PalmSecure™

U4PS-LCB3-01ENZ3(3)

FUJITSU Biometric Authentication

PalmSecure™ SDK V02

Sample Application

for Java

Manual

Professional Edition

(V06 Windows(x86)/Windows(x64)

/Linux(x64)/Linux(armhf)/Linux(arm64))

FUJITSU

◆ Revision History

Revision	Issued Date	Revised Page	Modification Details
Rev. 1	Oct 2020	Entire document	Newly created
Rev. 1.1	Jul 2021	Entire document	• Updated the version of Visual C++.
		Page 6	• Updated the version of tested Java in “2.1 Hardware and Software Requirements”.
Rev. 1.2	Nov 2022	Face page	• Added Linux(armhf) and Linux(arm64)
		Page 6	• Modified the following descriptions in “2.1 Hardware and Software Requirement”. ・Added caution in Note 1). ・Added Linux(armhf) version and Linux(arm64) version to “Interface module”.
Rev 1.3	Jan 2023	Page 6	• Modified descriptions for hardware, OS and the Sensor driver in “2.1 Hardware and Software Requirements”

◆ Introduction

Thank you for purchasing PalmSecure™ SDK V02 (hereinafter called “this product”).
This document explains how to use Sample application for Java.
This document is intended for readers who have basic knowledge of the following.

- Windows or Linux operations
- Java Virtual Machine
- Java language

This sample application is provided in order to help customer’s application development, and not guaranteed to work properly in customer’s actual environment. Please note that it is customer’s responsibility to do the quality assurance.

January 2023 : Rev. 1.3

Caution for This Manual

You are required to use this product within the specification described in this document.

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◆ Abbreviations and Common Terms

Abbreviations and common terms used in this document are as follows.

Abbreviations/ Common Term	Description
This product	Abbreviation for “PalmSecure™ SDK V02”.
SDK	Abbreviation for “PalmSecure™ SDK”.
Sample application	Abbreviation for “Sample application for Java V06 Professional Edition”.
Interface module	Abbreviation for “Sample interface module for Java V06”.
Authentication library	Abbreviation for “Authentication Library V34 Professional Edition”.
Sensor	Common term for “PalmSecure Sensor V2” and “PalmSecure-F Pro”.
Windows	Abbreviation for ”Microsoft® Windows® operating system”.
Windows 11	Abbreviation for “Microsoft® Windows® 11”.
Visual C++ 2019	Abbreviation for “Microsoft® Visual C++® 2019”.
JNI	Abbreviation for “Java Native Interface”.
JRE	Abbreviation for “Java Runtime Environment”.
JDK	Abbreviation for “Java Development Kit”.

◆ Notations

The following symbols are used in this document.

Symbol	Description
!Caution	Describes things that you have to look out for. You must read it.
★Tip	Provides reference information. Read it if necessary.
>See>	Indicates an item to be referred.
Operation	Describes operation procedures.
[ ] button	Indicates a button displayed on the screen.

Also, the “PalmSecure-F Pro” is called “PalmSecure-F Pro sensor” in this document.

◆ Table of Contents

Chapter1 Introduction of Sample Application

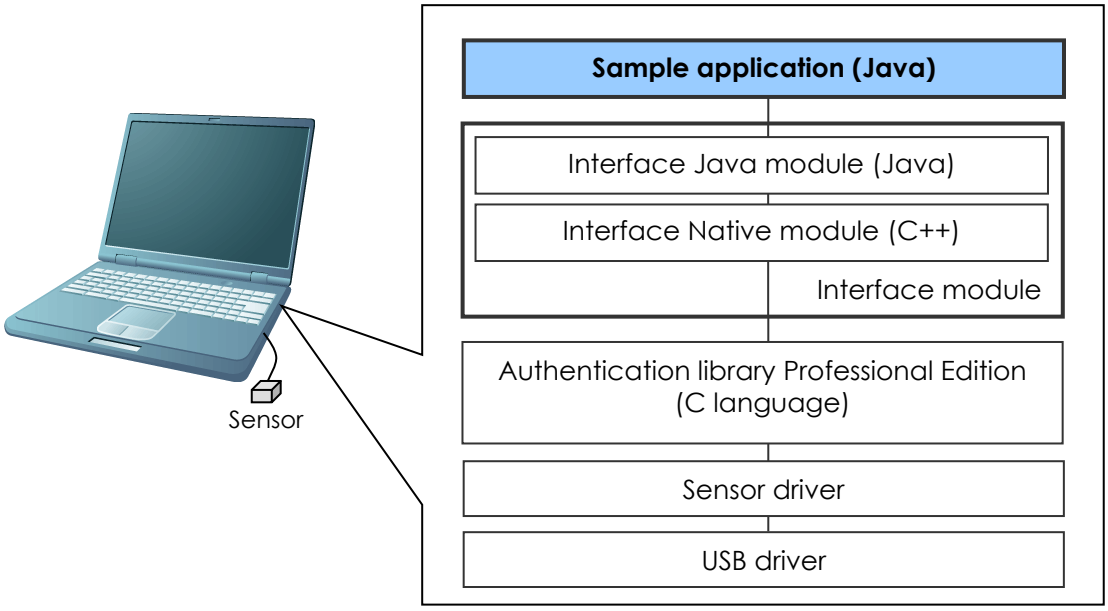
1.1 Overview

Sample application shows how to use Interface module.

Sample application runs on Java virtual machine.

And it calls Authentication library via Interface module.

The software structure including Sample application is as follows.



>See> For information on the Interface module, refer to the “Sample Interface Module for Java Manual”.

>See> For information on how to build Sample application, refer to the “3.5 How to Build”.

1.2 List of Contents

The following table shows provided files of Sample application.

Folder			Stored file/ folder	Description
1st Hierarchy	2nd Hierarchy	3rd Hierarchy		
PalmSecure Sample ForJava	release	Application	StartSample.bat	Batch file to start Sample application for Windows
			StartSample.sh	Shell to start Sample application for Linux
			PalmSecureSample_Java.jar	Sample application (Note)
		SettingFile	English	Setting file (For details, refer to "◆ Setting file") (Note)
			Japanese	
	source		com	Source program of Sample application (Note)
			JavaBuild.bat	Batch file for Windows to create class file from source program

Note) Common for Windows and Linux.

◆ Setting file

Each folder for English and Japanese contains the following files.

Stored file	Description
PalmSecureSample.ini	Application setting file
PalmSecureSample.lang	Language file
PalmSecureSample_GUIDELESS.bmp	Guidance image for hand placing (without the Palm guide)
PalmSecureSample_HANDGUIDE.bmp	Guidance image for hand placing (with the Palm guide)
PalmSecureSample_NG.wav	Sound file of Verification / Identification NG
PalmSecureSample_OK.wav	Sound file of Verification / Identification OK

Chapter2 Before Using Sample Application

2.1 Hardware and Software Requirements

2.1 Hardware and Software Requirements

In order to use Sample application, the following hardware and software are necessary.

<table>
<tr><th colspan="2">Hardware and Software Requirements</th><th>Description</th></tr>
<tr><td colspan="2">Hardware Requirements</td><td rowspan="2">Follow the requirements for the Sample interface module for Java referring to the “Sample Interface Module for Java Manual”.</td></tr>
<tr><td rowspan="5">Software Requirements</td><td>OS (Note 1)</td></tr>
<tr><td>Sensor driver</td><td></td></tr>
<tr><td>Authentication library</td><td>Authentication library V34 Professional Edition
(Download the latest version from SDK V02L03 in the SDK V02 Support Website.)</td></tr>
<tr><td>Interface module (Note 2)</td><td>• Windows(x86) version
f3bc4jav.jar and F3BC4JNI.DLL [for Windows(x86)]
• Windows(x64) version
f3bc4jav.jar and F3BC4JNI.DLL [for Windows(x64)]
• Linux(x64) version
f3bc4jav.jar and libf3bc4jni.so [for Linux(x64)]
• Linux(armhf) version (Note 3)
• Linux(arm64) version (Note 3)</td></tr>
<tr><td>Visual C++ runtime library (Windows only)</td><td>Visual C++ 2019 Redistributable (Note 2)</td></tr>
<tr><td>Tested Java</td><td>AdoptOpenJDK with HotSpot 11.0.10.9</td></tr>
</table>

Note 1) For information on OSes that the Sample application is tested on, refer to the “System Development Guide”. Note that the Smart App Control for Windows 11 is not supported.

Note 2) Since the Interface Native module for Windows is developed based on Microsoft Visual C++2019, some environments require installation of “Visual C++ 2019 Redistributable”.
Please download and install the proper package from the website of Microsoft Co. if necessary.

Note 3) Only the build environment such as Makefile is available for the Interface Native module for Arm.

>See> For information on how to build the Interface Native module for Arm, refer to the “Sample Interface Module for Java Manual”.

2.2 Installation of Sample Application

Please install Sample application as follows.

Operation

Step1 Confirm that all of the following configurations are completed on the target hardware before installing Sample Application.

(1) **PalmSecure Sensor driver is installed.**

>See> For installation of PalmSecure Sensor driver, refer to the "Sensor Driver Installation Guide".

(2) **Authentication library is installed.**

!Caution **License is required to use Authentication library**
Install the license file in advance by referring to the "How to Acquire the License File" and "Authentication Library Reference Guide". If proper license file is not located, "Authentication error" of Authentication library is shown.

>See> For information on how to install Authentication library, refer to the "Authentication Library Reference Guide".

(3) **"PvAPI.INI" file of Authentication library is prepared.**

★Tip **To display a message to prompt re-enrollment when quality of enrollment data is low**
Set "enrollment data score notification function" enable in "PvAPI.INI" (3. of Step 1).

★Tip **Guide mode setting**
Set the guide mode using the application setting file "PalmSecureSample.ini" mentioned later.
In case the guide mode is set by using the setting file of Authentication library "PvAPI.INI", the value set to the "PalmSecureSample.ini" is effective.

(4) **The version of firmware of Sensor unit is confirmed and updated if necessary.**

>See> For information on how to confirm the firmware version, refer to the "Sensor Maintenance Tool Operation Guide".

>See> For information on how to update firmware, refer to the "System Development Guide".

(5) **Interface module is installed.**

!Caution **Visual C++ 2019 Redistributable is required to use Interface module for Windows.**
If the Visual C ++ 2019 Redistributable is not installed on the target hardware, download and install it from the website of Microsoft Co.

>See> For information on how to install Interface module and how to confirm appropriate Visual C ++ 2019 Redistributable is installed, refer to the "Sample Interface Module for Java Manual".

Step2 Copy Sample application to the target hardware.

- **Windows:**
  Copy "PalmSecureSample_Java.jar" file and "StartSample.bat" file; stored in "PalmSecureSampleForJava\release\Application" folder, to the same folder.

- **Linux:**
  Copy "PalmSecureSample_Java.jar" file and "StartSample.sh" file; stored in "PalmSecureSampleForJava\release\Application" folder, to the same folder.

Step3 Copy each setting file to the folder which contains Sample application.

- **To use English message:**
  Copy all files contained in the following folder.
  "PalmSecureSampleForJava\release\SettingFile\English"

- **To use Japanese message:**
  Copy all files contained in the following folder.
  "PalmSecureSampleForJava\release\SettingFile\Japanese"

Step4 Add application key printed in "License agreement" to the value of "ApplicationKey"; the setting item of "PalmSecureSample.ini" copied in Step3.

>See> For information on the "PalmSecureSample.ini", refer to "3.2 Application Setting File".

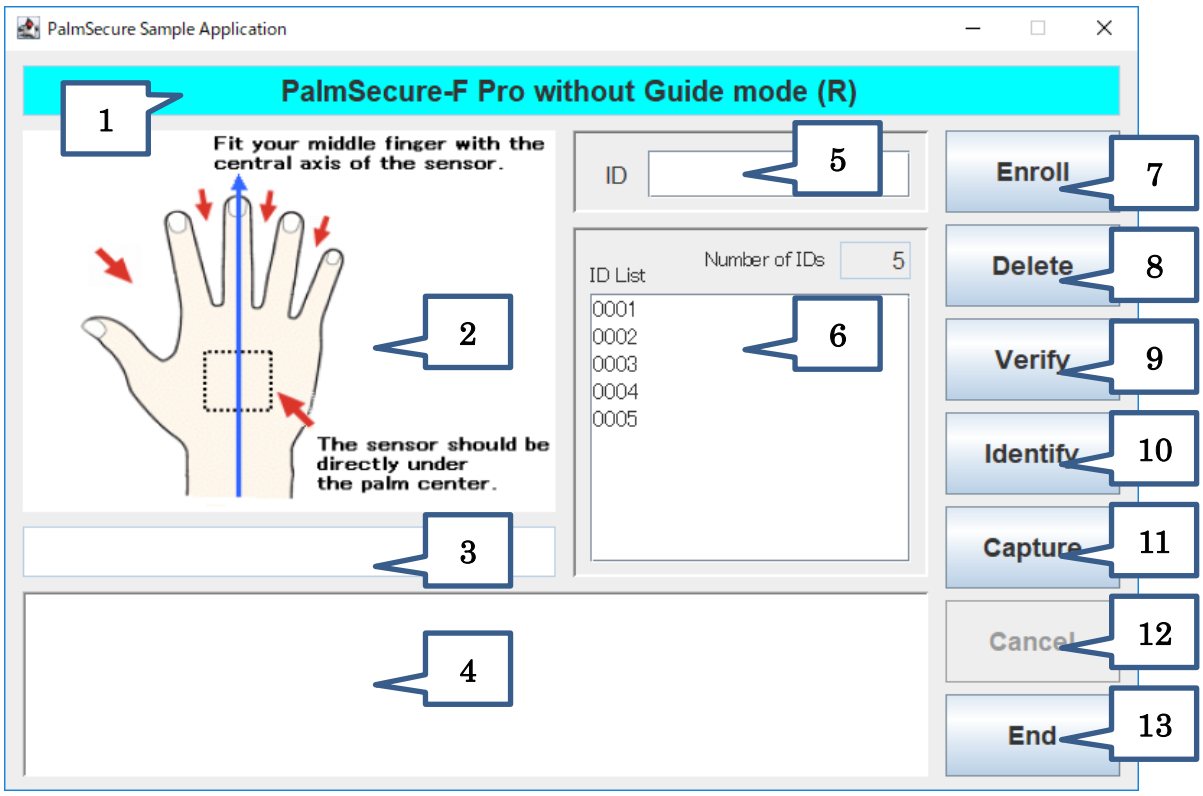
Step5 Connect the Sensor to the target hardware.

Step6 Double click "StartSample.bat" or "StartSample.sh" and start Sample application.

Chapter3 How to Use Sample Application

3.1 Window Structure

The following shows the window of Sample application.



No.	Name	Description
1	Sensor type / guide mode display area	Area to display Sensor type and Guide mode.
2	Guidance image display area	Area to display guidance image for hand placing.
3	Process name display area	Area to display a name of executing process.
4	Guidance message display area	Area to display guidance message for hand placing and process result. (Note 1)
5	ID input area	Area to input ID of enrollment data.
6	ID list display area	Area to display ID(s) of enrollment data. (Note 2)
7	[Enroll] button	Button to enroll new palm vein data.
8	[Delete] button	Button to delete enrollment data.
9	[Verify] button	Button to execute verification.
10	[Identify] button	Button to execute identification.
11	[Capture] button	Button to execute capturing.
12	[Cancel] button	Button to cancel enrollment, verification, identification or capturing process.
13	[End] button	Button to terminate Sample application.

Note 1) The message defined in the language file (PalmSecureSample.lang) is shown in the guidance message display area.

Note 2) IDs of the palm data that matches the settings shown in the "Sensor type / guide mode display area" (item No.1) are shown in the ID list display area.
IDs of palm data for both Without guide mode and With guide mode are shown in the ID list display area if using the R-format type or I33-format type.

3.2 Application Setting File

You can change the operations of Sample application by modifying "PalmSecureSample.ini".

The following table shows setting items in "PalmSecureSample.ini".

No.	Setting Item	Description
1	ApplicationKey	Application key printed in "License agreement" (The value to set in "Key" of "JAVA_PvAPI_ApAuthenticate".)
2	GExtendedMode	0 : I-format type 1 : I33-format type 2 : R-format type
3	GuideMode	0 : Without guide mode 1 : With guide mode
4	MaxResults	The maximum number of candidates; enrollment data items similar to captured data. (Value to set in "MaxNumberOfResults" of "JAVA_BioAPI_Identify".)
5	NumberOfRetry	The number of retry when process result is NG in test authentication of enrollment, verification and identification.
6	LogMode	0 : Not output logs 1 : Output logs
7	LogFolderPath	A path name of output folder for the log file and silhouette image file.
8	SilhouetteMode	0 : Not output silhouette image files 1 : Output silhouette image files
9	SleepTime	Waiting time (ms) for switching process between enrollment and test authentication, and that for retry process.
10	EnableCapture	0 : Disable the [Capture] button 1 : Enable the [Capture] button

3.3 How to Use Function

3.3.1 Enrollment

The following shows how to create enrollment data by capturing palm vein for one hand.

Operation

Step1 **Enter ID (Note) of enrollment data to "ID input area".**

Step2 **Click [Enroll] button.**

"Guidance message display area" displays message for guiding palm to correct position. Follow the message and place a hand.

Note) Error occurs in case the same ID exists in "ID list display area".

Step3 **Enrollment result is displayed on "Guidance message display area".**

When enrollment data is created successfully, a message to indicate success is displayed on "Guidance message display area".

Enrollment data is output to "Data" folder as following file name.

The "Data" folder is in the same folder as Sample application.

- **Format of file name:**

  [Sensor type] [Type and mode] _ [Input ID].dat

  - [Sensor type]
    1: PalmSecure Sensor V2 or
    PalmSecure-F Pro sensor

  - [Type and mode]
    0: I-format type in Without guide mode
    1: I-format type in With guide mode
    2: I33-format type in Without guide mode or
    I33-format type in With guide mode
    3: R-format type in Without guide mode or
    R-format type in With guide mode

3.3.2 Verification

The following shows how to execute verification.

Operation

Step1 **Input an ID of enrollment data to "ID input area", or select an ID in "ID list display area".**

Step2 **Click [Verify] button.**
"Guidance message display area" displays message for guiding palm to correct position. Follow the message and place a hand.

Step3 **Verification result is displayed on "Guidance message display area".**

3.3.3 Identification

The following shows how to execute identification.

Operation

Step1 **Click [Identify] button.**
"Guidance message display area" displays message for guiding palm to correct position. Follow the message and place a hand.

Step2 **Identification result is displayed on "Guidance message display area".**

★Tip **In case there are multiple enrollment data similar to captured data**

- If difference of authentication result score is 3,000 or more, it displays data of the highest score as identification result.
- If difference of the score is less than 3,000, it displays a message to inform there is no corresponding enrollment data.

3.3.4 Capturing

The following shows how to create authentication data by capturing palm vein for one hand.

Operation

Step1 **Click [Capture] button.**
"Guidance message display area" displays message for guiding palm to correct position. Follow the message and place a hand.

Step2 **Capturing result is displayed on "Guidance message display area".**
"Guidance message display area" displays message of processing success when authentication data is created. Authentication data is output to "CaptureData" folder in the folder which Sample application exists.
The output file name is as follows. (Note)
Note) Same name file is overwritten.

- **Format of file name:**
  [Sensor type] [Type and mode] _ Capture.dat

  - [Sensor type]
    1: PalmSecure Sensor V2 or
    PalmSecure-F Pro sensor

  - [Type and mode]
    0: I-format type in Without guide mode
    1: I-format type in With guide mode
    2: I33-format type in Without guide mode or
    I33-format type in With guide mode
    3: R-format type in Without guide mode or
    R-format type in With guide mode

3.3.5 Deletion

The following shows how to delete enrollment data.

Operation

Step1 **Enter an ID of enrollment data to "ID input area", or select an ID in "ID list display area".**

Step2 **Click [Delete] button.**
Corresponding enrollment data in "Data" folder is deleted.

3.4 Log Output

When executing enrollment, verification, identification or capturing, a log file is output to the folder specified in “LogFolderPath” of “Application setting file”. The following table shows file name and format of the log.

- **File name :** Result.csv

- **Format :**

No.	Process	Output format
1	Enrollment	[Date] [Time],[Sensor type],[Type and mode],E,[Process result], [Number of retry],[file name of silhouette image]
2	Verification	[Date] [Time],[Sensor type],[Type and mode],V,[Process result], [Number of retry], [file name of silhouette image], [Enrollment data ID]
3	Identification	[Date] [Time],[Sensor type],[Type and mode],I,[Process result], [Number of retry], [file name of silhouette image], [Enrollment data ID and authentication result score (Note)]
4	Capturing	[Date] [Time],[Sensor type],[Type and mode],C,[Process result], [Number of retry], [file name of silhouette image]

Note) If there are more than one candidate, enrollment data IDs and authentication result scores of all candidates are output to the log.

- [Date]

Format: **yyyy/mm/dd**

yyyy : year
mm : month
dd : day

- [Time]

Format: **hh:mm:ss**

hh : hour
mm : minute
ss : second

- [Sensor type]

1: PalmSecure Sensor V2 or PalmSecure-F Pro sensor

- Type and mode]

0: I-format type in Without guide mode
1: I-format type in With guide mode
2: I33-format type in Without guide mode or
I33-format type in With guide mode
3: R-format type in Without guide mode or
R-format type in With guide mode

3.5 How to Build

The following shows how to build Sample application.

Operation

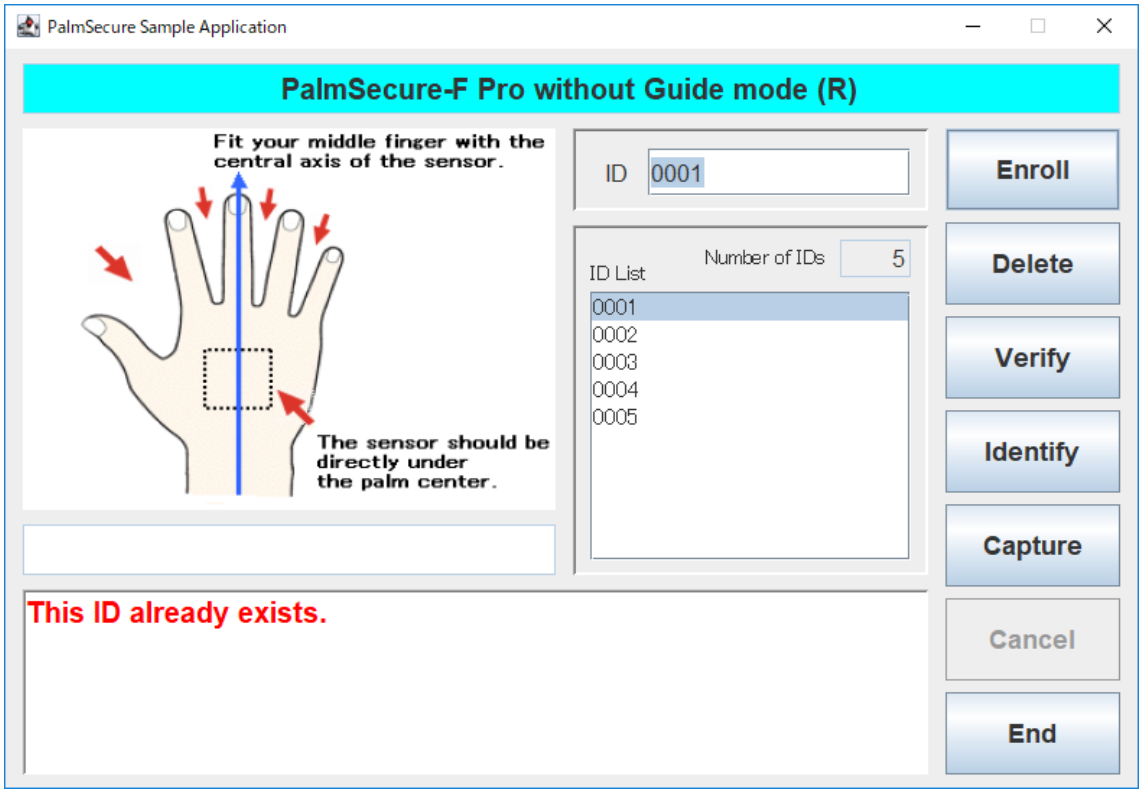
Step1 **Store JAR file "f3bc4jav.jar" of Interface module to the following folder.**
"PalmSecureSampleForJava\source"

Step2 **Double click "JavaBuild.bat" file, and build Sample application.**

Chapter4 Error Information

4.1 Error notification from Sample Application

When error occurs in Sample application, error message is to be displayed in "Guidance message display area" on the window of Sample application.



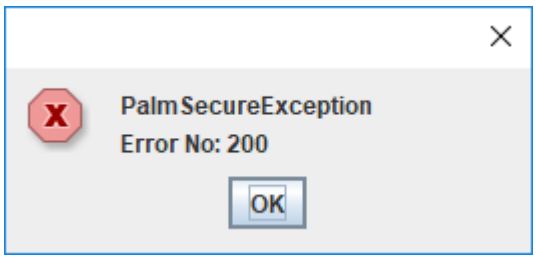
>See> For information on "Guidance message display area", refer to "3.1 Window Structure".

★Tip **Error message**
Error message is defined in language file (PalmSecureSample.lang).

>See> For information on the language file (PalmSecureSample.lang), refer to "1.2 List of Contents".

4.2 Error notification from Interface module

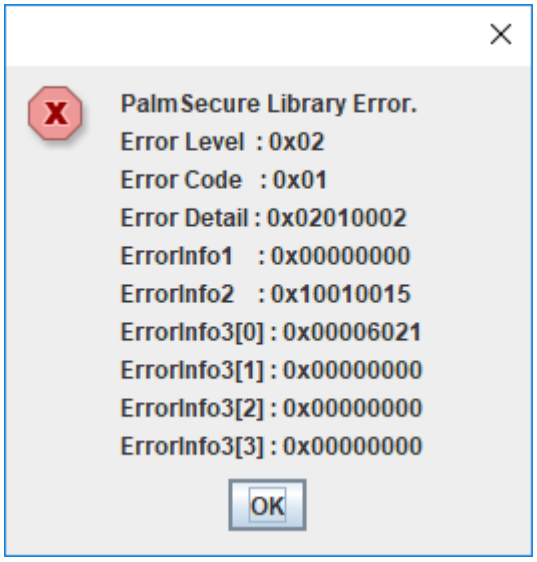
When error occurs in Interface module, error information is to be displayed in a dialog box as follows.



>See> For details of error information of Interface module, refer to the "Sample Interface Module for Java Manual".

4.3 Error notification from Authentication Library

When error occurs in Authentication library, error information is to be displayed in a dialog box as follows.



>See> For details of error information of Authentication library, refer to the "Authentication Library Reference Guide".

Appendix

Appendix A Reference for Source Program

The following shows file name and method name of source program corresponding to each basic process.
For details, please refer to description of each source program.

A.1 Initialization

For initialization process, please refer to the following.

File name: PsMainFrame.java
Method name: Ps_Sample_Apl_Java_InitLibrary

A.2 Termination

For termination process, please refer to the following.

File name: PsMainFrame.java
Method name: Ps_Sample_Apl_Java_TermLibrary

A.3 Enrollment

For enrollment process, please refer to the following.

File name: PsThreadEnroll.java
Method name: run

A.4 Verification

For verification process, please refer to the following.

File name: PsThreadVerify.java
Method name: run

A.5 Identification

For identification process, please refer to the following.

File name: PsThreadIdentify.java

Method name: run

A.6 Capturing

For capturing process, please refer to the following.

File name: PsThreadCapture.java

Method name: run

A.7 Cancellation

For cancellation process, please refer to the following.

File name: PsThreadCancel.java

Method name: run

A.8 Event handler for status notification

For event handler for status notification, please refer to the following.

File name: PsStateCallback.java

Method name: JAVA_BioAPI_GUI_STATE_CALLBACK

A.9 Event handler for guidance image notification

For event handler for guidance image notification, please refer to the following.

File name: PsStreamingCallback.java

Method name: JAVA_BioAPI_GUI_STREAMING_CALLBACK

Appendix B Updating the Sample Application

When you are using previous versions of Sample application and updating to V06, please update the Sample interface module to V06, and the Authentication library to V34 together.

Also, if you continue to use existing palm vein data, set the following items in the application setting file "PalmSecureSample.ini" to the same value used in the previous version of Sample application.

・ApplicationKey (Note 1)
・GExtendedMode (Note 2)
・GuideMode (Note 3)

Note 1) Sample application V02L02 does not have this setting item.
Check your source code for the value you set.

Note 2) Sample application V04L01 or earlier do not have this setting item.
When using palm vein data enrolled by Authentication library V30-V32, set the value for I-format type to the "GExtendedMode".
Note that the palm vein data enrolled by Authentication library V24 or earlier cannot be used continuously. You must re-enroll the palm vein data in R-format type.

★Tip **How to confirm the version of palm vein data**
You can confirm the version of palm vein data by the method of Sample interface module "JAVA_PvAPI_GetTemplateInfoEx".

Note 3) Be sure to set the same guide mode as before in case of using I-format type.

In addition, if you were using Sample application V01, please modify the structure of palm vein data.

>See> For information on the structure of palm vein data, refer to Appendix B in the "Sample Interface module for JAVA Manual".

If updating the Sample application is difficult and the previous version (Note) has to be used on the Authentication library V34 and Interface module V06, note the following points in addition to the above.
Note) You cannot continue to use Sample application V01.

◆ When using Sample application V02-V04

・The PalmSecure-F Pro sensor is not supported.
To use the PalmSecure-F Pro sensor, modify the [Sensor type] part in the file name of existing enrollment data as follows.
Example:
11_0001.dat re-name 81_0001.dat

・The "PalmSecureSample.ini" does not have the setting item "GExtendedMode".
Set the format type to the "GExtendedMode" in the operational environment setting file of the Authentication library ("PvAPI.INI").

◆ When using Sample application V05L01 or V05L02

・R-format type is not supported.
Use I-format type or I33-format type.
・The PalmSecure-F Pro sensor is not supported.
To use the PalmSecure-F Pro sensor, modify the [Sensor type] and [Type and mode] parts in the file name of existing enrollment data as follows.
Example:
11_0001.dat re-name 80_0001.dat

◆ When using Sample application V05L03 or V05L04

・R-format type is not supported.
Use I-format type or I33-format type.
・You can use the existing enrollment data as it is.

!Caution Re-naming the enrollment data
When re-naming the existing enrollment data, be careful not to mix the internal format of the palm vein data. It may cause an error during authentication.

When updating the Sample application to V06 after re-naming the file name of the existing enrollment data, re-name it again in the original file name format.

>See> For information on the file name format of enrollment data, refer to "3.3.1 Enrollment".


PalmSecure