OpenView SDK

User's Manual

Software Version 1.0

DMTA-20096-01EN — Rev. 2
November 2018

This instruction manual contains essential information on how to use this Olympus product safely and effectively. Before using this product, thoroughly review this instruction manual. Use the product as instructed.

Keep this instruction manual in a safe, accessible location.

Olympus Scientific Solutions Americas, 48 Woerd Avenue, Waltham, MA 02453, USA

This document was prepared with particular attention to usage to ensure the accuracy of the information contained therein, and corresponds to the version of the product manufactured prior to the date appearing on the title page. There could, however, be some differences between the manual and the product if the product was modified thereafter.

The information contained in this document is subject to change without notice.

Software version 1.0
Part number: DMTA-20096-01EN
Rev. 2
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Important Information — Please Read Before Use

OpenView SDK is designed to help create custom applications for nondestructive inspections of industrial and commercial materials.

Instruction Manual

This instruction manual contains essential information on how to use this Olympus product safely and effectively. Before using this product, thoroughly review this instruction manual. Use the product as instructed.

Keep this instruction manual in a safe, accessible location.

IMPORTANT

Some of the details of screen images shown in this manual may differ from the screen images displayed in your software. However, the principles remain the same.

Safety Symbols

The following safety symbols might appear on the instrument and in the instruction manual:


General warning symbol

This symbol is used to alert the user to potential hazards. All safety messages that follow this symbol shall be obeyed to avoid possible harm or material damage.

 Shock hazard caution symbol

This symbol is used to alert the user to potential electric shock hazards. All safety messages that follow this symbol shall be obeyed to avoid possible harm.

Safety Signal Words

The following safety signal words might appear in the documentation of the instrument:

 **DANGER**

The DANGER signal word indicates an imminently hazardous situation. It calls attention to a procedure, practice, or the like that if not correctly performed or adhered to will result in death or serious personal injury. Do not proceed beyond a DANGER signal word until the indicated conditions are fully understood and met.

 **WARNING**

The WARNING signal word indicates a potentially hazardous situation. It calls attention to a procedure, practice, or the like that if not correctly performed or adhered to could result in death or serious personal injury. Do not proceed beyond a WARNING signal word until the indicated conditions are fully understood and met.

 **CAUTION**

The CAUTION signal word indicates a potentially hazardous situation. It calls attention to a procedure, practice, or the like that if not correctly performed or adhered to may result in minor or moderate personal injury, material damage, particularly to the product, destruction of part or all of the product, or loss of data. Do not proceed beyond a CAUTION signal word until the indicated conditions are fully understood and met.

Note Signal Words

The following note signal words could appear in the documentation of the instrument:

IMPORTANT

The IMPORTANT signal word calls attention to a note that provides information that is important or essential to the completion of a task.

NOTE

The NOTE signal word calls attention to an operating procedure, practice, or the like, that requires special attention. A note also denotes related parenthetical information that is useful, but not imperative.

TIP

The TIP signal word calls attention to a type of note that helps you apply the techniques and procedures described in the manual to your specific needs, or that provides hints on how to effectively use the capabilities of the product.

Warranty Information

Olympus guarantees your Olympus product to be free from defects in materials and workmanship for a specific period, and in accordance with conditions specified in the *Olympus Scientific Solutions Americas Inc. Terms and Conditions* available at http://www.olympus-ims.com/en/terms/.

The Olympus warranty only covers equipment that has been used in a proper manner, as described in this instruction manual, and that has not been subjected to excessive abuse, attempted unauthorized repair, or modification.

Inspect materials thoroughly on receipt for evidence of external or internal damage that might have occurred during shipment. Immediately notify the carrier making the delivery of any damage, because the carrier is normally liable for damage during shipment. Retain packing materials, waybills, and other shipping documentation needed in order to file a damage claim. After notifying the carrier, contact Olympus for assistance with the damage claim and equipment replacement, if necessary.

This instruction manual explains the proper operation of your Olympus product. The information contained herein is intended solely as a teaching aid, and shall not be used in any particular application without independent testing and/or verification by the operator or the supervisor. Such independent verification of procedures becomes increasingly important as the criticality of the application increases. For this reason, Olympus makes no warranty, expressed or implied, that the techniques, examples, or procedures described herein are consistent with industry standards, nor that they meet the requirements of any particular application.

Olympus reserves the right to modify any product without incurring the responsibility for modifying previously manufactured products.

Technical Support

Olympus is firmly committed to providing the highest level of customer service and product support. If you experience any difficulties when using our product, or if it fails to operate as described in the documentation, first consult the user's manual, and then, if you are still in need of assistance, contact our After-Sales Service. To locate the nearest service center, visit the Service Centers page at: http://www.olympus-ims.com.

Introduction

OpenView SDK is a software development kit (SDK) that you can use to develop optimized inspection software and workflows:

- It enables you to build customized software user interfaces based on the application and user requirements.
- You can use it to automate your inspection-system workflow.

OpenView SDK is compatible with 64-bit C++ and C# programming environments. It includes a complete sample program with original source code that provides a user-friendly, ready-to-use starting point for creating the most common types of applications (for details, see "Sample Application and Code Snippets" on page 11).

NOTE

A certain level of knowledge and familiarity with nondestructive testing (NDT) using ultrasound is required to be able to use OpenView SDK. For details on OpenView SDK commands, refer to the help file at the following access path:

[Installation Folder Name]\OlympusNDT\OpenView SDK[Version]\Doc

For more information on nondestructive ultrasonic testing, refer to the following manuals from the *Advanced NDT Series* collection, available for free as downloadable PDF files at http://www.olympus-ims.com/en/pdf-library/.

- *Introduction to Phased Array Ultrasonic Technology Applications*
- *Advances in Phased Array Ultrasonic Technology Applications*

1. SDK Integration into a System Workflow

OpenView SDK is mainly used in conjunction with the FocusData SDK during the steps of an inspection system workflow. The workflow steps are shown in Figure 1-1 on page 7.

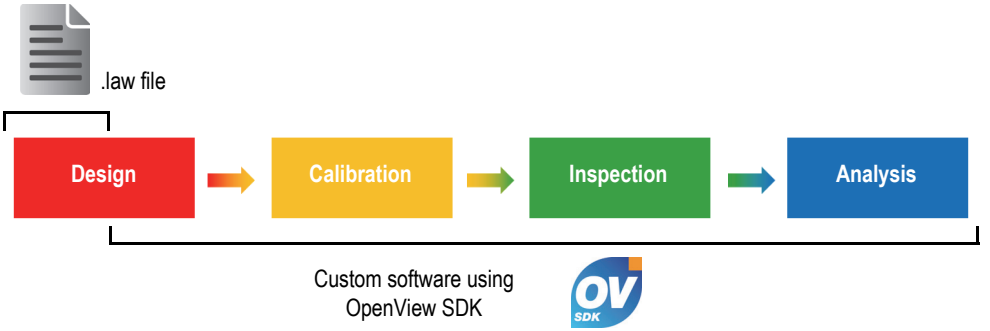

Figure 1-1 The workflow steps

OpenView SDK enables you to build your own software to generate inspection configurations, control the inspection, and modify acoustic parameters. You can also use it to retrieve, process, and store live A-scan and C-scan data.

Several actions are completed by the custom software during the workflow's steps. The actions are detailed in Table 1 on page 8.

Table 1 Actions for the workflow

Workflow step	Custom software actions
Design	• Import .law file • Beam set creation
Calibration	• Set Beam parameters • Set Gate parameters • Set TCG parameters • Set general UT parameters
Inspection	• Start inspection • Stop inspection
Analysis	• Build custom data representation

2. Hardware Requirements and Configurations

OpenView SDK is compatible with Windows 7 and later operating system versions.

2.1 Getting Started — Minimum Computer Requirements

The minimum computer requirements for OpenView SDK are as follows:

- CPU: Intel Core i7 or Xeon E3
- RAM memory: 16 GB (DDR3 or better)
- Data storage drive: SSD
- Network adaptor: Gigabit Ethernet card — dedicated to the acquisition instrument (for acquisition). The driver must support a 9k Jumbo Packet. The computer needs a second network adaptor if you want to simultaneously connect it to a local area network and to a data acquisition instrument.
- A keyboard and a pointing device
- One of the following operating systems (64 bit):
  - Microsoft Windows 10
  - Microsoft Windows 8
  - Microsoft Windows 7

2.2 Required Integrated Development Environment (IDE)

OpenView SDK requires the following integrated development environment (IDE): Visual Studio 2015 or later version.

2.3 Configurations

The firewall, instrument connection, and Ethernet minimum speed are automatically configured using the Configuration Tool provided with OpenView SDK. For integration details, see “SDK Integration Requirements” on page 23. For troubleshooting and configuration details, see “Troubleshooting Guide” on page 17, and “Configuring the IP Address” on page 19.

3. Sample Application and Code Snippets

The compiled and ready-to-use sample application (program) for OpenView SDK can be found in the folder at the following access path:

[Installation Folder Name]\Olympus NDT\OpenView SDK [Version]\

This sample application is an ideal starting point for building your own custom applications.

The complete source code of the sample application is available at the above access path, in a subfolder with the name of the sample application, to which is added the name of the language used to program the sample application's code.

The code snippets can be accessed as follows:

- Visual Studio Solution (program):
  C:\OlympusNDT\OpenView SDK\1.0\OpenViewSDK.CodeSnippets.sln
- Projects that are included with the Solution:
  C:\OlympusNDT\OpenView SDK\1.0\CodeSnippets

The **SampleApplication.NET.exe** program integrates the main OpenView SDK functions into a simple user interface (see examples in Figure 3-1 on page 12 to Figure 3-3 on page 13).

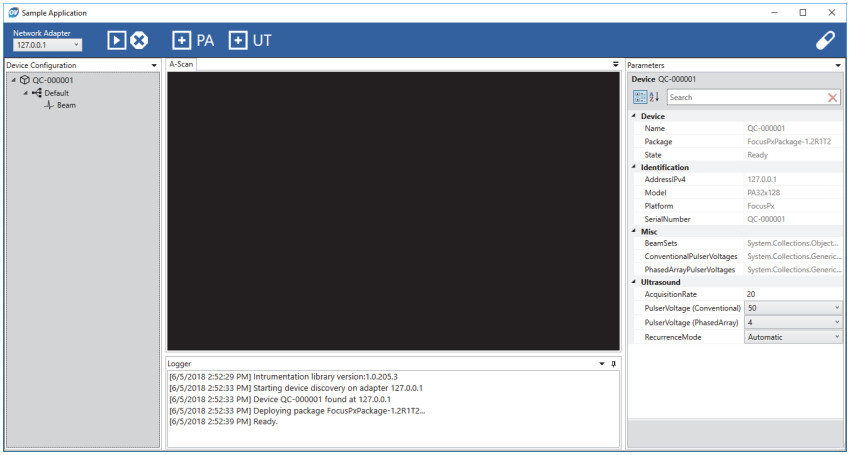

Figure 3-1 The Sample Application SDK main window — example 1

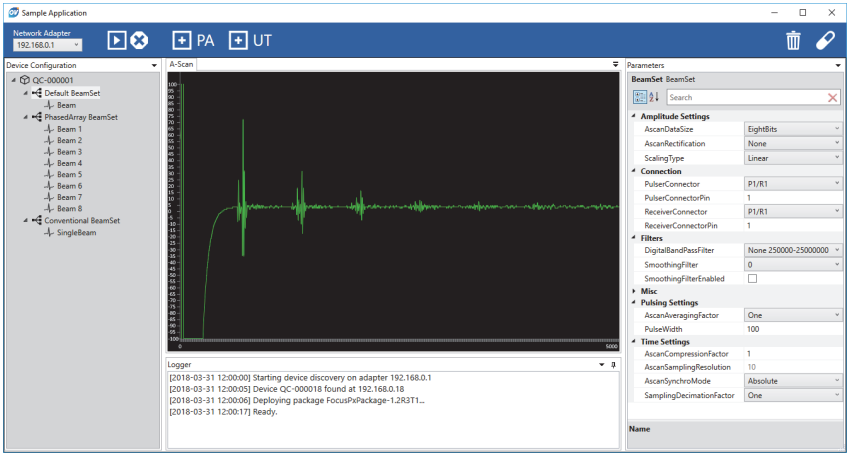

Figure 3-2 The Sample Application SDK main window — example 2

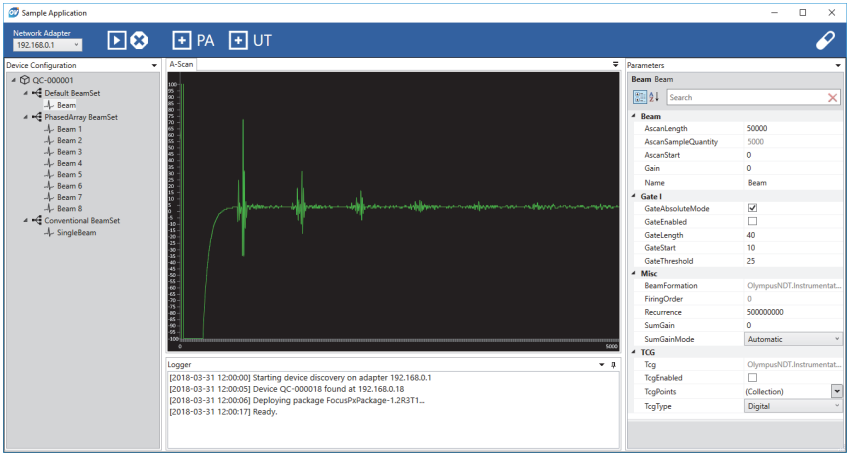

Figure 3-3 The Sample Application SDK main window — example 3

4. Command Organization

OpenView SDK commands are based on a tree structure. The availability of commands depends on the elements to be controlled.

4.1 Conventions

The following conventions are used in the commands:

- Interfaces can be easily identified because their names generally begin with the letter *i*.
- Sets of parameters end with *collections*.

4.2 Units

All values in your settings are expressed in the International System of Units (SI) as follows:

- Time is in nanoseconds.
- Amplitude is in percentage and in decibels (dB).

4.3 Command Structure

The illustration of the entire API command structure is provided through the OpenView SDK installer at the following access path:

C:\OlympusNDT\OpenView SDK\1.0\doc

5. Troubleshooting

This chapter provides OpenView SDK troubleshooting instructions.

5.1 Troubleshooting Guide

Table 2 on page 17 provides a guide for exceptions that may be thrown by OpenView SDK.

Table 2 Troubleshooting guide

Exception message	Solution
The user has tried to use an address already used by an application: Port, IP address, Protocol	Close the process using the address. Tip: Use the command "`netstat -a -b`" to list all processes using an address.
The network adaptor with IP address is unusable.	Validate the following points: • The network adaptor associated with the IP address exists. • The network adaptor is not disabled. • The Ethernet cable connected to the network adaptor has both end points connected.
The TCP connection has been closed unexpectedly: Protocol, Remote IP address, Remote Port	Validate the following points: • The Ethernet cable(s) linking the PC to the device is/are still connected. • The device has not been rebooted.
The device Serial Number is in an invalid state.	Reboot the device.

Table 2 Troubleshooting guide *(continued)*

Exception message	Solution
The firewall blocks the following transfer: Local Port, Local IP address, Remote IP address, Protocol, Direction. Note: There may be an optional, additional message stating that the rule Rule Name blocks the transfer.	If a rule is mentioned in the message, disable the rule. If nothing is mentioned, reinstall OpenView SDK.
The device Serial Number does not have enough disk space to download the firmware package.	Contact Olympus.
The buffer holding the acquisition data has overflowed.	Try the following steps: • Ensure that a thread is constantly calling "`IAcquisition::WaitForData`" when the object "`IAcquisition`" is started. • Reduce the workload of the thread calling "`IAcquisition::WaitForData`" to a minimum. • Execute the code with a faster PC. • Execute the code in the Release configuration. • Close all applications other than the one using OpenView SDK. • Lower the data throughput by either lowering the acquisition rate or by using a lighter setup. • If you are using a switch, validate that it supports Jumbo Packets up to 9014 bytes. • Try replacing the hardware linking the devices to the PC: Ethernet cable, switch, and PC. • Reboot the device(s). • If none of the above resolves the error, contact Olympus.

Table 2 Troubleshooting guide *(continued)*

Exception message	Solution
The configuration of the network adaptor with IP address is invalid.	Use the connectivity Configuration Tool to set up the network adaptor with the following parameters: • Set the IP address as detailed in Table 3 on page 21. For Configuration Tool instructions, see "Configuring the IP Address" on page 19. • The subnet mask must be *255.255.0.0*. • The Jumbo Packet must be set to 9014 bytes.

5.2 Configuring the IP Address

This section provides instructions for configuring the IP address on the FOCUS PX.

To configure the IP address

1. Close your API software application before starting the IP address configuration.
2. Open the Configuration Tool in administrator mode:
   - On the desktop, right-click the Configuration Tool icon, and then click **Run as administrator > Yes** (see Figure 5-1 on page 20).

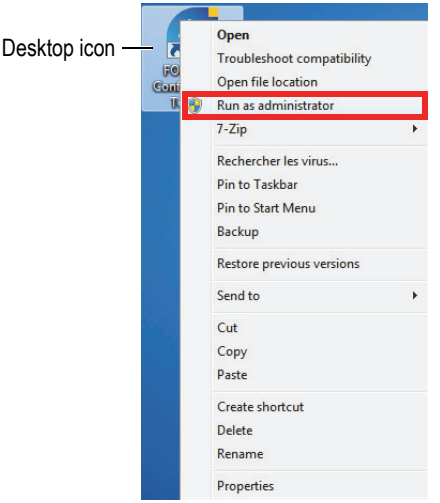

Figure 5-1 Opening the Configuration Tool

3. Click **Configure Network Card** (see Figure 5-2 on page 20).

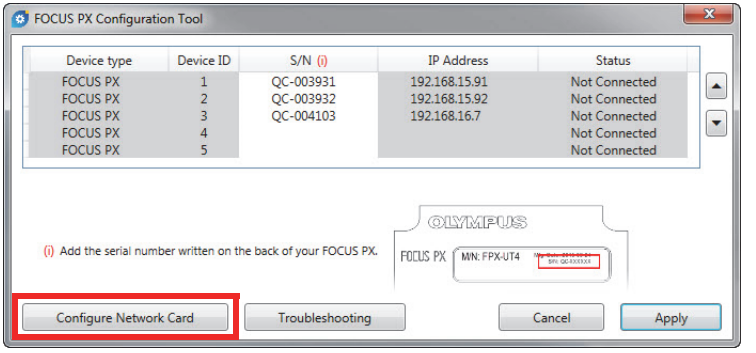

Figure 5-2 Starting the configuration of the network card

4. In the **Network configuration** dialog box, select the network card that is used for FOCUS PX communication (see Figure 5-3 on page 21).

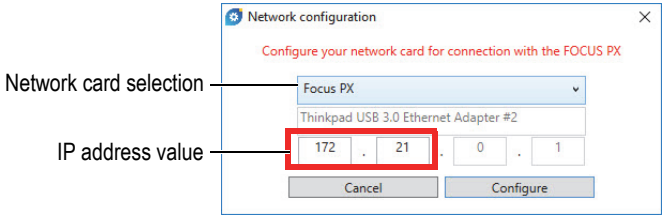

Figure 5-3 Selecting the network card to configure

5. Type the value of the IP address that you want to use.
   See Table 3 on page 21 for the available IP addresses.
6. Click **Configure**.
7. Click **OK > Apply**.

Table 3 Available IP addresses

Address block	Range	Scope	Purpose
10.0.0.0/8	10.0.0.0 –10.255.255.255	Private network	Used for local communications within a private network.
172.16.0.0/12	172.16.0.0 –172.31.255.255		
192.168.0.0/16	192.168.0.0 – 192.168.255.255		

Appendix: SDK Integration Requirements

This appendix contains the requirements and recommended practices for integrating OpenView SDK into your software.

A.1 Required Firewall Rules

Table 4 on page 23 lists all ports that must be enabled during the installation of your software, along with the executable commands that add firewall rules for the ports.

Table 4 Commands for ports

Port	Command
21	`netsh advfirewall firewall add rule name=”Olympus OpenView SDK” dir=in action=allow protocol=TCP localport=21`
67	`netsh advfirewall firewall add rule name=”Olympus OpenView SDK” dir=in action=allow protocol=UDP localport=67`
68	`netsh advfirewall firewall add rule name=”Olympus OpenView SDK” dir=out action=allow protocol=UDP remoteport=68`
9994	`netsh advfirewall firewall add rule name=”Olympus OpenView SDK” dir=out action=allow protocol=TCP remoteport=9994,10994,12000,27015`
10994	
12000	
27015	

A.2 Installers and Keys for OpenView SDK

The two available installers for OpenView SDK are described in Table 5 on page 24. Software integrators must incorporate the end user's installer into their own installer.

Table 5 Installers

Installer	Description
InstallOpenViewSDK-1.0RXXX.exe	To be installed on the programmer's computer. Includes libraries, documentation and code snippets. This installs in C:\OlympusNDT.
InstallOpenView-1.0RXXX.exe	To be installed on the end user's computer. Includes libraries only. This installs in C:\Program Files.

To locate and access the libraries at runtime, a key is required. The key values are automatically configured by the installers (see Table 6 on page 24).

Table 6 Keys

Installer	Key
InstallOpenViewSDK-1.0RXXX.exe	HKEY_LOCAL_MACHINE\SOFTWARE\OlympusNDT\OpenView SDK\1.0\VersionPath
InstallOpenView-1.0RXXX.exe	HKEY_LOCAL_MACHINE\SOFTWARE\OlympusNDT\OpenView \1.0\VersionPath

A.3 Firmware Package

The software development kit (OpenView SDK) and FOCUS PX firmware package used by FOCUS PX instruments are bundled together. The OpenView SDK installer embeds the FOCUS PX firmware so that at start-up, the firmware package is sent to the FOCUS PX. Because OpenView SDK always requires the firmware package that is used on the computer, the application code should search for the latest installed version of firmware.

The following sample code is an example of good programming practice:

```
// Select the latest version of firmware packages.
shared_ptr<IFirmwarePackage> package;
auto packages = IFirmwarePackageScanner::GetFirmwarePackageCollection();
```

```
    if (!packages.empty() )
package = packages->GetFirmwarePackage(0);

    if (package == nullptr)
      throw std::exception("Could not find the firmware package.");


    // Start the package on the device.
    if (!device->HasPackage(package))
      device->Download(package);

    device->Start(package);
```

A.4 Configuration Tool

The Configuration Tool is installed by the end user's installer. The root directory is in the same location as the content of the registry key (see Table 6 on page 24). The "Tools" folders must be added to this root directory.

It is recommended that you add a link in your software to call up the Configuration Tool. The link should show, for example, a blue and yellow shield icon

(

) to indicate that administrative rights may be required.

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