



FocusData

User's Manual

Software Version 1.0

DMTA-20095-01EN — Rev. B
September 2022

This instruction manual contains essential information on how to use this Evident 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.

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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

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Important Information — Please Read Before Use

Intended Use

FocusData is designed to help integrate systems for nondestructive inspections of industrial and commercial materials.

Instruction Manual

This instruction manual contains essential information on how to use this Evident 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 symbols 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, which, 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, which, 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 an operating procedure, practice, or the like, which, 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 safety symbols could appear in the documentation of the instrument:

IMPORTANT

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

NOTE

The **NOTE** signal word calls attention to an operating procedure, practice, or the like, which 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 provides hints on how to effectively use the capabilities of the product.

Warranty Information

Evident guarantees your Evident product to be free from defects in materials and workmanship for a specific period, and in accordance with conditions specified in the Terms and Conditions available at <https://www.olympus-ims.com/en/terms/>.

The Evident 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 Evident for assistance with the damage claim and equipment replacement, if necessary.

This instruction manual explains the proper operation of your Evident 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, Evident 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.

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

Technical Support

Evident 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 on the Evident Scientific Web site.

Introduction

FocusData is a COM component that allows users to customize the way their inspection data is presented and processed. This library can be used to retrieve the A-scan, C-scan, and thickness data for custom applications, along with various acquisition parameters from FocusPC data files.

FocusData is compatible with 32-bit and 64-bit C++, C#, LabVIEW, MATLAB, and Visual Basic programming environments. Complete programs are provided, including the original source code. This provides a user-friendly, ready-to-use starting point for creating applications.

FocusData supports the .fpd data file formats acquired with FocusPC.

This manual outlines the FocusData installation, its functionalities, data file structure, and the ways in which the library information can be used to visualize scan results and build custom applications.

NOTE

FocusPC data is stored in the .fpd file format, which is referred to as a data file in this manual.

A certain level of knowledge and familiarity with nondestructive testing (NDT) using ultrasound is required to be able to use FocusData.

The FocusData commands are detailed in an online help document located at the following access paths:

- For the 32-bit version: [Installation Folder Name]\Program Files (x86)\Evident NDT\FocusDat nnn \Manual
- OR

- For the 64-bit version: [Installation Folder Name] \ Program Files \ Evident NDT \ FocusData nnn \ Manual

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

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

1. Installation

FocusData is available in 32-bit and 64-bit versions, both of which can be downloaded from the Evident website.

Make sure the computer onto which the FocusData component is to be installed meets the minimum system requirements. To visualize data samples, see “Application Example” on page 27.

1.1 System Requirements

To install and run FocusData, you need a computer that meets the following requirements:

- CPU: Intel Core i7 or Xeon E3
- RAM memory: 16 GB (DDR3 or better)
- Data storage drive: SSD
- Network adaptor: Gigabit Ethernet card
- 1280 × 1024 or higher display adaptor and monitor resolution
- One USB port for the HASP security hardware key
- A keyboard and a pointing device
- One of the following operating systems:
 - Microsoft Windows 8
 - Microsoft Windows 7
 - Microsoft Windows XP Professional (Service Pack 3)

1.2 Finding the Version Number of FocusData for Windows 8, Windows 7, and Windows XP

If the FocusData component has already been installed on your computer, its version number must be found in order to decide whether it should be updated.

To find the version number of FocusData for Windows 8

1. On the Windows taskbar, click **Settings**, and then click **Control Panel**.
2. Click **Uninstall a program**.

The **Uninstall or change a program** window is displayed.

3. Scroll down to **Evident NDT FocusData [version number]**.

The number displayed at the end of the name of the software indicates the current software version (see Figure 1-1 on page 12).

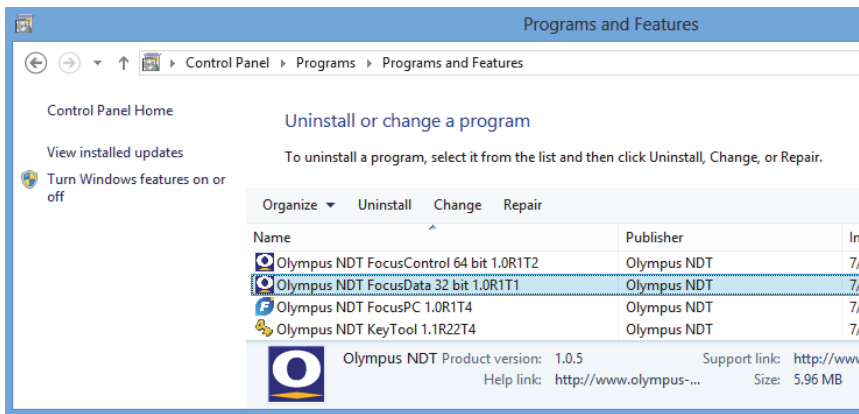


Figure 1-1 Finding the version number of FocusData under Windows 8 using the Uninstall or change a program window

To find the version number of FocusData for Windows 7

1. On the Windows taskbar, click the Start button, and then click **Control Panel**.
2. Under **Programs**, click **Uninstall a program**.
The **Uninstall or change a program** panel is displayed.
3. Scroll down to **Evident NDT FocusData [version number]**.

The number displayed at the end of the name of the software indicates the current software version (see Figure 1-2 on page 13).

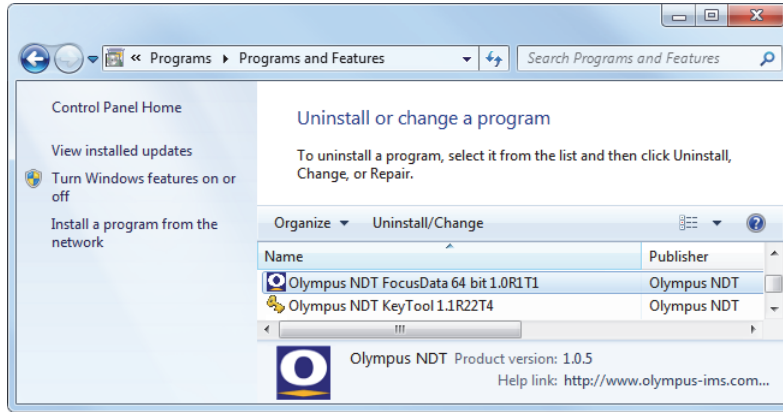


Figure 1-2 Finding the version number of FocusData under Windows 7 using the Uninstall or change a program window

To find the version number of FocusData for Windows XP

1. On the Windows taskbar, click the Start button, and then click **Control Panel**.
2. Double-click **Add or Remove Programs**.

The **Add or Remove Programs** window is displayed.

3. Scroll down to **Evident NDT FocusData [version number]**.

The number displayed at the end of the name of the software indicates the current software version (see Figure 1-3 on page 13).

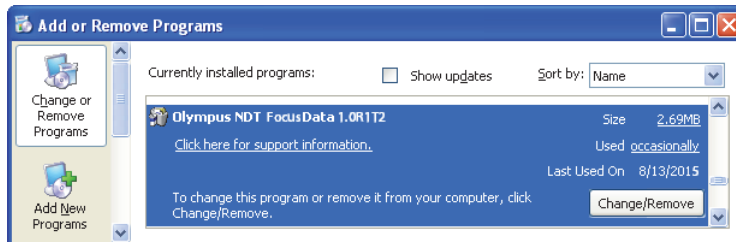


Figure 1-3 Finding the version number of FocusData under Windows XP using the Add or Remove Programs window

1.3 Installing the FocusData Component

The FocusData component is installed using an installation wizard in Windows 8, Windows 7, or Windows XP.

NOTE

The example installation is for Windows 8, but the same steps apply to Windows 7 and Windows XP.

To install the FocusData component

1. On the Evident website at <https://www.olympus-ims.com/en/service-and-support/downloads/>, find and download the installer for the FocusData software. It can also be found on the software USB key provided with Evident instruments.

NOTE

On the Evident website, you can find the most recent version of the FocusData component installer.

2. Double-click the **InstallFocusData-[version].exe** installer that you have downloaded from the website or accessed on the USB key.
The installation wizard appears.
3. On the **Software License Agreement** page of the installation wizard, click **I agree** (see Figure 1-4 on page 15).

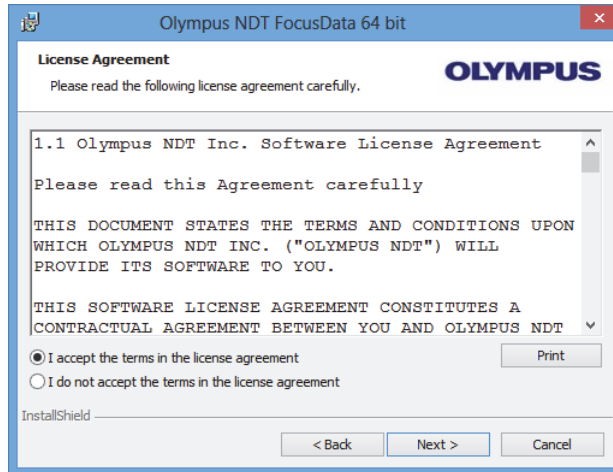


Figure 1-4 The Software Agreement page

4. On the **Welcome** page of the installation wizard, click **Next** (see Figure 1-5 on page 15).

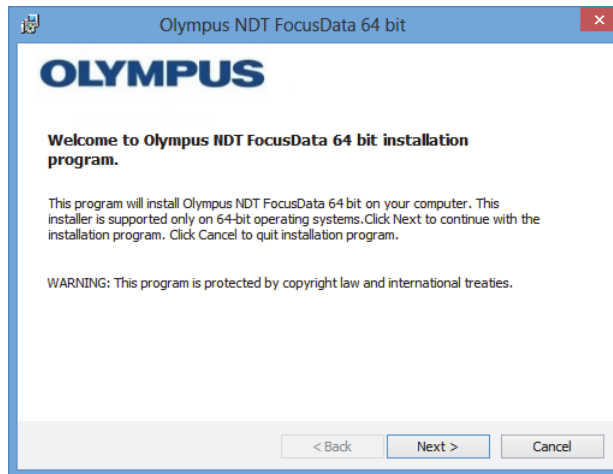


Figure 1-5 The Welcome page

5. On the **Select Destination Directory** page, under **Destination drive**, select the drive where you wish to install the software, and then click **Next** (see Figure 1-6 on page 16).

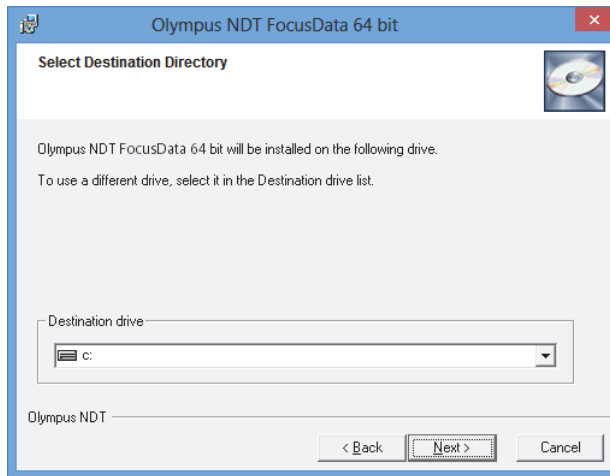


Figure 1-6 The Select Destination Directory page

6. On the **Start Installation** page, click **Next** (see Figure 1-7 on page 17).

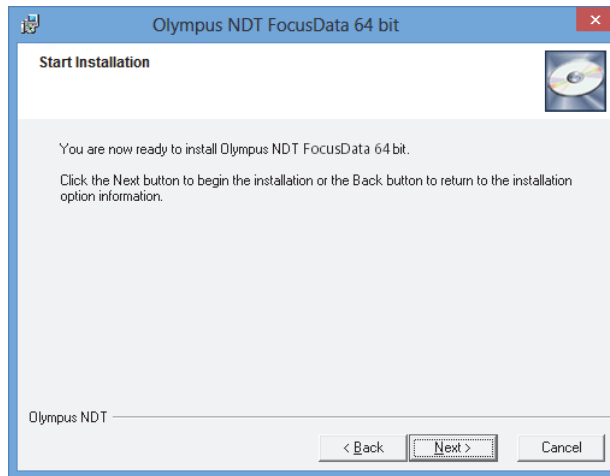


Figure 1-7 The Start Installation page

The **Installing** page appears briefly. After the installation has been completed, the **Installation Complete** page appears.

7. On the **Installation Complete** page, click **Finish** (see Figure 1-8 on page 17).

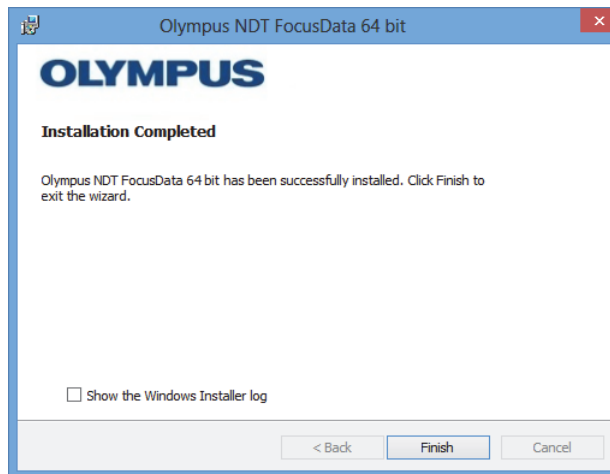


Figure 1-8 The Installation Complete page

2. Accessing Data

This chapter presents a description of stored inspection data.

Data is stored in the .fpd data file format. Data files are accessed through the FocusData COM component (see Figure 2-1 on page 19).

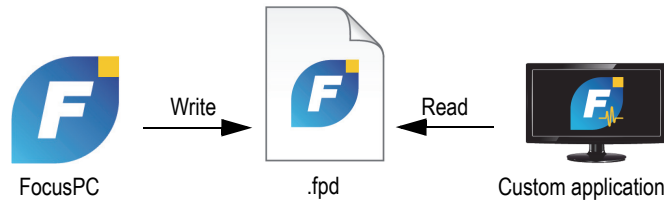


Figure 2-1 Diagram of Evident FocusData

2.1 Data Groups for FocusPC Data Files

A data group contains either the A-scan or C-scan data associated with a specific beam, along with information that can be used to reconstruct the image. It should also be noted that a data group is generated based on the node parameters defined in the tree structure. The entry point to access the data groups is `IFocusDataFile`. For more information on the `IFocusDataFile` entry point and the data file's tree structure, see "Data File Structure" on page 31.

Each data file contains a collection of data groups; one for each type of data to be stored or analyzed. The number of data groups can vary.

2.2 Acquisition Data Storage

This section presents a description of how Evident NDT acquisition data is stored.

The basic data storage model used is based on the fact that, in most cases, scanning produces a raster scan (made of a scan axis and an index axis), which creates rows and columns of information.

The acquisition instrument samples a waveform and/or a reading inside an inspection gate. Since all waveforms have the same length, acquisition data can be regarded as a three-dimensional cube. The acquisition file contains one cube for each type of data stored during the inspection. For a mechanical raster scan or a combined mechanical-electronic raster scan, the scan axis is named the column and the index axis is named the row. For an A-scan only, the depth of the cube is the size of the data information which is named the samples (see Figure 2-2 on page 20).

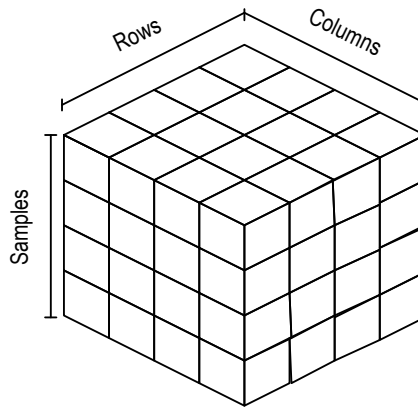


Figure 2-2 Representation of acquisition data for an A-scan

Data from a C-scan is represented as one part of the whole A-scan, which is represented as a slice of the cube (see Figure 2-3 on page 21).

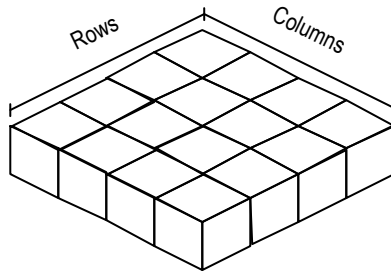


Figure 2-3 Representation of acquisition data for a C-scan

There are two ways to access acquisition data: `ReadData` and `ReadAScan` from the `DataAccess` parameter in the data group. `ReadData` retrieves the complete data file whether it is an A-scan or a C-scan. `ReadAScan` must be followed by position coordinates in order to retrieve a specific part of the A-scan.

2.2.1 ReadData

The `ReadData` command retrieves complete data from either a C-scan or an A-scan. This section explains how you must reconstruct the data since the `.fpd` file format supports only a one-dimensional table.

IMPORTANT

The data format type that is used by FocusData is `FLOAT`.

When data comes from A-scans and the file takes up a lot of memory space, it is recommended to retrieve data separately (by slice) for each A-scan. The size-limitation point at which A-scan data files should be separated depends on the computer's capacity. Generally, however, if files are 100 MB or larger, you should use the `ReadDataSlice` function to retrieve data in separate, smaller portions.

The size of the table for an A-scan series is determined by the following equation: the number of rows times the number of columns times the number of samples times the sample size (in bytes). After you have retrieved the data, it is presented in a single row made of variables of the `FLOAT` type.

For example, assuming that each FLOAT, or sample, contains 4 bytes, then for an A-scan series of 4 (rows) \times 4 (columns) \times 4 (samples), the stored data equals $64 \times \text{FLOAT} = 256$ bytes.

The data will be sent sequentially as follows:

R1C1S1, R1C1S2, R1C1S3, R1C1S4, which is the first A-scan (position 1,1).

R1C2S1, R1C2S2, R1C2S3, R1C2S4 which is the second A-scan (position 1,2).

R1C3S1, R1C3S2, R1C3S3, R1C3S4 which is the third A-scan (position 1,3).

R1C4S1, R1C4S2, R1C4S3, R1C4S4, which is the last A-scan (position 1,4).

And then same sequence is repeated with the second row, and so on.

Figure 2-4 on page 22 shows an example of data position for an A-scan.

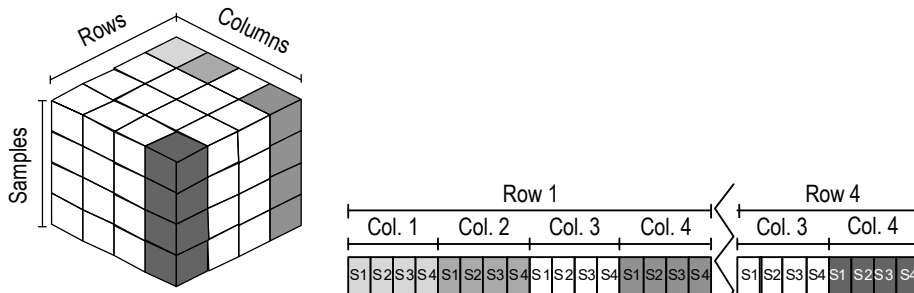


Figure 2-4 Data position for an A-scan (ReadData)

The size of the table for a C-scan is determined by the following equation: the number of rows times the number of columns times the sample size (in bytes). After you have retrieved the data, it is presented in a single row made of variables of the FLOAT type.

For example, assuming that the FLOAT, or sample, contains 4 bytes, then for a C-scan of 4 (rows) \times 4 (columns), the stored data equals $16 \times \text{FLOAT} = 64$ bytes.

The data will be sent sequentially as follows:

R1C1, R1C2, R1C3, R1C4

R2C1, R2C2, ...and so on.

Figure 2-5 on page 23 shows an example of data position for a C-scan.

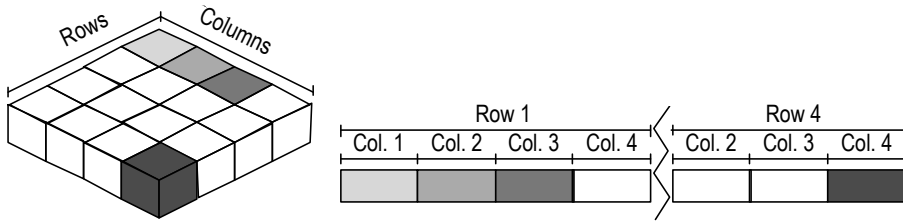


Figure 2-5 Data position for a C-scan (ReadData)

2.2.2 ReadAscan

IMPORTANT

The data format type that is used by FocusData is FLOAT.

The `ReadAscan` command retrieves data from an A-scan at a given coordinate. This section explains how you must reconstruct the data since the `.fpd` file format supports only a one-dimensional table.

The size of the table for an A-scan is equal to the row times the column times the number of samples times the size of a sample in bytes. After you have retrieved the data, it is presented in a single row made of variables of the FLOAT type.

For example, for an A-scan at position row 4, column 4, and for 4 samples you get $4 \times \text{FLOAT} = 16$ bytes. The data will be sent sequentially as follows:

R4C4S1, R4C4S2, R4C4S3, R4C4S4.

Figure 2-6 on page 24 shows an example of data position at specific coordinates for an A-scan.

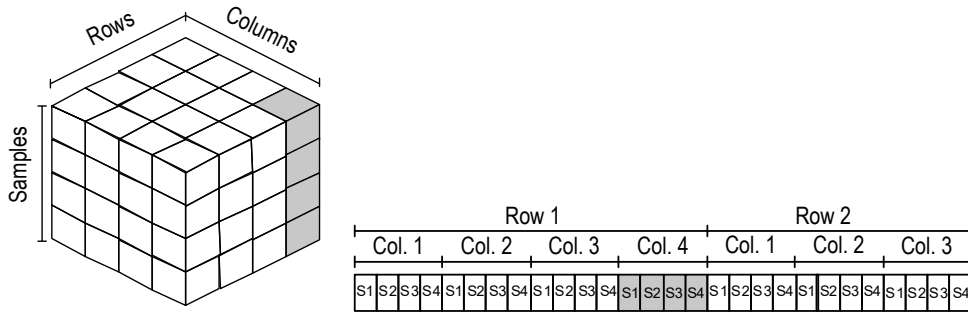


Figure 2-6 Data position for an A-scan (ReadAScan)

2.2.3 ReadDataSlice

IMPORTANT

The data format type that is used by FocusData is FLOAT.

The `ReadDataSlice` command retrieves a row or a column of data at a specific position, for a specified data slice type (A-scan or C-scan).

For example, for all A-scans of the second row (a scan line at position 1), data will be sent sequentially as follows:

R1C1, R1C2, R1C3, ..., R1Cn

Figure 2-7 on page 25 and Figure 2-8 on page 25 show an example of data position at specific coordinates respectively for a C-scan and an A-scan.

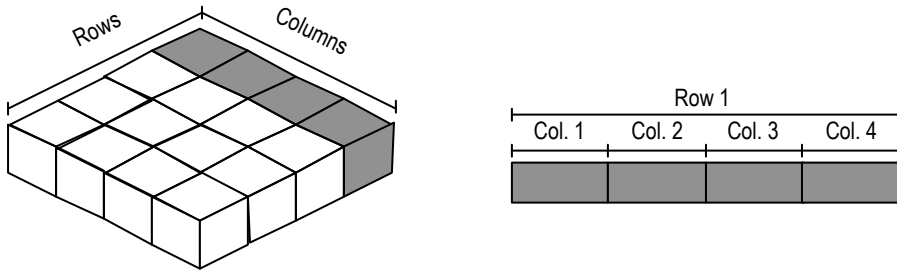


Figure 2-7 Data position for a C-scan (ReadDataSlice)

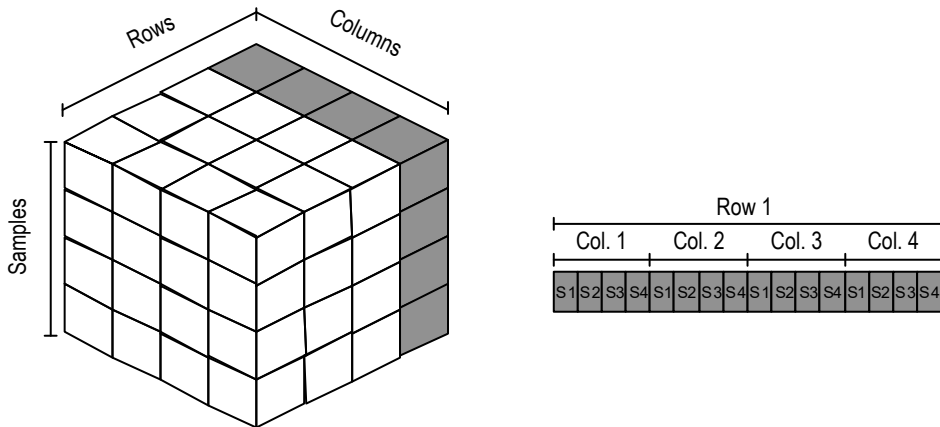


Figure 2-8 Data position for an A-scan (ReadDataSlice)

3. Application Example

A sample application that provides an ideal starting point to build custom applications can be found in the following FocusData directories:

- For the 32-bit version: [Installation Folder Name]\Program Files (x86)\Evident NDT\FocusData\Sample\Binaries
OR
- For the 64-bit version: [Installation Folder Name]\Program Files\Evident NDT\FocusData\Sample\Binaries

The complete source code for this sample application can be found in the following directories:


- For the 32-bit version: [Installation Folder Name]\Program Files (x86)\Evident NDT\FocusData\Sample
OR
- For the 64-bit version: [Installation Folder Name]\Program Files\Evident NDT\FocusData\Sample

The **DataExtraction_MFC.exe** program reproduces typical FocusPC data extraction applications. This application extracts data from files in Evident NDT data file format in order to perform external data display and processing using custom built applications.

3.1 Using the FocusPC Data Extraction Application

The sample data extraction application provides the basic controls to extract data from FocusPC data files.

To use the FocusPC data extraction application

1. In the **Samples** directory, double-click the **DataExtraction_MFC.exe** program.
2. In the **DataExtraction_MFC.exe** program, under **Data File**, click **Browse** ().
3. Select a FocusPC (.fpd) data file, and then click **Open**.

If you do not have a data file, you can use the one included with the samples. Go to the **Samples** directory and open the **CompositeInspectionData.fpd** data file (see Figure 3-1 on page 29).

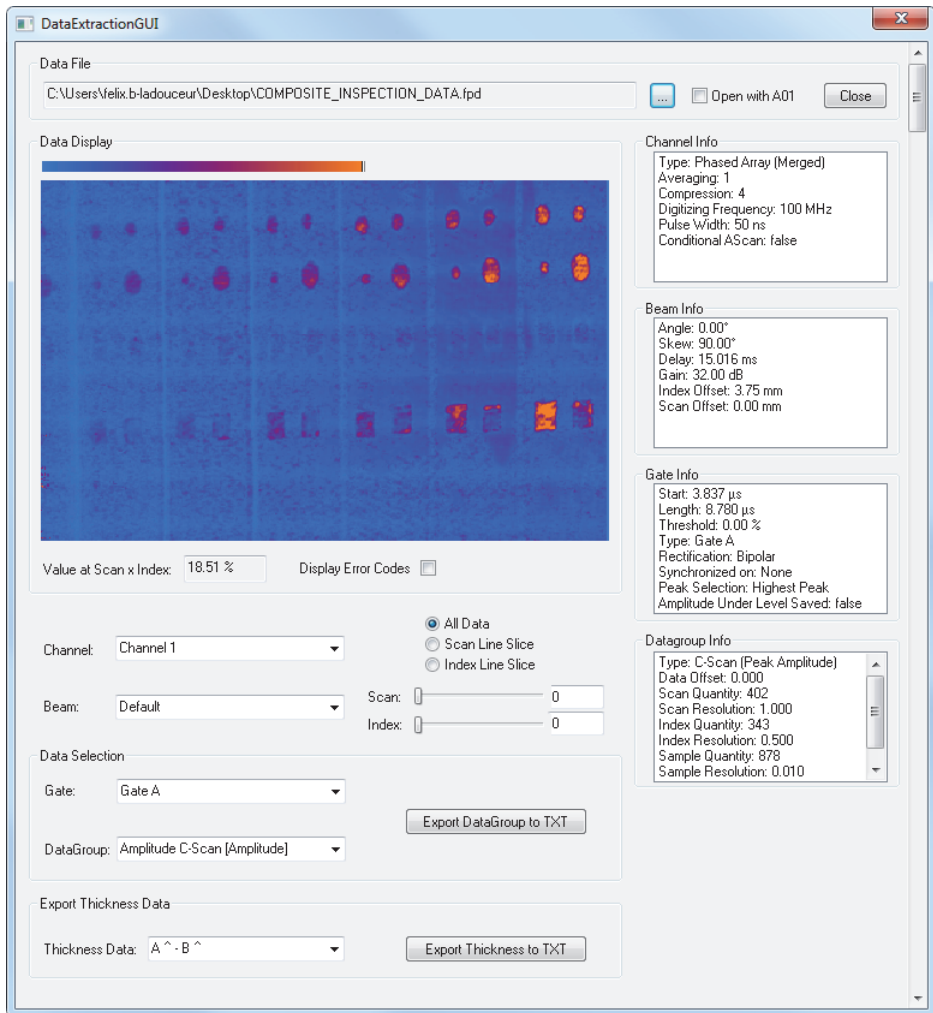


Figure 3-1 Reading data in the sample data extraction application

3.2 FocusPC Data Extraction Application Description

The sample data extraction application provides the functions required to control which data to extract from data files and display in the host application (see Figure 3-2 on page 30).

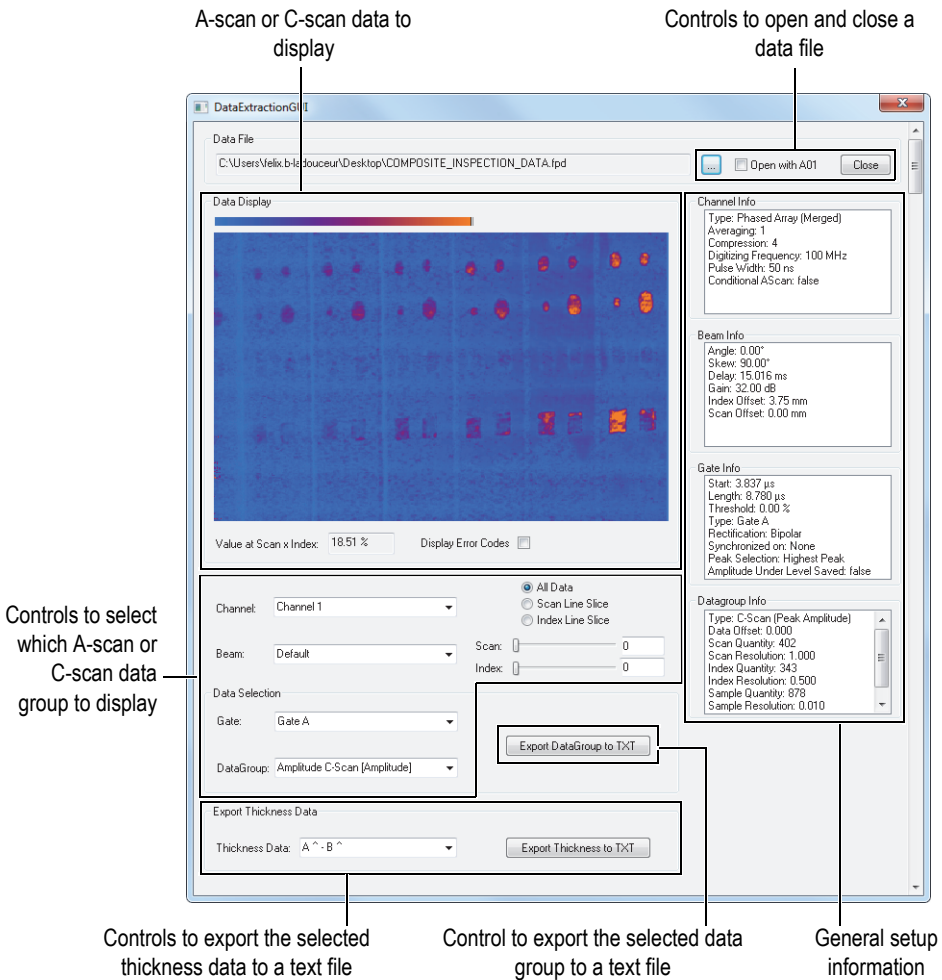


Figure 3-2 Reading data in the sample data extraction application

The various controls available in this application allow the user to extract A-scan, C-Scan, and thickness data to a text file that can then be easily imported, processed, and/or displayed by any other program. The application also displays the selected A-scan or C-scan data group and allows the user to retrieve the principal acquisition parameters.

4. Data File Structure

FocusData is based on an arborescent structure. For the data file structure, see the tree view in Figure 4-1 on page 33 and Figure 4-2 on page 34.

The interfaces can be easily identified as their names begin with the letter I. Collection names end with the letter s.

NOTE

The FocusData commands are detailed in an online help document located at the following access paths:

- For the 32-bit version: [Installation Folder Name]\Program Files (x86)\Evident NDT\FocusData nnn \Manual
OR
- For the 64-bit version: [Installation Folder Name]\Program Files\Evident NDT\FocusData nnn \Manual

NOTE

In this text, the term “collection” is used to refer to one dimensional object arrays for programming purposes.

The term “channels” originates from earlier software versions, and it is used to refer to groups displayed in the FocusPC interface.

To access the data in a file, a `DataAccess` object must first be created. To access the data, you must access the `IFocusDataFile` interface.

Legend for Figure 4-1 and Figure 4-2

Terms in **bold** identify public methods.

Terms in *italics* identify public properties.

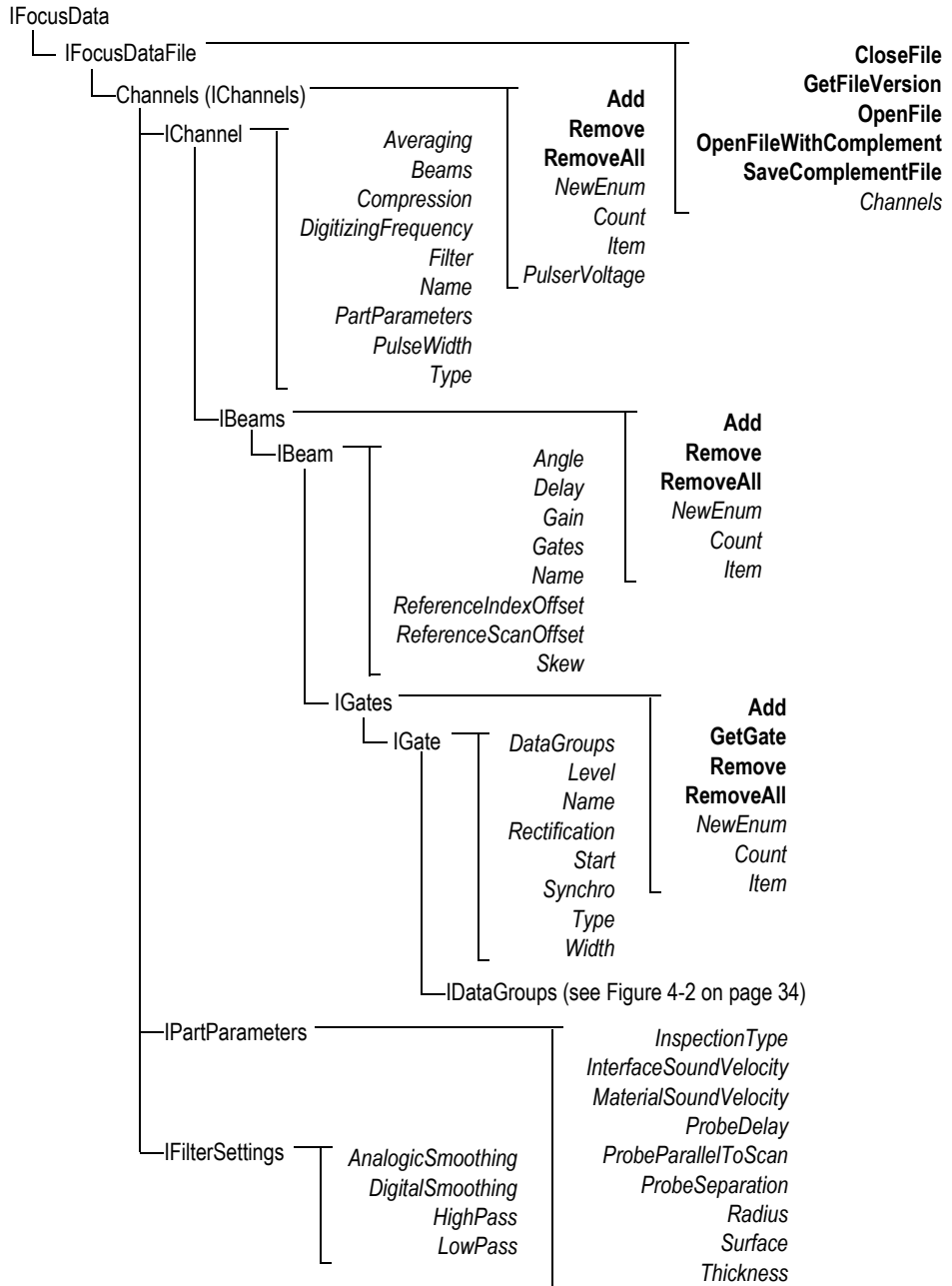


Figure 4-1 IFocusDataFile access tree structure

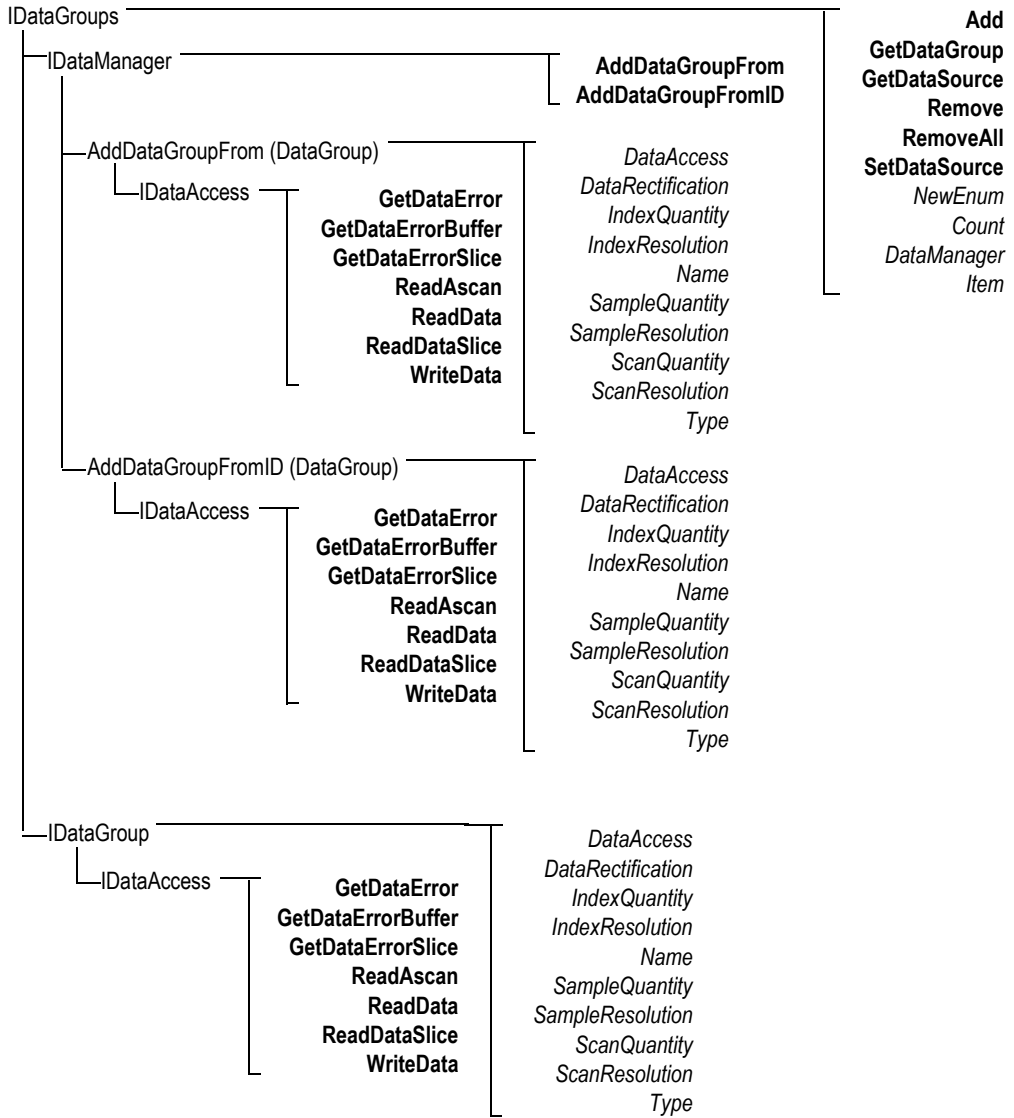


Figure 4-2 IDataGroups tree structure

NOTE

The FocusData commands are documented in detail in the FocusData documentation, which is provided as an online help document, located at the following access path:

- For the 32-bit version: [Installation Folder Name]\Program Files (x86)\Evident NDT\FocusData nnn \Manual
OR
 - For the 64-bit version: [Installation Folder Name]\Program Files\Evident NDT\FocusData nnn \Manual
-

Items in a collection are numbered starting with 1. If there are 10 channels in the Channels collection, you will have access to channels 1 to 10.

For example, if you have a pointer on the channel collection, and you want to get channel number 1, do the following:

```
pChannel = pChannels->Item[1];
```

Units

All data values are expressed in the international system of units as follows:

- Time is in seconds.
- Amplitude is in percentage.
- Distance is in meters.
- Data on the ultrasound axis are expressed in time.
- Rotation/angles are in degrees.
- Data on the scan and index axes are expressed in distance or rotation.

5. Troubleshooting

If you encounter a problematic issue with FocusData, several initial troubleshooting steps can be performed to solve the most common problems. If the issue persists, contact Evident technical support.

5.1 Troubleshooting First Steps

Before contacting Evident technical support, it is recommended that you perform the following short steps. These steps will help solve simple and common issues, and gather essential information that will speed up solving remaining issues in case technical support needs to be contacted.

To perform the troubleshooting first steps

1. Verify which version of the Windows operating system is installed on your computer (Windows 8, Windows 7, or Windows XP Service Pack 3 or higher).

To retrieve the Windows operating system version under Windows 8

- ◆ On the Windows taskbar, click **Settings**, and then click **PC info**.

Under **Windows edition**, the version of the operating system is displayed (see Figure 5-1 on page 38).

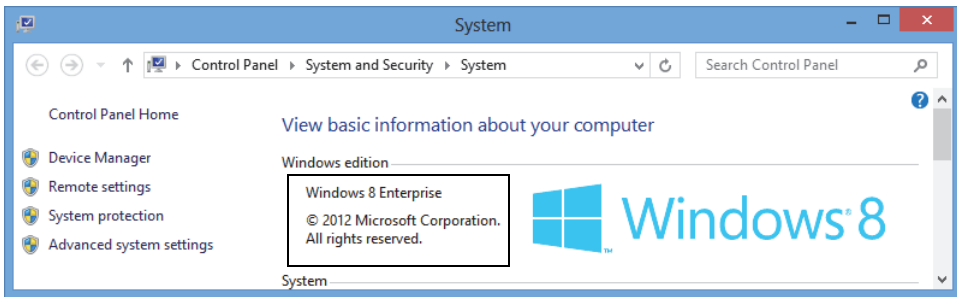


Figure 5-1 The Windows 8 Control Panel displaying the Windows edition

To retrieve the Windows operating system version under Windows 7

- a) On the taskbar, click **Start**.
- b) Right-click **Computer**, and then click **Properties**.

Under **Windows edition**, the version of the operating system is displayed (see Figure 5-2 on page 38).

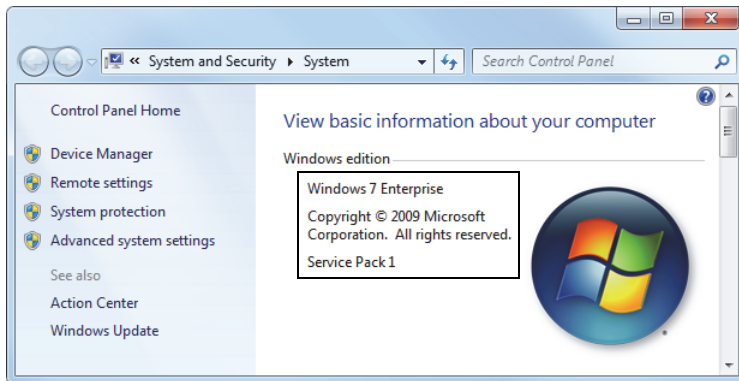


Figure 5-2 The Windows 7 Control Panel displaying the Windows edition

To retrieve the Windows operating system version under Windows XP

- a) On the taskbar, click **Start**.
- b) Right-click **My Computer**, and then click **Properties**.
- c) Click the **General** tab (see Figure 5-3 on page 39).

Under **System**, the version of the operating system is displayed.



Figure 5-3 Windows XP version number in the System Properties dialog box

2. Verify that your HASP key, which contains your FocusData license, is properly connected and recognized by your computer: On the Windows taskbar, click the **Start** button, click **All Programs**, click **Evident NDT**, and then click **Keytool [Version Number]** (see Figure 5-4 on page 40).

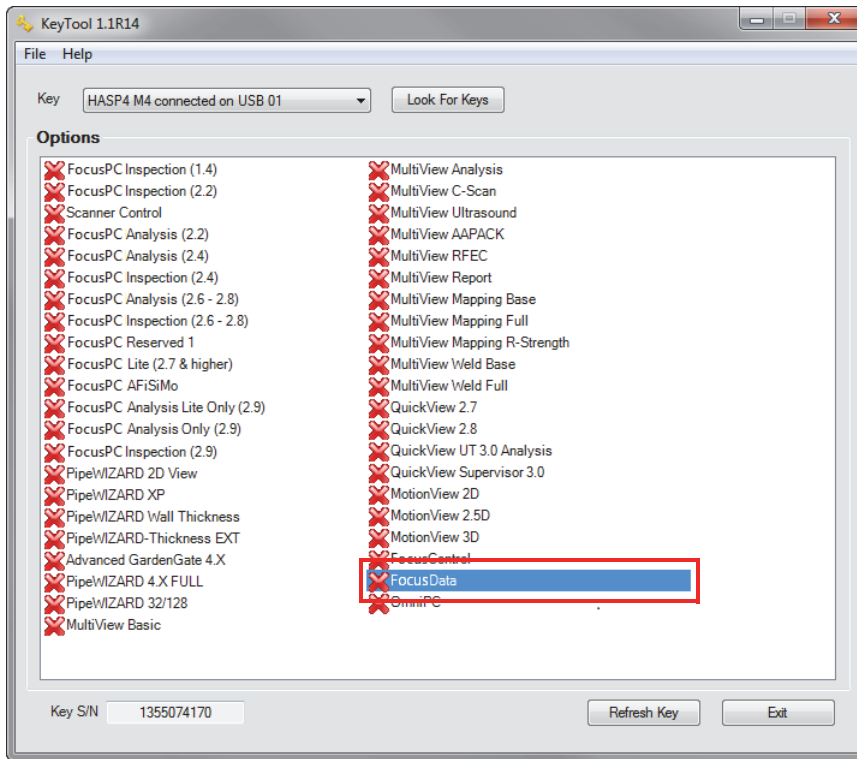


Figure 5-4 The KeyTool window showing the FocusData license

Verify that your HASP key is properly recognized by the KeyTool software and that it contains the FocusData software license.

3. If applicable, verify whether your antivirus software is preventing FocusData from working correctly.
4. If applicable, verify whether your firewall software is preventing FocusData from working correctly.
5. Reinstall the latest FocusData version on your computer. For more information, see “Installing the FocusData Component” on page 14.
6. Install the latest FocusData version on another computer to see if this solves the problem. For more information, see “Installing the FocusData Component” on page 14.

After completing this procedure, if an issue persists, get in touch with your local Evident representative.

5.2 Contacting Technical Support

If you need to contact technical support, to help diagnose and resolve your issue more quickly, make sure you already have at hand the following information:

- Serial number of the one or more instruments
- System information file (.nfo).

To retrieve the system information file under Windows 8

- (1) On the Windows taskbar, click **Search**.
- (2) In the **Search** dialog box, type **msinfo32**.
- (3) In the **System Information** dialog box, click **File**, and then click **Save**.

To retrieve the system information file under Windows 7

- (1) On the Windows taskbar, click **Start**, type **run** in the **Search programs and files** box, and then press the Enter key.
- (2) In the **Run** dialog box, type **msinfo32**.
- (3) In the **System Information** dialog box, click **File**, and then click **Save**.

To retrieve the system information file under Windows XP

- (1) On the Windows taskbar, click **Start**, and then click **Run**.
- (2) In the **Run** dialog box, type **msinfo32**.
- (3) In the **System Information** dialog box, click **File**, and then click **Save**.

- Firmware version of the one or more instruments
- FocusData version number

For more information, see “Finding the Version Number of FocusData for Windows 8, Windows 7, and Windows XP” on page 12.

- Brand and model of the one or more laptops
- Operating system version of the one or more computers
- Antivirus software on the one or more computers
- Firewall on the one or more computers
- Type of Ethernet cables being used
- State of lights on Ethernet router

Yellow lights should be on and the green light should be flashing.

When you have all the appropriate information, contact Evident technical support.
For more information, see “Technical Support” on page 8.

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