Usage of Type0004 Module

Rev. 1.10

October 29, 2021

1 Introduction

This document describes supplement things to use the module. Some of these are restriction of the current version module.

2 Supported camera

The Type0004 module supports D7000 The module cannot control two or more cameras, can control one camera only.

3 Environment

For the operating environment of Module SDK, refer to the following chapter of ReadMe_Eng.txt.

- Environment of operation

4 About applications using Module SDK

We recommend that the application using Module SDK to use the development environment in which Module SDK is created.

The development environment of the sample program and Module SDK is the same. For the development environment of the sample program, refer to the following chapter of ReadMe_Eng.txt.

- Contents - [Windows] - Sample Program
- Contents - [Macintosh] - Sample Program

5 Capabilities

Client should acquire the value of each Capability once now after opening of Source object. (There is no necessity for acquiring the value every time before setting the value.) When the setting of the value is executed by kNKMAIDCommand_CapSet now without acquiring the value, the value to which Client did set might not be correctly set to the camera.

5.1 kNkMAIDCapability_ProgressProc

The module notifies progress information through MAIDProgress function. When the module can't compute how much the task is finished, the module will call MAIDProgress function with ulTotal = 0 and ulDone = Non-0. When the task has finished, the module will call function with ulDone = ulTotal.

5.2 kNkMAIDCapability_EventProc

MAID3.1 specification says that the client doesn't have to set MAIDEvent function to kNkMAIDCapability_EventProc. But the current module assumes that the client always sets the MAIDEvent function. So if the client doesn't set MAIDEvent function to EventProc, there are following restrictions to use the module.

1) The client can't use kNkMAIDCommand_EnumChildren.

2) The client can't support lens exchange and device turn off and on.

3) The module doesn't notify changing of capability value, so the client should keep checking these values.

5.3 kNkMAIDCapability_Children

The client may use this capability to enumerate the child objects. The client also can use kNkMAIDCommand_EnumChildren for same purpose. If the client doesn't set MAIDEvent function to kNkMAIDCapability_EventProc, the client should use kNkMAIDCapability_Chilren to enumerate the child objects.

5.4 kNkMAIDCapability_PictureControlData

The camera decides whether the camera uses the setting value of Picture Control data, or the value that camera decides internally according to the following setting of Picture Control data.

1) QuickAdjustFlag (Color)

If this value is valid(1), the camera uses only the value of "QuickAdjust".

If this value is invalid(0), the camera uses the following value, "Saturation", "Hue", "Sharpening", "Contrast", "Brightness", "CustomCurveFlag", "CustomCurveData", and does not use the value of "QuickAdjust".

- CustomCurveFlag

  If this value is "Custom Curve used"(1), the camera does not use "Contrast", "Brightness".

- Toning (Monochrome)

  If this value is B&W(0), the camera does not use "ToningDensity".

- Contrast, Brightness, CustomCurveFlag, CustomCurveData

  If the value of kNkMAIDCapability_Active_D_Lighting is set to the value except for "Off"(3), the camera does not use "Contrast", "Brightness", "CustomCurveFlag", "CustomCurveData".

5.5 kNkMAIDCapability_DeleteDramImage

The timing of deletion for DRAM image is limited to the following 2 cases. The module does not support the deletion on the timing excluding the following 2 cases.

1. Before receiving kNkMAIDEvent_AddChild for Source Object.
2. After issuing kNkMAIDCapability_Acquire for Image Object, and before issuing kNkMAIDCommand_Close.

The case 1 example of the command sequence is shown to the following table.

No	Command / Capability / Event	Object Type
1	kNkMAIDCapability_Capture	Source
2	kNkMAIDCommand_Async	Source
3	kNkMAIDEvent_AddPreviewImage	Source
4	kNkMAIDCapability_CurrentPreviewID	Source
5	kNkMAIDCapability_DeleteDramImage	Source

The case 2 example of the command sequence is shown to the following table.

No	Command / Capability / Event	Object Type

1	kNkMAIDCapability_Capture	Source
2	kNkMAIDCapability_Children	Source
3	kNkMAIDCommand_Open	Item
4	kNkMAIDCapability_Children	Item
5	kNkMAIDCommand_Open	Image
6	kNkMAIDCapability_DataProc (Set)	Image
7	kNkMAIDCapability_Acquire	Image
8	kNkMAIDCommand_Async	Image
9	kNkMAIDCommand_Abort	Image
10	kNkMAIDCapability_CurrentPreviewID	Source
11	kNkMAIDCapability_DeleteDramImage	Source
12	kNkMAIDCapability_DataProc (Reset)	Image
13	kNkMAIDCommand_Close	Image
14	kNkMAIDCommand_Close	Item

At the case 2, the execution of kNkMAIDCapability_Acquire is needed before the execution of kNkMAIDCapability_DeleteDramImage. So, in the case of small data size image, JPEG Basic, the all of image data may complete reading by the kNkMAIDCapability_Acquire before issuing of deletion command. In that case, the error doesn't occur when the deletion command is executed, but the image will be saved in client program.

When the callback function was set to kNkMAIDCapability_ProgressProc, the termination of operation will be notified with the parameter of callback function, “ulDone == ulTotal” or “ulDone == ulTotal==0”. But when the client aborts the operation by kNkMAIDCommand_Abort, the termination of operation will not be notified.

5.6 kNkMAIDCapability_SaveMedia

“0：Card” is selectable as the value of kNkMAIDCapability_SaveMedia, but in the current module, the normal shooting performance is not secured.

6 Image and Thumbnail Data

An image data file is transferred from the module through MAID Data Delivery Function. (refer to 5.27 File Data Delivery Structure and 10.3 MAID Data Delivery Function in MAID3.pdf)

All thumbnail images are raw byte data in order of RGBRGBRGB…. The pixel order is from left to right and from top to bottom. The size of thumbnail image is fixed as follows.

Width: 160 pixels Height: 120 pixels

7 Connection with camera

If the client sends kNkMAIDCommand_Async to the module, it can know the camera is connected with PC through AddChild event for module object. When the module detects the camera is turned off, the module sends RemoveChild event for the current opened module object.

8 Opening object

The client can open only one object at same object type(eNkMAIDObjectType). (e.g. If there are two source object with different ID, client can open either one at the same time.)

But exceptional case, image and thumbnail object, these are belong to kNkMAIDObjectType_DataObj, can be opened at the same time, from same ID Item object.

9 The restriction while executing Live view.

While the Live view is executing, the use of a lot of capability will become prohibition.

When there is no description that this capability is usable with executing live view on the document "MAID3Type0004.pdf", the use of this capability will become prohibition.

But though the use of this capability is changed to prohibition, the ulVisibility and ulOperations of this capability will not be changed basically and keeps the current settings of ulVisibility and ulOperations. (Capability_AFCapture and Capability_PreCapture, etc. also have a part of exception.)

The usable capability when Live view is executing is as follows.

Live view mode	capability
Hand-held	kNkMAIDCapability_FocusPreferredArea
	kNkMAIDCapability_AutoFocus
Tripod	kNkMAIDCapability_ContrastAF
	kNkMAIDCapability_MFDriveStep
	kNkMAIDCapability_MFDrive
	kNkMAIDCapability_ContrastAFArea
Hand-held / Tripod	kNkMAIDCapability_LiveViewStatus
	kNkMAIDCapability_LiveViewProhibit
	kNkMAIDCapability_LiveViewImageZoomRate
	kNkMAIDCapability_Capture
	kNkMAIDCapability_GetLiveViewImage

10 The restriction about D7000

When you use D7000 camera on Windows XP, Mac OS X 10.5, Explorer(Windows) or Image Capture (Mac OS X 10.5) may not detect the camera properly. If this happens, turn the camera off once and turn it on again.

11 AF-F Shooting on D7000

When shooting a Live View on a D7000 camera, Focus Point information will not be attached to the recorded images when the AF mode is set to AF-F.

12 The restriction on Macintosh

Type0004 module for Macintosh (Type0004 Module.bundle) works on 64bit mode only.(Not supported works on 32 bit mode)

After connecting your camera to your PC, please wait to start module until the memory card access lamp stops flashing.

Additionally, do not allocate an application to start int the Image Capture[Connecting this Camera opens] when using module. After the launched application is closed, module may no longer function properly.

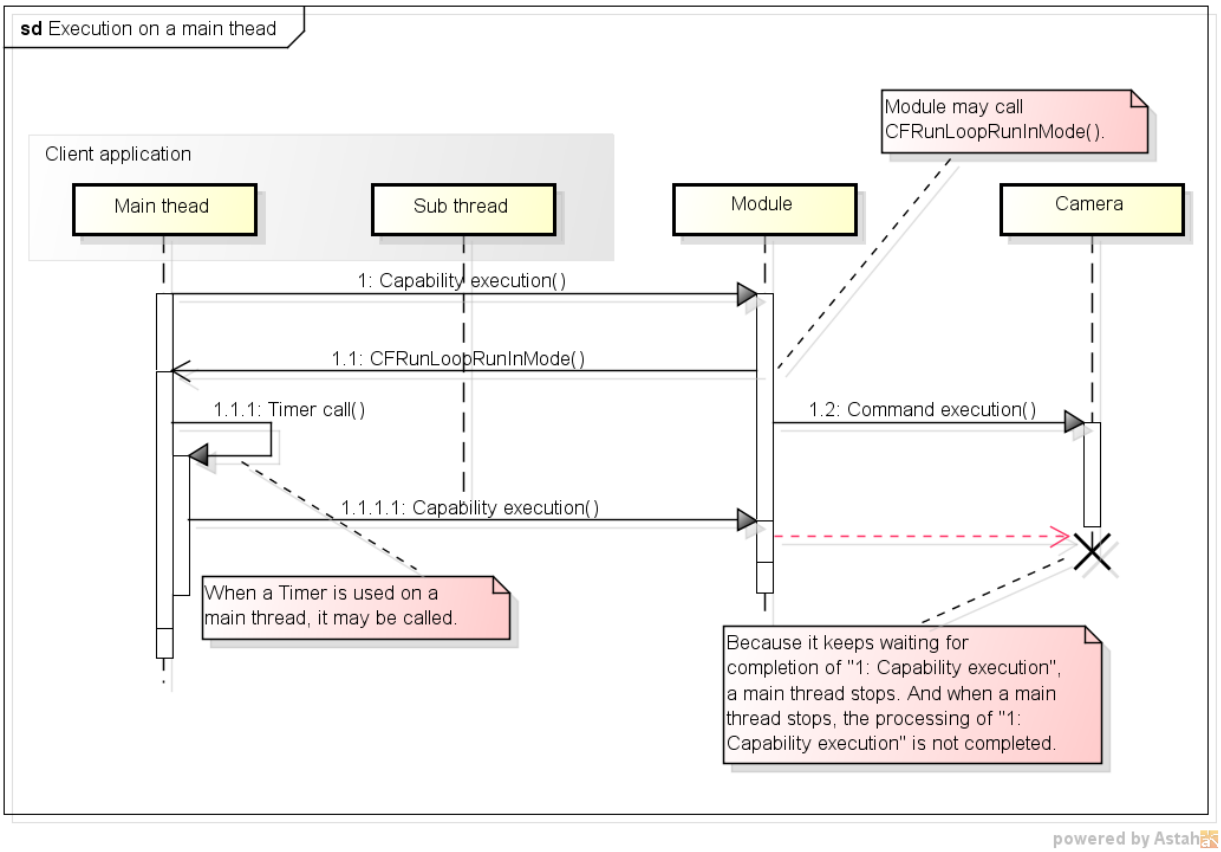
When you connect a camera set in the “Camera control” mode to the computer, the connected camera will show under the SHARED list in the Image Capture application (bundled with OS). To use Module through the LAN connection, please make sure that you do not select the camera on the list.

Client application must not stop a main thread during execution of Capability when you use Module for Macintosh.

When client stops a main thread during execution of Capability, Module may not return from processing of that Capability, because Module can't receive the response from a camera.

Example 1) When client application executes Capability from a main thread, Module may call CFRunLoopRunInMode(). Therefore the timer in the main thread may be called, for example, though control shifts to Module.

When the client executes other Capability at the timer processing, it may become the wait state. This is because processing of Capability which it executed from a main thread earlier is not completed. Because the timer processing is executed on a main thread, as a result, the main thread stops. Therefore the Capability that executed earlier can't receive the response from a camera and it reaches to a deadlock state.


sd Execution on a main thead
Client application
Main thead
Sub thread
Module
Camera
Module may call CFRunLoopRunInMode().
1: Capability execution()
1.1: CFRunLoopRunInMode()
1.1.1: Timer call()
1.2: Command execution()
1.1.1.1: Capability execution()
When a Timer is used on a main thread, it may be called.
Because it keeps waiting for completion of "1: Capability execution", a main thread stops. And when a main thread stops, the processing of "1: Capability execution" is not completed.
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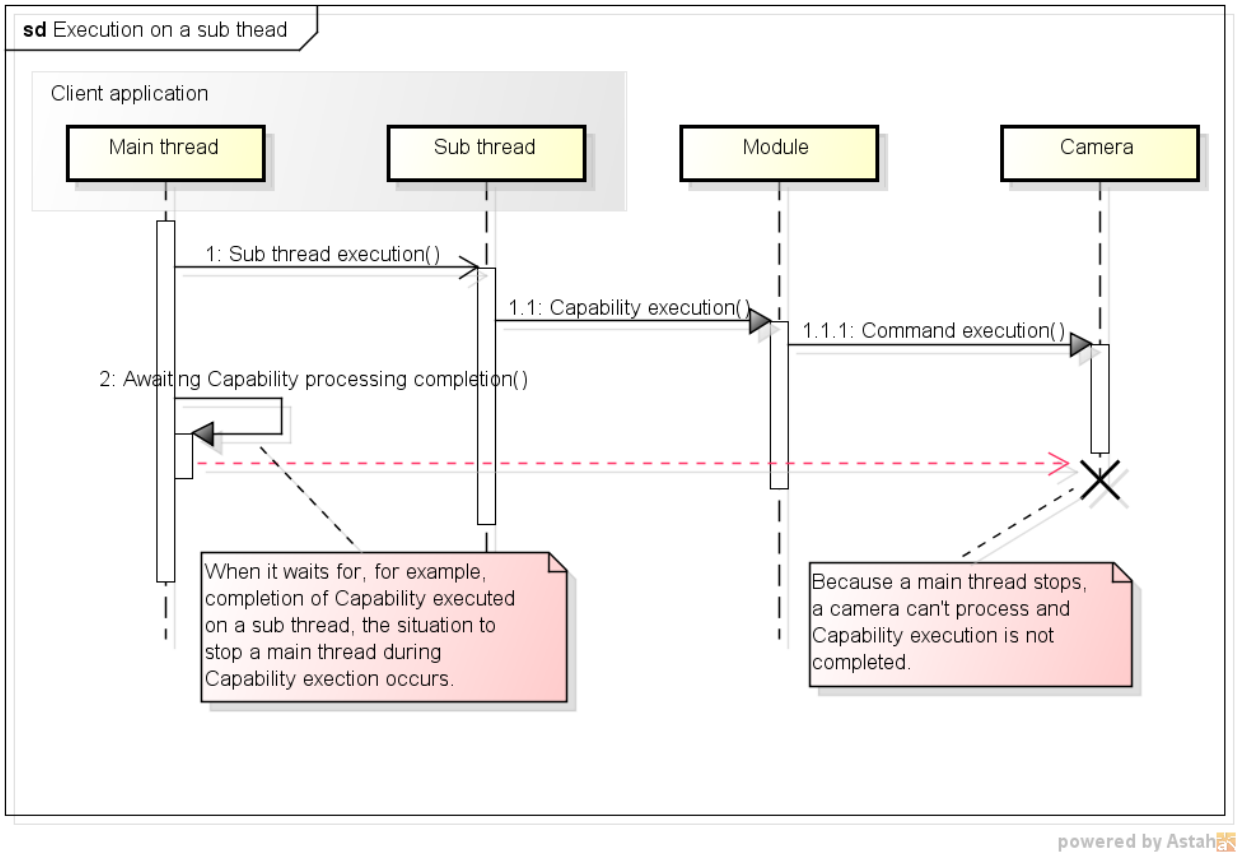
Example 2) When client application may execute Capability from a sub thread and wait for the processing completion of Capability in main thread, client must not stop the main thread.
In this case, client has to call CFRunLoopRunInMode()at fixed intervals until the completion of Capability.



12.1 Important note about macOS 10.15

On macOS 10.15, you must provide access to removable volumes for the Terminal app. To do this, open *System Preferences*, then go to the *Security & Privacy* pane, click on the *Privacy* tab, select *Files and Folders* and allow *Removable Volumes* access for *Terminal*.

If the Terminal app is not registered, use the tccutil tool (bundled with OS) to reset the privacy settings, and relaunch the application.

13 Structure Member Alignment

In MAID3.H, there is a comment saying that all alignments are 4byte, but this value depends on platform.

14 History

- Rev.1.10 October 29, 2021
  - 3 Environment...Update the environment of Windows and Macintosh.
  - 4 About applications using Module SDK... Update the development environment.
  - 5 Runtime Library…Delete

- Rev.1.9 February 26, 2020
  - 3 Environment...Update the environment of Windows and Macintosh.
  - 13.1 Important note about macOS 10.15...Added.

- Rev.1.8 November 15, 2019
  - 3 Environment...Update the environment of Macintosh.
  - 4 About the usage environment of Module SDK for Macintosh...Change BaseSDK to use.
  - 5 Runtime Library...Changed the version of Visual Studio.

- Rev.1.7 September 28, 2018
  - 3 Environment…Update the environment of Macintosh.
  - 4 About the usage environment of Module SDK for Macintosh…Updated the recommended version of base SDK.
  - 7 Image and Thumbnail Data...Correct a file name to refer to.
  - 10 The restriction while executing Live view...Correct a file name to refer to.
  - 13 The restriction on Macintosh…Add the notice of using Module for Macintosh.

- Rev.1.6 June 14, 2017
  - 3 Environment…Update the environment of Macintosh.
  - 4 About the usage environment of Module SDK for Macintosh…Updated the recommended version of base SDK.

- Rev.1.5 December 9, 2016
  - 3 Environment…Update the environment of Macintosh.
  - 4 About the usage environment of Module SDK for Macintosh…Added.

- Rev.1.4 March 31, 2016
  - 4 Runtime Library…Added.

- Rev.1.3 February 29, 2016
  - Environment…Update the environment of Windows.

- Rev.1.2 November 13, 2015
  - Environment…Update the environment and restriction of Macintosh.

- Connection with camera…Change the object which AddChild and RemoveChild event are sent to from source object to module object.
- The restriction on Macintosh …Integrate chapter of Macintosh. Add the notice of using Module for Macintosh.

- Rev.1.1 February 16, 2015
  - Environment…Update the environment and restriction of Macintosh.

- Rev.1.0 December 1, 2010 First version