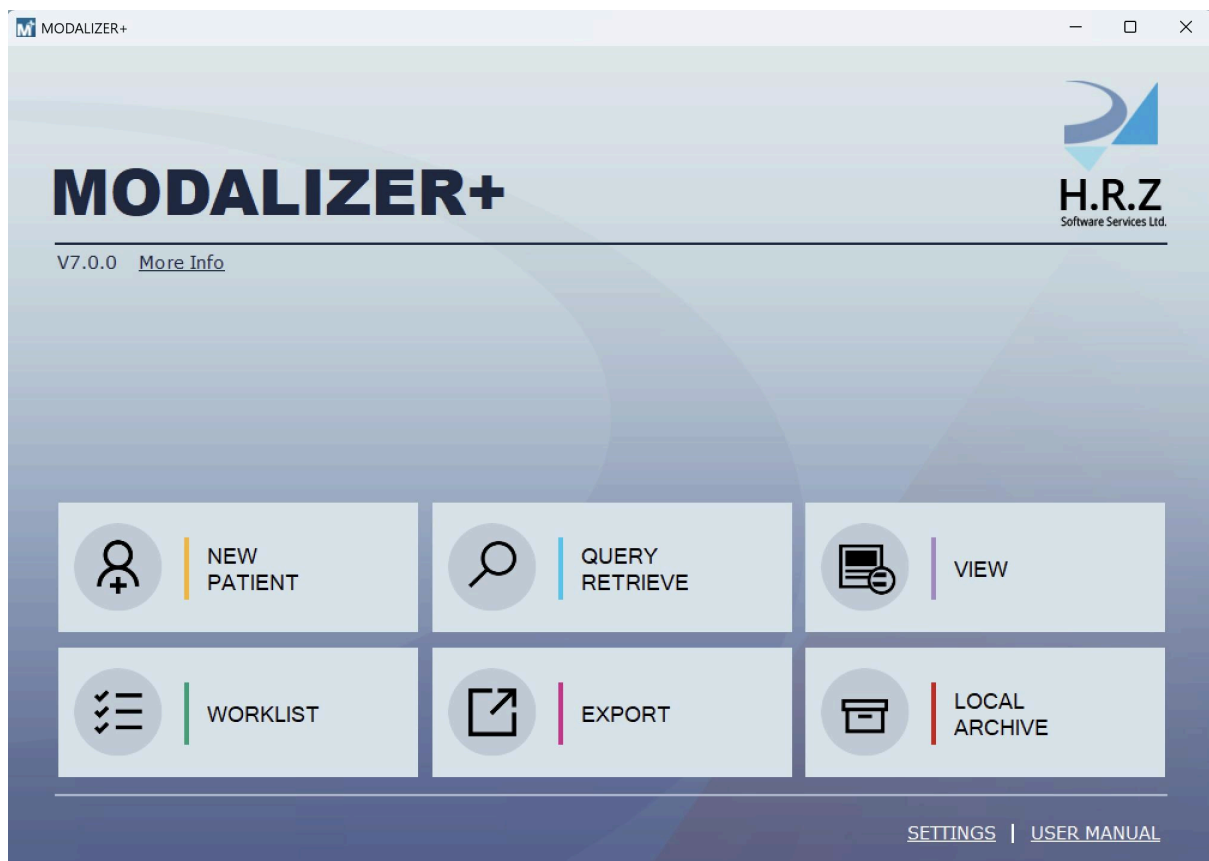


# MODALIZER+

*User's Manual*

Version 7.0

## HEALTHCARE IMAGING WORKFLOW WIZARD



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## Reference Documents

Title	Date	Link
DICOM Conformance Statement	February 16, 2026	<a href="#">MODALIZER+ V7.0 DICOM CONFORMANCE STATEMENT.pdf</a>



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## 1. Introduction

*MODALIZER+* is a powerful and easy-to-use All Purpose Healthcare Imaging Workflow Software, Point-of-Care Imaging and Reporting tool. It was carefully designed to capture, scan and display Images, videos and documents in PACS Environment.

*MODALIZER+* provides a complete solution for Healthcare personnel to document patient encounters, attach media to the patient folder in the PACS, and perform many other important related tasks.

*MODALIZER+* is a state of the art DICOM Application with rich feature set combining Imaging Modality, Reporting Tool, DICOM Viewer, DICOM Converter and PACS Import Tool. Here are some of the things that *MODALIZER+* can do:

- Capture, scan and convert Images from image files, USB Cameras, paper and film scanners and other TWAIN and UVC Imaging Devices, HEVC, MPEG, PDF, JPG, PNG, TIFF, Jpeg 2000 (J2K) and Bitmaps.
- Fully Customizable, auto-complete, PDF Report Templates.



- Powerful DICOM Q/A capabilities for editing DICOM files and applying changes at the Study, Series or Single Instance levels.
- Integrate with a PACS to store, search, retrieve and display Images and Reports.
- Workflow Integration using DICOM Modality Worklist and Modality Performed Procedure Step to obtain Patient and Procedure parameters, report procedure progress, eliminate typos and reduce QA efforts.
- Multi-Modality Image Display and PACS Workstation - creating, connecting, searching, retrieving and storing images and documents on the PACS. Creating DICOM Media, Burning CD/DVD and USB with integrated DICOM CD Viewer.
- Manage your own medical image archive using the built-in Local Archive database.
- DICOM Listener.
- Customizable DICOM instances structure and content.
- Configurable “Capture Key” to take images using the keyboard or dedicated hardware such as pedal or external capture button.

## 1.1. System requirements

**Computer:** Microsoft Windows compatible laptop/desktop/tablet or virtual machine

**Display resolution:** minimum 1024x768 pixels

**Operating systems:** Microsoft Windows 10 or 11

**.NET Framework:** 4.8, .net Core 3.1 (for Video Capture Application)

**Processor:** All Windows supported architectures (Intel, Arm), minimum recommended processor speed – 1Ghz

**Internal memory:** recommended minimum 1GB

**Storage:** recommended minimum 40GB of hard disk/SSD

**Network Protocol:** Secure DICOM Networking (TLS 1.2) over TCP/IP

**USB:** optional for external imaging hardware supporting VIA TWAIN/WIA: optional for endoscope, webcams,

**Scanner integration:** Use the scanner vendor TWAIN driver utility for configuration of the scanning profile parameters.

## 1.2. Why convert to DICOM?

Digital Imaging and Communications in Medicine (DICOM) is the standard for handling, storing, printing, and transmitting medical images. DICOM is the most widely deployed healthcare-imaging standard in the world. DICOM images can be exchanged between two entities that are capable of receiving image and patient data in DICOM format.

DICOM enables the integration of scanners, archives, workstations, printers, and network hardware from multiple manufacturers into a picture archive and communication system (PACS).



### **1.3. Supported Image, Video and Document Types**

*MODALIZER+* supports the following conversions: PDF, JPEG, PNG, BMP, TIF, Jpeg 2000, MPEG-2, MPEG-4 and HEVC. *MODALIZER+* can convert a series of images of the same type and size to Multi-Frame DICOM objects stored in a single file.

### **1.4. Free DICOM viewer and Personal DICOM Archive (Mini PACS)**

*MODALIZER+* includes a free DICOM Viewer and Personal DICOM Local Archive. Click "Free Viewer" or drag-and-drop DICOM file/folder onto the application window to open the viewer screen. When closing the free viewer, *MODALIZER+* will open HRZ Website in your browser.



## 2. Quick Start

This section is a step by step demonstration of *MODALIZER+* Capabilities.

**NOTE 1:** You can open the user manual from all the screen of the application by clicking on the “User Manual” button at the bottom left corner of the application window.

**NOTE 2:** You can start *MODALIZER+* from the command line with parameters. See detailed description in the Command Line Parameters section of this document.

**NOTE 3:** Every function in the menu has a unique **color code** that continues through the operation. The color from the main menu item follows in the next screens icons and the title bar separator.

### 2.1. The New Patient Wizard (Orange)

In this workflow the patient and study information is keyed in manually and stored in the generated DICOM files.

- Click “New Patient” in the main menu.
- Enter the patient’s data. Click the ellipses to the right of the patient last name text box to add middle initial, prefix and suffix. Click “Next”.
- *MODALIZER+* recognizes TWAIN/WIA supporting Devices that are connected to your computer. You can select one of them using the drop-down menu on the top left corner of the image preview panel.
- In addition to the embedded image capture module (the red button), there are two stand alone external applications that can be used: The Scanner Exap (Scanner Button) and The Camera Exap (two concentric red circles).
- Select files from your computer by clicking “Add files”. If the camera preview panel is visible, capture images by clicking the red button or [capture key](#) (if configured). You can also drag-and-drop files from your computer to the *MODALIZER+* window. Click “Next”.
- You can use the scanner and camera external applications as well.
- To record video click the two circles red button that opens the video capture application (Camera EXAP).
- Select “Convert” for Action and then click “Next”.
- Click “View” to display the new study in the DICOM viewer.
- Click the “Done” button to complete the procedure and return to the main menu.

### 2.2. Capturing Images and Scanning Documents

*MODALIZER+* Automatically detects and connects to TWAIN/WIA supporting devices such as the internal web camera of your laptop, USB cameras and most document Scanners. When a supported imaging device is detected, the capture and preview panels are automatically displayed. *MODALIZER+* can work with multiple image sources simultaneously and can easily switch between devices within the same procedure.




MODALIZER+ can capture video streams from devices that comply with the USB Video Device Class (UVC) and MPEG-2, MPEG-4 and HEVC video files. To start capturing, click the "Camera" button on the bottom left of the video panel.

When connected to a scanner, clicking the red capture button launches the scanner’s interface. The scanned documents are added to the bottom panel of attached documents.

**NOTE:** At the bottom of the [settings screen](#) you can check the “Use Scanner UI” option to launch the scanner driver application when clicking the capture button. This will let you change the scanning parameters from the Scanner driver application.

Click the add files button to browse for images and documents and attach them to the procedure.

You can add image comments to every image by clicking the pencil  button on every image thumbnail.

**NOTE:** if not edited, the comments are not inserted into the converted files.

**NOTE:** if user selects to build one multi-framed DICOM file - comments will be inserted into "PerFrame" sequence.

(0028, 0103)	PixelRepresentation	0
(5200, 9230)	PerFrameFunctionalGroupsSequence	
Item[1]		
(0020, 9111)	FrameContentSequence	
Item[1]		
(0020, 9158)	FrameComments	Frame 1
Item[2]		
(0020, 9111)	FrameContentSequence	
Item[1]		
(0020, 9158)	FrameComments	Frame 2
Item[3]		
(0020, 9111)	FrameContentSequence	
Item[1]		
(0020, 9158)	FrameComments	Frame 3
(7FE0, 0010)	FixedData	352163920

### 2.3. Filling a Report

MODALIZER+ is a great reporting tool, automated, customizable, and fully integrated with your PACS and Worklist Manager.

MODALIZER+ Formatted Report **automatically fills patient and study information** into report templates. The report templates are customizable. You can add your own logo and signature, and use your own stationery style.

There are three ways to create a report in the acquisition screen:



1. Formatted Report - to create a new PDF using the predefined formatted report templates, select the template from the list, and click the “Formatted Report” button – this will create a new file from the template. Edit and save it as PDF. Close the editor. Verify that the PDF file was added in the bottom panel.
2. Attach an existing PDF file from your computer: select a PDF file using the “Add files” button or drag-and-drop the files on the Acquisition screen.
3. Create a DICOM Structured Report by typing text in the report text panel.  
**Note:** For more details on this feature read the [Reporting chapter](#).

#### 2.4. Export DICOM Removable Media - CD/DVD/USB (Magenta)

To complete this task, please verify that you have a CD/DVD Writer in your computer. If you don't have a CD/DVD Writer, you can export the study to any removable media like Disk-on-Key or to a directory on your hard disk.

Prepare the DICOM files that you would like to export.

- In the main menu click “Export”.
- Select the source folder with files to export.
- Click “Scan”. MODALIZER+ will now read the data from the files and prepare them for export. MODALIZER+ will display the study details.
- Verify that the “Copy, Arrange and Rename” option is selected.
- Checkmark “Include DICOM Viewer to DICOMDIR”.
- Select a destination folder to which MODALIZER+ will prepare the files for export.
- Click “Next”.
- Select the destination drive for the media.
- Click “Burn to disc”.
- After the operation completes, eject the disc.
- Test the disk: Insert the media. If your AutoRun option is disabled click the DICOMViewer.exe - the study will be displayed in the DICOM Viewer.

**Note:** For more information see [Burn CD/DVD](#).

#### 2.5. Viewing DICOM files (Purple)

To view DICOM files simply drag-and-drop the files on the *MODALIZER+* window. You can drag-and-drop one or more files, a directory or a DICOMDIR file. You can also drag-and-drop files and folders on the *MODALIZER+* desktop icon.

**Note:** Read more about HRZ's [DICOM Viewer](#).

#### 2.6. Connecting To PACS/RIS

Maximize your *MODALIZER+* capabilities by connecting to a PACS and/or a RIS. Once *MODALIZER+* is integrated with your Storage and Worklist servers you will be able to use [Modality Worklist](#) to obtain Patient and Procedure parameters and [Query/Retrieve](#) to search for studies stored in the PACS..

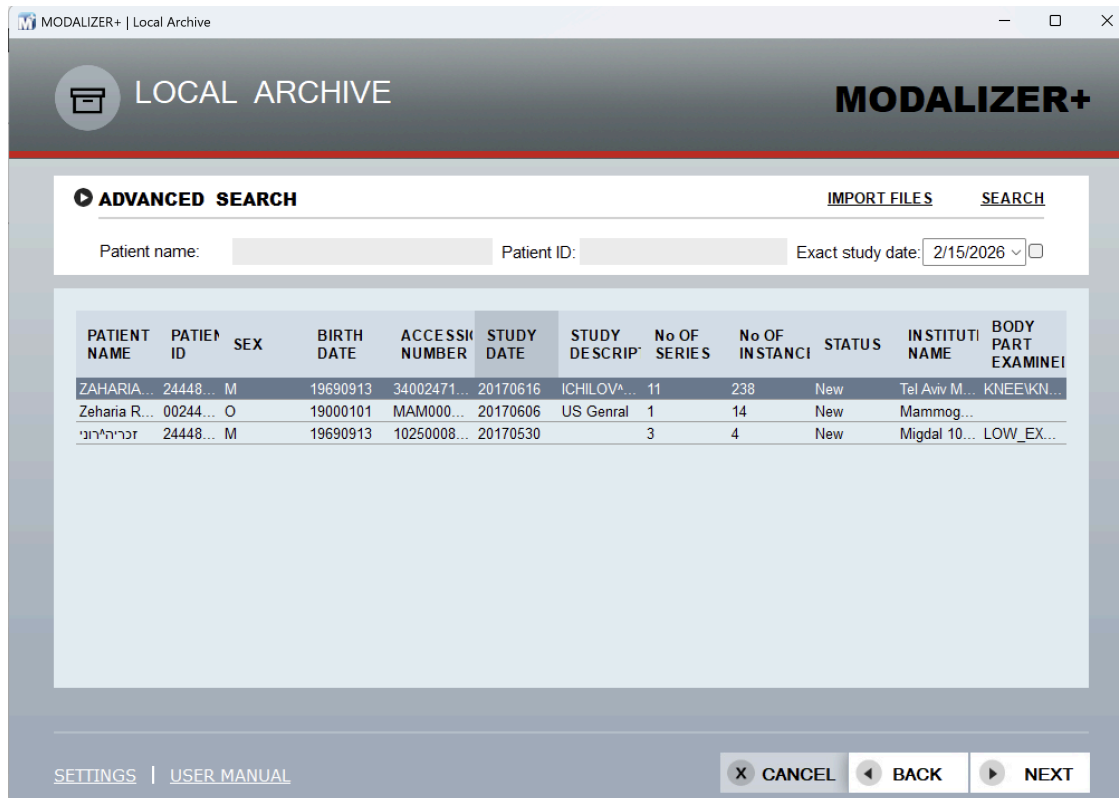


Read more about [Storages Servers configuration](#) and [WorkList Servers configuration](#).

## 2.7. The Local Archive/Mini PACS (Red)

MODALIZER+ is also a Mini-PACS. Use the Local DICOM Archive to store created, converted, and imported studies. All the files in the local archive are stored according to the DICOM Standard using the DICOM file format and are registered in the internal application database.

To disable or enable the local archive open the [settings](#) screen and uncheck “Use Local Archive”.



## 3.



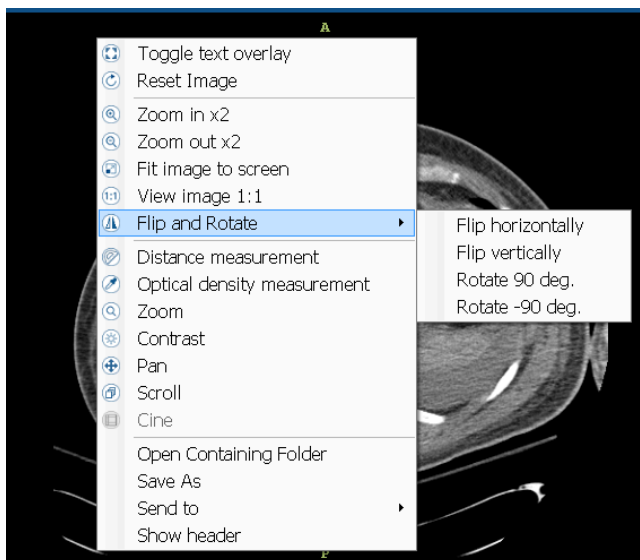
## 4. The DICOM Viewer (Purple)

MODALIZER+ is a powerful and friendly Multi-Modality DICOM Viewer.



The DICOM Viewer consists of:

1. Main display area – display the selected image. Press CTRL-H to show/hide the DICOM attributes, CTRL-T to show/hide the text overlay. Right click to open the context menu with various operations, start/stop tools, open folder containing current image, send image to PACS and save it according to an original SOP class and transfer syntax (as JPEG/PNG/BMP/PDF/MPEG file). In addition each file can be saved as "Text" (DICOM dump):

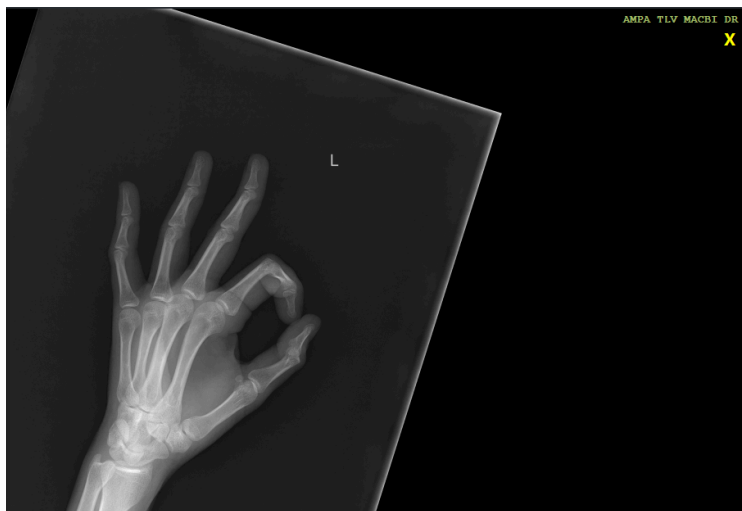


**Click F11 to enter the full screen mode.** In full screen mode the image display panel takes the entire screen and the other panels are hidden..

Full-screen can also be toggled from the right-click context menu and additionally can be turned off (once active) by clicking the ESC key or by clicking the 'x' button



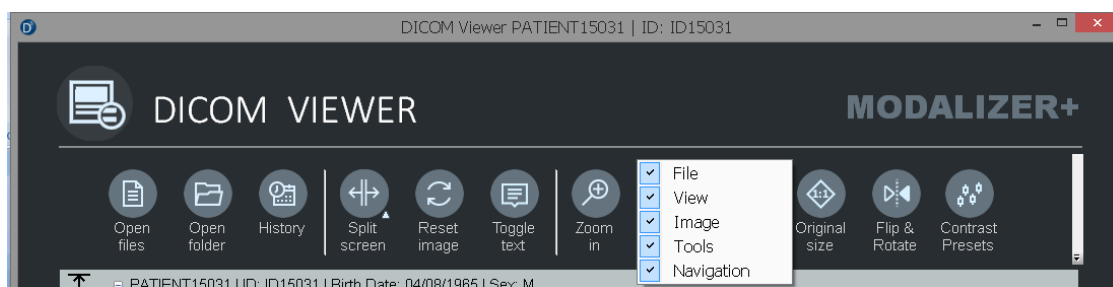
on the top-right corner:



2. Patients and Studies tree –right click on the study row to show the context menu with options to send the study to PACS, close it (remove from the viewer) or export it to external media (available only for studies from Local Archive).
3. Series thumbnails of the currently selected study - right click on the thumbnail shows a context menu with an option to send the series to PACS.
4. Preview of the images within the currently selected series (as thumbnails in the bottom panel). If the images within the series are spatially related then they will be grouped and not displayed as individual files. If all the images of the current series are spatially related then no image thumbnail is displayed for the series. You can send a single image to PACS - the right click on the image opens a context menu with such an option.  
On selection series first image will be displayed in central area. To display another image - click on its thumbnail or click left/right arrow to load next/previous image.
5. Tool buttons strip allowing to perform various operations on the current image and load new images from folder/file open dialog or from history record. DICOM Viewer operations can be made from the toolbar or from the context menu from right-click on the image panel.

The panels can be expanded/collapsed by clicking the arrow icons at the top left of each panel.

Right-click the toolbar area to open context menu allowing to customize the toolbar and select which groups of buttons are visible.



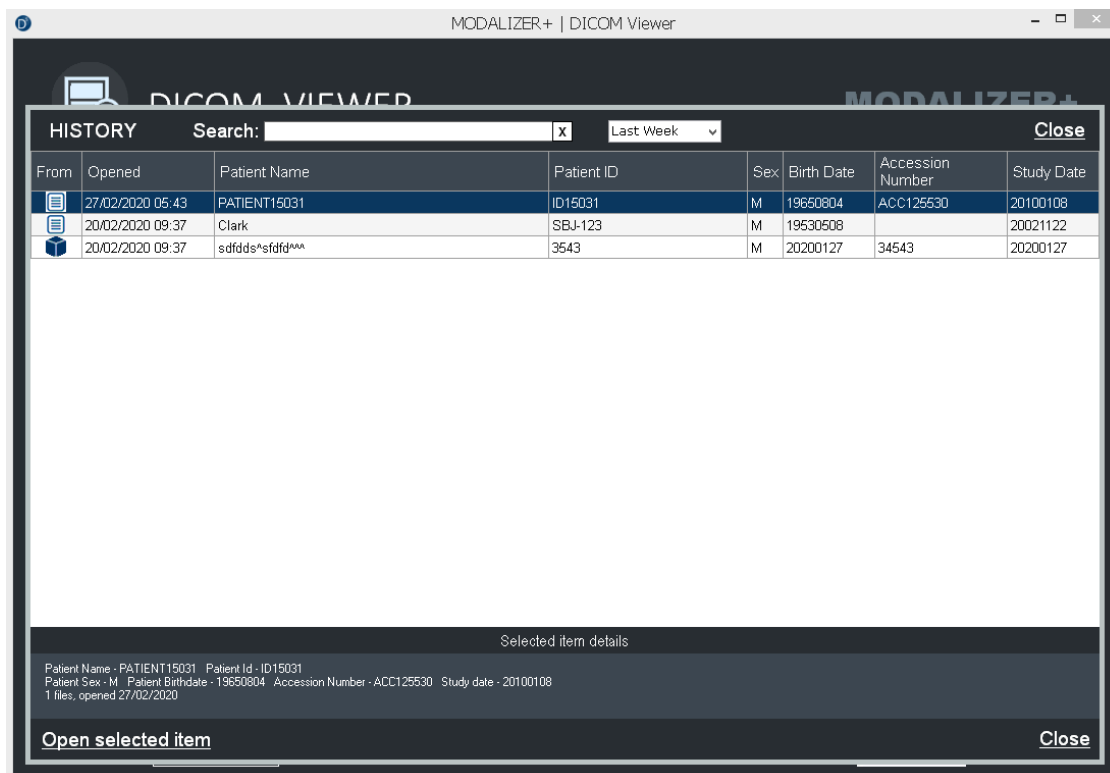


## 4.1. Loading images to the Viewer

There are few ways to display DICOM files - you can drag and drop the items or to click "Open Files" or use the shortcut CTRL-O to browse for a folder and select the files to view. In order to display an entire folder's content use "Open Folder" button.

There is also an option to open files from the History screen:

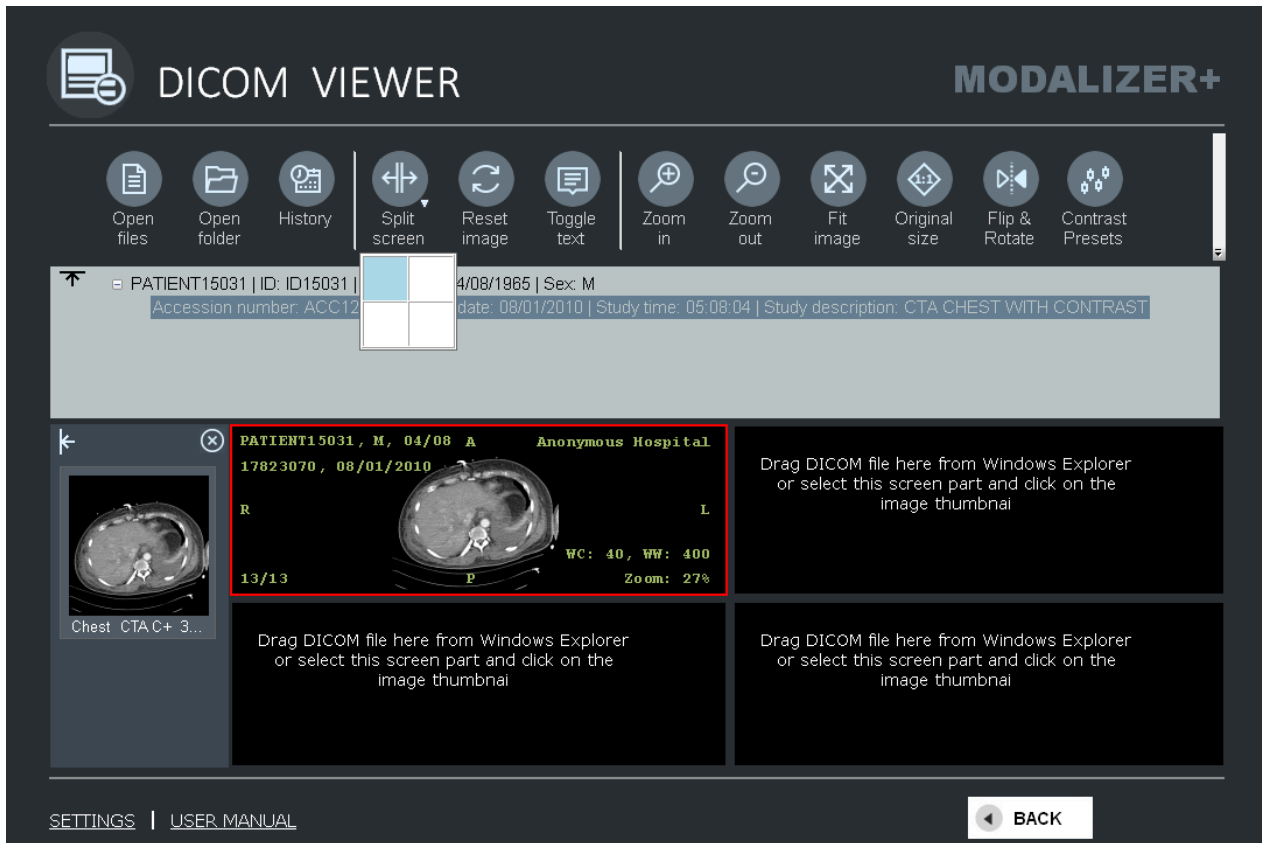
History screen can be opened by pressing 'History' button or by the shortcut CTRL-SHIFT-H.



Each "open action" (Files, Folder, DICOMDIR etc.) contains one or more study rows. Study row templates is "[Patient Name],[Patient ID],[Accession Number]". To find study - type required text in the "Search" field on the top. Select entire action as shown in the image above or single study, check its details in the panel below and click "Open selected item" to load files.

If a DICOM file contains embedded video – the viewer displays it in the built-in video player (if possible), or in system Video player. Embedded PDF will be opened in system PDF viewer, SR report - in built-in HTML viewer.

Up to four (4) studies can be displayed side by side simultaneously using the split options in the toolbar.



Different studies can be opened in every view section. Click on the section (it will get highlighted with a red frame)) and click on a study or series thumbnail. You can also simply drag a thumbnail to the section where you want it displayed.



**DICOM VIEWER** **MODALIZER+**

Open files | Open folder | History | Split screen | Reset image | Toggle text | Zoom in | Zoom out | Fit image | Original size | Flip & Rotate | Contrast Presets

PATIENT15031 | ID: ID15031 | Birth Date: 04/08/1965 | Sex: M  
Accession number: ACC125530 | Study date: 08/01/2010 | Study time: 05:08:04 | Study description: CTA CHEST WITH CONTRAST  
b1fcd7cp07188p | ID: 8ca04716p151bbp | Birth Date: 01/12/2013 | Sex: O  
Accession number: 8b157bba1 | Study date: 14/02/2013 | Study time: 135709 | Study description:

b1fcd7cp07188p, 0, 01 Unknown institution PATIENT15031, M, 04/08 A Anonymous Hospital  
14/02/2013, 14/02/2013 17823070, 08/01/2010  
R L  
WC: 0, WW: 0 Zoom: 32% 1/13 P WC: 40, WW: 400 Zoom: 27%

0001 0002 0003 0004 0005 0006

SETTINGS | USER MANUAL **BACK**

**DICOM VIEWER** **MODALIZER+**

Open files | Open folder | History | Split screen | Reset image | Toggle text | Zoom in | Zoom out | Fit image | Original size | Flip & Rotate | Contrast Presets

PATIENT15031 | ID: ID15031 | Birth Date: 04/08/1965 | Sex: M  
Accession number: ACC125530 | Study date: 08/01/2010 | Study time: 05:08:04 | Study description: CTA CHEST WITH CONTRAST  
b1fcd7cp07188p | ID: 8ca04716p151bbp | Birth Date: 01/12/2013 | Sex: O  
Accession number: 8b157bba1 | Study date: 14/02/2013 | Study time: 135709 | Study description:

b1fcd7cp07188p, 0, 01 Unknown institution PATIENT15031, M, 04/08 A Anonymous Hospital  
14/02/2013, 14/02/2013 17823070, 08/01/2010  
R L  
WC: 0, WW: 0 Zoom: 65% 1/13 P WC: 40, WW: 400 Zoom: 63%

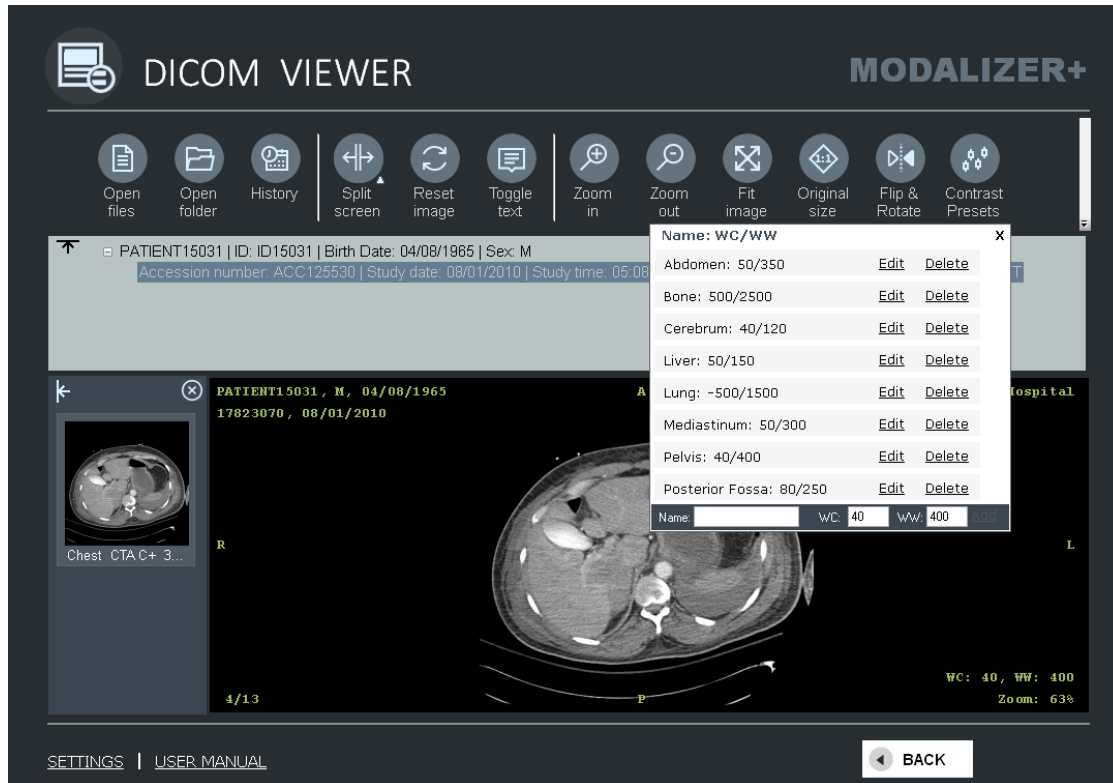
Chest CTA C+ 3...

SETTINGS | USER MANUAL **BACK**



## 4.2. Using Hounsfield units Contrast Presets

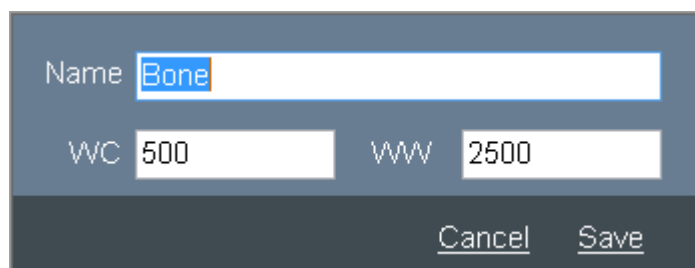
MODALIZER+ comes with a predefined contrast presets, you can open this list by clicking "Contrast presets" tool button:



Select required presets to change WC/WW values of the currently opened image.

New custom preset can be added by filling Name/WC/WW values in the bottom line and clicking "Add" button.

You can delete existing preset or edit it in the pop-up window:



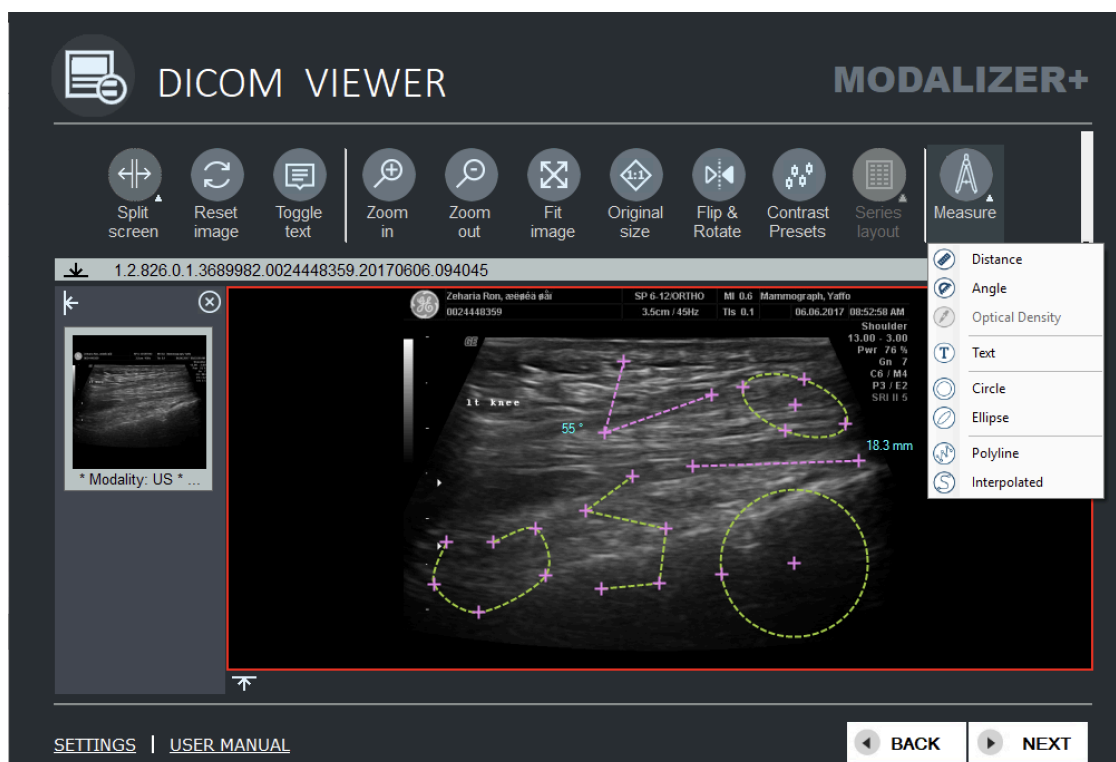
If an image contains one or more VOI LUT (Values of Interest Lookup Tables) their values will be added to the list of contrast presets.



Name: WC/WW		X
VOI LUT 1 - no explanation		
Abdomen: 50/350	<a href="#">Edit</a>	<a href="#">Delete</a>
Bone: 500/2500	<a href="#">Edit</a>	<a href="#">Delete</a>
Cerebrum: 40/120	<a href="#">Edit</a>	<a href="#">Delete</a>
Liver: 50/150	<a href="#">Edit</a>	<a href="#">Delete</a>
Lung: -500/1500	<a href="#">Edit</a>	<a href="#">Delete</a>
Mediastinum: 50/300	<a href="#">Edit</a>	<a href="#">Delete</a>
Pelvis: 40/400	<a href="#">Edit</a>	<a href="#">Delete</a>
Posterior Fossa: 80/250	<a href="#">Edit</a>	<a href="#">Delete</a>
Name: <input type="text"/>	WC: <input type="text" value="0"/>	WW: <input type="text" value="0"/>

When opening an image with VOI LUT the first pair is automatically applied.

### 4.3. Measurements tools



MODALIZER+ DICOM Viewer supports all the graphic annotations that are defined in the DICOM standard. The measurement and annotation tools are:

- Distance (length in mm)
- Angle (degrees)
- Optical Density (HU)
- Text annotation
- Circle (Diameter in mm and area in mm<sup>2</sup>)
- Ellipse (Oval) (Diameters in mm of major and minor axes and area in mm<sup>2</sup>)
- Polyline
- Interpolated line



The graphic annotations are stored according to the DICOM standard and can be displayed by supporting DICOM viewer.

You can measure distance on the image (in mm for calibrated images, in pixels for others), calculate optical density in any selected point (for CT images), measure angle between three points, circle diameter and area and ellipse diameters and area.

To start "Distance" drawing, click the left mouse button within the image panel. Start point will be marked as cross and dashed line will appear. Move mouse pointer to another place and left-click again to mark end point. Measured distance will be displayed on mouse move.

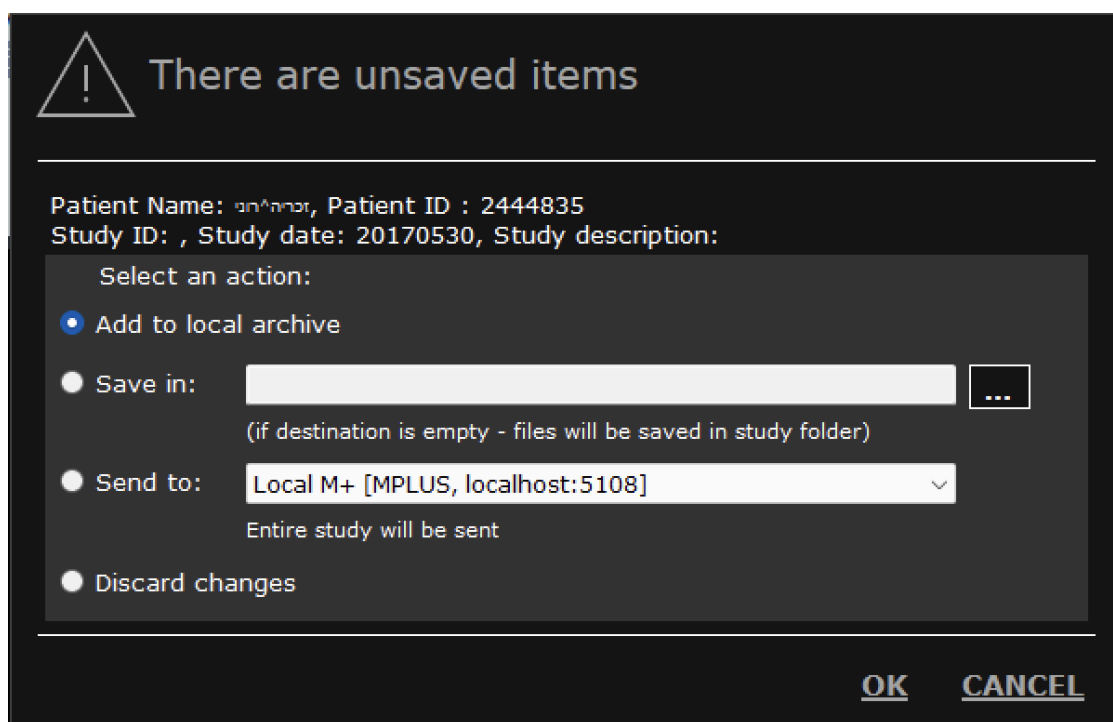
To start "Angle" drawing, click the left mouse button within the image panel. Start point will be marked as cross and dashed line will appear. Move mouse pointer to another place and left-click again to mark second (angle peak) point, repeat this to define end point. Measured angle will be displayed on mouse move (after peak point was created)

To calculate optical density click left mouse button once on the selected spot:

To change an existing measurement, select start/end cross or entire line (enter mouse pointer), press mouse left button and move pointer holding left-button pressed to required place and release mouse.

To delete a distance line select any part of the line and click on "Delete" button on the keyboard. You can save measurement lines / point as Grayscale Softcopy Presentation State module file under a new series (about viewing of GSPS modules - see 4.7).

When closing the viewer while there are unsaved annotations or edits the following form is displayed

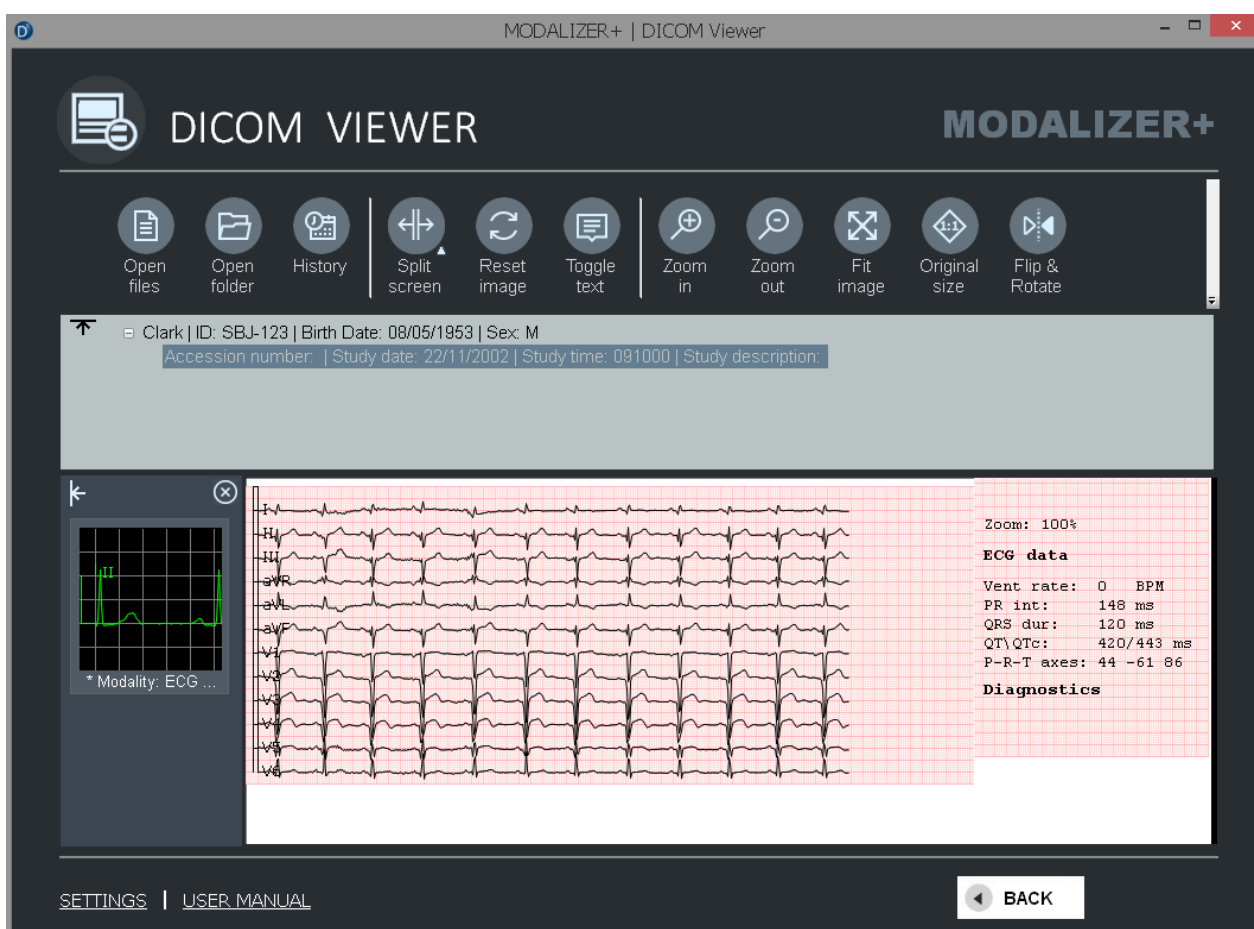




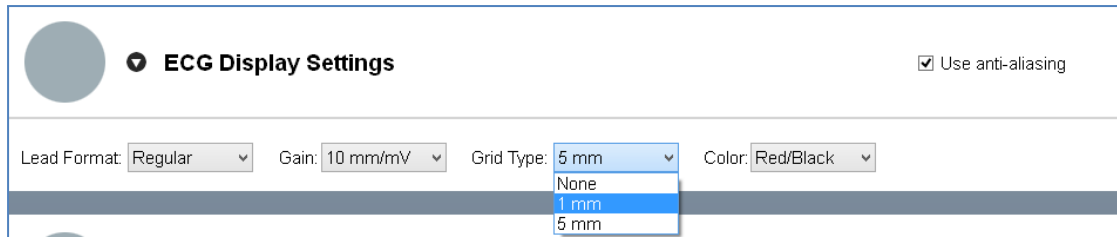
1. Select "Add to local archive" to store the new items in the local archive. This option is available only if "Use local archive" was selected on the General Settings. If a study with the measurement is already a part of the Local Archive - only the new GSPS file will be added
2. Select "Send to" option to send an entire study or only new files to PACS (if a study was retrieved from PACS, source PACS will be selected by application).
3. Select "Save in" to store new GSPS file in selected folder.
4. Select "Don't save" if you don't want to add GSPS file to the study

#### 4.4. ECG Viewer

MODALIZER+ can display DICOM 12 Lead ECG Instances.

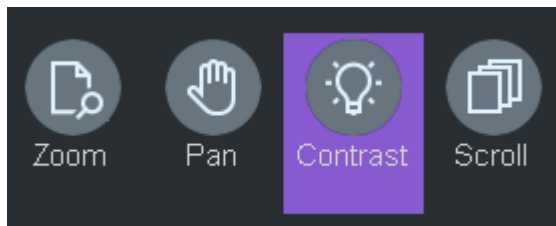


Use the ECG Display Settings tab in the configuration screen to select the graph formats (click "Setting" button from the Viewer, select required parameters and click "Back" on Settings screen. New display parameters are immediately applied.



#### 4.5. Using Zoom/Pan/Contrast/Scroll tools

To start/stop any of these tools click the tool button. When the tool is active the button background is set to red and the mouse pointer changes to the tool mouse icon:

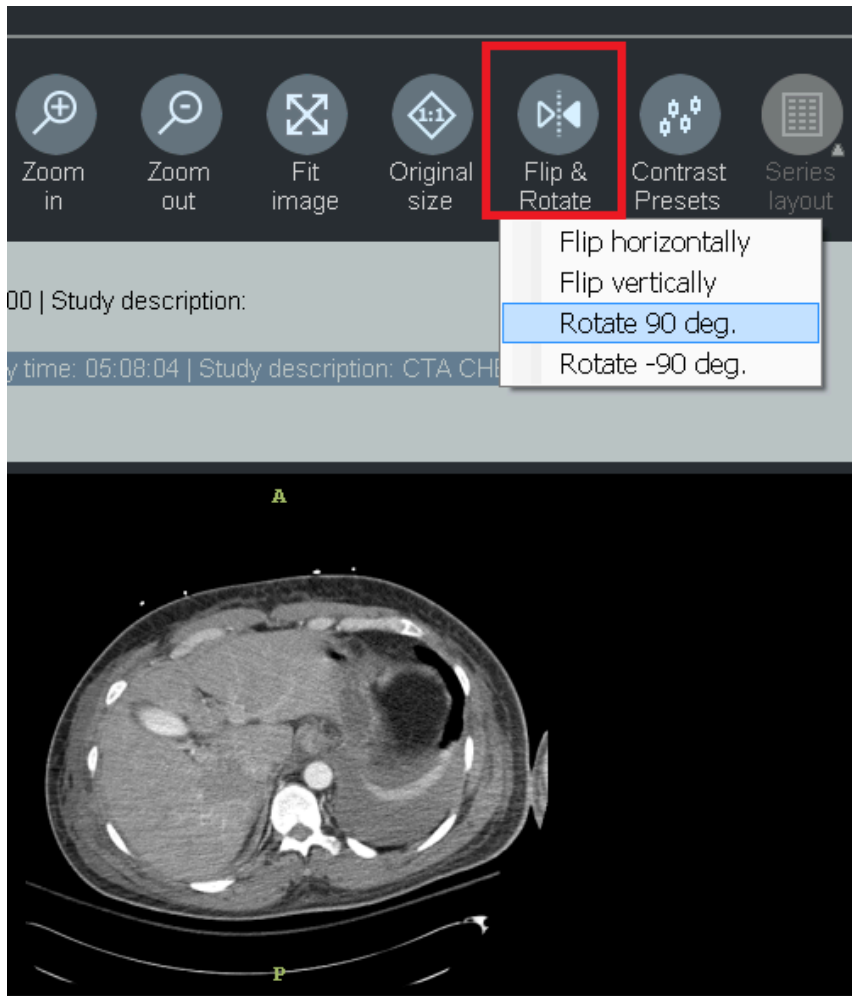


To change image zoom/contrast, move zoomed image inside viewer panel (Pan Tool) or scroll frames - press left mouse button and move pointer holding left button pressed.

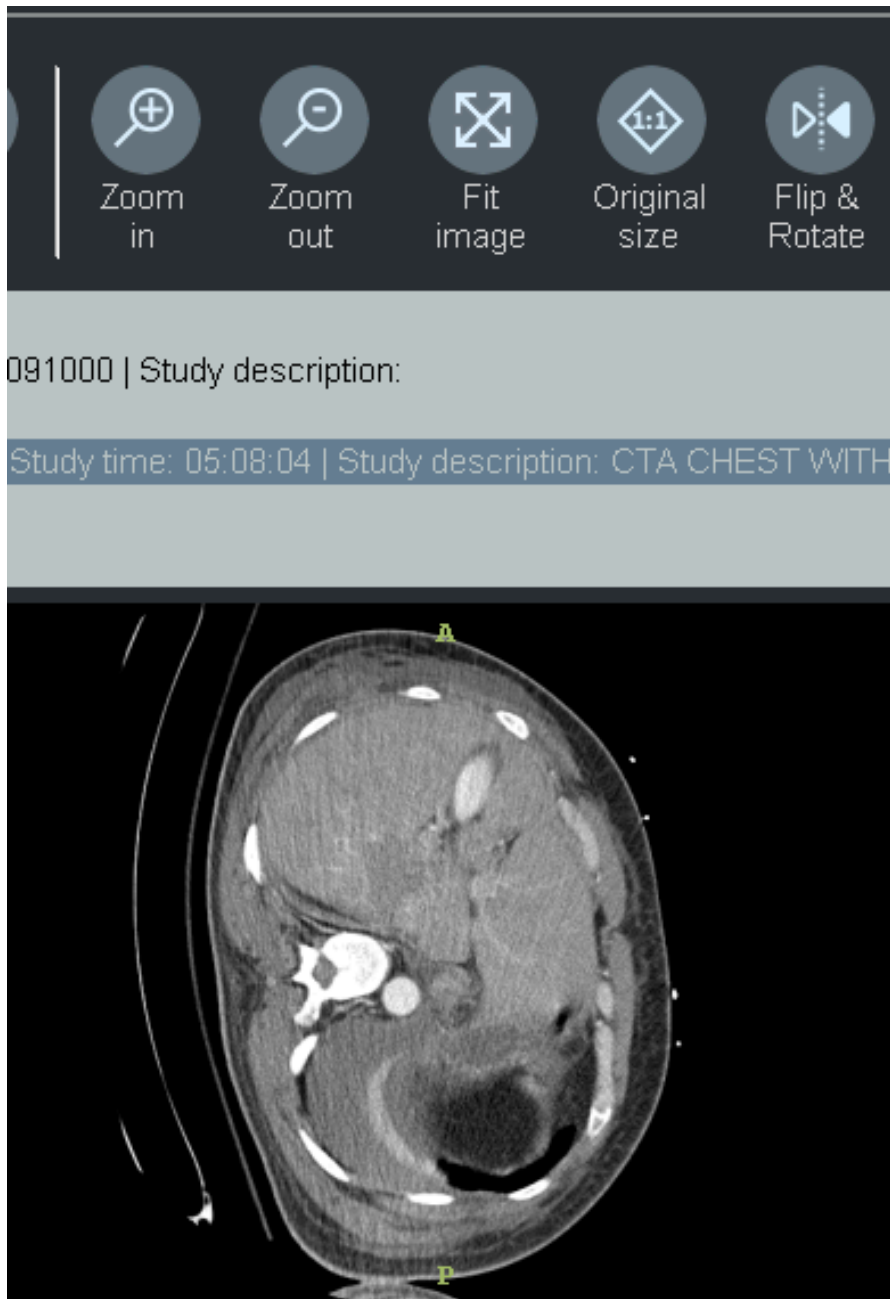
#### 4.6. Flip and Rotate tool

Available actions: Flip Vertically, Flip Horizontally, Rotate 90 Clockwise, Rotate 90 Counterclockwise. All measurements on the current image will be changed accordingly

Before:

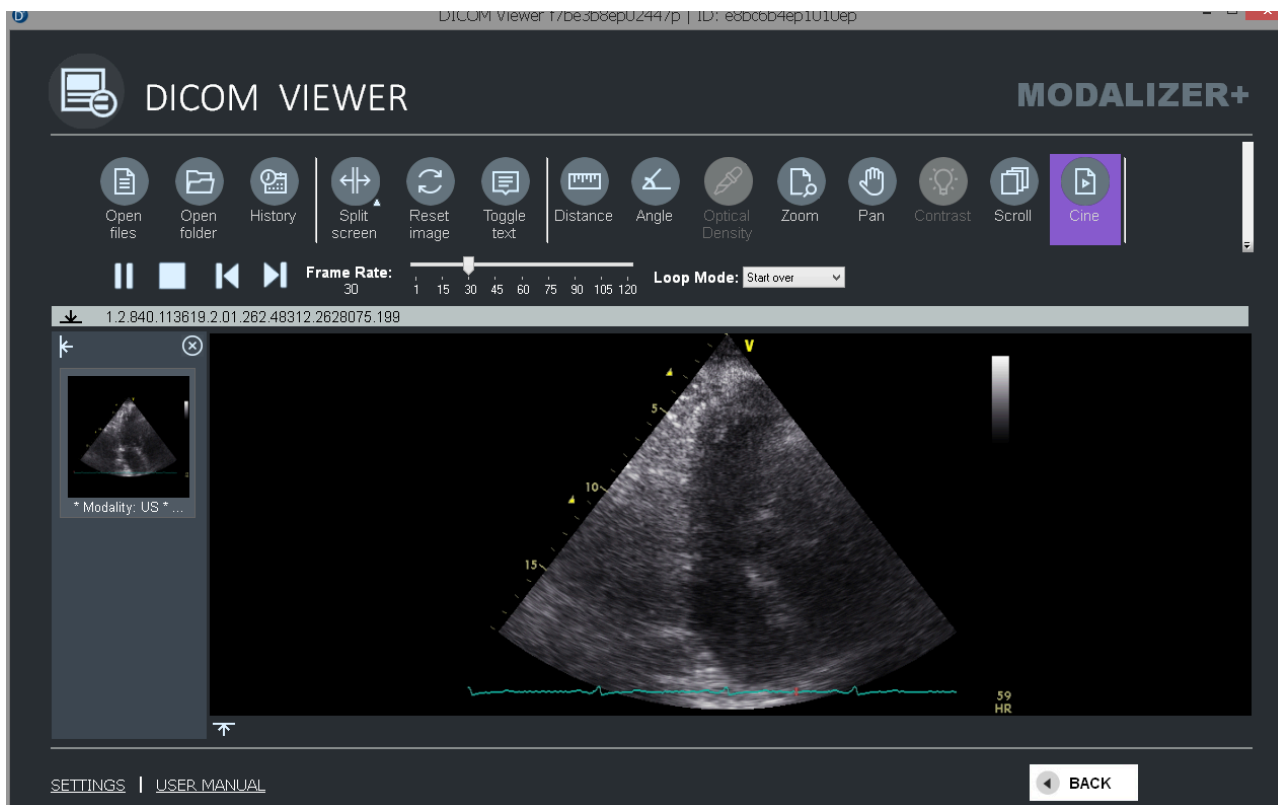


After:





#### 4.7. CINE tool

If the DICOM file contains a multi-frame image CINE mode is enabled and the cine buttons can be used.

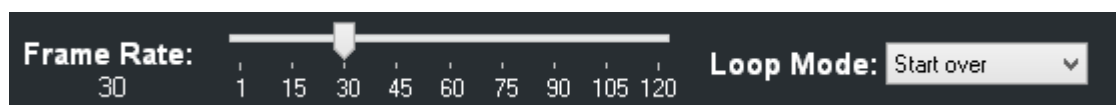


To Pause/Start CINE - click  button.

To Stop CINE and close CINE panel - click  button

To go to the first/last frame - click  buttons

You can change CINE frame rate and loop mode:



#### 4.8. Display Grayscale Softcopy Presentation State module

MODALIZER+ can display graphic and text annotations stored in DICOM Presentation State objects (GSPS). When a user opens a study, the application selects all such files, loads their data (relations between annotations and study instances/frames, annotations types/positions etc.) and converts it to graphic objects drawn on the corresponding images.



Every GSPS module (series with PR modality) is displayed as a separate thumbnail in the left panel like any other series.

When a user clicks a PR series thumbnail is highlighted, the graphic objects in the GSPS module are displayed as separate image thumbnails in the bottom panel and first of them is displayed in the main area on the image and frame it is referencing.

Click on each image thumbnail loads corresponding image/frame and graphic objects into main area.

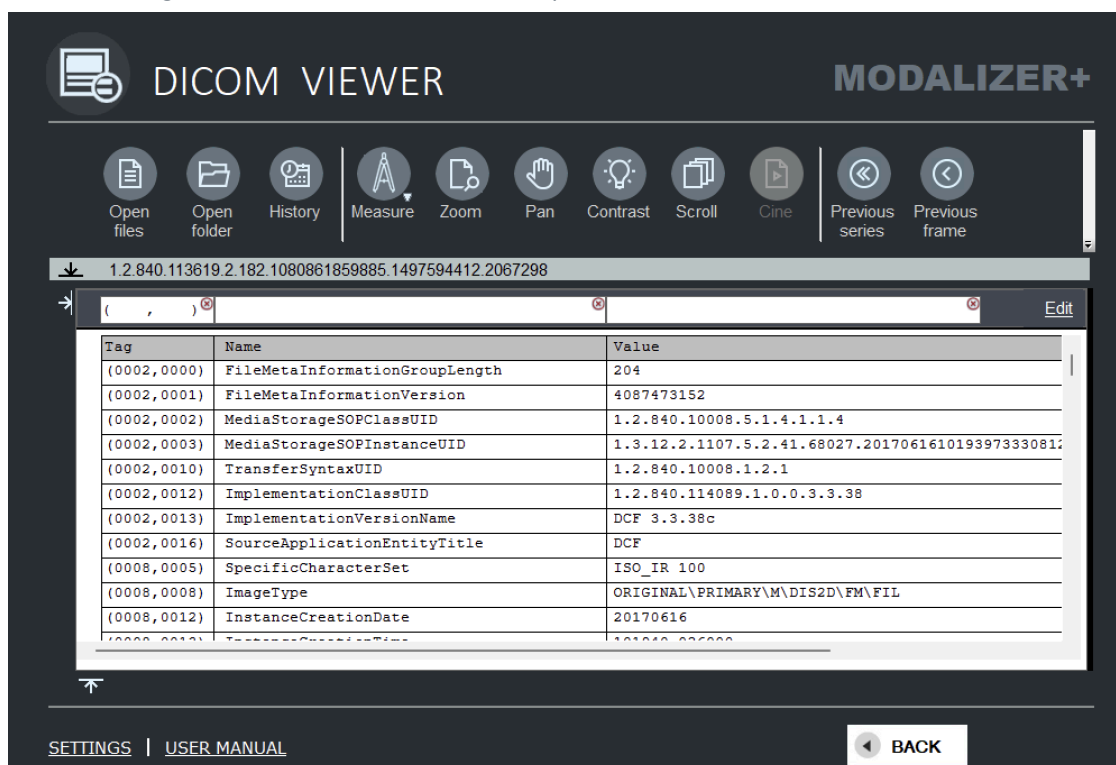
When user clicks a non-PR series (images), the annotations are hidden.

When the PR series is selected and user chooses "Show header" - the tags of the PR are displayed ("Edit" for PR files is not allowed)

### 4.9. DICOM Header view

To view all the data elements in a DICOM file right-click on the image and select "Show header" or use the shortcut key combination **Ctrl-H**.

Use the search bar at the top of the header view to search for data elements by their tag number or tag name. You can also search for specific data element values.



NOTE: By default all private tags are displayed with "?" name, but you have an option to use dicom.dic file (located in the installation folder) to configure private tag names and types.

Format of the dicom.dic tag line is:

```
# Tag          VR      Name                                     VM      Version
```



```
(0027,0000)    UL    SamplePrivateGrpLength  1    RZDCX
```

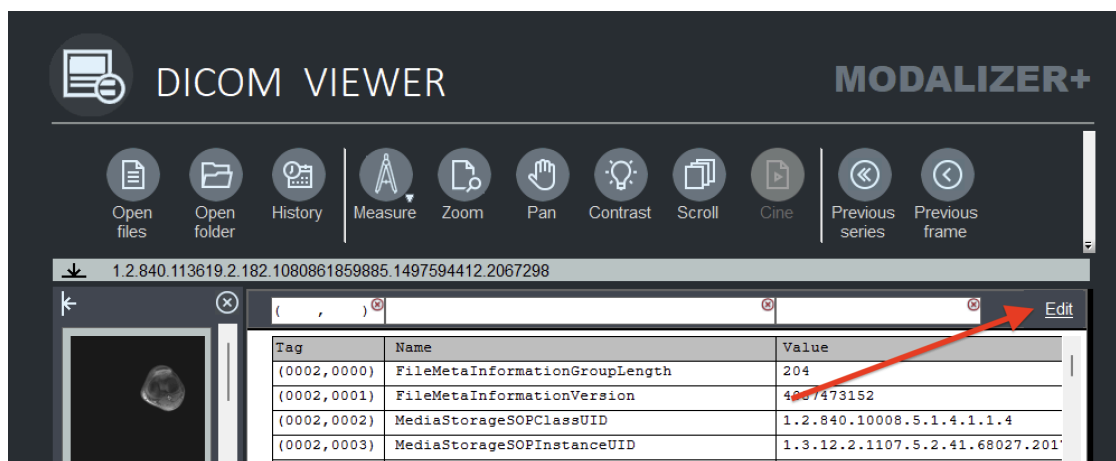
All columns MUST be separated by "Tab".

Dicom.dic file from the installation package contains few lines as example. If you don't need them - open file in Notepad and delete unnecessary lines or just delete dicom.dic from the installation folder.

#### 4.10. DICOM Editor

MODALIZER+ is also a powerful DICOM Q/A workstation with editing tools. **Edits can be made in the Instance, Series or Study Level.**

To go into edit mode, first display the DICOM Header (CTRL-H) and then click the Edit button at the top right of the image panel.



MODALIZER+ conforms to IHE IOCM integration profile (Imaging Objects Change Management) and will save all edits as new instances in new series and create a Key Object Selection object. However, MODALIZER+ does enable the user to overwrite the original DICOM objects and not create new instances and KO objects.

In edit mode the user can:

- Add data elements and
- Add sequence data elements
- Add sequence items
- Add/Edit/Delete data elements inside a sequence item
- Duplicate sequence items
- Remove data elements
- Remove sequence items
- Edit data element values

When entering edit mode a new DICOM instance is generated from the original and updated according to the DICOM standard:

1. A new series is created



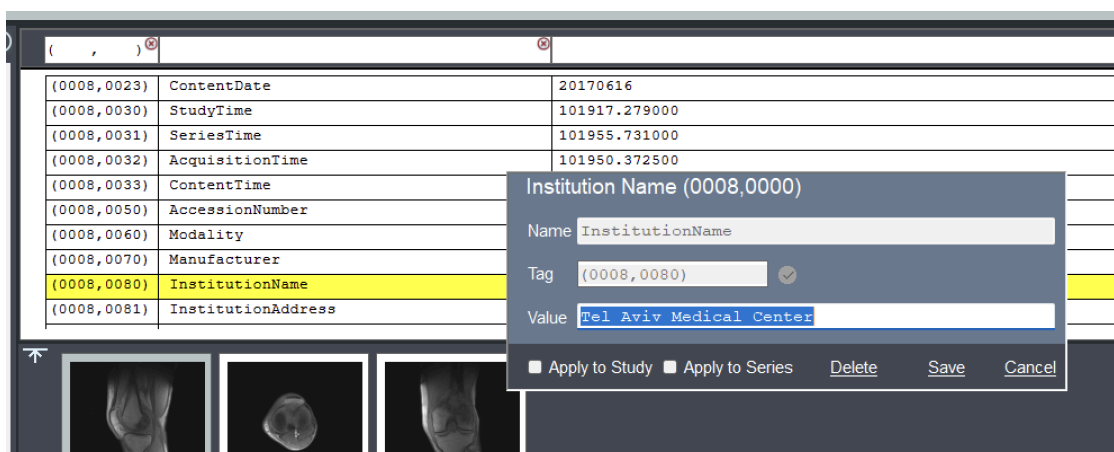
2. Referenced instance sequence (0008,114A) with reference to the original series/instance inserted into the new instance

Right click anywhere on the DICOM header view to display a context menu with the following options:

1. Edit tag (modify data element value)
2. New tag (add a data element)
3. Delete tag (remove a data element)
4. Show deleted (Show the deleted elements in the current view, they will be highlighted in red)

Double click on a data element to open the edit data element form.

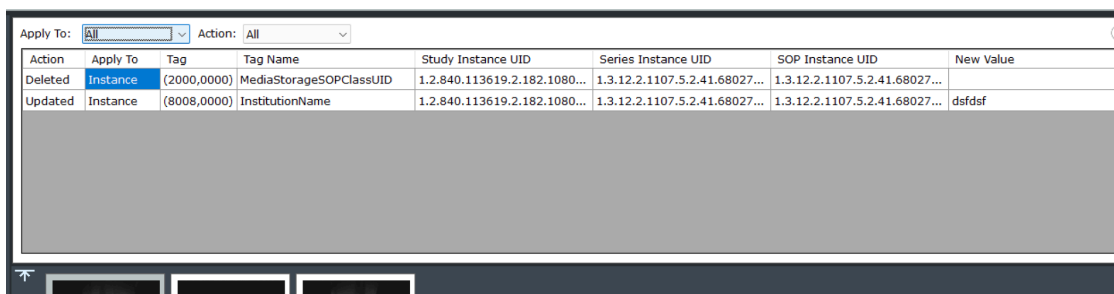
NOTE: File Meta Header data elements (group 0002) can't be edited as they are not part of the object.



**EDIT Levels:** In the edit data element form, changes can be applied to the current instance, to the entire series or to the entire study.

You can copy an entire sequence, delete it or add data elements to it.

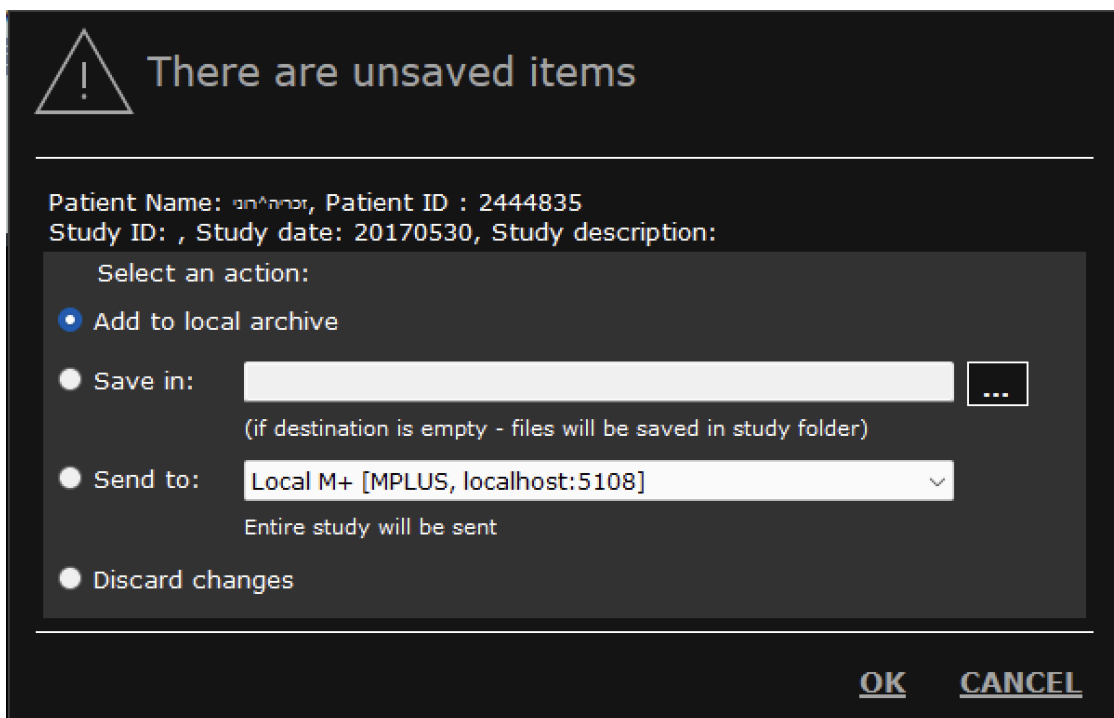
All the edits are applied at the end of the operation. You can review all edits by clicking the “Review” button at the top right corner of the DICOM header view panel. Edits can also be modified in the review display. Use the action and level filters to review specific level and action edits.





To complete the edit operation close the study or click the NEXT or the BACK buttons at the bottom right corner of the screen.

On closing study user will be suggested with several option concerning new instance:



If the user decides to save the new instance Key Object Selection (KOS) Document will be created and saved as a new series.

### 4.11. Image Info View

From the context menu select “Image Info” to show the displayed image meta information (size, compression method, color space).

### 4.12. Shortcut keys

The following shortcut keys are available in the DICOM viewer.

Ctrl + H	Show/Hide text overlay
Ctrl + O	Open File
Ctrl+Shift+H	Show History
F11	Full screen mode
Esc	Exit full screen mode



## 5. Working with Studies

### 5.2. New Patient (Yellow)

Select the “New Patient” option from the main menu:

Click "..." button to show/hide Prefix, Middle Name and Suffix fields:

Enter the patient's information (optional), then click “Next”.


Compose the study with images and report as explained in the [Create a new Study](#) section then click “Next”.

Create formatted PDF report (optionally) as explained in [Writing a Report](#)



Notes:



1. Click button  to change the style of the presentation (thumbnails/list).
2. Click on "Patient name..." strip to view full details about procedure

**Patient name - bbbbbb^bbbbbb^^^, ID - 334535**

Patient sex:	<input type="text" value="F"/>	Patient birthdate:	<input type="text" value="20200227"/>	Accession Number:	<input type="text" value="eteter"/>
Requested Procedure Description	<input type="text" value="DICOMIZED Images"/>				
Station Name:	<input type="text" value="MODALIZERPlus"/>	Modality:	<input type="text" value="OT"/>	Referring Physician Name:	<input type="text"/>
Procedure Start Date:	<input type="text" value="20200227"/>	Procedure Start Time:	<input type="text" value="112429.896"/>		
Scheduled Procedure Step Description	<input type="text"/>				

CONVERT

MODALIZER+

Destination Folder  [Browse](#)

Report Title

**Create report as:**  DICOM SR  PDF file

**Image Format to save in DICOM:**  Jpeg  J2k  Uncompressed  Automatic

**Compression quality:**

Create one Multi-Frame File  Invert Images

**ACTION**

Convert

Convert and create DICOMDIR  Include DICOM Viewer to DICOMDIR

Convert and send to PACS:

[SETTINGS](#) | [USER MANUAL](#)

X CANCEL

◀ BACK

▶ NEXT

The “Convert” screen has three panels:

- Panel #1:
  - Destination Folder – where the converted files will be saved. A new directory is created in your documents folder for every conversion under the MODALIZER+ main folder. If "Use local Archive" option is selected in the Settings screen - destination folder will be created as sub-folder of storage place defined in Settings. If not - you can change destination to any folder on your computer.
  - Report Title.



- Create report as – *MODALIZER+* allows you to create a DICOM SR (default) or as an encapsulated PDF.
- Panel #2:
  - Image Format to save in DICOM:
    - “Automatic” (default) - the files will be converted to DICOM the way they are. JPEG Images will be converted as JPEG and other as uncompressed.
    - “Uncompressed - all files will be first uncompressed and converted to DICOM.<sup>1</sup>
    - J2K - Convert all images to Jpeg 2000
    - “JPEG” - all Images will be converted to JPEG as Encapsulated JPEG using the JPEG Lossy Transfer Syntax.<sup>23</sup>
  - Create one Multi-Frame File – use this option when you have a series of related images. All images must be the same format and the same size.
- Panel #3:
  - Convert - converting only. The converted files will be saved in the destination folder.
  - Convert and create DICOMDIR. DICOMDIR is a file that includes patient and study information and links to all the converted files.
  - Convert and send to PACS. In order to save the study on PACS you need to configure it. See [Storage Server configuration](#).

### 5.3. Sending DICOM Images to the PACS

DICOM files are typically stored in a PACS. This allows accessing them from other DICOM applications.

After acquiring the study images the “Convert” screen is displayed. Select an option “Convert and send to PACS”. If a PACS wasn’t defined yet click “[Settings](#)” and configure it. Then click “Next”.

Click “Send to”.

[How to send the same study to multiple destinations](#)

---

<sup>1</sup> Changing the image format may result in quality loss.

<sup>2</sup> Some PACS May not allow storing JPEG Compressed DICOM Images.

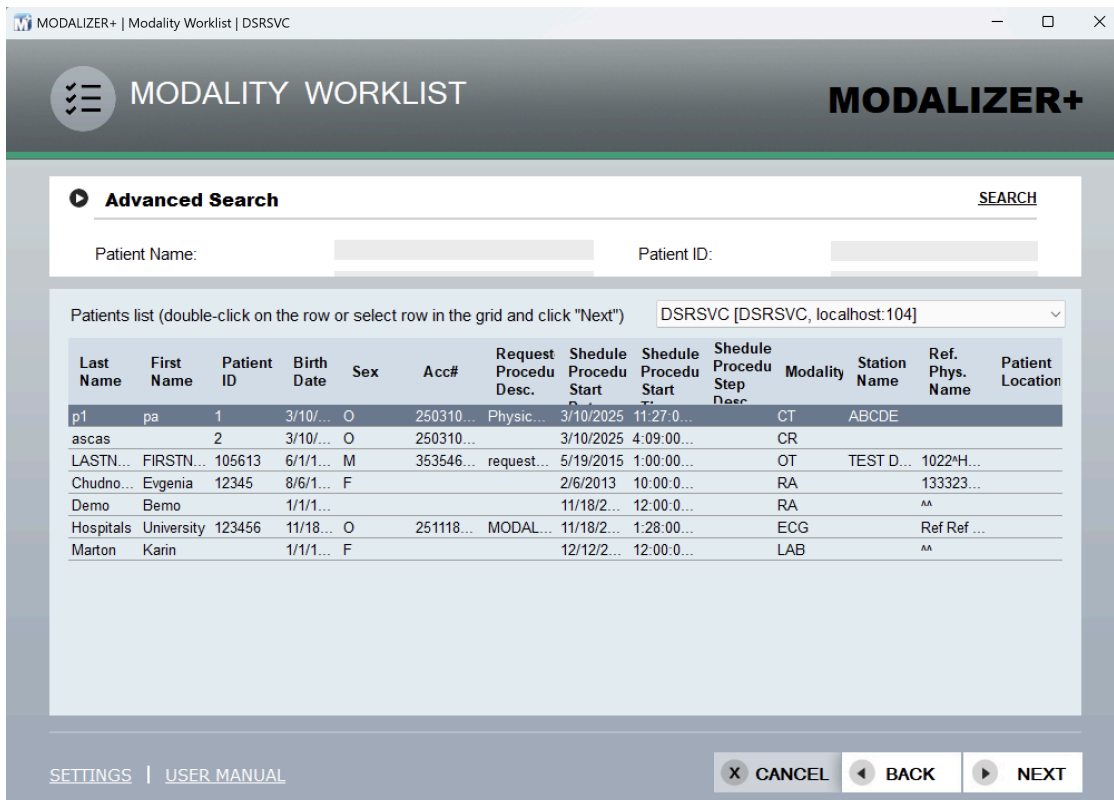
<sup>3</sup> JPEG Compressed Images usually take less disk space and may be faster to store and restore from the PACS but loose some quality compared to uncompressed files..



### 5.4. Modality Worklist Query (Green)

In order to use the Modality Worklist Service configure a [Worklist Server](#).

Click “Modality Worklist” in the main menu:



The basic search is done by the patient name or by patient ID. If you are not sure in patient’s name spelling you can use wildcard characters “?” and “\*”. “?” is used to represent a single character and “\*” represents any number of characters. Click “Advanced Search” to present additional search options like a range of days when the study has been created or by the accession number. Clicking “Search” with no search parameter set will list all the existing studies. This is not recommended and it may take a very long time.

Search also can be started by pressing "Enter" in any text box in the Advanced Search area.

A default search filter can be set in the settings screen for “today” and for a specific scheduled AE title. To enable this mark the appropriate check-boxes in the “[Worklist Server](#)” settings panel.

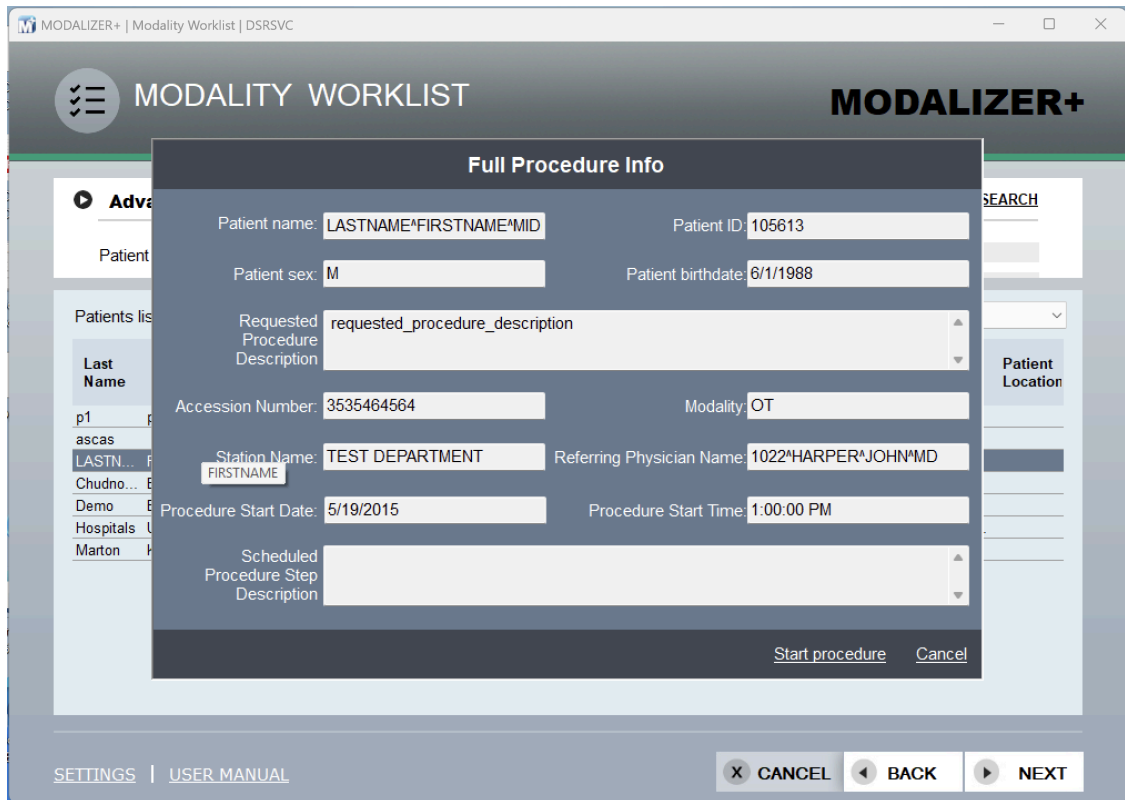
On screen opening query will be sent to the default MWL server (one currently selected in the settings screen) but you can switch to another server by selecting it from the list located under search panel.

MODALIZER+ uses the attributes received from the MWL Query in the new study Images and report.

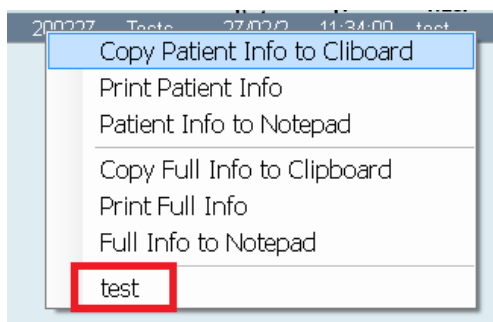


Double click on the row from the list of results or clicking the "Next" button will lead you to document the study by creating images and [adding a report](#).

**NOTE:** If "Two step verification" option on the "Worklist Servers" section of the settings screen is selected - all the data from the selected MWL entry will be displayed in a popup modal windows before starting the procedure:



Right click on the row opens menu allowing to copy/print patient and study info or execute some custom action using selected data ("test" in the below image):



[How to configure Customs Actions.](#)

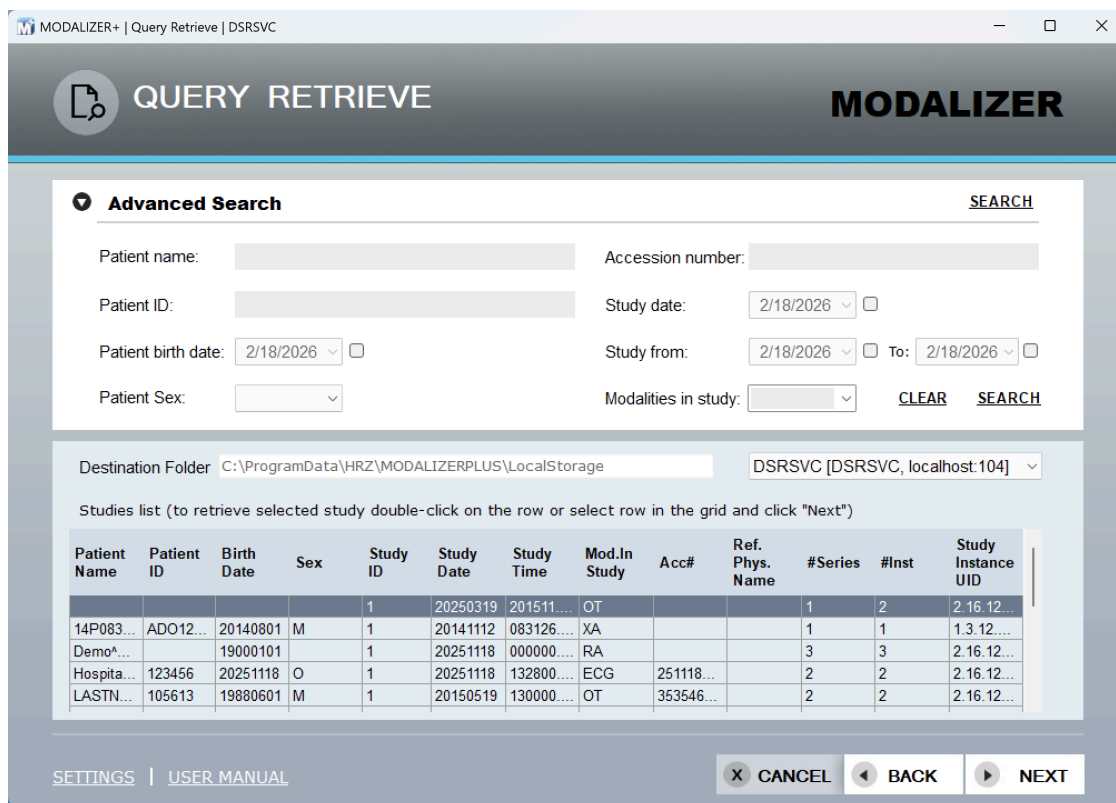
### 5.5. Query/Retrieve - Searching the PACS (Azure)

Query/Retrieve (Q/R) is a DICOM Service that allows to search for DICOM objects in a PACS using search criteria (patient name, date of creation of the images, modality



etc.) and retrieve them for viewing or other purposes. To use Q/R you configure a [Storage Server](#).

Select "Query Retrieve" from the main screen.



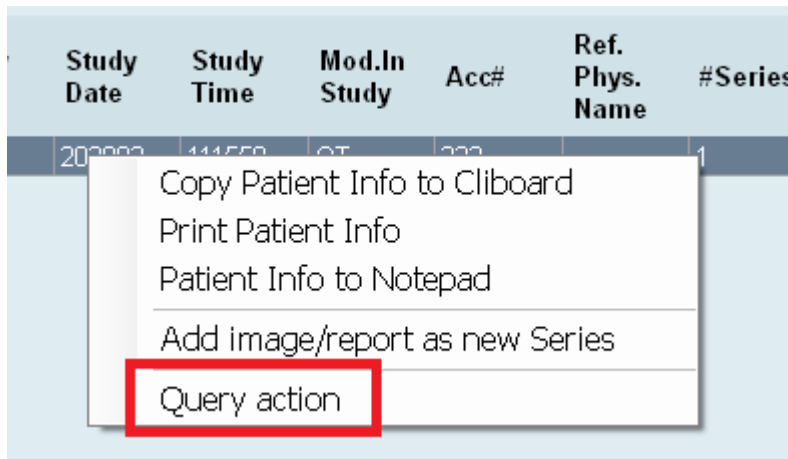
Once the search criteria are set click "Search". Clicking "Search" with no search parameter set will list all the existing studies. This is not recommended and it may take a very long time.

Search also can be started by pressing "Enter" in any text box in the Advanced Search area.

On screen opening query will be sent to the default Storage server (one currently selected in the settings screen) but you can switch to another server by selecting it from the list located under search panel

Double click on the row from the list of results or select the row and click "Next" –the matching DICOM files will be stored in the destination folder and then displayed in the [DICOM viewer](#).

Right click on the row opens menu allowing to copy/print patient and study info, add a new series to an existing study or execute some custom action using selected data ("Query action" in the below image):



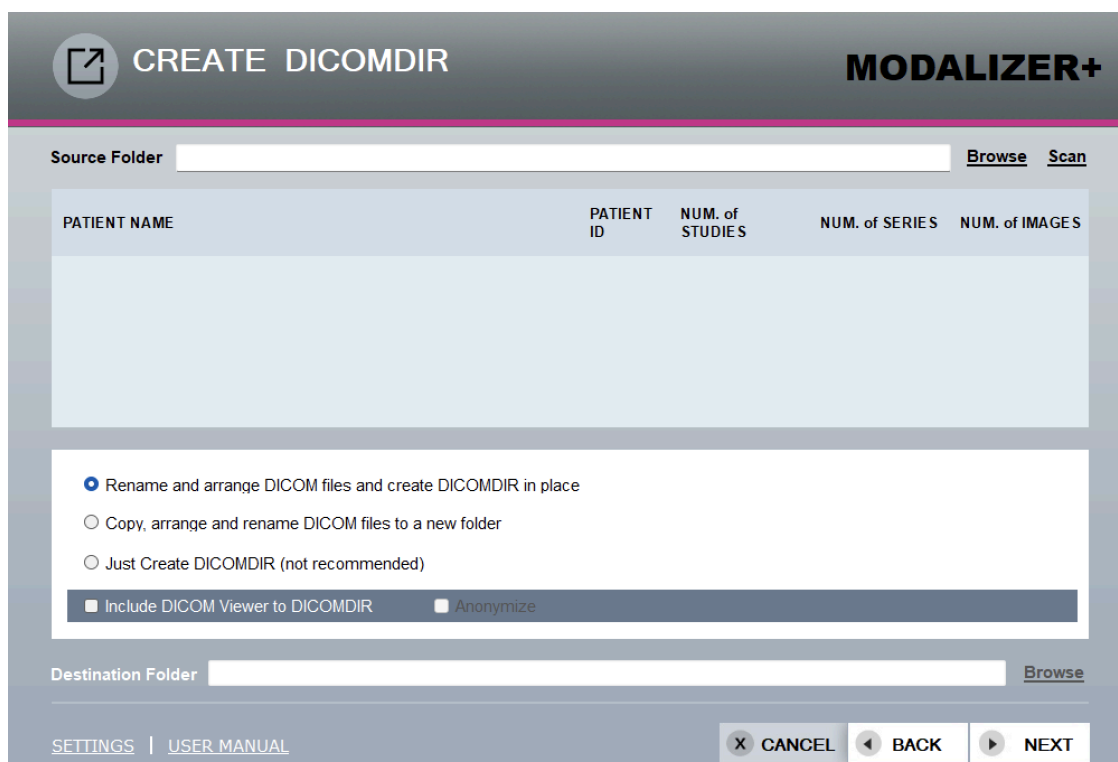
[How to configure Customs Actions.](#)

### 5.6. Export - Burn CD/DVD (Magenta)

MODALIZER+ can create portable medical records with specific studies and reports, and an embedded DICOM Viewer.

Select “Export” from the main screen.

In order to prepare a Standard DICOM Media, MODALIZER+ prepares the media files using standard filenames in Patient-Study-Series-Image hierarchy and creates a DICOMDIR file.



The “Export” screen consists of two areas:



- Part #1:
  - Source Folder - click “Browse” to select the folder with files to burn
  - Study Details Table - click “Scan” to verify the study’s details (if no valid DICOM files found no details will be presented)
- Part #2:

Select the appropriate option from the list:

  - Rename and arrange DICOM files and create DICOMDIR in place - the original DICOM files will be renamed according to the standard and arranged hierarchically and DICOMDIR file will be created in the root folder.
  - Copy, arrange and rename DICOM files to a new folder - the DICOM files will be copied and arranged hierarchically and DICOMDIR will be created in the folder that you define.
  - Just create DICOMDIR (Not recommended) - this option only create DICOMDIR file in the same folder with DICOM files. If the filenames are not according to the standard, they will not be renamed. This option may not comply with all the standard requirements.
  - Destination Folder - define the destination folder for the option “Copy, arrange and rename DICOMDIR in folder”

Notes:

- In order to include the Viewer of MODALIZER+ to the created DICOMDIR check the option “Include DICOM Viewer to DICOMDIR”.
- In order to anonymize/de-identify DICOM files in the destination folder check the option “Anonymize”. This option is available only if " Copy, arrange and rename DICOM files to a new folder" was selected. Also you can select an additional option to remove all private tags (DICOM attributes that are not defined in standard, but are custom data specific for your organization)

Click “Next”. Select the drive for the media to be burn. Click “Burn to disc” option.

## 6. Reporting

MODALIZER+ features two options for creating reports:

1. DICOM Structured Reporting (SR) - The purpose of the DICOM SR specifications is to improve the documentation of diagnostic images by defining semantic reports that can both readable for software and also can be rendered for display. While this method is recommended by the DICOM standard committees, there’s no option to control how the report will be displayed by the PACS. If preserving the looks of the report (such as font, colors, logo and other graphic features) is important to you, consider using DICOM Encapsulated PDF Report.
2. Formatted Report Templates – Create PDF reports using the standard DICOM Encapsulated PDF class definition. This option enables controlling the graphic design of the report. MODALIZER+ features a unique templates mechanism to automatically fill the case info into existing template documents.



## 6.2. Formatted Report Templates

Formatted Report Templates automates the process of filling the report with case attributes such as patient identification (e.g. Name, ID, Birth Date and Sex), study information and other attributes.

A report template is saved as RTF Document with placeholders for values that are automatically filled while following the new patient wizard. You can create your own templates and select from multiple templates depending on the performed procedure.

The special '\$' surrounded placeholders are automatically replaced by the actual attributes values for every new report. The following attributes can be used:

<b>Patient Name</b>	\$PatientName\$
<b>Patient ID</b>	\$PatientID\$
<b>Patient Sex</b>	\$PatientSex\$
<b>Patient Birth Date</b>	\$PatientBirthdate\$
<b>Accession Number</b>	\$AccessionNumber\$
<b>Study Date</b>	\$StudyDate\$
<b>Study Time</b>	\$StudyTime\$
<b>Modality</b>	\$Modality\$
<b>Requested Procedure Description</b>	\$RequestedProcedureDescription\$
<b>Scheduled Procedure Step Description</b>	\$ScheduledProcedureStepDescription\$
<b>Station Name</b>	\$StationName\$
<b>Referring Physicians Name</b>	\$ReferringPhysiciansName\$

Read more about [how to configure the report templates](#).

## 6.3. DICOM Structured Reports (DICOM SR)

Create a DICOM Structured Report by typing text in the report text panel on "Acquisition" screen and selecting the "DICOM SR" option in the "Create report as" section on "Convert to DICOM" screen. DICOM file containing SR will be added to a destination folder automatically as a separate series. You can load the report to the Viewer where it will be displayed.

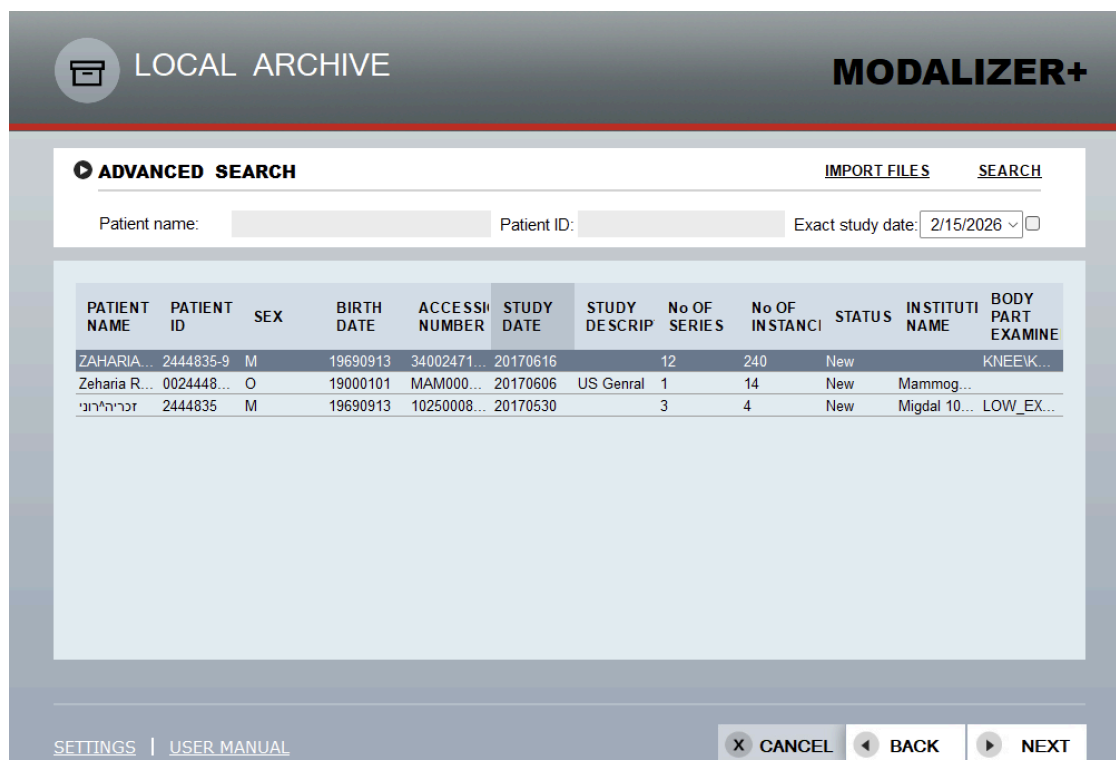


## 7. The Local Archive/Mini PACS (Red)

The Local Archive is a built-in SQLite database and hierarchically structured storage place (Root folder/Study folder/Series folder/DICOM files). All converted/retrieved from PACS DICOM files are stored in this storage place if "Use local archive" option is marked in Settings screen. You are able to search, view, export, delete stored files and add new DICOM files to an existing study using "Local Archive" screen.

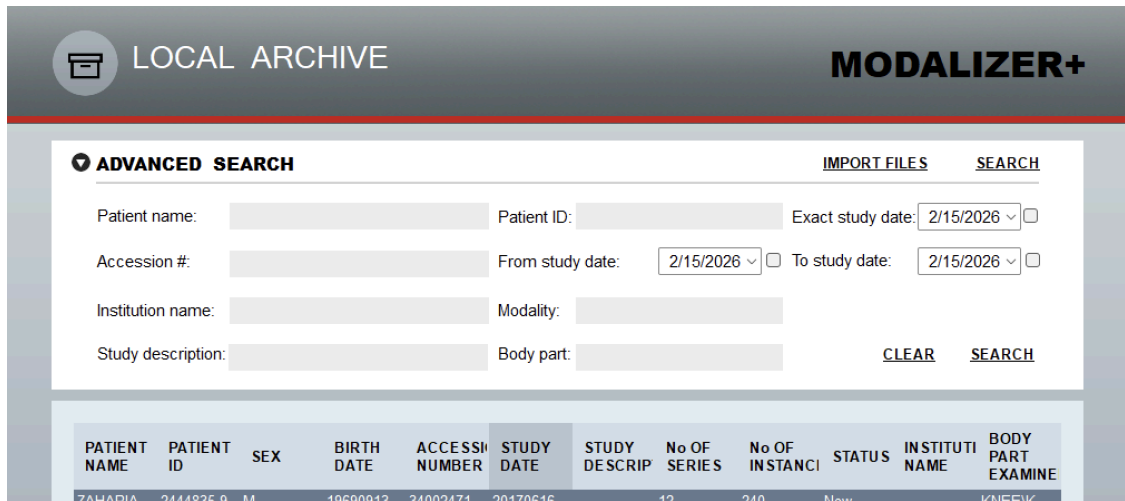
See in "[Settings](#)" how to configure the Local Archive.

Select "Local Archive" from the main screen:



Default sorting of the result grid is by study date descending.

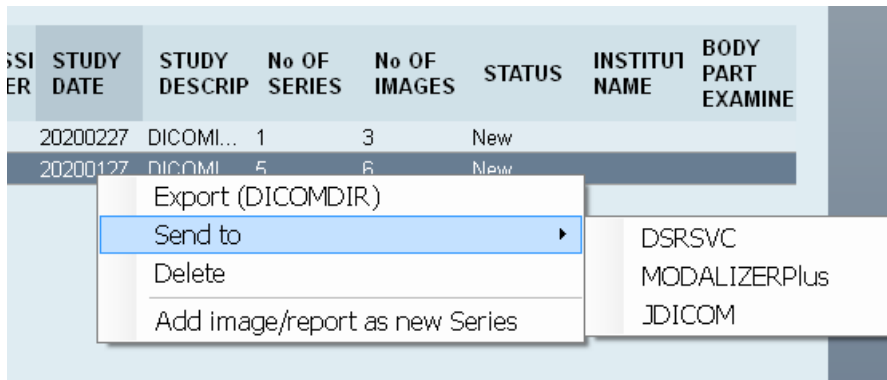
Additional search fields are available when expanding the advanced search option:



Once the search criteria are set click "Search". Double click on the row from the list of results or clicking the "Next" button will lead you to Viewer screen displaying images of the selected study.

You can import DICOM files from the folder by your selection. To do it click "Import files" and select required folder. This folder will be scanned, valid files will be copied to archive folder and found studies will be entered into DB.

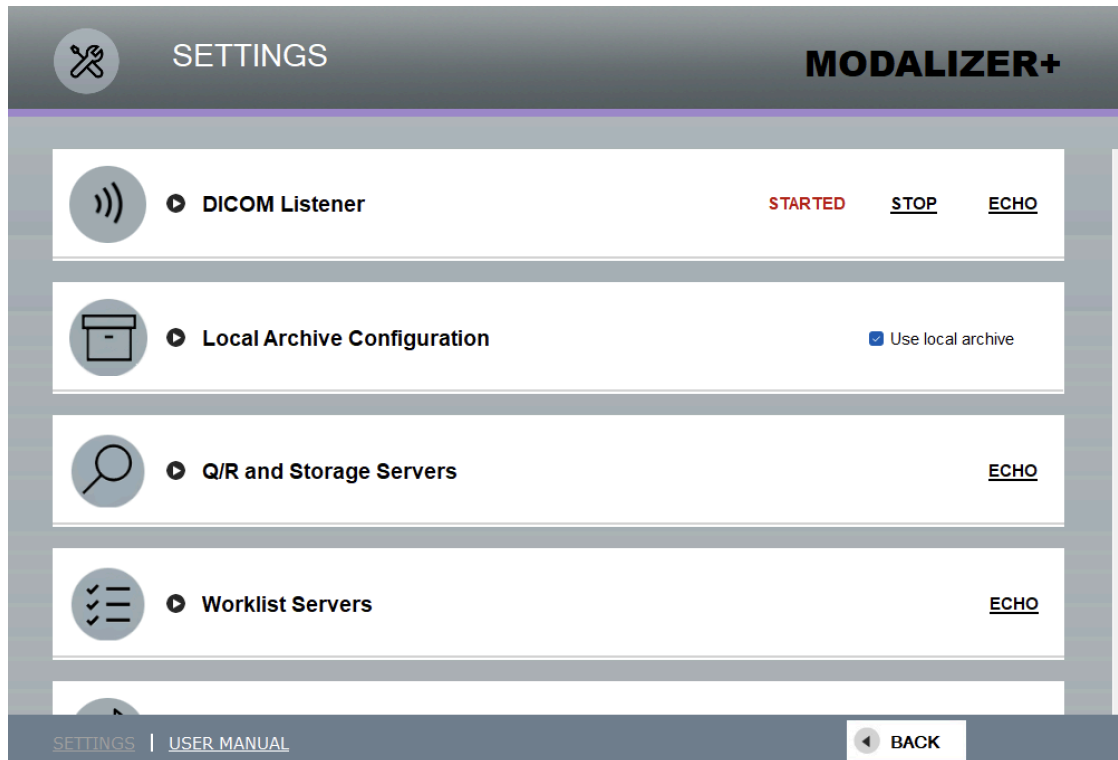
Right click on the row opens menu allowing to export/send to PACS/delete selected study or add a new series to it:



Click on "Export" opens the [export screen](#).

## 8. MODALIZER+ Settings

You can open the "Settings" screen by clicking the "Settings" link in the main menu or by clicking the "Settings" button in the bottom left corner of any screen. Here you can set the Listener, Storage and Worklist servers, configure Local Archive, Formatted report templates and Custom Actions, change the conversion process configuration and define how to display ECG files in the Viewer

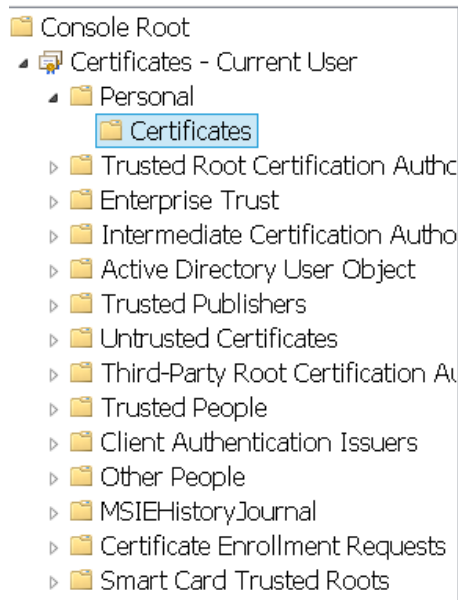


The DICOM nodes (workstations, PACS systems) can communicate if they know each other. That means, each system must know the AE Title, the IP address or hostname and the IP port of the other system. After setting these parameters you will be able to use Storage, Modality Worklist and Query/Retrieve.



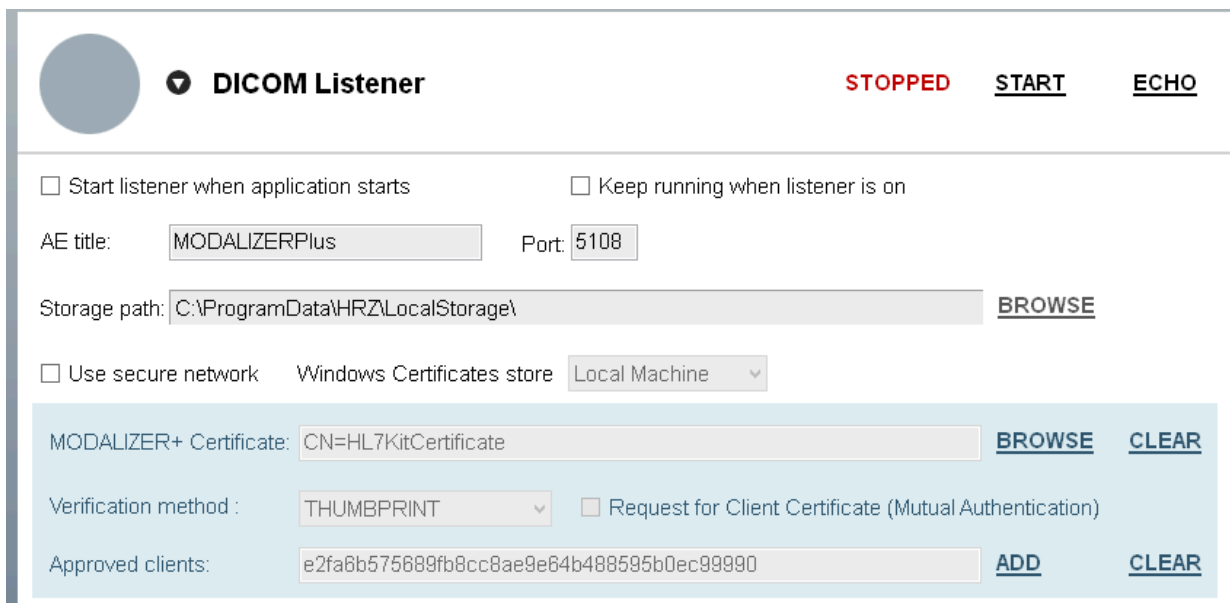
## 8.2. Secure DICOM Networking using TLS (Transport Layer Security)

Certificates from the Windows store can be used to secure the DICOM connections to the PACS. Both the Local Machine and the Current User certificate stores can be used (see Microsoft Management Console).



See more detailed explanations about using certificates in Listener configuration and Remote Servers configuration sections.

## 8.3. DICOM Listener configuration





MODALIZER+ can receive DICOM files sent from other applications if its built-in DICOM Listener is started. Current listener status is displayed in the right upper corner of the Listener tab.

First set your listener AE Title and port. You can always start/stop listener by clicking "Start"/"Stop" button next to status label.

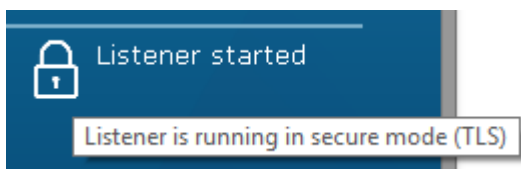
To change folder where listener stores received files - click "Browse" button.

When "Use local archive" on Local Archive configuration tab is selected:

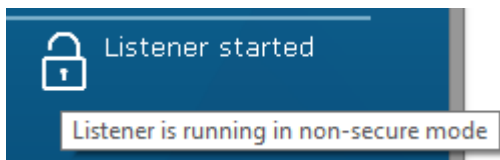
- a. Local Archive folder will be used as listener Storage path and "Browse" button will be disabled.
- b. Info about all DICOM files received by listener will be inserted to DB automatically

You can decide to start listener each time when MODALIZER+ starts by marking "Start listener when application starts" checkbox.

If listener is running there is an indication on the main application screen:



In case "Use secure network" is not selected indication will be like:



If you want to minimize MODALIZER+ to the tray on closing application by "X" (so that the listener keeps running) - mark "Keep running when listener is on" checkbox. To restore MODALIZER+ to view - right click on tray icon and select "Open". To exit MODALIZER+ which is collapsed to tray - right click on tray icon and select "Exit"

NOTE: If one MODALIZER+ instance is already running, all other instances you'll try to start will be opened in "Viewer only" mode. In such case check for another MODALIZER+ instance collapsed to the system tray.

Checkbox "Use secure network" - if selected enable DICOM TLS Network Security Layer








"Windows Certificate store" area - select required store (Local Machine or Current User)

"MODALIZER+ Certificate" area - click "Browse" to select certificate that identifies MODALIZER+ from Windows store:



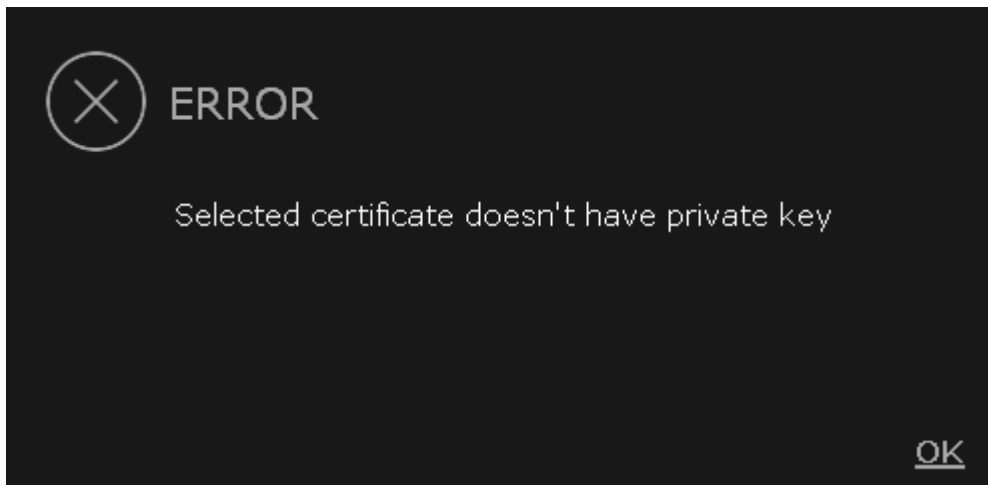
**Select certificate**  
 Please check that certificate has private key

---

	Issuer: Go Daddy Root Certificate Authority - G2 Valid From: 03/05/2011 to 03/05/2031  <a href="#">Click here to view certificate properties</a>
	<b>Go Daddy Root Certificate Authority - G2</b> Issuer: Go Daddy Class 2 Certification Authority Valid From: 01/01/2014 to 30/05/2031
	<b>MySslClientCertificate</b> Issuer: MySslClientCertificate Valid From: 01/01/2015 to 01/01/2025
	<b>HRZ Software Services LTD</b> Issuer: Go Daddy Secure Certificate Authority - G2 Valid From: 23/11/2016 to 21/11/2017
	<b>HL7KitCertificate</b> Issuer: HL7KitCertificate Valid From: 26/07/2018 to 26/07/2019
	<b>NVIDIA GameStream Server</b> Issuer: NVIDIA GameStream Server Valid From: 08/03/2019 to 08/03/2039
	<b>IIS Express Development Certificate</b> Issuer: localhost Valid From: 19/08/2018 to 19/08/2023

OK Cancel

If user selects a certificate that doesn't have a private key, an error message will be shown and certificate will not be selected:



Click "Clear" to remove selected certificate from settings.

Checkbox "Certificate Verification" - if checked listener will ask clients to provide a certificate

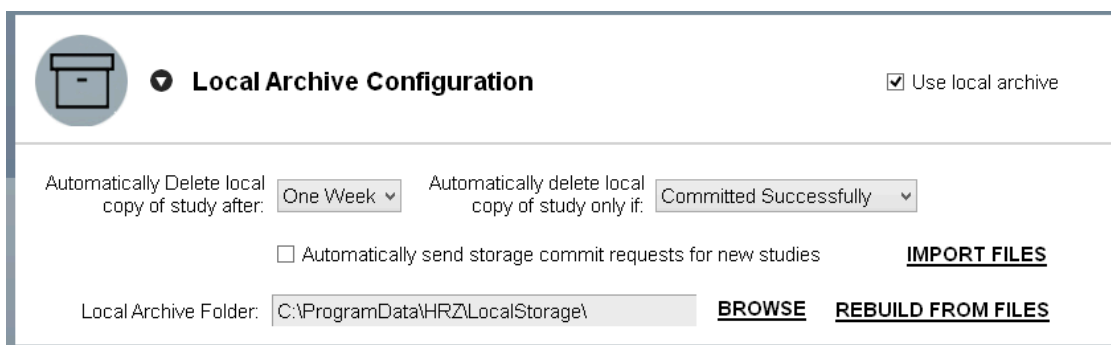
Checkbox "Request for Client Certificate (Mutual Authentication)" - when disabled the clients are not asked to identify ???

"Approved clients" textbox - list of all certificates belonging to the listener clients. User must get clients certificates as files and import them into Windows Store using Microsoft Management Console.

Click "Add" to select certificate from the list, click "Clear" to remove ALL client certificates.

### 8.4. Local Archive configuration

All converted/retrieved DICOM files can be stored in hierarchically structured storage place (Root folder/Study folder/Series folder/DICOM files); info about these files is stored in built-in SQLite data base. To use this option, mark "Use local archive" checkbox on the "Local Archive Configuration" tab.



To change the root folder where archived studies are stored – click the "Browse" button.

Set required clearing mode by selecting options from "Automatically delete local copy of study after" and "Automatically delete local copy of study only if" lists.



You may need to re-fill DB by info about DICOM files stored in root folder, for example if you want to switch to another storage folder. You can do it by selecting required path and clicking "Rebuild from files" button. Current archive folder will be scanned and found studies inserted into DB.

This operation is executed in separate task with displaying its progress while running. You can stop this operation by clicking "Cancel" button.

Log file RebuildFromFiles.log will be created containing follow data:

- The name of every folder that is scanned
- The name of every file that is opened (full path)
- Whenever new study is added with Study Instance UID.

You can also import DICOM files from the folder by your selection. To do it click "Import files" and select required folder. This folder will be scanned, valid files will be copied to archive folder and found studies will be entered into DB.

## 8.5. Storage Servers configuration

The screenshot shows the 'Storage Servers' configuration window. It includes a search icon, a dropdown menu for 'Storage Servers', and an 'ECHO' button. Below this, there is a 'Timeout (sec.):' field with a value of '5' and a checked checkbox for 'Show servers selection'. At the bottom, there is a 'Default remote:' dropdown menu with the value 'DSRSVC [DSRSVC, localhost:104]' and three buttons: 'EDIT', 'ADD NEW', and 'DELETE'.

**Note:** You should configure at least one server.

- First set your Local Application Entity Title:
  - Local AE - The DICOM AE Title of this installation of MODALIZER+. This must match to the MODALIZER+ AE Title configured in the PACS.
  - Local port - define the port number that MODALIZER+ listens on for incoming connections (The default port is 5108)
  - Timeout - the purpose of a server timeout is to prevent from endlessly waiting for a server to respond. The recommendation is to keep the default, if there are known connection problems increase the value.
- The next step is to define a new server. Click "Add new ":



DSRSVC

Remote AE <input style="width: 90%;" type="text" value="DSRSVC"/>	Retrieve method <input style="width: 90%;" type="text" value="C-MOVE"/>						
Remote host <input style="width: 90%;" type="text" value="localhost"/>	Remote port <input style="width: 90%;" type="text" value="104"/>						
Description <input style="width: 95%;" type="text" value="DSRSVC"/>							
Secure network <input type="checkbox"/>	Windows Certificates store <input style="width: 90%;" type="text" value="Local Machine"/>						
<table style="width: 100%; border: none;"> <tr> <td style="width: 80%;">Local AE Certificate Subject Name <input style="width: 95%;" type="text"/></td> <td style="text-align: right;"><a href="#">Browse</a> <a href="#">Clear</a></td> </tr> <tr> <td>Verification method <input style="width: 95%;" type="text" value="NONE"/></td> <td></td> </tr> <tr> <td>Remote AE Certificates <input style="width: 95%;" type="text"/></td> <td style="text-align: right;"><a href="#">Add</a> <a href="#">Clear</a></td> </tr> </table>		Local AE Certificate Subject Name <input style="width: 95%;" type="text"/>	<a href="#">Browse</a> <a href="#">Clear</a>	Verification method <input style="width: 95%;" type="text" value="NONE"/>		Remote AE Certificates <input style="width: 95%;" type="text"/>	<a href="#">Add</a> <a href="#">Clear</a>
Local AE Certificate Subject Name <input style="width: 95%;" type="text"/>	<a href="#">Browse</a> <a href="#">Clear</a>						
Verification method <input style="width: 95%;" type="text" value="NONE"/>							
Remote AE Certificates <input style="width: 95%;" type="text"/>	<a href="#">Add</a> <a href="#">Clear</a>						
<a href="#">Echo</a> <a href="#">Cancel</a> <a href="#">Save</a>							

Set the data for your Storage Server. Click the "Echo" button to verify that the settings are correct. If red X icon is displayed, verify that the settings are correct and the server is running. Click "Save" to apply the settings for a new Storage Server or "Cancel" to exit the settings. Check the log file lastEcho.log in MODALIZER+ installation folder (C:\MODALIZERPLUS).

"Retrieve method" combo box allows selection between using C-MOVE and C-GET. The user can select which of the commands to use for retrieving the instances.

"Windows Certificate store" area - select required store (Local Machine or Current User)

Local AE Certificate (optional - user don't have to select certificate. Not all servers require it) - click "Browse" to select local certificate from Windows store. Click "Clear" to remove selected local certificate.

This certificate verifies MODALIZER+ identity. The remote AE may request for this (mutual authentication)

Remote AE Certificate (optional - user don't have to select certificate. If not defined MODALIZER+ will not verify the server certificate explicitly) - click "Browse" to select remote certificate from Windows store. Click "Clear" to remove selected remote certificate.

Checkbox "Verify Certificate" (enabled only when Remote AE Certificate is blank) . When checked RZDCX will look for the remote certificate in the local user cert store



**Important:** To complete this step you must also configure your Storage Server (PACS) with Your MODALIZER+ AE Title (the value you set for “Local AE”), the hostname (or IP address) of your computer and the IP port (the value you set for “Local port”).

**Note 1:** Ask your System/PACS Administrator for the Storage Server parameters.

**Note 2:** MODALIZER+ is compatible with most DICOM PACS providers. Please advise your PACS software help file about AE configuration of your PACS server or ask your System Administrator.

## 8.6. Worklist Servers configuration

The Worklist Server must be configured in order to use Modality Worklist query.

The screenshot shows the 'Worklist Servers' configuration panel. At the top left is a circular icon with three checkmarks. The title 'Worklist Servers' is centered, and an 'ECHO' button is on the top right. Below the title, there are input fields for 'Local AE' (containing 'ModalitySCU') and 'Timeout (sec.):' (containing '5'). A checkbox 'Show servers selection' is checked. Below this is a dropdown menu for 'Default worklist:' showing 'DSRSVC [DSRSVC, localhost:104]'. To the right of the dropdown are three buttons: 'EDIT', 'ADD NEW', and 'DELETE'. At the bottom, there is a 'Worklist Query Filter' section with three checkboxes: 'For today' (unchecked), 'For this AE' (unchecked), and 'Two step verification' (checked). A 'Modality:' dropdown menu is also present.

Configure the parameters for your Worklist Server. Click the “Echo” button to verify that the settings are correct. If red X icon is presented verify that the settings are correct and the server is running. Click “Save” to apply the settings for a new Storage Server or “Cancel” to exit the settings.

Timeout - The recommendation is to keep the default, if there is known connection problem increase the value.

Two more options in the Worklist Server panel refer to Worklist Query filter. You can define that the search results will present only the studies that scheduled for today and/or for a specific Scheduled AE Title. To do this mark the appropriate check-boxes in the “Worklist Server” panel.

"Two step verification" checkbox: if this option is selected (default is checked) – the user will be asked to review and confirm the data received from the Modality Worklist before starting the procedure.

A screenshot of the 'DSRSVC' configuration dialog box. The dialog has a dark blue header with the title 'DSRSVC'. Below the header, there are several input fields and checkboxes. 'Remote AE' is a text field containing 'DSRSVC'. 'Remote host' is a text field containing 'localhost', and 'Remote port' is a text field containing '104'. 'Description' is a text field containing 'DSRSVC'. There are two checkboxes: 'Automatic MPPS' (unchecked) and 'Secure network' (unchecked). To the right of 'Automatic MPPS' is a 'Storage server' dropdown menu. To the right of 'Secure network' is a 'Windows Certificates store' dropdown menu set to 'Local Machine'. Below these are three sections: 'Local AE Certificate Subject Name' with a text field, 'Browse', and 'Clear' buttons; 'Verification method' with a dropdown menu set to 'NONE'; and 'Remote AE Certificates' with a text field, 'Add', and 'Clear' buttons. At the bottom right, there are 'Echo', 'Cancel', and 'Save' buttons.

See "Storage servers configuration " about Remote server and security settings.

Checkbox "Automatic MPPS" - select if you want MPPS to be sent with the completed study.

Note: Don't check this option if the Worklist Server you work with doesn't support MPPS.

"Storage server" list allows to select one the remote servers defined in MODALIZER+ as default destination to send study created from the Modality Worklist.

Note: Ask your System Administrator for the Worklist Server parameters.



## 8.7. External Acquisition Application configuration

User has an option to use some external application to acquire images for converting to DICOM. For example - some application receiving images from medical device as CT etc. This application must receive as input parameter path to some "exchange data" file containing patient data (name and ID) and save acquired file in the parent folder of this file.

To use this option, the following parameters must be configured in the settings screen:

1. **Path to executable:** full path to EXE file starting external application (by default it is built-in example working exactly as Acquisition screen). To select EXE - click "Browse" button in the same line. To return to built-in example - click "Reset to built-in" button
2. **Shared folder:** full path to a folder in which exchange file (XML, txt, json etc.) will be stored. To select folder - click "Browse" button in the same line.

In order to use EXAP - select "**Use EXAP**"

When "Use EXAP" is selected - external application will be started when user clicks "Next" button on "New patient"/ "Modality Worklist" screen or on adding new series to existing study from "Local Archive"/"Query Retrieve" screen.

MODALIZER+ will fill the exchange file with case attributes such as patient identification (e.g. Name, ID, Birth Date and Sex), study information and other attributes.

Template file (located in MODALIZER+ installation folder and named **PatientDataTemplate.xml**) can be of any text format - XML, txt, json, even RTF. By default it's XML containing ALL available fields:

```
<?xml version="1.0" encoding="utf-8" ?>
<PatientData>
  <PatientName>
    $PatientName$
  </PatientName>
  <PatientId>
```

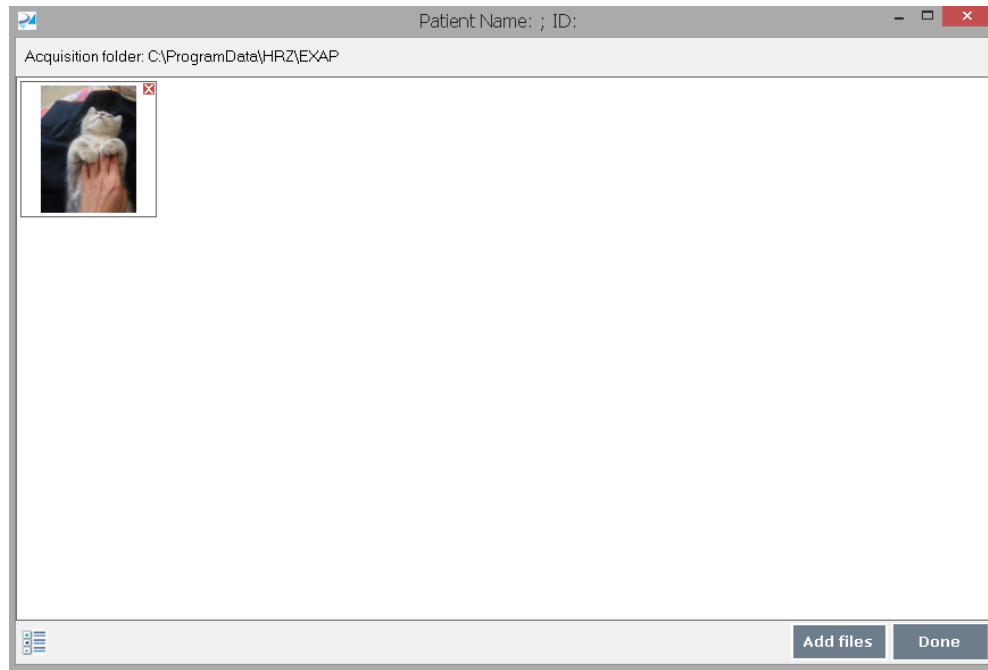


```
    $PatientID$
  </PatientId>
  <PatientSex>
    $PatientSex$
  </PatientSex>
  <PatientBirthdate>
    $PatientBirthdate$
  </PatientBirthdate>
  <AccessionNumber>
    $AccessionNumber$
  </AccessionNumber>
  <StudyInstanceUID>
    $StudyInstanceUID$
  </StudyInstanceUID>
  <StudyId>
    $StudyId$
  </StudyId>
  <StudyDate>
    $StudyDate$
  </StudyDate>
  <StudyTime>
    $StudyTime$
  </StudyTime>
  <Modality>
    $Modality$
  </Modality>
  <RequestedProcedureDescription>
    $RequestedProcedureDescription$
  </RequestedProcedureDescription>
  <ScheduledProcedureStepDescription>
    $ScheduledProcedureStepDescription$
  </ScheduledProcedureStepDescription>
  <StationName>
    $StationName$
  </StationName>
  <ReferringPhysiciansName>
    $ReferringPhysiciansName$
  </ReferringPhysiciansName>
</PatientData>
```

Output file is saved as PatientData.xml in the shared folder so your EXAP application is able to load required data from it.

The special '\$' surrounded placeholders are automatically replaced by the actual attributes values for every new exchange file.

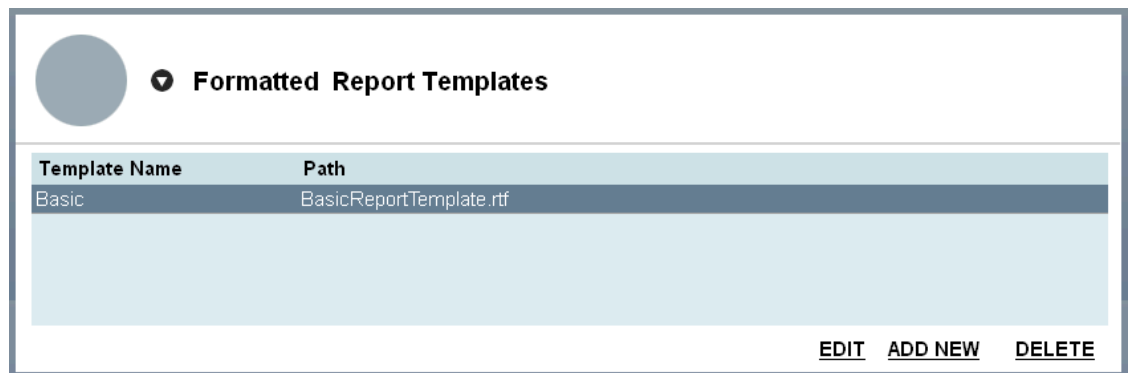
MODALIZER+ is installed with built-in EXAP application as example:



After user added files and clicked "Done" (or executed custom actions in external application and closed it) - "Acquisition" screen will be opened with acquired files added to the list

### 8.8. Formatted Report Template configuration

About formatted reports structure see [Reporting](#) section.



Select required template in the list and click "Edit" to edit the template properties:



Edit formatted report

Template Name  [Edit template](#)

Path  [Browse](#)

[Cancel](#) [Save](#)

You can change templates name which is displayed in the list of templates on "Images" screen, select another RTF file or open RTF file itself to edit its content by clicking "Edit template" button (you can edit the header/footer of the template, edit text and add Logo).

If you want to create a new template - click "Add new" and select path to your custom RTF file.

To delete existing template - select it in the list and click "Delete"

NOTE: At least one template must exist so you cannot delete last one.

### 8.9. Custom Actions configurations

"Custom Action" is a some operation you can execute using data from one MWL entry (see [Modality Worklist Query](#)) or Query entry (see [Query/Retrieve - Searching the PACS](#))

Custom Actions

Start from	Title	Command	Replace Params
Modality Worklist	test	C:\Temp\test.rtf	<input checked="" type="checkbox"/>
Query Retrieve	Query action	Some.exe	<input type="checkbox"/>

[EDIT](#)  
 [ADD NEW](#)  
 [DELETE](#)

To create new custom action click "Add new" button:



New custom action

Start from Modality Worklist ▼

Title

Command  [Browse](#)

Replace parameters

[Test](#)  
 [Cancel](#)  
 [Save](#)

Select a screen where you want to see new action (Modality Worklist or Query Retrieve), give action a title which will appear in the list and define some command you want to execute - path to some file (as .TXT, .RTF, .EXE or .BAT) .

Mark "Replace parameters" checkbox to make application replace pre-defined parameters inside command file by data from MWL/Query (as in [formatted report](#))

When you select custom action from the row on MWL/QUERY screen - defined file will be opened (with replaced parameters if needed) as separate system process.

To edit existing custom action - select it in the list and click "Edit" button.

To delete existing custom action - select it in the list and click "Delete" button.

You can test your action by clicking "Test" button (parameters will be replaced by some random data).

Types of the custom action:

1. Start EXE without parameters.
2. Open document template, TXT or RTF for example, containing placeholders ( \$PatientID\$ etc.) to replace (like formatted reports). Place holders will be replaced, files stored in [MyDocuments]\MODALIZERPLUS\ACTIONS folder and opened as separate process (Notepad, Word etc.)
3. Start EXE with parameters. To pass parameters to EXE you need to do follow:
  - a. Create batch file containing path to your EXE and parameters, for example MyCustomAction.bat file which content is  
"C:\MyFolder\EXE.exe \$PatientID\$ \$PatientName\$ "
  - b. Select MyCustomAction.bat as you custom action.
  - c. Select "Replace parameters" check box.



**Available parameters are:**

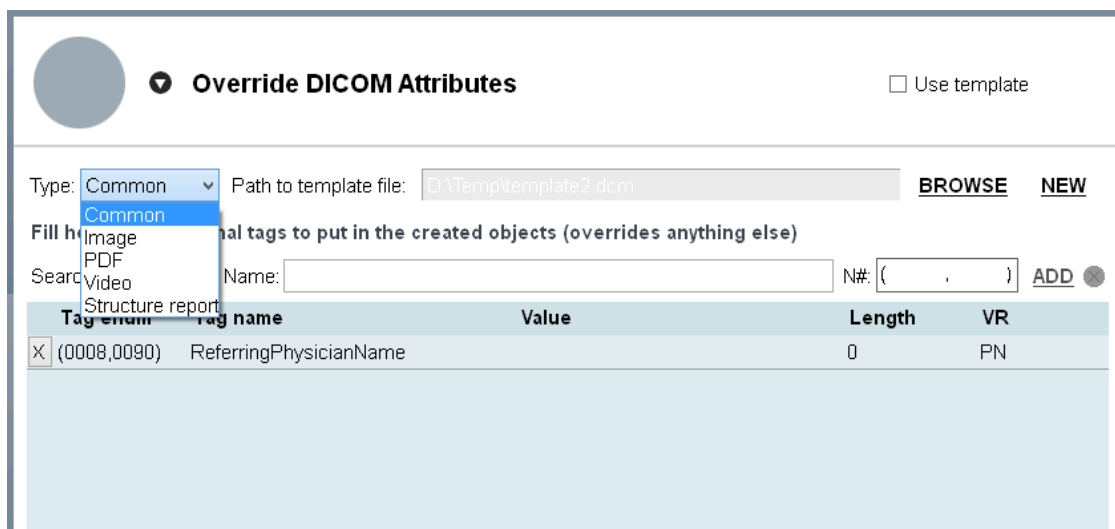
- \$PatientName\$
- \$PatientID\$
- \$PatientSex\$
- \$PatientBirthdate\$
- \$StudyDate\$
- \$AccessionNumber\$
- \$StudyTime\$
- \$Modality\$
- \$RequestedProcedureDescription\$
- \$ScheduledProcedureStepDescription\$
- \$StationName\$
- \$ReferringPhysiciansName\$

### 8.10. DICOM templates - Override DICOM Attributes

DICOM attributes are stored in the files that you can edit or replace. In order to use the attributes as they're defined in the template mark "V" in the check-box "Use Template".

Application allows to define not only one template common to all converted DICOM files, but also specific templates for each type of such files.

There is combo box "Type" in "Override" section:



"Common" template (if defined) will be inserted into each converted DICOM file.

There are also four other types: Image, PDF, Video and Structure Report templates which will be inserted only to relevant files.

Any of the files can be created/selected separately.

**Important!** The override attributes are applied after all other conversion steps were made. Make sure not to override any image attributes (group 0028).



To create your own DICOM attributes template click “New”, in the opened window select the file location and give it a name. Click “Save”. The created file will be automatically loaded in MODALIZER+ and you can edit the attributes. You can find the attribute by its name - start typing to get a drop-list of the appropriate attributes or search by the attribute’s tag enumeration. Click “Add” to present the value in the table. Enter the new value in the attribute’s row in the “Value” column. Clicking “X” in the left column will remove the attribute from the template.

If you want to use another DICOM attributes template click “Browse” and select.

### 8.11. ECG Display Settings

See [Displaying ECG in Viewer](#).

### 8.12. Misc configuration

At the bottom of the configuration screen there are few additional options:

The screenshot shows a configuration panel with the following options:

- Create new folder for every run
- Use unicode character set
- Capture Key:  ?
- Define configuration per user
- Log level:

#### 8.12.1. File System Directory Organizations

Create new folder for every run - in this way each study will be stored in separated folder (Recommended).

When Local Archive is disabled the converted images destination folder can be manually set (see [New Patient](#)).

When "Create new folder" is enabled, every study is stored in a newly created directory.

#### 8.12.2. Support of the Unicode character set

When "Use unicode caharcter set" is checked, values of "String" tags (Value Representation SH, LO, ST, LT, UT, PN) will be inserted encoded as Unicode.

#### 8.12.3. Per-User Configuration

When per-user configuration is checked, every user (from the windows operating system) has its own configuration file.

#### 8.12.4. Capture Key

Define key combination to capture image from the currently selected TWAIN/WIA device when in the capture screen

1. click inside the “capture key” text box
2. Hold the keys combination to use for image capture.



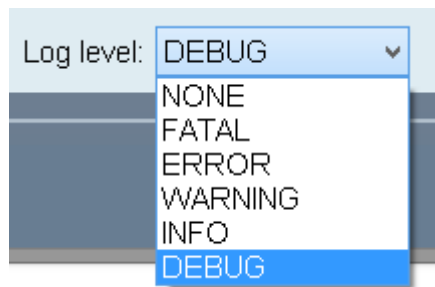
Valid keys:

- Combinations of control/alt/shift keys and characters (Ctrl-A, Alt-Z, Ctrl-Shift-F etc.)
- The function keys (F1, F2, ...)

Enter/Return and Space keys are not recommended as they may interfere with standard UI functionality.

To disable the capture key, click in the text box and then press the delete key.

### 8.12.5. DICOM Log level for operations as "Send ECHO", "Get Query" etc.



Default value is "INFO"



## 9. Completing tasks with MODALIZER+

### 9.2. Viewing DICOM Images

MODALIZER+ is a powerful DICOM Workstation that lets you display DICOM Files from your local computer, from CD/DVD/USB and from any PACS.

There are a few ways to present the files - you can Drag-and-drop the items or to click "Open Files" to browse for a folder and select the files to view. In order to present all folder's content use "Open Folder" button.

### 9.3. Using CD/DVD DICOM Viewer

DICOMZIER automatically adds a DICOM CD Viewer to every burned CD/DVD so patients and physicians can view their studies and reports anywhere. Double click the DICOM Viewer application in the CD/DVD root folder to view the CD/DVD content.

### 9.4. Viewing PDF file in DICOM format

To extract a PDF from a DICOM Encapsulated PDF file, click PDF icon in the Viewer – the file will be converted to PDF and displayed using your system default PDF viewer.

### 9.5. Attaching scanned documents to the patient folder

MODALIZER+ will automatically identify compatible camera or other imaging device connected to your computer. If there are more than one device connected choose the one you'd like to use through the drop-list in the upper left corner of the Image/Report panel.

Capture an image by clicking on the red button. The icon of the captured image will be presented in the panel below the Image/Report panel.

### 9.6. Sending the same study to multiple destinations

Once an operation is completed you can send a copy of your study to others DICOM applications by using the "Send to" option in the operation completed screen. Select the destination from the drop-list next to the "Send to" button. If the destination DICOM application is not in the list, enter settings and add new [Storage Server](#).

### 9.7. MPPS (Modality Performed Procedure Step)

Modality Performed Procedure Step is a complementary service to Modality Worklist.

Once the procedure was started via Modality Worklist Query the modality creates a new MPPS that references the Study.

MPPS has 3 statuses:



- IN PROGRESS – this means that the procedure has been started
- COMPLETED – this means that the procedure is finished.
- DISCONTINUED – if the procedure was stopped in the middle

## 10. Troubleshooting

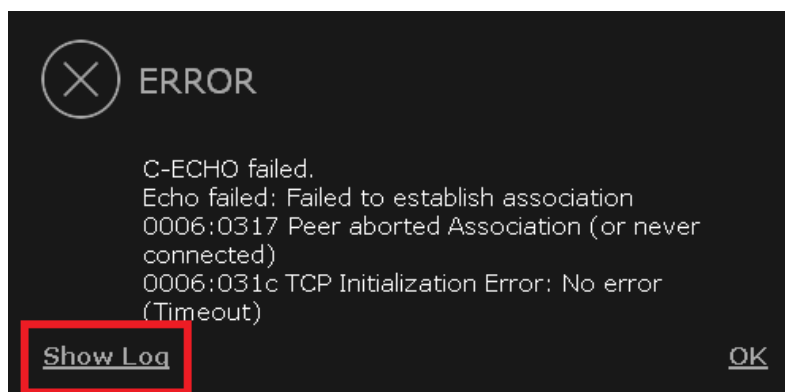
### 10.2. Log Files

MODALIZER+ Log files are stored in the directory: C:\Users\\Documents\MODALIZERPLUS\LOGS.

MODALIZER+ keeps the last log for every DICOM operation:

- LastEchoToStorageServer - the log on Echo to PACS action
- LastEchoToWorklistServer - the log on Echo to Worklist Server action
- LastMove - the log on copying a study to PACS
- LastMPPSCreate - the log on MPPS creation
- LastMPPSSet - the log on setting MMPS
- LastQuery - the log on Query Retrieve operation
- LastSend - the log on the send to PAXS operation
- LastWorklistQuery1 - the log on Worklist Server search operation

When operation fails, message will be displayed with an option to open correspondent Log file:



## 11. Command line parameters

When launched with specified command line parameters MODALIZER+ will start directly in the Q/R screen and send a query according to the parameters. Query parameters appear in the query screen when results are retrieved from PACS and could be editable for additional query.

Also there is command line parameter allowing to get "snapshot" of the current image from the MODALIZER+ viewer.



## Command Line options

-q or -Q	Start MODALIZER+ in the query screen and send a Query.
-o or -O	Set the output path for Send as references. This option overrides the EXAP shared folder name.

## Query parameters

0 or more query parameters can follow the -Q option. Every parameter should be of the form:

tagName="value"

Double quotes are optional for cases where the value contains whitespace characters (space).

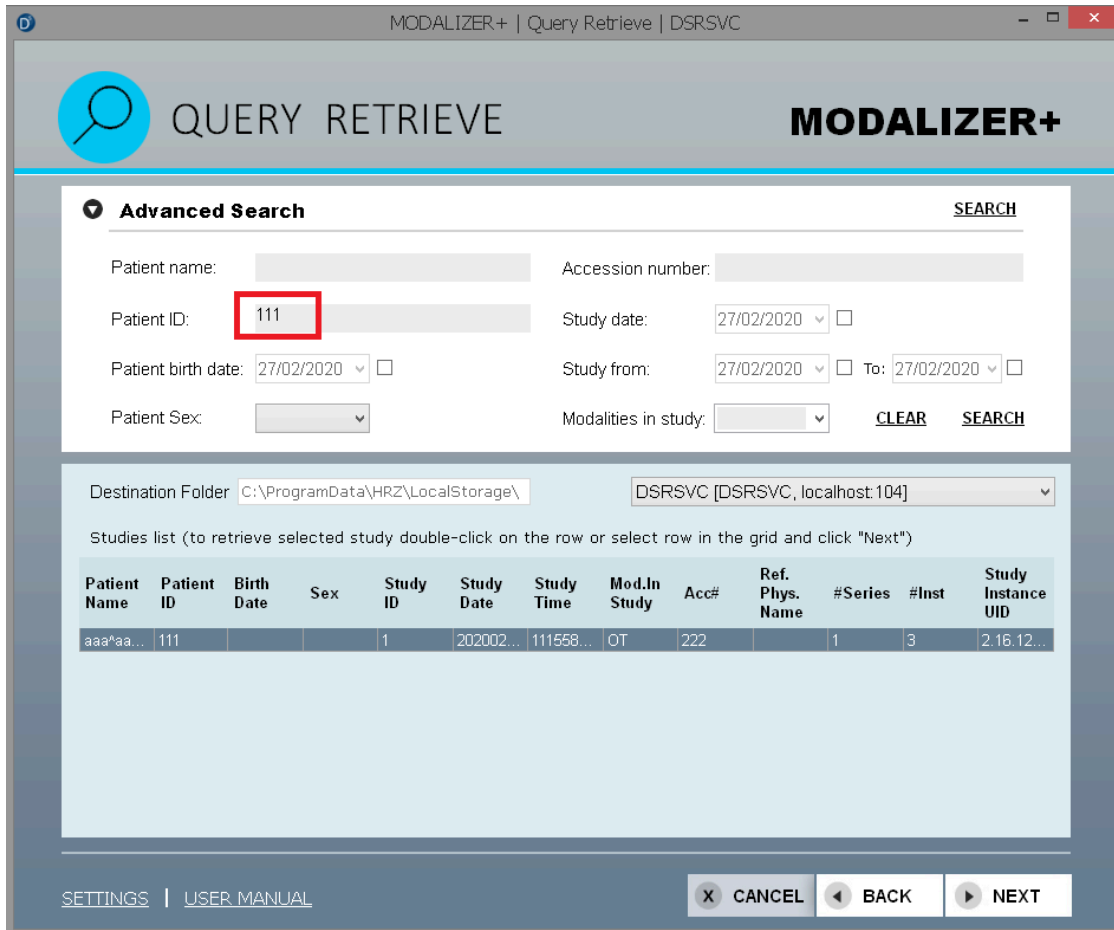
The allowed tags are all the ones that are displayed in the Q/R screen including the advanced search. The tag names should be according to RZDCX's DICOM\_TAG\_ENUM.

Option	Tag Name	Tag	Comments and examples
patientName	Patient Name	(0010,0010)	
patientId	Patient ID	(0010,0020)	
PatientBirthDate	Patient Birth Date	(0010,0030)	Exact date in DICOM format (YYYYMMDD) Example: "20170821"
PatientSex	Patient Sex	(0010,0040)	Valid Values: M/F/O or Male/Female/Other (both accepted).
AccessionNumber	Accession Number	(0008,0050)	
StudyDate	Study Date	(0008,0020)	Exact date in DICOM format (YYYYMMDD) including ranges. When value is a date range double quotes must be used to prevent parsing it as command line option. Examples: "20170821" (exact date) "-20170821" (to date). "20170812" (from date). "20170812-20170911" (date range)



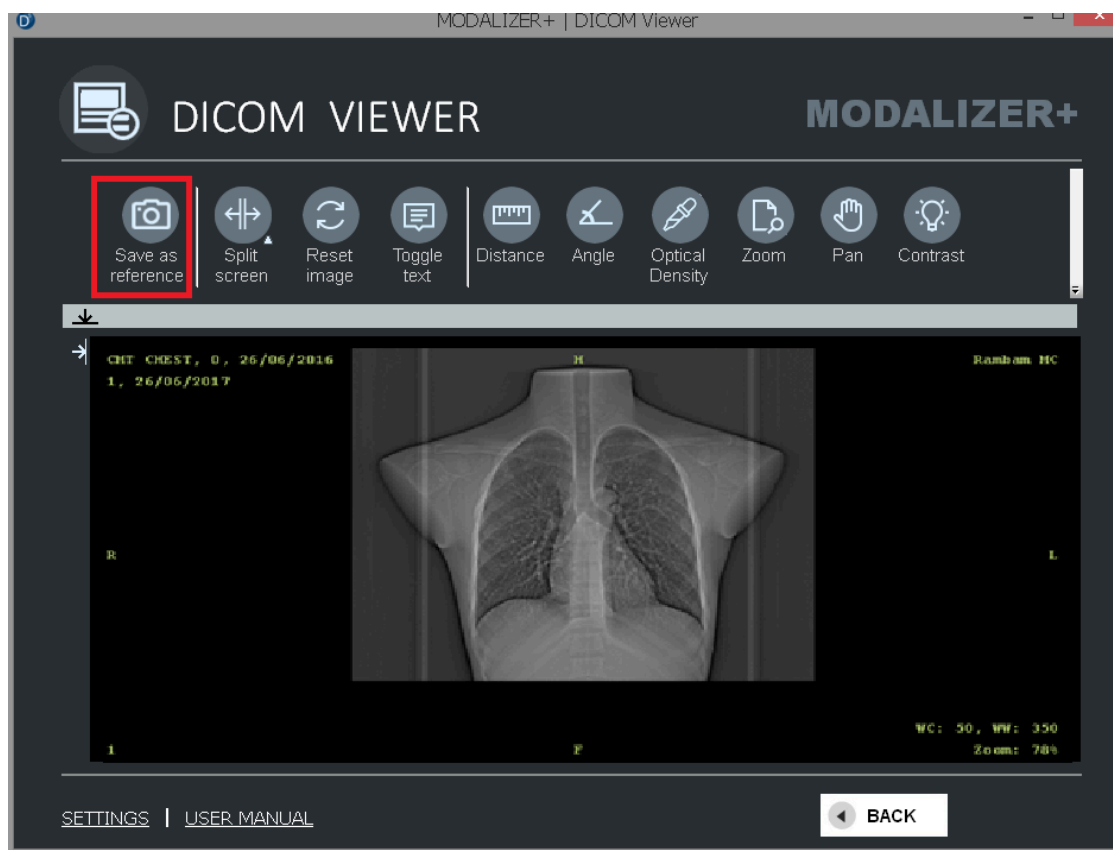
ModalitiesInStudy	Modalities in Study	(0008,0061)	
-------------------	---------------------	-------------	--

Example: MODALIZERPlus.EXE -q patientId="111" will start the directly to the Q/R string and start a query:



**Save as reference button**

When the -O command line parameter is used, the Save as reference button will be displayed instead of the three buttons on the left (open file, open folder and history) :



Clicking the "Save as reference" button will save the currently displayed and selected image using the current VOI LUT to the path provided as the value of the option. For example if the MODALIZER+ started with the command: *MODALIZERPlus.EXE -O "c:\taken Send as references"* then the files will be saved in "c:\taken Send as references".

The Save as references will be saved in PNG format in the full resolution of the DICOM image (i.e. according to the Rows and Columns tags (0028,0100) and (0028,0101)).

Next to the PNG file, the original DICOM file will be saved:

The Send as reference save files will have the following filename pattern:

<destination-folder>\SOP Instance UID.png  
 <destination-folder>\SOP Instance UID.dcm

<destination-folder> is the value from the -O command line parameter. If -O is not set, application uses the EXAP shared folder from configuration.

If the provided path is not empty, and there is already a file with that name, the file shall be replaced without asking the user.

Start MODALIZER+ with "-help" or "-h" parameter to open popup windows with the description of command line parameters.



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