

**DigitalPersona, Inc.**

# **U.are.U<sup>®</sup> UPOS for OPOS**

Version 1.0

## **Reference Guide**



digitalPersona.

**DigitalPersona, Inc.**

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**Technical Support**

The DigitalPersona Web site provides an online technical support form at <http://www.digitalpersona.com/support/enterprise/chooseproduct.php>. Simply describe your issue and include your contact information, and a technical support representative will contact you shortly by email or by phone.

Phone support is available at 877 378-2740 in the U.S. only.  
Outside the U.S., call +1 650-474-4000.

**Feedback**

Although the information in this guide has been thoroughly reviewed and tested, we welcome your feedback on any errors, omissions, or suggestions for future improvements. Please contact us at

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The DigitalPersona U.are.U UPOS for OPOS conforms to the specifications for the Biometrics device category in Chapter 4, "Biometrics," of the UnifiedPOS Retail Peripheral Architecture, Version 1.11, dated January 15, 2007. The complete UPOS documentation is available at <http://www.nrf-arts.org/UnifiedPOS/default.htm>.

The DigitalPersona U.are.U UPOS for OPOS is a set of COM objects that acts as an extension to the DigitalPersona fingerprint reader driver, providing an OPOS-compliant application interface to DigitalPersona products. It consists of a Control Object (CO) (an ActiveX® Control) for the OPOS Biometrics device category and a Service Object (SO).

A supported DigitalPersona optical fingerprint reader is necessary to use reader-dependent methods and may be purchased separately from DigitalPersona or from your distributor. See *Supported DigitalPersona Products* on page 4 for a complete list of fingerprint readers and modules.

The purpose of this document is to

- Provide instructions for installing the files that enable your application to use DigitalPersona fingerprint readers within a POS environment
- Describe the properties, methods, and events that are implemented by the U.are.U UPOS for OPOS Control
- Provide additional information about the properties, methods, and events that are only partially implemented or are not supported by the U.are.U UPOS for OPOS Control

## Target Audience

This guide is for developers who have a working knowledge of the C or C++ programming language, of the use of COM objects, and of the UPOS specification.

## Chapter Overview

*Chapter 1, Introduction*, this chapter, describes the audience for which this guide is written; defines the notational and typographical conventions used throughout this guide; identifies a number of resources that may assist you in using the U.are.U UPOS for OPOS; identifies the minimum system requirements needed to run the U.are.U UPOS for OPOS; and lists the DigitalPersona products supported by the U.are.U UPOS for OPOS.

*Chapter 2, Quick Start*, provides a quick introduction to the U.are.U UPOS for OPOS using the sample application located on the product CD.

*Chapter 3, Installation*, contains instructions for installing the U.are.U UPOS for OPOS and the redistributables and describes the contents of the product CD.

Chapter 4, *Implementation Notes*, contains specific information about the U.are.U UPOS for OPOS implementation of the OPOS Control.

Chapter 5, *Control Object API Reference*, includes a table of information about how UPOS methods, properties, and events are implemented in the DigitalPersona U.are.U UPOS for OPOS.

Chapter 6, *Device-Related Result Codes*, defines DigitalPersona device-related result codes returned to the *ResultCodeExtended* attribute of the **ErrorEvent** event.

Chapter 7, *Redistribution*, identifies the files that you may redistribute according to the End User License Agreement (EULA) provided on the U.are.U UPOS for OPOS product CD.

An index is also included for your reference.

## Document Conventions

This section defines the typographical and notational conventions used in this guide.

### Notational Conventions

The following notational conventions are used throughout this guide:

NOTE: Notes provide supplemental reminders, tips, or suggestions.

### Typographical Conventions

The following typographical conventions are used in this guide:

Typeface	Purpose	Example
<i>Italics</i>	Used for attributes in events  For developers who are viewing this document online, text in italics may also indicate hypertext links to other areas in this guide or to URLs.	<i>EventNumber</i> is a specific value assigned by the SO.  For a complete list of fingerprint readers, see <i>Supported DigitalPersona Products on page 4</i> .
<b>Bold</b>	Used to indicate methods and properties  Used to indicate window and dialog box elements	A <b>DataEvent</b> is fired by the SO to provide input data from the fingerprint reader to the application.  Click <b>Begin Enroll Capture</b> .  A message appears in the area under the <b>Specific Methods</b> control box.
ALL_CAPS	Used to indicate property and result code values	FT_OK is a device-related extended result code.

## Additional Resources

You can refer to the resources in this section to assist you in using the U.are.U UPOS for OPOS.

### Related Documentation

Subject	Document
Fingerprint recognition, including the history and basics of fingerprint identification and the advantages of the DigitalPersona's Fingerprint Recognition Algorithm	The DigitalPersona White Paper: Guide to Fingerprint Recognition (Fingerprint Guide.pdf) located in the Docs folder on the U.are.U UPOS for OPOS product CD
Late-breaking news about the product	The Readme.txt files provided in the root directory on the product CD as well as in some subdirectories

### Online Resources

Website name	URL
DigitalPersona Developer Connection Forum for DigitalPersona Developers	<a href="http://www.digitalpersona.com/webforums/">http://www.digitalpersona.com/webforums/</a>
Latest updates for DigitalPersona software products	<a href="http://www.digitalpersona.com/support/downloads/software.php">http://www.digitalpersona.com/support/downloads/software.php</a>

## System Requirements

This section lists the minimum software and hardware requirements needed to run the U.are.U UPOS for OPOS.

- X86-based processor or better
- 16 MB of memory (RAM)
- Approximate available hard-disk space as follows

U.are.U UPOS for OPOS	10 MB
U.are.U UPOS for OPOS redistributables	8 MB

- CD/DVD-ROM drive for installation
- Microsoft® Windows® XP or Microsoft® Windows® XP Embedded<sup>1</sup>
- USB port on the computer where the fingerprint reader is to be connected

1. For a list of Windows XP Embedded files required to run the U.are.U UPOS for OPOS redistributables on a Windows XP Embedded platform, see the U.are.U UPOS for OPOS XPE Dependencies.xls file in the Docs folder on the product CD.

## Supported DigitalPersona Products

The U.are.U UPOS for OPOS supports the following DigitalPersona products:

- DigitalPersona Fingerprint Reader 4000B and module, revisions 100 and 101

This chapter provides a quick introduction to the U.are.U UPOS for OPOS using the sample application, DPOPOSDemo.exe, which is located in the <destination folder>\OPOS with Dev Tools\Sample Code\DP OPOS Demo folder.

## Install the Software

Before you can use the sample application, you must install the U.are.U UPOS for OPOS (see *Installing the U.are.U UPOS for OPOS* on page 9.) You must also insert the fingerprint reader into your USB connector.

## Using the Sample Application

### To start the application

- Open the DPOPOSDemo.exe file.

The **DigitalPersona U.are.U UPOS for OPOS** window appears.

### To open the connection with the fingerprint reader

- Click **Open()**.

The **Open** method of the Control Object (CO) is called.

If the call succeeds, the connection with the fingerprint reader is opened and various properties (common and specific) are set to their default values, which are displayed in the **Common Properties** and **Specific Properties** tabs. Also, the **Device Opened** message appears in the area under the **Specific Methods** control box.

NOTE: As each method is called, the any properties that change are displayed in the **Common Properties** and **Specific Properties** tabs.

If the method call fails, a failure message appears in the box at the bottom of the window, and error codes are displayed in the **Result Code** and **Extended Result Code** boxes.

Once the connection with the fingerprint reader has been opened, it needs to be claimed.

### To claim the fingerprint reader

- Click **Claim()**.

The **Claim** method of the CO is called, and the **Claimed** property is set to true. Then the **DeviceEnabled** and **DataEventEnabled** properties are set to true, and the **Device Claimed** message appears in the area under the **Specific Methods** control box.

If the method call fails, a failure message appears in the box at the bottom of the window, and error codes are displayed in the **Result Code** and **Extended Result Code** boxes.

Enrolling a fingerprint consists of capturing four fingerprint images, converting them into fingerprint pre-enrollment templates, and then creating an enrollment template from these templates.

### To perform fingerprint enrollment

1. Click **Begin Enroll Capture**.

The **beginEnrollCapture** method of the CO is called, and the **Waiting for fingerprint scan** message appears in the area under the **Specific Methods** control box.

2. Touch the fingerprint reader four times. Follow the instructions that appear in the area under the **Specific Methods** control box to guide you.

If the method call succeeds, an enrollment template is created and the **Fingerprint Image Scanned** message appears in the area under the **Specific Methods** control box.

If the method call fails, a failure message appears in the area under the **Specific Methods** control box. If an error occurs, appropriate messages appear in the box at the bottom of the window, and error codes are displayed in the **Result Code** and **Extended Result Code** boxes.

### To perform fingerprint verification

1. Click **Begin Verify Capture**.

The **beginVerifyCapture** method of the CO is called, and the **Waiting for fingerprint scan** message appears in the area under the **Specific Methods** control box.

2. Touch the fingerprint reader.

If the method call succeeds, a verification template is created and the **Fingerprint Image Scanned** message appears in the area under the **Specific Methods** control box.

If the method call fails, a failure message appears in the area under the **Specific Methods** control box. If an error occurs, appropriate messages appear in the box at the bottom of the window, and error codes are displayed in the **Result Code** and **Extended Result Code** boxes.

3. Click **Verify Match**.

The **verifyMatch** method of the CO is called.

If the method call succeeds, a match is performed using the latest enrollment template available and the verification template that was created in step 2. The result appears in the area under the **Specific Methods** control box: **Fingerprint matches** or **Fingerprint does not match**.

If the method call fails, a failure message appears in the area under the **Specific Methods** control box. If an error occurs, appropriate messages appear in the box at the bottom of the window, and error codes are displayed in the **Result Code** and **Extended Result Code** boxes.

### To perform fingerprint identification

1. Click **Begin Verify Capture**.

The **beginVerifyCapture** method of the CO is called, and the **Waiting for fingerprint scan** message appears in the area under the **Specific Methods** control box.

2. Touch the fingerprint reader.

If the method call succeeds, a verification template is created and the **Fingerprint Image Scanned** message appears in the area under the **Specific Methods** control box.

If the method call fails, a failure message appears in the area under the **Specific Methods** control box. If an error occurs, appropriate messages appear in the box at the bottom of the window, and error codes are displayed in the **Result Code** and **Extended Result Code** boxes.

3. Click **Identify Match**.

The **identifyMatch** method of the CO is called.

If the method call succeeds, a match is performed using all of the enrollment templates available and the verification template that was created in step 2. A candidate ranking is generated by listing only the indices of the enrollment templates that match. The result appears in the area under the **Specific Methods** control box, for example, **Candidate array: 0 2**, or, if none of the templates matches, **Candidate ranking array is empty**.

If the method call fails, a failure message appears in the area under the **Specific Methods** control box. If an error occurs, appropriate messages appear in the box at the bottom of the window, and error codes are displayed in the **Result Code** and **Extended Result Code** boxes.

### To perform fingerprint verification using a verification template created on-the-fly

1. Click **Verify**.

The **verify** method of the CO is called, and the **Waiting for fingerprint scan** message appears in the area under the **Specific Methods** control box.

2. Touch the fingerprint reader.

If the method call succeeds, a verification template is created on-the-fly. Then a match is performed using the latest enrollment template available and the verification template. The result appears in the area under the **Specific Methods** control box: **Fingerprint matches** or **Fingerprint does not match**.

If you do not place your finger on the fingerprint reader within the stipulated time (10 seconds in this sample), the operation times out and the **Timeout error...** message appears in the area under the **Specific Methods** control box.

If the method call fails, a failure message appears in the area under the **Specific Methods** control box. If an error occurs, appropriate messages appear in the box at the bottom of the window, and error codes are displayed in the **Result Code** and **Extended Result Code** boxes.

### To perform fingerprint identification using a verification template created on-the-fly

1. Click **Identify**.

The **identify** method of the CO is called, and **Waiting for fingerprint scan** message appears in the area under the **Specific Methods** control box.

## 2. Touch the fingerprint reader.

If the method call succeeds, a verification template is created on-the-fly. Then a match is performed using all of the enrollment templates available and the verification template. A candidate ranking is generated by listing only the indices of the enrollment templates that match. The result appears in the area under the **Specific Methods** control box, for example, **Candidate array: 0 2**, or, if none of the templates matches, **Candidate ranking array is empty**.

If you do not place your finger on the fingerprint reader within the stipulated time (10 seconds in this sample), the operation times out and the **Timeout error...** message appears in the area under the **Specific Methods** control box.

If the method call fails, a failure message appears in the area under the **Specific Methods** control box. If an error occurs, appropriate messages appear in the box at the bottom of the window, and error codes are displayed in the **Result Code** and **Extended Result Code** boxes.

### To close the connection with the fingerprint reader

- Click **Close()**.

The **Close** method of the CO is called.

If the method call succeeds, the connection with the fingerprint reader is closed, all of the controls other than the **Open()** button are disabled, and the properties are reset, or cleared.

If the method call fails, a failure message appears in the box at the bottom of the window, and error codes are displayed in the **Result Code** and **Extended Result Code** boxes.

### To clear the enrollment template array set and the verification template

- Click **Clear Data**.

The **clearInput** method of the CO is called.

If the method call succeeds, the enrollment template array set and the verification template are cleared. A new verification template and a set of enrollment templates can now be created.

If the method call fails, a failure message appears in the box at the bottom of the window, and error codes are displayed in the **Result Code** and **Extended Result Code** boxes.

### To close the application

- Click the **Close** button.

This chapter contains instructions for installing the various components of the product and describes the contents of the U.are.U UPOS for OPOS product CD.

The following two installations are located on the product CD:

- U.are.U UPOS for OPOS, which you use in developing your application. This installation is located in the OPOS with Dev Tools\Install folder.
- Redistributables, which you must provide to your end users to implement the U.are.U UPOS for OPOS methods, properties, and events. This installation is located in the OPOS\Install folder. (The redistributables are also included in the U.are.U UPOS for OPOS installation.)

## Installing the U.are.U UPOS for OPOS

### To install the U.are.U UPOS for OPOS

1. Insert the U.are.U UPOS for OPOS product CD into your CD/DVD-ROM drive.
  - If Autorun is enabled on your computer, the setup program starts automatically.
  - If setup does not start automatically, open one of the following files located in the OPOS with Dev Tools\Install folder on the U.are.U UPOS for OPOS product CD:
    - Setup.exe, the standard installer
    - Setup.msi, the MSI installation package
2. Follow the installation instructions as they appear.
3. Restart your computer.
4. Insert the fingerprint reader into your USB connector.

## Installing the Redistributables

When you develop a product based on the U.are.U UPOS for OPOS, you need to provide the redistributables to your end users. These files are designed and licensed for use with your application. You may include the installation files located in the OPOS\Install folder in your application or you may incorporate the redistributables directly into your installer. You may also use the merge modules located in the Redist folder on the product CD to create your own MSI installer.

### To install the redistributables

1. Insert the U.are.U UPOS for OPOS product CD into your CD/DVD-ROM drive.
2. Open one of the following files located in the OPOS\Install folder on the U.are.U UPOS for OPOS product CD:
  - Setup.exe, the standard installer
  - Setup.msi, the MSI installation package
3. Follow the installation instructions as they appear.
4. Restart your computer.
5. Insert the fingerprint reader into your USB connector.

## Contents of the U.are.U UPOS for OPOS Product CD

Table 1 describes the files and folders on the U.are.U UPOS for OPOS product CD.

**Table 1.** U.are.U UPOS for OPOS product CD files and folders

Folder	File	Description
Docs	Fingerprint Guide.pdf	DigitalPersona White Paper: Guide to Fingerprint Recognition
	U.are.U UPOS for OPOS Reference Guide.pdf	DigitalPersona U.are.U UPOS for OPOS Reference Guide
	U.are.U UPOS for OPOS XPE Dependencies.xls	List of DLL dependencies for installation of your application on Microsoft Windows XP Embedded
	UPOS EULA_070913.rtf	End User License Agreement for the U.are.U UPOS for OPOS
OPOS	Setup.exe	Installs the redistributables
OPOS\Install	InstallOnly.bat Setup.exe Setup.msi UninstallOnly.bat	Installation files for the redistributables
OPOS with Dev Tools	Setup.exe	Installs the U.are.U UPOS for OPOS
OPOS with Dev Tools\Install	Setup.exe Setup.msi	Installation files for the redistributables, sample code, header file, and documentation

**Table 1.** U.are.U UPOS for OPOS product CD files and folders *(continued)*

<b>Folder</b>	<b>File</b>	<b>Description</b>
Redist	DigitalPersona_Reader_Maintenance.pdf	DigitalPersona U.are.U Fingerprint Reader Use and Maintenance Guide
	DpCore.msm DpDrivers.msm DpFpRec.msm DPFpUI.msm DpProCore.msm DPOPOS.msm	Merge modules for creating your own MSI installer
	Warnings_and_Regulatory_Information.pdf	Hardware Warnings and Regulatory Information
Third-Party Software\Adobe Reader	AdbeRdr80_en_US.exe Readme.txt	Installs Adobe® Reader® 8 Adobe Reader notice
Third-Party Software\Microsoft Installer	WindowsInstaller-KB893803-v2-x86.exe	Microsoft MSI installer

This chapter contains specific information about the U.are.U UPOS for OPOS implementation of the OPOS Control.

## DataEvent

### Syntax

```
<< event >> upos::events::DataEvent
    Status: int32 { read-only }
```

### Description

This event is fired to provide input data from the fingerprint reader to the application. The actual input data is placed in one or more device-specific properties.

### Attribute

This event contains the following attribute:

Attribute	Type	Description
<i>Status</i>	<i>int32</i>	BIO_DATA_ENROLL (if enroll capture is completed) BIO_DATA_VERIFY (if verify capture is completed)

## DirectIOEvent

### Syntax

```
<< event >> upos::events::DirectIOEvent
    EventNumber: int32 { read-only }
    Data: int32 { read-write }
    Obj: object { read-write }
```

### Description

This event is fired by the Service Object (SO) to communicate directly with the application. **DirectIOEvent** is used in the U.are.U UPOS for OPOS to notify the user of the image-capturing status, fingerprint reader connection status, and image quality, etc., whenever required.

## Attributes

This event contains the following attributes:

Attribute	Type	Description
<i>EventNumber</i>	<i>int32</i>	Event number whose specific values are assigned by the SO.
<i>Data</i>	<i>int32</i>	Additional numeric data. Specific values vary by the <i>EventNumber</i> and the SO.
<i>Obj</i>	<i>object</i>	Additional data whose use varies by the <i>EventNumber</i> and the SO.

## EventNumber Return Values

EventNumber	Description
1	The fingerprint reader was disconnected.
2	The fingerprint reader was reconnected.
3	The fingerprint reader was touched.
4	The finger was removed from the fingerprint reader.
5	A fingerprint image is ready for processing.
6	Provides information about the quality of the fingerprint image.
7	A supplied fingerprint credential was added to the fingerprint enrollment template.
8	The fingerprint capture operation was stopped.

## Data Return Values

EventNumber <sup>1</sup>	Data	Description
6	DP_QUALITY_GOOD, DP_QUALITY_NONE, etc.	Can be any value from the DP_SAMPLE_QUALITY enumeration in the table on the next page.
7	1,2,3, etc.	Holds the number of images added.

1. For every other *EventNumber* (1 through 5 and 8), *Data* holds the value 0 (Not Supported).

**DP\_SAMPLE\_QUALITY Enumeration**

<b>Value</b>	<b>Meaning</b>
DP_QUALITY_GOOD (0)	The image is of good quality.
DP_QUALITY_NONE (1)	There is no image.
DP_QUALITY_TOOLIGHT (2)	The image is too light.
DP_QUALITY_TOODARK (3)	The image is too dark.
DP_QUALITY_TOONOISY (4)	The image is too noisy.
DP_QUALITY_LOWCONTR (5)	The image contrast is too low.
DP_QUALITY_FTRNOTENOUGH (6)	The image does not contain enough information.
DP_QUALITY_NOCENTRAL (7)	The image is not centered.

**Obj Return Values**

<b>EventNumber</b>	<b>Object</b>
1	The fingerprint reader was disconnected.
2	The fingerprint reader was reconnected.
3	The fingerprint reader was touched.
4	The finger was removed from the fingerprint reader.
5	NULL (Not Supported).
6	Provides information about the quality of the fingerprint image.
7	A supplied fingerprint credential was added to the fingerprint enrollment template.
8	The fingerprint capture operation was stopped.

## StatusUpdateEvent

### Syntax

```
<< event >> upos::events::StatusUpdateEvent
    Status: int32 { read-only }
```

### Description

This event is used in the U.are.U UPOS for OPOS to notify the user that a raw image is available for use.

### Attribute

This event contains the following attribute:

Attribute	Type	Description
<i>Status</i>	<i>int32</i>	The <i>Status</i> parameter notifies the user that raw image data is available.

### Status Return Values

StatusUpdateEvent	Value	Meaning
1	BIO_SUE_RAW_DATA	Raw image data is available.

The following table provides information about how UPOS properties, methods, and events are implemented in the DigitalPersona U.are.U UPOS for OPOS.

Name	Implemented <sup>1</sup>	Comment
<b>OPOS Common Properties</b>		
<b>AutoDisable</b>	Partial	This property is initialized to false in the <b>open</b> method. It is not modified during the execution of the application since it is not required to automatically disable the device when data is received.
<b>BinaryConversion</b>	Partial	This property is initialized to OPOS_BC_NONE in the <b>open</b> method and is not modified during the execution of the application.
<b>CapCompareFirmwareVersion</b>	Partial	This property is initialized to false in the <b>open</b> method. It is not modified during the execution of the application since the compare firmware version operation is not supported.
<b>CapPowerReporting</b>	Partial	This property is initialized to OPOS_PR_NONE in the <b>open</b> method. It is not modified during the execution of the application since the power reporting operation is not supported.
<b>CapStatisticsReporting</b>	Partial	This property is initialized to false in the <b>open</b> method. It is not modified during the execution of the application since the statistics reporting operation is not supported.
<b>CapUpdateFirmware</b>	Partial	This property is initialized to false in the <b>open</b> method. It is not modified during the execution of the application since the update firmware operation is not supported.
<b>CapUpdateStatistics</b>	Partial	This property is initialized to false in the <b>open</b> method. It is not modified during the execution of the application since the update statistics operation is not supported.
<b>CheckHealthText</b>	No	This property is not supported.
<b>Claimed</b>	Yes	This property is initialized to false in the <b>open</b> method. It is set to true on Claim and set to false again on Release.
<b>ControlObjectDescription</b>	Yes	This property is supported.
<b>ControlObjectVersion</b>	Yes	This property is supported.
<b>DataCount</b>	Partial	This property is initialized to 0 in the <b>open</b> method and is not modified during the execution of the application.

Name	Implemented <sup>1</sup>	Comment
<b>DataEventEnabled</b>	Partial	This property is initialized to false in the <b>open</b> method and is set to true after a successful Claim operation.
<b>DeviceDescription</b>	Yes	This property is supported.
<b>DeviceEnabled</b>	Partial	This property is initialized to false in the <b>open</b> method and is set to true after a successful Claim operation. Since the <b>AutoDisable</b> property is never set to true, <b>DeviceEnabled</b> always remains true.
<b>DeviceName</b>	Yes	This property is supported.
<b>FreezeEvents</b>	Partial	This property is initialized to false in the <b>open</b> method. It is not modified during the execution of the application since it is not required to freeze events.
<b>OpenResult</b>	Yes	This property is supported.
<b>OutputID</b>	No	This property is not supported by the Biometrics device category.
<b>PowerNotify</b>	Partial	This property is initialized to OPOS_PN_DISABLED in the <b>open</b> method. It is not modified during the execution of the application since Power Reporting is not supported.
<b>PowerState</b>	Partial	This property is initialized to OPOS_PS_UNKNOWN in the <b>open</b> method. It is not modified during the execution of the application since the power reporting operation is not supported.
<b>ResultCode</b>	Yes	This property is supported.
<b>ResultCodeExtended</b>	No	This property is not implemented.
<b>ServiceObjectDescription</b>	Yes	This property is supported.
<b>ServiceObjectVersion</b>	Yes	This property is supported.
<b>State</b>	Partial	This property is initialized to OPOS_S_IDLE in the <b>open</b> method and is set to OPOS_S_CLOSED in the <b>close</b> method.
<b>Specific Properties</b>		
<b>Algorithm</b>	Yes	This property is initialized to 0 in the <b>open</b> method and is not modified during the execution of the application.
<b>AlgorithmList</b>	Partial	This property is currently set to an empty string since there is only one (default) algorithm.
<b>BIR</b>	Yes	This property holds the biometric data that is captured and returned to the application.

Name	Implemented <sup>1</sup>	Comment
<b>CapPrematchData</b>	Partial	This property is initialized to false in the <b>open</b> method. It is not modified during the execution of the application since the MOC (Match-on-Card) SmartCard technology needed to generate a processed <b>BIR</b> based on pre-match data stored on a SmartCard is not supported.
<b>CapRawSensorData</b>	Yes	This property is initialized to true in the <b>open</b> method and is not modified during the execution of the application.
<b>CapRealTimeData</b>	Partial	This property is initialized to false in the <b>open</b> method and is not modified during the execution of the application.
<b>CapSensorColor</b>	Yes	This property is initialized to BIO_CSC_GRAYSCALE in the <b>open</b> method and is not modified during the execution of the application.
<b>CapSensorOrientation</b>	Yes	This property is initialized to BIO_CSO_INVERTED in the <b>open</b> method and is not modified during the execution of the application.
<b>CapSensorType</b>	Yes	This property is initialized to BIO_CST_FINGERPRINT in the <b>open</b> method and is not modified during the execution of the application.
<b>CapTemplateAdaptation</b>	Partial	This property is initialized to false in the <b>open</b> method. It is not modified during the execution of the application since the template adaptation operation is not supported.
<b>RawSensorData</b>	Yes	This property holds the raw biometric data that is captured and returned to the application.
<b>RealTimeDataEnabled</b>	Partial	This property is initialized to false in the <b>open</b> method and is not modified during the execution of the application.
<b>SensorBPP</b>	Yes	This property is initialized by invoking the DigitalPersona function that defines the image resolution in pixels.
<b>SensorColor</b>	Yes	This property is initialized by invoking the DigitalPersona function that defines the image type.
<b>SensorHeight</b>	Yes	This property is initialized by invoking the DigitalPersona function that defines the image height in pixels.
<b>SensorOrientation</b>	Yes	This property is initialized to BIO_SO_INVERTED in the <b>open</b> method and is not modified during the execution of the application.
<b>SensorType</b>	Yes	This property is initialized to BIO_ST_FINGERPRINT in the <b>open</b> method and is not modified during the execution of the application.

Name	Implemented <sup>1</sup>	Comment
<b>SensorWidth</b>	Yes	This property is initialized by invoking the DigitalPersona function that defines the image width in pixels.
<b>Common Methods</b>		
<b>Open</b>	Yes	This method is implemented.
<b>Close</b>	Yes	This method is implemented.
<b>ClaimDevice</b>	Yes	This method is implemented.
<b>ReleaseDevice</b>	Yes	This method is implemented.
<b>CheckHealth</b>	No	This method is not implemented for Digital Persona.
<b>ClearInput</b>	No	This method is not implemented for Digital Persona.
<b>ClearInputProperties</b>	No	This method is not implemented for Digital Persona.
<b>ClearOutput</b>	No	This method is not supported by the Biometrics device category.
<b>DirectIO</b>	No	This method is not implemented for Digital Persona.
<b>CompareFirmwareVersion</b>	No	This method is not implemented for Digital Persona.
<b>ResetStatistics</b>	No	This method is not implemented for Digital Persona.
<b>RetrieveStatistics</b>	No	This method is not implemented for Digital Persona.
<b>UpdateFirmware</b>	No	This method is not implemented for Digital Persona.
<b>UpdateStatistics</b>	No	This method is not implemented for Digital Persona.
<b>Specific Methods</b>		
<b>beginEnrollCapture</b>	Yes	This method is implemented.
<b>beginVerifyCapture</b>	Yes	This method is implemented.
<b>endCapture</b>	Yes	This method is implemented.
<b>identify</b>	Yes	This method is implemented.
<b>identifyMatch</b>	Yes	This method is implemented.
<b>processPrematchData</b>	No	This method is not implemented for Digital Persona.
<b>verify</b>	Yes	This method is implemented.
<b>verifyMatch</b>	Yes	This method is implemented.

Name	Implemented <sup>1</sup>	Comment
<b>Events</b>		
<b>DataEvent</b>	Yes	Valid values for <i>Status</i> parameter are 1- BIO_DATA_ENROLL (Enrollment) 2- BIO_DATA_VERIFY (Verification)
<b>DirectIOEvent</b>	Specific	Return values are 1 - DP_DIOE_DISCONNECT 2 - DP_DIOE_RECONNECT 3 - DP_DIOE_FINGER_TOUCHED 4 - DP_DIOE_FINGER_GONE 5 - DP_DIOE_IMAGE_READY 6 - DP_DIOE_SAMPLE_QUALITY 7 - DP_DIOE_ENROLL_FEATURES_ADDED 8 - DP_DIOE_OPERATION_STOPPED
<b>ErrorEvent</b>	Yes	<b>ResultCode</b> - Standard OPOS Result Code
	Specific	<b>ResultCodeExtended</b> - DigitalPersona Result Code
	Yes	<b>ErrorLocus</b> - EL_INPUT
	Yes	<b>ErrorResponse</b> - ER_CLEAR
<b>OutputCompleteEvent</b>	No	This event is not supported by the Biometrics device category.
<b>StatusUpdateEvent</b>	Partial	Valid values for <i>Status</i> parameter are 1 - BIO_SUE_RAW_DATA

1. Yes = Fully implemented  
 No = Not implemented  
 Partial = Implemented, but not all features are available  
 Specific = Implemented with device-specific features or data

This chapter defines DigitalPersona device-related result codes returned to the *ResultCodeExtended* parameter of the **ErrorEvent** event.

Value	Result Code	Description
0	FT_OK	The function succeeded.
1	FT_WRN_NO_INIT	The fingerprint feature extraction module or the fingerprint comparison module are not initialized.
8	FT_WRN_INTERNAL	An internal error occurred.
9	FT_WRN_KEY_NOT_FOUND	The fingerprint feature extraction module or the fingerprint comparison module could not find an initialization setting.
11	FT_WRN_UNKNOWN_DEVICE	The fingerprint reader is not known.
12	FT_WRN_TIMEOUT	The function has timed out.
-1	FT_ERR_NO_INIT	The fingerprint feature extraction module or the fingerprint comparison module is not initialized.
-2	FT_ERR_INVALID_PARAM	One or more parameters are not valid.
-3	FT_ERR_NOT_IMPLEMENTED	The called function was not implemented.
-4	FT_ERR_IO	A generic I/O file error occurred.
-7	FT_ERR_NO_MEMORY	There is not enough memory to perform the action.
-8	FT_ERR_INTERNAL	An unknown internal error occurred.
-9	FT_ERR_BAD_INI_SETTING	Initialization settings are corrupted.
-10	FT_ERR_UNKNOWN_DEVICE	The requested device is not known.
-11	FT_ERR_INVALID_BUFFER	A buffer is not valid.
-16	FT_ERR_FEAT_LEN_TOO_SHORT	The specified fingerprint feature set or fingerprint template buffer size is too small.
-17	FT_ERR_INVALID_CONTEXT	The given context is not valid.
-29	FT_ERR_INVALID_FTRS_TYPE	The feature set purpose is not valid.
-32	FT_ERR_FTRS_INVALID	Decrypted fingerprint features are invalid. Decryption may have failed.
-33	FT_ERR_UNKNOWN_EXCEPTION	An unknown exception occurred.

You may redistribute the files in the OPOS\Install and the Redist folders of the U.are.U UPOS for OPOS product CD to your end users pursuant to the terms of the end user license agreement (EULA) located in the Docs folder on the product CD.

When you develop a product based on the U.are.U UPOS for OPOS, you need to provide the redistributables to your end users. These files are designed and licensed for use with your application. You may include the installation files located in the OPOS\Install folder in your application or you may incorporate the redistributables directly into your installer. You may also use the merge modules located in the Redist folder on the product CD to create your own MSI installer.

Per the terms of the EULA, DigitalPersona grants you a non-transferable, non-exclusive, worldwide license to redistribute, either directly or via the respective merge modules, the following files contained in the OPOS\Install and Redist folders of the U.are.U UPOS for OPOS product CD to your end users and to incorporate these files into derivative works for sale and distribution:

## OPOS\Install Folder

- InstallOnly.bat
- Setup.exe
- Setup.msi
- UninstallOnly.bat

## Redist Folder

- DpCore.msm

This merge module contains the following files:

- Dpcoper2.dll
- Dpdevice2.dll
- Dpfpapi.dll
- Dphostw.exe
- Dpmux.dll
- Dpmsg.dll
- Dpclback.dll

- DpDrivers.msm

This merge module contains the following files:

- Dpd00701x64.dll
- Dpdevctlx64.dll
- Dpdevdatx64.dll
- Dpersona\_x64.cat
- Dpersona\_x64.inf
- Dpi00701x64.dll
- Dpinst32.exe
- Dpinst64.exe
- Usbdpfp.sys
- Dpersona.cat
- Dpersona.inf
- Dpdevctl.dll
- Dpdevdat.dll
- Dpk00701.sys
- Dpk00303.sys
- Dpd00303.dll
- Dpd00701.dll
- Dpi00701.dll

- DpFpRec.msm

This merge module contains the following files:

- Dphftrex.dll
- Dphmatch.dll

- DPFpUI.msm

This merge module contains the following file:

- Dpfpui.dll

- DPOPOS.msm

This merge module contains the following files:

- Dpserviceobject.dll
- Oposbiometrics.ocx

- DpProCore.msm

This merge module contains the following files:

- Dpdevts.dll
- Dpsvinfo2.dll
- Dptsclnt.dll

## Fingerprint Reader Documentation

You may redistribute the documentation included in the Redist folder on the U.are.U UPOS for OPOS product CD to your end users pursuant to the terms of the EULA, which is located in the Docs folder on the product CD, and of this section.

### Hardware Warnings and Regulatory Information

If you distribute DigitalPersona U.are.U fingerprint readers to your end users, you are responsible for advising them of the warnings and regulatory information included in the Warnings and Regulatory Information.pdf file in the Redist folder on the U.are.U UPOS for OPOS product CD. You may copy and redistribute the language, including the copyright and trademark notices, set forth in the Warnings and Regulatory Information.pdf file.

### Fingerprint Reader Use and Maintenance Guide

The DigitalPersona U.are.U Fingerprint Reader Use and Maintenance Guide, DigitalPersona Reader Maintenance.pdf, is located in the Redist folder on the U.are.U UPOS for OPOS product CD. You may copy and redistribute the DigitalPersona Reader Maintenance.pdf file, including the copyright and trademark notices, to those who purchase a U.are.U module or fingerprint reader from you.

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