



Expanding the scope of GI

PillCam™ Desktop & Reader Software v9.0 IT Guide

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Note

Changes or modifications not expressly approved by Given Imaging Limited could void authority to operate the PillCam Capsule Endoscopy System.



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Table of Contents

Introduction	1
Using This Guide	1
Audience and Work Tasks.....	1
Chapter 2:	
Software Installation	3
System Requirements	3
Installing PillCam Desktop.....	4
Software Installation	4
Registration	7
Silent Installation of PillCam Reader	9
Chapter 3:	
Configuring PillCam Desktop IT Settings	11
Introduction.....	11
System Wide Settings	11
User Groups	13
Shared Data Settings	14
Chapter 4:	
HIS Connectivity	20
Introduction.....	20
Input.....	21
Import File Location (HIS Directory)	21
Input XML File	22
Output.....	28
Folder Structure.....	28
Output XML File.....	29
Additional Information.....	36

Chapter 5:	
Backup and Restore	39
Introduction	39
Maintaining Archives	40
Archive Structure	40
Moving Archives onto Removable Media	41
Backing Up the Study Manager Index	41
Restoring the Study Manager Index	42
Use Case Example	43
 Chapter 6:	
Troubleshooting	44
Introduction	44
Patient Check-in Problems	44

Using This Guide

This IT guide is designed to help you, the IT administrator or software integrator, configure PillCam Desktop to work effectively in your hospital or medical facility.

PillCam Desktop is the software application that allows medical professionals to review the video images from PillCam CE (capsule endoscopy) studies. PillCam Desktop can be installed on your facility's PCs in a network environment under Microsoft Windows Network.

When correctly configured for your facility, PillCam Desktop can:

- import patient data from the HIS (Hospital Information System) or EMR (electronic medical records), simplifying patient check-in at the start of PillCam studies.
- export reports, patient details and video clips (not the entire video) to EMR.
- use facility network resources, such as disk storage and peripherals.



Note:

For complete documentation about PillCam Desktop, see the *PillCam™ Capsule Endoscopy User Manual*.

Audience and Work Tasks

This guide is intended for the IT specialist (network or system administrator).

To support the networking capabilities of PillCam Desktop, the IT administrator's role includes:

- Creating an interface layer between the facility information system and PillCam Desktop. This interface layer must be able to create patient data files associated with a patient and the PillCam capsule endoscopy study to be performed.

- Selecting a network location for these patient data files, which are then imported to PillCam Desktop during patient check-in.
- Determining work settings for multiple PillCam Desktop and PillCam Reader users on the network.
- Defining the export destination of patient reports to reporting formats used by the facility.
- Supporting hardware and all other applications installed in the PCs that are running PillCam Desktop.

Chapter 2: Software Installation

System Requirements

Specification	Minimum	Recommended
CPU	<ul style="list-style-type: none"> Intel® Core™2 Quad AMD equivalent 	
OS (Operating System)	PillCam Desktop: <ul style="list-style-type: none"> Windows® 7 SP1 and above, 32 & 64 bit Windows® 8, 32- & 64-bit Windows® 8.1, 32- & 64-bit Windows® 10 	
RAM	1 GB	<ul style="list-style-type: none"> 3 GB for 32-bit OSs 6 GB for 64-bit OSs
Disk Space	<ul style="list-style-type: none"> 1 GB for software 10 GB available for data 	
Screen (color and aspect ratio / resolution)	24-bit color: <ul style="list-style-type: none"> 4:3 / 1024 x 768 16:9 / 1366 x 768 16:10 (8:5) / 1280 x 800 	32-bit color
Removable Media	DVD-ROM	DVD-RW
USB	USB 2 <ul style="list-style-type: none"> USB 2 hub (all DR2s and DR3s must connect through USB 2 hub unless Windows® 7) USB disk or external drivers (for data transfers) must be partitioned as NTFS 	
Software	<ul style="list-style-type: none"> PDF Reader software such as Adobe® Acrobat 	

Installing PillCam Desktop

Before you start the installation process, you should:

- Close all open applications.
- Disconnect all recorders.
- Make sure you have a legal MS Windows license.
- Confirm that any previous version of PillCam Desktop (or RAPID) and the PillCam Atlas on this PC can be overwritten.
- Disable all antivirus applications.

Software Installation



Note

For installation, registration and configuration purposes, you need to select the **Run as administrator** option in order to have full administrator rights, even if you are already logged in as an administrator.

To install the PillCam Desktop software:

1. Access the PillCam Desktop installation media. The PillCam Desktop installation menu screen appears. If the screen does not open automatically, right click the **autorun.exe** file in the installation folder and select **Run as administrator**.

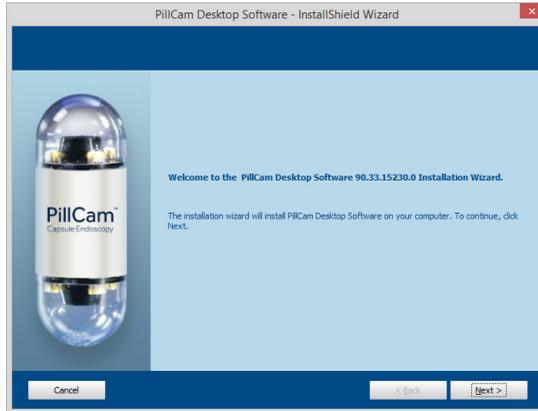




Note

PillCam Atlas is installed automatically during the software installation process.

2. Click **Install PillCam Desktop SW V9** to display the **Welcome** screen.

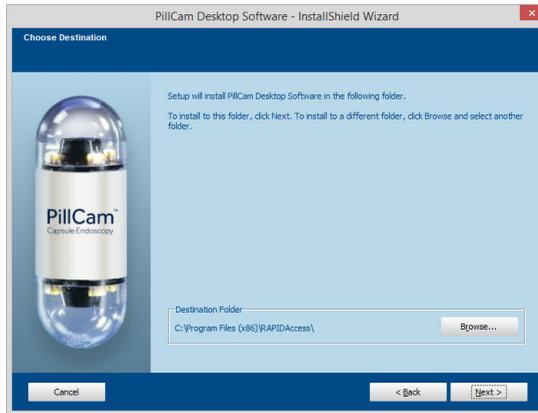


Click **Next** to continue with the installation.

3. In the **License Agreement** screen, click **Accept** to continue with the installation.



4. In the **Choose Destination** screen, you can change the destination folder if necessary. Click **Next** to continue the installation.



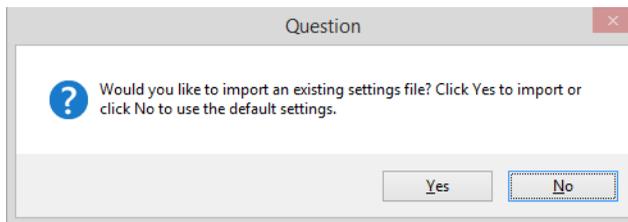
A screen appears showing a progress bar.



Note

Some steps may take several minutes.

5. If a previous version of PillCam Desktop was installed on the PC, the system wide settings will be imported automatically during installation. If the settings were exported (see [System Wide Settings](#)), you are prompted to import the existing settings file. Click **Yes** to import or **No** to use the default settings in PillCam Desktop.



It is also possible to import the settings at a later stage using the via **Tools > System Wide Settings**.

6. The **InstallShield Wizard Complete** screen displays. Click **Finish**.



Registration

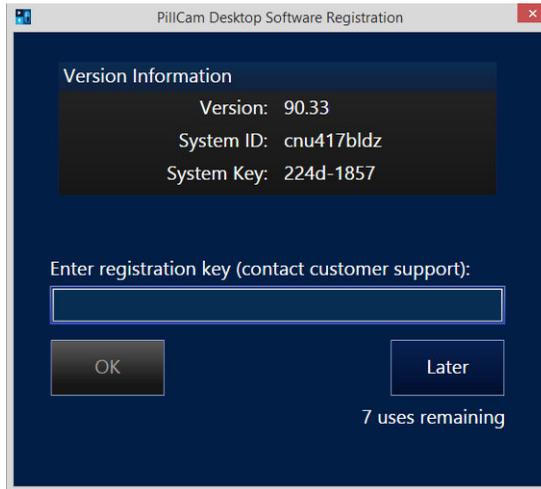
Unrestricted use of PillCam Desktop requires registration via the Given Imaging registration center.

1. Click the software icon on the desktop.

When you run the software for the first time, a license agreement in English (US) appears on your screen, which is the legally binding version. A translation in other languages is provided.

2. Read the license agreement and click **Yes** to accept it. You may select another language to read it, but you must reselect English to accept the license agreement.

3. Register the software for unrestricted use via the Given Imaging registration center. You must supply requested information to obtain the Registration Key. The registration screen appears at the end of the installation process.



4. Keep this registration window open until you finish registration.



Note

Each time you open the registration window, a new System Key appears and any Registration Key based on a previous System Key will not be accepted.

If you click **Later**, you can open and use the PillCam Desktop software, but after seven uses without registering, you must first perform registration in order to use PillCam Desktop.

5. Obtain a Registration Key online or by phone:
 - **Online:** <https://portal.givenimaging.com/RapidRegistration>
 - **Phone:** call your local Given Imaging customer support center. Be ready to provide the following information:
 - System ID (from the registration screen)
 - System Key (from the registration screen)
 - CD serial number (supplied with the CD/Disk on key)
 - Your customer ID

6. Enter the Registration Key you received using only lower case letters and numbers.
7. Click **OK**. The software screen appears.

Silent Installation of PillCam Reader

PillCam Reader is a version of PillCam Desktop that is provided as part of your PillCam license. PillCam Reader is almost identical to PillCam Desktop, but without ability to create videos from recorder data. It is designed for medical personnel who need to review study data or completed reports that were created in PillCam Desktop.

PillCam Reader can be installed as needed throughout your network. Rather than install it manually for each user, you can perform a silent installation (that is, install it automatically via a batch file).

To perform silent installation:

1. Copy the entire contents of the PillCam Reader distribution (from CD-ROM or other distribution media) to a path where you have write-access (on the local PC or on a network drive).
2. From the Command Prompt window (**Start > Run > cmd**), run the PillCam Reader installer as follows:

Windows 7:

```
\\networkpath for PillCam Reader 9.0  
distribution\Reader\InstallerPS2.exe /nui
```

Windows 8.1 and above:

```
\\networkpath for PillCam Reader 9.0  
distribution\Reader\InstallerPS3.exe /nui
```



Note

For Windows Vista and above (Windows 7 SP1, 8.1 and 10), the Command Prompt must be opened with administrative privileges.

3. Follow the prompts and accept the license agreement. Once the license agreement has been accepted, you can install PillCam Reader silently.

4. Add the command line:

Windows 7:

```
\\networkpath\Reader\InstallerPS2.exe /sln
```

Windows 8.1 and above:

```
\\networkpath\Reader\InstallerPS3.exe /sln
```

(where *networkpath* is the full path to the location of the PillCam Reader 9.0 distribution) to a batch file that is run for users on the network.

Chapter 3: Configuring PillCam Desktop IT Settings

Introduction

All users can customize PillCam Desktop from the Settings screen (from the PillCam Desktop home screen, select **Tools > Settings**). However:

- There are some settings that are relevant only in environments where there are more than one user (for example, more than one person using PillCam Desktop on the same PC, but logging in with different Windows usernames).
- Only users with Windows administrative privileges can access certain settings.

As your facility's IT professional, it is your responsibility to control access to PillCam Desktop and to control how and where PillCam Desktop data is shared.

System Wide Settings

System Wide settings are a way to export PillCam Desktop settings and apply them to other installations of PillCam Desktop, without having to manually configure each installation. This allows consistency among multiple users for settings such as a hospital logo on the CE report or shared data directories.

System Wide settings override factory (default) settings and apply to all users on that PC; however, individually customized user settings override System Wide settings.

The System Wide checkbox appears at the bottom of each screen in Settings. If selected, the settings on that screen will be included the exported XML file.



Note:

Only an administrator can define something as a system-wide setting, or can export and import those settings.

System-wide settings affect all users on the specific PC while the user settings are user-specific. User settings override system settings!

To export settings:

1. Select **Tools > System Wide Settings > Export**.
2. Browse to directory and filename to which the file will be exported.
3. Click **Save**.

If the export is successful, this message appears:

System wide settings export successful

To import settings to another installation of PillCam Desktop:

1. Select **Tools > System Wide Settings > Import**.
2. Browse to file and click **Open**.

You are prompted:

***Importing will overwrite existing system wide settings.
Do you wish to continue?***

3. Click **Yes**.

If the import is successful, this message appears:

***System wide settings import successful.
Restart PillCam Desktop to enable the changes.***

User Groups

You can limit use of the PillCam Desktop software through user groups. Create one or more user groups in Windows/Active Directory. These are users who are authorized to open and use PillCam Desktop.

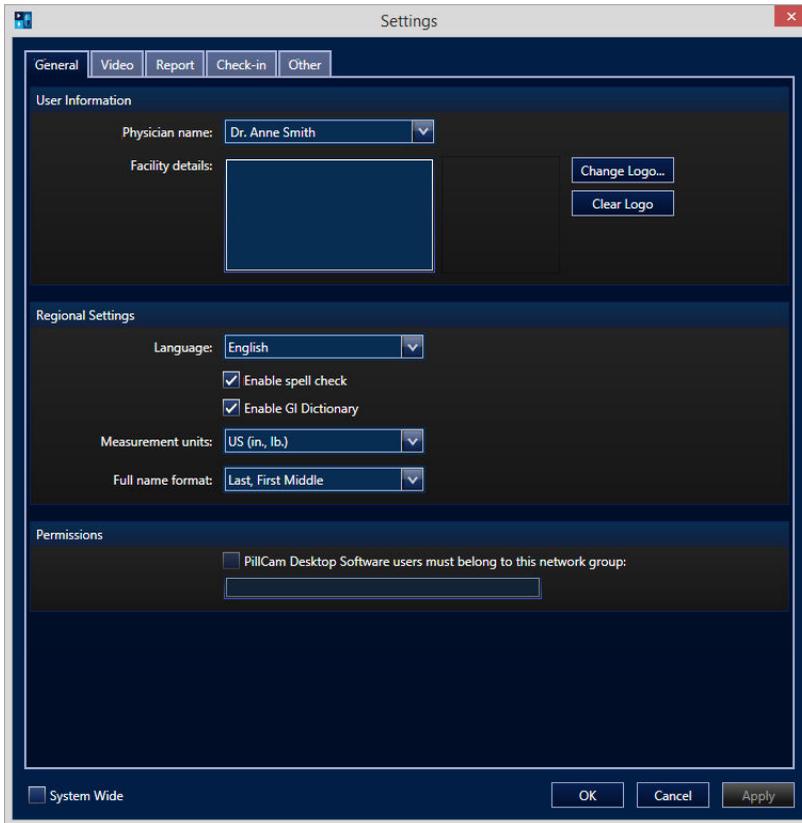
User groups in PillCam Desktop function as follows:

- PillCam Desktop is always available to a user who is an administrator on that PC, even if the user isn't connected to the network.
- If a user isn't an administrator, and the checkbox **PillCam Desktop Software users must belong to this user group** is selected, then the user must belong to one of the specified groups.

To define user groups:

1. After you have created the user groups, select **Tools > Settings**. The **Settings** screen appears.
2. In the **General** tab, select the **System Wide** checkbox at the bottom of the screen (see [System Wide Settings](#) on page 11).
3. In **Permissions**, select **PillCam Desktop Software users must belong to this network group:** and type in the user group.
 - Multiple user groups can be specified, separated by a semicolon (;).
 - These user groups can be from the active directory (such as **Given\PillCamUsers**), local groups (such as **Users**), or both (such as **Given\PillCamUsers; Users**).
 - For user groups defined on the network, type **[name of domain]** before the name of the user group.

- The number of user groups is not limited.



Shared Data Settings

PillCam Desktop generates a large amount of data. The folders needed for the different kinds of data can be local or on a server. To support data sharing and simplify the management of the data:

1. Define all the directories needed by PillCam Desktop for data (see [Data Directories](#) on page 15).
2. Define the directory for the Study Manager files (see [Study Manager Shared Data Directory](#) on page 16).
3. Define which values are system wide (see [System Wide Settings](#) on page 11).

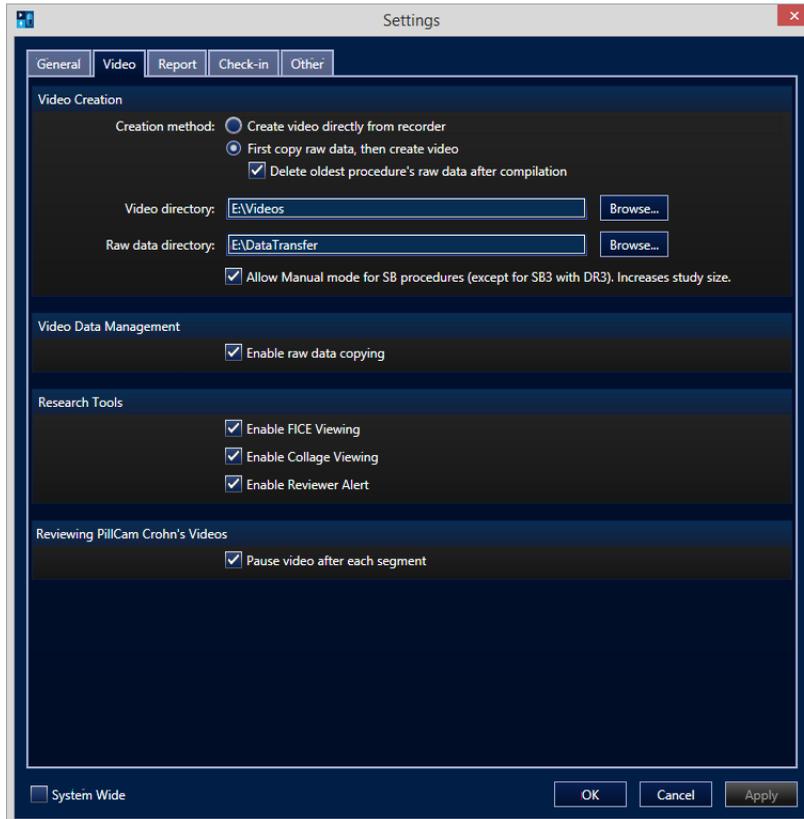
Data Directories

- In the **Video** tab of the **Settings** screen, you determine the directories for storing raw data files and created videos.



Note:

You must have administrative privileges to define any data directories in PillCam Desktop.



- **Video directory:** Define the default location where PillCam Desktop stores the videos after processing the raw data.



Note:

These files are very large! One study may be 120 MB to 2 GB.

- **Raw data directory:** Define the default location to where PillCam Desktop can store raw data as it is copied from the recorder, before processing the raw data into a video. The files in this folder appear on the **Raw Data Files** screen.

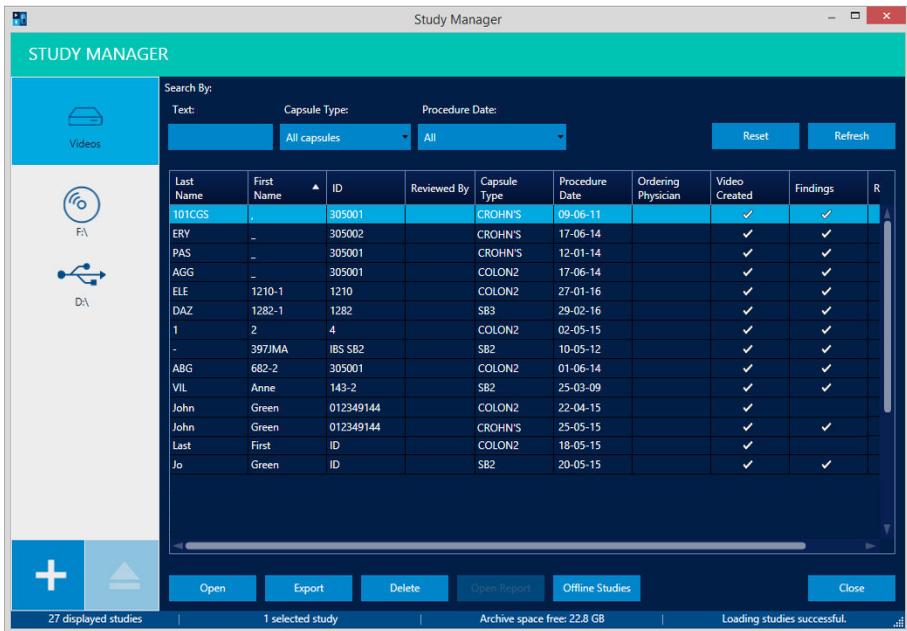
Regimens Directory

To allow physicians to edit and approve their regimens:

1. Create a folder with read and write permissions for the relevant users.
2. In the **Settings** screen, under the **Other** tab, define the **Regimen Directory** to that created folder.

Study Manager Shared Data Directory

The **Shared data directory** is the path where the Study Manager's shared data resides. Shared data refers to columns that appear in the Study Manager. These columns are customizable (which appear and in which order). When multiple users are sharing data in the Study Manager, it is important to define this shared data so that all users will have a common interface.



The screenshot shows the Study Manager application window. The title bar reads "Study Manager". The main content area is titled "STUDY MANAGER" and features a search bar with "Text:" and "Capsule Type:" dropdowns, and a "Procedure Date:" dropdown. Below the search bar is a table with columns: Last Name, First Name, ID, Reviewed By, Capsule Type, Procedure Date, Ordering Physician, Video Created, Findings, and R. The table contains 15 rows of study data. At the bottom of the interface, there are buttons for "Open", "Export", "Delete", "Open Report", "Offline Studies", and "Close". A status bar at the very bottom shows "27 displayed studies", "1 selected study", "Archive space free: 22.8 GB", and "Loading studies successful."

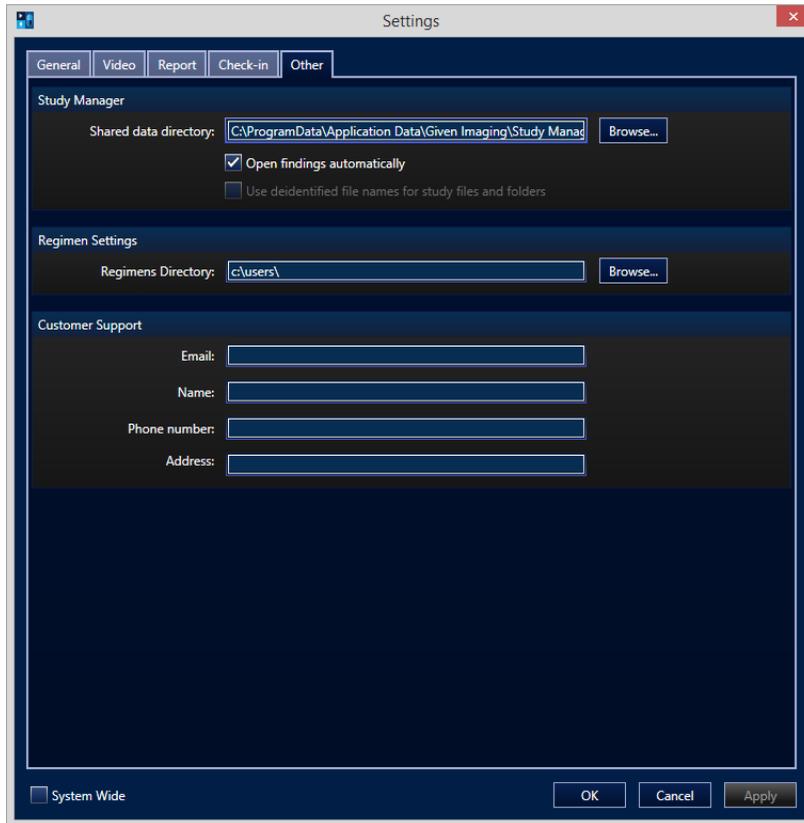
Last Name	First Name	ID	Reviewed By	Capsule Type	Procedure Date	Ordering Physician	Video Created	Findings	R
1D1GGS	-	305001		CROHN'S	09-06-11		✓	✓	
ERY	-	305002		CROHN'S	17-06-14		✓	✓	
PAS	-	305001		CROHN'S	12-01-14		✓	✓	
AGG	-	305001		COLON2	17-06-14		✓	✓	
ELE	1210-1	1210		COLON2	27-01-16		✓	✓	
DAZ	1282-1	1282		SB3	29-02-16		✓	✓	
1	2	4		COLON2	02-05-15		✓	✓	
-	397JMA	IBS SB2		SB2	10-05-12		✓	✓	
ABG	682-2	305001		COLON2	01-06-14		✓	✓	
VIL	Anne	143-2		SB2	25-03-09		✓	✓	
John	Green	012349144		COLON2	22-04-15		✓	✓	
John	Green	012349144		CROHN'S	25-05-15		✓	✓	
Last	First	ID		COLON2	18-05-15		✓	✓	
Jo	Green	ID		SB2	20-05-15		✓	✓	



Note:

For details about customizing these columns, see the *PillCam™ Capsule Endoscopy User Manual*.

1. In **Settings > Other** tab, define the directory for the shared data.



2. Select the **System Wide** checkbox.

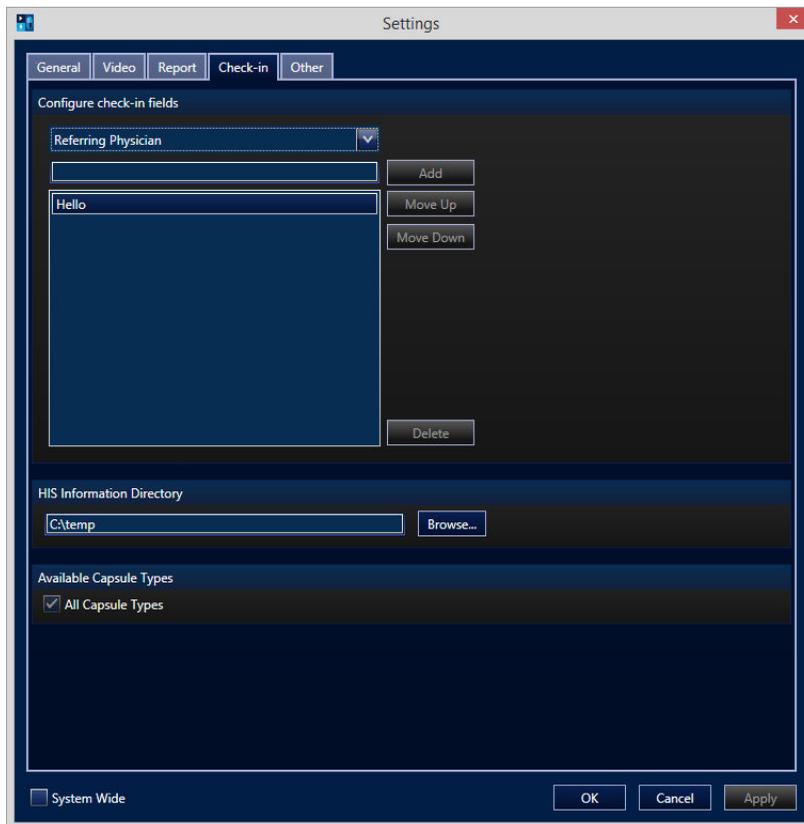
Import and Export Data Locations

PillCam Desktop searches the predefined directory for patient data XML files that must conform to a predefined schema described in Chapter 4: HIS Connectivity. The files should be created from patient and procedure data that constitute the procedure work order in the information system.

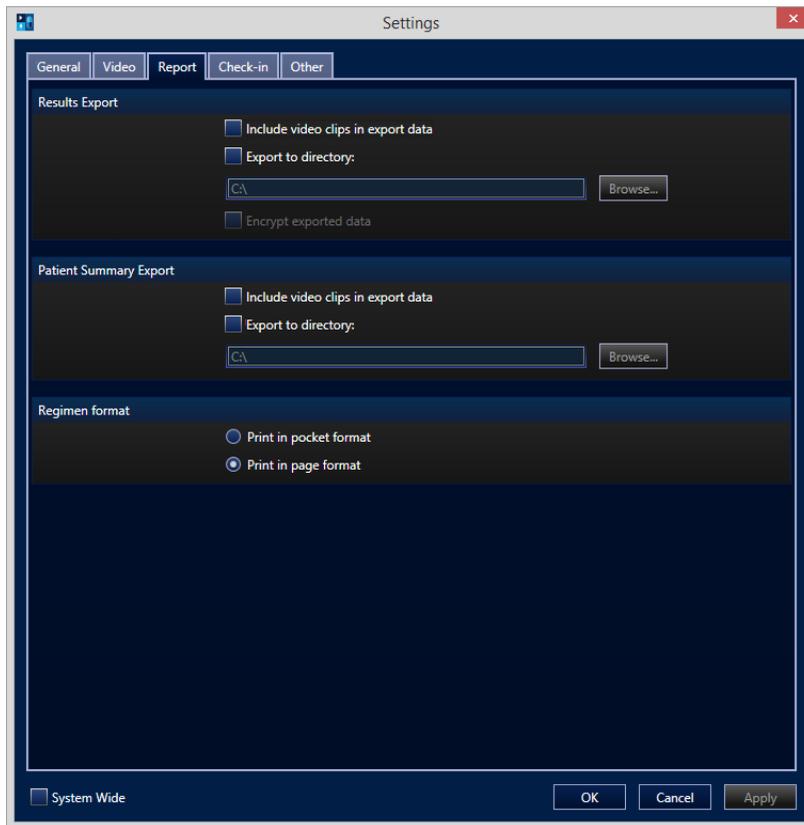
The network application that creates these files must convert the data from your HIS to the file format suitable for PillCam Desktop to import during the check-in process.

The patient data files must reside in the predefined directory, either local or remote, that is accessible to PillCam Desktop and for which the users have read and write access.

1. Define the **HIS Information Directory** (where PillCam Desktop will look for the XML file). This is the input for your HIS.



2. Define the location where the report data is output (**Export to directory**).



Define both **Results Export** and **Patient Summary Export**; users can decide which way study findings can be exported. Both generate data, but the Patient Summary method does not include the XML data (see [Folder Structure](#) on page 28).

Chapter 4: HIS Connectivity

Introduction

The PillCam Desktop software and your HIS or EMR share data through intermediary XML files.

- 1.** Patient information exported from your HIS is imported into PillCam Desktop during patient check-in. This *input* process simplifies the check-in and reduces errors by auto-populating fields. Input can also include information about the specific PillCam CE study that was ordered.
- 2.** After the study has been performed, the resulting report data is *output* from PillCam Desktop and can be imported back into the HIS.

To make this data sharing work, you need to understand the structure of the input and output XML files, and how to define the directories in which PillCam Desktop will search for these files.

Input

The input is data exported from your HIS, converted into an XML file, and imported to PillCam Desktop. PillCam Desktop uses the import file to automatically populate fields during patient check-in.



Note:

Certain nodes that populate fields must contain valid data. These nodes are:

- BirthDate
- ProcedureDate
- Height
- Weight
- Waist
- UnitType
- Build
- RTLReasonForReferral
- Gender
- CapsuleType (may be edited during check-in)
- CapsuleSubType (may be edited during check-in)
- Sensor (mandatory for DR2 only)

These nodes cannot be empty. (If your HIS does not contain this data, make sure that the XML node is not present in the input file.)

For all other nodes, PillCam Desktop ignores any blank nodes (for example, **<MiddleName></MiddleName>**) and allows the field to be entered manually during patient check-in or edited in the Study Manager using Update Patient Details.

Import File Location (HIS Directory)

PillCam Desktop looks for the XML file in the predefined location (either a local or network directory that is accessible to PillCam Desktop). PillCam Desktop users must have read and write access to this directory.

To set the default location:

1. From the PillCam Desktop home screen, select **Tools > Settings**.
2. Click the **Check-in** tab.

3. Enter the path in **HIS Information Directory** (or click **Browse** to locate the path).

Input XML File

It is your responsibility to supply the network application that creates these files by converting the HIS data into the specific XML scheme described below. You can use any filename as long as the file is XML (with the extension **.xml**).

Structure

Here is the required structure of the XML file (shown with **sample values**):

```
<?xml version="1.0" encoding="utf-8"?>
<HISInformation>
  <LastName>Stafford</LastName>
  <MiddleName>Henry</MiddleName>
  <FirstName>Daniel</FirstName>
  <ID>56790021</ID>
  <BirthDate>1967-08-13</BirthDate>
  <Gender>Male</Gender>
  <ProcedureDate>2012-02-15</ProcedureDate>
  <CheckinPerson>Alan</CheckinPerson>
  <ReferringPhysician>Dr Jones</ReferringPhysician>
  <ICDCode>556</ICDCode>
  <CapsuleLotNo>111</CapsuleLotNo>
  <SensorSerNo>555</SensorSerNo>
  <CapsuleId>238141536</CapsuleId>
  <Insurance>BlueShield</Insurance>
  <ReasonForReferral>Bleeding and pain</ReasonForReferral>
  <RTLReasonForReferral>false</RTLReasonForReferral>
  <Group>HGT</Group>
  <Weight>75</Weight>
  <Height>1.76</Height>
  <Waist>0.8</Waist>
  <UnitType>0</UnitType>
  <ProtocolCode>GHYY</ProtocolCode>
  <OrderingPhysician>Dr Sharon Mathers</OrderingPhysician>
  <CapsuleType>1</CapsuleType>
  <CapsuleSubType>2</CapsuleSubType>
  <Build>1</Build>
  <Sensor>7</Sensor>
  <BatterySerialNo>1234</BatterySerialNo>
  <RecorderSerialNo>5678</RecorderSerialNo>
  <UserSpecificItems>
    <UserSpecificItem>
      <Key>Patient Phone</Key>
      <Value ValueType="text">206-324-8817</Value>
    </UserSpecificItem>
  </UserSpecificItems>
</HISInformation>
```

```

    </UserSpecificItem>
  </UserSpecificItems>
</HISInformation>

```

Node Details

All nodes (element or XML tag) are optional.



Note:

Nodes with incorrect values can corrupt the patient check-in process. It is your responsibility to make sure that the XML generated by your HIS does not contain incorrect values.

Each node in the patient data XML file is explained below.

Node Name	Description	Meaning	Values
LastName	alphanumeric string, up to 20 chars	Patient's last name.	
MiddleName	alphanumeric string, up to 20 chars	Patient's middle name.	
FirstName	alphanumeric string, up to 20 chars	Patient's first name (full, not initial).	
ID	alphanumeric string, up to 20 chars	Patient ID used by hospital (could be SSN or other external ID).	
BirthDate	date (formatted as YYYY-MM-DD)	Patient's date of birth.	
Gender	alphanumeric	Patient's gender.	Male or Female (case sensitive)
ProcedureDate	date (formatted as YYYY-MM-DD)	The date on which the PillCam capsule procedure was performed.	legitimate date
ReferringPhysician	alphanumeric string, up to 20 chars	The name of the physician who referred the patient to the Ordering Physician.	

Node Name	Description	Meaning	Values
ICDCode	alphanumeric string, up to 5 chars	The International Statistical Classification for the health problem.	
Insurance	alphanumeric string, up to 20 chars	Name or code for insurance carrier.	
Group	alphanumeric string, up to 20 chars		
ReasonForReferral	alphanumeric string, up to 20 chars	Free text field for doctors to enter symptoms or other info.	
RTLReasonForReferral	alphanumeric. If true, accepts right-to-left input for Hebrew or Arabic text.	For use if RTL language is input in the ReasonForReferral field.	true or false
Weight	decimal, to 2 decimal places	Patient's weight in kilos (for example, 81).	
Height	decimal, to 2 decimal places	Patient's height represented in meters (for example, 1.79).	
Waist	decimal, to 2 decimal places	Patient's waist measurement at widest point, in meters (for example, .72).	
UnitType	integer	Determines the unit of measurement as will appear in PillCam Desktop. <ul style="list-style-type: none"> If 0, kilos are converted to pounds and meters to inches. If 1, kilos are used, and meters are converted to centimeters. 	0 = English (pounds, inches) 1 = Metric (kilos, centimeters)
Build	integer	The patient's general physique.	0 = Thin 1 = Normal 2 = Stocky 3 = Protuberant Abdomen

Node Name	Description	Meaning	Values
ProtocolCode	alphanumeric string, up to 20 chars	A predefined code for the protocol followed for this PillCam procedure.	
OrderingPhysician	alphanumeric string, up to 20 chars	The name of the physician who ordered the PillCam procedure.	
UserDataBlob	alphanumeric string, up to 500 chars	See Custom Nodes on page 27.	
UserSpecificItems	collection of UserSpecificItem elements	See Custom Nodes on page 27.	
CheckinPerson	alphanumeric string, up to 20 chars	The medical staff member who checked the patient in to PillCam Desktop.	may be predefined in PillCam Desktop
RegimenName	alphanumeric string, up to 20 chars.	The name of a predefined regimen that the patient must follow before and during the procedure. Note: for COLON2, DR3 only.	must be predefined in PillCam Desktop
CapsuleLotNo	alphanumeric string, up to 20 chars	Lot number on PillCam packaging. Note: this value can be manually edited during the check-in process.	
SensorSerNo	alphanumeric string, up to 20 chars	Serial number printed on the sensor belt or sensor array.	
CapsuleType	integer	The type of capsule used for the PillCam procedure. Note: see Capsule Types on page 26 for correct pairings of CapsuleType and CapsuleSubType.	1 = SB 2 = UGI 4 = COLON 6 = CROHN'S
CapsuleSubType	integer	Some capsule types have variations. Note: see Capsule Types on page 26 for details.	1, 2, or 3

Node Name	Description	Meaning	Values
Sensor Note: PillCam Desktop does not import this field for DR3.	integer (but can accept string for backward-compatibility with RAPID v7)	CapsuleTypes and SensorTypes go together. The values (that is, what appears when the data is exported from PillCam Desktop) for SensorType are listed with their appropriate CT (CapsuleType).	3 = "8-lead sensor array" (CT 1 and 4) 4 = "3-lead sensor array" (CT 2) 7 = "SB sensor belt" (CT 1) 8 = "C2 sensor belt" (CT 4) 9 = "SB3 sensor belt" (DR3 only)
BatterySerialNo	alphanumeric string, up to 20 chars.	Serial number printed on the recorder battery.	
RecorderSerialNo	alphanumeric string, up to 20 chars	Serial number printed on the recorder.	

Capsule Types

Capsule Label	Type	Sub-type
SB1	1	1
SB2	1	2
SB3	1	3
ESO1	2	1
ESO2	2	2
UGI	2	3
COLON1	4	1
COLON2	4	2
CROHN'S	6	1

Custom Nodes

DataBlob

This is an alphanumeric string that contains information. While DataBlobs can contain any type of information, they most commonly contain GUIDs (128-bit values that can be used to point to data in the HIS). GUIDs have the following structure: 8 hexadecimal digits, then three groups of 4 hexadecimal digits each, then 12 hexadecimal digits; for example:

```
6B29FC40-CA47-1067-B31D-00DD010662DA
```

The DataBlob allows you to reference non-text data (such as an image or a multimedia file) from your HIS. The data isn't used by PillCam Desktop and does not appear in the PillCam CE report. However, when exporting PillCam Desktop data, the DataBlob data becomes part of the output XML.

UserSpecificItems

This is a complex node made up of up to 10 **UserSpecificItem** elements. Each UserSpecificItem element contains two elements:

- Key (type String, up to 11 characters): this is the label (for example, **Street Address**).
- Value (type String, up to 11 characters): this is the actual data for the element (for example, **142 Elm Street**). It also contains an attribute called ValueType (type String, up to 5 characters), which identifies the type of data (for example, **numeric**).

All UserSpecificItems are displayed as a table of two columns on the last page of the CE report, where each row in the table contains a Key and the associated Value. This allows you to add custom information to the CE report.

Example

```
<UserDataBlob>6B29FC40-CA47-1067-B31D-00DD010662DA</
  UserDataBlob>
<UserSpecificItems>
  <UserSpecificItem>
    <Key>Patient Phone</Key>
    <Value ValueType="String">206-324-8817</Value>
  </UserSpecificItem>
  <UserSpecificItem>
    <Key>City</Key>
    <Value ValueType="String">Seattle</Value>
  </UserSpecificItem>
  <UserSpecificItem>
    <Key>State</Key>
    <Value ValueType="String">Washington</Value>
  </UserSpecificItem>
</UserSpecificItems>
```

Output

When a study has been completed and the physician finalizes the CE report, the data can be output from PillCam Desktop and made available to your HIS.

The output is saved to a predefined directory. This directory contains:

- a standard PDF report
- the report text in XML format (including the UserDataBlob and the UserSpecificItems; see [Custom Nodes](#) on page 27)
- a subdirectory containing the images and video clips that were marked by the physician

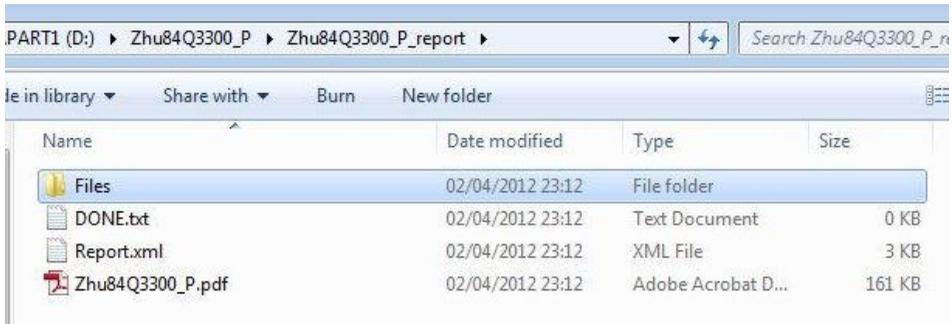


Note:

Many of the nodes in the output XML are similar to those of the input, but with slight differences. Review the tables carefully!

Folder Structure

An XML output file is usually created by the physician who wrote the CE report. When the physician selects **Export > Results** from PillCam Desktop (from the Report tab in the viewing screens), PillCam Desktop creates a folder called `xxxxxx_report`, where `xxxxxx` is the name of the study video. The default location of this is in the same folder as the video. You can specify a different directory to be the default (in PillCam Desktop: **Tools > Settings > Report > Results Export**). The folder looks like:



The folder contains:

- **Files** folder
Contains data from the PillCam recorder.
- Image files
The files naming convention is `thumbnail_{id}.jpg` for the image and

thumbnail_{id}_localization.jpg for the localization image (the information about where in the GI tract the image was captured). The ID is a unique number for each pair of thumbnails and their localizations.

- **<study name>.pdf** file
A CE Report following the same naming for the export folder.
- **report.xml** file
The XML file as described above.
- **DONE.txt** file
This empty text file is created upon successful completion of the export process. Your HIS can monitor for its creation to determine when other files can be accessed.

If the physician selects **Export > Patient Summary** from PillCam Desktop, **report.xml** and **DONE.txt** are not created. The default location is defined in **Tools > Settings > Report > Patient Summary Export**.

Output XML File

The output XML file contains data, exported from PillCam Desktop, about the PillCam CE report. The data is presented as XML and can be imported by your HIS.

Structure

Here is the structure of the output XML file (shown with **sample values**):

```
<?xml version="1.0" encoding="utf-8" ?>
<report>
  <patient>
    <patient_id>56790021</patient_id>
    <name>
      <lastname>Stafford</lastname>
      <midname>Henry</midname>
      <firstname>Daniel</firstname>
    </name>
    <insurancecarrier>HRL</insurancecarrier>
    <insurancegroup>BlueShield</insurancegroup>
    <gender>Male</gender>
    <birthdate>13/08/1967</birthdate>
    <clinic>
      <clinic_name>Dolman Family Health</clinic_name>
      <clinic_info />
    </clinic>
  </patient>
</report>
```

```

<test capsulelabel="PillCam COLON2" capsule_subtype="PillCam
COLON2" capsuletype="PillCam COLON" test_id="eb89a552-afcb-
4831-b60b-09adc38d3a26" user_data_blob="6B29FC40-CA47-1067-
B31D-00DD010662DA">
  <test_date>12/03/2012</test_date>
  <capsule_id>4BQASLX</capsule_id>
  <referredby>Dr Jones</referredby>
  <orderedby>Dr Sharon Mathers</orderedby>
  <icd9>556</icd9>
  <reasonforreferral RTL="False">Bleeding and pain</
  reasonforreferral>
  <summary RTL="False" />
  <testfindings RTL="False" />
  <weight>165 lbs</weight>
  <height>69.5 inches</height>
  <waistline>31.5 inches</waistline>
  <build>Normal</build>
  <checkin_person>Alan</checkin_person>
  <capsule_lot_no>111</capsule_lot_no>
  <sensor_serial_no>555</sensor_serial_no>
  <protocol_code>GHYY</protocol_code>
  <battery_serial_no>1234</battery_serial_no>
  <recorder_serial_no>5678</recorder_serial_no>
  <sensor>8-lead sensor array</sensor>
  <start_recording_time>15/02/2012, 13:42:34</
  start_recording_time>
  <end_recording_time>15/02/2012, 20:06:20</end_recording_time>
  <passagetimes>
    <smallbowel_passagetime>0h 2m</smallbowel_passagetime>
    <colon_passagetime>0h 0m</colon_passagetime>
  </passagetimes>
  <thumbnail thumbnail_id="1000000" thumbnail_time="00:00:00">
    <thumbnail_image image_path="/thumbnail_1000000.jpg" />
    <thumbnail_localization localization_path="/
    thumbnail_1000000_localization.jpg" />
  <thumbnail_comment />
</thumbnail>
  <thumbnail thumbnail_id="1000077"
  thumbnail_time="00:00:38">
    <thumbnail_image image_path="/thumbnail_1000077.jpg" />
    <thumbnail_localization localization_path="/
    thumbnail_1000077_localization.jpg" />
    <thumbnail_comment>First Duodenal Image.</
    thumbnail_comment>
  </thumbnail>
  <thumbnail thumbnail_id="1000355" thumbnail_time="00:02:57">
    <thumbnail_sbLocationPercentage>52%</
    thumbnail_sbLocationPercentage>

```

```

        <thumbnail_sbTimePercentage>86%</
        thumbnail_sbTimePercentage>
        <thumbnail_image image_path="/thumbnail_1000355.jpg" />
        <thumbnail_localization localization_path="/
        thumbnail_1000355_localization.jpg" />
        <thumbnail_comment>First Ileocecal Valve Image.</
        thumbnail_comment>
    </thumbnail>
    <thumbnail thumbnail_id="1000400" thumbnail_time="00:03:20">
        <thumbnail_image image_path="/thumbnail_1000400.jpg" />
        <thumbnail_localization localization_path="/
        thumbnail_1000400_localization.jpg" />
        <thumbnail_comment>First Cecal Image.</thumbnail_comment>
    </thumbnail>
    <thumbnail thumbnail_id="1000434" thumbnail_time="00:03:37">
        <thumbnail_image image_path="/thumbnail_1000434.jpg" />
        <thumbnail_localization localization_path="/
        thumbnail_1000434_localization.jpg" />
        <thumbnail_comment>Last Cecal Image.</thumbnail_comment>
    </thumbnail>
    <thumbnail thumbnail_id="1000446" thumbnail_time="00:03:43">
        <thumbnail_image image_path="/thumbnail_1000446.jpg" />
        <thumbnail_localization localization_path="/
        thumbnail_1000446_localization.jpg" />
        <thumbnail_comment>First Rectal Image.</thumbnail_comment>
    </thumbnail>
    <thumbnail thumbnail_id="1000470" thumbnail_time="00:03:55">
        <thumbnail_image image_path="/thumbnail_1000470.jpg" />
        <thumbnail_localization localization_path="/
        thumbnail_1000470_localization.jpg" />
        <thumbnail_comment>Last Rectal Image.</thumbnail_comment>
    </thumbnail>
    <UserSpecificItems>
        <UserSpecificItem>
            <Key>Patient Phone</Key>
            <Value ValueType="text">206-324-8817</Value>
        </UserSpecificItem>
    </UserSpecificItems>
</test>
</patient>
</report>

```

Node Details

Each node (element or XML tag) in the report XML file is explained below.

Node Name	Description	Meaning	Values
report	unspecified	This is the parent node that contains all other nodes for the export.	
patient	unspecified	This is a parent node for all patient nodes.	
patient_ID	alphanumeric string, up to 20 chars	This is the same patient ID as in the import file.	
name	unspecified	The name node and its elements are the same as in the import file.	
lastname	alphanumeric string, up to 20 chars	Patient's last name.	
midname	alphanumeric string, up to 20 chars	Patient's middle name.	
firstname	alphanumeric string, up to 20 chars	Patient's first name.	
insurancecarrier	alphanumeric string, up to 20 chars	Name or code for insurance company.	
insurancegroup	alphanumeric string, up to 20 chars		
gender	alphanumeric string, up to 10 chars	Patient's gender.	Male or Female (case sensitive)
birthdate	date	Patient's date of birth.	legitimate date
clinic	unspecified	This is the parent node for all clinic nodes.	
clinic_name	alphanumeric string, up to 20 chars	Name of clinic or facility (appears on the top of the first page of the CE reports).	
clinic_info	alphanumeric string, up to 20 chars	Additional info as needed.	

Node Name	Description	Meaning	Values
test	unspecified	This is the parent node for all test nodes.	
test_ID	GUID	This is a unique string assigned by PillCam Desktop.	
capsulelabel	alphanumeric string, up to 20 chars	The general type of capsule.	PillCam SB2 PillCam SB3 PillCam UGI PillCam COLON2 PillCam Crohn's
capsulesubtype	alphanumeric string, up to 20 chars		PillCam SB2 PillCam SB3 PillCam UGI PillCam COLON2 PillCam Crohn's
capsuletype	alphanumeric string, up to 20 chars	The general type of capsule (SB, UGI, COLON, Crohn's).	PillCam SB PillCam UGI PillCam COLON PillCam Crohn's
test_date	date	Date on which the procedure was performed.	
referredby	alphanumeric string of up to 20 chars	The name of the referring physician.	
orderedby	alphanumeric string of up to 20 chars	The name of the physician who ordered the procedure.	
icd9	alphanumeric string of up to 20 chars	Illness or condition classification.	
reasonforreferral RTL	alphanumeric string of up to 100 chars	Symptoms or reasons leading to the procedure.	True or False
summary RTL	alphanumeric string of up to 500 chars	What was entered in the Summary and Recommendations field in the Report area of video viewing.	True or False
testfindings RTL	alphanumeric string of up to 500 chars	Descriptive overview of the findings.	True or False
weight	alphanumeric string of up to 10 chars	Combined with unit of measurement.	
height	alphanumeric string of up to 10 chars	Combined with unit of measurement.	

Node Name	Description	Meaning	Values
waistline	alphanumeric string of up to 10 chars	Combined with unit of measurement.	
build	alphanumeric string of up to 20 chars	Indicates the general body type of the patient. Thin Normal Stocky Protuberant Abdomen	
passagetimes	unspecified	Marks the relative time for certain milestones in the GI tract.	
esophageal_emptying	alphanumeric string of up to 20 chars	Marks the relative time when the capsule leaves the esophagus. Format is xh ymzs .	
gastric_passagetime	alphanumeric string of up to 20 chars	Marks the relative time that the capsule was in the gastric passageway. Format is xh ym zs .	
smallbowel_passagetime	alphanumeric string of up to 20 chars	Marks the relative time that the capsule was in the small bowel. Format is xh ym zs .	
colon_passagetime	alphanumeric string of up to 20 chars	Marks the relative time that the capsule was in the colon. Format is xh ym zs .	
checkin_person	alphanumeric string of up to 20 chars	The name of the person who checked the patient in.	
capsule_lot_no	alphanumeric string of up to 20 chars	String printed on capsule packaging.	
sensor_serial_no	alphanumeric string of up to 20 chars	Serial number printed on sensor label.	
protocol_code	alphanumeric string of up to 20 chars	Code for the patient preparation protocol.	
battery_serial_no	alphanumeric string of up to 20 chars	Serial number printed on the battery label.	
recorder_serial_no	alphanumeric string of up to 20 chars	Serial number printed on the recorder label.	

Node Name	Description	Meaning	Values
sensor	alphanumeric string of up to 20 chars.	Text describing sensor. Based on numeric value entered at input.	see Input XML File on page 22
start_recording_time	alphanumeric string of up to 20 chars	Actual starting time (when the recorder first detects the capsule). Note: for DR3 only.	
end_recording_time	alphanumeric string of up to 20 chars	Actual ending time. Note: for DR3 only.	
regimen_name	alphanumeric string of up to 20 chars	Note: for COLON2, DR3 only.	
thumbnail	unspecified	Thumbnails are images marked by the physician.	
thumbnail_id	numeric string of up to 20 digits	Identifies a specific thumbnail.	
thumbnail_image	unspecified	Name of the file (usually a .jpg).	
image_path	alphanumeric string of up to 20 chars	Full path (folder) where the image is located.	
thumbnail_localization	alphanumeric string of up to 20 chars	Name of the file (usually a .jpg) showing the relative position of the associated thumbnail image.	
localization_path	alphanumeric string of up to 20 chars	Full path (folder) where the image is located.	
thumbnail_time	alphanumeric string of up to 20 chars	Relative time when the thumbnail was captured. Format depends on time settings in local PC.	
thumbnail_comment	alphanumeric string of up to 50 chars	Notes or description about the thumbnail.	
thumbnail_sbTime Percentage	numeric string of up to 3 digits		0 to 100
thumbnail_sbLocalization Percentage	numeric string of up to 3 digits	Location of thumbnail represented as percentage of time passed in the procedure.	0 to 100

Node Name	Description	Meaning	Values
thumbnail_SB progressthumbnail_ SBprogress_path	numeric string of up to 3 digits		0 to 100
lewiscore	numeric string of up to 10 digits	A scoring index for mucosal findings.	
user_data_blob	alphanumeric string of up to 500 chars	User-defined.	
UserSpecificItem	unspecified	User-defined.	

Additional Information

Units of Measurement

Date and time values are formatted according to the local PC's system specifications:

- Passage times are formatted as Xh Ym Zs, where X are hours, Y are minutes, and Z are seconds (for example, **1h 2m 3s**).
- Weight and height are set according to the requested measurement units (**Metric** or **English**) in PillCam Desktop's settings (**General tab > Regional Settings**). Both have the unit appended to their value (for example, **83 kilos** or **185 lbs**).

RTL

Some nodes contain **RTL** as part of their expression (for example, **summary RTL**). This allows support of right-to-left languages, such as Hebrew and Arabic, by aligning text from right to left. The default is **RTL=false** (that is, for left-to-right languages, such as English).

Complex Nodes

Complex nodes contain multiple nested nodes.

Name

The **name** node is contained in the **patient** node. It consists of three nodes denoting the last, middle, and first name:

```
<name>
  <lastname>Doe</lastname>
  <midname>K</midname>
```

```
<firstname>John</firstname>
</name>
```

Clinic

The **clinic** node is contained in the **patient** node. It is for the name of the clinic and any additional information that may be needed relating to the clinic:

```
<clinic>
  <clinic_name>City Medical Center</clinic_name>
  <clinic_info />
</clinic>
```

Test

The **test** node is contained in the **patient** node.

```
<test test_id="1c07c43f-1dcf-4c98-b1ba-059898c0eed2"
  capsulelabel="PillCam SB2">
  <test_date>23/12/2012</test_date>
  <capsule_id>ALDBSLT</capsule_id>
  <referredby />
  <orderedby />
  <reasonforreferral RTL="False" />
  <summary RTL="False" />
  <testfindings RTL="False" />
  <weight>58 kg</weight>
  <height>165 cm</height>
  <waistline>73 cm</waistline>
  <build>Normal</build>
  <checkin_person />
  <capsule_lot_no>2011-08/16298S</capsule_lot_no>
  <sensor_serial_no />
  <protocol_code />
  <battery_serial_no />
  <recorder_serial_no>144418</recorder_serial_no>
  <sensor>8-lead sensor array</sensor>
  <start_recording_time>23/12/2012, 11:13:07 AM</
    start_recording_time>
  <end_recording_time>23/12/2012, 14:33:19 PM</end_recording_time>
  <thumbnail />
</test>
```

Passagetimes

The **passagetimes** node is contained in the **test** node.

```
<passagetimes>
  <esophageal_emptyingTime>35m 47s</esophageal_emptyingTime>
  <gastric_passagetime>1h 12m</gastric_passagetime>
```

```
<smallbowel_passagetime>4h 8m</smallbowel_passagetime>
<colon_passagetime>0h 23m</colon_passagetime>
</passagetimes>
```

Thumbnail

The **thumbnail** node is contained in the **test** node. It has two attributes: **thumbnail_id** and **thumbnail_time**. **Thumbnail** contains three nodes: **thumbnail_image**, **thumbnail_localization**, and **thumbnail_comment**. The attributes **image_path** and **localization_path** are used for **thumbnail_image** and **thumbnail_location**.

```
<thumbnail thumbnail_id="1" thumbnail_time="00:00:00">
  <thumbnail_image image_path="files/thumbnail_1.jpg" />
  <thumbnail_localization localization_path="files/
    thumbnail_1_localization.jpg" />
  <thumbnail_comment />
</thumbnail>
```

Chapter 5: Backup and Restore

Introduction

PillCam Desktop Software generates a lot of data, and this data needs to be managed. To understand your role in this process, you must first understand how the Study Manager recognizes data.

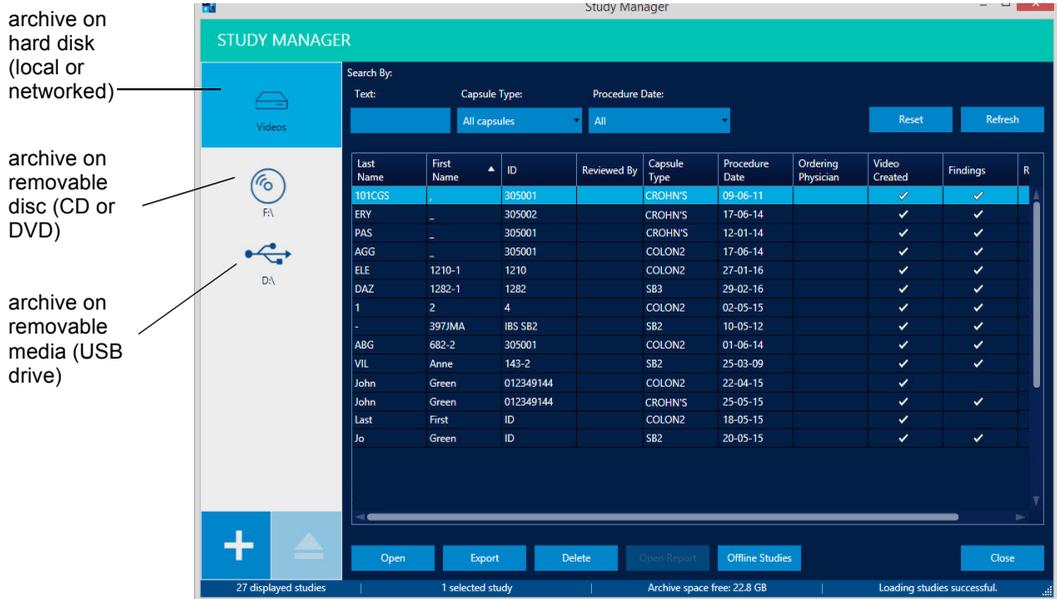
The Study Manager is the main interface for PillCam Desktop users for selecting and viewing *studies*. A PillCam study is the collection of videos and other data associated with a specific PillCam capsule endoscopy procedure. An archive is a collection of studies (one folder that contains one or more study folders).

The Study Manager uses an indexer that works as a background process. The indexer keeps track of any changes to the archive directories and their contents. When the Study Manager is opened, the indexer refreshes the list of archives and their studies.

Archives can be:

- **online**: any archive that is currently physically connected to the PC and therefore accessible by PillCam Desktop. Online data is volatile in that it is subject to whatever changes the user makes (for example, adding, deleting, moving, rename, etc.). The indexer therefore makes no permanent record of online data; the index is rebuilt each time the Study Manager is run.
- **offline**: any archive on removable media (for example, external hard disk, CD, or DVD). Offline archives are stored with permanent index pointers. This means that the Study Manager will remember an archive's contents and display it as an offline archive, even when it has been physically disconnected from the PC. This is important as it allows users to search for specific studies or patients, even when large amounts of data have been stored offline.

The Study Manager displays a list of available archives on the left side of the screen. When an archive is selected, all of its studies are listed.



The Study Manager is also user-specific; the list of studies from any selected archive is rebuilt by the indexer for that particular user, based on the user's settings in PillCam Desktop. Therefore, two users who share the same PC, but log in using separate usernames, can see a different set of archives.

Maintaining Archives

PillCam Desktop archives are very large; users can quickly run out of room on their local hard disk. By using archives, users can have unlimited offline storage.

Archive Structure

When a PillCam study is created, its default location is in the folder specified in **Tools > Settings > Video > Video Creation**. There can be a separate folder for raw data transferred from the recorder and for the videos created from that data. The

name of the folder, and the study file within it, is based on the following patient check-in information transferred from the recorder:

- patient's last name
- patient's middle initial
- patient's first name
- patient's ID number (in parentheses)
- date that the study was performed (format: **DD MMM YY**)

The study file has the extension *.gvi. For example: the folder

Doe F. John (12345) 21 Feb 12 (which is located in the predefined Created Video directory)

contains the file

Doe F. John (12345) 21 Feb 12.gvi

Moving Archives onto Removable Media

Users can copy individual studies or entire archives onto removable media (see *Backing Up Data* in the *PillCamTM Capsule Endoscopy User Manual*).

In addition, we recommend:

1. Implement a backup policy for any shared network folder containing study data.
2. Determine what is the longest reasonable period for archives to remain in that folder.
3. When archives are older than the time specified, copy them to DVD for offline archiving.

Backing Up the Study Manager Index

Perform a backup of the Study Manager index to save the current results of the indexer. The indexer is a background process running all the time in the Study Manager, updating the index as changes are made. A backup saves a static version of the index, either as a permanent reference, or to transfer to another PC.



Note:

You must be logged on as Admin to have access to this utility.

1. Shut down PillCam Desktop.
2. From the Start menu, select **Programs > Given Imaging> Backup and Restore Offline Studies**.

3. Select **Export directory**.

4. Specify the location.

The data is copied, uncompressed, to that location (DVD or USB drive, for example) in Microsoft Access format (a file with the extension ***.accdb**).

When the backup is finished, this message appears:

Export directory successful.

Restoring the Study Manager Index

Performing a restore of the Study Manager index allows you to restore the archive list from a previously backed up database index.



Note:

You must be logged on as Admin to have access to this utility.

1. Shut down PillCam Desktop.

2. From the Start menu, select **Programs > Given Imaging > Backup and Restore Offline Studies**.

3. Select **Import directory**.

4. Specify the location where the ***.accdb** file is located. If there are multiple backups, select the one you want to use.

When the restore is finished, this message appears:

Import directory successful.

Use Case Example

Dr. Robert Edelson performs an average of 40 capsule endoscopy procedures each month. At the end of each month, he transfers all of that month's studies to a DVD and labels it accordingly (for example, **June 2012**).

Each time he creates a DVD, he inserts it into his PC while the Study Manager is open. The Study Manager's background indexer then automatically updates the index to include the studies on that DVD.

In October 2012, Dr. Edelson performed a capsule endoscopy on patient Marcia Blane. The report was completed and at the end of the month, the patient's data was transferred to a DVD.

In January 2013, Dr. Edelson needed to review Marcia Blane's report. In the Study Manager, he searched for the patient's name and saw that her report was in the archive labeled **October 2012**. He located that DVD, inserted it into PC, and was immediately able to access all the data directly through the Study Manager.

In March 2013, Dr. Edelson installed PillCam Reader on his laptop. From his office PC, he backed up the Study Manager index and then restored it on the laptop. He was then able to have the same studies appearing in both the Study Manager running on his office PC and the Study Manager running on his laptop.

Since there is no automatic way to synchronize these two installations of the Study Manager, Dr. Edelson should continue to perform the back-up and restore of the Study Manager index when he creates his monthly DVDs.

Chapter 6: Troubleshooting

Introduction

This chapter covers only those troubleshooting issues that directly relate to the IT setup of PillCam Desktop and the HIS connectivity. For general troubleshooting issues for PillCam Desktop or the PillCam platform, see the *PillCamTM Capsule Endoscopy System* manual.

Patient Check-in Problems

Problem: One or more fields in the check-in process have incorrect data, but PillCam Desktop won't let you manually edit them.

Cause: Any field populated by the imported HIS data cannot be edited. If an XML node contains an incorrect value (for example, a patient name is misspelled or the incorrect gender listed), the user cannot correct the error from PillCam Desktop.

Solution:

1. (User) Cancel the check-in process. Restart it without importing data. Enter all values manually.
2. (User) After creating the video, update the patient details manually using the Study Manager.