

Required function before execution

Execution order	Function name	Description
1	sgm_CamOpen	This function is executed to start camera control.

4-30. sgm_FreeArrayMemory

Description

Function that releases the memory used in the API side.

The target is an IFDArray-format structure.

Syntax

```
HRESULT WINAPI sgm_FreeArrayMemory(IFDArray *idfArray);
```

Parameter

idfArray : [Input/Output] Pointer of the structure with memory freed

- 4-30-1. IFDArray Structure

Component	Type	Description
dwDirectoryCount	DWORD	Number of directories
imageFileDirectory	ImageFileDirectory *	Entry to directory structure (1 to N) Refer to "5. ImageFileDirectory Structure". For information about the setting value, refer to "5.4. APIConfig Tag List".

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).

For details, refer to "6. Error Codes".

4-31. sgm_GetLastCommandData

Description

This instruction acquires data of the last executed command.

Syntax

```
HRESULT WINAPI sgm_GetLastCommandData (  
LPSDK_INFO lpInfo,  
LPBYTE      lpCommandData,  
LPDWORD     lpCommandSize,  
LPBYTE      lpResponseData,  
LPDWORD     lpResponseSize  
);
```

Parameter

lpCommandData : [Output] Returns binary data of the command sent by PTP.

lpCommandSize : [Input/Output] Input - Memory size / Output - Data size

lpResponseData : [Output] Returns binary data of the command received by PTP.

lpResponseSize : [Input/Output] Input - Memory size / Output - Data size

Return value

HRESULT

Returns whether function processing succeeded or failed (LONG type).
For details, refer to "6. Error Codes".

5. ImageFileDirectory Structure

ImageFileDirectory Structure

Component	Type	Description
wTagId	WORD	Tag Defines the individual ID for each instruction.
wType	WORD	Directory type Refer to the Directory type list.
dwCount	DWORD	Count Number of elements included in the directory entry
value	UNION	Offset to value If data fits in 4 bytes, enter the value; otherwise, enter the offset from the reference position. (The data length position is used as the reference position.)

Directory type list

Type	Content	Description
1	BYTE	8-bit unsigned integer
2	ASCII	9-bit byte that contains one 7bitASCII code. The last byte is terminated with a null byte. The count value is calculated, including a null byte.
3	SHORT	16-bit unsigned integer
4	LONG	32-bit unsigned integer
5	RATIONAL	LONG: 2 units The first LONG indicates a numerator. The second LONG indicates a denominator.
6	SBYTE	8-bit signed integer (two's complement notation)
7	UNDEFINED	8-bit byte that can be specified with any value by the field definition.
8	SSHORT	16-bit signed integer (two's complement notation)
9	SLONG	32-bit signed integer (two's complement notation)
10	SRATIONAL	SLONG: 2 units The first SLONG indicates a numerator. The second SLONG indicates a denominator.
11	FLOAT	32-bit single precision floating point IEEE format
12	DOUBLE	64-bit double precision floating point IEEE format

5-1. GetCamStatusData2

Tag	Content	Type	Count	Description
0001.h	Offset of checksum	LONG	0	No Checksum
			1	Offset value to Checksum
0002.h	Camera Status	SHORT	1	Refer to CamStatus.
0003.h	RecoverFlag	SHORT	Variable length	OperationCode of the corresponding command
0004.h	StatusChg	SHORT	Variable length	sgm_GetCamStatus: 9012.h
0005.h	CaptStatusChg	BYTE or SHORT	Variable length	OperationCode of the corresponding command
9012.h	sgm_GetCamDataGroup1	UNDEFINED	Variable length	Refer to "4-6. sgm_GetCamDataGroup1".
9013.h	sgm_GetCamDataGroup2	UNDEFINED	Variable length	Refer to "4-8. sgm_GetCamDataGroup2".
9014.h	sgm_GetCamDataGroup3	UNDEFINED	Variable length	Refer to "4-10. sgm_GetCamDataGroup3".
9023.h	sgm_GetCamDataGroup4	UNDEFINED	Variable length	Refer to "4-12. sgm_GetCamDataGroup4".
9027.h	sgm_GetCamDataGroup5	UNDEFINED	Variable length	Refer to "4-14. sgm_GetCamDataGroup5".
902B.h	sgm_GetCamViewFrame	UNDEFINED	Variable length	Refer to "4-23. sgm_GetCamViewFrame".
9030.h	sgm_GetCamCanSetInfo5	UNDEFINED	Variable length	Refer to "4-20. sgm_GetCamCanSetInfo5".
9031.h	sgm_GetCamDataGroupFocus	UNDEFINED	Variable length	Refer to "4-16. sgm_GetCamDataGroupFocus".
9033.h	sgm_GetCamDataGroupMovie	UNDEFINED	Variable length	Refer to "4-18. sgm_GetCamDataGroupMovie".

5-2. SgmCanSetInfo5

Tag	Contents	Type	Count	Description					
0001	Drive Mode	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.					
				Order	Data		Value	Drive Mode	
				0	Setting value 0		1	Single Capture	
				1	Setting value 1		2	Continuous	
				:	:		3	Self Timer two sec.	
				n	Setting value n		4	Self Timer 10 sec.	
							5	Interval Timer	
0002	Continuous shooting speed	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.					
				Order	Data		Value	Continuous shooting speed	
				0	Setting value 0		1	High Speed (H)	
				1	Setting value 1		2	Medium Speed (M)	
				:	:		3	Low Speed (L)	
				n	Setting value n				
0003	Interval Timer (Set the number of shots.)	Optional	2	Enter the available setting value in the array format shown in the list at the bottom left. If you cannot set an available value, clear the count to "0". For the infinite setting value, refer to the list at the bottom right. For the finite setting, enter the available maximum number using a numeric value.					
				Order	Data		Value	Infinite setting	
				0	Infinite setting		0	Invalid	
				1	Finite setting		1	Valid	
0004	Interval Timer (Time setting)	Optional	3	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". Data must be entered in seconds.					
				Order	Data				
				0	Minimum				
				1	Maximum				
				2	Increments				
:	Reserved								
0010	SFD	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.					
				Order	Data		Value	Number of SFD frames	
				0	Setting value 0		1	1 frame composition	
				1	Setting value 1		2	2 frame composition	
				:	:				
				n	Setting value n		N	N frame composition	
0011	Image Quality	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.					
				Order	Data		Value	Image Quality	
				0	Setting value 0		02.h	RAW	DNG
				1	Setting value 1		10.h	JPEG	FINE
				:	:		20.h		NORMAL
				n	Setting value n		30.h		BASIC
							12.h	RAW+JPEG	DNG+FINE
0012	DNG image quality	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.					
				Order	Data		Value	DNG image quality	
				0	Setting value 0		12	12bit	
				1	Setting value 1		14	14bit	
				:	:				
				n	Setting value n				
:	Reserved								
0020	Still image resolution	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.					
				Order	Data		Value	Still image resolution	
				0	Setting value 0		01.h	HIGH	
				1	Setting value 1		02.h	MED	
				:	:		03.h	LOW	
				n	Setting value n				

0021	Aspect	BYTE	Optional	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Aspect Ratio</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>1</td><td>21:9</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>2</td><td>16:9</td></tr><tr><td>:</td><td>:</td><td></td><td>3</td><td>3:2</td></tr><tr><td>n</td><td>Setting value n</td><td></td><td>4</td><td>√2:1</td></tr><tr><td></td><td></td><td></td><td>5</td><td>4:3</td></tr><tr><td></td><td></td><td></td><td>6</td><td>7:6</td></tr><tr><td></td><td></td><td></td><td>7</td><td>1:1</td></tr></table>	Order	Data		Value	Aspect Ratio	0	Setting value 0		1	21:9	1	Setting value 1		2	16:9	:	:		3	3:2	n	Setting value n		4	√2:1				5	4:3				6	7:6				7	1:1
Order	Data		Value	Aspect Ratio																																								
0	Setting value 0		1	21:9																																								
1	Setting value 1		2	16:9																																								
:	:		3	3:2																																								
n	Setting value n		4	√2:1																																								
			5	4:3																																								
			6	7:6																																								
			7	1:1																																								
	Reserved																																											
0100	Still image/Movie switching	BYTE	2	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Mode</td></tr><tr><td>0</td><td>Still Image mode</td><td></td><td>0</td><td>Invalid</td></tr><tr><td>1</td><td>Movie mode</td><td></td><td>1</td><td>Valid</td></tr></table>	Order	Data		Value	Mode	0	Still Image mode		0	Invalid	1	Movie mode		1	Valid																									
Order	Data		Value	Mode																																								
0	Still Image mode		0	Invalid																																								
1	Movie mode		1	Valid																																								
	Reserved																																											
0110	Audio Record	BYTE	Optional	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Audio Record</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>0</td><td>OFF</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>1</td><td>ON</td></tr><tr><td>:</td><td>:</td><td></td><td></td><td></td></tr><tr><td>n</td><td>Setting value n</td><td></td><td></td><td></td></tr></table>	Order	Data		Value	Audio Record	0	Setting value 0		0	OFF	1	Setting value 1		1	ON	:	:				n	Setting value n																		
Order	Data		Value	Audio Record																																								
0	Setting value 0		0	OFF																																								
1	Setting value 1		1	ON																																								
:	:																																											
n	Setting value n																																											
0111	Number of voice channels	BYTE	1	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Number of voice channels</td></tr><tr><td>0</td><td>Setting value</td><td></td><td>2</td><td>Number of voice channels: 2</td></tr></table>	Order	Data		Value	Number of voice channels	0	Setting value		2	Number of voice channels: 2																														
Order	Data		Value	Number of voice channels																																								
0	Setting value		2	Number of voice channels: 2																																								
0112	Gain adjustment method	BYTE	Optional	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Adjustment method</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>1</td><td>Auto</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>2</td><td>Manual (Independent)</td></tr><tr><td>:</td><td>:</td><td></td><td>3</td><td>Manual (Same)</td></tr><tr><td>n</td><td>Setting value n</td><td></td><td></td><td></td></tr></table>	Order	Data		Value	Adjustment method	0	Setting value 0		1	Auto	1	Setting value 1		2	Manual (Independent)	:	:		3	Manual (Same)	n	Setting value n																		
Order	Data		Value	Adjustment method																																								
0	Setting value 0		1	Auto																																								
1	Setting value 1		2	Manual (Independent)																																								
:	:		3	Manual (Same)																																								
n	Setting value n																																											
0113	Manual gain Adjustment amount	Optional	3	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <table><tr><td>Order</td><td>Data</td><td></td></tr><tr><td>0</td><td>Minimum</td><td></td></tr><tr><td>1</td><td>Maximum</td><td></td></tr><tr><td>2</td><td>Increments</td><td></td></tr></table>	Order	Data		0	Minimum		1	Maximum		2	Increments																													
Order	Data																																											
0	Minimum																																											
1	Maximum																																											
2	Increments																																											
0114	Wind Noise Canceller	BYTE	Optional	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Wind Noise Canceller</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>0</td><td>OFF</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>1</td><td>ON</td></tr><tr><td>:</td><td>:</td><td></td><td></td><td></td></tr><tr><td>n</td><td>Setting value n</td><td></td><td></td><td></td></tr></table>	Order	Data		Value	Wind Noise Canceller	0	Setting value 0		0	OFF	1	Setting value 1		1	ON	:	:				n	Setting value n																		
Order	Data		Value	Wind Noise Canceller																																								
0	Setting value 0		0	OFF																																								
1	Setting value 1		1	ON																																								
:	:																																											
n	Setting value n																																											
	Reserved																																											
0150	Record Format	BYTE	Optional	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Record Format</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>1</td><td>Cinema DNG</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>2</td><td>MOV</td></tr><tr><td>:</td><td>:</td><td></td><td>3</td><td>MotionJPEG</td></tr><tr><td>n</td><td>Setting value n</td><td></td><td></td><td></td></tr></table>	Order	Data		Value	Record Format	0	Setting value 0		1	Cinema DNG	1	Setting value 1		2	MOV	:	:		3	MotionJPEG	n	Setting value n																		
Order	Data		Value	Record Format																																								
0	Setting value 0		1	Cinema DNG																																								
1	Setting value 1		2	MOV																																								
:	:		3	MotionJPEG																																								
n	Setting value n																																											
0151	CinemaDNG Image Quality	BYTE	Optional	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>CinemaDNG image quality</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>8</td><td>8bit</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>10</td><td>10bit</td></tr><tr><td>:</td><td>:</td><td></td><td>12</td><td>12bit</td></tr><tr><td>n</td><td>Setting value n</td><td></td><td>14</td><td>14bit</td></tr></table>	Order	Data		Value	CinemaDNG image quality	0	Setting value 0		8	8bit	1	Setting value 1		10	10bit	:	:		12	12bit	n	Setting value n		14	14bit															
Order	Data		Value	CinemaDNG image quality																																								
0	Setting value 0		8	8bit																																								
1	Setting value 1		10	10bit																																								
:	:		12	12bit																																								
n	Setting value n		14	14bit																																								

0152	MOV Image Quality	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	MOV image quality
				0	Setting value 0		1	ALL-I
				1	Setting value 1		2	IPB
				:	:			
				n	Adjustment value n			
	Reserved							
0160	Movie resolution	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Movie resolution
				0	Setting value 0		1	FHD
				1	Setting value 1		2	UHD
				n	Setting value n			
0161	Frame Rate	RATIONAL	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". Specify the setting value in fps based on the fractional format.				
				Order	Data		Value	Frame Rate
				0	Setting value 0		19988/100	119.88fps
				1	Setting value 1		100/1	100fps
				:	:		5994/100	59.94fps
				n	Setting value n		50/1	50fps
							2997/100	29.97fps
							25/1	25fps
			2398/100	23.98fps				
0162	Binning	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Binning
				0	Setting value 0		0	OFF
				1	Setting value 1		1	ON
				:	:			
				n	Setting value n			
:	Reserved							
0200	Exposure mode	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Exposure mode
				0	Setting value 0		1	P
				1	Setting value 1		2	A
				:	:		3	S
				n	Setting value n		4	M
							5	C1
							6	C2
			7	C3				
0201	PROGRAM SHIFT	BYTE	1	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	PROGRAM SHIFT
				0	Setting value		1	Available
	Reserved							
0210	F value	SSHORT	Three or greater	Enter the range and increments of the available AV value in the array format shown at the bottom left. (F value) If you cannot set an available value, clear the count to "0". Specify the setting value using a signed fixed-point number with an 8-bit decimal part. If multiple increment units can be specified, enter them following [3].				
				Order	Data			
				0	Minimum			
				1	Maximum			
				2	Increment 0			
				:	:			
				n+2	Increment n			
0211	T value	SSHORT	2	Enter the range and increments of the available AV value in the array format shown at the bottom left. (T value) If you cannot set an available value, clear the count to "0". Specify the setting value using a signed fixed-point number with an 8-bit decimal part.				
				Order	Data			

				0	Minimum			
				1	Maximum			
0212	Shutter Speed	SSHORT	Three or greater	Enter the range and increments of the available TV value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". Specify the setting value using a signed fixed-point number with an 8-bit decimal part. If multiple increment units can be specified, enter them following [3].				
				Order	Data			
				0	Minimum			
				1	Maximum			
				2	Increment 0			
				:	:			
				n+2	Increment n			
0213	(Not APEX) Shutter Speed	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Shutter Speed
				0	Setting value 0		0	Bulb
				1	Setting value 1		1	Sync
				:	:			
				n	Setting value n			
0214	Shutter angle	RATIONAL	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0".				
				Order	Data			
				0	Setting value 0			
				1	Setting value 1			
				:	:			
				n	Setting value n			
0215	ISO Manual	SSHORT	Three or greater	Enter the range and increments of the available SV value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". Specify the setting value using a signed fixed-point number with an 8-bit decimal part. If multiple increment units can be specified, enter them following [3].				
				Order	Data			
				0	Minimum			
				1	Maximum			
				2	Increment 0			
				:	:			
				n	Increment n			
0216	ISO Auto	SSHORT	Three or greater	Enter the range and increments of the available SV value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". Specify the setting value using a signed fixed-point number with an 8-bit decimal part. If multiple increment units can be specified, enter them following [3].				
				Order	Data			
				0	Minimum			
				1	Maximum			
				2	Increment 0			
				:	:			
				n	Increment n			
0217	Exposure Compensation /Exposure error	SSHORT	Three or greater	Enter the range and increments of the available EV value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". Specify the setting value using a signed fixed-point number with an 8-bit decimal part. If multiple increment units can be specified, enter them following [3].				
				Order	Data			
				0	Minimum			
				1	Maximum			
				2	Increment 0			
				:	:			
				n	Increment n			
0218	Exposure Bracket (Number of brackets)	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Number of brackets
				0	Setting value 0		3	Three pieces
				1	Setting value 1		5	Five pieces
				:	:			
				n	Setting value n			
0219	Exposure Bracket (Order)	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Exposure order
				0	Setting value 0		1	0 → - → +

				1	Setting value 1		2	- → 0 → +
				:	:		3	+ → 0 → -
				n	Setting value n			
0220	Exposure Bracket (Bracketing amount)	SHORT	Two or greater	Enter the range and increments of the available EV value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". Specify the setting value using a signed fixed-point number with an 8-bit decimal part. If multiple increment units can be specified, enter them following [3].				
				Order	Data			
				0	Maximum			
				1	Increment 0			
				:	:			
				n+1	Increment n			
	Reserved							
0250	METERING MODE	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	METERING MODE
				0	Setting value 0		1	Evaluative
				1	Setting value 1		2	Center Weighted Average
				:	:		3	Spot
				n	Setting value n			
0251	(By application operation) AE Lock	BYTE	1	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	AE Lock
				0	Setting value 0		1	Available
0252	Flash	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Flash
				0	Setting value 0		1	Red eye
				1	Setting value 1		2	Rear Curtain
				:	:		3	Slow Sync.
				n	Setting value n		4	FP
0253	Flash Exposure Compensation	SSHORT	Three or greater	Enter the range and increments of the available EV value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". Specify the setting value using a signed fixed-point number with an 8-bit decimal part. If multiple increment units can be specified, enter them following [3].				
				Order	Data			
				0	Minimum			
				1	Maximum			
				2	Increment 0			
				:	:			
				n+2	Increment n			
	reserved							
0300	Custom bracket	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Custom bracket
				0	Setting value 0		1	White Balance
				1	Setting value 1		2	Color Mode
				:	:		3	Fill Light
				n	Setting value n			
0301	White Balance	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	White Balance
				0	Setting value 0		1	Auto
				1	Setting value 1		2	Auto (Lighting Source Priority)
				:	:		3	Daylight
				n	Setting value n		4	Shade
							5	Incandescent
							6	Fluorescent
							7	Flash
							8	COLOR TEMP.
							9	Custom 1
							10	Custom 2
							11	Custom 3
0302	White Balance (Color Temperature)	SHORT	3	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0".				

				Specify data in kelvin.																																																												
				<table><tr><td>Order</td><td>Data</td><td></td></tr><tr><td>0</td><td>Minimum</td><td></td></tr><tr><td>1</td><td>Maximum</td><td></td></tr><tr><td>2</td><td>Increments</td><td></td></tr></table>	Order	Data		0	Minimum		1	Maximum		2	Increments																																																	
Order	Data																																																															
0	Minimum																																																															
1	Maximum																																																															
2	Increments																																																															
0303	White Balance (Custom capture)	BYTE	1	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right. <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Custom capture</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>1</td><td>Can be captured.</td></tr></table>	Order	Data		Value	Custom capture	0	Setting value 0		1	Can be captured.																																																		
Order	Data		Value	Custom capture																																																												
0	Setting value 0		1	Can be captured.																																																												
0304	White Balance (Adjustment)	SBYTE	3	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the data description unit, follow the guidance of the camera UI. <table><tr><td>Order</td><td>Data</td><td></td></tr><tr><td>0</td><td>Minimum</td><td></td></tr><tr><td>1</td><td>Maximum</td><td></td></tr><tr><td>2</td><td>Increments</td><td></td></tr></table>	Order	Data		0	Minimum		1	Maximum		2	Increments																																																	
Order	Data																																																															
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1	Maximum																																																															
2	Increments																																																															
0305	White Balance Bracket (Number of brackets)	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right. <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Bracketing Number</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>3</td><td>Three pieces</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>5</td><td>Five pieces</td></tr><tr><td>:</td><td>:</td><td></td><td></td><td></td></tr><tr><td>n</td><td>Setting value n</td><td></td><td></td><td></td></tr></table>	Order	Data		Value	Bracketing Number	0	Setting value 0		3	Three pieces	1	Setting value 1		5	Five pieces	:	:				n	Setting value n																																						
Order	Data		Value	Bracketing Number																																																												
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1	Setting value 1		5	Five pieces																																																												
:	:																																																															
n	Setting value n																																																															
0306	White Balance Bracket (Direction)	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right. <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Direction</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>1</td><td>B⇔A</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>2</td><td>G⇔M</td></tr><tr><td>:</td><td>:</td><td></td><td></td><td></td></tr><tr><td>n</td><td>Setting value n</td><td></td><td></td><td></td></tr></table>	Order	Data		Value	Direction	0	Setting value 0		1	B⇔A	1	Setting value 1		2	G⇔M	:	:				n	Setting value n																																						
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n	Setting value n																																																															
0307	White Balance Bracket (Bracketing amount)	BYTE	2	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Bracketing Amount</td></tr><tr><td>0</td><td>Maximum</td><td></td><td>1</td><td>±1</td></tr><tr><td>1</td><td>Increments</td><td></td><td>:</td><td></td></tr><tr><td></td><td></td><td></td><td>N</td><td>±N</td></tr></table>	Order	Data		Value	Bracketing Amount	0	Maximum		1	±1	1	Increments		:					N	±N																																								
Order	Data		Value	Bracketing Amount																																																												
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0320	Color Mode	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right. <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Color Mode</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>1</td><td>Standard</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>2</td><td>Vivid</td></tr><tr><td>:</td><td>:</td><td></td><td>3</td><td>Neutral</td></tr><tr><td>n</td><td>Setting value n</td><td></td><td>4</td><td>Portrait</td></tr><tr><td></td><td></td><td></td><td>5</td><td>Landscape</td></tr><tr><td></td><td></td><td></td><td>6</td><td>Cinema</td></tr><tr><td></td><td></td><td></td><td>7</td><td>Sunset Red</td></tr><tr><td></td><td></td><td></td><td>8</td><td>Forest Green</td></tr><tr><td></td><td></td><td></td><td>9</td><td>FOV Classic Blue</td></tr><tr><td></td><td></td><td></td><td>10</td><td>FOV Classic Yellow</td></tr><tr><td></td><td></td><td></td><td>11</td><td>Monochrome</td></tr></table>	Order	Data		Value	Color Mode	0	Setting value 0		1	Standard	1	Setting value 1		2	Vivid	:	:		3	Neutral	n	Setting value n		4	Portrait				5	Landscape				6	Cinema				7	Sunset Red				8	Forest Green				9	FOV Classic Blue				10	FOV Classic Yellow				11	Monochrome
Order	Data		Value	Color Mode																																																												
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			9	FOV Classic Blue																																																												
			10	FOV Classic Yellow																																																												
			11	Monochrome																																																												
0321	(Color Mode) Contrast	SRATIONAL	3	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the data description unit, follow the guidance of the camera UI. <table><tr><td>Order</td><td>Data</td><td></td></tr><tr><td>0</td><td>Minimum</td><td></td></tr><tr><td>1</td><td>Maximum</td><td></td></tr><tr><td>2</td><td>Increments</td><td></td></tr></table>	Order	Data		0	Minimum		1	Maximum		2	Increments																																																	
Order	Data																																																															
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1	Maximum																																																															
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0322	(Color Mode) (Sharpness)	SRATIONAL	3	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the data description unit, follow the guidance of the camera UI. <table><tr><td>Order</td><td>Data</td><td></td></tr><tr><td>0</td><td>Minimum</td><td></td></tr><tr><td>1</td><td>Maximum</td><td></td></tr><tr><td>2</td><td>Increments</td><td></td></tr></table>	Order	Data		0	Minimum		1	Maximum		2	Increments																																																	
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0323	(Color Mode) Saturation	SRATIONAL	3	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the data description unit, follow the guidance of the camera UI.				
				Order	Data			
				0	Minimum			
				1	Maximum			
				2	Increments			
0324	(Monochrome) Filtering Effect	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Filtering Effect
				0	Setting value 0		0	OFF
				1	Setting value 1		1	Yellow
				:	:		2	Orange
				n	Setting value n		3	Red
							4	Green
							5	Blue
0325	(Monochrome) Toning Effect	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Toning Effect
				0	Setting value 0		0	B&W
				1	Setting value 1		1	Red
				:	:		2	Warm Tone
				n	Setting value n		3	Sepia
							4	Green
							5	Blue Green
							6	Blue
							7	Cold Tone
							8	Blue Purple
							9	Purple
Reserved								
0327	Color Mode Bracket (Number of brackets)	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Bracketing Number
				0	Setting value 0		1	One piece
				1	Setting value 1			
				:	:		N	N brackets
				n	Setting value n			
Reserved								
0340	Fill Light	SRATIONAL	3	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0".				
				Order	Data			
				0	Minimum			
				1	Maximum			
				2	Increments			
0341	Fill Light Bracket (Number of brackets)	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Bracketing Number
				0	Setting value 0		3	Three pieces
				1	Setting value 1		5	Five pieces
				:	:			
				n	Setting value n			
0342	Fill Light Bracket (Bracketing amount)	RATIONAL	2	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data			
				0	Maximum			
				1	Increments			
Reserved								
0350	HDR	SBYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	HDR
				0	Setting value 0		-1	AUTO
				1	Setting value 1		0	OFF
				:	:		1	±1.0
				n	Setting value n		2	±2.0
							3	±3.0

	Reserved																																																																				
0500	DC Crop	SBYTE	Optional	<p>Enter the available setting value in the array format shown at the bottom left.</p> <p>If you cannot set an available value, clear the count to "0".</p> <p>For the setting value, refer to the list at the bottom right.</p> <table> <tr> <th>Order</th><th>Data</th><th></th><th>Value</th><th>DC Crop</th></tr> <tr> <td>0</td><td>Setting value 0</td><td></td><td>-1</td><td>AUTO</td></tr> <tr> <td>1</td><td>Setting value 1</td><td></td><td>0</td><td>OFF</td></tr> <tr> <td>:</td><td>:</td><td></td><td>1</td><td>ON</td></tr> <tr> <td>n</td><td>Setting value n</td><td></td><td>2</td><td>Super35</td></tr> </table>	Order	Data		Value	DC Crop	0	Setting value 0		-1	AUTO	1	Setting value 1		0	OFF	:	:		1	ON	n	Setting value n		2	Super35																																								
Order	Data		Value	DC Crop																																																																	
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1	Setting value 1		0	OFF																																																																	
:	:		1	ON																																																																	
n	Setting value n		2	Super35																																																																	
0501	Lens Optics Compensation Distortion	SBYTE	Optional	<p>Enter the available setting value in the array format shown at the bottom left.</p> <p>If you cannot set an available value, clear the count to "0".</p> <p>For the setting value, refer to the list at the bottom right.</p> <table> <tr> <th>Order</th><th>Data</th><th></th><th>Value</th><th>Distortion</th></tr> <tr> <td>0</td><td>Setting value 0</td><td></td><td>-1</td><td>AUTO</td></tr> <tr> <td>1</td><td>Setting value 1</td><td></td><td>0</td><td>OFF</td></tr> <tr> <td>:</td><td>:</td><td></td><td></td><td></td></tr> <tr> <td>n</td><td>Setting value n</td><td></td><td></td><td></td></tr> </table>	Order	Data		Value	Distortion	0	Setting value 0		-1	AUTO	1	Setting value 1		0	OFF	:	:				n	Setting value n																																											
Order	Data		Value	Distortion																																																																	
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:	:																																																																				
n	Setting value n																																																																				
0502	Lens Optics Compensation Chromatic Aberration	SBYTE	Optional	<p>Enter the available setting value in the array format shown at the bottom left.</p> <p>If you cannot set an available value, clear the count to "0".</p> <p>For the setting value, refer to the list at the bottom right.</p> <table> <tr> <th>Order</th><th>Data</th><th></th><th>Value</th><th>Chromatic Aberration</th></tr> <tr> <td>0</td><td>Setting value 0</td><td></td><td>-1</td><td>AUTO</td></tr> <tr> <td>1</td><td>Setting value 1</td><td></td><td>0</td><td>OFF</td></tr> <tr> <td>:</td><td>:</td><td></td><td></td><td></td></tr> <tr> <td>N</td><td>Setting value n</td><td></td><td></td><td></td></tr> </table>	Order	Data		Value	Chromatic Aberration	0	Setting value 0		-1	AUTO	1	Setting value 1		0	OFF	:	:				N	Setting value n																																											
Order	Data		Value	Chromatic Aberration																																																																	
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0503	Lens Optics Compensation Diffraction	BYTE	Optional	<p>Enter the available setting value in the array format shown at the bottom left.</p> <p>If you cannot set an available value, clear the count to "0".</p> <p>For the setting value, refer to the list at the bottom right.</p> <table> <tr> <th>Order</th><th>Data</th><th></th><th>Value</th><th>Diffraction</th></tr> <tr> <td>0</td><td>Setting value 0</td><td></td><td>0</td><td>OFF</td></tr> <tr> <td>1</td><td>Setting value 1</td><td></td><td>1</td><td>ON</td></tr> <tr> <td>:</td><td>:</td><td></td><td></td><td></td></tr> <tr> <td>N</td><td>Setting value n</td><td></td><td></td><td></td></tr> </table>	Order	Data		Value	Diffraction	0	Setting value 0		0	OFF	1	Setting value 1		1	ON	:	:				N	Setting value n																																											
Order	Data		Value	Diffraction																																																																	
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N	Setting value n																																																																				
0504	Lens Optics Compensation Vignetting	SBYTE	Optional	<p>Enter the available setting value in the array format shown at the bottom left.</p> <p>If you cannot set an available value, clear the count to "0".</p> <p>For the setting value, refer to the list at the bottom right.</p> <table> <tr> <th>Order</th><th>Data</th><th></th><th>Value</th><th>Vignetting</th></tr> <tr> <td>0</td><td>Setting value 0</td><td></td><td>-1</td><td>AUTO</td></tr> <tr> <td>1</td><td>Setting value 1</td><td></td><td>0</td><td>OFF</td></tr> <tr> <td>:</td><td>:</td><td></td><td></td><td></td></tr> <tr> <td>n</td><td>Setting value n</td><td></td><td></td><td></td></tr> </table>	Order	Data		Value	Vignetting	0	Setting value 0		-1	AUTO	1	Setting value 1		0	OFF	:	:				n	Setting value n																																											
Order	Data		Value	Vignetting																																																																	
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n	Setting value n																																																																				
0505	Lens Optics Compensation Color Shading	SBYTE	Optional	<p>Enter the available setting value in the array format shown at the bottom left.</p> <p>If you cannot set an available value, clear the count to "0".</p> <p>For the setting value, refer to the list at the bottom right.</p> <table> <tr> <th>Order</th><th>Data</th><th></th><th>Value</th><th>Shading</th></tr> <tr> <td>0</td><td>Setting value 0</td><td></td><td>-1</td><td>AUTO</td></tr> <tr> <td>1</td><td>Setting value 1</td><td></td><td>0</td><td>OFF</td></tr> <tr> <td>:</td><td>:</td><td></td><td>1</td><td>#1</td></tr> <tr> <td>n</td><td>Setting value n</td><td></td><td>2</td><td>#2</td></tr> <tr> <td></td><td></td><td></td><td>3</td><td>#3</td></tr> <tr> <td></td><td></td><td></td><td>4</td><td>#4</td></tr> <tr> <td></td><td></td><td></td><td>5</td><td>#5</td></tr> <tr> <td></td><td></td><td></td><td>6</td><td>#6</td></tr> <tr> <td></td><td></td><td></td><td>7</td><td>#7</td></tr> <tr> <td></td><td></td><td></td><td>8</td><td>#8</td></tr> <tr> <td></td><td></td><td></td><td>9</td><td>#9</td></tr> <tr> <td></td><td></td><td></td><td>10</td><td>#10</td></tr> </table>	Order	Data		Value	Shading	0	Setting value 0		-1	AUTO	1	Setting value 1		0	OFF	:	:		1	#1	n	Setting value n		2	#2				3	#3				4	#4				5	#5				6	#6				7	#7				8	#8				9	#9				10	#10
Order	Data		Value	Shading																																																																	
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			9	#9																																																																	
			10	#10																																																																	
0506	Lens Optics Compensation Color Shading (Custom capture)	BYTE	1	<p>Enter the available setting value in the array format shown at the bottom left.</p> <p>If you cannot set an available value, clear the count to "0".</p> <p>For the setting value, refer to the list at the bottom right.</p> <table> <tr> <th>Order</th><th>Data</th><th></th><th>Value</th><th>Compensation value acquirement</th></tr> <tr> <td>0</td><td>Setting value</td><td></td><td>1</td><td>Can be captured.</td></tr> </table>	Order	Data		Value	Compensation value acquirement	0	Setting value		1	Can be captured.																																																							
Order	Data		Value	Compensation value acquirement																																																																	
0	Setting value		1	Can be captured.																																																																	
	Reserved																																																																				
0600	Focus Mode	BYTE	Optional	<p>Enter the available setting value in the array format shown at the bottom left.</p> <p>If you cannot set an available value, clear the count to "0".</p> <p>For the setting value, refer to the list at the bottom right.</p> <table> <tr> <th>Order</th><th>Data</th><th></th><th>Value</th><th>Focus Mode</th></tr> <tr> <td>0</td><td>Setting value 0</td><td></td><td>1</td><td>MF</td></tr> <tr> <td>1</td><td>Setting value 1</td><td></td><td>2</td><td>AF</td></tr> </table>	Order	Data		Value	Focus Mode	0	Setting value 0		1	MF	1	Setting value 1		2	AF																																																		
Order	Data		Value	Focus Mode																																																																	
0	Setting value 0		1	MF																																																																	
1	Setting value 1		2	AF																																																																	

				:	:		3	AF-S
				n	Setting value n		4	AF-C
0601	(By application operation) AF Lock	BYTE	1	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	AF Lock
				0	Setting value		1	Available
0602	Face / Eye priority AF	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Face / Eye priority AF
				0	Setting value 0		0	OFF
				1	Setting value 1		1	Face Only
				:	:		2	Face / Eye Auto
				n	Setting value n			
	Reserved							
0610	Focus Area	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Focus Area
				0	Setting value 0		1	Multi Auto Focus Points
				1	Setting value 1		2	1-point selection
				:	:		3	Tracking
				n	Setting value n			
0611	1-point selection method	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	1-point selection
				0	Setting value 0		0	Free selection
				1	Setting value 1		49	49-point selection
				:	:			
				n	Setting value n			
0612	Focus Area Overall area	Optional	2	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0".				
				Order	Data			
				0	Vertical width			
				1	Horizontal width			
0613	Focus Area Valid area	Optional	4	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". The distance measurement frame icon can be placed within the area specified by this tag in the entire focus area.				
				Order	Data			
				0	Top			
				1	Bottom			
				2	Left			
				3	Right			
0614	Distance measurement frame size number	BYTE	1	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For example, if three types of icons (Large, Medium, and Small) are able to be selected, enter "3".				
				Order	Data			
				0	Setting value			
0615	Area for each distance measurement frame size	Optional	(Distance measurement frame size number) x2	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". If multiple setting values are able to be selected, enter them in descending order. For example, if three types of icons (Large, Medium, and Small) are able to be selected, enter them in order of Large, Medium, and Small.				
				Order	Data			
				0	Vertical width 0			
				1	Horizontal width 0			
				2	Vertical width 1			
				3	Horizontal width 1			
				:	:			
				2n	Vertical width n			
				2n+1	Horizontal width n			
0616	Distance measurement frame movement amount	Optional	1	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0".				
				Order	Data			
				0	Vertical direction			
				1	Horizontal direction			

	Reserved		Optional																															
0650	Pre-AF /Constant AF	BYTE	Optional	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <div>For a still image, set Pre-AF. For a movie, set Constant AF.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Pre-AF/Constant AF</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>0</td><td>OFF</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>1</td><td>ON</td></tr><tr><td>:</td><td></td><td></td><td></td><td></td></tr><tr><td>n</td><td>Setting value n</td><td></td><td></td><td></td></tr></table>	Order	Data		Value	Pre-AF/Constant AF	0	Setting value 0		0	OFF	1	Setting value 1		1	ON	:					n	Setting value n								
Order	Data		Value	Pre-AF/Constant AF																														
0	Setting value 0		0	OFF																														
1	Setting value 1		1	ON																														
:																																		
n	Setting value n																																	
0651	Focus limit (Macro)	BYTE	Optional	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Focus limit</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>0</td><td>OFF</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>1</td><td>ON</td></tr><tr><td>:</td><td></td><td></td><td></td><td></td></tr><tr><td>n</td><td>Setting value n</td><td></td><td></td><td></td></tr></table>	Order	Data		Value	Focus limit	0	Setting value 0		0	OFF	1	Setting value 1		1	ON	:					n	Setting value n								
Order	Data		Value	Focus limit																														
0	Setting value 0		0	OFF																														
1	Setting value 1		1	ON																														
:																																		
n	Setting value n																																	
	Reserved																																	
0656	AF-S operation	BYTE	Optional	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>AF-S operation</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>1</td><td>Release priority</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>2</td><td>Focus priority</td></tr><tr><td>:</td><td></td><td></td><td></td><td></td></tr><tr><td>n</td><td>Setting value n</td><td></td><td></td><td></td></tr></table>	Order	Data		Value	AF-S operation	0	Setting value 0		1	Release priority	1	Setting value 1		2	Focus priority	:					n	Setting value n								
Order	Data		Value	AF-S operation																														
0	Setting value 0		1	Release priority																														
1	Setting value 1		2	Focus priority																														
:																																		
n	Setting value n																																	
0657	AF-C operation	BYTE	Optional	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>AF-C operation</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>1</td><td>Release priority</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>2</td><td>Focus priority</td></tr><tr><td>:</td><td></td><td></td><td></td><td></td></tr><tr><td>n</td><td>Setting value n</td><td></td><td></td><td></td></tr></table>	Order	Data		Value	AF-C operation	0	Setting value 0		1	Release priority	1	Setting value 1		2	Focus priority	:					n	Setting value n								
Order	Data		Value	AF-C operation																														
0	Setting value 0		1	Release priority																														
1	Setting value 1		2	Focus priority																														
:																																		
n	Setting value n																																	
	Reserved																																	
0700	LV image transfer	BYTE	1	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>LV image transfer</td></tr><tr><td>0</td><td>Setting value</td><td></td><td>1</td><td>Transferable</td></tr></table>	Order	Data		Value	LV image transfer	0	Setting value		1	Transferable																				
Order	Data		Value	LV image transfer																														
0	Setting value		1	Transferable																														
0701	LV magnification rate	BYTE	Optional	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Magnification rate</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>1</td><td>x1 (No magnification)</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>4</td><td>x4</td></tr><tr><td>:</td><td></td><td></td><td>8</td><td>x8</td></tr><tr><td>n</td><td>Setting value n</td><td></td><td></td><td></td></tr></table>	Order	Data		Value	Magnification rate	0	Setting value 0		1	x1 (No magnification)	1	Setting value 1		4	x4	:			8	x8	n	Setting value n								
Order	Data		Value	Magnification rate																														
0	Setting value 0		1	x1 (No magnification)																														
1	Setting value 1		4	x4																														
:			8	x8																														
n	Setting value n																																	
0702	Focus Peaking	BYTE	Optional	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <div>For the setting value, refer to the list at the bottom right.</div> <table><tr><td>Order</td><td>Data</td><td></td><td>Value</td><td>Peaking Color</td></tr><tr><td>0</td><td>Setting value 0</td><td></td><td>0</td><td>Off</td></tr><tr><td>1</td><td>Setting value 1</td><td></td><td>1</td><td>White</td></tr><tr><td>:</td><td></td><td></td><td>2</td><td>Black</td></tr><tr><td>n</td><td>Setting value n</td><td></td><td>3</td><td>Red</td></tr><tr><td></td><td></td><td></td><td>4</td><td>Yellow</td></tr></table>	Order	Data		Value	Peaking Color	0	Setting value 0		0	Off	1	Setting value 1		1	White	:			2	Black	n	Setting value n		3	Red				4	Yellow
Order	Data		Value	Peaking Color																														
0	Setting value 0		0	Off																														
1	Setting value 1		1	White																														
:			2	Black																														
n	Setting value n		3	Red																														
			4	Yellow																														
	Reserved																																	
0800	Date	SHORT	12	<div>Enter the available setting value in the array format shown at the bottom left.</div> <div>If you cannot set an available value, clear the count to "0".</div> <table><tr><td>Order</td><td>Data</td><td></td></tr><tr><td>0</td><td>Year (Oldest)</td><td></td></tr><tr><td>1</td><td>Month (Oldest)</td><td></td></tr><tr><td>2</td><td>Day (Oldest)</td><td></td></tr><tr><td>3</td><td>Hour (Oldest)</td><td></td></tr><tr><td>4</td><td>Minute (Oldest)</td><td></td></tr><tr><td>5</td><td>Second (Oldest)</td><td></td></tr></table>	Order	Data		0	Year (Oldest)		1	Month (Oldest)		2	Day (Oldest)		3	Hour (Oldest)		4	Minute (Oldest)		5	Second (Oldest)										
Order	Data																																	
0	Year (Oldest)																																	
1	Month (Oldest)																																	
2	Day (Oldest)																																	
3	Hour (Oldest)																																	
4	Minute (Oldest)																																	
5	Second (Oldest)																																	

				6	Year (Latest)			
				7	Month (Latest)			
				8	Day (Latest)			
				9	Hour (Latest)			
				10	Minute (Latest)			
				11	Second (Latest)			
0801	Shutter Sound	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the data description unit, follow the guidance of the camera UI.				
				Order	Data			
				0	Minimum			
				1	Maximum			
				2	Increments			
0802	AF Volume	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the data description unit, follow the guidance of the camera UI.				
				Order	Data			
				0	Minimum			
				1	Maximum			
				2	Increments			
0803	Timer Volume	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the data description unit, follow the guidance of the camera UI.				
				Order	Data			
				0	Minimum			
				1	Maximum			
				2	Increments			
	Reserved							
0810	Electronic Image Stabilization	BYTE	Optional	Enter the available setting value in the array format shown at the bottom left. If you cannot set an available value, clear the count to "0". For the setting value, refer to the list at the bottom right.				
				Order	Data		Value	Image Stabilization
	0	Setting value 0	0	OFF				
	1	Setting value 1	1	ON				
	:	:						
	n	Setting value n						

5-3. DataGroupFocus

Tag	Contents	Type	Count	Description
0001	Focus Mode	BYTE	1	Setting value of Focus mode
				1 MF
				2 AF
				3 AF-S
				4 AF-C
0002	(By application) AF Lock	BYTE	1	0 OFF
				1 ON
0003	Face / Eye priority AF Setting value	BYTE	1	Setting value of Face / Eye Priority AF
				0 OFF
				1 Face Only
				2 Face / Eye Auto
0004	Face / Eye priority AF Detection status	BYTE	1	Face / Eye detection status
				0 Non-detection
				1 Detection
0010	Focus Area	BYTE	1	Setting value of focus area
				1 Multi Auto Focus Points
				2 1-point selection
				3 Tracking
0011	1-point selection method	BYTE	1	Setting value when the focus area is set to 1-point selection
				0 Free selection
				49 49-point selection
0012	Distance measurement frame size	BYTE	1	Size setting of distance measurement frame
0013	Distance measurement frame position (User setting)	Optional	2	Record the user setting value of the distance measurement frame in the array format in the following order. Vertical and horizontal coordinates of gravity The frame size is determined for each mode, therefore, set only the position according to the position of the CanSetInfo5v focus area coordinate system.
0014	Distance measurement frame (Face detection / focus judgment)	Optional	Distance measurement frame x4	Face detection frame or distance measurement frame information used for focus judgment For one distance measurement frame, record items in the array format in the following order. Vertical and horizontal coordinates of gravity, vertical width, horizontal width If there are multiple distance measurement frames, connect and arrange items by the number of frames in the format above.
0051	Pre-AF /Constant AF	BYTE	1	For a still image, specify the Pre-AF setting value. For a movie, specify the Constant AF setting value.
				0 OFF
				1 ON
0052	Focus limit (Macro)	BYTE	1	Focus limit setting value
				0 OFF
				1 ON

5-4. DataGroupMovie

Tag	Contents	Type	Count	Description
0001	Still image/movie switching	BYTE	1	Still Image/Movie mode switching It is possible to set a mode different from the camera's switch state when using API.
				1 Still image
				2 Movie
:	Reserved			
0005	T value	SSHORT	1	Current T value Specify the setting value using a signed fixed-point number with an 8-bit decimal part. This setting is read only.
0006	Shutter Speed setting method	BYTE	1	Shutter speed setting method When the speed is set, use the shutter speed of DataGroup1. When the angle is set, use the shutter speed of DataGroupMovie.
				1 Speed
				2 Angle
0007	Shutter angle	RATIONAL	1	Shutter angle setting value
:	Reserved			
0010	Audio Record	BYTE	1	Audio Record setting value
				0 OFF
				1 ON
0011	Gain adjustment method	BYTE	1	Gain adjustment method
				1 Auto gain
				2 Manual gain
0012	Manual gain Adjustment amount	SBYTE	Number of voice channels	Manual gain If there are multiple voice channels, enter them in the array format.
0013	Wind Noise Canceller	BYTE	1	Wind Noise Canceller setting value
				0 OFF
				1 ON
:	Reserved			
0050	Record Format	BYTE	1	Record format setting value
				1 Cinema DNG
				2 MOV
				3 MotionJPEG
0051	Cinema DNG Image Quality	BYTE	1	Setting value of Cinema DNG image quality
				8 8bit
				10 10bit
				12 12bit
				14 14bit
0052	MOV image quality	BYTE	1	Setting value of MOV image quality
				1 ALL-I
				2 IPB
:	Reserved			
0060	Movie resolution	BYTE	1	Setting value of movie resolution
				1 FHD
				2 UHD
0061	Frame Rate	RATIONAL	1	Setting value of Frame Rate Unit in fps A setting example is as follows. If no error occurs, arbitrarily determine the denominator.
				11988/100 119.88fps
				100/1 100fps
				5994/100 59.94fps
				50/1 50fps
				2997/100 29.97fps
				25/100 25fps
				2398/100 23.98fps
:	Reserved			
0062	Binning	BYTE	1	Setting value of binning
				0 OFF
				1 ON

5-5. APIConfig Tag List

Tag	Contents	Required	Type	Count	Description
0001	Camera model	Required	ASCII	Optional	
0002	Serial No.	Required	ASCII	Optional	
0003	Firmware version version	Required	ASCII	Optional	
0005	Communication version	Required	FLOAT	1	Integer part: Major version Decimal part: Minor version

6. Error Codes

The table below defines the errors that are displayed when using API.

Add a system error and PTP no-object error to the response value of the PTP standard, and use them as error codes.

Error code	Description	Defined name
0xA0002001	OK	ERROR_CODE_OK
0xA0002002	General Error	ERROR_CODE_RENERALERROR
0xA0002005	Operation Not Supported	ERROR_CODE_OPERATIONNOTSUPPORTED
0xA0002006	Parameter Not Supported	ERROR_CODE_PARAMETERNOTSUPPORTED
0xA0002007	Incomplete Transfer	ERROR_CODE_INCOMPLETETTRANSFER
0xA0002016	Invalid Code Format	ERROR_CODE_INVALIDCODEFORMAT
0xA0002017	Unknown Vender Code	ERROR_CODE_INVALIDCODEFORAMT
0xA0002018	Capture Already Terminated	ERROR_CODE_CAPTUREALREADYTERMINATED
0xA0002019	Device Busy	ERROR_CODE_DEVICEBUSY
0xA000201D	Invalid Parameter	ERROR_CODE_INVALIDPARAMETER
0xA000A080	CheckSum Error	ERROR_CODE_CHECKSUM_ERROR
0xA000A081	Not initialized Error	ERROR_CODE_NOTINITIALIZED_ERROR
0xA0001001	System error	ERROR_CODE_SYSTEM_ERR
0xA0001002	PTP no-object error	Result PTP Not Err
0x80004002	Session unopened error	ERROR_CODE_NOTINTERFACE

6-1. Responses Provided in PTP Standard

This response uses a part of the descriptor standardized in PTP (Picture Transfer Protocol, ISO15740). For details, refer to its specifications.

- OK
 - Response Code: 0xA0002001
 - Response sent from the camera to the PC when a command data communication from the PC to the camera is completed or succeeds.
- General Error
 - Response Code: 0xA0002002
 - Response sent from the camera to the PC when a command data communication from the PC to the camera is terminated incompletely.
 - When the cause is unknown or it is other than any of the assigned error responses, this response is sent.
- Operation Not Supported
 - Response Code: 0xA0002005
 - Response sent from the camera to the PC when no function is assigned to the sent command.
- Parameter Not Supported
 - Response Code: 0xA0002006
 - Response sent from the camera to the PC when no parameter is attached to the sent command to which a parameter should be attached.
- Incomplete Transfer
 - Response Code: 0xA0002007
 - Response sent from the camera to the PC when data transfer is not completed.
- No Valid ObjectInfo
 - Response Code: 0xA0002015
 - Response sent from the camera to the PC when no valid ObjectInfo is specified.
- Invalid Code Format
 - Response Code: 0xA0002016
 - Response sent from the camera to the PC when the data code is not based on the correct format.

- Unknown Vender Code
 - Response Code: 0xA0002017
 - Response sent from the camera to the PC when an undefined command is received.
- Capture Already Terminated
 - Response Code: 0xA0002018
 - Error response sent from the camera to the PC when an undefined function is executed.
- Device Busy
 - Response Code: 0xA0002019
 - Response sent from the camera to the PC when the camera is busy.
- Invalid Parameter
 - Response Code: 0xA000201D
 - Response sent from the camera to the PC when an invalid parameter is received in data.
 - When the null value is transferred to the pointer-type argument of API, this response is also returned as the API return value.

6-2. Custom Responses

- CheckSum Error
 - Response Code: 0xA000A080
 - Error response that is returned when the checksum of the sent data does not match the sum of data.
- Not initialized Error
 - Response Code: 0xA000A081
 - API return value that is returned when the API use start is not called before API execution.
- System error
 - Response Code: 0xA0001001
 - API return value that is returned when a response of the sent command is not returned.
- Session unopened
 - Response Code: 0x80004002
 - API return value that is returned when no session is open for the transferred camera handle.

7. Handling the APEX Value

The APEX value used in Camera Control API is classified into two types:

8bit and 16bit

This chapter describes how to handle the APEX value for each type.

7-1. 8bit APEX Step

Only the parts used for a communication with the PC are indicated in the orange cells in 1/3 step, and in the purple cells in 1/2 step.

When the parameter is set to the camera or PC, data matching the parameter is sent.

Only the 1/3 step is available for ISO.

STEP	DATA(BIT)	ISO (LCD of SV)	Compensation (LCD of CV)		Shutter Speed (LCD of TV)		Aperture (LCD of AV)	
		1/3	1/3	1/2	1/3	1/2	LCD	LCD
0	00000000	6	0.0	0.0				
1	00000001							
2	00000010							
3	00000011	8	0.3					
4	00000100			0.5				
5	00000101	10	0.7					
6	00000110							
7	00000111							
8	00001000	12	1.0	1.0	buLb	buLb	1.0	1.0
9	00001001							
10	00001010							
11	00001011	16	1.3				1.1	
12	00001100			1.5				1.2
13	00001101	20					1.2	
14	00001110		1.7					
15	00001111							
16	00010000	25	2.0	2.0	30"		1.4	1.4
17	00010001					30"		
18	00010010							
19	00010011	32	2.3		25"		1.6	
20	00010100			2.5		20"		1.8
21	00010101	40	2.7		20"		1.8	
22	00010110							
23	00010111							
24	00011000	50	3.0	3.0	15"	15"	2.0	2.0
25	00011001							
26	00011010							
27	00011011	64	3.3		13"		2.2	
28	00011100					10"		2.5
29	00011101	80	3.7		10"		2.5	
30	00011110							
31	00011111							
32	00100000	100	4.0		8"	8"	2.8	2.8
33	00100001							
34	00100010							
35	00100011	125	4.3		6"		3.2	
36	00100100					6"		3.5
37	00100101	160	4.7		5"		3.5	
38	00100110							
39	00100111							
40	00101000	200	5.0		4"	4"	4.0	4.0
41	00101001							
42	00101010							
43	00101011	250	5.3		3"2		4.5	
44	00101100					3"		4.5

45	00101101	320	5.7		2"5		5.0	
46	00101110							
47	00101111							
48	00110000	400	6.0		2"	2"	5.6	5.6
49	00110001							
50	00110010							
51	00110011	500	6.3		1"6		6.3	
52	00110100					1"5		6.7
53	00110101	640			1"3		7.1	
54	00110110							
55	00110111							
56	00111000	800			1"	1"	8.0	8.0
57	00111001							
58	00111010							
59	00111011	1000			0"8		9.0	
60	00111100					0"7		9.5
61	00111101	1250			0"6		10	
62	00111110							
63	00111111							
64	01000000	1600			0"5	2	11	11
65	01000001							
66	01000010							
67	01000011	2000			0"4		13	
68	01000100					3		13
69	01000101	2500			0"3		14	
70	01000110							
71	01000111							
72	01001000	3200			4	4	16	16
73	01001001							
74	01001010							
75	01001011	4000			5		18	
76	01001100					6		19
77	01001101	5000			6		20	
78	01001110							
79	01001111							
80	01010000	6400			8	8	22	22
81	01010001							
82	01010010							
83	01010011	8000			10		25	
84	01010100					10		27
85	01010101	10000			13		29	
86	01010110							
87	01010111							
88	01011000	12800			15	15	32	32
89	01011001							
90	01011010							
91	01011011	16000			20		36	
92	01011100					20		38
93	01011101	20000			25		40	
94	01011110							
95	01011111							
96	01100000	25600			30	30	45	45
97	01100001							
98	01100010							
99	01100011	32000			40		51	
100	01100100					45		54
101	01100101	40000			50		57	
102	01100110							
103	01100111							
104	01101000	51200			60	60	64	64
105	01101001							
106	01101010							
107	01101011	64000			80		72	

108	01101100					90		76
109	01101101	80000			100		81	
110	01101110							
111	01101111							
112	01110000	102400			125	125	91	91
113	01110001							
114	01110010							
115	01110011				160			
116	01110100					180		
117	01110101				200			
118	01110110							
119	01110111							
120	01111000				250	250		
121	01111001							
122	01111010							
123	01111011				320			
124	01111100					350		
125	01111101				400			
126	01111110							
127	01111111							
128	10000000				500	500		
129	10000001							
130	10000010							
131	10000011				640			
132	10000100					750		
133	10000101				800			
134	10000110							
135	10000111							
136	10001000				1000	1000		
137	10001001							
138	10001010							
139	10001011				1250			
140	10001100					1500		
141	10001101				1600			
142	10001110							
143	10001111							
144	10010000				2000	2000		
145	10010001							
146	10010010							
147	10010011				2500			
148	10010100					3000		
149	10010101				3200			
150	10010110							
151	10010111							
152	10011000				4000	4000		
153	10011001							
154	10011010							
155	10011011				5000			
156	10011100					6000		
157	10011101				6000			
158	10011110							
159	10011111							
160	10100000				8000	8000		
161	10100001							
162	10100010				Sync	Sync		
163	10100011				10000			
164	10100100							
165	10100101				12800			
166	10100110							
167	10100111							
168	10101000				16000	16000		
169	10101001							
170	10101010							

171	10101011				20000			
172	10101100							
173	10101101				25600			
174	10101110							
175	10101111							
176	10110000				32000	32000		
177	10110001							
178	10110010							
179	10110011							
180	10110100							
181	10110101							
182	10110110							
183	10110111							
184	10111000							
185	10111001							
186	10111010							
187	10111011							
188	10111100							
189	10111101							
190	10111110							
191	10111111							
192	11000000							
193	11000001							
194	11000010							
195	11000011							
196	11000100							
197	11000101							
198	11000110							
199	11000111							
200	11001000							
201	11001001							
202	11001010							
203	11001011							
204	11001100							
205	11001101		-6.3					
206	11001110							
207	11001111							
208	11010000		-6.0					
209	11010001							
210	11010010							
211	11010011		-5.7					
212	11010100							
213	11010101		-5.3					
214	11010110							
215	11010111							
216	11011000		-5.0					
217	11011001							
218	11011010							
219	11011011		-4.7					
220	11011100							
221	11011101		-4.3					
222	11011110							
223	11011111							
224	11100000		-4.0					
225	11100001							
226	11100010							
227	11100011		-3.7					
228	11100100							
229	11100101		-3.3					
230	11100110							
231	11100111							
232	11101000		-3.0	-3.0				
233	11101001							

234	11101010							
235	11101011		-2.7					
236	11101100			-2.5				
237	11101101		-2.3					
238	11101110							
239	11101111							
240	11110000		-2.0	-2.0				
241	11110001							
242	11110010							
243	11110011		-1.7					
244	11110100			-1.5				
245	11110101		-1.3					
246	11110110							
247	11110111							
248	11111000		-1.0	-1.0				
249	11111001							
250	11111010							
251	11111011		-0.7					
252	11111100			-0.5				
253	11111101		-0.3					
254	11111110							
255	11111111							

7-2. 16bit APEX Step

This value, which is handled in CanSetInfo5, is specified as a value in 1/256 increments for which the APEX value is expressed by S7.8.