

ZEBRA SCANNER SDK FOR WINDOWS DEVELOPER'S GUIDE

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Revision History

Changes to the original guide are listed below:

Change	Date	Description
-01 Rev A	6/2011	Initial release.
-02 Rev A	3/2012	Updates for 64-bit: - updated Table 2-2; converted code to text from graphics - removed unsupported methods - updated Table 2-2 (add cradle info for DS6878 & LS4278) - added USB CDC support - updated pgs. 4-13 & 4-14: DEVICE_BEEP_CONTROL & DEVICE_LED_ON changed to SET_ACTION; <arg-int> values changed to 2 & 43, respectively - updated note and Step 6 on page 4-14; added 3 rows for TWAIN to the bottom of Table 2-3 on page 2-11.
-03 Rev A	11/2013	Adds: ->Scale information. ->Intelligent Document Capture (IDC) information. ->USB IBM Table-top; SSI Updates: ->Installation package name changes ->New Configuration section (pg. 2-13).
-04 Rev A	4/2015	Zebra software branding.
-05 Rev A	3/2016	Zebra software rebranding.
-06 Rev A	3/2017	- Removed/replaced references to the <i>Attribute Data Dictionary</i> - Updated supported operating systems table - Updated List of Methods table - Added Action Attributes table - Removed CONFIGURE_DADF and RESET_DADF commands

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Quick Startup

ABOUT THIS GUIDE

Introduction

This guide provides information about the Zebra Scanner Software Developer Kit (SDK) - an architectural framework providing a single programming interface across multiple programming languages and across multiple system environments for all scanners communication variants (such as IBMHID, SNAPI, SSI, HIDKB, Nixdorf Mode B, etc.).

Chapter Descriptions

Topics covered in this guide are as follows:

- [Chapter 1, INTRODUCTION TO THE SCANNER SDK](#) provides an overview of the Zebra Scanner Software Developer Kit (SDK).
- [Chapter 2, INSTALLATION & CONFIGURATION](#) describes how to install Zebra Scanner SDK and its components on recommended platforms.
- [Chapter 3, SCANNER SDK API](#) provides the set of APIs to interface with scanner devices.
- [Chapter 4, TEST UTILITIES & SOURCE CODE](#) provides information about testing and evaluation of the Zebra Scanner SDK's software components using the test utilities provided in the SDK.
- [Chapter 5, SAMPLE SOURCE CODE](#) provides information about how a developer uses the Zebra Scanner SDK.
- [Appendix A, WRITE SIMPLE APPLICATIONS USING THE SCANNER SDK API](#) provides a step by step guide to writing simple applications using CoreScanner APIs.
- [Appendix B, SCANNER SDK VISUAL STUDIO PROJECT TEMPLATE](#) provides information about using the SDK project template.
- [Appendix C, DESCRIPTION OF INTELLIGENT DOCUMENT CAPTURE FORMAT](#) provides Intelligent Document Capture output information.
- [Appendix D, CORESCANNER DEBUG LOGGING](#) provides information about enabling debug logging.

Notational Conventions

The following conventions are used in this document:

- Courier New font is used for code segments.
- *Italics* are used to highlight:
 - Chapters and sections in this and related documents
 - Dialog box, window and screen names
 - Drop-down list and list box names
 - Screen field names
 - Check box and radio button names
 - File names
 - Directory names.
- **Bold** text is used to highlight:
 - Parameter and option names
 - Icons on a screen
 - Key names on a keypad
 - Button names on a screen.
- bullets (•) indicate:
 - Action items
 - Lists of alternatives
 - Lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.
- Notes, caution and warning statements appear as follows:



NOTE This symbol indicates something of special interest or importance to the reader. Failure to read the note does not result in physical harm to the reader, equipment or data.



CAUTION This symbol indicates that if this information is ignored, the possibility of data or material damage may occur.



WARNING! This symbol indicates that if this information is ignored the possibility that serious personal injury may occur.

Service Information

If you have a problem using the equipment, contact your facility's technical or systems support. If there is a problem with the equipment, they will contact the Zebra Technologies Global Customer Support Center at: www.zebra.com/support.

CHAPTER 1 INTRODUCTION TO THE SCANNER SDK

Overview

The Zebra Scanner Software Developer Kit (SDK) defines an architectural framework providing a single programming interface across multiple programming languages (such as MS .NET, C++, Java) and across multiple system environments (such as Windows XP, Vista, Linux) for all scanners communication variants (such as IBMHID, SNAPI, HIDKB, Nixdorf Mode B, etc.).

The Zebra Scanner SDK includes a suite of components that provides a unified software development framework with a wide range of functions for interfacing Zebra scanners to user applications and solutions.

With this SDK you can read bar codes, manage scanner configurations, capture images/videos and selectively choose a list of scanners on which to work. While one application is in one programming language using a scanner or a set of scanners, another application in a different language can be used differently within the same system environment.

For a list of the most commonly requested topics within this guide, see [Quick Startup](#) in the back of the guide.

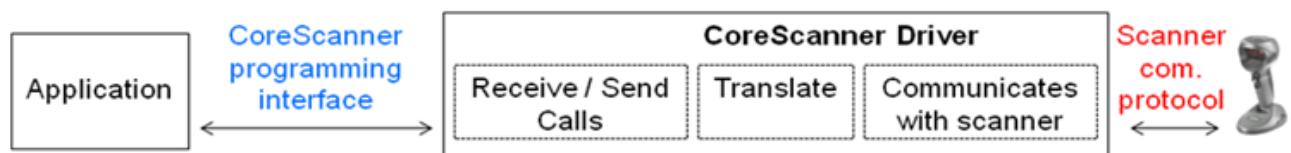


Figure 1-1 *Software Developer Framework*

The SDK can build an application with complete control of its scanner's capabilities.

- Data, Barcode
 - Simulation HID Keyboard output
 - OPOS/JPOS output
 - SNAPI output

- Command and Control
 - LED and Beeper Control
 - Aim Control
- Imaging
 - Capture / Transfer of images
 - Capture / Transfer of Video
- Remote Scanner Management
 - Asset Tracking
 - Device Configuration (Get, Set and Store scanner attributes)
 - Firmware Upgrade
 - Scanner Communication Protocol Switching
 - Service to Automate Configuration / Firmware Upgrade Process.



NOTE For a list of a scanner's supported attribute (parameter) numbers and definitions, refer to the *Product Reference Guide* for that model scanner, available from the Zebra Support website at <http://www.zebra.com/support>. Attributes include configuration parameters, monitored data, and asset tracking information.

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FAQs

- Can multiple scanners be connected to the CoreScanner Driver?
 - Yes, multiple scanners can be connected simultaneously to one host running the CoreScanner driver.
- If two scanners are connected, can data be tracked by scanner ID?
 - Yes, if scanner X decodes a bar code 123, it returns to the application a data event consisting of 123 as the data label and the serial number as the scanner ID.
- Can multiple applications be connected to the CoreScanner Driver?
 - Yes, multiple applications can be connected simultaneously on one host running the CoreScanner driver. An application can register from a selection of event types (such as bar code, image, video or management). The application receives the event information plus the originating scanner ID.
- Are the CoreScanner calls common across operating systems?
 - Yes. For example, the Open method's function signatures for C++ and Java are the same except for the platform specific data and return types (highlighted in yellow below).

JAVA

int Open(long appHandle, short[] sfTypes, int lengthOfType, long status);

C++

HRESULT Open(LONG appHandle, SAFEARRAY* sfTypes, SHORT lengthOfType, LONG* status);

Figure 1-2 Function Signatures for C++ and Java

Scanner SDK Architecture

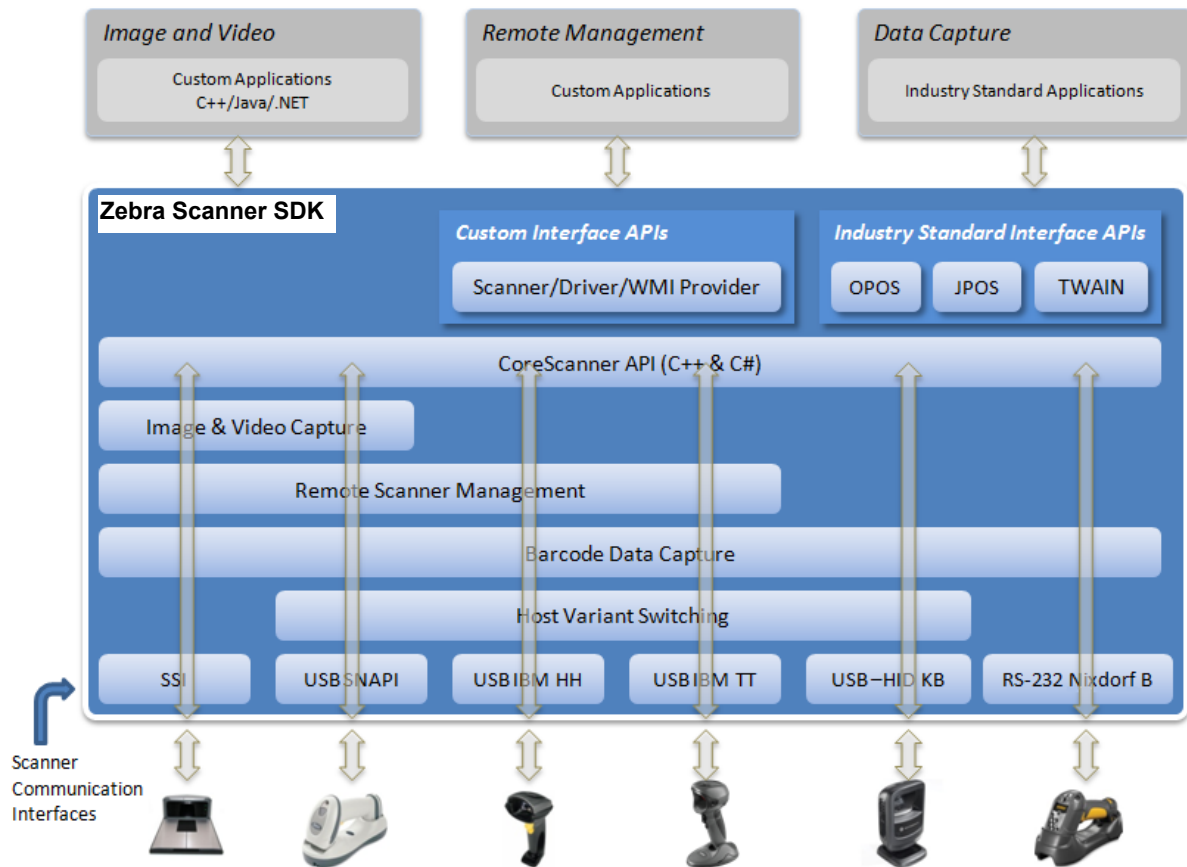


Figure 1-3 SDK Architecture

You can configure Zebra scanner devices to be operated in different host communication modes such as USB SNAP I, USB OPOS, USB HID Keyboard, USB IBM Table-top, SSI, and RS232 Nixdorf Mode B. Device feature support varies depending on communication mode but all modes support bar code scanning. Refer to the Product Reference Guide of a specific scanner for the bar codes to set its supported host communication modes.

Using the Zebra Scanner SDK, you can switch between supported host communication modes by calling the host variant switching command programmatically. This is useful when the device is in a less feature supportive mode and some advanced functionality is required but not supported by the current communication mode. The scanner can be switched to a feature rich mode and commands executed before switching the scanner back to the previous mode.

For example, you want to disable the UPC-A symbology but the device is in USB HID Keyboard mode. If the mode is supported by the scanner, you may switch to USB SNAP I or USB OPOS, set UPC-A to be disabled permanently and then switch the scanner back to USB HID Keyboard mode. See [Table 1-1 on page 1-6](#) for more information.

Table 1-1 illustrates scanner capabilities supported by each communication mode. Refer to the specifications of a device for its ability to support of each communication mode.

Table 1-1 *Scanner Device Communication Modes Vs. Capabilities*

Capabilities	USB SNAPI	USB OPOS	USB HID Keyboard	USB IBM Table-top	RS232 Nixdorf B	SSI
Data	Supported	Supported	Supported	Supported	Supported	Supported
Host Variant Switching	Supported	Supported	Supported	Supported	Not Available	Not Available
Management	Supported	Supported	Not Available	Supported	Not Available	Supported
Image & Video	Supported	Not Available	Not Available	Not Available	Not Available	Supported (Image Only)
Simulated HID Keyboard Output *	Supported	Supported	Not Applicable	Supported	Supported *	Supported

***Advanced Data Formatting (ADF) is not supported when using Simulated HID Keyboard Output.**

Simulated HID Keyboard Output is a feature enabling scanners in USB SNAPI, USB IBM Table-top, USB OPOS, or SSI mode to emulate HID Keyboard keystrokes to a host system for scanned data labels. It sends the content of the scanned data label as HID Keyboard keystrokes thus emulating USB HID Keyboard scanner mode.

Multiple Scanner Device Identification Methodology For Applications

The Zebra Scanner SDK supports multiple scanner devices to any application that runs on top of CoreScanner APIs. Each scanner device is shown to the user application by a unique scanner identification number. The scanner ID is a numeric value assigned to each connected device so there cannot be multiple scanner devices holding the same scanner ID.

Asset tracking information like model number, serial number, current firmware version and date of manufacture are available if the scanner and its current host mode support the management feature.

For example, in some modes like USB HID Keyboard, you do not see asset tracking information but the same scanner device shows you such information when it is in USB OPOS or USB SNAPi mode.

The format of device asset tracking information can follow different naming conventions for device model, serial number or current firmware version. For example, the length of a serial number for DS6707 and DS9808 scanners can be different.

How Multiple Applications Access Multiple Scanners From Scanner SDK

The Zebra Scanner SDK supports multiple applications accessing multiple scanner devices connected to the host at the same time.

As described previously, a scanner ID uniquely identifies a connected scanner device to all applications. A scanner ID is consistent among all applications for one SDK instance. If the CoreScanner service or the host machine is restarted, a device may be assigned a different scanner ID but it is unique and referenced by all applications.

Three Applications Connected To One Scanner

Figure 1-4 illustrates how multiple applications communicate with multiple scanner devices.

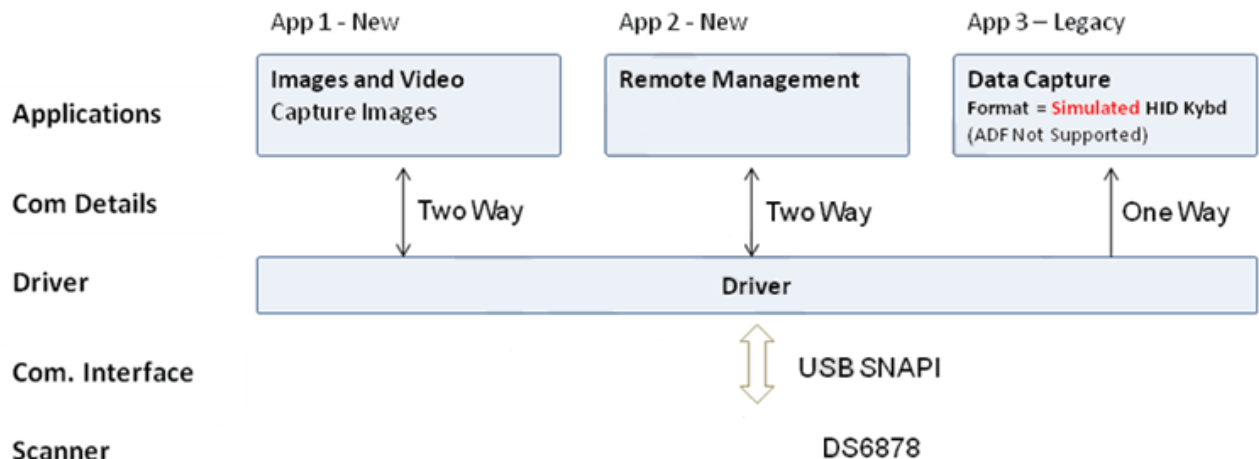


Figure 1-4 Three Applications Connected To One Scanner

Implementation Details

- Three applications are connected to one scanner.
- App 1 & App 2 support bi-directional (two way) communication with the scanner.
- Legacy App 3 supported by driver converting SNAPi data into HID format.

Three Applications Connected To Two Scanners

Figure 1-4 illustrates how multiple applications communicate with multiple scanner devices.

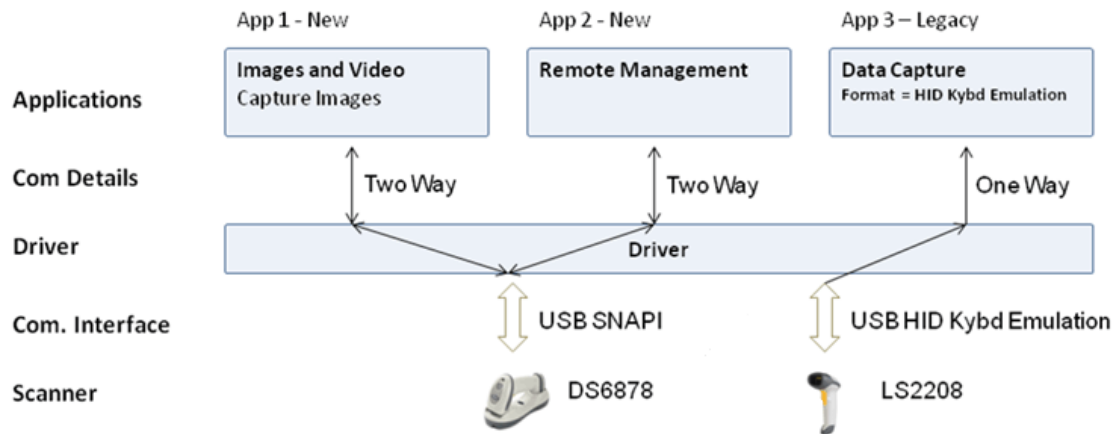


Figure 1-5 Three Applications Connected To Two Scanners

Implementation Details

- Three applications are connected to two scanners.
- App 1 and App 2 support bi-directional (two way) communication with the DS6878.
- Legacy App 3 receives HID keyboard emulation data from the LS2208.

Many-to-Many Application Device Usage

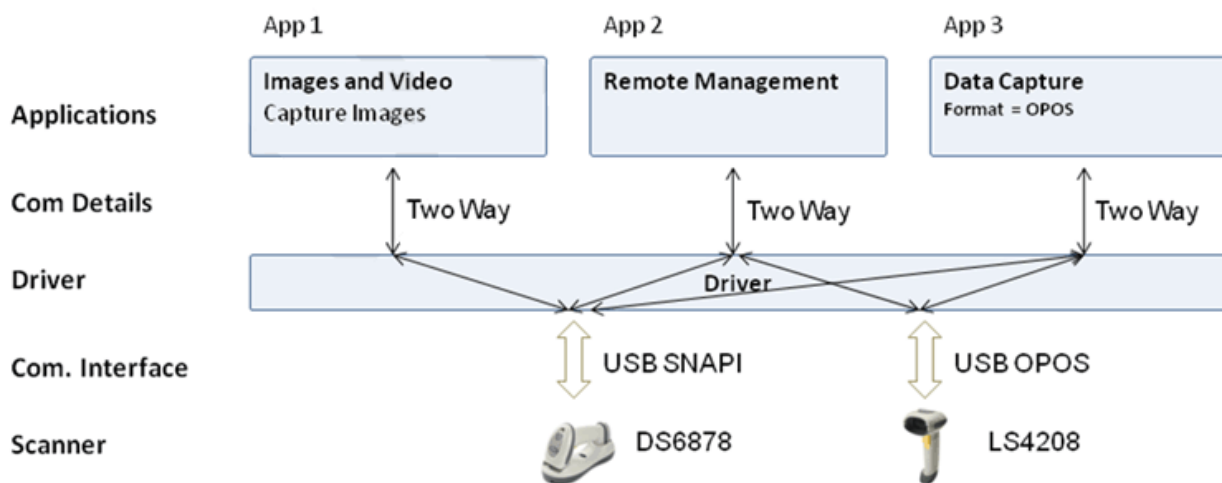


Figure 1-6 Many-to-Many Application Device Usage

Implementation Details

- App 1 performs image capture with the DS6878.
- App 2 can remotely manage both the DS6878 and LS4208.
- App 3 receives OPOS data from both the DS6878 and LS4208.

One Application Connected to Two Scanners

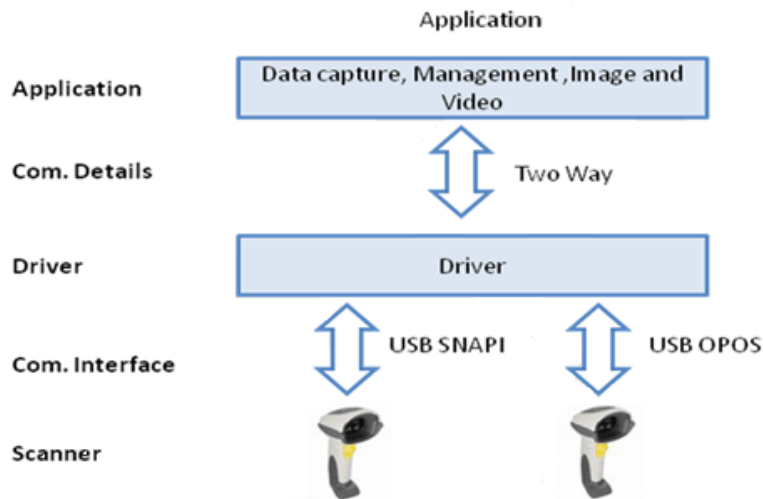


Figure 1-7 One Application Connected to Two Scanners

Implementation Details

- One application can manage multiple scanners in multiple communication interfaces.
- The application can capture data, image and video, send management commands and receive responses from multiple scanners.
- All responses from the scanners consist of the scanner device details (ScannerID, serial number, model number, etc.) identifying the device that sent the response.

For example, a bar code event for a scanned label is shown below. The scanned data label arrives with a unique ScannerID and the scanner's model number and the serial number.

```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <scandata>
      <modelnumber>DS6707-SR20001ZZR </modelnumber>
      <serialnumber>7114000503308 </serialnumber>
      <GUID>9008A01BB72BA34BB519806B63701AAA</GUID>
      <datatype>11 </datatype>
      <datalabel>0x39 0x37 0x38 0x30 0x32 0x30 0x31 0x34</datalabel>
      <rawdata>0x39 0x37 0x38 0x30 0x32 0x30 0x31 0x34</rawdata>
    </scandata>
  </arg-xml>
</outArgs>
```


CHAPTER 2 INSTALLATION & CONFIGURATION

Overview

This chapter describes how to install Zebra Scanner SDK and its components on recommended platforms.

✓ **NOTE** See [System Requirements on page 2-2](#) for supported platforms.

The SDK installation package includes support for:

- Installing required components to enable any Zebra scanner to communicate with applications or tools that execute on top of the Zebra Scanner SDK.
- Supporting documents.
- Test utilities.
- Sample applications and source projects.

This section covers installation and configuration instructions.

✓ **NOTE** Uninstall any previous Zebra, Symbol or 3rd party drivers or SDKs installed on your system which communicate with Zebra Scanner Devices before installing the Zebra Scanner SDK. This includes but is not limited to Zebra and Symbol supplied OPOS, JPOS and SNAPI drivers.

For a list of the most commonly requested topics within this guide, see [Quick Startup](#) in the back of the guide.

✓ **NOTE** For a list of a scanner's supported attribute (parameter) numbers and definitions, refer to the *Product Reference Guide* for that model scanner, available from the Zebra Support website at <http://www.zebra.com/support>. Attributes include configuration parameters, monitored data, and asset tracking information.

SDK Components

The SDK installation package includes following components.

- Zebra Scanner SDK Core components and drivers (COM API, Imaging drivers)
- OPOS Drivers
 - Scanner OPOS
 - Scale OPOS
- JPOS Drivers
 - Scanner JPOS
 - Scale JPOS
- Remote Management Components
 - Scanner WMI Provider
 - Driver WMI Provider
- Web Link to latest Developer's Guide - Document(s)
- Test & Sample utilities with Source code packages
 - Scanner SDK Sample Application (C++)
 - Scanner SDK Sample Application (Microsoft® C# .NET)
 - Scanner OPOS Test Utility
 - Scale OPOS Test Utility
 - JPOS Test Utility for Scanner and Scale
 - Scanner WMI Provider Test Utility (Microsoft® C# .NET)
 - Driver WMI Provider Test Utility (Microsoft® C# .NET).

The SDK installation package installs its components to the following default location:
C:\Program Files\Zebra Technologies\Barcode Scanners\.

System Requirements

Supported Operating Systems

Table 2-1 *Supported Operating Systems*

Zebra Scanner SDK Installation Package	
Microsoft® Windows XP SP3 (32bit)	Zebra_Scanner_SDK_(32bit)_v3.xx.xxxx.exe
Microsoft® Windows 7, Windows 8, and Windows 10 (32bit)	Zebra_Scanner_SDK_(32bit)_v3.xx.xxxx.exe
Microsoft® Windows 7, Windows 8, and Windows 10 (64bit)	Zebra_Scanner_SDK_(64bit)_v3.xx.xxxx.exe

Recommended minimum hardware requirement: x86 PC for 32-bit SDK, or x64 PC for 64-bit SDK with 512Mb RAM.

Scanner Models Versus Communication Modes

For an up-to-date table listing scanner models and their supported communication modes refer to the Scanner SDK for Windows website at: www.zebra.com/scannersdkforwindows.

Installing the SDK

Download the relevant Scanner SDK setup program for the 32-bit or 64-bit operating system on your PC from <http://www.zebra.com/scannersdkforwindows>.

There are two options for installing the Zebra Scanner SDK on a system.

- Typical installation - Loads all components in the installation package.
- Custom installation - Provides the ability to change the default selection of components.

If you install components such as OPOS, JPOS or WMI provider (remote management), the installer automatically installs sample programs and test utilities related to those components.

To download the appropriate OPOS, JPOS and WMI Developer's Guides go to:

<http://www.zebra.com/scannersdkforwindows>.

Step-by-Step Installation Instructions

1. Execute the setup program. The installation process checks for CoreScanner drivers on the target machine. If the driver package is not present or outdated, clicking **Install** adds updated drivers before installing the scanner SDK package.

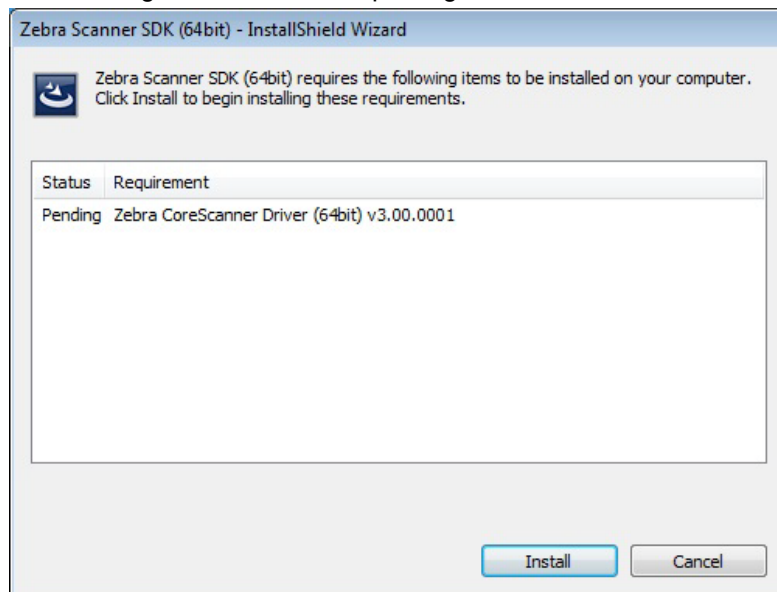


Figure 2-1 Prerequisite Check And Install

2. Installation continues once the prerequisite drivers are installed on the machine.

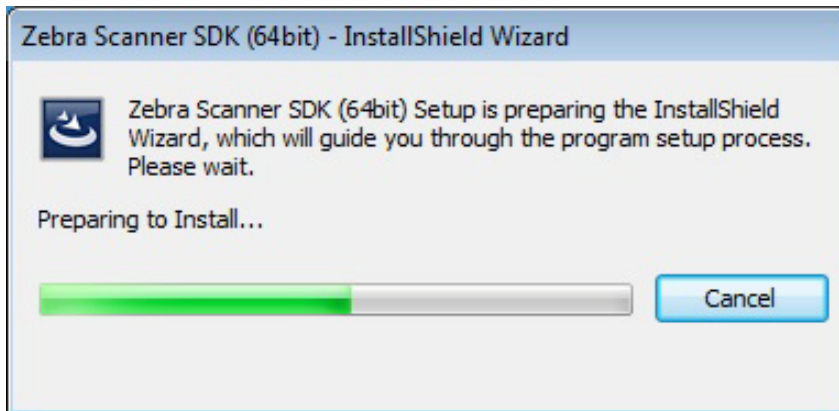


Figure 2-2 *Initial Window*

3. Click **Next** on the *Welcome* screen.

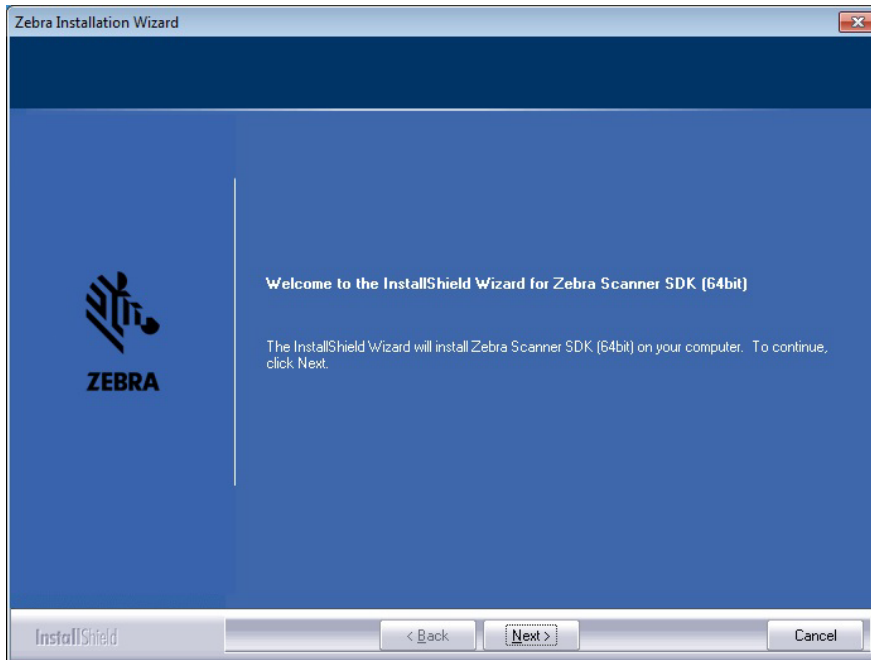


Figure 2-3 *Welcome Screen*

4. Review the license agreement and click **Yes** to accept.

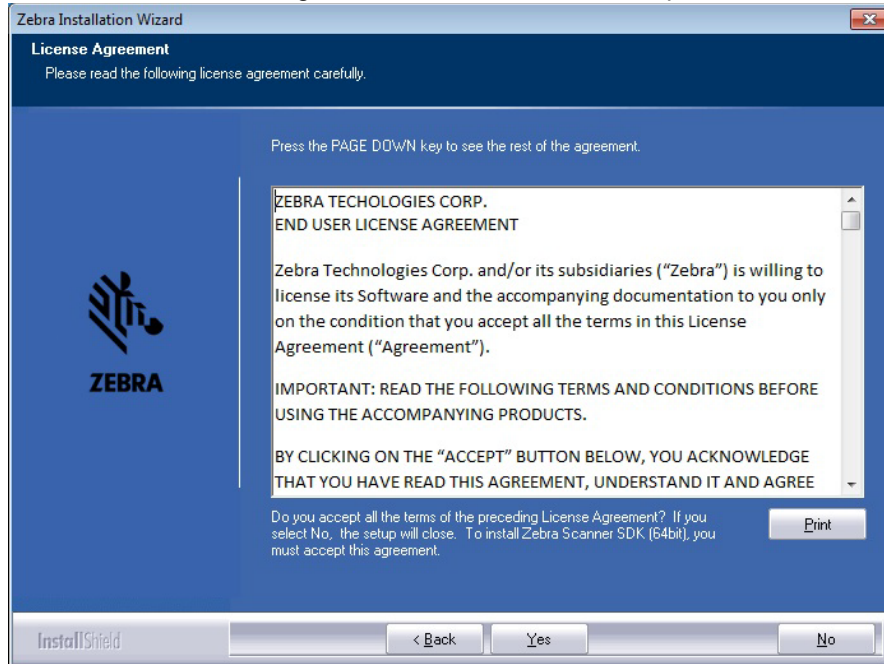


Figure 2-4 License Agreement

5. Select the *Setup Type*.

The user is prompted with two installation options:

- Complete - The installation package installs all components.
- Custom - The installation package gives the option to select which components are loaded during the installation process. The user is prompted to select components from the available list.

The user can select the destination folder by clicking **Browse** and selecting the drive and folder in which to install the Zebra Scanner SDK. However, common components are placed in designated locations for consistency with other SDK users.

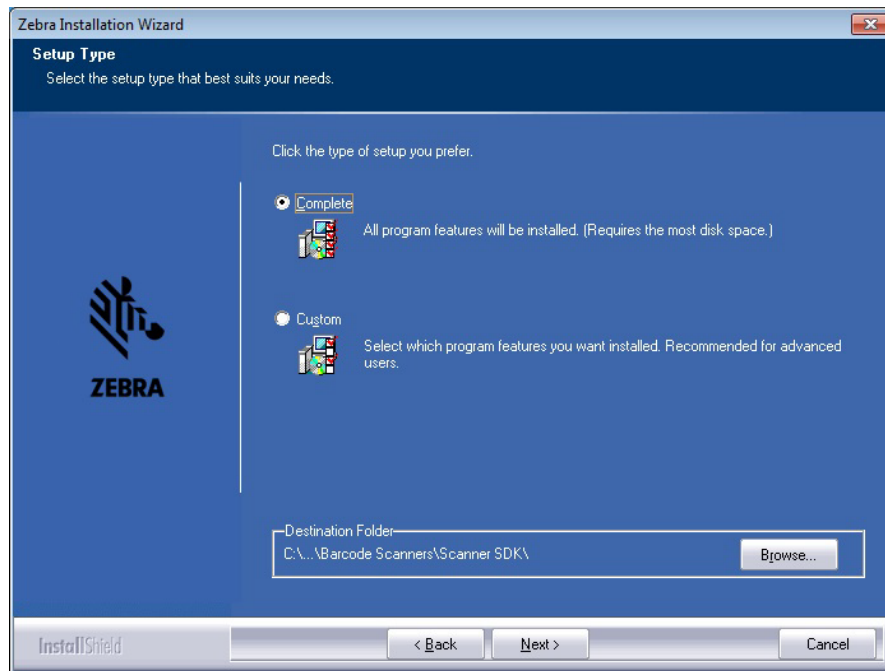


Figure 2-5 Setup Type

6. Select features. The user is prompted to select features to be installed from the available components list.

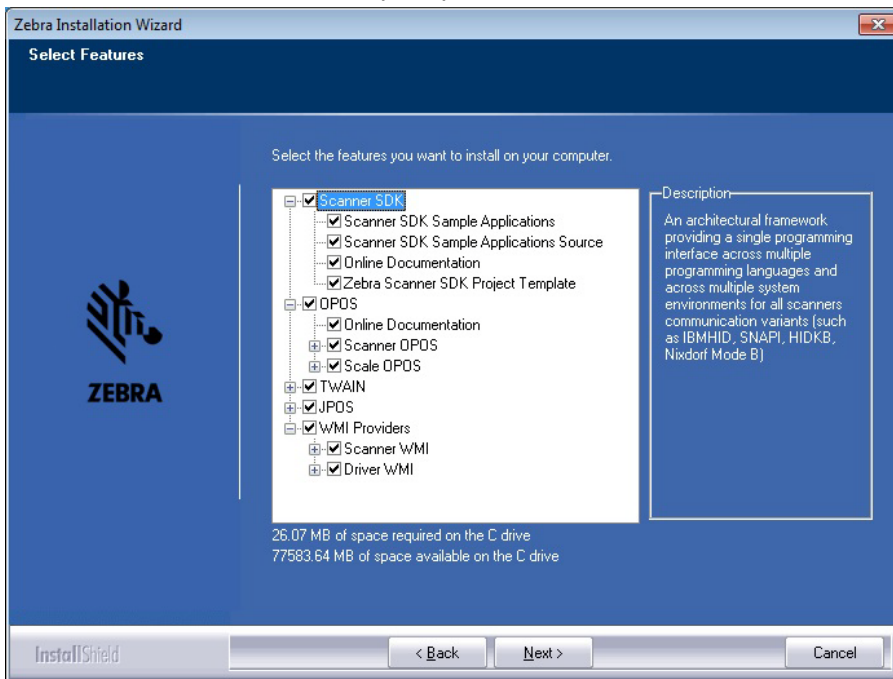


Figure 2-6 Select Features



NOTE Scanner SDK and USB imaging drivers are common components and are installed automatically.

7. Wait for the installation to complete.

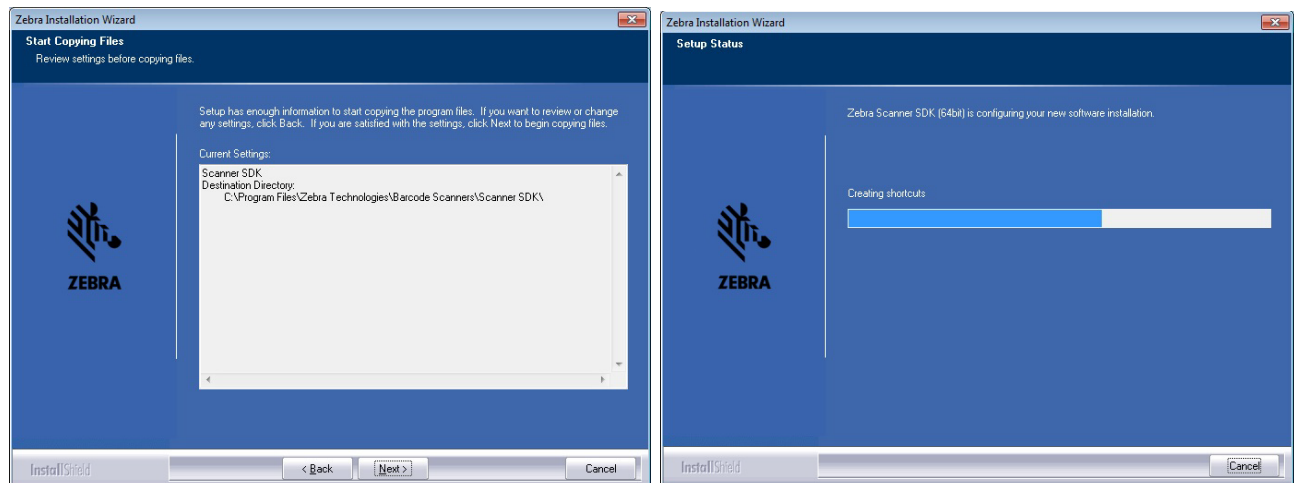


Figure 2-7 *Installation Progress*

8. Installation complete.

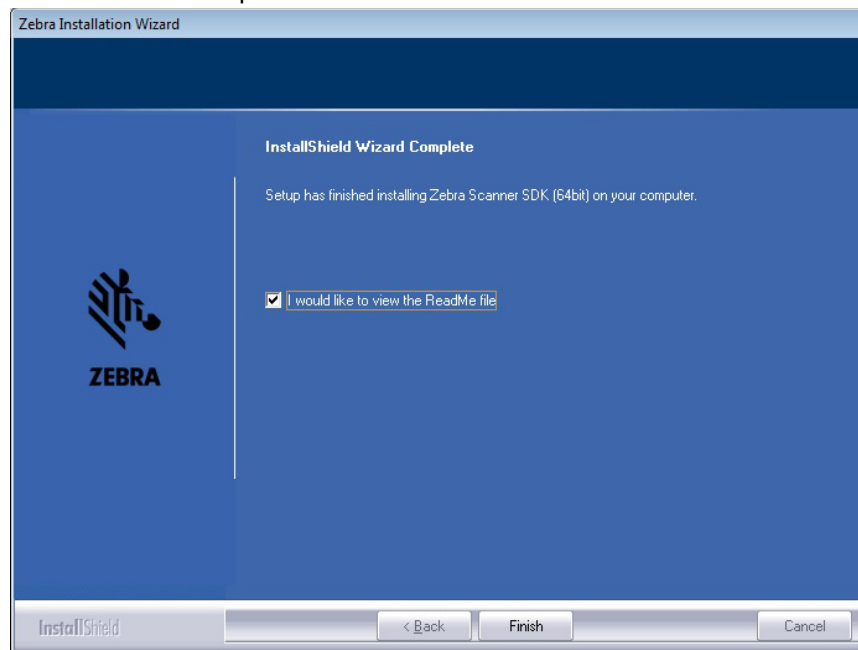


Figure 2-8 *Installation Complete*

Installed Components

There are three Windows services installed with the CoreScanner driver in a default installation:

- CoreScanner - coordinates activity between the communication layer (SNAPI, IBMHH, SSI, etc.) and upper level drivers (OPOS, JPOS, SDK API, etc.).
- RSM Driver Provider - provides WMI support.
- Symbol Scanner Management - provides WMI support.

[Table 2-2](#) lists the components installed.

Table 2-2 Zebra Scanner SDK Components

Component	File	Description	Installation Path
Scanner Driver	CoreScanner.exe	Scanner Driver/COM Server	.\Common
Scanner Driver	SNAPITrans.dll	Transport Component	.\Common
Scanner Driver	USBHIDKBTrans.dll	Transport Component	.\Common
Scanner Driver	NIXBTrans.dll	Transport Component	.\Common
Scanner Driver	IBMHIDTrans.dll	Transport Component	.\Common
Scanner Driver	SSITrans.dll	Transport Component	.\Common
Scanner Driver	IBMHIDTTTrans.dll	Transport Component	.\Common
WMI Providers	ScannerService.exe	WMI Provider Services	.\Common
WMI Providers	symbscnr.dll	WMI Instance Providers	.\Common
WMI Providers	ScannerWMITest.sln	Scanner WMI Sample Application	.\Scanner SDK\wmi_provider_scanner\Sample Applications\src
WMI Providers	RSMDriverProviderService.exe	WMI Provider Services	.\Common
WMI Providers	RSMDriverProvider.dll	WMI Instance Providers	.\Common
WMI Providers	symbscnr.mof	Managed Object Format file for WMI and CIM	.\Common
WMI Providers	RSMDriverProvider.mof	Managed Object Format file for WMI and CIM	.\Common
WMI Providers	DriverWMITest.sln	Driver WMI Sample Application	.\Scanner SDK\wmi_provider_driver\Sample Applications\src
Configuration	config.xml	Scanner Driver Configuration File	.\Common
Scanner Driver	HIDKeyboardEmulator.exe	HID Keyboard Emulator	.\Common\
SDK C++ Sample App source code	SampleApp_CPP.sln	SDK C++ Sample Application and source projects	.\Scanner SDK\Scanner SDK\Sample Applications\src

Table 2-2 Zebra Scanner SDK Components (Continued)

Component	File	Description	Installation Path
SDK C# Sample App source code	SampleApp_CSharp.sln	SDK C++ Sample Application and source projects	.\Scanner SDK\Scanner SDK\Sample Applications\src
OPOS	OPOSScanner.ocx	OPOS Scanner Control	.\Scanner SDK\OPOS\Scale OPOS\Sample Applications\src
OPOS	STIOPOS.dll	OPOS Service Object	.\Scanner SDK\OPOS\Scale OPOS\Sample Applications\src
OPOS	TestScan.sln	OPOS Sample application source project	.\Scanner SDK\OPOS\Scale OPOS\Sample Applications\src
OPOS	OPOSScale.ocx	OPOS Scale Control	.\Scanner SDK\OPOS\Scale OPOS\bin
OPOS	ScaleOPOS.dll	OPOS Scale Service	.\Scanner SDK\OPOS\Scale OPOS\bin
OPOS	OPOSScaleSampleApp.exe	OPOS Scale Sample Application source project	.\Scanner SDK\OPOS\Scale OPOS\Sample Applications\src
JPOS	CSJPOS.dll	JPOS JNI Layer for CoreScanner API	.\Scanner SDK\JPOS\bin
JPOS	POSTest	JPOS Sample Application	.\Scanner SDK\JPOS\Sample Applications\src
TWAIN	twain.ds	TWAIN driver data source	%WinDir%\twain_32\Zebra (32-bit) %WinDir%\twain_64\Zebra (64-bit)
TWAIN	TWAIN_App_mfc32.exe	TWAIN sample application	.\Scanner SDK\JPOS\Sample Applications\bin
TWAIN	TWAIN_APP_MFC.sln	TWAIN sample application source project	.\Scanner SDK\JPOS\Sample Applications\src

Configuration

Serial Mode Settings

The Zebra Scanner SDK is capable of communicating with scanners connected to serial ports through Nixdorf Mode B, or SSI serial host mode. The SDK does not open any serial port without user consent to prevent other devices from being interfered with by Scanner SDK commands. Users can configure SDK usage of serial ports with entries in the < SERIAL_MODE_SETTINGS > section of the config.xml file located in %Program Files%\Zebra Technologies\Barcode Scanners\Common.

Serial mode setting entries indicate the serial com port number (*PORT ID*), the baud rate (*BAUD*) and the serial host mode (*NAME*) used to communicate with the attached scanner. The value of the name field can be *NIXMODB*, or *SSI* and the value of each of the three fields must be enclosed in quotation marks.

By default, the serial port settings in config.xml are commented out. To activate a serial mode setting, enter a line outside of the commented area, modify the settings appropriately, save the config.xml file and restart the CoreScanner service.

Sample <SERIAL_MODE_SETTINGS> Definition in Config.xml

```
<SERIAL_MODE_SETTINGS>
  <!-- Uncomment lines in this section to configure Serial Scanners
    <PORT ID='5' BAUD='9600' NAME='NIXMODB' />
  -->
  <PORT ID='3' BAUD='9600' NAME='SSI' />
</ SERIAL_MODE_SETTINGS >
```

Simulated HID Keyboard Output

The Zebra Scanner SDK is capable of configuring a scanner to send simulated HID keyboard output (also known as HIDKB pump, or HIDKB emulation mode) while in USB SNAPi, USB IBM Hand-held, USB IBM Table-top, SSI, or RS-232 Nixdorf Mode B communication modes. This simulated HID keyboard output functionality can be configured by changing the XML elements in the <HID_KB_PUMP_SETTINGS> section of the config.xml file.

By default, the language locale of the simulated keyboard output is English. Only the English and French languages are currently supported.

Table 2-3 *Config.xml File Elements*

Tag	Values	Description
< ENABLE>	0, 1	0 - Disable (default) 1 - Enable
< LOCALE>	0, 1	0 - English (default) 1 - French
< FUNCTION_KEY_MAPPING>	0, 1	When - 0 VK_RETURN transmitted as VK_CONTROL + M VK_TAB transmitted as VK_CONTROL + I VK_BACK transmitted as VK_CONTROL + H When - 1 VK_RETURN transmitted as VK_RETURN VK_TAB transmitted as VK_TAB VK_BACK transmitted as VK_BACK Refer to your scanner's Product Reference Guide for further information on function key mapping.
< INTER_KEY_DELAY>	0, >0	Character transmission delay interval in milliseconds. The default value of zero transmits keystrokes as they are decoded. If > 0, latency is introduced into key transmission so that any receiving application can adjust to the rate of transmission.

Sample <HID_KB_PUMP_SETTINGS> definition in config.xml:

```
<HID_KB_PUMP_SETTINGS>
  <LOCALE>0</LOCALE>
  <!-- ENGLISH=0, FRENCH=1 -->
  <ENABLE>0</ENABLE>
  <!-- ENABLED=1, DISABLED=0 -->
  <FUNCTION_KEY_MAPPING>1</FUNCTION_KEY_MAPPING>
  <INTER_KEY_DELAY>0</INTER_KEY_DELAY>
</HID_KB_PUMP_SETTINGS>
```

Notes

- Refer to the specific scanner Product Reference Guide for supported serial port parameter settings.
- Simulated HID Keyboard Output settings can be temporarily changed by an application using the CoreScanner API commands KEYBOARD_EMULATOR_ENABLE and KEYBOARD_EMULATOR_SET_LOCALE. To make permanent changes to these settings that remain persistent over a reboot of the host machine, the Config.xml file must be manually edited. Changes to Config.xml take effect only after the CoreScanner service is restarted.
- When using the language locale with Simulated HID Keyboard Output, the user may need to change the input language of the application receiving keyboard input to match the language specified in Config.xml.
- Simulated HID Keyboard functionality becomes unavailable if you use Windows' Switch User functionality to switch the user on your PC. Manually restart the CoreScanner, RSM Driver Provider, and Symbol Scanner Management services, or reboot the host PC to ensure correct operation.

Simple Data Formatting (SDF)

SDF enables the formatting of scanned bar code data with prefix and suffix labels through the CoreScanner driver. SDF is available while the scanner is in USB SNAPi, USB IBM Hand-held, USB IBM Table-top, SSI, or RS-232 Nixdorf Mode B communication mode¹. Unlike Advanced Data Formatting (ADF), SDF does not permit modifying the scanned bar code data itself with any rule-based method. The prefix/suffix labels are composed of one or more ASCII characters (1-255). There can be one or more prefix/suffix labels, and they are defined in the config.xml file in the <SDF> section using the <SDFTAGDEF> tag. The SDF description is composed of a <SDFMETA> section, and a <SDFSELECT> section. The <SDFMETA> section defines the prefix/suffix labels used in SDF, and how they are combined in various ways to compose one or more SDF format definitions in the form of <SDFDEF> tags.



NOTE ¹To add prefix/suffix formatting for a scanner in HID keyboard mode, use the programming bar codes in the scanner's Product Reference Guide.

Sample <SDF> definition in config.xml:

```
<SDF>
  <SDFMETA>
    <SDFTAGDEF>SUFFIX1.SUFFIX2.PREFIX1.PREFIX2</SDFTAGDEF>
    <SUFFIX1>13.10</SUFFIX1>
    <SUFFIX2>35.36</SUFFIX2>
    <PREFIX1>37.38</PREFIX1>
    <PREFIX2>48.49.50</PREFIX2>
    <SDFDEF SdfCode='0' SdfFormat='DATA' />
    <SDFDEF SdfCode='1' SdfFormat='DATA.SUFFIX1' />
    <SDFDEF SdfCode='2' SdfFormat='DATA.SUFFIX2' />
    <SDFDEF SdfCode='3' SdfFormat='DATA.SUFFIX1.SUFFIX2' />
    <SDFDEF SdfCode='4' SdfFormat='PREFIX2.DATA' />
    <SDFDEF SdfCode='5' SdfFormat='PREFIX2.DATA.SUFFIX1' />
    <SDFDEF SdfCode='6' SdfFormat='PREFIX1.DATA.SUFFIX2' />
    <SDFDEF SdfCode='7' SdfFormat='PREFIX1.DATA.SUFFIX1.SUFFIX2' />
  </SDFMETA>
  <SDFSELECT>6</SDFSELECT>
</SDF>
```

In the XML sample above, four SDF prefix/suffix labels are defined as: SUFFIX1, SUFFIX2, PREFIX1, and PREFIX2. The values in these tags are delimited by a '.' character in the XML. Each of these labels is defined as shown below with the decimal ASCII character sequence that they represent:

SUFFIX1 = ascii(13), ascii(10) = CR, LF
 SUFFIX2 = ascii(35), ascii(36) = #, \$
 PREFIX1 = ascii(37), ascii(38) = %, &
 PREFIX2 = ascii(48), ascii(49), ascii(50) = 0, 1, 2

Formats are also delimited by a '.' character in the XML. There can be one or more format definitions that use the above defined labels as follows:

```
<SDFDEF SdfCode='6' SdfFormat='PREFIX1.DATA.SUFFIX2' />
```

This format definition is identified by the keyword SdfCode and the format is represented by the keyword SdfFormat. Note that "DATA" is an intrinsic that means "Insert the Scanned Bar Code Here". The format definition to be executed is based on SdfCode and is specified in the <SDFSELECT> tag. The XML clause above would transmit the bar code data as:

```
%& BarcodeData#$
```

Basic Installation Verification

You can perform a basic inspection on your system process list to verify a successful installation of the Zebra Scanner SDK.

✓ **NOTE** This is simple verification of the operation of the Zebra Scanner SDK. See [How to Verify Scanner SDK Functionality on page 4-7](#) for more advanced SDK testing.

The following instructions guide you through a simple check of the Scanner SDK's operation.

1. Right click on the *Windows Task Bar* and select *Task Manager*.

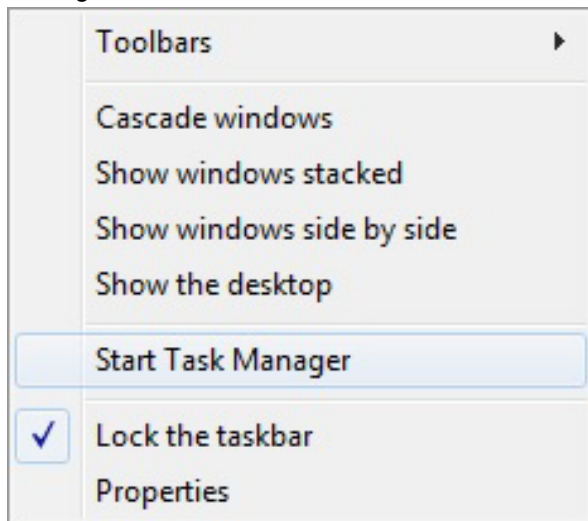


Figure 2-9 Task Bar Selection of Task Manager

2. Under the *Processes* tab, find the *CoreScanner.exe* in the *Image Name* list under.

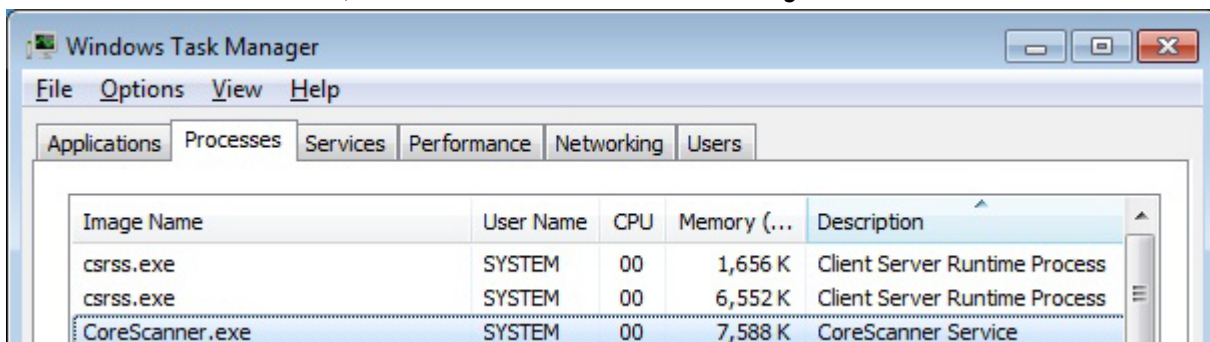


Figure 2-10 CoreScanner.exe on Task Manager

3. The appearance of "CoreScanner.exe" in the Processes list indicates a successful installation.

Silent Unattended Installation of the Scanner SDK

The CoreScanner driver and the Scanner SDK require the Microsoft 2012 C++ Redistributable Package which automatically installs if it does not already exist on the host PC. For an unattended installation, a complication arises if the 2012 C++ Redistributable is not pre-installed. By default, Microsoft triggers a reboot of the PC after the C++ Redistributable installation. In this case, a reboot is injected into the overall silent install process (which may then also require a login).

To avoid the interruption, the 2012 C++ Redistributable can be downloaded from Microsoft and pre-installed silently while suppressing the reboot using the command line switches `/install /quiet /norestart`. This delays the required reboot, and allows a custom silent CoreScanner and Scanner SDK install to be performed using a subsequent command.

The Visual C++ Redistributable for Visual Studio 2012 can be downloaded from the Microsoft website. The appropriate file `vcredist_x86.exe` (32-bit version) or `vcredist_x64.exe` (64-bit version) must be selected and downloaded. The command line to perform its install silently without reboot is:

```
vcredist_x86.exe /install /quiet /norestart
or
vcredist_x64.exe /install /quiet /norestart
```

The required reboot must be performed at the end of the overall installation process to ensure correct operation.

The Zebra Scanner SDK, including the underlying CoreScanner driver, is packaged using the Flexera InstallShield installer program. SDK components can be selectively installed using the SDK Custom Installation option. In conjunction with this custom install option, the installer program supports command line switches to record custom responses that can be used to create a silent install response file. These response files, ending in the extension `.iss`, may then be used to perform a silent installation of the CoreScanner driver and Scanner SDK components on production PCs.

The Silent Install command line options are listed in [Table 2-4](#).

Table 2-4 *Silent Install Command Line Options*

Command Line Switch	Description
-s	Silent mode. The -s switch runs the installation in silent mode using the responses contained in a recorded response file.
-r	Record mode. The -r switch displays all the setup dialogs and records the chosen responses in the file specified with the -f1 switch described below.
-f1	Specify custom response file name and path. The -f1 switch specifies where the response file is located for the -s switch, or where it should be created when using the -r switch. Specify an absolute path; using a relative path yields unpredictable results.
-f2	Specify alternative log file name and path. When running an installation in silent mode (using the -s switch), the log file is created by default in the same directory and with the same name (except for the extension) as the response file. The -f2 switch enables you to specify an alternative log file location and file name. Specify an absolute path; using a relative path yields unpredictable results.

When executed from a command prompt, the example below uses the -r and -f1 switches to record your responses to the setup prompts into a custom response file:

```
"Scanner_SDK_(32bit)_v2.0x.00xx.exe" -r -f1"c:\path\customsetup.iss"
```

The responses chosen using the command above are saved in the specified response file and can then be used as input to silently install the SDK with those chosen responses on production PCs.

The next example shows how the -s switch uses the response file created with the previous command to perform the silent install:

```
"Scanner_SDK_(32bit)_v2.0x.00xx.exe" -s -f1"c:\path\customsetup.iss"
```

Note that there is no space between the -f1 switch and first quotation mark for the custom response file.

If necessary, the -r switch option can also be used to record a custom response file for a silent removal of the SDK by running the command on a PC that has the SDK already installed.



IMPORTANT The CoreScanner drivers are required for any SDK component so the CoreScanner services are installed, and must be running to provide functionality.

CHAPTER 3 SCANNER SDK API

Overview

The Zebra Scanner SDK provides an easy to use yet powerful and extendible set of API commands to interface with scanner devices. The API commands include:

- Open
- GetScanners
- ExecCommand
- ExecCommandAsync
- Close.

Once the SDKs Open and GetScanners commands are invoked and the list of connected scanners is retrieved, all other methods execute through the ExecCommand and ExecCommandAsync commands. This is a user friendly approach, and easy to code in terms of day-to-day programming.

With the evolution of the SDK's capabilities, it is easier to increase the number of methods rather than increase the number of API commands. The benefit to the user is that, once you have the system up and running, a new method is just an additional operation to the existing code.

In addition to the commands above, the Zebra Scanner SDK supports seven types of events:

- ImageEvent
- VideoEvent
- BarcodeEvent
- PNPEvent
- ScanRMDEvent
- CommandResponseEvent
- IOEvent
- BinaryDataEvent.

See [Appendix A, WRITE SIMPLE APPLICATIONS USING THE SCANNER SDK API](#) for a starter example of an application illustrating the Zebra Scanner SDK API. For a table listing the most commonly requested topics within this guide, see [Quick Startup](#) in the back of the guide.



NOTE For a list of a scanner's supported attribute (parameter) numbers and definitions, refer to the *Product Reference Guide* for that model scanner, available from the Zebra Support website at <http://www.zebra.com/support>. Attributes include configuration parameters, monitored data, and asset tracking information.

Scanner ID

In the SDK context, scanner ID uniquely identifies a scanner device connected to the CoreScanner driver, and is required to communicate programmatically with the device. Developers need to call the GetScanners method of the CoreScanner API in order to retrieve the scanner IDs of connected devices. For example, to switch on a scanner's red LED, the scanner ID of that particular scanner must be obtained to provide that value in the <scannerID> element of inXML of the ExecCommand method call.

During each CoreScanner driver instance, scanner IDs are sequentially assigned to each connected device. When the CoreScanner driver is restarted, the array of connected scanners is reinitialized and previous scanner IDs may no longer be valid. In this case, the GetScanners method must be executed to obtain the new scanner IDs.

During a single CoreScanner driver instance, an RSM¹-supported scanner that is unplugged, and reconnected retains its unique scanner ID. However, a non-RSM device is assigned a different scanner ID each time it is reconnected.

✓ **NOTE** ¹ Remote Scanner Management

API Commands

Open

Opens an application instance from the user application or user library. This must be the first API command called before invoking any other API command from the user level application.

Syntax

C#	C++
<pre>void Open(int reserved, System.Array sfTypes, short lengthOfTypes, out int status);</pre>	<pre>HRESULT STDMETHODCALLTYPE Open(/* [in] */ LONG reserved, /* [in] */ SAFEARRAY * sfTypes, /* [in] */ SHORT lengthOfTypes, /* [out] */ LONG *status) = 0;</pre>

Parameters

reserved - Reserved argument. Set to 0.

sfTypes - Selects the types of scanners requested for use with the API.

Table 3-1 Values for *sfTypes*

Code	Value	Scanner Category
SCANNER_TYPES_ALL	1	All Scanners
SCANNER_TYPES_SNAPI	2	SNAPI Scanners
SCANNER_TYPES_SSI	3	SSI Scanners (RS232)
SCANNER_TYPES_IBMHID	6	IBM Hand Held Scanners (USB OPOS)
SCANNER_TYPES_NIXMODB	7	Nixdorf Mode B scanners (RS232)
SCANNER_TYPES_HIDKB	8	USB HID Keyboard emulation scanners
SCANNER_TYPES_IBMTT	9	IBM Table Top Scanners

lengthOfTypes - Number of elements or the size of *sfTypes* array

status - Return value for the command

Return Values

0 - Success.

Any other value - See [Error and Status Codes on page 3-42](#).

GetScanners

Gets a list of scanners of the requested types that are connected at any time. This command should be invoked after the Open command.

Syntax

C#	C++
<pre>void GetScanners(out short numberOfScanners, System.Array sfScannerIDList, out string outXML, out int status);</pre>	<pre>HRESULT STDMETHODCALLTYPE GetScanners(/* [out] */ SHORT *numberOfScanners, /* [out][in] */ SAFEARRAY * sfScannerIDList, /* [out] */ BSTR *outXML, /* [out] */ LONG *status) = 0;</pre>

Parameters

numberOfScanners - Number of connected scanners of requested type(s).

sfScannerIDList - Array of scannerIDs of the requested type(s). The size of the array is 255 (MAX_NUM_DEVICES).

outXML - XML string-scanner meta information. See [Chapter 4, TEST UTILITIES & SOURCE CODE](#) for examples.

status - Return value for the command.

Return Values

0 - Success.

Any other value - See [Error and Status Codes on page 3-42](#).

ExecCommand

Provides synchronous execution of a method via an opcode.

Syntax

C#	C++
<pre>void ExecCommand(int opcode, ref string inXML, out string outXML, out int status);</pre>	<pre>HRESULT STDMETHODCALLTYPE ExecCommand(/* [in] */ LONG opcode, /* [in] */ BSTR *inXML, /* [out] */ BSTR *outXML, /* [out] */ LONG *status) = 0;</pre>

Parameters

opcode - Method to be executed. See [Table 3-11 on page 3-17](#) for opcodes.

inXML - Relevant argument list for the opcode, structured into an XML string.

outXML - XML string, scanner meta information.

status - Return value for the command.

Return Values

0 - Success.

Any other value - See [Error and Status Codes on page 3-42](#).

ExecCommandAsync

Provides asynchronous execution of a method via an opcode. Any response data is retrieved as `CommandResponseEvents`. See [CommandResponseEvent on page 3-14](#).

```
HRESULT STDMETHODCALLTYPE ExecCommandAsync(
    /* [in] */ LONG opcode,
    /* [in] */ BSTR *inXML,
    /* [out] */ LONG *status) = 0;
```

Syntax

C#	C++
<pre>void ExecCommandAsync(int opcode, ref string inXML, out int status);</pre>	<pre>HRESULT STDMETHODCALLTYPE ExecCommandAsync(/* [in] */ LONG opcode, /* [in] */ BSTR *inXML, /* [out] */ LONG *status) = 0;</pre>

Parameters

opcode - Method to be executed. See [Table 3-11 on page 3-17](#) for opcodes.

inXML - Relevant argument list for the opcode, structured into an XML string.

status - Return value for the command.

Return Values

0 - Success.

Any other value - See [Error and Status Codes on page 3-42](#).

Close

Closes the application instance through the CoreScanner service.

Syntax

C#	C++
<pre>void Close(int reserved, out int status);</pre>	<pre>HRESULT STDMETHODCALLTYPE Close(/* [in] */ LONG reserved, /* [out] */ LONG *status) = 0;</pre>

Parameters

reserved - Reserved argument. Set to 0.

status - Return value for the command.

Return Values

0 - Success.

Any other value - See [Error and Status Codes on page 3-42](#).

API Events

The user application must register for each event category separately to receive events for that category. Use the methods REGISTER_FOR_EVENTS and UNREGISTER_FOR_EVENTS for this purpose (see [Table 3-11 on page 3-17](#)).

ImageEvent

Triggered when an imaging scanner captures images in image mode. To receive ImageEvents, an application needs to execute the REGISTER_FOR_EVENTS method with the SUBSCRIBE_IMAGE event type.

Syntax

C#	C++
<pre>void OnImageEvent(short eventType int size short imageFormat, ref object sfImageData, ref string pScannerData)</pre>	<pre>void OnImageEvent(SHORT eventType, LONG size, SHORT imageFormat, VARIANT *sfImageData, BSTR* pScannerData)</pre>

Parameters

eventType - Type of image event received (see [Table 3-2](#)).

Table 3-2 Image Event Types

Event Type	Value	Description
IMAGE_COMPLETE	1	Triggered when complete image captured
IMAGE_TRAN_STATUS	2	Triggered when image error or status

size - Size of image data buffer.

imageFormat - Format of image. (See [Table 3-3](#).)

Table 3-3 Image Formats

Image Type	Value
BMP_FILE_SELECTION	3
TIFF_FILE_SELECTION	4
JPEG_FILE_SELECTION	1

sfImageData - Image data buffer.

pScannerData - Information in XML format about the scanner (ID, Model Number, Serial Number and GUID) that triggered the image event.

```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <modelnumber>DS6707-SR20001ZZR</modelnumber>
    <serialnumber>7114000503322</serialnumber>
    <GUID>33C01F39EB23D949B5F3DBF643304FC4</GUID>
  </arg-xml>
</outArgs>
```

VideoEvent

Triggered when an imaging scanner captures video in video mode. To receive VideoEvents, an application needs to execute the REGISTER_FOR_EVENTS method with the SUBSCRIBE_VIDEO event type.

Syntax

C#	C++
<pre>void OnVideoEvent(short eventType, int size, ref object sfvideoData, ref string pScannerData)</pre>	<pre>void OnVideoEvent(SHORT eventType, LONG size, VARIANT *sfvideoData, BSTR* pScannerData)</pre>

Parameters

eventType - Type of video event received (see [Table 3-4](#)).

size - Size of video data buffer.

sfvideoData - Video data buffer.

pScannerData - Reserved parameter: always returns an empty string.

Table 3-4 Video Event Types

Event Type	Value	Description
VIDEO_FRAME_COMPLETE	1	Triggered when complete video frame is captured.

BarcodeEvent

Triggered when a scanner captures bar codes. To receive BarcodeEvents, an application needs to execute the REGISTER_FOR_EVENTS method with the SUBSCRIBE_BARCODE event type.

Syntax

C#	C++
<pre>void OnBarcodeEvent(short eventType, ref string pscanData)</pre>	<pre>void OnBarcodeEvent(SHORT eventType, BSTR pscanData)</pre>

Parameters

eventType - Type of bar code event received (see [Table 3-4](#)).

Table 3-5 Bar Code Event Types

Event Type	Value	Description
SCANNER_DECODE_GOOD	1	Triggered when a decode is successful.

pscanData - Bar code string that contains information about the scanner that triggered the bar code event including data type, data label and raw data of the scanned bar code.

```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <scandata>
      <modelnumber>DS6707-SR20001ZZR</modelnumber>
      <serialnumber>7114000503322</serialnumber>
      <GUID>33C01F39EB23D949B5F3DBF643304FC4</GUID>
      <datatype>8</datatype>
      <datalabel>0x30 0x32 0x31 0x38 0x39 0x38 0x36 0x32</datalabel>
      <rawdata>0x30 0x32 0x31 0x38 0x39 0x38 0x36 0x32</rawdata>
    </scandata>
  </arg-xml>
</outArgs>
```

The value of the <datatype> in the XML above indicates the bar code type of the scanned bar code.

[Table 3-6](#) lists the values received in IBM Hand-Held USB, SNAPI and Wincor-Nixdorf RS-232 Mode B communication protocols for each supported bar code type.

Table 3-6 Bar Code Data Types

Bar Code Data Type	Communication Protocol		
	SNAPI	IBM Hand-Held	NIXDORF Mode B
Code 39	1	1	1
Codabar	2	2	2
Code 128	3	3	3
Discrete (Standard) 2 of 5	4	4	4
IATA	5	N/A	4
Interleaved 2 of 5	6	6	6
Code 93	7	7	7
UPC-A	8	8	8
UPC-E0	9	9	9
EAN-8	10	10	10
EAN-13	11	11	8
Code 11	12	N/A	N/A
Code 49	13	13	N/A
MSI	14	N/A	14
EAN-128	15	15	15
UPC-E1	16	N/A	N/A

A bar code data type marked as N/A is unsupported by that communication protocol. The SDK typically returns a value of 0 for these bar code data types. However, in some cases the SDK may identify these symbologies as a related data type. For example, UPC-A + 2 Supplemental is not a supported symbology in Nixdorf Mode B but the SDK identifies it as UPC-A.

Table 3-6 Bar Code Data Types (Continued)

Bar Code Data Type	Communication Protocol		
	SNAPI	IBM Hand-Held	NIXDORF Mode B
PDF-417	17	17	17
Code 16K	18	N/A	N/A
Code 39 Full ASCII	19	N/A	N/A
UPC-D	20	N/A	N/A
Code 39 Trioptic	21	N/A	N/A
Bookland	22	N/A	8
Coupon Code	23	N/A	N/A
NW-7	24	N/A	N/A
ISBT-128	25	N/A	N/A
Micro PDF	26	N/A	26
DataMatrix	27	27	27
QR Code	28	28	28
Micro PDF CCA	29	N/A	N/A
PostNet US	30	N/A	N/A
Planet Code	31	N/A	N/A
Code 32	32	N/A	N/A
ISBT-128 Con	33	N/A	N/A
Japan Postal	34	N/A	N/A
Australian Postal	35	N/A	N/A
Dutch Postal	36	N/A	N/A
MaxiCode	37	37	37
Canadian Postal	38	N/A	N/A
UK Postal	39	N/A	N/A
Macro PDF	40	N/A	N/A
Micro QR code	44	44	28
Aztec	45	45	45
GS1 Databar (RSS-14)	48	48	48
RSS Limited	49	49	48

A bar code data type marked as N/A is unsupported by that communication protocol. The SDK typically returns a value of 0 for these bar code data types. However, in some cases the SDK may identify these symbologies as a related data type. For example, UPC-A + 2 Supplemental is not a supported symbology in Nixdorf Mode B but the SDK identifies it as UPC-A.

Table 3-6 *Bar Code Data Types (Continued)*

Bar Code Data Type	Communication Protocol		
	SNAPI	IBM Hand-Held	NIXDORF Mode B
GS1 Databar Expanded (RSS Expanded)	50	50	48
Scanlet	55	N/A	N/A
UPC-A + 2 Supplemental	72	72	N/A
UPC-E0 + 2 Supplemental	73	73	N/A
EAN-8 + 2 Supplemental	74	74	N/A
EAN-13 + 2 Supplemental	75	75	N/A
UPC-E1 + 2 Supplemental	80	N/A	N/A
CCA EAN-128	81	N/A	N/A
CCA EAN-13	82	N/A	N/A
CCA EAN-8	83	N/A	N/A
CCA RSS Expanded	84	N/A	N/A
CCA RSS Limited	85	N/A	N/A
CCA RSS-14	86	N/A	N/A
CCA UPC-A	87	N/A	N/A
CCA UPC-E	88	N/A	N/A
CCC EAN-128	89	N/A	N/A
TLC-39	90	N/A	N/A
CCB EAN-128	97	N/A	N/A
CCB EAN-13	98	N/A	N/A
CCB EAN-8	99	N/A	N/A
CCB RSS Expanded	100	N/A	N/A
CCB RSS Limited	101	N/A	N/A
CCB RSS-14	102	N/A	N/A
CCB UPC-A	103	N/A	N/A
CCB UPC-E	104	N/A	N/A
Signature Capture	105	N/A	N/A
Matrix 2 of 5	113	N/A	N/A
Chinese 2 of 5	114	N/A	N/A

A bar code data type marked as N/A is unsupported by that communication protocol. The SDK typically returns a value of 0 for these bar code data types. However, in some cases the SDK may identify these symbologies as a related data type. For example, UPC-A + 2 Supplemental is not a supported symbology in Nixdorf Mode B but the SDK identifies it as UPC-A.

Table 3-6 Bar Code Data Types (Continued)

Bar Code Data Type	Communication Protocol		
	SNAPI	IBM Hand-Held	NIXDORF Mode B
UPC-A + 5 Supplemental	136	136	N/A
UPC-E0 + 5 Supplemental	137	137	N/A
EAN-8 + 5 Supplemental	138	138	N/A
EAN-13 + 5 Supplemental	139	139	N/A
UPC-E1 + 5 Supplemental	144	N/A	N/A
Macro Micro PDF	154	N/A	N/A

A bar code data type marked as N/A is unsupported by that communication protocol. The SDK typically returns a value of 0 for these bar code data types. However, in some cases the SDK may identify these symbologies as a related data type. For example, UPC-A + 2 Supplemental is not a supported symbology in Nixdorf Mode B but the SDK identifies it as UPC-A.

PNPEvent

Triggered when a scanner of a requested type attaches to the system or detaches from the system. The pairing of a Bluetooth scanner to a cradle does not trigger a PnP event. To receive information about a newly paired device, the GetScanners command must be called again. To receive PnPEvents, an application needs to execute the REGISTER_FOR_EVENTS method with the SUBSCRIBE_PNP event type.

Syntax

C#	C++
<pre>void OnPNPEvent(short eventType, ref string ppnpData)</pre>	<pre>void OnPNPEvent (SHORT eventType, BSTR ppnpData)</pre>

Parameters

eventType - Type of PnP event received (see [Table 3-7](#)).

Table 3-7 PnP Event Types

Event Type	Value	Description
SCANNER_ATTACHED	0	Triggered when a Zebra Scanner is attached.
SCANNER_DETACHED	1	Triggered when a Zebra Scanner is detached.

ppnpData - PnP information string containing the asset tracking information of the attached or detached device.

Samples

Sample ppnpData XML for attachment of a direct scanner.

```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <arg-xml>
    <scanners>
      <scanner type="SNAPI">
        <scannerID>1</scannerID>
        <modelnumber>DS9808-SR00007C1WR</modelnumber>
        <serialnumber>1026300507698 </serialnumber>
        <GUID>77E48FC31C75444B90BE318FECFAE867</GUID>
      </scanner>
    </scanners>
    <status>1</status>
  </arg-xml>
</outArgs>
```

Sample ppnpData XML for attachment of a cascaded scanner. This XML can be received as a PnP event after a GetScanners command, if there are devices newly paired to a Bluetooth cradle.

```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <arg-xml>
    <scanners>
      <scanner type="USBIBMHD"> ← Information about Bluetooth Cradle
        <scannerID>1</scannerID>
        <modelnumber>CR0078-SC10007WR </modelnumber>
        <serialnumber>1020800512980 </serialnumber>
        <GUID>3665579766A9514DAAF523D35E051674</GUID>
        <pnp>0</pnp>
      <scanner type="USBIBMHD"> ← Information about Bluetooth Scanner
        <scannerID>2</scannerID>
        <modelnumber>DS6878-SR20007WR </modelnumber>
        <serialnumber>M1M87R38Y </serialnumber>
        <GUID></GUID>
        <pnp>1</pnp>
      </scanner>
    </scanners>
    <status>1</status>
  </arg-xml>
</outArgs>
```

ScanRMDEvent

Receives RMD Events when updating firmware of the scanner. To receive RMD Events, an application needs to execute the REGISTER_FOR_EVENTS method with the SUBSCRIBE_RMD event type.

Syntax

C#	C++
<pre>void OnScanRMDEvent(short eventType, ref string prmdData)</pre>	<pre>void OnScanRMDEvent (SHORT eventType, BSTR prmdData)</pre>

Parameters

eventType - Type of the RMD event received (see [Table 3-8](#)).

prmdData - ScanRMD information string containing the data of event. (See [Firmware Upgrade Scenarios on page 4-27](#) for more details on this string.)

Table 3-8 RMD Event Types

Event Type	Value	Description
SCANNER_UF_SESS_START	11	Triggered when flash download session starts.
SCANNER_UF_DL_START	12	Triggered when component download starts.
SCANNER_UF_DL_PROGRESS	13	Triggered when block(s) of flash completed.
SCANNER_UF_DL_END	14	Triggered when component download ends.
SCANNER_UF_SESS_END	15	Triggered when flash download session ends.
SCANNER_UF_STATUS	16	Triggered when update error or status.

CommandResponseEvent

Received after an asynchronous command execution (ExecCommandAsync). To receive CommandResponseEvents, an application needs to execute the REGISTER_FOR_EVENTS method with the SUBSCRIBE_OTHER event type.

Syntax

C#	C++
<pre>void OnCommandResponseEvent(short status, ref string prspData)</pre>	<pre>void OnScanRMDEvent (SHORT status, BSTR prspData)</pre>

Parameters

status - Status of the executed command. (See [Error/Status Codes on page 3-42](#).)

prspData - CommandResponse information string that contains the outXML of the executed command.

IOEvent

Received when an exclusively claimed device is accessed by another client application. To receive IOEvents, an application needs to execute the REGISTER_FOR_EVENTS method with the SUBSCRIBE_OTHER event type. Standard practice is that an application handles these IO Events once it has claimed a scanner. While that application has the scanner claimed, other applications get STATUS_LOCKED when they try to execute commands directed toward the claimed scanner.

Syntax

C#	C++
<pre>void OnIOEvent(short type, byte data)</pre>	<pre>void OnIOEvent(short type, BYTE data)</pre>

Parameters

type - Reserved parameter.

data - Reserved parameter.

ScannerNotificationEvent

Received when a SNAPI scanner changes its operational mode. To receive ScannerNotificationEvents, an application needs to execute the REGISTER_FOR_EVENTS method with the SUBSCRIBE_OTHER event type.

Syntax

C#	C++
<pre>void OnScannerNotification (short notificationType, ref string pScannerData)</pre>	<pre>void OnScannerNotification (short notificationType, BSTR pScannerData)</pre>

Parameters

notificationType - Type of the notification event received (see [Table 3-9](#)).

pScannerData - Information about the scanner (ID, Model Number, Serial Number and GUID) that triggered the notification event.

Table 3-9 Notification Event Types

Notification Type	Value	Description
DECODE_MODE	1	Triggered when a scanner changes its operation mode to decode.
SNAPSHOT_MODE	2	Triggered when a scanner changes its operation mode to image mode.
VIDEO_MODE	3	Triggered when a scanner changes its operation mode to video mode.

BinaryDataEvent

Triggered when an IDC-supported imaging scanner captures an image in Intelligent Document Capture (IDC) or Signature Capture mode. To receive a BinaryDataEvent, an application needs to execute the REGISTER_FOR_EVENT method with the SUBSCRIBE_IMAGE event type.

Syntax

C#	C++
<pre>void On_BinaryDataEvent(short eventType, int size, short dataFormat, ref object sfBinaryData, ref string pScannerData)</pre>	<pre>void OnBinaryDataEvent(SHORT eventType, LONG size, SHORT dataFormat, VARIANT * sfBinaryData, BSTR* pScannerData)</pre>

Parameters

eventType - Reserved.

size - Size of the BinaryData data buffer.

dataFormat - The format of the Binary DataEvent

Table 3-10 Notification Event Types

Data Format	Description
0xB5	IDC format
0x69	Signature Capture Format

sfBinaryData - IDC / Signature Capture data buffer.

pScannerData - Information in XML format about the scanner (*ID*, *Model Number*, *Serial Number*, and *GUID*) that triggered the BinaryDataEvent.

```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <modelnumber>DS6707-DC20007ZZR </modelnumber>
    <serialnumber>1222800502597 </serialnumber>
    <GUID>28B8BF91FB7F3A459CFF63BAEFDC767B</GUID>
    <channel>usb_BULK</channel>
  </arg-xml>
</outArgs>
```



NOTE The <channel> tag in the XML above refers to the USB channel which the scanner uses to send the Binary data. This can be usb_BULK or usb_HID.

Both Intelligent Document Capture (IDC) and Signature Capture data are presented with the BinaryDataEvent. This event is fired by the CoreScanner service when this binary capture data is available. A client application has to register for image events using the RegisterForEvents opcode in order to receive BinaryDataEvents from the CoreScanner driver. The image data payload of a BinaryDataEvent is passed through the VARIANT type argument sfBinaryData. The event type captured, IDC or Signature, is specified with the dataFormat parameter of the event handler function. Document Capture data is formatted according to the ISO15434 Specification (see [Appendix C, DESCRIPTION OF INTELLIGENT DOCUMENT CAPTURE FORMAT](#) for details). Signature Capture data is formatted with the Zebra standard image format (refer to Signature Capture in the Appendix of Product Reference Guide for the image scanner in use).

Methods Invoked Through ExecCommand Or ExecCommandAsync

Table 3-11 *List of Methods*

Description	Method	Value	Page
Scanner SDK Commands	GET_VERSION	1000	3-19
	REGISTER_FOR_EVENTS	1001	3-20
	UNREGISTER_FOR_EVENTS	1002	3-20
Scanner Access Control Commands	CLAIM_DEVICE	1500	3-21
	RELEASE_DEVICE	1501	3-21
Scanner Common Commands	ABORT_MACROPDF	2000	3-21
	ABORT_UPDATE_FIRMWARE	2001	3-22
	AIM_OFF	2002	3-22
	AIM_ON	2003	3-22
	FLUSH_MACROPDF	2005	3-23
	DEVICE_PULL_TRIGGER	2011	3-23
	DEVICE_RELEASE_TRIGGER	2012	3-23
	SCAN_DISABLE	2013	3-24
	SCAN_ENABLE	2014	3-24
	SET_PARAMETER_DEFAULTS	2015	3-24
	DEVICE_SET_PARAMETERS	2016	3-25
	SET_PARAMETER_PERSISTANCE	2017	3-25
	REBOOT_SCANNER	2019	3-26
Scanner Operation Mode Commands	DEVICE_CAPTURE_IMAGE	3000	3-26
	DEVICE_CAPTURE_BARCODE	3500	3-26
	DEVICE_CAPTURE_VIDEO	4000	3-27

* Values for the SET_ACTION method are available in [Table 3-13 on page 3-35](#).

Table 3-11 *List of Methods (Continued)*

Description	Method	Value	Page
Scanner Management Commands	ATTR_GETALL	5000	3-27
	ATTR_GET	5001	3-29
	ATTR_GETNEXT	5002	3-30
	ATTR_SET	5004	3-31
	ATTR_STORE	5005	3-31
	GET_DEVICE_TOPOLOGY	5006	3-32
	START_NEW_FIRMWARE	5014	3-32
	UPDATE_FIRMWARE	5016	3-33
	UPDATE_FIRMWARE_FROM_PLUGIN	5017	3-33
	UPDATE_DECODE_TONE	5050	3-34
	ERASE_DECODE_TONE	5051	3-34
Scanner Action Commands *	SET_ACTION	6000	3-34
Serial Scanner Commands	DEVICE_SET_SERIAL_PORT_SETTINGS	6101	3-36
Other Commands	DEVICE_SWITCH_HOST_MODE	6200	3-37
Keyboard Emulator Commands	KEYBOARD_EMULATOR_ENABLE	6300	3-38
	KEYBOARD_EMULATOR_SET_LOCALE	6301	3-38
	KEYBOARD_EMULATOR_GET_CONFIG	6302	3-39
Scale Commands	SCALE_READ_WEIGHT	7000	3-40
	SCALE_ZERO_SCALE	7002	3-41
	SCALE_SYSTEM_RESET	7015	3-41

* Values for the SET_ACTION method are available in [Table 3-13 on page 3-35](#).

Examples: Using the Methods



NOTE The inXML segments that follow are only examples. The inXML strings must be customized by the programmer based on each user's requirements.

GET_VERSION

Value 1000

Description: Gets the version of CoreScanner Driver

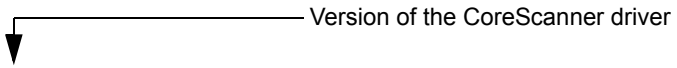
Asynchronous supported: No

Supported Scanner Communication Protocols: N/A

inXml:

```
<inArgs></inArgs>
```

outXml:



```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <arg-xml>
    <arg-string>01.00.00</arg-string>
  </arg-xml>
</outArgs>
```

REGISTER_FOR_EVENTS**Value 1001**

Description: Register for API events described [API Events beginning on page 3-7](#)

Asynchronous supported: No

Supported Scanner Communication Protocols: N/A

inXml:

```

<inArgs>
  <cmdArgs>
    <arg-int>6</arg-int>
    <arg-int>1,2,4,8,16,32</arg-int>
  </cmdArgs>
</inArgs>

```

[Table 3-12](#) lists the Event IDs for the inXML code above.

Table 3-12 *Event IDs*

Event Name	Event ID
SUBSCRIBE_BARCODE	1
SUBSCRIBE_IMAGE	2
SUBSCRIBE_VIDEO	4
SUBSCRIBE_RMD	8
SUBSCRIBE_PNP	16
SUBSCRIBE_OTHER	32

outXml: null

UNREGISTER_FOR_EVENTS**Value 1002**

Description: Unregister from API events described in [API Events beginning on page 3-7](#)

Asynchronous supported: No

Supported Scanner Communication Protocols: N/A

inXml:

```

<inArgs>
  <cmdArgs>
    <arg-int>6</arg-int>
    <arg-int>1,2,4,8,16,32</arg-int>
  </cmdArgs>
</inArgs>

```

outXml: null

CLAIM_DEVICE**Value 1500**

Description: Claim a specified device

Asynchronous supported: No

Supported Scanner Communication Protocols: n/a

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

↑ Specified Scanner ID

outXml: null

RELEASE_DEVICE**Value 1501**

Description: Release a specified device

Asynchronous supported: No

Supported Scanner Communication Protocols: n/a

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

↑ Specified Scanner ID

outXml: null

ABORT_MACROPDF**Value 2000**

Description: Abort MacroPDF of a specified scanner

Asynchronous supported: No

Supported Scanner Communication Protocols:SNAPI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

↑ Specified Scanner ID

outXml: null

ABORT_UPDATE_FIRMWARE**Value 2001**

Description: Abort Firmware updates process of a specified scanner while it is progressing

Asynchronous supported: No

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPI, SSI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

↑ Specified Scanner ID

outXml:

null



WARNING! If the scanner's firmware is not backup protected, issuing this command during a firmware update may cause a corruption leaving the scanner inoperable. For models that are backup protected refer to the Scanner SDK for Windows website at: www.zebra.com/scannersdkforwindows.

AIM_OFF**Value 2002**

Description: Turn off the aiming of a specified scanner

Asynchronous supported: No

Supported Scanner Communication Protocols: SNAPI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

↑ Specified Scanner ID

outXml:

null

AIM_ON**Value 2003**

Description: Turn on the aiming of a specified scanner

Asynchronous supported: No

Supported Scanner Communication Protocols: SNAPI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

↑ Specified Scanner ID

outXml:

null

FLUSH_MACROPDF**Value 2005**

Description: Flush MacroPDF of a specified scanner

Asynchronous supported: No

Supported Scanner Communication Protocols: SNAPI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```



Specified Scanner ID

outXml: null

DEVICE_PULL_TRIGGER**Value 2011**

Description: Pull the trigger of a specified scanner

Asynchronous supported: N/A

Supported Scanner Communication Protocols: SNAPI, IBM Hand-held*, IBM Table-top*, SSI*

* Supported auxiliary scanners if the firmware supports.

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```



Specified Scanner ID

outXml: null

DEVICE_RELEASE_TRIGGER**Value 2012**

Description: Release the pulled trigger of a specified scanner

Asynchronous supported: N/A

Supported Scanner Communication Protocols: SNAPI, IBM Hand-held*, IBM Table-top*, SSI*

* Supported auxiliary scanners if the firmware supports.

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```



Specified Scanner ID

outXml: null

SCAN_DISABLE**Value 2013**

Description: Disable scanning on a specified scanner

Asynchronous supported: N/A

Supported Scanner Communication Protocols: SNAPI, IBM Hand-held, IBM Table-top, Nixdorf Mode B, SSI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

↑ Specified Scanner ID

outXml: null

SCAN_ENABLE**Value 2014**

Description: Enable scanning on a specified scanner

Asynchronous supported: N/A

Supported Scanner Communication Protocols: SNAPI, IBM Hand-held, IBM Table-top, Nixdorf Mode B, SSI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

↑ Specified Scanner ID

outXml: null

SET_PARAMETER_DEFAULTS**Value 2015**

Description: Set parameters to default values of a specified scanner

Asynchronous supported: No

Supported Scanner Communication Protocols: SNAPI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

↑ Specified Scanner ID

outXml: null

DEVICE_SET_PARAMETERS**Value 2016**

Description: Set parameter(s) of a specified scanner temporarily. Parameters set using this command are lost after the next power down.

Asynchronous supported: No

Supported Scanner Communication Protocols: SNAPi

inXml:

```

<inArgs>
  <scannerID>1</scannerID> ← Specified Scanner ID
  <cmdArgs>
    <arg-xml>
      <attrib_list>
        <attribute>
          <id>145</id> ← Attribute Number
          <datatype>B</datatype> ← Attribute Type
          <value>0</value> ← Attribute Value
        </attribute>
      </attrib_list>
    </arg-xml>
  </cmdArgs>
</inArgs>

```

outXml: null



NOTE Refer to the pertinent scanner's *Product Reference Guide* for supported attribute numbers, types, and possible values.

SET_PARAMETER_PERSISTENCE**Value 2017**

Description: Set parameter(s) of a specified scanner persistently. Parameters set using this command are persistent over power down and power up cycles.

Asynchronous supported: No

Supported Scanner Communication Protocols: SNAPi

inXml:

```

<inArgs>
  <scannerID>1</scannerID> ← Specified Scanner ID
  <cmdArgs>
    <arg-xml>
      <attrib_list>
        <attribute>
          <id>145</id> ← Attribute Number
          <datatype>B</datatype> ← Attribute Type
          <value>0</value> ← Attribute Value
        </attribute>
      </attrib_list>
    </arg-xml>
  </cmdArgs>
</inArgs>

```

outXml: null

REBOOT_SCANNER**Value 2019**

Description: Reboot a specified scanner. Direct execution of this command on a Bluetooth scanner does not result in a reboot. This command needs to be sent to the scanner's associated cradle to reboot the Bluetooth scanner.

Asynchronous supported: N/A

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPI, SSI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

Specified Scanner ID

outXml: null

DEVICE_CAPTURE_IMAGE**Value 3000**

Description: Change a specified scanner to snapshot mode. While in this mode, an imaging scanner blinks the green LED at one second intervals to indicate it is not in standard operating (decode) mode. The scanner comes to its standard operating mode after a trigger pull or the snapshot time out is exceeded. After a trigger pull, the CoreScanner driver triggers an ImageEvent containing the captured image (see [ImageEvent on page 3-7](#)).

Asynchronous supported: N/A

Supported Scanner Communication Protocols: SNAPI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

Specified Scanner ID

outXml: null

DEVICE_CAPTURE_BARCODE**Value 3500**

Description: Change a specified scanner to decode mode.

Asynchronous supported: N/A

Supported Scanner Communication Protocols: SNAPI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

Specified Scanner ID

outXml: null

DEVICE_CAPTURE_VIDEO**Value 4000**

Description:

Change a specified scanner to video mode. In this mode, the imaging scanner behaves as a video camera as long as the trigger is pulled. When the trigger is released, the scanner returns to Decode Mode. As long as the trigger is pulled, the CoreScanner driver triggers VideoEvents that contain the video data (see [VideoEvent on page 3-8](#)).

Asynchronous supported:

N/A

Supported Scanner Communication Protocols: SNAPi

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

← Specified Scanner ID

outXml:

null

ATTR_GETALL**Value 5000**

Description:

Get all the attributes of a specified scanner. A synchronous call of this method returns an outXML like the example below. An asynchronous call of this event triggers a CommandResponseEvent (See [page 3-14](#)).

Asynchronous supported:

Yes

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPi, SSI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
outXml:
<?xml version="1.0" encoding="UTF-8" ?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <modelnumber>DS670-SR20001ZZR</modelnumber>
    <serialnumber>7116000501003</serialnumber>
    <GUID>A2E647DED2163545B18BCEBD0A2A133D</GUID>
  </arg-xml>
  <response>
    <opcode>5000</opcode>
    <attrib_list>
      <attribute name="">0</attribute>
      <attribute name="">1</attribute>
      <attribute name="">2</attribute>
      <attribute name="">3</attribute>
      <attribute name="">4</attribute>
      <attribute name="">5</attribute>
      <attribute name="">6</attribute>
      <attribute name="">7</attribute>
      <attribute name="">8</attribute>
      <attribute name="">9</attribute>
      <attribute name="">10</attribute>
      <attribute name="">11</attribute>
      <attribute name="">12</attribute>
      <attribute name="">13</attribute>
      <attribute name="">14</attribute>
      <attribute name="">15</attribute>
      <attribute name="">16</attribute>
```

← Specified Scanner ID

← Scanner ID of Data Receiving

← Asset Tracking Information of the Scanner

← Method Response Received

← Attribute Numbers

inXml (continued):

```

<attribute name="">17</attribute>
<attribute name="">18</attribute>
<attribute name="">19</attribute>
<attribute name="">20</attribute>
<attribute name="">21</attribute>
<attribute name="">22</attribute>
<attribute name="">23</attribute>
<attribute name="">24</attribute>
<attribute name="">25</attribute>
<attribute name="">26</attribute>
<attribute name="">27</attribute>
<attribute name="">28</attribute>
<attribute name="">29</attribute>
<attribute name="">30</attribute>
<attribute name="">31</attribute>
<attribute name="">34</attribute>
<attribute name="">35</attribute>
<attribute name="">36</attribute>
<attribute name="">37</attribute>
<attribute name="">38</attribute>
<attribute name="">39</attribute>
<attribute name="">655</attribute>
<attribute name="">656</attribute>
<attribute name="">657</attribute>
<attribute name="">658</attribute>
<attribute name="">659</attribute>
<attribute name="">665</attribute>
<attribute name="">670</attribute>
<attribute name="">672</attribute>
<attribute name="">673</attribute>
<attribute name="">705</attribute>
<attribute name="">716</attribute>
<attribute name="">718</attribute>
<attribute name="">721</attribute>
<attribute name="">724</attribute>
<attribute name="">726</attribute>
<attribute name="">727</attribute>
<attribute name="">728</attribute>
<attribute name="">730</attribute>
<attribute name="">731</attribute>
<attribute name="">734</attribute>
<attribute name="">735</attribute>
<attribute name="">745</attribute>
<attribute name="">6000</attribute>
<attribute name="">6001</attribute>
<attribute name="">6002</attribute>
<attribute name="">6003</attribute>
<attribute name="">6004</attribute>
<attribute name="">20004</attribute>
<attribute name="">20006</attribute>
<attribute name="">20007</attribute>
<attribute name="">20008</attribute>
<attribute name="">20009</attribute>
<attribute name="">20010</attribute>
<attribute name="">20011</attribute>
<attribute name="">20013</attribute>
  </attrib_list>
</response>
</arg-xml>
</outArgs>

```

← Attribute Numbers



NOTE Refer to the pertinent scanner's Product Reference Guide for supported attribute numbers, types, and possible values

ATTR_GET**Value 5001**

Description:

Query the values of attribute(s) of a specified scanner. An synchronous call of this method returns outXML like the example below. An asynchronous call of this event triggers a [CommandResponseEvent](#) (see [CommandResponseEvent on page 3-14](#)).

Asynchronous supported:

Yes

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPi, SSI

inXML:

```
><inArgs>
  <scannerID>1</scannerID> ← Specified Scanner ID
  <cmdArgs>
    <arg-xml>
      <attrib_list>535,20004,1,140,392</attrib_list> ← Required Attribute Numbers
    </arg-xml>
  </cmdArgs>
</inArgs>
```

outXML:

```
<?xml version="1.0" encoding="UTF-8" ?>
<outArgs>
  <scannerID>1</scannerID> ← Scanner ID of Data Receiving
  <arg-xml>
    <modelnumber>DS670-SR20001ZZR</modelnumber>
    <serialnumber>7116000501003</serialnumber>
    <GUID>A2E647DED2163545B18BCEBD0A2A133D</GUID> ← Asset Tracking Information
    <response>
      <opcode>5001</opcode> ← Method Response Received
      <attrib_list>
        <attribute>
          <id>535</id>
          <name></name>
          <datatype>S</datatype>
          <permission>R</permission>
          <value>27APR07</value>
        </attribute>
        <attribute>
          <id>20004</id> ← Attribute Number
          <name></name>
          <datatype>S</datatype> ← Attribute Data Typer
          <permission>R</permission> ← Permissions of the Attribute
          <value>DS6707X4</value> ← Attribute Value
        </attribute>
        <attribute>
          <id>1</id>
          <name></name>
          <datatype>F</datatype>
          <permission>RWP</permission>
          <value>True</value>
        </attribute>
        <attribute>
          <id>140</id>
          <name></name>
          <datatype>B</datatype>
          <permission>RWP</permission>
          <value>0</value>
        </attribute>
      </attrib_list>
    </response>
  </arg-xml>
</outArgs>
```


ATTR_SET**Value 5004**

Description:

Set the values of attribute(s) of a specified scanner.
Attribute(s) set using this command are lost after the next power down.

Asynchronous supported:

N/A

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPi, SSI

inXml:

```

<inArgs>
  <scannerID>1</scannerID> ← Specified Scanner ID
  <cmdArgs>
    <arg-xml>
      <attrib_list>
        <attribute>
          <id>1</id> ← Attribute Numbers
          <datatype>F</datatype> ← Attribute Data Type
          <value>False</value> ← Attribute Value
        </attribute>
      </attrib_list>
    </arg-xml>
  </cmdArgs>
</inArgs>

```

outXml:

null

ATTR_STORE**Value 5005**

Description:

Store the values of attribute(s) of a specified scanner.
Attribute(s) store using this command are persistent over power down and power up cycles.

Asynchronous supported:

N/A

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPi, SSI

inXml:

```

<inArgs>
  <scannerID>1</scannerID> ← Specified Scanner ID
  <cmdArgs>
    <arg-xml>
      <attrib_list>
        <attribute>
          <id>1</id> ← Attribute Number
          <datatype>F</datatype> ← Attribute Data Type
          <value>False</value> ← Attribute Value
        </attribute>
      </attrib_list>
    </arg-xml>
  </cmdArgs>
</inArgs>

```

outXml:

null

GET_DEVICE_TOPOLOGY**Value 5006**

Description: Get the topology of devices that are connected to the calling system

Asynchronous supported: No

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPi, SSI

inXml:

```
<inArgs></inArgs>
```

outXML:

```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <arg-xml>
    <scanners>
      <scanner type="SNAPI"> ← Scanner Type
        <scannerID>1</scannerID>
        <modelnumber>DS670-SR20001ZZR</modelnumber>
        <serialnumber>7116000501003</serialnumber>
        <GUID>A2E647DED2163545B18BCEBD0A2A133D</GUID>
        <VID>1504</VID>
        <PID>6400</PID>
        <DoM>24MAR10</DoM>
        <firmware>NBRPUAAM</firmware>
      </scanner>
      <scanner type="USBIBMhid">
        <scannerID>2</scannerID>
        <modelnumber>CR0078-SC10007WR</modelnumber>
        <serialnumber>MXA4WD88</serialnumber>
        <GUID>993DF345C3B00E408E8160116AE9A319</GUID> ← Asset Tracking
        <VID>1504</VID>                                Information of
        <PID>2080</PID>                                the Scanner
        <DoM>24MAR10</DoM>
        <firmware>NBCACAK7</firmware>
      <scanner type="USBIBMhid">
        <scannerID>3</scannerID>
        <serialnumber>M1M87R39H</serialnumber>
        <modelnumber>DS6878-SR20007WR</modelnumber> ← Cascaded Scanner
        <DoM>08OCT10</DoM>
        <firmware>PAAAJ500-002-N25</firmware>
      </scanner>
    </scanners>
  </arg-xml>
</outArgs>
```

START_NEW_FIRMWARE**Value 5014**

Description: Start the updated firmware. This causes a reboot of the specified scanner.

Asynchronous supported: N/A

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPi, SSI

inXml:

```
<inArgs>
  <scannerID>1</scannerID> ← Specified Scanner ID
</inArgs>
```

outXml:

null

UPDATE_FIRMWARE**Value 5016**

Description:

Update the firmware of the specified scanner. A user can specify the bulk firmware update option for faster firmware download in SNAPI mode. If an application registered for ScanRMDEvents, it receives ScanRMDEvents as described [on page 3-14](#).

Asynchronous supported:

N/A

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPI, SSI

inXml:

```

<inArgs>
  <scannerID>1</scannerID>
  <cmdArgs>
    <arg-string>D:\ScannerFW\DS6707\NBRPUCAM.DAT</arg-string>
    <arg-int>2</arg-int>
  </cmdArgs>
</inArgs>

```

Diagram annotations for inXml:

- Specified Scanner ID points to `<scannerID>1</scannerID>`
- Path to the DAT File points to `<arg-string>D:\ScannerFW\DS6707\NBRPUCAM.DAT</arg-string>`
- Bulk Update Option points to `<arg-int>2</arg-int>`

outXml:

null

UPDATE_FIRMWARE_FROM_PLUGIN**Value 5017**

Description:

Update the firmware of the specified scanner using a scanner plug-in. A user can specify the bulk firmware update option for faster firmware download in SNAPI mode. If an application registered for ScanRMDEvents, it receives ScanRMDEvents as described [on page 3-14](#).

Asynchronous supported:

N/A

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPI, SSI

inXml:

```

<inArgs>
  <scannerID>1</scannerID>
  <cmdArgs>
    <arg-string>D:\ScannerFW\DS9808\DS9808-COMMON SR MODELS-S-018.SCNPLG</arg-string>
    <arg-int>2</arg-int>
  </cmdArgs>
</inArgs>

```

Diagram annotations for inXml:

- Specified Scanner ID points to `<scannerID>1</scannerID>`
- Path to the Plug-in File points to `<arg-string>D:\ScannerFW\DS9808\DS9808-COMMON SR MODELS-S-018.SCNPLG</arg-string>`
- Bulk Update Option points to `<arg-int>2</arg-int>`

outXml:

null



NOTE The UPDATE_FIRMWARE_FROM_PLUGIN command does not verify the supported scanner models of the plug-in. It attempts the firmware update with the DAT file extracted from the specified plug-in file regardless of model.

UPDATE_DECODE_TONE**Value 5050**

Description: Update good scan tone of the scanner with the specified WAV file.

Asynchronous supported: N/A

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPI, SSI

inXml:

```
<inArgs>
  <scannerID>1</scannerID> ← Specified Scanner ID
  <cmdArgs>
    <arg-string> C:\WavFiles\tone16Khz16bit.wav</arg-string>
  </cmdArgs>
</inArgs>
```

↑ Path to WAV File

outXml: null

ERASE_DECODE_TONE**Value 5051**

Description: Erase the good scan tone of the scanner.

Asynchronous supported: N/A

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPI, SSI

inXml:

```
<inArgs>
  <scannerID>1</scannerID> ← Specified Scanner ID
</inArgs>
```

outXml: null

SET_ACTION**Value 6000**

✓ **NOTE** Values for the SET_ACTION method are available in [Table 3-13](#).

Description: Perform an action involving the scanner's beeper or LEDs.

Asynchronous supported: N/A

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPI, SSI

inXml:

```
<inArgs>
  <scannerID>1</scannerID> ← Specified Scanner ID
  <cmdArgs>
    <arg-int>0</arg-int> ← Scanner Action Commands
  </cmdArgs>
</inArgs>
```

outXml: null

Table 3-13 Action Attributes and Values

Attribute Number (Opcode)	Attribute Name	Description	Data Type	Values
6000	Beeper/LED	Triggers the beeper/LED via command	'X'	0 - 1 high short beep 1 - 2 high short beeps 2 - 3 high short beeps 3 - 4 high short beeps 4 - 5 high short beeps 5 - 1 low short beep 6 - 2 low short beeps 7 - 3 low short beeps 8 - 4 low short beeps 9 - 5 low short beeps 10 - 1 high long beep 11 - 2 high long beeps 12 - 3 high long beeps 13 - 4 high long beeps 14 - 5 high long beeps 15 - 1 low long beep 16 - 2 low long beeps 17 - 3 low long beeps 18 - 4 low long beeps 19 - 5 low long beeps 20 - Fast warble beep 21 - Slow warble beep 22 - High-low beep 23 - Low-high beep 24 - High-low-high beep 25 - Low-high-low beep 26 - High-high-low-low beep 42 - Green LED off 43 - Green LED on 45 - Yellow LED 46 - Yellow LED off 47 - Red LED on 48 - Red LED off
6001	ParameterDefaults	Initiates a parameter defaults command	'X'	0 - Restore Defaults 1 - Restore Factory Defaults 2 - Write Custom Defaults
6003	BeepOnNextBootup	Controls whether or not boot up / power up beep is suppressed on the next power up	'X'	0 - Disable beep on next bootup 1 - Enable beep on next bootup
6004	Reboot	Remote reboot command	'X'	

Table 3-13 *Action Attributes and Values (Continued)*

Attribute Number (Opcode)	Attribute Name	Description	Data Type	Values
6005	HostTriggerSession	Triggers the scanner to start scanning via command	'X'	0 - start Host Trigger Session 1 - stop Host Trigger Session
6011	StatsReset	Reset/default a specific statistic	'X'	The specific statistic attribute to reset. Range: 15002-19999
6013	StatsResetAll	Reset/default all statistics	'X'	'
6017	ScaleReadWeight	Read Weight from scale	'A'	Byte[0] status: 0 - scaleNotEnabled 1 - scaleNotReady 2 - stableWeightOverLimit 3 - stableWeightUnderZero 4 - nonStableWeight 5 - stableZeroWeight 6 - stableNonZeroWeight Byte[1] units: 0=kgs 1=lbs Bytes[2-5] weight in thousandths of units
6018	ScaleZero	Zeros the scale	'X'	
6019	ScaleReset	Resets the scale	'X'	
6022	ChangeAllCodeTypes	Enables/Disables all code types	'X'	0 = Disable All Code types 1 = Enable All Code Types

DEVICE_SET_SERIAL_PORT_SETTINGS**Value 6101**

Description: Set the serial port settings of a NIXDORF Mode B Scanner

Asynchronous supported: N/A

Supported Scanner Communication Protocols: n/a

inXml:

```

<inArgs>
  <scannerID>1</scannerID> ← Specified Scanner ID
  <cmdArgs>
    <arg-int>5</arg-int> ← Number of Parameters
    <arg-int>9600,8,0,0,1</arg-int> ← Serial Port Settings
  </cmdArgs>
</inArgs>

```

outXml:

null

DEVICE_SWITCH_HOST_MODE**Value 6200**

Description:

Switch the USB host mode of a specified scanner. This operation causes a reboot of the device as a result of the host mode switch. When the specified scanner is in HID Keyboard mode, the only supported target host variants are IBM Hand-held, IBM Table-top, SNAPI, and SSI. A user can configure the switching host mode as a silent switch (suppressing the typical device reboot beeps) and keep the targeted host mode as the permanent host mode of the device by setting those parameters in the inXML string. Direct execution of this command on a Bluetooth scanner does not result in a host mode switch. This command needs to be sent to the scanner's associated cradle to switch the host mode of the Bluetooth scanner.

Asynchronous supported:

N/A

Supported Scanner Communication Protocols: IBM Hand-held, IBM Table-top, SNAPI, HID Keyboard.

inXml:

```

<inArgs>
  <scannerID>l</scannerID> ← Specified Scanner ID
  <cmdArgs>
    <arg-string>XUA-45001-1</arg-string> ← String Code for Target Host Variant
    <arg-bool>TRUE</arg-bool> ← Silent Switch Option
    <arg-bool>FALSE</arg-bool> ← Permanent Change Option
  </cmdArgs>
</inArgs>

```

Table 3-14 lists the string codes for USB host variants.

Table 3-14 USB Host Variants

Host Variant	String Code
USB-IBMHID	XUA-45001-1
USB-IBMTT	XUA-45001-2
USB-HIDKB	XUA-45001-3
USB-OPOS	XUA-45001-8
USB-SNAPI with Imaging	XUA-45001-9
USB-SNAPI without Imaging	XUA-45001-10
USB-CDC Serial Emulation (see note below)	XUA-45001-11



NOTE USB-CDC (Communications Device Class) host mode enables Zebra bar code scanners to communicate with applications requiring legacy serial COM port emulation using a USB port. Using the Scanner SDK, you can switch the scanner into USB-CDC mode, but you cannot switch back into other modes. Please scan the Set All Defaults bar code from your scanner's Quick Start Guide to make the scanner visible to the SDK. Go to: <http://www.zebra.com/support> for more information about USB CDC host mode.

outXml:

null

KEYBOARD_EMULATOR_ENABLE**Value 6300**

Description:

This setting enables/disables the keyboard emulation mode of the connected scanners which are in IBM Hand-held, IBM Table-top, NIXDORF Mode B, SNAPI, and SSI host modes.

Asynchronous supported:

No

Supported Scanner Communication Protocols: N/A

inXml:

```
<inArgs>
  <cmdArgs>
    <arg-bool>TRUE</arg-bool> ← Keyboard Emulator State
  </cmdArgs>
</inArgs>
```

outXml:

null



NOTE Any HIDKB Emulator-related settings that are changed using the API are temporary. These settings revert to the values in the config.xml file after a restart of the CoreScanner service or a system reboot.

KEYBOARD_EMULATOR_SET_LOCALE**Value 6301**

Description:

Change the locale of the emulated keyboard

Asynchronous supported:

No

Supported Scanner Communication Protocols: N/A

inXml:

```
<inArgs>
  <cmdArgs>
    <arg-int>1</arg-int> ← Keyboard Emulator Language Locale ID
  </cmdArgs>
</inArgs>
```

[Table 3-15](#) lists the Language Locale ID for the XML code above.

Table 3-15 *Language Locale IDs*

Locale	Value
English	0
French	1

outXml:

null

KEYBOARD_EMULATOR_GET_CONFIG**Value 6302**

Description: Gets the current configuration of the HID Keyboard Emulator from the config.xml file.

Asynchronous supported: No

Supported Scanner Communication Protocols: N/A

inXml:

```
<inArgs></inArgs>
```

outXml:

```
<outArgs>
  <arg-xml>
    <KeyEnumState>1</KeyEnumState> ← Keyboard Emulator State
    <KeyEnumLocale>0</KeyEnumLocale> ← Keyboard Emulator Language Locale ID
  </arg-xml>
</outArgs>
```

SCALE_READ_WEIGHT**Value 7000**

Description: Measure the weight on the scanner's platter and get the value.

Asynchronous supported: No

Supported Scanner Communication Protocols: SNAPI, IBM HID, IBM Table-top, SSI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

outXml:

```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <modelnumber>MP6200-LN000M010US</modelnumber>
    <serialnumber>13049010501209 </serialnumber>
    <GUID>D827BAC4979B430BB6E57747620C1978</GUID>
    <response>
      <opcode>7000</opcode>
      <weight>0.700</weight>
      <weight_mode>English</weight_mode>
      <status>6</status>
      <rawdata>0x06 0x01 0x00 0x00 0x02 0xbc </rawdata>
    </response>
  </arg-xml>
</outArgs>
```

outXml Tag Descriptions

weight: The weight of the item in killogram or English pounds.

weight_mode: English (pounds), Metric (Kg).

status: Satus of the scale.

rawdata: The value retrieved from RSM attribute 6017. See [Table 3-13 on page 3-35](#) for more information.

Table 3-16 Status Code Descriptions

Status Code Value	Description
0	scaleNotEnabled
1	scaleNotReady
2	stableWeightOverLimit
3	stableWeightUnderZero
4	nonStableWeight
5	stableZeroWeight
6	stableNonZeroWeight

SCALE_ZERO_SCALE**Value 7002**

Description: Zero the scale.

Asynchronous supported: No

Supported Scanner Communication Protocols: SNAPI, IBM HID, IBM Table-top, SSI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

outXml: Null

SCALE_SYSTEM_RESET**Value 7015**

Description: Reset the scale.

Asynchronous supported: No

Supported Scanner Communication Protocols: SNAPI, IBM HID, IBM Table-top, SSI

inXml:

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

outXml: Null

Error/Status Codes

Table 3-17 *Error and Status Codes*

Error/ Status Code	Value	Description
SUCCESS	0	Generic success
STATUS_LOCKED	10	Device is locked by another application
ERROR_INVALID_APPHANDLE	100	Invalid application handle. Reserved parameter. Value is zero.
ERROR_COMMLIB_UNAVAILABLE	101	Required Comm Lib is unavailable to support the requested Type
ERROR_NULL_BUFFER_POINTER	102	Null buffer pointer
ERROR_INVALID_BUFFER_POINTER	103	Invalid buffer pointer
ERROR_INCORRECT_BUFFER_SIZE	104	Incorrect buffer size
ERROR_DUPLICATE_TYPES	105	Requested Type IDs are duplicated
ERROR_INCORRECT_NUMBER_OF_TYPES	106	Incorrect value for number of Types
ERROR_INVALID_ARG	107	Invalid argument
ERROR_INVALID_SCANNERID	108	Invalid scanner ID
ERROR_INCORRECT_NUMBER_OF_EVENTS	109	Incorrect value for number of Event IDs
ERROR_DUPLICATE_EVENTID	110	Event IDs are duplicated
ERROR_INVALID_EVENTID	111	Invalid value for Event ID
ERROR_DEVICE_UNAVAILABLE	112	Required device is unavailable
ERROR_INVALID_OPCODE	113	Opcode is invalid
ERROR_INVALID_TYPE	114	Invalid value for Type
ERROR_ASYNC_NOT_SUPPORTED	115	Opcode does not support asynchronous method
ERROR_OPCODE_NOT_SUPPORTED	116	Device does not support the Opcode
ERROR_OPERATION_FAILED	117	Operation failed in device
ERROR_REQUEST_FAILED	118	Request failed in CoreScanner
ERROR_OPERATION_NOT_SUPPORTED_FOR_AUXILIARY_SCANNERS	119	Operation not supported for auxiliary scanners
ERROR_DEVICE_BUSY	120	Device busy. Applications should retry command.
ERROR_ALREADY_OPENED	200	CoreScanner is already opened
ERROR_ALREADY_CLOSED	201	CoreScanner is already closed
ERROR_CLOSED	202	CoreScanner is closed
ERROR_INVALID_INXML	300	Malformed inXML
ERROR_XMLREADER_NOT_CREATED	301	XML Reader could not be instantiated

Table 3-17 *Error and Status Codes (Continued)*

Error/ Status Code	Value	Description
ERROR_XMLREADER_INPUT_NOT_SET	302	Input for XML Reader could not be set
ERROR_XMLREADER_PROPERTY_NOT_SET	303	XML Reader property could not be set
ERROR_XMLWRITER_NOT_CREATED	304	XML Writer could not be instantiated
ERROR_XMLWRITER_OUTPUT_NOT_SET	305	Output for XML Writer could not be set
ERROR_XMLWRITER_PROPERTY_NOT_SET	306	XML Writer property could not be set
ERROR_XML_ELEMENT_CANT_READ	307	Cannot read element from XML input
ERROR_XML_INVALID_ARG	308	Arguments in inXML are not valid
ERROR_XML_WRITE_FAIL	309	Write to XML output string failed
ERROR_XML_INXML_EXCEED_LENGTH	310	InXML exceed length
ERROR_XML_EXCEED_BUFFER_LENGTH	311	buffer length for type exceeded
ERROR_NULL_POINTER	400	Null pointer
ERROR_DUPLICATE_CLIENT	401	Cannot add a duplicate client
ERROR_FW_INVALID_DATFILE	500	Invalid firmware file
ERROR_FW_UPDATE_FAILED_IN_SCN	501	FW Update failed in scanner
ERROR_FW_READ_FAILED_DATFILE	502	Failed to read DAT file
ERROR_FW_UPDATE_INPROGRESS	503	Firmware Update is in progress (cannot proceed another FW Update or another command)
ERROR_FW_UPDATE_ALREADY_ABORTED	504	Firmware update is already aborted
ERROR_FW_UPDATE_ABORTED	505	FW Update aborted
ERROR_FW_SCN_DETACHED	506	Scanner is disconnected while updating firmware
STATUS_FW_SWCOMP_RESIDENT	600	The software component is already resident in the scanner

CHAPTER 4 TEST UTILITIES & SOURCE CODE

Overview

This chapter provides information about testing and evaluation of the Zebra Scanner SDK's software components using the test utilities provided in the SDK.

For a list of the most commonly requested topics within this guide, see [Quick Startup](#) in the back of the guide.



NOTE For the attributes (parameters) applicable to a specific scanner, refer to the *Product Reference Guide*. Product Reference Guides may also contain an appendix listing the generic non-parameter attributes supported on most Zebra scanners.

Test Utilities Provided in the SDK

The Zebra Scanner SDK includes the following test utilities:

- Zebra Scanner SDK C++ Sample Application
- Zebra Scanner SDK C# .Net Sample Application

Each test utility demonstrates the main functionalities of the SDK. You can gain an understanding of the Zebra Scanner SDK using these test utilities. This section also describes how to use the test utilities' functionality.



NOTE You may need to install the Microsoft®.Net Framework v2.0 or later to execute C# .Net Sample application. If so, Microsoft detects and informs the user of this requirement.

The Zebra Scanner SDK Test Utilities support the following functionality:

- Discovery of asset tracking information
- Scan a bar code
- Capture Image and Video
- Capture documents with Intelligent Document Capture (IDC)
- Attribute query and setting
- Host Variant switching
- Firmware upgrade.

Scanner SDK C++ Sample Application

The Scanner SDK C++ Sample Application enables you to simulate an application that communicates with the Scanner SDK. The utility demonstrates the functionality of the SDK. It includes C++ source code and its solution and project files for further reference.

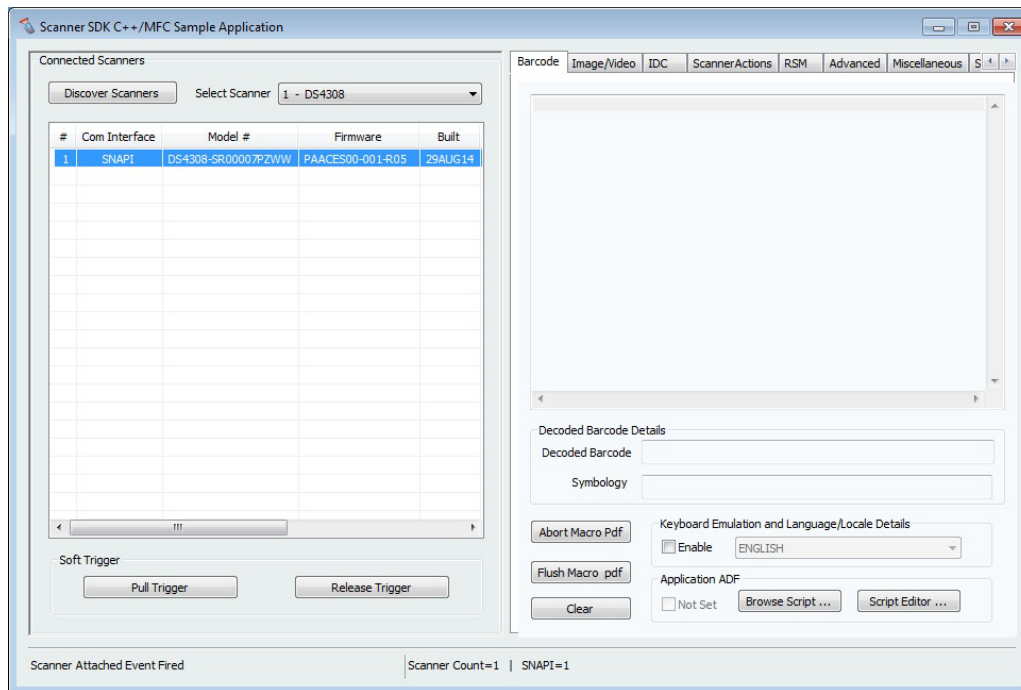


Figure 4-1 C++ Sample Application

Scanner SDK C#.Net Sample Application

The Scanner SDK C#.Net Sample Application enables you to simulate an application that communicates with the Scanner SDK. The utility demonstrates the functionality of the SDK. It includes C#.Net source code and its solution and project files for further reference.

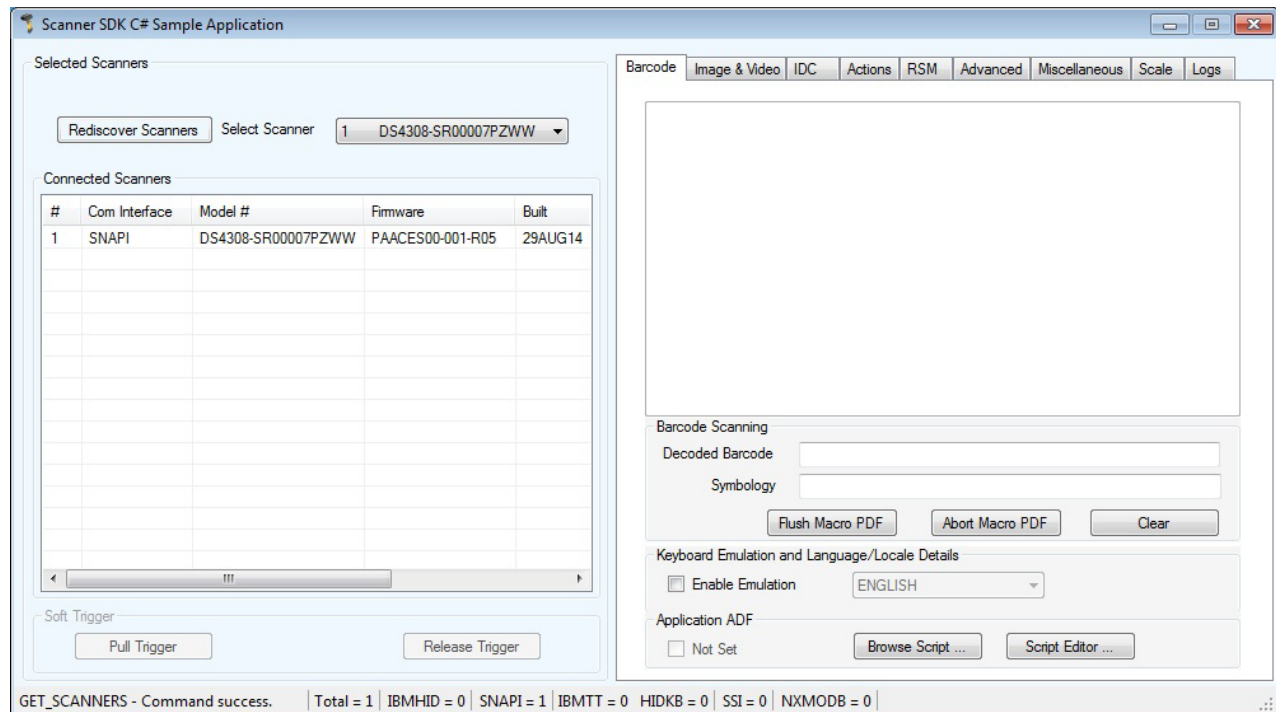


Figure 4-2 C# Sample Application

Table 4-1 Test Utility Buttons and Fields by Tab Screen

Button or Field	Description
Discover Scanners	Invokes Open, GetScanners methods and register for all the events.
Select Scanner	Select the scanner you want to invoke the command
Connected Scanners	List all the connected scanners regardless of the mode
Pull Trigger	Soft Pull Trigger the scanner for Bar code, Image and Video actions
Release Trigger	Soft Release Trigger the scanner for Bar code, Image and Video actions
Bar Code Tab	
Flush Macro PDF	Flush Macro PDF bar code buffer
Abort Macro PDF	Abort Macro PDF continues read
Clear	Clear the Bar code data area
Decoded Bar Code	Display label value of the scanned bar code
Symbology	Display the symbology of scanned bar code
Enable Emulation	Enable Simulated HID Keyboard Output

Table 4-1 *Test Utility Buttons and Fields by Tab Screen (Continued)*

Button or Field	Description
Image/Video Tab	
Image	Invoke image capture mode
Video	Invoke video capture mode.
Abort Transfer	Abort Image Transfer on serial scanners.
Image Type	Select JPG, TIFF or BMP image type.
Enable Video View Finder	Enable the view finder in image mode.
Save Image	Save the captured image.
IDC Tab	
Get	Display value of the IDC-related parameter in the drop down menu.
Set	Temporarily set the value of the IDC-related parameter in the drop down menu.
Store	Permanently store the value of the IDC-related parameter in the drop down menu.
Value	Field to display, and enter an IDC-related parameter value.
Decode Data	Value of linked or anchor bar code data.
Symbology	Symbology of linked or anchor bar code.
Use HID	Specify HID channel for data transmission (instead of the default BULK channel).
Clear	Clears all the fields.
Scanner Actions Tab	
Enable/Disable Scanner	Enable/Disable the scanner for data/image/video capture initiation.
Aim	Switch on and off Aim control of the scanner.
Beeper	Beep the beeper of the scanner.
Reboot Scanner	Reboot the scanner.
LED	Light the LED(s) on the scanner.
Switch Host Variant	Switch the scanner host type from current type to desired type; the user has the option to select silent feature and variant change persistent and non-persistent.
RSM Tab	
Get All IDs	Get all supported attribute IDs from the selected scanner.
Get Value	Select one or more attribute IDs and get the value for them.
Next Value	Get the next attributes value given the current attribute number.
Store Value	Store value(s) for selected attribute(s).
Set Value	Set value(s) for selected attribute(s).
Select All	Select all the attribute IDs at the RSM data viewer.
Clear All	Clear all the attribute data at the RSM data viewer.

Table 4-1 Test Utility Buttons and Fields by Tab Screen (Continued)

Button or Field	Description
Clear All Values	Clear all the attribute values at the RSM data viewer (C# only).
Clear Value	Clear a selected attribute value at the RSM data viewer (C# only).
Advanced Tab	
Firmware Update Operations	Updated firmware and launch the new firmware on the scanner.
Browse	Browse the Firmware file (*.DAT) or Plug-in file (*.SCNPLG).
Update	Initiate firmware update process.
Abort	If you want to abort firmware update process.
Launch	Once firmware update finishes launch the new firmware in the scanner.
Claim Scanner	Exclusively claim and declaim the scanner for this application.
Miscellaneous Tab	
SDK Version	Get the scanner SDK version.
Get Device Topology	Get the scanner device topology, this is useful to get an idea of scanner topology for cascaded scanners.
Serial Interface Settings	Serial interface settings for serial scanners.
Scale Tab	
Read weight	Read the weight of the item on the scale.
Zero scale	Zero the scale.
Reset scale	Reset the scale.
Weight Measured	Weight of the item (Pounds or Kilograms).
Weight Unit	Weight mode of the scale (English or Metric).
Logs Tab	
Event Log	Command and event log, logs commands initiated.
XML log	Displays Output of each function if an output exists.
Clear Event Log	Clear command and event log area.
Clear XML Log	Clear XML log area.



NOTE The SDK Sample Application in the latest release of the Scanner SDK for Windows implements a **ScanToConnect** tab. The ScanToConnect feature enables a Zebra cordless Bluetooth scanner to pair directly to a PC/tablet by scanning an on-screen bar code, replacing the need for a paper pairing label. This paperless pairing solution wirelessly connects the scanner directly to the host, without the need for a cradle.

Sample source code for the **ScanToConnect** tab is included with installation of the SDK Sample Application. For further information on this functionality, contact the Zebra Technologies Global Customer Support Center at: www.zebra.com/support.

How to Verify Scanner SDK Functionality

This section guides you through a series of use cases and test cases of the Zebra Scanner SDK and its functionality.

See [Basic Installation Verification on page 2-14](#) for more information.

Scanner Discovery / Asset Tracking Information / Validating Successful SDK Installation

1. Connect a Zebra USB scanner(s) to the computer and put the scanner into USB OPOS (Hand Held) or USB SNAPi mode by scanning one of the bar codes below.



USB (IBM Hand Held)



USB SNAPi

2. Launch the Zebra Scanner SDK Sample Utility by selecting *Start > All Programs > Zebra Scanner > Scanner SDK > Scanner SDK Sample Application (C++)* or *Scanner SDK Sample Application (C#.Net)*.

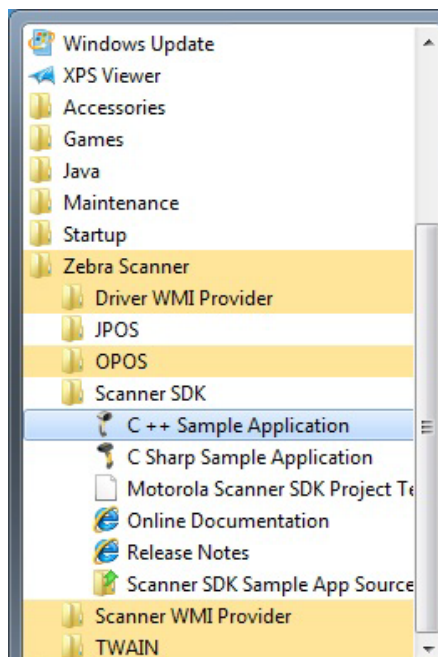


Figure 4-3 Start Scanner SDK Sample Application (C++) or C#.Net

3. Click **Discover Scanners** to display all the connected scanners in the *Connected Scanners* area.
4. Clicking **Discover Scanners** in the sample application executes an *Open* for all types of scanners and an *ExecCommand* with the *REGISTER_FOR_EVENTS* method using the following XML and a *GetScanners* API call:

```
<inArgs>
  <cmdArgs>
    <arg-int>6</arg-int>
    <arg-int>1,2,4,8,16,32</arg-int>
  </cmdArgs>
</inArgs>
```

✓ **NOTE** The first <inArgs> tag in the XML is filled with the number of events you want to register. In the example above, number of event it wants to register is "6". The second <arg-int> tag is filled with the event ids that you want to register separated by the commas (","). See event IDs in [Table 4-2](#).

Table 4-2 *Supported Event IDs*

Event Name	Event ID
SUBSCRIBE_BARCODE	1
SUBSCRIBE_IMAGE	2
SUBSCRIBE_VIDEO	4
SUBSCRIBE_RMD	8
SUBSCRIBE_PNP	16
SUBSCRIBE_OTHER	32

See [Chapter 5, SAMPLE SOURCE CODE](#) for more information about how to call *Open*, *ExecCommand* and *GetScanners* APIs.

1. The *GetScanners* API call produces XML code as follows:

```
<?xml version="1.0" encoding="UTF-8" ?>
<scanners>
  <scanner type="SNAPI">
    <scannerID>1</scannerID>
    <serialnumber>7116000501003</serialnumber>
    <GUID>A2E647DED2163545B18BCEBD0A2A133D</GUID>
    <VID>1504</VID>
    <PID>6400</PID>
    <modelnumber>DS670-SR20001ZZR</modelnumber>
    <DoM>27APR07</DoM>
    <firmware>NBRPUAAC</firmware>
  </scanner>
</scanners>
```

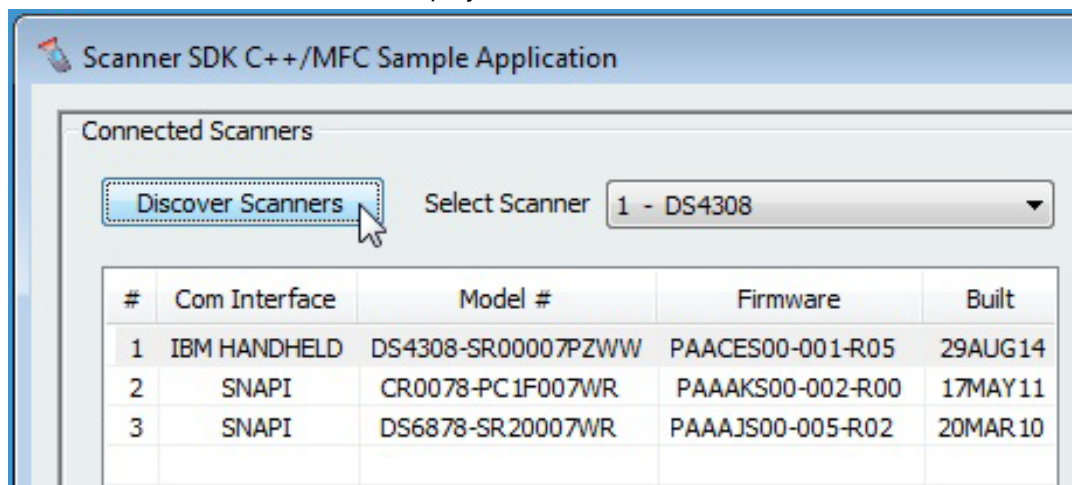
Table 4-3 Data Representation of the GetScanners Output in this Example

Scanner Information	Value	Description
Scanner ID	1	A unique ID assigned for a scanner from the SDK; any scanner specific method execute from ExecCommand should point to a scanner ID
Serial Number	7116000501003	Device serial number printed on the label
Model Number	DS670-SR20001ZZR	Device model number
Date of Manufacture	27APR07	Device date of manufacture
Firmware Version	NBRPUAAC	Current firmware version
H/W GUID	A2E647DED2163545B18BCEBD0A2A133D	Hardware unique ID

- The XML consists of the scanner type, scanner ID, serial number, GUID, VID, PID, model number, date of manufacture and firmware version of the connected scanners.

All discovered scanners are presented in the *Connected Scanners* window ([Figure 4-4](#)) by processing the XML received from the [GetScanners](#) command along with their asset tracking information returned by querying device parameters. The detection of scanners indicates the SDK was installed successfully.

Click **Discover Scanners** to display the connected scanners.

**Figure 4-4** Connected Scanners

Bar Code Scanning

1. Connect and discover a scanner (see [Scanner Discovery / Asset Tracking Information / Validating Successful SDK Installation on page 4-7](#)).
2. Scan a bar code and its decoded data is returned in the form of XML data and displayed on the *Barcode* tab. To illustrate the typical implementation, the sample application also displays only the "Bar code" data below the XML data.

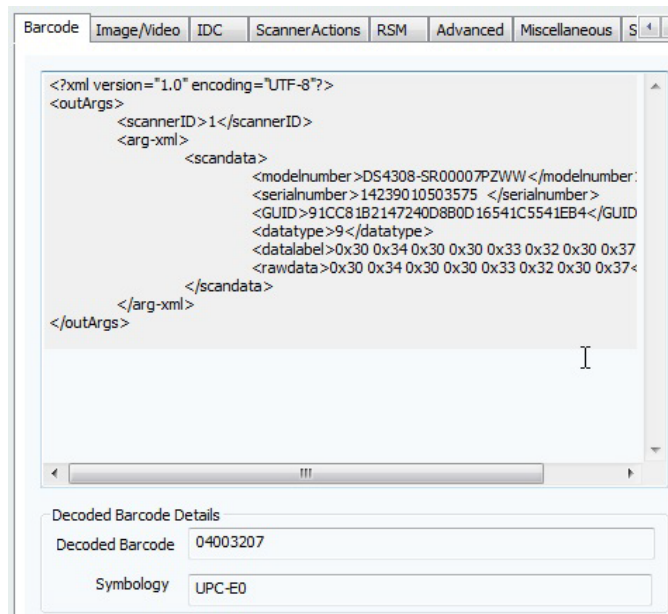


Figure 4-5 Decoded Bar Code Data

Example

1. Scan the following sample bar code after discovering the scanner in the sample application (see [Scanner Discovery / Asset Tracking Information / Validating Successful SDK Installation on page 4-7](#)).



Sample Bar Code

2. The following XML is returned:

```
<?xml version="1.0" encoding="UTF-8" ?>
<outArgs>
  <scannerID>2</scannerID>
  <arg-xml>
    <scandata>
      <modelnumber>DS670-SR20001ZZR</modelnumber>
      <serialnumber>7116000501003</serialnumber>
      <GUID>A2E647DED2163545B18BCEBD0A2A133D</GUID>
      <datatype>8</datatype>
      <datalabel>0x30 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x31 0x32</datalabel>
      <rawdata>0x30 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x31 0x32</rawdata>
    </scandata>
  </arg-xml>
</outArgs>
```

3. By processing the XML above, the sample application displays the decoded bar code in the *Decoded Bar code* text box and the symbology in the *Symbology* text box.

Language/Locale Details

1. Toggle the *Enable Emulation* check box to enable/disable *Simulated HID Keyboard Output*.
2. Select the language locale from the drop down menu.

The sample application first retrieves the current config.xml file (see [Simulated HID Keyboard Output on page 2-11](#)) by executing an *ExecCommand* API call with the *KEYBOARD_EMULATOR_GET_CONFIG* method and an empty inXML. It receives outXML as shown below:

inXML:

```
<inArgs></inArgs>
```

outXML:

```
<outArgs>
  <arg-xml>
    <KeyEnumState>1</KeyEnumState>
    <KeyEnumLocale>0</KeyEnumLocale>
  </arg-xml>
</outArgs>
```

The sample application processes the XML above and populates the user interface. The <KeyEnumState> tag indicates the current state of Simulated HID Keyboard Output, where enabled = 1 and disabled = 0. The <KeyEnumLocale> tag indicates the language locale number currently active with the CoreScanner service. The value of "0" above indicates English.

Use the *ExecCommand* API call with the *KEYBOARD_EMULATOR_ENABLE* method and following inXML to enable/disable Simulated HID Keyboard Output.

```
<inArgs>
  <cmdArgs>
    <arg-bool>TRUE</arg-bool>
  </cmdArgs>
</inArgs>
```

To enable HID KB Emulator use "TRUE" in <arg-bool> tags and "FALSE" to disable it.

Use the *ExecCommand* API call with the *KEYBOARD_EMULATOR_SET_LOCALE* method and following inXML to change the language locale.

```
<inArgs>
  <cmdArgs>
    <arg-int>1</arg-int>
  </cmdArgs>
</inArgs>
```

Set the <KeyEnumLocale> tag value to "1" for French and "0" for English.

Capture Image and Video

1. Connect and discover an imaging scanner (see [Scanner Discovery / Asset Tracking Information / Validating Successful SDK Installation on page 4-7](#)).
2. Select a "SNAPI" mode scanner ID from the *Select Scanner* drop-down box. Your selection is then reflected in the *Connected Scanners* window.



NOTE If no SNAPI scanner is shown in the *Connected Scanners* window, you must connect an imaging scanner that supports image/video transfer. For an up-to-date table listing scanner models and their supported communication modes refer to the Scanner SDK for Windows website at: www.zebra.com/scannersdkforwindows.

Alternatively, select "SNAPI" mode scanner in the *Connected Scanners* area. Your selected Scanner's ID is displayed in the *Select Scanner* drop-down combo box.

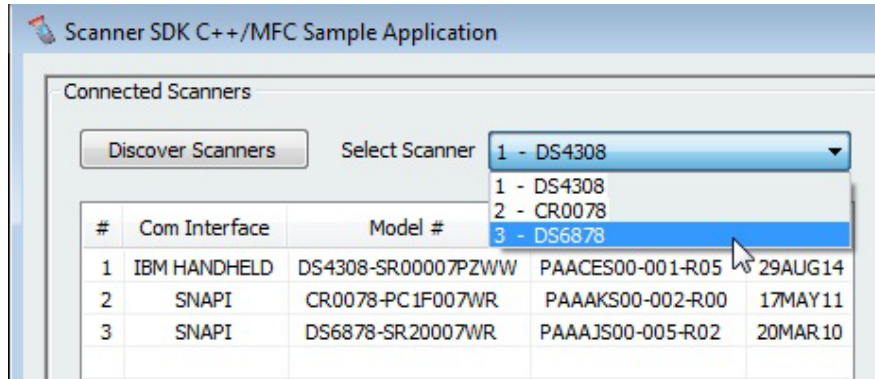


Figure 4-6 Scanner Selection

3. Go to the *Image & Video* tab.
4. Select an image type of JPG, TIFF or BMP.
5. Selecting the image type in the sample application executes an *ExecCommand* API call using the *DEVICE_SET_PARAMETERS* method and following XML code:

```
<inArgs>
  <scannerID>1</scannerID>
  <cmdArgs>
    <arg-xml>
      <attrib_list>
        <attribute>
          <id>304</id>
          <datatype>B</datatype>
          <value>4</value>
        </attribute>
      </attrib_list>
    </arg-xml>
  </cmdArgs>
</inArgs>
```

✓ **NOTE** The <scannerID> tag in the XML is filled with the scanner's ID selected in the *Connected Scanners* list of the sample application. The <id> tag contains the image file type parameter of the selected scanner. In the XML example above, this value is 304. The value 4 indicates the image type the user should get from the scanner. See [Table 4-4](#) for valid Image Types.

Table 4-4 Image Types

Image Type	Value
BMP_FILE_SELECTION	3
TIFF_FILE_SELECTION	4
JPEG_FILE_SELECTION	1

✓ **NOTE** These values may change with the scanner model. Refer to the scanner Product Reference Guide for more information on scanner parameters. For more information about parameter settings, see [Parameter Setting \(Device Configuration\)](#) on page 4-21.

6. Check *Enable Video View Finder* and click either **Image** to put the scanner into image capture mode or **Video** to put the scanner into video capture mode.
7. Checking *Enable Video View Finder* in the sample application executes an *ExecCommand* API call with the *DEVICE_SET_PARAMETERS* method and following XML code:

```
<inArgs>
  <scannerID>1</scannerID>
  <cmdArgs>
    <arg-xml>
      <attrib_list>
        <attribute>
          <id>324</id>
          <datatype>B</datatype>
          <value>1</value>
        </attribute>
      </attrib_list>
    </arg-xml>
  </cmdArgs>
</inArgs>
```

✓ **NOTE** The <scannerID> tag in the XML contains the selected scanner's ID from the *Connected Scanners* list of the sample application. The <id> tag contains the video view finder parameter number of the scanner and value 1 indicates that the view finder is enabled. A value "0" indicates the view finder is disabled.

8. Click **Image** in the sample application. **Image** executes an *ExecCommand* API call using the *DEVICE_CAPTURE_IMAGE* method with the XML code below. Click **Video** to execute an *ExecCommand* API call using the *DEVICE_CAPTURE_VIDEO* method with the following XML code.

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

9. Click **Pull Trigger** on the bottom left side of the utility to capture an image. If the scanner was placed into video capture mode in the previous step, click **Pull Trigger** once to start video capture and click **Release Trigger** to stop video capture.
10. Clicking **Pull Trigger** or **Release Trigger** in the sample application executes an *ExecCommand* API call using the corresponding *DEVICE_PULL_TRIGGER* or *DEVICE_RELEASE_TRIGGER* method with the following XML code

```
<inArgs>
  <scannerID>1</scannerID>
</inArgs>
```

✓ **NOTE** You can use the trigger on the scanner to start and stop image or video capture instead of the soft trigger buttons provided in the sample utility.

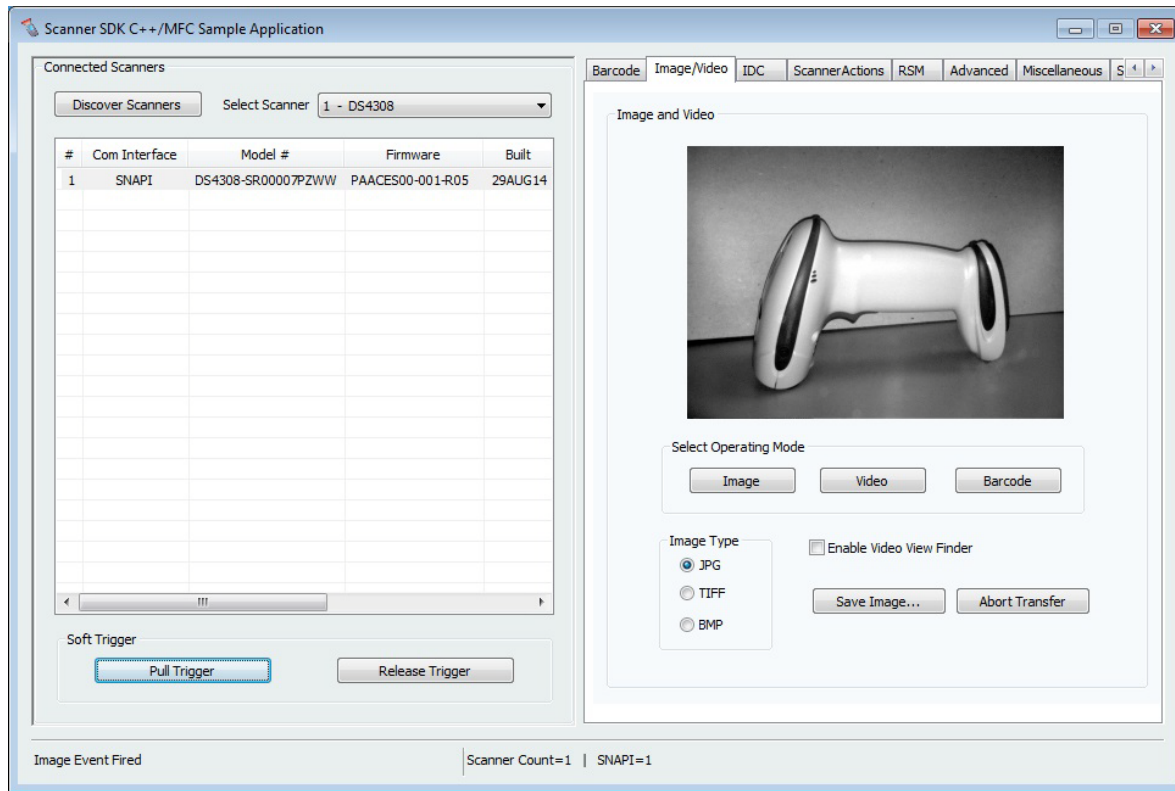


Figure 4-7 Captured Image Displayed on the Image & Video Tab

11. If you registered with ImageEvent (see [Register for COM Events on page 5-2](#)) you receive an image event for the performed pull trigger when in image mode.
12. If you registered with VideoEvent (see [Register for COM Events on page 5-2](#)) you receive a video event for the performed pull trigger when in video mode.

Beep the Beeper

Zebra scanners are capable of sounding the beeper by invoking the Beeper method from the host system.

1. Connect and discover a scanner (see [Scanner Discovery / Asset Tracking Information / Validating Successful SDK Installation on page 4-7](#)).
2. Select a "SNAPI" or "OPOS/IBM OPOS" mode scanner ID from the *Select Scanner* drop-down box. Your selection is reflected in the *Connected Scanners* window (see [Figure 4-6 on page 4-12](#)).
3. Select the desired beep sequence from the list defined on the *Scanner Actions* tab as shown in [Figure 4-8](#).
4. Click **Beep**.

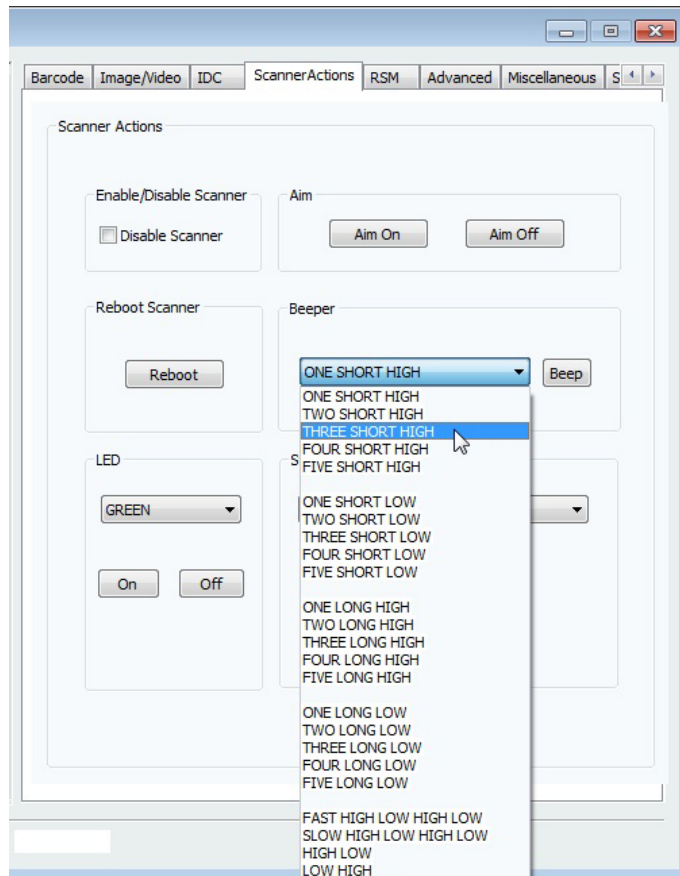


Figure 4-8 Beep Values

5. Clicking **Beep** in the sample application executes an *ExecCommand* API call with the SET_ACTION method and following XML code:

```
<inArgs>
  <scannerID>1</scannerID>
  <cmdArgs>
    <arg-int>2</arg-int>
  </cmdArgs>
</inArgs>
```

✓ **NOTE** The <scannerID> tag in the XML is filled with the scanner's ID selected in the *Connected Scanners* list of the sample application. The <arg-int> tag in the XML is filled with the beep's ID selected in the *Beeper* drop-down list shown in [Figure 4-10 on page 4-19](#).

6. You can sound any of the beeps defined in [Table 3-13 on page 3-35](#) by changing the value of the <arg-int> tag in the XML code. Successful execution of the command returns the status parameter as "0".

Flash the LED

Zebra scanners are capable of flashing an LED by initiating the flash LED method from the host system.

1. Connect and discover a scanner (see [Scanner Discovery / Asset Tracking Information / Validating Successful SDK Installation on page 4-7](#)).
2. Select a "SNAPI" or "OPOS/IBM OPOS" mode scanner ID from the *Select Scanner* drop-down box. Your selection is reflected in the *Connected Scanners* window (see [Figure 4-6 on page 4-12](#)).
3. Select the desired LED from the list, defined on the *Scanner Actions* tab (see [Figure 4-9 on page 4-16](#)).
4. Click **On** to light the LED and **Off** to turn it off.



Figure 4-9 LED Selection

5. Clicking **On** in the sample application executes an *ExecCommand* API call with the SET_ACTION method and the following XML code:

```
<inArgs>
  <scannerID>1</scannerID>
  <cmdArgs>
    <arg-int>43</arg-int>
  </cmdArgs>
</inArgs>
```



NOTE The <scannerID> tag in the XML is filled with the scanner ID selected in the *Connected Scanners* list of the sample application. The <arg-int> tag in the XML is filled with the corresponding action value to turn on or off the LED selected from the drop-down list shown in [Figure 4-9](#).

6. You can control any LED supported by the scanner by changing the action value in the <arg-int> tag. The list of action values can be found in [Table 3-13 on page 3-35](#).

- Clicking **Off** in the sample application executes an *ExecCommand* API call using the `DEVICE_LED_OFF` method with the same XML code that turned it on.

✓ **NOTE** The *Beep the Beeper* and *Flash the LED* XML code examples are the same. The only difference between these commands is the method name. All XML used in an *ExecCommand* API call has a common format. The `</inArgs>` tag always contains the `<scannerID>` tag and optionally contains `<cmdArgs>` tags and `<arg-xml>` tags inside the `</inArgs>` tag. Inside `<cmdArgs>`, there can be `<arg-string>`, `<arg-bool>` and `<arg-int>` tags. You can execute different commands for the same XML by changing the method parameter in *ExecCommand*.

Querying Attributes and Parameters

To query parameters from a specific device, such as the *Date of Manufacture* and *Firmware Version*, use the following procedure.

- Connect and discover a scanner (see *Scanner Discovery / Asset Tracking Information / Validating Successful SDK Installation on page 4-7*).
- Select the scanner you want to query from the list of *Connected Scanners* and then select the *RSM* tab.
- Click **Get All IDs** to retrieve the entire list of supported attribute IDs of the selected scanner. This operation executes an *ExecCommand* API call with the *ATTR_GETALL* method and the following XML:

```
<inArgs><scannerID>1</scannerID></inArgs>
```

✓ **NOTE** The `<scannerID>` tag in the XML contains the scanner's ID selected in the *Connected Scanners* list of the sample application.

- The sample application receives the XML output below and displays the corresponding attribute IDs on the grid (see *Figure 4-10 on page 4-19*).

```
<?xml version="1.0" encoding="UTF-8" ?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <modelnumber>DS670-SR20001ZZR</modelnumber>
    <serialnumber>7116000501003</serialnumber>
    <GUID>A2E647DED2163545B18BCEBD0A2A133D</GUID>
  </arg-xml>
  <response>
    <opcode>5000</opcode>
    <attrib_list>
      <attribute name="">0</attribute>
      <attribute name="">1</attribute>
      <attribute name="">2</attribute>
      <attribute name="">3</attribute>
      <attribute name="">4</attribute>
      <attribute name="">5</attribute>
      <attribute name="">6</attribute>
      <attribute name="">7</attribute>
      <attribute name="">8</attribute>
      <attribute name="">9</attribute>
      <attribute name="">10</attribute>
      <attribute name="">11</attribute>
      <attribute name="">12</attribute>
      <attribute name="">13</attribute>
      <attribute name="">14</attribute>
      <attribute name="">15</attribute>
      <attribute name="">16</attribute>
      <attribute name="">17</attribute>
      <attribute name="">18</attribute>
```

```

<attribute name="">20</attribute>
  <attribute name="">21</attribute>
  <attribute name="">22</attribute>
  <attribute name="">23</attribute>
  <attribute name="">24</attribute>
  <attribute name="">25</attribute>
  <attribute name="">26</attribute>
  <attribute name="">27</attribute>
  <attribute name="">28</attribute>
  <attribute name="">29</attribute>
  <attribute name="">30</attribute>
  <attribute name="">31</attribute>
  <attribute name="">34</attribute>
  <attribute name="">35</attribute>
  <attribute name="">36</attribute>
  <attribute name="">37</attribute>
  <attribute name="">38</attribute>
  <attribute name="">39</attribute>
  <attribute name="">655</attribute>
  <attribute name="">656</attribute>
  <attribute name="">657</attribute>
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  <attribute name="">672</attribute>
  <attribute name="">673</attribute>
  <attribute name="">705</attribute>
  <attribute name="">716</attribute>
  <attribute name="">718</attribute>
  <attribute name="">721</attribute>
  <attribute name="">724</attribute>
  <attribute name="">726</attribute>
  <attribute name="">727</attribute>
  <attribute name="">728</attribute>
  <attribute name="">730</attribute>
  <attribute name="">731</attribute>
  <attribute name="">734</attribute>
  <attribute name="">735</attribute>
  <attribute name="">745</attribute>
  <attribute name="">6000</attribute>
  <attribute name="">6001</attribute>
  <attribute name="">6002</attribute>
  <attribute name="">6003</attribute>
  <attribute name="">6004</attribute>
  <attribute name="">20004</attribute>
  <attribute name="">20006</attribute>
  <attribute name="">20007</attribute>
  <attribute name="">20008</attribute>
  <attribute name="">20009</attribute>
  <attribute name="">20010</attribute>
  <attribute name="">20011</attribute>
  <attribute name="">20013</attribute>
</attrib_list>
</response>
</arg-xml>
</outArgs>

```

Date of Manufacture is
27 April 2007

Firmware Version is
DS6707X4

UOC A status is
"TRUE" so it is enabled

Beeper Volume is
"0" so it is high

ADF Rule Contained Within the
Scanner's ADF Buffer



NOTE To find the corresponding attribute names refer to the scanner's *Product Reference Guide*.

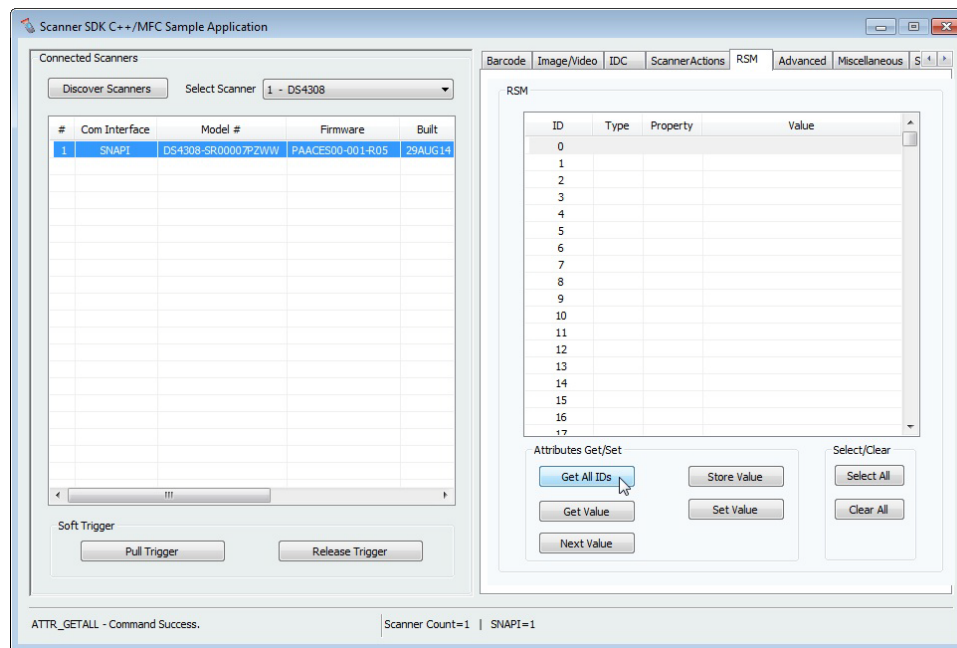


Figure 4-10 Get RSM IDs

1. To query attributes, select attribute IDs and click "Get Value" to view the attribute values. This operation executes an *ExecCommand* API call with the *ATTR_GET* method and the following XML.

```
<inArgs>
  <cmdArgs>
    <scannerID>1</scannerID>
    <arg-xml>
      <attrib_list>535,20004,1,140,392</attrib_list>
    </arg-xml>
  </cmdArgs>
</inArgs>
```

✓ **NOTE** The *<scannerID>* tag in the XML contains the scanner's ID selected in the *Connected Scanners* list and the *<attrib_list>* tag with the attribute IDs selected in the RSM grid.

For example, if you want to retrieve the values of the *Date of Manufacture*, *Firmware Version*, *UPC -A status*, *Beeper Volume* and *ADF Rule* parameters, you need to know their attribute IDs. [Table 4-5](#) shows the corresponding IDs. Selecting these attribute IDs in the grid of the sample application and clicking **Get Value** executes an *ExecCommand* API call with the *ATTR_GET* method and the XML shown above.

Table 4-5 Device Parameters to Query

Parameter	Attribute #
Date of Manufacture	535
Firmware Version	20004
UPC A status	1
Beeper Volume	140
ADF Rule	392

The sample application's RSM grid displays the output as in [Figure 4-12 on page 4-25](#) by processing the XML above.

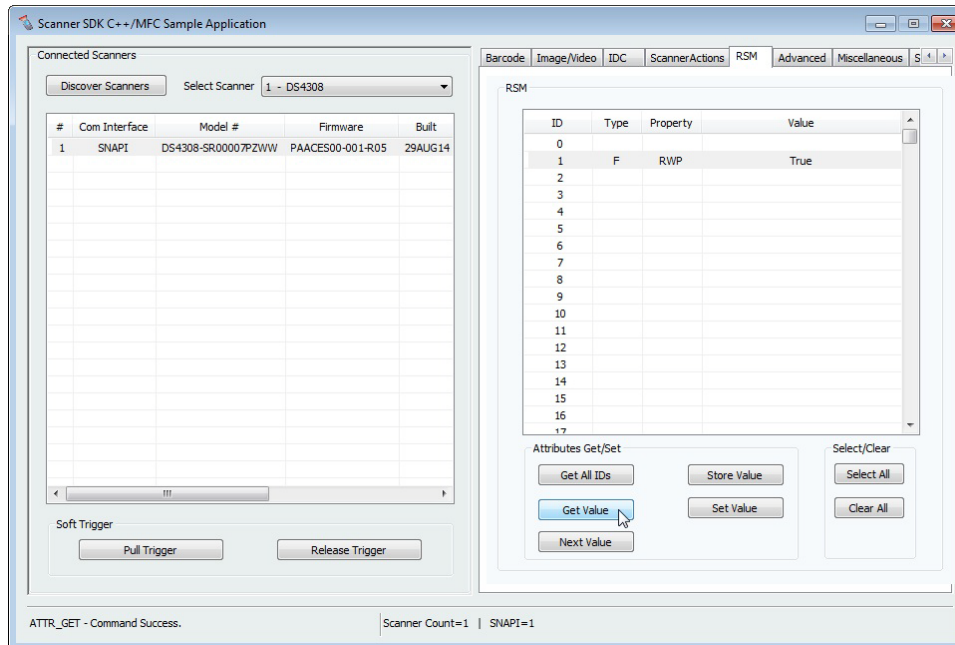


Figure 4-11 RSM Attribute Values for Selected IDs

Parameter Setting (Device Configuration)

To set parameters of a specific device, such as UPC-A status or Beeper Volume, use the following procedure.

1. Query the parameter (see [Querying Attributes and Parameters on page 4-17](#)).
2. To set an attribute, select and edit the attribute value in the *RSM* window data grid. Then select the entire row of the changed attribute and click **Set Value** or **Store Value**. Clicking these buttons execute an [ExecCommand](#) API call using the [ATTR_SET](#) or [ATTR_STORE](#) method and XML code shown below.

```
<inArgs>
  <scannerID>1</scannerID>
  <cmdArgs>
    <arg-xml>
      <attrib_list>
        <attribute>
          <id>1</id>
          <datatype>F</datatype>
          <value>False</value>
        </attribute>
      </attrib_list>
    </arg-xml>
  </cmdArgs>
</inArgs>
```

✓ **NOTE** The `<scannerID>` tag in the XML contains the scanner's ID selected from the *Connected Scanners* list and the `<attrib_list>` tag contains the `<attribute>` tags selected in the RSM grid.

Examples

These examples demonstrate how to enable/disable a symbology, program an ADF rule, control beeper volume and control LEDs.

Before starting the example, scan the **Set All Defaults** bar code below to return all parameters to the scanner's default values (replacing the scanner's current settings). Refer to the scanner's Product Reference Guide for default values.



Set All Defaults

Enable / Disable a Symbology

To disable the UPC-A symbology, determine the attribute ID of UPC-A by referencing the [Attribute Data Dictionary](#) (p/n 72E-149786-xx). The attribute ID of the UPC-A parameter is "1". To change and validate the setting, use the following procedure:

1. Put the scanner into USB OPOS (Hand Held) or USB SNAPi mode by scanning one of the bar codes in [Scanner Discovery / Asset Tracking Information / Validating Successful SDK Installation on page 4-7](#), or set the mode using the procedure in [Host Variant Switching on page 4-25](#).
2. Get the value of attribute ID 1. The value of this attribute should be "TRUE" if you scanned the **Set All Defaults** bar code before beginning the example.
3. To disable the UPC-A attribute of a scanner, change the value of the attribute ID 1 to "FALSE" in the *RSM* grid and click **Set Value** or **Store Value**.
4. The sample application then executes an [ExecCommand](#) API call with the [ATTR_SET](#) or [ATTR_STORE](#) method and the XML shown in [Parameter Setting \(Device Configuration\) on page 4-21](#).
5. If the command executed successfully, you can not scan the following UPC-A bar code.



Sample UPC-A Bar Code

Programming an ADF Rule

If you want to create an ADF rule to add the prefix "A" to any bar code and an **Enter** key after scanning a bar code, you must modify the ADF buffer of the scanner. According to the [Attribute Data Dictionary](#) (p/n 72E-149786-xx), the attribute ID of the ADF rule is 392.

To change and validate the setting:

USB Host Type = HID Keyboard Wedge

1. Scan the bar code below, or follow the procedure in [Host Variant Switching on page 4-25](#) to switch the scanner to HID keyboard mode. This enables the scanner to send data to any text editor.



USB Host Type - HID Keyboard Wedge

2. Open a text editor such as Windows Notepad and scan the [Sample UPC-A Bar Code on page 4-22](#) while the text editor is the active window. The text "012345678912" is inserted into the editor window.
3. Put the scanner into USB OPOS (hand held) or USB SNAPI mode by scanning one of the bar codes in [Scanner Discovery / Asset Tracking Information / Validating Successful SDK Installation on page 4-7](#), or following the procedure in [Host Variant Switching on page 4-25](#) to switch the host mode.
4. In the sample application, change the value of the selected scanner's attribute 392 to:
0x01 0x0C 0x11 0xF4 0x14 0x10 0x47 0x0D.
5. Click **Store Value**.
6. The sample application then executes an [ExecCommand](#) API call using the [ATTR_STORE](#) method and the following XML code:

```
<inArgs>
  <scannerID>1</scannerID>
  <cmdArgs>
    <arg-xml>
      <attrib_list>
        <attribute>
          <id>392</id>
          <datatype>A</datatype>
          <value>0x01 0x0C 0x11 0xF4 0x14 0x10 0x47 0x0D</value>
        </attribute>
      </attrib_list>
    </arg-xml>
  </cmdArgs>
</inArgs>
```

7. After successfully executing the command, repeat steps 1 and 2.
8. The text entered in Notepad is "A012345678912<Enter key>".

Beeper Volume Control

Suppose you want to change the beeper volume of the scanner. According to the [Attribute Data Dictionary](#) (p/n 72E-149786-xx), the corresponding attribute ID is 140 and the scanner beeper has three volume levels:

- 2 = low
- 1 = Medium
- 0 = High

To change and validate this setting:

1. Put the scanner into USB OPOS (hand held) or USB SNAP! mode by scanning one of the bar codes in [Scanner Discovery / Asset Tracking Information / Validating Successful SDK Installation on page 4-7](#), or following the procedure in [Host Variant Switching on page 4-25](#) to switch the host mode.
2. Scan the [Sample UPC-A Bar Code on page 4-22](#) and listen to the beeper carefully.
3. Select attribute ID 140 from the RSM attribute grid. Its value should be "0" (if the **Set All Defaults** bar code was scanned at the beginning of the example).
4. Change the value to "2" and click **Set Value** or **Store Value**.
5. The sample application then executes an [ExecCommand](#) API call with the [ATTR_SET](#) or [ATTR_STORE](#) method and the following XML code:

```
<inArgs>
  <scannerID>1</scannerID>
  <cmdArgs>
    <arg-xml>
      <attrib_list>
        <attribute>
          <id>140</id>
          <datatype>B</datatype>
          <value>2</value>
        </attribute>
      </attrib_list>
    </arg-xml>
  </cmdArgs>
</inArgs>
```

6. After successfully executing the command, scan the Sample UPC-A bar code again and note that the beeper volume is lower.



NOTE Changes made using the *Store Value* commands are permanent (persistent over power down and power up cycles). Changes made using the *Set Value* command are temporary (parameters set using this temporary command are lost after the next power down).

Beeper and LED Control

Suppose you want to beep the scanner or light the LED of the scanner. According to [Table 3-13 on page 3-35](#), the Action Attribute ID is 6000.

To change and validate this setting:

1. Put the scanner into USB OPOS (hand held) or USB SNAP! mode by scanning one of the bar codes in [Scanner Discovery / Asset Tracking Information / Validating Successful SDK Installation on page 4-7](#), or following the procedure in [Host Variant Switching on page 4-25](#) to switch the host mode.
2. To light the LED of the scanner execute an [ExecCommand](#) API call with the [ATTR_SET](#) or [ATTR_STORE](#) method and the following XML code:

```

<inArgs>
  <scannerID>1</scannerID>
  <cmdArgs>
    <arg-xml>
      <attrib_list>
        <attribute>
          <id>6000</id>
          <datatype>X</datatype>
          <value>43</value>
        </attribute>
      </attrib_list>
    </arg-xml>
  </cmdArgs>
</inArgs>

```

✓ **NOTE** You can execute several actions by changing the <value> tag in the XML above. For example, to turn off the LED, change the value to 42; to beep the beeper, change the value to an integer between 0 and 25. Refer to [Table 3-13 on page 3-35](#) for Action Attribute values.

Host Variant Switching

1. Connect and discover a scanner (see [Scanner Discovery / Asset Tracking Information / Validating Successful SDK Installation on page 4-7](#)).
2. Under the *Scanner Action* tab, select a *Target Mode* from the drop-down menu in the *Switch Host Variant* area.
3. *Permanent Change* or *Silent Reboot* options (hidden by the *Target Mode* drop-down list) may be selected if desired.
4. Click **Switch Host Mode** and the scanner reboots and sets to the selected target mode.

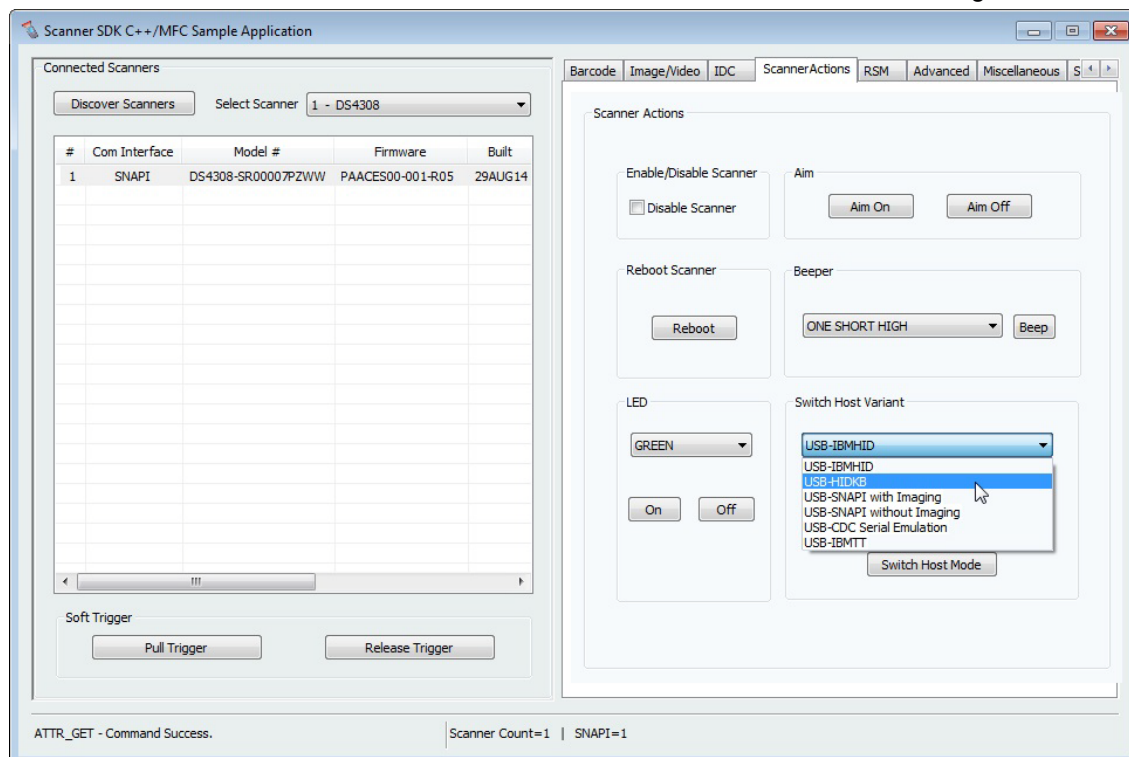


Figure 4-12 Changing Host Mode

5. Clicking **Switch Host Mode** in the sample application executes an *ExecCommand* API call with the *DEVICE_SWITCH_HOST_MODE* method and the following XML code:

```
<inArgs>
  <scannerID>1</scannerID>
  <cmdArgs>
    <arg-string>XUA-45001-1</arg-string>
    <arg-bool>TRUE</arg-bool>
    <arg-bool>FALSE</arg-bool>
  </cmdArgs>
</inArgs>
```

- ✓ **NOTE** The <scannerID> tag in the XML code above contains the scanner's ID selected from the *Connected Scanners* list of the sample application. The <arg-string> tag contains the string code of the target host variant selected from the drop-down list. These codes are referenced in [Table 3-14 on page 3-37](#). The first <arg-bool> tag contains the boolean value for the silent reboot option. A value of TRUE causes the scanner to reboot silently (without the typical reboot beeps). The second <arg-bool> tag contains the boolean value for the permanent change option.

A value of TRUE for this second <arg-bool> tag causes the target host variant to be persistent over power down and power up cycles. Otherwise the host variant change is temporary until the next reboot occurs.

When you are in HID Keyboard mode the only allowed target host variants are IBM Hand-held USB and SNAPI.

See [Table 3-14 on page 3-37](#) for a list of string codes for USB host variants.

Firmware Upgrade

Firmware Upgrade Scenarios

Three firmware upgrade scenarios that should be considered are discussed below.

Scenario A: Loading a compatible, different version of firmware from the firmware already on the scanner

- Upgrading the firmware on a scanner includes two steps:
 1. The firmware file downloads to the scanner.
 2. The firmware file on the scanner is activated (programmed into the scanner). Activation lasts for approximately 50 seconds, during which the LED blinks red. During activation, the scanner does not respond to network queries. When activation (programming) completes, the scanner automatically reboots (the LED turns off) and emits a power up beep, and powers up with the new upgraded firmware.
- A firmware download can take up to 20 minutes depending on the connection speed between the POS terminal and the scanner, the operating mode of the scanner and the size of the firmware file.

Scenario B: Loading the same version of firmware that is already on the scanner

- A firmware file can include multiple components. When loading the same version of firmware, some components in the firmware file may be the same as those already on the scanner, while other components are different.
Before firmware loads to the scanner, the scanner driver reads the header information of each firmware component to validate the model number and version. For example, if the first component downloading from the firmware file is the same version as the one already on the scanner, the component does not load to the scanner. Each remaining component in the firmware file is verified against the equivalent component on the scanner, and only components that are different are downloaded to the scanner.

Scenario C: Loading an incompatible version of firmware on the scanner

- This occurs when attempting to load firmware designed for one scanner model say DS6707 onto another incompatible scanner model say DS6708.

A firmware file can include multiple components. Before downloading firmware to the scanner, the scanner driver reads the header information of each firmware component to validate the model number and version. If the scanner driver determines that the firmware component model number does not match the scanner, the component does not load. This process continues to verify each remaining component in the firmware file.

Firmware Upgrade Procedure

1. Connect and discover a scanner (see [Scanner Discovery / Asset Tracking Information / Validating Successful SDK Installation on page 4-7](#)).
2. Obtain the latest firmware .DAT file for loading to a scanner using 123Scan².
 - a. Download and launch 123Scan2 from www.zebra.com/123scan2.
 - b. Using 123Scan², confirm you have the latest scanner plug-in. The plug-in contains a number of files including the firmware file and release notes.
 - i. To download the latest scanner plug-ins from within 123Scan², launch 123Scan², go to the help menu and click **Check for updates**.
 - ii. For a listing of scanner models, plug-ins and firmware files supported in 1123Scan² select **Supported scanners and plug-ins** under the *Help* menu.

- iii. The plug-ins are contained within a 123Scan² sub folder accessible in: *[WINDOWSDRIVE]\Documents and Settings\ [USERNAME]\Application Data\123Scan2\Plug-ins* in Windows XP systems and *[WINDOWSDRIVE]\Users\ [USERNAME]\Application Data\123Scan2\Plug-ins* in later versions of Windows. The firmware file is named with a .DAT extension (e.g., *CAAABS00-006-R02D0.DAT*).

- ✓ **NOTE** If you have the appropriate 123scan² plug-in, extract the firmware .DAT file from plug-in as follows: Rename the file extension of the plug-in file from .SCNPLG to .ZIP and use a standard archive tool, such as WinZip, to extract the firmware update file which ends with the file extension .DAT.

For example the DS9808 plug-in is named *DS9808-COMMON SR MODELS-S-017.SCNPLG*. After changing .SCNPLG to .ZIP, its firmware .DAT file *CAAABS00-006-R02D0.DAT* can be accessed with WinZip.

3. From the *Advanced* tab of the sample application, browse to and select the firmware .DAT file.

4. Check the *Bulk Update* option if bulk channel updating is preferred.

- ✓ **NOTE** A firmware update can be performed over one of two possible communication interfaces (channels), USB HID or the much faster USB Bulk. Most SNAPI devices support USB Bulk firmware update but some only support the USB HID channel. To confirm whether or not your scanner supports faster firmware upgrades via USB Bulk mode refer to the Scanner SDK for Windows website at: www.zebra.com/scannersdkforwindows.

5. Click **Update** to transfer the firmware file from the computer to the scanner.

6. Clicking **Update** in the sample application executes an *ExecCommand* API call with the *UPDATE_FIRMWARE* method and the following XML code:

```
<inArgs>
  <scannerID>1</scannerID>
  <cmdArgs>
    <arg-string>D:\scanner\ScannerFW\DS6707\DS6707X4.DAT</arg-string>
    <arg-int>2</arg-int>
  </cmdArgs>
</inArgs>
```

- ✓ **NOTE** The <scannerID> tag in the XML contains the scanner's ID selected in the "Connected Scanners" list of the sample application. The <arg-string> tag contains the path to the firmware file. The <arg-int> tag contains an integer value depending on the selection of bulk update option. If bulk update option is selected, the value of the tag would be "2". Otherwise it would be "1".

7. If you have registered with ScanRMDEvent (see [Register for COM Events on page 5-2](#)), you receive six types of events per firmware update cycle.
8. The OnScanRMDEvent function has two parameters where the first short type parameter contains the event type described above. The six event type values are listed in [Table 4-6](#).

Table 4-6 *Firmware Update Event Types*

Event Value	Event Type	Description
11	SCANNER_UF_SESS_START	Triggered when flash download session starts
12	SCANNER_UF_DL_START	Triggered when component download starts
13	SCANNER_UF_DL_PROGRESS	Triggered when block(s) of flash completed

Table 4-6 *Firmware Update Event Types (Continued)*

Event Value	Event Type	Description
14	SCANNER_UF_DL_END	Triggered when component download ends
15	SCANNER_UF_SESS_END	Triggered when flash download session ends
16	SCANNER_UF_STATUS	Triggered when update error or status

The second parameter of the same function contains an XML for the above event types. By processing the XML further information can be obtained. The formats of the receiving XMLs for each event types are as follows. All XMLs are containing the information about the scanner that it updates.

✓ **NOTE** A firmware file can include multiple components. Before downloading firmware to the scanner, the scanner driver reads the header information of each firmware component to validate the model number and version. If the scanner driver determines that the firmware component model number does not match the scanners', the component does not load. This process continues to verify each remaining component in the firmware file.

a. SCANNER_UF_SESS_START

```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <sess_start>
      <modelnumber>DS670-SR20001ZZR</modelnumber>
      <serialnumber>S/N:7108E15933CA1B4BB776F7BDB4B3F826</serialnumber>
      <GUID>7108E15933CA1B4BB776F7BDB4B3F826</GUID>
      <maxcount>3075</maxcount>
      <status>0</status>
    </sess_start>
  </arg-xml>
</outArgs>
```

✓ **NOTE** The <maxcount> tag contains the number of records in the firmware file.

b. SCANNER_UF_DL_START

```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <dl_start>
      <modelnumber>DS670-SR20001ZZR</modelnumber>
      <serialnumber>S/N:7108E15933CA1B4BB776F7BDB4B3F826</serialnumber>
      <GUID>7108E15933CA1B4BB776F7BDB4B3F826</GUID>
      <software_component>0</software_component>
      <status>0</status>
    </dl_start>
  </arg-xml>
</outArgs>
```

✓ **NOTE** The <software_component> tag contains the component number that downloads started.

c. SCANNER_UF_DL_PROGRESS

```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <dl_progress>
      <modelnumber> DS670-SR20001ZZR </modelnumber>
      <serialnumber>S/N:7108E15933CA1B4BB776F7BDB4B3F826</serialnumber>
      <GUID>7108E15933CA1B4BB776F7BDB4B3F826</GUID>
      <software_component>1</software_component>
      <progress>7</progress>
      <status>600</status>
    </dl_progress>
  </arg-xml>
</outArgs>
```



NOTE The <progress> tag contains the record number that it downloading at that moment. The <status> tag contains the status of the download progressing record. 600 value means that it is the resident firmware. For more status and error codes see [Table 3-17 on page 3-42](#).

d. SCANNER_UF_DL_END

```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <dl_end>
      <modelnumber> DS670-SR20001ZZR </modelnumber>
      <serialnumber>S/N:7108E15933CA1B4BB776F7BDB4B3F826</serialnumber>
      <GUID>7108E15933CA1B4BB776F7BDB4B3F826</GUID>
      <software_component>2</software_component>
      <size>0</size>
      <status>0</status>
    </dl_end>
  </arg-xml>
</outArgs>
```

e. SCANNER_UF_SESS_END

```
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <sess_end>
      <modelnumber> DS670-SR20001ZZR </modelnumber>
      <serialnumber>S/N:7108E15933CA1B4BB776F7BDB4B3F826</serialnumber>
      <GUID>7108E15933CA1B4BB776F7BDB4B3F826</GUID>
      <status>0</status>
    </sess_end>
  </arg-xml>
</outArgs>
```

f. SCANNER_UF_STATUS

```

<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <sess_info>
      <modelnumber> DS670-SR20001ZZR </modelnumber>
      <serialnumber>S/N:7108E15933CA1B4BB776F7BDB4B3F826</serialnumber>
      <GUID>7108E15933CA1B4BB776F7BDB4B3F826</GUID>
      <status>506</status>
    </sess_info>
  </arg-xml>
</outArgs>

```

9. After the file transfer is complete, click **Launch** to activate (program into the scanner) the new firmware. Activation takes approximately one minute, during which the LED blinks red and scanning bar code data is disabled. During activation, the scanner does not respond to network queries. When activation (programming) completes, the scanner automatically reboots (the LED turns off), emits a power up beep and restarts with the new upgraded firmware.

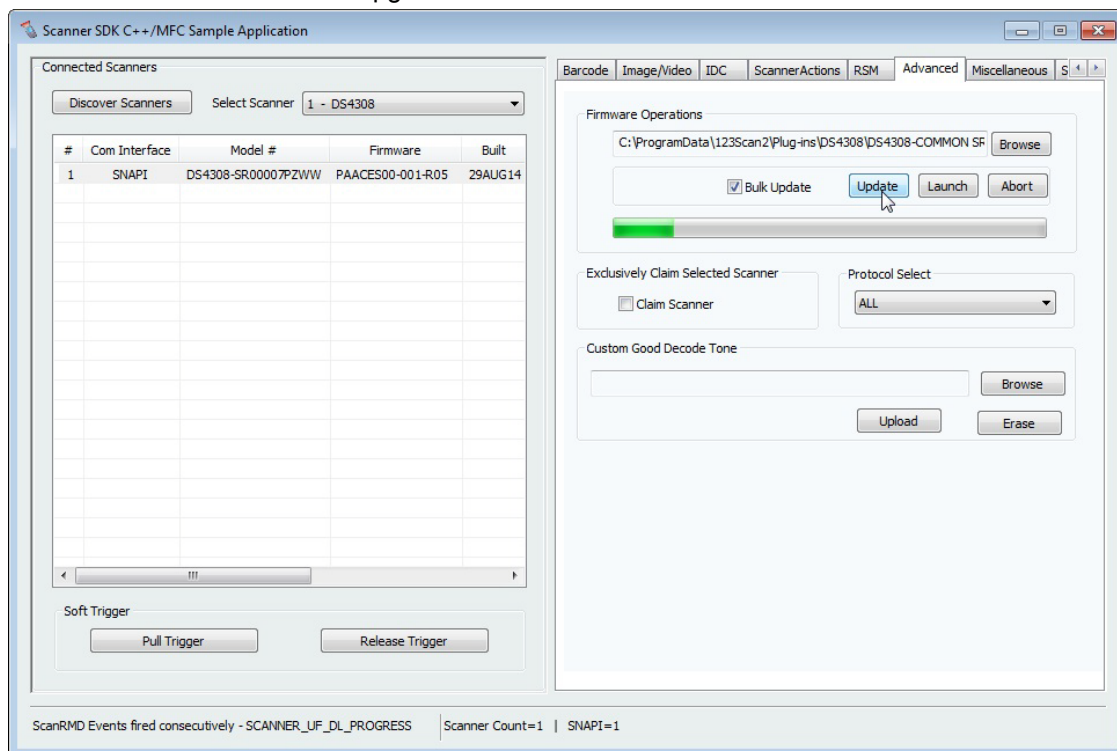


Figure 4-13 *Firmware Upgrade Through Bulk (Faster Download Mode) Channel*

CHAPTER 5 SAMPLE SOURCE CODE

Overview

This chapter provides information about how a developer uses the Zebra Scanner SDK. This is demonstrated by code snippets from the sample application.

See [Appendix A, WRITE SIMPLE APPLICATIONS USING THE SCANNER SDK API](#) for a starter example of an application illustrating the Zebra Scanner SDK API. For a list of the most commonly requested topics within this guide, see [Quick Startup](#) in the back of the guide.



NOTE For a list of a scanner's supported attribute (parameter) numbers and definitions, refer to the *Product Reference Guide* for that model scanner, available from the Zebra Support website at <http://www.zebra.com/support>. Attributes include configuration parameters, monitored data, and asset tracking information.

Sample Utilities Provided in the SDK

The Zebra Scanner SDK includes sample utilities that demonstrate the main functionalities of the SDK. You can gain an understanding of the Zebra Scanner SDK by using these test utilities. In addition, this section describes how to use the utilities functionality.

- Zebra Scanner SDK C++ Sample Application
- Zebra Scanner SDK C# .Net Sample Application

Creation of COM Object And Registration for Events

```
using CoreScanner;
...
m_pCoreScanner = new CoreScanner.CCoreScannerClass(); //create COM object
...
```

Register for COM Events

```
/* Event registration for COM Service */
m_pCoreScanner.ImageEvent += new
CoreScanner._ICoreScannerEvents_ImageEventEventHandler(OnImageEvent);
m_pCoreScanner.VideoEvent += new
CoreScanner._ICoreScannerEvents_VideoEventEventHandler(OnVideoEvent);
m_pCoreScanner.BarcodeEvent += new
CoreScanner._ICoreScannerEvents_BarcodeEventEventHandler(OnBarcodeEvent);
m_pCoreScanner.PNPEvent += new
CoreScanner._ICoreScannerEvents_PNPEventEventHandler(OnPNPEvent);
m_pCoreScanner.ScanRMDEvent += new
CoreScanner._ICoreScannerEvents_ScanRMDEventEventHandler(OnScanRMDEvent);
m_pCoreScanner.CommandResponseEvent += new
CoreScanner._ICoreScannerEvents_CommandResponseEventEventHandler(OnCommandResponseEvent);
m_pCoreScanner.IOEvent += new
CoreScanner._ICoreScannerEvents_IOEventEventHandler(OnIOEvent);
```

Calling Open Command

```
private void Connect()
{
    if (m_bSuccessOpen)
    {
        return;
    }
    int appHandle = 0;
    GetSelectedScannerTypes();
    int status = STATUS_FALSE;

    try
    {
        m_pCoreScanner.Open(appHandle, m_arScannerTypes, m_nNumberOfTypes, out
status);
    }
    ...
}
```

Calling Close Command

```
private void Disconnect()
{
    if (m_bSuccessOpen)
    {
        int appHandle = 0;
        int status = STATUS_FALSE;
        try
        {
            m_pCoreScanner.Close(appHandle, out status);
        }
        ...
    }
}
```

Calling GetScanners Command

```
private void ShowScanners()
{
    lstvScanners.Items.Clear();
    combSlcrScnr.Items.Clear();
    m_arScanners.Initialize();
    if (m_bSuccessOpen)
    {
        m_nTotalScanners = 0;
        short numOfScanners = 0;
        int nScannerCount = 0;
        string outXML = "";
        int status = STATUS_FALSE;
        int[] scannerIdList = new int[MAX_NUM_DEVICES];
        try
        {
            m_pCoreScanner.GetScanners(out numOfScanners, scannerIdList, out outXML,
out status);
            ...
        }
    }
}
```

Calling ExecCommand Command and ExecCommandAsync Command

```
private void ExecCmd(int opCode, ref string inXml, out string outXml, out int status)
{
    outXml = "";
    status = STATUS_FALSE;
    if (m_bSuccessOpen)
    {
        try
        {
            if (!chkAsync.Checked)
            {
                m_pCoreScanner.ExecCommand(opCode, ref inXml, out outXml, out
status);
            }
            else
            {
                m_pCoreScanner.ExecCommandAsync(opCode, ref inXml, out status);
            }
        }
        ...
    }
}
```


APPENDIX A WRITE SIMPLE APPLICATIONS USING THE SCANNER SDK API

Overview

This appendix provides a step by step guide to writing simple applications using CoreScanner APIs.

Before you start to write applications using CoreScanner APIs, please prepare your development environment properly.

- Install Microsoft Visual Studio 2005 or newer version and make sure you have enough system resources to develop an application on your system.
- Install the Scanner SDK and make sure the SDK is operational. See [How to Verify Scanner SDK Functionality on page 4-7](#) for more information.

Before coding an application in Microsoft C# .Net (console application or an application with a user interface), be prepared with basic reference importing, class declaration and instantiation (see page [A-2](#)).



NOTE For a list of a scanner's supported attribute (parameter) numbers and definitions, refer to the *Product Reference Guide* for that model scanner, available from the Zebra Support website at <http://www.zebra.com/support>. Attributes include configuration parameters, monitored data, and asset tracking information.

Import CoreScanner Reference, Class Declaration and Instantiation

To create an empty project in Microsoft Visual Studio 2005 (create a console project):

1. Start Microsoft Visual Studio 2005.
2. Go to *File -> New -> Project*

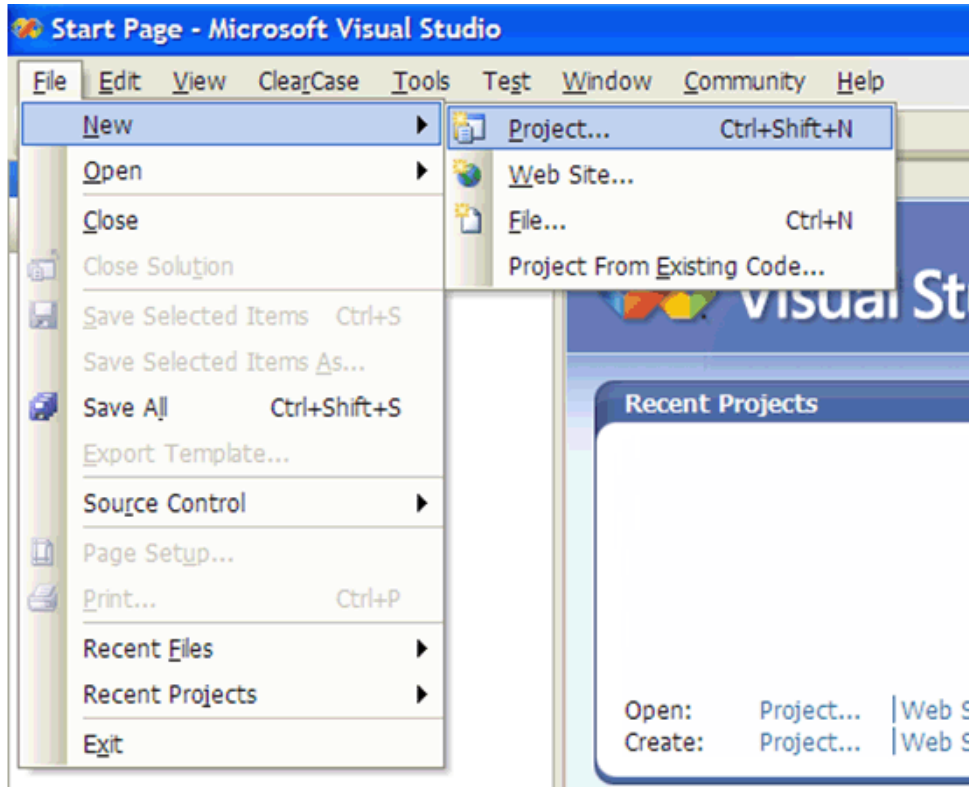


Figure A-1 New Project

3. Select Project "Visual C#" and Template as "Console Application" and type a name for your project. In this example, it is "ConsoleApplication1".

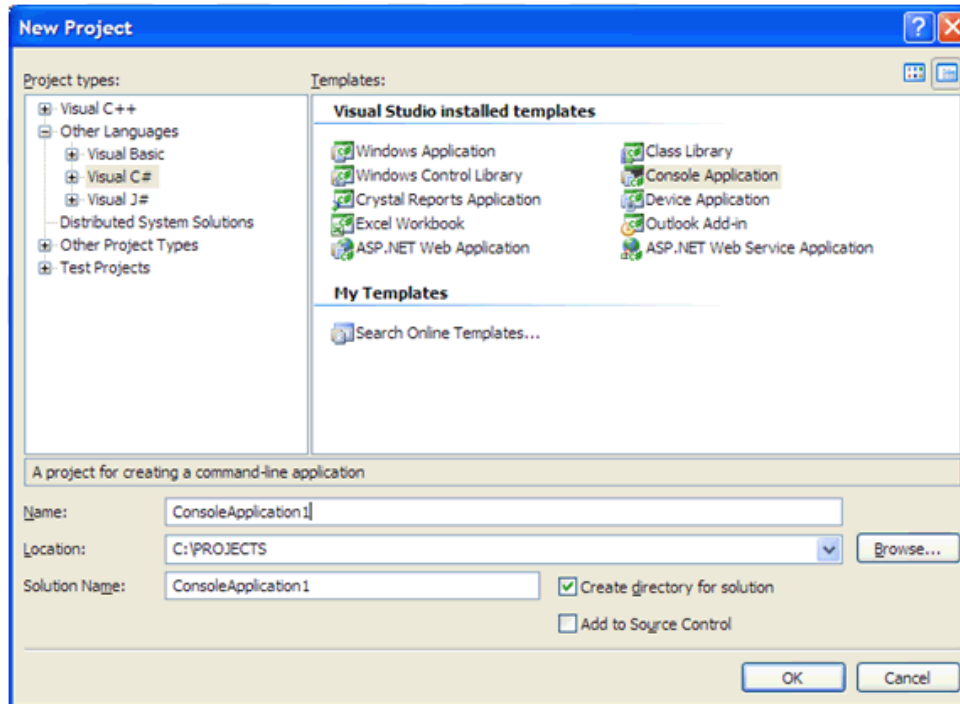


Figure A-2 Console Application1

4. Import CoreScanner as a reference into your application.
5. Go to *Project -> Add Reference...*

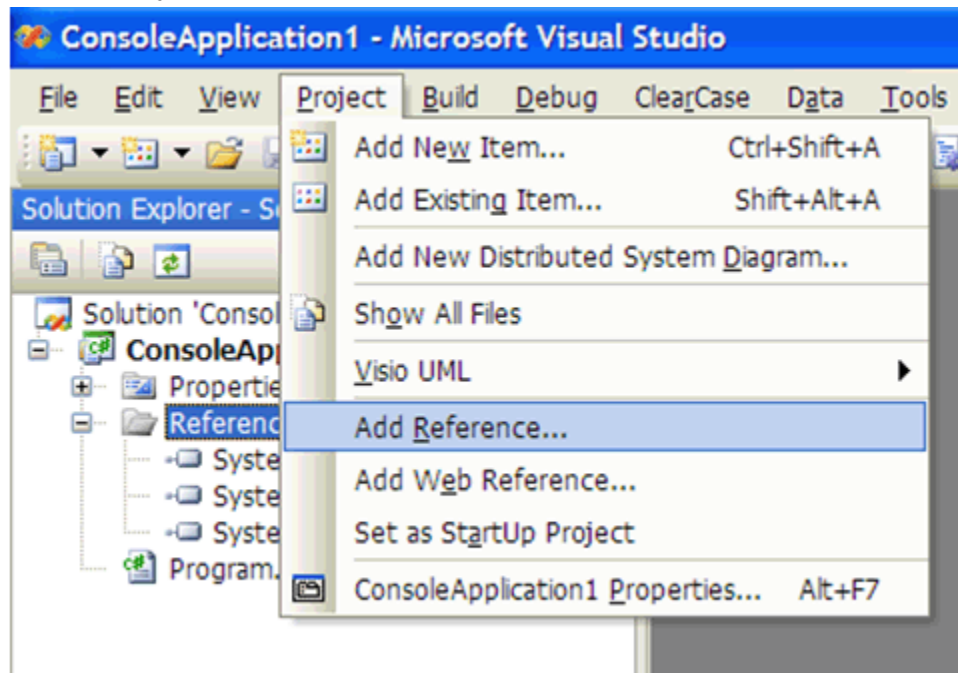


Figure A-3 Add Reference

6. Select the CoreScanner Type Library from the COM tab and click **OK**.

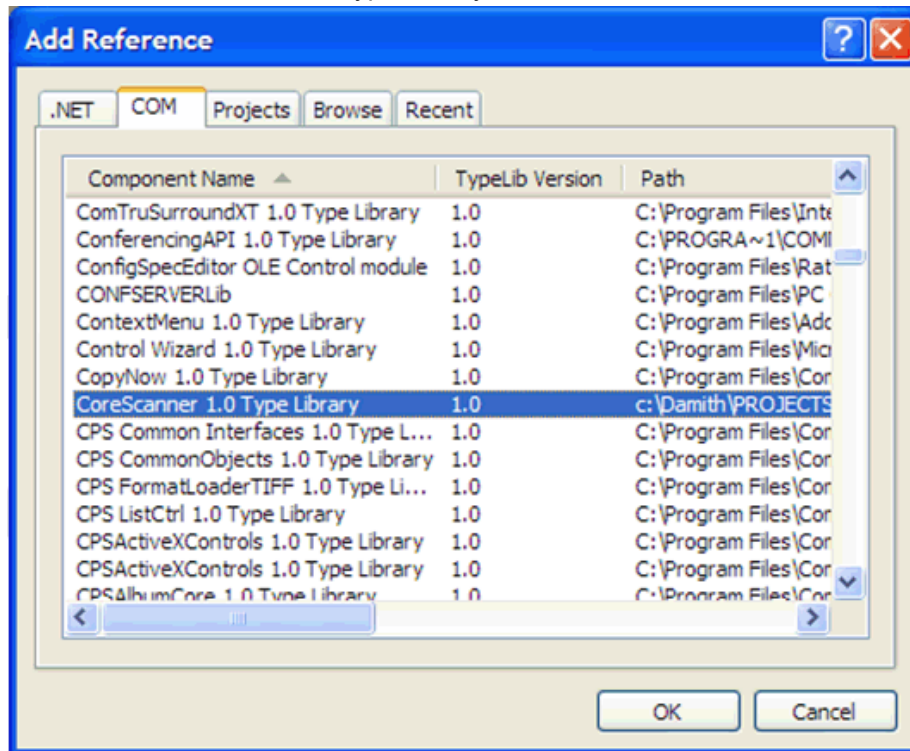


Figure A-4 CoreScanner Type Library

7. CoreScanner is listed in your project under *References* as shown below.

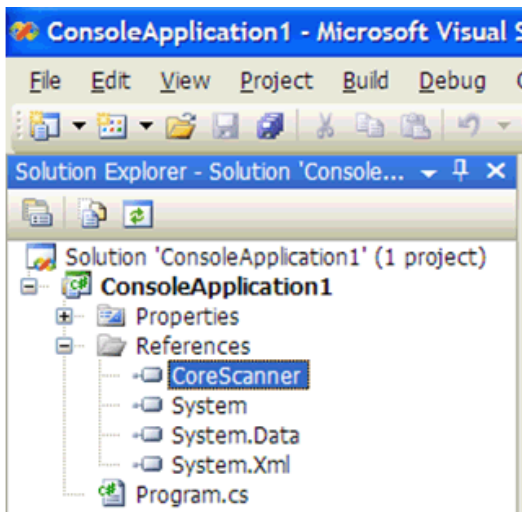


Figure A-5 CoreScanner Reference

8. You are now ready to import the CoreScanner library into your application. After importing, you can declare and instantiate the CoreScanner class for the application.

Open the Program.cs file and enter the modifications as shown below.

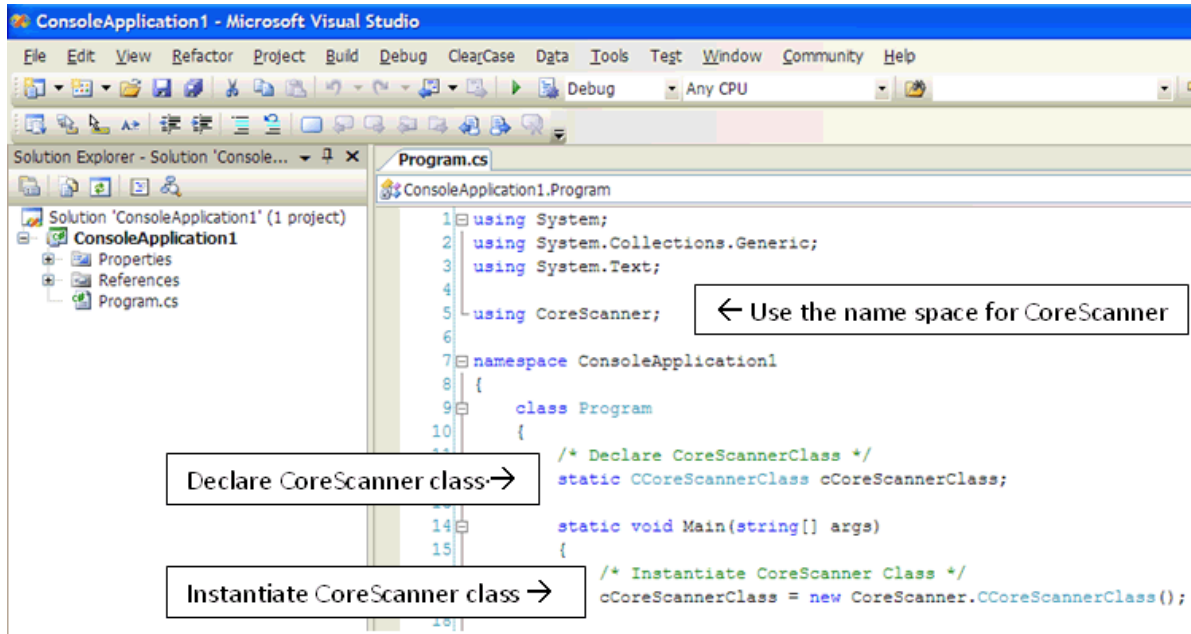


Figure A-6 Open Program.cs File

9. Now you are ready to start dealing with CoreScanner APIs. Follow steps 1 to 7 before you start using APIs.

Call Open API

After you instantiate CoreScanner class into your application you can call Open API as shown below.

```
using System;
using System.Collections.Generic;
using System.Text;
using CoreScanner;

namespace ConsoleApplication1
{
    class Program
    {
        // Declare CoreScannerClass
        static CCoreScannerClass cCoreScannerClass;

        static void Main(string[] args)
        {
            //Instantiate CoreScanner Class
            cCoreScannerClass = new CCoreScannerClass();

            //Call Open API
            short[] scannerTypes = new short[1];    // Scanner Types you are interested in
            scannerTypes[0] = 1;                    // 1 for all scanner types
            short numberOfScannerTypes = 1;          // Size of the scannerTypes array
            int status;                              // Extended API return code

            cCoreScannerClass.Open(0, scannerTypes, numberOfScannerTypes, out status);

            if (status == 0)
            {
                Console.WriteLine("CoreScanner API: Open Successful");
            }
            else
            {
                Console.WriteLine("CoreScanner API: Open Failed");
            }
        }
    }
}
```

If you have successfully executed all the commands, you see the following output on the console window.

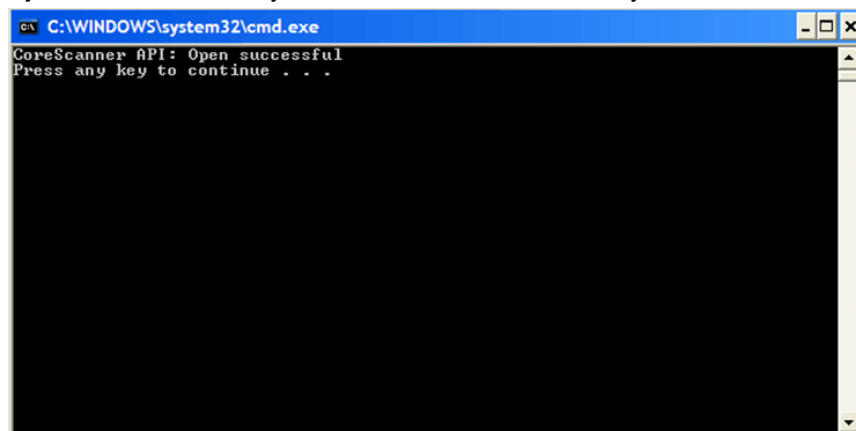


Figure A-7 Open API Success - Console Window

Call GetScanners API

After you call Open API as described on page [A-6](#) you can call the GetScanners API as shown below.

```
using System;
using System.Collections.Generic;
using System.Text;
using CoreScanner;

namespace ConsoleApplication1
{
    class Program
    {
        // Declare CoreScannerClass
        static CCoreScannerClass cCoreScannerClass;

        static void Main(string[] args)
        {
            //Instantiate CoreScanner Class
            cCoreScannerClass = new CCoreScannerClass();

            //Call Open API
            short[] scannerTypes = new short[1]; // Scanner Types you are interested in
            scannerTypes[0] = 1;                // 1 for all scanner types
            short numberOfScannerTypes = 1;      // Size of the scannerTypes array
            int status;                          // Extended API return code

            cCoreScannerClass.Open(0, scannerTypes, numberOfScannerTypes, out status);

            // Lets list down all the scanners connected to the host

            short numberOfScanners;              // Number of scanners expect to be used
            int[] connectedScannerIDList = new int[255];
                                                // List of scanner IDs to be returned
            string outXML;                       //Scanner details output

            cCoreScannerClass.GetScanners(out numberOfScanners, connectedScannerIDList,
                                         out outXML, out status);

            Console.WriteLine(outXML);
        }
    }
}
```

If you have successfully executed all the commands, you see the following output on the console window.

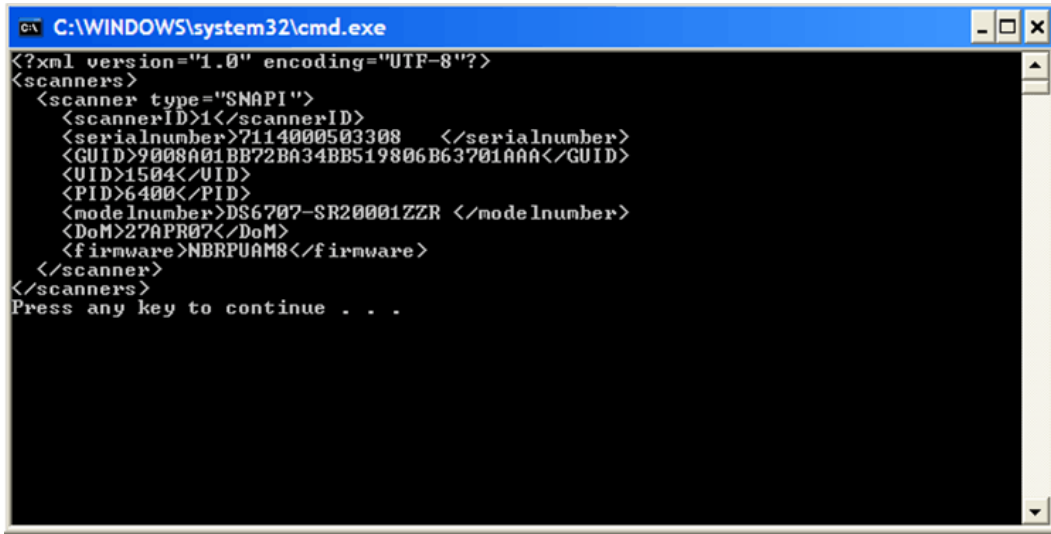
A screenshot of a Windows command prompt window titled "C:\WINDOWS\system32\cmd.exe". The window displays XML output from the GetScanners API. The XML structure is as follows: <?xml version="1.0" encoding="UTF-8"?> <scanners> <scanner type="SNAPI"> <scannerID>1</scannerID> <serialnumber>7114000503308 </serialnumber> <GUID>9008A01BB72BA34BB519806B63701AAA</GUID> <UID>1504</UID> <PID>6400</PID> <modelnumber>DS6707-SR20001ZZR </modelnumber> <DoM>27APR07</DoM> <firmware>NBRPUAM8</firmware> </scanner> </scanners> Below the XML output, the text "Press any key to continue . . ." is displayed. The command prompt window has a standard Windows title bar with minimize, maximize, and close buttons.

Figure A-8 *GetScanners API Success - Console Window*

Calling ExecCommand API to Demonstrate Beep the Beeper

After you call Open API as described on page [A-6](#), you can call ExecCommand API as shown below.

```
using System;
using System.Collections.Generic;
using System.Text;
using CoreScanner;

namespace ConsoleApplication1
{
    class Program
    {
        // Declare CoreScannerClass
        static CCoreScannerClass cCoreScannerClass;

        static void Main(string[] args)
        {
            //Instantiate CoreScanner Class
            cCoreScannerClass = new CCoreScannerClass();

            //Call Open API
            short[] scannerTypes = new short[1]; // Scanner Types you are interested in
            scannerTypes[0] = 1;                 // 1 for all scanner types
            short numberOfScannerTypes = 1;       // Size of the scannerTypes array
            int status;                          // Extended API return code

            cCoreScannerClass.Open(0, scannerTypes, numberOfScannerTypes, out status);

            // Let's beep the beeper
            int opcode = 6000;                   // Method for Beep the beeper
            string outXML;                       // Output
            string inXML = "<inArgs>" +
                "<scannerID>1</scannerID>" + // The scanner you need to beep
                "<cmdArgs>" +
                "<arg-int>3</arg-int>" + // 4 high short beep pattern
                "</cmdArgs>" +
                "</inArgs>";

            cCoreScannerClass.ExecCommand(opcode, ref inXML, out outXML, out status);
        }
    }
}
```

If you have successfully executed all the commands, you see the following output on the console window. There is no visual output for this beep command but an audible beep sounds from the scanner.

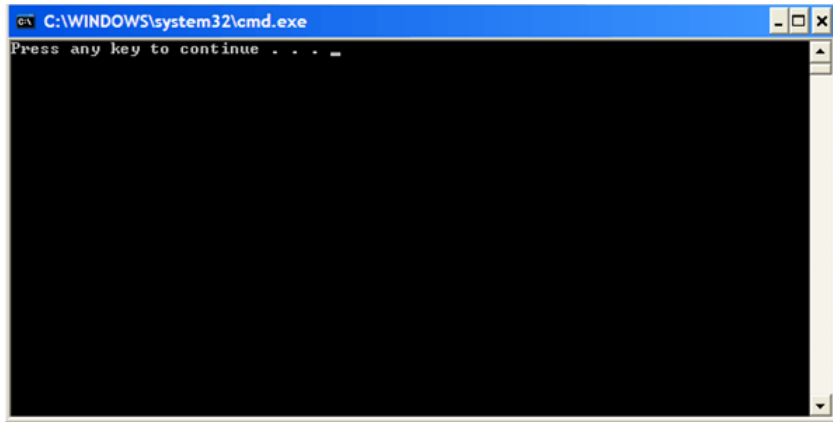


Figure A-9 *Call ExecCommand API Success - Console Window*

Retrieve Asset Tracking Information from ExecCommand with the RSM_GET Method

After you call Open API as described on page [A-6](#), you can call ExecCommand API as shown below.

```
using System;
using System.Collections.Generic;
using System.Text;
using CoreScanner;

namespace ConsoleApplication1
{
    class Program
    {
        // Declare CoreScannerClass
        static CCoreScannerClass cCoreScannerClass;

        static void Main(string[] args)
        {
            //Instantiate CoreScanner Class
            cCoreScannerClass = new CCoreScannerClass();

            //Call Open API
            short[] scannerTypes = new short[1]; // Scanner Types you are interested in
            scannerTypes[0] = 1;                // 1 for all scanner types
            short numberOfScannerTypes = 1;      // Size of the scannerTypes array
            int status;                          // Extended API return code

            cCoreScannerClass.Open(0, scannerTypes, numberOfScannerTypes, out status);

            // Let's retrieve assert tracking information
            int opcode = 5001;                    // Method for Get the scanner attributes
            string outXML;                        // XML Output
            string inXML = "<inArgs>" +
                "<scannerID>1</scannerID>" +
                // The scanner you need to get the information
                "<cmdArgs>" +
                "<arg-xml>" +
                "<attrib_list>20004,533,20007,1</attrib_list>" +
                // attribute numbers you need
                "</arg-xml>" +
                "</cmdArgs>" +
                "</inArgs>";

            cCoreScannerClass.ExecCommand(opcode, ref inXML, out outXML, out status);
            Console.WriteLine(outXML);
        }
    }
}
```

If you have successfully executed all the commands, you see the following output on the console window.

```

C:\WINDOWS\system32\cmd.exe
<?xml version="1.0" encoding="UTF-8"?>
<outArgs>
  <scannerID>1</scannerID>
  <arg-xml>
    <modelnumber>DS6707-SR20001ZZR </modelnumber>
    <serialnumber>7114000503308 </serialnumber>
    <GUID>9008A01BB72BA34BB519806B63701AAA</GUID>
    <response>
      <opcode>5001</opcode>
      <attrib_list>
        <attribute>
          <id>20004</id>
          <name></name>
          <datatype>S</datatype>
          <permission>R</permission>
          <value>NBRPUM8</value>
        </attribute>
        <attribute>
          <id>533</id>
          <name></name>
          <datatype>S</datatype>
          <permission>R</permission>
          <value>DS6707-SR20001ZZR </value>
        </attribute>
        <attribute>
          <id>20007</id>
          <name></name>
          <datatype>S</datatype>
          <permission>R</permission>
          <value>Imager </value>
        </attribute>
        <attribute>
          <id>1</id>
          <name></name>
          <datatype>F</datatype>
          <permission>RWP</permission>
          <value>True</value>
        </attribute>
      </attrib_list>
    </response>
  </arg-xml>
</outArgs>
Press any key to continue . . .

```

Figure A-10 Retrieve Asset Tracking Information from ExecCommand Success - Console Window

Enable the UPC-A Attribute by Calling SET_ATTRIBUTE via ExecCommand

After you call Open API as described on page [A-6](#), you can call ExecCommand API as shown below.

```
using System;
using System.Collections.Generic;
using System.Text;
using CoreScanner;

namespace ConsoleApplication1
{
    class Program
    {
        // Declare CoreScannerClass
        static CCoreScannerClass cCoreScannerClass;

        static void Main(string[] args)
        {
            //Instantiate CoreScanner Class
            cCoreScannerClass = new CCoreScannerClass();

            //Call Open API
            short[] scannerTypes = new short[1]; // Scanner Types you are interested in
            scannerTypes[0] = 1;                // 1 for all scanner types
            short numberOfScannerTypes = 1;      // Size of the scannerTypes array
            int status;                          // Extended API return code

            cCoreScannerClass.Open(0, scannerTypes, numberOfScannerTypes, out status);

            // Let's set the UPC-A enable/disable
            int opcode = 5004;                    // Method for Set the scanner attributes
            string outXML;                        // XML Output
            string inXML = "<inArgs>" +
                "<scannerID>1</scannerID>" +
            // The scanner you need to get the information (above)
                "<cmdArgs>" +
                "<arg-xml>" +
                "<attrib_list>" +
                "<attribute>" +
                "<id>1</id>" +
            // Attribute number for UPC-A
                "<datatype>F</datatype>" +
                "<value>False</value>" +
                "</attribute>" +
                "</attrib_list>" +
                "</arg-xml>" +
                "</cmdArgs>" +
                "</inArgs>";

            cCoreScannerClass.ExecCommand(opcode, ref inXML, out outXML, out status);
            Console.WriteLine(outXML);
        }
    }
}
```

This method does not show any output but it sets the UPC-A to enable (True) or disable (False).

Capture Bar Code Data into an Application

1. Create an empty C# *Windows Application* project in Microsoft Visual Studio.

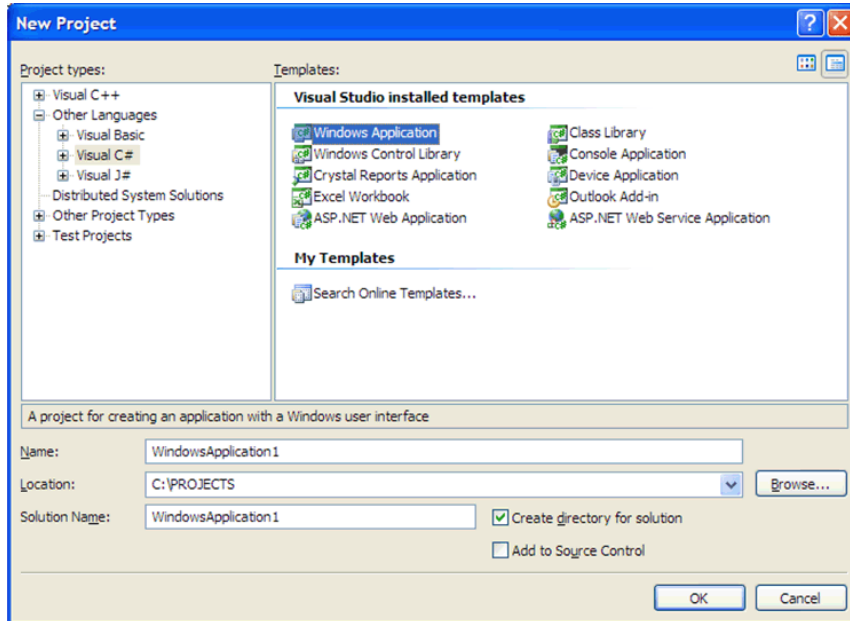


Figure A-11 Create Empty C# Windows Application

2. Add CoreScanner as a reference into your project. See [Import CoreScanner Reference, Class Declaration and Instantiation on page A-2](#) for more details.
3. Add a button and a text area into your application.

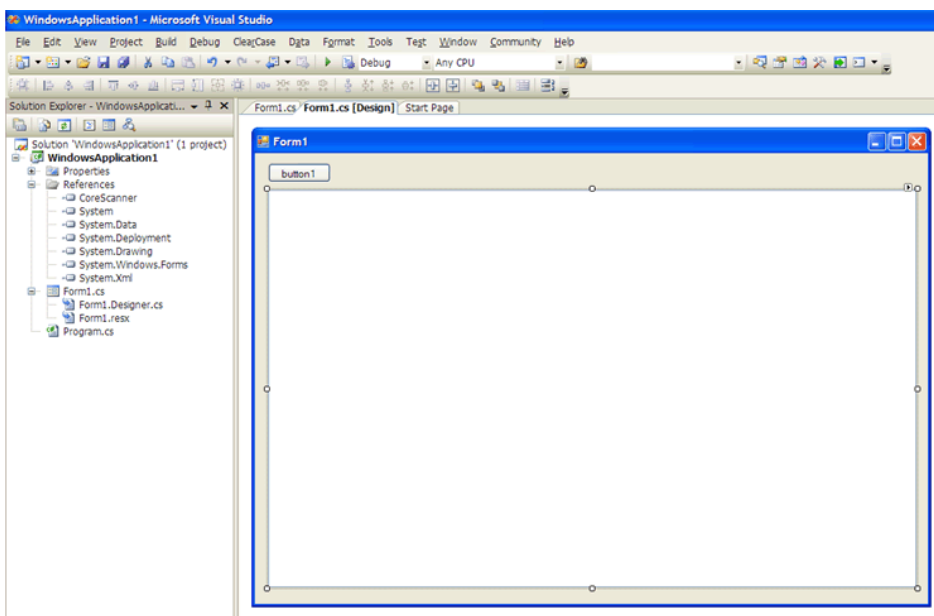


Figure A-12 Add a Button

4. Include the following code segment into the *Button click* method.

```
try
{
    //Instantiate CoreScanner Class
    cCoreScannerClass = new CCoreScannerClass();

    //Call Open API
    short[] scannerTypes = new short[1]; //Scanner Types you are interested in
    scannerTypes[0] = 1;                 // 1 for all scanner types
    short numberOfScannerTypes = 1;      // Size of the scannerTypes array
    int status;                          // Extended API return code

    cCoreScannerClass.Open(0, scannerTypes, numberOfScannerTypes, out status);

    // Subscribe for barcode events in cCoreScannerClass
    cCoreScannerClass.BarcodeEvent += new
        _ICoreScannerEvents_BarcodeEventHandler(OnBarcodeEvent);

    // Let's subscribe for events
    int opcode = 1001;                    // Method for Subscribe events
    string outXML;                        // XML Output
    string inXML = "<inArgs>" +
        "<cmdArgs>" +
        "<arg-int>1</arg-int>" + // Number of events you want to subscribe
        "<arg-int>1</arg-int>" + // Comma separated event IDs
        "</cmdArgs>" +
        "</inArgs>";

    cCoreScannerClass.ExecCommand(opcode, ref inXML, out outXML, out status);
    Console.WriteLine(outXML);
}
catch (Exception exp)
{
    Console.WriteLine("Something wrong please check... "+exp.Message);
}
```

5. Implement a method to receive the event as shown below and populate the text box with scanned data.

```
void OnBarcodeEvent(short eventType, ref string pscanData)
{
    string barcode = pscanData;
    this.Invoke((MethodInvoker)delegate { textBox1.Text = barcode; });
}
```

6. If you execute the application and click on the button, the application instantiates CoreScanner and is ready to receive bar code events. *Figure A-13* illustrates the output when you scan a bar code.

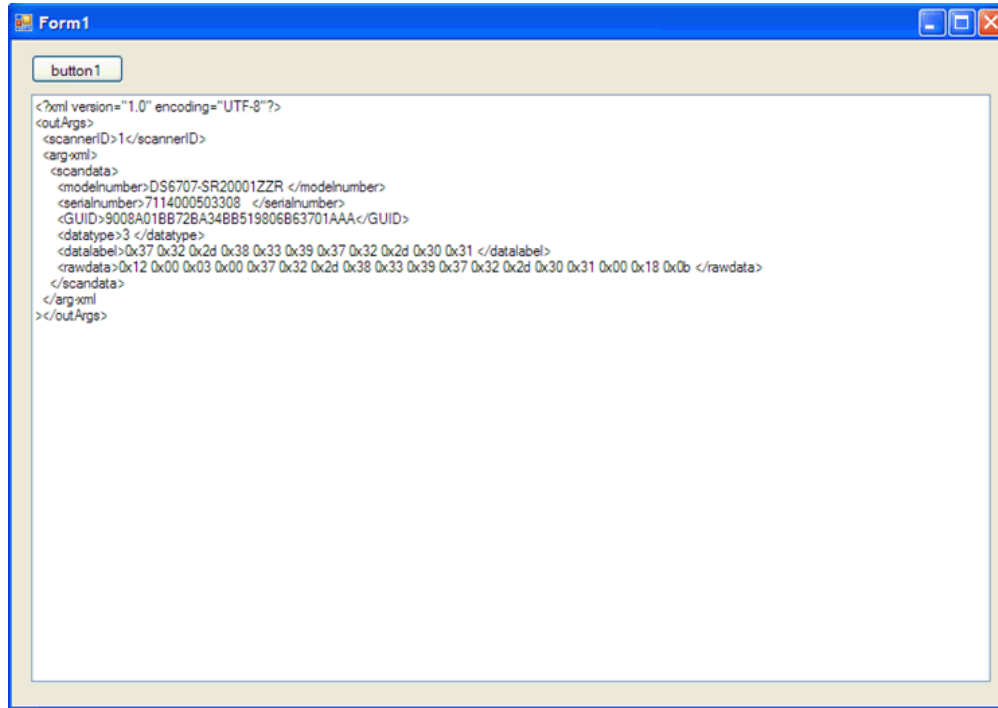


Figure A-13 Scanned Bar Code Output

APPENDIX B SCANNER SDK VISUAL STUDIO PROJECT TEMPLATE

Overview

The Scanner SDK project template is an easy way to use the CoreScanner API in .NET languages. Previously, a CoreScanner API user needed to add a COM reference to the CoreScanner type library, and use the XML API provided by the CoreScanner driver to process XML input and output. The Zebra Scanner SDK project template was created to minimize XML processing as it is an object based API.

Environment

- Scanner SDK v2.3, or above
- Visual Studio 2005, or above

Installing the Project Template

To install the Scanner SDK project template:

1. Install the Scanner SDK v2.3, or above.
2. Go to *Start > All Programs > Zebra Scanner > Scanner SDK*.

3. Click Zebra Scanner SDK Project Template.

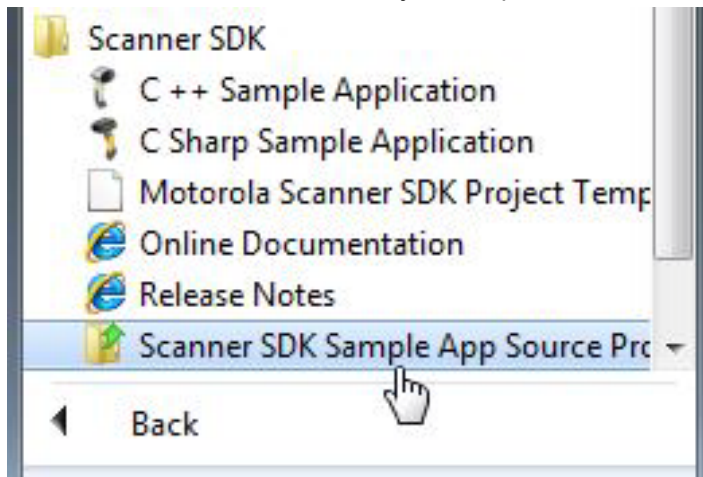


Figure B-1 Zebra Scanner SDK Project Template Folder

4. Click **Next** in Visual Studio Content Installer window.

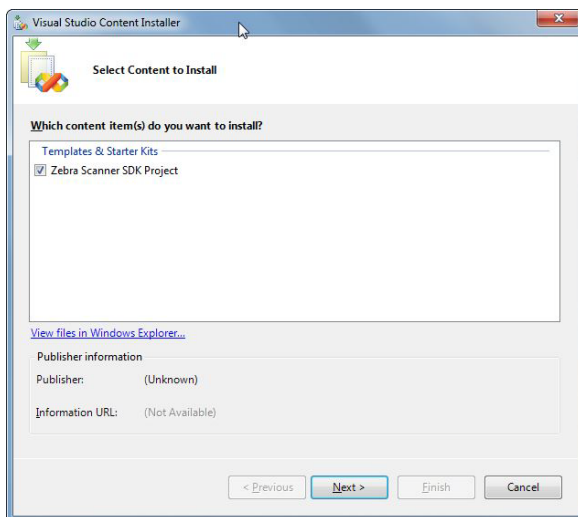


Figure B-2 Visual Studio Content Installer Window

5. Click **Yes** to confirm there was no signature found.

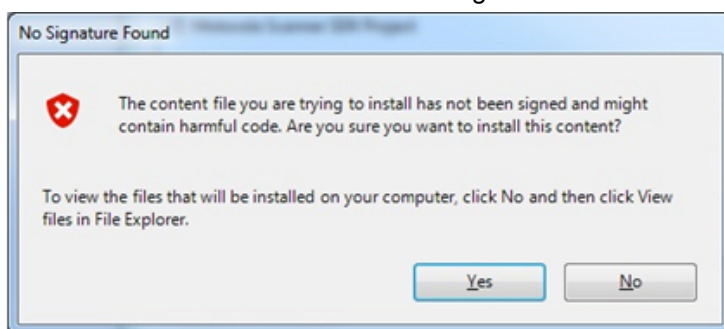


Figure B-3 No Signature Found Window

6. Click **Finish** to install.

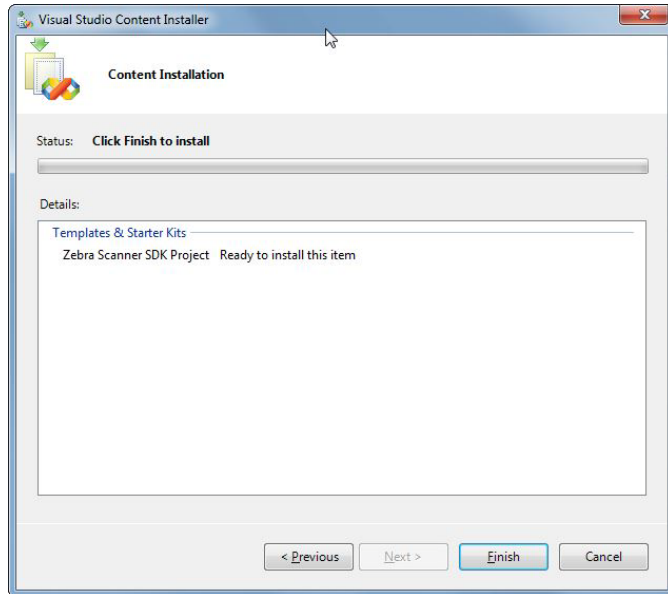


Figure B-4 *Finish Install Window*

7. Close the Visual Studio Content Installer after a successful installation.

Using the Project Template

To use the project template:

1. Open Visual Studio and create a new project.
2. Under Visual C#, a new project type called Zebra Scanner SDK displays.

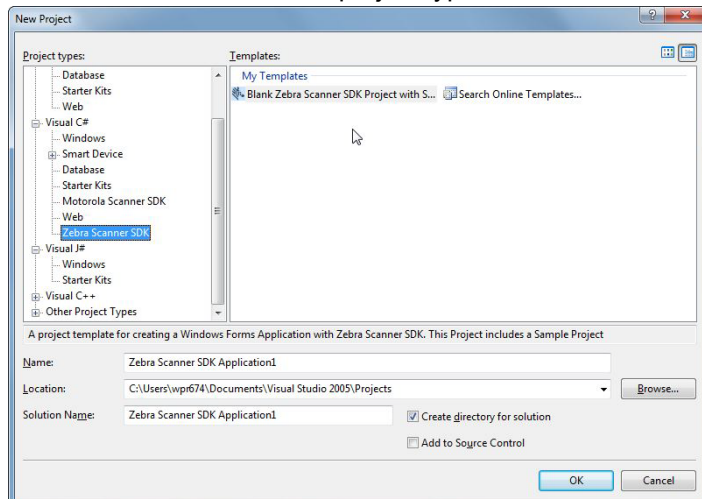


Figure B-5 *New Project Templates Window*

3. Create a blank Zebra scanner SDK project.

4. After creating the project, the *Solution Explorer* displays, showing two applications.

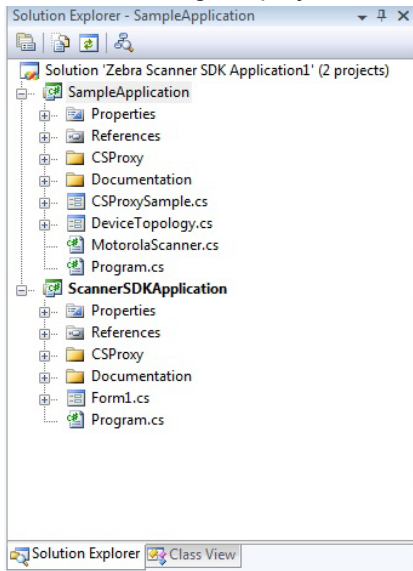


Figure B-6 *Solution Explorer Window*

- a. *Sample Application* is a sample application written using the C# wrapper provided with the project template.
- b. *ScannerSDKApplication* is the newly created application. Refer to code samples in the sample application. Copy and paste the required content to the new Scanner SDK application.

APPENDIX C DESCRIPTION OF INTELLIGENT DOCUMENT CAPTURE FORMAT

Overview

The Intelligent Document Capture output is presented as decode data of type BT_ISO15434. This data starts with Zebra specific items, such as the data length and message type, followed by one ISO/IEC 15434 message envelope containing one or more Format "09" (binary data) envelopes (one each for image and barcode data). [Table C-1](#) illustrates the format.

Table C-1 *Formats*

Data	Length (Bytes)	Comment	ISO/IEC 15434 Envelope
BT_ISO15434	1	Packet Identifier	
XXXXXXXX	4	Packet Length (32-bit unsigned)	
MSG_EASYCAP	1	ISO/IEC 15434 Message type2	
[]>Rs	4	Message Header	
09G _s tttG _s G _s nnG _s	varies	Format Header ttt = "BMP" or "JPEG" or "TIFF" nn = number of bytes in data field	
Image Data	varies	Data⁵	
R _s	1	Format Trailer	
09G _s tttG _s G _s nnG _s	varies	Format Header ttt = "Bar Code" nn = number of bytes in data field	
Bar Code Data	varies	Data⁶	
R _s	1	Format Trailer	
E _{ot}	1	Message Trailer	



NOTE 1. $R_s=0x1E$; $G_s = 0x1D$; $E_{ot} = 0x04$

NOTE 2. Currently only message type defined.

NOTE 3. Image and barcode entries may appear in any order.

NOTE 4. Bar code envelope (header, data and trailer) may be missing (Intelligent Document Capture doesn't always require a barcode).

NOTE 5. Image format same as is currently used for BT_SIGNATURE, with type of 0.

NOTE 6. Byte1=code type (BT_*), followed by decode data.

Example

The following is a BT_ISO15434 decode message with one bar code (type DataMatrix with data "ABC 123456789") followed by one image (8x8x1, BMP format). This example shows how to map the bytes into the format detailed in [Table C-1 on page C-1](#).

```
0x0000 b5 00 00 00 95 00 5b 29 3e 1e 30 39 1d 42 61 72
0x0010 43 6f 64 65 1d 1d 31 34 1d 1b 41 42 43 20 31 32
0x0020 33 34 35 36 37 38 39 1e 30 39 1d 42 4d 50 1d 1d
0x0030 31 30 30 1d 03 00 00 00 00 5e 42 4d 5e 00 00 00
0x0040 00 00 00 00 3e 00 00 00 28 00 00 00 08 00 00 00
0x0050 08 00 00 00 01 00 01 00 00 00 00 00 00 00 00 00
0x0060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0x0070 00 00 00 00 ff ff ff 00 ff 00 00 00 ff 00 00 00
0x0080 ff 00 00 00 ff 00 00 00 ff 00 00 00 ff 00 00 00
0x0090 ff 00 00 00 ef 00 00 00 1e 04
```

Addr	Data	Description
00	b5	Packet Identifier = BT_ISO15434
01	00000095	Packet Data Length
05	00	Message type = MSG_EASYCAP
06	5b 29 3e 1e	Message Header = "[>R _s "
0a	30 39 1d 42 61 72 43 6f 64 65 1d 1d 31 34 1d	Format Header = "09G _s BarCodeG _s G _s 14G _s "
19	1b	Code Type = BT_DATAMATRIX
1a	41 42 43 20 31 32 33 34 35 36 37 38 39	Decode Data = "ABC 123456789"
27	1e	Format Trailer = R _s
28	30 39 1d 42 4d 50 1d 1d 31 30 30 1d	Format Header = "09G _s BMPG _s G _s 100G _s
34	03	File format = BMP
35	00	Type = DocCap
36	0000005e	Bytes in image data
3a	42 4d	Signature = "BM"
3c	5e000000	Size of the file
40	0000	Reserved

Addr	Data	Description
42	0000	Reserved
44	3e000000	Starting position of image data
48	28000000	Size of header
4c	08000000	Image width
50	08000000	Image height
54	0100	Number of color planes
56	0100	Number of bits per pixel
58	00000000	Compression method
5c	00000000	Size of bitmap
60	00000000	Horizontal resolution
64	00000000	Vertical resolution
68	00000000	Number of colors
6c	00000000	Number of important colors
70	00000000 ffffffff00	Color Palette
78	ff000000 ff000000 ff000000 ff000000 ff000000 ff000000 ff000000 ff000000	Image Data
98	1e	Format Trailer = R_s
99	04	Message Trailer = E_{ot}

APPENDIX D CORESCANNER DEBUG LOGGING

Overview

By default, logging is disabled in the CoreScanner driver. Users can enable and configure this feature via a Windows registry key. There is a unique log file for each session of the CoreScanner service with the date and time of the service start in the file name.

Example: CORESCANNER_2013.04.17_18-21-27.log

Enabling CoreScanner logging may increase run time.

CoreScanner logging can be configured by changing values under the following registry key:

HKEY_LOCAL_MACHINE\SOFTWARE\Zebra\Zebra Scanners\CoreScanner

- FileLog - Enable/disable file logging. The two valid values are 1 and 0.
 - 1 - Enable file logging
 - 0 - Disable file logging (default).
- Level - Desired level of logging ranges from 1 to 5. The default value of 4 is sufficient.
- Location - Pre-existing folder location for log creation. The default location is C:\Program Files\Zebra Scanner\Common\Logs.
- DebugPrint - Enable/disable logging in a debug output monitoring tool such as the Microsoft DebugView (<http://technet.microsoft.com/en-us/sysinternals/bb896647.aspx>). The two valid values are 1 and 0.
 - 1 - Enable debug output
 - 0 - Disable debug output.
- EngDbgStr - Enable/disable engineering level information in the debug output. The two valid values are 1 and 0.
 - 1 - Engineering debug output enable
 - 0 - Engineering debug output disable.



IMPORTANT Changes o these registry values require a CoreScanner service restart to take effect.

Microsoft DebugView

The Microsoft DebugView utility may be used to provide real time log messaging from the CoreScanner driver and SDK components. The utility is available for download from the Microsoft TechNet website.

To use the Microsoft DebugView, configure Microsoft DebugView as follows:

1. Run DebugView. (In Windows 7, run as Administrator.)
2. From the *Options* menu, enable *Clock Time* and *Show Milliseconds*.
3. From the *Capture* menu (Windows 7, and above) enable *Capture Global Win32*.
4. Include the following filter to capture CoreScanner driver debug output while eliminating other debug messages:

CORESCANNER*;SNAPI_TRANS*;IBMTT_TRANS*;IBMHD_TRANS*;S_S_I_TRANS*

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